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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

Tue, 15 Feb 2022

# India finally taking some steps to leverage AI for military applications

New Delhi: India is now finally taking some steps towards ensuring effective use of artificial intelligence (AI) in fighting conflicts, which is fast becoming a critical operational necessity that may well decide the outcome of wars in the future.

Top officials say the defence establishment, ranging from the Army, Navy and IAF to DRDO labs, is increasingly focusing on AI to enable faster decision-making and shortening the sensor-to shooter loop, AI-powered surveillance and weapon systems.

But it's early days yet. India should get cracking on "a national mission-mode action plan" to effectively leverage AI and ML (machine learning) for military applications, with concrete participation from the IT industry and academia, the officials said.

China, of course, is leagues ahead with its long-standing focus on "informatized" and "intelligentized" warfare. "AI, ML, lethal autonomous weapon systems (LAWS), robotics and cyberwarfare have been major thrust areas for the People's Liberation Army...It has taken huge strides in them," a senior officer said.

The Indian defence establishment, on its part, now has a Defence Artificial Intelligence Council (DAIC) led by the defence minister to provide overall guidance and support. Defence minister Rajnath Singh, incidentally, had earlier declared that "25 defence-specific AI products" will be developed by 2024.

A Defence AI Project Agency (DAIPA) has also been created under the secretary (defence production), with Rs 100 crore earmarked annually for AI-enabled projects.

Individual services are also cranking up their own efforts. The Navy, for instance, has 30 ongoing AI projects encompassing autonomous systems, maritime domain awareness, perimeter security, decision-making, predictive inventory maintenance and management.

Apart from setting up an "AI core group", the Navy is also creating an AI centre of excellence at INS Valsura in Jamnagar, which already has a modern lab on AI and Big Data analysis.

The Army, too, has several schemes underway on contemporary and emerging AI technologies. Apart from civil industry partnerships, an AI centre of excellence has been established at the Military College for Telecommunication Engineering in Mhow.

Application-oriented research in AI is also being conducted at two dedicated DRDO labs, Centre for Artificial Intelligence and Robotics (CAIR) and DRDO Young Scientist Laboratory (DYSL)-AI, both at Bengaluru. Moreover, all DRDO system labs have started AI technology groups to introduce AI features in all products.

But with countries like the US and China galloping towards AI-driven warfare, there is widespread acceptance that much more needs to be done on this "disruptive technology" front to



boost the combat capability and survivability of Indian forces. "The Israel-Hamas conflict last year firmly underscored the power of AI," said Army chief General M M Naravane, at a seminar recently.

"Improved situational awareness, fusion of sensors, faster decision-making, use of autonomous weapons, and integration of AI into every facet of warfare, will necessitate changes to war fighting doctrines, organisations and structures, training methodology and leadership. For militaries across the world as well as for us, this remains an ongoing challenge, and a work in progress," he added.

<https://timesofindia.indiatimes.com/india/india-finally-taking-some-steps-to-leverage-ai-for-military-applications/articleshow/89559262.cms>

## Business Standard

Tue, 15 Feb 2022

### **BHEL bags order to supply compact heat exchanger sets for Tejas aircraft**

*The order envisages manufacturing, assembly, testing and supply of compact heat exchangers to be fitted in the light combat aircraft, Tejas, being manufactured by HAL*

New Delhi: State-owned Bharat Heavy Electricals Ltd (BHEL) on Monday said it has bagged an order from Hindustan Aeronautics Ltd to supply compact heat exchanger sets for Tejas aircraft.

"Bharat Heavy Electricals Limited has received a prestigious order for the supply of compact heat exchanger sets for 83 LCA Tejas MK1A aircrafts, from Hindustan Aeronautics Limited (HAL)," the company said in a statement.

The order envisages manufacturing, assembly, testing and supply of compact heat exchangers to be fitted in the light combat aircraft, Tejas, being manufactured by HAL.

The BHEL's Heavy Plates and Vessels Plant (HPVP), Visakhapatnam is the sole supplier of heat exchangers for LCA Tejas to HAL since 1996.

The BHEL-HPVP and Aeronautical Development Agency (ADA), Bangalore have jointly designed and developed 13 different types of compact heat exchangers for Environmental Control System (ECS) and Secondary Power System (SPS) of LCA MK-1 programme.

The BHEL is also currently working with DRDO for the development of Air Cycle Machine based Liquid Cooling System (LCS) for Aircraft POD application for LCA MK-2.

The BHEL-HPVP has dedicated, intricate manufacturing and inspection facilities for manufacturing of state-of-the-art Compact Heat Exchangers for different types of aircraft manufactured by HAL.

The same are progressively being augmented to meet International Aero Standards (AS9100) and BHEL is ready to meet the requirements of future programs of LCA, ALH, Sukhoi and AMCA.

The BHEL has been a reliable supplier of critical equipment and services in the defence and aerospace sector for over three decades, the statement said.

Significantly, the company has already established specialised manufacturing facilities and capabilities aimed at making a major contribution towards self-reliance in the production of defence equipment, it added.

These initiatives of BHEL will be a driving force towards the Aatmanirbhar Bharat Abhiyan of Government of India, it further said.

[https://www.business-standard.com/article/companies/bhel-bags-order-to-supply-compact-heat-exchanger-sets-for-tejas-aircraft-122021400763\\_1.html](https://www.business-standard.com/article/companies/bhel-bags-order-to-supply-compact-heat-exchanger-sets-for-tejas-aircraft-122021400763_1.html)



File Photo

## Defence Strategic: National/International



Press Information Bureau  
Government of India

Ministry of Defence

Mon, 14 Feb 2022 6:16PM

### CRNO visit to India (13-17 Feb 22)

Rear Admiral Saif Bin Nasser Bin Mohsin Al Rahbi, Commander of the Royal Navy of Oman (CRNO) is on a goodwill visit of to India. The visit aims to consolidate bilateral relations with Indian Navy, as also to explore new avenues for defence cooperation with India.

The CRNO commenced his visit by paying homage at National War Memorial on 14 Feb 22. The CRNO was received by Admiral R Hari Kumar, Chief of the Naval Staff, at the majestic South Block Lawns and accorded a 50 Men Guard of Honour. Both the Naval Principals held discussions to explore avenues to further enhance cooperation between the Navies.

The CRNO would also be visiting Indian Navy's Western Naval Command at Mumbai, wherein he would be interacting with the Flag Officer Commanding-in-Chief, Western Naval Command and visit *IN* ships at Naval Dockyard, Mumbai.

The first visit of the incumbent CRNO to India, reverberates the growing cooperation between the Indian Navy and the Royal Navy of Oman, which include operational interactions, training and exchange of Subject Matter Experts. Both Navies have been participating in the biennial maritime exercise '*Naseem Al Bahr*' since 1993. This exercise was last conducted in 2020, off Goa and the next edition is scheduled later this year. *INS Sudarshini* visited Muscat in Dec 21 and had embarked RNO Sea Riders for sea experience.



<https://pib.gov.in/PressReleasePage.aspx?PRID=1798323>



पत्र सूचना कार्यालय  
भारत सरकार

रक्षा मंत्रालय

Mon, 14 Feb 2022 6:16PM

## रॉयल नेवी ऑफ ओमान (सीआरएनओ) के कमांडर की भारत यात्रा (13-17 फरवरी, 2022)

रॉयल नेवी ऑफ ओमान के कमांडर (सीआरएनओ) रियर एडमिरल सैफ बिन नासिर बिन मोहसिन अल राहबी भारत की सद्भावना यात्रा पर हैं। उनकी इस यात्रा का उद्देश्य भारतीय नौसेना के साथ द्विपक्षीय संबंधों को मजबूत करना और भारत के साथ रक्षा सहयोग की नई संभावनाओं को तलाशना है।

सीआरएनओ ने आज राष्ट्रीय युद्ध स्मारक पर श्रद्धांजलि अर्पित कर अपनी इस यात्रा की शुरुआत की। नौसेनाध्यक्ष एडमिरल आर हरि कुमार ने साउथ ब्लॉक के भव्य लॉन में उनका स्वागत किया और सीआरएनओ को 50 सैनिकों ने गार्ड ऑफ ऑनर दिया। दोनों नौसेना प्रमुखों ने नौसेनाओं के बीच सहयोग को और आगे बढ़ाने की संभावना तलाशने के लिए चर्चा की।

सीआरएनओ मुंबई में भारतीय नौसेना की पश्चिमी नौसेना कमान का भी दौरा करेंगे, जहां वे पश्चिमी नौसेना कमान के फ्लैग ऑफिसर कमांडिंग-इन-चीफ के साथ वार्ता करेंगे। इसके अलावा सीआरएनओ मुंबई स्थित नौसेना के डॉकयार्ड में आईएन पोर्तों का दौरा भी करेंगे।

मौजूदा सीआरएनओ की पहली भारत यात्रा, भारतीय नौसेना और ओमान की रॉयल नेवी के बीच बढ़ते सहयोग को दिखाता है। इसमें परिचालन संबंधी बातचीत, प्रशिक्षण और विषय के विशेषज्ञों का आदान-प्रदान शामिल हैं। दोनों नौसेनाएं 1993 से दो साल में एक बार होने वाले समुद्री अभ्यास 'नसीम अल बहर' में हिस्सा ले रही हैं। यह अभ्यास आखिरी बार 2020 में गोवा में आयोजित किया गया था और इसका अगला संस्करण इस साल के अंत में निर्धारित किया गया है। वहीं, इससे पहले आईएनएस सुदर्शिनी ने दिसंबर, 2021 में मस्कट का दौरा किया था और प्रशिक्षुओं को समुद्री अनुभव देने के लिए आरएनओ (रॉयल नेवी ऑफ ओमान) की समुद्री यात्रा में शामिल हुआ था।



<https://pib.gov.in/PressReleasePage.aspx?PRID=1798368>

## India, Oman Navy Chiefs hold talks to explore new avenues of defence cooperation

*India and Oman have very strong defence ties, and all three services have bilateral exchanges and exercises with Oman's services.*

New Delhi: Commander of the Royal Navy of Oman Rear Admiral Saif Bin Nasser Bin Mohsin Al Rahbi, who is on “a goodwill visit” to India, held discussions with his Indian counterpart Admiral R Hari Kumar on Monday “to explore avenues to further enhance cooperation between the Navies”.

The Navy in a statement on Monday said that Rear Admiral Saif Bin Nasser Bin Mohsin Al Rahbi, Commander of the Royal Navy of Oman (CRNO) “is on a goodwill visit of to India” and his visit “aims to consolidate bilateral relations with Indian Navy, as also to explore new avenues for defence cooperation with India.”

“The first visit of the incumbent CRNO to India, reverberates the growing cooperation between the Indian Navy and the Royal Navy of Oman, which include operational interactions, training and exchange of Subject Matter Experts. Both Navies have been participating in the biennial maritime exercise ‘Naseem Al Bahr’ since 1993. This exercise was last conducted in 2020, off Goa and the next edition is scheduled later this year. INS Sudarshini visited Muscat in December 2021 and had embarked RNO Sea Riders for sea experience.” the Navy said.

Rear Admiral Al Rahbi is on a five-day goodwill visit to India from Sunday.

Rear Admiral Al Rahbi will also visit the Western Naval Command at Mumbai during his trip, and will visit Indian Naval Ships at the dockyard there, the Navy said.

The development comes two weeks after Oman’s Secretary General at the Ministry of Defence Mohammed Bin Nasser Bin Ali Al Zaabi had held the 11th India–Oman Joint Military Cooperation Committee Meeting (JMCC) on bilateral defence cooperation with Indian Defence Secretary Ajay Kumar.

India and Oman have very strong defence ties, and all three services have bilateral exchanges and exercises with Oman’s services.

Oman provides operational support to the Indian Navy for anti-piracy missions in the Arabian Sea. Also, India had got access to the Duqm port in Oman, strengthening India’s capability and maritime strategy in the Indian Ocean Region, especially against China’s aggressive advance in the region.

On January 31, Zaabi had also met Defence Minister Rajnath Singh and the chiefs of the Army, the Navy and the Air Force, and leaders of India’s defence industry.

<https://indianexpress.com/article/india/india-oman-navy-chiefs-hold-talks-explore-new-avenues-defence-cooperation-7773967/>



Chief of Naval Staff Admiral R Hari Kumar with Commander of the Royal Navy of Oman Rear Admiral Saif Bin Nasser Bin Mohsin Al Rahbi during their meeting. (PTI)

## EAM discusses national security challenges with Philippines Mins

Manila: External Affairs Minister S Jaishankar on Monday held productive discussions with his Philippines counterpart Teodoro L Locsin and defence minister Delfin Lorenzana during which they covered a range of issues dealing with mutual national security and development aspirations. Jaishankar's three-day maiden visit to the Philippines comes over two weeks after the key Southeast Asian country signed a USD 375 million deal with India to buy three batteries of the BrahMos cruise missile.



"Held productive discussions with FM @teddyboylocsin of Philippines. We are entering a new phase of our partnership. Its basis is the mutuality of national security and development aspirations. Our conversation covered a range of issues dealing with both, Jaishankar tweeted.

"Expect to take forward a shared agenda through sustained engagement. Thank you @teddyboylocsin for a warm welcome and generous hospitality, he said in another tweet after the wide-ranging talks.

Later in the day, Jaishankar met Defence Minister Delfin Lorenzana and had a "good discussion" on national security challenges and expanding defence cooperation.

"Nice to meet Defense Minister @del\_lorenzana of Philippines. A good discussion on national security challenges and expanding defense cooperation," he tweeted.

Jaishankar also met Finance Minister Carlos Dominguez III and Agriculture Minister William Dar.

"A warm conversation on economic recovery and development cooperation with Finance Minister @SecSonnySays and Agriculture Minister @DarAgriculture of the Philippines," Jaishankar tweeted. "Appreciate their long association with India and their enthusiasm for strengthening our partnership," he said.

[http://www.millenniumpost.in/nation/eam-discusses-national-security-challenges-with-philippines-mins-468340?infinite\\_scroll=1](http://www.millenniumpost.in/nation/eam-discusses-national-security-challenges-with-philippines-mins-468340?infinite_scroll=1)

## Spirits soar at Singapore Airshow 2022

By Matt Thurber

Although the public can't attend this edition of the Singapore Airshow because of the Covid pandemic, anyone can watch the live-streamed daily flying displays and flypasts from home. In addition to eight flying displays, four air forces along with Boeing and Airbus are flying aircraft during the show's flypasts. The daily flying display schedule begins today at 12:30 p.m., then starts at 11:30 a.m. on February 16, 17, and 18.

Highlights of the displays include Airbus's A350-1000 and Boeing's 777X, both making their Asian debuts. A U.S. Air Force B-52 Stratofortress will participate in the flypasts, and the U.S. Marine Corps' Lockheed Martin's F35B Lightning II short takeoff, vertical landing stealth fighter will also make an appearance.



The Singapore Air Force will fly two solo aerobatic performances with its F-16C fighter jets and fly a graceful pairing of AH-64D Apache attack helicopters.

This year's other aerobatics displays include a single-jet performance of the Indian Air Force's indigenous design, the HAL Tejas light combat aircraft, also making its Singapore Airshow debut, and the Jupiters, Indonesia's aerobatic team, flying six Korea Aerospace Industries KT-1B Woong Bee single-engine turboprop trainers.

"In all aspects, the level of optimism is high and growth potential is good," said Leck Chet Lam, managing director of Singapore Airshow organizer Experia. "The Singapore Airshow is a catalyst for the global aerospace industry to connect, converge, and converse. It's even more important now to get the industry players together, to find solutions to this pandemic and sustained growth beyond the pandemic."

The air show's organizers aren't here just to talk about the business climate and how the pandemic is affecting the aerospace industry but also to help companies prosper by addressing "talent sustenance," he explained. That means not only attracting new entrants into aerospace but also helping employees learn and grow in their careers.

This year, organizers expect more than 13,000 attendees from 37 countries and regions. The show will feature two forums to promote "business matchmaking," said Leck, including the Aviation CEO Forum on February 15 and the Sustainable Aviation Forum on February 16 and 17. The CEO forum will address "how the industry is going forward," he said, while the sustainability forum centers on "something we cannot avoid."

"These are conversations we have curated so we can discuss how to go forward," he noted.

To underscore the airshow's dedication to sustainability principles, Experia is publishing the show directory in digital form and hosting an online media center. At the show site, 15,000 solar panels will help cut carbon dioxide emissions.

"Covid changed our lives in so many ways," said Lim Tse Yong, vice president of capital goods and conglomerates for the Singapore Economic Development Board. "We're grateful to Experia for putting on this show."

Lim said he expects a full recovery of the aerospace industry in 2025 or 2026, after governments lift more pandemic-related restrictions. But, he pointed out, despite the pandemic, a number of aerospace companies make their home in Singapore. "They put their trust in us," he said.

Much of Singapore's success in retaining its aerospace activity during the pandemic resulted from early collaboration between the government, trade associations, and companies. They all realized the importance of retaining the skilled workforce that the industry had spent so many years developing, leading to 23 months of wage support.

"Singapore never lets a good crisis go to waste," he said. "We are turning a corner." Since April 2021, Singapore's aerospace manufacturing output has achieved nearly 60 percent year-over-year growth.

<https://www.ainonline.com/aviation-news/aerospace/2022-02-14/spirits-soar-singapore-airshow-2022>



The Singapore Air Force Lockheed Martin F-16C fighter pulling g with afterburner lit during the pre-show demonstration of its acrobatic routine.

# More Rafale fighter jets to reach India soon!

## Check details

*The first Rafale for India, with the tail number RB008, had made its maiden flight on October 30, 2018 in France.*

*By Huma Siddiqui*

French company Dassault Aviation will complete the deliveries of the 36 'Rafale' fighter jets to the Indian Air Force (IAF) soon. As reported by Financial Express Online earlier, as per the Intergovernmental deal inked by both sides in September 2016, India had placed an order for 36 multi-role fighter jets in fly-away condition at a cost of Rs 59,000 crores. And as per the contract, the delivery of all the 36 will be completed by 2022.

The last of the three fighter jets with the 13 identified India specific enhancements (ISE) are expected to arrive later this week. The company has already handed over three fighters to the IAF and modalities are being worked out for ferrying them to India.

The aircraft will take off from France and will be supported by in-flight refueling on its journey, just like the previous times when the ferrying was supported by the air forces of France and UAE.



The last of the three fighter jets with the 13 identified India specific enhancements (ISE) are expected to arrive later this week.

### **Will the earlier Rafale delivered to IAF have ISE?**

Yes. The upgrade of the all the Rafale which are already with the IAF are in the process of being upgraded to the ISE configuration in India. All the 13 ISE are already certified by the concerned authorities.

Before being ferried to India, some of the ISE were incorporated at the manufacturing stage. And post certification the remaining are being included in the aircraft and this is related to software and hardware upgrades.

### **What does RB stand for?**

As has been reported earlier, the aircraft in the IAF fleet have a unique tail number. And, all fighters and trainers have different set of alphabets as initials.

Out of the 36 fighter jets, the first RB008 which is the first jet handed over to the IAF was the earliest fighter fitted with ISE and was certified, will remain in France for the time being, explained a senior officer.

The initial stands for the former IAF Chief Air Chief Marshal RKS Bhadauria. He had as the then Deputy Chief had led the negotiation team when the deal was in the process of contract negotiations and he played a very critical role in the final contract. And, at the time of the first delivery, he was the then chief of IAF.

The first Rafale for India, with the tail number RB008, had made its maiden flight on October 30, 2018 in France. It was on this aircraft that the 13 ISE have been incorporated, tested and certified.

India was the fourth country in the world to have the Rafale in its fleet. The others are Qatar, Egypt and France. And very recently, Indonesia has confirmed an order of 42 Rafale fighters from Dassault Aviation of France.

The ISE which are in the process of being incorporated in all the Rafale the IAF has in its fleet are considered to be the most advanced among all the Rafales being flown by other Air Forces across the globe.

## More about the ISE

These include potent electronic jammer pod and avionics; helmet mounted display; radar enhancements; advanced infrared search and track sensors; and their ability to start and operate from high-altitude airfields.

The first batch of five Rafales which had arrived in India in September 2020 were inducted into the No 17 Golden Arrows Squadron at the Ambala Air Force Station. The second squadron for these fighters was operationalised last year in July at Main operating Base at Hashimara, West Bengal.

<https://www.financialexpress.com/defence/more-rafale-fighter-jets-to-reach-india-soon-check-details/2433641/>

# The Tribune

Tue, 15 Feb 2022

## Navy, Coast Guard satellite to keep track of fishing vessels

*ISRO is coming up with an OCEANSAT-III which will cover the entire Indian Exclusive Economic Zone (EEZ)*

New Delhi: The Navy and the Coast Guard will soon have the latest satellite to track fishing vessels across a wider area at sea.

This will be separate from the existing naval satellite 'Rukmini'. The Indian Space Research Organisation (ISRO) is coming up with an OCEANSAT-III, for which the Department of Fisheries is providing Rs 30.65 crore this fiscal ending on March 31.

"This (the satellite) will cover the entire Indian Exclusive Economic Zone (EEZ) and hence, track fishermen in a comprehensive manner," the Ministry of Defence told the Rajya Sabha in a written reply.

The EEZ is 370 km of sea from any point of the Indian territory and needs to be regulated for illegal activities. The launch of the OCEANSAT-III is not yet announced, but is expected within two months.

The first OCEANSAT was launched in 1999. The latest version will map several aspects that affect fisheries.

Tracking unregulated and regulated fishing boats is one of prime tasks of the Navy and Coast Guard especially after the November 2008 Mumbai terror attacks, when armed terrorists from Pakistan sailed on a hijacked fishing boat to reach Mumbai.

The coastal security revamp post-Mumbai attacks included installing the Automatic Identification System (AIS), also called transponders, on all fishing vessels. These emit a signal that allows the ground-based controllers to know the location of boats.

### All set for OCEANSAT-III

#### Rs 30.65 cr provided by Department of Fisheries for the latest satellite

- It will cover the Indian Exclusive Economic Zone, which is 370 km of sea from any point of Indian territory
- The launch of OCEANSAT-III is not yet announced, but is expected in two months

<https://www.tribuneindia.com/news/nation/navy-coast-guard-satellite-to-keep-track-of-fishing-vessels-369646>

## India, Sri Lanka conclude 9th Army to Army staff talks in Pune

*PUNE India and Sri Lanka held 9th Army to Army staff talks in Pune from February 10-12 to foster better coordination between the two militaries*

Pune: India and Sri Lanka held 9th Army to Army staff talks in Pune from February 10-12 to foster better coordination between the two militaries.

A delegation of six Sri Lankan Armed Forces officers were on a three-day visit to India as part of Army to Army Staff talks. It was organised by Agnibaaz Division under the aegis of Headquarter Southern Command at Pune, a defence spokesperson said. The staff conference was led by Major General Anil Kumar Kashid, Additional Director General International Cooperation, head of Indian Army delegation and Major General HP Ranasinghe, head of the Sri Lankan Army delegation.

Both countries discussed agenda points focusing on key issues related to training, conduct of bilateral and multilateral exercises, enhancing relations in fields of arts, sports & cultural exchanges. Conference culminated with discussion on progress of already implemented matters and planned intended course of action in the forthcoming years. The talks were testimony of ever increasing bilateral military cooperation and understanding between the two nations.

The visiting delegation visited Military Institute of Technology (MILIT) and National Defence Academy (NDA), Khadakwasla on February 11. The team interacted with Commandant and faculty on the training methodology and best practices being undertaken at MILIT. The delegation was briefed on armed forces related technological studies being undertaken at MILIT and also interacted with the Sri Lankan Army student officers attending DSTSC course at MILIT.

The visit to National Defence Academy (NDA) was aimed towards the enhancing cooperation as part of the 'Training Exchange Program' between both countries which has been the strongest and most enduring pillar of India-Sri Lanka bilateral defence cooperation. The delegation members were briefed about the training methodology and associated infrastructure at NDA. Sri Lankan cadets undergoing training at NDA also met the delegation members at the Cadets' Mess. The delegation called on Air Marshal Sanjeev Kapoor, Commandant, NDA.

The Sri Lankan delegation also visited College of Military Engineering (CME), Pune where they were exposed to the training infrastructure at CME utilized for imparting training on all relevant engineering aspects for emerging security challenges across the entire spectrum of conflict. A combat engineer demonstration was also organized for the delegation. In addition a cultural tour was also organized for the delegates providing a splendid insight into India's rich heritage and culture.

<https://www.hindustantimes.com/cities/pune-news/india-sri-lanka-conclude-9th-army-to-army-staff-talks-in-pune-101644859223265.html>



India and Sri Lanka held 9th Army to Army staff talks in Pune from February 10-12 to foster better coordination between the two militaries. (HT PHOTO)

## India, Maldives hold dialogue to expand defence cooperation

*The Maldives is one of India's key maritime neighbours in the Indian Ocean Region and the bilateral defence and security ties have been on an upward trajectory in the last few years.*

New Delhi: Defence Secretary Ajay Kumar has held "very productive" talks with the top military brass of the Maldives to further bolster bilateral defence and security cooperation amid concerns over China's increasing footprint in the Indian Ocean.

The Maldives is one of India's key maritime neighbours in the Indian Ocean Region and the bilateral defence and security ties have been on an upward trajectory in the last few years.

"Delighted to be in Maldives for the 3rd Defence Cooperation Dialogue. Had very productive discussions. Deeply appreciate warm hospitality of @cdfmndf Maj Gen Abdulla Shamaal," Mr Kumar tweeted on Monday, a day after the talks in Male.



"Delighted to be in Maldives for 3rd Defence Cooperation Dialogue," Defence Secretary Ajay Kumar tweeted.

In November, India, the Maldives and Sri Lanka held a two-day maritime operation in the Indian Ocean, signalling a resolve to jointly keep the region safe and secure including for international trade.

Major General Abdulla Shamaal, the Chief of Maldives National Defence Force (MNDF) said that the Defence Cooperation Dialogue (DCD) is instrumental in "time-honoured" defence cooperation between the two countries.

"Extremely pleased to welcome Indian Defence Secretary, @drajaykumar\_ias & the high level delegation to the third Defence Cooperation Dialogue. The DCD is instrumental in our time-honoured def. coop. relationship & we are glad to note further avenues of MNDF capacity building," he tweeted.

Development cooperation has been a key emerging pillar of the India-Maldives relationship with New Delhi providing Lines of Credit of over USD 1.2 billion (one billion is equal to ₹ 100 crore) for infrastructure and grants for community development projects to the island nation.

In August last year, the island nation sealed a contract for the implementation of an India-funded connectivity project, billed as the largest infrastructure initiative being rolled out in the island nation.

Under the Greater Male Connectivity Project (GMCP) project, a 6.74 km long bridge and causeway link will be built to connect capital city Male with adjoining islands of Villingli, Gulhifalhu and Thilafushi.

Funded under a grant of USD 100 million and a Line of Credit of USD 400 million from India, it will be reportedly the largest infrastructure project in the Maldives.

India extended assistance to the Maldives during the coronavirus pandemic that included the early supply of vaccines.

The Maldives was the first beneficiary of India's Vaccine Maitri initiative last year.

<https://www.ndtv.com/india-news/india-maldives-hold-dialogue-to-expand-defence-cooperation-2767312>

## Indian Navy's increase in capex to enhance its maritime security

Following the news of Indian Navy's expenditure for FY2022-2023 announced in the union budget recently, Sourabh Banik, Aerospace & Defense Analyst at GlobalData, a data and analytics company, said the expenditure will boost the country's security.

"Indian Navy's capital expenditure (capex) witnessed a significant jump of 38.4 percent in the revised estimates of FY2021-2022 as compared to the originally budgeted capex for the same year. The initial budgeted capex of US\$4.44 billion in FY2021-2022 was revised to US\$6.15 billion. This increase is primarily attributed to the delivery payments made by Indian Navy last year for various platforms including P-8I aircraft, MH-60R helicopters, Advanced Light Helicopters (ALH) Mk III, Kalvari-class (Scorpène-class) submarines and Visakhapatnam-class destroyer.



"The revised estimate of Navy's capex has been further increased by 3.4 percent to US\$6.36 billion in FY2022-2023 budget. This indicates India's focus on boosting its maritime capabilities and maintaining its territorial influence, which was allegedly challenged by its regional rival China on multiple occasions, especially in the Indian Ocean region.

"Furthermore, the Quad (comprising of US, Japan, Australia and India) is the extended beneficiary of India's shift in focus on maritime security, as it will provide the alliance additional firepower to counter China's naval power in the region. According to GlobalData's report, 'Global Naval Vessels and Surface Combatants Market to 2031 and Global Submarine Market To 2031', India is expected to spend US\$58.9bn on procuring naval vessels and submarines between 2021 and 2031, highlighting that the Indian Navy's upward spending trend is unlikely to subside in the near-term."

<https://asiapacificdefencereporter.com/indian-navys-increase-in-capex-to-enhance-its-maritime-security/>

## Israel to provide Morocco with missile defence system in \$600mn deal

The state-run company Israel Aerospace Industries (IAI) will provide Morocco with an advanced air and missile defence system, after they signed a \$600 million, the media reported.

IAI will provide Morocco with the Barak MX system, in a deal that began to take shape during Defence Minister Benny Gantz's visit to Morocco in November last year, according to Israel's Channel 12 TV news and financial website Globes,

Barak MX provides a single integrated solution for multiple simultaneous aerial threats from different sources and ranges in several mission types and battle conditions, Xinhua news agency quoted the reports as saying.

These threats include fighters, sea-skimming and cruise missiles, ballistic missiles, drones, helicopters and gliding bombs, and the system offers three interception ranges of 35, 70 and 150 km.

Morocco and Israel signed a historic agreement for the establishment of full diplomatic relations in December 2020.

The deal comes amid Morocco's growing tension with its neighbour Algeria and a possible threat of booby-trapped drones against the North African country, according to Channel 12.

<https://ahmedabadmirror.com/israel-to-provide-morocco-with-missile-defence-system-in-600mn-deal/81821232.html>

## Science & Technology News

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Tue, 15 Feb 2022

### ISRO successfully orbits 3 satellites

Sriharikota (AP): The Indian Space Research Organisation on Monday successfully placed its earth observation satellite EOS-04 and two small satellites into the intended orbit, its first launch mission in 2022.

Following a smooth countdown of 25 hours and 30 minutes, the workhorse launch vehicle, the Polar Satellite Launch Vehicle (PSLV-C52) with the three satellites onboard blasted off at 5.59 am from here amid dark, early morning skies.

ISRO said the important flight events — stage and strap-on ignitions, heat shield separation, stages and strap-on separation and satellite injection — took place exactly as planned.

It said after a flight of about 17 minutes, 34 seconds, the three satellites — EOS-04, INSPIRESat-1 and INST-2TD — were injected successfully into a sun-synchronous polar orbit of 529 km, and the orbit achieved for the satellites is "very close" to the intended orbits.

After the separation, the two solar arrays of EOS-04 deployed automatically and ISRO Telemetry Tracking and Command Network (ISTRAC) at Bengaluru, assumed the control of the satellite, it said, adding that, in the coming days the satellite will be brought to its final operational configuration following which it will begin to provide the data.

Prime Minister Narendra Modi tweeted congratulating space scientists on the successful launch of PSLV C52 mission.

"The mission of PSLV-C52/EOS-04 has been successfully accomplished. The primary satellite EOS-04 has been put into a very precise orbit by PSLV-C52, and along with that, co-passenger satellites INSPIRESat-1 and INS-2TD also have been placed into right orbit," ISRO Chairman S Somanath said.

Today's launch also happens to be the first mission after Somanath took over as the Secretary, Department of Space and Chairman, Space Commission, recently.

Thanking everyone for making the mission possible, he said: "This spacecraft is going to be one of the biggest assets for us to serve the country." Mission Director S R Biju said, "What we have accomplished today is really marvellous." Satellite Director Srikanth said the health of EOS-04 is perfectly fine, after the separation, and the solar panels are deployed autonomously after injection and started generating the desired power.



"In a couple of days after calibration and braking for outgassing, the satellite will be ready to deliver the glimpse of images. The services will be an integral part of many governmental services. EOS-04 has taken a small step in the nation's dream of opening the space sector with industry participation in the form of build to print and also assemble and test. We have fairly succeeded in our effort," he said.

This was the 80th launch vehicle mission from SDSC SHAR, Sriharikota; 54th flight of PSLV; and the 23rd flight of PSLV in XL configuration (6 strap-on motors).

EOS-04, weighing 1,710 kg and with a mission life of 10 years, is a radar imaging satellite designed to provide high quality images under all weather conditions for applications such as agriculture, forestry and plantations, soil moisture and hydrology and flood mapping.

The satellite realised at U R Rao Satellite Centre, Bengaluru, generates 2,280 W power.

Co-passenger satellites INSPIRESat-1 and INS-2TD were successfully separated from the PSLV in a predetermined sequence.

INSPIRESat-1 is from Indian Institute of Space Science and Technology (IIST) in association with Laboratory of Atmospheric and Space Physics at University of Colorado Boulder, while INS-2TD is a technology demonstrator satellite from ISRO. This is a precursor to the India-Bhutan Joint Satellite (INS-2B).

Two scientific payloads on INSPIRESat-1, with a mass of 8.1 kg and mission life of one year, are aimed at improving the understanding of ionosphere dynamics and the sun's coronal heating processes. INS-2TD, with a mass of 17.5 kg, has a mission life of six months. Having a thermal imaging camera as its payload, the satellite benefits the assessment of land surface temperature, water surface temperature of wetland or lakes, delineation of vegetation (crops and forest) and thermal inertia (day and night).

<http://www.millenniumpost.in/nation/govt-panel-recommends-eua-for-bes-covid-jab-corbevax-468341?infinite-scroll=1>



Tue, 15 Feb 2022

## Hyderabad based ATL plays key role in ISRO's successful PSLV launch

*ATL has been associated with ISRO for manufacturing various electronics and mechanical sub-systems*

Hyderabad: Indian Space Research Organisation (ISRO)'s latest Polar Satellite Launch Vehicle (PSLV C-52) successful mission into space once again saw a critical role played by the city-based Ananth Technologies Limited (ATL) in carrying out the 'sub-assemblies of various flight systems, integration, and checkouts'.

"This PSLV C-52 mission has also been unique for its different stages harnessed, integrated, tested and qualified by us. We have been a long-term partner with the ISRO's Vikram Sarabhai Space Centre (VSSC) and taking guidance from its engineers", said founder, chairman & managing director of ATL Subba Rao Pavuluri on Monday.

The company's Thiruvananthapuram unit has worked on various stages of the rocket like fabrication, assembly, testing, avionics packages such as on-board computers, control electronics, telemetry, power systems etc., while the Bengaluru manufacturing unit has contributed to the satellite mission through many other key avionics systems, he explained.



The ISRO's PSLV C-52 carrying three satellites successfully lifting off from the first launch-pad Satish Dhawan Space Centre at Sriharikota in Andhra Pradesh on Monday, February 14, 2022. | Photo Credit: B. Jothi Ramalingam



Headquartered in the city, the ATL has been involved with the ISRO missions for the last three decades associated with manufacturing of various electronics and mechanical sub-systems for launch vehicles, satellites, spacecraft payloads, and ground systems.

“We are thankful for the ISRO in reposing trust in us all these years. We have also been providing geo-spatial data and services for developmental projects in the country. Plus, manufacturing critical aerospace sub-systems for the strategic sector such as avionics packages, sensors, communication systems, sophisticated flight systems and the likes,” informed Dr. Subba Rao.

The CMD also highlighted ATL has provided to ISRO ‘zero-defect manufacturing support’ to around 69 launch vehicles and 89 spacecraft so far. The firm has recently formed a joint venture with the United States (U.S.) based Saturn Satellite Networks (SSN), for building advanced small-to-medium-sized satellites specifically be suitable to be launched on-board India’s PSLV and SSLV – Small Satellite Launch Vehicle, he said.

ATL has also entered into agreements with reputed aerospace and space companies of Europe, the U.S., and Russia for specialized manufacturing services, said Dr. Subba Rao and observed that government opening the space sector for ‘enhanced participation’ of private industries in all areas would help in the resolve for self-reliance under the ‘Atmanirbhar Bharat’.

<https://www.thehindu.com/news/national/telangana/hyderabad-based-atl-plays-key-role-in-isros-successful-pslv-launch/article65048368.ece>



Tue, 15 Feb 2022

## Quantum errors made more tolerable

By Andreas Trabesinger

ETH physicists have modified one of the major schemes for quantum error correction and put it into practice, demonstrating that they can substantially prolong the lifetime of quantum states—a crucial ingredient for future large-scale quantum computers.

In modern computing devices, literally billions of transistors work restlessly in almost perfect harmony. The keys to producing near-perfect computation from devices made from imperfect components are the use of digitisation and error correction, with the latter encompassing procedures to detect and rectify inaccuracies as they occur. The challenge of preventing errors from accumulating is one that future quantum computers have to face as well—in fact it forms the main barrier to realizing useful computations. Alas, the tools that have been perfected for classical computers cannot be applied directly to quantum computers, which play by another set of rules, those of quantum mechanics. Ingenious solutions for quantum error correction have been proposed over the past couple of decades, and recently there has been encouraging progress towards implementing such methods in state-of-the-art quantum computers. Writing in *Nature Physics*, the group of Prof. Jonathan Home at the Institute for Quantum Electronics report such an experimental realization—one that stands out by factoring in important limitations of physically realistic devices and by being relatively easy to implement compared to other proposed error-correction schemes, thus increasing the relevance of the demonstration for practical quantum computation.



The experimental chamber in which the experiments of de Neeve and colleagues were performed. Credit: ETH Zurich/D-PHYS Home group

### Allowing a quantum of error

The way information is processed in quantum computers differs fundamentally from that in their classical counterparts. This opens up unique computational capabilities, but also calls for novel

strategies to deal with errors that occur in the process. More specifically, quantum information cannot be perfectly duplicated, and measurements inevitably alter the fragile quantum states. Nevertheless, with some creative rethinking it is possible to devise measurements that can tell us whether the quantum information has been disturbed. As with classical error correction, the key is to harness redundancy.

Among the innovative ideas that have emerged for quantum error correction, the so-called Gottesman–Kitaev–Preskill (GKP) code is a particularly promising one, using flexible control of a single oscillator to avoid having to control many different individual physical carriers of quantum information. It encodes discrete quantum information in the continuous space of a quantum system, forcing it to be positioned at regularly spaced points forming a comb with teeth at fixed intervals, effectively digitizing space (see image below). Information is stored in the size of the comb teeth. Small displacements of the comb in position can be corrected, so long as they do not cause neighboring teeth to overlap. While this scheme was proposed in 2001, an experimental demonstration of error correction with GKP codes came only in 2020, but the degree of error correction that could be achieved was somewhat limited. This is because the GKP code is exact only for quantum states of infinite energy, whereas experiments naturally involve finite-energy states. Brennan de Neeve, a doctoral student in the Home group, Dr. Thanh-Long Nguyen, a postdoctoral researcher there, and Tanja Behrle, another doctoral student, have now tackled just that issue.

### **Coping with finiteness**

The team used a platform in which quantum information is encoded in the mechanical oscillator motion of a single trapped ion. This was the same system in which the Home group pioneered the generation and control of logical states of the GKP code. Building on these capabilities, de Neeve et al. now designed and implemented a novel measurement scheme that is optimized for finite-energy states. Their approach is relatively simple to realize, in that it makes use of damping processes which avoid having to measure the quantum state and subsequently apply classically controlled feedback. Putting the new method into practice, they demonstrated efficient correction of unwanted displacements in the motion of their quantum oscillator. As a result, they extended the coherence time (in essence the lifetime of the quantum state) by a factor of three, setting a benchmark for quantum computing systems.

Such prolonged coherence times are important, as they translate directly into more time for executing quantum computations, a key 'currency' when it comes to practical devices. The work therefore addresses one of the grand challenges in the field of quantum computing. Moreover, the new approach uses variants of well-established techniques in the tool chest of experimental quantum physics, inspiring confidence that it can be pushed even further. Combined with progress on other fronts, this brings us ever closer to eventually enabling quantum computers to perform calculations with arbitrary precision, even if constructed from fault-prone components.

**More information:** Brennan de Neeve et al, Error correction of a logical grid state qubit by dissipative pumping, *Nature Physics* (2022). [DOI: 10.1038/s41567-021-01487-7](https://doi.org/10.1038/s41567-021-01487-7)

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**Journal information:** [Nature Physics](#) , [Nature](#)  
<https://phys.org/news/2022-02-quantum-errors-tolerable.html>

