

मई  
May  
2025

खंड/Vol. : 50 अंक/Issue : 93

23/05/2025

# समाचार पत्रों से चयनित अंश Newspapers Clippings

डीआरडीओ समुदाय को डीआरडीओ प्रौद्योगिकियों, रक्षा प्रौद्योगिकियों, रक्षा नीतियों, अंतर्राष्ट्रीय संबंधों और विज्ञान एवं प्रौद्योगिकी की नूतन जानकारी से अवगत कराने हेतु दैनिक सेवा

A Daily service to keep DRDO Fraternity abreast with DRDO Technologies, Defence Technologies, Defence Policies, International Relations and Science & Technology



रक्षा विज्ञान पुस्तकालय  
Defence Science Library  
रक्षा वैज्ञानिक सूचना एवं प्रलेखन केंद्र  
Defence Scientific Information & Documentation Centre  
मेटकॉफ हाउस, दिल्ली - 110 054  
Metcalf House, Delhi - 110 054

## CONTENTS

S. No.	Title	Source	Page No.
<b>DRDO News</b>			<b>1-6</b>
1	Indigenous weapons pipped Chinese systems in Operation Sindoor, says DRDO chief	<i>The Times of India</i>	1
2	नागास्त्र-1 से कांपा पाकिस्तान, अब आ रहे नागास्त्र-2 और 3! बदलते वार पैटर्न में स्वदेशी पिनाका बना गेमचेंजर	<i>News18 Hindi</i>	2
3	Faster than sound, undetectable by radar..., DRDO's hypersonic missile can bypass defenses, can fly at a speed of..., and strike deep into China and Pakistan	<i>India.com</i>	3
4	BrahMos: The bolt from the blue - DRDO scientists are developing its more lethal versions, BrahMos-NG and BrahMos-II	<i>The Tribune</i>	5
<b>Defence News</b>			<b>6-17</b>
<b>Defence Strategic: National/International</b>			
5	Incorrect to say India doesn't have a National Security Strategy: CDS	<i>The Hindu</i>	6
6	Rajnath releases CDS book on Indian military evolution	<i>Hindustan Times</i>	8
7	Theatre commanders to lead future wars: CDS	<i>The Tribune</i>	9
8	CDS Anil Chouhan applauds Western Air Command's significant contribution to Operation Sindoor	<i>ANI News</i>	10
9	Anil Ambani's Reliance Defence signs pact with German firm for artillery shells, explosives supply	<i>The Economic Times</i>	12
10	Operation Sindoor: Experience proved 'litmus test' for Agniveers	<i>The Economic Times</i>	13
11	Border talks with India and Bhutan advancing, says China's white paper on security; Highlights internal, external threats	<i>The Economic Times</i>	14
12	Operation Sindoor: Breaking Gordian knot of terror & talks	<i>The Tribune</i>	16
<b>Science &amp; Technology News</b>			<b>18-20</b>
13	ISRO gearing up for space station, Gaganyaan, lunar missions: Chairman Narayanan	<i>The Economic Times</i>	18
14	CAR-T therapy can be safely manufactured at hospital, finds ICMR-funded trial led by CMC Vellore	<i>The Hindu</i>	19

## DRDO News

### Indigenous weapons pipped Chinese systems in Operation Sindoor, says DRDO chief

Source: The Times of India, Dt. 23 May 2025,

URL: <https://timesofindia.indiatimes.com/city/nagpur/indigenous-weapons-pipped-chinese-systems-in-operation-sindoor-says-drdo-chief/articleshow/121347631.cms>

Operation Sindoor undoubtedly proved the superiority of India's indigenous weapons systems over those made in China, said chairman of Defence Research and Development Organisation (DRDO), Samir Kamat, here on Thursday. "Pakistan deployed an array of systems procured from China. Our indigenous weapons easily outmatched the Chinese systems pitched by Pakistan," said Kamat.

However, he said some lessons were learnt from the conflict, and the country's premier defence research agency will look at improvements and induction of newer weapon systems. Not divulging specifics, he said some measures will be taken on an urgent basis. At the same time, he stressed the country's air defence system has proven to be highly effective.

## DRDO CHIEF OPENS SDAL'S HI-TECH UNIT

**D**RDO chairman Samir Kamat opened a new manufacturing facility for pyrotechnic composition and delay elements at Solar Defence and Aerospace Limited unit near city on Thursday, reports **Shishir Arya**.

The delay element plays key role in controlling the timing of ignition in a whole gamut of weapon systems, from hand grenades to missiles. This would replace the manual system of making the delay element with a fully automated mechanism, said sources.

The delay is set for different time gaps, which can be as close as 1 to 4 seconds.



DRDO chairman Samir Kamat opened a new manufacturing facility at SDAL unit near the city on Thursday

For example, in a hand grenade, a delay is maintained from the moment safety pin is taken off to the time it blasts. Delay element is also present in complex weapons like missiles, said sources.

SDAL is also making multimodal hand grenades for the Army.



The purpose of the visit was to check facilities here, and coming to Nagpur was very fruitful. It's important to have a robust private sector that's involved in both manufacturing and R&D to sustain long-drawn conflicts



**SAMIR KAMAT**  
CHAIRMAN, DRDO

Kamat was in the city to tour the defence manufacturing establishments located here, including Solar Defence and Aerospace Limited (SDAL), a private sector ammunition maker, apart from DRDO's own chemical warfare unit and a facility of Brahmos Aerospace Private Limited (BAPL).



The Nagastra-1 loitering munition made by Solar was reportedly used in Operation Sindoor. Even the propulsion system of BrahMos missiles that pounded Pakistan came from the company.

Talking to TOI, Kamat said the purpose of the visit was to check facilities here, and coming to Nagpur was very fruitful. "It's important to have a robust private sector that's involved in both manufacturing and R&D to sustain long-drawn conflicts," he said.

Kamat said a variety of systems can be put in place to counter drone attacks. He also mentioned that a range of sensors that can be used to detect and neutralise drones are expected to be inducted over the next six months or a year. Kamat also stressed upon the need to coordinate between stakeholders in the defence sector, including the PSU and private manufacturers.

On indigenisation of conventional systems, he said the country is swiftly moving towards it. For example, in artillery, Advanced Towed Artillery Gun System (TAGS) and Dhanush guns have been developed. There may be some subsystems that have to be imported, but the dependence on foreign sources has reduced, he said. On upcoming systems, he said DRDO includes VSHORADS, man-portable air defence systems, man-portable anti-tank guided missiles (MPTAGM), vertically launched short-range surface-to-air missiles (VLSRSAM), heavyweight and advanced lightweight torpedoes.

\*

## नागास्त्र-1 से कांपा पाकिस्तान, अब आ रहे नागास्त्र-2 और 3! बदलते वार पैटर्न में स्वदेशी पिनाका बना गेमचेंजर

Source: News18 Hindi, Dt. 22 May 2025,

URL: <https://hindi.news18.com/news/nation/india-pakistan-conflict-nagastra-1-used-2-and-3-trial-phase-pinaka-game-changer-weapon-drdo-9257941.html>

भारत की रक्षा तैयारी अब पुराने ढर्रे पर नहीं चल रही. पाकिस्तान से टकराव के हालात में अब जवाब सीधे और सटीक मिल रहा है, वो भी स्वदेशी हथियारों के जरिए. हाल ही में भारत के स्वदेशी ड्रोन 'नागास्त्र-1' के इस्तेमाल से पाकिस्तान खौफजदा है. अब DRDO व इंडियन इंडस्ट्री मिलकर नागास्त्र-2 और नागास्त्र-3 जैसे अत्याधुनिक हथियार तैयार कर रहे हैं.

### Nagastra-1: पाकिस्तान में दहशत फैलाने वाला स्वदेशी ड्रोन

DRDO और नागपुर की Solar Industries द्वारा मिलकर विकसित किया गया 'नागास्त्र-1' भारत का पहला स्वदेशी आत्मघाती ड्रोन है. हालिया भारत-पाक संघर्ष में इसका इस्तेमाल हुआ और इसके असर ने पाकिस्तान को चौंका दिया. यह ड्रोन टारगेट के ऊपर जाकर खुद को विस्फोट कर देता है, जिससे दुश्मन के बंकर, वाहन और ठिकाने ध्वस्त हो जाते हैं. GPS आधारित टारगेटिंग, कम वजन और हाई एक्सप्लोसिव पेलोड इसकी खासियत है. इसे सोलजर्स बैकपैक में ले जा सकते हैं और फील्ड में ही लॉन्च किया जा सकता है.

### Nagastra-2 और Nagastra-3: अगली पीढ़ी के घातक हथियार

Solar Industries के चेयरमैन सत्यनारायण नुवाल ने खुलासा किया है कि Nagastra के दो वर्जन- नागास्त्र-2 और नागास्त्र-3, ट्रायल फेज में हैं. इन ड्रोन में रेंज, पेलोड और सटीकता को और अपग्रेड किया गया है. ये ड्रोन

मौजूदा युद्ध पैटर्न के अनुसार AI-बेस्ड टारगेट रिकग्निशन से लैस होंगे. इनके 2024-25 में सेना में शामिल होने की उम्मीद है.

### पिनाका: दुश्मन की रीढ़ तोड़ने वाला रॉकेट सिस्टम

नागास्र की तरह ही 'पिनाका मल्टी-बैरल रॉकेट सिस्टम' भी एक स्वदेशी चमत्कार है, जिसे DRDO और टाटा ग्रुप/सोलर इंडस्ट्रीज ने मिलकर बनाया है. पिनाका की रेंज 45-90 किमी तक है और एक साथ दर्जनों रॉकेट फायर कर सकता है. सटीकता, मोबाइल लॉन्चर और तेजी से री-लोडिंग की क्षमता इसे एक गेम-चेंजर बनाती है. हाल में इसके सभी वेरिएंट्स का ट्रायल सफल रहा है, और इसे पाकिस्तान बॉर्डर के नजदीक तैनात किया जा चुका है.

### DRDO का फोकस: लंबी लड़ाई के लिए तैयार भारत

DRDO प्रमुख डॉ. समीर वी. कामत का कहना है कि अगर भारत को आत्मनिर्भर बनना है और लंबी लड़ाइयों के लिए तैयार रहना है, तो रक्षा R&D और प्रोडक्शन में निजी कंपनियों की भागीदारी जरूरी है. 'हम कई नए सिस्टम्स पर काम कर रहे हैं- मिसाइल, एयर-बेस्ड हथियार, नौसैनिक हथियार और ड्रोन-रोधी सेंसर. अगले 6 से 12 महीनों में ये सिस्टम सेना में शामिल होंगे.' डॉ. कामत ने यह भी बताया कि हालिया संघर्षों में DRDO के सिस्टम्स ने अच्छा प्रदर्शन किया है, लेकिन यह वक्त सीखने और और बेहतर सिस्टम्स को लाने का है.

### बदलता युद्ध का चेहरा

सोलर इंडस्ट्रीज के चेयरमैन ने एक अहम बात कही, 'अगर आज अजरबैजान, आर्मीनिया, रूस और यूक्रेन के युद्ध देखें, तो युद्ध का पैटर्न पूरी तरह बदल चुका है. ड्रोन, रॉकेट और सटीक हमले अब युद्ध की दिशा तय कर रहे हैं.' भारत इसी बदलते परिदृश्य को समझते हुए, अपनी रणनीति और हथियार प्रणाली को तेजी से अपडेट कर रहा है.

\*

## Faster than sound, undetectable by radar..., DRDO's hypersonic missile can bypass defenses, can fly at a speed of..., and strike deep into China and Pakistan

Source: India.com, Dt. 22 May 2025,

URL: <https://www.india.com/news/india/faster-than-sound-undetectable-by-radar-drdo-hypersonic-missile-can-bypass-defenses-can-fly-at-speed-of-mach-5-that-is-6120-km-per-hour-and-strike-into-china-pakistan-7835549/>

India is on the verge of creating a major milestone in the defense sector. The Defence Research and Development Organisation (DRDO) is getting ready to launch an indigenous hypersonic missile that could become one of the fastest and most powerful weapons in the world. This missile is expected to fly at a speed of Mach 5, that's around 6,120 kilometers per hour. Such a development would significantly boost India's status as a global military power. Dr. Sudhir Kumar Mishra, a senior DRDO scientist and former CEO of BrahMos Aerospace, recently confirmed this. According to him, the hypersonic engine was successfully tested a few weeks ago, and the full system will be revealed soon.

### What is a Hypersonic Missile?

Hypersonic missiles are weapons that can fly at speeds five times faster than the speed of sound or even more. That means speeds ranging from Mach 5 to Mach 25 (roughly 6,120 to 24,140 km/h). Their incredible speed, ability to change direction mid-flight, and the fact that they travel at lower altitudes make them extremely hard to detect or stop with current air defense systems.

**There are two main types of hypersonic missiles:**

**Hypersonic Glide Vehicles (HGV):** These are launched into the upper atmosphere using a rocket. After reaching high altitudes, they glide at incredible speeds toward their target, often changing direction during flight, which makes them very difficult to track.

**Hypersonic Cruise Missiles:** These use scramjet engines (supersonic combustion ramjets), which compress incoming air and mix it with fuel to create high-speed thrust. These missiles fly at lower altitudes and can hit targets with high precision.

**DRDO's Latest Breakthrough in Hypersonic Technology**

On May 16, 2025, Dr. Sudhir Kumar Mishra made a significant announcement during a media event that DRDO has successfully tested an indigenous hypersonic engine. The ground test of this scramjet engine was conducted on April 25 at the Scramjet Connect Test Facility in Hyderabad. Impressively, the engine ran continuously for over 1,000 seconds (more than 16 minutes), marking the longest scramjet engine test ever done globally. With this, India now stands alongside countries like the USA, Russia, and China in advanced hypersonic technology.

**Joint Development with Public and Private Sectors**

This advanced missile is being developed by DRDO's Dr. A.P.J. Abdul Kalam Missile Complex in Hyderabad in collaboration with other DRDO labs and private Indian companies. It will have a range of over 1,500 kilometers and can carry a variety of warheads, making it a highly flexible weapon system for the Indian armed forces.

**Key Features of the DRDO Hypersonic Missile**

**Indigenous Scramjet Engine:** The missile is powered by a fully Indian-developed scramjet engine. It is built to maintain hypersonic speeds with key features like advanced thermal management, propulsion stability, and high-temperature endurance. Ceramic Thermal Barrier Coatings (TBCs) are used to handle extreme heat.

**Endothermic Fuel:** DRDO, in partnership with Indian private firms, has developed a special fuel that helps keep the engine cool and improves ignition. This results in better performance and efficiency of the missile. **Incredible Speed and Maneuverability:** The missile can fly at Mach 5, change direction mid-flight, and operate at low altitudes making it extremely hard to detect or intercept by enemy defense systems.

**Extended Range:** With a range of over 1,500 kilometers, this missile can strike both tactical and strategic targets. It is capable of carrying both conventional and nuclear warheads. **Fully Made in India:** From the launcher and engine to the navigation system, every major component of this missile has been developed indigenously by DRDO.

\*

## **BrahMos: The bolt from the blue**

DRDO scientists are developing its more lethal versions, BrahMos-NG  
and BrahMos-II

*-by Air Marshal Amit Tiwari (Retd)*

**Source: The Tribune, Dt. 23 May 2025,**

**URL: <https://www.tribuneindia.com/news/comment/brahmos-the-bolt-from-the-blue/>**

In 1983, the Government of India formed the Integrated Guided Missile Development Programme. Initially, it was focussed on ballistic missiles. But the devastating effect of US ship- and air-launched Tomahawk cruise missiles on Iraqi air defence systems during the 1991 Gulf war inspired India. In 1998, Dr APJ Abdul Kalam signed a pact with his Russian counterpart, establishing the BrahMos Aerospace joint venture. In 2001, the first test launch of BrahMos was conducted.

BrahMos is a two-stage cruise missile with a solid-propellant booster in the first stage that accelerates the missile to supersonic speeds. Once separated, a liquid-fuelled ramjet engine takes over, propelling it to a cruising speed of Mach 3. It operates at altitudes of 15 km to 10 m and has a range of 300-800 km. It carries a 200-300 kg conventional warhead and operates on the fire-and-forget principle. After firing, it autonomously navigates to its target, using inertial navigation, satellite guidance and terrain contour-matching, achieving accuracy of less than one metre.

The air-to-surface version was launched in 2017 and inducted into 222 Squadron, Tigersharks, in 2020. Its speed, accuracy and kinetic impact makes BrahMos one of the deadliest conventional cruise missiles. A direct hit from BrahMos can destroy reinforced bunkers, warships or command centres through its momentum. Its kinetic energy is 32 times of the US Tomahawk missile.

As ground-based air defence systems have become more accurate and lethal, the operational freedom once enjoyed by aerial platforms has diminished. The Ukraine-Russia war is a live example. After suffering heavy losses in the early stages, both sides avoided overflying contested areas and relied on long-range standoff weapons.

A similar approach was observed in the recent India-Pakistan conflict, when neither Indian nor Pakistani aircraft crossed the border. Pakistan relied on Turkish-made drones. Most of them were intercepted. Pakistan also used the 'Fateh' ballistic missile. Ballistic missiles have large-radar cross-section and follow a predictable, high-altitude parabolic trajectory. It makes them vulnerable to interception. Sure enough, India intercepted all missiles. In contrast, India launched BrahMos missiles from Su-30 MKIs to destroy targets with pinpoint accuracy. Though detailed results remain classified, the operational impact was undeniable. These missiles ensured minimal risk to pilots while achieving precision strike objectives. Due to its low-altitude, supersonic cruise profile, BrahMos is virtually impossible to intercept with existing air defence systems.

Indian scientists are already developing a future, more lethal version, BrahMos-NG (Next Generation). This will be smaller and lighter, enabling integration with platforms such as Tejas, Mirage and Rafale. Importantly, there will be no compromise on speed, range, lethality or stealth. Equipped with Active Electronically Scanned Array radar, it will offer enhanced precision. Simultaneously, a hypersonic version, known as BrahMos-II, inspired by the Russian Zircon

missile, is being developed. It will be powered by scramjet to have a speed of more than 8 Mach and range of over 1,500 km. It will be impossible to intercept. This missile could be a true game-changer.

Arms exports play a vital role in enhancing a nation's strategic influence. India has promoted BrahMos, with the Philippines becoming the first customer in 2022. Vietnam and Indonesia have expressed interest. Given concerns over China's growing presence in the South China Sea, the acquisition of BrahMos by ASEAN nations could bolster regional deterrence. India's entry into this niche market will enhance its strategic and economic ties across Asia.

The BrahMos showcased success of the government's push for 'Atmanirbhar Bharat'. The missile has more than 70 per cent Indian components. Its success is likely to catalyse collaboration between DRDO, Indian industries and academia and boost innovation.

The success of BrahMos is a testament to the changing nature of the battlefield, shifting from tactics to technologically-driven warfare, particularly the rise of precision-guided munitions like cruise missiles. BrahMos is poised to be a tactical asset and strategic game-changer for the security landscape.

\*

## Defence News

### Defence Strategic: National/International

#### **Incorrect to say India doesn't have a National Security Strategy: CDS**

**Source:** The Hindu, **Dt.** 22 May 2025,

**URL:** <https://www.thehindu.com/news/national/incorrect-to-say-india-doesnt-have-a-national-security-strategy-cds/article69607234.ece>

Abrogation of Article 370 and bifurcation of Jammu and Kashmir into two Union Territories would not have been possible without the elements — 'Policy, Processes and Organisational Structures' — that constitute the National Security Strategy (NSS), Chief of Defence Staff (CDS) General Anil Chauhan wrote in his book, while stating that India doesn't have a written NSS but says it is "incorrect" to say that India doesn't have one.

"Strategic analysts and political pundits in India and abroad often have been found stating that India does not have a national security strategy. That is incorrect and a myopic understanding of the issue. What we don't have is a written document called the NSS, which is published periodically by some Western nations," Gen. Chauhan wrote in the book he authored, Ready,



Relevant and Resurgent: A Blueprint for the Transformation of India's Military, which was released on Thursday (May 22, 2025).

"Israel, the most threatened nation on earth, does not have a written policy document/ NSS," he wrote, while stating that on the contrary, Pakistan issued a written National Security Policy in 2022 and soon ran into economic problems, political instability, rift between the armed forces and citizens and problems on its western borders. "They had the written document but lacked the organisational structures, processes and policies to secure the nation," Gen. Chauhan remarked.

An apex level Defence Planning Committee (DPC) chaired by the National Security Adviser (NSA) was set up in 2018 which was to formulate the NSS and a National Defence Strategy (NDS) but there has been no update on the progress.

In the past, former Army Chief Gen. Manoj M. Naravane had said it was essential to have an NSS, NDS and a higher defence organisation in place and only then we can think of integrated theatre commands.

### **COVID-19 challenges**

Gen. Chauhan said no nation could secure itself without a strategy in place. The important constituents of a strategy would be Policy, Processes and Organisational Structures. "I believe that India has all these functioning efficiently. India encountered the challenges of COVID-19 from zero preparation level to a nation acting in unison to propagating 'Vaccine Maitri'.

Today, surgical strikes, multi-alignment, and Atmanirbharta are part of a strategy to secure the nation, the country's second CDS elaborated in the book, an excerpt of which was published on the news portal stratnewsglobal. It is possible because all organisational structures, processes and policies are in place, he said. "The resounding success of G20 in the same manner promotes national interests, contributing to national security."

Dwelling into the country's organisational structures responsible for national security, the book details that the National Security Council (NSC) is at the apex headed by the Prime Minister with the NSA as a Secretary. It oversees both internal and external security about conventional and non-conventional threats, military affairs, space, cyber and technology, Gen. Chauhan noted.

Further, the National Security Council Secretariat (NSCS) functions under the aegis of the Prime Minister's Office (PMO) and is responsible for national security planning and coordination in the political, economic, energy and strategic arenas. It has three tiers. The processes are steered through various committees such as the Strategic Policy Group and DPC, both of which function under the chairmanship of the NSA. Other enabling committees include the Defence Acquisition Council, which is headed by the Defence Minister, and the Chiefs of Staff Committee to coordinate on the policy front for all tri-services military matters.

\*

## Rajnath releases CDS book on Indian military evolution

Source: Hindustan Times, Dt. 23 May 2025,

URL: <https://www.hindustantimes.com/india-news/rajnath-releases-cds-book-on-indian-military-evolution-101747939597993.html>

Defence minister Rajnath Singh on Thursday released the book, “Ready, Relevant and Resurgent: A Blueprint for the Transformation of India’s Military”, authored by chief of defence staff General Anil Chauhan.

The book offers deep insights into the ongoing transformation of the Indian armed forces, driven by jointness, integration and self-reliance, to meet the demands of 21st century warfare and secure national interests, HQs Integrated Defence Staff (IDS) said.

The book is rare as it has been authored by a serving four-star officer.

It comes at a time when jointness among the three services, an essential prerequisite to the creation of theatre commands, is in sharp focus. The armed forces are charting a path towards theaterisation, a long-awaited reform for the best use of the military’s resources to fight future wars.

“It reflects marking a new era in India’s higher defence organisation,” HQs IDS wrote on X.

The theaterisation model being pursued involves raising the China-centric northern theatre command in Lucknow, the Pakistan-centric western theatre command in Jaipur, and the maritime theatre command in Thiruvananthapuram.



The concepts ideated in the book aim to focus on the long-term efficacy of military reforms to foster jointness and interoperability, facilitate optimisation and ensure credible modernisation of the armed forces to meet emerging challenges, Chauhan writes in the introduction.

Jointness was in focus during Operation Sindoor too; New Delhi's response to the Pahalgam terror attack that killed 26 people. It triggered four days of strikes and counterstrikes with fighter jets, missiles, drones, long-range weapons and heavy artillery before the Indian and Pakistani forces reached an understanding on stopping all military action on May 10.

Ready, Relevant and Resurgent was the theme chosen for the Combined Commanders' Conference held in March 2023, the first attended by Chauhan as CDS.

"The reforms in the armed forces need to be seen from a wider perspective. Today, war and warfare are continuously evolving at an increasingly rapid pace. As a result, the armed forces need to absorb new and emerging technologies as well as evolve new tactics to be future-ready. The future of warfare itself needs deliberation, diligent prognosis and an informed assimilation," he wrote.

There is also a requirement for defence officers to understand the larger dynamics of national security without diluting the military preparedness aspect, read excerpts published by website StratNewsGlobal.

"The mosaic has to be filled with threats and challenges that we may face from our adversaries on the borders, in the Indian Ocean Region, in space and in cyber domains. From the rising threat of terrorism and radicalisation on one end to the weaponisation of sanctions and the use of information as a weapon are major challenges that need to be dealt with."

\*

## **Theatre commanders to lead future wars: CDS**

**Source: The Tribune, Dt. 23 May 2025,**

**URL: <https://www.tribuneindia.com/news/india/theatre-commanders-to-lead-future-wars-cds/>**

Just days after the skirmish with Pakistan, Chief of Defence Staff General Anil Chauhan has penned his thoughts in a book on how to fight future wars and laid down a blueprint —theatre commanders, and not the service chiefs, will be responsible for operations and war fighting. He mentioned the need for "deliberation" and "diligent prognosis".

The General has come out with a book titled "Ready, Relevant and Resurgent: A Blueprint for the Transformation of India's Military". Defence Minister Rajnath Singh released the book in New Delhi on Thursday. It offers insights into the ongoing transformation of the Indian armed forces to meet the demands of 21st century warfare.

Giving a firm opinion on the transformation and creation of "theatre commands", which will integrate all manpower and equipment in a geographical area under one commander, the CDS states that the theatre commander will have the responsibility of force application (that is, to fight wars and conduct operations), whereas the chiefs of the armed forces will be responsible for what

is colloquially called the “raise, train and sustain (RTS) function”. In other words, the service chiefs will not be responsible for fighting wars or conducting operations.

The CDS notes that the transformation will trigger new operational and administrative challenges. The acceptability of the change will only happen once officers at all levels are aware of the impending changes. An essential prerequisite for the establishment of theatre commands is a high degree of jointness among the three services and the physical integration of several processes, activities and essential infrastructure, writes the CDS.

The book articulates a vision for building a “future-ready” force. The CDS writes that the “future of warfare itself needs deliberation, diligent prognosis and an informed assimilation”. The armed forces need to build capabilities to conduct integrated multi-domain operations across the spectrum of conflict. He calls for organisational structures, capabilities and strategies to be dovetailed into our understanding of the future.

War and warfare are continuously evolving at a rapid pace, and the armed forces need to absorb new and emerging technologies as well as evolve new tactics to be future-ready, General Chauhan says in his book. It involves not only modernising equipment but also modernising doctrinal concepts, tactics, techniques and procedures.

Technology, he says, has a major influence on the conduct of combat. Military technology finds application in the civilian domain and vice versa.

\*

## **CDS Anil Chauhan applauds Western Air Command's significant contribution to Operation Sindoor**

**Source:** ANI News,      **Dt.** 22 May 2025,

**URL:** <https://www.aninews.in/news/national/general-news/cds-anil-chouhan-applauds-western-air-commands-significant-contribution-to-operation-sindoor20250522210437/>

Chief of Defence Staff (CDS) General Anil Chauhan on Thursday, applauded the Western Air Command of the Indian Air Force for its significant contribution to Operation Sindoor, highlighting the Air Force's vital role in integrated military operations.

According to a statement from the Headquarters of Integrated Defence Staff, CDS Chauhan visited the Headquarters of Western Air Command in the national capital, discussing operations with Air Marshal Jeetendra Mishra, Air Officer Commanding in Chief (AOC-in-C). The visit reaffirmed the Indian Armed Forces' commitment to joint preparedness and synergised air operations.

Earlier on May 14, CDS Chauhan, along with Chief of Army Staff General Upendra Dwivedi, Chief of Navy Staff Admiral Dinesh K Tripathi and Air Chief Marshal AP Singh provided a direct perspective from the leadership of the Armed Forces into the successful conduct of Operation Sindoor.





During the deliberations, insights into the Tri-Services synergy achieved during the operation were deliberated upon. Insights on the TriServices synergy achieved through clearly stated Strategic guidance, and the successful execution of new-age multi-domain operations, with an exceptional degree of Jointness and Integration, deliberated with Veterans and Think Tanks," read a statement from HQ IDS.

India launched Operation Sindoor on May 7 as a decisive military response to the April 22 Pahalgam terror attack in which 26 people were killed. Indian Armed Forces targeted terror infrastructure in Pakistan and Pakistan-occupied Jammu and Kashmir, leading to the death of over 100 terrorists affiliated with terror outfits like the Jaish-e-Mohammed, Lashkar-e-Taiba and Hizbul Mujahideen.

After the attack, Pakistan retaliated with cross-border shelling across the Line of Control and Jammu and Kashmir as well as attempted drone attacks along the border regions, following which India launched a coordinated attack and damaged radar infrastructure, communication centres and airfields across 11 airbases in Pakistan.

After this, on May 10, an understanding of the cessation of hostilities between India and Pakistan was announced.

\*

## **Anil Ambani's Reliance Defence signs pact with German firm for artillery shells, explosives supply**

**Source:** The Economic Times    **Dt.** 22 May 2025,

**URL:** <https://economictimes.indiatimes.com/news/defence/anil-ambanis-reliance-defence-signs-pact-with-german-firm-for-artillery-shells-explosives-supply/articleshow/121341952.cms>

Anil Ambani's Reliance Defence has signed an agreement with German arms manufacturer Rheinmetall AG for the supply of ammunitions like artillery shells and explosives from a new facility to be set up in Maharashtra. "Reliance Infrastructure Ltd-promoted Reliance Defence Ltd (Reliance Defence) and Dusseldorf-based Rheinmetall AG have agreed on a strategic partnership in the field of ammunition. An Agreement to this effect has now been signed by the representatives of both companies," the Indian firm said in a statement.

This is the third defence tie-up by the group after joint ventures with Dassault Aviation and Thales of France.

"The collaboration between the companies will include the supply of explosives and propellants for medium and large calibre ammunition to Rheinmetall by Reliance," it said.

Furthermore, the two companies intend to engage in joint marketing activities for selected products and may extend their cooperation based on future opportunities.

The EUR 80 billion Rheinmetall AG excels in critical domains, such as armoured vehicles, infantry fighting vehicles, advanced air defence systems, and state-of-the-art ammunition technology. At the pinnacle of its portfolio is the Leopard 2A7, widely recognised as one of the most sophisticated main battle tanks worldwide.

The strategic partnership will strengthen India's defence manufacturing capabilities aligning with the government's flagship 'Make in India' and 'Atmanirbhar Bharat' initiatives. It advances the vision to position India among the world's leading defence exporters.

"In order to support this collaboration, Reliance Defence Ltd will set up a greenfield manufacturing facility in the Watad Industrial Area of Ratnagiri, Maharashtra. The manufacturing facility, one of the largest in South Asia, will have an annual capacity to produce up to 2,00,000 artillery shells, 10,000 tonnes of explosives and 2,000 tonnes of propellants," the statement said without giving details of investment to be made.

This new facility will help Reliance Defence achieve its objective of being among the top three Defence exporters in the country.

"The cooperation gives Rheinmetall further access to important raw materials and secures not only its supply chains, but also the interest of its customers, but also creates further growth opportunities. In India, the new state-of-the-art facility will make a significant contribution to supplying the country's armed forces," it said.

The defence manufacturing complex will contribute to supporting India's ambitious defence export target of Rs 50,000 crore by 2029.

Armin Papperger, CEO of Rheinmetall AG, emphasised that "this strategic partnership of Rheinmetall with Reliance Defence led by Anil Ambani's Reliance Group illustrates our strong commitment to partner with India under the strong leadership of Prime Minister Modi".

Anil D Ambani, founder and Chairman, Reliance Group, said: "We are proud to partner with Rheinmetall AG, one of the world's most respected leaders in defence manufacturing, and to collaborate with visionary leader, Armin Papperger. This strategic partnership brings cutting-edge capabilities to India, marking a transformational moment for the country's private defence manufacturing sector".

Guided by the vision of 'Aatmanirbhar Bharat', as championed by Prime Minister Narendra Modi, the objective is to position Reliance Defence among the top 3 defence exporters, enabling India to not only meet its domestic defence needs but also emerge as a key player in the global defence supply chain, he said.

"This project marks a major step in the Reliance Group's long-term strategy to invest in the fast-growing defence manufacturing sector."

Reliance Defence recently announced plans to set up an integrated project for the manufacturing of explosives, ammunition and small arms under the Dhirubhai Ambani Defence City (DADC).

The DADC is being built in the Watad industrial area in Ratnagiri, Maharashtra, and once completed will be the largest greenfield project in the defence sector ever developed by any private company in India.

\*

## **Operation Sindoor: Experience proved 'litmus test' for Agniveers**

**Source: The Economic Times    Dt. 22 May 2025,**

**URL: <https://economictimes.indiatimes.com/news/defence/operation-sindoor-experience-proved-litmus-test-for-agniveers/articleshow/121344365.cms?from=mdr>**

Many Agniveers were also part of the Indian military units, including air defence, which played a critical role during the recent four-day military confrontation between India and Pakistan, the significant experience earned in the line of duty proving a "litmus test" for them, people familiar with the matter said.

However, only limited number of Agniveers are presently there in the military units and, therefore, they are working under the supervision of their mentors, they said.

India decimated nine terror camps in Pakistan-Occupied-Kashmir and Pakistan under Operation Sindoor with precision strikes early on May 7 following which Pakistan attempted to attack the Indian military bases on May 8, 9 and 10.

The Pakistani actions were strongly responded to by the Indian side. The Indian military targeted eight Pakistani air bases with missiles and other long-range weapons on May 10 in retaliation for Pakistan's attempts to strike several military facilities.

During the four-day intense military confrontation, the Indian armed forces intercepted and neutralised swarms of Pakistani drones to push back aerial incursions, with the air defence system playing a critical role in thwarting the attacks.

Many Agniveers were also part of artillery and infantry units, and also were parts of teams that manned the air defence systems, said people familiar with the matter. The experience earned in the line of duty thus proving a "litmus test" for them, they said.

The hostilities ended with an understanding on stopping all military actions following talks between the Director Generals of Military Operations of both sides on the afternoon of May 10.

"#GeneralUpendraDwivedi, #COAS, and All Ranks of the #IndianArmy pay homage to the unwavering courage of #Braveheart Agniveer Murlinaik who made the supreme sacrifice in the line of duty during OPERATION SINDOOR. His indomitable valour will forever be etched in our hearts. The Indian Army stands resolutely with his family in this hour of grief," the Indian Army had said in a post on X on May 20.

\*

## **Border talks with India and Bhutan advancing, says China's white paper on security; Highlights internal, external threats**

**Source: The Economic Times    Dt. 22 May 2025,**

**URL: <https://economictimes.indiatimes.com/news/defence/border-talks-with-india-and-bhutan-advancing-says-chinas-white-paper-on-security-highlights-internal-external-threats/articleshow/121342689.cms?from=mdr>**

Talks to resolve border issue with India and Bhutan "continue to advance", a new white paper on China's national security has said, identifying a host of internal and external threats faced by the country and its one-party political system. The 23-page security paper released recently in Mandarin has outlined a host of threats and challenges faced by China.

China has settled boundary issues with 12 of its 14 land neighbours and the negotiations with India and Bhutan continue to advance to resolve the border disputes, said the white paper titled 'China's National Security in the New Era'.

Beijing has completed the demarcation of the Beibu Gulf waters between China and Vietnam, signed border defence cooperation agreements with nine neighbouring countries, established border defence talks and meetings mechanisms with 12 countries, and regularly carried out friendly visits, working talks, joint patrols, and joint cross-border crime drills, the paper said.

While China's border disputes with India and Bhutan remain to be resolved, the country has a maritime dispute with several countries, including Japan in the East China Sea, and the Philippines, Vietnam, Malaysia, Brunei and Taiwan in the South China Sea.



India and China have held 23 rounds of Special Representatives-level talks to resolve the border disputes spanning 3,488 km along the Line of Actual Control (LAC).

China and Bhutan held 25 rounds of talks to resolve about 400 km of the boundary issue.

Significantly, the white paper identifies threats to the political system ruled by the Communist Party of China (CPC) headed by President Xi Jinping.

The core of political security is regime security and system security, it said.

The most fundamental thing is to maintain the leadership and ruling status of the CPC and maintain the socialist system with Chinese characteristics.

If political security is not guaranteed, China will inevitably fall into a fragmented and scattered situation, the great rejuvenation of the Chinese nation will be out of the question, and the fundamental and long-term interests of the people will not be guaranteed, it said.

It is necessary to enhance political sensitivity and political discernment, eliminate various political risks in a timely manner, and prevent non-political risks from spreading into political risks, it said.

Any attempt to separate the Communist Party from the people and to set them against each other will never succeed, the paper said.

For China, external security pressure is increasing. Western anti-China forces are doing everything they can to contain, suppress and contain China, implement different strategies against it by carrying out infiltration and sabotage activities, it said.

Foreign forces are stepping up their efforts to interfere in China's neighbouring affairs, posing a threat to the security of China's borders and surrounding areas.

Some countries have grossly interfered in China's internal affairs, causing trouble in the Taiwan Strait, the South China Sea and the East China Sea, and frequently causing trouble on issues related to Xinjiang, Tibet and Hong Kong, it said.

Some external forces are deliberately playing the "Taiwan card," and the "Taiwan independence" forces are stubbornly adhering to their separatist positions and taking risks and provocations. Overseas separatist forces such as "Tibetan independence" and "East Turkestan" in Xinjiang are frequently active, it said.

While highlighting challenges China faces in the Taiwan Strait, the South China Sea and the East China Sea, besides Xinjiang, Tibet and Hong Kong-related issues, the paper has stressed the importance of building a strong military to face the traditional and new security challenges.

On Taiwan, which China claims as part of its mainland, the paper said Beijing will never allow any person, any organisation, any political party, at any time, in any form, to separate any piece of Chinese territory from China.

We will unswervingly promote the complete reunification of the country, it said.

On the strategic front, the paper spoke of challenges posed by the US to contain China and the importance of close China-Russia relations.

The Sino-Russia ties are based on non-alignment, non-confrontation and non-targeting third parties, and are not affected by any third party, nor are they interfered with or coerced by external factors, it said.

On the China-US rivalry, it said being two major countries neither side can suppress the other from the so-called "position of strength" or deprive the other side of its legitimate right to development in order to maintain its leading position. The four red lines of the Taiwan issue, democracy and human rights, the road system and the right to development cannot be challenged, it said.

The "Thucydides Trap" (meaning a new power rising to challenge the existing power) is not a historical destiny, it said, referring to the US concerns over China's rise to challenge its global dominance. The "new Cold War" cannot be fought and cannot be won, it said, adding that the containment of China is unwise, undesirable, and will not succeed. China is willing to work with the US to explore the correct way for the two major countries to get along on this planet, for the benefit of both countries and the world, it added.

It also said non-traditional security challenges for China are increasing and listed extreme climate disasters besides terrorism, separatism, religious extremism, and major transnational epidemics as serious security threats. Security issues in space, deep sea, polar regions, and cyberspace were listed as major threats.

The Asia-Pacific region has become the focus of great power competition. Some countries have strengthened military alliances in the Asia-Pacific region, wooed regional partners, built exclusive "small groups," and insisted on advancing military deployments including the intermediate-range missile system, seriously exacerbating regional tensions, it added, without naming anyone.

\*

## **Operation Sindoor: Breaking Gordian knot of terror & talks**

*-by Maj Gen Ashok K Mehta (Retd)*

**Source: The Tribune, Dt. 23 May 2025,**

**URL: <https://www.tribuneindia.com/news/comment/operation-sindoor-breaking-gordian-knot-of-terror-talks/>**

Foreign Minister S Jaishankar's clanger last week that "at the start of the operation we messaged Pakistan, we were hitting only terrorist targets and not Pakistan's military so it could stay out" (though it chose not to) has proved disingenuous. Why was it said 20 days after Operation Sindoor? Earlier, at Uri and Balakot, "exclusion of Pakistan military" was qualified after the operations. So was it this time. But Pakistan's response was inevitable. The MEA has clarified it was said during phase 1 at the end of the operation when the DGMOs spoke.

Nearly three weeks on, smoke over Bahawalpur and Muridke has not settled down. The fog of war has not lifted. Truth remains the first casualty. The ceasefire has no expiry date. Two terrorist incidents have taken place in Shopian and Tral and six local terrorists killed. Pahalgam culprits have not been caught. A new Multi-Agency Centre has come up; akin to shutting the stable door after the horse has bolted. For the sixth time, Donald Trump has said he "managed to arrange

ceasefire and avoid a bad nuclear war." In all previous India-Pakistan conflicts, US crisis management has been a notable feature.

During Kargil and Balakot, diplomacy was riding on the back of the military. In Op Sindoor, Indian diplomacy could not keep pace with the velocity of the brilliantly executed operations that had only one questionable supporter, Israel. No neighbouring country has backed India's kinetic response, though all have condemned the Pahalgam attack without naming Pakistan. China and Turkiye have come out in support of Pakistan. Despite India's veiled denial of US intercession, diplomatic teams are being sent abroad for fire-fighting. Pakistan is following suit. In the month of July, Pakistan will hold the UNSC presidency, during which Kashmir is likely to come up.

Both India and Pakistan have celebrated victory. The balance of advantage in the aerial exchange is unarguably with India. Pakistan will live to fight another day as cross-border terrorism will not cease soon. While India may not have a national security policy, it has coined a complex counter-terrorism doctrine, declaring a terrorist attack an act of war and removing the light between proxies and sponsors. Delhi has dispensed with Pakistan's deniability and dossiers exchange. Not only is Op Sindoor the shortest stand-off, non-contact skirmish, but also the briefest nuclear crisis. For the first time, the IAF has taken the honours by proving to be the sword arm. It has established air power is minimally escalatory. The termination of the operation was qualified with "any Pakistan misadventure would attract a corresponding response." Pakistan's inevitable one-notch-up response therefore had escalation built in. Rawalpindi had to escalate to de-escalate and get off ramp. Superior technology and skill in delivery enabled India to maintain domination over escalation control.

This has restored deterrence and expanded space for conventional operations by raising Pakistan's nuclear threshold. During the conflict, there was no nuclear signalling, except US detection of dynamic targeting that set off the nuclear alarm. The sale-worthiness of made-in-India and tested against Pakistan weaponry has enhanced even as the Chinese watched with a hawk eye. Despite the stunning rise of technology, the man behind the machine is supreme. The foot soldier will dominate in conquest and defence of territory (PoK and LAC). Op Sindoor was a war of attrition and achieving psychological ascendancy. The relevance of the Army will remain due to India's unsettled borders, internal instabilities and defending sovereignty and territorial integrity.

The internationalisation of Kashmir and re-hyphenation with Pakistan have already happened. On bilateralism, Islamabad's National Security Committee stated on April 25 in response to Delhi's slew of non-kinetic measures that "Pakistan shall exercise the right to hold all bilateral agreements with India including but not limited to Simla Agreement in abeyance till India desists from its manifest behaviour of fomenting terrorism inside Pakistan, non-adherence to international law and UN resolutions on Kashmir." The US may say it has "influence", not "control" over Pakistan, it exercises both. The Composite Dialogue begun in 2004 has remained on-off since 2008. The contours of the post-Pahalgam dialogue will be known after the cessation of firing stabilises into ceasefire. India should drop the charade: response was against terrorist infrastructure not the military, proportionate, responsible and non-escalatory. Ironically, Op Sindoor was required to break the Gordian knot terror and talks won't go together.

\*

## Science & Technology News

### ISRO gearing up for space station, Gaganyaan, lunar missions: Chairman Narayanan

Source: The Economic Times, Dt. 22 May 2025,

URL: <https://economictimes.indiatimes.com/news/science/isro-gearing-up-for-space-station-gaganyaan-lunar-missions-chairman-narayanan/articleshow/121342540.cms>

ISRO is gearing up to launch its own space station into orbit, marking a bold leap in India's space ambitions, chairman V Narayanan said on Thursday. The Indian Space Research Organisation (ISRO) chief also said the Department of Space, of which he is the Secretary, is working alongside various organisations to ensure the safety and security of the country's citizens.

"Take our country, for example - we have 11,500 km of coastline, and then there's the northern border. We have a vast border to monitor, and the government is working diligently to ensure our safety. There are responsible individuals and systems in place," he told reporters on the sidelines of a programme of Rammohan Mission here.

Narayanan said, "Currently, we have 57 satellites in orbit, serving the public by providing real-time updates and data on a wide range of issues, from weather forecasts to tele-education in the most remote areas."

About the space station, he said it will weigh over 50 tonnes.

He asserted that the setback cannot in any way derail ISRO's future programmes like Gaganyaan - which will be an important milestone for India's space exploration.

"Right now, we (ISRO) are also working on Chandrayaan-4 and Chandrayaan-5. Chandrayaan-5, in collaboration with Japan, will have a 6,400 kg lander carrying a 350-kg rover. It will have a life span of 100 days," he said.

The Chandrayaan-3 lander weighed 1,600 kg having a 25-kg rover.

Chandrayaan-4, to bring back sample from the lunar surface, will be launched in the next two-and-a-half years.

"Over the past several decades, India has moved on and is now placed among the top nations in space research and exploration," he added.

The eminent space scientist further said that ISRO is preparing for the country's first human spaceflight, called 'Gaganyaan'.

Narayanan said Gaganyaan's first mission will be an uncrewed test flight, which is expected to be launched in the coming days.

This will be followed by two missions with crew which are expected to be launched by ISRO in the near future, he added.



Earlier in the day, the ISRO chief addressed students of Ram Mohan Mission and Ram Mohan Mission High School on the 253rd birth anniversary of social reformer Rammohan Roy.

He paid glowing tributes to Roy and other social reformers who championed the causes of emancipation and women's uplift. Narayanan also highlighted the contributions of women space scientists in India's space programmes.

\*

## **CAR-T therapy can be safely manufactured at hospital, finds ICMR-funded trial led by CMC Vellore**

**Source: The Hindu, Dt. 22 May 2025,**

**URL: <https://www.thehindu.com/sci-tech/health/car-t-therapy-can-be-safely-manufactured-at-hospital-finds-icmr-funded-trial-led-by-cmc-vellore/article69604920.ece>**

An ICMR-funded trial led by CMC Vellore demonstrated that CAR-T therapy, which uses a patient's own T cells to fight cancer, can be safely manufactured at the hospital and infused to treat patients in India at a low cost.

For the first time, these CAR-T cells were produced and infused in a hospital in India.

CMC Vellore director and principal author of the study Vikram Mathews explained that Chimeric antigen receptor T cells (CAR-T cells) are normal T-cells that are part of the patient's own immune system. In CART-T cell therapy, these cells are engineered to recognise and target the specific cancer cell, thus using the immune system to fight the disease. CAR-T cell therapy has been proven to be very effective even in patients who have failed all other therapies, he said.

This process usually involves inserting into the normal T cells, the required genetic information to produce an antibody receptor that will recognise the antigen/substance on the surface of the cancer cell. "This process is usually done in large centralised commercial corporations, which contributes to logistic challenges, increased costs, and decreased efficacy," Dr. Mathews said.

One of many strategies to reduce the cost of this therapy, is to produce the CAR-T cells at the hospital site itself, this strategy is called decentralized or point-of-care manufacturing (PoC).

In this study, the authors provided evidence that this is feasible in India.

### **What did the study find?**

Early data from this study establishes its safety and also shows promising results, said Dr Mathews said.

A total of 10 patients, aged 6-59 years, six of them with acute leukemia and four with lymphoma, who had failed all earlier treatments, were treated with CAR-T cells manufactured at CMC Vellore under this PoC strategy.

The study found that the therapy brought about 100 per cent remission in acute lymphoblastic leukaemia patients, 50 per cent remission in large B-cell lymphoma patients. Overall, eight of the ten patients remained cancer-free at a median follow-up of 15 months since starting the therapy.

The doctors further reported that this was safe, well-tolerated, and had minimal side effects.

The study, 'Safety, efficacy and total cost of point-of-care manufactured anti-CD19 CAR-T cell therapy in India: VELCART trial' has been published in the journal Molecular Therapy.

The study also stated that when CART-T cells are manufactured in this PoC model, the cost of the therapy is nearly 90 per cent less than the global average. The production time for the CART-T cells was nine days in in-hospital settings.

Dr Mathews said that the use of a fresh, unfrozen product also contributed to better outcomes.

"This trial redefines how cancer therapy can be delivered - efficiently, affordably, and close to patients. India is leading the way in developing next-generation, in-house biotherapies with global relevance," he said.

"This model could be easily replicated in most tertiary healthcare facilities in the country," Dr Mathews said.

\*