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**The Silent High Ground:
India's Space Warfare
Imperative**

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The Silent High Ground: India's Space Warfare Imperative

"Space is already an established domain of warfare. Now space will cast its influence on the air, maritime and land domains".

—General Anil Chauhan, PVSM, UYSM, AVSM, SM, VSM (Retd)

Former Chief of Defence Staff of India

Abstract

Space is no longer merely an enabler of military operations. It is becoming a contested operational domain in its own right. Satellites now support navigation, communications, intelligence, surveillance and reconnaissance, missile warning and precision targeting. The loss or disruption of these capabilities can affect not only military operations but also civilian life and critical infrastructure.

This brief examines the evolution of space warfare and assesses India's preparedness against a rapidly changing threat environment. It argues that India has acquired important building blocks, including the 2019 Mission Shakti anti-satellite capability, NavIC, growing space-based surveillance and an expanding private space sector. Yet important gaps remain in resilience, space situational awareness, replenishment, counter-space capability, institutional integration, doctrine and military-space culture.

The central argument is that, India does not need to win a satellite-counting contest. It needs a resilient, integrated and affordable space architecture supported by a dedicated military command, a strong civil-military ecosystem, trusted international partnerships and a force capable of continuing operations when space services are degraded or denied.

Keywords: Space Warfare, Counter-Space Operations, Space Situational Awareness, NavIC, Civil-Military Space Integration

Introduction

On 03 December 2021, while deployed along the Line of Control in Poonch Sector, something unusual in the night sky was observed. A string of lights moved overhead in a tight and deliberate formation. They were too ordered to be stars and too silent to be aircraft. For

those standing on the ground, the immediate question was simple: what is that threat? how to counter it? The answer came only a few hours later— It was Starlink.

Nothing hostile had happened. Yet the incident left a more important question behind. What exactly can a constellation passing over a contested military zone see, connect or enable? What happens when such a capability belongs not to a military but to a commercial company? And what would India be able to do if the same technology were being used deliberately against us?

The episode exposed a gap that is easy to overlook. A soldier deployed along the LC or LAC is trained to understand the terrain, the enemy's deployment, weapons and equipments. But the increasingly contested environment above him can remain unfamiliar. The same problem exists at the national level.

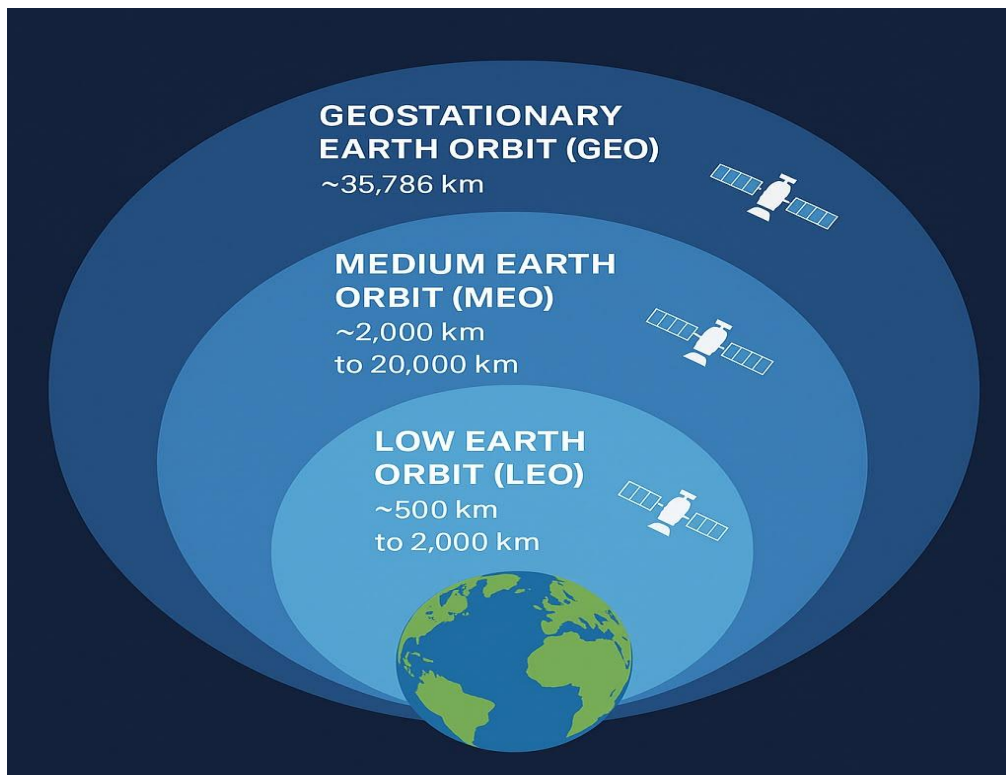
Modern military operations depend on space for positioning, navigation and timing, secure communications, surveillance, intelligence, missile warning and increasingly precision targeting. Civilian life is equally dependent on satellite-enabled communications, weather forecasting, navigation, banking, transport and disaster management. Space has therefore become almost invisible precisely because it has become so deeply integrated into everyday life.

Historically, control of the ground created empires. Control of the seas created maritime powers. Air power subsequently transformed warfare. Space is now beginning to perform the same function across all the three domains.

What Exactly is Space Warfare?

Space warfare broadly involves the 'use, protection, disruption, denial or destruction of space-enabled military capabilities'. It includes not only satellites but also launch systems, ground stations, data links and user equipments. It is useful to distinguish three connected concepts:

Figure 1: Major Earth Orbital Regimes: Low Earth Orbit (LEO), Medium Earth Orbit (MEO) and Geostationary Earth Orbit (GEO)



Source: https://www.esa.int/Enabling_Support/Space_Transportation/Types_of_orbits

- **Space Enabled Warfare:** Using satellites to improve operations on land, at sea and in the air.
- **Space Warfare:** Contesting the space domain itself through surveillance, manoeuvre, cyber, electronic warfare or physical attack.
- **Counter-Space Operations:** Measures intended to protect one's own space capabilities or degrade an adversary.

The important point is that, a satellite does not have to be destroyed to become militarily useless. Jamming its signal, spoofing its data, attacking its ground station, disrupting its software or preventing the user from accessing its services can achieve much the same operational effect.

The pace of change has become particularly evident in September 2026. On 14 September 2026, US Secretary of the Air Force, Troy Meink, publicly confirmed that the United States has “on-orbit space control weapons” capable of defending the Joint Force against hostile adversary action; the nature of these systems was not disclosed. On 23 September, the United Kingdom announced No. III Space Effects Squadron— its first

dedicated unit for countering hostile threats to UK satellites, including through electronic warfare. These developments are significant not because they introduce space warfare for the first time, but because they demonstrate that major militaries are now openly organising forces and capabilities to protect, contest and deny space-enabled effects (Albon, C. 2026) (MoD, UK, 2026).

From the Cold War to the Present

The idea of weaponising the space above the atmosphere predates the satellite age. German scientists during the Second World War explored extreme concepts such as the proposed *Sonnengewehr*¹. These, however, remained theoretical.

The Cold War transformed this idea into technology. The United States and Soviet Union developed reconnaissance satellites, communication systems and eventually anti-satellite capabilities. The Soviet Union experimented with co-orbital systems while the United States demonstrated a direct-ascent ASAT capability in 1985 (US Space Force).

The 1991 Gulf War demonstrated something even more consequential: space could transform conventional warfare. Satellite navigation, communications and surveillance became central to the American way of war. GPS-assisted navigation and positioning helped forces move and coordinate across a large theatre with a degree of precision that had previously been difficult to achieve. The lesson was subsequently absorbed by other major military powers.

China's 2007 destruction of the Fengyun-1C satellite demonstrated the destructive potential of modern ASAT systems and generated a large debris field. Russia's 2021 ASAT test reinforced the same danger. But the character of the threat has changed again (ESA) (ODPO).

The 2022 cyberattack on Viasat's KA-SAT network, carried out shortly before Russia's invasion of Ukraine, demonstrated that a satellite does not need to be physically attacked to produce battlefield effects. The attack disrupted communications for users in Ukraine and affected tens of thousands of customers elsewhere in Europe. The EU subsequently attributed the attack to Russia. However, the important operational lesson was that, a space-enabled military service could be degraded through an attack on terrestrial infrastructure and network

¹ The *Sonnengewehr* (or Sun Gun) is a weapon of mass destruction developed by the Nazis. Consisting of a large reflective surface positioned in orbit around the earth, the weapon focuses large amounts of sunlight to create a concentrated beam of photons carrying immense amounts of energy, thus incinerating its target.

management rather than through an attack on the satellite itself (Viasat, 2022) (Sexton, R. 2025).

The lesson is straightforward: the weakest point in the space architecture may not be stationed in space at all.

Today, the contest includes cyber operations, jamming, spoofing, electronic warfare, directed energy, rendezvous and proximity operations, autonomous systems and artificial intelligence. AI is particularly important because future space operations will involve enormous quantities of data arriving faster than humans can analyse them. The side that can detect, classify, decide and respond faster will gain an advantage without necessarily firing a weapon.

The United States Space Force's 2040 planning documents already envisage a space environment shaped by AI, cyber operations, autonomous systems, proliferated spacecraft and increasingly contested navigation.

The legal framework has not kept pace. The 1967 Outer Space Treaty prohibits placing nuclear weapons and other weapons of mass destruction in orbit and prohibits military activity of certain kinds on celestial bodies. It does not, however, prohibit conventional ASAT weapons. The result is a domain wherein military competition is accelerating faster than the rules governing it (UNOOSA, 1966).

Why Space Matters

The strategic discussion becomes meaningful only when translated to the battlefield.

A modern formation may depend on satellites for:

- Navigation and timing
- Satellite communications
- Intelligence and surveillance
- Weather information
- Missile warning
- Targeting and battle damage assessment
- Long-range unmanned systems
- Logistics and movement management

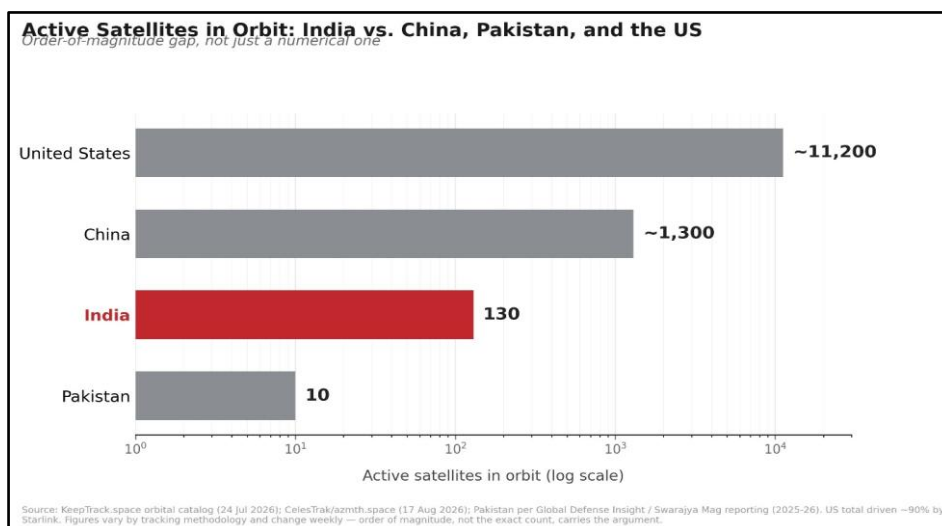
The growing integration of drones makes this dependence even more important. A drone operating beyond the line of sight can use satellite communications or satellite-enabled navigation to extend its effective range and maintain connectivity well beyond the reach of conventional tactical radio systems. The same architecture can support reconnaissance, targeting and battle management. This creates a double vulnerability.

The experience of Ukraine provides a concrete illustration of the operational value of commercial connectivity. Research presented by Stanford CISAC found that access to Starlink significantly improved Ukrainian forces' ability to hold territory, while preliminary findings suggested that its principal effect was on the quality of strikes rather than simply increasing the volume of drones, artillery or other munitions. The example matters because it shows how a commercial constellation can become part of battlefield performance without being designed as a conventional weapons system (Reuters, 2025).

If India can maintain assured access to its own satellite services while denying or degrading an adversary's access, the advantage can multiply across land, air and maritime operations. If India's satellite services are jammed, spoofed, attacked or simply unavailable, the same platforms can become significantly less effective. The issue is therefore not merely "How many satellites does India have?"

The more important questions are: How resilient are they? How quickly can they be replaced? How much redundancy exists? How long can forces operate without them? And can the adversary be prevented from achieving the same effects?

Figure 2: Active Satellites in Orbit: United States, China, India and Pakistan



Source: Prepared by the Author

India: Capability but Not Yet a Complete Architecture

India demonstrated a major technological capability in March 2019 through its “Mission Shakti”— DRDO’s direct-ascent interceptor successfully destroyed an Indian satellite in the Low Earth Orbit, making India the fourth country after the United States, Russia and China to demonstrate such a capability. Mission Shakti established an important deterrent foundation. But ASAT capability is only one component of space power ! (PIB, 2019)

India also possesses NavIC, communications satellites, Earth-observation systems, military communications infrastructure and growing space-based surveillance capabilities. The country has also developed Project NETRA and other space situational awareness capabilities. Yet important gaps remain.

The scale of India’s space architecture itself is increasing. ISRO’s Indian Space Situational Awareness Report 2025, released in April 2026, recorded 144 Indian spacecrafts launched by the end of 2025, including spacecraft from private operators and academic institutions. Of these, 22 government-owned operational satellites were in LEO and 31 in GEO. The report also recorded a rapidly expanding global space-object population and extensive collision-avoidance activity involving Indian spacecraft. The implication is important: as India’s space footprint grows, space situational awareness, protection and traffic management become operational necessities rather than supporting functions (ISSAR, 2026).

The vulnerability is not confined to orbit. In February 2026, CERT-In and SIA-India released joint Space Cyber Security Guidelines covering satellite communications, ground infrastructure, supply chains and space assets. The framework recognises that resilience of the national space architecture depends on protecting the entire ecosystem rather than the spacecraft alone.

The objective, therefore, should not be permanent control of space in the traditional sense of air or maritime superiority. It should be the ability to preserve India’s freedom of action in, from and through space while denying an adversary the same freedom when required.

NavIC is a Warning

The present state of NavIC illustrates the danger of ‘treating space capability as a one-time acquisition’ (ISRO).

The Government stated in July 2026 that NavIC currently has three satellites providing PNT (Positioning, Navigation and Timing) services. Four operational satellites are required for basic standalone 'Positioning'. The Government also stated that the 'Timing' service remains functional and that NVS-03 is ready for launch while NVS-04 and NVS-05 are at advanced stages of development. This is not a failure of technology. It is a problem of replenishment and resilience.

For a military force, the consequence is not merely reduced satellite performance. It is greater dependence on multi-constellation GNSS and therefore a larger requirement for assured alternatives when navigation signals are degraded, denied or spoofed.

A military navigation architecture cannot afford long gaps between generations of satellites. Satellites have finite lifespans. Launch failures occur. Components fail. Adversaries can interfere with signals. The replacement pipeline must therefore be treated as an operational requirement rather than a space-science programme.

The China-Pakistan Challenge

China has moved considerably faster in institutionalising military space power. In April 2024, Beijing dissolved its Strategic Support Force (SSF) and created a dedicated Aerospace Force alongside the Cyberspace Force, Information Support Force and Joint Logistics Support Force. The Aerospace Force reports within the PLA structure directly under the Central Military Commission. China's advantage is therefore not simply the number of satellites it operates. It is the combination of:

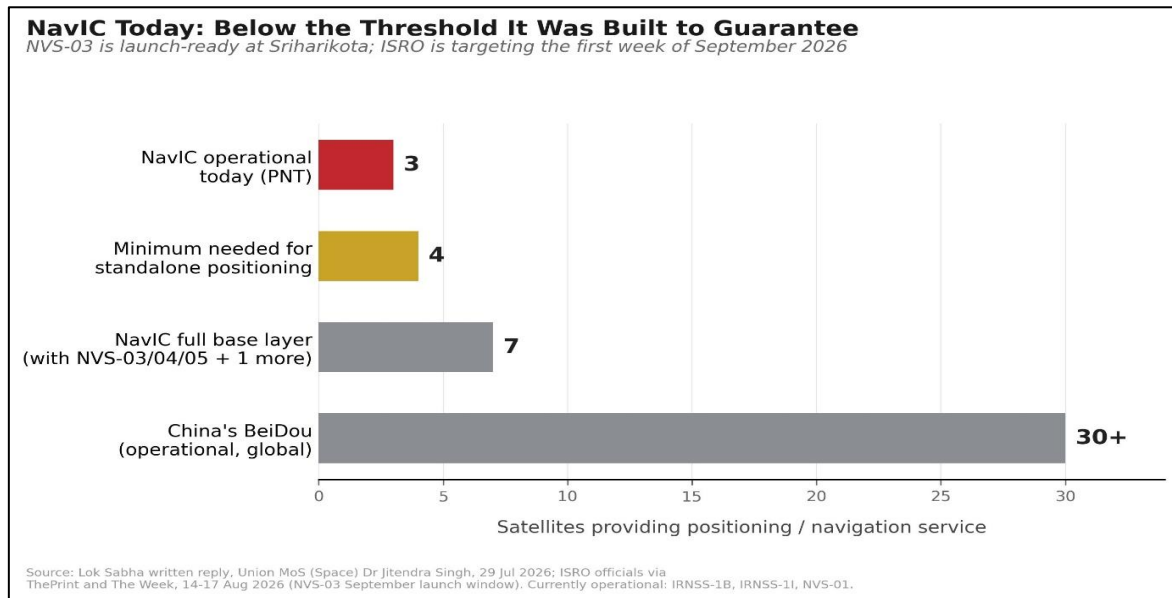
**space assets + military command + industrial capacity + launch capability + data
infrastructure + counter-space capability**

Pakistan's dependence on China adds another dimension. During Operation Sindoor, in May 2025, it was proved that China had provided Pakistan with "live inputs" on Indian military positions during the conflict. Pakistan's Army Chief subsequently rejected the allegation as factually incorrect. Regardless of the precise nature of the intelligence provided, the episode demonstrates why the space dimension of a future India-Pakistan conflict should be treated as part of a wider strategic contest rather than a purely bilateral one.

This should change Indian planning. A future crisis involving Pakistan could involve Chinese satellite-derived intelligence, navigation support, communications or other forms of technical assistance from the outset (PIB, 2026).

The Numbers Problem

Figure 3: NavIC and BeiDou: – Comparative Navigation Coverage



Source: Prepared by the Author

There is a temptation to respond to China's large and growing satellite fleet by proposing an equally large Indian constellation. That would be the wrong lesson.

Satellites are expensive not only to manufacture and launch but also to operate, insure, maintain and replace. Their value also depends on the ground infrastructure, data processing, communication links and personnel that turn a satellite into an operational capability. The real requirement is therefore coverage, persistence and resilience rather than a headline satellite number.

India should favour a layered architecture comprising:

- High-value strategic satellites for specialised missions.
- Smaller and proliferated satellites for resilience.
- Commercial satellites for additional capacity.
- Rapid replenishment capability when satellites are lost.
- Multiple ground stations and distributed networks to prevent a single point of failure.
- Onboard autonomy and AI to reduce dependence on continuous ground control.
- Interoperable systems across military and civil agencies.

The US is moving precisely in this direction—its 2040 planning recognises the need for more resilient architectures and greater integration with commercial space providers.

SpaceX and the Civil-Military Fusion Question

The most important lesson from SpaceX is not simply the number of Starlink satellites; rather it is the business model. A commercial constellation can be built at a scale and speed that traditional government procurement often struggles to match. The same infrastructure can support civilian communications during peacetime and provide military connectivity during conflict.

The United States has institutionalised this approach through Starshield and other commercial-space arrangements. The Ukraine experience demonstrated the strategic significance of commercial space. Satellite connectivity became an operational resource for a country fighting a major war. India should learn from this without attempting to reproduce Starlink exactly.

The objective should be an Indian civil-military space ecosystem wherein commercial companies can rapidly provide communications, imagery, launch services, data processing and other capabilities to the armed forces. India's private space sector is developing rapidly. The next step is to connect this ecosystem to defence requirements. The Government does not need to own every satellite. It needs the ability to access, integrate and control the effects it requires during a crisis.

Integration: The Missing Layer

India's space effort is distributed across multiple institutions. ISRO provides civil-space capabilities. DRDO develops defence technologies. The Defence Space Agency handles military space functions. IN-SPACe facilitates the private sector. The Services remain the principal users. This arrangement has produced capabilities. But a war requires integration.

A satellite does not belong to the Army, Navy or Air Force in isolation. Its information may simultaneously support an artillery unit, an aircraft, a naval task force and the national command authority. India therefore needs a single operational architecture connecting:

ISRO + DRDO + Defence Space Agency/Space Command + the three Services + IN-SPACe + private industry + intelligence agencies

The objective should not be bureaucratic consolidation for its own sake. It should be a common operational picture, common standards, common data architecture and clear

command relationships. India also requires a dedicated space cadre. Officers cannot develop expertise in orbital mechanics, space domain awareness, satellite communications, electronic warfare and counter-space operations through occasional postings alone.

The Ground-Level Fix

The cheapest reform may also be one of the most important. Space literacy should become part of own military training.

A soldier deployed on the LC or LAC should know, at a basic level:

- What a satellite pass looks like
- The difference between a satellite and a drone
- What satellite navigation can and cannot provide
- What jamming and spoofing mean
- What loss of satellite communications might look like
- How to operate when navigation is degraded
- How unusual activity should be reported

Officers should train for space-degraded operations just as they train for degraded communications.

Exercises should deliberately simulate:

- Loss of GNSS
- Satellite communications denial
- Degraded ISR
- Spoofed navigation
- Cyberattack on ground stations
- Delayed satellite imagery
- Loss of commercial connectivity

The purpose is not to turn every soldier into a space specialist— rather it is to ensure that the loss of space support does not become the loss of military effectiveness.

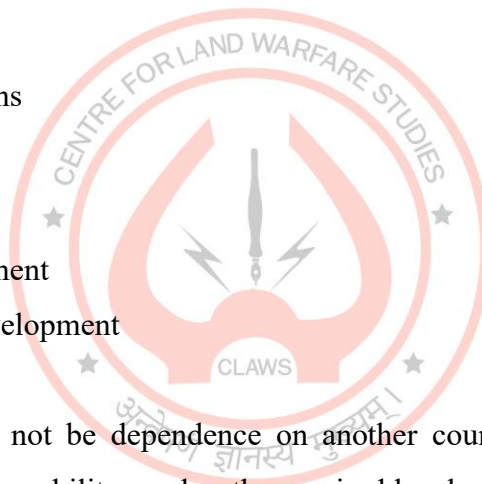
Partnerships and Space Diplomacy

India cannot and should not attempt to build every capability alone. Space capability is capital-intensive. Partnerships can provide access to technology, data, launch capacity, space-domain awareness and resilient communications while indigenous capability develops.

India already has important relationships with the United States, France, Japan and Australia. India's participation in the Artemis Accords also places it within a growing international framework for lunar exploration and space cooperation. The next stage should be 'space diplomacy with an operational purpose'.

India should seek deeper cooperation in:

- Space-domain awareness
- Satellite tracking
- Missile warning
- Navigation resilience
- Secure communications
- Data sharing
- Launch support
- Space traffic management
- Joint research and development



The objective should not be dependence on another country. It should be collective resilience until indigenous capability reaches the required level.

Global powers increasingly treat international partnerships as part of space superiority rather than as an optional diplomatic activity. Their Space Command now manages international agreements covering satellite communications, PNT, space-domain awareness and missile warning.

Finance: What Does India Actually Need?

India cannot afford an unlimited space budget. Nor does it need one. The objective should be to spend scarce resources cleverly on capabilities for greater military advantage.

Priority should therefore go to:

- **Resilience Before Extravagance.** A larger number of affordable and replaceable satellites can sometimes provide greater survivability than a small number of exquisite platforms.
- **Replenishment Before Expansion.** A satellite constellation is not complete unless India can replace failed or destroyed satellites quickly.
- **Ground Infrastructure.** The best satellite is of limited value if its data cannot reach the soldier in time.
- **Dual-use Procurement.** Civilian commercial systems should be designed from the beginning with defence requirements in mind.
- **Indigenous Launch Capacity.** Access to orbit is itself a strategic capability.
- **AI and Data Processing.** Collecting more data is pointless if humans cannot process it quickly enough.

The strategic objective should therefore be to ensure that a larger share of India's growing commercial space economy can also serve national security.

What India Should Do Now?

The priority should be a focused ten-point agenda:

- **Establish a Unified Military Space Command.** Move beyond a coordination model towards a command with clear authority, dedicated manpower and budgetary responsibility.
- **Publish a National Military Space Doctrine.** Define missions, command relationships, escalation thresholds and the roles of offensive and defensive counter-space capabilities.
- **Build Resilient Constellations.** Move from a small number of high-value satellites towards layered and proliferated architectures.
- **Create a Rapid Replenishment System.** Maintain launch-ready or rapidly manufacturable satellites for critical missions.
- **Restore NavIC Resilience.** Treat navigation as critical military infrastructure and ensure continuous replenishment.
- **Integrate Civil and Military Space.** Create common standards and data pathways linking ISRO, DRDO, the Services, IN-SPACe and industry.

- **Develop an Indian Commercial Military-Space Ecosystem.** Use long-term procurement commitments to encourage companies to build defence-relevant capabilities.
- **Institutionalise Space Literacy in the Services.** Create dedicated training and space-warfare schools while introducing basic space awareness across the force.
- **Build Space Partnerships.** Deepen cooperation with trusted partners in space-domain awareness, PNT, communications, launch and intelligence.
- **Develop an Indian “Space 2047”.** India needs its own long-term force-planning exercise setting out what capabilities, personnel, satellites, launch capacity and partnerships it will require by 2047.

The US has now undertaken forward-looking exercises linking future threats to force design, personnel, technology and partnerships. India needs an equivalent exercise tailored to its own geography, economy and threat environment.

Why This Cannot Wait

Space is no longer a future contingency. It is already embedded in military operations. The warning signs are visible: ASAT weapons, satellite jamming, cyberattacks, proximity operations, AI-enabled surveillance, commercial constellations and the growing integration of space into drone and precision-strike operations. For India the danger is particularly acute.

A conflict with Pakistan could involve Chinese space support. A confrontation with China would place India's comparatively smaller space architecture against a much larger and increasingly sophisticated system. A loss of navigation, communications or surveillance for even a limited period could impose disproportionate operational costs.

The first indication of a space attack may not be an explosion in orbit. It may simply be that a map stops updating.

- A drone loses its link.
- A navigation system begins giving the wrong coordinates.
- A satellite image does not arrive.
- A commander loses communications.

The battlefield may still look normal. But the force may already be fighting blind.

Conclusion

India has crossed the first threshold. Mission Shakti demonstrated that India can reach and destroy an object in orbit. NavIC established the principle of sovereign navigation. ISRO and DRDO have built substantial space capabilities. India's private space sector is beginning to provide a new source of innovation and scale. But the next phase is fundamentally different.

The question is no longer whether India can put satellites into space. It is whether India can fight through the loss of space services, protect its own architecture, deny an adversary the same advantages and rapidly restore what is lost.

This requires more than satellites. It requires command integration, resilient architecture, rapid replenishment, AI-enabled data processing, civil-military fusion, space literacy in the Services and partnerships with countries that can strengthen India's resilience while indigenous capability expands. The lesson from that night along the Line of Control remains relevant. A formation of satellites passed silently overhead. The soldiers below could see it but did not understand it.

The high ground is no longer simply above the battlefield. It is indeed part of the battlefield.

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