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# Defence News

## Drone, data units part of India's defence '47 vision

*Source: Hindustan Times, Dt. 13 Mar 2026*

India is preparing to initiate far-reaching military reforms to ensure its armed forces are ready for future battlefield challenges, with the proposed creation of a drone force, a data force and a defence geospatial agency standing out among the raft of goals it seeks to pursue and accomplish by 2047 when the country marks its Independence centenary.

The roadmap, Defence Forces Vision 2047, to transform the military into a world-class force also seeks to establish a space command, a cyber-command, a cognitive warfare action force and a national air defence shield under Mission Sudarshan Chakra as the character of war evolves rapidly due to technological advancements. The vision document lays down that the revamp will be carried out in three phases: up to 2030 (era of transition), 2030-40 (era of consolidation) and 2040-47 (era of excellence).

“The challenges of the future will demand adaptability, courage and resilience,” defence minister Rajnath Singh said in a foreword to the document that outlines strategic priorities and goals for the next two decades to tackle new geostrategic, technological and security realities. Singh released the document on Tuesday but its contents became public on Thursday. The document delves into how the rapid march of technology profoundly impacts war and warfighting, noting that emerging technologies such as hypersonics, robotics, stealth, drones, quantum computing, and artificial intelligence are expanding the battlespace and changing the concept of force application during combat.

“Still unknown or unexplored are dual use technologies that may cause a disruptive effect, forcing a paradigm shift in the fundamental essence of war and warfighting. The exponential growth in sensors, data storage and advanced data analytics, processing power, connectivity, automation, machine learning and AI are all significantly impacting warfare. India's defence forces must seize this opportunity and enhance their strength by incorporating niche and emerging warfighting technologies as part of their modernisation,” it says.

Future war strategies, the document notes, will rely on seamless integration of networks, secure communications and superiority in data management. “Security challenges are no longer restricted to land, maritime or air domain. They are expanding into new domains including cyber, space and cognitive.” Jointness and synergy among the services are a central pillar of the vision. “Synergised use of force will require tri-service integration of a high order. The spirit of jointness must prevail in all rank and file of the three services which will be the bedrock of integration,” it says.

Last year, Singh said jointness in the military --- a prerequisite to the creation of theatre commands --- cannot be achieved through structural reforms alone but will also require a change in mindset and the challenges involved will have to be tackled through dialogue and understanding, stressing that tri-service integration is a must for survival in a fast-changing security environment. Jointness and integration must be pursued relentlessly to improve synergy and enable unified planning and execution of operations across multiple domains, the document points out. The armed forces have been asked to integrate networks which will pave the way for integrated communication, ISR (intelligence, surveillance and reconnaissance), targeting and air defence; formalise a tri-services integrated logistics and inventory management system; introduce organisational efficiency through

de-layering, optimisation and restructuring; raise a joint headquarters and operationalise the joint operations coordination centre; and segregate force generation and force application by raising integrated structures for operational command.

A modern, strong and combat ready military (lethal and meritocratic) is key to ensuring India's territorial integrity and internal stability, which is essential to foster an environment conducive to growth and prosperity, the document says. The armed forces cannot afford to be 'status quoist,' it adds. "Preparing for and winning future wars will need more than just modern equipment. It will need an imaginative, innovative and inventive approach when it comes to planning of operations and employment of forces. Given the rapid advancements in warfighting techniques and technologies, a dynamic, adaptive and agile defence force will be better positioned and structured for victory."

It calls upon the armed forces to strengthen deterrence through the acquisition of intelligent platforms, combat assets and force multipliers; promulgate national and theatre strategies for envisaged threats; create resilient border infrastructure; strengthen coastal surveillance and introduce air domain awareness over maritime zones; expand underwater domain awareness; and augment terrestrial warfare capability with space-based capacities in ISR, positioning, navigation, and communication.

The military has also been asked to build resilient and responsive cyber defence networks, expand the airspace envelope to near space, and invest in autonomous and intelligent systems. It states that the challenges in transitioning from a 20th-century military force to the envisioned one are plentiful. "Sustained investments are required to realise this vision. The leap in capacities and capabilities envisaged can neither be met through standard off-the-shelf acquisitions nor by employing these capabilities through mere replication of existing doctrines and strategies drawn from around the globe. Indian solutions --- covering the entire canvas from threat mitigation to balanced technological infusion, force structuring, doctrines, and secure supply chains --- would have to be implemented to secure national interests," it adds.

<https://www.hindustantimes.com/india-news/drone-data-units-part-of-india-s-defence-47-vision-101773342714440.html>

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## Space command, drone agency, air shield in MoD's 'vision 2047'

*Source: The Tribune, Dt. 13 Mar 2026*

The Ministry of Defence on Thursday unveiled an ambitious plan that includes creating dedicated entities for analysing data, operating drones and carrying out geo-spatial mapping. Full-fledged commands for space operations and cyber operations are to be raised, while an expanded air defence system named "Sudarshan Chakra" is expected by 2030.

The MoD made public the document "Defence Forces Vision 2047: A Roadmap for a Future-Ready Indian Military". Defence Minister Rajnath Singh had formally released the 47-page document at an event on March 10. It was made public today. The document says the plan is to expand ballistic missile defence (BMD) and air defence systems for protecting economic and strategic assets as well as civilian installations against multi-domain threats as part of mission "Sudarshan Chakra".

India has already tested a BMD system and is looking to expand it, analysts explained. “Sudarshan Chakra” is the name of the expanded air defence system.

The vision document lists the creation of a defence geo-spatial agency, a data force, a drone force and a cognitive warfare action force. In the case of a full-fledged space command, the forces have a division handling space. The full command indicates expansion and the need to control space operations. It also talks about creating capabilities to dominate the electro-magnetic spectrum — the ability to control, communicate and detect in battle while denying, disrupting or deceiving an adversary’s communications, radars and navigation systems.

The MoD says the focus will be on technological development and indigenous research and development of niche and complex systems to achieve self-reliance in capability development. It also mentions the need for dual-use infrastructure and creation of “surge” capacities to cater to prolonged high-intensity operations. The document divides the future roadmap into three transition phases: Phase I from now to 2030 will be the era of transition; Phase II from 2030 to 2040 will be the era of consolidation; and Phase III from 2040 to 2047 will be the era of excellence.

Phase I aims to undertake organisational restructuring for multi-domain operations and exercise positive control over borders and the Line of Control and the Line of Actual Control. It also seeks to deter adversaries from initiating or provoking conflict and to contain standoffs, localised confrontations and terrorism. Phase II aims to achieve the next level of integration, move towards data-driven operations and integrate space and cyber capabilities into traditional domains, while acquiring the capability to dominate aerospace and maritime domains.

Phase III aims to transform the armed forces into a world-class military leading in all aspects of technology and capable of meeting future threats and challenges by ensuring freedom of operations across all domains in areas of interest. India’s presence in the Indian Ocean Region will be sustained through robust maritime domain awareness, underwater domain awareness and air domain awareness.

<https://www.tribuneindia.com/news/india/space-command-drone-agency-air-shield-in-mods-vision-2047/>

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## **IAF chief check preparedness of Western Air Command**

*Source: The Pioneer, Dt. 13 Mar 2026*



Chief of Air Staff Air Chief Marshal AP Singh, on Thursday, flew a sortie in an upgraded MiG-29 fighter jet from a frontline airbase under the IAF's Western Air Command. The Indian Air Force chief also reviewed the overall operational preparedness of the command, including infrastructure, crew readiness and aircraft maintenance standards at the key base, according to officials. The IAF maintains three squadrons of upgraded MiG-29s - MiG-29 UPGs — primarily deployed in the western and northern sectors.

<https://dailypioneer.com/news/iaf-chief-check-preparedness-of-western-air-command>

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## Science & Technology News

### इसरो ने क्रायोजेनिक इंजन का समुद्र तल पर परीक्षण किया

Source: Punjab Kesari, Dt. 13 Mar 2026

बेंगलुरु, (पंजाब केसरी): भारतीय अंतरिक्ष अनुसंधान संगठन (इसरो) ने बृहस्पतिवार को कहा कि उसने तमिलनाडु के महेन्द्रगिरि स्थित अपने प्रणोदन परिसर में नोजल सुरक्षा प्रणाली और बहु-तत्व इग्नाइटर का इस्तेमाल करते हुए 22 टन थ्रस्ट स्तर पर अपने क्रायोजेनिक इंजन (सीई20) का समुद्र तल पर सफलतापूर्वक परीक्षण (हॉट टेस्ट) किया है। इससे पहले, नोजल सुरक्षा प्रणाली का इस्तेमाल करते हुए समुद्र तल परीक्षण 19 टन थ्रस्ट स्तर पर किए जा रहे थे। सीई20 क्रायोजेनिक इंजन 'लॉन्च व्हीकल मार्क-3' (एलवीएम3) के ऊपरी क्रायोजेनिक चरण को शक्ति प्रदान करता है। इसरो ने अपनी वेबसाइट पर एक पोस्ट में कहा, 'एलवीएम3 वाहन की भार वहन क्षमता को बढ़ाने के लिए, एलवीएम3 के भावी मिशनों को उन्नत सी32 चरण के साथ संचालित करने की योजना है, जिसमें सीई20 इंजन के लिए 22 टन का थ्रस्ट होगा। इस बात को ध्यान में रखते हुए, सीई20 इंजन का उड़ान स्वीकृति परीक्षण भी 22 टन थ्रस्ट स्तर पर आयोजित किया जाना आवश्यक है। इसमें कहा गया है, 'इसलिए, वर्तमान परीक्षण (10 मार्च को) ने नोजल सुरक्षा प्रणाली (एनपीएस) का इस्तेमाल करते हुए 22 टन थ्रस्ट स्तर पर 165 सेकंड की परीक्षण अवधि के साथ इंजन के समुद्र-स्तर परीक्षण को सफलतापूर्वक पूरा किया।'

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## **ISRO, AIIMS sign MoU for cooperation in space medicine and research**

*Source: The Hindu, Dt. 13 Mar 2026*

The Indian Space Research Organisation (ISRO) has signed a memorandum of understanding (MoU) with the All India Institute of Medical Sciences (AIIMS) for cooperation in space medicine and research. According to ISRO, the MoU aims to promote joint research aligned with ISRO's priority areas, with a shared objective of advancing human health, performance and safety during human space missions.

ISRO said that long duration human space missions such as Bharatiya Antariksh Station and crewed missions to Moon offer unique medical challenges due to the extreme space environment and microgravity. "This cooperation is targeted to conduct ground and space-based studies to develop multidisciplinary space medicine expertise, medical devices, procedure and protocols to maintain human health and performance under extreme space environments as well as advance healthcare for the nation," the space agency said.

It added that focused research and developments are planned in the fields of human physiology, behavioural health, immunology and gut microbiome, biomedical, neuroscience and neurophysiology, nutrition and metabolic health, musculoskeletal atrophy and aging in microgravity, infectious diseases control and countermeasures for improving human health and performance in space environment.

"Through this research collaboration, ISRO and AIIMS reaffirm their commitment to advancing space medicine, fostering interdisciplinary research and building long-term institutional cooperation to support India's human space flight programme initiatives and it will also spur new innovations and creates new opportunities for the scientific community in the country," the space agency said.

### **Sea level test of cryogenic engine**

ISRO successfully conducted a sea level hot test of its cryogenic engine (CE20) at 22 tonne thrust using nozzle protection system and multi-element igniter on March 10 at ISRO Propulsion Complex, Mahendragiri in Odisha. Earlier, the sea level tests utilizing nozzle protection systems were being carried out at 19 tonne thrust level. The CE20 cryogenic engine powers the upper cryogenic stage of the LVM3 launch vehicle.

<https://www.thehindu.com/sci-tech/science/isro-aiims-sign-mou-for-cooperation-in-space-medicine-and-research/article70735067.ece>

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## **TDB-DST supports Orbitaid Aerospace Pvt. Ltd. for development of indigenous on-orbit satellite docking and refueling technology**

*Source: Press Information Bureau, Dt. 12 Mar 2026*

In a significant step towards strengthening India's emerging private space ecosystem, the Technology Development Board (TDB), Department of Science & Technology (DST), Government of India, has extended financial assistance to OrbitAID Aerospace Private Limited for the project

titled “Development of Docking and Refueling Systems for In-Space Life Extension of Satellites.” The initiative aligns with the Government of India’s vision of enabling greater participation of private industry in the space sector and fostering indigenous capabilities in advanced space technologies.

OrbitAID Aerospace Private Limited is developing advanced on-orbit satellite servicing capabilities, including technologies for refueling operational satellites in space. Such capabilities are increasingly important as the number of satellites in orbit grows rapidly, creating both opportunities and challenges related to space congestion, satellite lifecycle management, and sustainable space operations.

A key innovation under the project is the Standard Interface Docking and Refueling Port (SIDRP)—a Technology Readiness Level (TRL-7) system designed to enable autonomous docking and propellant transfer between satellites in orbit. The system integrates a satellite fill-and-drain valve with a dual docking interface and is engineered to operate reliably in both ground and microgravity environments.

SIDRP incorporates advanced engineering features including autonomous docking capability, dual docking mechanisms, and multiple built-in redundancies to ensure safe and reliable propellant transfer. The system allows a servicing satellite module to approach and dock with a client satellite, enabling in-orbit refueling that can significantly extend the operational life of satellites at a fraction of the cost required for launching replacement spacecraft.

During operations, the OrbitAID Service Module approaches the target satellite using advanced guidance, navigation, and control systems supported by LiDAR, optical, and infrared sensors. Once in proximity, the docking interface enables soft capture followed by secure latching and safe propellant transfer to replenish the satellite’s fuel reserves.

With financial support from TDB, the project will focus on further development, testing, and demonstration of the SIDRP system in space, paving the way for the establishment of an indigenous on-orbit servicing ecosystem in India. The initiative is expected to open new opportunities for satellite life-extension services, enhance operational efficiency for satellite operators, and contribute to sustainable space infrastructure.

Speaking on the occasion, Sh. Rajesh Kumar Pathak, Secretary, TDB, stated that “India’s space sector has entered a transformative phase under the leadership of Hon’ble Prime Minister, with reforms encouraging private enterprise and innovation. He noted that technologies such as on-orbit servicing and satellite life-extension systems represent the next frontier of commercial space activities, and reaffirmed TDB’s commitment to supporting Indian startups developing advanced space technologies that strengthen India’s global competitiveness and technological self-reliance.”

Promoters of OrbitAID Aerospace Private Limited expressed appreciation for the support extended by TDB and noted that the assistance will help accelerate the development, testing, and in-space demonstration of the docking and refueling system, positioning the company to contribute to India’s rapidly expanding space innovation ecosystem.

<https://www.pib.gov.in/PressReleasePage.aspx?PRID=2239031&reg=3&lang=1>

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# Solving mystery of heat transport in magnetic semiconductors unveils possibilities in high-performance electronics

Source: Press Information Bureau, Dt. 12 Mar 2026

Scientists have decoded how heat flows in magnetic semiconductors, materials that are critical to emerging technologies such as spintronics, magnetic memory, and quantum devices. The discovery resolves a decade-old puzzle in condensed matter physics and opens up new possibilities for advanced thermal management in high-performance electronic and magnetic systems.

In conventional semiconductors, thermal conductivity decreases as temperature increases, primarily due to enhanced scattering of heat-carrying lattice vibrations, known as phonons. However, several magnetic semiconductors defy this rule by exhibiting an unusual increase in thermal conductivity above their magnetic transition temperature. Chromium nitride (CrN), a magnetic semiconductor used in coatings and electronic applications, is one such material. Until now, the microscopic origin of this anomalous thermal behaviour had remained unclear.

A research team led by Prof. Bivas Saha at the Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bengaluru, an autonomous institution of the Department of Science and Technology (DST) has now provided direct experimental evidence identifying the underlying mechanism responsible for this phenomenon. The study demonstrates that strong coupling between phonons and magnetic spin fluctuations plays an important role in governing heat transport in magnetic semiconductors.

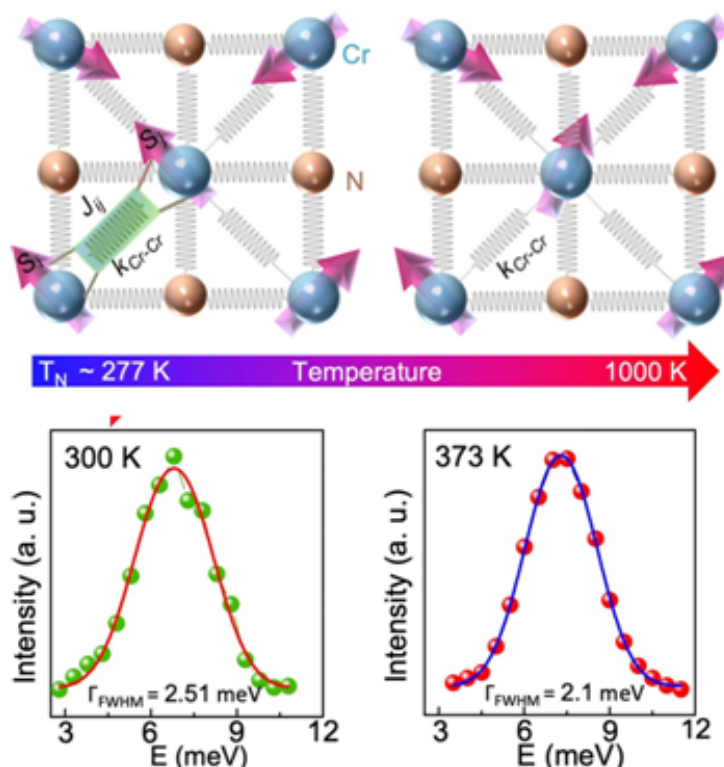


Fig: (Upper Panel) Evolution of dynamic spin-phonon coupling with temperature and its influence on acoustic phonon lifetime. (A) Schematic of coupled spin and phonon fluctuations near  $T_N$  in paramagnetic CrN. At higher temperatures ( $T \gg T_N$ ), spin fluctuations and spin-phonon coupling strength diminish. (Lower Panel) Temperature-dependent inelastic X-ray scattering spectrum at  $q$

= (0 0 0.18) of CrN highlighting the transverse acoustic (TA) phonon mode. Voigt function-fitted TA phonon mode of CrN at 300K and 373K are presented.

The researchers employed state-of-the-art temperature-dependent inelastic X-ray scattering techniques to directly measure phonon lifetimes in high-quality epitaxial CrN thin films across the magnetic phase transition. These measurements allowed the team to track how lattice vibrations interact with magnetic excitations as the material evolves from an ordered magnetic state to a disordered one.

The experiments revealed that acoustic phonons, which are the primary carriers of heat, experience strong damping near the Néel temperature due to intense interactions with magnetic spin fluctuations. Surprisingly, as the temperature increases further and long-range magnetic order weakens, phonon lifetimes increase anomalously. This leads to enhanced thermal conductivity at raised temperatures, contrary to conventional expectations. In contrast, optical phonons were found to follow standard temperature-dependent behaviour, clearly isolating the role of spin fluctuations in controlling heat transport.

These experimental observations are strongly supported by advanced atomistic spin-dynamics simulations and first-principles calculations, which together establish a clear microscopic mechanism linking magnetic fluctuations to anomalous heat conduction. The combined experimental and theoretical approach provides a comprehensive framework for understanding thermal transport in magnetically ordered materials.

“This work provides the first direct experimental evidence connecting spin fluctuations with enhanced thermal conductivity in magnetic semiconductors,” said Prof. Bivas Saha, who led the study. “By understanding how spin–lattice interactions influence heat flow, we can explore new strategies for thermal management in magnetic, spintronic, and quantum devices, where heat dissipation is a critical challenge.”

The findings have broad technological implications. Efficient heat management is essential for the reliable operation of high-power spintronic devices, magnetic memory elements, and future quantum technologies. The ability to tune thermal transport through magnetic degrees of freedom offers a fundamentally new approach to designing materials with controllable heat flow, potentially enabling devices that are both faster and more energy efficient.

The research was conducted through a collaborative effort involving JNCASR, IISER Thiruvananthapuram, Linköping University (Sweden), and major international synchrotron facilities, including SPring-8 (Japan) and DESY (Germany). The study was recently published in the journal *Science Advances*, underscoring India’s growing leadership in cutting-edge materials research.

Publication link: [10.1126/sciadv.adw7332](https://doi.org/10.1126/sciadv.adw7332)

<https://www.pib.gov.in/PressReleasePage.aspx?PRID=2238734&reg=3&lang=1>

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The Tribune  
The Statesman  
पंजाब केसरी जनसत्ता  
The Hindu  
The Economic Times  
Press Information Bureau  
The Indian Express  
The Times of India  
Hindustan Times  
नवभारत टाइम्स  
दैनिक जागरण  
The Asian Age  
The Pioneer