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# समाचार पत्रों से चयित अंश Newspapers Clippings

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

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**THE TIMES OF INDIA***Wed, 02 Feb 2022***G A Srinivasa Murthy appointed director of Defence Research and Development Laboratory***By Ch Sushil Rao*

Hyderabad: G A Srinivasa Murthy has been appointed director of Defence Research and Development Laboratory (DRDL) of the Defence Research and Development Organisation (DRDO) in Hyderabad.

Consequent to superannuation of Dr Dashrath Ram, G A Srinivasa Murthy, a scientist and programme director of Advanced Naval Systems Programme was appointed as director of DRDL, a premier laboratory of Dr APJ Abdul Kalam Missile Complex.

Srinivasa Murthy completed his BE in Electronics and Communication Engineering from Andhra University in 1986 and pursued his ME in Digital Systems from Osmania University in Hyderabad.

He joined DRDL in 1987 and made significant contributions in the area of structural dynamics, ground resonance testing, electrical integration and checkout for various projects of the missile complex.

His leadership provided necessary thrust to the design, development and production of advanced missile systems and technologies.

He is renowned for his contributions towards the Advanced Naval Systems Programme (ANSP).  
<https://timesofindia.indiatimes.com/city/hyderabad/g-a-srinivasa-murthy-appointed-director-of-defence-research-and-development-laboratory/articleshow/89274739.cms>



**G A Srinivasa Murthy joined the DRDL in 1987.**

*Tue, 01 Feb 2022***BrahMos, Russian Machine Company to sign deal for missile supplies to Philippines**

*Russian Military-Industrial Corporation NPO Mashinostroyenia and Russian-Indian joint venture BrahMos Aerospace are preparing to sign a deal for delivery of anti-ship missile systems to the Philippines, BrahMos co-director Alexander Maksichev told Sputnik on Tuesday*

*By Sumaira FH*

Moscow (UrduPoint News / Sputnik - 01st February, 2022) Russian Military-Industrial Corporation NPO Mashinostroyenia and Russian-Indian joint venture BrahMos Aerospace are

preparing to sign a deal for delivery of anti-ship missile systems to the Philippines, BrahMos co-director Alexander Maksichev told Sputnik on Tuesday.

Last Friday, the Philippine defense ministry and BrahMos concluded a \$375 million contract for supply of ground-based anti-ship missile systems. The contract will also include training for operating personnel and a logistics support package.



"In the near future, taking into account the pandemic, NPO Mashinostroyenia will sign a contract with Russian-Indian joint venture Brahmos for the execution of the first export contract for the supply of missiles to the Philippines," Maksichev said.

The contract between the companies will cover both the manufacturing and adapting the rockets to the requirements of the Philippine side, according to the official.

"All the operations will be carried out under the current Missile Technology Control Regime, which is aimed at limiting proliferation of missiles and missile technologies," Maksichev said.

BrahMos Aerospace was established in 1998 and was named after the rivers of Brahmaputra and Moscow. It specializes in supersonic cruise missiles capable of being launched from submarines, ships, planes, or land-based platforms. NPO Mashinostroyenia represents the Russian side of the joint venture.

<https://www.urdupoint.com/en/world/brahmos-russian-machine-company-to-sign-deal-1460176.html>



Tue, 01 Feb 2022

## Philippines buys India's Ship-Sinking Missiles amidst disputes with China

*By Sebastien Roblin*

Last Friday, Philippine defense minister Delfin Lorenzana signed a nearly \$375 million deal to purchase sophisticated anti-ship missiles from India. The arms sale will significantly improve the Pacific nation's heretofore limited naval warfare capabilities at a time that Beijing is building up its military presence on islands in the South China Sea claimed by (and much closer to) Manila.

The Philippine Navy is set to begin receiving the first of three batteries by the end of 2022. Each battery will consist of three mobile launcher units mounting three missiles each. The batteries will also include vehicles for radar surveillance to acquire maritime targets, support (likely including missile reloads), and command-and-control. The deal also includes training for the battery's operators and maintainers, and an Integrated Logistics Support package.

The Brahmos will constitute the fighting strength of the new Coastal Defense Regiment of the Philippine Marine Corps. This unit, which also is meant to incorporate anti-aircraft missiles, was activated in August 2020, and is expected to be fully operational by 2026. It's intended to protect sea lines of communication between the main islands and those subject to territorial disputes with China, establishing an anti-access/area-denial strategy presumably mirroring China's use of missile batteries deployed to both natural and artificial islands to constrain the mobility of adversary forces. Brahmos missiles also could provide a land-attack capability using GPS guidance.

With a maximum range of 180 miles, BrahMos batteries on the major Philippine island of Luzon have just enough range to threaten ships close to the disputed Scarborough Shoal around 150 miles west of the major Philippine island of Luzon. The Coastal Defense Regiment could also forward deploy missiles on small islands, though that would place them at greater risk.

The Philippine Army *also* plans to acquire ground-based Brahmos missiles for its Ground-Based Anti-Ship Missile requirement. According to the Horizon 3 plan, it seeks to acquire two batteries for service under the Army Artillery Regiment to reportedly “provide area denial as the operational situation requires.”

BrahMos was jointly developed by India and Russia in the early 2000s based on the latter’s P-800 *Oniks* anti-ship missile, but incorporating Indian components and with range reduced to 290 kilometers (180 miles) so as to comply with missile export regulations. India currently deploys Brahmos missiles on its warships, Army trucks, and IAF Su-30 jet fighters for attacks against both ships and land targets.

The large, 3.25-ton missile uses a rocket-booster at launch to accelerate to nearly three times the speed of sound (Mach 2.8) before switching to a ramjet engine, which is highly efficient at sustaining supersonic speeds but isn’t good at accelerating to them.

This allows the missile to supersonic cruise all the way to the target, giving air defenses little time to react, and a very difficult target to hit. That in turn means even warships protected by extensive air defense systems, as is the case for China’s modern destroyers and frigates, may not have a hard time defending against an attack, particularly if multiple missiles are fired to over-saturate defenses.

Though the Philippine Navy could hypothetically have sought ship-mounted Brahmos for greater operational mobility, land-based mobile batteries trucks are cheaper and arguably more survivable. That’s because trucks can be concealed by terrain while changing position after launch to avoid counter-battery fires.

While the Philippines has become the weapon’s first export client, it’s also thought likely Vietnam may acquire the missile for a similar purpose—to better deter the threat posed by China’s far more powerful naval forces and their growing predominance on disputed areas of the South China Sea.

While the U.S. has sought for years to provide the Philippines with defense assistance to buttress it against Chinese pressure—which could potentially include F-16 fighters in the near future—the deal with India highlights how other countries in the Asia-Pacific region concerned with China’s military activities are playing a key role in enhancing Manila’s capabilities.

Those include Japan, which recently sold surveillance radars to the Philippines, and South Korea, which has exported FA-50 Golden Eagle jet fighters and various patrol craft and artillery systems. Like New Delhi, these countries may see sales or donations of defense goods to Manila as reinforcing their broader security strategy in the Indo-Pacific region.

<https://www.forbes.com/sites/sebastienroblin/2022/01/31/manila-buys-indias-ship-sinking-missiles-amidst-disputes-with-china/?sh=3639fd164044>



**NEW DELHI, INDIA - JANUARY 18:** Brahmos WPN System participate in the rehearsals for Republic Day celebrations 2018, at Rajpath on January 18, 2018 in New Delhi, India. (Photo by Sonu Mehta/Hindustan Times via Getty Images)



Wed, 02 Feb 2022

## Div Com Kashmir visits DRDO, GB Panth Hospitals

As Covid-19 positivity rate of third wave continues to fluctuate, the Divisional Commissioner (Div Com) Kashmir, Pandurang K Pole today visited DRDO Hospital Khonmuh and GB Panth Hospital to review the present situation of Covid-19 Pandemic, admission of patients, occupancy of beds and emergency plan to cater to the oxygen supply.

The Div Com was accompanied by Director Health Services Kashmir, Dr Mushtaq Ahmad Rather; Epidemiologist Kashmir, Dr Talat Jabeen; Incharge Divisional Covid Control Room Kashmir, Tahir Ahmad Magray and other medical officers.



On the occasion, Div Com was informed that 413 covid patients were admitted to DRDO Covid dedicated Hospital in January, out of which 48 were admitted to ICU. It was further informed that 340 patients recovered during the same month.

Besides, Medical Superintendent DRDO Hospital informed that in the 510 bedded hospital, there are 125 ICU beds.

Regarding the status of Oxygen supply, he informed that there are 2 PSA plants with capacity of 1000 liters per minute each besides 56 Kilo Liter Liquid Medical Oxygen Tank.

He was apprised that one Oxygen plant needs servicing while another needs functional repair. Div Com on the Occasion directed nodal officer to resolve the issues on priority basis.

Div Com also directed to prepare exigency plan of adequate Oxygen supply to the hospital by identifying two more Oxygen plants which can be used during emergency to maintain constant supply of medical Oxygen.

Further, Div Com was apprised about the liability of bills of electric department which were generated since the functioning of Hospital.

Regarding staff strength and compliance of the roster by the staff, it was informed that there are 57 Doctors besides medical officers and paramedic staff who are delivering their services with dedication.

At GB Panth, Div Com inspected the isolation ward for neonatal children and other children. He was informed that the hospital conducted 700 screening out of which 35 were referred to DRDO and Bemina while two casualties were also reported.

Later, Div Com directed administrators of GB Panth hospital to create parking space for vehicles in the vicinity to facilitate patients and attendants.

<http://brighterkashmir.com/div-com-kashmir-visits-drdo-gb-panth-hospitals>



Press Information Bureau  
Government of India

Ministry of Defence

Tue, 01 Feb 2022 5:46PM

## Union Budget 2022-23

### Further impetus to Armed Forces modernisation & defence security Infrastructure development

*Total allocation under Capital Outlay of Defence Services enhanced to 1.52 lakh crore*

*68% of capital procurement budget to be earmarked for domestic industry to promote self-reliance & reduce import dependency*

*25% per cent of defence R&D budget earmarked for private industry & startups*

*Raksha Mantri Shri Rajnath Singh terms the Budget as growth oriented*

*Says, it would give fillip to 'Make in India', boost demand & build capacities for a New India*

The Union Budget for Financial Year 2022-23, presented by the Finance Minister on February 01, 2022, has given further impetus to modernisation of Defence Services and Defence Security Infrastructure development, including the Border Road Infrastructure and Coastal Security Infrastructure.

The Union Budget 2022-23 envisages a total outlay of Rs 39.45 lakh crore. Out of this, Ministry of Defence has been allocated a total budget of Rs 5.25 lakh crore, which is 13.31% of the total budget. This includes an amount of Rs 1.19 lakh crore for Defence Pensions. The total Defence Budget represents an enhancement of Rs 46,970 crore (9.82%) over Budget Estimates 2021-22.

Through enhanced budgetary support over the years, the Government has placed modernisation and infrastructure development of the Armed Forces at the centre stage of the National Security and Defence Planning process. The total allocation under Capital Outlay of the Defence Services has been increased from Rs 86,740 crore in 2013-14 to 1.52 lakh crore in 2022-23. There is an enhancement of 76% over a period of nine years. Further, during this period, the total Defence Budget including Defence Pensions has increased by 107.29%, from Rs 2.53 lakh crore in 2013-14 to Rs 5.25 lakh crore in 2022-23.

**Sustained thrust on Modernisation & Infrastructure Development:** In the Union Budget 2022-23, the Capital Allocations pertaining to modernisation and infrastructure development of Armed Forces has been significantly increased to Rs 1.52 lakh crore. This represents an increase of Rs 17,308 crore (12.82%) over FY 2021-22. Further, cumulative increase in the Capital Budget since 2019-20 has been Rs 48,975 crore (47.37%).

The increase in the overall Capital Budget reflects the Government's resolve towards sustainable enhancement in the modernisation and infrastructure development and also towards achieving the objectives of 'Aatmanirbhar Bharat'.

In order to give push to indigenous Domestic Enterprises under the 'Aatmanirbhar Bharat', the share of domestic capital procurement, which was earmarked at 64% in 2021-22, has been enhanced to 68% of the Capital Acquisition Budget of the Defence Services (Rs 1.24 lakh crore) for the FY 2022-23, which would be Rs 84,598 crore.

The Capital segment of the MoD (Civil) budget catering to organisations such as Indian Coast Guard (ICG), Border Roads Organisation (BRO) and Directorate General Defence Estates (DGDE) etc has also seen a notable jump of 55.60%. In absolute terms, this amount is Rs 8,050 crore in FY 2022-23 against Rs 5,173 crore in FY 2021-22.

The Capital Budget of Border Roads Organisation (BRO) has been increased by 40% to Rs 3,500 crore in FY 2022-23 vis-à-vis Rs 2,500 crore in FY 2021-22. This will expedite the progress of creation of border infrastructure including important tunnels (Sela and Naechiphu tunnel) and bridges on major river gaps.

Underlining the importance of overall maritime security, the Capital Budget of the Indian Navy has been enhanced by 44.53%, with a total allocation of Rs 46,323 crore in FY 2022-23. This increase is aimed at acquisition of new platforms, creation of Op and Strategic Infrastructure, bridging of critical capability gaps and building a credible maritime force for the future.

Additionally, to boost the Coastal Security, the Capital budget of Indian Coast Guard has been enhanced by 60.24% to Rs 4,246 crore in FY 2022-23 vis-à-vis Rs 2,650 crore in FY 2021-22. This enhancement is aimed at building up of assets such as acquisition of ships & aircraft, augmentation of infrastructure, establishment of coastal security network and building up technical & administrative support structures.

Rs 173.03 crore and Rs 131.08 crore have been provisioned under DGDEs Capital Budget for BE 2022-23 and RE 2021-22, respectively, mainly for construction of boundary posts/pillars and perimeter fencing of Defence Land. This is directed towards preventing encroachment on Defence Land.

Towards hand holding of the newly created seven Defence Public Sector Undertakings (DPSUs), Rs 1,665 crore in RE 2021-22 and Rs 1,310 crore in BE 2022-23 has been earmarked for their planned modernisation. Additionally, Rs 2,500 crore in BE 2022-23 and also in RE 2021-22 has been set aside as Emergency Authorization Fund

Further, for enabling the Defence Industrial eco-system in the country, iDEX and DTIS has been allocated Rs 60 crore and Rs 23 crore respectively in the FY 2022-23. Under the iDEX (Innovations for Defence Excellence) Scheme, MoD aims to create an environment which fosters innovation and encourages technology development in Defence by engaging R&D institutes, academia, industries, start-ups and even individual innovators. Defence Testing Infrastructure Scheme (DTIS) envisages the creation of state-of-the-art testing infrastructure in partnership with the private industry thereby boosting domestic defence and aerospace manufacturing.

#### **Budget Announcement 2022-23: Aatmanirbharta in Defence**

- Government is committed to reducing imports and promoting AtmaNirbharta in equipment for the Armed Forces. 68 per cent of the capital procurement budget will be earmarked for domestic industry in 2022-23, up from 58 per cent in 2021-22.
- Defence R&D will be opened up for industry, startups and academia with 25 per cent of defence R&D budget earmarked. Private industry will be encouraged to take up design and development of military platforms and equipment in collaboration with DRDO and other organizations through SPV model.
- An independent nodal umbrella body will be set up for meeting wide ranging testing and certification requirements.

In a series of tweets, Raksha Mantri Shri Rajnath Singh congratulated the Finance Minister on presenting an excellent Union Budget 2022-23. He said, the Budget would give fillip to 'Make in India', boost demand and build capacities for a stronger, prosperous and confident India.



The Raksha Mantri added that the Budget outlines the Government's focus on 'Aatmanirbharta' and Prime Minister Shri Narendra Modi's vision for development and pro-people reforms. He termed it as a growth oriented Budget, focussing on harnessing the energies of New India.

Shri Rajnath Singh described the proposal to reserve 25 per cent of the R&D Budget for startups and private entities as an excellent move.

The Raksha Mantri appreciated the fact that this year's Budget has increased the total outlay for effective capital expenditure by a massive 35.4 per cent to more than 10.6 lakh crores with the bulk of the money going into the development of social and physical infrastructure in the country.

On the allocation of 68 per cent of defence capital procurement budget towards domestic procurement, Shri Rajnath Singh said, it is in line with the 'Vocal for Local' push and will certainly boost the domestic defence industries.

The Raksha Mantri exuded confidence that digitalisation of land reforms will transform India's rural economy and will go a long way in creating new opportunities for the farmers and the agriculture sector.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1794415>

## Business Standard

Wed, 02 Feb 2022

### Defence allocation sees moderate rise, IAF gets largest capital boost

*In the Budget FY23, the government has allocated Rs 5.25 trillion.*

*By Ajai Shukla*

New Delhi: Notwithstanding a still sluggish economy, and sustained military pressure on the Army from multiple intrusions by Chinese troops on the border in Ladakh, the government has raised defence allocations for financial year 2022-23 (FY23) by less than 5 per cent, compared to the Revised Estimates for FY22 and by almost 10 per cent over BE 2021-22.

The government had allocated Rs 4.78 trillion for BE 2021-22. In the Revised Estimates for 2021-22, that was raised to Rs 5.02 trillion. In the Budget FY23, the government has allocated Rs 5.25 trillion.

While the 1.3-million-strong Army has been given the bulk of the revenue and pension budgets, the Indian Air Force (IAF) has been allocated the biggest share of the capital allocation: Rs 55,587 crore, or about 10 per cent more than what the IAF got last year.

The IAF faces a continuing burden of payments for 36 Rafale fighters it bought in 2016, modernisation of the Mirage 2000 and Jaguar fighter fleets, and the manufacture of Sukhoi-30MKIs and Tejas fighters by Hindustan Aeronautics Ltd (HAL). There is also a large expenditure looming on a tender for 114 multi-role fighters, for which the IAF has initiated a global procurement.

To the Army's credit, it has deployed a large number of troops and equipment to the Ladakh frontier without seriously overshooting its revenue budget, from which payments for such a deployment is made.

Meanwhile, the Navy has been given a capital budget of Rs 47,591 crore, about the same as the preceding year's allocation. The Army has once again been allocated the smallest share: Rs 32,015 crore.



**In the Budget FY23, the government has allocated Rs 5.25 trillion.**

Indicating the intent to keep money flowing to indigenous research & development (R&D) projects, the Defence Research & Development Organisation (DRDO) was allocated a healthy capital budget of Rs 11,982 crore.

After years of lip service to funding prototype development under the Technology Development programme, the government this year allocated a relatively healthy Rs 1,365 crore for prototype development under the “Make” category of acquisitions.

In what would have come as a relief, the Ministry of Defence (MoD) has managed to stabilise pensions. The pension allocations were kept at Rs 1.19 trillion, up by Rs 2,818 crore.

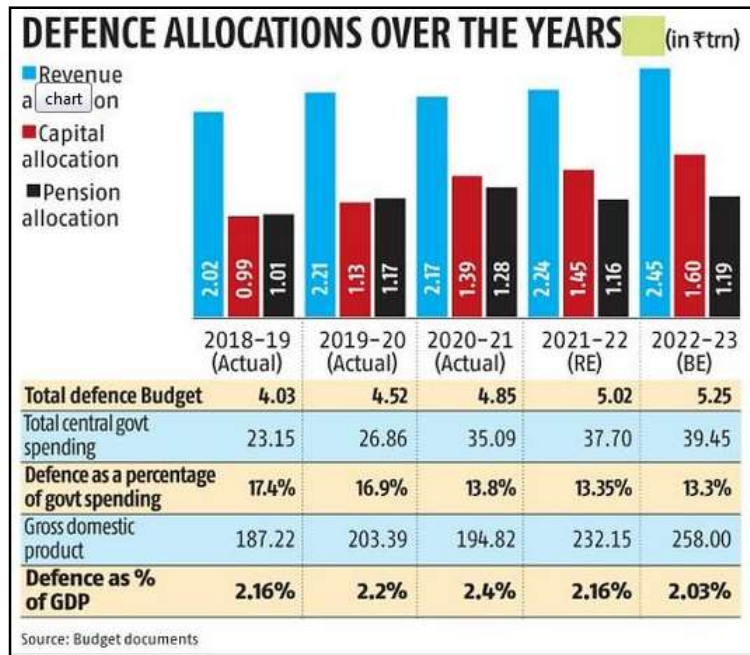
With an emphasis on infrastructure building by the military, the capital segment of the MoD (Civil) budget, which caters to organisations such as the Indian Coast Guard, Border Roads

Organisation (BRO) and Directorate General Defence Estates, has seen a notable jump of 55.6 per cent. In absolute terms, the capital allocations under these heads is Rs 8,050 crore in FY23 — up more than 50 per cent against the allocations of Rs 5,173 crore in FY22.

With the aim of strengthening border infrastructure, the BRO’s capital budget has been increased by 40 per cent, from Rs 2,500 crore in the current year to Rs 3,500 crore.

“This will expedite the progress of creation of border infrastructure including important tunnels (Sela and Naechiphu tunnel) and bridges on major river gaps,” stated the MoD in a statement on Tuesday.

[https://www.business-standard.com/article/economy-policy/defence-allocation-sees-moderate-rise-iaf-gets-largest-capital-boost-122020200018\\_1.html](https://www.business-standard.com/article/economy-policy/defence-allocation-sees-moderate-rise-iaf-gets-largest-capital-boost-122020200018_1.html)



**Press Information Bureau**  
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**Ministry of Defence**

*Tue, 01 Feb 2022 12:48PM*

## **Lt Gen Manoj Pande takes over as Vice Chief of the Army Staff**

Lt Gen Manoj Pande, PVSM, AVSM, VSM took over as the Vice Chief of the Army Staff on 01 February 2022.

An alumnus of National Defence Academy, Lt Gen Manoj Pande was commissioned in December 1982 to the Corps of Engineers (The Bombay Sappers). The General Officer commanded an Engineer Regiment during Operation Parakram in the sensitive Pallanwala Sector along the Line of Control of Jammu and Kashmir. He is a graduate of Staff College, Camberley (United Kingdom) and attended the Higher Command (HC) and National Defence College (NDC) Courses.

In his 39 years of distinguished military career, he has tenanted important and challenging command and staff appointments in different operational environments which



include command of an Engineer Brigade of Strike Corps in the Western Theatre, Infantry Brigade along Line of Control in Jammu and Kashmir, Mountain Division in the High Altitude Area of Western Ladakh, a Corps in the North East, Commander-in-Chief Andaman & Nicobar Command (CINCAN) and General Officer Commanding-in-Chief of Eastern Command.

His staff exposures include Brigade Major of a Mountain Brigade in the North East, Assistant Military Secretary (AMS) in Military Secretary's Branch, Colonel Q of a Mountain Division in High Altitude Area and Brigade General Staff (Operations) at Headquarters Eastern Command. The General Officer also served as Chief Engineer in the United Nations Mission in Ethiopia and Eritrea. He tenanted the appointments of Additional Director General (ADGMO-B) in the Military Operations Directorate at Army Headquarters, Chief of Staff at Headquarters Southern Command and Director General Discipline Ceremonial & Welfare at the Army Headquarters.

For his illustrious service he has been conferred with the award of Param Vishisht Seva Medal, Ati Vishisht Seva Medal, Vishisht Seva Medal, the Chief of Army Staff Commendation and GOC-in-C Commendation twice. Lt Gen Manoj Pande takes over the appointment of the Vice Chief of the Army Staff from Lt Gen CP Mohanty who superannuated on 31 January 2022 after completing four decades of illustrious career in the Army.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1794122>



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*Tue, 01 Feb 2022 5:48PM*

## **India & Oman review progress in military-to-military engagements during 11th Joint Military Cooperation Committee meeting in New Delhi**

*Secretary General of Ministry of Defence, Oman calls on Raksha Mantri Shri Rajnath Singh*

Secretary General at the Ministry of Defence, Oman Dr Mohammed Bin Nasser Bin Ali Al-Zaabi called on Raksha Mantri Shri Rajnath Singh in New Delhi on February 01, 2022. They discussed ways to enhance defence cooperation between the two countries. The Secretary General at the Ministry of Defence, Oman also briefed Shri Rajnath Singh about the 11<sup>th</sup> India-Oman Joint Military Cooperation Committee Meeting (JMCC) on bilateral defence cooperation which was held in New Delhi on January 31, 2022.

The JMCC meeting was co-chaired by Defence Secretary Dr Ajay Kumar and Secretary General at the Ministry of Defence, Oman. During the meeting, the two sides reviewed the progress made in military-to-military engagements, including joint exercises, industry cooperation and various ongoing infrastructure projects. It was decided to identify new avenues and examine areas of mutual interest for Joint Venture in order to enhance defence industry cooperation. Conduct of Humanitarian Assistance and Disaster Relief (HADR) exercise involving the three services and enhancing the scope and complexities of the existing joint exercises were also discussed. Both the countries agreed to work together to combat the issue of drug trafficking prevalent in the North Arabian Sea.

It was agreed to hold the next JMCC in Oman on mutually convenient dates. The JMCC is the apex body between the Defence Ministries of India and Oman to comprehensively review & guide all aspects of bilateral defence cooperation.

The Secretary General also called on the three Service Chiefs and met with the CEOs of Indian Defence Industries. He will be visiting Cochin Shipyard Limited, Military Training Establishments and the Indigenous Aircraft Carrier Vikrant, during his stay.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1794410>

## France hands over 3 Rafale fighter jets with India-specific enhancements to IAF

*In light of the Indian acquisition of Rafale, the Pakistani air force has decided to go for 25 Chinese made J-10 multi-role fighters as a counter and PLA Air Force has deployed the J-20, so called fifth generation fighter, at Hotan, Lhasa, Kashgar and Nyingchi air bases in Tibet and Sinkiang.*

New Delhi: The Indian Air Force (IAF) on Tuesday received three of the last four Rafale fighter jets, as reported by Hindustan Times earlier. The fighter planes were handed over by France at Istres-Le Tube air base of Rafale manufacturer Dassault Aviation, and is situated north-west of Marseille.

After this, the IAF will wait for the right opportunity to take the fighter jets to India between February 15 and 20. According to people aware of the developments, the handed over planes will now be test-checked for all the details. The fighter jets are expected to arrive in India between February 15 and 16, the people cited above said.

When they fly out of France, these fighter jets will receive mid-air refueling by the air force of India's close ally, the United Arab Emirates, using Airbus multi-role transport tankers.

These Rafale fighter jets are fully equipped with India specific enhancements, which will give them extra teeth to fight any regional adversary.

The last fighter jet is nearly ready with fresh paint and enhancements, but will arrive in April due to the reasons best known to IAF.

The last of the 36 contracted fighters from France is actually the first fighter used for training IAF personnel after the deliveries started from France. This fighter was inspected by Defence Secretary Ajay Kumar at the Istres air base during his visit to France for a high level defence dialogue in December 2021.

Although IAF remains tight-lipped over what India specific enhancements are on Rafale, it is learnt that these relate to long range Meteor air-to-air missile, low band frequency jammers, advanced communication systems, more capable radio altimeter, radar warning receiver, high altitude engine start up, synthetic aperture radar, ground moving target indicator and tracking, missile approach warning systems and very high frequency range decoys.

On the arrival of the fighter jets, the IAF will test the specific enhancements to their satisfaction under Indian conditions apart from verifying the original equipment manufacturers claims as per agreement. After this, work will begin in retrofitting the remaining 32 aircraft at Ambala in western sector and Hashimara air base in eastern sector with the India specific enhancements with all the related equipment already with the IAF. The upgradation exercise will be carried out at Ambala air base which has the maintenance cum repair set up for Rafale fighters in India.

<https://www.hindustantimes.com/india-news/france-hands-over-3-rafale-fighter-jets-with-india-specific-enhancements-to-iaf-101643711222359.html>



IAF's Rafale jet fighter doing the vertical Charlie maneuver on 2021 Republic Day.

## Government makes experimental scheme to induct women fighter pilots permanent

*He tweeted, “The MoD has decided to convert the Experimental Scheme for Induction of Women Fighter Pilots in the Indian Air Force into a permanent scheme. It is a testimony to the capability of India’s ‘Nari Shakti’ and our PM Shri @narendramodi ’s commitment towards women empowerment.”*

New Delhi: Over six years after the Indian Air Force (IAF) had started accepting women pilots on an experimental basis, the Ministry of Defence (MoD) has decided to convert it into a permanent scheme, Defence Minister Rajnath Singh announced on Tuesday, calling it a testimony to the government’s commitment towards women empowerment.

He tweeted, “The MoD has decided to convert the Experimental Scheme for Induction of Women Fighter Pilots in the Indian Air Force into a permanent scheme. It is a testimony to the capability of India’s ‘Nari Shakti’ and our PM Shri @narendramodi ’s commitment towards women empowerment.”

Till date, 16 women fighter pilots have been commissioned in the IAF. The MoD has now given clearance to make it a permanent scheme.

The Defence Ministry had approved allowing women to join the Air Force as fighter pilots in 2015, but the scheme for “Induction of Women SSC officers in Fighter Stream of Flying Branch” began in 2016.

Women fighter pilots came into the spotlight just last week, when Flight Lieutenant Shivangi Singh, India’s first female pilot for the Rafale fighter aircraft, was seen standing on the Air Force’s tableau in the Republic Day parade. She was the second-ever woman fighter pilot to be part of the Republic Day parade, the first being Flight Lieutenant Bhawna Kanth, who was a part of Air Force’s tableau in 2021.

Last year has given a major boost to women joining the armed forces, as, after intervention from the Supreme Court, women have been allowed to join the National Defence Academy, that feeds officers into the three forces. Nearly a third of the candidates who appeared for the NDA’s entrance test in November were women.

The Supreme Court had also intervened in 2020 to push the Army to allow Permanent Commission to women in all non-combat streams.

A year ago, then Minister of State for Defence Shripad Naik had told the Rajya Sabha on February 8, 2021, that for 12,18,036 men in the Army, it only has 6,807 women. Similarly, in the Air Force, the men to women ratio was 1,46,727 to 1,607. In the Navy there were only 704 women, for 10,108 men.

<https://indianexpress.com/article/india/government-scheme-women-fighter-pilots-permanent-7751997/>



India's first woman Rafale fighter jet pilot Flight Lieutenant Shivangi Singh during the Republic Day parade. (Twitter/@PIB\_India)

## एक्सपेरिमेंट खत्म, अब वायुसेना में परमानेंट होंगी महिला फाइटर पायलट...रक्षा मंत्रालय का फैसला

रक्षा मंत्रालय ने इंडियन एयर फोर्स (IAF) में महिला लड़ाकू पायलटों को शामिल करने की प्रायोगिक योजना शुरू की थी। अब इसे स्थायी योजना में बदलने का फैसला किया गया है। रक्षा मंत्री राजनाथ सिंह ने यह जानकारी दी।

*Edited by अमित शुक्ला*

रक्षा मंत्रालय ने भारतीय वायु सेना में महिला लड़ाकू पायलटों को शामिल करने की प्रायोगिक योजना को स्थायी योजना में बदलने का फैसला किया है। रक्षा मंत्री राजनाथ सिंह ने मंगलवार को कहा कि यह फैसला भारत की नारी शक्ति की क्षमता और महिला सशक्तिकरण के प्रति प्रधानमंत्री नरेंद्र मोदी की प्रतिबद्धता का प्रमाण है।

रक्षा मंत्री ने ट्विटर पर कहा, 'रक्षा मंत्रालय ने भारतीय वायु सेना में महिला लड़ाकू पायलटों को शामिल करने के लिए प्रायोगिक योजना को एक स्थायी योजना में बदलने का फैसला किया है।'

उन्होंने कहा, 'यह भारत की 'नारी शक्ति' की क्षमता और हमारे प्रधानमंत्री नरेंद्र मोदी की महिला सशक्तिकरण के प्रति प्रतिबद्धता का प्रमाण है।'



महिला फाइटर पायलट

सुप्रीम कोर्ट की ओर से तीनों सेनाओं में भर्ती के लिए प्रतिष्ठित राष्ट्रीय रक्षा अकादमी (एनडीए) में महिलाओं के प्रवेश का मार्ग प्रशस्त करने के कुछ महीने बाद यह फैसला आया है।

भारतीय वायु सेना की फ्लाइटिंग ऑफिसर अवनी चतुर्वेदी ने 2018 में अकेले लड़ाकू विमान उड़ाकर पहली भारतीय महिला बनने का गौरव हासिल किया था। उन्होंने अपनी पहली एकल उड़ान में मिग-21 बाइसन उड़ाया था।

नौसेना ने 2020 में डोर्नियर समुद्री विमान मिशन पर महिला पायलटों के अपने पहले समूह को तैनात करने की घोषणा की थी।

सेना ने 2019 में एक महत्वपूर्ण कदम उठाते हुए महिलाओं को सैन्य पुलिस में शामिल करने की प्रक्रिया शुरू की थी।

<https://navbharattimes.indiatimes.com/india/decision-to-make-permanent-the-plan-to-induct-women-fighter-pilots-into-the-air-force/articleshow/89280643.cms>

## Replacing Indian Army's archaic rifles, Israeli LMGs, Russian AK-203, American Sig Sauer to boost the military

As India faces the threat of a two-front war, the need to bolster the small arms firepower of the military has become imperative. India's infantry units, the first line of defense at the borders, continue to use archaic rifles.

The Indian Army had been looking to replace these guns with state-of-the-art assault rifles, for which several deals were inked in the last two years. One of the major defense partners to supply machine guns to India has been Israel.



IWI Negev- Wikipedia

Israel and India have made significant progress in developing their domestic military arms sector and India remains a major buyer of Israeli small arms. India and Israel Weapon Industries (IWI) secured a \$118 million contract in March 2020 for approximately 16,000 Negev NG-7 machine guns. Last year, a supply of 6,000 general-purpose machine guns was dispatched, stated National Interest.

IWI remains committed to supplying all NG-7s to the Indian Army within two years, implying that the remaining 10,000 will be in service by the middle of 2022. New Delhi has also expressed interest in acquiring more NG-7s, according to a report by Israel Defense.

The Indian Army's infantry units deployed along the Line of Actual Control (LAC) and the Line of Control (LOC) have reportedly been supplied with the NG-7 guns. While the LAC denotes the disputed border between India and China, the LoC is the de facto border between India and Pakistan in the Kashmir region.

Last year, Jamyang Tsering Namgyal, Member of Parliament from Ladakh, tweeted a photograph of the Indian Air Force's Garud commandos. "Armed with Negev Light Machine Guns, Tavor-21 & AK-47 assault rifles, Garud Special Forces operatives have been deployed in forward locations along the Line of Actual Control in Eastern Ladakh," he wrote on Twitter.

In March 2019, the Defence Ministry had approved the long-awaited request for a contemporary, state-of-the-art Light Machine Gun (LMG) for the armed forces. The MoD inked a capital acquisition contract with Israel Weapons Industries for 16,479 LMGs at a cost of Rs 880 crores, as previously reported by India Today.

### The Negev Light Machine Gun

The Negev is an Israeli light machine gun created by Israel Weapon Industries (previously known as Israel Military Industries) to replace the Galil LMG, which suffered from barrel overheat during sustained fire. It uses universal NATO ammunition.

The NG-7 is a modernized version of the Negev NG-5, a light machine gun with a 5.56x45mm NATO caliber. The NG-7 has a 20-inch barrel and uses the larger and more powerful 7.62x51mm NATO cartridge.

A short-stroke gas piston operating system and a rotary bolt locking mechanism are used in the gas-operated, select-fire machine gun. A 100 or 125-round assault drum magazine feeds the weapon.

The NG-7 fires at a standard rate of 600 to 750 rounds per minute (RPM), with a second setting for "severe situations" that raises the rate to 1,000 RPM. The effective range is around 1 km. A

Picatinny sight rail on top of the receiver and a fully adjustable folding stock are part of the machine gun's modernized body.

It's unknown if the IWI eLog weapon-embedded sensor module is included in the NG-7s provided to the Indian military. The module was incorporated to collect data on the weapon's use so that maintenance and repair could be done more efficiently, according to National Interest.

### **Russian & American Guns**

In December 2021, India and Russia struck a deal to manufacture AK-203 assault rifles in the country during Russian President Vladimir Putin's visit to New Delhi and the inaugural India-Russia 2+2 dialogue.

As part of the Rs 5,124-crore deal, an Indo-Russian joint venture will produce 500,000 AK-203 assault rifles in Uttar Pradesh, India. The 7.62 X 39mm caliber AK-203 rifle has a range of over 500 meters and a rate of fire of 600 RPM.

It is shorter in length and lighter in weight than the 5.56mm INSAS (Indian Small Arms System) rifles, which it will replace. These rifles, of which an initial 70,000 would be bought from Russia, are expected to be inducted into the Indian Armed Forces sometime in the second half of 2024.

While there is still some time before the Indian Army could finally be armed with the Russian assault rifles, the service decided to arm all of its infantry battalions with the American Sig Sauer last year when the AK-203 deal hadn't been signed, as previously reported by The Print.

This is indicative of the Indian Army's alacrity and commitment towards arming its infantry with the best modern small arms to bolster their firepower.

Sig 716s were to be issued to at least two companies (about 100 soldiers) in each infantry battalion, regardless of whether they were in the field or at peace posts, according to the plan.

In December 2019, the Indian Army received the first delivery of 72,000 SiG 716 G2 Patrol assault/battlefield rifles to bolster border patrolling along the Line of Control with Pakistan. It received the second shipment of 72,000 firearms in 2021.

Further, the Sig Sauers were modified to suit the Indian standards, as previously stated by The Federal. The Indian Army integrated existing sight systems on these rifles as it does not have an optical device, which restricted its use in the dark. Since the bullets used in these rifles were a little expensive, the Indian Army used the local made rounds of the 7.62 light machine gun (LMG) to ration the cost of operations.

The infantry soldiers welcomed the American rifles, which weighed only 3.82 kg without the magazine. The rifle has an effective kill range of 600 meters and is more accurate than the INSAS. The rifle becomes ambidextrous when cocking is done from behind rather than from the side, as is the case with most small guns.

To reduce ordnance difficulties, the Sig 716s and Negev NG-7s are likely to be utilized in the same regiments. Both purchases were wise investments in the modernization and defense of India's military, National Interest noted.

<https://eurasianimes.com/indian-armys-archaic-rifles-israeli-lmgs-russian-ak-203-us-sig-sauer/>



## India, EU discuss cooperation in joint naval activities in Indo-Pacific

*India currently has one of the largest facilities for maritime domain awareness in the form of the Gurugram-based Information Fusion Centre-Indian Ocean Region of the Indian Navy.*

*By Rezaul H Laskar*

New Delhi: India and the European Union (EU) on Tuesday discussed cooperation in the field of maritime domain awareness and joint naval activities as part of their efforts to ensure an open, inclusive and rules-based order in the Indo-Pacific region.

These issues figured in the second India-EU maritime security dialogue, which was held in a virtual format. The two sides said in a joint statement that the consultations focused on developments in the maritime security environment and policy developments covering the EU's strategy for cooperation in the Indo-Pacific.

Officials of the two sides also discussed India's Indo-Pacific Oceans' Initiative, maritime cooperation and regional initiatives to address international maritime security issues.

"India and the EU discussed cooperation, including in the field of maritime domain awareness, capacity-building and joint naval activities, following their successful joint naval exercise in the Gulf of Aden in June 2021," the statement said.

India currently has one of the largest facilities for maritime domain awareness in the form of the Gurugram-based Information Fusion Centre-Indian Ocean Region of the Indian Navy. Among the partner countries that have posted international liaison officers at the centre are Australia, France, Japan, the Maldives, Mauritius, Myanmar, Seychelles, Singapore, the UK and the US.

In addition to tracking merchant shipping, the centre helps maintain a close watch on the activities of Chinese naval and other vessels in regional waters.

The statement also said India and the EU are committed to a "free, open, inclusive and rules-based maritime order in the Indo-Pacific region" that is underpinned by respect for territorial integrity and sovereignty, democracy, rule of law, freedom of navigation and overflight, unimpeded lawful commerce, and peaceful resolution of disputes in accordance with international law, especially the United Nations Convention on Law of the Sea (UNCLOS).

This was an apparent reference to China's activities across the Indo-Pacific, especially the South China Sea, where Beijing is involved in maritime disputes with several Southeast Asian nations and has stepped up its military activities.

The meeting was co-chaired by Sandeep Arya, joint secretary for disarmament and international security affairs in the external affairs ministry, and Joanneke Balfoort, the director for security and defence policy at the European External Action Service.

In a separate development, Saurabh Kumar, secretary (East) in the external affairs ministry, told an online roundtable discussion organised by Gateway House and the US embassy that India has sought to strengthen security and freedom of navigation in the Indo-Pacific by becoming a net security provider.

"It has built relations with partner countries across the region. It has provided defence training courses and deputed mobile training teams. Indian Navy's Information Fusion Centre for the Indian Ocean region has enhanced maritime domain awareness among partner countries," he said.



The European Union (EU) and India conducted a joint naval exercise in the Gulf of Aden on June 18-19, 2021. (Photo courtesy: European External Action Service)

The Indian Ocean Naval Symposium, which gathers 35 navies, also contributes to deepening mutual understanding on maritime challenges, and the country's Security And Growth for All in the Region" policy or SAGAR focuses on securing regional supply chains, avoiding disproportionate dependence on a single country, and ensuring prosperity of all stakeholders.

<https://www.hindustantimes.com/india-news/india-eu-discuss-cooperation-in-joint-naval-activities-in-indopacific-101643741146288.html>

## THE WALL STREET JOURNAL

Wed, 02 Feb 2022

# What are hypersonic missiles and who's developing them?

*Missile tests by U.S. rivals raise pressure for defenses and America's own hypersonic missiles*

*By Alastair Gale*

Recent hypersonic missile tests by North Korea and China have highlighted the challenge of coming up with effective defenses against the advanced weapons, as well as the difficulties the U.S. has had in developing its own hypersonic-missile program. Here's a guide to hypersonic missiles.

### What are hypersonic missiles?

"Hypersonic" means more than five times the speed of sound, or just over a mile a second. But in common military terminology, not every missile traveling at hypersonic speed is called a hypersonic missile. The term is generally reserved for missiles that can be maneuvered before hitting their target and don't follow a simple, straight course.



A missile tested by North Korea on Jan. 11 was described by state media as a hypersonic ballistic missile. Photo: KCNA/Reuters

There are two main types of hypersonic missiles. The first is launched on a ballistic course. "Ballistic" refers to the curved arc of any projectile shot into the air, and in this case the arc tops out high above the earth. As it begins its descent, the tip carrying the warhead heads back to earth at hypersonic speed with the ability to change course throughout its flight.

This tip is called a glide vehicle because it doesn't have its own power source like a jet airplane's fuel tank—it moves, or glides, while being buffeted by forces such as aerodynamic lift and drag. A variant called a maneuverable re-entry vehicle typically makes just a single turn before reaching its target.

The second type of hypersonic missile is a cruise missile. It flies on a flatter course and is powered throughout its flight, so it isn't a glider.

### What are the advantages of hypersonic missiles compared with other missiles?

Because of their maneuverability, hypersonic ballistic missiles are harder to track and destroy. They often begin their descent at lower altitudes than other ballistic missiles, which may allow them to fly below the coverage area of land- or sea-based radar-detection systems.

As for cruise missiles, most common types currently travel at less than hypersonic speed. Making the missile fly faster has obvious advantages in catching an opponent by surprise, but also requires more advanced propulsion technology.

### Can hypersonic ballistic missiles be intercepted?

It is difficult with existing missile defenses because of the missiles' combination of speed and an unpredictable flight path. The U.S. issued contracts to three defense contractors in November 2021 to develop interceptor missiles against hypersonic missiles, but American officials have said it will likely take until the middle of this decade to develop a defensive capability.

## Which countries are developing hypersonic missiles?

China has conducted hundreds of hypersonic ballistic missile tests, according to the former vice chairman of the U.S. Joint Chiefs of Staff, Gen. John Hyten, including two in the summer of 2021 in which missiles circuted the globe. Russia is developing both ballistic and cruise hypersonic missiles. Several other countries, including the U.K. and India, are researching them.

**North Korea has been testing a lot of missiles. Are any of them hypersonic ballistic missiles?**

Quite possibly. Keep in mind that, under common military terminology, “hypersonic ballistic missile” refers to a missile with a maneuverable warhead traveling at hypersonic speed. After North Korea tested a ballistic missile on Jan. 11, Japanese officials said their tracking data showed the missile turned sharply before it landed in the sea. That suggested it was a hypersonic ballistic missile, which is how North Korea’s official media described it.

Other recent North Korean missile tests, including one on Jan. 30, didn’t involve maneuverable warheads.

## What about the U.S.?

The U.S. has several programs to develop hypersonic glide vehicles and hypersonic cruise missiles but suffered two failed tests of a hypersonic glide vehicle in 2021. U.S. defense officials say the development of hypersonic missiles is now a priority.

<https://www.wsj.com/articles/hypersonic-missiles-11643688227>



Wed, 02 Feb 2022

# नौसेना का 'Milan-2022' एक्सरसाइज इसी महीने, अमेरिका, ऑस्ट्रेलिया, रूस समेत 46 देशों को निमंत्रण

भारतीय नौसेना मित्र देशों की नौसेनाओं के साथ विशाखापट्टनम में 'मिलन-2022' (Milan-2022) एक्सरसाइज करेगा। इस एक्सरसाइज में इन देशों को इन्वाइट किया गया है।

By: नीरज राजपूत

समंदर में मित्र-देशों की नौसेनाओं (Navy) के साथ मेल-मिलाप बढ़ाने और संबंध मजबूत करने के इरादे से भारतीय नौसेना (Indian Navy) इस महीने विशाखापट्टनम (Visakhapatnam) में 'मिलन-2022' (Milan-2022) नाम की एक बड़ी एक्सरसाइज करने जा रही है। इस एक्सरसाइज में हिस्सा लेने के लिए भारत (India) ने अमेरिका (America), आस्ट्रेलिया (Australia), रूस (Russia), फ्रांस (France), इंग्लैंड (England), ब्राजील (Brazil) और फिलीपींस (Philippines) सहित कुल 46 देशों की नौसेनाओं को आमंत्रित किया है। खास बात ये है कि मिलन एक्सरसाइज के दौरान सिर्फ बंगाल की खाड़ी में ऑपरेशनल एक्सरसाइज ही नहीं आयोजित की जाएगी, बल्कि विशाखापट्टनम में सभी देशों के नौसैनिकों की एक भव्य 'सिटी-परेड' भी आयोजित की जाएगी।



मिलन एक्सरसाइज

भारतीय नौसेना के मुताबिक, इस महीने की 25 तारीख से शुरू होने वाली मिलन एक्सरसाइज दो हिस्सों में होगी। पहला हार्बर फेस होगा जो 25 फरवरी से 28 फरवरी तक होगा और दूसरा चरण समंदर में 1-4

मार्च तक होगा। हार्बर फेस में सभी देशों की नौसेनाएं विशाखापट्टनम में सिटी-परेड में हिस्सा लेने के साथ-साथ अंतर्राष्ट्रीय सेमिनार में हिस्सा लेंगी और नेवल ऑफिसर्स का इंटरैक्शन होगा।

इसके अलावा दो दिन के लिए आगरा और बोधगया का टूर भी शामिल होगा ताकि एक दूसरे की सांस्कृतिक विरासत का आदान-प्रदान हो सके। इसके बाद चार दिनों की एक्सरसाइज बंगाल की खाड़ी में होगी। इस साल की मिलन एक्सरसाइज का ध्येय-वाक्य है कमेरडेरिए, कोहिसन एंड कोलैबोरेशन यानि मेल-मिलाप, एकजुटता और सहयोग।

मिलन एक्सरसाइज का ये 11वां संस्करण है। पहली मिलन एक्सरसाइज वर्ष 1995 में हुई थी। उस वक्त भारतीय नौसेना के अलावा चार अन्य देशों की नौसेनाओं ने हिस्सा लिया था। आखिरी मिलन एक्सरसाइज 2018 में हुई थी जिसमें 17 देशों की नौसेनाओं ने हिस्सा लिया था। अभी तक मिलन एक्सरसाइज के सभी संस्करण अंडमान निकोबार में होते आए थे। ये पहली बार है कि सिटी ऑफ डेस्टेनी यानि विशाखापट्टनम में ये युद्धाभ्यास होने जा रहा है।

मिलन एक्सरसाइज के लिए दिए अपने संदेश में नौसेना प्रमुख, एडमिरल आर हरि कुमार ने कहा कि समुद्र एक गोंद की तरह है जो हम सभी देशों की नौसेनाओं को एक पेशेवर समुदाय के रूप में बांध कर रखता है। मिलन-2022 इस बंधन का जश्न मनाने का समय है और सभी मित्र-देशों की नौसेनाओं को एक दूसरे से जोड़ने, सीखने और समुद्री-क्षेत्र में एक दूसरे की सर्वोत्तम कार्यशैली जानने का मौका देता है।

एडमिरल आर हरि कुमार के मुताबिक, मिलन-2022 में बहुराष्ट्रीय समूह में सीमैनशिप ड्रिल, जटिल ऑपरेशनल परिदृश्य, सामरिक युद्धाभ्यास और समुद्र में अभ्यास की एक विस्तृत श्रृंखला शामिल है। नौसेना प्रमुख के मुताबिक, इस दौरान आयोजित होने वाले कार्यक्रमों का उद्देश्य हमारे ऑपरेटर्स, मेंटेनर्स, प्लानर्स और सभी प्लान को कार्यवित करने वाले एक्सक्यूटर्स की कार्यशैली को निखारने और युद्धपोत पर अपनी जिम्मेदारियों और कमांड को संवारने के लिए है।

आपको बता दें कि इसी महीने की 21 तारीख को विशाखापट्टनम में ही भारतीय नौसेना की प्रेसिडेंट फ्लीट रिव्यू है जिसमें 50 युद्धपोत और 50 ही एयरक्राफ्ट हिस्सा ले रहे हैं।

<https://www.abplive.com/news/india/milan-2022-exercise-will-be-held-in-visakhapatnam-with-navies-of-friendly-countries-ann-2052329>

## Science & Technology News

INDIA  
TODAY

Wed, 02 Feb 2022

### ISRO conducts breakthrough demonstration of hack-proof quantum communication

*During the demonstration, scientists managed to create an atmospheric channel on the ground to enable sharing of quantum-secure text, image transmission and quantum-assisted two-way video calling.*

New Delhi: In a major step forward towards satellite-based quantum communication, scientists from Ahmedabad-based Space Applications Centre and Physical Research Laboratory successfully demonstrated quantum entanglement. Using real-time Quantum Key Distribution (QKD), they conducted hack-proof communication between two places separated by 300 meters.

Quantum communication is one of the safest ways of connecting two places with high levels of code and quantum cryptography that cannot be decrypted or broken by an external entity. If a hacker tries to crack the message in quantum communication, it changes its form in such a manner that would alert the sender and would cause the message to be altered or deleted.

During the demonstration, scientists managed to create an atmospheric channel on the ground to enable sharing of quantum-secure text, image transmission and quantum-assisted two-way video calling. The experiment was conducted between two buildings separated by 300 meters at the Space Applications Centre.

"This experiment and demonstration were repeated over several nights to ensure the repeatability and robustness of an indigenously developed QKD system capable of seamlessly generating and utilizing secure keys for various applications," Isro said in a statement, adding that this is yet another significant step towards the development of the planned Satellite-Based Quantum Communication.

Isro chief S Somnath was present to witness the demonstration during which various images were encrypted using a generated quantum key and transmitted over a classical channel from one building to another building. They were then decrypted at the receiving terminal in real-time.

Isro said that to achieve the feat, scientists developed various key technologies like robust & high brightness entangled photon source (EPS), BBM92 protocol implementation, NavIC enabled synchronization, polarization compensation techniques, among others. A cryptographic application software suite with integrated quantum security has also been developed and demonstrated for text, image, video encryption/decryption.

"The Department of Space is getting ready for satellite-based demonstrations of fundamental quantum mechanics experiments as well as quantum communication for future-proof data security," Isro said.

The latest breakthrough comes on the back of an earlier demonstration of quantum secure video-conferencing in free space, over a distance of 300 meters in March last year. Former Isro chief K Sivan had said that the space agency was working on a hackproof communication system. He had said that Isro's work will make the relay faster and much more secure in the coming era of quantum computers that explore quantum mechanics.

China already has a satellite dedicated to quantum information science, Micius, and demonstrated quantum communication in a laboratory over a coiled optical fibre up to 404 kilometres long.

<https://www.indiatoday.in/science/story/isro-conducts-breakthrough-demonstration-of-hack-proof-quantum-communication-1907344-2022-02-01>



The latest breakthrough comes on the back of an earlier demonstration of quantum secure video-conferencing in free space. (Photo: Getty)



The demonstration was conducted at SAC, Ahmedabad, between two buildings separated by a distance of 300 m. (Photo: Isro)

## ISRO gears for first launch of 2022, RISAT-1A to liftoff in February

*The launch will be the first of five to be conducted in a span of three months by Isro as it pushes the delayed missions into orbit.*

New Delhi: The Indian Space & Research (Isro) is gearing up for its first launch of 2022 during Valentine's Day week. The space agency is set to launch the Earth Observation Satellite, also called the RISAT-1A onboard the Polar Satellite Launch Vehicles as it gears up to find the lost rhythm due to Covid-19.

Sources told IndiaToday.in that Isro is planning to launch the satellite onboard its workhorse PSLV-C52 to Low Earth Orbit (LEO), likely between February 14-17. The final date for the launch is yet to be announced. Several missions led by Isro had been delayed in the last two years due to the coronavirus pandemic and the successive lockdowns that followed.

The launch will be the first of five to be conducted in a span of three months by Isro as it pushes the delayed missions into orbit. Newly appointed Isro Chief S Somnath has said that the RISAT-1A launch is scheduled for February this year, followed by the launch of OCEANSAT-3 and INS 2B on PSLV C-53 in March, and SSLV-D1 MicroSAT in April 2022.

### WHAT IS RISAT-1A?

RISAT-1A is part of the Radar Imaging Satellite (RISAT) series that is used for radar imaging and reconnaissance. These satellites are placed in the low earth orbit about 500 kilometres above the surface of the planet. The first satellite in this series was launched way back in 2009 when Isro placed RISAT-2 into orbit.

Used for surveillance and monitoring developments on the ground, RISAT has applications in fields such as agriculture and disaster management support. Isro had previously launched RISAT-2BR1 in 2019 onboard PSLV's 50th mission.

### FINDING LOST PACE

The latest launch comes months after the space agency suffered a major setback when its Earth Observation Satellite (EOS-03) could not be deployed due to a "technical anomaly" in August last year. The mission failed after the Cryogenic Upper Stage ignition did not kick in due to a technical anomaly.

With several plans in the pipeline and a timeline of others pushed ahead, Isro is also looking to launch GSAT-21, the first fully funded satellite by the New Space India Limited (NSIL) this year. The communication satellite will be developed and operated by NSIL to meet the Direct to Home (DTH) application needs.

Meanwhile, the space agency will also be looking to push India's maiden manned mission, Gaganyaan, on the launchpad. Another project was delayed due to Covid-19, Somnath had apprised things have again fallen back on track and all the systems needed for the first unmanned mission are being readied.

Isro is planning to launch the first uncrewed mission under Gaganyaan in 2022, following which the second unmanned mission "Vyommित्रा" will carry a robot and this will then be followed by the manned mission.

<https://www.indiatoday.in/science/story/isro-gears-for-first-launch-of-2022-risat-1a-to-liftoff-onboard-pslvc-52-in-february-1907096-2022-02-01>

## इसरो जल्द लॉन्च करेगा साल 2022 की पहली सैटेलाइट, जानिए इसकी खासियत

नई दिल्ली: भारतीय अंतरिक्ष अनुसंधान संगठन (ISRO) EOS-4/RISAT-1A सैटेलाइट को 14 से 17 फरवरी के बीच लॉन्च कर सकता है। इसरो PSLV-C52 रॉकेट से EOS-4/RISAT-1A सैटेलाइट को लॉन्च करेगा। इस सैटेलाइट की लॉन्चिंग जुलाई 2021 में होनी थी, लेकिन कोरोना संकट की वजह से इसको टाल दिया गया था। EOS-4/RISAT-1A एक माइक्रोवेव रिमोट सेंसिंग सैटेलाइट है। अब इसके 14 से 17 फरवरी के बीच लॉन्च करने की संभावना है।

एक मीडिया रिपोर्ट के मुताबिक, भारतीय अंतरिक्ष एजेंसी इस सैटेलाइट को पृथ्वी की निचली कक्षा में तैनात कर सकती है। हालांकि इसरो की तरफ से अभी अर्थ ऑब्जरवेशन सैटेलाइट EOS-4/RISAT-1A के लॉन्चिंग तारीख की आधिकारिक घोषणा नहीं की गई है। इस साल शुरुआत के तीन महीनों में इसरो पांच लॉन्चिंग तैयारी कर रहा है।

इसरो सबसे पहले EOS-4 सैटेलाइट को लॉन्च करेगा। इसके बाद OCEANSAT-3 और मार्च में INS-2B की लॉन्चिंग की जाएगी। फिर इसरो SSLV-D1 माइक्रोसैट को लॉन्च करेगा। हालांकि इसरो इन सैटेलाइट की लॉन्चिंग डेट को आखिरी समय पर बदल भी सकता है। क्योंकि लॉन्चिंग से पहले कई तरह से उनके मानकों की जांच की जाती है।

ऑब्जरवेशन सैटेलाइट EOS-4/RISAT-1A इमेजिंग और निगरानी के लिए इस्तेमाल की जाती है। यह एक रडार इमेजिंग सैटेलाइट है। पृथ्वी से 500 किमी की ऊंचाई पर इन सैटेलाइट्स की तैनाती की जाती है। इसरो ने इस सीरीज की पहली सैटेलाइट को साल 2009 में लॉन्च किया था। यह सैटेलाइट निगरानी और विकास कार्यों में इस्तेमाल की जाती है।

इस सैटेलाइट से प्राकृतिक आपदाओं और मौसम से संबंधित सही जानकारी मिलती है। इसरो को रियल टाइम यह तस्वीरें मिलेंगी। जलीय स्रोतों, फसलों, जंगलों, सड़कों-बांधों-रेलवे के निर्माण में इनका इस्तेमाल किया सकता है। इस सैटेलाइट से जमीनी और जलीय सीमाओं की निगरानी भी होती है। इससे दुश्मनों की हरकतों पर भी नजर रखी जा सकती है।

RISAT-1A सैटेलाइट 1858 किलोग्राम की है और यह मिशन 5 साल तक रहेगा। इसमें सी बैंड सिंथेटिक अपर्चर रडार का इस्तेमाल किया गया है। यह किसी भी मौसम के दौरान भारत के इलाकों की इमेजिंग करने में सक्षम है। साल 1979 से लेकर अब तक भारत ने 37 अर्थ ऑब्जरवेशन सैटेलाइट्स लॉन्च किए हैं जिनमें दो लॉन्चिंग के दौरान फेल हो गए।

इसरो के Cartosat और RISAT सीरीज के लॉन्च किए सैटेलाइट्स से दुश्मन घबराता है, क्योंकि उनकी हरकतों पर भारत अंतरिक्ष से नजर रख रहा है। इन सैटेलाइट्स ने ही सर्जिकल स्ट्राइक से लेकर बीते साल चीन के साथ हुए विवाद पर नजर रखी थी।

<https://www.amarujala.com/photo-gallery/bizarre-news/isro-gears-for-first-launch-of-2022-risat-1a-to-liftoff-onboard-pslvc-52-in-february?pageId=5>

