ADF LAND DOMAIN PUBLICATION

LN 7.2.11 OLVANAN FIRES AND TARGETING FROM GROUP ARMY TO COMBINED ARMS BRIGADE

Issued by authority of the Chief of Army.

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[3] https://www.legislation.gov.au/Series/C2004A03712
[4] http://drnet/AssociateSecretary/security/policy/Pages/dspf.aspx

Preface

1. ADF Land Domain Publications (LPubs) describe the fundamental principles that guide land forces' actions, and provide the common frame of reference on how the Army achieves its mission. LPubs are the basis of the Army's training system based on time-tested, proven principles of war, combined with the critical analysis of contemporary lessons. LPubs have been shaped since 1901 by Army's proud history and culture, while being constantly adapted as required, thereby representing the sum of the Army's collective historical knowledge, presented into objective guides for action. In essence LPubs explain and guide 'who we are', 'what we do' and 'how we do it'.

2. ADF doctrine provides the framework that guides thinking but does not dictate what to do. While doctrine publications are written in a non-prescriptive style that allows latitude in interpretation and flexibility in application, they are specific enough to provide informed guidance. Doctrine is about fighting power and the integration of its three components: intellectual, moral and physical, applied through mission command and our manoeuvrist approach to warfighting.

3. Land procedural publications provide the authorised procedural and technical knowledge required for land forces to achieve their mission. Unlike doctrine, procedural publications convey information covering a range of activities based on best possible practice, in clear detailed steps that, depending on the publication, describe and/or prescribe how to perform specific tasks and drills. Whilst the majority of procedural publications are descriptive in nature, the decision not to follow the guidance contained in the publications should be justifiable. Land procedural publications are aligned and subordinate to ADF doctrine.

4. Land procedural publications include a number of publications that prescribe the procedures for the safe conduct of a range of tasks and activities required for delivering a range of lethal warfighting capabilities. Procedural publications which are safety in nature are written with an expectation of compliance, and therefore do not attempt to prescribe every 'do' and 'don't'. A number of land procedural publications are classified as Landworthiness Regulations in accordance with *Defence Landworthiness Management System Manual*. **LPubs constitute a lawful general order when written in mandatory terms and apply to all personnel**.

5. **Land Domain Publication - Note (LNote)** is a provisional publication valid for no more than 24 months from its release until it is cancelled, released as an enduring LPub or absorbed into an existing LPub. LNote can be released:

a. as an addendum to an existing land publication

b. to provide additional information of significance in a timely manner to address an emerging issue, an identified lesson, or to satisfy a major/critical knowledge gap

c. as an unscheduled/short notice new publication, published in response to changing strategic guidance, introduction of new capabilities, emerging threats or opportunities.

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7. **Land Training Information Bulletin (LTIB)** is developed by a Training Authority, Training Centre or LDP, as a means to provide specific direction and training guidance related to a specific land capability.

8. **Land Aides-Memoire (LAM)** are a practical guide that succinctly contain information on a particular theme, task, position or employment category. They are drawn from wider authorised LPubs, or other Defence authorised documents.

Aim

9. The aim of this publication is to provide an in depth understanding on how the Olvanan Peoples' Army, established under the Decisive Action Training Environment (DATE), construct will support operations with fires.

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Associated publications

10. This publication should be read in conjunction with other publications and documents, in particular:

a. Olvana – Operational Environment - https://odin.tradoc.army.mil/DATE/a7f54b856bdda3a8a4666108b3f05c6e

b. Olvana –Structures - https:// https://odin.tradoc.army.mil/FS/INDO-PACIFIC/OLVANA/17_ARMYLand publication L-Library

11. The ADF Land Power Library (L-Library) is the single access point, and digital catalogue for Army's authorised land power artefacts, supporting resources, including other related publications. In addition to accessing all current and historical publications, the L-Library contains links to ADF doctrine, and other ADF domain publications, as well as approved international partner publications. The L-Library is accessible via ADF Land Power Library and Army Knowledge Online.

12. Additional printed copies of Land Publications may be ordered using the Defence Print Ordering Portal which can be accessed via this link: https://printportal/overview.web.

Security

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Amendment record

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2. All superseded amendment record pages should be retained at the rear of the publication for audit purposes.

3. Proposals to amend this publication may be emailed to: armybattlelab.landdomainpublications@defence.gov.au.

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Chapter 1
Introduction to Olvanan Fires

Political power grows out of the barrel of a gun.

Mao Zedong

Speech, Problems of War and Strategy 1938

Section 1-1. Introduction

1.1 The purpose of P 7.2.11 - Olvanan Fires and Targeting from Group Army to Combined Arms Brigade is to provide an in depth understanding of how the Olvanan Peoples' Army (OPA) will support operations with fires and in particular artillery.

Definition of Fires

1.2 Olvanan doctrine define 'fires' as a critical integrated warfighting function used to destroy or neutralise enemy systems across all domains. The OPA relies heavily on fires to offset potential weaknesses in manoeuvre using a 'systems-of-systems' approach to target the enemy's vulnerabilities in command and control, ISR and logistics networks. This definition applies to both direct and indirect means.

1.3 Direct means are considered to be 'fires' when planned or tasked for effect, not merely used in immediate self-defence. The Olvanan definition also covers no-kinetic means. The Olvanans consider them to be firepower methods, not just enablers. Space and counter-space capabilities may also be considered to be fires when they are used to deny the enemy the use of its sensing capabilities, break enemy kill chains and shape the operational environment.

1.4 The table on the next page identifies those capabilities that are considered to be 'fires' by the OPA.

Figure 1.1 – Mechanised FA Battalion

Table 1.1 - Olvanan Fires

Kinetic Fires (traditional and expanded)	Tube artillery Rocket artillery (MRLS) Naval gunfire Air-delivered munitions (bombs, rockets) Tank main guns IFV cannons ATGM Naval guns engaging surface, shore, or aerial targets
Precision and stand-off fires	Land-attack cruise missiles Anti-ship missiles Ballistic missiles Loitering munitions (when centrally tasked)
Non-kinetic Fires	Electronic fires Electronic attack (jamming, deception) Radar suppression Communications disruption Cyber fires Network denial Data corruption System spoofing or degradation Information/cognitive fires Psychological operations Military deception Information operations designed to shape decision-making
Space and Counter-Space Fires	GPS degradation ISR denial Satellite interference (reversible or irreversible)

1.5 The following table identifies the guiding principles used by the Olvanans for the employment of fires.

Table 1.2 - Guiding Principles

Principle	**Explanation**
Effects before execution	Desired effects drive fires planning
System focus	Fires target enemy systems, not individual platforms
Temporal control	Effects are sequenced and sustained over time
Integration	Fires are synchronised with manoeuvre, information and protection
Adaptation	Fires are dynamically re-tasked based on assessment and feedback

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Loitering Munitions (LM) and First Person View (FPV) Munitions

1.6 The ongoing war in the west has highlighted the use of LM and FPV drones on the battlefield. LM have been used for surgical strikes on high-value targets (for example, artillery, air defence and vehicles) forcing units to disperse and employ cage armour on vehicles. Commercial off-the-shelf FPV drones are used widely for widespread low-cost attacks. One of the protagonists' artillery has used FPV drones specifically for counter-battery fire in conjunction with Lancet reconnaissance drones. Based on these observations some commentators classify LM and FPV drones as artillery and therefore from a western perspective may be classified as 'fires.'

1.7 The Olvanans consider LM and FPV drones to be 'fires' only when they satisfy all three of the following requirements:

a. They are tasked to produce a defined fire effect such as destruction, neutralisation, suppression, disruption, delay or psychological shock

b. They are integrated into fires and targeting when they are tasked, authorised, prioritised or sequenced through a fires or strike process

c. They are employed to service the commander's fire plan rather than individual initiative or local self-defence.

1.8 Of greater concern to the Olvanans would be the threat posed by LM and FPV drones to their own artillery units. FPV drones and LM have transformed counter-fire tactics by compressing detection-to-strike timelines and making the broader fires system more vulnerable. Survivability of artillery units can no longer rely primarily on dispersion, camouflage or rapid displacement. Effective counter-UAS techniques will need to be developed. These techniques will be covered in a later chapter of this document.

Section 1-2. The Evolution of Olvanan Fire Support

1.9 In over a little more than two decades, OPA fire support has undergone significant development. What began as a legacy inventory of ageing, Donovian-derived systems Olvanan fires support has transformed into a large, diverse, sophisticated family of predominantly indigenous gun and rocket capabilities. Modern rocket systems, many capable of delivering precision or near-precision guided effects, now exist in notably great numbers across OPA formations. Mortars, howitzers, and multiple rocket launchers form the backbone of ground indirect fire support.

1.10 A decision was taken in the late 20th Century to prioritise enhanced ground indirect firepower, driving through sustained investment of fire support modernisation. Close air support exists only in limited or emergent form, and attack helicopter density across the OPA has historically been low, though this capability is growing. Naval fire support is similarly sparse within the broader OPA portfolio, although amphibious forces mitigate this shortfall by carrying a substantial proportion of their own direct-fire and indirect-fire systems, including amphibious tanks, assault guns, and mortars.

1.11 This has resulted in the OPA establishing fire support at very high densities. As well as employing heavy mortars combined arms brigades are supported by howitzers, and multiple rocket launchers within their organic fire support battalions. At the group-army echelon, artillery brigades incorporate mixed gun and rocket battalions including a heavy rocket battalion. The combined arms brigade's artillery battalion fields 18 122-mm guns and a light rocket battery with six launchers. When reinforcing fires are considered, both mass and destructive potential the OPA has a distinct advantage. Group-army artillery brigades field 36 guns and 39 rocket launchers of mixed calibres, creating a significant range and firepower advantage over approximate Western equivalents.

1.12 The table on the following page details artillery assets and mortars held within the 17th Group Army. All of these equipments are self-propelled enabling them to keep up with supported manoeuvre units.

Table 1.3 - 17th Group Army Artillery Rockets and Tube Arillery

Unit/ formation	PHL-03 300mm MRL	PHL-09 122mm MRL	PZH-11 122mm MRL	PLZ-05 155mm HOW	PCL-09 122mm HOW	PLZ-07 122mm HOW
514 FA BDE	12	27		36		
502 FA BN		6			18	
503 FA BN		6			18	
504 FA BN		6			18	
505 FA BN		6			18	
506 FA BN			9			18
843 FA BN		6			18	
Totals	12	57	9	36	90	18

1.13 The following table lists mortar assets held within combine arms brigades. All of these mortars are self-propelled.

Table 1.4 – 17th Group Army Mortars

Formation	PLL-05 120mm MOR	PCP00182mm MOR	TYPE 09 120mm MOR
502 MECH BDE	24		
503 MECH BDE	24		
504 MTZD BDE		18	
505 MTZD BDE		18	
506 ARMD BDE			24
843 AMPHIB BDE	24		
Totals	72	36	24

1.14 Modernisation has not only included rocket launchers and tubes but also fire direction, target acquisition and forward observation capabilities. As the world's leading producer and developer of unmanned aircraft systems, Olvana has enabled the OPA to adopt UAVs early as ISR platforms for artillery targeting, particularly in support of long-range rocket fires. The inclusion of UAVs with an FPV capability has enabled the OPA to cover gaps in the battlefield that were previously unavailable to fires.

1.15 Modern OPA combined arms brigades are also well-equipped with counter battery radars, battlefield surveillance radars, sound-ranging systems, and long-range EO/IR sensors, supported by well-equipped mounted and dismounted forward observers. Substantial training resources are allocated to surveillance and targeting to produce observers who are highly proficient in the use of sensor-to-shooter integration.

Section 1-3. The Role of Olvanan Fire Support

1.16 Olvanan fire support, and in particular artillery, is the primary executor of land-domain firepower enabling commanders to shape, disrupt and paralyse enemy combat systems. Its role is to deliver integrated effects-focused fires to destroy enemy systems, dominate the counter battery fight, support manoeuvre elements and contribute to operations through precision, scale and centralised control.

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1.17 This is achieved through:

a. Delivering fires with sufficient accuracy and timeliness to achieve the desired effect on a specific target while minimising unintended effects

b. Applying fires in sufficient volume, duration and distribution to achieve and sustain decisive effects across the area of operations

c. Coordinating the employment of fires with other capabilities and warfighting functions in support of the commander's intent.

Section 1-4. Fires within the Contemporary Operational Environment (COE)

1.18 The Olvanan COE is complex, dynamic and continually shaped by competition across multiple domains over extended timeframes. Military and non-military tools are coordinated centrally and used together in order to shape the COE's conditions to achieve national objectives. The distinction between peace and armed conflict is increasingly becoming unclear. Actions once associated with war are now routinely produced without a declaration of war. The Olvanans are also not afraid to use grey zone operations if it will provide them with an advantage over their enemies in the COE.

1.19 Contestation occurs continuously across all domains including economic, legal and technological domains. Olvanan actions are designed to influence their enemies' decision-making while protecting their national freedom of action. Operations will begin early to shape the OE to their advantage so that they can escalate actions according to their timelines. They will use military force as part of a broader system to deter intervention by enemies whilst at the same time create advantage at decisive times and locations of their choosing.

1.20 Fires focus on the generation of effects rather destruction. They are used to shape the environment over time focusing on disrupting the enemy's C2, sensing and sustainment systems whilst at the same time protecting their own freedom of action whilst supporting manoeuvre. To employ fires effectively the Olvanans will plan centrally but decentralise execution. They also will strive to achieve rapid sensor-to-shooter integration. Fires are not employed on their own but are coordinated with electromagnetic, cyber, information and space activities. Through this integration fires can be used to influence operational tempo and constrain the enemy's decision-making processes to achieve operational advantage across the battlespace.

Strategic and Operational Fires

1.21 Strategic and operational fires shape the battlespace well before tactical forces are committed. At the strategic level, the OPA employs joint fires to achieve national and theatre objectives by disrupting or destroying the adversary's ability to generate, command and sustain combat power. These fires are synchronised across the land, maritime, air, cyber, space and electromagnetic domains. They are directed against strategic centres of gravity, including national command authorities, integrated air and missile defence systems, long-range strike capabilities, logistics infrastructure, communications networks and other critical military and civil systems.

1.22 Rather than seeking the destruction of individual formations, strategic fires aim to paralyse the adversary's operational system, creating favourable conditions for subsequent joint operations.

1.23 At the operational level, fires support campaign objectives by isolating the battlespace, degrading operational reserves, suppressing enemy long-range fires and air defence, disrupting command and control, and preventing the movement and sustainment of enemy forces. Operational fires integrate the effects of theatre missile forces, air power, naval strike systems, long-range artillery, electronic warfare, cyber operations and reconnaissance-strike capabilities into a single, coordinated firepower effort.

1.24 Tactical fires conducted by Combined Arms Brigades and Field Artillery formations are nested within this broader campaign design, delivering responsive and sustained fire support while contributing to the commander's operational objectives. The cumulative effect is to create windows of opportunity that enable manoeuvre forces to seize and retain the initiative.

Tactical Fires

1.25 Tactical fires at the FA brigade and CA-Bde level are used to achieve decisive effects rapidly before the enemy can respond. Fires are executed within strict control measures which are tied to higher intent. They are also conducted to disrupt enemy systems and decision-making processes rather than simply destroy targets.

Section 1-5. Systems-Based Warfare (SoS) and the Conduct of Joint Operations

1.26 The OPA approach to modern warfare uses an integration of systems-of-systems (SoS) operations, joint operations, and informationised and intelligentised warfare to achieve decisive effects against an enemy's operational system which are applied as follows:

a. SoS warfare provides the conceptual framework for identifying and attacking critical nodes

b. Joint operations integrate land, air, maritime, electromagnetic, cyber and space capabilities into a single operational system to attack these critical nodes

c. Informationised and intelligentised warfare enhance detection and decision-making through networked command, data fusion and increasingly automated processes.

1.27 Collectively, these concepts enable the OPA's capacity to generate precision, scale, accumulative effects and compress decision cycles to disrupt the enemy's ability to function as a unified force and achieve operational activities. OPA planners seek to identify system centres of gravity and critical nodes whose degradation generates disproportionate operational effects through an adversary system.

Systems-of-Systems (SoS)

1.28 A warfare system is an organised set of people, processes and capabilities that work together to produce a specific military effect. It includes forces sense the environment, make decisions, deliver effects and sustain these actions. A war system can operate independently but is most effective when integrated with other warfare systems as part of a larger SoS.

1.29 The OPA's key warfare systems are explained in the table on the next page.

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Table 1.5 - OPA Key Warfare Systems

System	Description	Purpose	Key elements
C2	Integrates command authorities, headquarters, communications, and decision-support tools to direct forces and synchronise operations	Enable centralised control, coordinated execution, and rapid decision-making across echelons and domain	Joint CPs Digital networks Digital links Automation Redundancy
ISR	Detects, tracks, and characterises enemy forces, systems, and activities.	Provide timely and accurate information to support targeting, fires, manoeuvre, and assessment	Satellites UAVs, Radars Reconnaissance units Cyber collection, Data fusion nodes
Fires	Delivers kinetic and non-kinetic effects against enemy targets across depth and domains	Destroy, suppress, disrupt, or paralyse enemy systems to achieve joint operational objectives	Artillery Rocket forces Missiles Maritime strike Air-delivered strike, loitering munitions EW Cyber fires
Information and cognitive warfare	Shapes perceptions, decision-making, and behaviour of enemy forces, leadership, and populations	Undermine confidence, cohesion, and willingness to act while reinforcing friendly narratives	Information operations Psychological operations Cyber influence Media control deception
Air and missile defence	Protects forces and critical assets from aerial and missile threats	Preserve system integrity and freedom of action under persistent ISR and precision strike conditions	SAMs SHORAD Radars C2 networks
Manoeuvre	Employs ground, maritime, and air forces to seize terrain, control space, or exploit fires effects	Exploit windows created by fires and information effects to achieve positional or decisive advantage	CA-Bdes Amphibious forces Airborne forces Mobility assets
Sustainment and protection	Enables endurance and survivability through logistics, maintenance, medical support, and force protection	Maintain continuous operations while mitigating attrition and disruption	Ammunition supply Fuel Transport Engineering Recovery Camouflage Deception Base defence

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1.30 A system of systems (SoS) is a selection of these independent, functionally systems that are integrated to achieve effects that no single system can produce on its own. Each system retains its own purpose and capability, but through shared information, coordination, and mutual dependency these SoS enables sensing, decision-making, fires, manoeuvre, protection, and sustainment to operate as a unified whole.

1.31 SoS warfare describes how conflict is conducted between interconnected operational systems, not between individual units or platforms. Both friendly and opposing forces consist of a set of interacting systems that cover C2, target detection and identification, fires, manoeuvre, protection, sustainment, information, and political control. How well they perform together will determine combat effectiveness.

1.32 Success is achieved by disrupting the relationships between systems, degrading their coherence, and collapsing their ability to function as an integrated whole. This approach prioritises paralysis, dislocation, and loss of decision advantage over physical destruction alone.

1.33 This concept underpins OPA modern campaigning and explains why destroying forces is often secondary to breaking the enemy's operational system.

Reconnaissance-Strike

1.34 A reconnaissance-strike system is one of the principal operational mechanisms through which system-of-systems warfare is executed. SoS warfare is the broader warfighting concept. The reconnaissance-strike system is one of the primary combat architectures used to operationalise that concept.

1.35 Within OPA doctrine, SoS warfare seeks to integrate all combat systems into an interconnected operational network capable of generating coordinated effects across multiple domains simultaneously. The objective is not merely to destroy enemy platforms individually, but to paralyse the enemy operational system by attacking its critical nodes, functions, linkages and decision-making processes.

1.36 The reconnaissance-strike system is the mechanism that links reconnaissance, information processing, decision-making and strike delivery into a unified combat system capable of conducting those attacks. The following table explains the relationship between the two concepts.

Table 1.6 – Relationship between SoS and Reconnaissance-Strike

Concept	Role
System-of-systems warfare	The overarching operational theory
Reconnaissance-strike system	The operational execution architecture
Fires and targeting	The practical combat functions within the architecture

1.37 SoS warfare defines what must be achieved operationally. The reconnaissance-strike system defines how targets are identified, processed and attacked to achieve it.

1.38 The reconnaissance-strike system represents the operational mechanism through which informationised and intelligentised warfare are translated into combat effects. Within informationised warfare, the reconnaissance-strike system integrates sensors, command systems and strike assets into a networked operational architecture. Within intelligentised warfare, the same system increasingly incorporates AI-enabled processing, autonomous systems and machine-assisted decision-making to accelerate the kill chain and generate adaptive multi-domain effects.

Joint Operations

1.39 Joint operations are the practical means by which SoS warfare is executed. The use of joint operations is the OPA's primary method for achieving military objectives, integrating land, maritime, air, space, cyber, electromagnetic, and information forces under centralized command. Joint operations are effects-focused and system-oriented, designed to disrupt adversary decision-making, sensing, mobility, and sustainment rather than to defeat forces through attrition alone.

1.40 Planning and control are centralized at the Theatre Command level, while tactical units execute tightly defined tasks with limited discretion. Joint fires serve as the principal integrating mechanism, synchronizing kinetic and non-kinetic actions to shape conditions, manage escalation, and enable manoeuvre.

1.41 For most of its history, the OPA was organised and employed as a land-centric force. Operations emphasised mass, manpower, and territorial control. Coordination with naval and air forces existed but was limited, sequential, and largely subordinate to ground manoeuvre. Command structures, doctrine, and communications did not support true joint integration.

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1.42 The 1991 Gulf War was a decisive wake-up call for the Olvanans. OPA analysts observed that a technologically advanced force, using joint fires, air dominance, ISR, and precision strike, could defeat a large army rapidly and at distance. It also demonstrated the shortfalls of the OPA's force structures and doctrine in modern warfare.

1.43 From the mid-1990s to early 2000s the OPA began to develop its joint doctrine and the formalisation of it campaign/operational theory. This involved the development of methods such as the joint firepower strike (we will cover this in more detail in a later chapter). However, joint operations remained theoretical and unevenly implemented.

1.44 A decisive shift occurred with reforms of 2015-2016 once it was recognised that adoption of joint operations required a structural change. This involved:

a. Replacing military regions with theatre commands

b. Designating Theatre Commands explicitly joint warfighting headquarters

c. Reorganising the services to support joint operations rather than independent campaigns

d. Elevated information, space, cyber, and electronic warfare as core joint enablers

1.45 Since 2016 the OPA has applied joint operations across the peace-war continuums including:

a. Presence and deterrence operations

b. Joint exercises and rehearsals

c. Information and influence activities

d. Fires preparation and access denial.

1.46 Joint operations now underpin how the OPA plans, trains, and fights, serving as the central mechanism for achieving system-level effects, managing escalation, and countering technologically superior adversaries. Joint operations are the practical means by which system-of-systems warfare is executed.

Informationised Warfare

1.47 Informationised weapons derive their combat effectiveness from their integration into information networks not just from their physical destructive power. They are:

a. Digitally connected to sensors, command systems and other shooters

b. Able to receive, transmit and act on data, such as targeting information, timing and effects

c. Designed to operate as part of a wider SoS, not in isolation

d. A component of the detect-decide-strike-assess cycle.

1.48 The information layer (consisting of sensors, networks, data fusion and command systems) can transform a conventional munition into a high-effect weapon. For example, a dumb artillery projectile fired using real-time UAV targeting through a digital fire-control network can be more 'informationised' than a standalone precision munition fired blindly.

1.49 Informationised warfare enables SoS warfare.

Intelligentised Warfare

1.50 As systems become more complex and data-rich, human decision-making alone becomes too slow. Intelligentised warfare uses human-machine teaming and algorithm-driven decision-making to:

a. Identify critical system nodes and vulnerabilities

b. Prioritise targets based on system impact

c. Optimise timing, sequencing and the scale of effects

d. Maintain tempo against a reacting enemy.

1.51 Intelligentised warfare is not a replacement for command. Rather it supports commanders by compressing decision cycles and enabling more precise system disruption.

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Fires as an SoS at the Tactical Level

1.52 OPA fires is a closed-loop tactical SoS: detect – decide – strike – assess – re-strike. Each of these steps is a system. None are owned by artillery alone. The following paragraphs describe this closed-loop in more detail.

a. Detection. Targets are detected by a joint sensor web consisting of:

(1) Army UAVs and reconnaissance detachments

(2) Counter battery radars

(3) Air and maritime ISR platforms

(4) Electronic and cyber reconnaissance.

(5) These sensors contribute to a shared targeting picture, not a single unit's fire plan.

b. Decision. Fires decisions are made through integrated command networks, not battery CPs acting in isolation. Automation and decision aids:

(1) Prioritise targets

(2) Match effects to target type

(3) De-conflict joint fires

(4) Reduce human decision time

(5) Commanders remain in the loop but machines compress the timeline.

c. Strike. Fires are delivered by the best shooter available which may be:

(1) Tube artillery

(2) Rocket artillery

(3) Loitering munitions attack aviation

(4) Maritime fires

(5) Electronic or cyber effects

(6) The emphasis is the effect on the enemy system, not which arm fires the round.

d. Sensors immediately assess effects:

(1) Was the target neutralised?

(2) Has the enemy system been degraded or is it adapting?

(3) What nodes should be struck next?

(4) AI-enable tools assist in re-tasking fires enabling rapid follow-on strikes.

1.53 The OPA is not attempting to destroy every enemy platform but is trying to collapse the enemy's ability to fight as a system. Fires at the tactical level are used to:

a. Break the enemy's kill chain

b. Paralyse the enemy's C2

c. Isolate the enemy's manoeuvre forces

d. Create psychological shock through tempo and inevitability.

1.54 Each fire mission is designed to enable the next effect, not stand alone. This results in coordinated system-level effects that degrade the enemy's ability to sense, decide, move and fight, not just simply accurate fires.

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Section 1-6. A Vignette – Conducting SoS Warfare at the Tactical Level

1.55 The following vignette is designed to demonstrate how the OPA uses SoS at the tactical level.

1.56 An OPA armoured (heavy) CA-Bde has been ordered by the Group Army commander to attack and isolate an enemy BCT from the division, paralyse the BCT C2 and fires systems, and ultimately cause the BCT to culminate before the CA-Bde commits its main forces.

1.57 The Commander's intent is to collapse the enemy brigade's combat system, not to destroy it platform by platform. Fires will be the decisive means to isolate, paralyse, and dislocate the enemy's command, sensing, and fire support systems, enabling manoeuvre forces to penetrate, exploit, and consolidate. The desired end state is a BCT that has lost the ability to coordinate fires, manoeuvre reserves, or sustain defensive operations, and is forced to culminate.

1.58 The operation will be conducted in six phases:

a. Phase 1 (D-7 to H-hr) – shaping and isolation. The purpose of this phase is to isolate the enemy BCT and degrade its combat system. The end state is the BCT is isolated from higher command, has degraded situational awareness, and cannot effectively coordinate defensive fires. Fires tasks include:

   (1) Conducting preparatory fires and non-kinetic attacks against enemy command posts, fire support coordination nodes, and air defence systems

   (2) Prioritising degradation of enemy sensing, communications, and targeting networks

   (3) Supporting reconnaissance elements with responsive fires to protect ISR access and deny enemy counter-reconnaissance.

b. Phase 2 (H to H+4) – advance and fix the enemy force. The purpose of this phase is to fix enemy forward forces and supress enemy fires. The end state is enemy forward battalions are fixed in position and enemy fires are disrupted and displaced. Fires tasks include:

   (1) Executing counter-battery fires against identified enemy artillery systems

   (2) Suppressing enemy air defence and ISR assets to protect friendly reconnaissance and manoeuvre.

   (3) Supporting fixing forces with suppressive and obscuration fires to prevent enemy manoeuvre.

c. Phase 3 (H+4 to H+8) – unfold and conduct decisive action. The purpose of this phase is to isolate the penetration area and conceal the main effort. The end state is the enemy BCT is unable to identify the main effort or reposition forces in time to counter it. Fire tasks include:

   (1) Concentrating fires against enemy reconnaissance, reserves, and command nodes covering the intended penetration area

   (2) Employing electronic attack and deception to mask the main effort

   (3) Maintaining fires pressure to prevent enemy reconstitution or reserve commitment.

d. Phase 4 (H+8 to H+12) – enable penetration at the decisive point. The purpose of this phase is to enable penetration at the decisive point. The end state is that penetration is achieved and enemy defensive fires are unable to influence the decisive action. Fires tasks include:

   (1) Massing artillery and rocket fires are directed at the breach site to overwhelm enemy fires and protection systems

   (2) Striking enemy reserves and sustainment nodes to prevent reinforcement

   (3) Providing continuous fires coverage and electronic protection for breaching and assault forces.

e. Phase 5 (H+12 to H+20) – annihilate the enemy force and exploit. The purpose of this phase is to exploit success and accelerate enemy culmination. The end state is that the enemy BCT loses cohesion and combat effectiveness and is unable to continue organised resistance. Fire tasks include:

   (1) The delivery of rapid, violent fires against retrograding, repositioning, or counter-attacking enemy elements.

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(2) Using persistent ISR to enable rapid re-attack of critical nodes.

(3) Denying enemy attempts to reorganise or restore command and control.

f. Phase 6 (H+20 to change of mission) – continuing operations. The purpose of this phase is to consolidate gains and defeat any enemy counter-attack. The end state is the consolidation of friendly forces and posturing for follow-on operations. Fires tasks include:

(1) The protection of friendly command posts, sustainment areas, and manoeuvre forces with fires and electronic effects.

(2) The disruption of enemy counter-attacks and reconnaissance efforts.

(3) Maintaining readiness to re-engage key enemy systems.

1.59 The commander's fires priorities for all phases are:

a. Priority 1 – Enemy reconnaissance and sensing assets

b. Priority 2 – Enemy command and control nodes

c. Priority 3 – Enemy fires systems

d. Priority 4 – enemy air defence systems

e. Priority 5 – Enemy reserves and sustainment nodes.

1.60 Coordinating instructions cover:

a. Fires are to be dynamically re-tasked based on real-time assessment.

b. The use of automation and decision-support tools are authorised for recommending target prioritisation and shooter allocation.

c. Commanders are responsible for effects achieved not rounds expended.

d. Timings are expressed in hours to reflect brigade-level phasing and cumulative system effects. Tactical engagements will occur within these time frames.

1.61 In his closing guidance the commander stressed that fires are the decisive arm. Manoeuvre was to exploit the effects that fires create.

1.62 Prior to contact, the OPA conducted persistent reconnaissance, electronic warfare, and long-range fires to isolate the BCT from higher headquarters and degrade its command, sensing, and fires systems. At H-Hour, the OPA CA-Bde initiated a phased attack in which electronic attack, counter-reconnaissance, and precision and suppressive fires disrupted BCT command and control, intelligence collection, air defence, and artillery.

1.63 As forward battalions were fixed, fires were employed as an integrated system, with joint sensors, electronic intelligence, and unmanned systems feeding targeting networks that prioritised BCT fires, command posts, and protection assets. Artillery, rockets, attack aviation, and electronic effects were synchronised to mass effects at the decisive point, isolate the penetration area, and prevent reinforcement or reconstitution.

1.64 Through continuous re-tasking based on near-real-time assessment, the OPA fires disrupted and displaced BCT fire support, eroded tempo, and forced culmination, demonstrating how OPA fires were employed as a system-of-systems to defeat the enemy's ability to command, sense, and fight as a coherent force.

Section 1-7. Conclusion

1.65 This chapter has established the conceptual framework for Olvanan fires and targeting. Fires are treated as a central warfighting function, employed to generate effects against an adversary's operational system rather than to destroy platforms in isolation. The OPA applies fires through a system-of-systems approach, executed by joint operations and enabled by informationised and intelligentised warfare.

1.66 Olvanan fires are effects-focused, system-oriented, and centrally directed. Planning emphasises rapid sensor-to-shooter integration, continuous assessment, and dynamic re-tasking to maintain tempo and decision advantage. Tactical fires are executed in accordance with higher intent and are designed to disrupt enemy command, sensing, manoeuvre, and sustainment systems.

1.67 Although fires are inherently joint and multi-domain, this publication now narrows its focus. The remainder of this document addresses Army fires, concentrating on the employment of direct and indirect fire support from Group Army to Combined Arms Brigade level. Subsequent chapters examine the organisation of Olvanan fire support focusing on OPA artillery, targeting processes, and tactical employment of Army-controlled fire support within the broader Olvanan fires framework. Lastly fire support logistics and sustainment as well as emerging technologies in fires and targeting will be covered.

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Chapter 2
Organisation of Olvanan Indirect Fires

> *Weapons are an important factor in war, but not the decisive factor; it is people, not things that are decisive.*
>
> **Mao Zedong**
>
> On Protracted War 1938

Section 2-8. Introduction

2.1 Western doctrine typically frames artillery employment around cooperation (combined arms and joint integration), concentration of force (massed effects at decisive points), flexibility (responsive, decentralised control), economy of effort (prioritisation and restraint) and surprise (timing, deception, and fires sequencing). These principles assume decentralised mission command, target-centric fires and fires in support of manoeuvre as the dominant paradigm.

2.2 The OPA does not organise its fires and artillery principles around these Western categories. Instead, OPA employment is derived from integrated joint operations, system-of-systems warfare, and informationised / intelligentised warfare. Olvanan doctrine treats fires as the leading element of combat power. Manoeuvre forces exploit the conditions created by fires rather than driving the battle themselves. Campaigns (operations) are designed around firepower plans. Fires shape the battlefield before and during manoeuvre. Indirect fires, missiles, air strikes, cyber and EW are central to victory.

Section 2-9. OPA Artillery Characteristics

2.3 OPA artillery is a system-influencing, precision enabled and a centrally controlled fires capability. The Olvanans use it to dictate battlefield tempo and disrupt the enemy's systems. It is also used to support joint objectives across all echelons of the battlespace.

2.4 Olvanan artillery has the following characteristics:

a. OPA artillery is centrally planned and directed. Fire missions are based on higher-level objectives not targets of opportunity. Artillery is used to disrupt the enemy's systems rather support manoeuvre in isolation. Lower level initiative exists but only within clearly defined intent and control measures.

b. The OPA prioritises precision fires while retaining the ability to deliver massed fires. Firing units operate from dispersed positions but are networked to concentrate effects. This approach reduces vulnerability while preserving the shock associated with traditional massed fires.

c. OPA artillery operates as part of an integrated reconnaissance-strike system. UAVs, counter-battery radars, electronic warfare sensors, space-based ISR and digital fire-control systems are linked to shorten response times. This enables rapid engagement of targets across the battlefield.

d. Counter battery and counter-fire are core tasks. Detection, rapid engagement and immediate displacement are routine activities. Survivability is achieved through mobility, dispersion, deception and speed rather than relying on hardened gun positions.

e. OPA artillery is a contributor to joint and multi-domain operations not just a land-based fires effect. Artillery is often used to support, exploit or reinforce non-kinetic effects including electromagnetic, cyber, information and space activities.

f. OPA artillery is employed to apply pressure while controlling escalation. Fire method, munition, scale and timing are selected to achieve the required effect and signal intent.

g. OPA artillery is oriented towards engaging targets beyond the close fight. Long-range rockets, extended-range tubed artillery and precision munitions are used to engage C2, logistics and air defence nodes, as well as intervention forces before they can influence tactical manoeuvre.

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h. OPA artillery effectiveness is heavily reliant on sensors, communications, positioning and data accuracy. The disruption to ISR, networks and navigation can significantly reduce fires effectiveness. This make the protection of information, redundancy and recovery critical.

Section 2-10. Olvanan Artillery Principles of Employment

2.5 The OPA employs its artillery based on the following principles:

a. System-focused. Artillery is employed to attack the structure, relationships and functioning of the enemy's operational system rather than individual platforms.

b. Effects first. OPA planners start with what they want the enemy system to stop doing. The desired effect will determine:

(1) What node is to be targeted,

(2) When it is struck in order to disrupt a process or decision

(3) How it is to be struck covering munition type, volume of fire, duration of fire and whether or not non-kinetic fires are to be included.

c. Centralised control, distributed execution. Higher headquarters will centrally plan and control firepower while dispersed units will execute in accordance with the plan.

d. Temporal and functional mass. The massing of artillery fire is achieved through timing, sequencing and the coordination of effects, not the physical concentration of guns.

e. Integration with joint and non-kinetic fires. Artillery fires are planned and executed as part of a joint firepower system which is synchronised with EW, cyber, air, maritime and space effects.

f. Precision enabled by information superiority. Precision is the result of knowing exactly what matter, when it matters and acting faster than the enemy can adapt. Information superiority enables precision by allowing the OPA to:

(1) Identify critical nodes, not just visible targets

(2) Striking during decisive moments not whenever fires are available

(3) Select the minimum force required to achieve the desire effect

(4) Re-strike immediately if the effect is incomplete.

g. Continuous assessment and re-tasking. Assessment drives immediate re-tasking to sustain effects.

h. Survivability through mobility and system protection. Artillery survivability is dependent on the system-level integration of mobility, dispersion, deception and counter-reconnaissance, not on the action of guns or batteries in isolation.

i. Firepower dominance at the tactical level. Artillery is the primary means of achieving dominance at the tactical (and operational) levels enabling manoeuvre units to exploit the conditions it creates.

j. Cumulative effects over time. Success is achieved through repeated, compounding degradation of enemy systems over time rather than single decisive engagements.

Section 2-11. Structure of Indirect Fires

2.6 Olvanan indirect fires include not only tube and rocket artillery, and mortars but also missiles, air and naval capabilities, EW, Cyber, information warfare systems and space capabilities. The purpose of this document though is to focus on artillery. The OPA organises artillery to enable centralised effects design with distributed execution, integrate fires with ISR, EW, cyber, air, and missile forces and support firepower assault and system paralysis, not just manoeuvre support.

OPA Artillery Echelons

2.7 OPA artillery is organised primarily at brigade level, with battalions optimised for specific delivery roles (tubes, rockets, long-range fires). Echelons include field Artillery (FA) brigades organic to group armies and field artillery battalions organic to CABs.

Field Artillery Brigade (FA Bde)

2.8 The group army field artillery brigade provides reinforcing fires and precision strike to subordinate CABs. The brigade is equipped with 155mm self-propelled guns (SPGs) as well as light (122-mm) and heavy (300-mm) rocket artillery systems. The battalion mix reflects intended effects, not symmetry and rocket battalions are often prioritised for decisive shaping fires.

2.9 An FA Bde consists of:

a. Two 155mm SP battalions

b. One 300mm heavy rocket battalion

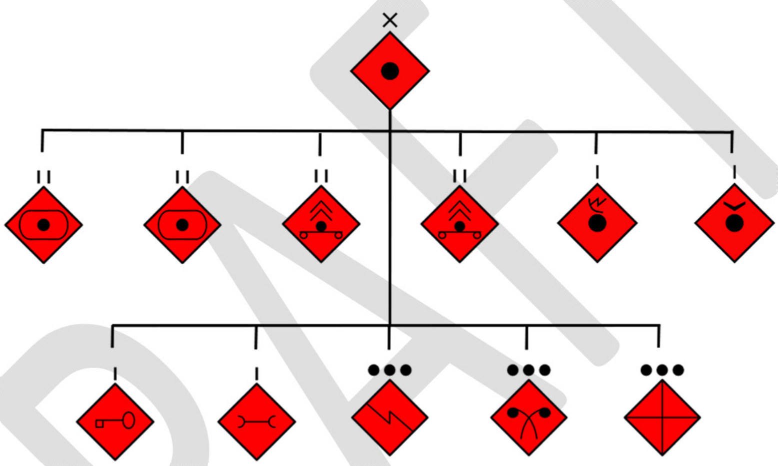
c. One 122mm light rocket battalion

d. A target acquisition battery

e. A UAV company

f. Operational and service support elements.

Figure 2.1 – FA Bde ORBAT

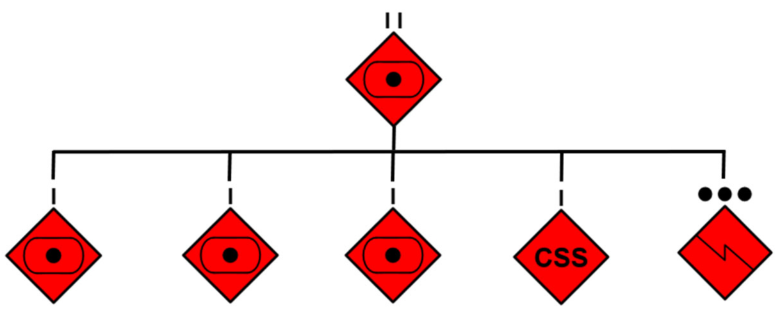


2.10 The Brigade HQ functions as a firepower command node, not merely an administrative HQ. it is staff heavy with approximately one third of its personnel devoted to operations, targeting, ISR integration and C2. This reflects its role as a brigade-level fires manager rather than a simple battalion controller.

SPH Battalions

2.11 The FA Brigade's SPH battalions are FA brigade-controlled firepower units employed as part of a centrally planned, effects-driven firepower system. They receive fire missions through the FA Brigade's firepower planning and command system. They are allocated firepower tasks, not assigned as support to a CAB.

Figure 2.2 – FA Bde SPH Battalion ORBAT



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2.12 SPH battalions are used for responsive, adjustable and sustained firepower. Core mission types include:

a. Counter-fire missions including the engagement of enemy artillery, rockets and mortars which have been cued by TA radars and/or UAVs as well as rapid reaction and re-attack missions as the enemy displaces

b. Tactical-level precision strike missions on command posts, EW nodes AD or manoeuvre forces using guided r near-precision munitions

c. Sustained suppression of enemy artillery, AD or manoeuvre forces which are timed to protect friendly manoeuvre or hold key areas

d. Follow-on and re-attack fires to re-engage targets after initial rocket or joint strikes, which are adjusted based on assessment and updated sensing

e. Synchronising fires with manoeuvre phases to support an advance, defence or counter-attack

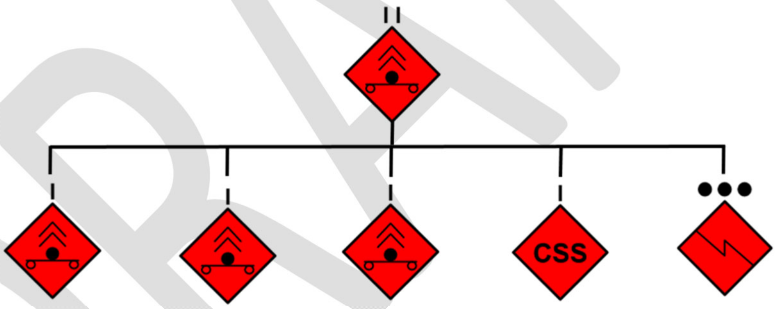
f. Tactical fixing ad blocking fire missions to prevent enemy movement or reinforcement in specific zones as well as to channel enemy manoeuvre into unfavourable terrain

g. Targets of opportunity using short-notice engagements generated by UAVs or observers where a high degree of responsiveness is a key consideration.

Heavy Rocket Battalion

2.13 The heavy rocket battalion is the FA Brigade's high intensity, system-disrupting firepower element. The battalion provides heavy rocket firepower at a specific time and place to degrade the enemy's operational system which cannot be achieved by sustained fire missions over time.

Figure 2.3 – FA Bde Heavy Rocket Battalion ORBAT



2.14 The heavy rocket battalion is employed for short-duration, high-density fire power designed to shock and disrupt systems. They are committed selectively not continuously. Core mission types include:

a. Firepower-assault missions which consist of sudden and intense strikes against priority targets and are intended to overwhelm defences and create psychological shock

b. System-disruption strikes to degrade enemy command, fires, sensing or AD systems causing temporary paralysis or loss of coordination

c. Area suppression and saturation to create wide-area effects on enemy force concentrations or key zones

d. Pre-emptive counter-fire strikes which are often used early to seize the initiative against suspected or detected enemy artillery groupings

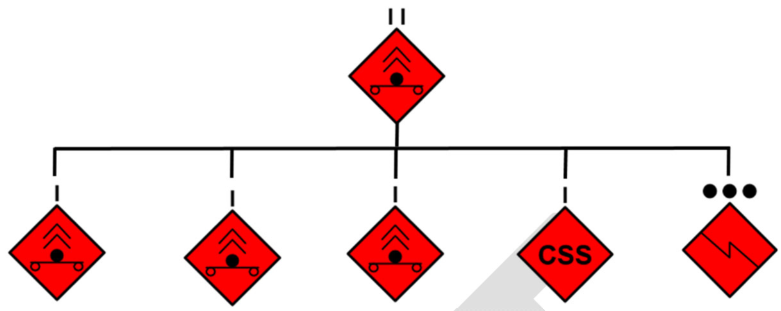
e. Isolation and interdiction fires which are applied at key times to prevent enemy reinforcement or withdrawal by disrupting reserves, logistic nodes or movement corridors

f. Using strikes to enable breakthrough, exploitation or counter- attack and are timed to coincide with friendly manoeuvre or joint actions.

Light Rocket Battalion

2.15 The light rocket battalion provides centrally-commanded, high-tempo saturation and suppression fires. It is used to shape the close fight, sustain pressure on enemy forces and bridge the gap between heavy rocket strikes and sustained tube artillery fires.

Figure 2.4 – FA Bde Light Rocket Battalion ORBAT



2.16 The light rocket battalion remains under command of the FA Brigade and is tasked by fire power mission and desired effect. They are not paired with manoeuvre formations. Core mission types include:

a. The provision of dense fires against enemy infantry, vehicles and positions, used repeatedly to keep these forces suppressed

b. The neutralisation of assembly areas, strong points and defensive belts

c. Engaging suspected or detected enemy artillery areas

d. Preparatory shaping fires to prepare conditions for manoeuvre or follow-on actions especially immediately before or during advances

e. Denying movement through routes, chokepoints or approaches as well as fixing enemy elements at the tactical level while other effects are applied elsewhere

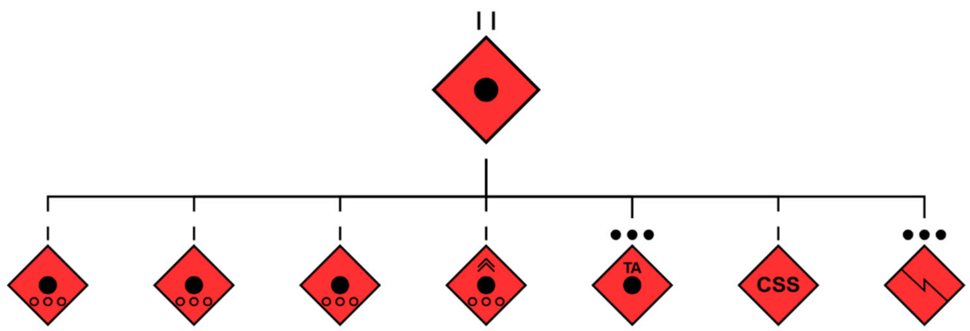
f. Sustaining suppression on a target once heavy rockets have delivered shock to prevent rapid enemy recovery or reconstitution

g. As a deception tool to mask intent or suggest that the main effort is elsewhere thereby increasing the enemy's uncertainty and reaction burden.

Combined Arms (CA-Bde) Field Artillery (FA) Battalions

2.17 CA-Bde FA battalions are held under direct CA-Bde control for immediate employment. They provide fire support to CA-Bdes in real time, by protecting manoeuvre elements, exploiting fleeting opportunities and maintaining pressure. CA-Bde FA battalions do not replicate Group Army FA Bde functions. They operate within their respective CA-Bde's battle rhythm executing short-notice missions tied directly to the CA-Bde's scheme of manoeuvre.

Figure 2.5 – FA Battalion ORBAT



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2.18 A CA-Bde FA battalion consists of:

a. Three 122-mm SPG batteries

b. One light (122-mm) rocket battery

c. One command element

d. Operational and service support elements.

2.19 FA battalion commanders execute assigned effects tasks and their use of initiative is restricted by brigade targeting priorities. As well as the provision of indirect fire support survivability (mobility, dispersion and emission control) is also a core task.

2.20 CA-Bde commanders use the FA battalion to maintain tempo during contact and suppress identified strongpoints. Likely task include:

a. Maintaining tempo during contact

b. Suppressing identified strongpoints

c. Enabling breach, assault, or withdrawal operations

d. Neutralising ATGM teams and infantry fighting positions

e. Obscuring manoeuvre axes

f. Delivering immediate counter-fire against detected enemy tube systems

2.21 FA battalion fires are typically short in duration, highly responsive and focussed within the CA-Bde's area of operations.

Battery and Platoon Level Units

2.22 Batteries are the principal firing units at lower echelons. Platoons/sections operate individual guns or launchers. Their employment is characterised by the use of shoot-and-scoot deployment techniques, the use of dispersed firing points and the use of GNSS-enabled rapid survey. Fire missions are usually digitally generated rather than voice-controlled.

Target Acquisition Capabilities

2.23 Fire direction, targeting, and forward observation have been major areas of investment. Olvana has become a world leader in unmanned aircraft system production and development. The OPA was an early adopter of unmanned aircraft as intelligence, surveillance, and reconnaissance platforms in support of its artillery, particularly its long-range rocket artillery.

2.24 Group Army and CA-Bde artillery battalions include fire-finding radars, battlefield surveillance radars, long-range electro-optical and infrared sensors, and sound- ranging equipment, in addition to well-equipped forward observers, both mounted and dismounted. The OPA devotes significant training resources to the battlefield surveillance and targeting mission. Observers of all types are likely well trained, and integration between sensors and shooters is likely agile, redundant, and reliable.

2.25 The FA Bde is also equipped with a target acquisition battery and a UAV company.

Field Artillery Brigade Target Acquisition (TA) Battery

2.26 The FA Bde TA Battery provides the FA Bde with timely and accurate targeting data to support CA-BDE operations. The battery consists of:

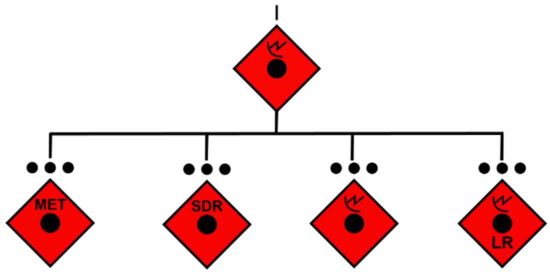
a. A Meteorological Platoon for accurate weather data,

b. A Sound Ranging Platoon,

c. A Counter Battery Platoon

d. A Long Range Sensor Platoon.

Figure 2.6 – FA Bde TA Battery ORBAT



2.27 The Battery is configured for counter-battery fire. Platoons may be pushed forward closer to the front lines in order to locate targets, but run the risk of enemy actions if not properly protected. If any of these platoons are pushed forward, it is important that the supported CA-Bde provides adequate protection for the battery to complete its mission. The battery will likely only provide targeting data back to the FA Bde and not necessarily integrate with the supported CA-Bde FA battalion.

2.28 TA radars are used to open and close firing windows, not to maintain persistent surveillance. The TA battery is employed using the following principles:

a. The battery focuses on adversary artillery, rockets, mortars, and firing radars as well as prioritising high-payoff systems (long-range, precision, or networked fires)

b. It is used to cue UAVs or other ISR assets and they are rarely trusted alone for the engagement of high-value targets

c. Emission control is a command-level decision and radars will only be activated in short, controlled periods

d. TA data feeds directly into the FA brigade fire-control system.

FA Bde UAV Company

2.29 The UAV Company provides integral ISR support to the FA Bde. The primary UAV is the ASN-209, a large fixed wing UAV that can operate further forward in the battlespace. The use of this UAV enables real-time accurate targeting information for the FA Bde, and more importantly provides timely battlefield damage assessment.

2.30 The UAV Company ground stations will typically operate well behind the front lines (likely the Reserve or Garrison Zone) in order to remain undetected. It is unlikely that targeting data is shared with the supported CAB directly, but will be fed to the FA Bde HQ. It is unlikely that the UAV Company will be tasked to support a CA-Bde.

2.31 The UAV platforms are evolving rapidly with new models entering service approximately every two months, and are likely to be superseded from the model indicated above.

Section 2-12. Artillery Groupings

2.32 The OPA uses the terms artillery group and mobile artillery group to describe two related but distinct firepower constructs. Both are temporary task-organised groupings created for a mission or phase of an operation, but they differ in purpose, echelon, mobility, composition and operational role.

Artillery Groups

2.33 An artillery group is a larger, more centrally controlled firepower grouping designed to deliver concentrated operational or deep tactical fires. It is normally formed at Group Army, theatre, or occasionally CA-Bde level for a major operation. An artillery group's primary purpose is to:

a. Mass fires against operationally significant targets.

b. Conduct counter-battery warfare.

c. Deliver deep fires against command posts, logistics, air defence and reserves.

d. Support breakthrough or decisive operations.

e. Integrate long-range rocket and tube artillery.

f. Provide theatre-level firepower coordination.

2.34 The artillery group is more heavily armed and less tactically mobile than manoeuvre forces. It is centrally controlled focusing on operational depth and is often synchronised through a firepower coordination centre. It usually operates from prepared or semi-prepared firing areas and may relocate by echelon rather than continuously manoeuvring with frontline battalions.

2.35 An artillery group may contain:

a. 155 mm SPH battalions (for example PLZ-05 units)

b. 122 mm SPH battalions and 300 mm long-range rocket artillery battalions (such as PCH-191 or PHL-03)

c. Counterbattery radar detachments (for example SLC-2 or SLC-7, UAV detachments (ASN-209 or equivalent) and meteorological sections

d. EW support elements

e. Ammunition transport and reload elements

f. Fire direction and target processing cells

2.36 The artillery group is formed with the intention of creating firepower dominance, shock and paralysis, deep interdiction and system disruption. It is closely tied to the reconnaissance–strike system and SoS warfare. The artillery group is often the principal executor of operational fires within an informationised or intelligentised campaign.

Mobile Artillery Groups

2.37 A mobile artillery group is a more agile, tactically responsive grouping designed to manoeuvre closely with frontline forces during fast-moving operations. Its primary purpose is to:

a. Provide immediate responsive fire support.

b. Support advancing mechanised or armoured forces.

c. Conduct rapid displacement and leapfrogging.

d. Maintain continuous fire support during manoeuvre.

e. Support engagements in fragmented or fluid battlespaces.

2.38 The mobile artillery group is therefore much more closely integrated with the manoeuvre force than the larger artillery group.

2.39 The mobile artillery group is smaller, lighter and highly mobile. It is optimised for shoot-and-scoot operations, designed for rapid occupation and displacement. It is more decentralised and closely tied to brigade tempo. It often advances by bounds behind manoeuvre battalions and may establish multiple temporary firing areas during a single phase of operations.

2.40 A mobile artillery group commonly contains:

a. 122 mm SPH batteries or battalions (such as PLZ-07 or PCL-09)

b. 120 mm mortar companies (such as PLL-05-equipped manoeuvre battalion mortars)

c. Light 122 mm MRL batteries (such as PHL-90B)

d. Forward observers and UAV teams

e. Lightweight logistics and ammunition redistribution vehicles

f. Brigade-level reconnaissance and target acquisition assets

2.41 Heavy 300 mm rocket systems are normally not part of a mobile artillery group because they require larger logistical support. They also have larger electromagnetic and thermal signatures. They are centrally controlled and operate deeper in the battlespace.

2.42 The mobile artillery group supports the advance to contact, the pursuit, exploitation, mobile defence and rapid concentration and dispersal of fires. It is particularly important in terrain where manoeuvre corridors are limited, such as jungle roads, mountain passes, urban corridors and littoral landing zones.

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2.43 Mobile artillery groups are vulnerable to counter fire and direct fire, and rapid movement is considered key to its survival. They are likely built around either 81-mm/120-mm rapid-fire mortars or mobile 122-mm self-propelled howitzers.

Key Differences

2.44 The key differences between artillery groups and mobile artillery groups are detailed in the following table.

Table 2.1 Artillery Group Vs Mobile Artillery Group

Artillery Group	Mobile Artillery Group
Operational/deep fires	Tactical/manoeuvre fires
Centralised control	Responsive decentralised support
Heavy systems	Lighter mobile systems
Operational depth	Close support
Firepower concentration	Tempo support
Larger logistics footprint	Smaller agile footprint
Often static/echeloned displacement	Continuous leapfrogging movement
155 mm and 300 mm emphasis	122 mm and mortar emphasis
Counterbattery and interdiction	Immediate manoeuvre support

2.45 Conceptually an artillery group destroys the enemy system and a mobile artillery group sustains the manoeuvre battle.

Section 2-13. Capabilities Overview

2.46 In recent times the OPA has accelerated the transition from towed artillery to self-propelled systems, both tracked and wheeled. This shift recognises that survivability in a drone-saturated, counter-battery intensive battlefield is less dependent on static protection. The focus is more on mobility, and rapid emplacement and immediate displacement deployment. Modern OPA artillery is therefore designed to conduct short duration, high intensity fire missions before relocating to another firing position. This tactical action aids in reducing exposure to persistent ISR, loitering munitions and precision counter-fire.

2.47 The adoption of automated fire-control systems, digital networking, and improved on-board navigation further supports compressed sensor-to-shooter timelines while enabling dispersed, battery-level manoeuvre. Collectively, these developments position PLA artillery as a mobile, networked fires system optimised for survivability under conditions of continuous aerial surveillance and contested electromagnetic spectrum operations.

2.48 The OPS employs tracked and wheeled self-propelled tube artillery and rocket artillery as follows:

a. PLZ-05 (Type 05) 155mm Self-Propelled Howitzer

b. PLZ-07 (Type 07) 122mm Self-Propelled Howitzer

c. PHZ-10 122mm Multiple Launch Rocket System

d. PHL-90B (Type 90B) 122mm Multiple Rocket Launcher

e. PHL-03 (AR2) 300mm Multiple Rocket Launcher.

2.49 More detailed information covering these items is detailed in Annex 2A.

Digital and Networked Automated Fire-control Systems

2.50 OPA artillery employs a family of digital and networked automated fire-control systems rather than a single universal system. These systems collectively form part of the PLA's broader informationised and increasingly intelligentised firepower architecture.

2.51 At the tactical level, OPA artillery automation integrates:

a. Digital fire-direction systems.

b. On-board ballistic computers.

c. Satellite and inertial navigation.

d. Automated gun-laying systems.

e. Digital communications networks.

f. Sensor-to-shooter integration.

g. Target processing and mission distribution systems.

2.52 The purpose is to reduce sensor-to-shooter timelines, support distributed firepower operations, and enable integration into the OPA reconnaissance–strike system.

2.53 OPA artillery fire-control systems are designed to:

a. Automate target processing.

b. Digitally transmit fire missions.

c. Reduce manual calculations.

d. Support rapid shoot-and-scoot operations.

e. Integrate UAV, radar and EW target feeds.

f. Enable simultaneous impact and coordinated fire missions.

g. Maintain operations under degraded communications conditions.

2.54 The OPA places heavy emphasis on “digitalised artillery”, “networked firepower”, “integrated firepower command” and “sensor-to-shooter integration”. This means the fire-control system is not merely a gun computer. It is part of a larger operational firepower network.

2.55 Automated systems enable the OPA to disperse artillery units widely, maintain networked fire coordination, reduce vulnerability to counterbattery fires and rapidly mass fires from dispersed locations. This is central to OPA survivability concepts. Automation supports fast occupation, rapid fire mission execution and immediate displacement. This enables OPA systems to halt, self-locate, receive digital target data, fire and move again within minutes.

On-board Fire-control Computer

2.56 Modern systems such as the PLZ-05, PLZ-07, PCL-09 and PCH-191 contain digital ballistic computers, meteorological correction software, automatic gun-laying systems and position/navigation systems as well as gun orientation sensors, muzzle velocity radar interfaces and, ammunition selection databases.

2.57 These systems allow the weapon to occupy positions rapidly, self-locate, receive digital fire missions, lay automatically onto target and conduct rapid displacement after firing. This significantly reduces emplacement and engagement timelines.

Digital Fire Direction System

2.58 At battalion and brigade level, OPA artillery units use automated fire-direction and command systems that receive target data digitally, assign firing units and compute firing solutions. They are also capable of prioritising targets, synchronising multiple batteries, deconflicting airspace and FSCMs, tracking ammunition expenditure.

2.59 These systems are often vehicle-mounted command posts integrated into artillery battalion HQs, firepower coordination centres and brigade command systems. The exact nomenclature is not always publicly disclosed, but the architecture resembles a distributed digital fires network rather than a standalone western-style FDC.

Integrated Communications Network

2.60 PLA artillery automation depends heavily on tactical datalinks, digital radio networks, fibre links, microwave relay systems and mobile command vehicles.

2.61 These connect UAVs, WLRs, EW systems, forward observers, brigade HQs, rocket artillery units, air defence and manoeuvre units. This allows near-real-time target dissemination.

Sensor Integration

2.62 OPA automated fire-control systems are heavily integrated with UAV reconnaissance, weapon locating radar, acoustic sensors, EW emitters, ground reconnaissance units and satellite reconnaissance.

2.63 Examples include:

a. CH-802 UAVs.

b. ASN-209 UAVs.

c. SLC-2 counterbattery radar.

d. Battlefield surveillance radars.

2.64 Target information can be digitally transferred directly into the artillery command network.

Navigational and Orientation Systems

2.65 At CA-Bde level, OPA artillery survivability and responsiveness are critically dependent on organic positioning, navigation and timing (PNT) that enables rapid, survey-free emplacement under a persistent ISR and counter-battery threat. In recent years, the OPA has employed an integrated INS/GNSS-based fire control architecture across both tube and rocket artillery platforms to compress survey timelines and enable immediate shoot-and-scoot employment.

2.66 Key systems employed by OPA artillery formations and units include:

a. The Beidou Navigation Satellite System (BDS)

b. Inertial Navigation Systems (INS)

Beidou Navigation Satellite System (BDS)

2.67 BDS is Olvana's sovereign satellite navigation constellation. BDS provides global positioning, navigation, timing (PNT) services and short message communication (SMC) to military users operating across joint networks. BDS supports autonomous weapon positioning, target coordinate mensuration, digital fire mission transmission, synchronisation of fire missions, ballistic computation inputs and time-on-target (TOT) coordination. It enables survey-free occupation of firing positions reducing gun emplacement timelines from tens of minutes (conventional survey) to under 2–3 minutes.

Inertial Navigation Systems (INS)

2.68 OPA artillery platforms are equipped with on-board strap down inertial navigation systems, typically employing ring laser gyroscopes (RLG) or fibre-optic gyroscopes (FOG). RLG INS employs ring laser gyroscopes to measure motion. They provide precision, dependability and robustness. FOG INS relies on fibre optic gyroscopes to measure motion. These gyroscopes offer accuracy, minimal drift over time, and durability, which makes them suitable for navigation. INS provides self-contained positioning, orientation, azimuth and velocity without having to rely on external signals. INS enables gun platform self-location, automatic laying, and continuous navigation during movement as well as degraded-mode operation under GNSS denial. This supports rapid displacement, silent reoccupation and GNSS-independent firing capability following counter-battery threat detection.

Weapon Locating Radars

2.69 CA-Bde-level WLR systems enable detection and engagement of enemy indirect fire systems within tactical depth, while higher-echelon systems extend counter-battery coverage into operational depth. When integrated with UAV-derived targeting and digital fires networks, these radars support time-sensitive counter-fire missions and rapid displacement of friendly artillery following engagement. This aids in reducing vulnerability to drone-enabled counter-battery detection in ISR-saturated environments.

2.70 At CA-Bde and Group Army level, OPA weapon-locating radars do not operate as standalone counter-battery sensors. They are integrated into a reconnaissance–strike network that links ISR assets directly to artillery and rocket units through brigade and higher-echelon digital command systems.

2.71 More detailed information covering these items is detailed in Annex 2A.

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Meteorological Support

2.72 Meteorological (MET) functions are treated as integral components of the fires system rather than specialist enablers operating in isolation. In recent years, particularly in parallel with the transition to SP tube and rocket artillery, the OPA has modernised its MET function to support rapid emplacement, digital fire-control, and dispersed shoot-and-scoot employment. Artillery MET detachments provide real-time atmospheric data to artillery battalion fire direction centres (FDCs), brigade fires coordination elements, and rocket artillery units. This data is used to correct ballistic solutions, account for environmental effects on projectile flight and improve first-round fire-for-effect probability.

2.73 Met detachments measure air temperature, air pressure, humidity, wind speed and direction (for surface and upper air), air density and ballistic wind profile. Upper-air data is particularly critical for long-range 155 mm fires and extended-range rocket artillery missions. This MET data is transmitted digitally using the FA bde and CA-Bde communications networks to artillery battalion FDCs and on-board fire control systems aboard SP artillery platforms to enable automatic ballistic corrections without the need for manual computation.

2.74 MET support is provided using MET radar systems in the FA-Bde's TA battery and automatic weather stations at CA-Bde's FA battalion. Both these systems underpin first-round fire-for-effect for both CA-Bde organic guns and Group Army fires. The primary MET radar system is the702D Met Radar system. More detailed information covering this item is detailed in Annex 2A.

Automatic Weather Stations (AWS).

2.75 Surface meteorological observation is not centralised at theatre level. Instead, it is treated as a deployable fires-support function organic to artillery and rocket formations. At the tactical level this is conducted using automatic weather stations (AWS) that feed into the same ballistic-support architecture as the 702D upper-air radar. AWS do not measure upper-air profiles. Rather they measure surface wind speed and direction, air and ground temperature, relative humidity, atmospheric pressure and air density (derived). Typically AWS consist of an ultrasonic wind sensor, temperature probe, humidity sensor, barometric pressure sensor, solar radiation detector and a ground temperature probe which make up a sensor mast assembly. Processing components consist of a data acquisition unit, a ballistic MET processor, a MET message formatter and a digital fire control interface. Communications components include a tactical VHF/UHF data link, a BeiDou time synchronisation module and a Battalion FDC data terminal.

Survey Support

2.76 In OPA fires doctrine, survey is not a legacy trade. It is treated as a ballistic assurance function that sits alongside MET and calibration inside the artillery support system. Consequently OPA artillery units retain organic optical and inertial survey capabilities to validate or reset GNSS/INS-derived position and orientation in EW-contested environments. This function is critical for long-range fires and rocket employment, where launcher azimuth error directly translates into non-linear impact dispersion.

2.77 OPA artillery units are heavily dependent on BeiDou GNSS receivers, integrated INS on SPH/MRL platforms and digital fire control systems. However, Olvanan doctrinal and technical publications repeatedly identify GNSS as susceptible to interference and spoofing. This can introduce errors and degrade first-round effectiveness through positional drift, timing error, orientation error and cause false grid solutions. These errors are summarised in the following table.

Table 2.2 – Impact of Survey Errors

GNSS error type	Fires impact
Position error	Range error
Azimuth error	Lateral dispersion
Timing error	TOT failure
Height error	Trajectory miscalculation

2.78 For long-range fires a 1–2 mil launcher misorientation caused by GNSS degradation can produce hundreds of metres of impact error beyond 70–100 km.

2.79 Survey is an anti-EW fires enabler. Survey detachments establish primary firing point grid, azimuth reference and platform orientation. This is achieved through the use of optical theodolites, gyrocompasses, inertial survey vehicles and astronomic survey (backup). These methods are passive, non-emitting, non-spoofable and EW-resilient. Survey provides a verified "truth grid" independent of the electromagnetic environment.

2.80 OPA artillery survey detachments employ vehicle-mounted inertial positioning systems, usually CSK-181 vehicles. These are supported by optical survey teams to establish firing unit grid and launcher azimuth independently of GNSS. This enables survey-verified alignment of SPH and MRL platforms prior to long-range missions in EW-contested environments. Optical survey teams are equipped with theodolites with tripods, digital azimuth indicators and laser rangefinders. This enables them to establish reference bearings to establish the true grid azimuth of a known line at the firing position, validate INS headings to eliminate INS drift and provide orientation at firing points so that digital fire missions can be executed without optical laying.

Calibration

2.81 Tube wear and muzzle velocity (MV) deviation are treated as the primary formation-level ballistic uncertainty drivers for tube artillery and mortars. At CA-Bde level, these are considered as predictable, quantifiable fire control variables that must be measured and modelled in order to enable first-round fire-for-effect. Rather than conducting repeated registration missions, the OPA artillery units measure the ballistic output of each weapon directly using a platform-mounted muzzle velocity radar (MVR). The primary MVR used by OPA artillery units is the Type 775 MVR.

2.82 The MVR measures actual projectile exit velocity at the muzzle and records MVs for each round, each propellant charge and each weapon platform. This enables artillery units to derive a mean MV per charge, an MV variance per charge and MV drift over time to form a weapon-specific ballistic signature. Calibration typically occurs post-maintenance, after defined Equivalent Full Charge (EFC) thresholds have been achieved and prior to major operations.

2.83 Similar to Western doctrine, OPA artillery units calibrate their tube artillery using the following step-by-step process:

a. A surveyed firing point is established

b. INS or an inertial survey vehicle confirms true orientation

c. Calibration rounds are fired by charge increment (for example Charge 3, 5 and 7)

d. The MVR records MV per round

e. The Fire Control System computes the average MV deviation from the tabular standard and the charge-specific MV offset

f. The battalion Fire Control and Coordination Centre (FCCC) generates a gun-specific correction coefficient.

2.84 During digital fire mission processing the FCCC ballistic computer applies the corrected MV (Tabular MV – Gun MV correction coefficient. This modifies time of flight, elevation quadrant and predicted impact point for each platform. Without this correction projectiles would land short, errors increase with range and impact dispersion would become asymmetric.

2.85 Because mortars operate at lower MV, on steeper trajectories and with a longer time of flight, they are more sensitive to MV variation. Consequently PLA self-propelled mortar systems (such as the PLL-05) conduct more frequent MV calibration, maintain charge-specific MV tables and apply temperature-adjusted MV corrections.

2.86 By modelling tube wear through MV measurement, the OPA enables first-round fire-for-effect, digital TOT missions, counter-fire without adjustment an immediate suppression in manoeuvre support. This is the technical basis that allows CA-Bde organic artillery to support precision firepower methods and suppression firepower methods. This eliminates the need for registration points, bracketing missions and observed adjustment.

Fire Support Specialists

2.87 OPA artillery forward observers (FOs) are expected to generate grid targets, transmit digitally, support precision fires, cue WLR counter-fire and provide terminal designation as well as conduct prolonged voice adjustment. At CA-Bde level, OPA FOs are no longer equipped solely as voice-reporting spotters, but operate as digitally networked target acquisition nodes within the brigade's reconnaissance–fire complex. In recent years, the OPA has fielded a suite of handheld and vehicle-mounted digital systems that enable FOs to detect, fix, transmit, and adjust targets directly into the brigade fires network without voice relays through battalion or brigade fire direction centres.

Integrated targeting Acquisition Devices

2.88 FOs are typically equipped with hand-held, multi-function integrated reconnaissance and target designation systems that combine a laser rangefinder, a digital magnetic compass, thermal and non-thermal imagers, a BeiDou-enabled GNSS receiver and an inertial measurement unit. These devices provide observer self-location, target bearing, range and elevation enabling FOs to generate grid-quality target coordinates suitable for immediate digital transmission to artillery units.

Digital Targeting Terminals

2.89 FOs are also equipped with ruggedised fire-support terminals or tactical tablets that support digital map display, target plotting, coordinate calculation, mission request formatting and ballistic message generation. These devices interface with brigade fire-control systems, artillery battalion FDCs and UAV ground control stations using secure tactical data links. These terminals enable digital calls-for-fire, automated fire mission processing, adjustment-of-fire messaging, battle damage assessments (BDA) reporting without reliance on voice radio nets.

Tactical Data Radios

2.90 FO terminals are connected via VHF/UHF software-defined radios, mobile ad hoc networks (MANET) and digital battlefield communication systems. These systems are used to support the encryption of target data transmission, near-real-time fire mission updates and networked sensor-to-shooter integration. These radios link observers directly to CA-Bde artillery battalions, brigade reconnaissance element, UAV operators and higher-echelon targeting networks.

UAV Integration

2.91 As well as being co-located with small UAS detachments and reconnaissance elements, CA-Bde FOs are likely to be equipped with FPV-capable quad-rotor ISR UAVs or mini-fixed wing UAVs. These systems can be used for launch point confirmation, fall of shot observation, BDA and counter-reconnaissance.

Forward Observation Vehicles (FOVs)

2.92 FOs are mounted in FOVs in manoeuvre brigades. FOVs are equipped with the equipment that has been identified in the previous paragraphs. Primary observer platforms are as follows:

a. The ZBD-04A Firepower Reconnaissance Variant which is employed in heavy (armoured) CA-Bdes

b. The ZBL-08 Reconnaissance/Artillery Observation Variant employed in medium (mechanised) CA-Bdes

c. CSK-181/CSK-141/CSK-131 Reconnaissance Variants employed in light (motorised) CA-Bdes.

2.93 More detailed information covering these items is detailed in Annex 2A.

UAV Fires

2.94 The OPA employs a layered mix of tactical ISR UAVs, armed UAVs and loitering munitions at the CA-Bde level. Unlike Western brigade combat teams that often rely heavily on higher-echelon UAV support, OPA CA-Bdes integrate UAVs directly into reconnaissance battalions, artillery target acquisition systems, and increasingly into combined reconnaissance–strike networks.

2.95 The table on the next page identifies the key armed or strike-capable UAV systems that are likely used at the CA-Bde level.

Table 2.3 – Key Armed/Strike-capable UAV Systems used at CA-Bde Level

System	Role	Likely employment	Key characteristics
CH-901	Loitering munition/ one-way attack UAV	Organic to reconnaissance, SOF, amphibious and light combined-arms elements	Tube-launched; anti-armour, anti-personnel, or radar attack; swarm-capable
Wing Loong 1	MALE armed UAV	Usually attached from higher echelon aviation/UAV formations in support of CAB operations	Precision strike with guided missiles/bombs; ISR + strike
BZK-008	Tactical ISR UAV with targeting support	Operated by CA-Bde reconnaissance battalions	Provides artillery targeting, BDA and reconnaissance
ASN-206	Tactical reconnaissance and targeting UAV	Group Army/CA-Bde fire support integration	Artillery spotting and target acquisition
FH-95	EW-enabled UAV/ strike coordination	Supports reconnaissance-strike complexes	Combines ISR, EW, and strike coordination
Commercial FPV-type UAVs	Improvised tactical strike UAVs	Company–battalion level	Increasingly observed in training and experimentation

Armed UAVs

2.96 The most significant CA-Bde-level armed UAV capability is the CH-901. It functions as both a reconnaissance system and a loitering strike munition .The system can be vehicle-mounted or man-portable and is intended to attack artillery systems, air defence radars, command posts, armour and point targets of opportunity. It is particularly important within the reconnaissance–strike system because it shortens the sensor-to-shooter chain. UAVs can identify a target and immediately prosecute it without waiting for tube artillery or rocket fires. CA-Bdes operate tactical UAVs directly linked to brigade firepower coordination centres to create a “sensor-to-shooter” network integrated with artillery and rocket forces.

2.97 The OPA is increasingly integrating small commercial-style quadcopters and FPV drones at company and battalion level. These systems are used for target confirmation, artillery adjustment, and BDA as well as direct attack, urban reconnaissance and EW-assisted targeting. This reflects the OPA’s shift from “informationised warfare” toward “intelligentised warfare,” where UAVs are not treated as auxiliary assets but as integral nodes within the system-of-systems reconnaissance-strike architecture.

2.98 More detailed information covering the CH-901 is detailed in Annex 2A.

Loitering Munitions (LM)

2.99 The OPA employs an expanding family of LM ranging from man-portable tactical systems to larger operational-level strike UAVs. These systems support reconnaissance–strike warfare, intelligentised operations and distributed precision strike. Loitering munitions are used to conduct dynamic targeting, suppress enemy air defences (SEAD), attack artillery and command posts as well as destroy armoured vehicles. They are also used to support urban operations, integrate ISR and strike functions, and conduct swarm attacks. They support battle damage assessment (BDA) and re-attack cycles.

2.100 OPA doctrine does not treat loitering munitions as isolated strike systems. They are integrated into the broader reconnaissance–strike complex and operate as part of a system-of-systems approach linking ISR, electronic warfare (EW), artillery, rockets, aviation and command networks.

2.101 More detailed information covering these items is detailed in Annex 2A.

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Section 2-14. Integration with other Operational Systems

2.102 Artillery is only one of several OPA operational warfare systems that are centrally controlled, digitally networked, mutually supporting and effects-generating subsystems. At CA-Bde and Group Army level, OPA joint operations integrate the following major systems:

a. The reconnaissance-strike system that detects, locates and nominates targets for artillery, rockets and aviation strike.

b. The firepower strike system, the effects arm of the recon-strike system, which delivers precision, saturation or suppression against nominated targets. Artillery is the tactical-strike subsystem which sits inside the reconnaissance strike system.

c. The information confrontation system, which degrades enemy sensing, decision-making and fire control networks, and will often precede CA-Bde artillery fires.

d. The air defence system, which protects artillery battalions, protects UAV networks, CPs and TA assets.

e. The manoeuvre system, which is supported by artillery shaping fires.

f. The command information system, which fuse ISR inputs, prioritise targets and assign fires.

g. The sustainment system, which sustain artillery rates of fire, UAV sortie rate and radar operations

2.103 Each of these is a warfare subsystem. Artillery only becomes decisive when reconnaissance–strike, Information confrontation and command information systems are functioning. If those systems are degraded the firepower strike system may still exist but cannot operate effectively. OPA artillery is functionally integrated into a set of mutually supporting warfare systems via the CA-Bde/Group Army command information system. This occurs through information integration, tasking integration and effects integration.

2.104 Artillery is provided with targeting data from a range of ISR assets including UAV, WLR, acoustic sensors, EW SIGINT and ground reconnaissance elements. These inputs are fused at the FA battalion FCCC, CA-Bde fires element and the Group Army FA Bde CP to generate target grid, type, engagement priority and required effects.

2.105 The command information system receives ISR inputs, de-conflicts targets and assigns strike assets. Artillery fire missions are digitally assigned via SDR/data terminal link and transmitted as target grid, azimuth of fire, fuse/effect and timing constraint to INS-oriented launchers.

2.106 Artillery fires are synchronised with manoeuvre, to suppress ATGM belts, obscure breach sites and isolate strongpoints to enable armoured/mechanised advance. Prior to engaging an enemy force with artillery fires EW assets will conduct GNSS denial operations, communications jamming and radar spoofing to support shoot-and-scoot missions. The air defence system protects artillery firing areas, UAV relay nodes and FDCs ensuring rates of fire can be sustained.

Section 2-15. Conclusion

2.107 The organisation of OPA indirect fires reflects a system-oriented approach to warfare that prioritises integration, tempo, operational reach and centrally coordinated firepower effects. Artillery is employed as part of a broader reconnaissance–strike system. This system links sensors, command systems, manoeuvre forces, UAVs, EW assets and precision strike capabilities into a unified operational framework. OPA indirect fires are characterised by mobility and the ability to conduct rapid displacement. Indirect fires are also structured around digital fire control, long-range precision engagement and the ability to compress sensor-to-shooter timelines through networked target acquisition and cross-cueing. This enables OPA artillery to rapidly mass effects without physically concentrating forces, while delivering suppression, disruption, destruction, and psychological effects across the depth of the battlespace.

2.108 OPA artillery organisational structures are designed to support both tactical responsiveness and operational-level massing of fires. CA-Bdes possess organic indirect fire systems able to provide immediate support to manoeuvre forces, while Group Army FA Bdes provide reinforcement, depth fires and long-range strike capabilities. Integrated target acquisition, UAV, EW, and command-and-control elements support continuous reconnaissance, dynamic targeting, and rapid re-engagement cycles. Collectively, these structures reflect the OPA's transition toward an increasingly informationised and intelligentised fire support system in which combat power is generated through the integration of sensors, decision-making, communications, and effects across the reconnaissance–strike network.

Annexes:

2A Tracked and Wheeled Self-propelled Tube Artillery

2B Tracked and Wheeled Self-propelled Rocket Artillery

2C OPA Radar Systems

2D Forward Observer Vehicles

2E Armed UAV

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Annex 2A Tracked and Wheeled Self-propelled Tube Artillery

1. OPA tracked and wheeled tube artillery provides responsive, mobile, and scalable fire support across tactical and operational levels of warfare. These systems are designed to deliver sustained suppression, precision strike, counter-battery fire, and deep interdiction in support of combined arms and joint operations. Tracked self-propelled systems are optimised for cross-country mobility and integration with mechanised and armoured formations during high-intensity manoeuvre operations. Wheeled systems prioritise operational mobility, rapid displacement, reduced sustainment burden and distributed employment across extended road networks.

2. Both tracked and wheeled artillery systems are integrated into the OPA's reconnaissance–strike architecture through digital fire control systems, Beidou navigation, UAV-enabled target acquisition and networked command systems. This enables rapid sensor-to-shooter integration, dynamic targeting, and dispersed fire delivery.

PLZ-05 (Type 05) 155mm Self-Propelled Howitzer

3. The PLZ-05 is the OPA's primary tracked 155 mm self-propelled howitzer employed in GA FA Bdes. It provides operational-depth fires in support of brigade and group army manoeuvre formations and has progressively replaced legacy 152 mm systems. Its adoption reflects the OPA's transition to digitally-networked, NATO-calibre 155 mm artillery capable of conducting short-duration, high-intensity fire missions under persistent ISR threat.

Figure 2A.1 – PLZ-05 155mm Tracked SPH

4. The PLZ-05 has a fully automated loading system, employs digital fire control and ballistic computation and uses an on-board inertial and Beidou-enabled navigation system. It is also equipped with integral NBC protection and an automated fire suppression system. It provides protection against 14.5mm anti-personnel rounds to the front and 7.62mm anti-personnel rounds to the side. These features enable rapid emplacement, firing, and displacement to mitigate vulnerability to drone-enabled counter-battery fires.

Table 2A.1 – Technical Information for PLZ-05

Calibre	155mm
Crew	4-5
Vehicle speed	50 km/h, 55km/h max
Vehicle range	550 km
Types of ammunition	Extended range full bore (ERFB) ERFB base bleed GP-1 laser-guide projectile WS-35 guided projectile Thermobaric DPICM Smoke WP Smoke BE Multi-spectral smoke BE ERFB illumination
Weapon range	100 km maximum with Beidou (GPS) guided projectile 58 km maximum with Rocket assisted projectile
Integral magazine	30 rounds
Burst rate of fire	4 rounds in about 15 seconds (multiple round simultaneous impact capable)
Sustained rate of fire	8-10 rounds/minute 3-5 rounds/minute continuous rate of fire
Emplacement time	30-60 seconds
Displacement time	30-60 seconds
Digital fire control	Yes
On-board navigation	Yes

PLZ-07 (Type 07) 122mm Self-Propelled Howitzer

5. The PLZ-07 is the primary tracked 122 mm artillery system organically assigned to heavy (armoured) CA-Bdes. It provides responsive, brigade-level indirect fires in direct support of manoeuvre battalions and has replaced earlier 122 mm tracked SP systems. Similar to the PLZ-05, the PLZ-07 utilises a digital fire-control system and employs satellite navigation.

Figure 2A.2 – PLZ-07 122mm Tracked SPH

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6. The PLZ-07 is also equipped with an integrated NBC protection system and an automatic fire suppression system. The carriage is based on an armoured ZBD-04 chassis providing protection against small arms fire and shell splinters. The PLZ-07 enables dispersed employment in support of forward manoeuvre elements while maintaining sufficient protection for operations in contact.

Table 2A.2 – Technical Information for PLZ-07

Calibre	122 mm
Crew	5
Vehicle speed	55 km/h cross country, 65 km/h max
Vehicle range	500 km
Types of ammunition	HE-Frag DPICM Extended Range Projectile Rocket Assisted Projectile Smoke WP IR-obscuring smoke (BE) Screening smoke (BE) Smoke marker (BE) Illumination Thermobaric/incendiary
Weapon range	HE-FRAG 18 km Extended Range Projectile 22 km Rocket assisted Projectile 27 km
Integral magazine	40 rounds
Burst rate of fire	6-8 rounds/minute
Sustained rate of fire	3-4 rounds/minute
Emplacement time	1-2 minutes
Displacement time	Less than 1 minute
Digital fire control	Yes
On-board navigation	Yes

PCL-09 122mm Self-Propelled Howitzer

7. The PCL-09 is a truck-mounted 122 mm self-propelled howitzer which provides high-mobility fires to light (motorised) and medium (mechanised) CA-Bdes. It represents the OPA's doctrinal shift toward mobility-based survivability, trading armour protection for rapid displacement and reduced emplacement time in counter-battery intensive environments. The PCL-09 employs a digital fire control system and on-board navigation.

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Figure 2A.3 – PCL-09 Wheeled 122mm SPH

8. The PCL-09 is highly mobile and has reduced emplacement and displacement times. It also has a lower visual and thermal signature compared to tracked SPs such as the PLZ-09. The PCL-09 is optimised for shoot-and-scoot employment and dispersed road-march manoeuvre, reducing vulnerability to persistent ISR and drone-enabled counter-battery engagement.

Table 2A.3 – Technical Information for PCL-09

Calibre	122 mm
Crew	4
Vehicle speed	85 km/h max
Vehicle range	800 km
Types of ammunition	HE-Frag DPICM Extended Range Projectile Rocket Assisted Projectile Smoke WP IR-obscuring smoke (BE) Screening smoke (BE) Smoke marker (BE) Illumination Thermobaric/incendiary
Weapon range	HE-FRAG 18 km Extended Range Projectile 22 km Rocket assisted Projectile 27 km Capable of firing 122 mm
Integral magazine	40 rounds
Burst rate of fire	6-8 rounds/minute
Sustained rate of fire	3-4 rounds/minute
Emplacement time	1-2 minutes
Displacement time	Around 1 minute
Digital fire control	Yes
On-board navigation	Yes

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Annex 2B
Tracked and Wheeled Self-propelled Rocket Artillery

9. OPA tracked and wheeled rocket artillery provides long-range, high-volume, and precision firepower in support of operational manoeuvre, deep strike, and system-level disruption. These systems are designed to attack enemy command and control nodes, air defence systems, logistics infrastructure, concentrations of forces and other high-value targets across extended distances.

10. Tracked rocket artillery systems are optimised for integration with mechanised formations and sustained operations in complex terrain, while wheeled systems prioritise strategic mobility, rapid deployment and dispersed employment across large operational areas. Modern OPA rocket artillery employs a combination of unguided, guided, and long-range precision munitions to support both saturation fires and precision strike missions.

11. These systems are integrated into the OPA's reconnaissance–strike complex through digital command networks, UAV-enabled target acquisition, satellite navigation, and multi-source sensor fusion. This enables rapid targeting, dynamic re-engagement, and coordinated long-range fires within an informationised and increasingly intelligentised operational environment.

PZH-10 122mm Multiple Launch Rocket System

12. The PHZ-10 is a tracked 122 mm multiple rocket launcher (MRL) system employed in heavy (armoured) CA-Bdes. It provides brigade-level saturation fires for the suppression of forward defensive positions, disruption of manoeuvre units and the neutralisation of light materiel targets. It replaces legacy towed 122 mm rocket systems and enables responsive, short-notice fire missions in direct support of manoeuvre battalions.

Figure 2B.1 – PZH-10 Tracked 122mm MRL

13. The PZH-10 employs a digital fire-control system and INS/GNSS-enabled on-board navigation reducing emplacement and displacement times, and the ability to conduct dispersed battery-level operations. The carriage utilises an armoured tracked chassis. The PHZ-10 supports shoot-and-scoot employment in forward areas while maintaining protection against small arms and shell fragments.

Table 2B.1 – Technical information for PZH-10

Calibre	122 mm
Crew	3
Vehicle speed	65 km/hr max
Vehicle range	500 km
Types of ammunition	HE-FRAG DPICM Smoke Incendiary Thermobaric Extended range
Weapon range	40 km standard rocket 50 km extended-range
Integral magazine	40 rockets
Burst rate of fire	20 seconds full salvo duration
Partial ripple rate of fire	Selectable
Emplacement time	1-2 minutes
Displacement time	Around 1 minute
Digital fire control	Yes
On-board navigation	Yes

PHL-90B (Type 90B) 122mm Multiple Rocket Launcher

14. The PHL-90B is a wheeled 122 mm MRL employed in light (motorised) and medium (mechanised) CA-bdes. It provides highly mobile saturation fires for area suppression, counter-mobility and interdiction. It represents a mobility-optimised alternative to tracked rocket systems. It has a high-degree of operational mobility capable of rapid emplacement and displacement.

Figure 2B.2 – PHL-09B Wheeled 122mm MRL

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15. The PHL-90B employs a digital fire-control system and is INS/GNSS enabled. It also has a reduced acoustic and thermal signature relative to tracked launchers. The PHL-90B is optimised for dispersed road-march manoeuvre and rapid relocation following fire missions in counter-battery-intensive environments.

Table 2B.2 – Technical Information for PHL-90B

Calibre	122 mm
Crew	5
Vehicle speed	85 km/hr, 80 km/hr cross-country
Vehicle range	800 km
Types of ammunition	HE-FRAG DPICM Smoke Incendiary Thermobaric Extended range
Weapon range	40 km standard rocket 50 km extended-range
Integral magazine	40 rockets
Burst rate of fire	18-20 seconds
Sustained rate of fire	Fires singly or salvos with 0.5 seconds between rounds
Emplacement time	Around 2-3 minutes
Displacement time	Around 1-2 minutes
Digital fire control	Yes
On-board navigation	Yes

PHL-03 (AR2) 300mm Multiple Rocket Launcher

16. The PHL-03 is a heavy wheeled 300 mm MRL employed in Group Army FA Bdes. It provides operational-depth fires against: command posts, artillery positions, logistics hubs, air defence systems and infrastructure nodes. The system supports deep shaping and interdiction operations beyond the range of organic CA-bde artillery.

Figure 2B.3 – PHL-03 Wheeled 300mm MRL

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17. The PHL-03 employs automated laying, on-board INS/GNSS navigation and digital fire-control systems. The PHL-03 enables short-duration saturation or precision fire missions followed by immediate displacement to mitigate detection by counter-battery radar and UAS.

Table 2B.3 – Technical Information for PHL-03

Calibre	300 mm
Crew	4
Vehicle speed	60 km/hr
Vehicle range	650 km
Types of ammunition	HE-FRAG DPICM Anti-armour sub-munition Thermobaric/fuel –air explosive (FAE) Guided precision Penetrating/hardened-target Incendiary
Weapon range	70km standard range 130km extended-range 130-220km guided
Integral magazine	12
Burst rate of fire	Salvo of 12 rockets in about 60 seconds
Sustained rate of fire	Fires singly
Emplacement time	Less than 5 minutes
Displacement time	1 minute
Digital fire control	Yes
On-board navigation	Yes

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PCH-191 Chinese Modular Long-Range Rocket Launcher

18. The PCH-191 is a modular, wheeled heavy rocket system that is slowly replacing the PHL-03 in FA Bdes. It provides a long-range precision capability and saturation fires targeting high-value operational targets, air defence systems, logistics and sustainment infrastructure as well as theatre-level fire support nodes It represents the OPA's transition to modular, precision capable rocket artillery.

Figure 2B.4 – PCH-191 Wheeled Modular Long-Range Rocket System

19. The PCH-191 uses a modular launch configuration of 300mm, 370mm or 750mm rockets with rapid re-load capability. It employs a digital fire-control system and an INS/GNSS-enabled on-board navigation system. The PCH-191 enables dispersed employment and precision engagement at extended ranges, reducing exposure to counter-battery engagement in ISR-saturated environments.

Table 2B.4 – Technical Information for PCH-191

Calibre	300 mm and 370 mm rockets, 750 mm tactical missile
Crew	4
Vehicle speed	75 km/hr max
Vehicle range	650 km
Types of ammunition	HE-FRAG (300mm rocket) Cargo/sub-munition (300mm rocket) Guided (300mm rocket) BRE6/Fire Dragon 220 (370mm) BRE8/Fire Dragon 280 (370mm) FD 480 tactical missile (750mm)
Weapon range	300 mm – up to 140 km 370 mm – up to 290 km 750 mm – 480 km
Integral magazine	Various
Burst rate of fire	INA
Sustained rate of fire	INA
Emplacement time	Around 2-3 minutes
Displacement time	Around 1-2 minutes
Digital fire control	Yes
On-board navigation	Yes

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Annex 2C
OPA Artillery Radar Systems

SLC-2 Counter-Battery Radar

20. The SLC-2 is the OPA's primary Group Army and CA-Bde-level weapon-locating radar. It is employed by the GA TA Battery and the CA-bde's target acquisition platoon. It is capable of detecting mortars, tube artillery and rocket artillery. It is frequently employed in forward areas to support time-sensitive counter-battery engagements.

21. The SLC-2 is capable of launch point estimation and impact prediction. It provides digital output data to a formation's fires network. It can also be used to cue tube and rocket artillery. The SLC-2 supports commanders by enabling responsive counter-battery fires against enemy systems operating beyond organic UAV coverage.

Figure 2C.1 – SLC-2 Counter Battery Radar

Table 2C.1 – Technical Information for SLC-2

Type	Counterbattery radar on 6x6 EQ2102 Truck
Crew	4
Vehicle speed	90 km/h max
Vehicle range	INA
Armament	Unarmed
Band	S-Band
Detection range	Artillery 35 km Rockets 50 km

BL-904 Counter-Battery Radar

2.109 The BL-904 is a legacy weapon locating radar but still widely fielded as a short-range counter-battery radar employed by target acquisition elements of the FA brigade and CA-Bde TA platoons. It is capable of detecting and tracking mortar rounds and artillery shells at the tactical level.

Figure 2C.2 – BL-904 Counter Battery Radar

Table 2C.2 – Technical Information for BL-904

Type	Artillery Location and Fire Correction Radar on 6x6 EQ2102 Truck
Crew	3
Vehicle speed	90 km/h max
Vehicle range	INA
Armament	Unarmed
Band	X-Band
Detection range	82 mm Mortar 15 km

SLC-7 Long Range Surveillance Radar.

2.110 The SLC-7 is a long range surveillance radar which can also be used as a long-range counter-battery radar. It is largely employed by theatre-level artillery units and in some cases may be employed by Group Army FA Bdes. It is designed to detect long-range tube artillery and heavy rocket artillery as well as tactical ballistic missile launches. It is primarily used to support operational-depth counter-fire and strike operations. The SLC-7 supports deep shaping operations by enabling engagement of enemy artillery and rocket systems beyond CA-Bde engagement depth.

Figure 2C.3 – SLC-7 Long Range Surveillance Radar

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Table 2C.3 – Technical Information for SLC-7

Type	Long range surveillance radar
Crew	INA
Vehicle speed	INA
Vehicle range	INA
Armament	Unarmed
Band	4th generation L-Band
Detection range	450 km
Targets	Able to detect fixed-wing aircraft, helicopters, drones, artillery, and rockets

702D Met Radar

22. The 702D Met Radar system. consists of two vehicle-mounted shelters. The Meteorological Radar Shelter provides radiosonde tracking and atmospheric data acquisition. The meteorological support shelter provides data processing and MET message generation. Both shelters are typically mounted on a 4×4 North-Benz 2629 truck chassis.

Figure 2C.4 – 702D Met Radar System

23. The meteorological radar shelter includes the circular tracking antenna assembly, the elevating ball-guide screw antenna positioning mechanism, a main control console, terminal computer and communications systems, a power distribution unit and an environmental control/air-conditioning unit. This provides automatic radiosonde tracking, atmospheric profile computation and fire-control formatted MET output.

24. At the tactical level the 702D enables real-time MET message generation rocket and SPH trajectory correction, first-round hit probability improvement and long-range dispersion reduction. This is especially important for PHL-03/PCH-191 heavy rocket fires, extended-range 155 mm missions and precision-guided artillery munitions.

Table 2C.4 – Technical Information for 702D

Type	Weather radar mounted on 6x6 EQ2102 truck
Crew	INA
Vehicle speed	90 km/g max
Vehicle range	INA
Armament	Unarmed
Band	INA
Detection range	200 km
Detection altitude	25,000 m

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Annex 2D
Forward Observation Vehicles (FOVs)

2.111 FOs are mounted in FOVs in manoeuvre brigades. FOVs are equipped with a suite of handheld and vehicle-mounted digital systems that enable FOs to detect, fix, transmit, and adjust targets directly into the brigade fires network without voice relays through battalion or brigade fire direction centres.

ZBD-04A Firepower Reconnaissance Variant

25. The ZBD-04A reconnaissance vehicle combines reconnaissance capability with the survivability and mobility of a mechanised combat vehicle. Unlike lightly protected reconnaissance vehicles, the ZBD-04A CRV can operate in high-threat environments alongside mechanised formations. Survivability measures include armoured protection, smoke grenade launchers, NBC protection systems, high mobility and displacement capability and digital communications enabling dispersed operations.

Figure 2D.1 – ZBD-04A Reconnaissance Variant

26. The retractable sensor mast also supports survivability by permitting reconnaissance from covered or defilade positions, reducing exposure to direct fire and counter-reconnaissance assets.

Table 2D.1 – Technical Information for ZBD-04A

Type	Tracked Amphibious Armoured Reconnaissance Vehicle
Crew	3
Passengers	up to 11
Vehicle speed	50 km/h cross country, 70km/h max 13 km/h swim speed
Vehicle range	500 km
Armament	12.7 mm HMG
Sensors	Telescopic mast with electro-optical and infrared (EO/IR) system, a laser-range finder, and an X-band radar.

ZBL-08 Reconnaissance/Artillery Observation Variant

27. The ZBL-08 Firepower Reconnaissance and Artillery Observation Variant is a specialised reconnaissance and target acquisition vehicle derived from the ZBL-08 (Type 08) 8×8 wheeled armoured vehicle family. The platform is designed to support PLA artillery, rocket artillery, and combined arms formations by conducting battlefield surveillance, target acquisition, artillery observation, and battle damage assessment (BDA) within the PLA reconnaissance–strike system.

Figure 2D.2 – ZBL-08 Reconnaissance Variant

28. The vehicle is assessed to incorporate a combination of mast-mounted electro-optical (EO) sensor systems, thermal imaging equipment, laser range-finders and laser target designators, and a battlefield surveillance radar. It is likely to be equipped with day/night observation systems, digital fire control and targeting terminals, satellite and tactical radio communications systems as well as battlefield management system (BMS) integration. The mast-mounted sensor arrangement enables the crew to conduct surveillance from concealed or defilade positions while minimising exposure of the hull. This supports survivability during reconnaissance and artillery observation missions.

Table 2D.2 –Technical Information for ZBL-08

Type	Wheeled 8x8 Armoured Reconnaissance Vehicle
Crew	3
Passengers	7
Vehicle speed	100 km/h max
Vehicle range	800 km
Armament	30 mm autocannon
Sensors	Telescopic mast with electro-optical and infrared (EO/IR) system, a laser-range finder, and an X-band radar.

CSK-181/CSK-141/CSK-131 Reconnaissance Variants

29. The CSK-181, CSK-141, and CSK-131 vehicle families are light tactical mobility platforms employed to support reconnaissance, command and control, fire support coordination, artillery observation, and target acquisition tasks at battalion, brigade, and Group Army level. These vehicles are designed to provide highly mobile reconnaissance and fire support teams with protected transport, communications, and sensor integration capabilities suitable for dispersed and rapidly manoeuvring operations.

30. The CSK-181, CSK-141, and CSK-131 reconnaissance and artillery observation variants provide highly mobile and digitally connected reconnaissance platforms capable of supporting distributed targeting and fire support operations. While less heavily armed and protected than tracked reconnaissance vehicles, they offer greater strategic and operational mobility, lower signature, and improved flexibility for dispersed reconnaissance tasks.

Figure 2D.3 – CSK-141 Reconnaissance Variant

31. The CSK-141 is a lighter protected tactical mobility platform employed primarily in reconnaissance, liaison, and light support roles. Compared to the CSK-181, it provides reduced protection and payload capacity but offers improved deployability and operational agility. The platform is likely used where speed and low signature are prioritised over protection, and terrain restricts larger reconnaissance vehicles. Its smaller physical and electromagnetic signature improves survivability during reconnaissance and artillery observation operations.

Table 2D.3 Technical Information for CSK-141

Type	Light Wheeled 4x4 Tactical Reconnaissance Vehicle
Crew	2
Passengers	9 or 1200 kg
Vehicle speed	135 km/h max
Vehicle range	500 km
Armament	Roof mounted 12.7mm HMG or 35 mm AGL
Sensors	Highly likely to carry YJ-17A Man portable GSR, Electro-optical, Thermal and Laser designators as well as communications equipment to permit

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Annex 2E
Armed UAV and LM

32. The OPA operates a range of lightweight and man-portable armed UAV and LM at the tactical level.

CH-901

33. The CH-901 is the most widely used tactical loitering munition used by the OPA. It can be deployed in several ways. It can be carried by soldiers in the field and launched out of a tube, as well as from vehicles, aircraft, and UCAVs. It can be readied and launched from its tube in 3 minutes. The drone then dashes to its target area at 180 km/h (110 mph), where it flies around for up to 60 minutes, at 100 km/h (62 mph) and at an altitude of 100 m (330 ft) to 150 m (490 ft).

34. Once a target is located using the drones electro-optical guidance, it dives onto its target at 288 km/h (179 mph) and detonates its warhead. The CH-901 can carry a 3.5 kg (7.5 lbs) high explosive warhead, a fragmentation charge, a shaped charge for penetrating armour, or a camera for reconnaissance. The drones can also be launched in waves to swarm and overwhelm enemies.

Figure 2E.1 – CH-901 UAV

Table 2E.1 – Technical Information for CH-901

Characteristic	Details
Role	Tactical loitering munition
Launch Method	Tube/canister launch
Range	Approximately 15–40 km
Endurance	Approximately 120 minutes
Warhead Types	HEAT and fragmentation
Guidance	EO/IR with operator control
Employment	Reconnaissance-strike and precision attack

Figure 2E.2 – Barrage Swarm Drone Launcher

35. The Barrage Swarm Drone Launcher can launch up to 48 CH-901 attack drones to saturate a target. The drones are launched with compressed air, then unfold their wings and fly to the target area with an electric-powered propeller. The launch vehicle is a variant of the DF EQ2050 vehicle.

36. It is likely that one vehicle with 48 CH-901 UAVs will be allocated to a manoeuvre company.

S570 Loitering Munition

37. The S570 loitering munition weapon system has a reconnaissance radius of up to 10 km and as a weapon has a lethal radius of about 8 meters. It is equipped with an IR and CCD guided system. It can be launched by an individual or by a launch vehicle.

Figure 2E.3 – S570 Loitering Munition

38. The S570 is mainly used to combat light armoured targets, buildings and cluster soldiers. The bomb is actually a small drone with a warhead propelled by a propeller and four folded wings are deployed to maintain flight stability after launch. Under the control of the operator the missile can accurately strike the target and penetrate more than 60 mm of armour. Up to six S570 LM can be carried in a backpack.

39. It is likely that a platoon will be allocated 18 LMs with three launchers.

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Table 2E.2 – Technical Information for S570

Characteristic	Details
Role	Tactical loitering munition
Launch Method	Tube/canister launch
Range	Approximately 10 km
Endurance	Approximately 25 minutes
Warhead Types	HEAT and fragmentation
Guidance	EO/IR with operator control
Employment	Reconnaissance-strike and precision attack

Tomahawk H16-V12

40. The Tomahawk H16-V12 is a heavy multirotor VTOL reconnaissance and strike UAV. It is a tactical armed quadcopter/octocopter-style UAV designed for reconnaissance, strike support, urban operations, and short-range tactical attack missions.

Figure 2E.4 Tomahawk H16-V12

41. The H16-V12 has been designed as a modular tactical support UAV capable of carrying multiple payload types. Reported payloads include grenade launchers, smoke munitions, tear gas grenades, stun grenades, small bombs and lightweight missiles. It is also capable of carrying ISR payloads as well as loudspeaker and psychological operations payloads.

Table 2E.3 –Technical Information for H16-V-12

Characteristic	Details
Role	Reconnaissance and strike
Launch Method	VTOL
Range	Up to 15 km
Endurance	Approximately 60 minutes
Warhead Types	Various
Guidance	BeiDou
Employment	Reconnaissance-strike and precision attack

42. The H16-V12 is significant because it reflects several broader OPA trends involving the development of unscrewed systems. These developments cover:

a. Low -cost expendable strike systems

b. Distributed tactical UAV operations

c. FPV-style tactical strike concepts

d. Integration of ISR and strike functions

e. Manned–unmanned teaming

f. Decentralised reconnaissance–strike capability.

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Chapter 3
Command and Control of Olvanan Artillery

The commander stands for the virtues of wisdom, sincerity, benevolence, courage and strictness.

Sun Tzu

The Art of War, Chapter 1 – Laying Plans, circa 512 BCE

Section 3-1. Introduction

3.1 This chapter describes how the Olvanan People's Army (OPA) commands, tasks, and re-tasks artillery and joint fires. It explains OPA command relationships, firepower authority, and task organisation constructs. OPA artillery command and control does not replicate Western General Support (GS) or Direct Support (DS) models. Instead, it is governed by:

a. Unified and centralised command

b. Unified planning and echeloned execution

c. Mission- and phase-based firepower tasking

d. Dynamic adjustment of command relationships.

3.2 OPA artillery employment is governed by the principle of unified planning, echeloned execution. This means planning authority is centralised at higher headquarters. Execution authority is bounded and conditional, and re-tasking authority remains predominantly above the manoeuvre echelon. OPA doctrine prioritises system-level optimisation over habitual support relationships.

3.3 The following table summarises the difference between the western and OPA models of command and control.

Table 3.1 – Comparison of OPA and Western Models of C2

Western model	OPA model
Artillery supports manoeuvre	Manoeuvre exploits fires
Support relationships define task	Firepower task defines relationship
DS stability valued	Dynamic re-tasking prioritised
Decentralised execution encouraged	Execution freedom constrained by central plan

Section 3-2. Terminology

3.4 The OPA distinguishes between firepower relationships and command modes. Firepower relationships are covered by the terms constituent, supporting, dedicated, and affiliated describe how artillery units are related to a manoeuvre formation. Command modes include the terms unified command, centralised command, and echeloned command describe how authority over fires is exercised across headquarters levels.

Core Command Constructs

3.5 OPA artillery command relationships define who controls fires and for what purpose. They are not equivalent to GS/DS categories. Key terms include:

a. Unified command describes how fires from multiple units are coordinated through a single headquarters. During an operation, all fires supporting the main effort are coordinated under one operational fire plan. For example, for a CA-Bde offensive this covers the organic FA battalion, an attached SP battalion, UAV strike systems and aviation so that they all contribute to the same targeting plan.

b. Centralised command describes how a higher headquarters directly controls firepower allocation and major strike decisions covering long-range and operational fires. For example a Group Army HQ controls heavy rockets, long-range SP artillery and counter-battery operations which enables it to concentrate fires at decisive points and avoid fragmented use of high-value firepower.

c. Echeloned command describes how firepower authority is distributed across command levels according to mission and range. Each formation commands its organic artillery. For example, a CA-Bde commander controls its CA-Bde field artillery battalion and coordinates brigade fire support. This enables the brigade to exercise immediate suppression and shaping fires during manoeuvre.

d. Adjustment of command relationships implements the temporary change in control authority. This term is used for phase shifts or re-prioritising transitions.

e. Firepower command authority identifies who has authority over the employment of fires. This is often retained at Group army level or higher.

Firepower Tasking Constructs

3.6 OPA artillery is task-organised through mission and priority assignment rather than permanent attachment. Key terms include:

a. Firepower employment covers the planning, allocation, sequencing and execution of fires. It is similar to western fires planning.

b. Firepower allocation covers the distribution of artillery across missions and phases and is similar to the western allocation of fires.

c. Firepower task means assigned mission, such as counter-battery and is similar to the western term 'fire mission'.

d. Priority firepower direction describes support to the axis of the main effort. In western terminology it is the same as 'supported unit'. However in OPA doctrine it is the axis that is supported not the unit.

e. Fire support priority refers to how fires are prioritised by time and by phase.

f. Dynamic adjustment is the term used to re-task fires as assessment changes. It is rapid and centralised. It is similar to how western artillery or fires are re-allocated.

Firepower Relationships

3.7 There are four relationships which cover command/support relationships described in OPA artillery doctrine:

a. Constituent refers to units that are organic to a formation and form an integral part of it.

b. Supporting refers to a unit that provides fires in support of another formation. Supporting units continue to be commanded by and receive their logistics from their parent headquarters but are positioned and given mission priorities by their supported headquarters.

c. Dedicated refers to a unit that is attached to a formation for a specific mission or period but still receives logistics support from its parent organisation.

d. Affiliated refers to a unit associated for coordination but not under direct command. Affiliated organisations are those of which operate in a unit's Area of Responsibility (AOR) in such a way that the unit may be able to sufficiently influence it to act in concert for a limited time.

Management of Firepower Relationships by Staff

3.8 Staff manage the four firepower relationships by adjusting command arrangements. For example:

a. Constituent firepower is managed by brigade staff controlling organic artillery battalion.

b. Supporting firepower is managed by higher headquarters allocating artillery to subordinate formations.

c. Dedicated firepower is managed by assigning artillery units to support a specific formation during a key phase.

d. Affiliated firepower is managed by temporarily attaching firepower to a formation for a specific mission.

e. This structure is effective because it connects doctrine (command constructs), organisation (headquarters), process (staff functions) and employment (firepower relationships).

Functional Groupings

3.9 OPA artillery is task-organised functionally, temporally, centrally and without habitual re-organisation. Units remain administratively intact. Task organisation exists in the fire plan, the command network and the targeting architecture. No physical grouping is required. Functional groups include:

a. A firepower unit is the smallest functional element capable of delivering a discrete fire mission. It is normally a single firing element or a small tactical grouping of weapons controlled together. Firepower units perform the physical delivery of fires. Typical missions include suppression, destruction, interdiction and counter-battery. For example, a 122 mm artillery battery may contain six guns, each of which can function as a firepower unit within a coordinated fire mission.

b. A firepower group is a temporary grouping of multiple firepower units organised to attack a specific target set or accomplish a mission. It represents a tactical fires package and may combine several systems such as a radar system (counter-battery), an artillery battery (tube artillery), rocket launchers (MRL systems), mortars (battalion mortar platoon) and loitering munitions. Firepower groups enable, concentration of fires, coordinated attack on targets and flexible mission execution. However they exist only as long as the mission requires.

Section 3-3. The Connection between Firepower Relationships and Command Modes

3.6 OPA command constructs provide the framework for employing firepower. Unified command ensures that all combat power supports a single operational design. Centralised command allows higher headquarters to control and allocate major firepower assets. Echelon command sequences combat power during different phases of the battle. The four firepower relationships are the practical mechanisms used to adjust command relationships and allocate firepower in accordance with these principles.

Unified Command

3.7 This command arrangement ensures that all combat systems operate toward a single operational objective under one commander’s intent. This does not mean every unit is permanently subordinate. Instead it means all combat power is coordinated through a single operational design. To achieve unified command headquarters align subordinate formations under a single operational command structure. Cross-domain forces are coordinated through joint command nodes and firepower resources are integrated into the overall battle plan. Command relationships therefore ensure that firepower supports the commander’s operational concept. Unified command normally employs constituent and supporting relationships as follows:

a. Constituent firepower includes all organic firepower units belonging to a formation such as a CA-Bde FA battalion and manoeuvre battalion mortars. This ensures immediate support of the commander’s mission and continuous fires integrated with manoeuvre.

b. Supporting firepower includes external units supporting the formation (for example, the Group Army FA Bde) while remaining under higher command. This enables the commander’s combat power to be reinforced while maintaining high-level coordination.

c. Unified command ensures that both organic and supporting firepower operate as part of a single operational fires plan.

Centralised Command

3.8 This command arrangement ensures that key combat resources, especially long-range firepower, remain under higher headquarters control. This enables concentration of fires, the coordination of operational effects and the prioritisation of targets across the battlespace. The higher headquarters retains authority over major firepower assets, allocates fires to subordinate units by mission or time period and avoids permanently attaching critical firepower resources enabling command relationships to remain flexible rather than fixed.

3.9 Centralised Command primarily employs supporting and affiliated firepower as follows:

a. Using supporting firepower higher-echelon artillery supports subordinate formations without transferring command authority. For example, a group army artillery brigade firing in support of a CA-Bde. The CA-Bde receives fire effects, not command of the artillery unit.

b. Affiliated units are temporarily attached to support a specific mission. They remain administratively under their parent formation but operate under another commander for a defined task. For example, a rocket artillery battery attached to a CA-Bde for a breakthrough operation to provide flexibility without permanently transferring units.

c. Centralised command ensures that high-value firepower can be massed and shifted between sectors.

Echelon Command

3.10 This command arrangement organises forces into successive operational layers, each with different roles during the battle. A typical structure consists of a first echelon, the initial engagement, a second echelon, exploitation or reinforcement and a reserve, a decisive commitment. As operations progress firepower resources may shift between echelons and artillery support priorities will change. Command relationships will be reconfigured to support the next operational phase. Echelon command commonly employs dedicated firepower as follows:

a. Dedicated firepower is assigned to a specific formation or mission for a defined period. For example, an artillery battalion allocated to support the main effort brigade during the breakthrough phase. Unlike supporting firepower, it is not shared across multiple formations during that phase.

b. This ensure continuous fire support during decisive operations.

c. Dedicated firepower enables the OPA to concentrate artillery effects at the decisive point of the battle.

Command Constructs Working Together

3.11 The three command constructs operate together as follows:

a. Unified command establishes the overall operational design, determines objectives and integrates manoeuvre and fires.

b. Centralised command determines who controls major firepower resources. The higher HQ retains control of long-range fires with resources allocated according to operational priorities.

c. Echelon command determines when and where firepower is concentrated during different phases of the battle. The first echelon receives initial support and the second echelon receives fires during exploitation.

Example Vignette.

3.12 A medium (mechanised) CA-Bde is conducting offensive operations with support from the FA bde. The operation will be conducted in three phases and supported by artillery assets as follows:

a. Phase 1 – Shaping. The Group army artillery brigade conducts counter-battery fires and deep interdiction as supporting firepower.

b. Phase 2 – Breakthrough. The CA-Bde's constituent FA battalion is assigned to the brigade main effort as dedicated firepower.

c. Phase 3 – Exploitation. A rocket artillery battery from the FA Bde is temporarily attached to exploitation force as affiliated firepower.

3.13 Western doctrine often focuses on unit command relationships whereas OPA doctrine focuses on firepower relationships linked to operational phases. The OPA approach emphasises centralised control of firepower, flexible task organisation and the concentration of fires at decisive points.

Section 3-4. Comparison with Western Doctrine

3.12 OPA doctrine deliberately avoids permanent Direct Support (DS) artillery relationships because it views artillery primarily as an operational firepower resource that must be concentrated and manoeuvred across the battlefield, rather than as a permanently paired support asset for manoeuvre units. The difference reflects deeper doctrinal principles about how combat power should be organised and applied. OPA doctrine has a preference for time-based firepower allocation stems from four main aspects of PLA operational thinking as follows:

a. Concentration of firepower

b. Firepower manoeuvre

c. Centralised firepower control

d. System-of-systems warfare.

Concentration of firepower

3.13 Decisive effects are created by massive, concentrated fires delivered at key moments and locations. If artillery battalions were permanently assigned to brigades, as in Western DS relationships, firepower would be distributed across the front with each brigade supported by its direct support artillery battalion. As per western doctrine each brigade retains its artillery regardless of whether it is the main effort. OPA doctrine considers this inefficient because it prevents the commander from massively concentrating artillery on the decisive sector. Instead, the OPA keeps artillery under higher command so that it can be shifted and concentrated. For example, multiple artillery battalions support one brigade during a breakthrough then shift to another brigade during exploitation. Accordingly firepower is temporally concentrated, not permanently distributed.

Firepower Manoeuvre

3.14 OPA doctrine treats artillery as a manoeuvre capability, similar to armoured forces. Firepower can be manoeuvred spatially (moving artillery units) and temporally (changing which unit receives fire support). Using time-based allocation the commander can move firepower between formations during the battle without physically relocating artillery units. In an offensive friendly artillery targets enemy artillery and air defence during the shaping phase. During the breakthrough in phase 2, multiple artillery battalions support the main effort brigade. In Phase 3, the exploitation, firepower shifts to exploitation forces. In a Western DS system, each brigade would normally keep its artillery regardless of phase. OPA doctrine instead shifts firepower according to operational timing.

Centralised Firepower

3.15 OPA command philosophy emphasises centralised control of major combat resources, particularly long-range fires. Higher headquarters typically retain control of rocket artillery, long-range tube artillery and operational firepower assets. This allows the commander to prioritise targets across the entire battlespace, coordinate deep and close fires and mass fires rapidly. Permanent DS relationships would decentralise firepower control to brigade commanders, which contradicts this principle. Instead, brigades request fire support while higher headquarters allocate artillery according to operational priorities.

System-of-Systems Warfare

3.16 Modern OPA doctrine regards fires as part of a networked reconnaissance–strike system. Artillery is integrated with UAV reconnaissance, electronic warfare, radar sensors, missile forces and aviation. In this system, firepower is assigned according to target priority rather than organisational relationships. Targets may be engaged by whichever strike asset is most suitable. For example, radar detects artillery, rocket artillery conducts counter-battery fire and artillery supports manoeuvre brigade. The decision is based on targeting logic, not on which artillery unit belongs to which brigade.

OPA Solution

3.17 Instead of permanent DS relationships, OPA doctrine allocates artillery according to time and mission priorities. For example:

a. H-30 to H-hour, artillery conducts counter-battery fire.

b. H-hour to H+60, three artillery battalions support the breakthrough brigade.

c. H+60 to H+120, artillery shifts to support the exploitation force.

3.18 The same artillery units support different manoeuvre formations at different times. Accordingly, manoeuvre commanders receive priority of fires, not ownership of artillery units. This approach allows commanders to mass artillery rapidly, shift fires between sectors, synchronise fires with operational phases and concentrate effects at decisive points. This approach aligns with the OPA's emphasis on high-intensity, short-duration firepower strikes.

Section 3-5. The OPA Firepower Command System

3.18 OPA artillery command and control is implemented through a layered firepower command system that links operational command constructs with specialised staff organisations. Unified command ensures that artillery fires support the overall operational design, while centralised command retains control of major firepower assets at higher headquarters. Echelon command sequences firepower across the phases of the battle.

3.19 These principles are executed through the headquarters and staff responsible for firepower planning, targeting, and fire control. Through these staff processes, commanders adjust firepower relationships to allocate artillery in accordance with operational priorities.

Firepower Command Structure

3.20 Rather than a single artillery headquarters controlling everything, the OPA distributes fire control responsibilities across several command nodes. Artillery C2 is layered with different headquarters as follows:

a. Military theatre firepower headquarters

b. Group army artillery headquarters.

c. Group Army FA Bde headquarters

d. CA-Bde headquarters

e. FA battalion headquarters.

Military Theatre Firepower Headquarters

3.21 This headquarters does not command artillery formations directly. Rather, it commands joint firepower effects, strategic strike systems and theatre reconnaissance-strike operations. Known as the Theatre Joint Firepower Coordination Centre (TJFCC), it is embedded within the Military Theatre Joint Operations Command Centre (MTJOCC).

3.22 The TJFCC is responsible for:

a. Strategic targeting covering campaign targets, operational centres of gravity and strategic interdiction

b. Joint reconnaissance–strike integrating satellite reconnaissance, long-range UAVs, cyber intelligence, SIGINT, EW collection and theatre radar networks

c. Theatre missile and rocket coordination covering long-range rocket artillery, ballistic missiles, cruise missiles, strategic rocket support, determining target assignment, strike sequencing and strike timing

d. Joint effects coordination synchronising rocket artillery, missile strikes, aviation, EW, cyber and information operations

e. Battle damage assessment (BDA) including ISR tasking, strike assessment, re-attack recommendations and target custody maintenance.

Group Army Artillery Headquarters

3.23 This headquarters functions as campaign firepower headquarters responsible for synchronising all fires available to the Group Army commander. Designated as the Group Army Firepower Coordination Centre (GAFCC), it is embedded within the Group Army headquarters rather than existing as a separate artillery command.

3.24 The GAFCC is responsible for:

a. Campaign Fire Planning including operational fire support plans, firepower phasing, campaign target prioritisation, counter-battery planning, deep battle support and the transition of fires between formations. This is where the Group Army commander's firepower concept is developed.

b. Firepower Allocation covering the allocation of FA Brigade battalions, theatre rocket support, army aviation strike assets, attached missile forces and EW effects. The GAFCC determines who gets fires, when they get fires and what effects are authorised.

c. Targeting and ISR Fusion integrating WLR (SLC-2 and SLC-7), UAV brigades, EW collection, SIGINT, theatre ISR feeds and satellite data. It produces high-payoff target lists, high-value target lists and firepower priority lists.

d. Counterbattery Coordination covering enemy artillery tracking, sensor tasking, counterbattery prioritisation and engagement recommendations. It coordinates WLR networks, UAV surveillance, 155 mm SPH battalions and 300 mm MRL battalions.

e. Deep Fires covering operational depth strikes, logistics interdiction, reserve disruption and command post attacks. Typical targets include brigade HQs, logistics hubs, air defence systems, bridges and assembly areas

f. Sustainment and Firepower Support covering ammunition forecasting, rocket allocation, fuel prioritisation and maintenance support. This is particularly important during high-intensity operations.

Group Army FA Bde Headquarters

3.25 The FA Brigade headquarters functions as an operational-level firepower coordination and target is to synchronise deep fires, counterbattery operations, ISR integration, EW support and theatre-level fire allocation in support of the Group Army or Expeditionary Force.

3.26 The FA bde headquarters consists of the following components:

a. The command group consisting of the brigade commander, political commissar, chief of staff and brigade staff. This element provides command authority, operational direction and political oversight.

b. The firepower operations and planning section which conducts fire mission planning, deep target engagement planning, fire support coordination measures, time-window fire allocation, priority target nomination, cross-boundary fire coordination as well as the construction of firepower timelines and sequencing. This section coordinates 155 mm SPH battalions, 300 mm MRL battalions, attached theatre rocket forces, aviation-delivered fires and naval fires (in littoral operations).

c. The reconnaissance–strike coordination cell which integrates UAV detachments, WLR detachments, EW targeting SIGINT, satellite and higher-echelon targeting feeds, target custody management and sensor-to-shooter coordination. Subordinate elements include a UAV control section, a counterbattery operations section, a target fusion section and a battle damage assessment section. This is the core of the brigade reconnaissance–strike system.

d. A communications and network section which is responsible for digital fire-control networks, datalink management, tactical communications, GNSS synchronisation and data relay for dispersed batteries. This section operates brigade fire-control servers, tactical data network nodes, relay UAV coordination and the encrypted digital fires network.

e. The electronic warfare and counter-reconnaissance liaison. Liaison coordinate GPS jamming, radar suppression, communications attack, UAV disruption and electromagnetic deception. This supports survivability and counter-targeting.

f. The sustainment and technical support section responsible for ammunition fore, radar maintenance, FCS calibration, recovery planning and displacement sustainment. This section supervises ammunition transfer points, mobile repair teams and technical diagnostic detachments

g. Given the counterbattery/UAV threat environment, the brigade HQ coordinates SHORAD coverage, camouflage and deception, displacement cycles, EMCON and survivability engineering.

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CA-Bde Headquarters

3.27 Within a CA-Bde headquarters, artillery command and control is managed primarily through the brigade operations staff. The key organisation is the firepower coordination element. CA-Bde HQ staff are responsible for:

a. Integrating fires with manoeuvre operations

b. Prioritising targets

c. Allocating brigade firepower

d. Requesting higher-echelon fire support.

3.28 These functions are usually performed within the operations section rather than a separate artillery headquarters. The table on the following page details the each of the staff elements in the headquarters and their role in the employment of artillery.

FA Battalion Headquarters

3.29 The FA battalion HQ is more tactical and execution-focused. Its purpose is to command firing batteries, process missions rapidly and maintain survivability during displacement operations. The FA battalion HQ consists of:

a. A command group which controls battalion tactical movement and fire mission execution. It comprises the battalion commander, political officer, deputy commander and chief of staff.

b. A battalion fire direction and firepower coordination element which is the battalion's central fire mission processing node. It receive missions from the CA-bde firepower coordination element, processes firing solution, assign batteries/platoons, coordinates simultaneous impact, executes rapid fire missions and manages battery displacement timing. It consists of a mission processing cell, a meteorological section, a survey/navigation section and a ballistic computation section.

c. A target acquisition and sensor section responsible for forward observer coordination, lightweight radar interfaces, acoustic detection integration and local target validation. Its responsible for tactical target acquisition within the brigade fire framework.

d. A Communications Section responsible for digital fire-control connectivity, battery communications, relay stations and alternate communications paths. It maintains fibre, radio and satellite redundancy as well as the battalion tactical data network.

e. A technical and maintenance section responsible for launcher repair, hydraulic system, FCS maintenance, navigation system maintenance, ammunition handling systems and generator support. OPA artillery systems are highly dependent on technical support.

f. A Sustainment Section responsible for ammunition resupply, fuel distribution, redistribution stock accounting, displacement sustainment and recovery coordination. It is integrated closely with brigade logistics.

OPA Artillery Command Posts (CPs)

3.30 Within the OPA command philosophy, artillery headquarters do not operate from a single static command post. Rather, headquarters are distributed across multiple command posts that collectively provide survivability, continuity of command, redundancy and operational flexibility under reconnaissance-strike conditions.

3.31 The FA-Bde and FA battalion headquarters employ a layered CP structure consisting of:

a. A base command post

b. An advance command post

c. A rear command post

d. A reserve/alternate command post.

3.32 These are not merely physical locations; they are functionally differentiated headquarters nodes.

FA Brigade Headquarters CP Structure

3.33 The FA Brigade HQ disperses its functions across all four CPs.

Base CP

3.34 The Base CP is the FA Bde's primary operational headquarters. Its role is operational firepower coordination, ISR fusion, deep targeting, sustainment coordination, long-range communications and theatre-level integration. This is the largest and most digitally connected node.

3.35 The base CP contains the firepower operations and planning section, the reconnaissance–strike coordination cell, the communications and network section, the sustainment and technical support section and the electronic warfare and counter-reconnaissance liaison.

3.36 The base CP remains further from the FEBA and displaces less frequently. It uses hardened or concealed positions, relies heavily on camouflage/deception and maintains extensive communications infrastructure. Because it emits significant electronic signature, survivability is heavily dependent on displacement planning, EMCON, decoys, fibre communications and terrain masking.

Advance CP

3.37 The Advance CP is the brigade's forward tactical fire-control node. It supports immediate fire support, dynamic targeting, offensive tempo and rapid counterbattery response. It is the brigade HQ element most closely linked to a manoeuvre headquarters.

3.38 Functions located at the advance CP include:

a. A forward firepower coordination element

b. A counter-battery coordination cell

c. A tactical reconnaissance–strike cell

d. Liaison teams.

3.39 The advance CP displaces frequently, operates with reduced staff, uses highly mobile vehicles, maintain low EM signature and relies on burst communications. This CP enables artillery responsiveness during fast-moving operations.

Rear CP

3.40 The Rear CP supports sustainment and continuity operations. It is less involved in tactical fires control and more focused on preserving operational endurance. It is responsible for logistics and technical support coordination as well as administrative and personnel functions.

3.41 The rear CP remains relatively static and is co-located with sustainment nodes. It has a reduced electronic signature and uses dispersed logistics points.

Reserve CP

3.42 The Reserve CP exists to ensure survivability and continuity of command. It is an alternate brigade headquarters, a command redundancy node and an emergency takeover HQ.

3.43 The Brigade Reserve CP maintains a duplicate operational picture and communications architecture as well as a backup fire-control capability. It is an emergency command authority staffed at reduced strength until activated.

3.44 The Reserve CP enables continuity after counterbattery attack, continuity after EW disruption, continuity after precision strike and rapid command reconstitution.

FA Battalion CP Structure

3.45 The battalion CP structure is smaller but conceptually similar.

Battalion Base CP

3.46 This is the primary battalion fire-control node. It contains the battalion fire direction element, mission processing, ballistic computation, communications and the survey/met section. It controls battery missions, fire sequencing and displacement timing. This is the battalion's primary tactical control node.

Battalion Advance CP

3.47 This is the forward tactical element supporting manoeuvre tempo. It includes a small fire mission team, FO/UAV coordination, liaison officers and rapid engagement authority. It moves with the lead firing batteries and the manoeuvre brigade TAC HQ.

Battalion Rear CP

3.48 This CP is focused on sustainment and coordinates ammunition replenishment, fuel, maintenance recovery vehicles and casualty evacuation. It is located near ammunition transfer points and the battalion logistics area.

Battalion Reserve CP

3.49 This CP maintains a redundant fire-control capability, alternate communications and emergency command succession. It allows the battalion to continue firing after counterbattery attack, UAV strike and EW disruption.

Operational Logic

3.50 This CP structure directly supports reconnaissance-strike warfare, distributed survivability, continuous fires under attack, rapid displacement and degraded communications operations

3.51 The key doctrinal principle is that the headquarters must survive long enough to preserve the kill chain. Notably, this differs from many western artillery headquarters, which are often more centralised, less dispersed, less redundancy-focused and less ISR-integrated.

3.52 The OPA model assumes that there is constant UAV observation, counterbattery threat, EW attack and precision strike exposure. Therefore the headquarters itself becomes a manoeuvre system.

Relationship between Command Constructs and Staff Roles

3.53 Links are as follows:

a. Unified command is achieved through the integration of fires planning staff within manoeuvre headquarters.

b. Centralised command is maintained because major firepower assets are controlled by higher-level firepower command posts.

c. Echelon command is implemented through staff planning that allocates firepower according to operational phases.

Interaction between CA-Bde HQ and FA Battalion HQ

3.54 The relationship between the two HQ is that the CA-Bde HQ decides what targets to engage and the FA battalion HQ decides how to engage them. Interaction between the two HQ is demonstrated in a typical targeting flow:

a. Reconnaissance assets detect a target.

b. Intelligence and operations staff at CA-Bde HQ evaluate the target.

c. CA-Bde HQ assigns a fire mission to the FA battalion.

d. FA battalion HQ calculates firing data.

e. Batteries execute the fire mission.

f. CA-Bde headquarters performs firepower coordination, while the FA battalion headquarters performs fire control.

3.55 The diagram on the following page depicts the layout of an FA battalion supporting its CA-Bde.

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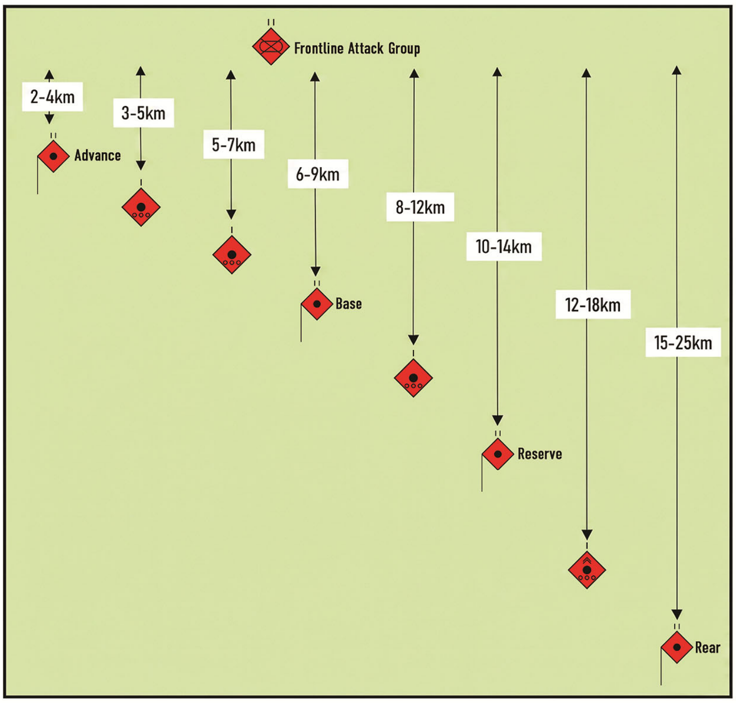
Figure 3.1 – FA Battalion Layout



Section 3-6. Integrating OPA Command and Control

3.45 Command and control of OPA artillery is best understood as a layered firepower management system that links command philosophy, staff processes, and tactical fire control nodes. Rather than relying on permanently assigned artillery units, the OPA employs a system that centralises control of major firepower assets while allowing commanders to allocate fires flexibly across the battlespace.

3.46 This system begins with the OPA's core command constructs. Unified command ensures that artillery fires support the overall operational design of the formation. Centralised command retains control of major firepower assets at higher headquarters, allowing commanders to concentrate artillery effects against decisive targets. Echelon command sequences firepower across the phases of the battle, enabling artillery to support shaping operations, breakthroughs, and exploitation in turn.

3.47 These command principles are implemented through a series of firepower relationships that determine how artillery is allocated to subordinate formations. Organic artillery battalions establish the brigade's constituent firepower, providing immediately responsive support to manoeuvre units. Higher-echelon artillery formations normally provide supporting firepower, remaining under their parent headquarters while delivering fires in support of subordinate brigades.

3.48 During critical phases of the battle, artillery units may be assigned as dedicated firepower to reinforce a specific formation, while affiliated firepower allows additional strike assets to be temporarily attached for particular missions.

3.49 The practical management of these relationships occurs through a distributed staff process within brigade and higher headquarters. Within a CA-Bde headquarters, intelligence staff analyse reconnaissance inputs to identify targets, while operations and firepower coordination staff prioritise those targets and integrate fires into the brigade's manoeuvre plan. These staff do not normally conduct fire-control calculations. Instead, they transmit fire missions to the FA battalion command post.

3.50 The FA battalion command post serves as the brigade's primary fire-control node. Its staff process target data, generate firing solutions, and assign artillery batteries to execute fire missions. Through digital communications networks linking reconnaissance elements, brigade headquarters, and firing units, the battalion command post translates operational firepower decisions into executable artillery engagements. At the firing unit level, battery command posts receive firing data from the FA battalion headquarters and direct individual guns or launchers to execute the mission. This layered structure allows artillery batteries to conduct multiple fire missions simultaneously while maintaining coordination with the brigade's overall fire plan.

3.51 Higher-echelon artillery headquarters, particularly Group Army artillery brigades, provide an additional layer of command and control. Their staff plan operational fires, integrate targeting information from multiple reconnaissance systems, and allocate artillery battalions to support subordinate formations according to operational priorities. By retaining control of long-range artillery and rocket systems, these headquarters enable the concentration and manoeuvre of firepower across the wider battlespace.

3.52 Together, these headquarters and staff processes form part of the OPA's broader reconnaissance–strike system, which links sensors, command networks, and strike assets into a continuous targeting cycle. Through this system, targets are detected by reconnaissance elements, prioritised by command staffs, processed by artillery fire-control nodes, and engaged by firing units. The result is a command architecture that emphasises centralised control of firepower, flexible allocation of artillery resources, and rapid sensor-to-shooter engagement.

3.53 This approach reflects the OPA's broader operational philosophy of concentrating firepower at decisive points while maintaining the ability to shift fires rapidly between formations and phases of the battle. By integrating command constructs, firepower relationships, staff processes, and artillery command posts within a single firepower management system, the OPA seeks to ensure that artillery remains responsive to manoeuvre commanders while still supporting operational-level objectives.

A Vignette – Artillery Command and Control Relationships

Situation

3.54 Following a successful amphibious landing an OPA mechanised CA-Bde has assumed responsibility for the advance and capture of a major town with port and airfield facilities to the north-east. The brigade is advancing along the single coastal road through dense jungle terrain against a delaying enemy battlegroup supported by an artillery regiment equipped with self-propelled howitzers, TPQ-53 weapon locating radars, UAVs and a Light Electronic Warfare Team (LEWT).

3.55 The CA-Bde's organic fires capability includes its constituent FA battalion of three 122mm self-SPH batteries and one 122mm MRL battery. The CA-bde's three manoeuvre battalions, each have a 120mm mortar company (six PLL-05 self-propelled mortars). To support the operation the FA bde has allocated the following fires assets:

a. A dedicated 155mm SPH battery

b. A dedicated SLC-2 WLR detachment

c. A dedicated ASN-209 UAV detachment

d. A supporting 300mm MRL battery.

3.56 Remaining FA Bde assets and theatre-level fires assets remain affiliated.

3.57 The dedicated assets remain under the administrative control of the FA Brigade but are placed under mission authority of the CAB for the duration of the operation. The 300mm MRL battery remains under direct control of the Expeditionary Force and is employed only against approved operational-level targets.

3.58 The FA Bde deploys its headquarters using four command posts:

a. Located approximately 40 km behind the forward line the FA Bde Base Command Post (BCP) is responsible for sustainment coordination, ammunition management, personnel administration, long-range fire planning, liaison with Expeditionary Force Headquarters and reserve target development. The BCP maintains continuous communications with all subordinate artillery battalions and controls the brigade's sustainment network.

b. Located approximately 10–15 km behind the lead CAB elements the FA Bde Advance Command Post (ACP) is the primary operational headquarters. It is responsible for current operations, dynamic targeting, counter-battery operations, UAV integration, fire mission approval and coordination with CA-Bde Headquarters. The ACP serves as the principal interface between the FA Bde and the CA-Bde.

c. The Brigade Rear Command Post (BRCP) is responsible for ammunition distribution, maintenance coordination, recovery operations and route management. The RCP controls movement of ammunition and repair assets forward tBResCP) is a small survivable command element prepared to assume control if the ACP is destroyed or communications are disrupted.

3.59 The CA-Bde also employs a distributed headquarters structure:

a. The CA-Bde Advance Command Post controls the brigade battle. It is responsible for current operations, ISR synchronisation, fire support coordination and air-ground integration. The FA Bde ACP maintains a liaison team within the CA-Bde ACP.

b. The CA-Bde Rear Command Post controls sustainment operations and coordinates support to the FA battalion.

3.60 The CA-Bde FA Battalion employs four command elements:

a. The FA battalion Advance Command Post (ACP) is located near the CA-Bde ACP. It is responsible for fire direction, fire mission processing, counter-battery engagement coordination and coordination with supported manoeuvre battalions.

b. The FA battalion Base Command Post (BCP) is responsible for fire planning, ammunition accounting, future operations and communications management

c. The FA battalion Rear Command Post (RCP) is responsible for ammunition redistribution, maintenance and recovery and casualty evacuation

d. The FA battalion Reserve Command Post (ResCP) is prepared to assume control following enemy attack or communications failure.

Sequence of Events

3.61 At 0930 hours, a CH-802 UAV from the CA-Bde reconnaissance battalion detects an enemy artillery firing position approximately 18 km ahead of the lead battalion. The UAV operator transmits the target to the CA-Bde ACP. Simultaneously, the dedicated ASN-209 UAV detachment confirms the target while the dedicated SLC-2 radar begins tracking outgoing artillery trajectories.

3.62 The target is immediately passed to the CA-Bde ACP, the FA Bde ACP and FA battalion ACP. As the target is a confirmed enemy artillery battery, engagement authority has already been delegated by the Expeditionary Force Headquarters.

3.63 The FA battalion ACP develops the initial fire plan. The battalion commander proposes one battery of 122mm SPHs for immediate suppression, the dedicated 155mm battery for destruction fires and the SLC-2 WLR for battle damage assessment and re-engagement.

3.64 The proposed mission is transmitted digitally to the FA Bde ACP. The Brigade ACP reviews the mission and confirms no conflict exists with planned deep-fire operations. Approval is granted within minutes.

Execution

3.65 At 0936 hours one constituent 122mm battery conducts suppression fire. The dedicated 155mm battery conducts destruction fire. The enemy battery ceases firing and begins displacement. The SLC-2 radar detects movement while the ASN-209 UAV tracks the withdrawing guns.

3.66 The Brigade ACP assesses that the target is escaping beyond the effective range of the FA battalion. The ACP therefore submits a strike request to Expeditionary Force Headquarters for employment of the supporting 300mm rocket battery.

3.67 At 0941 hours approval is granted. Four 300mm precision-guided rockets strike the route network ahead of the withdrawing battery. The remaining enemy guns are destroyed while the road is temporarily blocked by crater effects.

Command Relationships Demonstrated

3.68 This action highlights the layered relationship between OPA artillery headquarters as follows:

a. The CA-Bde Headquarters is responsible for determining operational priorities, requesting fire support and integrating fires with manoeuvre.

b. The CA Bde FA Battalion is responsible for immediate tactical fires, processing fire missions, controlling constituent artillery assets and coordinating mortar and artillery support.

c. The FA Bde ACP is responsible for synchronising brigade-level fires, integrating dedicated assets, managing counterbattery operations and coordinating deep fires.

d. The Expeditionary Force Headquarters is responsible for release authority for operational-level fires, employment of supporting rocket forces and the prioritisation of theatre-level targets.

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3.69 This vignette demonstrates that OPA artillery is neither fully centralised nor fully decentralised. Tactical engagements are normally prosecuted by the CA-Bde FA Battalion using constituent and dedicated assets under delegated authorities. The FA Bde ACP acts as the critical coordinating headquarters that links the CA-Bde's immediate fire support requirements with the Expeditionary Force's broader reconnaissance-strike system.

3.70 Supporting and affiliated assets, particularly long-range rocket artillery, remain centrally controlled and are committed only when their effects contribute directly to operational objectives. This arrangement enables rapid tactical responsiveness while preserving higher headquarters' ability to mass firepower against decisive targets.

Section 3-7. Conclusion

3.52 OPA artillery command and control is characterised by the integration of centralised authority, distributed execution, and system-level coordination. Firepower relationships, tasking constructs, and functional groupings provide the framework through which artillery capabilities are allocated, prioritised, and synchronised across the operational battlespace. Rather than relying on fixed support relationships, the OPA employs flexible command arrangements that enable rapid reallocation of firepower in accordance with changing operational priorities, targeting requirements, and temporal windows of opportunity. This approach is reinforced through a combination of unified, centralised, and echeloned command modes, allowing higher headquarters to retain control of strategic effects while delegating routine engagement authority to subordinate formations where responsiveness and tempo are critical.

3.53 The effectiveness of the OPA command system is therefore dependent on the integration of digital command networks, reconnaissance–strike systems, sensor-to-shooter architectures, and coordinated decision-making processes. Command and control is not treated as a discrete headquarters activity, but as an integrated combat function linking targeting, intelligence, manoeuvre, sustainment, electronic warfare, air defence, and fires into a single operational system.

3.54 Through this integration, OPA artillery C2 seeks to reduce decision latency, accelerate kill chains, maintain operational tempo, and concentrate effects across multiple domains simultaneously. The result is a command architecture designed to support continuous, adaptive, and system-focused firepower employment within informationised and increasingly intelligentised warfare.

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Chapter 4
Employment of Olvanan Artillery

In battle, there are not more than two methods of attack—the direct and the indirect.

Sun Tzu

The Art of War, Chapter 5 – Energy / Strategic Military Power, circa 412 BCE

Section 4-1. Introduction

4.1 Artillery provides the CA-Bde with responsive, scalable, and all-weather firepower to shape the battlespace, enable manoeuvre, and generate decisive effects. Within the OPA construct artillery functions as a component of a broader firepower system, integrated with reconnaissance, electronic warfare, information systems, and joint fires to deliver coordinated effects against the enemy as a system.

4.2 This chapter provides the doctrinal framework for the employment of artillery within CA-Bde operations. It explains how fires are designed, allocated, and synchronised across offensive and defensive operations, complex terrain, and contingency and limited operations. It establishes how artillery contributes to integrated firepower strikes by linking delivery methods to desired effects, and by integrating CA-Bde and Group Army capabilities to generate coherent, system-wide outcomes.

Fires as Effects, Not Platforms

4.3 OPA doctrine distinguishes between the means of delivering firepower and the effects those fires are intended to achieve. This distinction underpins how artillery is integrated within a system-of-systems approach to warfare.

4.4 Methods of fire delivery describe how firepower is applied. This includes the use of tube artillery, rocket systems, mortars, and other delivery mechanisms, as well as the trajectories, control measures, and technical processes required to place munitions on target.

4.5 Types of fire describe the purpose of the fire mission. These are defined by the effects sought, such as suppression, destruction, interdiction, or precision strike.

4.6 Commanders do not employ artillery based solely on available platforms. They assign firepower tasks based on the effects required, and then allocate the most appropriate delivery methods to achieve those effects. This allows fires to be composed, adjusted, and reallocated dynamically in response to the situation.

Section 4-2. Methods of Fires Delivery

4.7 OPA doctrine, methods of delivery describe the technical and organisational means of putting munitions onto a target and covers the system, trajectory, and control method used to deliver effects. Typical delivery methods include:

a. Direct versus indirect fire

b. Trajectory-based delivery

c. Precision and area delivery

d. Platform based delivery.

Direct versus Indirect Fire

4.8 The distinction between direct fire and indirect fire is doctrinally grounded in line-of-sight, targeting methodology, and kill chain structure. It is not defined by the weapon system alone, but by how that system is employed within the engagement process.

4.9 Direct fire is engagement of a target that is visible to the firer, using a line-of-sight trajectory, where the firer can observe and adjust fire directly onto the target. Characteristics include:

a. The firer has line-of-sight (LOS) of the target maintaining visual or sensor-based contact with it.

b. The projectile has a flat trajectory, low-angle, high-velocity flight path.

c. The ability to detect, identify and engage the target, and adjust fire when required are co-located.

d. There is minimal delay between acquisition and engagement.

e. Terrain, weather, and sensor capability constrain employment.

4.10 Direct fire weapons are typically used in close combat and manoeuvre support and anti-armour engagements. Tank main guns engaging armour, IFV cannons engaging infantry or vehicles and ATGM teams engaging visible targets are examples of direct fire.

4.11 Indirect fire is engagement of a target that is not visible to the firer, using a predicted ballistic solution, based on target data provided by external observers, sensors, or targeting systems. Indirect fire has the following characteristics:

a. There is no LOS requirement and targets may be masked by terrain or be located beyond the horizon.

b. Projectiles follow a curved flight path.

c. Indirect fire use distributed control involving observers/sensors, a fire direction centre (FDC) and the firing unit.

d. Accurate indirect fire is data-dependent requiring survey, meteorological data, and ballistic computation.

e. Indirect fire enables the engagement of targets across the depth of the battlespace.

4.12 Indirect fire is useful for shaping fires (deep, close, and rear), suppression, neutralisation, and destruction, counter-battery and interdiction, and fires in support of manoeuvre. Examples of indirect fire include the use of 155mm SP howitzers engaging targets at operational depth, MRL systems conducting area or precision strikes and mortars engaging defilade or reverse-slope positions.

4.13 Direct fire represents a self-contained kill chain, where the firing platform integrates sensing, decision, and engagement functions. Indirect fire operates within a reconnaissance–strike system where sensors (such as UAVs, WLR, observers and EW) generate targeting data. Command and fire control elements process and prioritise targets using this data and fire units execute effects at range. Accordingly, indirect fire is a system-dependent capability, requiring accurate spatial, atmospheric, and temporal data, robust C2 and fire control architecture and integration across multiple echelons. Direct fire, by contrast, remains decisive in close combat, where immediacy and visual control outweigh the advantages of range and system integration.

Trajectory-based Delivery

4.14 As a fires concept trajectory-based delivery classifies and employs weapons based on the shape, control, and predictability of the projectile's trajectory rather than simply by platform or calibre. It is particularly useful because it links weapon employment to effects, terrain, and target exposure within the broader reconnaissance–strike system.

4.15 Trajectory-based delivery refers to the employment of fires according to the type of trajectory used to reach the target, and the associated ballistic, geometric, and control characteristics of that trajectory. In practical terms, it answers the question, "How does the munition travel to the target, and what does that enable or constrain?"

4.16 Core trajectory types include:

a. Low angle (LA) trajectory

b. High angle (HA) trajectory

c. Variable trajectory

d. Ballistic rocket trajectory

e. Controlled/guided trajectory.

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4.17 A low angle trajectory is a relatively straight, shallow flight path with minimal curvature. It is characterised by a high velocity and short time of flight, and consequently it is less sensitive to meteorological variation. It has limited ability to engage defilade targets.

4.18 A high angle trajectory has a steep, curved ballistic arc allowing the munition to descend onto the target. Using high trajectory enable the engagement of targets that ae behind terrain and in defilade. It has a longer time of flight and therefore is more sensitive to environmental factors requiring a full ballistic solution (covering MET, survey and MV) to achieve accurate fire.

4.19 High-angle fires have a number of constraints:

a. A longer time of flight makes it more susceptible to detection by WLR. Steep ballistic arc are easier to track and are more predictable in trajectory reconstruction. Consequently the enemy is able to produce faster and more accurate counter-battery solutions.

b. High-angle trajectories occupy vertical battlespace, often overlapping with UAV flight paths, aviation corridors and loitering munitions creating airspace coordination constraints. This requires the use of formal airspace coordination measures (ACMs) creating potential delays in clearance of fires. There is also the potential for increased risk of fratricide in congested airspace.

c. An increased counter battery threat potentially increase the logistics burden. More rounds may be need to achieve the required effect due to dispersion and reduced lethality against some targets. Increased ammunition expenditure rates increase the logistics burden of ammunition resupply.

d. The use of high-angle fires reduce accuracy and adjustment of fire is often required before fire-for-effect increasing the time to achieve effective engagement.

4.20 High-angle fires trade access and flexibility for time, accuracy sensitivity, survivability risk, and system dependence. They are therefore most effective when they are integrated into a networked fires system, supported by robust target acquisition and fire control, and employed deliberately against appropriate target sets and terrain conditions.

4.21 A variable trajectory is achieved by systems capable of adjusting elevation to achieve either low-angle or high-angle trajectories depending on the mission. OPA tube artillery platforms are capable of variable trajectory. Trajectory management enables the platforms to achieve clearance of obstacles, the desired impact angle and synchronisation using high and low trajectories to achieve time-on-target. Whilst this allows for engagement optimisation for terrain and target type there is a trade-off between time of flight, accuracy, and angle of fall.

4.22 The distinction between low trajectory and high trajectory is formally defined by the quadrant elevation (QE) of the weapon relative to the horizontal plane. In artillery terms, this is a mathematical and ballistic boundary condition, not just a descriptive one. 45 degrees quadrant elevation (QE) is the theoretical maximum range elevation in a vacuum (no drag), forming the doctrinal dividing line between the two regimes.

4.23 At 45 degrees elevation a projectile achieves maximum horizontal range (in ideal conditions) and there is a balance between vertical and horizontal velocity components creating the two distinct regimes:.

a. A low-angle elevation is achieved at a QE of less than 45 degrees where the horizontal velocity of a projectile is dominant, the trajectory is flatter and a longer range can be achieved for a given charge.

b. A high-angle elevation is achieved at a QE of greater than 45 degrees where the vertical velocity of a projectile is dominant, the trajectory has a steeper ascent and descent, and a shorter range is achieved but there is a greater angel of fall.

4.24 This is summarised in the following table.

Table 4.1 – Trajectory Parameters

Parameter	Low Trajectory	High Trajectory
Quadrant Elevation	Typically ~0°–45°	Typically ~45°–70°+
Velocity distribution	Horizontal > Vertical	Vertical > Horizontal
Range efficiency	Maximised	Reduced
Angle of fall	Shallow	Steep
Clearance capability	Limited	High (can clear obstacles/terrain)

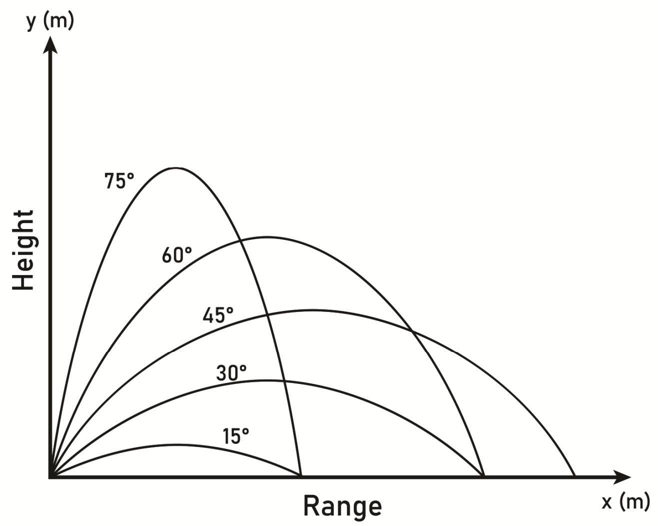
4.25 The 45-degree boundary is a technical divider, but the choice of trajectory is tactical. Commanders and fire planners select:

a. Low-angle trajectories when range and speed are prioritised and the target is exposed

b. High-angle trajectories when terrain masking must be overcome and vertical effects (top-down, defilade) are required/

4.26 Consequently elevation is not just a firing parameter. It is also a means of shaping effects through trajectory selection.

Figure 4.1 – Trajectories



Precision and Area Delivery

4.27 The distinction between precision delivery and area delivery is concerned with how fires achieve effects on a target set. Specifically, whether effects are concentrated on a single point or distributed across a defined area. In OPA doctrine, this maps directly to firepower methods such as precision strike and area coverage or suppression fire.

4.28 Precision delivery is the employment of fires to achieve effects on a specific point target or discrete aim-point, typically with minimal dispersion and limited collateral effects. Precision delivery is characterised by:

a. A point-target focus

b. A low circular probable error (CEP) where there is high accuracy relative the size of the target

c. The use of controlled effects designed to minimise collateral damage

d. Often guidance-enabled using INS/GNSS, laser, imaging, or terminal correction

e. Reduced ammunition expenditure where fewer rounds are required to achieve the desired effect.

4.29 Circular error probable (CEP) is a measure of a weapon system's precision. It is defined as the radius of a circle, centred on the aim point, that is expected to enclose the landing points of 50% of the rounds. That is, if a given munitions design has a CEP of 10 m, when 100 munitions are targeted at the same point, an average of 50 will fall within a circle with a radius of 10 m about that point.

4.30 Precision delivery is predominantly used for the destruction of high-value targets (HVTs), counter-C2, counter-ISR and counter-fire nodes, shaping operations prior to manoeuvre and to enable system paralysis within the reconnaissance–strike complex.

4.31 Typical munitions include:

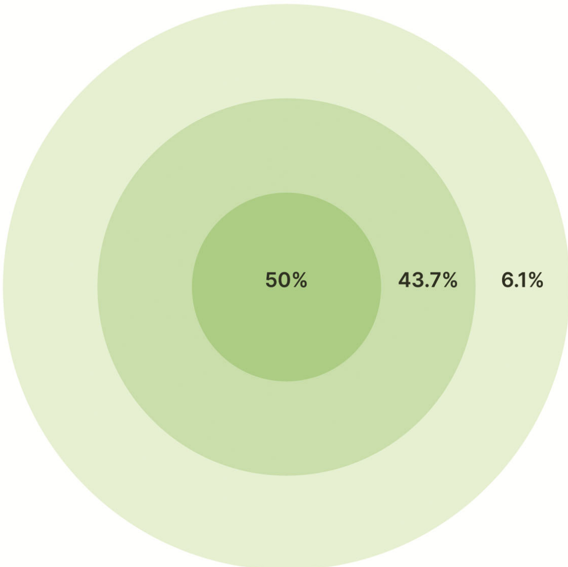
a. Guided artillery rounds (e.g. laser/GNSS)

b. Guided rockets (e.g. PCH-191 precision rockets)

c. ATGMs and top-attack munitions

d. Loitering munitions.

Figure 4.2 – Circular Probable Error



4.32 Area delivery is the employment of fires to achieve effects across a defined area, using dispersion, volume, or patterning to engage multiple targets or compensate for uncertainty in target location. Area delivery has the following characteristics:

a. It has an area-target focus with targets such as troops, assembly areas, logistics nodes, artillery positions

b. It has dispersion-based effects where lethality achieved through coverage rather than pinpoint accuracy

c. It focuses on using volume of fire where multiple rounds or rockets delivered to saturate the area

d. There is a tolerance of target uncertainty but fires can be effective even with imprecise target location

e. There is a higher ammunition expenditure where effects achieved through mass.

4.33 Area delivery is used for the suppression and neutralisation of enemy forces, fixing enemy manoeuvre elements, area denial and interdiction and preparation fires and firepower shaping.

4.34 Typical systems include:

a. Unguided artillery (122mm/155mm HE)

b. MRL systems (122mm, 300mm rockets)

c. Mortars (especially in suppression roles)

d. Cargo/cluster-types

4.35 Precision and area delivery are complementary firepower methods employed within the same system. Precision delivery supports system destruction (such as key nodes and decision centres) and disruption of enemy C2, ISR, and fires networks. Area delivery supports system suppression (for example, forces, formations and manoeuvre elements) and the creation of temporal and spatial windows for manoeuvre. Effective fire planning integrates both methods. Precision fires are used to remove key enablers whereas area fires degrade the broader system and fix forces.

4.36 Precision delivery is often associated with controlled trajectories (for example, guided munitions) and, accurate targeting data and sensor integration. Area delivery is often associated with ballistic or unguided trajectories and the use of dispersion and volume to achieve effect. However, this is not absolute. Tube artillery can deliver precision (guided rounds) or area (HE volleys). MRLs can shift from area saturation to precision strike with guided rockets.

4.37 Commanders integrate both to achieve simultaneous system disruption and force suppression, aligning effects against critical nodes and broader formations within the battlespace.

Platform-based Delivery

4.38 Platform-based delivery refers to the employment of fires categorised by the weapon system or platform delivering the munition, such as tube artillery, rocket artillery (MRL), mortars, direct-fire systems (such as tanks, IFVs and ATGMs) and UAV-delivered or loitering munitions. The focus is on what system is firing rather than how is it firing or “what effect is being achieved.

4.39 Major platforms used by the OPA include:

a. 122mm and 155mm tube artillery platforms capable of delivering variable trajectory fires, capable of both precision and area delivery. They provide responsive, flexible fires in close and deep battle, and are the core of brigade-level organic firepower.

b. 122mm and 300mm rocket artillery (MRL) platforms which use ballistic rocket trajectories, also capable of both precision and area delivery. They provide rapid massing of fires as well as deep strikes and operational-level effects.

c. Light, medium and heavy mortar (60-120mm) platforms which deliver high-angle fires. They provide immediate, organic fires at battalion level and are effective in complex terrain (such as urban, jungle and mountains).

d. Direct-fire platforms including tanks, IFVs, ATGM teams delivering flat-trajectory, line-of-sight fires. They are used in close combat, anti-armour and direct support to manoeuvre.

e. Aerial/loitering platforms including UAVs, loitering munitions and attack aviation which make use of controlled or guided trajectories. They are used for precision engagement of high-value targets and also persistent ISR-strike integration.

4.40 Platform-based framing provides organisational clarity aligns directly with unit structure and ORBATs this useful for planning at CA-Bde FA battalion and Group Army FA-Bde. It simplifies ammunition planning, maintenance and resupply as each platform has distinct sustainment requirements. it also maps cleanly to command relationship, for example organic (constituent) fires and reinforcing/ supporting fires.

4.41 Platform-based framing also has its limitations. It does not describe effects. For example a 155mm howitzer can deliver precision fires, area fires and uses both high-angle and low-angle trajectories. By referring to only the platform does not explain how it is employed.

4.42 Platform-based thinking can mask sensor–shooter relationships, and the role of UAVs, WLR and EW in targeting. In OPA doctrine, the system matters more than the platform. Using platform-based framing also reduces flexibility in planning.

4.43 A platform-centric construct encourages prescriptive allocation, for example, assigning rockets to one target set and guns to another, rather than selecting fires based on the required effect and prevailing conditions. The employment of artillery should be effects-driven and condition-based with platforms chosen to deliver the desired outcome.

4.44 OPA doctrine prioritises the reconnaissance-strike system where sensing, decision-making and fires are integrated across a network. A platform-centric approach does not adequately represent the distributed, system-of-systems nature of networked fires.

4.45 In an OPA context platform-based delivery uses a force structure lens. Trajectory-based delivery uses a physics/employment lens. Precision versus area delivery uses an effects lens. OPA doctrine prioritises effects then trajectory then platform (in that order). This means the commander defines the desired effect (for example, destroy, suppress or disrupt) and then selects the appropriate trajectory and delivery method, and then finally assigns the platform best suited to execute the mission.

4.46 Platform-based delivery categorises fires by what system delivers them and is essential for organisation, logistics and command relationships. However it is insufficient on its own to describe how fires achieve effects in modern operations.

Section 4-3. Firepower Effects and Types

4.47 Firepower effects and firepower types are deliberately treated as distinct but related constructs. Effects describe the outcome required against a target and are assigned during the targeting process. Firepower types describe the method by which that outcome is achieved and are selected during fires planning and allocation. The relationship between the two is not fixed. A single effect may be achieved using different firepower types depending on target conditions, while a single firepower type may contribute to multiple effects. This separation enables flexible, condition-based employment of firepower across the reconnaissance–strike system.

Firepower Effects

4.48 Firepower effects describe the outcome required. OPA fires are planned to achieve the following effects:

a. Suppression to temporarily degrade enemy combat effectiveness

b. Destruction to permanently neutralise targets through physical damage

c. Disruption to interrupt an enemy's tempo, cohesion or function

d. Shock or deterrence to achieve psychological or coercive effects

e. Isolation to deny movement, reinforcement or sustainment.

4.49 These effects define the commander's intent for fires and are assigned during the targeting process.

The Five Types of Firepower

4.50 The "Five Types of Firepower" describe how firepower is applied to achieve the required effect, not what systems deliver them. They are effect-driven constructs embedded within the reconnaissance–strike system and are used to shape targeting logic, timing, and resource allocation across the system-of-systems. The five types are:

a. Suppressive firepower

b. Shock or demonstration firepower

c. Precision firepower

d. Saturation firepower

e. Blockade firepower.

Suppression Firepower

4.51 This is Firepower employed to degrade or temporarily neutralise enemy combat effectiveness, without necessarily destroying the target. Suppressive firepower focuses on functional effects such as reduce firing, observation or movement, forcing enemy forces to take cover and enable manoeuvre during an assault or crossing an obstacle. It can be continuous, intermittent, or timed and is often integrated with EW and information operations. It is used to fix enemy forces, suppress enemy artillery, AD, ISR assets and enable friendly manoeuvre or survivability.

4.52 It is executed by CA-Bde artillery and TA assets, often as part of counter-reconnaissance and counter-fire tasks. It is typically executed using tube artillery (firing HE, DPICM or smoke rounds) or rockets, mortars, electronic warfare (as non-kinetic suppression) and UAV-delivered munitions.

4.53 The following table identifies the ammunition used, duration and typical expenditure for suppression firepower.

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Table 4.2 – Suppression Fires

Weapon system	Ammunition type	Duration	Typical expenditure	Remarks
122mm SPH	HE-FRAG	3-8 mins	60-120 rds/battery	Rapid suppression of infantry positions, roadblocks, jungle edges
155mm SPH	HE-FRAG/DPICM	2-5 mins	36-72 rds/battery	Greater fragmentation radius and overpressure
122mm MRL	HE rocket	20-60 secs	18-40 rockets	Short intense suppression prior to assault
300mm MRL	Cluster/cargo rocket	<60 secs	4-8 rockets	Suppresses battalion assembly areas and artillery positions
120mm Mortar	HE-FRAG	2-6 mins	36-72 rds/platoon	Standard suppression mission
	HE airburst/proximity	1-4 mins	24-48 rs/platoon	Effective in jungle and reverse slope
	Smoke	5-15 mins intermittent	12-24 rds/platoon	Obscuration and screening

Shock or Demonstration Firepower

4.54 This firepower is employed to achieve psychological, coercive, or signalling effects, rather than purely physical destruction. The emphasis is on timing, visibility, and scale. It is often fired as high-intensity, short-duration strikes and can include non-lethal or limited lethal effects. It is used to induce shock, paralysis, or decision hesitation as well as to signal escalation dominance or intent. It is also used to support information operations and narrative shaping. It is integrated into informationised warfare, often synchronised with PSYOPS, cyber, and media effects.

4.55 It is delivered by massed rocket/artillery strikes, missile demonstrations and fires deliberately placed for visibility for example on urban edges, near key assets.

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4.56 The following table identifies the ammunition used, duration and typical expenditure for shock firepower.

Table 4.3 – Shock Fires

Weapon system	Ammunition type	Duration	Typical expenditure	Remarks
122mm SPH	HE-FRAG thermobaric	2-4 mins	90-180 rds/battery	High-tempo barrage immediately before assault
155mm SPH	HE-FRAG/DPICM	2-4 mins	48-96 rds/battery	Significant blast and fragmentation effect
122mm MRL	Full salvo HE rockets	20-40 secs	40-80 rockets	Area shock effect against defensive positions
300mm MRL	Thermobaric/HE rockets	<30 secs	6-12 rockets	Severe blast effect against hardened or dense targets
120mm Mortar	HE-FRAG rapid fire	1-3 mins	60-120 rds/platoon	Violent close support barrage
	Mixed HE/Smoke	2-5 mins	48-96 rds/platoon	Shock plus obscuration

Precision Firepower

4.57 This is firepower employed to achieve point or high-value target destruction with minimal expenditure and a high confidence of kill. It is used against C2 nodes, radars, air defence systems, logistics hubs, and also key leaders. It relies on high-fidelity ISR and target mensuration using guided munitions (such as PGK, laser-guided or Beidou/GNSS-guided rockets/missiles). It is typically used in low-volume, high-effect engagements. Its use enables system paralysis by removing critical nodes as well as supporting decapitation and the disruption of kill chains. It also creates conditions for follow-on fires (such as, the degradation of AD systems before mass fires).

4.58 It is used by Group Army FA Brigade long-range battalions and CA-Bde precision strike elements to execute deep shaping fires. Delivery means include 155mm tube artillery, guided rockets fired by PCH-191 fire units, loitering munitions/UAV strike assets and joint fires (air-delivered precision).

4.59 The following table identifies the ammunition used, duration and typical expenditure for precision firepower.

Table 4.4 – Precision Fires

Weapon system	Ammunition type	Duration	Typical expenditure	Remarks
155mm SPH	Laser/GNSS-guided projectile	<2 mins	1-4 rounds	Greater fragmentation radius and overpressure
300mm MRL	Fire Dragon 140A	Immediate	Single	WLR, AD systems, comms nodes, Bde-level CPs
120mm Mortar	GP120 Precision-guided mortar bomb	<2 mins	1-6 rounds	Bunkers, MGs, vehicles

Saturation Firepower

4.60 This is firepower employed to cover an area target with sufficient density to achieve suppression, neutralisation, or destruction. It focuses on probability of effect, not pinpoint accuracy and is characterised by high volume/high rate of fire designed for troop concentrations, assembly areas and logistics zones. Its purpose is to achieve suppression and attrition, deny the enemy use of terrain or disrupt enemy manoeuvre and support firepower preparation in offensive operations. It is the primary role of CA-Bde FA battalions during close fight shaping and support to CA-Bdes.

4.61 It is delivered using tube artillery (122mm and 155mm), massed MRL fires (122mm and 300mm) and mortars at lower echelons.

4.62 The following table identifies the ammunition used, duration and typical expenditure for saturation firepower.

Table 4.5 – Saturation Fires

Weapon system	Ammunition type	Duration	Typical expenditure	Remarks
122mm SPH	HE-FRAG	10-20 mins	150-300 rds/battery	Sustained area bombardment
155mm SPH	HE-FRAG/DPICM	8-15 mins	90-180 rds/battery	Wider lethal radius and deeper penetration
122mm MRL	Full battery salvo HE rockets	1-3 mins	120-240 rockets	Saturates company defensive areas
300mm MRL	HE/cargo rockets	1-2 mins	12-36 rockets	Severe blast effect against hardened or dense targets
120mm Mortar	HE-FRAG sustained fire	10-20 mins	120-240 rds/platoon	Saturation of company defensive area
	Mixed HE and airburst	8-15 mins	90-180 rds/platoon	Area suppression and attrition

Blockade Firepower

4.63 This is firepower employed to block, delay, or canalise enemy movement and sustainment. It targets routes, choke points, bridges, crossings and logistics flows. It is often planned in depth and over time and may include the deployment of scatterable mines and terrain denial effects. It is designed to disrupt operational tempo and reinforcement, isolate segments of the battlefield and support defensive shaping and counter-mobility. It is frequently coordinated at Group Army level, but executed by both FA-Bdes and CA-Bde artillery, especially in littoral and choke-point terrain.

4.64 It employs artillery-delivered mines (RAAM-type analogues), rocket-delivered minefields, precision fires on key infrastructure and repeated fires on MSRs/ASRs.

4.65 The table on the following page identifies the ammunition used, duration and typical expenditure for blockade firepower.

Table 4.6 – Blockade Fires

Weapon system	Ammunition type	Duration	Typical expenditure	Remarks
122mm SPH	HE, smoke, scatterable mines	15-60 mins	60-120 rds/battery	Used on roads, junctions, crossings
155mm SPH	HE, RAAM-style mine, smoke	30-90 mins intermittent	36-72 rds/battery	Longer-range route denial
122mm MRL	Type 84 AT Mine, SAPM	1-5 mins strike window	20-40 rockets	Rapid route closure
300mm MRL	FASCAM or deep interdiction rocket	Immediate effect; persists for hours	4-12 rockets	Operational interdiction
120mm Mortar	HE-FRAG sustained fire	5-20 mins intermittent	36-96 rds/platoon	Route denial and harassment
	Smoke	<5 mins	12-23 rds/platoon	Obscuration of roads and crossings

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Combining Methods of Delivery, Effects and Firepower Types

4.66 Firepower effects define the required outcome against a target, while firepower types define the method used to achieve that outcome. Delivery methods describe how firepower is physically applied, including trajectory, munition, and platform. Effects are assigned during targeting, firepower types are selected based on target conditions, and delivery methods are determined by available means and constraints.

4.67 The relationship is not fixed: a single effect may be achieved through different firepower types, and each type may be delivered through multiple means. This separation enables flexible, condition-based employment of fires across the reconnaissance–strike system.

Artillery Groupings

4.68 In OPA doctrine, artillery groupings are not defined by equipment type but by command relationship and function. They are mission-tailored firepower groupings assembled around the commander's scheme of manoeuvre. Their deployment depends heavily on the operation type, terrain, threat, and the intended fire effects. Broadly, artillery groups (AGs) provide mass, depth and sustained fires, while mobile artillery groups (MAGs) provide responsive, manoeuvre-synchronised fires.

The Artillery Group (AG)

4.69 The Artillery Group consists of organic and attached firepower allocated to a formation to provide continuous support, typically including tube artillery from both brigade and higher echelon formations.

4.70 The artillery group is positioned in deep areas, and its primary missions are to:

a. Support scouting and security operations.

b. Disrupt or pre-empt advancing or unfolding (pre-attack positioning) enemy troops.

c. Support defensive groups.

d. Disrupt or defeat enemy flanking and encirclement attempts.

e. Disrupt enemy penetrations and counterattacks.

f. Suppress enemy artillery.

g. Strike at key targets, such as enemy command posts and supply areas.

4.71 Broadly speaking, fire support missions are conducted by tube artillery units, while annihilation, suppression and counter-fire missions are conducted by rocket artillery units. Missile units, if available, conduct precision deep strike missions. The artillery group is built around artillery battalions combined in such a way as to achieve a combined arms effect.

The Mobile Artillery Group (MAG)

4.72 The MAG fields highly mobile artillery and mortar systems that provide close, direct fire support to offensive and defensive groups of all types. Missions include suppressing or destroying enemy positions, delivering obscurants or illumination, conducting short-range counter-fire, and disrupting enemy reinforcement or counterattack movements.

4.73 Because of its vulnerability to counter-fire and direct fire, the mobile artillery group must frequently displace to survive. It is likely built around 82 mm or 120 mm rapid-fire mortars or mobile 122 mm self-propelled howitzers.

4.74 Where the CAB FA battalion operates without reinforcing artillery from the FA Brigade, it normally organises two self-propelled howitzer batteries into the Mobile Artillery Group to support close manoeuvre, while the remaining self-propelled howitzer battery and the multiple rocket launcher battery form the Artillery Group to conduct shaping, blockade, and counter-battery fires. This task organisation remains mission-dependent and may be adjusted according to terrain, threat, and commander priorities.

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Section 4-4. Artillery in Reconnaissance-Strike Operations

4.75 Reconnaissance–strike operations are a foundational operational concept within the OPA's approach to informationised and intelligentised warfare. Reconnaissance-strike links intelligence, surveillance, reconnaissance (ISR), command systems, decision-making, and strike systems into a continuously networked operational process designed to detect, identify, track, engage, and assess targets at high tempo. Rather than treating reconnaissance, targeting, fire support and battle damage assessment as sequential activities, reconnaissance–strike operations integrate them into a unified kill web capable of rapidly generating combat effects across the battlespace.

4.76 Reconnaissance–strike operations' purpose is to accelerate the detection-to-engagement cycle while disrupting and destroying enemy operational systems. The OPA seeks to identify, track and engage critical nodes within the enemy system including command and control, artillery, air defence, logistics, reserves, ISR systems and communications networks. This reflects the broader OPA emphasis on systems confrontation and systems destruction warfare. Reconnaissance–strike operations therefore focus not only on attrition, but on paralysis, disruption and disintegration of enemy operational cohesion.

OPA Reconnaissance-Strike Components

4.77 OPA reconnaissance–strike consists of five interconnected components:

a. Reconnaissance and surveillance

b. Information fusion and processing

c. Command and decision

d. Strike

e. Assessment and retargeting.

Reconnaissance and Surveillance

4.78 The reconnaissance and surveillance layer provides persistent target detection and tracking. It incorporates UAVs, weapon-locating radars, electronic warfare systems, reconnaissance units, ground surveillance radars, acoustic sensors, cyber reconnaissance and signals intelligence systems. The objective is to maintain continuous situational awareness and preserve target custody over enemy forces and systems.

4.79 Tactical reconnaissance assets may include brigade-level UAVs, artillery observation systems, counterbattery radars and reconnaissance detachments operating in conjunction with manoeuvre forces.

Information Fusion and Processing

4.80 The OPA reconnaissance–strike system relies heavily on multi-source sensor fusion and automated target correlation. Information from UAVs, radar systems, EW sensors, acoustic sensors and human observers is fused into a common operational picture. This process supports target validation, dynamic targeting, cross-cueing between sensors and rapid target reprioritisation. Increasingly, AI-assisted processing systems are being introduced to reduce analyst workload, improve target recognition and accelerate kill-chain timelines.

Command and Decision

4.81 Command systems within reconnaissance–strike operations are intended to compress the decision cycle between detection and engagement. Digital command networks, automated fire mission processing and standardised authority frameworks enable rapid engagement of time-sensitive targets. The OPA balances the requirement for operational tempo with the need for centralised control of high-value or politically sensitive targets. Weapon release authority is therefore determined by target category, effect required, location and time sensitivity.

Strike

4.82 Strike integrates tube artillery, rocket artillery, missiles, loitering munitions, armed UAVs, electronic attack and other precision and non-precision systems. Strike systems are selected according to target type, desired effect, engagement authority and operational priority. Reconnaissance–strike operations emphasise simultaneous engagement, depth strike, precision attack and counterbattery fire. The integration of fires with ISR enables rapid transition from target detection to target engagement.

Assessment and Retargeting.

4.83 Following engagement, UAVs, EW systems, radar and other sensors conduct battle damage assessment and support restrike decisions. This creates a continuous detect–strike–assess–re-engage cycle. The OPA places strong emphasis on maintaining target custody throughout this process in order to ensure that surviving or displaced targets can be rapidly re-engaged. Dynamic retargeting is therefore a central feature of reconnaissance–strike operations.

Tactical Characteristics

4.84 Reconnaissance–strike operations are characterised by persistent ISR, rapid kill chains, multi-domain integration, dynamic targeting and continuous re-tasking. Operations are normally conducted in conjunction with UAV overwatch, EW support and digital command systems.

4.85 Tactical engagements are often followed immediately by displacement and survivability actions in order to minimise exposure to counterbattery fire and enemy ISR systems.

The Use of Artillery

4.86 Artillery is one of the central strike and sensing components within OPA reconnaissance–strike operations. It is not employed simply as an isolated fire support arm, but as part of an integrated reconnaissance–targeting–engagement network designed to detect, fix, strike, assess and re-engage enemy systems.

4.87 Within the OPA construct, artillery performs five major functions within reconnaissance–strike operations:

a. Artillery as the prime strike system

b. Artillery as part of the kill chain

c. Artillery as a reconnaissance enabler

d. Artillery as a counter-reconnaissance and counter-system weapon

e. Artillery as a persistent fires network.

Artillery as the Prime Strike System

4.88 Artillery provides the principal means of rapidly delivering massed or precision fires once targets are detected by ISR assets. This includes suppression, neutralisation, destruction, blockade, counter-battery fire, precision strike, obscuration and terrain denial.

4.89 Artillery is favoured because it provides rapid response, sustained fires, all-weather capability, depth engagement, comparatively low cost per engagement and high responsiveness to dynamic targets. Within reconnaissance–strike operations, artillery is expected to rapidly exploit UAV detections, EW cueing, radar acquisitions, reconnaissance reports and in-time AI-assisted target recommendations.

Artillery as Part of the Kill Chain

4.90 OPA artillery units are digitally connected to ISR and command systems. Rather than waiting for traditional observer-generated fire missions, artillery may receive targeting data directly from UAVs, WLR, EW systems, reconnaissance detachments and higher-echelon targeting networks. This compresses the detect – decide – deliver timeline. A typical sequence is as follows:

a. Step 1. UAV detects movement.

b. Step 2. Sensor fusion confirms target type.

c. Step 3. Brigade fires cell validates target.

d. Step 4. Fire mission generated digitally.

e. Step 5. Artillery fires within minutes or seconds.

f. Step 6. UAV conducts BDA.

g. Step 7. Restrike ordered if required.

4.91 The emphasis is on rapid kill-chain closure, time-sensitive targeting, dynamic re-tasking and continuous target custody.

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Artillery as a Reconnaissance Enabler

4.92 Artillery also supports reconnaissance directly. This occurs through reconnaissance by fire, suppression to expose movement, smoke to shape observation, counterbattery provocation, thermobaric strike against concealed positions and obscuration to force enemy displacement.

4.93 Artillery fires are used to generate target signatures, provoke enemy reactions, expose firing positions, trigger electromagnetic emissions and confirm defensive locations. This is especially important in complex terrain such as jungle, mountainous terrain, urban terrain and littoral operations. In these environments, artillery helps ISR systems "see" concealed enemy forces.

4.94 Reconnaissance by fire uses fire, typically artillery and mortars, to reveal enemy defensive positions or encourage the enemy to reveal artillery assets by counter-fire. This usually involves delivering large amounts of indirect fire into specific areas believed occupied by enemy forces, then observing to confirm or deny enemy presence as reactions occur. It may also encourage enemy batteries to react with counter-fire, allowing PLA Army counter-fire capabilities to target them effectively. This has added effects of depleting enemy ammunition or forcing displacement due to counter-fire threat.

Artillery as a Counter-Reconnaissance and Counter-System Weapon

4.95 Within reconnaissance–strike operations, artillery targets enemy ISR, artillery, UAV launch sites, radar systems, command posts, logistics nodes and air defence systems. This reflects the OPA focus on systems destruction warfare. Artillery is therefore employed not simply against frontline troops, but against operational systems, networks, sustainment and command architecture.

4.96 Counterbattery fire is especially important. For example:

a. An SLC-2 WLR detects enemy artillery

b. Artillery fires are rapidly assigned;

c. UAVs conduct BDA

d. Restrikes occur if displacement is detected.

Artillery as a Persistent Fires Network

4.97 The OPA increasingly employs artillery as part of a continuously networked fires architecture. This includes tube artillery, rocket artillery, loitering munitions, FPVs, missile systems and armed UAVs. Rather than operating independently, these systems cooperate within the reconnaissance– strike system. For example:

a. Tube artillery suppresses

b. FPVs track movement

c. UAVs confirm BDA

d. Rocket artillery strikes reserves

e. EW jams communications

f. Additional fires are reassigned dynamically.

4.98 This creates layered and continuous strike effects.

Tactical Employment of Artillery in Reconnaissance–Strike Operations

4.99 In reconnaissance-strike operations deployment is dictated by sensor coverage and kill-chain speed.

AG in Reconnaissance-Strike Operations

4.100 AGs are usually placed where they can service multiple target areas without moving. Deployment priorities include the need for wide firing arcs, good communications connectivity, digital integration with ISR and survivability. They engage HQs, AD systems, logistics elements, artillery and enemy reserve forces.

4.101 Sensor links commonly include UAVs (such as ASN-209 UAVs), EW elements, satellites, WLRs and SOF scouts

4.102 AGs function as the heavy strike component of the reconnaissance-strike system.

MAG in Reconnaissance-Strike Operations

4.103 MAGs move forward with reconnaissance forces. They are typically placed behind screening forces and security elements, and near UAV-supported target areas. This is to shorten the sensor-to-shooter timeline, exploit fleeting targets and engage pop-up targets. Examples include detected mortar platoons, moving convoys, temporary CP and UAV launch sites.

4.104 MAGs may fire within minutes of detection.

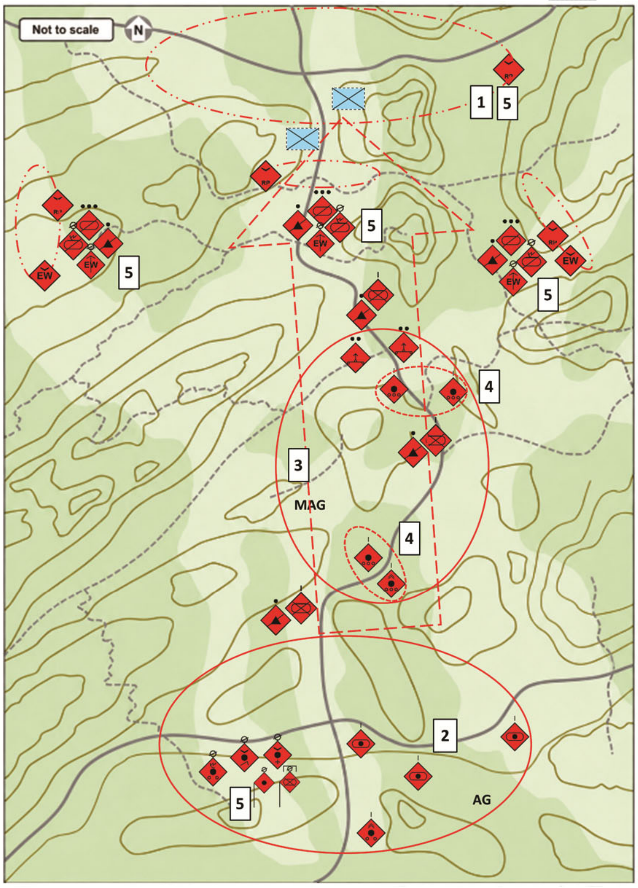
Integration with ISR

4.105 Artillery within reconnaissance–strike operations depends heavily on ISR integration. Artillery does not simply support ISR. ISR and artillery operate as a unified combat system. Key ISR-artillery relationships include UAV cueing, radar cueing, EW cross-cueing, acoustic targeting, dynamic target updates and BDA integration.

Survivability

4.106 Because artillery emits strong signatures, survivability is critical. OPA artillery units therefore emphasise shoot-and-scoot operations, dispersed firing positions and decoys, electromagnetic discipline, camouflage and concealment, rapid displacement and mission-command style execution within delegated authorities. Artillery must survive long enough to remain part of the reconnaissance–strike network.

Figure 4.3 – Reconnaissance Strike Operations



1. FA Bde UAV deployed to detect possible enemy gun positions and cue an SLC-2 WLR attached to the AG.
2. AG consisting of one 155mm SPH battalion and one 300mm MRL deployed to service multiple targets.
3. MAG consists of the FA battalion split into one group of two 122mm SPH batteries and a second group consisting of the remaining SPH battery and the 122mm MRL battery.
4. The groups leap frog along MSR to provide continuous fire support to engage fleeting and pop-up targets.
5. A detachment of the reconnaissance–strike coordination cell, attached to the FA battalion Base CP and mechanised CA-Bde HQ integrates ISR feeds from UAVs, EW elements, recon and FO parties

A Vignette – Reconnaissance-Strike Operations

Situation

4.107 During a mechanised brigade's advance north, the lead combined arms battalion approaches a narrow jungle defile overlooking a river crossing. Brigade UAV coverage identifies several areas of disturbed vegetation and intermittent thermal signatures along a reverse slope overlooking the main supply route. Electronic warfare detachments also detect short-duration radio transmissions consistent with dismounted anti-armour teams operating in the area. Due to dense jungle canopy and limited visibility, the battalion commander assesses that visual confirmation of enemy positions is unlikely prior to entering the engagement area.

Action

4.108 To confirm the presence of defensive positions without committing manoeuvre forces, the battalion firepower coordination cell orders a reconnaissance-by-fire mission. Two PLL-05 120mm self-propelled mortars fire a short series of HE airburst rounds onto suspected ambush positions along the reverse slope, while a CH-802 UAV maintains overwatch of the target area. Within seconds of impact, UAV operators observe personnel movement, thermal signatures and the displacement of concealed vehicles attempting to withdraw deeper into the jungle. Simultaneously, EW systems detect increased radio traffic and an enemy ATGM team engages prematurely against a reconnaissance vehicle moving behind the lead company.

4.109 The reconnaissance-by-fire mission confirms the presence and approximate disposition of the defending force while preserving the momentum of the advance. The brigade fires cell rapidly transitions from target confirmation to engagement, assigning a PLL-09 battery to conduct suppression fires while FPV drones track withdrawing vehicles. The battalion subsequently bypasses the disrupted ambush site and continues the advance with reduced risk of surprise engagement along the constrained jungle

Section 4-5. Counter-Fire Operations

4.110 Counter-fire operations are conducted to detect, locate, identify, disrupt, suppress, neutralise or destroy enemy firepower systems. The purpose of counter-fire is not merely to destroy artillery systems, but to degrade the enemy's ability to deliver effective fire support. It achieves this by attacking the entire firepower system, including sensors, command posts, communications networks, ammunition supply points and firing units.

4.111 The OPA employs counter-fire operations as part of its reconnaissance-strike system and system-of-systems warfare approach. Counter-fire activities are designed to deny the enemy freedom of action, reduce the effectiveness of enemy fires and preserve the combat power of friendly manoeuvre forces. Counter-fire operations also support offensive, defensive and stability operations and are conducted continuously throughout all phases of combat.

Counter-Fire Target Categories

4.112 Counter-fire targets are categorised according to their contribution to the enemy firepower system and include firing systems, fire control and command systems, target acquisitions systems and sustainment nodes.

Firing Systems

4.113 Firing systems include mortars, self-propelled and towed artillery, multiple rocket launchers, Precision strike launchers and loitering munition launch sites.

4.114 These targets are normally engaged immediately following detection.

Fire Control and Command Systems

a. These include artillery command posts, fire direction centres, firepower coordination centres, digital fire-control nodes and communications relay stations.

4.115 These targets are considered high-payoff targets because their destruction may paralyse multiple firing units simultaneously.

Target Acquisition Systems

4.116 These include WLRs, ground surveillance radars, UAV launch and control sites, observation posts and electronic warfare collection systems.

4.117 The destruction of target acquisition systems reduces the enemy's ability to locate friendly forces and conduct effective counter-fire operations.

Sustainment Nodes

4.118 These include ammunition supply points, reload points, fuel storage locations as well as maintenance and recovery facilities.

4.119 Attacks against sustainment nodes reduce the enemy's ability to sustain prolonged fire support operations.

Detection Systems

4.120 Counter-fire operations rely upon the integration of multiple reconnaissance and surveillance systems. Including WLRs, UAVs, EW systems, human observation and higher-level ISR systems.

WLRs

4.121 WLRs provide the primary means of detecting enemy artillery, rockets and mortars. Capabilities include:

a. The detection of projectile trajectories.

b. The determination of firing point coordinates.

c. The determination of point of impact.

d. The classification of weapon types.

e. The simultaneous tracking of multiple projectiles.

4.122 Weapon-locating radars provide rapid target acquisition and are particularly effective against artillery and rocket systems operating within range of friendly forces.

UAVs

4.123 UAVs provide confirmation of radar detections, persistent surveillance of likely firing areas, tracking of displacement routes and BDA.

4.124 UAVs are particularly valuable against highly mobile artillery systems employing shoot-and-scoot tactics.

EW Systems

4.125 Electronic warfare systems contribute to counter-fire operations through the detection of artillery command networks, identification of digital fire-control systems, the location of communications nodes and the detection of UAV control stations.

4.126 Electronic intelligence is used to complement physical target acquisition and improve target confirmation.

Human Observation

4.127 Forward observers, reconnaissance patrols and security forces contribute to counter-fire operations through visual observation and reporting.

4.128 Human observation remains important in restrictive terrain such as jungle, urban and mountainous environments where technical sensors may be limited.

Higher-Level ISR Systems

4.129 Operational and theatre-level assets may contribute satellite imagery, synthetic aperture radar, signals intelligence and airborne surveillance platforms.

4.130 These systems provide deep target acquisition and assist in identifying enemy artillery concentrations before combat begins.

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The Counter-Battery Engagement Process

4.131 Counter-battery engagements are conducted using a systematic detect-deliver-assess methodology.

Detection

4.132 Enemy firing activity is detected through radar, UAVs, electronic warfare systems or visual observation.

Identification

4.133 The target is identified and classified according to weapon type, unit affiliation, location, activity and threat level.

Confirmation

4.134 Where time permits, target information should be confirmed using multiple sources to reduce the risk of misidentification. Typical confirmation methods include radar plus UAV, radar plus electronic warfare, UAV plus visual observation.

Engagement Decision

4.135 The Firepower Command and Coordination Centre determines:

a. Engagement priority.

b. Desired effects.

c. Appropriate firing unit.

d. Ammunition allocation.

e. Time constraints.

Delivery

4.136 The designated firing unit conducts the engagement. Potential delivery systems include mortars.122mm artillery, 155mm artillery, rocket artillery, loitering munitions and joint fires.

Assessment

4.137 Assessment determines whether the target was destroyed, whether additional engagement is required, whether target displacement occurred and whether target status has changed.

Sensor-to-Shooter Timelines

4.138 The effectiveness of counter-fire operations depends upon minimising sensor-to-shooter timelines. The OPA seeks to achieve the shortest possible engagement cycle through digital communications and automated fire-control systems. The following table identifies the desired times for the kill chain.

Table 4.7 – Sensor-to-Shooter Timelines

Activity Objective	Time
Detection	Immediate
Identification	< 1 minute
Fire Mission Processing	< 2 minutes
Weapon Engagement	< 5 minutes
Battle Damage Assessment	< 10 minutes

4.139 Counter-battery operations against highly mobile artillery systems should prioritise speed over detailed target analysis. Longer engagement timelines may result in target displacement before weapon effects arrive.

Integration of Unmanned Aerial Vehicles in Counter-Fire Operations

4.140 UAVs are a critical component of the OPA counter-fire system. UAVs provide persistent surveillance, target confirmation, target tracking and BDA that complement the capabilities of WLRs, EW

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systems and ground observers. UAVs are employed throughout the counter-fire process to reduce sensor-to-shooter timelines while maintaining target accuracy. UAVs are particularly important against highly mobile artillery systems that employ rapid occupation, firing and displacement procedures.

Functions

4.141 UAVs support counter-fire operations through the following primary functions:

a. Detection

(1) UAVs monitor likely artillery deployment areas, firing positions, route networks and assembly areas to detect enemy indirect fire systems before they engage friendly forces.

(2) Indicators include vehicle movement, gun deployment, rocket launcher preparation, ammunition handling activities, command vehicle concentrations and radar emissions.

(3) Persistent surveillance may identify artillery locations before firing occurs, allowing pre-emptive engagement.

b. Target Confirmation

(1) WLRs may identify a firing point within seconds of enemy weapon discharge. UAVs provide visual confirmation of the target before engagement.

(2) Confirmation may include weapon type, the number of firing systems, orientation, state of deployment, the presence of command vehicles and the presence of ammunition vehicles.

(3) Target confirmation improves engagement accuracy and reduces ammunition expenditure.

c. Target Custody

(1) Target custody is the continuous observation of a target from detection until engagement and assessment.

(2) OPA assets seek to maintain target custody whenever possible.

(3) UAVs provide continuous tracking of artillery units, monitoring of displacement routes, observation of alternate firing positions and the monitoring of assembly and reload areas.

(4) Target custody prevents enemy artillery units from breaking contact with the reconnaissance-strike system.

d. Engagement Support

(1) During engagement, UAVs provide real-time information regarding target movement, the last-known location, changes in disposition and additional targets within the target area.

(2) This information may be transmitted directly to the Firepower Coordination Centre or firing unit.

(3) Where digital networks permit, UAV feeds may be integrated directly into artillery command systems.

e. BDA

(1) Following engagement, UAVs conduct immediate BDA.

(2) Assessment may identify destroyed, damaged and surviving systems, secondary explosions, Fires and continued enemy activity.

(3) BDA supports decisions regarding re-engagement and target reprioritisation.

f. Re-Attack Support

(1) Counter-fire operations frequently require multiple engagements.

(2) UAVs assist re-attacks by locating surviving systems, identifying relocated firing positions, detecting recovery efforts and tracking withdrawal routes.

(3) This allows rapid follow-on engagements before the enemy can restore combat effectiveness.

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UAV Employment by Echelon

CA-Bde UAV Assets

4.142 CA-Bde-level UAVs provide direct support to counter-fire operations within the brigade area. Typical tasks include:

a. Monitoring likely artillery deployment areas.

b. Observing routes and choke points.

c. Supporting weapon-locating radar coverage.

d. Conducting battle damage assessment.

4.143 CA-Bde CH-802 UAVs normally operate within 20–40 kilometres of the forward line and focus on mortars, brigade artillery and rocket artillery operating in forward areas.

Firepower Brigade UAV Assets

4.144 FA Bde UAVs provide deeper reconnaissance. Typical tasks include:

a. Locating artillery battalions

b. Monitoring rocket artillery deployment areas

c. Identifying command posts

d. Supporting long-range precision fires.

4.145 ASN-209 systems would normally operate beyond the CAB area and search for operational-level targets.

Theatre and Operational UAV Assets

4.146 Higher-echelon UAVs provide wide-area surveillance, deep target acquisition and strategic battle damage assessment. They also provide target development for long-range rocket artillery and missile forces. These systems support operational and theatre-level counter-fire operations.

Integration with WLR and EW

4.147 The most effective counter-fire method combines UAVs and WLRs. A typical sequence is:

a. Enemy artillery fires.

b. WLR calculates point of origin.

c. Firepower Command and Coordination Centre assigns UAV coverage.

d. UAV confirms target.

e. Fire mission is approved.

f. Artillery or rockets engage.

g. UAV conducts battle damage assessment.

h. Re-attack is ordered if required.

4.148 This process significantly improves engagement effectiveness against mobile artillery systems. EW systems may identify:

a. Fire-control transmissions.

b. Artillery command networks.

c. UAV control stations.

d. Data relay nodes.

e. Electronic warfare information can cue UAVs to investigate specific areas.

4.149 Similarly, UAV observations may direct electronic warfare assets toward previously unidentified emitters. This creates a mutually supporting reconnaissance network.

Countering Shoot-and-Scoot Tactics

4.150 Modern artillery units often displace within minutes of firing. To counter this threat, UAVs focus on:

a. Immediate post-firing movement.

b. Alternate firing positions.

c. Reload areas.

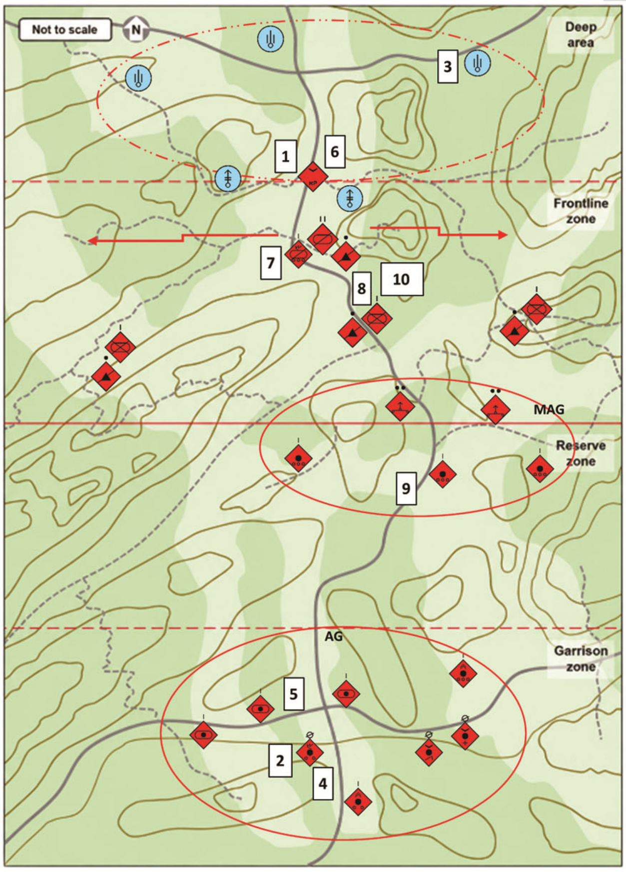
d. Vehicle assembly points.

4.151 Rather than attacking the firing position alone, the OPA seeks to track the artillery unit throughout its movement cycle. This approach increases the likelihood of successful engagement and reduces the effectiveness of enemy survivability measures.

UAV Contribution to Intelligentised Counter-Fire Operations

4.152 As the OPA develops intelligentised warfare capabilities, UAVs become key contributors to automated reconnaissance-strike systems. UAVs may provide automated target recognition, vehicle classification, change detection, route prediction and BDA.

Figure 4.4 – Counter-fire Operations



1. FA Bde UAV detects possible enemy gun positions and cues the SLC-2 WLR detached to the AG.
2. SLC-2 WLR orientates towards the enemy gun position locations.
3. Enemy battery unmasks and engages recon elements.
4. SLC-2 WLR detects enemy battery firing and fixes its location.
5. The AG's 155mm SPH batteries engage enemy gun battery position.
6. UAV conducts BDA.
7. Recon elements detect possible mortar locations forward of their position using radar.
8. Arty FOs deployed with recon elements confirm locations.
9. The MAG's 122mm SPH engage enemy mortar locations.
10. Arty FOs conduct BDA.

4.153 These capabilities reduce operator workload and accelerate sensor-to-shooter timelines. The ultimate objective is to create a continuous reconnaissance-strike network capable of detecting, tracking and engaging enemy artillery systems before they can complete their firing and displacement cycle.

Integration of EW Systems in Counter-Fire Operations

4.154 Electronic Warfare (EW) has become one of the most important elements of the modern counter-battery fight, particularly for forces that rely heavily on UAVs, digital fire-control systems, GNSS navigation, and networked artillery. In some circumstances, EW can be as effective as physical counter-battery fires because it can prevent enemy artillery from finding targets or delivering accurate fire in the first place.

4.155 Counter-battery operations are fundamentally a competition between two kill chains:

a. Detect enemy artillery.

b. Identify and locate firing units.

c. Deliver counter-battery fires.

d. Assess effects.

e. Survive enemy retaliation.

4.156 EW can influence every stage of this process.

Detection

4.157 Artillery units generate significant electronic signatures through digital fire-control networks, tactical radios, data links, UAV control stations, WLR and satellite communications. An EW capability can:

a. Detect radio transmissions from artillery command posts.

b. Geolocate fire direction centres.

c. Locate UAV ground control stations.

d. Identify artillery battalion headquarters.

e. Build a pattern of life showing likely firing positions.

4.158 EW often provides the initial cue that directs UAVs or artillery radars toward a suspected artillery position. For example, an enemy battery transmits digital fire missions from its gun line. An OPA EW company detects and geolocates these transmissions. An ASN-209 UAV is directed to investigate. The UAV confirms the battery position. A PCH-191 battery then engages. In this case EW was the first sensor in the kill chain.

Jamming Enemy Counter-Battery Radars and UAVs Supporting Counter-Fire Operations

4.159 Counter-battery radars are critical to modern artillery. EW can degrade radar performance, increase false returns, reduce tracking accuracy and force radar shutdown or relocation. However, modern radars use frequency agility, low-probability-of-intercept techniques and anti-jam measures, so radar jamming alone rarely eliminates a capable radar. The more common approach is detect – geolocate – destroy rather than trying to jam continuously.

4.160 Modern artillery is heavily dependent on UAVs for target acquisition, BDA, counter-battery confirmation and target custody. EW can jam UAV control links, video downlinks, disrupt navigation signals, force UAVs to return home, cause crashes and interrupt target tracking. Recent conflicts have shown that many counter-battery engagements fail because the UAV tracking the target is jammed before the firing solution is completed. Without UAV observation, artillery frequently loses target custody.

GNSS Jamming

4.161 Modern artillery increasingly relies on GPS, BeiDou, GLONASS and Galileo. EW can interfere with gun positioning, survey accuracy, rocket navigation, precision-guided artillery rounds and UAV navigation. Effects include reduced accuracy, longer mission processing times, increased dispersion and the inability to employ some precision munitions.

4.162 This is particularly important against precision rocket systems. A battery firing unguided rockets may still achieve effects, but a precision-guided rocket that loses navigation can miss by hundreds of metres.

Disrupting Fire Control Networks

4.163 Modern artillery formations rely on digital networks connecting observers, UAVs, radars, fire direction centres and gun batteries. EW can jam radio networks, interrupt data transmission, delay fire missions and force units onto voice communications. Even a delay of two or three minutes can allow an enemy battery to displace before counter-battery fires arrive.

4.164 This is particularly relevant against PLA-style "shoot-and-scoot" tactics.

Protecting Friendly Artillery

4.165 EW is also defensive. Artillery survivability can be enhanced by emission control (EMCON), radio silence, the use of directional antennas, decoy emitters, frequent frequency changes and short transmission windows.

4.166 A battery that minimises emissions is significantly harder to locate. This is why modern counter-battery operations increasingly target not just guns, but the electronic signatures associated with those guns.

Using EW in the Kill Chain

4.167 EW is not treated as a separate supporting activity but as part of the reconnaissance-strike complex. A typical counter-battery sequence might be:

a. EW detachment detects enemy artillery network activity.

b. An SLC-2 radar is cued to search the area.

c. An ASN-209 UAV confirms the location.

d. The Firepower command and Coordination Centre validates the target.

e. PCH-191 or PLZ-05 units engage.

f. EW jams enemy UAVs and communications during the engagement.

g. UAVs conduct BDA.

4.168 In this example EW serves three simultaneous functions:

a. Sensor (finding the target).

b. Protection (shielding friendly artillery).

c. Attack (degrading enemy response).

4.169 The most successful counter-battery operations combine EW, UAVs, WLRs and artillery into a single reconnaissance-strike system. In this system, EW often provides the first detection of the target and simultaneously prevents the enemy from completing its own counterbattery kill chain. This makes EW one of the highest-value combat multipliers in the artillery battle.

AG Employment in Counter-Fires Operations

4.170 AGs are the principal counter-fires force. They are typically deployed in rear firing areas with large engagement coverage, near to WLR nodes and are networked to the counter-fires coordination cell. Key assets include the SLC-2 WLR, SLC-7 WLR if allocated, UAVs and EW geolocation.

4.171 The AG placement priorities include overlapping radar coverage, multiple firing azimuths and rapid displacement routes. Its main targets include tube artillery, mortars, MRLs and firing CPs.

MAG Employment in Counter-Fires Operations

4.172 MAGs support are against short-lived targets in counter-fires operations. They generally deploy closer to the FEBA, have a shorter time-to-fire and are very reliant on aggressive displacement. They are best used against mortars, shoot-and-scoot guns and transient launchers

4.173 They are particularly useful when enemy artillery fires from urban edges, jungle clearings and defilade positions.

Section 4-6. Artillery in Offensive Operations

4.174 The OPA conducts offensive operations to defeat, dislocate, or destroy enemy forces and to seize and retain the initiative. OPA doctrine considers offensive operations to be a continuous sequence of actions that transition from developing contact to system disintegration and exploitation. These actions are not treated as discrete mission types, but as interrelated phases of a single operational logic.

4.175 OPA artillery is employed as a central component of the reconnaissance–strike system. It is not solely a supporting arm but provides the primary means to:

a. Disintegrate the enemy's operational system

b. Enable manoeuvre at the decisive point

c. Sustain tempo during exploitation

d. Prevent enemy recovery and reconstitution

4.176 OPA artillery employment in offensive operations follows a consistent functional sequence:

Shape – Fix – Break – Exploit – Prevent – Recovery

4.177 This sequence is achieved through the integration of:

a. Artillery Groups for the conduct of time-bound massed fires

b. Mobile Artillery Groups for manoeuvre and persistence of firepower

c. ISR-enabled targeting cycles to enable continuous re-tasking.

Framework for Offensive Artillery Fires

4.178 For the purpose of artillery employment, offensive operations are described in the following phases:

a. Advance to contact

b. Advance in contact

c. Attack (penetration)

d. Breakthrough and expansion

e. Pursuit.

4.179 These phases overlap. Artillery employment shifts in emphasis rather than transitioning abruptly. Offensive fires transition from massed firepower to manoeuvred firepower. Artillery groups deliver mass fires and mobile artillery groups sustain tempo. Firepower is allocated by time, phase, and effect. Units do not retain permanent fire support relationships. Artillery units are reassigned to achieve effects at decisive points.

Advance to Contact

4.180 The advance to contact reduces uncertainty and shapes the battlespace. The force does not passively seek contact. It uses reconnaissance, manoeuvre, and fires to force the enemy to reveal its dispositions. Artillery supports this phase by engaging high-value targets, suppressing enemy reconnaissance and conducting counter-battery fires.

4.181 Typical targets include:

a. Observation posts

b. UAV launch sites

c. Forward security elements

d. Artillery firing units.

4.182 Firepower is limited but deliberate. Precision and suppression are the dominant fires. Artillery helps establish favourable conditions for decisive engagement by degrading enemy ISR and shaping the engagement area to enable concentrated firepower effects against the enemy.

Advance in Contact

4.183 The aim during this phase is to maintain momentum once contact is established. The force seeks to prevent the enemy from stabilising the engagement. Artillery supports this phase by providing continuous suppression fires to enable manoeuvre elements to bypass or penetrate enemy positions. It is also used to engage emerging targets.

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4.184 Targets include:

a. ATGM teams

b. Strongpoints

c. Dismounted infantry

d. Forward reserves

4.185 Suppression is the dominant firepower type. Fires are responsive and frequently re-tasked. Artillery prevents stasis by continuously imposing effects that deny the enemy time and freedom to stabilise.

The Attack (Penetration)

4.186 The attack is the decisive phase in offensive operations. The objective is to disintegrate the enemy defensive system and create a breach. Artillery is the primary means of achieving this effect and an Artillery Group is formed to deliver massed fires at the decisive point. Firepower preparation is short in duration, high in intensity and synchronised with manoeuvre.

4.187 Targets include:

a. Defensive positions

b. Strongpoints

c. AT systems

d. Obstacles and breach areas

e. Artillery and air defence.

4.188 Types of firepower used during this phase include saturation, destruction and suppression. The objective is system collapse, not attrition alone.

Breakthrough and Expansion

4.189 During breakthrough, forces penetrate and widen the breach. Artillery shifts from the FEBA to targets in depth with the Artillery Group continuing to suppress residual resistance. The Mobile Artillery Group begins forward displacement. Fires are re-tasked against to engage the enemy's counterattack forces, enemy depth positions and enemy movement corridors. This phase marks the transition from mass to manoeuvre of firepower.

The Pursuit

4.190 During the pursuit manoeuvre forces seek to destroy retreating enemy forces and prevent their reorganisation. Artillery is used to sustain tempo and prevents enemy recovery. The Mobile Artillery Group becomes the primary fire support element during this phase. Artillery supports the pursuit by interdicting withdrawal routes, engaging logistics and reserves and striking time-sensitive targets.

4.191 Targets include:

a. Bridges and choke points

b. Retreating columns

c. Artillery displacement areas

d. Command elements

4.192 Types of firepower used include Blockade and Precision.

Artillery Groupings during Offensive Operations

4.193 Artillery groupings are mission-tailored firepower groupings assembled around the commander's scheme of manoeuvre. Their deployment will be heavily dependent on the operation type, terrain, threat, and the intended fire effects.

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AG Deployment

4.194 AGs are normally positioned in the brigade/group army deep rear battle area, where they can mass fires while remaining outside most enemy direct-fire and short-range counter-battery envelopes. Tube artillery units are typically deployed 10–25 km behind forward manoeuvre battalions. Rocket artillery is typically deployed 20–50+ km behind forward manoeuvre battalions. They are generally positioned near major MSRs and logistics hubs. They have access to established survey/control points and make use of concealed terrain (such as reverse slopes, tree cover, urban masking).

4.195 An AG's primary offensive tasks include deep shaping fires, counter-battery operations, the suppression of enemy artillery and AD, strikes on C2 nodes, breaching support and the isolation of reserve forces.

4.196 A typical AG structure is:

a. Forward elements consisting of TA detachments, UAV launch/recovery sites and WLRs such as SLC-2 WLR.

b. Main firing positions for 155 mm SPH battalions (such as PLZ-05), Rocket battalions (e.g. PHL-03)

c. Rear elements covering ammunition redistribution, maintenance/recovery and reserve firing areas

MAG Deployment

4.197 MAGs deploy much closer to manoeuvre echelons, often moving with CAB tactical groupings. MAGS typically deploy 3–10 km behind lead battalions, Leap-frogging between firing points and are often split into batteries or platoons.

4.198 MAGs are commonly located close to road junctions, forest edges, urban margins and make use of temporary hide positions. Their primary tasks cover immediate fire support, the provision of smoke, the suppression of AT positions, fire support during assault and also provide an emergency response to contacts.

4.199 Typically MAGs consist of the tube artillery of FA battalions and mortars. The MRL battery will be grouped with the artillery group.

Counter-Fire during Offensive Operations

4.200 During offensive operations, counter-fire supports freedom of manoeuvre. Primary objectives include the suppression of enemy artillery, the protection of advancing forces, the destruction of enemy WLRs and the neutralisation of enemy fire coordination systems.

4.201 Counter-fire assets are positioned forward to maximise detection ranges and minimise engagement timelines. UAVs are employed aggressively to identify artillery positions beyond the forward line of troops. Priority is normally given to systems capable of disrupting the tempo of the offensive operation.

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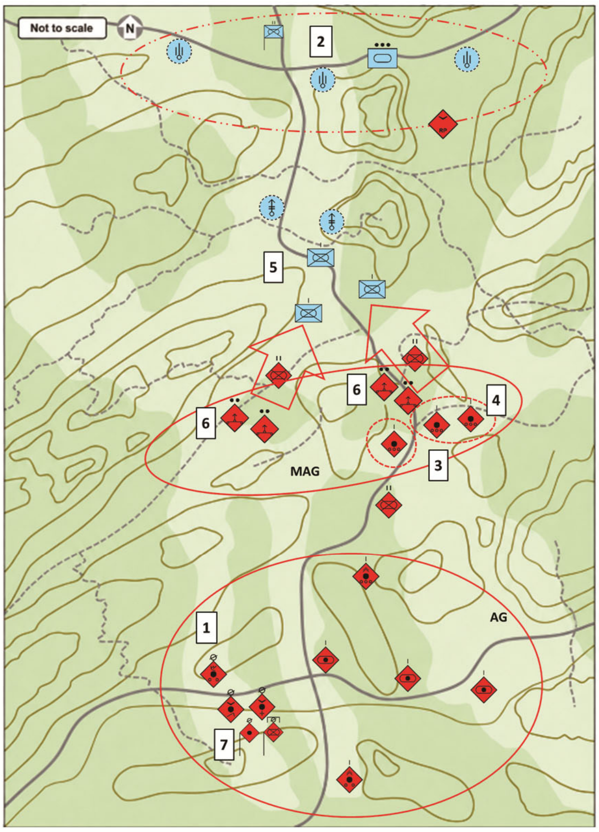
Figure 4.5 – Offensive Operations



1. The AG consists of 155mm SPH artillery, 300mm MRL and the FA battalion's 122mm MRL battery.
2. The AG is positioned in the deep rear battle area to provide deep shaping fires, counter-battery fires, suppress enemy artillery and AD, conduct strikes on C2 nodes, provide breaching support and isolate enemy reserve forces.
3. The MG consists of the FA battalion's tube artillery and the manoeuvre battalion's mortars.
4. The tube artillery batteries are split into two groups to provide continuous fire support as assaulting forces move forward.
5. The MAG provides immediate fire support to assaulting troops, smoke and suppresses enemy AT positions, fire support during the assault.
6. The manoeuvre battalion's mortar battery provides close fire support during the assault.

A Vignette – Offensive Operations

Situation

4.202 An OPA mechanised (medium) CA-Bde reinforced with an armoured battalion has been ordered by the Group Army commander to attack and isolate an enemy BCT from the enemy division, paralyse the BCT C2 and fires systems, and ultimately cause the BCT to culminate before the CA-Bde commits its main forces. The BCT is supported by integrated ISR consisting of UAV and ground sensors, brigade artillery with a counter-battery capability, and prepared obstacles and strong points.

4.203 The Commander's intent is to blind and dislocate the enemy reconnaissance–strike system, conduct a rapid breach of the forward defensive belt and exploit through the frontline zone into the depth area before the enemy can reconstitute.

4.204 Available fires include:

a. CA-Bde organic assets including the FA battalion and the mortar companies of the manoeuvre battalions

b. The armoured battalion's mortar company

c. FA Bde assets including a 155mm SP battalion, a 122mm MRL battery consisting of nine launchers, one 300mm MRL battery of four launchers and an SLC-2 WLR section.

4.205 The available artillery assets were organised into the MAG which consisted of the three 122mm SP gun batteries and the 122mm MRL battery of the FA battalion, the 155mm SP battery from the FA Bde and the SLC-2 WLR section. The artillery group's role would be to provide continuous fires into the frontline zone.

4.206 The AG oup consisted of the 300mm MRL and the 122mm MRL battery allocated from the FA Bde. The mobile artillery group's role would be to provide depth fire into the deep zone and decisive fires in the frontline zone.

Timeline

4.207 The operation is to be conducted in four phases as follows:

a. Phase 1 – blind and shape (H-48 to H-6). The attack is to begin with the degradation of the enemy's ability to observe and coordinate its operations, not by immediate destruction of forward positions.

(1) The mobile artillery group will engage with deep fires into the depth and frontline zones:

(a) 300mm MRL is to conduct strikes on UAV launch and recovery sites, enemy BCT command posts and logistic zones.

(b) 122mm MRL is to conduct strikes on assembly areas and forward staging positions.

(2) The artillery group is to conduct limited suppression of forward positions and use SLC-2 WLR to identify enemy artillery.

(3) Fires are to degrade the enemy's ISR capability, disrupt enemy targeting timelines and force the enemy to begin to deploy out of sequence.

b. Phase 2 – disrupt and isolate. (H-6 to H-1).

(1) The Mobile Artillery Group is to continue deep shaping interdicting routes between rear and forward positions, and target artillery and reserves.

(2) The Artillery Group is to initiate counter-fire using WLR cueing and suppress the enemy's forward defensive elements.

(3) In this phase artillery is to be used to force the enemy's artillery to displace, disrupt the enemy's reinforcement routes and increasingly isolate the enemy's forward units.

c. Phase 3 – breach and break-in ((H-1 to H+3). During this phase fires will initially be withheld then massed to achieve shock and paralysis at the breach point.

(1) The Artillery Group becomes the main effort.

(a) 122mm SP and 155mm SP batteries are to suppress strongpoints, destroy trench systems.

(b) 122mm MR battery is to delivers saturation fires on breach lanes.

(2) At H to H+2 the Mobile Artillery Group is to be committed as follows:

(a) 300mm MRL launchers is to provide massed fires on defensive depth and reserves.

(b) 122mm MRL assets are to reinforce breach fires.

(3) The use of fires in this phases is designed to overwhelm the enemy's defensive belt, support breaching elements to achieve penetration and locally collapse enemy cohesion.

d. Phase 4 – Exploitation (H+3 to H+24). CA-Bde manoeuvre forces will pass through the established breach.

(1) The Artillery Group is to deploy forward, provide continuous fires in the frontline zone and conduct counter-battery fire.

(2) The Mobile Artillery Group is to revert to depth zone fires to interdict withdrawing enemy forces, strike the enemy's reserves and disrupt the enemy's efforts to reorganise.

(3) These fires aim to disrupt the enemy's efforts to re-establish defensive coherence and enable OPA forces to maintain their tempo and push forward in depth.

4.208 In offensive operations, OPA artillery enables success by sequencing effects across the depth and frontline zones. The Artillery Group provides continuous fires to suppress and destroy forward defences, while the Mobile Artillery Group conducts deep fires to dislocate the enemy system and is committed during decisive windows to mass effects at the point of breach. This integration of depth and temporal concentration allows the attacking force to achieve penetration against a degraded and unsynchronised defence.

Section 4-7. Artillery in Defensive Operations

4.209 In Defensive operations OPA artillery is employed to shape, disrupt, and disintegrate the attacking enemy's system-of-systems, rather than simply attrit forward elements. Fires are centrally orchestrated but executed through dispersed firepower units to enhance survivability, with an emphasis on counter-reconnaissance, counter-fire, and time-based firepower concentration.

4.210 OPA defensive fires support the following objectives:

a. Disrupt the enemy's reconnaissance–strike system by targeting the enemy's ISR nodes (UAVs, radars, observers and C2 links), degrading the enemy's targeting timelines and decision cycles, and remove the enemy's ability to see, understand and coordinate their operations to make subsequent physical destruction easier, faster and more decisive.

b. Break operational coherence by interdicting the enemy's manoeuvre forces, logistics echelons, and reserves, fragmenting enemy tempo and sequencing of its attack and preventing the enemy transitioning from the advance to deliberate attack to exploitation.

c. Enable Counterattack and Reconstitution by preserving friendly combat power through economy of fires early, massing fires at decisive time windows to support counterattack forces and transitioning rapidly from defensive shaping to offensive fire support.

Defensive Firepower Framework

4.211 OPA artillery does not adopt a linear "support the FEBA" model, rather it applies depth-oriented fires, time-based firepower concentration, and system disruption. Fires are layered across three zones as follows:

a. From 50-300km OPA artillery is used to dislocate and delay enemy forces. Typical targets include enemy assembly areas, logistics hubs, long-range fires and C2 nodes.

b. From 20-50km OPA artillery is used to disrupt enemy coherence by targeting brigade groupings, artillery positions and reserves.

c. Form less than 20km OPA artillery is used to break up the enemy's assault by targeting Assault echelons, breaching forces and engineers.

4.212 Artillery is centrally controlled at Group Army level and allocated to formations for defined time windows. It is reallocated dynamically based on ISR and threat development. This enables temporal massing from dispersed firing units, allowing the concentration of effects without the physical concentration of forces.

4.213 Artillery firepower types are applied to achieve specific effects. For example:

a. Suppression fires are used to fix and degrade enemy assaulting elements

b. Precision fires are used to destroy the enemy's critical nodes

c. Blockade fires are used to canalise enemy manoeuvre

d. Saturation fires are used to overwhelm enemy formations

e. Sudden massed fires are used for psychological effect to disrupt the enemy's cognition and cohesion.

Artillery Tasks in Defence

4.214 OPA artillery has the following tasks in the defence:

a. Counter-reconnaissance is the priority artillery task in defence. Targets include UAV launch and recovery sites, sensor nodes and radar systems as well as reconnaissance elements and observers. This task is integrated with EW and air defence to degrade the enemy's ability to generate targeting data.

b. Counter-battery fires aim to neutralise the enemy's artillery system. This involves rapid sensor-to-shooter integration, the use of pre-authorised engagement criteria, and a combination of precision and area fires. Targets include enemy firing units, command nodes, and logistics elements supporting enemy fires.

c. Artillery disrupts manoeuvre by interdicting movement corridors, targeting choke points and crossings as well as employing blockade fires to shape avenues of approach.

d. Fires supporting forward units are limited in early phases, massed at decisive points, and focused on enemy breaching forces and assault echelons. Fires are episodic and high-intensity, not continuous.

e. Artillery supports counterattack by Isolating penetrations, targeting enemy follow-on forces and suppressing enemy flanks. Fires enable manoeuvre forces to destroy fragmented enemy elements.

Artillery Groupings

4.215 Similar to artillery groupings used in offensive operations, OPA artillery is organised into the AG and MAG. Defensive artillery deployment uses depth, deception, and survivability. The AG conducts deep fires within the disruption zone to fragment the enemy advance and is committed during decisive windows to reinforce fires in the frontline zone or support counterattack operations. The MAG provides responsive fires to disrupt the enemy assault and conduct counter-fire operations within the attack zone.

AG in Defence

4.216 AGs deploy in rear defensive zones, use alternate firing areas as well as hardened or dispersed positions. Typically they are 8–20 km behind the FEBA for tubes with rockets deployed farther rearward.

4.217 Tasks include the conduct of counter-preparation fires, counter-penetration, counter-battery fires, reserve interdiction and the provision of defensive fire barriers. Rather than the use of static batteries, OPA artillery make use of primary firing positions, alternate firing positions, supplementary firing positions and deception positions. This reduces vulnerability to WLR-driven counter-battery fires.

MAG in Defence

4.218 MAGs are often held as fire brigades, deployed behind likely enemy axes, near counterattack routes and concealed in terrain. They are used for the rapid reinforcement of threatened sectors, anti-armour suppression, fire support for counterattacks and the provision of emergency smoke screens

4.219 MAGs frequently remain uncommitted until enemy main effort is identified.

Positioning

4.220 In defensive operations, OPA artillery is generally located within the rear defence and depth zones, with forward elements positioned to support the frontal blocking and frontier defence zones.

4.221 The MAG is positioned forward within the depth zone to deliver responsive fires that disrupt and defeat the enemy assault within the frontal blocking and frontier defence zones, while conducting counter-fire operations.

4.222 The AG is positioned deeper within the rear defence zone and conducts fires into the depth zone and enemy deep area to fragment the attacking force, and is committed selectively to reinforce fires in the frontal blocking zone or to support counterattack operations.

Counter-Fire during Defensive Operations

4.223 Counter-fire supports the preservation of combat power and disruption of enemy attacks during defensive operations. Primary objectives include the destruction of enemy artillery concentrations, the neutralisation of preparatory fires, disruption of enemy fire support plans and the protection of defensive positions.

4.224 Counter-fire plans are prepared before combat and integrated with obstacle plans, defensive fire plans and ISR collection plans. Pre-planned target lists should identify likely enemy firing positions, command nodes and artillery deployment areas.

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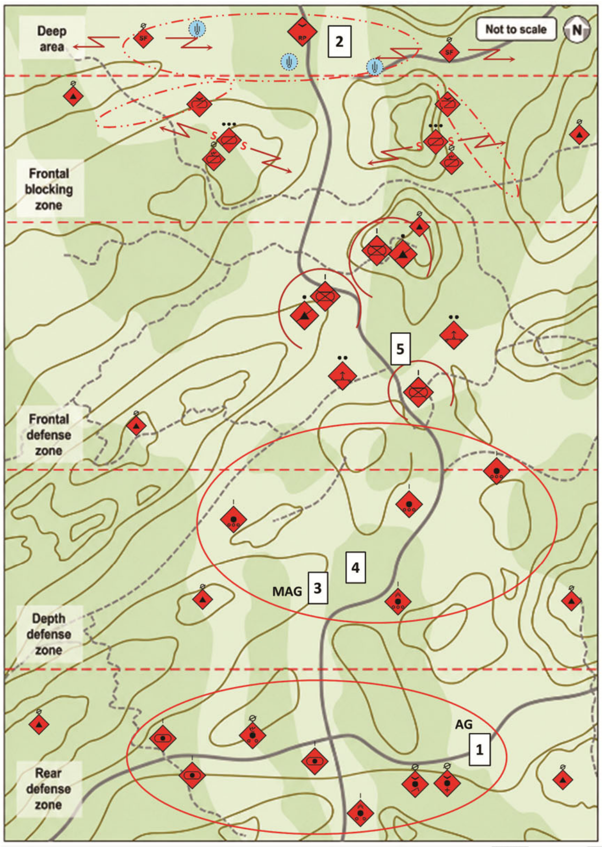
Figure 4.6 Defensive Operations



1. Consisting of 155mm SPH tube artillery and 300mm MRL artillery, the AG is positioned within the rear defence zone.
2. The AG conducts fires into the depth zone and enemy deep area to fragment the attacking force, and is committed selectively to reinforce fires in the frontal blocking zone or to support counterattack operations.
3. Consisting of the CA-Bde's FA battalion, the MAG is positioned within the depth zone to be used for rapid reinforcement of threatened sectors, anti-armour suppression, fire support for counterattacks and the provision of emergency smoke screens.
4. MAGs frequently remain uncommitted until enemy main effort is identified.
5. Mortar batteries provide close support to manoeuvre battalions.

A Vignette – Defensive Operations

Situation

4.225 An OPA medium CA-Bde is tasked to defend a key corridor oriented on a major road–river axis. The brigade is forward deployed with its organic FA battalion (three 122mm SP batteries and one 122mm MRL battery). The brigade has been reinforced with assets from the Group Army FA Bde, including a 155mm SP battalion, the 300mm MRL battalion, and the Target Acquisition (TA) battery providing WLR, UAV, and EW-enabled detection.

4.226 The enemy is a peer mechanised brigade conducting an advance to contact, transitioning to a deliberate attack. The enemy brigade is supported by UAV-enabled ISR and targeting, brigade-level fires with a counter-battery capability and engineer breaching elements.

4.227 The CA-Bde commander's intent is to:

a. Disrupt the enemy reconnaissance–strike system

b. Prevent the enemy from achieving a coordinated breach

c. Fix and fragment the enemy forward elements

d. Enable a brigade-level counterattack within 24 hours.

4.228 Fires will be centrally coordinated at GA level and allocated to the CA-Bde in time-bound windows. The CA-Bde's FA battalion will provide continuous responsiveness, while GA fires will deliver depth and decisive mass.

a. Fires will be executed in five overlapping phases:

b. Counter-reconnaissance (H-24 to H-6)

c. Deep shaping (H-12 to H-1)

d. Counter-fire (H+6 to H+2)

e. Assault disruption (H+1 to H+6)

f. Counterattack support (H+6 to H+24).

Timings Outline

4.229 Phase 1 – Counter-reconnaissance (H-24 to H-6). The defence begins by attacking the enemy's ability to observe, not its ability to shoot.

a. The TA battery identifies UAV launch sites and ground control stations, and forward reconnaissance elements.

b. Fires conduct 155mm and rocket precision strikes against UAV launch sites, suppression fires on suspected observer locations and EW disrupts control links.

c. The desired outcome is to degrade the enemy's ISR coverage so that it becomes intermittent, increase the enemy's targeting timelines increase and degrade the enemy's artillery effectiveness before the main engagement.

4.230 Phase 2 – Deep shaping (H-12 to H-1). Fires are conducted to disrupt the enemy's ability to prepare to conduct effective offensive operations.

a. FA Bde assets conduct long-range strikes against the enemy's Brigade assembly areas, logistics nodes and resupply columns, and command posts.

b. The 300mm MRL battalion conducts saturation fires on assembly areas, precision fires are conducted against C2 nodes and blockade fires are conducted along key routes.

c. The aim is to disrupt the cohesion of the enemy's advance so that units arrive in contact in piecemeal, and C2 and sustainment are disrupted.

4.231 Phase 3 – Counter-fire (H+6 to H+2). The aim of this phase is to deny the enemy's ability to use its artillery effectively.

a. TA systems will detect firing signatures via WLR and UAV when enemy artillery initiates its preparatory fires.

b. Fires will conduct immediate counter-fire missions using 155mm SP artillery for rapid response and 300mm rockets for area neutralisation.

c. Pre-authorised fire missions will be conducted, sensor-to-shooter timelines will be measured in minutes and multiple firing units will engage a single enemy artillery system.

d. The aim is to force enemy artillery to displace, reduced the volume and accuracy of enemy fires and severely disrupt the enemy's fire support synchronisation.

4.232 Phase 4 – Assault disruption (H+1 to H+6). Enemy manoeuvre forces are likely to advance along two axes, supported by breaching elements.

a. The CA-Bde FA battalion will execute suppression fires on forward elements, blockade fires to canalise movement and will target the enemy's engineer breaching teams

b. The FA Bde fires will be allocated for a decisive time window (H+1 to H+3 executing massed MRL fires on assault echelons and simultaneous strikes on follow-on forces.

c. The aim is to disrupt the enemy's assault formations before breaching and force its units into predictable avenues of approach, and cause a loss of tempo and cohesion.

d. Fires during this phase are not continuous but are withheld, then massed at the decisive moment.

4.233 Phase 5 – Counterattack support (H+6 to H+24). While the enemy's main effort is bogged down, a penetration occurs on a secondary axis but lacks depth and support.

a. Fires are used to isolate the enemy's penetration by interdicting its follow-on forces, suppressing its flanking units and concentrating fires on penetrated elements

b. CA-Bde manoeuvre units conduct a counterattack under artillery support.

c. The aim is to destroy the enemy's penetrating force in isolation, forcing it to transition to defensive posture thereby passing the initiative to OPA forces.

4.234 The Artillery Group is the allocated force consisting of the FA Bde's 155mm SP battalion and provides sustained fires in support of the CA-Bde. The Mobile Artillery Brigade is the retained force and consists of the FA Bde's 300mm MRL battalion. It is committed during: the assault disruption and

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counterattack phases. In defensive operations allocated forces sustain the fight and mobile or retained forces decide the fight.

4.235 The conduct of counter-reconnaissance early in defensive operations is decisive. The degradation of ISR directly reduces the effectiveness of enemy fires and manoeuvre. Fires are temporally concentrated, not continuously applied. Decisive effects are achieved through short-duration, high-intensity fire missions. Engaging the enemy in depth creates conditions for success in the close fight. By the time enemy forces reach the FEBA, they are already degraded.

4.236 Artillery enables manoeuvre, not substitutes for it. The decisive action is achieved by counterattack following fire-enabled dislocation. Centralised control with dynamic allocation is critical. The ability to shift firepower between axes prevents the enemy from achieving local superiority.

Section 4-8. Artillery in Security Operations

4.237 OPA CA-Bdes conduct security operations as integrated reconnaissance–security–firepower activities intended to preserve operational tempo, protect the operational system and enable uninterrupted reconnaissance–strike operations. Unlike Western approaches that separate security tasks into doctrinal categories such as screen, guard and cover, EW electronic warfare, air defence and manoeuvre forces.

4.238 Security operations are therefore designed not only to protect the force, but also to detect, identify and maintain target custody over enemy reconnaissance, fires and manoeuvre elements in support of the brigade's targeting process.

4.239 During offensive operations, security activities are normally conducted by reconnaissance detachments, UAVs, forward security elements and reconnaissance patrols operating forward of the main body and along likely enemy avenues of approach. These elements identify enemy blocking positions, artillery firing points, observation posts, ambush locations, obstacles and minefields. At the same time they simultaneously cue artillery, mortars and rocket artillery for suppression or precision engagement.

4.240 Security operations are closely integrated with the brigade's reconnaissance-strike system and support rapid sensor-to-shooter cycles by enabling early target detection and continuous target tracking. OPA security operations also include extensive counter-reconnaissance measures intended to disrupt enemy ISR systems and degrade enemy targeting capability. This includes the employment of artillery fires, UAV surveillance, EW jamming, camouflage, deception and local security patrols.

4.241 These are employed against enemy UAVs, reconnaissance patrols, radar systems, artillery observers and EW assets. The destruction or disruption of enemy reconnaissance systems is considered critical because it prevents the enemy from establishing target custody and conducting effective counter-battery, deep fires or precision strike operations.

4.242 Rear-area and flank security operations are similarly focused on protecting artillery, logistics, command nodes and sustainment systems from enemy reconnaissance and long-range fires. Security tasks include route security, protection of artillery firing positions, convoy security, local air defence, electromagnetic signature management and survivability measures during occupation and displacement.

4.243 Due to the central role of fires within the OPA reconnaissance-strike system, artillery security operations are continuously integrated with survivability, movement, camouflage and deception activities in order to preserve operational continuity and maintain sustained fire support throughout offensive operations.

Role of Artillery in Security Operations

4.244 Artillery plays a central role in OPA security operations by supporting reconnaissance security elements, disrupting enemy reconnaissance and protecting the brigade's operational system from enemy fires and manoeuvre. Artillery is employed to suppress, neutralise or destroy enemy reconnaissance patrols, observation posts, UAV launch sites, artillery firing positions, EW systems, ambush locations and blocking positions. These would have been identified by UAVs, reconnaissance detachments or radar systems. This enables forward security forces to maintain freedom of manoeuvre, preserve operational tempo and prevent enemy interference with the brigade's advance.

4.245 Artillery also supports counter-reconnaissance operations by targeting enemy ISR systems before they can establish target custody or conduct effective targeting. Counter-battery fires, rapid suppression missions and time-sensitive engagements are used to disrupt enemy artillery and reconnaissance-strike

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systems. In particular they target enemy WLRs, forward observers and UAV control sites. These activities are closely integrated with UAV surveillance, EW support and the brigade's broader targeting process to shorten sensor-to-shooter timelines and maintain continuous pressure on enemy reconnaissance assets.

4.246 During offensive operations, artillery supports route security, flank security and forward security operations. This is achieved through the suppression of likely ambush locations, choke points, river crossings, high ground and suspected enemy defensive positions ahead of manoeuvre forces. Artillery may also conduct interdiction and blockade fires against likely enemy reinforcement routes and withdrawal corridors in order to isolate enemy security elements and prevent counter manoeuvre. In restrictive terrain, artillery is frequently used to shape terrain corridors and support the secure movement of the main body.

4.247 Artillery additionally contributes to rear-area security through counterbattery protection, defensive fires, smoke employment and survivability support. Smoke and obscuration fires may be used to conceal artillery displacement, logistics movement, crossing operations or the occupation of battle positions.

4.248 Defensive fires are employed to protect artillery firing areas, command posts, sustainment nodes and critical infrastructure from enemy infiltration or attack. As part of the OPA reconnaissance-strike system, artillery security tasks are therefore not limited to force protection, but are integrated into the brigade's broader effort to preserve freedom of action, deny enemy targeting and maintain operational continuity.

A Vignette – Artillery Support to Security Operations

Situation

4.249 At H+6 during a mechanised brigade's advance northwards, the brigade reconnaissance battalion and forward security detachment are operating 12–15 kilometres ahead of the main body along a coastal MSR. Persistent surveillance from CH-802 UAVs identifies suspected enemy reconnaissance activity occupying elevated jungle terrain overlooking a key river crossing nearby.

4.250 Simultaneously, the brigade's EW detachment detects intermittent tactical radio transmissions assessed to be linked to enemy forward observers coordinating artillery fires against the advancing column.

4.251 The brigade commander assesses that the enemy is attempting to establish target custody over the CAB's lead manoeuvre battalion and supporting artillery group in preparation for delay operations and counterbattery fires.

Action Taken

4.252 To preserve operational tempo and prevent disruption of the advance, the brigade fires cell directs immediate suppression fires against the suspected reconnaissance positions. A forward-deployed 122mm SPH battery conducts a rapid fire mission using HE and airburst munitions against the ridgeline, while a 122mm rocket artillery battery executes a short-duration saturation mission against likely withdrawal routes and UAV launch sites identified by brigade reconnaissance assets.

4.253 As the fires are delivered, reconnaissance-security detachments manoeuvre forward to confirm effects and secure the crossing site. UAV surveillance identifies multiple enemy vehicles withdrawing north from the engagement area, while counterbattery radar detects enemy artillery attempting to displace after firing against the lead security force.

4.254 The brigade's firepower coordination cell immediately authorises a counter-battery engagement by a dedicated 155mm artillery battery operating in depth. Within minutes, precision fires are delivered against the enemy firing position, disrupting the enemy artillery group before effective follow-on fires can be conducted.

4.255 The suppression of enemy reconnaissance and artillery activity enables the brigade's lead manoeuvre battalion to continue its advance without significant delay. Engineers secure the crossing while artillery batteries displace forward under smoke concealment. Brigade UAVs maintain continuous surveillance along the axis of advance.

4.256 Throughout the operation, artillery fires support security operations not only through physical destruction of enemy forces, but by disrupting enemy ISR systems, preventing effective targeting and preserving the momentum of the brigade reconnaissance-strike system.

Section 4-9. Artillery in Complex Terrain

4.257 Different environments have a unique impact on vehicles, personnel and equipment that changes groupings, tactics and procedures. Personnel will require special training for each environment and vehicles will require specific preparation. Failure to undertake the required training and/or modifications will compromise the artillery capability.

4.258 This section describes the nature of the physical environment and its impact on artillery. It considers activities in the urban, jungle, mountainous and littoral environments.

Urban Terrain

4.259 OPA employment of artillery in urban terrain uses the same system-of-systems logic seen elsewhere, but with tighter constraints, higher coordination demands, and a stronger emphasis on precision, suppression, and isolation effects rather than large-scale area destruction. At the tactical level artillery is integrated into the reconnaissance–strike system to shape, isolate, and enable dismounted and mechanised assault forces.

Primary Firepower Tasks

4.260 OPA artillery in urban terrain is not the decisive arm. It is an enabling system designed to create conditions for infantry-led clearance. Primary firepower tasks include:

a. Isolation where artillery is used to interdict reinforcement routes (such as roads, bridges and, choke points), deny the enemy use of withdrawal routes and disrupt urban resupply (covering logistics nodes and vehicle parks).

b. Suppression by neutralising enemy firing points (such as windows, rooftops and strongpoints), fixing enemy defenders to prevent manoeuvre between buildings and to enable assault forces to close with enemy positions with reduced exposure.

c. Precision Destruction by engaging enemy command posts in hardened structures and key strongpoints (occupied by ATGM and heavy weapons teams), using guided munitions (such as laser/GNSS) and munitions that have low-collateral effects.

d. Obscuration and Screening using smoke to mask movement across streets and open areas and deny observation from elevated positions.

e. Create Psychological Effects using short, intense fires to induce shock and dislocation, and targeting command nodes to degrade cohesion.

Firepower Organisation

4.261 When conducting operations in urban terrain the composition of the artillery group and mobile artillery group reflects a deliberate split between depth, precision, and system-level fires and responsive, close, and manoeuvre-aligned fires. The exact mix is task-organised from the Group Army FA Bde and CA-Bde assets.

4.262 The Artillery Group delivers deep, precision, and isolating fires, engaging high-value targets beyond the immediate urban fight. It consists of 155mm SP tube artillery and 300mm long range rocket artillery. Tube artillery is used for precision strike, the controlled destruction of structures and counter-battery fires. Long range rocket artillery is used to strike command node, logistics hubs and reinforcement routes outside the urban area. The use of precision-guided rockets is the preferred ammunition type in urban terrain. Target acquisition assets such as WLR detachments and UAV reconnaissance elements (brigade/Group Army controlled) are also likely to be included in the Artillery Group. Its role is to enable counter-battery fire and deep targeting. Assets are usually located outside the dense urban area in depth typically 20-40km.

4.263 When operating in urban terrain the mobile artillery group provides close, responsive, high-tempo fires and directly supports CA-Bde manoeuvre battalions. It consists of the CA-Bde's organic FA battalion and mortars such as the Tyulpan 240mm SP mortars and the TOS-1A 220mm flame rocket launchers attached from the Enclosure Terrain Fire Support Battalion. The tube artillery is used for immediate suppression, close support and fires in support of assault elements. The 122mm MRL battery of the FA battalion is used for area suppression, short-duration saturation fires and urban strongpoint neutralisation. The use of mortars is critical in urban terrain. It is uses high-angle fires to engage reverse slopes (urban canyons) and positions in defilade.

4.264 Forward observer and UAV elements are embedded with assault companies and battalion HQs. They conduct real-time adjustment and target confirmation. Loitering munition teams from Group Army or higher may also be attached. Mobile artillery group artillery units are generally located just outside urban area or within secured sectors, typically 2–10 km from FEBA. They displace frequently using shoot-and-scoot techniques to avoid counter-battery fire.

4.265 The Artillery Group will generally have an increased use of precision munitions and a reduced use of area saturation to minimise collateral risk. The Mobile Artillery Group generally has an increased reliance on mortars for high-angle fires. They frequently conduct small-unit firing at battery or platoon level.

Jungle Terrain

4.266 OPA employment of artillery in jungle terrain is shaped by restricted observation, degraded communications, limited mobility, and the difficulty to conduct target acquisition. Consequently artillery is employed less as a continuous supporting arm and more as a selectively applied, ISR-enabled strike system at focuses on shaping key points (routes, choke points, and objectives) rather than broad area effects.

Primary Firepower Tasks

4.267 In jungle terrain, artillery supports manoeuvre by enabling movement through constrained terrain and disrupting enemy use of key terrain, rather than dominating the battlespace. Primary firepower tasks include:

a. Route Denial and Interdiction targeting tracks, trails, river crossings and defiles in order to delay reinforcement and resupply, and canalise enemy movement into engagement areas.

b. Suppression of Ambush Positions engaging likely ambush sites (such as bends, choke points and high ground near tracks) to enable safer movement of own forces.

c. Precision Strike on Key Nodes engaging enemy command elements, logistics caches and fire support positions requiring a high-confidence level ISR such as UAV cueing or reconnaissance teams.

d. Obscuration and Screening by using smoke to conceal movement along tracks and mask river crossings or helicopter landing zones.

e. Defensive Fires by using pre-planned fires on likely enemy avenues of approach, patrol routes and infiltration corridors.

Firepower Organisation

4.268 The CA-Bde’s FA battalion will be used to provide immediate, pre-planned fires and support to battalion manoeuvre axes. Sub-units are likely to be positioned along limited road networks using clearings or semi-open terrain. Often they will be dispersed in small firing units rather than massed batteries. Employment is likely to be constrained by restricted mobility tied to road/track access and a limited ability to reposition laterally. Response timings are likely to be reduced if routes are interdicted.

4.269 Similar to operating in urban terrain the Artillery Group will be used to provide deep interdiction and strike against rear-area jungle bases and logistics nodes. Its assets will include the 155mm SP howitzers and long-range MRL of the Group Army’s FA Bde. Likely targets include rear jungle bases and supply nodes along lines of communication. It is unlikely that the Artillery Group will be used for close support due to target acquisition challenges.

4.270 Consisting of wheeled artillery supplied by the FA battalion and manoeuvre battalion’s mortars, the Mobile Artillery Group will provide responsive fires along axes of advance and support to dispersed manoeuvre elements. Firing units will likely be dispersed in small firing units. They will leapfrog along tracks to provide immediate suppression and fires in support of contact. Mortars play a disproportionately important role because of their steep trajectories. They are better suited for engaging masked terrain and close support. Finally, there is likely to be limited opportunity to employ a shoot-and-scoot technique as there are likely to be few viable alternate positions and careful route planning will be required.

4.271 Jungle terrain provides a number of challenges for the use of ISR assets. The dense canopy limits UAV observation and degrades satellite and aerial ISR. Ground observation is short-range and often fragmented. Despite these challenges the OPA applies a layered approach to ISR using UAVs, ground reconnaissance teams and forward observers as follows:

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a. Where possible UAVs will operate along gaps in the canopy, river lines and clearings to provide intermittent target detection.

b. Ground reconnaissance teams are the primary source of targeting data and will operate forward of manoeuvre units.

c. Forward observers will be embedded with leading elements and are critical for the adjustment of fires and the conduct of danger-close engagements.

d. Targets will be predominantly point targets such as small units and caches, and linear targets such as tracks and river lines.

e. Artillery will rarely engage large area targets in jungle terrain.

4.272 The use of re-planned fires dominate in jungle terrain due to limited real-time targeting. Pre-planned targets are likely to be named areas of interest (NAIs) and target reference points (TRPs). Command and control of artillery will be retained at the CA-Bde HQ (for the organic FA battalion and MAG) and the Group Army HQ for the Artillery Group. The emphasis will be on the identification and engagement of high-payoff targets.

4.273 Jungle environments interfere with radio propagation leading to delays in fire missions. There will be a greater reliance on pre-arranged fire plans and redundant communications, such as relay, UAV nodes where possible.

4.274 OPA artillery units employ a bounding fires technique in support of movement. Bounding fires is the deliberate, sequential placement and shifting of artillery fires along an axis of advance to suppress, disrupt, or neutralise likely enemy positions ahead of manoeuvre elements. It is not random but planned, axis-based, time-controlled and linked to manoeuvre bounds.

4.275 Jungle terrain severely limits observation highly increasing ambush risk. Manoeuvre is limited by restricted movement corridors such as tracks, trails and river lines. This reduces the ability to reliably detect targets in advance the enemy's presence must be assumed along key terrain and likely axes of advance. So instead of using the conventional "find-fix-strike" technique, an "assume-suppress-move-confirm "technique is used.

4.276 The step-by-step process is as follows:

a. In the initial fire placement artillery fires on likely ambush sites such as track bends, choke points, or high ground near the route, typically 300-1000m ahead of the forward manoeuvre elements, depending on the terrain.

b. The manoeuvre element advances into the area just fired upon an fires lift or shift forward.

c. Artillery shifts to the next bound ahead to maintain continuous suppression of the route forward.

d. The process is repeated in bounds tied to the manoeuvre tempo.

4.277 The following table displays a comparison between manoeuvre bounding use by manoeuvre elements and bounding fires.

Table 4.8 – Manoeuvre Bounding and Bounding Fires Comparison

Manoeuvre bounding	Bounding fires
One element moves, one covers	Fires move ahead of force
Cover is direct fire	Cover is indirect suppression
Reactive	Largely pre-planned

4.278 Bounding fires has the following characteristics:

a. Targets such as TRPs, NAIs and likely ambush locations are pre-planned.

b. Fires use time-based synchronisation with fires shifting based on time or phase line crossings. They are not purely observer-driven.

c. The focus is on area suppression, not precision, often HE and airburst (if available) to disrupt, not necessarily destroy.

d. Fire Missions of short duration, typically 1–3 minute engagements are used to maintain tempo.

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4.279 This technique is most applicable during advance to contact and advance in contact as well as movement along tracks, river lines and narrow jungle corridors. However it is ammunition intensive and may alert enemy forces. It is also ineffective against deep, well-concealed positions. It requires good timing and coordination.

4.280 Bounding fires are employed to suppress likely enemy positions along constrained jungle axes by sequentially placing and shifting artillery fires ahead of advancing manoeuvre elements. This technique reduces ambush risk and enables continued movement despite limited observation and target acquisition.

Mountainous Terrain

4.281 OPA artillery employment in mountainous terrain is dominated by terrain-induced constraints on observation, mobility, and communications. Consequently fires are highly centralised in prioritisation, decentralised in execution, and focused on key terrain such as heights, passes and valleys. The emphasis shifts toward precision, high-angle delivery, and pre-planned fires, with temporal massing

Primary Firepower Tasks

4.282 In mountainous terrain artillery enables manoeuvre by controlling vertical and lateral movement corridors and denying key terrain, rather than delivering continuous area fires. Primary firepower tasks include:

a. The control of key terrain by engaging high ground which could be likely observation posts or fire bases, passes, defiles and ridgelines to deny the enemy observation and domination of terrain.

b. The interdiction of movement corridors targeting valley roads, switchbacks as well as bridges and tunnels to canalise the enemy and delay forces, and disrupt the enemy's logistics flow.

c. The suppression of defensive positions engaging reverse-slope positions using high-angle fire, entrenched positions on heights to enable infantry and light forces to close with the enemy.

d. The conduct of precision strike on critical nodes engage command posts in protected terrain as well as air defence and fire support positions. However this requires accurate mensuration (INS/GNSS, survey and met).

e. Conducting pre-planned fires on likely avenues of approach such valleys and ridgelines, and landing zones and helicopter approaches.

Firepower Organisation

4.283 The CA-Bde's FA battalion's primary role will be to provide direct support to manoeuvre battalions and the immediate suppression of identified positions. To achieve this it is likely to be positioned in valleys (but will be restricted with limited arcs), reverse slopes (for survivability) or on plateaus or widened terrain. It is likely to be constrained by severely restricted fields of fire, limited lateral movement between axes and vulnerable to observation from higher ground.

4.284 The Artillery Group will be provided by the Group Army FA Bde with the primary tasks of engaging high-value targets at range and deep interdiction across multiple valleys. Key targets will include enemy artillery on heights, rear-area logistics nodes and key terrain dominating operational axes.

4.285 The CA-Bde's FA battalion will provide the bulk of the Mobile Artillery Group supported the manoeuvre battalion's mortars which are critical in mountainous terrain. Assets are likely to be positioned along valley routes in support of battalion axes. They will also frequently displace along limited road networks.

Impact on ISR

4.286 Observation is not continuous across the battlespace in mountainous terrain. It is broken into discrete, disconnected observation zones separated by terrain masking. Visibility will be excellent in some directions whilst in others there will be no visibility. This can often be very close by. This is caused by terrain masking where intervening terrain such as ridges, spurs and peaks block line-of-sight. So an observer on one ridge sees into one valley but cannot see the next valley, reverse slopes or dead ground behind terrain features. Positions on the far side of a ridge are completely hidden even if they are only hundreds of metres away. This creates an "invisible enemy" problem. Unlike flat terrain observation is three dimensional, not two dimensional creating overwatch from heights and blind zones directly below observation points. Terrain masking is depicted in the image on the following page.

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Figure 4.7 – Terrain Masking

4.287 In mountainous terrain, observation and sensor coverage are fragmented by terrain masking, resulting in discrete and often disconnected areas of visibility separated by dead ground. Ridges, valleys, and reverse slopes prevent continuous observation, requiring forces to rely on multiple observation posts and pre-planned targeting to compensate for gaps in situational awareness. This applies to all ISR systems, not just human observers as follows:

a. UAVs are effective along ridgelines and above valleys but degraded in narrow valleys and behind terrain masking leading to intermittent coverage and not persistent across entire AO.

b. WLR require line of sight to projectile trajectory but detection arcs will be blocked by terrain resulting in coverage gaps and a reduction in counter-battery effectiveness

c. Radios are also affected with line of sight communication also being blocked by terrain leading to broken sensor-to-shooter links.

4.288 Unlike open terrain the enemy is unlikely to be detected until it is too late and many targets may never be directly observed. Consequently:

a. Fires must be pre-planned because detection is limited and there will be a heavy reliance on TRPs, NAIs and the conduct of terrain analysis.

b. Observers must be positioned deliberately with FOs placed on key heights to cover a designated sector, not the whole AO.

c. Multiple observation nodes will be required to cover different valleys/ridges to compensate for fragmentation.

d. High-angle fires become critical to engage reverse slopes and targets in defilade.

e. Sensor-to-shooter delays are likely to increase as detection will be intermittent and communications will be degraded.

4.289 Similar to operating in jungle terrain the OPA will apply a layered approach to the employment of ISR. UAVs will operate along valleys and ridge lines to provide persistent surveillance where possible. 2. Ground reconnaissance will be employed with observation posts deployed on heights to provide high-value targeting data. Forward observers will be embedded with manoeuvre units which is critical for adjustment of fires in dead ground. Target-types will be dominated by point targets (positions on heights) and linear targets (valley routes). Area targets will be limited to assembly areas in valleys or plateaux.

4.290 Pre-planned fires covering passes, defiles and reverse slopes (using high-angle fires) will dominate. CA-Bde/Group Army HQ will allocate fires to key terrain and high-payoff targets. Terrain masking will affect radio propagation so this will need to be mitigated using relay stations on heights and UAV relay (where available). Fire support coordination lines are likely to be aligned with ridge lines and valley boundaries. Restricted areas around friendly forces in confined terrain are likely to be created.

4.291 The employment of high-angle fire, delivered by mortars and tube artillery firing at high elevations, is critical for engaging reverse slopes and clearing positions in defilade. However this will make tube artillery more vulnerable to counter-battery fire. Fires are likely to be used to: support air assault or vertical manoeuvre, targeting landing zones and high ground dominating objectives.

4.292 Similar to the bounded-fires technique used in jungle terrain, fires are likely to be planned and shifted along single axes (valleys) to enable a sequential advance. As well as engaging reverse slopes with high-angle fire, precision munitions are likely to be used to overcome terrain masking. Dense pre-planned fires on likely approaches and choke points are likely to be conducted to delay and canalise enemy forces.

4.293 The major constraints which are likely to affect the use of artillery in mountainous terrain include:

a. Dead ground created by terrain masking reduces effectiveness of flat-trajectory fires.

b. There is likely to be difficulty in concentrating multiple batteries on a single target leading to a greater reliance on temporal massing (sequenced fires)

c. Ammunition usage rates may be higher but resupply will be constrained by terrain making it slower and more vulnerable.

d. Rapid changes in wind, temperature gradients will have a significant impact on ballistics.

4.294 In mountainous terrain, OPA artillery is employed to control key terrain and movement corridors rather than to achieve continuous fire dominance. Fires are concentrated on heights, passes, and valley routes, with high-angle delivery enabling engagement of reverse-slope and defiladed positions. Target acquisition is enabled through a combination of UAVs and ground-based observers occupying elevated positions, while terrain masking and communications challenges constrain responsiveness. Organic brigade artillery provides direct support along manoeuvre axes, while higher-echelon assets conduct deep interdiction and strike high-value targets. In this environment, artillery effectiveness is determined by terrain exploitation, precision, and timing rather than mass.

Littoral Terrain

4.295 Operations in littoral terrain impose a fundamental constraint on artillery employment. The ability to bring land-based firepower to bear is determined by whether it can be projected into the objective area prior to landing. While the physical terrain of the littoral is broadly consistent, the employment of artillery varies significantly depending on the operational context, particularly the distance between the force and its supporting land-based fires.

4.296 Consequently the employment of artillery in littoral terrain is best understood through two distinct but related models:

a. A near-seas model, in which land-based artillery can engage the objective from the outset,

b. A distant littoral model, in which artillery must be transported and established ashore before it can contribute to the fight.

4.297 In the near-seas model artillery forms the foundation of the fire support system, providing continuous shaping, suppression, and interdiction from depth throughout all phases of the operation.

4.298 In contrast, in a distant littoral environment the inability to employ land-based artillery prior to landing creates a temporary discontinuity in fire support. In this case, naval and air platforms assume responsibility for deep shaping and assault support, while artillery is introduced only after a lodgement has been established.

4.299 The defining distinction between these models is therefore the presence or absence of continuous artillery support at the point of contact.

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Near-Seas Model

4.300 Artillery operations in near-seas littoral terrain is characterised by the ability to project land based artillery fires into the landing area and associated lodgement objectives prior to the commencement of amphibious operations. This model is typified by a scenario, in which the proximity of the objective to mainland or forward-based forces enables long-range artillery systems to engage targets throughout all phases of the operation.

4.301 In this environment, the battlespace is dense and highly integrated across the land maritime, and air domains. Persistent ISR coverage, supported by unmanned systems radar, and electronic warfare capabilities, enables continuous targeting and rapid engagement of identified targets. Consequently artillery is able to influence the operation before, during, and after the landing, forming the foundation of the fires system.

4.302 Artillery employment is based on a layered fires structure comprising an artillery group and a mobile artillery group, integrated within a broader joint fires system as follows:

a. The artillery group is formed from higher-echelon artillery assets, typically at Group Army level, and constitutes the primary deep fires capability. Positioned in depth, the artillery group is responsible for:

(1) Deep shaping of the landing area and associated lodgement objectives

(2) Counter-battery operations

(3) Interdiction of enemy reserves and lines of communication

(4) Precision engagement of high-value targets

b. Targeting is centrally prioritised and dynamically adjusted in response to changes in the operational environment.

c. The mobile artillery group is typically formed from the CA-Bde's FA battalion and manoeuvre battalion mortars and may be reinforced as required. The mobile artillery group provides:

(1) Responsive, close fire support to manoeuvre units

(2) Suppression of enemy positions within the immediate battlespace

(3) Fires in support of lodgement expansion and inland operations

d. Following deployment ashore, the mobile artillery group integrates into an already active fires system, enhancing responsiveness and increasing the density of available fires.

4.303 Artillery is employed continuously across all phases of the amphibious operation as follows:

a. Deep Shaping (H-72 to H-6). During the deep shaping phase, the artillery group serves as the primary fires system. The purpose of these fires is to isolate the objective area, degrade the defensive system and create favourable conditions for the assault. It conducts sustained fires against:

(1) Command and control nodes

(2) Air defence systems

(3) Coastal surveillance and ISR assets

(4) Logistics nodes and infrastructure

(5) Reserve forces and assembly areas.

b. Assault phase (H-6 to H+2). During the assault phase, artillery continues to provide continuous fire support at the point of contact. Unlike distant littoral operations, there is no interruption in artillery support during this phase. Continuous suppression reduces the effectiveness of enemy fires and facilitates the landing of assault elements. Fires are directed against:

(1) Beach defences and obstacle belts

(2) Strongpoints and defensive positions

(3) Likely counterattack routes and assembly areas.

c. Lodgement phase (H+2 to H+12). As the lodgement is established, artillery continues to provide suppression and interdiction, while shifting fires deeper into the battlespace. The mobile artillery group is deployed ashore and integrated into the fires system, providing increased responsiveness and enabling more precise support to manoeuvre units.

d. Expansion phase (H+12 onward). The full fires system is employed during lodgement expansion and inland operations. The artillery group continues to conduct deep fires and counter-battery operations, while the mobile artillery group provides close support to advancing forces. This layered fires approach enables sustained tempo, disrupts enemy counterattacks, and supports the transition to manoeuvre operations inland.

4.304 The effectiveness of artillery in the near-seas model is enabled by persistent ISR and a continuous targeting cycle. Sensors, including UAVs, radar systems, and electronic warfare assets, provide real-time and near-real-time targeting data, enabling rapid engagement. Artillery operates with a continuous Decide–Detect–Deliver–Assess (D3A) cycle. Targeting is centrally prioritised but executed in a decentralised manner, allowing for rapid adaptation to changing conditions.

4.305 Command and control of artillery reflects a balance between centralised planning and decentralised execution. Higher headquarters retain control of target prioritisation and resource allocation, while subordinate units are empowered to execute fires in support of manoeuvre. Firepower is allocated based on time, phase, and priority of effort, allowing for dynamic re-tasking and efficient use of available systems. This approach supports continuous fire support and ensures alignment with the commander's intent.

4.306 The near-seas model of artillery employment is characterised by:

a. Continuous artillery support across all phases of the operation

b. Artillery-led deep shaping and suppression

c. High density and massing of fires

d. Integration with joint fires systems

e. Reduced operational risk during the assault phase.

4.307 The employment of artillery in the near-seas model has the following advantages and disadvantages:

a. Advantages:

(1) Continuous and responsive fire support

(2) High volume and density of fires

(3) Effective suppression of enemy defences

(4) Reduced risk to manoeuvre forces during landing.

b. Disadvantages:

(1) Dependence on persistent ISR and communications

(2) Vulnerability to counter-battery and electronic warfare

(3) Requirement for robust coordination across domains.

4.308 In the near-seas model, artillery forms the foundation of the fires system, providing continuous shaping, suppression, and interdiction from pre-landing through to inland expansion. Long-range artillery systems engage targets across the depth of the landing area and associated lodgement objectives, while organic artillery elements reinforce the fires system following deployment ashore. This results in a layered, continuous fires architecture that reduces risk during the assault and enables rapid transition to manoeuvre operations inland.

Distant Littoral Model

4.309 The distant littoral model of operations in littoral terrain is characterised by the inability to project land-based artillery fires into the landing area and associated lodgement objectives prior to the commencement of amphibious operations. This model is typified by operations in geographically remote theatres where the distance from mainland or established bases precludes the use of long-range artillery systems during the pre-landing and assault phases.

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4.310 In this environment, the battlespace is dispersed and expeditionary in nature, with extended lines of communication and limited forward basing. ISR coverage is less persistent and more dependent on maritime and air platforms. Consequently artillery cannot influence the operation at the point of contact and must be physically transported, landed, and emplaced before it can contribute to the fight. This creates a temporary discontinuity in fire support during the transition from sea to land.

4.311 Artillery employment is based on a phased fires structure in which responsibility for fire support transitions from joint naval and air systems to land based artillery following the establishment of a lodgement.

4.312 Prior to the establishment of land-based artillery ashore, fire support is provided primarily by naval and air platforms. These include surface combatants employing land-attack cruise missiles, carrier-based strike aircraft, long-range aviation, and attack helicopters. This joint fires system is responsible for:

a. Deep shaping of the landing area and associated lodgement objectives

b. Suppression of coastal defences and key terrain

c. Interdiction of enemy reserves and lines of communication

4.313 Targeting is centrally controlled and prioritised, with an emphasis on precision and timing due to the limited ability to sustain high volumes of fire.

4.314 The mobile artillery group is formed from the CA-Bde’s FA battalion as well as manoeuvre battalion mortars and constitutes the first land-based fires capability to be introduced into the operation. The mobile artillery group is deployed ashore once sufficient lodgement depth has been established to allow for safe emplacement. It provides:

a. Responsive, close fire support to manoeuvre units

b. Suppression of residual defensive positions

c. Fires in support of counterattack defeat and lodgement expansion

4.315 The introduction of the mobile artillery group marks the transition from reliance on joint fires to sustained land-based fire support.

4.316 The artillery group, consisting of higher-echelon artillery assets is introduced only as a follow-on echelon. Its deployment is dependent on the availability of secure ports, landing sites, or sustained logistical support. Once established, the artillery group provides:

a. Deep fires against operational-level targets

b. Counter-battery capability

c. Interdiction of reinforcement routes and logistics

4.317 The arrival of the artillery group restores depth and continuity to the fires system.

4.318 Artillery employment is characterised by a phased transition from joint fires to land-based fires, with a temporary gap in responsive fire support during the assault phase. Phases are as follows:

a. Deep Shaping Phase (H-72 to H-6). During the deep shaping phase, fires are delivered primarily by naval and air platforms. The purpose of these fires is to isolate the landing area, degrade the enemy’s defensive system and set conditions for the assault. These fires are directed against:

   (1) Command and control nodes

   (2) Airfields and ports

   (3) Coastal surveillance and ISR systems

   (4) Logistics infrastructure

   (5) Reserve forces and assembly areas.

b. Assault Phase (H-6 to H+2). During the assault phase, manoeuvre forces are committed to the landing without the support of land-based artillery. Fire support is provided by naval gunfire, aviation and attack helicopters. This phase is characterised by a temporary gap in responsive fire support, as artillery organic to the landing force has not yet been deployed ashore. Fires are limited in volume and must be carefully coordinated to avoid fratricide and maximise effect.

c. Lodgement Phase. (H+2 to H+12). As the lodgement is established, artillery systems are transported ashore and emplaced in initial firing positions. The mobile artillery group becomes operational during this phase, providing the first responsive land-based fires. This phase represents the transition from joint fires to sustained land-based fire support. The introduction of artillery enables:

(1) Immediate suppression of residual resistance

(2) Engagement of counterattack forces

(3) Improved responsiveness in support of manoeuvre

d. Expansion Phase (H+12 onward). During lodgement expansion and inland operations, the mobile artillery group provides continuous close support to manoeuvre units. As additional forces and sustainment capabilities are established, follow-on artillery assets may be deployed, restoring depth and enhancing the overall fires system. The integration of land-based artillery with ongoing naval and air fires enables the force to increase tempo, disrupt enemy operations, and conduct sustained manoeuvre inland.

4.319 Targeting is constrained by less persistent ISR and the distributed nature of the battlespace. During the pre-landing and assault phases, targeting relies heavily on maritime and air-based sensors. Following the establishment of the lodgement, forward observers and land-based sensors enable improved target acquisition and adjustment of fires. The targeting process transitions from centrally controlled joint fires to a more responsive, manoeuvre-driven system aligned with the Decide–Detect–Deliver–Assess (D3A) cycle.

4.320 Fire control in the distant littoral model evolves over time. During the pre-landing and assault phases, fires are centrally controlled and allocated across naval and air platforms. Following the deployment of artillery ashore, fire control becomes more decentralised, enabling responsive support to manoeuvre units. Command relationships must account for the transition between fire support systems ensuring continuity of effort and alignment with the commander's intent. The integration of artillery into the fires system requires effective coordination between joint and land components.

4.321 The distant littoral model of artillery employment is characterised by:

a. Absence of land-based artillery during the pre-landing and assault phases

b. Reliance on naval and air fires for shaping and initial support

c. A temporary gap in responsive fire support during the assault phase

d. Phased introduction of artillery following the establishment of a lodgement

e. Transition from centrally controlled joint fires to responsive land-based fires.

4.322 The employment of artillery in the distant littoral model has the following advantages and disadvantages:

a. Advantages:

(1) The ability to project fires across extended distances using naval and air platforms

(2) Flexibility in targeting through joint fires integration

(3) The gradual build-up of land-based fire support.

b. Disadvantages:

(1) There is temporary gap in responsive artillery support during the assault phase

(2) There is reduced fire density and continuity at the point of contact

(3) There is a dependence on successful lodgement for artillery employment

(4) There is increased operational risk during initial landing.

4.323 In the distant littoral model, artillery is not available to the landing force until it has been deployed ashore, resulting in a temporary discontinuity in fire support during the transition from sea to land. Naval and air platforms provide shaping and assault-phase fires, while the introduction of 122 mm artillery systems enables responsive support following the establishment of a lodgement.

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4.324 The subsequent deployment of heavier artillery assets restores depth and continuity to the fires system. The effectiveness of artillery in this model is therefore determined by the timing of its introduction, the management of the fires gap, and the successful integration of land-based fires with ongoing joint operations.

4.325 Regardless of the model applied, artillery ultimately becomes the principal means of enabling sustained manoeuvre ashore. However, the timing of its introduction fundamentally alters the character of the operation.

4.326 In near-seas operations, continuous artillery support allows for the systematic shaping and suppression of the objective, reducing risk during the assault and enabling rapid transition to inland operations. In distant littoral operations, artillery assumes this role only after it has been deployed ashore, closing the gap between sea-based and land-based fires and restoring continuity to the fire support system.

4.327 The effectiveness of artillery in littoral operations is therefore determined not only by its capabilities, but by the commander's ability to sequence its employment, manage the transition between fire support systems, and mitigate the risks associated with periods of reduced fire support.

Section 4-10. Artillery in Contingency and Limited Operations

4.328 The employment of artillery in contingency and limited operations differs significantly from its use in large-scale combat, reflecting the constrained objectives, limited force commitments, and heightened sensitivity to escalation that characterise these operations. In this context, artillery is not employed as a system for massed fires, but as a controlled and responsive means of generating specific effects in support of clearly defined tactical and operational objectives. The requirement to limit collateral damage, manage escalation, and maintain strategic flexibility places additional constraints on the scale, duration, and nature of artillery fires.

4.329 Artillery in contingency and limited operations is therefore employed selectively, often in support of discrete tasks such as securing key terrain, reinforcing forward elements, conducting raids, or responding to emerging threats. Fires are tightly controlled, frequently precision-oriented, and closely integrated with reconnaissance and manoeuvre elements. The emphasis is on achieving the desired effect with the minimum necessary force, with commanders balancing the need for responsiveness against the requirement for control.

4.330 As a result, artillery employment in this environment is characterised by precision, timing, and disciplined application rather than volume and mass.

Defining Contingency and Limited Operations

4.331 Contingency operations may be defined as short-notice, politically sensitive military operations conducted to respond to emerging crises, protect national interests, or create favourable conditions without escalating to large-scale war.

4.332 Typical triggers include:

a. Crisis in littoral/periphery (islands, SLOCs, overseas interests)

b. Protection of Olvanan citizens/assets abroad

c. Rapid seizure or denial of key terrain (ports, airfields, chokepoints).

4.333 Key characteristics include:

a. Compressed planning timelines

b. High political oversight and escalation sensitivity

c. Joint, system-of-systems employment from outset

d. Limited force footprint but high capability density

e. Reliance on pre-existing ISR–strike networks.

4.334 Limited operations are defined as deliberately constrained combat operations conducted to achieve specific operational objectives while controlling scale, duration, and escalation.

4.335 Typical objectives include:

a. Punitive strikes

b. Territorial denial / coercion

c. Limited objective attack (such as island seizure, border action)

4.336 Key characteristics include:

a. Clearly bounded objectives (geographic and temporal)

b. Escalation management central to planning

c. Selective targeting (military + system-critical nodes)

d. Integration of kinetic and non-kinetic effects

e. Sustainment and force preservation prioritised over decisive destruction.

4.337 The following table summarises the factors and key differences of contingency operations and limited operations.

Table 4.9 – Differences between Contingency and Limited Operations

Factor	Contingency Operations	Limited Operations
Trigger	Reactive (crisis-driven)	Deliberate (planned)
Preparation	Minimal/pre-configured	Pre-planned
Duration	Short, uncertain	Defined/bounded
Scale	Small–medium	Medium (but constrained)
Escalation control	Critical	Central objective
Fires approach	Immediate, responsive	Deliberate, phased

4.338 Contingency operations prioritise responsiveness and readiness of the reconnaissance–strike system. Limited operations prioritise calibration of effects to achieve objectives without escalation.

Employment of Artillery in Contingency Operations

4.339 In contingency operations, the PLA seeks to respond quickly to a developing crisis. Planning time is compressed, political oversight is high, and the force often operates with incomplete deployment and imperfect preparation. Under these conditions, the fire allocation model favours CA-Bde FA battalion for immediacy and Group Army artillery for early decisive shaping and tight central control over strikes with escalation implications.

4.340 The CA-Bde FA battalion is allocated to suppress enemy forward positions threatening brigade movement and provide immediate fire support to advance guards, assault detachments, or lodgements. It is also allocated to engage targets of opportunity inside the brigade's zone, deliver smoke, obscuration, neutralisation, and short-duration suppression to support rapid seizure of local tactical objectives. This makes CA-Bde FA battalion the principal tool for responsive fires in the first tactical echelon.

4.341 Group Army artillery is allocated to strike air defence sites, headquarters, radar, logistics nodes, and reserves as well as support entry operations, lodgement creation, or access denial. It is also used to reinforce a CA-Bde at the decisive point. It delivers long-range rocket fires against targets outside the CA-Bde's reach and conduct counter-intervention fires against follow-on forces or approach routes. This makes Group Army artillery the principal tool for operational shaping and selective concentration.

4.342 In contingency operations, Group Army artillery will often remain under centralised echelon control, but selected battalions, batteries, or fire missions may be placed in a supporting or temporarily dedicated relationship to a CA-Bde for the duration of a tactical phase. This is usually conditional and time-bound rather than permanent. Consequently the CA-Bde commander may receive direct access to specified fire missions, priority of support during a short window, or temporary attachment of selected rocket/tube elements. However the Group Army retains authority to reallocate those assets rapidly as the situation changes.

4.343 Fires allocated in contingency operations are described in the table on the following page.

Table 4.10 – Allocation of Fires in Contingency Operations

Function	CA-Bde FA battalion	Group Army FA Bde
Immediate suppression of enemy tactical positions	Primary	Reinforcing only if required
Support to CA-de advance/assault	Primary	Secondary/reinforcing
Destruction of operational C2/AD nodes	Limited	Primary
Deep shaping beyond brigade zone	Limited	Primary
Counter-intervention against follow-on forces	Rare	Primary
Dynamic targets in brigade zone	Primary	Case-by-case
Precision strike with political sensitivity	Usually not primary approval level	Primary
Cross-boundary firepower concentration	Limited	Primary

Employment of Artillery in Limited Operations

4.344 In limited operations, the OPA seeks a clearly bounded result without uncontrolled escalation. Fires are therefore more deliberate, more selective, and more closely matched to political purpose. The allocation model reflects this by reserving the most sensitive and operationally significant fires to higher command, while allowing the CA-Bde to control the fires needed for local manoeuvre and tactical consolidation.

4.345 The CA-Bde FA battalion is allocated to isolate the immediate objective area and suppress local defenders during a limited objective attack. It is also used to block or delay enemy tactical reinforcement and provide defensive fire support once the objective is seized. Its role is to maintain fire pressure without creating excessive collateral effects. The CA-Bde FA battalion artillery therefore supports the bounded tactical action: seizure, lodgement defence, limited penetration, punitive raid, or local denial.

4.346 Group Army artillery is allocated to strike operationally important nodes that enable enemy response and impose cost on selected targets as part of coercive signalling. It is also tasked to isolate the battlespace at depth and provide precision strike options against escalation-sensitive targets. It also reinforces the CA-Bde during decisive entry, seizure, or disengagement phases. Group Army artillery in limited operations is therefore the principal instrument for controlled operational effects and escalation management.

4.347 In limited operations, Group Army artillery is even less likely to be routinely devolved because targets often have escalation implications, munition choice may be politically sensitive and timing of fires may need approval above brigade level. Accordingly, the CA-Bde normally controls its own FA battalion for the local fight, while Group Army artillery conducts centrally approved shaping fires, time-sensitive deep strikes and selected reinforcement fires at decisive points. The CA-Bde may be given priority of support, but not necessarily direct command of higher-echelon assets.

4.348 The CA-Bde FA battalion mainly delivers immediate suppression and tactical shaping fires, whereas Group Army artillery delivers precision, destructive, and depth-oriented firepower against targets with operational significance.

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Table 4.11 – Allocation of Firepower Types

Firepower type	CA-Bde FA battalion role	Group Army Fa Bde role
Suppression	Primary	Reinforcing at scale
Destructive	Limited/local	Primarily against high-value targets
Precision	Increasing but limited by organic capability	Primary
Blockade	Localised	Primary at operational depth
Saturation	Limited and rare	Possible, but politically sensitive

4.349 In contingency and limited operations, artillery remains a critical enabler of manoeuvre, but its effectiveness is determined by how precisely and judiciously it is employed. Rather than dominating the battlespace through massed fires, artillery provides commanders with a flexible tool for generating controlled effects, supporting manoeuvre, and shaping localised engagements. Its value lies in its ability to deliver timely and proportionate firepower in support of limited objectives while avoiding unnecessary escalation.

Section 4-11. Conclusion

4.350 The successful employment of artillery is dependent on the integration of targeting, command and control, and rules of engagement, as well as a clear understanding of the operational and strategic implications of its use. As operations transition across the spectrum from competition to conflict, artillery must remain adaptable, capable of scaling its effects in accordance with the commander's intent. In this environment, the disciplined application of firepower enables forces to achieve tactical advantage, deter adversary actions, and retain freedom of action without committing to large-scale combat.

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Chapter 5
Targeting

> *Attack him where he is unprepared; appear where you are not expected.*
>
> **Sun Tzu**
>
> The Art of War, Chapter 1 – Laying Plans, 512 BCE

Section 5-1. Introduction to Targeting

5.1 Targeting within the OPA is not a discrete staff process but a continuous system function nested within the reconnaissance–strike system. Unlike Western approaches that conceptualise targeting as a linear kill chain, OPA targeting operates as a persistent, networked process that integrates detection, decision-making, and firepower delivery to generate effects against adversary systems.

5.2 The purpose of targeting is not simply to destroy individual targets, but to disrupt, degrade, or paralyse key nodes within an adversary's operational system. Accordingly, targets are understood as components of a broader system-of-systems, and engagement is optimised to achieve functional effects rather than physical destruction alone.

5.3 This chapter describes how the OPA conceptualises, structures, and executes targeting at the CA-Bde and Group Army levels. It establishes the linkage between targeting, command and control, and firepower employment described in Chapter 4.

Section 5-2. Purpose of Targeting

5.4 Targeting enables commanders to generate effects that support operational objectives by:

a. Disrupting enemy command and control (C2)

b. Degrading reconnaissance and surveillance systems

c. Neutralising firepower systems (counter-fires)

d. Interdicting sustainment and manoeuvre

e. Creating psychological and cognitive effects.

5.5 Targeting is therefore a primary mechanism for achieving tempo dominance, enabling OPA forces to act faster than the adversary can respond.

Section 5-3. The Target as a System Node

5.6 In the Olvanan targeting construct, a target is not defined solely by its physical characteristics, but by its role within an adversary system. A target is therefore conceptualised as a system node, an element whose disruption, degradation, or destruction produces disproportionate effects on the functioning of the system as a whole. This approach enables commanders to achieve operational effects more efficiently by attacking critical dependencies rather than engaging all components of a system.

5.7 A system node is a point within an adversary system whose degradation produces disproportionate effects on the system's overall function. This means a platform, such as a gun or a HQ vehicle is not being targeted but what that platform enables within the system. Western targeting is object-based and focuses on the physical object such as 'destroy that artillery battery or strike that HQ.' The OPA system-based approach targets a function within a system such as, 'disrupt the enemy's ability to coordinate fires or 'collapse the sensor-to-shooter link.

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5.8 A node can be:

a. Physical such as a brigade HQ command post, a UAV ground control station or an ammunition supply point

b. Informational such as a communications relay or a data link between ISR and fires

c. Functional such as a fire control capability, a targeting decision cycle or a logistics throughput

d. Temporal such as a critical moment such as a river crossing, or an assault phase.

5.9 Let's consider a scenario involving an enemy artillery system. A western approach might target the guns themselves whereas a system-node approach asks, 'What makes the artillery system effective?' the following table examines each node within the artillery system.

Table 5.1 – System-Node Approach

Node	Function	Target category
Guns	Deliver fire	Not always optimal
FDC	Computes firing data	High-value node
WLR/ISR sensor	Detects targets	Critical node
Communications link	Connects sensors to shooters	Critical node
Ammunition supply	Sustains fires	High-payoff node

5.10 Destroying the guns is one option but disrupting WLR/ISR sensors or communications link may collapse the entire system faster.

5.11 System-based targeting represents the practical convergence of informationised warfare, system-of-systems operations, and firepower effects doctrine within the Olvanan construct. Informationised warfare enables the identification of adversary systems and their vulnerabilities, system-of-systems operations provide the analytical framework for understanding their interdependencies, and firepower effects doctrine defines the means by which those systems are disrupted. Together, these concepts allow the OPA to achieve disproportionate operational effects by targeting critical nodes and linkages rather than engaging enemy forces through attrition.

Section 5-4. Target Categories in System-Based Targeting

5.12 Within the Olvanan targeting construct, target categories are not defined solely by their physical characteristics, but by their role within an adversary system, their contribution to operational outcomes, and the time sensitivity of their engagement. The following categories provide a functional framework for prioritisation and engagement.

High-Value Targets (HVTs)

5.13 HVTs are assets that are critical to the enemy's ability to execute its operational concept or sustain its system functions. They are identified during target development (pre-conflict and planning). They are derived from enemy doctrine, order of battle and system analysis. They represent what the enemy must have to operate.

5.14 HVTs are not just important objects. They are core nodes within operational systems such as C2, ISR, fires and logistics. The following table provides examples of HVTs.

Table 5.2 – HVT Examples

System	Example	Why it matters
C2	Bde HQ	Enables decision-making
ISR	UAV control station	Enables detection
Fires	Artillery battalion	Enables strike
Logistics	Fuel depot	Enables sustainment

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5.15 HVTs describe enemy dependency, not necessarily engagement priority.

High-Payoff Targets (HPTs)

5.16 HPTs are targets whose successful engagement contributes directly to the commander's mission and scheme of manoeuvre. They are derived from HVTs and selected based on the current operation, the Commander's intent and desired effects.

5.17 HPTs are the subset of system nodes whose disruption produces the most immediate operational advantage. For example, all artillery batteries may be considered as HVTs but only those affecting the main effort are considered to HPTs.

Time-Sensitive Targets

5.18 Time-Sensitive Targets are targets requiring immediate engagement because their value or vulnerability is limited in time. They have high operational impact, a short engagement window and are often pre-designated for rapid engagement. Examples include bridging units during river crossings, mobile missile launchers, and command nodes during displacement and amphibious forces in transit. They are frequently pre-authorised and linked to sensor triggers and time windows.

5.19 Tine-sensitive targets are defined by time + impact, not just importance.

Targets of Opportunity

5.20 Targets of Opportunity are unplanned targets identified during operations that can be engaged within existing authority and capability. They are not part of the original target list but are detected through ISR or observation. They are engaged if they are within authority and resources are available. Examples include newly detected artillery firing positions, ad hoc command posts and logistics convoys. The engagement of targets of opportunity exploits emergent vulnerabilities in the enemy's system.

Dynamic Targets

5.21 Dynamic targets are targets that require deliberate identification, validation, and engagement during execution, often involving additional decision-making processes. They are not pre-planned and require validation, prioritisation and approval if outside authority.

5.22 Dynamic targeting introduces latency into the Olvanan targeting system because it requires the identification, validation, prioritisation, and integration of a target prior to engagement. Unlike pre-planned or time-sensitive targets, which are already linked to decision authority and firepower systems, dynamic targets must be incorporated into the targeting architecture during execution, increasing the time between detection and effect.

Distinguishing Between Targets of Opportunity and Dynamic Targets

5.23 Targets of Opportunity and dynamic targets are distinct categories within the Olvanan targeting construct. While both arise during execution and are not pre-planned, Targets of Opportunity are engaged immediately under existing authority and within available resources. In contrast, dynamic targets require deliberate identification, validation, prioritisation, and often higher-level approval before engagement.

5.24 This distinction reflects the degree to which a target is already integrated into the targeting system, with Targets of Opportunity representing immediate exploitation of known vulnerabilities, and dynamic targets requiring integration into the system prior to engagement.

High-Value Individuals (HVIs)

5.25 HVIs are personnel who are critical to the functioning of an adversary system. They are human nodes within the system whose removal degrades function. They include commanders, key staff officers and technical specialists covering ISR, cyber, fires, survey and met.

5.26 HVIs can also be HPTs. For example a senior commander is categorised as a HVI. The same commander during a decisive phase can be categorised as an HPT.

Summary of Target Categories

5.27 In the Olvanan targeting system target categories are not fixed labels but conditional states based on system role, timing and operational relevance. The table on the following page provides a summary of these categories.

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Table 5.3 Target Categories

Category	Focus	Timing	Authority	System Role
HVT	Enemy dependency	Planned	NA	Core node
HPT	Mission relevance	Planned/execution	Command-directed	Critical node (selected)
TST	Time-critical	Immediate	Pre-authorised	Temporal node
TOO	Emergent	Immediate	Within authority	Newly exposed node
Dynamic	Emergent	Delayed	Requires approval	Newly integrated node
HVI	Key personnel	Varies	Context dependent	Human node

5.28 HVTs describe what the enemy needs. HPTs describe what needs to be hit. TSTs describe what must be hit now.

Section 5-5. Target Development

5.29 Target development within the Olvanan targeting system is a continuous, system-driven activity that begins prior to conflict and persists throughout execution. It integrates intelligence preparation, system analysis, and operational planning to identify, prioritise and maintain a set of targets aligned with the commander's intent.

5.30 Target development has two primary components:

a. Deliberate (pre-conflict and pre-operation) target development

b. Dynamic (execution-phase) target development.

5.31 The effectiveness of the OPA targeting system is largely determined by the degree to which targets are pre-developed and integrated, thereby reducing latency during execution.

Deliberate Target Development (Pre-Conflict/Pre-Operational)

5.32 Deliberate target development seeks to identify critical nodes and linkages within adversary systems, build target libraries, and enable pre-authorisation and rapid engagement at the onset of operations. At the tactical level, this ensures the CA-Bde can operate with minimal decision delay once conflict begins.

5.33 At CA-Bde level, deliberate target development is focused on the Brigade Battlespace and Forward Depth. This involves identifying enemy manoeuvre battalions and enemy artillery units likely to be within range. Development also identifies likely ISR assets, including UAV launch and recovery sites as well possible forward logistics nodes. Key terrain affecting system function will also be identified and analysed.

5.34 The CA-Bde will also break the enemy into functional systems to identify:

a. C2 arrangements including manoeuvre battalion HQ and forward CPs

b. ISR capabilities including UAV teams, forward observers and sensor nodes

c. Fires including artillery batteries, firing points and battalion/battery CPs

d. Logistics including forward supply points, ammo caches.

5.35 The next step involves the identification of critical nodes and linkages focusing on nodes (what to strike) and linkages (what connects the system). Examples include:

a. FO – FDC – Gun line

b. UAV – data link – fires unit.

5.36 CA-Bde-level target libraries outputs include:

a. Target lists covering HVTs (system dependencies) and HPTs (mission-relevant subset).

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b. Target characteristics covering location, function within the system it belongs to, expected behaviour and vulnerability for each target.

c. Engagement guidance covering recommended firepower method, priority, authority level and conditions for engagement, including TST triggers if applicable.

d. Pattern of life analysis where staff will analyse movement patterns (such as artillery displacement cycles), timing of resupply, command post relocation intervals and UAV launch cycles to identify whether targets are only vulnerable at specific times.

e. Pre-authorisation and integration covering pre-authorised engagement of TSTs and specific HPTs as well as the pre-allocation of fire units and sensor coverage to reduce latency from minutes ot seconds.

5.37 Deliberate target development at the tactical level focuses on the identification and characterisation of adversary system nodes and linkages within the CA-Bde battlespace. By developing target libraries, analysing patterns of behaviour, and establishing engagement conditions, the Olvanan targeting system enables pre-authorised and rapid engagement of critical targets during execution, significantly reducing targeting latency.

Target Development and Dynamic Targeting (Execution Phase)

5.38 As we have established, target development within the reconnaissance–strike system is a continuous, system-oriented process that identifies, validates, and prioritises targets as components of an adversary system rather than as discrete aim points. It integrates intelligence preparation, sensor tasking, and firepower allocation to enable the delivery of effects in accordance with campaign design.

5.39 Dynamic targeting is not treated as a separate activity but as an extension of deliberate targeting under time-constrained conditions, executed within pre-authorised engagement parameters. The key determinant of responsiveness is not sensor capability alone, but the pre-configuration of release of weapons authority (RWA) across echelons. Authority is established during target development, not at the point of engagement.

Target Development Framework

5.40 Target development at CA-Bde level follows a structured but non-linear process.

a. Target identification and nomination is derived from ISR feeds (UAV, WLR, EW and reconnaissance elements) and higher HQ target sets (Group Army fire plans). The focus is on identifying system nodes (C2, fires, ISR, logistics) and key functions, not just platforms.

b. Target Validation involves the confirmation of location (spatial accuracy), function (role within system) and time relevance (window of vulnerability).

c. Target Classification involves categorising targets to determine both priority and authority level:

(1) HVTs are identified as system-critical nodes

(2) HPTs that enable scheme of manoeuvre

(3) TST are those targets requiring immediate engagement

(4) Target of Opportunity are targets detected unexpectedly and are exploitable

(5) Dynamic Target are any targets engaged outside deliberate cycle but within conditions.

d. Authority Assignment is a critical step in the process where each target is assigned an authorised effect (such as suppression, destruction), the responsible echelon (Group Army / CA-Bde / battalion) and release conditions (centralised, conditional, immediate). This step determines whether a target can be engaged without further approval.

Release of Weapons Authority

5.41 Release of weapons authority is defined by the intersection of target type, authorised effect, engagement location and triggering condition. Only when these parameters are satisfied may subordinate elements execute fires without further approval.

5.42 Authority is defined across four parameters. The OPA does not grant a blanket permission to fire, but instead constructs authority as a bounded set of conditions. In practical terms, commanders do not say “you are cleared to engage targets”; they specify “You may achieve this effect, against this type of target, in this place, under these conditions.”

5.43 Each of the four parameters acts as a control variable. Only when all four are satisfied does release of weapons authority effectively “activate.” The four parameters are explained in the following table.

5.44 The four parameters are:

a. Target Type (What can be engaged).

(1) This parameter defines which categories of targets are authorised.

(2) It links directly to the target development taxonomy (HVT, HPT, TST and targets of opportunity).

(3) Its function is to prevent inappropriate engagement of higher-value operational targets, politically sensitive targets and ensures alignment with campaign priorities

(4) For example, a CA-Bde FA battalion may be authorised to engage enemy artillery (HPT) but not enemy brigade HQ (HVT)

b. Effect (What is allowed to be done to the target).

(1) This defines the permitted firepower outcome, not the weapon.

(2) Typical effects include suppress, destroy, disrupt/delay and fix/canalise.

(3) Controls intensity and purpose of fires and aligns fires with operational design (for example, shaping vs decisive effects)

(4) Even if a target is authorised, the authority may be suppress but not destroy

(5) This critical for ammunition management, escalation control and synchronisation with manoeuvre.

c. Location (Where engagement is permitted)

(1) This parameter defines geographic or spatial constraints such as fire support coordination lines (FSCL-like constructs, counter-battery zones, engagement areas/fire support areas and no-strike or restricted areas

(2) Its function is to prevent fratricide, de-conflict fires with manoeuvre and maintain higher HQ control over key terrain or deep areas

(3) A CA-Bde may be authorised to engage targets within a designated fire support area but must seek approval for targets beyond that boundary.

d. Time/Condition (When or under what trigger).

(1) Authority is often event-triggered, not continuously active.

(2) Examples of conditions include:

(a) “Upon detection of enemy artillery firing”

(b) “During Phase II (assault phase)”

(c) “If target meets TST criteria”

(d) “Within H-30 to H+60 window”

(3) Its function is to enable condition-based execution to synchronise fires with manoeuvre phases, operational timing or joint effects

(4) A unit may be authorised to engage a target type but only when a specific condition is met.

5.45 These parameters are not independent but combine to form a complete authority envelope. For example, a CA-Bde’s counter-battery authority. A Group Army order might implicitly define:

a. Target Type: Enemy artillery (HPT)

b. Effect: Suppression or destruction

c. Location: Within counter-battery zone (0–25 km)

d. Condition: Upon detection by WLR

5.46 Only when all four are satisfied can the CA-Bde engage immediately.

5.47 Authority is pre-engineered into the system as a set of constraints, not granted as a decision at the point of firing. Consequently:

a. It enables speed without losing control. Units act immediately when conditions are met and there is no need for repeated approvals

b. It controls escalation and resource use as effects are bounded and target types are restricted

c. It supports system-of-systems optimisation by preventing redundant fires, misallocation of high-value munitions and ensures high-value targets remain under higher HQ control.

5.48 At the CA-Bde level three authority states are applied:

a. Centralised Authority (Retained by Group Army):

(1) CA-Bde detects and nominates

(2) Engagement requires approval

(3) Applied to operational fires systems, theatre ISR nodes and politically sensitive targets

b. Conditional Authority (Pre-authorised)

(1) CA-Bde may engage when conditions are met

(2) The most common construct

(3) Applied to counter-battery targets, manoeuvre support targets and TSTs within defined zones.

c. Immediate Authority (Delegated)

(1) Subordinate units engage without approval

(2) Applied to close combat targets, Self-defence fires and pre-cleared engagement areas.

CA-Bde-Level Examples

5.49 Example 1: Counter-Battery Engagement (Conditional Authority)

a. Situation. A CA-Bde weapon locating radar detects an enemy 155 mm battery firing from a location 18 km away.

b. Target Development:

(1) Classified as HPT (fires system node)

(2) Pre-authorised under counter-battery engagement zone and authorised for suppression/destruction

c. Authority: Conditional release granted to CA-Bde FA battalion

d. Action:

(1) Fire mission initiated within 1–3 minutes

(2) No Group Army approval required

e. Outcome:

(1) Rapid suppression

(2) Minimal latency

(3) Maintains tempo of manoeuvre.

5.50 Example 2: Enemy Brigade Command Post (Centralised Authority)

a. Situation. CA-Bde UAV identifies hardened enemy brigade HQ.

b. Target Development:

(1) Classified as HVT (C2 system node)

(2) Linked to operational-level effects.

c. Authority: Retained at Group Army level

d. Action:

(1) CA-Bde validates and tracks, and submits target nomination

(2) Engagement delayed pending approval

e. Outcome:

(1) Increased latency (30–90+ minutes)

(2) Enables joint fires integration and potential multi-domain strike.

5.51 Example 3: Mechanised Company in Assembly Area (Immediate Authority)

a. Situation: Forward observers detect enemy company forming up for attack within eight km.

b. Target Development:

(1) Classified as target of opportunity/TST

(2) Within pre-cleared fire support area

c. Authority: Immediate release to manoeuvre battalion/artillery battery

d. Action:

(1) Immediate fire mission (tubes / MRL)

(2) Engagement in less than two minutes

e. Outcome:

(1) Disruption of enemy attack

(2) Local tactical advantage achieved.

5.52 At CA-Bde level, latency is primarily governed by authority design, not sensor capability. Latency and tempo control is summarised in the following table.

Table 5.4 – Latency and Tempo Control

Authority Type	Typical Engagement Time	Operational Effect
Centralised	30–90+ min	High coordination, low tempo
Conditional	1–5 min	Balanced tempo and control
Immediate	<2 min	High tempo, localised effect

5.53 The OPA manages tempo by shifting targets between authority states, not by changing the kill chain.

5.54 At CA-Bde level, target development and dynamic targeting are inseparable from the design of release of weapons authority. The OPA does not rely on rapid decision-making at the point of contact; instead, it achieves responsiveness by pre-authorising action within a structured control framework, allowing subordinate units to engage at speed while preserving system-level synchronisation of firepower effects.

Section 5-6. Sensor Architecture and Detection

5.55 Detection is not an isolated intelligence function in the OPA but an integrated component of the reconnaissance–strike system. Sensors are organised to identify functional nodes within an enemy's system, enabling fires to be applied against effects-relevant targets rather than discrete platforms. Detection is system-oriented, not platform-centric and effect-driven, not information-driven. Detection is integrated with fires, not separate from it. It enables targeting by identifying system nodes to enable engagement.

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Echeloned Sensor Architecture

5.56 OPA sensor architecture is organised by echelon to support both deliberate and dynamic targeting. Sensors are allocated to enable firepower effects, not solely to generate situational awareness.

Group Army/operational Level Sensors

5.57 Group armies are equipped with a range of sensors including long-range UAV systems, EW systems and deep reconnaissance elements. They also integrate with theatre ISR including space and cyber-enabled inputs. Their primary task are to identify HVTs and system-critical nodes, provide support to deliberate targeting and develop operational target sets.

CA-Bde Level Sensors

5.58 CA-Bde's are equipped with tactical UAVs, WLRs, EW detachments and reconnaissance battalions. Their primary tasks are to identify HPTs and TSTs, provide support to dynamic targeting and enable brigade-level fires.

Battalion and Tactical Edge Sensors

5.59 Manoeuvre battalions are equipped with forward observer teams, small UAV systems as well as optical and electronic observation devices. Their primary tasks are to detect targets of opportunity, provide immediate support to manoeuvre elements and provide close target acquisition.

Sensor Functional Roles

5.60 OPA doctrine groups sensors by function rather than platform as follows:

a. Detection to identify the presence of a target using UAVs and reconnaissance patrols

b. Mensuration to generate accurate coordinates using WLR and GNSS-enabled elements

c. Identification to determine the target-type and its function using, EO/IR sensors and EW assets

d. Tracking to maintain target continuity using persistent UAV surveillance

e. Cueing to trigger other sensors or fires using UW-UA-fires.

Sensor Integration

5.61 OPA sensors operate as a distributed sensing architecture that feeds a unified fires system. The objective is not simply to detect targets, but to compress the reconnaissance–strike cycle by eliminating sequential steps between detection, validation, and engagement.

5.62 Key Characteristics are as follows:

a. Digitised sensor outputs are shared across echelons. Sensor data, including coordinates, tracks, emitter signatures and imagery is digitally generated, transmitted via tactical data networks and accessible at multiple command levels. For example, a target detected at CA-Bde level can be viewed at viewed at Group Army level and engaged by a different firing unit. This eliminates the need for voice relays and manual reprocessing. This enables parallel awareness and decision-making, rather than sequential reporting.

b. Sensor-to-sensor cueing. One sensor triggers or refines the tasking of another. typical chains include EW-UAV where an emitter id detected and a UAV is cued to confirm location. The UAV identifies the firing unit and transmits data to WLR/fire unit to refine coordinates. The WLR detects the launch point and the UAV confirms displacement. This is important because no single sensor provides complete accuracy and full identification. Cross-cueing creates layered validation and increased confidence. Detection becomes a collaborative system function, not a single-sensor event.

c. Integration with fire direction systems (FA battalion firing CP). Sensor outputs are directly linked to Battalion and brigade firepower CPs and digital fire control systems. Sensors generate coordinates with data being automatically formatted and transmitted to the fires CP. The fires CP applies ballistic solutions and allocates firing units. This reduces human calculation and transcription errors enabling near-real-time fire mission generation. The fires CP becomes a node within the sensor network, not just a fire control element.

d. Reduction in sensor-to-shooter timelines. The time from detection to engagement is compressed. The traditional (linear) model involves five sequential steps (detect - report - validate - approve –

fire) and takes time. OPA fires use a networked model (detect - validate (via cross-cueing) - fire (if authorised) enabled by digital transmission, pre-authorised conditions and a direct sensor-firs CP linkage. Time is saved not by faster decisions, but by removing decision steps.

5.63 The following table explains the expanded sensor-to-shooter flow at CA-Bde-Level

Table 5.5 – Expanded Sensor-to-Shooter Flow

Step	Process	Actions
1	Initial Detection (EW)	EW system detects enemy artillery radar and communications node Generates approximate location and emitter type
2	Sensor Cueing (EW → UAV)	EW data triggers UAV tasking UAV slews to area and confirms platform type and activity
3	Target Refinement (UAV/WLR Integration)	UAV refines precise coordinates and movement pattern If enemy artillery fires WLR provides launch point accuracy and firing trajectory
4	Data Transmission to Fires System	Target data transmitted digitally to CA-Bde FA battalion firing CP Data includes coordinates, target type and confidence level
5	Fire Solution and Allocation	Firing CP computes firing data and selects tubes or rockets and ammunition type Checks authority conditions and fire support coordination measures
6	Engagement (Subject to Authority)	If pre-authorised an immediate fire mission is conducted If not the target is escalated
7	Assessment (Optional Loop Closure)	UAV or other sensor confirms effects and feeds data back into the system

5.64 The following operational effects can be achieved using this system:

a. Engagement timelines can potentially be reduced from Tens of minutes to minutes

b. Increased accuracy may be achieved through the use of multi-sensor validation to reduce targeting error and misidentification

c. Targets are allocated based on priority, the effect required and resource availability.

5.65 In the Olvanan system, the decisive factor is not the performance of individual sensors, but the degree to which sensors are integrated into a network that enables rapid, condition-based transition from detection to engagement.

Section 5-7. The Application of Targeting

5.66 The OPA applies a single targeting framework differently depending on operational context. In defensive operations, targeting is condition-driven and deliberate-heavy. In defensive operations, targeting is condition-driven and deliberate-heavy. In offensive operations, targeting is tempo-driven and dynamic-heavy.

Defensive Application

5.67 In defensive operations, OPA targeting is structured to disrupt, shape, and decisively engage the enemy as part of a system-based approach to warfare. Target development is conducted in depth prior to contact, focusing on enemy reconnaissance, fires, and command systems to degrade the adversary's ability to generate combat power. During the engagement, targeting is synchronised with terrain, obstacles, and manoeuvre to canalise the enemy into designated engagement areas, where massed firepower is applied at the decisive time.

5.68 Dynamic targeting is employed selectively to exploit time-sensitive opportunities, but remains bounded by pre-planned target systems and controlled release authority. This approach enables the defender to control tempo, preserve combat power, and achieve local firepower superiority at critical points in the battle.

Offensive Application

5.69 In offensive operations, OPA targeting is conducted as a continuous, system-oriented process designed to disrupt, dislocate, and destroy the enemy while sustaining operational tempo. Target development begins prior to contact, focusing on the identification and neutralisation of key system nodes, including command, reconnaissance, and fire support elements. During the attack, targeting is tightly synchronised with manoeuvre, breaching, and firepower application to isolate defensive positions and enable penetration.

5.70 As operations transition to exploitation and pursuit, dynamic targeting becomes predominant, enabling rapid engagement of time-sensitive targets such as reserves and withdrawing forces. This approach ensures that the enemy is unable to reconstitute combat power, allowing the attacking force to maintain momentum and achieve operational objectives.

Section 5-8. Targeting and the Application of Law of Armed Conflict (LOAC)

5.71 The Olvanan Communist Party (OCP) and the OPA recognise the Law of Armed Conflict (LOAC) through their obligations under instruments such as the Geneva Conventions, but do not treat it as an independent or overriding constraint on operations. Rather, LOAC is embedded within a system of Party control, campaign design, and war control, where legal considerations are weighed alongside operational effectiveness, escalation management, and information objectives.

5.72 The core principles, distinction, proportionality and military necessity, are acknowledged, but interpreted through a system-of-systems targeting framework, in which military and civilian functions are often interdependent. As a result, legality is not adjudicated separately from operations; it is contextualised within political guidance and operational intent.

5.73 In practice, the OPA applies LOAC through centralised command authority and weapon release decisions, rather than through formalised legal review processes. Sensitive or high-risk targets are retained at higher echelons, where civilian impact, political consequences, and narrative effects are assessed as part of a unified decision calculus. At lower levels, legal considerations are embedded within rules, target lists, and engagement criteria, enabling rapid execution within defined authority envelopes.

5.74 This approach is reinforced by the concept of legal warfare, which seeks to shape the legal and informational environment to legitimise operations. Consequently, LOAC within the OPA is best understood as politically mediated, operationally integrated, and instrumentally applied, rather than as a discrete compliance regime.

Targeting and LOAC

5.75 In OPA targeting authority is the primary control mechanism governing target engagement, including the application of legal and political considerations. Unlike Western approaches, where LOAC is applied through formal legal review processes, the OPA embeds legal considerations within command authority and weapon release decisions.

5.76 Authority is defined across four parameters:

a. Who may allocate firepower

b. Who may approve target engagement

c. Who may release weapons

d. Under what conditions authority may be delegated or retained

5.77 LOAC is not applied as a separate procedural step but integrated into the exercise of authority, particularly at the point of weapon release.

Authority as the Mechanism for LOAC Application

5.78 Legal and political considerations are applied through command judgement at each echelon, rather than through independent legal validation. At each stage of targeting, target development identifies potential legal and political sensitivities. Target nomination includes assessment of civilian risk and escalation implications. Weapon release authority determines whether those risks are acceptable

5.79 This means that LOAC compliance is achieved through command decision-making, not legal certification. Commanders do not ask, "Is this target legally permissible?" in isolation. They ask:

a. Does this target contribute to campaign objectives?

b. What are the civilian and political consequences?

c. Does engagement align with higher-level war control guidance?

5.80 The OPA deliberately concentrates decision-making authority where the risk is highest, and decentralises it where speed is most important, using authority thresholds to balance tempo and control. This structure is the primary mechanism through which LOAC considerations are enforced.

5.81 Lower Echelons (CA-Bde/FA battalion Level) engage targets within:

a. Pre-approved target sets

b. Defined firepower control measures

c. Established effects and engagement criteria.

5.82 Legal considerations are implicitly embedded in targeting guidance and reflected in:

a. No-strike and restricted target lists

b. Target engagement criteria

c. Effects limitations.

5.83 At this level, LOAC is applied through rules and constraints, not active legal analysis.

5.84 Higher Echelons (Group Army/Theatre Command) retain authority for:

a. HVTs

b. Politically sensitive targets

c. Targets with significant civilian risk

d. Targets with escalation implications.

5.85 Decision-making covers operational necessity, political acceptability, civilian impact and information effects. This echelon performs the functional equivalent of legal review, but within a political-operational framework.

5.86 The point of weapon release authority is where legal, political, and operational considerations converge. Within the OPA system this is conditional, echelon-dependent and time-sensitive in dynamic targeting. Release decisions incorporate target validation (system relevance), effects alignment, a collateral impact assessment (informal and command-driven) and the higher commander's intent and constraints. This creates a model where LOAC is applied at the moment of decision, not as a prerequisite process.

5.87 Dynamic targeting introduces compressed decision timelines, increasing reliance on pre-authorised conditions and delegated authority. To enable this higher HQ defines engagement criteria, acceptable risk thresholds and categories of targets cleared for immediate engagement. Subordinate units execute within authority envelopes and predefined legal and political boundaries. Where targets fall outside these parameters the authority to engage is escalated. This will increase decision latency as additional political and legal considerations will have to be applied. This ensures that LOAC considerations are still applied, but through control of authority rather than procedural review.

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5.88 Legal warfare is used to reinforce the authority model by shaping the conditions under which targets are approved. This includes:

a. The pre-designation of target categories as lawful

b. Establishing the domestic legal justification for operations

c. Preparing a narrative to support engagement decisions.

5.89 This ensures that commanders operate within a pre-conditioned legal environment and weapon release decisions are enabled, not constrained, by legal framing.

5.90 Embedding LOAC within authority produces consistent operational behaviours is designed to:

a. Enable faster engagement timelines for pre-authorised targets

b. Centralise decision-making for sensitive engagements

c. Enable a broader interpretation of military objectives, particularly for system nodes

d. Manage civilian harm as a command risk decision, not a legal threshold.

5.91 In OPA targeting, authority is the mechanism through which LOAC is applied. Legal considerations are embedded within command decision-making and exercised primarily at the point of weapon release. This results in a model where legality is contextual, politically mediated, and integrated with operational judgement, rather than independently assessed through formal legal processes.

Section 5-9. Weapon Release Authority and Fratricide Risk Management

5.92 The OPA's preference is to avoid firing large-calibre artillery or rocket artillery inside predetermined safety buffers around friendly troops unless specifically authorised. The commander balances:

a. Desired effect on the target

b. Accuracy of the weapon system

c. Type of ammunition

d. Proximity of friendly forces

e. Terrain and protection available to friendly troops

f. Operational urgency.

5.93 This is consistent with the PLA's broader emphasis on preserving combat power while maintaining offensive momentum.

Ammunition Selection

5.94 When friendly forces are close to the target, the OPA normally seeks to reduce risk by selecting more precise munitions as per the table below.

Table 5.6 – Ammunition Selection

Situation	Preferred munition
Friendly troops distant from target	HE, DPICM, thermobaric, area effects
Friendly troops relatively close	Reduced-volume HE missions
Friendly troops very close	Precision-guided artillery or rockets
Urban or complex terrain	Precision-guided munitions or direct-fire systems

5.95 A CA-Bde commander is therefore more likely to request a guided 155 mm round or precision rocket than a large-area saturation strike if manoeuvre elements are near the target.

Fire Control Measures (FCM)

5.96 The OPA relies heavily on the following FCM:

a. Fire Coordination Boundaries (FCB)

b. Firepower Strike Areas (FSA)

c. Mission-based Fire Zones. (MFZ)

d. Restricted Fire Areas (RFA)

e. No-fire Areas (NFA).

5.97 These measures are intended to prevent engagements that could endanger friendly forces. Before approval, the firepower coordination centre verifies:

a. Friendly force locations.

b. Target location accuracy.

c. Ammunition type.

d. Expected dispersion pattern.

e. Desired effects.

5.98 FCM are covered in detail in Chapter 6.

Command Authority

5.99 The closer friendly troops are to the target, the higher the authority generally required to approve the engagement. Routine missions can often be approved at battalion or brigade level. Missions presenting significant fratricide risk are more likely to require brigade or higher-level approval. This is similar in principle to Western "danger close" procedures even though the terminology differs.

Practical Distances

5.100 Based on the fragmentation characteristics of common OPA ammunition and comparison with Western safety calculations, the following table provides a useful planning guide.

Table 5.7 – Planning Distances

Weapon	Planning Distance
120 mm mortar	400–600 m
122 mm artillery	500–700 m
155 mm artillery	600–800 m
122 mm rockets	1,000–1,500 m
300 mm rockets	2,000–3,000 m
DPICM	Increase by 50–100%
Thermobaric	Increase significantly based on terrain

5.101 When friendly forces operate in close proximity to targets, firepower commanders adjust ammunition selection, firing volume and engagement authority to minimise fratricide risk. As the distance between friendly forces and the target decreases, the requirement for target location accuracy, precision munitions and higher-level engagement approval correspondingly increases

Section 5-10. Battle Damage Assessment (BDA)

5.102 The conduct of the OPA's Battle Damage Assessment (BDA) is not treated as a discrete terminal activity, but as a continuous assessment function embedded within the reconnaissance–strike system. BDA provides commanders with timely evaluation of whether assigned fires have achieved the desired effects against a target and directly informs subsequent targeting decisions.

5.103 BDA supports three primary purposes:

a. The confirmation of effects against designated targets

b. The refinement of target development and system understanding

c. The triggering of re-engagement or reallocation of firepower.

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5.104 Within the targeting process, BDA is nested within the Assess function, but directly feeds back into Decide and Deliver, forming a continuous targeting loop:

Detect – Identify – Decide – Deliver – Assess – Re-Decide

5.105 This reflects the OPA's preference for iterative system degradation rather than single-engagement target servicing.

5.106 OPA BDA is effects-centric, not strike-centric. Assessment is conducted against the commander's intended effect, rather than simply confirming physical destruction. BDA is categorised across three interrelated dimensions:

a. Physical damage, the observable destruction or damage to a target

b. Functional degradation, the reduction in a target's ability to operate

c. System impact, the effect on a target's role in a broader system.

5.107 A target may be physically intact but systemically neutralised, or physically damaged but still functionally relevant.

BDA in the Targeting Process

5.108 BDA sits within the Assess phase, but its outputs directly influence:

a. Target development covering the revalidation of target characteristics and the refinement of system node analysis

b. Dynamic Targeting covering the immediate re-engagement decisions and the identification of follow-on targets

c. Weapon Release Authority confirming that effects meet commander's intent and the authorisation (or withholding) of subsequent engagements.

5.109 BDA is the mechanism that closes and reopens the targeting cycle, enabling continuous adaptation.

5.110 BDA relies on the same networked ISR architecture used for target detection, enabling rapid confirmation through multi-source fusion. Primary sensors used at the CA-Bde level sensors are listed in the following table.

Table 5.8 – Primary Sensors

Sensor Type	BDA Function	Characteristics
UAV (Primary)	Visual confirmation of strike effects	Real-time, persistent, high confidence
EW Systems	Detection of emitter degradation or silence	Indirect, rapid, system-focused
Weapon Locating Radar (WLR)	Confirmation of counter-battery effects	Event-based, indirect confirmation
Forward Observers / Recon Elements	Close-range validation	High accuracy, terrain dependent

5.111 Higher echelon level sensors are listed in the following table.

Table 5.9 – Higher Level Sensors

Sensor Type	Role
Satellite ISR	Infrastructure and system-level assessment
HALE UAVs	Persistent operational-level BDA
Joint ISR Systems	Cross-domain validation

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BDA Workflow

5.112 At CA-Bde level, BDA is executed as a sensor-driven, near-real-time feedback loop embedded within the reconnaissance–strike system. It is not a post-strike reporting activity, but a decision-enabling process that directly drives re-engagement, firepower reallocation and target system degradation. The workflow is characterised by sensor persistence over target, rapid assessment and transmission, immediate linkage to fires decision-making and continuous iteration within the targeting cycle.

5.113 The following table displays the BDA workflow.

Table 5.10 – BDA Workflow

Step	Action	Remarks
Step 1 – strike execution	Fires delivered (tube artillery, MRL, loitering munition, or precision strike) Target location and expected effects pre-registered within the fire control system	A BDA-capable sensor is already assigned or cued to the target prior to strike
Step 2 – Immediate observation	Tactical UAV remains on station Secondary assets include EW monitoring emitter activity, WLR monitoring counter-battery response, FO/recon elements observing (if available)	BDA is planned before engagement, not requested after.
Step 3 – Initial effects observation	Visual – explosion effects, fires, destruction Movement – cessation or dispersal Electronic – emitter silence or degradation Behavioural – cessation of fires (artillery target) Loss of coordination or response	
Step 4 – Rapid effects assessment	Assessment is conducted at the lowest competent node (battery, battalion, or brigade fires element depending on system integration). Assessment determines status of target – destroyed, suppressed/paralysed, degraded, unaffected or uncertain	Assessment is made against intended effect, not simply observed damage.
Step 5 – Data transmission and fusion	BDA data transmitted digitally via fires network to Battalion fire control element, Brigade fires coordination element Data fused with pre-strike target data, ISR feeds, Higher-echelon intelligence (if available)	
Step 6 – Decision trigger	BDA output triggers a decision point within the targeting cycle: Effect Achieved – target considered neutralised within system context and fires shift to next priority target Effect Incomplete – Immediate re-engagement initiated using same firing unit (rapid repeat fire mission) or alternate firing unit (mass or cross-domain) Effect Uncertain – additional ISR tasking, UAV repositioning, secondary sensor cueing	Immediate
Step 7 – Re-engagement/reallocation	Fires reallocated based on target priority and availability of fire units	Enables temporal massing from dispersed systems, rather than relying on pre-planned fire concentration
Step 8 – System-level feedback	BDA results propagated upward: Contributes to system-of-systems assessment Updates target lists, high-value target status, operational picture	

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BDA Timings at CA-Bde Level

5.114 A full strike–assess–re-strike loop can occur within minutes, particularly when UAVs are integrated.at the CA-Bde level. Timings are detailed in the following table.

Table 5.11– Strike–Assess–Re-strike Timings

Phase	Timeline (Typical)	Driver
Strike to observation	Seconds–1 minute	UAV persistence
Observation to assessment	<1–2 minutes	Sensor clarity + training
Assessment to decision	Immediate (seconds)	Authority delegated at CAB level
Decision to re-engagement	1–5 minutes	Fire unit readiness

BDA Terminology

5.115 The OPA does not employ standardised BDA categories such as Kill, Partial Kill, No Effect, or Unknown. Instead, it uses descriptive, effects-based terminology that evaluates the physical, functional, and systemic impact of fires on a target. Assessment focuses on whether the target has been destroyed, suppressed, paralysed, or otherwise degraded in its contribution to the broader operational system.

5.116 While Western categorical models may be applied analytically for clarity, OPA practice emphasises effect sufficiency rather than binary target status. The OPA is less concerned with “What happened to the target?” and more concerned with “Has the target system been sufficiently degraded to achieve the desired operational effect?” Consequently the OPA use the following label:

a. Destroyed/paralysed – no re-engagement

b. Degraded/suppressed – likely re-engagement

c. No observable effect – immediate re-engagement

d. Uncertain/unconfirmed – further ISR required.

BDA and Dynamic Targeting

5.117 BDA is the primary trigger for dynamic re-engagement within OPA targeting, but operates alongside other triggers such as new target detection and time-sensitive opportunities.

5.118 Where BDA indicates incomplete effects the target remains active within the system and the targeting cycle is immediately reinitiated. Firepower is reallocated based on availability, target priority and the desired effect. This enables temporal massing of fires from dispersed systems and cross-domain re-engagement, for example switching from artillery to a UAV strike.

Summary

5.119 BDA within the OPA reconnaissance–strike system is a continuous, effects-based assessment process that determines whether fires have achieved the commander’s intent against a target system. Rather than serving as a terminal step, BDA drives the re-initiation of the targeting cycle, enabling rapid re-engagement, refinement of target understanding, and adaptive allocation of firepower across the battlespace.

5.120 At the CA-Bde level, the OPA conducts battle damage assessment using the same continuous, sensor-driven process embedded within the reconnaissance–strike system. BDA is planned prior to engagement, with ISR assets, primarily UAVs, maintained on target to provide immediate post-strike observation. Assessment is conducted against intended effects, evaluating whether the target has been destroyed, suppressed, or degraded in its operational function.

5.121 BDA outputs are transmitted across the fires network and directly trigger decision points within the targeting cycle. Where effects are incomplete, the OPA rapidly re-engages targets or reallocates firepower, enabling iterative degradation of target systems. This workflow allows the OPA to compress the strike–assess–re-strike cycle into minutes at CA-Bde level, supporting dynamic targeting and temporal massing of fires from dispersed systems.

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A Vignette – BDA

Situation

5.122 A mechanised CA-Bde is conducting offensive operations against a defending force employing a counter-battery radar (WLR) and a 155mm artillery battery in the forward defensive zone.

5.123 The brigade commander's intent is to suppress and neutralise enemy indirect fires to enable manoeuvre battalions to advance, achieving functional paralysis and not necessarily physical destruction. A tactical UAV from the Group Army RISTA battalion is assigned to maintain persistent surveillance over the target area.

5.124 The target consists of a six-gun 155m towed battery which is co-located with a WLR system. The target has been identified as a HPT within the CA-Bde fire plan.

Execution Timeline (H+0 to H+10)

H+0: Fire Mission Execution	CA-Bde FA battalion (122mm SPH + MRL battery) executes a time-on-target (TOT) strike Fire mission designed to suppress firing elements and disrupt radar tracking capability UAV already on station, observing target grid
H+1 to H+2: Immediate Observation	UAV captures multiple detonations within gun line. Secondary explosions (possible ammunition cook-off) observed and heard Two artillery pieces visibly damaged and the remaining guns dispersing CA-Bde EW system detects intermittent radar emissions (WLR degraded but not silent)
H+2 to H+3: Initial BDA (Effects Assessment)	Assessment conducted at brigade fires coordination element: Artillery battery is partially degraded (mobility disrupted, fires reduced) WLR is functionally degraded (intermittent tracking capability) Assessment Conclusion is that desired effect (complete suppression) has NOT been achieved
H+3 to H+4: Decision Point (Dynamic Targeting Trigger)	Brigade commander determines target remains operational within system and an immediate re-engagement is required Decision is made to conduct a follow-on precision strike against remaining artillery pieces and WLR emitter location
H+4 to H+6: Re-Engagement Execution	Fires are reallocated with FA battalion tube artillery conducting adjusted fire mission on dispersed guns Loitering munition (CA-Bde-controlled) tasked against WLR UAV continues to track movement of surviving artillery assets and location of WLR emission source
H+6 to H+7: Second Observation	UAV confirms additional artillery pieces have been destroyed or abandoned and no further organised displacement has occurred Loitering munition impacts WLR position and CA-Bde EW system reports complete loss of radar emissions
H+7 to H+8: Final BDA	Artillery battery assessed as combat ineffective (loss of firing capability) WLR has been neutralised (no emissions, confirmed strike) Enemy indirect fire system functionally paralysed
H+8 to H+10: Exploitation and Reallocation	Fires shifted to next HPT (enemy reserve company) UAV re-tasked forward to support manoeuvre battalion advance BDA data transmitted to Group Army fires network and systems-level target database for system-level is updated

Key observations are:

a. BDA Enables Immediate Re-Attack

(1) The initial strike was insufficient

(2) However UAV-enabled BDA was able to trigger re-engagement of the target within 3–4 minutes

b. Effects-Based Decision-Making determined that the target was not required to be destroyed in entirety. The decision was based on:

(1) Functional suppression

(2) System impact (loss of radar + fires coordination)

c. Sensor Persistence is decisive. UAV continuity enables real-time tracking of dispersion and accurate re-targeting

d. A compressed Targeting Cycle was achieved with the full cycle (strike → assess → re-strike → assess) being completed in less than eight minutes

e. Cross-Domain Integration was achieved with both tube artillery and loitering munition being employed.

5.125 The matrix on the following page illustrates how the CA-Bde integrates decision-making, sensor employment, fires delivery, and battle damage assessment within a compressed targeting cycle (H+0 to H+10 minutes).

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Tabl 5.12 – D3A Matrix

Time	DECIDE	DETECT	DELIVER	ASSESS
Pre H-Hour	Identify artillery battery + WLR as HPT; Assign desired effect: functional paralysis	UAV tasked to maintain persistent ISR EW monitors emitter	Fire plan developed (TOT strike); Loitering munition on standby	N/A (pre-engagement)
H+0	Authorise strike (pre-delegated authority for HPT)	UAV confirms target location EW confirms active radar	Tube artillery + MRL execute TOT strike	UAV observes immediate strike effects
H+1 to H+2	Maintain decision hold pending BDA	UAV maintains visual EW monitors emissions	No additional fires (awaiting assessment)	Visual: partial destruction; EW: intermittent emissions
H+2 to H+3	Determine effect insufficient Initiate dynamic targeting decision	UAV tracks dispersal EW confirms degraded radar	Prepare follow-on fires (adjusted missions + loitering munition)	Target assessed as degraded but operational
H+3 to H+4	Approve re-engagement Allocate fires across systems	UAV refines target locations (moving guns + radar)	Tube artillery re-engages guns Loitering munition assigned to WLR	Continuous UAV observation
H+4 to H+6	Maintain engagement until effect achieved	UAV tracks impacts EW monitors emissions	Sequential fires (adjusted artillery + UAV strike)	Progressive degradation observed
H+6 to H+7	Confirm effect achieved; Terminate engagement	UAV confirms no movement EW detects emitter silence	No further fires on target	Artillery neutralised WLR non-functional
H+7 to H+8	Reallocate fires to next HPT	UAV prepares to shift forward Other sensors cue next target	Fires shift to next target set	Final BDA recorded and disseminated
H+8 to H+10	Update targeting priorities Inform higher HQ	ISR network updated with BDA outputs	New fire missions initiated elsewhere	System-level effects integrated into COP

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Key Analytical Observations

5.126 From this matrix we can see that:

a. The Decide action is continuous, not sequential. Decision-making occurs at multiple points, not just pre-strike. BDA directly triggers re-decision within minutes

b. The Detect and Assess actions are integrated. The UAV performs both detection (target acquisition and tracking) and assessment (post-strike BDA). This collapses the traditional separation between Detect and Assess functions.

c. The Deliver action is iterative. Fires are not a single event. The initial strike → pause → re-strike → confirm effect enables temporal massing from dispersed systems

d. Assessment drives the system. Assessment determines whether fires continue, whether they shift or whether the target is removed from system

e. Times are compressed. The total Loop (Initial Strike to Re-Strike) takes about 3-5 minutes and is broken up as follows**:**

(1) Detect to deliver is pre-planned and therefore is immediate.

(2) Deliver to assess is UAV-enabled and takes 1-2 minutes.

(3) Assess to decide is achieved in seconds.

(4) Decide to deliver takes 1-3 minutes.

f. Authority is integrated through the process as follows:

(1) The initial strike has pre-delegated authority for HPT engagement.

(2) Post-strike assessment is conducted by the CA-Bde's fires coordination element.

(3) The re-engagement strike is delegated within the commander's intent

(4) Subsequent fires will be conditioned by BDA outcomes.

5.127 The D3A construct at ca-Bde level demonstrates the OPA's ability to compress the targeting cycle through integration of persistent ISR and rapid decision-making. Detection and assessment are effectively merged through UAV employment, enabling near-real-time evaluation of strike effects. This allows commanders to iteratively apply firepower until the desired effect is achieved, rather than relying on single engagements. Decision-making is continuous, with battle damage assessment acting as the primary trigger for re-engagement or reallocation of fires.

Section 5-11. Conclusion

5.128 The OPA approach to targeting is characterised by the integration of detection, decision-making, engagement, and assessment within a single reconnaissance–strike system, rather than as discrete and sequential functions. Targeting is conducted against systems rather than individual platforms, with success measured in terms of achieved effects, physical, functional, and systemic, rather than simple destruction. Within this construct, battle damage assessment is not a terminal activity but a continuous process that determines whether the desired effect has been achieved and, if not, drives immediate re-engagement or reallocation of firepower. This enables the OPA to apply fires iteratively, degrading adversary systems over time while maintaining tempo and operational coherence.

5.129 At the tactical level, this approach allows CA-Bdes to compress the targeting cycle into minutes, particularly where persistent ISR, most notably the use of UAVs, enables near-real-time assessment and decision-making. BDA functions as the primary trigger for dynamic re-engagement, operating within commander's intent and delegated authority to sustain pressure on high-payoff targets. The result is a targeting system that is adaptive, effects-based, and tightly integrated with command and control, enabling the OPA to achieve temporal massing of fires from dispersed systems. For opposing forces, this presents a requirement to disrupt sensor persistence, degrade assessment mechanisms, and deny the OPA the ability to close the strike–assess–re-strike loop that underpins its targeting methodology.

Chapter 6
Olvanan Fire Planning

Fight no battle unplanned; fight no battle you are not sure of winning.

Mao Zedong

Maoist operational principle derived from Mao Zedong's strategic writings, in particular Problems of Strategy in China's Revolutionary War, 1936

Section 6-1. Introduction

6.1 Fire planning is the process by which firepower is organised, sequenced, and applied to achieve operational and tactical objectives within the broader operational system. It is not a discrete activity, but a continuous function conducted across all stages of planning and execution.

6.2 OPA fire planning is nested within the reconnaissance–strike system, integrating the firepower strike system, reconnaissance system and information confrontation system. It is inherently system-oriented and effects-driven, focusing on disruption of the enemy's operational systems rather than isolated target destruction.

6.3 Fire planning is closely linked to targeting (Chapter 5) and command and control (Chapter3). It translates targeting decisions into executable firepower actions and ensures their synchronisation with manoeuvre and other operational systems.

Section 6-2. Inputs to Fire Planning

6.4 OPA Fire planning begins with initial inputs from higher headquarters and is continuously updated as the situation develops. These inputs cover the higher headquarters' intent, targeting outputs, intelligence preparation, available firepower resources and applicable constraints. These inputs define the required effects, priorities and conditions for the employment of firepower within the operational system.

Operational and Tactical Guidance

6.5 Fire planning is initiated by higher headquarters' intent and operational objectives. These define the purpose, scope, and desired effects of firepower employment. Key inputs include campaign and operational objectives, the Commander's intent and priorities, the scheme of manoeuvre (including current and projected phases), and assigned missions and tasks.

Targeting Outputs

6.6 Fire planning is driven by targeting processes, which provide target system analysis, HVTs and HPTs, pre-planned and dynamic target sets, and target prioritisation and sequencing. These outputs define what effects must be achieved, enabling fire planners to determine how and when firepower is to be applied.

Intelligence Preparation

6.7 Intelligence preparation provides the situational context for fire planning. It includes enemy dispositions, capabilities, and vulnerabilities, terrain and environmental considerations as well as ISR collection plans and sensor coverage. . ISR assets, including UAVs, WLRs, and EW systems, are integrated into fire planning to enable detection and engagement.

Firepower Resources

6.8 Fire planning is constrained and enabled by available firepower resources, including:

a. Constituent, supporting, dedicated, and affiliated firepower

b. Tube artillery, rocket artillery, and UAV-delivered effects

c. Loitering munitions and non-kinetic capabilities

6.9 Resource allocation is dynamic and time-based, reflecting the OPA preference for system-level optimisation over fixed command relationships.

Constraints and Authorities

6.10 Fire planning must account for:

a. Firepower release authority (centralised or delegated)

b. Operational and political constraints

c. Airspace coordination requirements

d. Risk of fratricide and interference

6.11 Authority conditions are integrated into the fire plan, defining when and how firepower may be employed.

Section 6-3. The OPA Fire Planning Process

6.12 Fire planning is conducted throughout the OPA operational planning process conducted across five steps.

The OPA Operational Planning Process

6.13 The primary outputs of the OPA planning process are the objectives and scheme of manoeuvre, along with the structure of the operational system being used to conduct the operation. The operational system may include multiple subordinate operational systems in addition to specialized supporting systems.

6.14 The planning process consists of five steps, each with distinct outputs. Subordinate units conduct planning in sequence with their higher echelon headquarters and adjust their plan according to inputs received from it. The planning process seeks to achieve unity of purpose throughout the operation, ensuring that all subordinate commanders know their role, mission, and place in the wider operation.

6.15 The five steps are as follows:

a. Step 1 – Assess the Situation. This is where the commander and staff evaluate terrain, enemy forces, friendly forces, and other relevant factors. These might include items such as key terrain and systems nodes as well as constraints and opportunities.

b. Step 2 – Make Decisions. This is where the commander and staff establish the purpose and objective of the operation, the general scheme of manoeuvre, the basic structure of the operational system, and key points of interest. The main effort and supporting efforts are established with the final output being the commander's concept of operations.

c. Step 3 – Issue Orders. This is where the commander and staff turn that concept into instructions for subordinates providing clear direction for execution, the key output will be the initial operational orders.

d. Step 4 – Organize Coordination. This step refines those orders by synchronising subordinate action and de-conflicting shared enablers. The output for this step is a coherent, synchronised scheme of manoeuvre.

e. Step 5 – Organize Support. This step then arranges the external capabilities needed to make the operation executable. The output for this step is an executable support framework for the operation.

The OPA Fire Planning Process

6.16 Fire planning is conducted throughout the operational planning process. It evolves iteratively across five steps as follows:

a. Step 1 – mission analysis

b. Step 2 – course of action (COA) development

c. Step 3 – course of action analysis

d. Step 4 – decision and plan refinement

e. Step 5 – orders production.

Step 1 – Mission Analysis

6.17 During mission analysis, fire planners determine how firepower will contribute to achieving the commander's intent and mission objectives. It involves:

a. Commander's intent and mission requirements covering the purpose of the operation, decisive points, main and supporting efforts as well as the desired operational and tactical effects.

b. Enemy analysis covering enemy composition and disposition, the identification of high-value targets and high-payoff targets, artillery and rocket forces, air defence systems, EW assets, command posts, logistics nodes and likely enemy courses of action.

c. Terrain and environmental analysis covering observation and fields of fire, dead ground, mobility corridors, key terrain, communications limitations and weather impacts on sensors and munitions.

d. Friendly force analysis covering available fire support assets, available reconnaissance assets, higher-echelon support, air and naval fires, ammunition availability and sustainment constraints.

e. Target Analysis identifies those enemy capabilities, systems and activities whose engagement will contribute most directly to mission accomplishment. The purpose is not simply to generate a list of targets, but to determine what effects must be achieved against those targets to support the commander's intent and scheme of manoeuvre. Within the OPA reconnaissance-strike system, target analysis focuses on understanding the enemy as an interconnected combat system. Firepower is therefore directed against those elements that most significantly contribute to the enemy's ability to observe, decide, manoeuvre, communicate, sustain and fight. Target analysis should examine:

(1) What role does the target perform within the enemy system? The destruction of a battalion command post may have greater operational impact than the destruction of an infantry platoon.

(2) How important is the target to the enemy's current operation? Not all targets warrant engagement.

(3) Can the target be successfully engaged? This involves consideration of the target’s size, its mobility, protection, signature and exposure time as well as the impact of terrain masking. A dug-in company may require significant resources, while an artillery battery caught in the open may be vulnerable to a rapid precision strike.

(4) What is the target’s location? Could it have alternate locations? Particular emphasis should be placed on identifying locations where targets are most vulnerable.

(5) How well protected is the target? Protection significantly influences the effects that can be achieved.

f. Once targets are analysed, planners determine the required effect. Firepower is allocated to achieve effects rather than simply destroy targets. Common effects include:

(1) Suppression to temporarily degrade a target's ability to perform its function.

(2) Neutralisation to render a target ineffective for a specified period. This is often the preferred effect because it may require less ammunition than destruction.

(3) Destruction to physically destroy personnel, equipment or infrastructure. Generally this requires the greatest expenditure of resources.

(4) Isolation to prevent reinforcement, withdrawal or resupply. This is commonly achieved through artillery, rockets, mines and precision strikes.

(5) Delay to slow enemy movement or operations.

(6) Disruption to break enemy synchronisation and decision-making. This is particularly important in informationised warfare.

6.18 Once targets and effects have been identified, planners determine the quantity and type of firepower required to achieve those effects. This process allocates available firepower resources against operational priorities while balancing effectiveness, ammunition expenditure, survivability and responsiveness.

6.19 Desired effects determine the scale of firepower allocated to a target. Suppression requires the least resources and temporarily degrades a target's ability to operate, typically to support manoeuvre or protect friendly forces. Neutralisation requires greater firepower and renders a target ineffective for a specified period. Destruction is the most resource-intensive effect and physically eliminates or permanently incapacitates a target. Other effects, such as isolation, delay and disruption, seek to restrict movement, slow operations or degrade C2.

6.20 Fire planners should seek the minimum effect necessary to achieve the commander's intent and operational objectives. Destruction is not inherently superior to suppression or neutralisation. In many circumstances, temporary suppression, neutralisation, isolation or disruption may achieve the required operational outcome while consuming significantly fewer resources and exposing firepower assets to less risk.

Step 2 – Course of Action (COA) Development

6.21 The purpose of COA Development is to develop fire support concepts that support the commander's manoeuvre options by integrating firepower, reconnaissance, EW, cyber and information operations into a coherent scheme capable of achieving the desired operational and tactical effects. The output of this step is a draft fire support concept for each proposed course of action.

6.22 Unlike Mission Analysis, which focuses on understanding the problem, COA Development focuses on designing how firepower will be employed to achieve the required effects.

6.23 COA development involves the following:

a. Development of the fire support concept

b. Identification of firepower tasks

c. Allocation of firepower resources

d. Integration of reconnaissance and target acquisition

e. Development of target priorities

f. Preliminary fire support coordination measures

g. Preliminary ammunition and sustainment planning

h. Development of the firepower timeline.

Development of the Fire Support Concept

6.24 Planners determine how firepower will support the scheme of manoeuvre throughout the operation. This includes:

a. Supporting the commander's intent

b. Enabling decisive actions

c. Shaping the battlefield

d. Isolating objectives

e. Suppressing enemy fire support systems

f. Disrupting enemy command and control

g. Supporting consolidation and defence against counterattack.

6.25 The fire support concept should describe how fires contribute to each phase of the operation rather than simply listing targets.

Identification of Firepower Tasks

6.26 Planners identify the principal firepower tasks required to support the operation. Typical tasks may include counter-battery operations, suppression of enemy air defences, support to advance-to-contact operations, isolation of objectives, interdiction of reserves, destruction of key enemy systems, support to obstacle breaching and support to assault operations.

6.27 Each task should be linked to a specific operational purpose.

Allocation of Firepower Resources

6.28 Planners develop a preliminary allocation of available firepower assets. This includes FA battalion assets, mortars, rocket artillery, reinforcing FA Brigade assets, UAV-delivered strike systems and loitering munitions.

6.29 Allocations should reflect target priorities, expected phases of the operation, anticipated decision points and sustainment constraints. For example:

a. 300 mm rockets may focus on deep targets and reserve formations

b. 155 mm artillery may focus on counter-battery and strongpoints

c. 122 mm artillery may provide close support to manoeuvre battalions

d. Mortars may support local engagements and immediate fire missions.

Integration of Reconnaissance and Target Acquisition

6.30 Planners determine how reconnaissance assets will support target acquisition and battle damage assessment. This includes brigade UAVs, artillery UAV detachments, WLR, reconnaissance battalion assets and EW collection systems.

6.31 Particular attention should be given to maintaining target custody from detection through engagement and assessment.

Development of Target Priorities

6.32 Target engagement priorities are established to guide subsequent planning and execution. Typical priorities may include:

a. 1. Enemy artillery and rocket systems.

b. 2. Command and control nodes.

c. 3. Air defence systems.

d. 4. Reserve forces.

e. 5. Defensive positions opposing the main effort.

6.33 Priorities should be linked directly to the commander's objectives.

Preliminary Fire Support Coordination Measures

6.34 Planners identify the coordination measures required to enable safe and effective employment of firepower. These may include:

a. Firepower Coordination Boundaries;

b. Mission-Based Fire Zones;

c. Firepower Strike Areas;

d. Restricted Fire Areas;

e. Airspace coordination measures.

6.35 These measures remain preliminary until refined during COA Analysis.

Preliminary Ammunition and Sustainment Planning

6.36 Planners estimate anticipated ammunition expenditure, redistribution requirements, fuel requirements and maintenance implications as well as displacement requirements. This ensures proposed courses of action remain sustainable.

Development of the Firepower Timeline

6.37 Planners begin sequencing firepower activities against the operation's phases. Typical activities include shaping fires, counterbattery operations, suppression fires, isolation fires, assault support fires and consolidation fires. This timeline forms the foundation for later synchronisation and war-gaming.

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Outputs

6.38 The outputs of COA Development should include:

a. A draft fire support concept for each manoeuvre COA

b. Preliminary firepower tasks

c. Proposed allocation of firepower assets

d. Preliminary target priorities

e. Proposed reconnaissance support arrangements

f. Preliminary coordination measures

g. Initial sustainment estimates

h. A draft firepower timeline.

6.39 During COA Development, fire planners translate mission analysis into practical fire support concepts. By integrating firepower, reconnaissance, targeting and sustainment considerations into each proposed course of action, planners establish the framework that will subsequently be tested, refined and synchronised during COA Analysis. This ensures that firepower remains fully integrated with the manoeuvre commander's

Step 3 – COA Analysis

6.40 The purpose of COA Analysis is to evaluate the feasibility, effectiveness, sustainability and survivability of proposed fire support concepts. Through analysis and war-gaming, planners identify strengths, weaknesses, resource shortfalls, decision points and opportunities for refinement before the plan is approved. The output of this step is a validated and refined fire support concept capable of supporting the operation under anticipated battlefield conditions.

6.41 COA analysis involves:

a. Testing the fire support concept

b. A detailed analysis of enemy COA

c. Target engagement analysis

d. Sensor-to-shooter analysis

e. Synchronisation analysis

f. Firepower allocation analysis

g. Survivability analysis

h. Sustainment analysis

i. Risk analysis

j. Outputs

Test the Fire Support Concept

6.42 The first activity is determining whether the proposed fire support concept can achieve the desired operational and tactical effects. Planners assess:

a. Are sufficient firepower assets available?

b. Can targets be detected in time?

c. Can desired effects be achieved?

d. Can the scheme support the manoeuvre plan?

e. Are priorities correctly assigned?

f. Can fires be sustained throughout the operation?

6.43 Particular attention should be given to identifying points where the fire plan may fail or require modification.

Conduct a Detailed Analysis of Enemy COA

6.44 Each proposed fire support concept should be examined against likely enemy actions. This includes assessing:

a. Enemy artillery response covering counter-battery activity, rocket artillery attacks and fire support reinforcement.

b. Enemy reconnaissance activity including UAV surveillance, ground reconnaissance and electronic surveillance.

6.45 Enemy C2 covering likely decision points, reserve commitments and counterattack options.

6.46 Enemy Air Defence including threats to UAV operations and restrictions on reconnaissance activities.

6.47 The objective is to determine whether the proposed fire support plan remains effective when the enemy reacts.

Target Engagement Analysis

6.48 Planners assess whether critical targets can be successfully engaged. Questions include:

a. Can targets be located with sufficient accuracy?

b. How long will targets remain exposed?

c. Which sensors are best suited to detect them?

d. Which weapon systems are best suited to engage them?

e. How quickly can engagements occur?

6.49 This analysis should identify potential gaps in the reconnaissance–strike chain.

Sensor-to-Shooter Analysis

6.50 A key feature of OPA fire planning is evaluating the responsiveness of the reconnaissance–strike system. Planners assess target acquisition timelines, data transmission times, fire mission processing times, weapon response times and battle damage assessment timelines. For example:

a. UAV Detection 1 min

b. Target Confirmation 2 min

c. Fire Mission Processing 1 min

d. Artillery Response 2 min

e. Total Kill Chain 6 min.

6.51 If the target is only exposed for three minutes, the engagement process may require modification.

Synchronisation Analysis

6.52 The fire support concept must be tested against the manoeuvre timeline. Planners assess:

a. Are fires occurring at the correct time?

b. Can firepower support decision points?

c. Can objectives be isolated before assault?

d. Can suppression be maintained during movement?

e. Are reserves interdicted before commitment?

6.53 The goal is to ensure that fires and manoeuvre remain mutually supporting throughout the operation.

Firepower Allocation Analysis

6.54 The proposed allocation of firepower resources should be tested against expected requirements. Planners assess the availability of artillery units, the availability of rocket forces, mortar support requirements, competing target priorities and fire mission density.

6.55 This often identifies periods where demand exceeds available firepower.

Survivability Analysis

6.56 Firepower survivability is a major consideration within modern OPA operations. Planners assess:

a. Counter-battery threat covering enemy radar coverage, expected response times and vulnerability of firing positions.

b. UAV Threat including the detection of artillery positions, detection of logistics activities and detection of command posts.

c. EW Threat covering communications vulnerability, navigation disruption and data-link degradation.

d. Displacement requirements including the frequency of movement, alternate firing positions and movement routes.

6.57 The objective is to ensure that firepower can survive long enough to support

Sustainment Analysis

6.58 The proposed fire support concept must be logistically achievable. Planners examine:

a. Ammunition consumption including expected expenditure by phase, redistribution requirements and resupply timelines.

b. Fuel consumption covering artillery movement requirements, generator requirements. and vehicle operating demands.

c. Maintenance and recovery covering equipment reliability, recovery assets and repair capacity.

6.59 Fire plans that cannot be sustained should be modified before approval.

Risk Analysis

6.60 The final activity is identifying operational risks. Examples include:

a. Insufficient ammunition – inability to support assault

b. UAV losses – reduced target acquisition

c. Counter-battery threat – loss of artillery systems

d. Communications disruption – delayed engagements

e. Weather effects – reduced target detection

6.61 Planners should identify mitigation measures for each significant risk.

Outputs

6.62 COA Analysis should produce:

a. Validated fire support concepts;

b. Refined target priorities;

c. Confirmed firepower allocations;

d. Refined reconnaissance plans;

e. Identified decision points;

f. Sustainment estimates;

g. Survivability measures;

h. Risk mitigation measures;

i. Recommended modifications to the fire support concept.

6.63 COA Analysis tests the proposed fire support concept against anticipated battlefield conditions and enemy reactions. By examining target engagement requirements, reconnaissance– strike timelines, synchronisation, survivability and sustainment, planners identify weaknesses and opportunities for improvement before selecting a preferred course of action. The result is a refined and achievable fire support concept that can be confidently recommended for approval and further development.

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Step 4 – Decision and Plan Refinement

6.64 The purpose of decision and plan refinement is to transform the selected fire support concept into a detailed and executable fire plan. This process incorporates the results of COA Analysis, resolves identified shortfalls and risks, and finalises the arrangements required to synchronise firepower with the manoeuvre plan. The output is a fully developed fire support plan ready for inclusion in operation orders and Firepower Coordination Orders.

Commander's Decision

6.65 Following COA Analysis, the commander selects the preferred course of action. This decision provides planners with the approved scheme of manoeuvre, the main effort, supporting efforts, operational priorities, acceptable levels of risk and the desired end state.

6.66 Fire planners use this decision as the basis for refining the fire support plan.

Refinement of Fire Support Tasks

6.67 Planners review and confirm all fire support tasks identified during previous planning stages. Tasks are refined to ensure they support the approved manoeuvre plan, contribute to the commander's intent, are achievable with available resources and are properly prioritised.

6.68 Examples include counter-battery operations, suppression of enemy air defences, objective isolation, support to obstacle breaching, support to assault operations, interdiction of reserves consolidation support. Each task should have a clearly defined purpose, timing and desired effect.

Refinement of Target Priorities

6.69 Target priorities are reviewed to ensure they align with operational objectives. Planners determine which targets receive priority engagement, which targets are monitored but not immediately engaged, which targets require higher-level approval and which targets may be engaged dynamically.

6.70 A typical prioritisation sequence may include:

a. 1. Enemy artillery and rocket systems.

b. 2. Command and control nodes.

c. 3. Air defence systems.

d. 4. Reserve forces.

e. 5. Defensive positions opposing the main effort.

6.71 Target priorities should remain flexible to accommodate changing battlefield conditions.

Final Allocation of Firepower Resources

6.72 Planners assign specific firepower assets to approved tasks. This includes artillery battalions, rocket artillery units, mortars, UAV-delivered strike systems, loitering munitions and supporting EW and cyber capabilities. Allocation decisions should account for target location, desired effects, range limitations ammunition availability and survivability considerations. For example:

6.73 122 mm Battalion – close support

6.74 155 mm Battery – counter-battery and strongpoints

6.75 300 mm Rocket Battery – deep targets and reserves

6.76 Mortars – immediate support to manoeuvre battalions

6.77 UAV Detachment – target acquisition and BDA

Refinement of the Reconnaissance–Strike System

6.78 A distinctive feature of OPA fire planning is the integration of reconnaissance and firepower. During this stage planners finalise:

a. Sensor responsibilities including brigade UAV coverage, artillery UAV coverage, counter-battery radar sectors and ground reconnaissance responsibilities.

b. Target Custody Arrangements covering detection responsibilities, confirmation procedures, handover procedures and battle damage assessment responsibilities.

c. Engagement timelines covering target acquisition timelines, fire mission approval timelines and sensor-to-shooter expectations.

6.79 The objective is to ensure the reconnaissance–strike system can function effectively during execution.

Refinement of Fire Support Coordination Measures

6.80 Coordination measures are reviewed and finalised. These may include:

a. Firepower coordination boundaries – boundaries between supported formations.

b. Mission-based fire zones – areas where firepower support is focused.

c. Firepower strike areas – areas designated for planned engagements.

d. Restricted fire areas – areas requiring special control measures.

e. Airspace coordination measures – measures supporting UAV and aviation operations.

6.81 The purpose is to maximise responsiveness while preventing fratricide and interference between supporting systems.

Development of the Firepower Timeline

6.82 The fire support concept is translated into a detailed timeline aligned with operational phases.

6.83 The timeline should identify:

a. Shaping Phase covering ISR operations, counter-battery preparation and deep strikes.

b. Initial Advance covering suppression of enemy observation and counter-battery operations.

c. Contact and Assault including objective isolation, suppression of defensive positions and assault support fires.

d. Consolidation covering interdiction fires, Counterattack defeat and security operations.

6.84 The timeline provides the foundation for subsequent orders and synchronisation activities.

Refinement of Sustainment Arrangements

6.85 The approved fire plan must be logistically sustainable. Planners confirm:

a. Ammunition requirements covering combat allocations, redistribution stocks and resupply schedules.

b. Fuel Requirements covering vehicle operations, displacement operations and generator support.

c. Maintenance and Recovery covering repair priorities, recovery plans and technical support requirements.

6.86 Particular attention should be given to maintaining continuous support throughout displacement cycles.

Refinement of Survivability Measures

6.87 Survivability arrangements are reviewed and incorporated into the fire plan. These include displacement schedules, alternate firing positions, camouflage and deception measures, emissions control procedures, counter-UAV measures and protection of command posts and logistics nodes.

6.88 These measures should be synchronised with fire missions and movement plans.

Confirmation of Authorities and Control Measures

6.89 Planners confirm:

a. Engagement authorities – who may approve engagements.

b. Dynamic targeting authorities – who may engage time-sensitive targets.

c. Restricted targets – targets requiring higher approval.

d. Battle damage assessment requirements – assessment criteria and reporting procedures.

6.90 This ensures all participants understand decision-making responsibilities before execution.

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Outputs

6.91 The outputs of decision and plan refinement should include:

a. Approved fire support concept

b. Final target priorities

c. Final firepower allocations

d. Approved reconnaissance-strike arrangements

e. Final coordination measures

f. Detailed firepower timeline

g. Sustainment plan

h. Survivability plan

i. Engagement authorities

j. A draft Firepower Coordination Order.

Conclusion

6.92 Decision and plan refinement transforms the selected fire support concept into an executable fire plan. By finalising target priorities, firepower allocations, reconnaissance-strike arrangements, coordination measures and sustainment requirements, planners ensure that firepower is fully integrated with the approved scheme of manoeuvre and prepared for execution.

6.93 The resulting plan provides the basis for issuing Firepower Coordination Orders and directing firepower operations during execution.

Step 5 – Orders Production

6.94 The purpose of Orders Production is to communicate the approved fire plan to subordinate, supporting and affiliated headquarters. This process translates planning decisions into clear instructions that synchronise firepower, reconnaissance, targeting, sustainment and command activities throughout the operation. The primary output is the Firepower Coordination Order (FCO) supported by associated annexes, overlays and digital products.

Development of the Firepower Coordination Order (FCO)

6.95 The FCO is the principal fires planning product produced during this step. The order translates the commander's intent and approved fire support concept into executable tasks and coordinating instructions.

6.96 The FCO should assign firepower tasks, establish priorities, allocate resources, define authorities, synchronise activities, communicate coordination measures and provide sustainment guidance. The order should support execution rather than repeat information already contained within the manoeuvre operation order.

Confirmation of Firepower Tasks

6.97 Before publication, planners review all assigned firepower tasks to ensure tasks remain aligned with the approved plan, responsibilities are clearly assigned, priorities are understood, no duplication exists and supporting relationships are accurately reflected.

6.98 Each task should identify responsible unit, supported unit, target category, desired effect, timing requirements and reporting requirements.

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Final Targeting Guidance

6.99 Orders production includes issuing the final targeting guidance required to support execution. This guidance may include:

a. Target priorities, for example:

(1) 1. Enemy artillery.

(2) 2. Command and control nodes.

(3) 3. Air defence systems.

(4) 4. Reserve forces.

(5) 5. Defensive positions.

b. Engagement guidance which specifies desired effects, authorised weapons, priority ammunition, restrictions and collateral damage considerations.

c. Dynamic targeting guidance which identifies time-sensitive targets, engagement authority, reporting requirements and target prosecution procedures.

Communication of Firepower Allocations

6.100 The order must clearly communicate how firepower resources have been allocated. This includes:

a. Tube Artillery covering support responsibilities, priority missions and movement responsibilities.

b. Rocket Artillery covering deep-fire tasks, interdiction missions and counter-battery support.

c. Mortars covering close support responsibilities.

d. Reconnaissance assets covering UAV tasking, radar tasking and reconnaissance priorities.

e. EW and Cyber Assets covering support relationships, target priorities and synchronisation requirements.

6.101 The allocation should reflect the approved fire support concept and the commander's priorities.

Publication of Fire Support Coordination Measures (FSCM)

6.102 Orders Production formalises all approved coordination measures. These may include:

a. Firepower Coordination Boundaries (FCB) to define responsibilities between formations.

b. Mission-based fire zones (MFZ) to focus firepower effort in support of operational objectives.

c. Firepower strike areas (FSA) to identify designated areas for planned firepower engagement.

d. Restricted fire areas (RFA) to identify areas requiring special control measures.

e. Airspace coordination measures (ACM) required to support UAV, aviation and missile operations.

6.103 These measures should be included within both written orders and graphical overlays.

Publication of the Firepower Timeline

6.104 The firepower timeline communicates how firepower activities are synchronised with the operation. It should identify:

a. Shaping Operations including reconnaissance activities, deep strikes and counter-battery preparation.

b. Manoeuvre support covering suppression fires, isolation fires and assault support.

c. Consolidation operations covering interdiction fires, security operations and counterattack defeat.

6.105 The timeline provides a common operational framework for all participants.

Publication of Reconnaissance and Targeting Instructions

6.106 A critical component of the FCO is the communication of reconnaissance and targeting responsibilities.

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6.107 This should include:

a. Reconnaissance Priorities including target categories, surveillance areas and information requirements.

b. Sensor Responsibilities covering UAV sectors, radar sectors and reconnaissance patrol tasks.

c. Target Custody Procedures which identify detection responsibilities, confirmation procedures, engagement authorities and battle damage assessment responsibilities.

6.108 This is particularly important within the OPA reconnaissance–strike system where multiple organisations contribute to target engagement.

Publication of Sustainment Instructions

6.109 Orders Production also communicates the sustainment arrangements necessary to support firepower operations. This includes:

a. Ammunition covering combat allocations, redistribution stocks and resupply priorities.

b. Fuel covering refuel schedules and priority of support.

c. Maintenance and Recovery including repair priorities, recovery procedures and technical support arrangements.

6.110 Medical Support covering casualty evacuation arrangements for firepower units.

Publication of Command and Communications Instructions

6.111 The order should clearly identify:

a. Command Relationships including supported and supporting relationships, dedicated and affiliated relationships and command authorities.

b. Reporting Requirements covering target reporting, battle damage assessment and ammunition reporting.

c. Communications including primary networks, alternate networks, digital fire-control systems and data-sharing procedures.

6.112 These instructions ensure that firepower units can coordinate effectively throughout execution.

Distribution and Rehearsal

6.113 Orders Production does not end when the order is issued. Planners should ensure that subordinate headquarters understand the order, key fire support tasks are rehearsed, digital products are distributed, coordination measures are confirmed and engagement procedures are understood.

6.114 Particular attention should be paid to rehearsing reconnaissance-to-firepower handovers and dynamic targeting procedures.

Outputs

6.115 The outputs of orders production typically include:

a. Primary Documents which include the Firepower Coordination Order, the Fire Support Annex and Targeting Annex.

b. Supporting Products including firepower overlays, target lists, firepower timelines, communications instructions and sustainment instructions.

c. Digital Products including target databases, digital fire plans, sensor tasking products and battle management products.

Conclusion

6.116 Orders Production converts the approved fire plan into executable instructions for subordinate and supporting headquarters. Through the publication of Firepower Coordination Orders, targeting guidance, coordination measures, reconnaissance tasking and sustainment instructions, planners ensure that all elements of the reconnaissance–strike system operate towards a common objective. The resulting products provide the framework through which firepower is coordinated, synchronised and executed during operations.

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6.117 The format for a firepower coordination order (FCO) is contained in Annex A. an example of an FCO is at Annex B.

Relationship to the OPA Operational Planning Process

6.118 The commander's decisions in Step 2 of the operational planning process establish the purpose, objective, scheme of manoeuvre, and operational-system structure that frame firepower employment. Fire support requirements are then communicated in Step 3, synchronised with subordinate action in Step 4, and formally arranged in Step 5, where the staff organises artillery, firepower, and other external support to the operation.

Section 6-4. Deliberate and Quick Fire Planning

6.119 The OPA differentiates between deliberate attacks or planned strikes and quick attacks or opportunity or immediate strikes primarily through the degree of planning, target development, approval authority and execution timelines.

6.120 Deliberate attacks are primarily used to shape the battlefield before manoeuvre, while quick attacks are used to exploit targets detected during execution. Within an informationised and intelligentised reconnaissance-strike system, both approaches are employed simultaneously.

Deliberate Attacks

6.121 A deliberate attack is a pre-planned firepower strike against a target or target system identified, analysed and approved before execution, conducted as part of the overall firepower plan. Deliberate attacks are integrated into the overall operational plan and synchronised with manoeuvre, ISR, EW, and cyber. At the operational level air and maritime activities are also included

Characteristics

6.122 Deliberate attacks have the following characteristics:

a. Targets are identified during planning and mission analysis.

b. Detailed target development and intelligence preparation are conducted.

c. Desired effects are determined before execution.

d. Weapons and ammunition are allocated in advance.

e. Deliberate attacks are integrated into the firepower plan and synchronised with manoeuvre.

f. Approval is normally obtained before operations commence.

Typical Targets

6.123 Typical targets include:

a. Command posts

b. Logistics hubs

c. Air-defence sites

d. Bridges and choke points

e. Known artillery positions

f. Reserve assembly areas

g. Communications nodes.

Firepower Methods Used in Deliberate Attacks

6.124 Firepower methods commonly applied in deliberate attacks include:

a. Precision Firepower to destroy critical targets such as command posts, air-defence sites and bridges.

b. Saturation Firepower using massed fires against defensive positions, reserves and logistics areas.

c. Blockade Firepower used to create obstacles and interdict routes, crossings and chokepoints.

d. Suppression Firepower used to reduce enemy artillery, air-defence and observation capability.

e. Psychological/Cognitive Firepower used to shape enemy perceptions and degrading morale.

6.125 In a deliberate attack 300 mm MRLs are used to engage deep targets while 155 mm SPH artillery is used to attack command posts and artillery positions. 122 mm SPH artillery suppresses forward defences while 120 mm mortars support assault battalions; UAVs are used to conduct target confirmation and BDA.

Quick Attacks

6.126 Quick Attack: A rapidly planned and executed firepower strike against a newly detected or emerging target, employing available sensors and weapon systems to achieve effects before the target can relocate, disperse or take protective action. They are a key component of reconnaissance-strike operations and are designed to exploit fleeting opportunities.

Characteristics

6.127 Quick attacks have the following characteristics:

a. They are triggered by real-time sensor detection.

b. They involve minimal planning and compressed approval process.

c. The emphasis on speed and responsiveness.

d. They are typically executed within minutes of detection.

e. They rely on digital sensor-to-shooter connectivity.

Typical targets

6.128 Typical targets include:

a. Enemy artillery and mortar positions

b. Mobile command posts

c. Air-defence systems

d. EW emitters

e. Armoured columns

f. Counterattack forces

g. UAV launch sites

Firepower Methods Used in Quick Attacks

6.129 Firepower methods commonly applied in quick attacks include:

a. Precision Firepower is the preferred method for destroying fleeting targets with minimal delay.

b. Suppression Firepower is used when immediate effects are required and precise destruction is unnecessary.

6.130 Saturation Firepower is employed against unexpectedly detected formations or concentrations.

6.131 In a quick attack an SLC-2 radar or UAV are used to detect enemy artillery. The Firepower command and Coordination Centre assigns the nearest available shooter and engages the target using 155 mm artillery, 122 mm artillery, MRL, loitering munitions or other available assets.

Comparison of Deliberate and Quick Attacks

The table on the following page provides a comparison of the two types of attack.

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Table 6.1 – Deliberate Vs Quick Attacks

Factor	Deliberate Attack	Quick Attack
Planning	Detailed	Minimal
Target Development	Extensive	Rapid
Intelligence	Collected over time	Real-time
Approval	Pre-approved	Immediate
Coordination	High	Limited
Execution Timeline	Hours to days	Minutes
Typical Targets	Known/fixed targets	Mobile/emerging targets
Purpose	Shape battlefield	Exploit opportunities

Section 6-5. Synchronisation of Fires

6.132 Effective fire planning requires the deliberate synchronisation of fires with manoeuvre, integration with other operational systems and alignment in time and space. Firepower is not applied in isolation but coordinated with manoeuvre actions to shape conditions, support forces in contact, and exploit opportunities as they arise. This is achieved through close integration with ISR, air defence, and information confrontation elements, ensuring that targets are detected, engaged, and assessed in a coherent and timely manner.

6.133 Synchronisation is both temporal and spatial, with firepower allocated against phases, events, and geographic areas to concentrate effects where and when they are required, while enabling dispersed forces to operate as part of a unified operational system.

Fires and Manoeuvre Integration

6.134 Fires and manoeuvre are mutually reinforcing because each creates conditions that enable the other to act more effectively, faster, and with less risk. This is not a supporting relationship but a continuous interaction within the operational system.

How Fires Enable Manoeuvre

6.135 Fires shape the battlefield so manoeuvre forces can move, close, and fight under favourable conditions. This is achieved through:

a. Suppression and neutralisation. Fires are used to suppress enemy direct fires, AD systems, and ISR nodes and reduce the enemy's ability to observe and engage manoeuvre forces. This enables manoeuvre units to advance with reduced exposure.

b. Dislocation of the adversary system. Dislocation involves breaking the coherence and effectiveness of the enemy's operational system, not simply destroying individual targets. Fires are used to strike command nodes, logistics, and reserves as well as to create gaps, delays, and confusion. This results in manoeuvre elements encountering a fragmented and less coordinated opponent.

c. Isolation of the Objective. Fires isolate the objective by preventing reinforcement, disrupting C2 and support as well as by fixing the enemy in time and space so it can be defeated in detail.

How Manoeuvre Enables Fires

6.136 Manoeuvre is not just a consumer of fires. It actively improves the effectiveness of firepower. This is achieved through:

a. Target generation. Manoeuvre elements force the enemy to displace, communicate and expose its systems. This creates detectable targets for UAV, EW, WLR and observers.

b. Target fixing. Manoeuvre elements fix enemy forces in place (for example. through contact or threat of contact). This enables effective engagement by artillery and rockets.

c. ISR access and cueing. Forward elements and reconnaissance detachments are able to confirm targets, provide terminal guidance and adjust fires. This improves accuracy and reduces engagement time.

A Continuous Loop

6.137 Fires and manoeuvre are mutually reinforcing within the OPA operational system with each enabling the effectiveness of the other. Firepower shapes the battlefield by suppressing, dislocating, and isolating adversary forces, creating conditions that enable manoeuvre elements to advance, close, and achieve positional advantage. In turn, manoeuvre generates and fixes targets by forcing the adversary to move, communicate and respond, exposing critical nodes to detection and engagement.

6.138 This interaction forms a continuous cycle within the reconnaissance–strike system where fires enable manoeuvre, manoeuvre exposes targets, and ISR links both to deliver timely and concentrated effects.

6.139 The table on the following page displays how manoeuvre actions are linked to firepower tasks by phase.

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Table 6.2 – Linking Firepower Task with Manoeuvre Action

Phase	Manoeuvre action	Firepower task	Effect sought	Typical delivery means	ISR/Trigger
Phase 1 – Shaping	Advance to contact / Reconnaissance push	Suppression of AD, ISR and forward positions	Reduce detection and engagement risk	Rocket artillery, EW, loitering munitions	EW detection, UAV reconnaissance
Phase 2 – Deployment	Manoeuvre elements deploy and position	Disruption of command nodes and key systems	Degrade coordination and situational awareness	Tube artillery, precision UAV strikes	UAV confirmation, SIGINT cues
Phase 3 – Assault / Decisive Action	Manoeuvre in contact / assault	Suppression and neutralisation of frontline forces	Enable freedom of movement and close combat	Tube artillery, MRL, direct fires integration	Forward observers, UAV adjustment
Phase 4 – Exploitation	Advance beyond objective / pursue	Interdiction of reserves and withdrawal routes	Prevent reinforcement and reorganisation	Long-range rockets, UAV strike	UAV tracking, WLR detection
Phase 5 – Consolidation	Reorganisation and defence of gains	Counterbattery and defensive fires	Protect force and disrupt counterattack	Tube artillery, WLR-enabled fires	WLR, ISR monitoring

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Integration with Operational Systems

6.140 Fire planning within the OPA is conducted as part of an integrated operational system where firepower is enabled by, and dependent upon, other systems operating together. Effective integration ensures that detection, decision-making and delivery functions are aligned, reducing latency and increasing the probability of achieving desired effects.

6.141 Integration is achieved through continuous coordination between the fires cell, ISR elements, EW and cyber capabilities, air defence units, and manoeuvre forces. These relationships are not sequential but they operate simultaneously within the reconnaissance–strike system.

Integration with ISR Systems

6.142 ISR integration underpins all fire planning by enabling target detection, confirmation, and assessment. EW, UAVs, and WLR identify potential targets, UAVs or other sensors validate target identity and location, observation and tracking of dynamic targets is conducted on a continuous, and BDA is conducted to determine effectiveness and re-engagement requirements.

6.143 Cross-cueing between sensors is the process which enables rapid detection, confirmation, and engagement by directing ISR assets sequentially onto targets. Cross-cueing is important because it reduces time to identify targets (faster than independent search), improves accuracy (multiple sensors confirm), enables engagement of fleeting targets and supports dynamic targeting. Without it targets could be missed or confirmed too late thereby increasing sensor-to-shooter timelines.

6.144 An EW – UAV – fires chain involves EW detects an emitter (radio, radar) and provides an approximate location, a UAV is then directed to that location and confirms the target visually. Fires then engage the target.

6.145 A WLR – Artillery (counter battery) chain begins with the WLR detecting incoming rounds. It then calculates the origin point and artillery is immediately cued with counter-battery fire being delivered.

6.146 Sensors are linked and sequenced with each sensor performing a specific role in the chain. EW assets detect, UAV confirms, WLR locates and Fires engage. This sequence is illustrated in the following example:

a. An OPA CA-Bde is conducting defensive operations against an enemy division.

b. The CA-Bde's EW Company detects increased radio traffic at approximately five kilometres to its front.

c. A CA-Bde UAV is re-tasked to the vicinity of the radio traffic and identifies a group of command vehicles

d. The target is passed to the FA battalion which conducts a strike within minutes.

6.147 Cross-cueing shortens the sensor-to-shooter timeline making dynamic targeting more effective.

Integration with Electronic Warfare and Cyber

6.148 EW and cyber capabilities are integrated into fire planning to enable targeting and enhance effects. Electronic Warfare assets detect adversary emissions (such as communications and radar), provide the geolocation for targeting and suppress or degrade adversary sensors and communications. Cyber assets can be used to disrupt the enemy's command and control systems, degrade its ISR networks and create windows of vulnerability for precision engagement

6.149 Integration is typically sequenced with EW detection and suppression conducted initially followed by cyber disruption and then a kinetic or UAV strike. These capabilities are coordinated through the fires cell to ensure timing aligns with manoeuvre and firepower delivery.

Integration with Air Defence Systems

6.150 Air defence integration is essential to protect firepower assets and enable ISR operations. Artillery, rocket systems, and command nodes need to be protected from air attack AD systems also need to be de-conflicted with UAV operations. The fires cell coordinates with air defence elements to ensure UAV access to target areas, prevent interference with fire missions and maintain the survivability of firepower units.

Integration with Manoeuvre Forces

6.151 Fire planning is directly linked to manoeuvre tasks and phases. Integration is achieved through alignment of firepower tasks with manoeuvre objectives and continuous communication between manoeuvre units and the fires cell. Forward elements and UAVs are also used for target confirmation. Manoeuvre units generate targets through movement and contact and provide real-time updates to the fires cell. They also exploit the effects of firepower.

Temporal and Spatial Integration

6.152 Temporal and spatial integration ensures that firepower is aligned with manoeuvre in both time and location to achieve the desired effect. Fires are planned against phases of the operation, key events, and designated areas, allowing commanders to concentrate effects at decisive points while maintaining support across the battlespace. This enables dispersed firepower systems to deliver coordinated effects through timing rather than physical massing. As the situation develops, firepower is adjusted to maintain alignment with manoeuvre, ensuring that effects are applied where they will have the greatest operational impact.

Temporal Integration

6.153 Temporal integration aligns firepower with the timing of manoeuvre and operational events. Fires are planned against phases of the operation (such as shaping, assault and exploitation), key events (such as breach, assault or commitment of reserves) and Time windows for firepower concentration.

6.154 When planning fires for manoeuvre and operational events fires must precede manoeuvre to shape conditions and must coincide with manoeuvre during decisive action. Fires must then follow manoeuvre to disrupt the enemy's response. Temporal integration enables the concentration of effects without physical massing and the ability to transition quickly between targets this enables fires to provide continuous pressure on the enemy's systems.

Spatial Integration

6.155 Spatial integration aligns firepower with geographic areas of operation. Fires are planned against manoeuvre areas, engagement areas, depth and rear areas as well as routes and axes of advance. Spatial considerations include range and coverage of firepower systems, positioning of firing units and the coordination with boundaries and control measures.

6.156 Spatial integration ensures critical areas are covered, gaps or overlap are avoided and effective fires support is provided to manoeuvre forces across the battlespace.

Combining Temporal and Spatial Integration

6.157 Effective fire planning requires the integration of both time and space. This is achieved through phase-based fire plans linked to geographic objectives, Firepower execution matrices and dynamic adjustment based on operational developments.

Dynamic Adjustment

6.158 Temporal and spatial integration enable dynamic adjustment by ensuring that feedback, decision-making, and firepower are aligned in time and space to rapidly refine engagements before the target can react. Dynamic adjustment relies on timely feedback (usually through BDA), available decision windows and firepower positioned to respond. Temporal integration governs when adjustments can occur and spatial integration governs whether adjustments can be executed.

6.159 Temporal integration ensures that adjustments occur within the engagement window, before the target changes or escapes as follows:

a. The ability to conduct BDA quickly enables immediate re-engagement. A UAV observes effects within minutes of the strike enabling the fires cell to process an assessment immediately. Follow-on fires can then be executed without delay. This maintains pressure on the target and prevents its recovery or displacement.

b. Pre-planned decision points such as re-engagement criteria which were established in advance and authority delegated to the fires cell reduces the delay between assessment and adjustment.

c. Continuous engagement windows where fires are sequenced to allow the initial strike, followed by the assessment and then followed by the follow-on strike. This enables multiple engagements within a single target window.

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d. Adjustments occur faster than the adversary can react preventing it from regrouping or repositioning.

6.160 Spatial integration ensures that the system is physically able to adjust fires as follows:

a. Persistent ISR coverage is achieved by the UAV remaining on station over the target area. Continuous observation enables corrections to be made enabling adjustments to be informed and accurate.

b. Multiple firing units are positioned to cover the same area, and to provide depth and redundancy. This allows rapid re-engagement without repositioning delays.

c. Fires have already been planned against specific areas so that adjustments can be made without re-planning from scratch.

d. Battlespace deconfliction because airspace and fire zones have already been coordinated eliminating delays due to coordination conflicts during re-engagement.

6.161 When temporal and spatial integration are aligned BDA is received quickly, decisions are made immediately, fires are adjusted without delay and targets are engaged repeatedly until neutralised. If poorly integrated BDA arrives too late, shooters are not in position, airspace conflicts delay re-engagement and the target relocates or recovers. This results the adjustment failing or becoming irrelevant.

6.162 Temporal and spatial integration enable dynamic adjustment by ensuring that feedback, decision-making, and firepower are aligned in time and space to rapidly refine engagements before the target can react.

Section 6-6. Integration with Cyber, EW and Information Operations

6.163 The OPA uses EW, cyber operations and information operations to enable, shape, and reinforce firepower effects within the operational system. These capabilities do not support activities in isolation; but are integrated with fire planning to influence how the enemy senses, decides, and acts.

6.164 Non-kinetic effects are used to create conditions in which firepower can be applied more rapidly, accurately, and effectively, and in some cases to achieve effects without the need for physical destruction. Their employment is closely aligned with targeting, manoeuvre, and the sequencing of firepower.

Role of Non-Kinetic Effects in Fire Planning

6.165 Non-kinetic capabilities contribute to fire planning in four ways:

a. Enabling detection using EW and cyber provide access to enemy emissions, networks, and systems

b. Shaping conditions for engagement by disrupting sensors, communications and decision-making

c. Enhancing effects by amplifying or reinforcing kinetic outcomes

d. Reducing reliance on destruction by achieving functional or systemic effects without physical attrition.

6.166 These capabilities are integrated into fire planning from the outset and are sequenced alongside kinetic fires to achieve system-level disruption.

EW in Fire Planning and Execution

6.167 EW is a primary enabler of targeting and engagement within the reconnaissance–strike system and supports fire planning through:

a. Detection and targeting by identifying adversary emitters (such as communications and radar), geolocating of targets for engagement and the cueing of ISR assets (such as UAVs).

b. Suppression and degradation through the disruption of communications and sensor systems, the reduction of enemy situational awareness and the degradation of the enemy's air defence effectiveness.

c. Deception and manipulation by generating false emissions, masking of friendly movement and firepower and inducing incorrect adversary responses.

6.168 EW is typically employed early in the engagement sequence to enable detection and create favourable conditions for firepower delivery.

Cyber Operations in Fire Planning and Execution

6.169 Cyber operations are employed to disrupt, degrade, or manipulate enemy systems at a systemic level. Key contributions include:

a. Command and control disruption by delaying or corrupting orders and isolating subordinate units from higher headquarters.

b. ISR degradation through the denial or manipulation of sensor data and the disruption of data transmission networks.

c. Enabling precision engagement through the creation of windows of vulnerability and fixing targets in place through disruption rather than physical means.

6.170 Cyber effects are often non-visible and may have a delayed impact but they can significantly influence the timing and effectiveness of firepower employment.

Information Operations and Psychological Effects

6.171 Information operations (IO) are employed to influence adversary perception, decision-making, and cohesion. Within fire planning, IO contributes through:

a. Psychological firepower by inducing confusion, hesitation, and loss of confidence, and disrupting decision-making processes.

b. Perception management by misleading adversary assessments of friendly intent and capability, and creating uncertainty regarding the situation.

c. Reinforcing Physical Effects by amplifying the perceived impact of fires and exploiting disruption to degrade morale and cohesion.

6.172 IO is most effective when synchronised with kinetic and non-kinetic actions, reinforcing their impact at the cognitive level.

Sequencing and Integration of Effects

6.173 The OPA employs non-kinetic and kinetic capabilities in a coordinated sequence to achieve cumulative effects. A typical sequence is conducted as follows:

a. EW detection and suppression

b. Cyber disruption of command and control

c. Information operations to influence perception

d. Kinetic firepower engagement

e. Information exploitation of effects

6.174 This sequencing enables the progressive disruption of the enemy system, aligning effects across physical, functional, and cognitive domains.

6.175 Non-kinetic and kinetic effects combine to achieve system-level outcomes as follows:

a. EW degrades sensing

b. Cyber disrupts decision-making

c. IO influences perception and cohesion

d. Firepower disrupts physical capability

6.176 Together, these effects dislocate the adversary system, isolate objectives from support and control enabling defeat in detail.

6.177 For fire planning to be effective at the CA-Bde level integration requires EW tasking to be aligned with ISR and targeting priorities. Cyber effects need to be synchronised with firepower delivery whilst IO needs to be aligned with manoeuvre phases and firepower effects. To be effective fires cells need to be aware of non-kinetic capabilities and limitations. Failure to integrate these capabilities results in reduced effectiveness, increased engagement timelines, and missed opportunities.

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6.178 EW, cyber, and information operations are integral to OPA fire planning. Their effective integration enables faster targeting, improved effects, and greater disruption of the adversary system, ensuring that firepower contributes decisively to operational success.

6.179 The following table provides a practical framework for integrating kinetic and non-kinetic effects into fire planning, showing how each OPA firepower method is reinforced by EW, cyber, and IO. Its purpose is to move fire planning beyond a platform or munition-centric approach and instead support effects-based planning within the operational system.

Table 6.3 – Integration of Kinetic and Non-kinetic Effects in Fire Planning

Firepower method	Kinetic role	EW contribution	Cyber contribution	IO contribution	Resulting effect
Precision	Strike C2 nodes, key systems	Locate emitters; refine targeting	Disrupt C2 networks; delay decisions	Create Uncertainty about leadership survival	Functional disruption of critical nodes
Suppression	Neutralise sensors, AD, frontline forces	Jam radar and Communications	Degrade ISR Feeds	Reinforce perception of being overwhelmed	Reduced effectiveness of enemy systems
Saturation	Overwhelm positions and force dispersion	Mask friendly fires; confuse detection	Disrupt coordination of response	Amplify shock and confusion	Fragmentation and loss of cohesion
Blockade	Interdict routes and movement	Detect movement via emissions	Disrupt movement coordination	Create perception of encirclement	Isolation in time and space
Psychological	Limited or supporting role	Create uncertainty through emissions	Disrupt Decision making systems	Directly target morale and cognition	Paralysis of Decision making and cohesion

6.180 The table delivers three critical layers of information:

a. The functional role of each firepower type defining what each type is intended to achieve (such as disruption, suppression or isolation) and anchors planning in effects rather than delivery systems.

b. The contribution of non-kinetic capabilities where the table shows how EW enables detection, suppression or deception, cyber disrupts systems and decision-making and IO influences perception and cohesion. This demonstrates that firepower effects are not generated by kinetic means alone, but through combined system actions.

c. The table links combined actions to outcomes such as functional disruption, fragmentation, Isolation in time and space, and cognitive degradation. This reinforces that the objective is to affect the adversary system, not just destroy targets.

6.181 The table helps planners think in terms of desired outcome (such as isolate or dislocate) and an appropriate combination of effects rather than defaulting to platform or munition selection. Without a framework, EW, cyber, and IO are often an afterthought, poorly synchronised and underutilised. The table ensures these capabilities are considered early in the planning process and sequenced deliberately.

6.182 By linking capabilities to firepower types, the table helps planners sequence EW, cyber, IO and fires as well as align them with manoeuvre phases to apply effects in the correct order. The table reflects the OPA approach of targeting systems, not just units and achieving cumulative effects across domains. It shows how physical, functional, and cognitive effects combine to achieve dislocation and isolation. achieved

6.183 By understanding how different effects interact, planners can select the most effective combination quickly, adjust fires based on BDA and system response to exploit emerging opportunities. It reinforces that the employment of OPA firepower is system-based, effects-driven and multi-domain.

A Vignette - EW–Cyber–Fires Sequencing in Practice at the CA-Bde Level

Situation

6.184 A mechanised CA-Bde is conducting offensive operations against a defending enemy battalion. Intelligence indicates that the enemy battalion command post is controlling defensive fires and coordinating reserve movement from a depth location. The fires cell identifies this command node as a high-payoff target critical to disrupting the enemy system.

Execution

6.185 H–10 to H–5: Detection and Preparation. CA-Bde EW element detects increased radio and data transmissions consistent with command activity. The location is refined and passed to the fires cell and a UAV is cross-cued to confirm the target. Simultaneously cyber effects are initiated against the adversary communications network and IO prepare messaging to exploit disruption.

6.186 H–5 to H–2: Disruption and Isolation. Cyber effects degrade the enemy's command network functionality, delaying orders and disrupting coordination. EW suppresses communications and radar emissions in the target area. UAV confirms the presence of command vehicles and communications equipment. The enemy command node is functioning at reduced effectiveness and is increasingly isolated from subordinate units.

6.187 H–2 to H: Engagement. The fires cell authorises engagement under pre-delegated authority. Precision fires are delivered against the enemy command node. Simultaneously, EW continues suppression to prevent warning or displacement. The enemy command node is struck while already degraded and unable to respond effectively.

6.188 H to H+5: Exploitation and Assessment. UAV conducts immediate BDA, confirming significant disruption and partial destruction of the enemy CP. IO amplify the effect by reinforcing perceptions of command failure. Follow-on fires are prepared if required. Enemy subordinate units experience confusion, delayed orders, and reduced coordination.

Outcome

6.189 The enemy command node is not only physically degraded but also functionally and cognitively disrupted. Enemy defensive fires become uncoordinated, and enemy reserve movement is delayed. This enables the CA-Bde manoeuvre elements to advance against a fragmented and dislocated defence.

6.190 Key observations are as follows:

a. EW and cyber degraded the target before kinetic engagement began.

b. Cross-cueing enabled rapid confirmation and engagement.

c. The target was less capable of reacting or relocating.

d. Disruption of command had wider operational effects.

6.191 The integration of EW, cyber, and information operations with firepower enables the OPA to disrupt, isolate, and degrade adversary systems prior to engagement, increasing the effectiveness and impact of fires.

Section 6-7. Fire Support Coordination

6.192 In OPA doctrine spatial control zones divide the battlespace into functional areas so commanders can assign responsibility, prioritise ISR, allocate fires, and manage manoeuvre. These zones are not merely geographic. They are command-and-control frameworks that determine who owns targets, who can engage them, and what effects are sought. They are used in both offensive and defensive operations.

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Offensive Spatial Control Zones

6.193 In offensive operations the OPA organises the battlespace into the following spatial control zones:

a. Deep area

b. Frontline zone

c. Reserve zone

d. Garrison/rear zone.

Deep Area

6.194 1. The deep zone lies beyond the immediate battle area, generally extending to enemy operational reserves, logistics hubs, artillery groupings, air defence sites, command nodes, bridges, choke points, and reinforcement routes. The deep area is used to shape the battle before contact, delay or isolate enemy reinforcements, break the enemy's system cohesion and conduct counter-battery and strategic interdiction

6.195 Typical targets engaged in the deep area include:

a. Brigade/division HQs

b. Long-range artillery and rockets

c. Fuel/ammunition depots

d. Bridges and crossings

e. EW nodes

f. Air defence radars.

6.196 The assets used include 300 mm MRL units, 155 mm SPH, UAV strike assets, loitering munitions, EW/cyber-attack as well as air and missile strikes. Group Army FA Brigade artillery groups mainly prosecute deep-zone targets. CA-Bdes usually have limited authority to engage here unless specific target-release authority is delegated.

6.197 The deep area extends 15–100+ km beyond the FEBA depending on weapon range.

Frontline Zone

6.198 The frontline is the decisive zone where the assault force physically destroys or dislocates enemy combat formations. Operations in the frontline zone are used to support breakthrough, suppress defenders, enable assault manoeuvre and neutralise direct-fire systems.

6.199 Typical Targets include:

a. Defensive strongpoints

b. ATGM teams

c. Mortars

d. Infantry trenches

e. Tank hull-down positions

f. Obstacles.

6.200 The assets used include 122 mm SPH, 120 mm mortars, direct-fire armour, FPV drones and assault engineers. The frontline zone is the primary responsibility of the CA-Bde's organic FA battalion and battalion mortars. The MAG is heavily focused here because it is required to rapidly respond, displace frequently and maintain close support.

6.201 The frontline zone extends from the FEBA to 5–15 km beyond enemy forward lines.

Reserve Zone

6.202 The reserve zone contains friendly forces preparing for exploitation, reinforcement, or commitment. It also holds follow-on forces, protects uncommitted combat power and is used to prepare breakthrough exploitation. Units include the brigade reserve battalion, follow-on armour (if allocated), engineers awaiting commitment and additional artillery ammunition stocks

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6.203 The reserve zone ats as a buffer between combat and sustainment areas. Reserve CPs often operate here because they can assume control if forward CPs are disrupted and coordinate reserve commitment

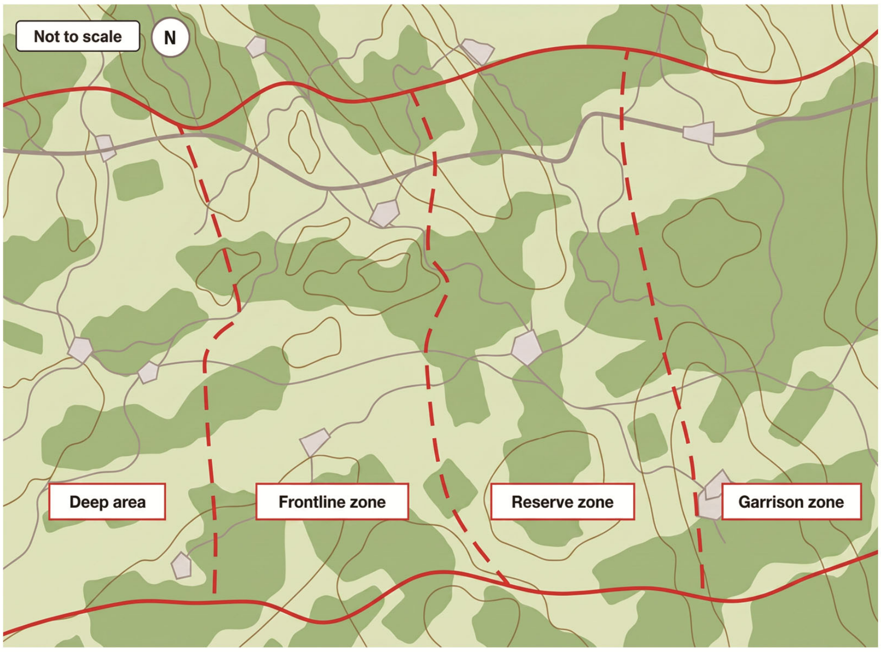
6.204 The reserve zone is typically 5–20 km behind assault forces.

Garrison Zone

6.205 The garrison zone sustains combat covering logistics, medical evacuation, repair and recovery, ammunition resupply and C2 redundancy. It includes, the brigade rear CP, ammunition transfer points, fuel points, maintenance nodes and medical facilities. The garrison zone is used to support sustained tempo and survivability. Counter-battery survivability often requires artillery logistic nodes to disperse throughout this zone.

6.206 The garrison zone extends 20–60 km behind the frontline.

Figure 6.1 – Offensive Spatial Control Zones



Functions of the Offensive Spatial Control Zones

6.207 Offensive spatial zones are used for five major functions:

a. Different artillery echelons may be allocated by zone. For example, the deep area is usually allocated to the FA Brigade AG and the frontline zone is usually allocated to the CA-Bde FA Battalion or the MAG.

b. Zones determine release authority. For example, deep strategic targets require Expeditionary HQ approval while tactical frontline targets only require CA-Bde approval. This supports centralised control with decentralised execution.

c. Different sensors watch different zones. For example, MALE UAVs cover the deep zone while the frontline zone by CH-802 and other tactical UAVs as well as scouts and FO teams.

d. CPs echelon spatially. For example, the advance CP is located in the frontline zone, the base CP near reserve zone, the rear CP in rear zone and the reserve CP is often located behind the rear CP.

e. The zones enable counter-strike protection. Enemy fires usually prioritise artillery and CPs. The use of zonal separation reduces catastrophic disruption.

Defensive Spatial Control Zones

6.208 Defensive spatial control zones are used to create depth, layered fires, and controlled attrition rather than a single linear defensive belt. Each zone has a distinct tactical purpose, designated target set, fire authority, and command responsibility. Together they allow the defender to detect, disrupt, canalise, destroy, and counterattack.

6.209 In defensive operations the OPA organises the battlespace into similar spatial control zones, typically:

a. Deep area

b. Frontal blocking zone

c. Frontal defence zone

d. Depth defence zone

e. Rear defence zone.

Deep Area

6.210 The deep area lies forward of the brigade's main defensive battle area and extends into enemy assembly and approach areas. The deep area is used to:

a. Detect enemy preparations early

b. Identify the enemy's main effort

c. Disrupt movement and deployment

d. Reduce enemy combat power before contact

e. Shape the timing and direction of enemy attack.

6.211 Rather than trying to destroy the enemy outright, the OPA uses this area to degrade the enemy system. Typical activities include UAV surveillance, EW collection, long-range artillery strikes, reconnaissance-strike operations, air and missile strikes and counter-battery detection.

6.212 Targets engaged are typically assembly areas, march columns and artillery positions. Targets also include bridging assets, logistics convoys, HQs and communications nodes and Fire Control CPs.

6.213 Engagements here are usually centrally controlled by the Group Army fire coordination centre and engaged by the FA Brigade artillery group. Weapon systems used include 155 mm SPH, 300 mm MRL, loitering munitions and long-range UAV strike systems.

Frontal Blocking Zone

6.214 The frontal blocking area lies between the deep area and the main defensive belt. This is essentially the delay and canalisation zone. It is used to slow enemy tempo, force route compression, channel enemy into engagement areas and separate lead echelons from follow-on forces.

6.215 This zone is critical because the OPA rarely wants the enemy to arrive at the main defensive belt in as an effective fighting force. Typical activities conducted include ambushes, obstacle emplacement, demolitions, harassment fires, reconnaissance by fire and the deployment of scatterable mines. Typical targets lead armour, breaching elements, engineers, route clearance vehicles and reconnaissance elements.

6.216 Fires conducted in the frontal blocking zone are often pre-planned with trigger lines and engagement criteria. Typical fire control measures include firepower blocking lines, no-fire lanes for friendly patrol withdrawal, obstacle engagement lines and the pre-registered artillery targets. Typically the OPA uses suppression and blockade fires to create psychological shock.

Frontier Defence Zone

6.217 The frontier defence zone is used to stop and destroy the enemy's main assault. The OPA focuses on halting enemy penetration, destroying enemy assault forces, denying terrain and inflicting decisive losses. This zone contains the highest density of direct fire systems, artillery targets, anti-armour kill zones and obstacles. Typically defensive layouts include observation posts, forward strongpoints, trench systems, bunkers, anti-tank positions and integrated obstacle belts

.

6.218 This zone has the most detailed fire planning. Fire missions are usually organized into final protective fires, anti-armour concentrations, mortar engagement areas direct-support artillery missions. Weapon systems used include 122 mm SPH, 120 mm mortars, ATGM teams, tanks in hull-down positions and FPV drones.

Depth Defence Zone

6.219 The depth defence zone lies behind the frontier defence zone and is the designated counterattack and recovery zone. The depth defence zone is used to absorb penetrations, prevent breakthrough exploitation, restore defensive integrity and launch counterattacks. While the OPA expects some enemy penetration, this zone ensures penetration does not become collapse.

6.220 Forces located in the depth defence zone include reserve forces, the MAG, the engineer reserve and mobile air defence assets. Fires conducted in this zone are highly responsive and dynamic focusing on sealing breaches, flank attacks, counterattack support and emergency blocking fires. Common fire missions include rapid suppression, precision strikes on breach forces, smoke for manoeuvre and emergency barrier fires.

6.221 Command authority for fires often becomes delegated to brigade level due to short timelines.

Rear Defence Zone

6.222 The rear defence zone contains critical sustainment and command infrastructure. It protects the brigade's ability to continue fighting. This zone sustains command, logistics, medical support, maintenance and communications. It includes the brigade rear CP, ammunition points and fuel points, repair nodes, medical facilities and reserve communications nodes.

6.223 The OPA regard rear areas are vulnerable to threats such as special forces raids, UAV strikes, long-range precision fires, cyber/EW disruption and loitering munitions. Fires conducted in the rear defence zone are mainly protective including counter-UAV, local air defence, counter-battery, protective smoke and emergency security fires.

6.224 The OPA uses defensive spatial control zones as a layered kill system as follows:

a. The deep area is used to find enemy forces and weaken them

b. The frontal blocking area is used to slow and channel them

c. The frontier defence zone is used to stop and destroy them

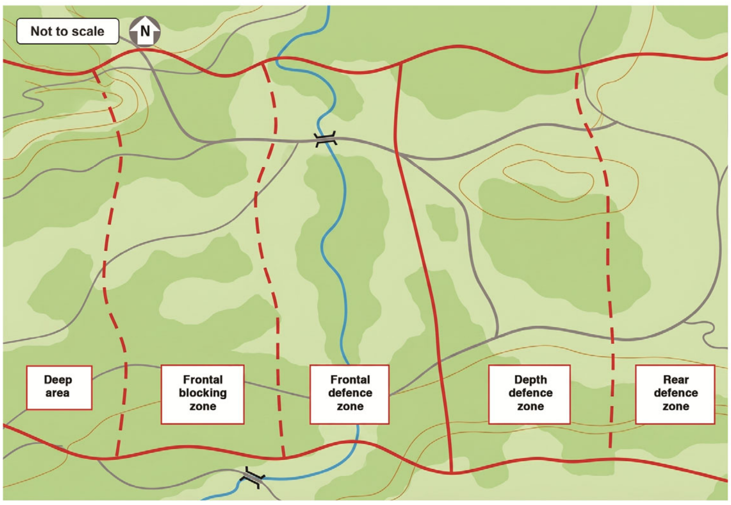
d. The depth defence zone is used for counterattack and to seal breaches

e. The rear defence zone is used to sustain the defence.

6.225 This layered construct strongly supports the OPA's preference for active defence, allowing the enemy to advance only into increasingly lethal and controlled engagement areas.

6.226 The following diagram displays spatial control zones for defensive operations.

Figure 6.2 – Defensive Spatial Control Zones



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How the Zones Work Together

6.227 These spatial control zones define the structure of the battlespace, assign responsibility to echelons and prioritise operational tasks. However, spatial zones do not in themselves deconflict fires. Fire support coordination is achieved through a superimposed system of fire coordination measures including firepower coordination boundaries, mission-based fire zones, firepower strike areas, command authority and temporal sequencing.

Fire Coordination Measures

6.228 Fire coordination measures (FCMs) are tools that enable the firepower coordination system to synchronise fires with manoeuvre while preventing fratricide, unnecessary duplication, and interference between subordinate formations. The OPA tends to use a combination of geographic control measures and command authority measures rather than relying solely on Western-style FSCMs.

Firepower Coordination Boundary (FCB)

6.229 FCBs separates areas of primary responsibility between adjacent formations or between echelons. They help determine which headquarters has engagement authority, which fires assets are normally responsible for targets and which ISR assets have priority within an area.

6.230 FCBs have the following characteristics:

a. They are normally terrain-based.

b. They may follow roads, rivers, ridgelines or grid lines.

c. They can be adjusted as the battle progresses.

d. They do not prohibit engagement.

e. They define responsibility rather than restriction.

6.231 The purpose of FCBs is not to stop engagements but to avoid two headquarters attacking the same target.

Mission-Based Fire Zone (MFZ)

6.232 MFZs are established to support a specific operation, task, or phase of the battle. Unlike an FSA, which is location-driven, an MFZ is mission-driven. Examples include support of a river crossing, support of an assault, support to a brigade advance, support of a withdrawal or support of counterattack operations.

6.233 MFZs have the following characteristics:

a. They exist for a defined period.

b. They are tied to a manoeuvre task.

c. They usually include designated firing assets.

d. They often includes priority ISR coverage.

6.234 An example for the seizure of an objective, MFZ RAVEN is created:

a. It is active from H-2 to H+6.

b. Its purpose is to support the brigade assault group.

c. It is assigned a 122 mm battalion, a 155 mm battery, the Brigade UAV company.

6.235 Once the assault is complete the MFZ is cancelled.

Firepower Strike Area (FSA)

6.236 FSAs are designated areas where pre-planned firepower effects are expected. These areas are usually established along likely enemy avenue and around defensive positions, logistics nodes, assembly areas and artillery firing areas.

6.237 FSAs have the following characteristics:

6.238 Thy are target-focused.

6.239 They contain pre-approved engagement procedures.

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6.240 They often have ISR coverage assigned.

6.241 They can be linked to specific effects.

6.242 For example, a brigade establishes FSA ALPHA at a major junction north of an urban area:

a. It is covered by a CH-802 UAV.

b. A 122 mm SPH battalion is responsible for suppression.

c. A 155 mm SPH battery is responsible for destruction.

d. A 300 mm MRL detachment is also available but its use is required by higher authority.

6.243 Any enemy detected inside the area can be rapidly engaged.

Restricted Fire Area (RFA)

6.244 RFAs are areas where fires may only occur under specified conditions. The intent is not to prohibit fire but to impose additional controls. Typical reasons include friendly troops nearby, UAV launch sites and air defence positions. They also include logistics areas, EW sites and sensitive infrastructure.

6.245 Engagements require:

a. Additional coordination.

b. Confirmation of friendly locations.

c. Specific approval authority.

6.246 For example, an RFA is established around an advancing battalion. Fires may occur only if:

a. The battalion commander confirms location

b. The Firepower Command and Coordination Centre approves.

c. The appropriate observer maintains visual target custody.

No-Fire Area (NFA)

6.247 NFAs prohibit engagement unless specifically authorised. Typical locations include:

a. Friendly force locations

b. Medical facilities

c. Prisoner holding areas

d. Cultural sites

e. Civilian concentration areas

f. Protected infrastructure.

6.248 No fires are conducted unless self-defence requirements exist or higher headquarters authorises engagement.

6.249 For example, an aid station established near the MSR is designated an NFA. No artillery engagement is permitted within the area without brigade commander approval.

Airspace Coordination Area (ACA)

6.250 Although primarily an airspace measure, ACAs are used to integrate air-ground fire coordination. They are used to separate:

a. UAV operations.

b. Artillery trajectories.

c. Loitering munitions.

d. Helicopters.

e. Fixed-wing aircraft.

6.251 For example, an ASN-209 is operating between 2,000 and 4,000 metres. A temporary ACA is established. Rocket artillery missions passing through that altitude block require coordination.

Target Engagement Zone (TEZ)

6.252 TEZs are target-focused engagement zones within its reconnaissance-strike system. A TEZ links sensors, decision authorities and firepower assets. they are designed to accelerate the kill chain.

6.253 For example, a counter-battery TEZ may contain:

a. Sensors including an SLC-2 radar and an ASN-209 UAV.

b. Weapons include a 155 mm SPH battery and a 300 mm MRL battery.

c. Authority is exercised by the FA Bde Firepower Command and Coordination Centre.

6.254 Enemy artillery entering the zone becomes a high-priority target set.

A vignette – How These Measures Work Together

6.255 A mechanised CA-Bde is advancing along a single axis to conduct an assault on a battalion-sized objective supported by artillery, mortars, WLR, UAVs and a LEWT. The CA-bde has its organic FA battalion and additional support provided by a 155mm SPH battery, a 300mm MRL battery, an SLC-2 WLR and a UAV detachment.

6.256 FCMs are applied as follows:

a. Brigade Deep Area

(1) An FCB is established at 15 km.

(2) A counter-battery TEZ is established to cover the enemy artillery belt.

(3) An ASN-209 is operating overhead.

(4) The 300 mm MRL battery is on call.

b. Brigade Close Area

(1) Multiple FSAs are established along the road network.

(2) CH-802 UAVs are maintaining surveillance.

(3) The organic 122 mm SPH battalion is supporting manoeuvre.

c. Assault Area

(1) An MFZ is established for seizure of key terrain.

(2) An RFA surrounding forward battalions is established.

(3) An ACA controlling UAV and artillery airspace is established.

(4) In protected areas, NFAs around medical, logistics and command locations.

Relationship to Friendly Troop Safety

6.257 The measures most relevant to troop safety are as follows:

6.258 RFAs control fires near friendly troops.

6.259 MFZs define who supports whom during close combat.

6.260 NFAs protect friendly and protected locations.

6.261 ACAs prevent conflicts between UAVs and fires.

6.262 Together these measures allow the OPA firepower coordination system to deliver fires as close as possible to friendly forces while maintaining positive control of engagement authority and minimising fratricide risk.

Temporal Control

6.263 Temporal control operates across all zones simultaneously. It sequences fires by phase, prevents interference between systems and enables depth-to-close synchronisation. For example, the Deep Area is engaged during the shaping phase, the Frontline Zone is engaged during the assault and the Reserve Zone is engaged during exploitation.

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Command Authority

6.264 Command authority applies across all zones and may override spatial responsibility. A target located within a given zone may still require higher-echelon approval and may be reassigned based on priority or sensitivity.

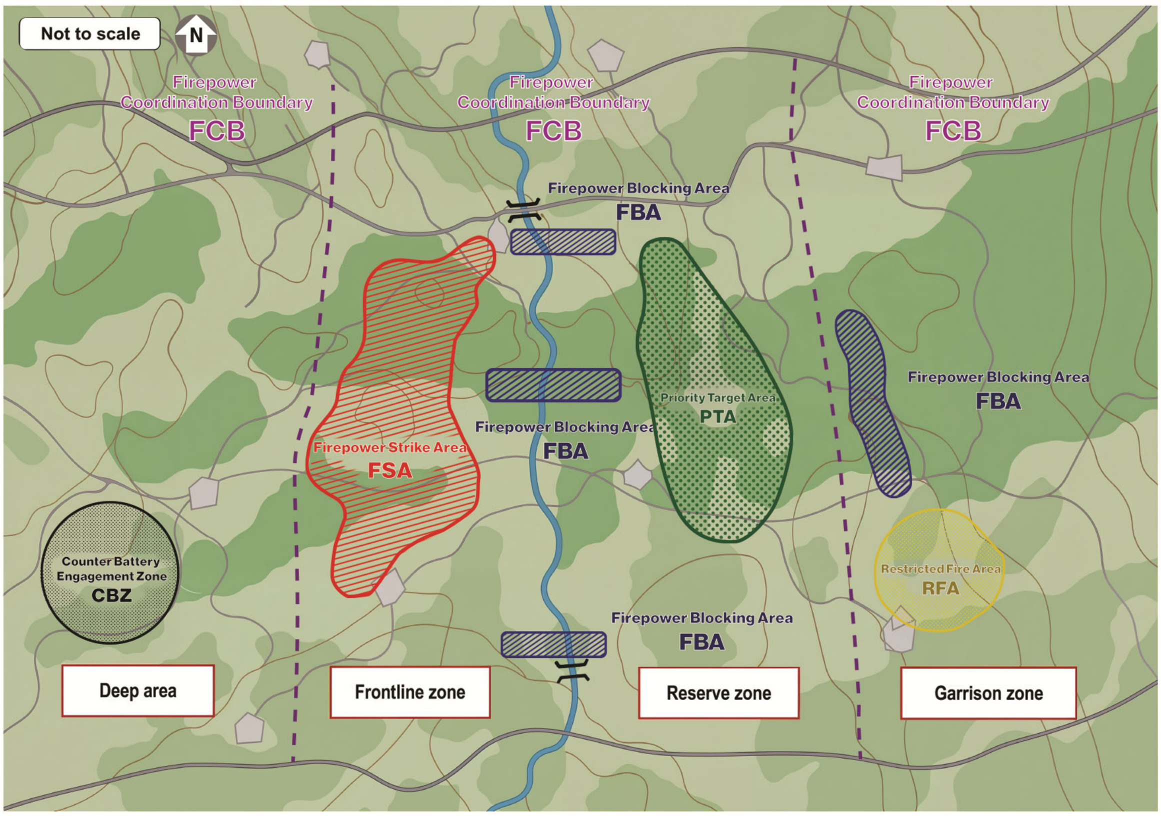
Functional Relationship

6.265 The following table summarises the relationship between spatial zones and fire coordination measures.

Table 6.4 – Spatial Zones and Fire Coordination Measures

Element	Function	Role in Fire Control	Relationship to Zones
Spatial Zones	Battlespace organisation	Assign responsibility	Foundation layer
Echelon Responsibility	Ownership of fight	Determines who engages	Derived from zones
Firepower Coordination Boundary	Engagement separation	Prevents duplication	Aligned with zone transitions
Mission-Based Fire Zones	Unit tasking	Assigns execution responsibility	Nested within zones
Firepower Strike Areas	Engagement enablement	Enables dynamic targeting	Crosses zones
Restricted Areas	Protection	Limits engagement	Overlays all zones
Temporal Control	Synchronisation	De-conflicts in time	Crosses all zones
Command Authority	Decision control	Approves engagement	Overrides zones

Figure 6.3 Fire Control Measures



6.266 In practice, fire support coordination follows a structured sequence as follows:

a. Spatial Zone identifies ownership to determine which echelon is responsible for the target.

b. FCMs refine control where boundaries, mission zones, and strike areas determine who engages the target and which unit executes the fire mission.

c. Authority and time enable execution where command authority and temporal sequencing determine when fires occur and whether engagement is authorised.

d. The system enables dynamic adjustment where ISR and C2 systems update target information and reassign fires as required.

6.267 This approach enables simultaneous engagement across depth, dynamic targeting across zone boundaries and the flexible allocation of firepower. It requires clear authority relationships, robust command and control systems and continuous situational awareness. The integration of spatial zones and fire coordination measures allows the OPA to control fires across the battlespace without reliance on fixed geometric FSCMs, achieving deconfliction through responsibility, authority, and time.

De-confliction and Airspace Coordination

6.268 OPA fire deconfliction is best understood as a layered control system rather than a single mechanism. It combines authority, echelon responsibilities, timing, and system-enabled coordination to prevent fratricide, duplication and interference across domains. OPA deconfliction answers three control questions:

a. Who has authority to engage?

b. Which echelon is responsible for the target?

c. When can engagement occur?

6.269 This replaces the Western reliance on “Where can I shoot?” (Geometry/FSCMs).

Layered Deconfliction Framework

6.270 The Olvanan deconfliction framework consists of seven layers as follows:

a. Layer 1: Echelon-Based Responsibility. This is the primary mechanism. Deconfliction begins with division of the battlespace by echelon:

   (1) Group Army – deep fires (operational depth) and HVTs (C2, ISR and logistics)

   (2) CA-Bde – the close battle and immediate manoeuvre support

   (3) Battalions – local, immediate fires.

   (4) The key mechanisms used include firepower Coordination Boundaries and mission zones. This prevents duplicate targeting and competing fire missions. It enables simultaneous depth engagement

   (5) This is the OPA equivalent of FSCL/CFL—but enforced by responsibility, not permission.

b. Layer 2: Command Authority and Fire Release. Even within a zone, fires are controlled through authority gating. This is the mechanism used by the OPA to regulate the release of firepower across spatial zones.

   (1) It ensures that engagement decisions are aligned with command intent, prioritisation and operational phase rather than solely with target location. For example, a unit may detect a target, may range the target but cannot engage without release authority.

   (2) It prevents multiple units engaging same target, uncoordinated fires across boundaries and the premature engagement of high-value targets.

c. Layer 3: Temporal Deconfliction. This is a critical mechanism) that deconflicts OPA fires through time sequencing. For example:

   (1) H-10 to H-5 EW suppression only

   (2) H-5 to H-0 Rocket isolation fires

(3) H-0 to H+15 Tube artillery fires

(4) H+15 onward Dynamic targeting

(5) This prevents airspace conflicts (UAV vs artillery trajectories), EW interference with sensors and overlapping fires.

(6) Time replaces space as the primary control variable.

d. Layer 4: Targeting Process. Deconfliction is embedded in the targeting cycle:

(1) Decide – the target nominated and ownership assigned (GA versus CA-Bde).

(2) Detect – ISR confirms the target and avoids duplicate detection chains.

(3) Deliver – a single shooter is assigned while other shooters are suppressed or held back.

(4) Assess – BDA determines re-engagement. BDA is a major deconfliction trigger by preventing the re-engagement of destroyed targets and also enables the reallocation of fires.

e. Layer 5: System-Based (Digital) Deconfliction. The OPA relies heavily on networked C2 systems to Share the target picture, integrate sensor-to-shooter and allocate real-time missions. This achieved through:

(1) Sensor cueing (EW – UAV – artillery)

(2) Digital fire mission distribution

(3) Automated prioritisation.

(4) This reduces latency and conflicting engagements, and enables dynamic reassignment.

f. Layer 6: Airspace and Trajectory Deconfliction. The OPA deconflicts airspace implicitly through:

(1) Altitude Separation using UAV operating layers and rocket/artillery trajectories.

(2) Time Separation where ISR UAVs are employed before fires and fires executed after UAV clearance has been given.

(3) Control by Phase using ISR-heavy phases versus fires-heavy phases. Unlike Western ACAs/ROZs, this is rarely formalised graphically.

g. Layer 7: Restricted and Protected Areas The OPA uses command-directed restrictions:

(1) No-fire areas and restricted areas

(2) These are used to protect friendly forces, key infrastructure and political objectives

(3) This prevents fratricide and reduces strategic and political risk.

Comparison with Western Deconfliction

6.271 The following table shows a comparison between OPA and western deconfliction methods.

Table 6.5 – OPA versus Western Deconfliction Methods

Function	Western Method	OPA Method
Spatial separation	FSCMs	Boundaries (responsibility)
Clearance of fires	Within FSCMs	Authority-based
Airspace control	ACA/ROZ	Time + altitude + phase
Target ownership	HPTL / TSM	Assigned by echelon
Dynamic targeting	Within FSCMs	System-driven

Strengths and Vulnerabilities

6.272 The OPA method of deconfliction is highly flexible, enables rapid dynamic targeting and is integrated with ISR. It also enables mass fires from dispersion.

6.273 However it highly dependent on communications and network integrity. It also runs the risk of over-centralisation and delays in authority release. It is also less intuitive without shared COP.

Deconfliction without FSCMs

6.274 OPA fires deconfliction is achieved through a layered system combining echelon-based responsibility, command authority, temporal sequencing and network-enabled targeting processes. Rather than relying on geometric control measures, the OPA integrates deconfliction within its reconnaissance–strike system, enabling dynamic, system-driven coordination of fires across the battlespace.

6.275 A CA-Bde fires cell SOP covering deconfliction workflows and a sensor-to-shooter deconfliction timing diagram comparing UAV, WLR and EW paths is at Annex B.

Section 6-8. Communication and Digital Coordination Systems

6.276 In OPA fire planning, communications and digital coordination systems are not simply administrative support tools but they are integral to the organisation, control, and execution of firepower. Under informationised conditions, the effective employment of artillery depends on the rapid movement of targeting data, command decisions, fire missions, and assessment reports across an integrated command information system.

6.277 These systems connect reconnaissance, command, and firepower elements, enabling the OPA to shorten planning cycles, synchronise fires with manoeuvre, and adjust firepower in response to changing battlefield conditions. They enable the OPA to compress sensor-to-shooter timelines, synchronise fires with manoeuvre and other operational systems, and maintain centralised control while permitting rapid, localised execution. As a result, fire planning is conducted as a continuous, data-driven process rather

Command Information Architecture

6.278 OPA fire planning is enabled by an integrated command information architecture that links reconnaissance, command, and firepower elements across echelons. This architecture operates as a networked system in which firepower coordination is nested within a broader command and control framework.

6.279 At a minimum, this architecture connects:

a. CA-Bde HQ (including the S2, S3 and fires cell)

b. FA battalion command post (including fire control and technical control elements)

c. Reconnaissance elements (including UAV platoons, WLR detachments and EW elements)

d. Higher firepower headquarters (Group Army FA Brigade)

e. Adjacent and supporting units.

6.280 The system supports a shared operational picture (COP) that integrates target data, friendly force disposition, control measures, and fire mission status. Fire planning is therefore conducted within a common data environment rather than through sequential voice-based coordination.

Information Flows for Fire Planning

6.281 Effective fire planning depends on the rapid and accurate movement of specific categories of information.

6.282 The following table identifies these core data flows.

Table 6.6 – Core Data Flows

Information Category	Purpose in Fire Planning
Target nominations	Initiate targeting process
Target location and classification	Enable weapon–target pairing
Target priority and timing	Support synchronisation
Friendly force locations	Enable deconfliction
Fire support coordination measures (FSCMs)	Control and restrict fires
Firepower allocation decisions	Assign shooters and munitions
Weapon release authority	Control engagement execution
Fire mission orders	Direct execution
Execution reports	Confirm delivery
Execution reports	Confirm delivery

6.283 These information flows are continuous and iterative. Planning, execution, and assessment are linked through the same network, enabling rapid transition between deliberate and dynamic targeting.

Digital Support to Deliberate Fire Planning

6.284 During planning phases, digital systems support the development and refinement of fire plans by enabling:

a. Rapid compilation and update of target lists

b. Target–weapon pairing based on range, effects and availability

c. Synchronisation of fires with manoeuvre phases

d. Allocation of firepower across artillery groups and mobile artillery groups

e. Integration of fire coordination measures and spatial control measures

f. Ammunition planning and sustainment forecasting.

6.285 Digital systems allow planners to visualise fire plans spatially and temporally, reducing planning friction and enabling iterative refinement. Fire plans are therefore continuously updated rather than fixed at a single decision point.

Digital Support to Dynamic Adjustment

6.286 During execution, digital coordination systems enable dynamic adjustment of fires in response to changing battlefield conditions. This includes:

a. Sensor-to-sensor cueing (e.g. EW – UAV – artillery)

b. Real-time target updates and refinement

c. Rapid reallocation of firepower between targets

d. Adjustment of fire timing and sequencing

e. Dissemination of updated FSCMs and restrictions

f. Immediate integration of BDA into re-engagement decisions.

6.287 Dynamic adjustment does not replace deliberate planning; it modifies it. The digital network enables pre-planned fires to be adapted without requiring full re-planning cycles.

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Authority and Control in Networked Fires

6.288 Digital systems accelerate coordination but do not remove command authority. Fire planning and execution remain governed by clearly defined authority structures. Within the network, digital systems support:

a. Transmission of target nominations to higher headquarters

b. Validation and prioritisation of targets

c. Allocation of firepower by authorised commanders

d. Dissemination of weapon release authority

e. Enforcement of restrictions and control measures.

6.289 Authority is embedded within the system. The network enables rapid transmission of decisions but does not decentralise control beyond authorised limits. Sensitive or HVTs may still require higher-level approval, while routine engagements may be executed at lower echelons.

Degradation and Contested Environment Considerations

6.290 OPA fire planning assumes that operations will be conducted in a contested electromagnetic and cyber environment. Communications and digital coordination systems are therefore vulnerable to:

a. Electronic warfare (jamming, interception, degradation)

b. Cyber disruption or intrusion

c. Bandwidth limitations and network congestion

d. Data latency and loss of synchronisation

e. Over-reliance on centralised network nodes.

6.291 To mitigate these risks, the OPA employs:

a. Redundant communications pathways consisting of multiple, independent communication routes across different transmission mediums, networks, and procedures. These are used to ensure continuity of command, control, and fire coordination when primary systems are degraded, disrupted, or denied

b. Multiple sensor inputs and cross-cueing

c. Pre-planned fires and triggers

d. Mission-type orders for firepower execution

e. Emission control and signature management

f. Reversion to simplified or analogue control methods,

6.292 Fire planning must therefore account for both network-enabled operations and degraded conditions.

CA-Bde-Level Implications

6.293 At CA-Bde level, communications and digital coordination systems have the following implications for fire planning:

a. The fires cell operates as a continuous coordination node rather than a periodic planning function.

b. FA battalion command posts must remain digitally integrated with brigade-level planning and targeting.

c. Sensor integration (including UAV, WLR and EW elements) is essential to maintaining an accurate targeting picture.

d. Fire planning becomes a continuous update cycle rather than a fixed plan.

e. Deconfliction depends on real-time sharing of location, timing, and authority data.

f. Survivability requires balancing connectivity with emission control and dispersion.

6.294 Consequently, the effectiveness of CA-Bde fire planning is directly linked to the integrity, speed, and resilience of its communications and digital coordination systems.

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A Vignette - CA-Bde Fire Planning under Network Degradation

Situation

6.295 A mechanised CA-Bde is conducting offensive operations against an enemy defending force. The brigade fires cell has developed a deliberate fire plan synchronised with manoeuvre elements. Digital command information systems are fully operational at H-2.

Execution

6.296 Phase 1: Network-Enabled Fire Planning (H-2 to H-0). A target list is developed and distributed digitally. A highly synchronised, digitally coordinated fire plan established Firepower is allocated across FA battalion (constituent fires), reinforcing Group Army rocket battalion (supporting fires). Fire coordination measures and firepower strike areas are disseminated via COP. Fire missions are preloaded into artillery systems.

6.297 Phase 2: Initial Execution (H to H+10). Rapid dynamic adjustment is enabled by networked coordination. A UAV detects movement in the enemy reserve zone and target data is transmitted digitally to the fires cell. The fires cell reallocates rocket fires onto new target and the fire mission orders are issued digitally to firing units.

6.298 Phase 3: Network Degradation (H+10 to H+20). Enemy EW disrupts the brigade digital network resulting in COP updates becoming delayed and incomplete. Data transmission between the UAV and the fires cell which confirms receipt and executes the fire orders. Tempo maintained despite the loss of the primary digital pathway.

6.299 Phase 4: Severe Degradation (H+20 to H+35). Radio communications is intermittently jammed and the fires cell cannot reliably transmit new fire missions. The brigade transitions to contingency measures and a pre-planned trigger is activated when the engage enemy reserve enters engagement area. The FA battalion executes pre-planned fires without further coordination and the rocket battalion executes a time-on-target mission as scheduled. The fire plan continues based on prearranged conditions.

6.300 Phase 5: Localised Execution (H+35 to H+60). The CA-Bde HQ is temporarily unable to communicate with forward units. The brigade transitions to emergency execution protocols. The FA battalion commander executes fires based on the Commander's intent and pre-established priorities. A UAV later re-establishes intermittent communications and provides BDA. Fires remain responsive despite temporary loss of central coordination.

Key Observations

6.301 Key observations are as follows:

a. Redundancy preserves the continuity of fires across all phases.

b. Digital systems enable speed but planning enables resilience.

c. Authority is progressively decentralised as connectivity degrades.

d. Pre-planned triggers are critical to maintaining tempo.

Section 6-9. Conclusion

6.302 OPA fire planning is a continuous, network-enabled function that integrates target development, firepower allocation, coordination, and execution into a single, iterative process. Enabled by integrated command information systems, fire planning compresses sensor-to-shooter timelines and allows fires to be synchronised with manoeuvre and other operational systems. Rather than a linear sequence, planning and execution occur concurrently, with fire plans continuously refined through dynamic adjustment based on real-time information.

6.303 The OPA balances centralised control with responsive execution by retaining authority over firepower allocation and weapon release while enabling subordinate units to act within defined parameters. This is achieved through digital coordination systems, clearly defined authority frameworks, and pre-planned fires, allowing rapid engagement without loss of control. At the same time, fire planning accounts for contested electromagnetic conditions through the deliberate use of redundant communication pathways, prearranged triggers, and mission-type execution methods to ensure continuity under degradation.

6.304 At the CA-Bde level, fire planning is a persistent coordination activity conducted by the fires cell, integrating sensors, command decisions, and firing units within a shared information environment. This enables the temporal concentration of dispersed firepower to generate effects at decisive points. Ultimately, the effectiveness of OPA fire planning depends on the ability to integrate information, exercise authority, and sustain tempo under conditions of uncertainty, making it a central component of operations in an informationised battlespace.

Annexes

Annex 6A Firepower Coordination Order (FCO) Template

Annex 6B Example Firepower Coordination Order (FCO)

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Annex 6A
Firepower Coordination Order (FCO) Template

Firepower Coordination Order (FCO)

Reference:

Operation:

Issuing Headquarters:

Date-Time Group:

Classification:

1. Situation

a. Enemy Forces

(1) Enemy Mission and Intent

(a) Summary of assessed enemy mission.

(b) Likely enemy objectives.

(c) Expected enemy reactions.

(2) Enemy Firepower Capabilities

(a) Artillery systems.

(b) Rocket artillery systems.

(c) Mortars.

(d) Counterbattery radars.

(e) UAV capabilities.

(3) High-Payoff Targets

Priority	Target Category	Remarks
1	Enemy artillery	
2	Command posts	
3	Air defence systems	
4	Reserves	
5	Logistics	

b. Friendly Forces

(1) Supported Formation. Formation supported by this order.

(2) Adjacent Formations. Relevant adjacent headquarters.

(3) Higher Headquarters Support.

(a) Supporting FA Brigade assets.

(b) Aviation support.

(c) Naval fire support.

(d) EW support.

(e) Cyber support.

c. Firepower Task Organisation

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Unit	Relationship	Primary task
CAB FA Battalion	Constituent	
155 mm Battery	Dedicated	
300 mm Rocket Battery	Supporting	
UAV Detachment	Dedicated	
SLC-2 Detachment	Dedicated	

2. Mission

State the firepower mission.

Example:

OPA firepower forces support the Combined Arms Brigade's advance to secure OBJ DRAGON by suppressing enemy indirect fire systems, isolating defensive positions, disrupting enemy command and control, and enabling freedom of manoeuvre.

3. Execution

a. Commander’s Firepower Intent

(1) Purpose

Why firepower is being employed.

(2) Method

How firepower will support the operation.

(3) End State

Desired battlefield conditions following execution.

b. Firepower Concept of Support

Describe:

(1) Shaping fires.

(2) Deep fires.

(3) Close support.

(4) Counterbattery operations.

(5) Consolidation support.

c. Firepower Tasks

(1) Deep fire tasks

Priority	Target Category	Desired Effect	Responsible unit
1	Command posts	Destruction	
2	Artillery groups	Neutralisation	
3	Reserves	Delay	

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(2) Close fire tasks

Priority	Target Category	Desired Effect	Responsible unit
1	Defensive positions	Suppression	
2	Strongpoints	Neutralisation	
3	Counterattack forces	Delay	

(3) Counter-battery tasks

Purpose	Priority targets	Engagement authority	Assessment criteria

d. Targeting guidance

(1) Priority targets

Priority	Target Category
1	
2	
3	
4	
5	

(2) Desired effects matrix

Target type	Desired effect	Preferred weapon system
Artillery		
Command post		
Reserve force		
Defensive position		

(3) Dynamic targeting guidance

(a) Time-sensitive targets

(b) Engagement authority

(c) Reporting procedures

e. Reconnaissance and target acquisition

(1) Priority intelligence requirements

(a) Pri 1

(b) Pri 2

(c) Pri 3

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(2) Reconnaissance priorities

Priority	Requirement	Responsible asset
1		
2		
3		

(3) Sensor Responsibilities

(a) UAVs

(b) Areas of responsibility.

(c) Target priorities.

(4) Weapon Locating Radars

(a) Coverage areas.

(b) Counter-battery responsibilities.

(5) Ground Reconnaissance

(a) Surveillance responsibilities.

(b) Target confirmation.

(6) Battle Damage Assessment

(a) Responsibility

(b) Reporting Timeline

(c) Assessment Criteria

f. Firepower timeline

Phase	Activity	Responsible unit
Shaping		
Advance		
Contact		
Assault		
Consolidation		

g. Fire Support Coordination Measures

(1) Firepower Coordination Boundaries

(2) Mission-Based Fire Zones

(3) Firepower Strike Areas

(4) Restricted Fire Areas

(5) Airspace Coordination Measures

Reference applicable overlay.

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4. Sustainment

a. Ammunition

(1) Combat allocations

Unit	Combat allocation
122mm battalion	
155mm battery	
122mm MRL	
300mm MRL	
Mortars	

(2) Redistribution stocks

Unit	Allocation
Battalion	
Brigade	

(3) Resupply priorities

b. Fuel

(1) Priority of support

(2) Refuel locations

(3) Refuel schedule

c. Maintenance and Recovery

(1) Priority of support

(2) Refuel locations

(3) Refuel schedule

5. Command and Communications

a. Command

(1) Supported Headquarters

(2) Firepower Coordinating Headquarters

(3) Firepower Authorities

(4) Dynamic Targeting Authorities

b. Reporting Requirements

(1) Target Reports

(2) Engagement Reports

(3) Battle Damage Assessment Reports

(4) Ammunition Status Reports

c. Communications

(1) Primary Network

(2) Alternate Network

(3) Digital Fire Control System

(4) UAV Data Links

(5) Targeting Information Systems

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6. Acknowledgement Instructions

Specify reporting and acknowledgement requirements.

Annexes:
Annex A – Target List

Target numbers, priorities and desired effects.

Annex B – Firepower Task Organisation

Detailed allocation of firepower units.

Annex C – Reconnaissance and Target Acquisition Plan

UAVs, radars, reconnaissance tasks and target custody procedures.

Annex D – Firepower Timeline

Detailed synchronisation matrix.

Annex E – Fire Support Coordination Measures Overlay

Boundaries, strike areas and coordination measures.

Annex F – Sustainment Plan

Ammunition, fuel, maintenance and recovery.

Annex G – Communications and Digital Systems

Networks, digital architecture and reporting formats.

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Annex 6B
Example Firepower Coordination Order (FCO)

Firepower Coordination Order (FCO)
Reference: OPA-CAB/FCO/001

Operation: Advance to Rabaul

Issuing Headquarters: 502 Mechanised CA-Bde Firepower command and Coordination Cell

Date-Time Group: D-2 1800H

Classification: Exercise /Training Use

1. Situation

a. Enemy Forces

(1) Enemy Mission and Intent

(a) A reinforced battalion battlegroup is conducting a delaying operation along the Matanakunai–Mandrambit–Rabaul road corridor.

(b) The enemy seeks to slow the OPA advance, inflict attrition on firepower and logistics elements, and preserve combat power for a final defensive battle in the Rabaul–Vunapope area.

(2) Enemy Firepower Capabilities

(a) One 155mm SPH regiment.

(b) HIMARS detachment

(c) TPQ-53 WLR detachment

(d) Battalion mortars.

(e) UAV reconnaissance detachment

(f) Light EW tea (LEWT)

(g) ASLAV recon sqn conducting forward security and delaying operations.

(3) High-Payoff Targets

Priority	Target Category	Remarks
1	HIMARS detachment	Greatest threat to bde HQ
2	TPQ-53 WLR	Enables enemy counter-battery
3	Battalion HQ	Controlling delaying operations
4	Reserve company groups	Counterattack threat
5	Logistics nodes	Sustaining delaying force

b. Friendly Forces

(1) Supported Formation. 502 Mechanised Bde

(2) Adjacent Formations. 1 Marine CA-Bde securing Tavanatagir lodgement area.

(3) Higher Headquarters Support. FA Bde

(a) One 155mm SPH battery (6xPLZ-05).

(b) One 300mm MRL battery (4 x PCH-191.

(c) One SLC-2 WLR .

(d) One ASN-209 UAV detachment (2 x aircraft).

c. Firepower Task Organisation

Unit	Relationship	Primary task
502 FA Battalion	Constituent	Close support
155 mm Battery	Dedicated	Counter-battery and strongpoints
300 mm Rocket Battery	Supporting	Deep strikes
UAV Detachment	Dedicated	Deep target acquisition
SLC-2 Detachment	Dedicated	Counter-battery acquisition

2. Mission

OPA firepower forces support the Combined Arms Brigade's advance to secure Rabaul by suppressing enemy artillery, disrupting enemy command and control, isolating defensive positions, delaying reserve movement and enabling continuous manoeuvre along the brigade axis of advance.

3. Execution

a. Commander’s Firepower Intent

(1) Purpose

Enable uninterrupted brigade momentum towards Rabaul while preventing effective enemy artillery interference.

(2) Method

Employ a reconnaissance-strike system integrating UAVs, counterbattery radar, tube artillery, rocket artillery and mortars to locate, engage and assess enemy high-payoff targets.

(3) End State

Enemy artillery neutralised, command and control disrupted, reserves delayed, and brigade manoeuvre elements able to secure Rabaul without major interruption.

b. Firepower Concept of Support

(1) Phase 1 – Departure from Lodgement Area

(a) Establish recon coverage

(b) Conduct counter-battery preparation

(c) Identify enemy delay positions

(2) Phase 2 – Advance to Contact

(a) Suppress identified enemy positions.

(b) Neutralise enemy artillery

(c) Interdict reserve movement routes.

(3) Phase 3 – Deliberate Attack

(a) Isolate objective areas

(b) Suppress defensive positions

(c) Destroy key strongpoints

(4) Phase 4 –Consolidation.

(5) Consolidation support.

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c. Firepower Tasks

(1) Deep fire tasks

Priority	Target Category	Desired Effect	Responsible unit
1	HIMARS	Destruction	300mm battery
2	TPQ-53 WLR	Destruction	300mm battery
3	SPH regiment	Neutralisation	300mm battery
4	BG HQ	Disruption	300mm battery
5	Reserve assembly areas	Delay	300mm battery
6	Logistics nodes	Disruption	300mm battery

(2) Close fire tasks

Priority	Target Category	Desired Effect	Responsible unit
1	Company defensive positions	Suppression	122mm SPH battalion
2	Strongpoints	Neutralisation	155mm SPH battery
3	Mortars	Neutralisation	122mm SPH battalion
4	Counterattack forces	Delay	122mm SPH battalion
5	Assault objectives	Isolation	122mm SPH battalion

(3) Counter-battery tasks

<table>
<tr><th>Purpose</th><th>Priority targets</th><th>Engagement authority</th><th>Assessment criteria</th></tr>
<tr><td rowspan="4">Neutralise enemy indirect-fire systems before they can disrupt manoeuvre</td><td>1 HIMARS</td><td rowspan="4">EFFCC – 300mm MRL
Ca-Bde firepower cell – tube artillery</td><td rowspan="4">Reduction in observed enemy artillery activity
Confirmation by UAV BDA</td></tr>
<tr><td>2 SPH batteries</td></tr>
<tr><td>3 mortar positions</td></tr>
<tr><td>4 TPQ-53 WLR</td></tr>
</table>

d. Targeting guidance

(1) Priority targets

Priority	Target Category
1	Enemy artillery
2	WLR
3	CPs
4	Reserves
5	Defensive positions

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(2) Desired effects matrix

Target type	Desired effect	Preferred weapon system
HIMARS	Destruction	300mm MRL
TPQ-53 WLR	Destruction	300mm MRL
SPH battery	Neutralisation	155mm SPH/300mm MRL
Bn HQ	Disruption	300mm MRL
Reserve company	Delay	122mm MRL
Company position	Suppression	122mm SPH
Strongpoint	Neutralisation	155mm SPH

(3) Dynamic targeting guidance

(a) Time-sensitive targets

A. Artillery batteries
B. Radar systems
C. UAV ground stations
D. Reserve movement columns

(b) Engagement authority

Target engagement authorised within 10 minutes of confirmation

(c) Reporting procedures

e. Reconnaissance and target acquisition

(1) Priority intelligence requirements

(a) Pri 1 – Location of enemy artillery

(b) Pri 2 – location of TPQ-53

(c) Pri 3 – Location and movement of reserves

(2) Reconnaissance priorities

Priority	Requirement	Responsible asset
1	Enemy artillery	SLC-2/ASN-209
2	Reserve movement	CH-802
3	Defensive positions	CH-209
4	BDA	ASN-209/CH-802

(3) Sensor Responsibilities

(a) CH-802 UAV company

A. Route recon
B. Monitoring likely delay positions
C. Observation of crossing points
D. Immediate BDA

(b) ASN-209 detachment

A. Deep recon
B. Counter-battery target confirmation
C. Reserve detection

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(4) Weapon Locating Radars

(a) SLC-2 WLR detachment

A. Continuous counter-battery surveillance
B. Target location and reporting

(b) Coverage areas.

(c) Counter-battery responsibilities.

(5) Ground Reconnaissance

(a) Surveillance responsibilities. TBA

(b) Target confirmation. TBA

(6) Battle Damage Assessment

(a) Responsibility

A. CH-802 for close targets
B. ASN-209 for deep targets

(b) Reporting Timeline – initial report within 10 minutes of engagement.

f. Firepower timeline

Phase	Activity	Responsible unit
H-12 to H	Counter-battery preparation	ASN-209/SLC-2
H to H+24	Advance support fires	122mm SPH bn
H+24 to H+48	Deep interdiction	300mm MRL
Assault phase	Isolation and suppression	All firepower assets
Consolidation	Counterattack defeat	122mm bn/155mm bty

g. Fire Support Coordination Measures

(1) Firepower Coordination Boundaries

Along manoeuvre battalion boundaries

(2) Mission-Based Fire Zones

(a) MBFZ NORTH

(b) MBFZ CENTRE

(c) MBFZ SOUTH

(3) Firepower Strike Areas

(a) FSA ALPHA – enemy artillery belt

(b) FSA BRAVO – reserve assembly area

(c) FSA CHARLIE – Rabaul defensive belt

(4) Restricted Fire Areas

Marine brigade lodgement area

(5) Airspace Coordination Measures

ASN-209 operating above CH-802 control altitude.

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4. Sustainment

a. Ammunition

(1) Combat allocations

Unit	Combat allocation
122mm battalion	Full combat load
155mm battery	Full combat load
122mm MRL	Full combat load
300mm MRL	Full combat load
Mortars	Full combat load

(2) Redistribution stocks

Unit	Allocation
Battalion	2 x full combat load
Brigade	3 x full combat load

(3) Resupply priorities

(a) Pri 1 – 122mm SPH batteries

(b) Pri 2 – 155mm battery

(c) Pri 3 – Mortar companies

(d) Pri 4 – 122mm MRL battery

(e) Pri 5 – 300mm MRL battery

b. Fuel

(1) Priority of support

(a) Artillery displacement vehicles

(b) UAV support vehicles

(c) Recovery vehicles

(2) Refuel locations

TBA

(3) Refuel schedule

TBA

c. Maintenance and Recovery

(1) Priority of support

(a) Firepower systems

(b) UAV systems

(c) Recovery assets

5. Command and Communications

a. Command

(1) Supported Headquarters

502 Mechanised Bde HQ

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(2) Firepower Coordinating Headquarters

502 Mechanised Bde firepower coordination Cell

(3) Higher Firepower Authorities

Expeditionary Force Firepower Coordination Centre.

(4) Dynamic Targeting Authorities

(a) 502 Mechanised Bde for close targets

(b) Expeditionary force commander for deep-fire rocket targets

b. Reporting Requirements

(1) Target Reports

Within five minutes of confirmation

(2) Engagement Reports

Within 10 minutes of mission completion

(3) Battle Damage Assessment Reports

Initial report within 10 minutes

(4) Ammunition Status Reports

Every six hours

c. Communications

(1) Primary Network

Brigade digital fires network

(2) Alternate Network

Brigade command radio network

(3) Digital Fire Control System

OPA integrated fire control system

(4) UAV Data Links

CH-802 and ASN-209 digital feeds routed through Firepower Coordination Cell

(5) Targeting Information Systems

Firepower command and Coordination system

6. Acknowledgement Instructions

All acknowledge.

Annexes:
Annex A – Target List

Annex B – Firepower Task Organisation

Annex C – Reconnaissance and Target Acquisition Plan

Annex D – Firepower Timeline

Annex E – Fire Support Coordination Measures Overlay

Annex F – Sustainment Plan

Annex G – Communications and Digital Systems

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ANNEX A – TARGET LIST

1. **Purpose**

This annex identifies approved targets, priorities, desired effects and engagement responsibilities.

2. **High-Payoff Targets**

Priority	Target no	Target description	Desired effect	Primary asset	Alternate asset
1	HPT-01	SPH bty	Neutralisation	155mm SPH bty	300mm MRL bty
2	HPT-02	TPQ-53 WLR	Destruction	300mm MRL bty	155mm SPH bty
3	HPT-03	BG HQ	Disruption	300mm MRL bty	155mm SPH bty
4	HPT-04	HIMARS	Destruction	300mm MRL bty	155mm SPH bty
5	HPT-05	Reserve coy	Delay	122mm MRL bty	122mm SPH bty
6	HPT-06	Logistics node	Disruption	300mm MRL bty	122mm MRL bty
7	HPT-07	Mortar position	Neutralisation	122mm SPH bty	155mm SPH bty
8	HPT-08	Defensive position	Neutralisation	155mm SPH bty	122mm SPH bty
9	HPT-09	Route block position	Suppression	122mm SPH bty	Mortars

3. Dynamic Targets

a. Artillery firing positions

b. Counter-battery radar emissions

c. Reserve movement columns

d. Command vehicles

e. UAV control stations

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ANNEX B – FIREPOWER TASK ORGANISATION

1. **Firepower Relationships**

Unit	Relationship	Supported formation
502 FA Battalion	Constituent	502 Mech Bde
Mortar companies	Constituent	Manoeuvre battalions
155mm SPH battery	Dedicated	502 Mech Bde
ASN-209 UAV detachment	Dedicated	502 Mech Bde firepower cell
SLC-2 detachment	Dedicated	502 Mech Bde firepower cell
300mm MRL battery	Supporting	502 Mech Bde

2. **Responsibilities**

a. 502 FA Battalion

(1) Close support

(2) Suppression

(3) Objective isolation

(4) Immediate fire support

b. 155mm battery

(1) Counter-battery

(2) Strongpoint reduction

(3) Precision engagements

c. 300mm MRL battery

(1) Deep strikes

(2) CPs

(3) Reserve interdiction

(4) HIMARS destruction

(5) Radar destruction

d. Mortar companies

(1) Immediate support

(2) Local suppression

(3) Obscuration

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ANNEX C – RECONNAISSANCE AND TARGET ACQUISTION PLAN

1. **Collection Priorities**

a. Priority 1 – Enemy artillery.

b. Priority 2 – Counterbattery radar.

c. Priority 3 – Reserve forces.

d. Priority 4 – Command posts.

e. Priority 5 – Defensive positions.

2. **Sensor Allocation**

a. CH-802 UAV Company

(1) Mission – Close reconnaissance.

(2) Coverage

(a) Route Matanakunai–Mandrambit.

(b) River crossings.

(c) Defensive positions.

(3) Reporting – Direct to 502 Mech Bde Firepower Cell.

b. ASN-209 UAV Detachment

(1) Mission – Deep reconnaissance.

(2) Coverage

(a) Rabaul approaches.

(b) Reserve assembly areas.

(c) Artillery operating areas.

(3) Reporting – Direct to Firepower Cell and FA Brigade HQ.

c. SLC-2 Counterbattery Radar

(1) Mission – Counterbattery surveillance.

(2) Coverage – Forward 25–30 km.

(3) Priority – Enemy SPH and mortar systems.

3. Target Custody Procedures

Detect – confirm – Engage – Assess

Stage	Responsibility
Detection	UAV/radar
Confirmation	Firepower cell
Engagement	Assigned unit
Assessment	UAV

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ANNEX D – FIREPOWER TIMELINE

1. **Phase 1 – Shaping (H-12 to H)**

Timing	Activity
H-12	ASN-209 launches
H-10	SLC-2 operational
H-8	Counterbattery target development
H-4	Deep target confirmation
H-1	Final target update

2. **Phase 2 – Advance to Contact (H to H+24))**

Timing	Activity
H	Brigade advance commences
H+2	Counterbattery priority
H+6	Suppression of delay positions
H+12	Reserve interdiction
H+24	Objective area isolation begins

3. **Phase 3 – Deliberate Attack**

Timing	Activity
TBA	Objective isolation
TBA	Counterbattery fires
TBA	Suppression of defensive positions
TBA	Strongpoint neutralisation
TBA	Reserve interdiction

4. **Phase 4 – Consolidation**

Timing	Activity
TBA	Counterattack defeat
TBA	Route interdiction
TBA	Security fires
TBA	BDA operations

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ANNEX E – FIRE SUPPORT COORDINATION MEASURES

1. **Firepower Coordination Boundaries**

a. FCB EAST – Separates eastern battalion area.

b. FCB WEST – Separates western battalion area.

2. **Mission-Based Fire Zones**

a. MBFZ ALPHA – Forward security zone.

b. MBFZ BRAVO – Main effort zone.

c. MBFZ CHARLIE – Rabaul objective zone.

3. **Firepower Strike Areas**

a. FSA ALPHA – Enemy artillery belt.

b. FSA BRAVO – Reserve concentration area.

c. FSA CHARLIE – Rabaul defensive area.

4. **Restricted Fire Areas**

a. RFA 1 – Marine lodgement area.

b. RFA 2 – Brigade logistics areas.

5. **Airspace Measures**

a. UAV Altitudes

System	Altitude
CH-802	Low-Medium
ASN-209	Medium-High

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ANNEX F – SUSTAINMENT PLAN

1. **Ammunition**

a. Priorities

(1) 1. CAB 122 mm Battalion.

(2) 2. 155 mm Battery.

(3) 3. Mortar Companies.

(4) 4. 122 mm MRL Battery.

(5) 5. 300 mm Battery.

b. Redistribution Stocks

Unit	Stock objective
Battery	1 day
Battalion	2 days
Brigade	3 days

2. **Fuel**

a. Priority

(1) 1. Artillery.

(2) 2. Recovery assets.

(3) 3. UAV support vehicles.

3. **Maintenance**

a. Priority

(1) 1. Fire control systems.

(2) 2. Artillery platforms.

(3) 3. UAV systems.

4. **Recovery**

a. Recovery assets positioned:

(1) One bound behind artillery.

(2) Along MSR.

(3) Near logistics support areas.

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ANNEX G – COMMUINCATIONS AND DIGITAL SYSTEMS

1. **Command Networks**

a. Network 1

CAB Command Network.

b. Network 2

Firepower Coordination Network.

c. Network 3

Counterbattery Network.

d. Network 4

UAV Operations Network.

2. **Reporting Requirements**

Report	Timeline
Target Report	Within 5 min
Engagement Report	Within 10 min
BDA Report	Within 10 min
Ammunition Report	Every 6 hrs

3. **Digital Systems**

a. Firepower Coordination Cell

(1) Receives all target information.

(2) Assigns engagements.

(3) Tracks effects.

b. Artillery Units

(1) Receive digital fire missions.

(2) Report ammunition expenditure.

(3) Report mission completion.

c. UAV Systems

(1) Provide live target feeds.

(2) Conduct BDA.

(3) Support dynamic targeting.

4. **Dynamic Targeting Procedures**

a. 1. Detect.

b. 2. Confirm.

c. 3. Assign weapon.

d. 4. Engage.

e. 5. Assess.

f. 6. Re-engage if required.

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Chapter 7
OPA Artillery Tactical Actions and TTPs

> *Fight when you can win, move away when you cannot.*
>
> **Mao Zedong**
>
> A Maoist operational principle derived from Mao's writings on guerrilla and mobile warfare. 1936 and 1937.

Section 7-1. Introduction

7.1 OPA artillery generates combat power through a continuous system of tactical actions, not through static gun lines or isolated fire missions. Operating within a contested battlespace characterised by persistent ISR, rapid targeting cycles, and precision counter-battery threats, artillery units fight as dispersed, mobile, and networked firepower nodes. Their effectiveness is determined by the ability to deliver timely effects, displace before detection, and re-engage in rapid succession, rather than by volume of fire alone.

7.2 To achieve this, OPA artillery employs a set of core tactical actions supported by tightly integrated TTPs. These actions are continuous and overlapping, forming a cycle in which positioning, fire delivery, movement, survivability, and sustainment are inseparably linked. Firepower is massed in time rather than space, enabling dispersed units to achieve decisive effects while minimising vulnerability.

7.3 The TTPs described in this chapter are designed to deliver three enduring outcomes of responsive and accurate firepower, survivability under persistent threat, and continuity of support to manoeuvre forces. Together, they enable artillery to operate as a coherent and adaptive system, capable of generating repeated effects across multiple phases of an operation.

7.4 The tactical actions and TTPs are the practical expression of the targeting and command and control frameworks outlined in earlier chapters. Targeting defines what is to be engaged and why, while C2 determines who has the authority to allocate and release firepower. This chapter explains how those decisions are executed at the tactical level. Effective artillery employment therefore depends on the integration of all three:

a. Targeting provides direction

b. C2 provides control

c. Tactical actions and TTPs provide execution.

Section 7-2. Core Artillery Tactical Actions

7.5 OPA artillery operates as a system of dispersed, mobile, and networked firepower nodes, integrated within a broader reconnaissance–strike architecture. Its effectiveness is not defined by the physical concentration of guns, but by the ability to continuously generate and reapply firepower effects under conditions of persistent observation and rapid counter-action.

7.6 To achieve this, OPA artillery employs a set of seven core tactical actions. These actions are continuous and interdependent, forming a cycle in which positioning, fire delivery, movement, and survivability are inseparably linked. Firepower is massed in time rather than space, enabling dispersed units to achieve decisive effects while minimising vulnerability.

7.7 Understanding these tactical actions is essential to understanding how OPA artillery fights. When executed together, they enable artillery to operate as a responsive, adaptive, and persistent combat capability, capable of delivering decisive effects while avoiding detection and destruction.

7.8 The seven core tactical actions are:

a. Reconnoitre and prepare

b. Occupy and establish firing readiness

c. Deliver fire

d. Displace and continue support

e. Survive and protect

f. Sustain firepower.

g. Assess and re-engage

7.9 These actions are conducted cyclically and often concurrently, forming a continuous occupy – fire – displace – reoccupy – fire rhythm.

Reconnaissance and Preparation

7.10 OPA artillery reconnaissance and preparation of firing positions is a deliberate, multi-layered process designed to achieve three outcomes simultaneously:

a. Immediate firing accuracy

b. Survivability under ISR and counter-battery threat

c. Mobility for repeated displacement

7.11 It is not a single activity but a sequenced workflow conducted by artillery units, supported by reconnaissance elements, and integrated with the broader reconnaissance–strike system. Position selection is not treated as a purely technical gun-line activity. It is framed as firepower position preparation within a contested reconnaissance environment. Positions are selected to fight from, not just to fire from and every position is assessed against detection, engagement, and displacement timelines. Multiple positions are always prepared in advance. The outcome is a position system, not a single firing point.

7.12 Reconnaissance occurs at multiple levels:

a. Higher HQ (Group Army/FA Bde) identifies artillery operating areas and allocates general firing zones. It deconflicts with manoeuvre forces, AD, EW elements, and logistics. It also Integrates ISR inputs (satellite, long-range UAV, EW).

b. The CA-Bde/FA Battalion Level conducts detailed terrain analysis, assigns position areas to batteries and plans displacement routes and timings. It also integrates WLR and UAV coverage.

c. The Battery/Platoon Level conducts physical reconnaissance selecting specific gun/launcher positions as well as confirming routes, spacing and local security. It also prepares positions for immediate occupation.

Key Activities in Reconnaissance and Preparation

7.13 OPA artillery evaluates terrain against four primary criteria:

a. Fire Capability covering range to likely target areas, the ability to cover assigned fire zones and masking for high-angle or low-angle fires.

b. Survivability covering available natural concealment (such as vegetation, urban clutter, folds in terrain and so on), concealment and cover from UAV observation, reduced radar exposure (WLR survivability) and the avoidance of predictable patterns.

c. Mobility covering multiple access and egress routes, all-weather trafficability, the ability to support rapid displacement and the avoidance of chokepoints.

d. Communications covering reliable digital and voice connectivity, redundant pathways (primary, alternate) and minimal electromagnetic exposure.

7.14 When conducting route reconnaissance OPA artillery units are particularly concerned with movement. Primary, alternate, and emergency routes are identified. Routes are assessed for load capacity, concealment and vulnerability to interdiction. Movement timings are planned to avoid detection and routes are linked to subsequent firing positions (not just the initial one) to support continuous displacement.

7.15 OPA artillery does not rely on a single firing position but develops primary positions (initial firing locations), alternate positions (pre-selected follow-on positions), supplementary positions (used for specific sectors or contingencies) and hide positions (concealed areas for waiting or deception). These positions are geographically separated, linked by planned routes and integrated into a movement cycle.

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Movement cycles link positioning, fire delivery, displacement, re-occupation and sustainment into a single continuous process.

Actions in the Gun Areas

7.16 Battery-level reconnaissance elements conduct ground reconnaissance (often mounted) to confirm exact gun/launcher siting, spacing and orientation as well as cover and concealment. They will mark firing point, vehicle locations, command post positions and ammunition points. They will identify local security requirements, air threat exposure and UAV observation risk.

7.17 The OPA emphasises rapid initial accuracy without lengthy registration. Accurate firing requires precise positioning. Initially GNSS will be used for rapid location fixing with INS systems providing orientation and backup. If required and if time permits traditional survey methods may be used to validate digital systems, establish reference bearings. Meteorological data via artillery MET systems will be integrated early.

7.18 Camouflage, Concealment, and Deception (CCD) is integrated from the outset. The aim is to delay detection, complicate targeting and increase survivability after firing. Measures adopted include:

a. The use of terrain masking and vegetation

b. The use of camouflage netting and multispectral concealment

c. The reduction of vehicle tracks and disturbances

d. The use of decoy positions and false signatures

e. The control of electromagnetic emissions.

7.19 Reconnaissance may also utilise ISR and targeting assets. UAVs may assist in route confirmation and position validation. EW systems help assess the electromagnetic environment and the risk of detection. WLR coverage is considered to avoid predictable firing locations and enable counter-battery operations. This ensures positions are nested within the reconnaissance–strike system.

7.20 Positions are prepared to minimise occupation time. This includes preparing pre-planned layout of firing units, command posts and the location of ammunition vehicles. Each gun/launcher will have a designated position with specific grid coordinates. The battery reconnaissance elements will ensure that there is spacing between platforms as well as command posts and logistic elements.

7.21 PLA artillery reconnaissance and preparation occurs well before operations (deliberate planning phase) and continuously during operations (dynamic update). Typical sequencing is as follows:

a. Higher HQ allocates artillery operating areas

b. Battalion conducts terrain analysis and assigns sectors

c. Battery reconnaissance teams deploy

d. Positions and routes are confirmed and marked before the batteries begin their deployment.

e. Survey/orientation data prepared at the selected positions

f. CCD measures are established

g. Batteries occupy when required.

7.22 Subsequent positions will be prepared before first occupation and reconnaissance continues even after firing begins.

7.23 At the CA-Bde/FA battalion level each battery will have multiple pre-reconnoitred positions. They can expect to occupy, fire briefly, and then displace. Firing positions will be widely dispersed. They can expect to move continuously even during sustained operations. Finally there will be heavy reliance on preparation rather than on-the-spot selection.

7.24 OPA artillery reconnaissance and preparation of firing positions is conducted as a continuous, echeloned process. This produces a network of primary, alternate and supplementary positions linked by pre-planned routes. Positions are selected while minimising exposure to enemy reconnaissance and counter-battery systems.

Occupying, Deploying and Establishing Firing Readiness

7.25 The purpose of occupation and deployment is to transition artillery units from movement to combat readiness in the shortest possible time while minimising exposure to enemy reconnaissance and counter-battery systems. This action enables artillery to deliver accurate fire immediately upon receipt of a fire mission and to displace before an effective enemy response.

7.26 OPA artillery units occupy and deploy using pre-determined, pre-surveyed, and pre-oriented positions established during the reconnaissance phase, combined with standardised drills and distributed layouts. Occupation is conducted as a time-critical tactical action, not an administrative activity. The process is characterised by:

a. Rapid transition from movement to firing readiness

b. Dispersion of firing elements to reduce vulnerability

c. Pre-configured layouts and communications

d. Immediate integration into the reconnaissance–strike system.

7.27 Occupation is conducted with the expectation that units may be detected and engaged by enemy ISR and counter-battery systems within minutes of arrival.

Arrival at the Battery Position

7.28 Occupation and deployment follows a consistent, parallelised sequence as follows:

a. When approaching and entering the battery area units move along pre-reconnoitred routes to pre-determined positions. Movement is conducted with dispersion between vehicles, the enforcement of emission control (EMCON) and making use of terrain masking. The final approach is executed in small packets to reduce signature. No route selection or position adjustment is conducted on arrival.

b. When occupying pre-determined firing points each firing unit moves directly to its pre-designated firing point upon arrival. Positions will have been pre-surveyed and pre-oriented. Batteries deploy with irregular spacing, using a dispersed non-linear layout. Occupation involves execution, not decision-making.

c. Command post and control node will be established. Battery and battalion command nodes will occupy pre-designated, offset locations. Command posts are physically separated from firing nodes, concealed and subject to emission-controls. Fire control systems will be activated, and linked to higher HQ and ISR networks.

d. Networks will be pre-configured prior to occupation with communications being verified rapidly, not optimised. EMCON will be maintained where possible. Units will establish primary digital fire control networks, alternate voice communications and redundant communication pathways.

e. Orientation and Technical Readiness processes will be conducted. This involves achieving firing accuracy through GNSS-based position confirmation, INS-based directional alignment for orientation and the validation against pre-surveyed position data where required will be conducted. Finally meteorological data and ballistic corrections will be integrated. Pre-surveyed and pre-oriented positions enable immediate firing accuracy without lengthy preparation.

f. Ammunition vehicles will occupy pre-designated, offset locations. They will be positioned to enable rapid resupply and reduce their vulnerability to strike. Initial ammunition loads will be prepared for immediate firing.

g. Units will implement local security measures, and camouflage, concealment, and deception (CCD). Units will also carry out measures to reduce visual, thermal and electromagnetic signatures. Immediate counter-UAV awareness measures will be activated and integrate with SHORAD and EW support where available.

h. A unit is considered ready when:

(1) firing units are positioned, oriented and prepared to fire

(2) Fire control systems are active and connected

(3) Communications are established and verified

(4) Ammunition is immediately available.

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7.29 OPA artillery occupation and deployment is a time-compressed, pre-planned, and execution-focused tactical action. By employing pre-determined, pre-surveyed, and pre-oriented positions, supported by parallel execution and dispersed layouts, artillery units achieve rapid firing readiness while minimising vulnerability to enemy reconnaissance and counter-battery systems.

A Vignette: FA Battalion – Occupation to First Fire and Displacement (H–15 to H+10 Minutes)

Situation

7.30 An OPA mechanised CA-Bde's FA battalion, consisting of three 122mm SP howitzer batteries and one 122mm MRL battery has been allocated a time-bound firepower mission to suppress an enemy forward company strongpoint and disrupt a reserve assembly area. The enemy's capabilities include persistent UAV reconnaissance, weapon-locating radar (WLR) coverage and rapid counter-battery response (estimated 3–5 minutes from first round detection). The FA battalion is required to occupy a pre-reconnoitred position, deliver suppression fires within a narrow time window and displace before effective enemy counter battery fire.

Timeline Narrative (H–15 to H+10)

7.31 H–15 to H–10: Final Approach.

a. Batteries move from hide positions along pre-reconnoitred, dispersed routes with movement being conducted in small packets (sections or individual vehicles).

b. EMCON is maintained and communications are minimal.

c. UAV feed indicates no immediate enemy observation of routes

7.32 The CA-Bde fires cell confirms target timing and fire mission sequencing, and the FA battalion CP prepares to transition to active control.

7.33 H–10 to H–6: Entry into Position Area.

a. Lead elements enter the position area using terrain masking and vehicles separate further to avoid clustering.

b. Each unit moves directly to pre-designated firing points.

c. No halt was conducted for orientation or adjustment as positions were pre-surveyed.

7.34 H–6 to H–3: Occupation and Deployment.

a. Guns/launchers halt, orient, and deploy immediately, command posts are established in separate concealed locations and ammunition vehicles move into offset positions

b. At the same time GNSS/INS confirms position and azimuth, communications networks (digital primary and voice alternate) are activated and meteorological data is uploaded to fire control systems.

c. At H–3 all batteries are physically in position, Communications has been established and units are approaching firing readiness.

7.35 H–3 to H–1: Establish Firing Readiness.

a. Final system checks are conducted, fire control systems are synchronised, target data is confirmed from the UAV feed and the initial ammunition is prepared at each gun/launcher.

b. The CA-Bde fires cell confirms weapon release authority and issues execution order for coordinated fires

7.36 At H–0 the FA battalion is fully ready to fire and target data is current and has been validated

7.37 H–0: First Rounds Fired.

a. Batteries fire in a coordinated time-on-target (TOT) sequence.

b. Fires include suppression firepower on the enemy's forward positions and saturation firepower on the enemy's reserve assembly area.

c. The enemy's forward elements are suppressed and the enemy's reserve is disrupted prior to movement.

d. Fires have been delivered from dispersed firing points, but massed in time.

7.38 H+1 to H+3: Continued Fire and Initial Enemy Detection.

a. Follow-on fire missions are conducted to maintain suppression.

b. Enemy WLR detects firing signatures and an enemy UAV begins to re-task toward suspected firing area.

c. The FA battalion CP anticipates counter-battery response and issues a displacement warning order.

7.39 H+3 to H+5: Final Fire Missions and Displacement Trigger.

a. The FA battalion's final fire missions are executed and fires shift to secondary targets at the c

b. The estimated enemy counter-battery timeline approaches and enemy UAV activity increases.

c. The FA battalion CP issues a displacement Order at approximately H+4.

7.40 H+5 to H+8: Displacement Execution.

a. Guns/launchers cease fire and immediately displace and units move along pre-designated alternate routes

b. Movement is rapid, dispersed and non-linear.

c. Command post displace separately to alternate location and maintains communications during movement where possible.

7.41 H+8 to H+10: Enemy Counter-Battery Response.

a. Enemy fires impact vacated firing position but finds no active firing units and a minimal residual signature.

b. No artillery losses have been sustained and the FA battalion is already moving to alternate firing positions.

7.42 This vignette demonstrates that OPA artillery effectiveness at CA-Bde level is determined less by platform capability and more by the ability to occupy rapidly, deliver effects within a narrow temporal window, and displace before enemy ISR and counter-battery systems can respond.

Delivering Fire

7.43 The purpose of delivering fire is to generate the required physical, functional, or systemic effects against designated targets in support of the commander's intent. OPA artillery delivers fire as part of a coordinated reconnaissance–strike system, enabling the rapid application of massed effects within constrained time windows.

7.44 OPA artillery does not treat fire delivery as a standalone activity. It is executed as a network-enabled process linking sensors, command nodes, and firing units.

7.45 Fire delivery is characterised by:

a. The centralised prioritisation of targets,

b. The time-bound allocation of firepower

c. Distributed execution by dispersed firing units

d. Integration with ISR, EW, cyber and manoeuvre.

Fire Delivery Sequence

7.46 OPA artillery fire delivery follows a consistent sequence:

7.47 Step 1. Target Detection and Identification.

a. Targets are identified through UAV reconnaissance, Weapon-locating radar (WLR), Electronic warfare (EW) systems, Manoeuvre unit reporting and Higher-echelon ISR

b. Targets may be pre-planned, time-sensitive or targets of opportunity.

7.48 Step 2. Target Validation and Prioritisation

a. This step determines whether the target is engaged and which firepower type is to be applied

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b. At CA-Bde or higher HQ target data is assessed for accuracy, timeliness and operational relevance.

c. Targets are prioritised based on commander's intent, phase of operation and firepower allocation.

7.49 Step 3. Firepower Allocation.

a. Firepower is allocated based on target importance, required effect and available systems.

b. Allocation may involve a single battery, multiple batteries, battalion-level fires or reinforcement from higher-echelon artillery.

c. OPA artillery employs time-based allocation, not fixed DS relationships and dynamic reallocation is used as the situation evolves.

7.50 Step 4. Weapon Release Authority.

a. Before engagement, the authority to fire is confirmed based on the target type, operational constraints and rules governing engagement.

b. Authority may be delegated for routine targets or retained at higher HQ for sensitive targets to ensure control of escalation and alignment with operational objectives.

7.51 Step 5. Fire Mission Execution.

a. Firing units execute missions using pre-determined or calculated firing data, digital fire control systems and standardised firing procedures

b. Fire delivery includes methods of engagement such as Immediate fires, planned fires, Time-on-target (TOT) and sequential or phased fires

c. Applied firepower Types include:

(1) Suppression to reduce enemy combat effectiveness

(2) Destruction to physically destroy targets

(3) Precision to engage point targets with minimal expenditure

(4) Saturation to overwhelm area targets

(5) Blockade to deny movement or access

d. When applying temporal massing multiple dispersed units fire simultaneously so that the effects are concentrated at the target in a narrow time window.

7.52 Step 6. Adjustment and Control.

a. During execution fires may be adjusted based on observer feedback, shifted to adjacent targets or terminated early or extended.

b. Adjustment is informed by UAV observation, forward observers and sensor feedback.

7.53 Step 7. Termination and Transition.

a. Fire missions are terminated when the required effect is achieved, target is neutralised or destroyed or higher priority targets emerge.

b. Firing units then prepare for follow-on missions or initiate displacement if required.

7.54 OPA artillery units deliver fire as a time-sensitive, system-integrated process that links detection, decision, and execution. Effectiveness is achieved through centralised prioritisation, distributed execution, and temporal concentration of effects, enabling artillery to generate decisive outcomes while preserving survivability in a contested battlespace.

Displacing, Re-Occupying and Continuing Support

7.55 The purpose of displacement is to preserve artillery combat power by avoiding enemy detection and counter-battery engagement, while maintaining uninterrupted fire support to manoeuvre forces. Re-occupation enables the rapid re-establishment of firing capability from new positions, ensuring continuity of firepower effects.

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7.56 Displacement is not an ad hoc reaction but a pre-planned and continuously executed tactical action embedded within the overall firepower employment cycle. Displacement involves pre-reconnoitred alternate and supplementary positions, trigger-based execution (time, event, or threat-driven), dispersed and non-linear movement and parallel continuation of fire support by other elements. The core principle is that artillery units do not remain in position long enough to be effectively targeted. Survivability is achieved through movement. Displacement, re-occupation, and fire delivery form a continuous cycle:

Occupy – fire – displace – re-occupy – fire

Displacement

7.57 OPA artillery employs the following displacement types:

a. Planned displacement is conducted in accordance with the fire plan and is linked to operational phases (such as advance or consolidation). This enables units to reposition for range, coverage, or manoeuvre support.

b. On-order displacement is prepared in advance but executed on command. It is usually triggered by emerging targets, changes in manoeuvre or evolving threat conditions.

c. Emergency displacement is executed immediately in response to enemy detection, counter-battery threat indicators or UAV observation.

7.58 Leapfrog displacement involves sub-units displacing sequentially. This ensures continuous fire support. One element fires and another moves. This is common at battery or platoon level.

7.59 Displacement is initiated based on time-based, event-based and threat-based triggers:

7.60 Time-based triggers are based on pre-determined maximum occupation time and at the completion of an assigned fire window. Event-based triggers occur at the completion of a fire mission, in conjunction with manoeuvre force movement or the transition to the next phase of an operation. Threat-based triggers occur as the result of detection by a UAV or ISR, WLR tracking or counter-battery indicators or an increase in enemy fires or air threat.

7.61 Displacement is executed in the following sequence:

a. Step 1. Preparation for Movement. Units will maintain engines ready or on short notice, equipment will be configured for a rapid-move. Ammunition will be secured or redistributed. Communications will be maintained until movement commences.

b. Step 2. Cease Fire and Break Contact. When fire missions are completed or terminated units will immediately prepare to move. No delay is accepted between the last round fired and commencement of movement.

c. Step 3. Movement to Alternate Positions. Units will move along pre-reconnoitred routes and alternate or deception routes where required. Movement will be dispersed, irregular and conducted in small packets.

d. Command posts displace separately from firing units and maintain communications where possible. Fire control may be degraded temporarily during the transition between nodes.

Reoccupation and the Continuation of Fire Support

7.62 OPA artillery maintains fire support through sequential displacement (leapfrogging). One element fires while another moves. This ensures uninterrupted support to manoeuvre. Higher-echelon artillery (such as from the Group Army FA Brigade) provides coverage while FA-battalion units displace to enable continuity during critical phases.

7.63 Firepower Allocation is distributed using the dynamic reallocation of fire missions to units still in position and to newly occupied units in order to maintain the tempo of operations. Fire plans account for displacement windows and temporary gaps. This overlapping coverage reduces the risk of fire support interruption.

7.64 OPA artillery displacement and re-occupation is a continuous, trigger-driven tactical action that preserves combat power while sustaining fire support. Effectiveness is achieved through pre-planned position systems, rapid execution, and overlapping fire support arrangements, ensuring artillery remains survivable, responsive, and integrated within the broader reconnaissance–strike system.

A Vignette – FA Battalion Displacement under Fire

Situation

7.65 A mechanised CA-Bde is conducting a deliberate attack against a defended enemy position. The CA-Bde's FA battalion is tasked to maintain continuous suppression of enemy forward positions, disrupt enemy counterattack forces forming in depth and survive under persistent UAV and WLR coverage. Enemy capabilities continuous UAV reconnaissance over likely artillery areas, WLR-enabled counter-battery response (assessed as a 3–5 minute engagement window) and responsive artillery fires against detected firing positions. To achieve continuous support while preserving combat power, theFA battalion employs leapfrog displacement at battery level.

7.66 The FA battalion divides its firing elements into two groups as follows:

a. Group A (Firing Group): Delivers fire from current positions

b. Group B (Manoeuvre Group): Displaces to alternate positions.

7.67 These roles alternate throughout the engagement, ensuring Continuous fire support, Reduced exposure to counter-battery and sustained operational tempo.

Timeline Narrative (H–15 to H+20 Minutes)

7.68 H to H+2: Initial Fire Mission (Group A Firing).

a. Group A (two batteries) delivers suppression fires on enemy forward positions

b. Group B (one tube battery + MRL battery) remains in hide positions, prepared to move

c. Enemy WLR begins tracking firing signatures and enemy UAV is tasked to confirm firing locations.

d. The FA battalion CP issues on-order displacement warning to Group A and Group B receives movement order to move to alternate positions.

7.69 H+2 to H+5: Group B Displaces and Re-Occupies.

a. Group B moves along pre-reconnoitred alternate routes. Movement is and dispersed and conducted in small packets.

b. Group A continues firing to maintain suppression.

c. At H+5 Group B occupies alternate firing positions and rapid deployment and readiness drills are executed.

7.70 H+5 to H+7: Transition of Fire (Handover Phase).

a. Group B establishes firing readiness.

b. Group A begins to reduce rate of fire and prepare for displacement.

c. The FA battalion CP shifts fire missions to Group B.

d. Fire support transitions from Group A to Group B without interruption.

7.71 H+7 to H+10: Group A Displacement Under Threat.

a. Group A ceases fire and immediately displaces.

b. Movement initiated before enemy counter-battery fires arrive.

c. Enemy counter-battery fires impact Group A's vacated positions and enemy UAV confirms area but finds no active firing units.

7.72 H+10 to H+14: Group B Sustains Fire.

a. Group B delivers continued suppression on forward positions and interdiction fires on enemy reserves

b. Group A moves to the next alternate position area and prepares for re-occupation.

7.73 H+14 to H+17: Group A Re-Occupies.

a. Group A occupies new firing positions and executes rapid deployment drills.

b. Communications and fire control systems are re-established

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c. Group A is ready to resume firing..

7.74 H+17 to H+20: Second Transition (Cycle Repeats)

a. Group A resumes firing

b. Group B prepares to displace

7.75 The cycle continues. Continuous leapfrog displacement maintains fire support and survivability.

7.76 This vignette demonstrates that OPA artillery survivability and effectiveness are achieved through the deliberate alternation of firing and manoeuvre elements, enabling continuous firepower generation while avoiding enemy counter-battery engagement. Leapfrog displacement allows artillery to maintain operational tempo, preserve combat power and remain integrated within the reconnaissance–strike system.

Surviving Counter-Battery Fire and Enemy Reconnaissance

7.77 The purpose of survivability measures is to preserve artillery combat power by avoiding detection, targeting, and destruction by enemy reconnaissance and counter-battery systems, while maintaining the ability to deliver continuous and effective fire support.

7.78 OPA artillery survivability is based on the principle that any firing unit that is detected and remains static will be engaged and destroyed within minutes. Accordingly, survivability is achieved through a combination of:

a. Mobility by avoiding the use of fixed positions

b. Dispersion to reduce vulnerability

c. Concealment and deception to delay detection

d. Temporal discipline to limit exposure time

e. Integration with protection systems such as AD and EW assets.

7.79 Survivability is not passive. It is an active, continuous tactical action conducted before, during and after fire delivery.

7.80 OPA artillery units are designed to operate under persistent threat from enemy reconnaissance systems, counter-battery systems and precision strike systems.

7.81 Enemy reconnaissance systems include UAVs (both persistent ISR and strike platforms), satellite surveillance (where applicable), ground reconnaissance elements and electronic intelligence (ELINT) and signals intelligence (SIGINT). Counter-battery systems include WLR, rapid-response artillery and rocket systems and integrated sensor-to-shooter networks. Precision strike systems include guided artillery and rockets, loitering munitions and air-delivered precision weapons.

Survivability Methods

7.82 OPA artillery employs a number of survivability methods as follows.

a. Mobility using a shoot-and-scoot technique to reduce the probability of successful counter-battery engagement. Units fire and displace before enemy response can be executed. This involves:

(1) Minimal dwell time in firing positions

(2) Immediate displacement after fire mission completion

(3) Pre-planned alternate positions and routes

(4) Continuous movement cycle (occupy–fire–displace).

b. Dispersion is used to reduce vulnerability by avoiding the concentration of assets. This is used to limit damage from a single enemy strike and complicate target acquisition. It involves:

(1) Wide spacing between guns/launchers

(2) Separation of firing units, command posts and logistics elements

c. Camouflage, Concealment, and Deception (CCD) to delay or prevent enemy detection. This is used to Increase enemy uncertainty and divert enemy fires onto false targets. It involves:

(1) Use of terrain masking (such as reverse slopes, vegetation or urban clutter)

(2) Multispectral camouflage nets

(3) Reduction of visual, thermal, and radar signatures

(4) Concealment of tracks and disturbances

(5) Use of decoys and false firing positions

(6) Deceptive electromagnetic emissions.

d. Emission Control (EMCON) is used to minimise electronic signature to avoid detection. It reduces susceptibility to SIGINT/ELINT detection and delays the enemy's targeting cycle. It involves:

(1) Restricting radio transmissions

(2) Using pre-configured digital communications

(3) Employing burst transmissions where required

(4) Using alternate communication methods (such as wire or relay).

e. Temporal Discipline is also used to limit the time artillery units are exposed so that unit activity is not exposed to the enemy's detection-to-engagement window. It involves:

(1) Rapid occupation and firing drills

(2) Minimal adjustment fires

(3) Pre-planned fire missions

(4) Strict adherence to displacement triggers

f. Irregular and Unpredictable activities are used to avoid patterns that enable enemy targeting. This is used to disrupt enemy ISR pattern analysis and increase the enemy's targeting uncertainty. It involves:

(1) Varying firing locations and routes

(2) Avoiding repeated use of the same positions

(3) Changing movement timings and sequences

(4) Employing deception movements.

g. Integration with AD, when available, to protect against enemy aerial reconnaissance and strike. It involves:

(1) Co-locating with or being covered by SHORAD systems

(2) Coordinating with brigade or higher AD assets

(3) Engaging enemy UAVs and loitering munitions

h. Integration with EW to disrupt enemy reconnaissance and targeting systems. This assists in breaking or delaying the enemy's kill chain and creating windows of reduced threat. It involves:

(1) Jamming enemy UAV control and data links

(2) Degrading enemy radar systems

(3) Disrupting enemy communications between sensors and shooters.

Survivability during Key Actions

7.83 Survivability is achieved through the continuous application of protective measures across the three key actions of occupation, fire delivery, and displacement. Rather than treating survivability as a static function of position, OPA artillery frames it as a dynamic cycle designed to defeat the adversary's sensor-to-shooter system.

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7.84 During occupation, emphasis is placed on concealment, dispersion, and rapid readiness to avoid detection. The OPA assumes that once a position is detected, it will be targeted rapidly, especially by enemy WLR and UAV-enabled fires. Actions taken include:

a. Multiple pre-surveyed, pre-registered firing positions (primary, alternate, supplementary and dummy).

b. Positions selected for:

(1) Masking from UAV line-of-sight (vegetation, urban clutter, reverse slopes)

(2) Electromagnetic concealment (reduced emissions exposure)

(3) Rapid ingress/egress routes (route redundancy vice single axis)

c. Use of “silent occupation” drills:

(1) No radio transmissions

(2) Limited GNSS exposure (pre-loaded fire data where possible)

7.85 Rapid occupation (“arrive–orient–ready”)

(1) Guns do not conduct deliberate, time-consuming lay procedures

(2) Reliance on INS/GNSS-based orientation and pre-surveyed reference data

(3) Occupation timelines compressed to minutes, not tens of minutes

b. Dispersion on occupation:

(1) No use of linear gun lines

(2) The use of irregular, non-patterned dispersion which is often terrain-driven

(3) Separating distances sufficient to reduce effectiveness of cluster/counter-battery fires and prevent single-point detection from cueing entire unit

c. Deception and decoys:

(1) Establishing dummy positions in parallel

(2) Using heat sources, signature replication (tracks, disturbed ground)

(3) Decoy positions being occupied first to trigger enemy ISR.

7.86 During fire delivery, exposure is minimised through short-duration engagements and temporal massing. Actions include:

a. Shoot-and-scoot is used as a baseline. Fire missions are structured as:

(1) Short duration engagements using limited rounds per position

(2) Avoiding prolonged fire missions unless protected by EW or deception or operating under air defence umbrella

b. Temporal massing from dispersed positions where effects are massed in time, not space:

(1) Multiple batteries fire from different positions and different azimuths

(2) This reduces the enemy’s counter-battery solution accuracy and the probability of unit-wide detection.

c. Signature management:

(1) Controlling muzzle flash (where possible)

(2) Dust signature (position selection, ground preparation)

(3) The use of variable firing intervals and non-linear fire patterns to complicate WLR tracking

d. Integration with EW and deception:

(1) EW is used to disrupt enemy UAV control links and degrade WLR data transmission

(2) Generating false firing signatures to draw counter-battery fires onto decoys

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e. Air defence integration: Positioning SHORAD systems to protect firing units against loitering munitions and ISR UAVs.

7.87 During displacement, mobility is exploited to break targeting cycles and prevent effective counter-battery response. Collectively, these actions ensure that artillery units remain survivable while sustaining continuous and responsive fire support. Actions include:

a. Immediate post-fire displacement

(1) Movement is initiated immediately after mission completion and often before BDA is confirmed

(2) Using pre-planned displacement triggers such as “Rounds complete” and “Counter-battery risk threshold reached”

b. Employing multiple displacement options:

(1) Units do not move as a single element

(2) Sub-units displace to different alternate/supplementary positions

(3) Routes are pre-reconnoitred and varied to avoid pattern development.

c. Leapfrogging/bounding movement:

(1) Batteries alternate between firing and moving

(2) This ensures continuous fires support and reduced predictability

d. Movement is conducted under concealment:

(1) Making use of terrain masking, urban cover, night or reduced visibility

(2) Enforcing strict emission control during movement including minimal radio use

(3) Making use of pre-briefed control measures

e. Integration with logistics for resupply:

(1) Conducting rearming and refuelling away from firing positions often at concealed logistics nodes

(2) This avoids creating detectable patterns at gun areas.

7.88 There are a number of risks associated with these actions including reduced fire duration limiting effects, communication degradation under EMCON, increased complexity of coordination and logistics strain due to frequent movement. Mitigation will require rehearsal, disciplined execution and robust planning.

7.89 OPA artillery survivability is achieved through mobility, dispersion, concealment, deception, and temporal discipline, integrated with air defence and electronic warfare. Artillery units survive not by resisting enemy fires, but by avoiding detection, disrupting targeting, and displacing before engagement, ensuring continuous contribution to the reconnaissance–strike system.

Sustaining Firepower

7.90 OPA artillery sustainment is designed to support high-tempo, dispersed, and mobile firepower employment. Sustainment is not episodic but a continuous, forward-oriented function integrated with fire planning and manoeuvre. Logistics elements are positioned forward to reduce resupply time and sustainment nodes are distributed o support dispersed firing units. Resupply cycles are pre-planned, linked to fire plans and integrated with displacement cycles. Firepower is only as effective as the ability to sustain it across time and space.

Components of Firepower Sustainment

7.91 Firepower sustainment has a number of components including:

a. Ammunition sustainment, the primary driver of artillery sustainment.

(1) This involves pre-positioning of ammunition in forward areas and distributing it across multiple vehicles and locations.

(2) It also includes the establishment of battery-level ammunition points, battalion-level supply nodes, continuous resupply during operations and redistribution between units based on expenditure.

(3) Considerations include: high consumption rates during saturation and suppression fires, the matching of munition type to target requirements and the avoidance of the concentration of ammunition stocks.

b. Fuel supports both firing systems (where applicable) and mobility (critical for displacement and survivability)

(1) Forward positioning of fuel assets is required

(2) Refuelling is required to be integrated with displacement cycles

(3) The use of dispersed refuelling points is a major requirement.

(4) Mobility is a survivability requirement and therefore fuel sustainment is a combat function.

c. Sustaining firing systems (maintenance and technical support) requires:

(1) Routine maintenance during lulls in operations, rapid repair of mechanical faults and fire control systems as well as the replacement of damaged components

(2) This involves positioning forward repair teams at battalion level, the redistribution of functional systems if required and the prioritisation of critical systems.

d. Barrel and Launcher Management

(1) For tube artillery barrel wear needs to be monitored, rates of fire have to be managed to prevent degradation and maintenance or replacement requires scheduling.

(2) For rocket systems, launcher readiness and reload cycles require management.

(3) This maintains accuracy and reliability over time.

e. Personnel Sustainment

(1) Sustained operations require rotation of crews where possible, the management of fatigue and the replacement of casualties.

(2) This involves ensuring minimum crew effectiveness is maintained and conducting the cross-training personnel.

f. Technical Inputs (Ballistics and Meteorology).

(1) Accurate fire requires continuous updates covering meteorological data (wind, temperature, pressure), ballistic corrections and calibration inputs

(2) This involves regular updates from meteorological systems, integration with fire control systems and the adjustment of firing data as conditions change.

7.92 OPA artillery employs a number of sustainment methods as follows:

a. Forward sustainment involves positioning logistics nodes close to firing units to reduce resupply time and increase responsiveness.

b. Distributed sustainment involves dispersing supplies across multiple locations to reduce vulnerability to enemy attack and support dispersed firing units

c. Continuous resupply involves conducting resupply during firing operations and during displacement in order to avoid large, vulnerable resupply pauses.

d. Integration with displacement involves conducting resupply during movement between positions to minimise additional exposure.

e. Prioritised allocation where ammunition and resources allocated based on target priority and operational phase to ensure critical missions are supported

7.93 Commanders must balance rate of fire versus endurance. Accordingly sustainment is controlled through:

a. Fire planning processes by linking expenditure to supply

b. Logistics coordination at battalion and brigade level

c. The real-time reporting of ammunition status and system readiness

d. The dynamic reallocation of resources.

7.94 Sustainment will differ according to the type of operation being conducted. Offensive operations are likely to experience high consumption rates, particularly in ammunition. This will require the forward displacement of logistics and continuous resupply to maintain tempo. Defensive operations are likely to require the pre-positioning of ammunition. Expenditure rates are likely to be lower but sustained. There will be a greater emphasis on the survivability of logistics nodes. High-tempo operations are likely to be characterised by continuous resupply cycles, an increased maintenance demand and a greater reliance on distributed sustainment.

7.95 There are a number of risks associated with sustaining firepower including ammunition depletion, logistic node vulnerability, route interdiction, maintenance failure and the overextension of supply lines. These risks may be mitigated through redundancy, dispersion, protected routes and prioritisation.

7.96 OPA artillery sustains firepower through continuous, forward, and distributed logistics, integrated with fire planning and displacement cycles. Effectiveness is achieved by maintaining the availability of ammunition, fuel, and technical support while preserving mobility and survivability. This ensures artillery can generate repeated and decisive effects throughout ongoing operations.

A Vignette – CA-Bde 24-Hour Artillery Sustainment Cycle

Situation

7.97 Aa CA-Bde is conducting continuous offensive operations over a 24-hour period. The FA battalion (three 122mm SP howitzer batteries and one 122mm MRL battery) is tasked to provide continuous suppression of enemy defensive positions, disrupt enemy reserves and counterattacks, and support successive manoeuvre phases (assault, consolidation and exploitation).

7.98 The enemy maintains persistent UAV reconnaissance, a WLR-enabled counter-battery capability and can interdict logistics routes.

7.99 The FA battalion must sustain high-tempo fires, frequent displacement and continuous resupply under threat.

7.100 Sustainment will be conducted as a continuous, distributed process, integrated with firing and displacement cycles. Ammunition is to be distributed across gun lines, battery resupply vehicles and battalion logistics nodes. Resupply is to be conducted during displacement and between fire missions. Logistics nodes are to be repositioned forward in line with manoeuvre.

24-Hour Timeline Overview

7.101 The operation will be conducted over four phases:

a. Phase 1 H to H+6 – Initial assault and firepower concentration.

b. Phase 2 H+6 to H+12 – Sustained suppression and counterattack disruption.

c. Phase 3 H+12 to H+18 – Consolidation and repositioning.

d. Phase 4 H+18 to H+24 – Exploitation and follow-on fires.

7.102 Phase 1 (H to H+6): Initial Assault.

a. Firing Activity will be characterised by high-intensity fires to suppress forward enemy positions and saturate depth targets resulting in a rapid expenditure of ammunition.

b. There will be frequent displacement after short fire missions with leapfrog movement between batteries.

c. Initial ammunition loads will be carried on vehicles.

d. Battery resupply vehicles will move forward to replenish gun lines during displacement.

e. Battalion logistics node remains in rear but prepares forward movement.

f. Immediate resupply requirements will be driven by high consumption rates.

7.103 Phase 2 (H+6 to H+12): Sustained Fire Support.

a. Firing Activity will be characterised by continued suppression fires, increased interdiction of enemy reserves and more selective targeting.

b. Batteries will continue leapfrog displacement with slightly longer occupation times as tempo stabilises.

c. Battalion logistics node will displace\s forward and establish forward ammunition transfer points (ATP).

d. Resupply sequence will be conducted as follows:

(1) Rear supply to battalion node

(2) Battalion node to battery vehicles

(3) Battery vehicles to the gun line.

e. Minor maintenance conducted during short lulls and barrel wear will be monitored

f. Sustainment shifts from immediate consumption to managed distribution.

7.104 Phase 3 (H+12 to H+18): Consolidation.

a. Firing Activity will be characterised by reduced rate of fire focusing on enemy counterattacks and key terrain.

b. Displacement will be less frequent but still required with units repositioning for range and survivability.

c. Resupply will become more deliberate with bulk resupply conducted at ammunition transfer points and redistribution will occur between batteries to balance expenditure.

d. There will be an increased opportunity for system checks, repairs and crew rest

e. Sustainment will focus on stabilising and preparing for the next phase.

7.105 Phase 4 (H+18 to H+24): Exploitation.

a. Firing Activity will be characterised by a renewed increase in fire missions to support advancing manoeuvre units and fires shifting deeper into the enemy's rear

b. Forward displacement will be conducted to maintain range and support increased mobility requirements.

c. Logistics nodes will displace forward again and resupply conducted during movement and at new forward positions.

7.106 Sustainment will be required to keep pace with manoeuvre to maintain firepower relevance.

7.107 This vignette demonstrates that OPA artillery sustainment is a continuous, synchronised process that links ammunition flow, displacement and fire delivery into a single operational cycle. Sustainment success is not determined by stockpiles alone, but by the ability to move resources forward, distribute them efficiently and align them with the tempo of operations.

Assessment and Re-engagement

7.108 The purpose of assessment and re-engagement is to determine the effectiveness of firepower effects and to initiate follow-on actions against the same or subsequent targets. This ensures that firepower is applied efficiently, decisively, and in accordance with the commander's intent.

7.109 Artillery assessment is not a post-strike activity conducted after the fact. It is a continuous, near-real-time process embedded within fire delivery. Assessment enables confirmation of effects achieved, Identification of residual target capability and the triggering of dynamic re-engagement. Firepower is not complete when rounds impact but when the required effect has been achieved or the target is no longer relevant. Assessment and re-engagement form the final stage of the reconnaissance–strike cycle, but also act as the trigger for subsequent cycles.

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7.110 OPA artillery assessment focuses on effects, not simply damage. Assessment categories include:

a. Destroyed – the target has been eliminated or rendered inoperable

b. Degraded – the target capability has been significantly reduced

c. Suppressed – the target is temporarily unable to operate

d. No Effect – the target remains operational

e. Unknown – there is insufficient information to determine effect.

7.111 These assessments determine whether re-engagement is required.

7.112 Assessment is derived from multiple sources including:

a. UAV and Aerial ISR, the primary source of real-time observation which provides visual confirmation of damage, movement or continued activity.

b. EW, which detects continued emissions and degraded communications, providing an indicator of the functional status of the target.

c. WLR which confirms the cessation or continuation of enemy fire and supports assessment of artillery targets.

d. Forward elements of the manoeuvre forces which report on observed effects and resistance levels.

e. Other ISR sources such as higher-echelon intelligence, signals and imagery analysis.

Assessment and Re-engagement Options

7.113 The assessment process involves the collection of data where sensor systems collect post-strike information and the data is transmitted to command nodes which conduct data fusion and analysis. Multiple inputs are correlated and validated to determine the effect on the target. Commanders then determine whether the target requires re-engagement, whether or not it can be deprioritised or whether new targets take precedence.

7.114 Based on assessment, OPA artillery may re-engage the target immediately, conduct an adjusted re-engagement, engage follow-on targets or terminate the mission. Immediate re-engagement is applied if the target remains active or time-sensitive conditions exist. This can be conducted with the same or different firing units. Adjusted re-engagement involves modifying the aim point, munition type or firepower type. It is used when the initial effects are insufficient. Follow-on targeting involves shifting fires to related targets or higher priority objectives and is determined by the evolving situation. Termination occurs when the required effect has been achieved and the target is no longer relevant.

7.115 OPA artillery assessment and re-engagement is a continuous, system-enabled process that links fire delivery to subsequent action. By integrating real-time sensor inputs with command decision-making, artillery units ensure that firepower achieves its intended effects and is rapidly reapplied where required.

A Vignette – CA-Bde UAV-Enabled Assess – Re-Engage Loop (H+0 to H+10 Minutes)

Situation

7.116 An OPA mechanised CA-Bde) is conducting offensive operations against an enemy defending force. The CA-Bde's FA battalion has just executed a suppression fire mission against an enemy mechanised company position. ISR assets include a tactical UAV providing persistent observation and EW systems monitoring enemy emissions.

7.117 Enemy capabilities include the ability to rapidly reconstitute after suppression, UAV reconnaissance and a WLR-enabled counter-battery response.

7.118 The FA battalion must is required to assess the effectiveness of fires, determine whether the target remains operational, execute re-engagement if required and displace before counter-battery engagement.

Timeline Overview

7.119 H+0: Impact of Initial Fire Mission.

a. Artillery fires impact the target area and suppression effects disrupt enemy movement.

b. The UAV maintains continuous observation over target area.

7.120 H+1 to H+2: Initial UAV Assessment.

a. The UAV observes partial destruction of vehicles and some enemy elements seeking cover. Movement continues within position.

b. EW detects intermittent enemy communications.

c. The target is assessed as degraded but not neutralised.

7.121 H+2 to H+3: Data Transmission and Fusion.

a. The AV transmits imagery to the CA-Bde fires cell and FA battalion CP where EW data is integrated with visual confirmation

b. The fires cell Action confirms the target remains operational and identifies a residual combat capability

7.122 H+3 to H+4: Decision Point.

a. The CA-Bde fires cell determines that re-engagement is required to complete suppression to prevent reorganisation

b. Adjustment is required to shift aim points to the surviving elements with an increased intensity of fires

c. Weapon release authority is confirmed (delegated level) and the re-engagement order is issued.

7.123 H+4 to H+5: Fire Mission Re-Tasking.

a. The FA battalion reallocates firing units, updates firing data. A new fire mission is prepared with adjusted target coordinates and a modified firepower type (increased intensity)

b. The UAV continues to track target movement and provide updated aim points

7.124 H+5 to H+6: Re-Engagement Fires Delivered.

a. The FA battalion executes intensified suppression/destruction fires.

b. Additional vehicle damage occurs and enemy movement is significantly reduced

c. Minimal delay has occurred between assessment and re-engagement.

7.125 H+6 to H+7: Immediate Post-Strike Assessment.

a. The UAV observes the cessation of organised movement and the destruction of key vehicles.

b. EW detects significant reduction in enemy transmissions.

c. The target is assessed as suppressed approaching neutralised

7.126 H+7 to H+8: Final Assessment and Decision.

a. The UAV confirms that there is no coordinated activity on the enemy position with only isolated personnel movement.

b. The fires cell makes the decision that the target has been sufficiently neutralised and no further re-engagement is required

c. Fires are shifted to follow-on targets

7.127 H+8 to H+10: Transition and Displacement.

a. FA battalion batteries prepare for displacement and transition to the next fire mission.

b. The enemy UAV and WLR begin identifying firing locations.

c. The FA battalion displaces before counter-battery fires arrive.

7.128 This vignette demonstrates that OPA artillery effectiveness depends on the ability to rapidly close the loop between observation, decision, and action, ensuring that firepower achieves its intended effect before the enemy can recover or respond. Assessment is not an endpoint but a trigger for subsequent immediate action.

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Section 7-3. Reconnaissance by Fire

7.129 Reconnaissance by fire is employed to confirm the presence, disposition, composition or activity of enemy forces through the deliberate application of fires in order to provoke observable reactions, movement, electromagnetic emissions or return fire. Within the OPA reconnaissance–strike system, reconnaissance by fire supports target confirmation, target custody and dynamic targeting by generating signatures that can be identified and exploited by ISR systems.

7.130 Reconnaissance by fire is particularly important in restrictive terrain where concealment limits direct observation and where enemy forces are likely to employ ambush tactics, dispersed positions and camouflage. Reconnaissance by fire may be conducted to:

a. Confirm suspected enemy defensive positions;

b. Identify anti-armour ambush sites;

c. Provoke enemy artillery or mortar fire;

d. Expose concealed air defence systems;

e. Trigger radio or electronic emissions;

f. Identify reserve or support positions;

g. Support advance-to-contact operations;

h. Support clearance of restrictive terrain and choke points.

7.131 Reconnaissance by fire is not intended solely to destroy enemy forces. Its primary purpose is to generate information that can be exploited by the reconnaissance–strike system in order to support subsequent engagement.

Trigger Conditions

7.132 Reconnaissance by fire is normally conducted when:

a. ISR systems identify suspicious activity but cannot positively confirm enemy presence;

b. Terrain or weather restricts observation;

c. Manoeuvre forces are approaching likely ambush areas;

d. Enemy anti-armour or indirect-fire systems are suspected within concealed terrain;

e. Enemy artillery positions require confirmation prior to counterbattery engagement;

f. Time-sensitive targeting requires rapid target validation;

g. Enemy displacement or movement must be provoked to preserve target custody.

7.133 Typical trigger conditions include:

a. Intermittent thermal signatures detected by UAVs;

b. Suspected camouflage or disturbed vegetation;

c. Temporary radio or electronic emissions;

d. Recent enemy artillery or mortar activity;

e. Intelligence reporting indicating likely defensive occupation;

f. Restricted terrain such as jungle tracks, river crossings, urban streets or mountain passes.

7.134 Reconnaissance by fire should normally be integrated into the brigade or battalion targeting process and coordinated with ISR collection plans.

Integration with UAVs

7.135 Reconnaissance by fire is most effective when integrated with UAV overwatch. UAVs provide observation of target areas before, during and after engagement and enable rapid identification of enemy reactions following the delivery of fires. This allows the OPA to rapidly transition from target confirmation to target engagement.

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7.136 UAVs may observe personnel movement, vehicle displacement, thermal signatures and secondary explosions. They can also be used to observe firing positions, command post activity, emplacement of anti-armour systems and movement along withdrawal routes.

7.137 Reconnaissance-by-fire missions are frequently coordinated with brigade or artillery UAV detachments in order to maintain continuous target custody. UAVs may also support battle damage assessment and restrike decisions following the initial engagement.

Counter-battery Provocation

7.138 Reconnaissance by fire may also be employed to provoke enemy artillery, mortars or air defence systems into revealing their positions. Limited fires, harassment fires or probing fires may be delivered against suspected enemy areas in order to induce enemy response. Once the enemy system engages, WLRs, UAVs, acoustic sensors and EW systems attempt to identify the firing position for immediate counterbattery engagement.

7.139 This technique is particularly effective against:

a. Artillery occupying concealed firing positions;

b. Short-duration mortar systems;

c. Air defence systems operating under emission control;

d. Reserve positions prepared for rapid occupation.

7.140 Counterbattery provocation operations must be carefully coordinated in order to minimise ammunition expenditure and reduce exposure to enemy counterbattery fires.

Application in Complex Terrain

7.141 Reconnaissance by fire is especially important in complex terrain such as jungle and urban terrain due to restricted visibility, reduced observation ranges and extensive concealment opportunities.

7.142 In jungle terrain, fires may be employed against reverse slopes, jungle edges, likely anti-armour ambush sites, river crossings, concealed firing points, road junctions and choke points.

7.143 In urban terrain, reconnaissance by fire may be employed to identify occupied buildings, provoke firing from concealed positions, expose anti-armour teams, identify sniper positions and confirm defensive strongpoints.

7.144 Typical munitions used in restrictive terrain include HE airburst, smoke, thermobaric and fragmentation rounds. UAVs and FPV systems are particularly important in these environments due to reduced line-of-sight observation.

First-Person-View (FPV) Integration

7.145 FPV systems increasingly support reconnaissance-by-fire operations by providing close-range observation of target areas immediately following engagement. FPV systems may be used to confirm enemy presence and identify surviving personnel. They can also be use to, track withdrawing vehicles, observe concealed firing positions, support restrike decisions and conduct follow-on attack missions.

7.146 FPV systems may also be deliberately employed to provoke enemy reaction prior to artillery engagement. This creates an integrated reconnaissance–strike process in which artillery, UAVs and FPV systems cooperate to generate and exploit enemy signatures.

Survivability Considerations

7.147 Reconnaissance-by-fire activities expose artillery and mortar systems to enemy ISR and counterbattery threats. Reconnaissance-by-fire missions should therefore be short duration, highly controlled, integrated with displacement planning and synchronised with survivability measures.

7.148 Artillery and mortar units conducting reconnaissance by fire should employ dispersed firing positions, minimise electromagnetic emissions, rapidly displace following engagement, employ camouflage and deception measures as well as limit predictable firing patterns. They should also be coordinated with EW and air defence systems.

7.149 Reconnaissance-by-fire operations should avoid unnecessary ammunition expenditure and should only be conducted when the anticipated intelligence value justifies the associated survivability risk.

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Authority Considerations

7.150 Reconnaissance by fire requires coordination between manoeuvre, ISR and fires elements. Engagement authority is normally determined by target location, type of munition employed, risk of collateral damage, proximity to friendly forces, operational phase and ammunition expenditure limitations.

7.151 Routine reconnaissance-by-fire missions conducted within manoeuvre formations may be delegated to battalion or company-level commanders under established firepower authorities. However, reconnaissance-by-fire missions involving long-range rocket artillery, thermobaric munitions or engagement within restricted areas may require higher level approval.

7.152 Reconnaissance-by-fire activities must remain integrated with the targeting process, ISR collection priorities and weapon release authorities in order to ensure that generated target signatures can be rapidly exploited by the reconnaissance–strike system.

Section 7-4. TTPs for Tactical Actions

7.153 The core artillery tactical actions just covered describe what OPA artillery units do in combat. The tactics, techniques, and procedures (TTPs) that follow describe how those actions are executed in practice. These TTPs provide the practical methods that enable artillery to operate as a dispersed, mobile, and networked firepower system, translating conceptual approaches to targeting, firepower employment, and command and control into repeatable, time-sensitive actions.

7.154 OPA artillery TTPs are interdependent and mutually reinforcing, linking positioning, mission processing, target acquisition integration, concentration of fires, movement and displacement, survivability, sustainment, and command and authority into a coherent system of execution. Designed for a battlespace defined by persistent ISR, rapid targeting cycles, and precision strike, they emphasise dispersion, temporal massing, speed, and disciplined control of signature and movement. Together, they enable artillery units to deliver timely effects, preserve combat power, and sustain continuous support to manoeuvre forces while avoiding detection and destruction.

7.155 OPA artillery TTPs also form a coherent system of execution. They are designed for a battlespace characterised by persistent ISR, rapid targeting cycles and precision counter-battery threats. Accordingly, they emphasise:

a. Dispersion and non-linear deployment, the temporal massing of fires

b. Continuous movement and displacement

c. Signature management and survivability

d. Decentralised execution within defined authority.

Positioning and Deployment

7.156 The purpose of positioning and deployment is to locate and configure artillery forces in a manner that enables effective fire delivery while minimising vulnerability to enemy reconnaissance and counter-battery systems. Positioning is therefore a balance between range, survivability, mobility, and connectivity. Artillery positions are selected not only for their ability to fire, but for their ability to survive, displace, and re-engage. Positions are organised as part of a position system, consisting of primary, alternate, and supplementary positions linked by pre-planned routes.

7.157 OPA artillery units evaluate potential positions against four core criteria:

a. Fire Capability covering the ability to range assigned targets, coverage of fire support coordination areas and suitability for required trajectories (low/high angle).

b. Survivability including concealment from UAV and satellite observation, reduced exposure to WLR detection, the avoidance of predictable patterns and natural protection (making use of terrain masking, vegetation or urban clutter).

c. Mobility considerations covering multiple access and egress routes, the ability to displace rapidly, the avoidance of chokepoints and to be able to move in all types of weather conditions.

d. Communications by ensuring reliable connectivity to higher HQ, firing units, ISR systems, the use of redundant communication pathways and the Ability to operate under EMCON conditions.

Positioning TTPs

7.158 Development of positions. OPA artillery establishes primary positions (initial firing locations0, alternate positions (pre-planned displacement positions), supplementary positions (for specific sectors or contingencies) and hide positions (concealed waiting or deception locations). Key TTPs include:

a. Ensuring positions are geographically separated

b. All positions are linked by pre-reconnoitred routes

c. Subsequent positions are prepared before initial occupation.

7.159 Dispersion of fire units to avoid concentration of artillery assets and reduce vulnerability to counter-battery and precision strikes. Key TTPs include:

a. Wide spacing between guns/launchers

b. Separation of batteries, sections, command posts and logistics nodes

c. The use of irregular layouts to avoid pattern detection.

7.160 Distributed layout of combat elements. OPA artillery units deploy in non-linear, distributed configurations. Key TTPs include:

a. Firing units are dispersed across the position area

b. Command posts located separately and concealed

c. Ammunition vehicles offset from firing units.

7.161 Positions are selected to maximise terrain advantages. Key TTPs include:

a. Making use of reverse slopes and defilade positions

b. Using vegetation and urban clutter for concealment

c. Avoiding sky lining and exposed ridgelines

d. The use of terrain to mask movement and occupation.

7.162 Route Integration. Positioning is inseparable from movement planning. Key TTPs include:

a. The identification of primary, alternate, and emergency routes

b. Linking routes to subsequent positions and logistics nodes

c. Selecting routes for concealment, survivability and mobility.

7.163 Pre-Survey and Orientation. Positions are prepared to enable rapid firing and reduce time from occupation to the firing of the first round. Key TTPs include:

a. The use of GNSS-based location fixing

b. The use of INS-based orientation

c. Using pre-surveyed firing data where possible

7.164 Camouflage, Concealment, and Deception (CCD). Key TTPs include:

a. The use of multispectral camouflage

b. Minimising the use of tracks

c. Using decoy positions

d. Avoiding the creation of visible patterns.

7.165 Emission Control (EMCON) Positioning. Key TTPs include:

a. Reducing electromagnetic signatures

b. Limiting the need for transmissions

c. Using terrain to shield emissions.

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7.166 Integration with Protection Systems. Key TTPs include:

a. Making use of coverage by short-range air defence (SHORAD) when available

b. Using EW support when available

c. Avoiding known enemy ISR focus areas.

Deployment TTPs

7.167 Deployment TTPs govern how OPA artillery units transition from movement into effective firing positions, balancing speed, concealment and readiness to engage. They define the procedures for occupation, orientation and integration with command, sensor and sustainment systems. Key TTPs include:

a. Units move directly to pre-designated firing points and conduct occupation drills executed in parallel

b. Gun/launcher positions are pre-planned, command post and logistics nodes occupy pre-allocated sites and communications networks pre-configured.

c. During deployment firing units orient, command posts activate, communications are established and ammunition is prepared with all actions occurring simultaneously.

d. Units achieve “good enough” accuracy rapidly and refine only if time permits.

e. Vehicles remain mobile and oriented for rapid departure with equipment configured for quick movement.

7.168 OPA artillery positioning and deployment is a mobility-driven, survivability-focused activity that enables dispersed forces to deliver concentrated effects. By integrating terrain, dispersion, pre-planning, and rapid execution, artillery units are able to operate effectively within a contested ISR environment while maintaining continuous fire depicts a CA-Bde’s FA battalion layout.

7.169 The following diagram depicts a notional CA-Bde FA battalion deployed in a dispersed configuration. Firing units, command nodes, and logistics elements are spatially separated and connected by multiple routes, enabling survivability, mobility, and continuous fire support within a contested ISR environment.

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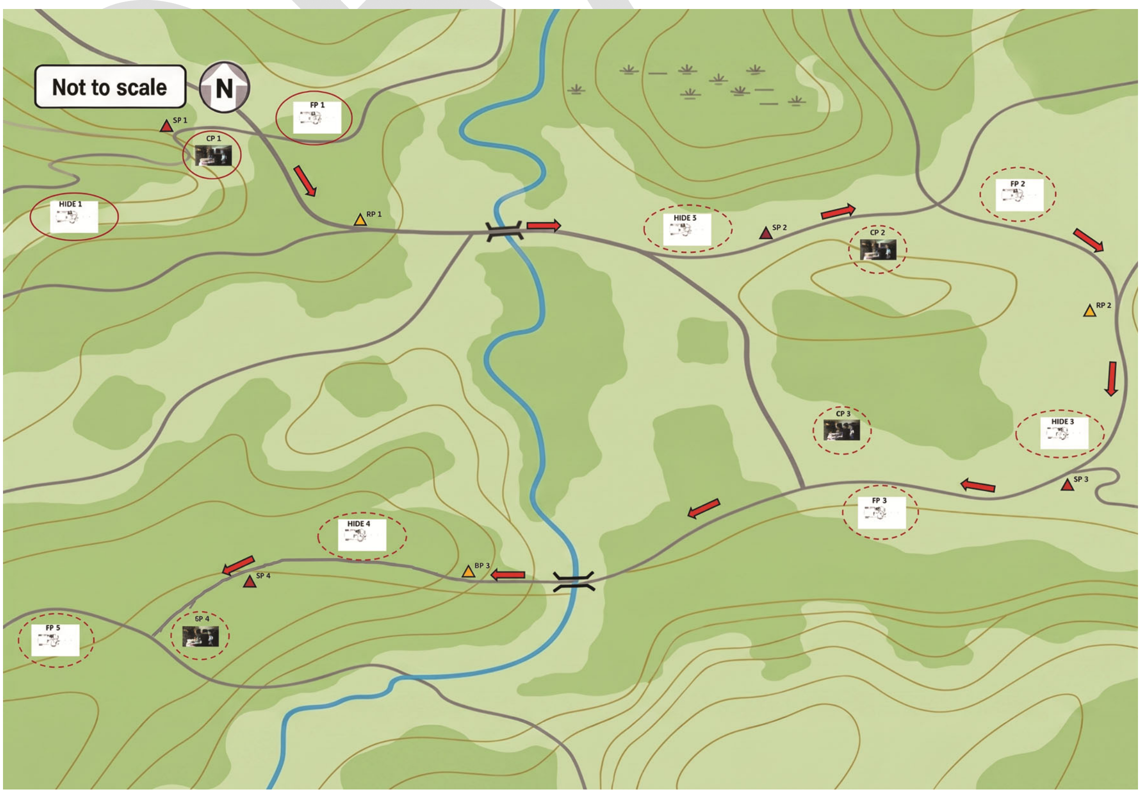
Figure 7.1 – FA Battalion Deployed in a Dispersed Configuration



Mission Processing

7.170 Mission processing TTPs govern how target information is received, validated, prioritised and concerted into executable fire missions. They ensure speed, accuracy and authority compliance in translating sensor inputs into timely, coordinated fire delivery.

7.171 Key TTPs include:

a. The parallel processing of validation, allocation and preparation of firing data

b. The use of standardised digital fire mission formats and pre-configured mission templates

c. The employment of rapid sensor-to-shooter timelines.

Target Acquisition Integration

7.172 Target acquisition integration TTPs govern how sensors are coordinated, cross-cued and fused to generate timely and accurate target data. They ensure continuous linkage between detection, confirmation and engagement systems reducing sensor-to-shooter timelines and enabling responsive, effects-based fires. Key TTPs include:

a. UAV, WLR, EW and observer integration to create multi-sensor redundancy

b. Sensor-to-sensor cueing (for example, EW – UAV)

c. The use of direct sensor-to-shooter links

d. Conducting persistent ISR coverage of target areas.

Concentration of Fires

7.173 Concentration of fires TTPs govern how dispersed artillery systems are synchronised to achieve decisive, time-convergent against priority targets. They emphasise temporal massing, integrated sensor-to-shooter linkages and centralised allocation to deliver overwhelming effects at the right time and location. Key TTPs include:

a. The temporal massing from dispersed positions by:

(1) Synchronising multiple firing units to achieve near-simultaneous impact using time-on-target/ time window effects

(2) Staggering firing sequences and ballistic solutions to converge effects in time and space

(3) Maintaining dispersion for survivability while concentrating effects at the point of decision.

b. Using centralised fire control and distributed execution where:

(1) Higher HQ (such as the CA-Bde fires cell/FA brigade) allocates firepower against priority targets.

(2) Subordinate units execute missions based on assigned fire plans and digital tasking

c. Prioritising fires and target weighting by:

(1) Allocating combat power against HVTs/HPTs

(2) Applying weighting of effort (main effort vs supporting effort) to determine volume and type of fires

(3) Adjusting priorities dynamically based on BDA and the commander's intent.

d. Using multi-system integration (covering guns, rockets and loitering systems) by:

(1) Combining tube artillery, MRLs, and precision systems to achieve complementary effects

(2) Tube artillery used for sustained suppression

(3) Rockets used for saturation and area neutralisation

(4) Precision/loitering munitions used for point destruction or disruption

(5) Sequencing or layering effects rather than treating systems independently.

e. Using sensor-to-shooter synchronisation by:

(1) Aligning ISR collection windows with fire missions to minimise latency

(2) Using cross-cueing (for example, EW – UAV – fires) to refine target accuracy before engagement

(3) Maintaining continuous updates to firing units for dynamic targets

f. Fire planning and pre-allocation by:

(1) Pre-planning targets, engagement areas, and fire missions to enable rapid execution

(2) Using on-call and pre-arranged fires to reduce decision time during execution.

(3) Integrating with manoeuvre plans (covering phase lines, objectives and axes of advance).

g. Ammunition and Effects Matching by:

(1) Selecting munitions based on desired effects (such as suppression, neutralisation or destruction)

(2) Balancing volume versus precision to avoid over or under-engagement.

(3) Managing expenditure rates to sustain concentration over time.

h. Deconfliction and airspace coordination by:

(1) Applying fire support coordination measures and airspace control measures

(2) Synchronising artillery, UAVs and aviation to enable simultaneous operations

(3) Preventing fratricide while maintaining tempo.

i. Rapid Re-Attack and Adjustment by:

(1) Using BDA to determine effectiveness and trigger re-engagement

(2) Maintaining firing readiness to exploit fleeting targets or incomplete effects

(3) Adjusting fire plans in near-real time based on updated intelligence.

j. Survivability During Concentration by:

(1) Limiting firing signatures (through shoot-and-scoot and emission control).

(2) Using deception, alternate positions, and displacement cycles

(3) Avoiding prolonged firing from a single location despite high-volume missions.

Movement and Displacement

7.174 Movement and displacement TTPs govern how artillery units reposition between firing locations to balance survivability, tempo, and continuity of fires. They define how forces move, transition, and re-establish combat capability while minimising exposure to detection and maintaining integration with command, sensor, and sustainment systems.

Movement TTPs

7.175 Movement TTPs describe how artillery forces displace between positions while preserving survivability, command and control, and readiness to fire. Key Movement TTPs include:

a. Route planning and management TTPs

(1) Using multiple pre-planned routes (primary, alternate, contingency, emergency),

(2) Avoiding patterning and varying routes and timings between displacements.

(3) Considering terrain mobility, choke points and concealment.

(4) Integrating engineer and ISR inputs to confirm route viability.

b. Movement by Bounds and Echelons TTPs:

(1) Moving in controlled groupings (such as battery, section or platoon level)

(2) Sequencing movement to maintain control and prevent congestion

c. Dispersion During Movement TTPs:

(1) Maintaining vehicle spacing to reduce vulnerability to strikes.

(2) Avoiding route compression, especially at halts, crossings, or urban terrain.

(3) Adjusting dispersion based on threat (such as UAV, artillery or air attack).

d. Speed, Timing, and Duration Control TTPs:

(1) Minimising time exposed on routes; avoid unnecessary halts.

(2) Using time windows (such as at night or periods of reduced visibility) to reduce detection

(3) Synchronising movement timing with manoeuvre forces and fires planning.

e. Signature Management (Physical and Electromagnetic) TTPs:

(1) Applying EMCON during movement where feasible

(2) Reducing visual and thermal signatures (through the use of camouflage, spacing and movement discipline)

(3) Limiting radio transmissions to essential traffic.

f. Command and Control in Motion TTPs:

(1) Maintaining continuous communications with higher HQ and adjacent units

(2) Using digital systems for real-time tracking and tasking updates

(3) Establishing movement control measures (such as checkpoints, phase lines and reporting triggers).

g. Integration with ISR and Security TTPs:

(1) Using ISR (UAV, EW and reconnaissance) to monitor routes and detect threats

(2) Employing local security elements or escorts where required

(3) Adjusting routes dynamically based on threat updates.

h. Actions on Contact (During Movement) TTPs:

(1) Conducting immediate drills for UAV detection, indirect fire, or ambush such as increasing speed and dispersion, deviating from the route if required and occupying hasty positions if necessary

(2) Maintaining command and report contact rapidly.

i. Movement–to–Occupation Transition TTPs:

(1) Preparing for rapid occupation on arrival by using pre-surveyed positions and having orientation data ready

(2) Maintaining partial readiness to fire during movement(where system design allows

(3) Ensuring a smooth handover from movement to deployment TTPs.

j. Sustainment Integration During Movement TTPs:

(1) Coordinating fuel, ammunition and maintenance with movement phases

(2) Avoiding the concentration of logistics elements with firing units

(3) Planning and positioning resupply points along or near movement routes.

7.176 Movement TTPs ensure artillery units displace with speed, dispersion, and unpredictability while maintaining command and control, integrating with ISR, and preserving readiness to rapidly reconstitute fire capability at the next position.

Displacement TTPs

7.177 Displacement is threat-informed, mission-driven and commander-controlled. While conducting displacement drills units maintain dispersion, mobility, and readiness to re-engage. All displacement methods rely on pre-surveyed positions, rehearsed drills, and digital C2 integration. Continuity of fires is preserved where required; survivability takes precedence in high-threat environments.

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7.178 Displacement is executed through immediate, leapfrog, or sequential methods to balance survivability, fire continuity, and control. Selection of method is determined by threat conditions, mission requirements, and the commander's intent, with all methods designed to preserve combat power while enabling responsive, effects-based fires.

Immediate Displacement (Shoot-and-Scoot) TTPs

7.179 Immediate displacement is used when there is a high counter-battery threat or the threat of detection by UAV/EW is high.

7.180 Actions on the position include:

a. A displacement order covering the route, destination and timing has been received.

b. Orders to cease firing or to handover the mission to another unit has been given.

c. Weapon systems will make systems safe whilst retaining essential firing data.

d. On coming out of action systems transition immediately to march order and displace without delay via pre-designated routes ensuring the time from last round fired to movement is minimised.

7.181 Once on route, units will maintain communications and provide positional reporting as required. Dispersion and EMCON will be applied as required.

7.182 At the new position:

a. Weapon detachments will conduct rapid occupation and orientation

b. Re-establish digital fire control links

c. Confirm readiness and accept fire missions.

Leapfrog Displacement TTPs

7.183 Leap frogging is used when there is a requirement to maintain continuous fire support and most likely to be used during offensive or manoeuvre operations.

7.184 Actions on the Position include the following:

a. The commander designates the displacing and firing elements.

b. A fire handover to stationary element is conducted.

c. The displacing element ceases fire and prepares for movement.

d. The non-displacing element maintains fire missions.

7.185 The displacing element moves to the alternate position and conducts rapid occupation and establish fire capability.

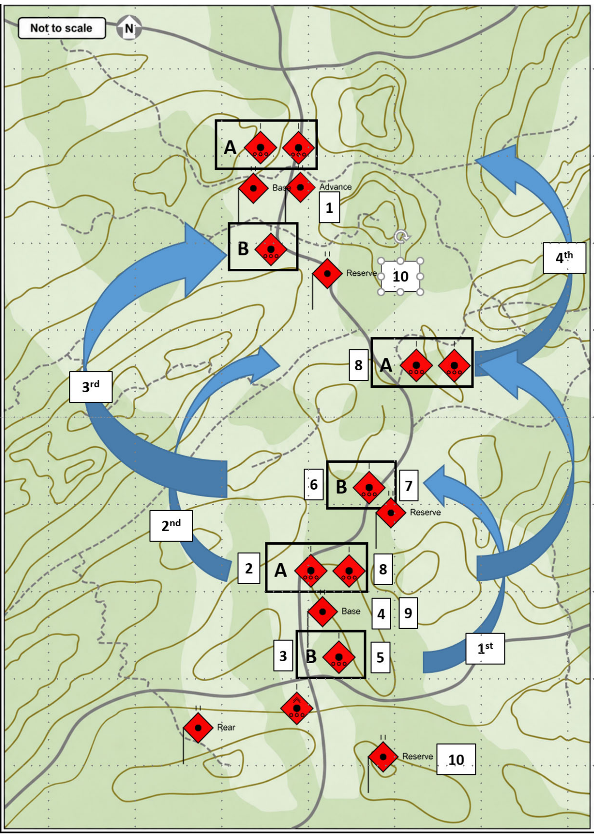
7.186 Relief and Continuation is conducted as follows:

7.187 The displaced element confirms readiness as the newly established element.

7.188 Fire responsibility is transferred to the newly established element.

7.189 The alternate displacement cycle continues.

Figure 7.2 – FA Battalion Leapfrog Displacement



1. The Advance CP is co-located near the CA-Bde forward command element or frontline attack group.
2. Group A consisting of Batteries 1 and 2 is the initial forward firing group, occupies firing positions and provides support.
3. Group B is the initial moving group consisting of the third SPH battery, Battery 3.
4. The Base CP manages fire priorities, ammunition expenditure and future displacement planning. At this point, Group A fires while Group B prepares to move.
5. Battery 3 displaces forward.
6. Battery 3 occupies new firing positions ahead of Battery 1 and 2. Battery 3 lays guns, establishes communications, confirms survey/GNSS data, registers digitally and readies ammunition.
7. Reports 'ready'. Fire support shifts from Battery 1 + 2 to Battery 3.
8. Once relieved Battery 1 and Battery 2 displace and move forward past Battery 3. This creates the leapfrog effect.
9. The Base CP moves less often. It only displaces when the Advance is CP too far ahead, communications degrade or fire planning latency increases.
10. When this occurs the Base CP leapfrogs with the Reserve CP.

Sequential Displacement TTPs

7.190 Sequential displacement is used for planned repositioning in a lower threat environment and there is a requirement for deliberate control.

7.191 Actions on the old position include:

a. A detailed movement order covering the route, destination and timing has been received.

b. Sub-units cease fire in accordance with the sequence and conduct deliberate transition drills to march order.

7.192 During movement execution sub-units displace in the designated order and maintain route discipline and spacing.

7.193 At the occupation of the new position units occupy the new positon using deliberate occupation drills covering survey, orientation and system checks and also integrate with C2, ISR and sustainment systems.

7.194 Fire capability will be restored progressively and normal fire planning and execution will be resumed.

C2 and Integration Considerations

7.195 Higher HQ will determine the displacement method based on the threat, mission and tempo. Using digital systems the FA battalion HQ will be to use real-time tracking and fire reallocation. Regardless of the displacement method used clear authority is required for fire handover and movement execution.

7.196 ISR supports route selection, threat identification and BDA post-displacement. Fires maintains synchronisation with manoeuvre forces and targeting priorities.

Survivability

7.197 Survivability TTPs ensure artillery units preserve combat power across occupation, fire delivery, and displacement by reducing detectability, targetability, and vulnerability.

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7.198 Dispersion and spatial separation TTPs include:

a. Ensuring platforms are deployed with sufficient spacing to avoid catastrophic loss from a single strike.

b. Dispersing command posts, ammunition points and support vehicles.

7.199 Mobility and displacement discipline TTPs include:

a. Applying immediate, leapfrog, or sequential displacement as dictated by the threat.

b. Avoiding prolonged occupation of firing positions.

c. Maintaining readiness for rapid movement at all times.

7.200 Signature management (multi-spectral) TTPs include:

a. Minimising visual, thermal, acoustic and electromagnetic signatures.

b. Applying camouflage, concealment and emission control (EMCON).

c. Limiting transmission times and avoid predictable communication patterns.

7.201 Deception and decoy employment TTPs include:

a. Employing dummy positions, false signatures and deception fires.

b. Alternating between primary and alternate positions to complicate enemy targeting.

7.202 Terrain exploitation TTPs include:

a. Using terrain masking, defilade and covered routes.

b. Selecting positions that reduce line-of-sight exposure to ISR assets.

7.203 Counter-reconnaissance measures TTPs include:

a. Detecting and disrupting enemy ISR including UAVs, EW and reconnaissance patrols.

b. Integrating air defence and EW support to deny enemy targeting when available.

7.204 Position hardening and protection TTPs include:

a. Using field fortifications where time permits.

b. Protecting critical nodes such as command posts, ammunition and sensors against fragmentation and blast.

7.205 Movement Security TTPs include:

a. Maintaining dispersion and unpredictability during movement.

b. Avoiding route patterning and congestion.

Sustainment

7.206 Sustainment TTPs ensure artillery units maintain continuous fire capability through effective management of ammunition, fuel, maintenance and logistics integration.

7.207 Ammunition management and distribution TTPs cover:

a. The prioritisation of ammunition allocation based on the commander's intent and target priorities.

b. Maintaining forward resupply with distributed caches where feasible.

c. Balancing expenditure rates against anticipated operational tempo.

7.208 Forward logistics integration TTPs include:

a. Positioning logistics elements to support rapid resupply without exposing them to risk.

b. Integrating logistics planning with displacement and movement cycles.

7.209 Fuel planning and resupply TTPs cover:

a. Synchronising fuel resupply with displacement phases.

b. Maintaining sufficient reserves to enable rapid movement and repositioning.

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7.210 Maintenance and repair discipline TTPs include:

a. Conducting preventative maintenance during lulls in operations.

b. Prioritising recovery and repair of critical systems including guns, launchers and vehicles.

7.211 Distributed sustainment nodes TTPs cover:

a. Avoiding the centralisation of logistics hubs to reduce vulnerability to targeting.

b. Using multiple, dispersed resupply points to enhance survivability.

7.212 Sustainment under threat TTPs include:

a. Conducting resupply during periods of reduced visibility where possible.

b. Minimising the duration and signature of logistics activities.

7.213 Integration with fire planning TTPs cover:

a. Linking sustainment planning directly to fire plans and expected rates of fire.

b. Adjusting logistics posture based on BDA and re-attack requirements.

Command and Authority

7.214 Command and authority TTPs define how artillery forces are controlled, coordinated, and authorised to deliver fires within a system-of-systems construct.

7.215 Centralised allocation, decentralised execution TTPs include:

a. Higher HQ allocating firepower against priority targets.

b. Subordinate units executing missions within assigned authorities.

7.216 Authority gating and release control TTPs cover:

a. Defining clear authority levels for fire mission approval and execution.

b. Centralising control for sensitive or high-risk targets and delegating control for routine engagements.

7.217 Digital fire control integration TTPs include:

a. The use of networked systems to transmit target data, fire missions and execution orders.

b. Maintaining redundancy in communications pathways.

7.218 Continuous situational awareness (COP) TTPs cover:

a. Maintaining a shared operational picture across firing units and command nodes.

b. Updating positions, target status and mission execution in real time.

7.219 Fire support coordination and deconfliction TTPs include:

a. Applying fire support coordination measures and airspace control measures.

b. Synchronising artillery with UAVs, aviation and other fires systems.

7.220 Dynamic targeting and re-tasking TTPs cover:

a. Enabling rapid reallocation of fires based on emerging targets.

b. Using BDA to trigger re-engagement or mission adjustment.

7.221 Redundancy and continuity of command TTPs include:

a. Establishing alternate command posts and succession of command.

b. Maintaining control despite disruption to primary C2 nodes.

7.222 Integration with manoeuvre commanders TTPs cover:

a. Aligning fire support with manoeuvre intent and scheme of manoeuvre.

b. Maintaining habitual relationships between artillery and supported units.

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Section 7-5. TTP Integration Matrix

7.223 The matrix on the next page demonstrates how OPA artillery TTPs integrate to enable continuous detection, decision, delivery, survivability, and re-engagement. It demonstrates that no TTP operates in isolation. Effectiveness is achieved through synchronisation across functions and time.

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Table 7.1 – TTP Integration Matrix

Tactical action	Positioning	Mission processing	Target acquisition integration	Concentration of fires	Movement and displacement	Survivability	Sustainment	Command authority
Reconnoitre and prepare	Select pre-determined, pre-surveyed pre-oriented positions	Pre-plan target sets and fire missions	Integrate ISR coverage and sensor plan	Plan fire groupings and timing	Identify routes and position systems	Plan concealment and signature reduction	Pre-position logistics and ATPs	Establish priorities and authority framework
Occupy an establish readiness	Occupy dispersed, non-linear firing nodes	Load and confirm fire mission data	Establish sensor links and tracking	Prepare synchronised fire plans	Maintain readiness to displace	Minimise signature during occupation	Position resupply vehicles	Confirm communications and control
Deliver fire	Operate from dispersed nodes	Rapid processing and dissemination of fire missions	Real-time sensor-to-shooter data flow	Execute temporal massing (TOT)	Prepare for immediate displacement	Limit dwell time and firing signature	Monitor ammunition expenditure	Execute under delegated authority
Displacement and continue support	Transition to alternate positions	Reassign fire missions to available units	Maintain ISR tracking during movement	Reallocate fires dynamically	Execute shoot-and-scoot / leapfrog	Avoid detection during movement	Conduct resupply en-route	Authorise displacement based on triggers
Survive and protect	Use terrain and dispersion	Adjust mission timing to reduce exposure	Use EW and ISR to detect threats	Limit duration of fire concentration	Displace before engagement	Apply CCD, EMCON, deception	Disperse logistics nodes	Retain control of sensitive actions
Sustain firepower	Position near support routes	Adjust missions based on ammo status	Use ISR to prioritise targets	Allocate fires based on resources	Integrate movement with resupply	Protect logistics from detection	Flow ammo: HQ-ATP-battery-gun	Control allocation of limited resources
Assess and re-engage	Maintain coverage of target areas	Process BDA and generate follow-on missions	Use UAV/EW to confirm effects	Re-mass fires if required	Reposition for follow-on targets	Avoid exposure during reengagement	Reallocate ammunition	Approve reengagement decisions

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Key Observations

7.224 OPA artillery effectiveness is derived from the integration of all TTPs, not from the optimisation of any single function. Positioning, targeting, fire delivery, movement, sustainment, and command processes operate as a single, interdependent system, in which changes in one function immediately affect the others. This integration enables artillery to transition seamlessly between actions, maintaining tempo and coherence across the battlespace.

7.225 Key observations are as follows:

a. OPA artillery effectiveness is derived from the integration of all TTPs, not from the optimisation of any single function. Positioning, targeting, fire delivery, movement, sustainment, and command processes operate as a single, interdependent system, in which changes in one function immediately affect the others. This integration enables artillery to transition seamlessly between actions, maintaining tempo and coherence across the battlespace.

b. Artillery operations are conducted as a continuous cycle rather than a linear sequence. Tactical actions overlap in time, with units simultaneously preparing to move, receiving target data, executing fire missions, and managing sustainment. This continuous cycle, occupy, fire, displace, re-occupy, and re-engage, ensures that firepower is applied persistently while reducing vulnerability to enemy targeting.

c. OPA artillery achieves decisive effects through synchronisation in time rather than concentration in space. Dispersed firing nodes are coordinated to deliver effects simultaneously at the target, typically through time-on-target (TOT) or tightly controlled firing windows. This approach maximises shock effect, compresses the enemy's response time, and allows artillery units to limit their exposure to counter-battery systems.

d. Survivability is not a discrete activity but a cross-cutting consideration embedded in every TTP. Decisions relating to positioning, movement, fire delivery, and sustainment are all shaped by the requirement to avoid detection, disrupt targeting, and displace before engagement. As a result, survivability is achieved through the cumulative effect of dispersion, signature management, mobility, and deception across all actions.

e. Command and authority provide the framework that enables all other TTPs to function coherently. Through centralised prioritisation, delegated execution authority, and clearly defined control measures, commanders ensure that firepower is applied in accordance with operational intent while maintaining responsiveness. Effective command and authority arrangements allow artillery units to act rapidly within defined boundaries, balancing speed, control, and survivability.

Section 7-6. Conclusion

7.226 Tactical actions and TTPs provide the practical framework through which OPA artillery units translate doctrine into combat effect. Tactical actions define what must be achieved at each stage of employment, while TTPs prescribe how those actions are executed under varying operational conditions.

7.227 Collectively, they enable the OPA's artillery forces to generate responsive, accurate and survivable fires through disciplined execution, integration with sensor and command systems, and the ability to adapt to threat, terrain, and tempo. Their effective application ensures that dispersed systems can be synchronised to deliver decisive, effects-based fires at the point of decision while preserving combat power for sustained operations.

Chapter 8
Fire Support Logistics and Sustainment

> *Bring war material with you from home, but forage on the enemy.*
>
> **Sun Tzu**
>
> The Art of War, Chapter 2 – Waging War, 512 BCE

Section 8-1. Introduction

8.1 The sustainment of OPA fires is fundamental to the generation, maintenance, and regeneration of combat power. Within the OPA construct, logistics is not treated as a rear-area support function, but as an integral component of the reconnaissance–strike system. OPA fires logistics is designed to enable:

a. Sustained and responsive firepower output

b. Rapid regeneration of combat capability

c. Distributed and survivable operations under conditions of persistent surveillance and precision strike

8.2 This chapter describes the organisation, principles, and employment of logistics systems that sustain OPA artillery forces across the spectrum of operations focusing on ammunition, fuel and maintenance.

8.3 OPA sustainment is effects-driven and aligned to firepower requirements rather than platform-centric models. Logistics is therefore integrated into fire planning, targeting processes, and command and control systems. Sustainment directly influences firepower type selection, the rate and duration of fire as well as operational tempo. The OPA approach emphasises anticipatory logistics.

Anticipatory Logistics

8.4 Anticipatory logistics is the forecast-driven positioning and allocation of resources in advance of demand, based on planned operations, expected consumption, and predictive analysis. Anticipatory logistics is predictive and forward-looking and uses the pre-positioning of ammunition and supplies based on fire plans, target density estimates and operational tempo forecasts. It is designed for high-intensity conflict and contested logistics environments.

8.5 In an OPA fires context anticipatory logistics enables the immediate execution of fire missions without delay and sustained high-tempo operations (such as saturation fires). It assists in reducing sensor-to-shooter latency caused by supply constraints. For example, A CA-Bde expects a 2-hour saturation fires window. Ammunition is forward staged at multiple dispersed nodes, allocated to batteries before H-hour, and protected and concealed in anticipation of ISR threat. Fires can commence immediately at scale, meaning that multiple firing systems can deliver high-volume, coordinated firepower at H-hour without reliance on follow-on resupply or phased build-up.

Just-in-Time (JIT) Logistics

8.6 JIT logistics is a demand-driven system that delivers supplies only when needed, minimising stockpiles and storage. JIT is reactive rather than predictive. It minimises inventory and storage footprint. It is reliant on secure, uninterrupted supply chains and the generation of accurate, real-time demand signals. It is typically used in industrial systems (for example, Toyota’s production model), peacetime or low-threat military operations and stable, uncontested logistics networks.

8.7 The OPA Uses demand-driven distribution where units request ammunition and supplies dynamically. Logistics responds to real-time consumption data and the use of digital systems enable responsive allocation. it also minimises static stockpiles in some contexts to reduce detection by ISR and vulnerability to precision strike.

Anticipatory versus JIT Logistics

8.8 The OPA employs a hybrid sustainment approach that combines anticipatory logistics with JIT distribution practices, particularly at the tactical level. During execution, logistics elements may redistribute ammunition and supplies dynamically in response to real-time consumption, reflecting JIT-like responsiveness enabled by digitised command and control systems. However, this responsiveness is nested within a fundamentally anticipatory sustainment model, in which ammunition, especially for artillery and rocket systems, is pre-positioned, pre-allocated and aligned to fire plans prior to H-hour.

8.9 In high-intensity, contested environments where supply lines are vulnerable to disruption and fires must be delivered within minutes, reliance on JIT alone would introduce unacceptable latency and risk. Accordingly, while JIT practices enhance efficiency and adaptability during operations, anticipatory logistics remains the dominant methodology, ensuring that decisive firepower can be generated immediately and sustained at tempo.

Section 8-2. The Olvanan Fires Sustainment Framework

8.10 OPA fires sustainment is organised as a multi-echelon framework that integrates ammunition distribution, maintenance and repair and time-based sustainment processes. This framework enables the anticipatory positioning of ammunition prior to H-hour, continuous, prioritised resupply during execution, and rapid restoration of combat capability through repair and maintenance. Sustainment is therefore defined not only by the location of resources at each echelon, but by the continuous flow of materiel and the regeneration of combat power across those echelons over time.

8.11 The echeloned support structure consists of the Group Army/FA Bde sustainment node, the FA battalions' resupply and maintenance nodes and the batteries' handover and maintenance points.

Relationship to CA-Bde Logistics Doctrine

8.12 OPA field artillery sustainment is nested within the broader CA-Bde sustainment architecture consisting of:

a. The Zhandou (Combat) Echelon (Z-Ech)

b. The Lian Zhichi (Company Support) Echelon (L-Ech)

c. The Ying Zhichi (Battalion Support) Echelon (Y-Ech)

d. The Logistic Support Detachments (LSD)

e. The Rear Area Support Groups (RASG) and task-organised Resupply Detachments (RD).

8.13 These echelons provide the overarching framework through which ammunition, fuel, maintenance, recovery, medical support and transport are coordinated across the CA-Bde.

8.14 Although OPA field artillery battalions are sustained through this broader CA-Bde sustainment architecture, artillery sustainment differs significantly from manoeuvre sustainment. Manoeuvre battalions are generally sustained through rotational and demand-driven resupply linked to combat endurance and manoeuvre tempo. In contrast, artillery sustainment is anticipatory, tonnage-intensive and synchronised directly to the fire plan, displacement cycle and targeting process. Ammunition expenditure, fuel consumption, maintenance requirements and survivability considerations require artillery sustainment to operate as a continuous tempo-enabling system rather than a routine combat service support function.

8.15 Consequently, OPA field artillery battalions adapt the broader sustainment framework to meet artillery-specific requirements. Artillery Y-Echelons and RDs are typically larger and more heavily weighted towards ammunition transport, fuel distribution, maintenance and recovery than those supporting manoeuvre battalions. Sustainment is organised around the continuous movement of ammunition, fuel and repair capability between battalion, battery and weapon echelons in order to maintain fire continuity, preserve survivability and sustain displacement tempo under persistent ISR and counter-battery threat. Sustainment therefore supports not only endurance, but the continuous generation and regeneration of firepower effects.

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Group Army/FA Brigade Sustainment Node (Artillery LSD/RASG Interface)

8.16 The FA Brigade sustainment node forms the primary sustainment base for artillery operations within the brigade area of operations. It is responsible for bulk ammunition storage and allocation, generation and tasking of transport assets (in particular 8×8 trucks), coordination of resupply operations and the execution of higher-level maintenance and repair.

8.17 Maintenance and repair functions at this echelon include:

a. Major equipment repair (including artillery systems, vehicles, and fire control systems),

b. Component replacement and refurbishment,

c. Recovery and evacuation coordination

d. The return of systems to operational units.

8.18 In practice, the brigade node conducts anticipatory push of ammunition and critical spares prior to H-hour and sustains operations through continuous lift and repair support.

Battalion Resupply and Maintenance Node (Artillery Y-Echelon)

8.19 The FA battalion resupply and maintenance node serves as the central integration point for sustainment and combat operations. It performs three primary functions:

a. Ammunition reception, prioritisation, and redistribution,

b. Coordination of resupply to batteries

c. The execution of intermediate-level maintenance and repair.

8.20 Maintenance functions at this echelon include the repair of mobility systems (such as vehicles and prime movers), the servicing of artillery systems (including minor faults and adjustments), maintenance of fire control and communications equipment, and the coordination of recovery for damaged systems. The battalion node is the critical decision point where ammunition is allocated based on operational priority, and combat power is regenerated through repair and return-to-service actions.

Battery Handover and Maintenance Point

8.21 The battery-level node represents the forward sustainment interface with firing units. It is responsible for the receipt and transfer of ammunition to weapon systems, short-duration holding of ammunition and supplies and the execution of immediate maintenance and repair tasks.

8.22 Maintenance functions at this echelon include basic fault rectification, weapon system servicing and preparation, immediate repair actions to restore firing capability, and reporting of equipment status to the FA battalion HQ. Battery commanders select handover and maintenance points based on proximity to firing positions, survivability and concealment and accessibility under contested conditions.

Task Organisation of Logistics

8.23 Logistics elements are task-organised to support artillery groups, mobile artillery groups and dedicated firepower groupings. Sustainment relationships mirror firepower command relationships (constituent, supporting, dedicated and affiliated), ensuring alignment between logistics support and firepower allocation.

8.24 Due to the central role of fires within the OPA reconnaissance–strike system, artillery sustainment is frequently prioritised during offensive operations, particularly in relation to ammunition distribution, fuel allocation, maintenance support and transport availability. This priority reflects he role of fires in enabling operational tempo, suppression, disruption and system-level effects across the battlefield.

Civil–Military Integration (CDI)

8.25 OPA logistics leverages Civil–Defence Integration (CDI) to expand sustainment capacity through the use of civilian transport assets (such as heavy trucks and RORO vessels), dual-use infrastructure (ports, airfields, highways) and pre-conflict stockpiling and mobilisation systems.

Section 8-3. Ammunition Sustainment

8.26 Ammunition sustainment is the principal determinant of OPA artillery combat power, governing the volume, duration, and tempo of fires that can be delivered. Within the OPA system-of-systems approach, ammunition is not treated as a passive commodity but as a time-sensitive, effects-linked resource that must be forecast, positioned, and allocated in accordance with the fire plan. This requires a sustainment model that combines anticipatory positioning prior to H-hour with responsive redistribution during execution, ensuring that ammunition is available at the point of need without introducing delay into the sensor-to-shooter cycle.

8.27 Ammunition sustainment is therefore integrated with targeting processes, firepower employment and command and control. Accordingly, the effectiveness of OPA fires is determined not only by the performance of weapon systems, but by the ability to ensure that appropriate ammunition is available at the point of need and at the time required, making the design and execution of ammunition sustainment as critical as the firing systems themselves.

8.28 Ammunition represents the consumable element of firepower, and therefore acts as the limiting factor in sustained artillery operations. Within OPA doctrine, ammunition defines the achievable firepower effects, constrains the duration of fire missions and directly influences operational tempo. The relationship between ammunition and fires is characterised by:

a. Volume – how much can be fired

b. Timing – when it can be fired

c. Allocation – where it is applied.

8.29 Firepower is not determined by the number of guns available, but by the ammunition that can be delivered, sustained, and replenished.

Ammunition Categories

8.30 OPA artillery sustainment must support a range of ammunition types, each with distinct logistical characteristics:

a. Tube artillery ammunition consisting of 122mm and 155mm projectiles

b. Rocket artillery ammunition consisting of 122mm and 300mm rockets

c. Precision munitions

d. Mortar ammunition.

e. Loitering munitions and FPV.

Tube Artillery Ammunition

8.31 Tube artillery ammunition forms the core of OPA firepower, providing the sustained, responsive fires required to support manoeuvre, shape the battlespace, and maintain operational tempo. Tube artillery ammunition is characterised by high consumption, continuous demand, and flow-based sustainment.

8.32 Within the OPA system-of-systems approach, 122 mm and 155 mm ammunition are treated as primary firepower enablers, requiring a sustainment model that ensures uninterrupted availability across all phases of operations. This sustainment model is characterised by high volume and continuous consumption, moderate weight and transport density, and predictable expenditure patterns. Consequently it must be forward positioned prior to operations, requires continuous resupply during execution and is sustained through flow-based logistics systems. Sustainment of tube artillery ammunition is therefore anticipatory in initial positioning and continuous and repetitive in execution.

8.33 The movement of 122 mm and 155 mm tube artillery ammunition is conducted using a combination of medium and heavy tactical logistics vehicles, designed to support continuous, flow-based resupply from brigade to battery level. Transport platforms are selected based on payload capacity, cross-country mobility and echelon of employment. Transport assets therefore directly influence the rate of ammunition flow, the ability to sustain fires over time and the responsiveness of the resupply system.

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8.34 Medium tactical trucks (6×6 Class) form the core of artillery ammunition transport at battalion level. They can carry approximately 3–5 tonnes cross-country and are highly mobile. They are employed to carry ammunition between FA battalion RPs and battery handover points (BHP). They are also used for forward resupply under contested conditions and to support last-mile delivery.

8.35 When transporting 122 mm ammunition they provide efficient transport density as fewer trucks are required to carry required loads. However when carrying 155 mm ammunition they have reduced loads due to weight constraints. Medium trucks enable flexible, distributed resupply, but require higher vehicle numbers for heavy ammunition.

8.36 Heavy tactical trucks (8×8 Class) provide bulk lift capability at brigade level. They can carry up to 15 tonnes but have lower cross-country mobility than 6×6 systems. They are best used for main supply routes. They are employed to carry ammunition between the FA brigade sustainment node and FA battalion RP. They are generally used for the bulk movement of ammunition and pre-positioning prior to operations. Heavy tactical trucks are most suitable as high-volume transport for 122mm ammunition and essential for the efficient movement of 155mm ammunition. Heavy trucks enable mass and efficiency, but are more vulnerable and less suited to forward areas.

8.37 Last-mile delivery is the final stage of the ammunition sustainment process, involving the movement of munitions from battery-level handover points to individual weapon systems under conditions of maximum threat and constraint. In OPA artillery operations, this phase is characterised by short-distance movement using light vehicles and manual handling, conducted under strict concealment and tightly synchronised with displacement and fire execution. It is the most vulnerable and time-sensitive element of the sustainment system, where exposure to enemy ISR, terrain limitations, and handling delays can disrupt the flow of ammunition. Accordingly, last-mile delivery is not simply a logistics function but a tactical activity that directly determines whether ammunition reaches the guns and whether fires can be sustained at the point of contact.

8.38 Light tactical vehicles, such as the Dongfeng Mengshi are used for last-mile delivery. Although they have a low weight carrying capacity they are highly mobile and have a reduced signature compared to larger vehicles.

Rocket Artillery Ammunition

8.39 Rocket artillery ammunition provides the OPA with the ability to deliver high-volume, short-duration firepower effects, enabling rapid shaping of the battlespace and disruption of enemy systems. Unlike tube artillery ammunition, which is sustained over time, rocket artillery ammunition is characterised by intense, episodic consumption.

8.40 Within the OPA system-of-systems approach, Multiple Rocket Launcher (MRL) ammunition is treated as a surge firepower capability, requiring a sustainment model that emphasises anticipatory positioning and timing rather than continuous flow.

8.41 Rocket artillery ammunition imposes a sustainment model characterised by extremely high consumption per fire mission, low transport density for heavy rockets and intermittent but critical demand peaks. Consequently rocket ammunition must be pre-positioned prior to firing. The resupply of rocket ammunition is time-critical and event-driven, and sustainment is not suited to continuous flow-based models. Rocket artillery ammunition sustainment is highly anticipatory in design and surge-based in execution.

8.42 Rocket artillery ammunition varies significantly by calibre. 122 mm rocket ammunition has a high volume per launcher, moderate transport density and a rapid reload capability relative to heavier systems. It is well suited to repeated saturation fires and tactical-level engagements. in terms of sustainment it has a manageable flow with surge peaks. 300 mm rocket ammunition has very low transport density but a high effect per round. It has a limited reload capacity and therefore a significant lift requirement. The use of heavy calibre rocket ammunition has a strong dependence on pre-positioned stocks.

8.43 These differences result in 122 mm MRL systems being sustained through limited flow with surge capacity and 300 mm systems being sustained through strict anticipatory positioning and controlled release.

8.44 The OPA employs a combination of medium (6×6) and heavy (8×8) tactical vehicles, supported by launcher-specific reload systems, to transport rocket artillery ammunition. Vehicle selection is driven by the calibre and weight of the rockets, method of packaging (loose rockets versus podded modules) and the requirement to support time-sensitive reload cycles. Rocket ammunition transport differs from tube

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artillery in that demand is episodic and surge-based, and resupply is closely tied to reload timing rather than continuous consumption.

8.45 Medium (6x6) tactical vehicles are the primary transport platform for 122mm rocket ammunition. They are capable of carrying large numbers of rockets due to relatively low individual weight. Rocket systems such as the PHL-90B employ launcher-specific reload vehicles. These vehicles are configured to carry reload rockets or packs, support the rapid reloading of launchers operating at battery level. Heavy (8x8) tactical vehicles are the primary transport platform for 300mm rocket ammunition. Rocket systems such as the PCH-191 carry pre-packaged rocket pods/modules. They generally include crane systems for reload and operate in close coordination with launchers.

Precision Munitions

8.46 Precision munitions represent a low-volume, high-effect component of OPA firepower, designed to achieve discrete, high-value effects against selected targets. Unlike conventional artillery ammunition, their employment is governed less by availability and more by targeting authority, prioritisation and timing. Within the OPA system-of-systems approach, precision munitions are treated as a strategic resource at the tactical level, requiring deliberate allocation to ensure they are employed against targets where their effects cannot be replicated by volume fires.

8.47 Precision munitions impose a distinct sustainment model characterised by low physical volume, high value and sensitivity, and restricted availability. Consequently they are not mass stockpiled forward in large quantities but are held under tighter control at higher echelons. Their distribution is closely linked to targeting decisions. Precision munitions operate within the broader ammunition sustainment system but differ in that they are not sustained through continuous resupply and they are not consumed at predictable rates. Rather they rely on anticipatory allocation and controlled release aligned to targeting priorities. This reinforces the principle that precision munitions are governed by decision-making and targeting processes, rather than by logistics flow alone.

8.48 Precision munitions within the PLA are transported using a combination of medium (6×6) and heavy (8×8) tactical logistics vehicles, supported by specialised handling and control measures. Unlike tube or rocket artillery ammunition, precision munitions are characterised by low physical volume, high unit value and sensitive to handling and storage conditions. Consequently transport is defined not by unique vehicle types, but by how those vehicles are employed, and the degree of control and protection applied during movement.

Mortar Ammunition

8.49 Mortar ammunition provides the OPA with immediate, responsive and organic fire support at the tactical level, enabling manoeuvre units to generate fires without reliance on higher-echelon artillery systems. It is characterised by moderate volume, high responsiveness and decentralised employment. Within the OPA's system-of-systems approach, mortar ammunition is treated as a tactical sustainment priority, bridging the gap between small arms and artillery fires. It ensures that manoeuvre elements retain the ability to generate firepower at short notice.

8.50 Mortar ammunition imposes a sustainment model characterised by moderate weight and volume, high consumption during short engagements, and frequent redistribution at the tactical level. Consequently it is typically held forward at unit level and resupply is conducted over short distances. Sustainment is decentralised and responsive. Sustainment is therefore anticipatory at the unit level, and responsive and continuous at the sub-unit level.

8.51 Mortar ammunition is transported using a combination of light tactical vehicles, medium trucks, and dismounted carriage, reflecting the requirement to support manoeuvre forces at close range. Unlike tube and rocket artillery ammunition, mortar sustainment is characterised by forward distribution at unit level, short-distance resupply and a high dependence on last-mile delivery. Transport is optimised for mobility in close terrain and responsiveness rather than bulk capacity.

8.52 Self-propelled mortar systems (such as the PLL-05) carry an on-board supply of ammunition which provides immediate fire capability, reducing reliance on external transport during initial engagements. Integrated carriers enhance initial responsiveness but still require resupply for sustained operations.

8.53 At the final stage mortar rounds are often carried by crews covering short distances on foot. Distribution occurs under concealment. This is particularly common in complex terrain, in urban or jungle environments and when avoiding detection.

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Loitering Munitions and FPV

8.54 The PLA employs loitering munitions (LM) and FPV systems to compress the sensor-to-shooter timeline and enable rapid engagement of dynamic targets. Loitering munitions provide persistent overwatch, allowing operators to detect, track, and strike targets within a single platform, while FPV systems deliver short-range, highly responsive precision effects in close support of manoeuvre or complex terrain.

8.55 Both are integrated with ISR inputs and are employed through decentralised execution within a centrally informed targeting framework. This enables lower echelons to prosecute fleeting targets while higher headquarters retain control over prioritisation. Consequently these systems complement conventional fires by exploiting gaps, conducting re-attacks, and maintaining pressure on dispersed or relocating enemy forces. Nevertheless their effectiveness is dependent on reliable communications, ISR integration, and sustained availability through distributed and low-signature support, these factors directly shape their sustainment requirements.

8.56 The sustainment of LM and FPV systems is characterised by a decentralised, demand-driven and an energy-dependent model. Their operational availability is governed primarily by system distribution, b. battery and power supply, and operator and control node integration. Unlike conventional ammunition, LM and FPV systems are not sustained through the continuous movement of mass, but through the maintenance of distributed, powered and connected strike capability across multiple small units.

8.57 The sustainment model for LM and FPV is characterised by:

a. Demand-driven consumption. Employment is dictated by target availability and operational opportunity resulting in irregular consumption patterns and limited predictability in resupply requirements.

b. Decentralised distribution. Systems are dispersed across platoon and company-level elements, b. held in small quantities and controlled at lower echelons. This enables rapid response to dynamic targets and reduced reliance on centralised logistics nodes.

c. Energy-dependent sustainment. LM and FPV systems are energy-dependent, meaning that their operational availability is constrained primarily by battery capacity, the availability of charged power sources and the ability to recharge or replace those power sources. Electrical power is required to sustain flight (covering range and loiter time), operate sensors and guidance systems, and maintain communications links between operator and system. Consequently the number of systems available does not equate to the number that can be employed. Effective combat power is determined by charged systems at the point of need, not total inventory. Sustainment includes battery transport and storage, charging systems (including vehicle-based, generator, or fixed), and management of charge–use–recharge cycles. Power supply is as critical as the munition itself. If it

d. Modular replacement. Systems are sustained through the replacement of complete systems or the substitution of modular components. This enables rapid regeneration of capability and simplified logistics at the tactical level.

e. Low-signature sustainment. Sustainment is conducted using light vehicles and small, dispersed loads. This reduces detectability and vulnerability to ISR and strike.

8.58 Loitering munitions and FPV systems are distributed using light and medium tactical vehicles, with final distribution conducted at the lowest tactical echelons. Unlike tube, rocket or mortar ammunition, these systems are characterised by low physical weight, high sensitivity to handling and storage conditions, and dependence on control systems and power supply. Consequently their transport requirements are defined less by lift capacity and more by packaging and protection, battery and power management, and c. integration with operator and control nodes.

8.59 Light vehicles such as the Dongfeng Mengshi are the primary transport platform for LM systems and FPV drone kits. They are used for the forward deployment of drone teams, the transport of munitions, control stations and batteries, and c. rapid relocation in support of manoeuvre. Medium tactical trucks (6x6) are used to move larger quantities of systems from higher-echelon nodes and support replenishment of forward drone teams.

8.60 Loitering munitions and FPV systems are transported as modular systems (covering airframe, payload and the control unit), in sealed or protective containers and include battery packs and charging equipment. They require protection from shock and vibration, environmental protection (against dust and moisture), and the secure storage of warheads. Transport must also include batteries and charging systems, spare components (such as propellers and control units), and operator control stations. This creates a sustainment requirement for energy supply and electronic support, rather than purely ammunition lift.

Sustainment and Effects-Based Ammunition Allocation

8.61 The sustainment of artillery ammunition within the OPA system is achieved through effect-based allocation. Ammunition is forecast, positioned and distributed according to the effects required by the fire plan, rather than through uniform or demand-driven resupply. This approach reflects that ammunition is not sustained as a commodity but as a means of delivering specific firepower effects in time and space.

8.62 Effect-based allocation links targeting, firepower employment and sustainment. Targets are analysed in terms of required effect (such as suppression, destruction or disruption), appropriate munition types and quantities are determined, and ammunition is positioned forward to enable those effects to be delivered at the required time. Sustainment becomes anticipatory in planning and responsive in execution.

8.63 During fire planning, ammunition allocation is derived from target lists (focusing on HVTs and HPTs), firepower tasks and timing of engagements. Planners then determine the type of ammunition required (such as HE, smoke or precision), the quantity required to achieve the effect, and when and where it must be available. This drives forward positioning prior to H-hour and prioritised resupply during execution. Effect-based allocation ensures that ammunition is available at the point of need and resupply supports ongoing firepower tasks, not generic consumption. This results in reduced inefficiency in ammunition distribution and improved alignment between fires and logistics. Sustainment is integrated with the fire plan and continuously adjusted based on BDA and re-tasking.

Ammunition Mixes

8.64 Ammunition is not held or transported as a uniform quantity but as a balanced mix of munition types aligned to anticipated firepower tasks. For tube artillery systems, this typically includes a predominance of high explosive (HE) rounds supported by smaller proportions of smoke and illumination. This composition reflects the requirement to deliver suppression as the primary effect, while retaining the ability to obscure, mark, or illuminate as required. Likely ammunition mixes for OPA artillery are detailed in the following tables.

Table 8.1 – 122mm Tube Artillery Combat Load Mix

Munition Type	Percentage	Role
HE	65–75%	Suppression / neutralisation
Smoke	10–15%	Obscuration
Illumination	5–10%	Target acquisition / BDA
Cargo / DPICM (if applicable)	5–10%	Area effects

Table 8.2 – 155mm Tube Artillery Combat Load Mix

Munition Type		Percentage	Role
HE		60–70%	Suppression / destruction
Smoke		10–15%	Obscuration
Illumination		5–10%	Target acquisition
Cargo / DPICM (if applicable)		10–15%	Area effects
Precision		5–10%	High-value targets

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Table 8.3 – 122mm Rocket Artillery Combat Load Mix

Munition Type	Percentage	Role
HE / fragmentation	70–80%	Saturation
Cargo / sub-munitions	10–20%	Area denial
Smoke / incendiary	5–10%	Obscuration / disruption

Table 8.4 – 300mm Rocket Artillery

Munition Type	Percentage	Role
HE / blast-frag	50–60%	Deep strike
Sub-munition	20–30%	Area/system disruption
Precision-guided	20–30%	HVT/HPT engagement

Firepower Types and Ammunition Allocation

8.65 Ammunition types are selected based on the firepower effect required. Each firepower type favours specific munitions that best achieve the intended outcome. This relationship ensures that ammunition allocation is effect-driven, with munition characteristics aligned to the desired operational outcome. Ammunition allocation is aligned to firepower types as depicted in the following table.

Table 8.5 – Ammunition Demand by Firepower Type

Firepower type	Demand profile	Type of ammunition	Logistic implication
Precision strike	Low volume, high value	Guided artillery rounds, precision rockets, loitering munitions, some HE and FPV	Secure handling, prioritised allocation
Suppression	High volume	HE (tube artillery) Smoke, illumination	Continuous resupply required
Destruction	High volume, short duration, high intensity	HE (high volume), rockets (122 mm/300 mm) Precision (for key points)	Anticipatory and surge logistics
Saturation	Very high volume, short duration	Rocket artillery (122 mm, 300 mm), HE (mass fires) Cargo/sub-munitions	Surge logistics, pre-positioning critical
Blockade	Moderate, time-based	HE (intermittent fires), scatterable munitions (if applicable)	Terrain-focused stockpiling

8.66 Each firepower type is best achieved through specific ammunition types, with HE forming the foundation, rockets providing volume and precision munitions enabling selective engagement, collectively ensuring that ammunition allocation is aligned to operational effects.

Relationship between Firepower Types, Ammunition Allocation and Phases of an Operation

8.67 Firepower types and ammunition allocations are applied in accordance with the phases of an operation, ensuring that the composition and volume of fires align with evolving tactical requirements over time. Within the OPA system, this relationship reflects the principle that firepower effects are sequenced in time and ammunition allocation must be structured to support those effects at each phase of the operation. Consequently ammunition sustainment is not uniform, but time-phased, with different munition types dominating at different stages. This is summarised in the following table.

Table 8.6 – Firepower and Ammunition by Operational Phase

Phase	Firepower type	Purpose	Ammunition mix	Sustainment model
Shaping (Pre-H-hour)	Precision/selective saturation Saturation/destruction	Degrade enemy systems Disrupt command and control Prepare conditions for manoeuvre	Precision, rockets	Anticipatory Low volume, high-value munitions
Shock (H to H+X)	Saturation Destruction	Achieve shock Disrupt cohesion Overwhelm target area	122 mm rockets (HE dominant) HE-heavy tube artillery Limited smoke	Surge High, short-duration demand
Manoeuvre	Suppression Disruption	Enable manoeuvre Maintain suppression Control enemy response	HE (65-75%) Smoke (15-20%) Illumination (5-10%)	Continuous flow Medium trucks dominate
Consolidation	Precision Selective suppression	Defeat remaining resistance Prevent counterattack Re-engage targets	Precision (increased use) HE (reduced volume) Mixed specialist munitions	Reduced volume Increased selectivity
Sustained operations	Mixed (all types depending on task)	Maintain pressure Conduct follow-on engagement	Balanced mix across munition types	Reconstitution Restoration of forward positioning

Echelon-Based Ammunition Sustainment

8.68 Ammunition sustainment within OPA fires is achieved through an echeloned, effect-based distribution system, in which ammunition is positioned, allocated, and moved in accordance with the fire plan and required firepower effects. Unlike line-based constructs that define fixed quantities at each level, the OPA system employs dynamic ammunition distribution across weapon, battery, and battalion echelons to enable immediate fires, short-term sustainment, and continuous resupply. Ammunition is therefore not treated as a static stock, but as a time-sensitive, effects-linked resource, governed by targeting requirements, firepower types and c. operational phases.

Echeloned Ammunition Distribution Framework

8.69 Ammunition is distributed across three functional echelons:

a. The weapon echelon (immediate fire capability) covers:

(1) Ammunition held at the weapon system includes rounds carried on self-propelled artillery systems and ready-to-fire rockets on launcher platforms.

(2) This enables immediate engagement, the provision of support to initial fire missions and the provision of a short-duration fire capability.

b. The battery echelon (short-term sustainment) covers:

(1) Ammunition held at battery level includes ammunition on ammunition vehicles organic to firing batteries and forward holding areas (BHPs) located in close proximity to the firing batteries.

(2) This enables the rapid replenishment of weapon systems, allowing them to sustain fires over short durations, and support immediate re-engagement.

c. The battalion echelon (distribution and continuity) covers:

(1) Ammunition held at battalion level includes ammunition held at resupply points (RP) and on medium truck transport fleets.

(2) This enables the distribution of ammunition to batteries, the ability to prioritise allocation based on the fire plan and maintain continuity of operations.

8.70 Ammunition is not held as a uniform quantity but as a balanced mix aligned to firepower effects. The composition reflects anticipated tasks (for example, HE for suppression and destruction, smoke for obscuration and illumination for targeting and BDA). This mix is determined during fire planning and adjusted dynamically during execution. Ammunition is allocated by effect, not by category or echelon.

8.71 Each firepower type drives ammunition allocation determining the composition of ammunition at each echelon and the sustainment burden placed on the system. For example:

a. Precision fires require guided or selective ammunition types

b. Suppression fires will be HE dominant

c. Destruction fires require HE and rockets

d. Saturation fires will be predominantly rockets

e. Blockade fires will be a combination of HE and specialist ammunition.

8.72 Ammunition distribution is sequenced in accordance with operational phases. Dominant echelon activity is as follows:

a. During shaping FA battalions conduct forward positioning.

b. During the shock phase weapons and batteries consume ammunition.

c. During manoeuvre batteries focus on sustainment activities.

d. During consolidation the focus is on controlled redistribution.

e. During sustained operations FA battalions focus on reconstituting their ammunition holdings.

8.73 Ammunition moves continuously between echelons flowing from battalion to battery to weapon system. Prior to H-hour this flow is anticipatory and then responsive during execution. This system has been designed to minimise delays and ensure ammunition is available at the point of need. Sustainment does not follow fires, it enables them.

Operational Implications

8.74 Ammunition sustainment is characterised by flexibility over fixed holdings. Ammunition is dynamically distributed across weapon, battery, and battalion echelons in accordance with the fire plan and required effects. This enables rapid concentration of firepower and continuous adjustment based on targeting and battle damage assessment (BDA). However this increases reliance on accurate planning, transport capacity, and timing. Sustainment is therefore defined not by pre-positioned quantities but by the ability to move and reallocate ammunition in time, while anticipatory positioning ensures availability at the point of need.

8.75 This model also introduces inherent vulnerability at the battery echelon, where forward stocks are exposed to enemy ISR and strike, particularly during high-tempo redistribution. This creates a constant trade-off between responsiveness and survivability that requires dispersion, concealment, and integration with displacement TTPs.

8.76 Consequently ammunition sustainment is inseparable from the targeting process, operating within the Decide–Detect–Deliver–Assess (D3A) cycle. Targeting decisions define ammunition mix, delivery and drives consumption. BDA informs reallocation, forming a continuous, feedback-driven system that integrates logistics, fires, and targeting to maintain tempo and achieve operational effects.

8.77 Unlike manoeuvre sustainment, artillery sustainment is continuously exposed to counter-battery threat, UAV surveillance, acoustic detection and electronic signature detection. Sustainment activities must therefore be synchronised with displacement cycles and survivability TTPs to minimise exposure and preserve operational continuity.

Ammunition Sustainment during Movement and Displacement

8.78 Ammunition sustainment during movement and displacement is inherently dynamic. It requires continuous adjustment to maintain both firepower availability and survivability as artillery units reposition. At the weapon echelon, on-board ammunition enables immediate fires but is rapidly depleted, placing immediate demand on the battery echelon to redistribute stocks. During fire delivery, battery ammunition vehicles move forward to sustain the gun line, creating a high-tempo, short-cycle resupply process conducted under threat.

8.79 When displacement occurs, this system is temporarily disrupted. Ammunition must be moved, reallocated, and re-established at new positions while preserving the ability to resume fires. The method of displacement, immediate, leapfrog, or sequential, directly affects how much ammunition can be carried forward, how quickly it can be reconstituted, and whether fire continuity can be maintained.

8.80 This creates a critical balance between mobility, survivability, and sustainment continuity. Forward ammunition stocks at the battery echelon are most vulnerable during redistribution and displacement, particularly when concentrated or moving between positions. This requires it to be dispersed, concealed and integrated with movement TTPs.

8.81 Battalion echelon sustainment must anticipate displacement by repositioning resupply points and redirecting transport routes to re-establish the flow of ammunition as quickly as possible. Consequently ammunition sustainment becomes a mobile, echeloned system in which stocks are continuously dispersed, moved, and re-concentrated in line with manoeuvre. This ensures that artillery units can regenerate combat power at each new position without loss of tempo.

A Vignette – CA-Bde UAV-Fires and Ammunition Sustainment during Displacement

Situation

8.82 A mechanised CA-Bde is conducting offensive operations against a defended enemy company position consisting of trench systems, light fortifications and UAV-enabled observation and counter-battery capability. The CA-Bde is supported by its organic 122 mm SPH and 122 mm MRL battalion. It is reinforced by Group Army FA Brigade elements including 55 mm SPH and 300 mm MRL. It has access to UAV-enabled targeting and BDA.

8.83 The CA bde's mission requires suppression of the objective, the application of shock fires against depth targets and continuous fire support during manoeuvre. This is to occur while maintaining survivability against counter-battery fires through frequent displacement.

8.84 The CA-bde's fires cell applies an effect-based allocation model as follows:

Target – Effect – Rounds – Transport – Time

8.85 Ammunition sustainment is organised across three echelons:

a. Weapon systems provide immediate fires based on a time scale of minutes

b. Batteries provide redistribution and sustainment based on a time scale of minutes

c. Battalions provide resupply and continuity based on a time scale of hours.

8.86 The key constraint is that fires occur in minutes and sustainment occurs in hours. Displacement disrupts both.

Timeline Overview

8.87 Phase 1 – Preparation and Positioning (H-24 to H-1). Ammunition is positioned before H-hour

a. Battalion echelon:

(1) Receives ammunition from FA bde nodes

(2) Builds mission-based loads consisting of an HE, smoke and illumination mix

(3) It allocates around five resupply vehicles per battery mission

b. Battery echelon:

(1) Establishes dispersed holding points (BHPs)

(2) Pre-stages ammunition by fire mission

(3) Separates stocks for survivability

c. Weapon echelon:

(1) Loads on-board ammunition

(2) Configures for immediate fire

8.88 Phase 2 – Initial Fires (H to H+10 minutes). All effects are enabled by pre-positioned ammunition and no immediate resupply required.

a. H+0: Shock Fires

(1) 300 mm MRL fires conduct saturation strikes on the enemy's C2 nodes, artillery and air defence assets

(2) 122 mm MRL deliver the initial shock attack against the objective

b. H+1 to H+10: Suppression Fires. The battery echelon sustains combat power in minutes through local redistribution.

(1) The 122 mm SPH battery consisting of six guns delivers suppression fires expending around 600 rounds over 10 minutes.

(2) The weapon echelon rapidly consumes on-board ammunition

8.89 Phase 3 – Disruption: Immediate Displacement (H+10 to H+20). Displacement creates a temporary break in the sustainment system, requiring rapid re-synchronisation.

a. Enemy counter-battery fires are detected and the artillery battery conducts immediate displacement conducting a rapid withdrawal with minimal redistribution time and partial ammunition movement only.

b. The weapon echelon moves with a minimum on-board load causing a temporary loss of fire capability.

c. The battery echelon prioritises mobility moving essential ammunition only, abandoning or caching excess stocks resulting in sustainment being temporarily disrupted

d. The battalion echelon redirects resupply establishing new RP and prepares forward push of ammunition.

8.90 Phase 4 – Re-Establishment and Leapfrog. Sustainment (H+20 to H+60).

a. The unit transitions to leapfrog displacement with one firing element remaining in position while one displaces.

b. The battery echelon splits ammunition between firing elements and moving elements

c. The battalion echelon pushes forward resupply of a replenishment package consisting of around 600-rounds, delivered using 8×8 trucks.

8.91 Phase 5 – Regeneration of Combat Power (H+60 onward). Ammunition is not just moved but rebalanced based on effect.

a. Ammunition flow of battalion to battery to weapon resumes.

b. Guns are restored to full firing capability, firepower is regenerated and follow-on missions are enabled.

c. UAV-enabled BDA drives the reallocation of HE versus smoke and dynamic targeting adjustments.

8.92 This vignette demonstrates that OPA artillery sustainment is a mobile, echeloned system in which ammunition is continuously distributed, redistributed, and repositioned across weapon, battery, and battalion levels, enabling firepower effects despite displacement, disruption, and time delays.

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Section 8-4. Fuel Sustainment

8.93 Fuel sustainment within artillery units is conducted through an echeloned, flow-based distribution system designed to support continuous operations rather than static stockholding. It is treated as a tempo-enabling commodity that directly governs the rate, frequency, and continuity of combat actions. Unlike sustainment models that focus on static stockholding, fuel in this context functions as an operational control variable that shapes how artillery units move, survive, and deliver firepower.

8.94 Tempo in artillery operations is primarily expressed through movement and displacement cycles, rather than rate of fire alone. Fuel availability therefore determines the ability of artillery units to execute these cycles, influencing both survivability and operational effectiveness.

8.95 Fuel sustainment is integrated across the artillery system, supporting not only firing platforms but also the command, sensing, and communications functions that enable the reconnaissance–strike complex.

Link to Movement and Displacement Cycles

8.96 Artillery operations are structured around repeated displacement cycles consisting of occupation, fire delivery, displacement, concealment, and re-occupation. These cycles are inherently fuel-intensive, with the highest consumption occurring during movement to and from firing positions.

8.97 Fuel availability determines the frequency, distance, and responsiveness of displacement, including:

a. The interval between successive displacements (for example, 2-hour vs 4-hour cycles)

b. The depth and direction of movement between positions

c. The ability to utilise concealed or indirect routes

8.98 Where fuel is sufficient, artillery units are able to maintain frequent and unpredictable movement, reducing pattern formation and complicating enemy targeting. Where fuel is constrained, displacement frequency decreases, movement becomes predictable, and survivability is degraded. Fuel therefore functions as a primary determinant of displacement tempo, which in turn underpins artillery survivability and continuity of fire support.

Link to Survivability Measures

8.99 Key artillery survivability measures, including dispersion and shoot-and-scoot tactics, are directly dependent on fuel availability. Dispersion increases survivability by reducing target density. However, it also increases fuel demand due to greater distances between firing elements, increased movement required to mass effects temporally and expanded logistics distribution requirements

8.100 Shoot-and-scoot tactics require artillery units to displace within the enemy counter-battery window. This demands that platforms maintain sufficient fuel reserves to enable immediate movement upon completion of fire missions.

8.101 Where fuel is available, artillery units can displace rapidly and clear firing positions before enemy fires are delivered. Where fuel is insufficient, displacement is delayed or incomplete, resulting in increased exposure to counter-battery engagement. Fuel is therefore a precondition for the effective execution of survivability TTPs, rather than a supporting function.

Link to Command Post, Sensor, and Communications Sustainment

8.102 Artillery operations rely on a network of command, sensor, and communications systems that enable target acquisition, decision-making, and fire control. These systems require continuous fuel support to maintain operational effectiveness. Fuel not only sustains tube artillery and rocket systems but also:

a. Command Posts (CPs), including generator-powered digital fire control and communications systems

b. Sensor systems, including UAV ground control stations, radar systems, and electronic warfare assets

c. Communications infrastructure, including relay nodes and data links.

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8.103 Continuous fuel availability ensures the persistence of the reconnaissance–strike cycle, enabling timely detection, processing, and engagement of targets. Fuel shortfalls degrade system performance by reducing ISR persistence, delaying targeting processes and disrupting coordination between firing units and higher headquarters.

Fuel as a Dynamic Sustainment System

8.104 Fuel sustainment within OPA artillery formations does not rely on fixed "lines" or static stockholding. Instead, it is managed as a dynamic system characterised by allocation, flow, and timing.

8.105 Fuel is allocated according to mission requirements and expected consumption rather than organisational distribution. Units conducting high-tempo operations, particularly those executing frequent displacement cycles, are prioritised for fuel allocation. Allocation decisions are typically centralised at brigade level and executed at battalion level, ensuring alignment with operational priorities.

8.106 Fuel is delivered through a continuous distribution process rather than large, infrequent resupply events. Replenishment is conducted in smaller, repeated increments during displacement pauses, during concealment or hide phases and during periods of reduced operational activity. This approach reduces the need for large forward stockpiles and enhances the survivability of fuel distribution systems.

8.107 Fuel distribution is based on forecast consumption derived from operational planning. Consumption modelling incorporates planned displacement frequency, movement distances and terrain, platform types and quantities as well as the duration and tempo of operations. Predictive modelling enables timely resupply, preventing shortfalls that would otherwise disrupt displacement cycles and operational tempo.

8.108 Fuel delivery is synchronised with tactical activity to maximise efficiency and minimise exposure. Key distribution windows include:

a. Post-displacement phases, when vehicles are temporarily concentrated

b. Concealment periods, when units are less detectable

c. Night operations, which reduce ISR vulnerability.

8.109 Timed distribution ensures that fuel availability is aligned with operational requirements, rather than treated as a static reserve.

Fuel Sustainment Echelon Framework

8.110 Fuel is supplied across three functional echelons as follows:

a. Strategic/theatre facilities provide bulk production and storage using national depots, pipelines and civilian integration.

b. Operational (Group Army/JLSF) facilities which provide bulk distribution and staging using Fuel depots, tanker battalions and forward fuel farms.

c. Tactical (FA Bde/FA Bn) facilities which provide final distribution and delivering using FA Bde logistics nodes and battalion POL vehicles.

Tactical Fuel Sustainment

8.111 At the FA brigade and battalion level, fuel is managed through:

a. Brigade Fuel Points (BFP) which are the primary receipt and redistribution node; typically co-located with brigade logistics area.

b. Battalion Refuel Points (BRP) which provide the forward distribution node supporting firing batteries.

c. Unit Refuel Points (URP) which are temporary or mobile refuel site established to support dispersed elements.

8.112 Replenishment methods used at the tactical level include point refuelling, mobile or forward refuelling, echeloned or leapfrog refuelling and opportunistic refuelling.

8.113 Point refuelling involves vehicles rotating through BFP/BRP/URP locations.it is conducted during planned pauses or displacement windows to enable efficient bulk transfer. Mobile (forward) refuelling involves tanker vehicles moving forward to gun positions, hides and assembly areas. This replenishment method is used to support dispersed and high-tempo operations. It also reduces vehicle movement and exposure.

8.114 Echeloned (leapfrog) refuelling involves logistics elements advancing in bounds. One element refuels while another remains operational. This used to enable continuous fire support without an operational pause. Opportunistic refuelling is conducted during tactical halts, route pauses and reorganisation phases to maintain operational momentum.

8.115 Fuel sustainment is integrated into fire planning, not treated as a separate activity. Key integration points include displacement planning as fuel demand is driven by movement cycles. Fire mission sequencing which affects tempo and duration is another key integration point. The employment of survivability TTPs such as dispersion increases consumption. Fuel availability has a direct influence on the rate of displacement, the ability to mass fires temporally and influences the survivability of artillery systems.

8.116 Fuel demand within FA formations is primarily driven by displacement frequency (which is the primary driver), terrain and mobility conditions, generator and sensor requirements covering command posts, UAV control stations and radar systems as well as the duration of operations and operational tempo.

8.117 Fuel distribution is coordinated through brigade logistics staff, FA battalion sustainment elements and integrated logistics command systems. Allocation is centralised at brigade level for prioritisation and decentralised at battalion level for execution. Distribution is synchronised with movement orders, fire plans and logistics convoy schedules.

8.118 Fuel sustainment has a number of vulnerabilities including the concentration of tanker vehicles, road-bound logistics networks and detectable forward refuel points. To mitigate these vulnerabilities the OPA will disperse fuel assets, frequently displace refuel points, make full use of deception and concealment, and conduct night and limited-visibility resupply. When available refuelling vehicles will integrate with AD and EW protection.

8.119 Fuel sustainment reflects a precision logistics model which is characterised by:

a. Continuous flow rather than static reserves

b. A high dependence on transport and timing

c. Integration with manoeuvre and fires

d. Vulnerability to interdiction but high adaptability

8.120 Fuel is therefore not merely a sustainment function, but a critical determinant of operational tempo, survivability, and firepower continuity.

An FA Bde Fuel Consumption and Resupply Model for 24-Hours

8.121 An FA Brigade consists of two 155mm PLZ-05 tube artillery battalions, one light 122mm MRL battalion, a heavy 300 mm MRL battalion, a brigade HQ, sensors, UAVs and logistics elements. The brigade is involved in high-tempo operations employing shoot-and-scoot TTPs. Displacement occurs every 2–4 hours and there is continuous ISR and CP activity.

8.122 Each SPH consumes around 300–500L/day depending on movement and MRL systems consume more during displacement cycles. Generators and sensors are operating continuously. The tables on the following page display:

a. Estimated consumption by function

b. A displacement-linked fuel demand model

c. A 24-Hour timeline model.

Table 8.7 – Estimated Fuel Consumption by Function

Component	Primary driver	Estimated daily consumption
Tube artillery battalions	Frequent displacement	High
MRL battalions	High mobility + surge operations	Very high
Command posts	Generators, communications	Moderate
UAV and sensor units	Continuous operation	Moderate
Logistics vehicles	Transport cycles	High

Table 8.8 – Displacement-Linked Fuel Demand Model

Phase	Activity	Fuel impact
H-2 to H	Movement to firing position	High consumption
H to H+1	Fire mission execution	Low (engines idle/minimal)
H+1 to H+2	Displacement (shoot-and-scoot)	High
H+2 to H+4	Hide/reposition/refuel	Moderate

Table 8.9 – 24-Hour Timeline Model

Time block	Activity	Fuel action
0000 – 0400	Night displacement + firing cycles	Mobile refuelling forward
0400 – 0800	Reposition + survivability moves	Battalion-level refuel
0800 – 1200	Fire missions + limited movement	Opportunistic refuel
1200 – 1600	Major displacement cycle	Peak fuel demand
1600 – 2000	Fire missions + reposition	Mobile refuel
2000 – 2400	Night displacement + reconstitution	Brigade-level replenishment

8.123 The step-by-step flow over a 24-hour period occurs as follows:

a. Group Army Fuel Node to FA Brigade (bulk delivery) is conducted 1–2 times daily using large tanker convoys

b. FA Brigade to FA Battalions is distributed by tanker vehicles timed to coincide with displacement pauses.

c. FA Battalion to Firing Units involves the employment of mobile refuelling teams and the establishment of URPs near hide areas.

8.124 Fuel resupply is deliberately aligned with post-displacement windows when vehicles are concentrated briefly, hide phases to reduce detection risk and night operations to aid signature reduction. Effective sustainment is characterised by a continuous displacement capability, sustained high-tempo fires and reduced vulnerability to counter-battery threats. If sustainment fails mobility is reduced, there is an increased exposure at firing positions and fire support tempo is degraded. Units will be unable to use survivability TTPs.

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8.125 Fuel sustainment is best understood as a tempo regulator within artillery operations. It determines not only how long a unit can fight, but how it fights, how often it moves, how it survives and how effectively it delivers firepower.

A Vignette – CA-Bde Fuel Sustainment under a Counter Battery Threat

Situation

8.126 A mechanised CA-Bde is conducting offensive operations against a peer adversary equipped with effective weapon locating radar (WLR) coverage, a responsive counter-battery fires (3–5 minute response window) and persistent ISR including UAV + SIGINT cueing.

8.127 The CA-Bde artillery system includes its organic FA battalion consisting of three 122mm SPH and one MRL battery, reinforcing fires from Group Army FA Bde and an integrated UAV and radar-based targeting capability. All artillery units employ high-tempo shoot-and-scoot TTPs, displacing every 2–3 hours.

Timeline Overview

8.128 Pre-Conditioning for Success (H-6 to H-1).

a. Over the preceding six hours, the brigade executed anticipatory fuel sustainment.

b. Brigade logistics staff forecasts increased consumption due to n elevated displacement frequency and enemy ISR persistence.

c. Fuel was pushed forward early, not on demand maintaining battalion POL stocks above 70% with forward unit refuel points (URPs) established near likely hide areas.

d. Mobile refuel teams were pre-positioned along displacement corridors and integrated into the manoeuvre and fires plan

e. Fuel convoy movement was conducted under cover of darkness, dispersed and staggered

f. This resulted in fuel availability being aligned with anticipated displacement cycles, not reactive demand.

8.129 Trigger Event (H-0).

a. The FA battalion conducts a coordinated fire mission in support of a manoeuvre assault.

b. Within 3 minutes enemy WLR detects firing signatures and counter-battery fires are initiated.

c. UAV ISR confirms artillery locations.

8.130 Success Sequence (H+0 to H+20 minutes).

a. Phase 1: Immediate Displacement (H+0 to H+5).

   (1) Batteries execute immediate shoot-and-scoot displacement.

   (2) All vehicles have sufficient fuel for full displacement and pre-identified alternate firing positions

   (3) Complete displacement achieved within required survivability window and no vehicles are left in firing positions.

b. Phase 2: Counter-Battery Impact (H+5 to H+10).

   (1) Enemy fires strike the original firing positions and known displacement routes

   (2) Positions are empty or occupied briefly and displacement routes have already cleared

   (3) There are minimal or no artillery losses.

c. Phase 3: Rapid Reconstitution (H+10 to H+20)

   (1) Units occupy alternate firing positions

   (2) Mobile refuel teams move forward to top up fuel during the hide phase and prepare for next displacement cycle

   (3) UAV BDA confirms enemy fires were ineffective and weapon systems are intact.

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8.131 Immediate Operational Effects.

a. Timely displacement denied the enemy targeting cycle and units were able to preserve a reduced signature persistence

b. Artillery units remained fully operational and fires were able to continue to support manoeuvre without interruption.

c. Continuous suppression and shaping fires enable manoeuvre units to maintain momentum

d. Fuel distribution continued despite enemy pressure and refuel nodes remained mobile and survivable.

8.132 Command Decision Advantage (H+20). The CA-Bde commander retains freedom of action and has the option to:

a. Continue high-tempo fires maintaining pressure on the enemy providing him with a sustained combat power advantage.

b. Reposition fires for shaping enabling him to shift fires to new priority targets providing him with operational flexibility

c. Integrate higher-echelon fires enabling him to mass effects at decisive points providing him with escalation control.

8.133 This vignette demonstrates that effective fuel sustainment transforms artillery from a vulnerable, time-limited asset into a resilient and continuously operational system. Under counter-battery pressure, success is not determined solely by tactical execution, but by the ability to sustain displacement cycles. Fuel, when properly anticipated and synchronised, enables the artillery system to outpace the enemy targeting cycle and preserve combat power.

Section 8-5. Maintenance, Repair and Recovery (MRR) in OPA Artillery Formations

8.134 MRR is a combat function, not a rear-area activity. The system prioritises speed over completeness (return to fight first), forward repair over evacuation and mobility preservation over platform perfection. Effective MRR sustains artillery tempo, preserves combat power under attrition and enables continued execution of survivability TTPs.

8.135 MRR is organised as an echeloned, forward-enabled system designed to preserve combat power under high-tempo operations. MRR is not treated as a rear-area function but is integrated into manoeuvre and fires to ensure that artillery systems remain mobile (retain their ability to displace), available (are able to fire) and recoverable (are able to be returned to service rapidly).

8.136 The system is optimised to:

a. Conduct forward repair where possible

b. Execute rapid recovery under threat

c. Minimise evacuation distances and repair timelines.

8.137 As with fuel and ammunition, MRR operates as a continuous support function, is aligned to operational tempo and displacement cycles.

Organisational Structure

8.138 MMR capability is distributed across three levels – crew/battery, battalion and brigade.

Crew/Battery

8.139 Each battery has a maintenance section which conducts immediate actions including basic maintenance and fault identification.

FA Battalion-Level Capability

8.140 FA battalions provide the primary forward MRR capability. At battalion level the CSS Company's maintenance section is equipped with recovery vehicles including armoured recovery vehicles and mobile maintenance detachments which operate as mobile repair teams. Their functions is to conduct battle

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damage assessment and repair (BDAR) as well as repair mobility and fire control faults. They also recover damaged systems from forward areas.

8.141 Battalion-level MRR focuses on rapid return to service of damaged equipment and will conduct repairs that can be completed within short time windows (hours, not days).

FA Brigade-Level Capability

8.142 FA brigades provide a reinforced and specialist maintenance capability. This is delivered through the brigade's maintenance company. As well as mechanics and artificers, the company is staffed with specialist technicians who repair and maintain electronics, fire control, radar and, communications equipment.

8.143 The maintenance company conducts complex repairs beyond battalion capability and manage controlled evacuation of damaged systems. It also provides additional recovery assets during high-loss periods. The company also acts as the intermediate repair echelon, bridging forward repair and higher-level sustainment.

Higher-Level Support (Group Army / JLSF)

8.144 Higher-echelon maintenance provides major repair facilities, component replacement and rebuild as well as the supply of spare parts and replacement systems. These elements are located in rear areas and integrated with the broader logistics infrastructure. Evacuation to this level is minimised where possible and only conducted when forward repair is not feasible.

8.145 Artillery maintenance extends beyond vehicle repair and includes calibration and servicing of fire control systems, navigation systems, hydraulic systems, launcher mechanisms, radar interfaces and sensor integration systems. This creates a more technically specialised maintenance burden than that associated with manoeuvre battalions.

Maintenance Concept

8.146 The maintenance concept is based on the forward repair principle, modular and rapid repair and continuous maintenance.

8.147 The forward repair principle primary objective is to repair equipment as far forward as possible. This includes conducting on-position repair during hide phases and forward repair at temporary maintenance points using mobile repair teams. Forward repair aims to reduce downtime, avoid long evacuation chains and maintain operational tempo.

8.148 OPA systems are designed to support component-level replacement and the rapid replacement of key systems. Using modular and rapid repair, repairs prioritise mobility systems (covering engines, tracks and wheels), fire control systems and communications equipment. This approach supports quick restoration of combat capability and deferring deeper repair at higher echelons.

8.149 Maintenance is conducted continuously, not as a discrete phase. Activities occur during post-fire hide phases, displacement pauses and night operations. This ensures that minor faults are addressed early so that system reliability can be maintained during high tempo operations.

Recovery Operations

8.150 Recovery operations include the extraction of damaged or immobilised artillery systems, the clearance of disabled vehicles from firing positions and routes and the movement of systems to repair locations. Recovery methods cover immediate, deliberate and leapfrog recovery. Immediate recovery is conducted under threat and focuses on clearing positions rapidly. Deliberate recovery is conducted during lower-threat periods and allows for more controlled extraction. Leapfrog recovery is conducted using recovery assets moving in bounds with firing units. They also deploy in close proximity to forward elements.

8.151 Recovery is closely linked to survivability. Disabled systems represent physical obstacles and present as high-signature targets. The use of rapid recovery reduces targeting opportunities for the enemy and aids in minimising the loss of equipment.

Integration with Displacement Cycles

8.152 MRR activities are synchronised with displacement cycles. Repair is conducted during hide phases. Recovery is conducted during displacement windows and maintenance is integrated into movement planning. This ensures there is no disruption to fire missions and the continuous availability of artillery systems. Maintenance and recovery assets displace regularly and operate in dispersed configurations.

Command and Control

8.153 MRR is coordinated through battalion sustainment elements and brigade logistics staff. Prioritisation is based on mission requirements, system criticality and repair feasibility. Commanders must balance repair effort versus operational urgency and recovery risk versus equipment value.

Risk Management

8.154 Forward repair teams are exposed to enemy ISR and strike. Recovery vehicles are vulnerable during extraction and maintenance nodes are detectable if they remain static. To mitigate these risks MMR elements disperse repair elements and frequently relocate maintenance sites. Repair is often conducted under concealment or limited visibility. Where possible they will integrate AD and EW protection.

8.155 MMR within OPA field artillery formations is organised as an echeloned, forward-oriented system designed to sustain combat power under high-tempo conditions. By integrating forward repair, rapid recovery, and continuous maintenance into displacement cycles, the system ensures that artillery units remain mobile, survivable and operational. MRR therefore functions as a critical enabler of tempo, directly supporting the ability of artillery forces to survive, reposition, and deliver sustained firepower within a contested environment.

A Vignette – CA-Bde MMR under a Counter Battery Threat

Situation

8.156 A mechanised CA-Bde is conducting offensive operations against a peer adversary equipped with effective weapon locating radar (WLR) coverage, a responsive counter-battery fires (3–5 minute response window) and persistent ISR including UAV + SIGINT cueing.

8.157 The CA-Bde artillery system includes its organic FA battalion consisting of three 122mm SPH and one MRL battery, reinforcing fires from Group Army FA Bde and an integrated UAV and radar-based targeting capability. All artillery units employ high-tempo shoot-and-scoot TTPs, displacing every 2–3 hours.

Timeline Overview

8.158 Pre-Conditioning for Success (H-6 to H-1).

a. Over the preceding six hours, the brigade executed anticipatory MRR preparation aligned with expected counter-battery pressure.

b. Battalion maintenance elements conduct continuous forward maintenance:

   (1) Minor faults were rectified during hide phases

   (2) Mobility systems covering tracks, engines, drivetrains were prioritised.

c. Mobile repair teams were forward-positioned near likely displacement corridors and task-organised to support specific firing batteries

d. Recovery assets were:

   (1) Dispersed and echeloned forward

   (2) Positioned to support rapid extraction from firing positions and routes

e. Brigade-level maintenance was prepared to reinforce battalion capability and to receive evacuated systems.

f. Maintenance effort for systems critical to current fire plans and units conducting the highest displacement rates were given the highest priority.

g. This resulted in the MRR system being aligned with displacement cycles and operational tempo.

8.159 Trigger Event (H-0).

a. The FA battalion conducts a coordinated fire mission in support of a manoeuvre assault.

b. Within 3 minutes:

(1) Enemy WLR detects firing signatures

(2) Counter-battery fires are initiated

(3) AV ISR confirms artillery positions

8.160 Success Sequence (H+0 to H+20 minutes).

a. Phase 1: Immediate Displacement (H+0 to H+5)

(1) Batteries initiate shoot-and-scoot displacement

(2) Systems operate at high readiness due to the pre-checking of mobility systems and faults having previously been rectified.

(3) Minor faults occur but are manageable with one SPH experiencing reduced mobility and one MRL launcher reporting a fire control fault.

(4) The majority of systems displace remain stationary.

b. Phase 2: Counter-Battery Impact (H+5 to H+10)

(1) Enemy fires strike the original firing positions and known displacement routes.

(2) Positions were largely vacated with degraded systems at risk but remained recoverable

(3) Recovery vehicles move forward under cover of displacement and mobile repair teams prepare for forward intervention.

c. Phase 3: Rapid Repair and Recovery (H+10 to H+20).

(1) The immobilised SPH was extracted from the route within minutes with the vehicle moving to a concealed repair location

(2) The mobility fault was rectified sufficiently for continued movement and the fire control issue was bypassed using alternate procedures.

(3) Units reconstituted occupying alternate firing positions and resuming fire missions with minimal delay

8.161 5. Immediate Operational Effects

a. Rapid recovery prevented route blockage

b. Units retained freedom of movement

c. Weapon systems cleared firing positions within counter-battery window and degraded systems were recovered before being targeted.

d. There was minimal loss of operational systems and temporary degradation was quickly mitigated.

e. Repair and recovery kept pace with operational tempo and faults were resolved faster than they accumulated.

8.162 Command Decision Advantage (H+20). The CA-Bde commander retains freedom of action and has the option to:

a. Continue high-tempo fires maintaining pressure on the enemy providing him with a sustained combat power advantage.

b. Reposition fires for shaping enabling him to shift fires to new priority targets providing him with operational flexibility

c. Integrate higher-echelon fires enabling him to mass effects at decisive points providing him with escalation control.

8.163 This vignette demonstrates that effective MMR enables artillery systems to withstand the physical demands of high-tempo operations under counter-battery pressure. By preserving mobility through forward repair and rapid recovery, MRR ensures that artillery units remain survivable and capable of sustaining fire support. As with fuel sustainment, success is determined not only by tactical execution, but by the ability to align support functions with the tempo and timing of operations.

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Section 8-6. Non-Ammunition and Non-POL Sustainment

8.164 Sustainment within the OPA fires system extends beyond ammunition, fuel and MRR to include a range of enabling functions that underpin fire delivery, command and control, survivability and regeneration. These sustainment elements are not discrete support activities, but integral components of the reconnaissance–strike system, directly influencing tempo, responsiveness, and combat effectiveness. Non-ammunition sustainment is therefore synchronised with fire planning, targeting cycles, and displacement operations, and is delivered in accordance with mission requirements rather than fixed sustainment schedules.

Key Sustainment Enablers

8.165 There are a number of key sustainment enablers that underpin the effective employment of OPA fires. These enablers focus on those functions that directly support fire control, sensor integration, platform performance, survivability, command and control, and personnel endurance. These elements represent critical dependencies within the reconnaissance–strike system and are sustained in accordance with operational priorities, rather than through routine distribution. Their availability directly influences the ability of artillery units to detect, engage, and re-engage targets while maintaining survivability under persistent ISR and counter-battery threat.

Fire Control and Sensor Sustainment (Class II)

8.166 Fire control and sensor systems are critically dependent on sustainment of Class II equipment. This includes batteries and portable power systems, fire control terminals and digital devices, and UAV ground control equipment and data links. These systems enable target acquisition and confirmation, fire mission processing and execution as well as Battle damage assessment (BDA).

8.167 Degradation of these sustainment elements results in loss of targeting capability, reduced responsiveness and potential inability to conduct engagements despite ammunition availability. Sustainment of power and digital systems is therefore treated as combat-critical.

Platform Sustainment Dependencies (Class III Non-Fuel)

8.168 Sustained operation of artillery platforms is dependent on Class III (non-fuel) items including lubricants, hydraulic fluids and cooling systems. These are essential to maintain weapon system functionality, support high rates of fire and prevent system degradation and failure.

8.169 Distribution is integrated with MRR activities and delivered through maintenance elements operating forward where required.

Command and Communications Sustainment

8.170 Command and control of fires is dependent on the sustainment of communications systems, including radios and data terminals, transmission equipment as well as power sources and ancillary components. Sustainment ensures continuity of command and control, execution of targeting and fire plans, and synchronisation across the reconnaissance–strike system.

8.171 Degradation results in loss of coordination, delays in engagement and the reduced effectiveness of fires.

Position Survivability Sustainment (Class IV)

8.172 Class IV sustainment supports the preparation and protection of firing positions through provision of camouflage and concealment systems, decoys and deception materials as well as revetments and protective works. These materials are employed to reduce visual, thermal, and electronic signatures, mitigate counter-battery effects and enhance survivability during fire delivery and occupation

8.173 Survivability within the OPA fires system is therefore constructed through deliberate sustainment actions, rather than assumed through dispersion alone.

Personnel Sustainment (Class I – Operational Focus)

8.174 Personnel sustainment within artillery units is focused on maintaining operational effectiveness rather than general welfare. Key considerations include the distribution of pre-packaged rations to minimise signature, the conduct of water discipline during sustained operations and the management of fatigue during prolonged fire missions.

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8.175 Sustainment is conducted during displacement or concealment periods in a manner that does not compromise survivability.

Medical Sustainment (Class VIII – Fires Context)

8.176 Medical sustainment within the fires system is focused on casualties resulting from counter-battery strikes and injuries associated with ammunition handling and platform operation. Medical support is forward-positioned but mobile and integrated into evacuation chains at brigade and higher levels.

8.177 Rapid casualty evacuation is critical to maintaining operational tempo and combat effectiveness.

Distribution and Timing

8.178 Sustainment within the OPA fires system is synchronised with operational activity rather than conducted on fixed schedules. Sustainment occurs between fire missions, during displacement pauses and under conditions that minimise detection. Distribution is conducted through mobile and dispersed sustainment nodes, leapfrogging logistics elements aligned with manoeuvre and the mission-based prioritisation of resources. Sustainment is synchronised to support the fire plan, rather than the fire plan being adjusted to accommodate sustainment.

Fires Sustainment Enablers and Operational Effects

8.179 The following table summarises fires sustainment enablers and operational effects.

Table 8.10 – Fires Sustainment Enablers and Operational Effects

Sustainment Function	Primary Class	Supported Fires Function	Operational Risk if Degraded
Batteries / power	Class II	Fire control, UAV operations	Loss of targeting and engagement capability
Camouflage / decoys	Class IV	Survivability	Increased counter-battery vulnerability
Lubricants / hydraulics	Class III	Platform performance	Reduced rate of fire, system failure
Communications sustainment	Class II	Command and control	Loss of synchronisation and coordination
Rations / water	Class I	Crew endurance	Reduced operational tempo
Medical support	Class VIII	Force preservation	Reduced combat effectiveness

8.180 Sustainment enablers within the OPA fires system are critical to the delivery, control, and survivability of firepower. These functions operate as integral components of the reconnaissance–strike system and are synchronised with targeting, fire planning, and displacement cycles. While less visible than ammunition and fuel sustainment, degradation of these enablers has immediate and significant impact on combat effectiveness, reducing the ability of artillery units to deliver sustained, responsive, and survivable fires.

Section 8-7. Conclusion

8.181 OPA fire support logistics and sustainment is a tempo-enabling system. Ammunition and fuel determine the ability to deliver fires. Maintenance and MRR preserve and restore that capability. Sustainment enablers (power, communications, survivability materials, and personnel support) allow the system to function continuously. These elements operate as an integrated whole. They are synchronised with targeting, fire planning, and displacement cycles. Sustainment is predictive and mission-driven. It is tightly linked to the reconnaissance–strike system.

8.182 This approach enables high-tempo, responsive, and survivable fires. It also creates vulnerabilities. The system relies on dynamic distribution and forward sustainment nodes. It depends on continuous integration across multiple functions. These features increase exposure to disruption. Logistics networks, sustainment elements and enabling systems are all potential targets. Effective sustainment therefore requires protection, dispersion and adaptation. It must operate under a persistent ISR and counter-battery threat. Sustainment is not a supporting activity. It is a decisive factor in generating, maintaining, and regenerating combat power within the OPA fires system.

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Chapter 9
Emerging Technologies in Fires and Targeting

Weapons are a factor, but not the decisive factor. It is people not things that are decisive.

Mao Zedong

On protracted War, 1938

Section 9-1. Introduction

9.1 This chapter outlines the role and impact of emerging technologies used by OPA fires. It focuses on their integration into the reconnaissance–strike system and their influence on targeting, fire planning, and execution. Emerging technologies are employed as integrated components of a networked system, rather than as independent or stand-alone capabilities. Their operational value is derived from how they connect sensors, decision-making processes, and delivery systems to generate coordinated firepower effects.

9.2 Within this construct, technologies such as UAV ISR, EW, artificial intelligence (AI) and precision fires operate as interdependent nodes within a system-of-systems (SoS), enabling:

a. Sensor-to-sensor and sensor-to-shooter cueing

b. Parallel processing across the targeting cycle

c. Continuous execution of the Decide–Detect–Deliver–Assess (D3A) cycle.

9.3 The primary operational effects of these integrated technologies are to reduce sensor-to-shooter latency and decrease the time it takes to make decisions. They also enable distributed yet synchronised firepower delivery and enhance survivability through distributed deployment, deliberate deception measures and disciplined control of electromagnetic emissions.

9.4 These developments reflect the transition from informationised warfare to intelligentised warfare.

Section 9-2. AI-Enabled Targeting and Decision Support

9.5 Artificial Intelligence (AI) is the key enabler driving the transition from informationised to intelligentised warfare. It is transforming the exploitation of integrated data into automated analysis and machine-assisted decision-making at operational speed. By embedding AI across ISR, C2 and fires systems, OPA forces shift from networked information sharing to a human–machine teaming construct. This is designed to continuously optimise targeting, prioritisation and execution across the battlespace.

9.6 The human–machine teaming construct is the operational framework which enables human decision-makers and AI-enabled systems to work in a coordinated, complementary manner. Humans define intent, constraints, and authority thresholds, while machines process large data volumes, generate insights, and execute or recommend actions at speed. This results in a combination of human judgement and machine precision to accelerate decision-making and improve operational effectiveness.

9.7 AI enhances OPA targeting and decision support by transforming target prioritisation from a static, rule-based process into a dynamic, adaptive, and predictive system. Rather than relying solely on pre-defined weighting criteria and manually updated priority lists, AI-enabled systems continuously consume, analyse and act upon multi-source data to optimise targeting outcomes in real time.

9.8 Within the OPA construct, AI is embedded across the reconnaissance–strike system. It enables the integration of sensors, decision-making nodes and delivery systems in a coherent, system-of-systems architecture. AI functions as a decision acceleration and optimisation layer, supporting both centralised intent and decentralised execution.

Adaptive and Predictive Targeting

9.9 AI enhances target prioritisation by replacing fixed weighting models (used in targeting algorithms) with adaptive decision frameworks that evolve based on operational context and observed outcomes. These systems dynamically adjust prioritisation criteria based on:

a. The phase of operation

b. The Commander's intent and targeting guidance

c. Enemy behaviour and disposition

d. BDA feedback.

9.10 AI identifies non-obvious high-payoff targets through pattern recognition and correlation across multiple data sources. It can be used to continuously refine HPTLs based on effectiveness rather than pre-conflict assumptions.

9.11 AI enables a transition from reactive targeting to predictive targeting, allowing OPA forces to anticipate future target states and engagement opportunities. By analysing behavioural patterns and historical data, AI systems can:

a. Predict movement and displacement cycles of enemy forces (such as artillery, logistics and command posts)

b. Identify likely future locations of HVTs

c. Anticipate the emergence of time-sensitive targets within defined temporal windows.

9.12 This capability reduces latency across the targeting cycle and enables pre-emptive engagement, particularly against fleeting or high-payoff targets. This shifts prioritisation from a static list-based approach to a continuously optimised target queue, aligned to system-level effects rather than individual target value.

Integration of Sensor Fusion, Dynamic Reprioritisation and System-Level Analysis

9.13 AI enhances the integration of ISR inputs by enabling automated multi-source sensor fusion. Data from UAVs, EW systems, radar and other sensors are combined to generate a coherent and continuously updated target picture. Key functions include:

a. The correlation and validation of sensor inputs to increase target confidence

b. Resolution of conflicting or incomplete data

c. Automated cross-cueing between sensors (such as EW detection triggering UAV confirmation)

d. Assignment of confidence scores to detected targets.

9.14 This significantly reduces sensor-to-shooter timelines and increases the reliability of targeting data within the reconnaissance–strike complex.

9.15 AI also enables the continuous reprioritisation of targets based on evolving battlefield conditions. Rather than periodic updates conducted by staff, AI systems:

a. Recalculate target priorities in real time as new data becomes available

b. Incorporate BDA feedback to adjust targeting focus

c. Respond immediately to emerging threats and opportunities.

9.16 This supports high-tempo operations and enables dynamic targeting at scale, particularly in contested and information-dense environments.

9.17 Consistent with the OPA concept of system-of-systems warfare, AI enables the analysis of targets as interconnected nodes within operational systems. AI systems:

a. Map relationships between command, sensor, shooter, and sustainment nodes

b. Assess second- and third-order effects of engagements

c. Prioritise targets based on their contribution to overall system function and vulnerability

9.18 This ensures that targeting decisions are aligned to system disruption effects, rather than isolated target destruction.

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Optimised Shooter-Target Pairing and BDA

9.19 AI supports decision-making by optimising the allocation of available effects to prioritised targets. This includes:

a. Matching targets to the most appropriate delivery system (such as tube artillery, rocket forces, UAV strike, EW or cyber)

b. Accounting for range, geometry, munition availability, and probability of success

c. Minimising resource expenditure while maximising operational effect.

9.20 This enables the efficient employment of dispersed fire systems and supports the temporal massing of effects.

9.21 AI integrates BDA with the targeting process, enabling continuous learning and refinement. AI systems analyse post-strike data from ISR and other sources. They assess effectiveness of engagements against intended effects and adjust prioritisation criteria and engagement methods accordingly. This reinforces BDA as a critical input to targeting and enables a self-improving decision support system.

Automation of Time-Critical Decisions

9.22 AI enables the rapid processing of targeting data and supports machine-speed decision-making for time-sensitive targets. Within defined authority thresholds, AI systems can validate targets based on available data. AI can then apply engagement criteria and constraints, and then recommend or initiate engagement actions.

9.23 Human operators retain oversight and authority, particularly for sensitive or high-risk targets, but they are no longer required to manually process all targeting decisions. This supports decision superiority under conditions of saturation and compression.

Risk Management

9.24 AI-enabled targeting systems incorporate operational constraints and risk considerations into decision-making processes. These include:

a. Collateral damage estimation

b. No-strike and restricted target lists

c. Fratricide risk assessment

d. Political and strategic sensitivities.

9.25 These constraints are embedded with the decision logic and applied in accordance with command-defined thresholds. This ensures that targeting decisions remain aligned with broader operational requirements.

9.26 AI expands the scope of targeting beyond physical destruction to include non-kinetic effects. This includes:

a. The identification and prioritisation of information, cyber, and electromagnetic targets

b. The integration of EW, cyber and information operations into the targeting process

c. The synchronisation of kinetic and non-kinetic effects to achieve combined outcomes.

9.27 This supports the OPA approach to informationised and intelligentised warfare, where effects are generated across multiple domains simultaneously.

Limitations and Vulnerabilities

9.28 While AI enhances targeting effectiveness, it introduces specific risks and dependencies. It is very data dependent. Targeting accuracy is contingent on the quality and integrity of input data. It is also susceptible to deception measures. AI systems may be vulnerable to decoys, spoofing and signature manipulation. Poorly constrained systems may prioritise efficiency over operational decisiveness. The use of AI also poses command and authority challenges. The delegation of decision-making to automated systems requires clearly defined authority thresholds and control measures.

9.29 These factors necessitate robust validation, oversight, and integration with command authority frameworks.

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9.30 AI-enabled targeting and decision support fundamentally enhance the OPA ability to conduct high-tempo, system-level operations. By enabling adaptive prioritisation, predictive targeting, real-time decision-making, and integrated effects, AI supports the rapid and efficient application of combat power across the battlespace.

9.31 It enables reduced sensor-to-shooter timelines and the improved allocation of fires and effects. It also enables enhanced integration of ISR, fires and information capabilities as well as continuous optimisation of targeting outcomes. AI acts as a critical enabler of temporal massing, system disruption, and decision superiority within the OPA fires and targeting construct.

Types of AI Models Used in the Kill Chain

9.32 The most important effect of AI is not improved accuracy but speed. The OPA seeks to compress the entire detect-decide-deliver-assess cycle so that targets can be engaged before they move, disperse, or conceal themselves. AI therefore acts as the enabler linking reconnaissance assets, targeting systems, artillery, rocket forces, EW systems and commanders into a single reconnaissance-strike network. In future OPA doctrine, AI should be described as a decision-support and kill-chain acceleration capability, rather than a replacement for commanders or fire planners. This aligns closely with OPA concepts of intelligentised warfare and system-of-systems operations.

9.33 Most OPA writings discuss AI in terms of functions and military applications, not named models. However, based on number of sources and the capabilities being developed, it is possible to identify the types of AI models likely to be employed at different stages of the reconnaissance-strike kill chain.

The Sensor Collection Layer

9.34 The most likely AI model type are computer vision models. These are used for UAV imagery and satellite imagery analysis, radar target recognition and automatic target detection. Examples include convolutional neural networks (CNNs), vision transformers (ViTs) and object-detection architectures similar to YOLO and Faster R-CNN.

9.35 Applications include the detection of artillery positions and identifying vehicle types, the recognition of missile launchers the detection in changes between imagery passes. This is currently the most mature military AI application.

The Data Fusion Layer

9.36 The most likely type of AI model multi-modal fusion models. These models are used for combining UAV and satellite imagery, EW intercepts, counter-battery radar tracks and HUMINT reports. Their functions cover the correlation of multiple observations, the reduction of false positives and the generation of a common operational picture. Typical technologies used are graph neural networks, Bayesian inference engines and transformer-based fusion architectures.

9.37 This is likely a major focus of the OPAs system-of-systems warfare concept.

The Target Identification Layer

9.38 The most likely type of AI model are classification and recognition models. They are used for Identifying the type of target, classifying the threat level and determining target category. For example identifying a tank versus an IFV, an artillery vehicle versus a logistics vehicle and a real target versus decoy.

9.39 They are likely based on deep learning image classifiers, radar signature recognition systems and electronic emitter fingerprinting models

The Target Prioritisation Layer

9.40 The most likely type of AI used are decision-support models. They are used to rank targets, assess their operational value and recommend an engagement order. These models use reinforcement learning, expert-system logic and predictive analytics. Inputs include target type, mission objectives, available weapons and time sensitivity.

9.41 For example, three high-payoff targets identified. A Brigade CP, an artillery battery and a fuel convoy. The brigade CP offers the highest system disruption potential. AI recommends an immediate precision strike within 10 minutes before displacement. In an AI-enabled reconnaissance-strike architecture, target engagement priority is determined not solely by target lethality or vulnerability, but by the anticipated effect on the enemy operational system. AI decision-support tools may therefore prioritise targets whose neutralisation produces cascading degradation across command, fires, sustainment and ISR networks.

The Command Decision Layer

9.42 This is where large language models (LLMs) are most likely to be used. It acts as the command interface between specialised AI systems and human decision-makers. Rather than directly firing weapons, LLMs would summarise battlefield information, draft recommendations, generate decision options, answer commander queries and produce operational reports.

9.43 Examples foundation models that could potentially be adapted for military use include DeepSeek, Qwen, ERNIE and general language models (GLMs). Military variants are very likely to be trained on OPA doctrine, orders formats, operational planning processes, historical exercises and intelligence databases.

9.44 A future commander might ask, "Identify the highest-payoff targets affecting the brigade's advance during the next six hours." The system would generate options rather than merely displaying data.

The Fire Mission Generation Layer

9.45 The most likely AI Type are Optimisation Models. These are used for weapon-target pairing, ammunition selection, fire unit assignment and timing calculations. Examples include operations research algorithms, constraint-satisfaction systems and reinforcement learning models.

9.46 Likely outputs include which fire unit should engage, what ammunition should be used, how many rounds are required and when to fire.

The Engagement Layer

9.47 The most likely AI Type are autonomous guidance models. They are used in loitering munitions, precision-guided rockets, cruise missiles and UAV strike systems. They provide terminal target recognition, aim-point selection, target reacquisition and counter-jamming navigation

9.48 This AI type operates on-board the weapon itself.

The BDA Layer

9.49 The most likely AI Type are assessment models. They are used for damage estimation, kill confirmation and re-attack recommendations. These are based on UAV video and satellite imagery, thermal signatures and radar observations

9.50 For example outputs indicates an 80% confidence factor for the target having been destroyed, confidence factor of 15% for a mobility kill and a five percent confidence factor for the target to have survived. The model recommends that no re-attack required.

The Future

9.51 Recent research suggest that the Olvanans are not simply using separate AI tools but creating a battlefield AI agent that combines computer vision, sensor fusion, decision support, large language models and optimisation engines.

9.52 In OPA doctrinal terms, this could be described as an AI-enabled reconnaissance-strike architecture that accelerates the D3A cycle (Decide–Detect–Deliver–Assess) and supports intelligentised warfare. An LLM is only one component. The more important military capability is the integration of multiple specialised AI models into a single reconnaissance-strike network that can rapidly generate and execute firepower decisions.

A Vignette – CA-Bde Conducting D3A using AI

Situation

9.53 A mechanised CA-Bde is conducting offensive operations in a contested littoral environment. The commander prioritises disruption of enemy artillery and associated C2/EW nodes. An AI-enabled targeting system has been integrated across ISR, fires, and command networks, operating within defined human authority thresholds.

9.54 The table on the following page compares the traditional D3A timeline with the AI-enabled D3A timeline.

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Table 9.1 – Timeline Comparison: Traditional vs AI-Enabled D3A

Phase	Traditional D3A Timeline	AI-Enabled D3A Timeline	Effect of AI
Sensor detection	H+0–10 sec	H+0–3 sec	AI accelerates correlation of sensor inputs
Target validation	H+10–30 sec	H+3–8 sec	AI fuses EW, UAV, and WLR inputs into a high-confidence track
Prioritisation and decision	H+30–55 sec	H+8–15 sec	AI generates ranked target queue and recommended COA
Human authorisation	H+55–65 sec	H+15–20 sec	Human remains in the loop, but reviews a pre-built recommendation
Fire mission processing	H+65–80 sec	H+20–25 sec	AI assists shooter–target pairing and digital fire mission generation
Shot fired	H+80–90 sec	H+25–30 sec	Decision-to-shot timeline is compressed
Time of flight	**H+90–130 sec**	**H+30–70 sec**	AI does not materially reduce ballistic time of flight
Rounds impact target	**Approx. H+130 sec**	**Approx. H+70 sec**	Full detect-to-impact timeline is reduced by about 60 sec
BDA initiated	H+130 sec onward	H+70 sec onward	AI auto-tasks BDA collection and reprioritises follow-on targets

9.55 AI-enabled targeting compresses the decision component of the kill chain by automating sensor fusion, target prioritisation, shooter–target pairing, and fire mission generation. In this example, the detect-to-shot timeline is reduced from approximately 90 seconds to 30 seconds. However, the full detect-to-impact timeline remains shaped by munition time of flight.

9.56 Assuming a representative 40-second time of flight, AI reduces the overall detect-to-impact timeline from approximately 130 seconds to 70 seconds. This distinction is critical: AI accelerates decision-making and mission processing, but ballistic effects remain constrained by range, trajectory, and munition performance.

Timeline Overview

9.57 AI-Enabled D3A Execution (H+0 to H+30 seconds).

a. H+0–10 sec: Detect (Machine-led, Human-validated)

(1) An EW sensor detects a fire control emission.

(2) AI instantly correlates with historical emitter signatures, predicts likely artillery displacement corridor and auto-cues a UAV to the predicted route

(3) WLR detects outgoing rounds; AI fuses EW + WLR + UAV inputs into a single high-confidence target track

(4) Human interface:

(a) S2 ISR operator confirms target classification and confidence score

(b) UAV operator verifies visual feed

(5) Outcome. Detection and validation compressed from around 30 seconds to around 10 seconds.

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b. H+10–20 sec: Decide (Machine-assisted, Human-authorised).

(1) AI:

(a) Elevates the artillery unit and associated EW node as priority targets

(b) Calculates system-level impact (fires + C2 disruption)

(c) Generates a ranked engagement recommendation

(2) Human interface:

(a) Fires cell reviews AI-generated COA on decision-support display

(b) S3 Fires confirms alignment with commander's intent and constraints

(c) Commander (or delegated authority) approves engagement

(3) Outcome. Decision cycle reduced from around 30 seconds to around 10 seconds.

c. H+20–30 sec: Deliver (Machine-optimised, Human-approved)

(1) AI executes automated shooter–target pairing:

(a) Rocket artillery (PCH-191) assigned to predicted firing point

(b) Tube artillery assigned to displacement route

(c) EW tasked to disrupt command node

(d) Tasks UAV for BDA

(2) Fire missions digitally transmitted immediately upon approval

(3) Human interface:

(a) Fires cell confirms deconfliction (FSCMs, airspace, friendly positions)

(b) Authority threshold check completed

(c) Outcome. Delivery compressed from ~30 seconds to ~10 seconds.

9.58 Shot fired (H+30–70 seconds).

a. Fire mission conducted. TOF around 40 seconds

b. Rounds impact target at approximately H+70 seconds.

9.59 H+70 sec onward: Assess (Machine-initiated, Human-judged).

a. AI:

(1) Analyses damage indicators and emission reduction

(a) Generates initial assessment

b. Human interface:

(1) S2 validates BDA reliability

(2) Commander determines need for re-engagement.

9.60 Outcome.

a. Total sensor-to-shooter timeline reduced from around 90 seconds to around 30 seconds

b. Engagement shifts from reactive counter-battery to predictive system disruption

c. Effects are synchronised across kinetic and non-kinetic domains.

9.61 Key observations include the following:

a. Temporal compression occurs as a result of AI reducing each phase of D3A through automation and parallel processing.

b. Predictive Advantage is achieved as targets are engaged based on anticipated positions, not their last known locations.

c. Human Control is maintained with critical decisions (validation, authority and constraints) remaining human-led.

d. A continuous loop is created with BDA feeding directly back into prioritisation without delay.

9.62 This vignette demonstrates that AI does not change the structure of D3A, but compresses and overlaps its phases. It transforms it from a linear sequence into a continuous, high-speed decision loop. This results in enhanced survivability, increased responsiveness, and improved ability to achieve system-level effects under time-constrained conditions.

Section 9-3. Photonics

9.63 Modern AI systems require enormous amounts of data processing, matrix calculations, neural network computations and data movement between processors and memory. In conventional electronic computers, the movement of electrons generates heat and consumes large amounts of power. This becomes a major limitation for military AI systems deployed at the tactical edge.

9.64 The use of photonics enhances intelligentised warfare by providing high-speed, low-power computing and communications capabilities that enable AI-assisted sensor fusion, target recognition, decision support and precision engagement. Integrated with the reconnaissance-strike system, photonic technologies reduce sensor-to-shooter timelines and improve the effectiveness of system-of-systems operations.

9.65 The OPA views photonics as an enabling technology for intelligentised warfare. Olvanan military and civilian research organisations are investing heavily in photonic AI chips, optical neural networks, optical communications, quantum-photonic technologies and AI-enabled ISR systems. The goal is to support a future battlefield in which sensors, command systems, AI decision aids and precision weapons are connected in a highly automated kill web.

Advantages of Photonics for AI

9.66 The use of photonics in AI has a number of advantages:

a. Much faster processing

b. Lower power consumption

c. Massive parallel processing

d. Improved sensor fusion

e. Enhanced Edge AI

f. Better performance in ISR missions.

Much Faster Processing

9.67 Photons travel at the speed of light and can carry information at extremely high rates. This provides for faster target recognition, faster sensor fusion, reduced latency in kill chains and near-real-time decision support.

9.68 For a reconnaissance-strike system, this could reduce the time between target detection, target identification, weapon assignment and engagement.

Lower Power Consumption

9.69 Moving light through optical circuits requires far less energy than moving electrons through conventional processors. This provides the following benefits:

a. Longer UAV endurance.

b. Reduced generator requirements.

c. Lower vehicle power demands.

d. Reduced thermal signatures.

9.70 This is particularly important for expeditionary operations or dispersed forces.

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Massive Parallel Processing

9.71 Different wavelengths of light can be processed simultaneously in the same optical pathway. This enables the processing of many sensor feeds simultaneously and the simultaneous analysis of EO, IR, radar, EW and acoustic data. Photonics also enables faster AI-assisted targeting.

9.72 A firepower command and coordination centre could theoretically analyse UAV feeds, counterbattery radar tracks, EW detections and satellite imagery all at the same time without overwhelming computing resources.

Improved Sensor Fusion

9.73 Modern AI systems rely on combining information from multiple sensors. Photonics can assist with high-bandwidth data transmission, optical networking and real-time image processing. This directly supports informationised warfare, intelligentised warfare and system-of-systems operations.

Enhanced Edge AI

9.74 Instead of sending data back to a headquarters, AI processing can occur directly on UAVs, in ground and artillery command vehicles saw well as AD systems.

9.75 This allows faster engagements, reduces the communications burden and provides for greater survivability under EW attack.

Better Performance in ISR Missions

9.76 Photonics is already used in hyperspectral sensors, thermal imagers, laser radar (LiDAR) and Optical communications.

9.77 When combined with AI, these systems can automatically detect vehicles, classify targets, track movement and predict future locations. This is particularly relevant to the reconnaissance-strike complex.

9.78 In practical terms, photonics could allow an OPA firepower command and coordination centre to process hundreds of UAV tracks, radar plots, EW detections and intelligence reports simultaneously, enabling AI to recommend targets and allocate firepower far more quickly than current electronic systems.

Section 9-4. Emerging Technologies in Autonomous and Semi-Autonomous Systems for Fires

9.79 The OPA integrates autonomous and semi-autonomous systems into its reconnaissance–strike architecture to accelerate fires. This section identifies the emerging technologies associated with autonomous and semi-autonomous systems that are shaping the future employment of fires. It focuses on technologies under development or early operationalisation within the OPA that materially affect target acquisition, decision-making, and strike integration.

Collaborative Swarm Autonomy

9.80 Emerging swarm technologies are transitioning from pre-programmed behaviours to adaptive, AI-driven collaboration. The systems operate as network of connected platforms that share data and automatically coordinate their actions in real time. This enables them to detect, track and engage targets without relying on a single controlling node.

9.81 The key technologies used in collaborative swarm technology include:

a. Distributed consensus algorithms. Algorithms that allow multiple systems (such as UAVs in a swarm) to agree on a shared decision or understanding without a central controller. Each node shares local data (for example, target sightings, position and status). The network iteratively aligns on target location and task allocation (who tracks and who strikes). The decision emerges from the group, not a headquarters. This enables swarms to collectively select and prioritise targets, even if communications are degraded or nodes are lost.

b. Reinforcement learning for cooperative behaviour. This is a type of machine learning where systems learn optimal actions through trial-and-error, guided by rewards, specifically to improve group performance. Systems are trained to maximise mission success (for example, target detection and survivability) and minimise inefficiencies such as duplication. Behaviour improves over time based on outcomes. It allows unmanned systems to adapt how they search, track and allocate targets, improving effectiveness in complex or changing environments.

c. Mesh-networked swarm communications. This a communication architecture where each system acts as a node that can send, receive and relay data, forming a self-organising network. There is no reliance on a single relay or HQ and data routes dynamically between nodes. The network continues functioning even if nodes are lost. This maintains sensor-to-shooter connectivity and coordination across dispersed systems, enabling continuous targeting and engagement under contested conditions.

9.82 These technologies allow autonomous systems to share information, agree on tasks, and coordinate actions as a group without relying on a central controller, enabling resilient and adaptive fires support.

Edge AI and On-board Target Processing

9.83 Edge AI enables platforms (such as UAVs, sensor or weapon system) to use AI on the platform itself. This enables data to be collected, analysed and acted on locally rather than being sent to a higher headquarters. In the targeting process, Edge AI moves key functions onto the sensor itself, compressing the D3A cycle as follows:

a. In the detect step, raw sensor data is processed on-board to identify potential targets in real time, removing delays from transmitting data for analysis.

b. In the identify/classify (detect/decide) step, automated target recognition is used to classify platforms and filter false positives, producing pre-validated target candidates.

c. In the decide step rules or learned models are applied to prioritise targets and flag time-sensitive threats, accelerating staff decision-making.

d. In the deliver step target data (including location, type and confidence) is generated and formatted for fire control systems, enabling rapid engagement.

e. In the assess step an immediate BDA is conducted and re-engagement is cued if required.

9.84 Edge AI shifts targeting from a centralised, sequential process to a distributed, parallel workflow, where sensors generate and refine targets prior to human validation and weapon release.

Autonomous Sensor Fusion and Cross-Cueing

9.85 Autonomous sensor fusion and cross-cueing involves the use of software and AI to automatically combine data from multiple sensors and task those sensors to support each other without continuous human direction

9.86 The key technologies used in autonomous sensor fusion and cross-cueing include:

a. Multi-source data fusion algorithms. These are algorithms that combine data from multiple sensors (including UAV EO/IR, EW intercepts, WLR tracks and radar) to produce a single, coherent and higher-confidence target picture. They align and merge data with different formats, accuracies and time stamps, and then weight sources based on reliability and confidence. The output produced is a refined target solution (including the location, type and confidence level). This reduces uncertainty and false positives, enabling faster, high-confidence target development for engagement.

b. Cross-cueing between sensors. This involves a process where one sensor automatically tasks another sensor to confirm, refine or track a target. For example, EW detects emitter, a UAV is cued to visually confirm and a WLR refines the location. This process can be automated or machine-assisted. It enables rapid target confirmation and refinement, reducing the need for manual ISR coordination and accelerating the detect phase.

c. Correlation engines. These are software systems that match, compare and reconcile data from different sensors to determine whether they refer to the same target. They can be used to deconflict multiple reports (thereby avoiding duplicate targets), track targets over time (to maintain “target custody”) and resolve inconsistencies in location, identity, or timing. This ensures the fires system engages the correct target with a consistent track, supporting continuous targeting and reducing misidentification risk.

9.87 These capabilities allow multiple sensors to combine their data, automatically cue one another, and maintain a consistent track on targets, enabling faster and more reliable targeting for fires.

Loitering Munition Autonomy

9.88 Loitering munitions are evolving from remotely piloted systems to semi-autonomous strike platforms capable of independent target search and engagement.

9.89 Key Technologies include:

a. Autonomous search algorithms are algorithms that enable unmanned systems to independently plan and execute how they search an area for targets without continuous human control.

b. Visual target recognition which enables a system to detect, identify and classify targets from imagery using automated analysis to provide rapid and consistent target identification to support fires.

c. Cooperative engagement within munition groups enables multiple munition groups (such as LM) to share information, allocate targets and coordinate their attacks, improving efficiency and effectiveness compared to individual engagements.

9.90 These technologies enable organic precision strike at lower echelons, the immediate engagement of time-sensitive targets and integration with ISR for rapid re-attack. Loitering munitions provide a parallel fires capability, reducing reliance on artillery for all engagements.

Autonomous Navigation in Contested Environments

9.91 Emerging systems are being designed to operate in GPS-denied environments through alternative navigation methods. Key Technologies include:

a. Vision-based navigation which enables unmanned systems to determine their position and navigate using visual data from on-board sensors allowing them continued targeting and strike operations in GPS-denied environments.

b. Terrain matching and mapping/simultaneous location and mapping (SLAM) enables unmanned systems to build and update a map of its own environment while determining its position within it, allowing accurate navigation and targeting in GPS-denied conditions.

c. Multi-sensor inertial navigation systems which combine inertial measurements with additional sensor inputs to provide accurate and resilient positioning, enabling navigation and targeting in degraded or denied environments.

9.92 This technology enables sustained ISR operations under electronic warfare conditions, the reliable delivery of targeting data and the continuity of autonomous operations. Targeting systems remain effective despite degradation of satellite-based navigation.

Autonomous Communications and Mesh Networking

9.93 Unmanned systems increasingly operate within self-forming, self-healing communication networks. Autonomous communications automatically establish, manage and optimise communications links between platforms without continuous human control. Their core functions include the selection and switching of frequencies or channels and routing data to the most efficient path. They prioritise critical information (e.g. targeting data) and adapt to jamming, congestion or node loss. This enables them to maintain sensor-to-shooter connectivity ensuring targeting data flows despite degraded networks. They also support distributed fire control without the need for constant operator intervention.

9.94 Mesh networking is a communication architecture where each node (for example, a UAV, a sensor or vehicle) acts as both a user and a relay, passing data between nodes across the network. Mesh networking is characterised by having no single point of failure or central hub and the use of multiple pathways for data transmission. They are self-forming and have a self-healing network structure.

9.95 When combined they enable networks that can configure and repair themselves automatically. They provide continuous communication even when nodes have been destroyed or jammed. They also enable real-time coordination between dispersed systems. This enables distributed ISR, targeting and strike coordination. They also support swarm operations and cross-cueing between sensors as well as preserve continuous targeting and engagement cycles under contested conditions.

9.96 Autonomous communications and mesh networking enable systems to automatically establish and maintain resilient, self-healing communication networks, ensuring continuous coordination and data exchange for targeting and fires in contested environments.

Human–Machine Teaming at Scale

9.97 Human–machine teaming at scale is the employment of a small number of operators controlling and coordinating large numbers of autonomous or semi-autonomous systems, enabled by AI-driven decision support and automation.it involves the expansion from one operator–one system to one operator–many systems. Machines handle data processing, target detection and prioritisation, and routine task execution. This enables humans focus on making decisions, validation and exercising authority for effects. Its key enablers include:

a. AI-assisted mission management which are AI tools that support planning, execution and adaptation of missions by processing large volumes of data and generating actionable recommendations.

b. Automated task allocation and prioritisation which are systems that assign tasks to platforms and rank targets automatically based on mission criteria.

c. Simplified human–machine interfaces (HMI) which are user interfaces designed to present complex information clearly and enable rapid control of multiple systems.

d. Autonomous coordination between systems which is ability of systems to share data and synchronise actions with minimal human direction.

9.98 In a fires context, a single operator can monitor multiple UAVs providing ISR and manage loitering munitions and sensor tasking. The systems generate and refine targets, and recommend engagements. The operator validates targets and authorises fires. This has the potential to increase sensor density and coverage, enable faster targeting and re-tasking and allow for higher operational tempo without proportional manpower increase.

9.99 Human–machine teaming at scale enables a small number of operators to control and coordinate multiple autonomous systems, allowing machines to manage data and tasks while humans retain decision authority over targeting and fires.

Autonomous Ground Systems for Target Acquisition

9.100 Autonomous ground systems combine independent mobility, integrated multi-sensor detection, and semi-autonomous control to conduct persistent, forward target acquisition, providing accurate and continuous targeting data for fires while retaining human oversight.

9.101 Through the use of on-board navigation (such as vision-based navigation, SLAM and multi-sensor INS) autonomous ground systems are able to move independently through urban areas, dense vegetation and restrictive terrain. They are able to infiltrate forward of friendly forces to pre-designated observation points. They can reposition based on mission triggers (for example, the detection of targets or the loss of line-of-sight). They can also avoid obstacles and adapt routes without continuous operator input. This enables persistent forward sensing without exposing personnel and maintains observation in terrain where UAVs are masked or constrained.

9.102 Integrated sensor payloads (such as EO/IR, acoustic and EW) are multiple sensors used to detect, identify and classify targets across different signatures. EO/IR: is used for the visual detection and classification of vehicles, equipment and personnel. Acoustic sensors are used to detect vehicle movement, artillery firing or engine noise. EW sensors are used for the detection and geolocation of emitters. Sensors are fused on-board to produce target type, location and level of confidence. This provides multi-source target confirmation and reduces false positives to improve targeting accuracy.

9.103 Semi-autonomous control systems operate with partial independence, executing tasks while remaining under human supervision. Thy can be used to conduct pre-programmed surveillance or patrol routes. They are capable of automatically detecting and flagging potential targets, and can maintain tracking and report data. Operators can intervene for target validation, re-tasking and engagement decisions. They aid in reducing operator workload, enable continuous target acquisition and tracking as well as maintain human control over targeting and fires.

9.104 Autonomous ground systems combine independent mobility, integrated multi-sensor detection, and semi-autonomous control to conduct persistent, forward target acquisition, providing accurate and continuous targeting data for fires while retaining human oversight.

9.105 Emerging technologies in autonomous and semi-autonomous systems are reshaping the conduct of fires by shifting emphasis from platform performance to system integration and decision speed. These technologies enable distributed sensing, rapid target generation, and parallel strike execution. As a result,

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fires systems are evolving into networked, adaptive architectures capable of sustaining tempo and effectiveness in contested environments.

Section 9-5. Precision Strike and Advanced Munitions

9.106 Emerging technologies are transforming the way the OPA conducts precision strike by integrating sensing, decision-making, and delivery systems into a unified, networked architecture. These technologies do not operate as discrete capabilities. Instead, they form an intelligentised strike system that compresses the Decide–Detect–Deliver–Assess (D3A) cycle through automation, autonomy, and data integration.

9.107 Precision strike is therefore no longer defined solely by the accuracy of individual munitions. It is defined by the ability to identify, prioritise, and engage targets rapidly across a system-of-systems environment, generating effects at the operational and tactical levels simultaneously.

AI and Machine-Assisted Targeting

9.108 AI underpins the transition from informationised to intelligentised warfare. AI enables automated target recognition and classification from ISR feeds. It enables multi-source sensor fusion and cross-cueing as well as real-time target prioritisation and dynamic re-tasking. It also enables predictive analysis to support anticipatory targeting.

9.109 AI reduces the cognitive burden on commanders and accelerates decision-making. Human operators retain authority and define constraints, while machine-assisted systems optimise execution within those parameters. AI compresses the Decide and Detect phases of the D3A cycle and enables simultaneous engagement of multiple targets across the battlespace.

Artillery Tube and Rocket Ammunition

9.110 Emerging technologies are improving artillery tube and rocket ammunition by increasing precision, range, adaptability, and survivability, while reducing the number of rounds required to achieve effects.

Precision Guidance and Course Correction

9.111 The integration of GNSS/INS guidance kits and control surfaces as well as in-flight trajectory correction to reduce circular error probable (CEP) is improving precision guidance and course correction. This results in fewer rounds required and enables the engagement of point targets with both tube and rocket artillery

Extended-Range Propulsion

9.112 Extended-range propulsion systems significantly increased range, allowing deep targeting and stand-off engagement. Olvana and the OPA have been working on a number technologies to achieve this goal including:

a. The improvement of base bleed and rocket-assisted projectiles (RAP) are existing capabilities

b. Solid-fuel ramjet propulsion and ramjet-assisted projectiles to extend 155 mm projectile ranges potentially beyond 100 km

c. Scram jet propulsion which Influences long-range rocket artillery/missile convergence enabling deep strike beyond traditional artillery ranges

d. Advanced air-breathing projectile concepts which use a projectile's velocity to sustain propulsion after launch and blur the line between artillery, rockets and missiles.

Multi-mode and Adaptive Fusing

9.113 These emerging technologies include the development of more effective programmable and sensor-based fuses (such as proximity, airburst and delay) as well as adaptive fuses that respond to target type or environment. This optimises the effects against varied targets (such as personnel, armour and structures).

Advanced Warhead Design

9.114 Emerging technologies in advanced warhead design include dual-purpose, thermobaric, and enhanced fragmentation warheads as well as warheads which have directional and focused effects. These projectiles improve lethality and tailor effects with fewer rounds.

Network-enabled and "Smart" Munitions

9.115 Network-enabled munitions cover munitions that are digitally connected to external systems (such as UAVs, sensors or command networks) and can exchange data during flight or prior to impact. They receive updated target data after launch, share target status and location within the network, and integrate with ISR and targeting systems. They enable the engagement of moving or time-sensitive targets. They support dynamic targeting and re-tasking as well as link munitions directly into the sensor-to-shooter network.

9.116 Smart munitions incorporate on-board sensors, guidance and processing to independently detect, select or adjust to targets. Their core functions include autonomous or semi-autonomous target detection, in-flight guidance and course correction. They also use adaptive fusing and effect selection. They can potentially increase accuracy and probability of kill, reduce the number of rounds required and enable the engagement of complex or partially obscured targets.

9.117 Network-enabled munitions rely on external data and connectivity whereas smart munitions rely on on-board sensing and processing. Many modern munitions now combine both.

Top-Attack and Sensor-Fused Sub-Munitions

9.118 These are munitions that deploy sub-munitions to detect and attack targets autonomously. They are effective against dispersed or armoured targets without precise coordinates.

Reduced Signature and Survivability Enhancements

9.119 These munitions include low-smoke propellants and munitions with a reduced thermal/EM signature. They have an improved resistance to jamming and spoofing. They potentially increase survivability of firing units and munition effectiveness in contested environments.

9.120 Emerging technologies are transforming artillery munitions into precision, network-enabled systems capable of extended-range, adaptive, and highly lethal effects, reducing ammunition expenditure while increasing responsiveness and effectiveness in complex environments.

Section 9-6. First-Person View (FPV) Systems and Close Precision Strike

9.121 FPV systems represent a rapidly evolving class of low-cost, operator-controlled precision strike capability. Typically consisting of commercially derived unmanned aerial platforms fitted with explosive payloads and real-time video transmission, FPV systems enable direct, terminally guided engagement of targets by a remote operator.

9.122 Unlike fully autonomous systems, FPVs operate under human-in-the-loop control, with the operator conducting navigation, target identification, and terminal guidance via a live video feed. This allows for high levels of precision against small, mobile, or concealed targets in complex terrain.

9.123 FPV systems have the following characteristics:

a. Low cost and scalability: Mass employment is achievable due to low production cost

b. Operator-guided precision: Human control enables discrimination and adaptive targeting

c. Short-range, high-risk employment: Typically employed within line-of-sight or relay-supported distances

d. Rapid adaptation: Payloads and configurations can be modified for specific target sets

e. High attrition tolerance: Designed for expendable use in contested environments

9.124 FPV systems are best understood as a form of close precision strike capability rather than traditional artillery or deep fires. They are typically employed at CA-Bde and below in support of manoeuvre elements for immediate target engagement. They are generally used against armoured vehicles and soft-skinned platforms, fighting positions and urban strongpoints. They are also used against dismounted personnel in complex terrain, sensors, communications nodes and logistics elements.

9.125 FPVs may be integrated into the broader reconnaissance–strike system through cueing from UAVs or EW systems. They may also be integrated with targeting priorities set at higher headquarters.

9.126 FPVs are rarely employed independently. UAVs provide detection, classification, and tracking while FPVs are cross-cued onto targets for terminal engagement. FPVs can also be used to engage point or fleeting targets. While artillery delivers suppression, neutralisation and depth effects, FPVs can provide post-strike confirmation and re-attack capability.

The Use of FPVs in BDA

9.127 FPVs significantly enhance BDA by providing immediate, close-range visual confirmation of effects. They can capture point-of-impact and immediate effects, provide a low-altitude perspective not available to overhead ISR and confirm the status of the target.

9.128 FPVs reduce the time between strike and assessment by combining strike and observation in a single platform and enabling near-instant reporting through live video feeds. FPV-enabled BDA can directly drive re-engagement decisions, escalation (for example replacing FPV with artillery) and target reprioritisation. BDA is the primary trigger for dynamic targeting and FPVs can accelerate that trigger.

FPVs in Dynamic Targeting

9.129 FPVs are optimised for targets of opportunity and time-sensitive targets. Their forward positioning reduces response time. They require minimal coordination (within authority thresholds) and are able to engage targets in defilade or in complex terrain.

9.130 FPVs can be employed in the immediate engagement of fleeting targets (such as dismounts, vehicles and sensors) and to conduct follow-up strikes based on BDA outcomes. They can also fill gaps where an artillery response is too slow or disproportionate.

9.131 The employment of FPVs is conducted at the lowest appropriate level (such as company or team). This is enabled by pre-delegated engagement authority and controlled through defined targeting criteria and COP integration.

Command and Control Considerations

9.132 The effective employment of FPVs requires established authority and release frameworks which provide clear delegation for dynamic targeting and defined engagement criteria.

9.133 FPVs needed to be integrated digitally with other systems so that real-time data can be shared across UAV, FPV and fires systems. They also need to be integrated in the common operating picture (COP).

9.134 The use of FPVs also poses deconfliction. They require spatial and temporal separation from artillery fires as well as airspace coordination with UAV operations.

Impact on the D3A Process

9.135 FPVs fundamentally alter the targeting cycle:

a. At the Decide phase FPVs can provide real-time visual input refines prioritisation.

b. At the Detect phase they can be used to confirm targets identified by UAV/EW.

c. At the Deliver phase FPVs can be used to provide immediate precision strike.

d. At the Assess phase they can be used to provide instant BDA.

9.136 FPVs can be used to collapse Detect–Deliver–Assess into a continuous action, enabling rapid iteration of the targeting cycle.

Operational Advantages, Limitations and Vulnerabilities

9.137 FPS have the following advantages:

a. They can be used to accelerate engagement and re-engagement cycles

b. They enable selective targeting with reduced collateral damage

c. They support continuous dynamic targeting

d. They can reduce reliance on large, detectable firing units

e. They enable the allocation of artillery to targets requiring mass or depth.

9.138 FPVs have the following limitations and vulnerabilities:

a. They are vulnerable to jamming and signal disruption

b. They have a limited operational radius

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c. They have a limited effect on hardened targets

d. They require trained personnel and coordination

e. They have a high consumption rates requiring sustained resupply.

9.139 FPV systems represent a significant evolution in the conduct of fires. By combining precision strike, real-time BDA and dynamic targeting capability, they transform the reconnaissance–strike system into a continuous, self-adjusting cycle. Their integration with UAV cueing and artillery enables a layered fires architecture that increases tempo, improves efficiency, and enhances overall combat effectiveness.

A Vignette – CA-Bde Offensive Action using FPVs

Situation

9.140 A mechanised CA-Bde is conducting an offensive operation to seize a key road junction defended by an enemy battlegroup. The enemy is employing dispersed armour, ATGM teams and SHORAD systems within complex terrain (woodland–urban fringe).

9.141 The brigade is reinforced with a UAV platoon (persistent ISR) and an FPV drone detachment integrated forward at company level.

9.142 The brigade commander's intent is to collapse the enemy defensive system through continuous reconnaissance–strike integration, using BDA-driven dynamic targeting to sustain tempo and prevent enemy reconstitution.

9.143 The brigade will employ a continuous D3A cycle, where UAVs will detect and track targets, FPVs will prosecute and assess targets in real time, and the FA battalion will deliver scalable mass.

9.144 Brigade elements have been tasked as follows:

a. The brigade fires cell (consisting of theS3 Fires and the Targeting Officer) is to prioritise targets, delegate engagement authority and conduct dynamic re-tasking as required.

b. The brigade FA battalion is to provide depth fires and engage dynamic targets as authorised.

c. The UAV Platoon is to provide wide-area ISR, tracking and BDA confirmation.

d. FPV Detachments (Company-level) are to provide precision strike, close BDA and immediate re-engagement.

e. The EW Detachment is to conduct emissions detection and limited disruption.

Timeline Overview

9.145 Phase 1: Detection and Initial Targeting (H-10 to H-5).

a. A UAV identifies:

(1) An enemy SHORAD vehicle (priority target),

(2) Enemy dismounted ATGM teams in tree line,

(3) Enemy armoured vehicles in depth (forming a reserve).

b. EW confirms enemy SHORAD radar emissions.

c. Targets are prioritised by the brigade fires cell:

(1) SHORAD (enables ISR/fires freedom of action)

(2) ATGM teams (threat to manoeuvre)

(3) Armour in depth (follow-on threat)

9.146 Phase 2: Initial Engagement (H-5 to H+1).

a. FPV Team 1 is assigned SHORAD for immediate strike (precision, low latency)

b. FA battalion is placed on-call as a contingency.

c. Action:

(1) FPV impacts SHORAD system

(2) Live video feed confirms catastrophic damage

9.147 Phase 3: Immediate BDA and Trigger (H+1 to H+3).

a. FPV feed + UAV overhead confirm SHORAD: Kill (K)

b. Dynamic Targeting Trigger:

(1) With SHORAD neutralised, UAV freedom of manoeuvre increases

(2) CAB Fires Cell immediately reprioritises targets

c. BDA outcome triggers the next targeting decision without delay

9.148 Phase 4: Dynamic Targeting – Close Battle (H+3 to H+7).

a. UAV tracks ATGM teams displacing

b. FPV Team 2 engages first ATGM team resulting in a partial kill (PK)

c. FPV loiters briefly and confirms surviving personnel

d. Decision:

(1) Immediate re-engagement is authorised (delegated authority)

(2) Second FPV strike results in a Kill (K)

e. Simultaneously, the remaining ATGM positions are engaged by 122mm artillery (airburst suppression).

9.149 Phase 5: BDA Feedback and Escalation (H+7 to H+10).

a. UAV BDA confirms:

(1) 1 x ATGM team destroyed

(2) 1 x suppressed but not neutralised (No Effect / NE on personnel survival)

b. Dynamic Targeting Response:

(1) CAB Fires Cell escalates and assigns repeat artillery mission

(2) holds FPVs for higher-value targets

9.150 Phase 6: Dynamic Targeting – Deep Fight (H+10 to H+15).

a. UAV identifies armoured element (~8–10 km) preparing counterattack

b. Engagement Allocation:

(1) Artillery executes time-on-target (TOT) strike (155mm battery)

(2) FPVs are positioned forward to conduct post-strike BDA and re-attack

c. BDA Sequence:

(1) UAV observes impacts (initial assessment)

(2) FPV moves in to confirm 2 x vehicles mobility killed (PK) and 1 x vehicle intact (NE)

d. Immediate Dynamic Re-tasking:

(1) FPV conducts follow-up strike on surviving vehicle → Kill (K)

(2) Artillery shifts fires to secondary depth targets.

Implications for CA-Bde Fires Planning

9.151 Implications are as follows:

a. FPVs must be integrated into targeting and BDA processes, not treated solely as strike assets

b. BDA thresholds (K / PK / NE) must be clearly defined to enable rapid decisions

c. Dynamic targeting requires robust communications, shared COP and delegated engagement authority.

d. Fire plans must incorporate branch plans driven by BDA outcomes

e. UAV–FPV pairing is critical for depth-to-close continuity.

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9.152 This vignette demonstrates that FPVs fundamentally alter the CAB targeting construct by integrating strike, BDA and dynamic targeting into a single continuous cycle. When combined with UAV cueing and artillery fires, FPVs enable a self-adjusting fires system, where each engagement generates the data required to drive the next. This results in accelerated tempo, increased precision, and sustained operational pressure across the close and deep fight.

Section 9-7. Directed Energy Weapons (DEW)

9.153 DEWs are systems that employ concentrated electromagnetic energy to produce military effects ranging from temporary disruption to permanent physical damage. DEWs are employed as part of integrated fires to degrade or deny adversary systems, disrupt sensor-to-shooter linkages and enable follow-on kinetic strike.

9.154 DEW are not employed as stand-alone capabilities. They are integrated within the OPA's system-of-systems fires architecture. Their primary role is to achieve effects across three functional areas:

a. Counter-reconnaissance by degrading the enemy's ISR systems and sensors

b. System disruption by interrupting command, control, and communications

c. Force protection by defeating the enemy's UAVs, precision munitions and surveillance assets.

9.155 DEW contribute to the temporal and functional shaping of the battlespace prior to and during kinetic fires.

High-Energy Laser (HEL) Systems

9.156 HEL systems deliver concentrated beams of optical energy to a target at the speed of light. Effects are scalable and depend on power output and dwell time.

9.157 Power output is the rate at which energy is delivered to the target, typically measured in kilowatts (kW). At brigade level, typical HEL systems are categorised as low power (10–30 kW), medium power (30–100 kW) and high power (100+ kW).

9.158 Low power HEL are effective in sensor dazzling but they have a limited effect on small UAVs medium power HEL provide an effective counter-UAS able to burn-through of airframes and control surfaces. High power HEL are capable of the rapid destruction of UAVs and some incoming munitions.

9.159 HEL systems generate the following effects:

a. Dazzle which is the temporary degradation of electro-optical sensors

b. Blind which is the permanent damage to optical systems

c. Destroy which is thermal damage to structures or components.

9.160 HEL systems are employed in counter-UAS operations within layered air defence and the protection of high-value assets (such as command posts, artillery and logistics nodes). At the strategic level they are employed in counter-space operations targeting ISR satellites. Employment is typically point-target focused and requires line-of-sight.

9.161 HEL effectiveness is constrained by atmospheric conditions (including dust, humidity and cloud cover), beam attenuation and thermal distortion as well as the requirement for continuous target tracking.

9.162 Dwell time is the length of time a laser beam remains focused on a single aim point on the target. Except for dazzling, laser effects are not instantaneous. They rely on thermal accumulation and material failure over time. To destroy a target, the laser must heat the surface, penetrate material and cause structural or functional failure. A dwell time of less than one second is effective for sensor dazzling or temporary disruption. A dwell time of 1-5 seconds will enable damage to UAV components and ignite materials. A dwell time greater than five seconds will cause structural failure or destruction.

9.163 Power output and dwell time are interdependent. A low power HEL requires a longer dwell time. A high power HEL achieves its effects with a shorter dwell time. Systems with shorter dwell times can engage more targets per minute and are more effective against swarms. However Longer dwell times increase exposure to detection by the enemy and reduce the ability to rapidly shift targets.

9.164 At brigade level directed energy effects are governed by the balance between power output and dwell time, constrained by tracking accuracy and environmental conditions. HEL systems are precision engagement systems constrained by time-on-target and higher power directly translates to faster kill chains. Sensor-to-shooter integration is essential for maintaining dwell time.

High-Power Microwave (HPM) Systems

9.165 HPM systems emit bursts of electromagnetic energy designed to disrupt or damage electronic systems. Effects are typically area-based and may affect multiple targets simultaneously. HPM systems generate a soft kill and a hard kill. A soft kill is the temporary disruption of electronic systems. A hard kill is the permanent damage to circuitry and components. HPM effects are particularly effective against UAV swarms, communications networks, and radar and sensor systems.

9.166 HPM systems may be employed to suppress enemy ISR and targeting systems prior to fires. They may also be employed to disrupt massed autonomous or semi-autonomous systems. They can also create windows of electromagnetic superiority. Their employment is typically wide-area and time-bounded, aligned to fire missions.

9.167 HPM effectiveness depends on the target’s vulnerability to electromagnetic effects, range and power output HPM effectiveness is also affected by the shielding and hardening of enemy systems.

Section 9-8. Conclusion

9.168 Emerging technologies are transforming OPA precision strike into a system-of-systems capability characterised by speed, integration, and adaptability. The convergence of AI, autonomy, networked sensors, and advanced munitions enables the OPA to compress decision cycles, expand strike options, and generate effects across multiple domains.

9.169 Precision strike is therefore no longer a discrete function of fires. It is a continuous, integrated process that links targeting, decision-making, and engagement into a unified operational system. FPV systems are too significant, and too doctrinally disruptive, to leave implicit. They warrant a dedicated subsection because they sit at the intersection of autonomy, loitering munitions, and mass precision, but introduce distinct TTP and employment implications.

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Abbreviations

ACA	Airspace coordination area
ACM	Airspace coordination measure
ACP	Advance command post
AD	Air defence
AG	Artillery group
AI	Artificial intelligence
AMPHIB	Amphibious
AO	Area of operations
ARMD	Armoured
ATGM	Anti-tank guided weapon
BCP	Base command post
AWS	Autonomous weapon system
BCT	Battalion combat team
BDA	Battle damage assessment
BDE	Brigade
BDS	Big data system
BEIDOU	BeiDou Navigation Satellite System
BFP	Brigade fuel point
BN	Battalion
BRCP	Brigade Rear Command Post
BFP	Brigade fuel points
BTY	Battery
C2	Command and control
CA-Bde	Combined arms brigade
CCD	Camouflage, Concealment, and Deception
CDI	Civil-Defence integration
CEP	Circular error of probability
COE	Common operating environment
CNN	Convolutional neural network
COP	Common operational picture
COY	Company
CP	Command post
D3A	decide–detect–deliver–assess
DET	Detachment
DEW	Directed energy weapon

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DPICM	Dual-purpose improved conventional munition
DS	Direct support
ECH	Echelon
EFC	Equivalent full charge
ELINT	Electronic intelligence
EMCON	Emission control
EO	Electro-optical
EW	Electronic warfare
FA	Field artillery
FASCAM	Family of scatterable mines
FCCC	Firepower coordination and control centre
FCM	Fire control/coordination measure
FCO	Firepower Coordination Order
FCS	Fire control system
FEBA	Forward edge of the battlefield
FO	Forward observer
FOV	Field of view
FPV	First person view
FSA	Firepower strike area
GA	Group army
GAFCC	Group Army Firepower Coordination Centre
GLM	General language model
GLONASS	Globalnaya Navigatsionnaya Sputnikovaya Sistema
GNSS	Global navigation satellite system
GPS	Global positioning system
GS	General support
HA	High angle
HE	High explosive
HE-FRAG	High explosive fragmentation
HEL	High energy laser
HMI	Human-machine interface
HPM	High-power microwave
HPT	high pay-off target
HPTL	High pay-off target list
HQ	Headquarters
HVT	High value target

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IFV	Infantry fighting vehicle
INS	Inertial navigation system
IO	Information operations
IR	Infrared
ISR	Intelligence, surveillance and reconnaissance
JIT	Just-in-time
JLSF	Joint logistics support force
LA	Low angle
LEWT	Light Electronic Warfare Team
LiDAR	Light detection and ranging
LLM	Large language model
LM	Loitering munition
LOS	Line of sight
MAG	Mobile artillery group
MANET	mobile ad hoc networks
MET	Metrological
MFZ	Mission-based fire zone
MINS	Minutes
MM	Millimetres
MRR	Maintenance, repair and recovery
MTJOCC	Military Theatre Joint Operations Command Centre
MV	Muzzle velocity
MVR	Machine vision recognition
NAI	Named area of interest
NFA	No fire area
OE	Operational environment
OPA	Olvanan Peoples Army
ORBAT	Order of battle
Pl	Platoon
QE	Quadrant elevation
RAAM	Remote ant-armour mine
RAP	Rocket-assisted projectile
RCP	Rear command post
RDS	Rounds
REGT	Regiment
ResCP	Reserve command post

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RORO	Roll-on-roll-off
ROZ	Restricted operations zone
S2	Intelligence
S3	Operations
SAM	Surface to air missile
SEAD	suppress enemy air defences
SHORAD	Short-range air defence
SIGINT	Signals intelligence
SLAM	simultaneous location and mapping
SoS	System-of-systems
SOP	Standard operating procedure
SQN	Squadron
TA	Target acquisition
TEZ	Target engagement zone
TJFCC	Theatre Joint Firepower Coordination Centre
TOT	Time on target
TP	Troop
TSM	Target synchronisation matrix
TTP	Tactics, techniques, and procedures
UAV	Unmanned aerial vehicle
UAS	Unmanned aerial system
UHF	Ultra-high frequency
URP	Unit refuel point
VHF	Very high frequency
ViT	Vision transformer
WLR	Weapon locating radar

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