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Issue Brief

Limits of Industrial Endurance and Doctrines: Lessons from War in West Asia

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Summary

The accelerated use of munitions such as long-range precision strike systems has led to critical shortfalls in US supply chains. These constraints are further compounded by dependence on China as a dominant supplier of critical minerals and components in global defence supply chains. A key lesson for India is that future warfighting effectiveness will depend not just on how well equipped a force is at the outset, but on how long it can sustain that level of equipping under real-world industrial and supply constraints.

On 28 February 2026, a combined force of the United States (US) and Israel launched a large-scale military offensive against Iran, code-named Operation Epic Fury by the US, marking a sharp escalation of the long-standing geopolitical problem. The operation was premised on expectations of a rapid victory, driven by assumptions of technological and operational superiority, favourable intelligence, and an assessment that Iran would capitulate to the combined force's military prowess.

On 1 March, President Donald Trump indicated that operations could last up to four weeks,[1] while the Pentagon stated that the campaign would achieve its objectives without requiring a prolonged ground deployment. However, Secretary of War Pete Hegseth avoided committing to a clear timeline, reflecting uncertainty about the war's trajectory.[2] By late March, the US had established back-channel contacts with Iran, even though political or military objectives were yet to be achieved.

Around 21/22 March, Washington reportedly opened back-channel communication with Tehran through intermediaries.[3] According to *The New York Times*, a 15-point proposal outlining a potential way forward to end the conflict was conveyed to Iran via Pakistan.[4] However, deep mistrust continues to shape Iran's response, particularly after the US strikes occurring after the proposal was shared. As the campaign entered its fourth week, Iranian officials publicly rejected overtures from the Trump administration, signalling resistance to negotiations under military duress.

Although both sides have outlined conditional positions and Pakistan has expressed willingness to facilitate dialogue, there is currently no clear pathway to de-escalation. Active hostilities persist, with continued missile and drone exchanges alongside sustained airstrikes, underscoring the war's intensity and volatility.[5]

Amid a tentative diplomatic movement, Israel has escalated its operational tempo. The Israel Defense Forces (IDF) has intensified strikes against critical Iranian targets, aiming to degrade strategic and defence-industrial capabilities before any potential ceasefire. On 24 March, Prime Minister Benjamin Netanyahu reportedly instructed the military to maximise damage to Iran's defence infrastructure within the next 48 hours, highlighting a push to secure tactical gains ahead of possible negotiations.[6]

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[1] Virginia Pietromarchi and Ted Regencia, **"Trump Says War on Iran Could Last Four Weeks"**, *Aljazeera*, 2 March 2026.

[2] Meghann Myers, **"Hegseth: US Went to War Because Iran 'Had No Intention' of Signing a Nuclear Deal"**, *Defense One*, 4 March 2026.

[3] Jacob Magid, **"Iran 'Present' Touted by Trump Was Passage of Several Fuel Tankers Through Hormuz"**, *The Times of Israel*, 25 March 2026.

[4] Howard Altman, **"After Nearly a Month of Epic Fury There's No Off-Ramp in Clear Sight"**, *TWZ*, 25 March 2026.

[5] Ibid.

[6] David M. Halbfinger, Ronen Bergman, Natan Odenheimer and Adam Rasgon, **"Israel Races to Hit Iran Hard While It Still Can, Leery of Possible Talks, Officials Say"**, *The New York Times*, 25 February 2026.

Overall, the war is ongoing and unresolved, with no immediate resolution in sight. The extremely high tempo of operations during the first 25 days of the war has exposed critical vulnerabilities in the US supply chain. Reports have emerged of shortages of long-range precision-strike weapons, despite denials from senior military and political leadership.[7]

This brief examines the doctrinal evolution within the US Armed Forces that has fostered a risk-averse operational culture and an increasing reliance on long-range precision weapon systems. It further analyses how a high operational tempo involving these systems—often critical and in limited supply—can lead to shortages, potentially increasing dependence on an adversarial nation for key components during wartime.

The brief will then outline lessons for the Indian Army as it undertakes doctrinal and structural reforms, including the raising of Integrated Battle Groups, Rudra all-arms brigades, Bhairav Light Commando Battalions, Shaktibaan Artillery Regiments with Divyastra Batteries and drone platoons. The agility and lethality of these formations will depend on accompanying doctrinal adaptations that enable high-tempo operations, force restructuring, and induction of next-generation weapon systems.

Finally, the brief underscores the importance of aligning doctrinal, organisational and structural reforms with industrial capacity and logistical sustainment capabilities. Any disconnect between these elements could introduce significant risks in the conduct of military operations.

Doctrinal Evolution in the US Armed Forces

The evolution of US warfighting doctrine since World War II has consistently emphasised technological superiority and the use of force multipliers to minimise casualties. In the post-Vietnam era, a close study of the Yom Kippur War revealed a dramatic increase in the tempo and lethality of modern combat, particularly in anti-tank and air defence systems. These lessons informed the development of the 'Active Defence' concept, which prioritised firepower over manoeuvre to channel adversaries into vulnerable positions, leading to their destruction. The doctrine attracted criticism for its over-reliance on attrition and firepower at the expense of manoeuvre, prompting further evolution. By the late 1970s, this debate culminated in the emergence of AirLand Battle, which sought to integrate manoeuvre, depth and synchronisation in combat operations.[8]

[7] Matthew Adams, **"'We Can Sustain This Fight Easily For As Long As We Need': Hegseth, Caine Provide Uupdate on Iran Strikes"**, *Stars and Stripes*, 4 March 2026.

[8] General William DePuy, first Training and Doctrine Command (TRADOC) Commander, was instrumental in producing in 1976, a new edition of the Army's basic war fighting doctrinal manual, FM 100-5, Operations, as the first stage in a post-Vietnam revival of doctrinal thinking. The 1976

The end of the Cold War between 1989 and 1991 marked the next major phase of doctrinal transformation.[9] Following the dissolution of the Soviet Union, US forces were significantly downsized and re-oriented.[10] This period coincided with a range of military operations, most notably the Gulf War, which demonstrated the effectiveness of precision-guided munitions, stealth platforms, and overwhelming airpower in achieving decisive outcomes with minimal losses. The new doctrine emphasised simultaneity in operations by addressing tactical, operational and strategic depth concurrently to induce operational paralysis and decisively defeat the enemy through overwhelming force and firepower.

These developments laid the foundation for the revolution in military affairs, characterised by the integration of real-time intelligence, GPS and network-centric warfare. In the post-9/11 era, doctrine evolved further with the incorporation of unmanned systems such as the MQ-9 Reaper, alongside advances in long-range precision weapons and cyber-electronic warfare. Operations in Iraq, Afghanistan, and across West Asia have reflected this shift, relying on persistent surveillance, long-range precision targeting, and proxy forces to achieve strategic effects while keeping US troop exposure and casualties to a minimum.

Epic Fury: High Operational Tempo through 'Shock and Awe'

The first 24 hours of the campaign witnessed more than a thousand precision-guided strikes delivered by strategic air assets and stand-off weapons against Iran. The concept of 'shock and awe', although it entered the military lexicon during the 1990s, gained prominence during the 2003 US-led coalition invasion of Iraq, which brought the idea into widespread recognition through a dramatic display of overwhelming kinetic force. The scale and intensity of the assault disoriented Iraqi decision-makers, disrupted their command-and-control structures, degraded their armed forces, and stunned the population.[11]

In essence, 'shock and awe' is an informal term for a military strategy that seeks to overwhelm an adversary through the rapid application of massive force. Its objective is to establish immediate tactical dominance by delivering strikes that inflict both physical destruction and psychological shock. The adversary is left disoriented and

doctrine stressed the commander's substitution of firepower for manoeuvre, and the potential of US weapons to concentrate combat power to decisively alter force ratios. Following the criticism of 'Active Defence' doctrine, in late-1970s led to second stage of doctrinal reform. The doctrine of AirLand Battle was developed by TRADOC General Donn Starry. See J. L. Romjoe, **"The Evolution of American Army Doctrine"**, Militaire Spectator JRG.

[9] "The American Army's first doctrinal response to the new strategic era came in a new Operations edition in 1993. Developed over the previous two years by TRADOC commander General Frederick Franks, it was the Army's first doctrine for the post-Cold War". Ibid.

[10] Ibid.

[11] Joe Dransfield and Kevin Rowlands, **"The Death of Shock and Awe is Greatly Exaggerated"**, Commentary, *RUSI*, 17 October 2024.

unable to mount an effective response, while the sheer scale and intensity of the offensive strikes observers.[12]

The combined force of the US and Israel attempted to repeat what had been achieved in 2003. The opening phase of Operation Epic Fury on 28 February was characterised by an extremely high operational tempo, designed to achieve strategic surprise and the immediate degradation of Iranian capabilities. In the first 24 hours of Operation Epic Fury, US forces attacked over 1,000 targets while the Israeli Air Force attacked over 750 additional targets.

Thereafter, the operation eased out slightly and picked up momentum between Days 7 and 10, by which time the combined force had achieved air superiority over Iran. After Day 10, they attacked approximately 300–500 targets per day to maintain a sustainable tempo.[13] By 25 March, the US had struck more than 10,000 military targets in Iran since the start of the war.[14] During the same period, the IDF too maintained a similarly high tempo of operations, having fired more than 15,000 munitions across Iran, four times more than the number fired during the 12-day war against Iran in June 2025.[15]

Impact of High Tempo of Operations on Logistic Sustainment

The tempo of military operations is the relative speed and rhythm at which the forces conduct operations—plan, manoeuvre, fight, and sustain themselves. In practice, tempo is not about how fast the forces can move, but about how well the forces can match the rate of action to the enemy's reaction time, the environment, and human and logistical limits.

Among many factors, logistics and sustainment play a decisive role in determining operational tempo. The tempo of operations depends on the capacity to reliably provision forces in the field with fuel, ammunition, spare parts, food and medical support. A responsive defence industrial base and a resilient logistics network—featuring pre-positioned stocks, efficient transportation and effective maintenance—enable forces to maintain a high pace of operations over prolonged periods. Conversely, limited supplies, whether due to a weak industrial base, inadequate provisioning or vulnerable supply lines, can significantly slow down operational momentum.

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[12] Ibid.

[13] Mark F. Cancian and Chris H. Park, **"Assessing the Air Campaign After Three Weeks: Iran War By the Numbers"**, *CSIS*, 25 February 2026.

[14] Eric Schmitt, **"Republicans in Congress Fret Over Iran War as Pentagon Offers Few Answers"**, *The New York Times*, 25 March 2026.

[15] Isabel Kershner, **"Tehran Dismisses U.S. Cease-Fire Conditions as Israel Steps Up Attacks"**, *The New York Times*, 25 February 2026.

The extremely high tempo of operations in the first 25 days of the war has exposed critical vulnerabilities in the US supply chain. The CEO of the German defence giant Rheinmetall has warned that the global air defence stockpiles are "empty or nearly empty" due to the war. In his assessment, "all European, American, and also Middle Eastern stocks are empty or nearly empty".[16] Supply chain vulnerabilities negatively affect surge capacity for weapons, equipment and munitions in multiple ways. For example, 500 Tomahawk missiles fired in the first 25 days of a conflict would take at least five years to replenish.

Uneven Rate of Expenditure and Fragility of the US Military

In the first 36 hours of operations, Iran fired over 1,000 munitions across West Asia, prompting interception response by US, Israeli and allied forces, leading to the consumption of more than 3,000 precision-guided munitions and interceptors.[17] A study by the Payne Institute for Public Policy[18] has concluded that the rate of fire of combined force is uneven across munitions categories, leading to uneven expenditure—extremely high for long-range interceptors and precision strike weapons—while the inventory of other categories continues to be reasonably comfortable.

This shortage of long-range interceptors and precision-strike weapons makes the US military uniquely fragile, as its operational progress depends on this category of complex, low-density systems that are difficult to replenish quickly, even during peacetime. Since 1991, the US military has nearly always attempted to fight 'risk-free' wars[19] whereby there is a 'doctrinal reliance' on long-range precision weapon systems in the initial stages of war to establish air dominance and a safe air defence corridor before progressing the rest of the operation, including ground operations.

As a result of high tempo and 'doctrinal necessity' of air dominance in the initial days of war, it is assessed that the US military may, in a few weeks, exhaust missiles such as ATACMS/PrSM ground-attack missiles and THAAD interceptors. Israel also faces a capability constraint, with its Arrow interceptor stocks projected to run out imminently, likely by the end of March.[20]

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[16] **"Rheinmetall CEO Warns Global Air Defence Stockpiles are Dwindling Due to Iran War"**, *Euractiv*, 19 March 2026.

[17] Macdonald Amoah, Morgan D. Bazilian and Lieutenant Colonel Jahara Matisek, **"The First 36 Hours of War Consumed Over 3,000 U.S.-Israeli Munitions"**, *Foreign Policy*, 5 March 2026.

[18] For details, see Macdonald Amoah, Morgan D. Bazilian and Lieutenant Colonel Jahara Matisek, **"Over 11,000 Munitions in 16 Days of the Iran War: 'Command of the Reload' Governs Endurance"**, *RUSI*, 24 March 2026; Macdonald Amoah, Morgan D. Bazilian and Lieutenant Colonel Jahara Matisek, **"The First 36 Hours of War Consumed Over 3,000 U.S.-Israeli Munitions"**, no. 17.

[19] Warren Chin, **"Technology, War and the State: Past, Present and Future"**, *International Affairs*, Vol. 95, No. 4, p. 771.

[20] Macdonald Amoah, Morgan D. Bazilian and Lieutenant Colonel Jahara Matisek, **"Over 11,000 Munitions in 16 Days of the Iran War: 'Command of the Reload' Governs Endurance"**, no. 18.

Critical Mineral Dependencies and Production Limits of Modern Warfare Systems

The first 36 hours of war have become a test of industrial endurance for the US. Industrial endurance depends on the weakest link in the production line and supply chain. Every weapon system, munition and platform that needs replacement must undergo a full process—from mining raw materials, refining them, making parts and assembling them in approved factories. The delay in production could be due to any number of reasons, from limited raw materials for key components to reliance on a single vendor or production facilities that take years to expand. The Payne Institute study has converted the expended munitions into the requirement of minerals to refill the spent inventory. Two examples from the study are quoted here to highlight how critical mineral dependencies will limit the production capacity of modern weapon systems.

Counter Rocket, Artillery and Mortar (C-RAM) versus Missiles

The study examined production-linked factors and associated costs of ammunition for C-RAM and similar gun systems and missiles. The study results note that, interestingly, even though C-RAM and missiles are different categories of munitions, their supply chains are linked, making it difficult to choose between them. In the first 16 days of the war, combined forces expended about 509,500 rounds from C-RAM and similar gun systems, worth roughly 25 million dollars, while approximately US$ 19 billion was spent on missile interceptors.[21]

The cost considerations would suggest a need for greater reliance on C-RAM; this is not always the case, because cheaper munitions do not imply easy availability. Replacing the expended rounds would require some 4,000 kilograms of tungsten, 29,000 kilograms of propellant, and over 10,000 kilograms of explosives. Around 80 per cent of the world's tungsten production is controlled by China, and the main alternative to tungsten is depleted uranium, which is not a preferred option for obvious reasons. Moreover, the supply chain for energetic materials used in C-RAM ammunition overlaps with that for interceptor missiles, creating tightly coupled production constraints that are not easily resolved.[22]

AN/TPY-2 and AN/FPS-132 Block 5 Radars

These are critical for air defence, both for targeting and interception. Their availability in requisite numbers is thus essential to maintain the operational tempo of war and the air defence of the selected area. Iran has successfully targeted key air defence radars operated by the US and its partners across West Asia. Among the radars that

[21] Ibid.

[22] Ibid.

have reportedly been destroyed/damaged are the AN/FPS-132 Block 5 early-warning radar located near Al Udeid Air Base in Qatar and the AN/TPS-59 in Bahrain.

Building a new AN/FPS-132 radar would take Raytheon approximately 5–8 years and cost around US$ 1.1 billion. In contrast, Lockheed Martin could build a new AN/TPS-59 in roughly 12 to 24 months, for US$ 50 million to US$ 75 million. A major challenge for the defence industrial base will be procuring 77.3 kilograms of gallium required for both systems, especially since China controls 98 per cent of the global supply. Additionally, about 30,610 kilograms of copper will be needed, a resource which is under increasing pressure due to rising demand from the technology sector.[23]

Lesson for India

The ongoing conflict in West Asia has underscored the implications of sustained high operational tempo on the consumption patterns of certain munitions, particularly long-range precision strike systems. The accelerated rate of expenditure has led to critical shortfalls that cannot be readily mitigated, given the inherent complexity and limited scalability of their production processes. China's dominance as a supplier in the global defence supply chain further compounds these constraints. China controls most of the world's critical defence minerals, including rare earths, gallium and germanium and has introduced export control regimes since 2023 to prevent its adversaries from freely acquiring them for defence production. This has created structural bottlenecks that impede timely replenishment and heighten strategic risk during wars.

High-tempo, technology-intensive warfare can burn through sophisticated munitions faster than even advanced industrial countries can replace them. India faces a two-front challenge with China and Pakistan. The Indian leadership may have to study the ongoing wars in Ukraine and West Asia and plan for protracted conventional wars. Some of the issues that the Indian Armed Forces may consider are given below:

Doctrine must balance precision, long-range warfare and sustainability

Long-range precision strike systems, advanced sensors and networked warfare are indispensable; however, over-reliance on them creates vulnerability when stocks are depleted. Indian doctrine should therefore continue to emphasise a calibrated mix-precision fires for high-value targets, combined with massed fires, deception and manoeuvre to reduce consumption rates. The concept of 'economy of force' needs to be re-interpreted in high-tech war, ensuring that expensive, limited-inventory munitions are reserved for decisive effects rather than routine use.

[23] Macdonald Amoah, Morgan D. Bazilian and Lieutenant Colonel Jahara Matisek, **"The First 36 Hours of War Consumed Over 3,000 U.S.-Israeli Munitions"**, no. 17.

Force restructuring should cater for endurance, not just lethality

India's ongoing reforms, such as Theatre Commands, Integrated Battle Groups, and specialised units, must be backed by the expansion of industrial capabilities, ammunition and equipment reserves, integrated logistics, and redundancy in capabilities. This would entail scaling up indigenous production of missiles, unmanned systems, artillery ammunition, and sensors, as well as building surge capacity for wartime manufacturing. War-time reserves—especially for critical munitions and electronic components—must be revisited with realistic assumptions about the duration of war India may have to fight, rather than pro forma short, high-intensity conflict models.

Doctrinal thinking must internalise the realities of protracted conflict scenarios

India's doctrinal thinking must internalise the possibility of protracted conflicts. Rather than assuming short wars, India's planning should account for extended, multi-domain conflicts where economic endurance, industrial depth and assistance from partner countries matter as much as battlefield performance. Secondly, India's war planning should, as a matter of necessity, always consider alternatives to high-cost systems—such as loitering munitions, autonomous swarms and electronic warfare—to impose cost asymmetry on adversaries.

Logistics and sustainment must be doctrinal pillars, not afterthoughts

High operational tempo places immense strain on repair and maintenance cycles and the demand for spare parts. The Indian Armed Forces' warfighting plans should factor in procurement and logistics as high priorities. Certain aspects to consider include predictive maintenance, modular systems and decentralised supply nodes to maintain operational tempo despite wartime disruptions.

Inputs regarding industrial capacities must factor in military plans

Dependence on external supply chains—particularly where adversarial control exists over critical inputs like rare earths and semiconductors—poses a strategic risk. The Ministry of Defence may make formal arrangements to share regular inputs with service headquarters on the status of industrial capacities, international restrictions and related issues that directly affect supply chains and sustenance.

In essence, the key lesson emerging from West Asia is that future warfighting effectiveness will depend not just on how advanced a force is at the outset, but on how long it can sustain that level of combat under real-world industrial and supply constraints.

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