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समाचार पत्रों से चयित अंश Newspapers Clippings

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Sun, 12 Sept 2021

Jagran Explainer: How INS Dhruv, Navy's 1st nuclear missile tracking ship, will strengthen India

The INS Dhruv is India first naval vessel that is capable of tracking nuclear missiles at a long range. Built by the Hindustan Shipyard in collaboration with the DRDO and NTRO, INS Dhruv is equipped with multiple features that make it a state-of-the-art instrument in modern naval warfare

New Delhi: In a major boost for India's naval power, the country on Friday got its first satellite and ballistic missile tracking ship Dhruv, which was commissioned from Vishakhapatnam in Andhra Pradesh. The INS Dhruv is India first naval vessel that is capable of tracking nuclear missiles at a long range. Built by the Hindustan Shipyard in collaboration with the DRDO and NTRO, INS Dhruv is equipped with multiple features that make it a state-of-the-art instrument in modern naval warfare. With the induction of INS Dhruv, India joins a select group of countries like the US, the UK, Russia, China and France to have such specialised vessels.



(file picture used for representation)

All you need to know about INS Dhruv:

INS Dhruv, with its anti-ballistic missile capabilities, will act as an early warning system for enemy missiles from enemies.

The INS Dhruv is also equipped with a state-of-the-art active scanned array radar (AESA) which will enable it to scan various spectrums and monitor spy satellites watching over India.

Dhruv is India's first naval vessel that is capable of tracking nuclear missiles at a long range. Thee INS Dhruv is also equipped with the capability to map ocean beds for research and detection of enemy submarines.

The satellite and ballistic missile tracking ships were known by the code designation VC-11184.

It has a length of 175 metres, beam of 22 metres, draught of six metres and can attain a speed of 21 knots. It is powered by two imported 9,000 kilowatts combined diesel and diesel (CODAD) configuration engines and three 1200 kilowatt auxiliary generators

The 10,00 tonnes vessel is housed with long-range radars, dome-shaped tracking antennae and advanced electronics. INS Dhruv will also help in monitoring the flight trajectories and telemetry data of the Agni land-based missiles and 'K' series of submarine-launched ballistic missiles launched by India during trials

How it will benefit India's naval power:

INS Dhruv will play a key role in India's maritime awareness in the Indo-Pacific since it is being commissioned at a time when an era of underwater warfare and surveillance drones with the use of advanced submarines has arrived.

INS Dhruv, with its state-of-the-art detection facilities, will also help the country's defence and military researchers understand the true missile capability of the adversary when they test their ballistic missiles.

With Dhruv monitoring the seas for spy satellites across a variety of spectrums, the Indian Navy can now keep an eye out in the entire region from the Gulf of Aden to the ingress route to the South China Sea via Malacca, Sunda, Lombok, Ombai and Wetar straits.

The Indian Navy can now strategise its military operations better across all three dimensions of naval warfare – sub-surface, surface, and aerial.

India's nuclear missile tracking ship will be manned by Indian Navy personnel with the Strategic Forces Command (SFC).

<https://english.jagran.com/india/jagran-explainer-how-ins-dhruv-navys-1st-nuclear-missile-tracking-ship-will-strengthen-india-10031960>

अमरउजाला

Sat, 11 Sept 2021

INS Dhruv: 2000 किमी दूर से आ रही मिसाइल को भी ट्रैक कर लेगा यह युद्धपोत, जानें भारत को इसकी जरूरत क्यों?

सार

INS Dhruv: इस जंगी जहाज को इतना गोपनीय रखा गया था कि सिर्फ प्रधानमंत्री कार्यालय और राष्ट्रीय सुरक्षा सलाहकार की निगरानी में ही इसे बनाने का काम पूरा हुआ। अब इसे आधिकारिक तौर पर नौसेना में शामिल किया जाएगा।

विस्तार

नई दिल्ली: भारतीय नौसेना की ताकत बढ़ाने के लिए केंद्र सरकार की कोशिशें जारी हैं। इसी के मद्देनजर नौसेना को महज सात साल के अंदर देश में बना पहला सैटेलाइट और बैलिस्टिक मिसाइल ट्रैकिंग जहाज आईएनएस ध्रुव मिलने जा रहा है। विशाखापत्तनम में मौजूद इस 17 हजार टन वजनी ट्रैकिंग पोत के जरिए हिंद-प्रशांत क्षेत्र में भारतीय नौसेना की ताकत में जबरदस्त इजाफा होने का अनुमान लगाया जा रहा है। दरअसल, मौजूदा समय में दुनिया के सिर्फ चार देशों के पास ही इस तकनीक वाला नौसैन्य मिसाइल सिस्टम मौजूद है।



आईएनएस ध्रुव का निर्माण 2014 में शुरू हो गया था और 7 साल बाद यह बनकर तैयार हो गया। - फोटो : Social Media

क्या है आईएनएस ध्रुव का इतिहास?

आईएनएस ध्रुव का निर्माण भारत के हिंदुस्तान शिपयार्ड लिमिटेड ने किया है। इसके निर्माण की शुरुआत के दौरान इसका नाम वीसी-11184 दिया गया था। इस शिप के केंद्रीय ढांचे का निर्माण 30 जून 2014 को मोदी सरकार के आने के बाद शुरू किया गया था। इसे इतना गोपनीय रखा गया कि सिर्फ प्रधानमंत्री कार्यालय (पीएमओ) और राष्ट्रीय सुरक्षा सलाहकार (एनएसए) की निगरानी में ही इसे बनाने का काम पूरा हुआ।

इस शिप के निर्माण के बाद इसके ट्रायल की जानकारी को भी अधिकतर गुप्त ही रखा गया। रिपोर्ट्स के मुताबिक, आईएनएस ध्रुव का हार्बर ट्रायल जुलाई 2018 में शुरू हुआ। 2018 के अंत तक इसका समुद्री ट्रायल भी शुरू हो गया। बताया जाता है कि तकरीबन दो साल तक पूरी जांच के बाद यह पोत अक्टूबर 2020 में गुपचुप तरीके से नौसेना तक पहुंचा दिया गया। अब सितंबर 2021 में इसे आधिकारिक तौर पर नौसेना में शामिल किया जाएगा। इस शिप के पूरे निर्माण की लागत का खुलासा नहीं किया गया है, लेकिन 2014 की एक रिपोर्ट के मुताबिक, इसे बनाने में तब लगभग 1500 करोड़ रुपये का खर्च अनुमानित था।

भारत को क्यों पड़ी ट्रेकिंग पोत की जरूरत?

मौजूदा समय में भारत के दो पड़ोसियों (चीन और पाकिस्तान) के पास परमाणु हथियार हैं। चीन पिछले काफी समय से समुद्री सीमा के जरिए भारत पर निगरानी रखने की कोशिश कर रहा है। नौसैन्य निगरानी के मामले में फिलहाल चीन सबसे आगे है। उसके पास भारत के मुकाबले ट्रेकिंग जहाजों का बड़ा बेड़ा है। चिंता की बात यह है कि चीन बीते काफी समय से अपने समुद्री क्षेत्र से निगरानी करने वाले जहाजों को हिंद महासागर की ओर भेज रहा है।

मिसाइलों की ट्रेकिंग के लिए कैसे काम करेगा आईएनएस ध्रुव?

चीन और पाकिस्तान दोनों के पास ही बैलिस्टिक मिसाइल तकनीक मौजूद है। हालांकि, जमीनी और हवाई सीमा पर भारत के पास आधुनिक रडार तकनीक मौजूद है। इससे युद्ध के समय इन दोनों देशों से आती मिसाइल-रॉकेट को ट्रैक कर उन्हें नष्ट किया जा सकता है। साथ ही भारत को जल्द ही रूस से एस-400 मिसाइल डिफेंस सिस्टम भी मिलने वाला है, जो इन दोनों देशों की सीमा पर तैनात किया जाना है। यानी भारत की जमीनी सीमा किसी मिसाइल या एयरक्राफ्ट के हमले से सुरक्षित हो जाएगी।

इस बीच, बड़ा खतरा यह है कि जमीनी जंग के बीच चीन और पाकिस्तान समुद्री रास्ते का इस्तेमाल करते हुए भारत पर नौसैनिक शिप से बैलिस्टिक मिसाइल दाग सकते हैं। चूंकि, बैलिस्टिक मिसाइल की रेंज ज्यादा होती है और बड़े समुद्री इलाके में रडार के लिए कोई तय जगह नहीं हो सकती, ऐसे में काम आते हैं नौसेना के ट्रेकिंग और सर्विलांस शिप। इन ट्रेकिंग शिप पर आधुनिक सर्विलांस रडार लगे होते हैं, जो कि एंटीना के जरिए सीधे सैटेलाइट से जुड़े होते हैं। ये सैटेलाइट ही दूरी से आ रही मिसाइल का पता लगाकर शिप में मौजूद रडार तक जानकारी भेजते हैं। इससे बैलिस्टिक मिसाइलों को आसानी से ट्रैक करने के बाद नष्ट किया जा सकता है। भारत में अब इन सभी जरूरतों को आईएनएस ध्रुव के जरिए पूरा किया जाएगा।

क्या हैं आईएनएस ध्रुव की खासियत?

आईएनएस ध्रुव का डिजाइन विक सेंडविक डिजाइन की ओर से तैयार किया गया है। इसकी लंबाई 175 मीटर यानी दो फुटबॉल मैदानों के बराबर है, जबकि चौड़ाई 22 मीटर है। इस शिप पर एक समय में 300 नौसैनिक रह सकते हैं। इस ट्रेकिंग शिप की रफ्तार 21 नॉट्स (40 किमी प्रतिघंटा) तक जा सकती है। निगरानी के लिए इस्तेमाल किए जाने वाले इस शिप में 9000 किलोवॉट का डीजल इंजन भी लगा है। इसके अलावा इसमें 1200 किलोवॉट के दो ऑक्सीलरी जेनरेटर भी लगे हैं।

किस तकनीक पर बना है आईएनएस ध्रुव का रडार ट्रेकिंग सिस्टम?

आईएनएस ध्रुव ट्रेकिंग और सर्विलांस शिप की सबसे बड़ी ताकत है इसका रडार सिस्टम, जो कि दो हजार किमी दूरी से लॉन्च होने वाली बैलिस्टिक मिसाइल को भी ट्रैक कर सकता है। रिपोर्ट्स की मानें तो इस शिप में एक्स-बैंड एईएसए और एस-बैंड एईएसए (X-Band AESA Radar और S-Band AESA Radar) लगाए गए हैं। इन्हें भारतीय नौसेना ने राष्ट्रीय तकनीकी अनुसंधान संस्थान (एनटीआरओ) और डीआरडीओ ने विकसित किया है।

इस ट्रैकिंग शिप में लगा रडार लगातार 360 डिग्री तक घूम कर मिसाइल और एयरक्राफ्ट की ट्रैकिंग कर सकता है। इस रडार की खासियत है कि यह एक रडार न होकर कई रडार का समूह है। यानी जहां एक रडार से एक समय में एक ही चीज को ट्रैक किया जा सकता है, वहीं आईएनएस ध्रुव में लगे रडार से एक ही बार में कई टारगेट को निशाना बनाया जा सकता है। बताया जाता है कि ये रडार एक बार में 10 टारगेट को लॉक कर निशाना बना सकता है।

बैलिस्टिक मिसाइल के खतरे से कैसे बचाएगा आईएनएस ध्रुव?

बैलिस्टिक उन मिसाइलों को कहा जाता है, जो बैलिस्टिक मार्ग (पैराबोला) अपनाती हैं। यानी जमीन या किसी वाहन से लॉन्च होने के बाद ये मिसाइलें आसमान में काफी ऊंचाई तक जाती हैं और फिर दुश्मन के ठिकाने को तबाह करती हैं। आईएनएस ध्रुव का रडार ट्रैकिंग सिस्टम यहीं पर सबसे ज्यादा काम आता है।

यह मुख्यतः कुछ चरणों में काम करेगा...

- आईएनएस ध्रुव का काम समुद्री क्षेत्र के ऊपर से दुश्मन की बैलिस्टिक मिसाइल लॉन्च होते ही शुरू हो जाएगा। सबसे पहले दुश्मन पर नजर रख रहे सैटेलाइट ही लॉन्च हुई मिसाइल का पता लगा लेंगे।
- हालांकि, मिसाइल की गति, उसकी दूरी और उसकी दिशा की पूरी जानकारी इस ट्रैकिंग शिप के जरिए ही पता चलेगी। आईएनएस ध्रुव पर लगा रडार सिस्टम इसका पता लगाएगा।
- इसके बाद यह पूरी जानकारी आगे किसी और पोत या जमीन पर लगे एयर डिफेंस सिस्टम पर भेजी जाएगी जो कि हमले के लिए आ रही बैलिस्टिक मिसाइल को नष्ट करने के लिए तैयार रहेगा।

<https://www.amarujala.com/india-news/ahead-of-induction-of-ins-dhruv-in-indian-navy-know-what-are-its-capabilities-and-how-will-it-help-in-tracking-and-destroying-nuclear-ballistic-missiles?pageId=7>



Sun, 12 Sept 2021

MRSAM-Barak-8 missile system handed over to IAF – Know how it will boost India's Air Defence?

A medium-range surface-to-air-missile (MRSAM) system is capable of knocking out aerial threats such as enemy fighter jets, missiles, unmanned aerial vehicles, and helicopters at a range of 70 km.

By Shailaja Tripathi

The Indian Air Force on September 9, 2021, inducted a medium-range surface-to-air-missile (MRSAM) system. It is capable of knocking out aerial threats such as enemy fighter jets, missiles, unmanned aerial vehicles and helicopters at a range of 70 km.

The Union Defence Minister Rajnath Singh defined the capability of the new missile system as a game-changer in India's air defence.

The Union Minister said that with the handing over of the MRSAM system to the Indian Air Force, India has taken a giant leap towards achieving 'Atmanirbhar Bharat'. The Chief of DRDO, G Satheesh Reddy handed over the first firing unit of the missile system to the Chief of Indian Air Force, Air Chief Marshal RKS Bhadauria.



MRSAM-Barak-8 missile system: Key details

- The missile system has been jointly developed by the Defence Research and Development Organisation (DRDO) and Israel Aerospace Industries. Other firms involved in the project include Bharat Electronics Limited, Israeli firm Rafael, Larsen & Toubro and Bharat Dynamics Limited.
- MRSAM or the Barak 8 air defence system includes advanced radar, command and control systems and mobile launchers.
- The advanced missile has been powered by a locally-developed rocket motor and the control system for high manoeuvrability in the terminal phase.

Significance:

A medium-range surface-to-air-missile system has the capability of shooting down an enemy aircraft at a 50-70 km range, even in bad weather. The advanced system will provide ultimate protection against different aerial platforms.

How MRSAM system will boost India's Air Defence?

The induction of the MRSAM system which was long-awaited will now give a boost to India's air defence capability significantly.

The Union Defence Minister said that MRSAM was one of the biggest missile systems available globally and that the project highlights a close partnership between the Indian and Israel defence systems. The project will strengthen the defence industrial bases of both India and Israel and it will be a win-win situation.

The naval version of MRSAM has already been deployed on few Indian warships in order to boost their anti-war warfare capabilities. The Indian army has also placed orders for MRSAM but has not yet inducted the system.

India and Israel had inked separate deals worth around \$3 billion over the last 4 years for the advanced surface-to-air missile systems for three services.

Why MRSAM system is required in present scenario?

The Union Defence Minister explained that geopolitical changes have impacted the economy, trade, security scenario and power politics. In such a situation, strengthening India's security and self-reliance has become a necessity and not an achievement.

He further added that the global scenario has been transforming very fast and the equations between nations are also changing as per their interest. Whether it is Indian Ocean Region, South China Sea, Central Asia or Indo-Pacific, uncertainty is everywhere.

Inauguration of emergency landing facility for IAF:

The induction ceremony of MRSAM took place after the Defence Minister and the Minister for Road Transport and Highways Nitin Gadkari jointly inaugurated an emergency landing facility for the Indian Air Force on the Satta-Gandhav stretch of NH-925A near Barmer.

The two union ministers also witnessed the aircraft operations in the new landing facility. It supports the landing of all the aircraft in the Indian Air Force's fighter and transport fleets.

<https://www.jagranjosh.com/current-affairs/mrsam-barak-8-missile-system-handed-over-to-iaf-know-how-it-will-boost-indias-air-defence-1631263444-1>

Explained: India's Ballistic Missile Defence programme, developed by DRDO

BMD programme aims to provide air-defence shield from all types of hostile missiles

By Pradip R Sagar

India's Ballistic Missile Defence (BMD) programme, which aims to provide an air-defence shield from all types of hostile missiles, even the nuclear ones, is complete. The Indian Air Force is deploying all of these assets, which are developed by the country's premier defence research agency DRDO.

India's BMD programme was launched after the 1999 Kargil war, keeping in mind Pakistan's expanding missile arsenal. China also played a key role in supporting Pakistan's missile programme.

The homegrown BMD was two-tiered - the first layer is the Prithvi Air Defence, which can intercept and destroy missiles at exo-atmospheric altitudes of 50–180 kilometres. Pradyumna Ballistic Missile Interceptor is going to replace the Prithvi air defence, according to a defence official.

The second layer is Advanced Air Defence (AAD) Missile for lower altitude interception, which is designed to knock down hostile missiles in the endo-atmosphere at altitudes of 15-40 kilometres. Akash Surface-to-Air Missiles (SAM) is part of AAD.

DRDO was given the responsibility to work on India's own BMD. According to an official, Prithvi air defence was first tested in 2006, making India the fourth nation to have anti-ballistic missile systems after the US, Russia and Israel. Similarly, AAD got its first test in 2007 and since then both systems have done multiple rounds of tests and are now in the process of deployment.

India also conducted its first successful anti-satellite (ASAT) test, under Mission Shakti in March 2019.

Besides BMD, India is also getting the Russian S-400 Triumf air defence system. Scheduled to be delivered by the end of this year, S-400 Triumf is one of the world's most advanced air defence systems that can simultaneously track numerous incoming objects, including aircraft, missiles and UAVs and neutralise them. Integrated with multifunction radar, autonomous detection and targeting systems, anti-aircraft missile systems, launchers, and command and control centre, S-400 will be a game-changer in the sub-continent and a huge boost to India's air defence capability.

On Thursday, in a significant boost to India's defence capabilities, the first deliverable firing unit of Medium-Range Surface-to-Air Missile (MRSAM) system was handed over to Indian Air Force. It provides a point and area air defence for ground assets against a wide range of threats including fighter aircraft, UAVs, helicopters, guided and unguided munitions, sub-sonic and supersonic cruise missiles. Capable of engaging multiple targets at ranges up to 70 km in severe saturation scenarios, the missile is powered by the indigenously developed rocket motor and control system for achieving high manoeuvrability during the terminal phase.

Moreover, on Friday, with the induction of Indian naval ship Dhruv, the nuclear missile tracking ship, Indian joins an elite group of countries like the US, Russia, China, UK and France to have such capability. Developed by DRDO, in collaboration with Hindustan Shipyard and the National



Defence Minister Rajnath Singh looks at MRSAM missile during its induction ceremony, at Air Force Station in Jaisalmer | PTI; Advanced Air Defence missile | via DRDO website

Technical Research Organisation (NTRO), INS Dhruv is expected to be based in eastern naval command in Vizag. INS Dhruv, which will be under the control of the Strategic Forces Command (SFC), is going to India's answer to China's 'sea-based military doctrine', under which PLA Navy has made massive investments in developing warships, submarine and aircraft carriers.

<https://www.theweek.in/news/india/2021/09/11/explained-indias-ballistic-missile-defence-programme-developed-by-drdo.html>



Sun, 12 Sept 2021

Indian Air Force gets medium-range missile defence system

By Ravi Sharma

The Jaisalmer-based 2204 Squadron, the 'Invincibles', has become the first unit in the Indian Air Force (IAF) to be equipped with the lethal Medium-Range Surface-to-Air Missile (MRSAM) system. The first of the 18 deliverable firing units of the MRSAM System was, on September 9, handed over to the Chief of the Air Staff, Air Chief Marshal R K S Bhadauria, by the Defence Research and Development Organisation (DRDO), in the presence of Defence Minister Rajnath Singh at a function at the Air Force Station, Jaisalmer.

The MRSAM is an advanced, network-centric combat air-defence system developed jointly by the DRDO and the Israel Aerospace Industries in collaboration with Indian industry partners from the private and public sectors, including MSMEs.

It is fitted with the Israeli supersonic Barack missile. The MRSAM system can destroy aircraft at distances of up to 110 kilometres, and is capable of simultaneously launching 24 missiles on 16 targets at ranges up to 70 km. Being quickly transportable, the missile system makes it difficult for the enemy to accurately mark its presence on the ground.

The MRSAM system provides point and area air defence for ground assets against a wide range of threats, including fighter aircraft, UAVs, helicopters, drones, guided and unguided munitions, sub-sonic and supersonic cruise missiles and other munitions. The missile is powered by an indigenously-developed rocket motor and control system for achieving high manoeuvrability during the terminal phase. The firing unit consists of missiles, Combat Management System (CMS), Mobile Launcher Systems (MLS), Advanced Long Range Radar, Mobile Power System (MPS), Radar Power System (RPS), Reloader Vehicle (RV) and the Field Service Vehicle (FSV).

Rajnath Singh termed the missile system "one of the best state-of-the-art missile systems in the world". Describing the development of the MRSAM system as a shining example of the close partnership between India and Israel, the Defence Minister added that the collaboration had played an important role in strengthening the defence industrial bases of India and Israel.

With the Indian Navy having already received another version of the MRSAM, it is expected that the Indian Army's requirements will also be expedited.

The Invincibles, originally raised in Bhatinda (in 1975), had in their arsenal the 'Pechora' surface-to-air missile. The squadron was relocated to Pune in 1993, and to Jaisalmer in 2015.

<https://frontline.thehindu.com/dispatches/indian-air-force-gets-medium-range-missile-defence-system/article36398986.ece>



Defence Minister Rajnath Singh looking at the MRSAM missiles during its induction ceremony at the Air Force Station, Jaisalmer, on September 09. Photo: Vijay Verma/PTI

First MRSAM system handed over to IAF Chief

Scientists at APJ Abdul Kalam Missile Complex played a key role in making this advanced missile

By V. Geetanath

Hyderabad: It was yet another triumphant moment for the APJ Abdul Kalam Missile Complex here when Defence Minister Rajnath Singh handed over the first Medium Range Surface to Air Missile (MRSAM) System to Indian Air Force (IAF) chief R.K.S. Bhadauria, earlier this week in the presence of Defence Research Development Organisation (DRDO) chairman G. Satheesh Reddy.

Scientists at the Kalam Complex, including those at Research Centre Imarat (RCI) housed inside, had played a key role in making this advanced missile in association with Israel Aerospace Industries (IAI). “It is the true success of a synergistic effort put in by defence public sector and private sector units, respective scientists and technologists over the last dozen years with RCI being the nodal lab,” informed senior defence officials, wishing to remain anonymous, on Saturday.



Top defence scientists with IAF officials at the development centre.

More than 100 medium, micro and small scale industries were involved in the project, most of them based in and around the capital here, but which cannot be named. This has also helped in scaling up technologies and skill to global standards, they claimed.

The lush green 4,000 acre missile complex conceived by former president Kalam also houses the Advanced Systems Laboratory (ASL) and the Defence Research & Development Lab (DRDL) and it has been in the forefront in the development of the strategic missile development projects including avionics over the years.

Incidentally, Indian Navy has already inducted its version of MRSAM and this latest version has been tweaked to meet IAF needs with a hat-trick of successful trials for “accuracy, reliability and efficacy” conducted five years ago at Balasore. “An Army version of the missile is in the advanced stage of development,” informed senior officials.

With BDL the lead production partner, IAF has contracted for 18 firing units with each consisting of 24 missiles each. MRSAM system provides point and area air defence for ground assets against threats from fighter aircraft, UAVs, helicopters, guided and unguided munitions, subsonic and supersonic cruise missiles. It is capable of engaging multiple targets at ranges up to 70 km and is powered by indigenously developed rocket motor and control system for achieving high manoeuvrability.

Firing unit has Missiles, Combat Management System (CMS), Mobile Launcher Systems (MLS), Advanced Long Range Radar, Mobile Power System (MPS), Radar Power System (RPS), Reloader Vehicle (RV) and Field Service Vehicle (FSV). “Development of Brahmos missile with Russia is the only comparable missile operating system developed indigenously as part of the Atma Nirbhar and Skill India initiatives of the government,” they said.

“This has been a transformative project with major production units as well as ancillary units augmenting their line systems and manpower. It has helped foster special skills, technologies; setting the right template for development of next generation tactical missiles,” asserted senior defence officials. Incidentally, new RCI director U. Raja Babu has been programme director for MRSAM and P. Srihari is project director, they added

<https://www.thehindu.com/news/cities/Hyderabad/first-mrsam-system-handed-over-to-iaf-chief/article36416587.ece>

MRSAM air defense system, jointly developed with IAI, inducted by Indian Air Force

The advanced system is said to provide protection against a variety of airborne threats. It has already been deployed by the IDF

Israel Aerospace Industries (IAI) on Friday congratulated India's Defence R&D Organization (DRDO) and the Indian Air Force on the induction of the country's MRSAM Air & Missile Defense System. The MRSAM, which was jointly developed by IAI and the Indian Defence Ministry's DRDO, is an advanced system that provides protection against a variety of aerial platforms. It is used by the Indian Air Force, Army and Navy as well as the Israel Defense Forces. The system includes an Advanced Phased Array Radar, command and control shelter, mobile launchers, and interceptors with an advanced RF seeker, IAI said.



Photo: IAI

In a ceremony held at Air Force Station Jaisalmer in India, the MRSAM system was inducted by Indian Defence Minister Rajnath Singh, Secretary of Department of Defence (Research and Development) and DRDO Chairman G Satheesh Reddy, Air Force Chief of Staff Air Chief Marshal RKS Bhadauria, Defense Chief of Staff General Bipin Rawat, Air Officer Commander-in-Chief (AOC-in-C), South Western Air Command Air Marshal Sandeep Singh, and IAI President and CEO Boaz Levy, along with other senior civilian and military officials. The induction comes after the two countries successfully carried out extended tests earlier this year at a facility in India which validated that all the components of the weapons system were working perfectly, according to IAI.

Boaz Levy, President and CEO of IAI, said "MRSAM Air & Missile Defense System is a cutting edge, innovative system and significant proof of the unique partnership and collaboration between the countries and IAI's commitment to India. The development and production of the system is fully based on the Make in India policy in partnership and collaboration between Israel and India's industries, and is a model of success of the Make in India policy for the benefit of all parties. During the last year, under strict Covid-19 conditions, teams from IAI and India worked shoulder-to-shoulder to ensure this moment, following the validation of the system's capabilities. The commitment of IAI to India, and to its defense forces, is unquestionable and we salute this partnership for many years to come."

<https://www.israeldefense.co.il/en/node/51800>

Indian military inaugurates use of IAI's missile defense system

The Indian Armed Forces has inaugurated the integration and operational use of Israel Aerospace Industries (IAI) Barak 8 MRSAM Air & Missile Defense System

By Danny Zaken

The Indian Armed Forces has inaugurated the integration and operational use of Israel Aerospace Industries (IAI) Barak 8 MRSAM Air & Missile Defense System. MRSAM is an advanced path-breaking air and missile defense system that provides ultimate protection against a variety of aerial platforms and includes an advanced phased array radar, command and control shelter, mobile launchers and interceptors with an advanced RF seeker. MRSAM is jointly developed by IAI and DRDO in collaboration with India and Israel for the Indian forces.



During a ceremony held in Air Force Station Jaisalmer India, the MRSAM system was inaugurated by Indian Defense Minister Rajnath Singh, Secretary of Department of Defense (R&D) and DRDO Chairman G Satheesh Reddy, and IAI President and CEO Boaz Levy along with other senior civil and military officials. The induction comes after earlier this year, the two countries successfully carried out extended tests at a facility in India which validated that all the components of the weapons system were working perfectly.

IAI's Barak 8 MRSAM sales in recent years have amounted to more than \$6 billion. Missiles for the system in India are being made locally.

Levy said, "MRSAM Air & Missile Defense System is a cutting edge, innovative system and significant proof of the unique partnership and collaboration between the countries and IAI's commitment to India. The development and production of the system is fully based on the Make in India policy in partnership and collaboration between Israel and India's industries, and is a model of success of the Make in India policy for the benefit of all parties. During the last year, under strict Covid-19 conditions, teams from IAI and India worked shoulder-to-shoulder to ensure this moment, following the validation of the system's capabilities. The commitment of IAI to India, and to its defense forces, is unquestionable and we salute this partnership for many years to come."

<https://en.globes.co.il/en/article-indian-military-inaugurates-use-of-iais-missile-defense-1001384443>

LCA-Mk2 to roll out next year, first flight in 2023, Says Scientist

'Detailed design has been completed and metal cutting is to start shortly'

By Dinakar Peri

New Delhi: The configuration for the Light Combat Aircraft (LCA)-Mk2 has been frozen and steel cutting is expected to begin soon while configuration for the fifth-generation Advanced Medium Combat Aircraft (AMCA) has been frozen and preliminary design completed, a senior scientist from the Aeronautical Development Agency (ADA) has said.

"The detailed design is complete. In fact, we are in the critical design review stage and metal cutting should start very shortly. Roll-out of the aircraft (Mk2) is planned next year and the first flight in early 2023. We are well on track to achieve these goals," Girish S. Deodhare,

Programme Director (Combat Aircraft) & Director, ADA, said at an event by the Centre for Air Power Studies and Society of Indian Defence Manufacturers.

Enhanced range

The aircraft features enhanced range and endurance including an onboard oxygen generation system, which is being integrated for the first time, Dr. Deodhare said.

Heavy weapons of the class of Scalp, Crystal Maze and Spice-2000 will also be integrated on the Mk2. The LCA-Mk2 will be a heavier and much more capable aircraft than the current LCA variants.

The Mk2 is 1,350 mm longer featuring canards and can carry a payload of 6,500 kg compared to 3,500 kg the LCA can carry.

In February, the Defence Ministry signed a ₹48,000-crore deal with Hindustan Aeronautics Ltd. (HAL) to supply 83 LCA-Mk1A to the Indian Air Force. In August, the HAL signed a \$716 million deal with GE Aviation of the U.S. for 99 F404 aircraft engines and support services to power the Mk-1A. The Mk2 will be powered by a more powerful GE-414 engine.

The Indian Air Force (IAF) has one squadron of the LCA in initial operational clearance and deliveries of the second squadron in final operational clearance configuration are under way.

The HAL has already set up a second assembly line to ramp up production from eight aircraft a year to 16. Order for 83 Mk-1A is expected to be completed by 2028-29, Dr. Deodhare said.

Stealth aircraft

Stating that the initial design of the AMCA was started way back in 2009, Dr. Deodhare said that it would be a twin engine stealth aircraft with an internal weapons bay and a diverterless supersonic intake, which has been developed for the first time for which the design is complete.

It will be a 25-tonne aircraft with internal carriage of 1,500 kg of payload and 5,500-kg external payload with 6,500 kg of internal fuel.

On the current status of the AMCA, Dr. Deodhare said the configuration had been frozen, preliminary service quality requirements finalised and preliminary design review completed.

"We are moving to critical design review by the middle of next year with the roll-out planned in 2024 and first flight planned in 2025."



More teeth: An LCA jet. The Mk2 will be heavier and much more capable than the current LCA variants. | Photo Credit: MURALI KUMAR K

The AMCA will have stealth and non-stealth configuration and will be developed in two phases, AMCA Mk1 with existing GE414 engine and an AMCA Mk2 with an advanced, more powerful engine to be developed later along with a foreign partner, Dr. Deodhare added.

The manufacturing and production of the aircraft will be through a special purpose vehicle, which will also have participation of private industry.

Simultaneously, the project for development of a twin-engine deck-based fighter jet meant to fly from the Navy's aircraft carriers is also making progress. On the various programmes under way, Dr. Deodhare said there was commonality of systems and technologies.

<https://www.thehindu.com/news/national/lca-mk2-to-roll-out-next-year-first-flight-in-2023-says-scientist/article36419325.ece>

THE TIMES OF INDIA

Sat, 11 Sept 2021

Amrita University to offer M.Tech in Defence Technology

Kollam: Amrita Vishwa Vidyapeetham, a leading multi-disciplinary teaching and research institution here, has become one of the pioneers in offering M.Tech in Defence Technology, the post-graduate programme jointly developed by Defence Research and Development Organisation (DRDO), and All India Council for Technical Education (AICTE).

The course is developed and being offered at the university now with the objective of meeting the burgeoning skill needs of India's fast-growing defence sector.

The university seeks admission for the academic year 2021-22 from engineering students with undergraduate degrees. Since Defence Technology is a multi-disciplinary domain, students from a wide range of engineering streams - from chemical engineering to computer science, can apply, a university statement said here.

M. Tech. in Defence Technology courses has been designed to produce postgraduates who will have the necessary theoretical and experimental knowledge, skills and aptitude in various defence systems and contemporary technologies to carry out R&D. The program will be based on class lectures and main thesis work, it said. During the program, the students will be given the opportunity to do their main thesis work at DRDO labs, defence PSUs, and private defence industries, it said.

According to the university statement, India's defence sector is fast expanding with the central government continuing its emphasis on defence-indigenisation to make the country, currently the world's third-largest importer of weapons and defence equipment, self-reliant. Hence, the domestic defence market is booming and the defence industry in the public and the private sector are on the hiring spree, it said. A specialised program like the current one is expected to create a large pool of talented workforce for the defence sector, and to give a fillip to the startup ecosystem in the defence sector, it added. On the launch of M.Tech in Defence Technology, G Satheesh Reddy, Chairman, DRDO, said there is an urgent need to expand the research base for developing advanced technology and for accelerating India's tech self-reliance in defence. "Amrita has been working with DRDO on many of the advanced technologies - particularly in the defence R&D. I am sure that the university will be a fountainhead of talent for the robust defence R&D, and manufacturing ecosystem for the defence industry in the country," he said.

P Venkat Rangan, Vice-Chancellor of Amrita University, said their vision is to contribute to nation-building by offering quality higher education in the fields of strategic importance to the country in engineering, medicine, education, and social sciences.

<https://timesofindia.indiatimes.com/home/education/news/amrita-university-to-offer-m-tech-in-defence-technology/articleshow/86111964.cms>

Defence Strategic: National/International



Press Information Bureau
Government of India
Ministry of Defence

Sat, 11 Sept 2021 3:54PM

Press statement of Raksha Mantri Shri Rajnath Singh after '2+2' Ministerial Dialogue between India & Australia

Key Highlights:

- *In-depth discussion on bilateral & regional issues*
- *Afghanistan, maritime security in Indo-Pacific, cooperation in multilateral formats & other related topics discussed*
- *Emphasis on ensuring free flow of trade, adherence to international rules & sustainable economic growth in entire region*
- *Invitation to Australia to engage in India's growing defence industry*

Full text of Raksha Mantri Shri Rajnath Singh's press statement:

"Excellency Ms Marise Payne and Excellency Mr Peter Dutton, Dr Jaishankar, Ladies and gentlemen, it is a great honor and pleasure to receive both the ministers from Australia for the inaugural 2+2 India – Australia Ministerial Dialogue. The 2+2 dialogue signifies the importance of the India – Australia Comprehensive Strategic Partnership. India and Australia share an important partnership which is based on a shared vision of free, open, inclusive and prosperous Indo-Pacific region. As two democracies we have a common interest in peace and prosperity of the entire region.

Today we have had in-depth and wide ranging discussion with Minister Payne and Minister Dutton on bilateral and regional issues. We have discussed various institutional frameworks for wide ranging collaboration including defence cooperation and fight against global pandemic. We exchanged views on Afghanistan, Maritime Security in the Indo-Pacific, cooperation in multilateral formats and other related topics.

During the discussions both sides emphasised the need to ensure free flow of trade, adherence to international rules and norms and sustainable economic growth in the entire region.

On the bilateral defence cooperation we decided to expand military engagements across services, facilitate greater defence information sharing and to work closely for mutual logistic support.

In the context of Defence Cooperation, both sides were glad to note continued participation of Australia in the Malabar Exercises. We invited Australia to engage India's growing defence industry and to collaborate in co-production and co-development of defence equipment.

Dr Jaishankar and I thank both the Australian ministers for their visit to India despite the challenges of the pandemic. Both the sides agreed to continue the high level engagements to build a strong and robust partnership. Thank you very much."

<https://pib.gov.in/PressReleasePage.aspx?PRID=1754109>



भारत और ऑस्ट्रेलिया के बीच '2+2' मंत्रिस्तरीय वार्ता के बाद रक्षा मंत्री श्री राजनाथ सिंह का प्रेस वक्तव्य

प्रमुख बातें:

- द्विपक्षीय और क्षेत्रीय मुद्दों पर गहन चर्चा
- अफगानिस्तान, हिंद-प्रशांत क्षेत्र में समुद्री सुरक्षा, बहुपक्षीय प्रारूपों में सहयोग और अन्य संबंधित विषयों पर चर्चा
- पूरे क्षेत्र में व्यापार के लिये मुक्त प्रवाह सुनिश्चित करने, अंतरराष्ट्रीय नियमों का पालन करने एवं टिकाऊ आर्थिक विकास पर जोर
- ऑस्ट्रेलिया को भारत के बढ़ते रक्षा उद्योग में शामिल होने का निमंत्रण

रक्षा मंत्री श्री राजनाथ सिंह के प्रेस वक्तव्य का पूरा पाठ:

"महामहिम सुश्री मौरिस पायने और महामहिम श्री पीटर डटन, डॉ. जयशंकर, देवियो और सज्जनो, 2+2 भारत-ऑस्ट्रेलिया मंत्रिस्तरीय वार्ता के उद्घाटन के लिए ऑस्ट्रेलिया के दोनों मंत्रियों का स्वागत करना बड़े सम्मान और खुशी की बात है। 2+2 संवाद भारत-ऑस्ट्रेलिया व्यापक रणनीतिक साझेदारी के महत्व को दर्शाता है। भारत एवं ऑस्ट्रेलिया के बीच एक महत्वपूर्ण साझेदारी हैं जो मुक्त, खुले, समावेशी और समृद्ध भारत-प्रशांत क्षेत्र के साझा दृष्टिकोण पर आधारित है। दो लोकतंत्रों के रूप में पूरे क्षेत्र की शांति और समृद्धि में हमारा समान हित है।

आज हमने द्विपक्षीय और क्षेत्रीय मुद्दों पर मंत्री पायने और मंत्री डटन के साथ गहन और व्यापक चर्चा की है। हमने रक्षा सहयोग और वैश्विक महामारी के खिलाफ लड़ाई सहित व्यापक सहयोग के लिए विभिन्न संस्थागत ढांचे पर चर्चा की है। हमने अफगानिस्तान, हिंद-प्रशांत में समुद्री सुरक्षा, बहुपक्षीय स्वरूपों में सहयोग और अन्य संबंधित विषयों पर विचारों का आदान-प्रदान किया।

चर्चा के दौरान दोनों पक्षों ने व्यापार के मुक्त प्रवाह, अंतरराष्ट्रीय नियमों और मानदंडों का पालन और पूरे क्षेत्र में सतत आर्थिक विकास सुनिश्चित करने की आवश्यकता पर बल दिया।

द्विपक्षीय रक्षा सहयोग के संदर्भ में, हमने दोनों देशों के रक्षा बलों के बीच बातचीत को बढ़ाने, रक्षा सूचनाओं के आदान-प्रदान को सुगम बनाने और साजो-सामान सहयोग के लिए मिलकर काम करने का निर्णय लिया है।

रक्षा सहयोग के संदर्भ में, दोनों पक्षों ने मालाबार अभ्यास में ऑस्ट्रेलिया की निरंतर भागीदारी पर प्रसन्नता व्यक्त की। हम ऑस्ट्रेलिया को भारत के बढ़ते रक्षा उद्योग में भाग लेने और रक्षा उपकरणों के सह-उत्पादन और सह-विकास में सहयोग करने के लिए आमंत्रित करते हैं।

डॉ. जयशंकर और मैं दोनों ऑस्ट्रेलियाई मंत्रियों को महामारी की चुनौतियों के बावजूद उनकी भारत यात्रा के लिए धन्यवाद देते हैं। दोनों पक्ष एक मजबूत और ठोस साझेदारी के निर्माण के लिए उच्च स्तरीय संपर्क जारी रखने पर सहमत हुए। आपका बहुत बहुत धन्यवाद।"

<https://pib.gov.in/PressReleasePage.aspx?PRID=1754182>



Press Information Bureau
Government of India

Ministry of Defence

Fri, 10 Sept 2021 5:20PM

Chief of Army Staff visits Chandimandir Military Station

General MM Naravane, Chief of the Army Staff visited Headquarters Western Command at Chandimandir on 10 September 2021. The Army Chief was updated on various operational and training related issues by Lieutenant General RP Singh, Army Commander, Western Command. The COAS addressed officers of the Western Command during which he exhorted them to serve with pride and in doing so uphold the military ethos and the rich culture of the Indian Army. While highlighting the various force modernisation measures being undertaken by the Indian Army, he emphasised that soldiers must also keep themselves abreast with latest trends in Information Technology, emerging cyber threats and counter measures.

Later, General Naravane interacted with the troops commending them for their professionalism and undaunted spirit in maintaining a high state of combat readiness despite the restrictions imposed by COVID-19 pandemic. He exhorted all ranks to continue working with zeal and be prepared for any future operational challenges.



COAS Addressing Officers of Western Command



COAS With Army Commander and Officers of Western Command

<https://pib.gov.in/PressReleasePage.aspx?PRID=1753872>



पत्र सूचना कार्यालय
भारत सरकार
रक्षा मंत्रालय

Fri, 10 Sept 2021 5:20PM

सेना प्रमुख ने चंडी मंदिर मिलिट्री स्टेशन का दौरा किया

सेना प्रमुख जनरल एम एम नरवणे ने दिनांक 10 सितम्बर, 2021 को चंडीमंदिर में पश्चिमी कमान मुख्यालय का दौरा किया। सेना प्रमुख को पश्चिमी कमान के कमांडर लेफ्टिनेंट जनरल आर पी सिंह द्वारा विभिन्न अभियानगत और प्रशिक्षण संबंधी मुद्दों पर ताज़ा जानकारी प्रदान की गई। सेना प्रमुख ने पश्चिमी कमान के अधिकारियों को संबोधित करते हुए उन्हें गर्व के साथ सेवा करने और सैन्य लोकाचार एवं भारतीय सेना की समृद्ध संस्कृति को बनाए रखने के लिए प्रोत्साहित किया। भारतीय सेना द्वारा किए जा रहे विभिन्न आधुनिकीकरण उपायों पर प्रकाश डालते हुए उन्होंने इस बात पर जोर दिया कि सैनिकों को सूचना प्रौद्योगिकी में नवीनतम रुझानों, उभरते साइबर खतरों और इनसे निपटने के उपायों के साथ खुद को अपडेट रखना चाहिए।

बाद में सेना प्रमुख ने कोविडमहामारी की वजह से लगाए गए प्रतिबंधों के बावजूद युद्ध संबंधी तैयारी की उच्च स्थिति बनाए रखने में उनकी व्यावसायिकता और निडर भावना के लिए सराहना करते हुए सैनिकों के साथ बातचीत की। उन्होंने सभी रैंकों को उत्साह के साथ काम करना जारी रखने और भविष्य की किसी भी सैन्य अभियानगत चुनौतियों के लिए तैयार रहने का आह्वान किया।



COAS Addressing Officers of Western Command



COAS With Army Commander and Officers of Western Command

<https://pib.gov.in/PressReleasePage.aspx?PRID=1753973>



**Press Information Bureau
Government of India**

Ministry of Defence

Fri, 10 Sept 2021 8:08PM

Press release for closing ceremony Indo-Kazakhstan joint training exercise KAZIND – 21

The 5th edition of Indo-Kazakhstan Joint Training Exercise, EXERCISE KAZIND-21 culminated today at Training Node Aisha Bibi, Kazakhstan after 12 days of mutual learning.

In the Joint Exercise which began on 31 August 2021, training was focused on Counter Insurgency/ Counter Terrorism operations in urban scenario as well as sharing of expertise on skills at arms. The exercise also provided an opportunity to troops of both Armies to foster everlasting professional and social bonding.

After intense military training, the joint exercise concluded with both Armies exhibiting their combat power and dominance over the terrorist groups during the Validation Exercise. The closing ceremony showcased the immense talent with unique traditional touch of both Nations. The senior officials expressed their satisfaction and appreciation towards the professional conduct of the exercise.

The bonhomie, esprit-de-corps and goodwill generated during the exercise will go a long way in future strengthening the bonds between the Armed Forces of both countries.



<https://pib.gov.in/PressReleasePage.aspx?PRID=1753955>



पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Fri, 10 Sept 2021 8:08PM

भारत-कजाकिस्तान संयुक्त अभ्यास काजिंद- 21- समापन समारोह की प्रेस विज्ञप्ति

भारत-कजाकिस्तान संयुक्त प्रशिक्षण अभ्यास का 5वां संस्करण, अभ्यास काजिंद-21 आज 12 दिनों तक परस्पर अभ्यास के बाद ट्रेनिंग नोड, आइशा बीबी, कजाकिस्तान में संपन्न हुआ।

31 अगस्त 2021 को शुरू हुए संयुक्त अभ्यास में, प्रशिक्षण शहरी परिदृश्य में काउंटर इंसर्जेंसी / काउंटर टेररिज्म ऑपरेशंस के साथ-साथ हथियारों पर कौशल विशेषज्ञता साझा करने पर केंद्रित था। इस अभ्यास ने दोनों सेनाओं के सैनिकों को हमेशा के लिए पेशेवर और सामाजिक तौर पर करीबी को बढ़ावा देने का अवसर प्रदान किया।

गहन सैन्य प्रशिक्षण के बाद दोनों सेनाओं ने सत्यापन अभ्यास के दौरान आतंकवादी समूहों पर अपनी युद्ध शक्ति और प्रभुत्व का प्रदर्शन करते हुए संयुक्त अभ्यास का समापन किया। समापन समारोह में दोनों देशों के अनूठे पारंपरिक संबंध के साथ अपार प्रतिभा का प्रदर्शन किया गया। वरिष्ठ अधिकारियों ने अभ्यास के पेशेवर आचरण के प्रति अपनी संतुष्टि और प्रशंसा व्यक्त की।

अभ्यास के दौरान उत्पन्न सौहार्द, टीम भावना और सद्भावना भविष्य में दोनों देशों के सशस्त्र बलों के बीच संबंधों को मजबूत करने में एक लंबा रास्ता तय करेगी।



<https://pib.gov.in/PressReleasePage.aspx?PRID=1754053>

India sets scorching pace for military drills across the globe

By Rajat Pandit

New Delhi: India is undertaking an unprecedented number of bilateral and multilateral military exercises with countries across the entire globe this year, with top officers using buzzwords like 'defence diplomacy', 'strategic signaling' and interoperability' with effortless ease like never before.

India may have put a halt to its bilateral and largely symbolic 'Hand-in-Hand' exercise with China since the military confrontation erupted in eastern Ladakh in May last year, but it's all systems go as far as other countries are concerned.



"Exercises enhance military and strategic cooperation, confidence-building and interoperability with different countries, apart from honing combat skills, imbibing best practices and operational tactics," said a senior Army officer.

"Defence diplomacy is an instrument to further India's diplomatic interests," he added. India, for instance, has stepped up its outreach to Africa, a continent where China has made deep inroads, with military exercises being used as one of the tools.

Then, of course, there is strategic signaling to countries like China through exercises like the quadrilateral 'Malabar' among India, the US, Japan and Australia, the last edition of which was conducted off Guam in the Western Pacific towards end-August.

The growing strategic congruence to deter coercion in the Indo-Pacific also came through the 'Quad-plus-France' exercise called 'La Pérouse' in the Bay of Bengal in April.

Having already set a scorching pace in undertaking exercises this year, India has several more scheduled in the last four months. A 'Quad-plus-UK' naval exercise, for instance, is slated in the Bay of Bengal next month.

This will be followed by the first tri-service exercise with the UK, centered around the 65,000-tonne aircraft carrier HMS Queen Elizabeth with its fifth-generation F-35B 'lightning' fighter jets, off the western coast from October 24-27. India has undertaken tri-service exercises only with the US and Russia till now. The Indian Army, having just concluded bilateral exercises 'Indra' in Russia and 'Kazind' in Kazakhstan, has currently deployed around 200 soldiers for the ongoing 17-nation 'Zapad' exercise at Nizhny in Russia.

Other forthcoming Army exercises include 'Surya Kiran' with Nepal, 'Mitra Shakti' with Sri Lanka, 'Ajeya Warrior' with the UK, 'Yudh Abhyas' with the US and 'Shakti' with France in the September-November timeframe.

The Navy, in turn, has conducted bilateral exercises with countries ranging from Vietnam, Indonesia, Philippines, Singapore and Thailand to Kenya, UAE, Qatar, Brunei, Bahrain, Egypt, UK and Germany this year. Indian warships also undertook their first-ever naval exercises with countries like Saudi Arabia, Algeria, Sudan and the European Union Naval Taskforce.

Not to be left behind, the IAF dispatched its Sukhoi-30MKI fighters and C-17 Globemaster-III aircraft to take part in the 'Desert Flag' exercise, which saw participation of air forces from India, US, France, UAE, Saudi Arabia and Bahrain, at the Al Dhafra airbase in March. "India is steadily enhancing its military outreach to the strategically-located Persian Gulf region," said an officer.

<https://timesofindia.indiatimes.com/india/india-sets-scorching-pace-for-military-drills-across-the-globe/articleshow/86150385.cms>

36th Rafale to have all India specific enhancements, arrives Jan 2022

Such is the fighting capability of French Rafale that its one squadron of 18 aircraft is equivalent to 2.5 squadrons (45 fighters) of Su-30 MKI in terms of turn-around and maintenance

By Shishir Gupta

New Delhi: France will deliver three Rafale fighters per month for the next three months with the last of the 36 contracted omni-role fighters carrying all 13 India specific enhancements to be delivered in January 2022. While 26 4.5 generation Rafale fighters are already operational from Ambala in the western sector and Hashimara in the eastern sector, three more Dassault manufactured fighters will be landing at Jamnagar base with the help of close ally UAE mid-air refueller on October 13. Three more are expected to be delivered in November and another three joining the Indian Air Force (IAF) in December.



A fully-loaded Rafale fighter jet is seen in this photo. (File Photo)

However, it is the 36th Rafale fighter that will be equipped with all India specific enhancements to make the platform more lethal. Already India specific enhancements have been included in Hammer air to ground, SCALP land attack and Meteor air to air missiles used by Rafale with more range, more height and more accuracy. It is only after the 36th fighter has landed after testing all India specific enhancements with some technologies having Israeli origins that the previous 35 fighters will be fitted with all the enhancements.

While the India specific enhancements remain classified, they are understood to be pertaining to more powerful radio altimeter, radar warning receiver, low band jammer, flight data recorder, high-altitude engine start-up, synthetic aperture radar, ground moving target indicator and tracking, infra-red search and track, helmet-mounted display, missile approach warning systems and very high-frequency range decoys.

France, one of India's closest strategic allies, has already sent the enhanced missiles and ammunition for Rafale to IAF. While the Meteor missile is best in its category in the Indian subcontinent, the Hammer and SCALP have pinpointed accuracy with last-minute target adjustment capability and radar avoidance. These weapon systems have multiple guidance facilities so that the enemy has no chance of jamming the missile either in the air to air or land-attack mode and can be used in stand-off mode for land targets over 70 kilometres away.

While the Indian Navy is also examining the option of Rafale-Maritime fighter for its indigenous aircraft carrier INS Vikrant, to be launched next August, the IAF has been asked to rationalize its fighter squadron strength due to the enhanced capability of Rafale. It is understood that one squadron of Rafale is equivalent to 2.5 squadrons of Russian Su-30 MKI in terms of turnaround and maintenance. The IAF's capability will further be multiplied with the addition of the S-400 air defence system to the Indian fighting capability.

<https://www.hindustantimes.com/india-news/36th-rafale-to-have-all-india-specific-enhancements-arrives-jan-2022-101631254286620.html>

India undertaking maintenance of Mauritius Coast Guard's patrol vessel

By Sidhant Sibal

Story highlights

At GRSE Kolkata, India is undertaking a scheduled maintenance of Mauritius Coast Guard Ship (MCGS) Barracuda. Indian Navy chief Adm Karambir Singh visited the shipyard last week to review the ongoing maintenance activities. Singh also interacted with the crew of the vessel

India is undertaking a scheduled maintenance of Mauritius Coast Guard Ship (MCGS) Barracuda at GRSE Kolkata. Garden Reach Shipbuilders & Engineers Kolkata (GRSE), an Indian government enterprise is one of the key shipyards of the country.

Indian Navy chief Adm Karambir Singh visited the shipyard last week to review the ongoing maintenance activities and interacted with the crew of the vessel.

The ship is in the final stages of the maintenance and shall undergo sea-trials shortly, which will be monitored jointly by both Indian Navy and Mauritius Coast Guard crew. Post the successful completion of the trials, MCGS Barracuda would be ready to sail to Mauritius.

The development is being seen as not only the support to the Mauritius Coast Guard from India but also in terms of capacity building.

Important to note that MCGS Barracuda was the first warship to be exported by an Indian shipyard and was built by GRSE. It was delivered to the Mauritian Coast Guard during PM Modi's visit to the country. It was commissioned into Mauritius National Coast Guard in March 2015.

It was the first 'Made to Order' warship constructed by India for any foreign country, and is seen as a testimony to the strong relationship between the two countries.

Indian Navy has been playing an important role in terms of reaching out to nations of the Indian Ocean. Amid Covid crisis, it reached out to countries of the area and provided them relief as part of Sagar missions.

<https://www.wionews.com/india-news/india-undertaking-maintenance-of-mauritius-coast-guards-patrol-vessel-412614>



Indian Navy chief Adm Karambir Singh visited the Mauritius Coast Guard Ship Barracuda at GRSE Kolkata. Photograph:(Others)

Pakistan expanding its nuclear arsenal, may have '200 warheads' by 2025: US report

The 'Bulletin Of The Atomic Scientists' report said that the country currently has approximately 165 warheads and is looking to expand with more warheads, more delivery systems, and a growing fissile materials production industry

In news that should worry India, Pakistan continues to expand its nuclear arsenal with more warheads, more delivery systems, and a growing fissile materials production industry, according to a report in the US-based 'Bulletin Of The Atomic Scientists' dated 9 September.

According to the publication, if the country continues in the same manner, it will have 200 warheads by 2025. "We estimate that the country's stockpile could more realistically grow to around 200 warheads by 2025 if the current trend continues," read the report prepared by Hans M Kristensen, director of the Nuclear Information Project at the Federation of American Scientists, and Matt Korda, research associate for the NIP.



Pakistani spectators watch the Shaheen-II long range missile capable of carrying a nuclear warhead on its launcher. AFP

It added that Pakistan as of date has a nuclear weapons stockpile of approximately 165 warheads. However, the Pakistani government has never publicly disclosed the size of its arsenal and media sources frequently embellish news stories about nuclear weapons.

Pakistan's nuclear stance

Pakistan is pursuing what it calls a "full spectrum deterrence posture," which includes long-range missiles and aircraft for strategic missions, as well as several short-range, lower-yield nuclear-capable weapon systems in order to counter military threats below the strategic level.

According to former Pakistani officials, this posture - and its particular emphasis on non-strategic nuclear weapons - is specifically intended as a reaction to India's perceived "Cold Start" doctrine.

This alleged doctrine revolves around India maintaining the capability to launch large-scale conventional strikes or incursions against Pakistani territory below the threshold at which Pakistan would retaliate with nuclear weapons.

Pakistan's nuclear arsenal

Pakistan has been trying to develop new short-range tactical weapons, sea-based cruise missiles, air-launched cruise missiles, and longer-range ballistic missiles for some time now. It has at least six operational nuclear-capable land-based ballistic missiles, including the short-range (60-70 km) NASR (Hatf-9) solid-fuel missile.

The medium-range missiles include Shaheen-II and newer Shaheen-III missiles. Once fully operational, researchers point out that the Shaheen-III missiles, with a projected range of 2,750 km, would bring Israel within range of Pakistani nuclear missiles for the first time. For this, these missiles will have to be deployed in the western parts of Balochistan province.

The paper further pointed out that Pakistan is also developing a multiple independent reentry vehicle (MIRV) technology-enabled nuclear-capable ballistic missile Ababeel.

Pakistan Air Force's (PAF) Mirage III and Mirage V fighter squadrons are likely to have nuclear delivery capabilities as well. Masroor Air Base near Karachi housing three Mirage squadrons has a "possible nuclear weapons storage site" nearby that, according to the authors, has been witnessing continuous underground constructions and expansions. "This includes a possible alert hangar with underground weapons-handling capability," said the publication.

Moreover, Pakistan has a well-established and diverse fissile material production complex that is expanding. It includes the Kahuta uranium enrichment plant east of Islamabad, which appears to nearing completion, as well as the enrichment plant at Gadwal to the north of Islamabad.

The New Labs Reprocessing Plant at Nilore, east of Islamabad, which reprocesses spent fuel and extracts plutonium, has been expanded. Meanwhile, a second reprocessing plant located at Chashma in the northwestern part of Punjab province may have been completed and become operational by 2015.

According to the report, the National Defence Complex in the Kala Chitta Dahr mountain range is ground zero to produce nuclear-capable missiles and launchers. Researchers suspect that the Pakistan Ordnance factories near Wah could be linked to nuclear warhead production.

According to the International Panel on Fissile Materials, Pakistan had approximately 3,900 kg of weapon-grade highly enriched uranium and about 410 kg of weapon-grade plutonium in early 2020. But the authors of the nuclear notebook argue that calculating stockpile size solely based on fissile material inventory could be a wrong approach. *Inputs from agencies*

<https://www.firstpost.com/world/pakistan-expanding-its-nuclear-arsenal-may-have-200-warheads-by-2025-us-report-9956161.html>



Press Information Bureau
Government of India

Ministry of Science & Technology

Fri, 10 Sept 2021 2:34PM

Noise Control Sheet Absorber developed by mimicking bee hives

An Indian researcher has fabricated paper honeycomb and stronger polymer honeycomb structure as sound-absorbing panels that dissipate acoustic energy to low-frequency ranges. The technology can be used in building acoustics and also as environmental noise control solution.

Many traditional materials have been found to be good at controlling higher frequencies. However, natural bee hives have been found to efficiently control high as well as low frequencies because of their geometry. It has been found from theoretical analysis and experimental investigations that this behaviour was owing to the conversion of acoustical energy into vibration energy. This vibration energy is dissipated in the form of heat due to wall damping property. Mimicking this property as an engineering solution could offer a cost-effective method for controlling noise pollution.

Dr. B. Venkatesham and Dr. Surya, faculty at Mechanical and Aerospace Engineering Department at IIT Hyderabad, fabricated low thickness and strong acoustic panels mimicking this property using biomimetic design methodology. The design methodology involves understanding the physics of bee hive sample acoustic energy dissipation and then mimicking its design. The team developed a mathematical model and calculated optimized parameters, and then fabricated the test samples using systematic, controlled parameters. Subsequently, fabrication of a large sample was done. They have used two different approaches and their respective prototype machines with two different kinds of materials. One prototype is for paper honeycomb based on indexed -Honeycomb Before Expansion (HOBE) process, and another prototype machine is for polymer honeycomb structure based on hot wire technique.



The panels were made by slicing stacked extruded polypropylene straws. The slicing process is done with the help of hot wire, which also bonds the straws together. The developed technology provides a mechanism of acoustic energy dissipation with lower thickness and higher specific strength of acoustic panels. A test facility to measure the absorption coefficient of large samples has also been established as part of this work.

This technology, supported by the Advanced Manufacturing Technologies programme of the Department of Science & Technology (DST), Government of India, is in the 6th stage of Technology Readiness Level, and Dr B. Venkatesham has allied with Eaton PVT Ltd, Maharashtra Industrial Development Corporation Kharadi Knowledge Park, Pune. He plans to further scale up the technology demonstration, develop a batch production machine for polymer materials, fabricate with newer alternative self-damping materials, and compliance with other safety requirements like flame retarding capacities, weather ability and so on. Dr Venkatesham says that it may create an opportunity to capture 15% of the traditional sound-absorbing acoustic material market based on the low-frequency applications.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1753826>



मधुमक्खी के छत्ते की नकल करके विकसित ध्वनि (शोर) नियंत्रण पत्रक अवशोषक

एक भारतीय शोधकर्ता ने ध्वनि को अवशोषित करने वाले पटल (पैनल) कागज से बने मधुमक्खी के छत्ते (पेपर हनीकॉम्ब) के रूप में एक मजबूत बहुलक (पॉलीमर) मधुमक्खी के छत्ते जैसी संरचना विकसित की है जो ध्वनिक ऊर्जा को कम-आवृत्ति की सीमा में लाकर विलुप्त कर देती है। इस प्रौद्योगिकी का उपयोग ध्वनिरोधी भवन निर्माण और पर्यावरणीय शोर को नियंत्रित करने वाले समाधान के रूप में भी किया जा सकता है।

कई पारंपरिक सामग्रियों को ध्वनि की उच्च आवृत्तियों को नियंत्रित करने के लिए अच्छा पाया गया है। किन्तु, इनसे भी अधिक मधुमक्खी के प्राकृतिक छत्तों (हनी बी हाईव्स) को उनकी ज्यामितीय संरचना के कारण उच्च और निम्न आवृत्तियों को

कुशलतापूर्वक नियंत्रित करने के अनुकूल पाया गया है। सैद्धांतिक विश्लेषण और प्रायोगिक जांच से यह पाया गया है कि ऐसा व्यवहार ध्वनिक ऊर्जा के कंपन ऊर्जा में रूपांतरण के कारण होता है। यह कंपन ऊर्जा छत्ते की दीवारों में नमी वाले गुणधर्म के कारण ऊष्मा के रूप में परिवर्तित होकर अवशोषित हो जाती है। एक इंजीनियरिंग समाधान के रूप में इस गुण की नकल करना ध्वनि प्रदूषण को नियंत्रित करने के लिए एक कम खर्चीले तरीके रूप में प्रस्तुत किया जा सकता है।

भारतीय प्रौद्योगिकी संस्थान (आईआईटी) हैदराबाद में यान्त्रिक एवं अंतरिक्ष अभियांत्रिकी (मैकेनिकल और एयरोस्पेस इंजीनियरिंग) विभाग के फैकल्टी डॉ. बी. वेंकटेशम और डॉ. सूर्या ने जैव अनुकृतीय (बायोमिमेटिक) डिजाइन पद्धति का उपयोग करके इस गुणधर्म की नकल करते हुए कम मोटाई वाले मजबूत ध्वनिक पटल (पैनल) तैयार किए। इस डिजाइन पद्धति में नमूने के रूप में मधुमक्खी के छत्ते के एक हिस्से की ध्वनिक ऊर्जा अपव्यय की भौतिकी को समझना और फिर उसकी तदनुसार नकल करना शामिल है। टीम ने एक गणितीय मॉडल विकसित किया और उसके लिए अनुकूलित मापदंडों की गणना करने के बाद व्यवस्थित एवं नियंत्रित मापदंडों का उपयोग करके परीक्षण के लिए नमूने तैयार किए। इसके बाद एक बड़े नमूने का निर्माण किया गया। उन्होंने दो अलग-अलग प्रकार की सामग्रियों के साथ दो अलग-अलग तरीकों और उनके संबंधित प्रोटोटाइप मशीनों का उपयोग किया है। पहला प्रोटोटाइप कागज से बने मधुमक्खी के छत्ते (पेपर हनीकॉम्ब) के लिए अनुक्रमित-हनीकॉम्ब बिफोर एक्सपेंशन (एचओबीई) प्रक्रिया पर आधारित है और दूसरा प्रोटोटाइप मशीन तप्त तार (हॉट वायर) तकनीक पर आधारित बहुलक (पॉलीमर) हनीकॉम्ब संरचना के लिए है।

इन पैनलों को निष्प्रयोज्य पड़ी (स्टेकड एक्सट्रूडेड) हुई पॉलीप्रोपीन की नलियों (स्ट्रॉ) को काटकर बनाया गया था। इन्हें पतियों में काटने की (स्लाइसिंग) प्रक्रिया गर्म तार की मदद से की जाती है, जो इन स्ट्रॉ को भी आपस में बांधती है। विकसित तकनीक कम मोटाई वाले ध्वनिक पैनलों की उच्च विशिष्ट शक्ति के



साथ ध्वनिक ऊर्जा अपव्यय का एक तंत्र प्रदान करती है। इस कार्य के हिस्से के रूप में बड़े नमूनों के अवशोषण गुणांक को मापने के लिए एक परीक्षण सुविधा भी स्थापित की गई है।

भारत सरकार के विज्ञान और प्रौद्योगिकी विभाग (डीएसटी) के उन्नत विनिर्माण प्रौद्योगिकी कार्यक्रम से सहायता प्राप्त यह प्रौद्योगिकी अपनी तैयारी स्तर के छठे चरण में है और डॉ बी. वेंकटेशम ने इसे ईटन प्राइवेट लिमिटेड, महाराष्ट्र औद्योगिक विकास निगम खराडी नॉलेज पार्क, पुणे के साथ संबद्ध किया है। उन्होंने प्रौद्योगिकी प्रदर्शन को और आगे बढ़ाने, बहुलक सामग्री के लिए बैच उत्पादन मशीन विकसित करने, नई वैकल्पिक स्वयं-डंपिंग सामग्री के साथ निर्माण और अन्य सुरक्षा आवश्यकताओं जैसे अग्नि की लौ को कम करने की क्षमता, मौसम के अनुकूल क्षमता आदि के अनुपालन की योजना बनाई है। डॉ वेंकटेशम का कहना है कि कम आवृत्ति अनुप्रयोगों के आधार पर विकसित यह संरचना पारंपरिक ध्वनि-अवशोषित ध्वनिक सामग्री बाजार के 15% पर कब्जा करने का अवसर पैदा कर सकती है।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1753869>



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Chandrayaan-2 orbiter payloads made discovery-class findings, says ISRO

Earlier this week, ISRO opened up its scientific discussions on Lunar Science to the people of the country, to engage the Indian academia, institutes, students, and people from all disciplines and walks of life

The observations of the Chandrayaan-2 orbiter payloads have yielded discovery-class findings, according to the Indian Space Research Organisation (ISRO).

There were eight scientific payloads hosted on the orbiter craft. They are: Chandrayaan-2 Large Area Soft X-ray Spectrometer (CLASS), Solar X-ray Monitor (XSM), CHandra's Atmospheric Compositional Explorer 2 (CHACE 2), Dual Frequency Synthetic Aperture Radar (DFSAR), Imaging Infra-Red Spectrometer (IIRS), Terrain Mapping Camera (TMC 2), Orbiter High Resolution Camera (OHRC), and Dual Frequency Radio Science (DFRS) experiment.

Earlier this week, ISRO opened up its scientific discussions on Lunar Science to "the people of the country, to engage the Indian academia, institutes, students, and people from all disciplines and walks of life", in the form of a two-day 'Lunar Science Workshop & Release of Chandrayaan-2 Data'.

The workshop commemorated the completion of two years of the Chandrayaan-2 orbiter in the lunar orbit. The events were conducted in virtual mode.

ISRO Chairman and Secretary in the Department of Space (DoS) K. Sivan inaugurated the workshop and released the documents on Chandrayaan-2 science results and data products for utilisation by the scientific community.

"The lunar workshop delivered the big news of bunch of discovery-class of findings by Chandrayaan-2," the Bengaluru headquartered India's national space agency said.

The mass spectrometer CHACE-2, in its pursuit to conduct first-ever in-situ study of the composition of the lunar neutral exosphere from a polar orbital platform, detected and studied the variability of the Argon-40 at the middle and higher latitudes of the Moon, depicting the radiogenic activities in the mid and higher latitudes of the Lunar interior, it said.

The discovery of Chromium and Manganese on the lunar surface, which are available in trace quantities, by the CLASS payload was announced.

The observations of microflares of the Sun, during the quiet-Sun period, which provide important clues on the coronal heating problem of the Sun, were made by the XSM payload.

The first-ever unambiguous detection of the hydration features of the Moon was achieved by Chandrayaan-2 with its infra-red spectrometer payload IIRS, which captured clear signatures of Hydroxyl and water-ice on the lunar surface, ISRO said.

The DFSAR instrument could study the subsurface features of the Moon, detected signatures of the sub-surface water-ice, and achieved high resolution mapping of the lunar morphological features in the polar regions, it was stated.

"The observations (of Chandrayaan-2 orbiter payloads) have been yielding intriguing scientific results, which are being published in peer-reviewed journals and presented in international meetings," Mr. Sivan said.

Chandrayaan-2, ISRO said, has the feat of imaging the Moon from 100 km lunar orbit with "best-ever" achieved resolution of 25 cm with its OHRC.

The TMC 2 of Chandrayaan-2, which is conducting imaging of the Moon at a global scale, has found interesting geologic signatures of lunar crustal shortening, and identification of volcanic domes, the ISRO said.

The DFRS experiment onboard Chandrayaan-2 has studied the ionosphere of the Moon, which is generated by the solar photo-ionisation of the neutral species of the lunar tenuous exosphere, it was noted.

The science data archived in Indian Space Science Data Centre (ISSDC) at Byalalu, near here, are being disseminated to public through its 'PRADAN' portal.

The questions received from the academia, institutes and students were addressed by the ISRO scientists during the two-day deliberations.

A panel discussion provided the opportunity to academia, institutes and students to interact with the ISRO scientists on lunar science and Chandrayaan-2, ISRO said.

Chandrayaan-2 is the second spacecraft in the Indian series of Lunar exploration satellites. It comprised an orbiter, lander named Vikram and rover named Pragyan to explore the unexplored South Polar region of the Moon.

It was launched on July 22, 2019 from the Sriharikota spaceport by GSLV Mk-III. It was inserted into a lunar orbit on August 20, 2019, with firing of thrusters on the orbiter.

The orbiter and lander modules were separated as two independent satellites on September 2, 2019.

Later, Vikram lander's descent was as planned and normal performance was observed up to an altitude of 2.1 km from Lunar surface on September seven, 2019. Subsequently, communication from the lander (with the six-wheeled Pragyan rover accommodated inside it) was lost and the lander had a hard landing on the lunar surface.

A successful soft-landing would have made India the fourth country after the erstwhile Soviet Union, the United States, and China to do so, according to ISRO officials.

The orbiter, placed in its intended orbit around the Moon, will enrich our understanding of the Moon's evolution and mapping of minerals and water molecules in polar regions, using its eight advanced scientific instruments, according to ISRO.

The precise launch and optimised mission management have ensured a long life of almost seven years for the orbiter instead of the planned one year, it said.

<https://www.thehindu.com/sci-tech/science/chandrayaan-2-orbiter-payloads-made-discovery-class-findings-says-isro/article36395028.ece>

Explained: What Chandrayaan-2 has sent

Although the soft landing on the Moon failed, the Orbiter has been doing its job. 2 years on, ISRO has released the information gathered, from confirmation of the presence of the water molecule to data about solar flares

By Sohini Ghosh, Amitabh Sinha

Ahmedabad, Pune: The failure of Chandrayaan-2, India's second mission to the Moon, to make a soft-landing on the lunar surface had led to much disappointment. The lander and rover malfunctioned in the final moments and crash-landed, getting destroyed in the process.

But that did not mean the entire mission had been wasted. The Orbiter part of the mission has been functioning normally, and in the two years since that setback, the various instruments on board have gathered a wealth of new information that has added to our knowledge about the Moon and its environment.

Earlier this week, the Indian Space Research Organisation (ISRO) released the information gathered by the scientific payloads till now, some of which were still to be analysed and assessed.

What is the information gathered?

The Orbiter is carrying eight instruments. Through different methods, these instruments are meant to carry out a few broad tasks — study in more detail the elemental composition of the lunar surface and environment, assess the presence of different minerals, and do a more detailed mapping of the lunar terrain.

ISRO has said each of these instruments has produced handsome amount of data that sheds new light on the moon, and offers insights that could be used in further exploration.

Some of the most significant results so far:

Water Molecule: The presence of water on the Moon had already been confirmed by Chandrayaan-1, India's first mission to the Moon that flew in 2008. Before that, NASA missions Clementine and Lunar Prospector too had picked up signals of water presence. But the instrument used on Chandrayaan-1 was not sensitive enough to detect whether the signals came from the hydroxyl radical (OH) or the water molecule (H₂O, which too has OH).

Using far more sensitive instruments, the Imaging Infra-Red Spectrometer (IIRS) on board Chandrayaan-2 has been able to distinguish between hydroxyl and water molecules, and found unique signatures of both. This is the most precise information about the presence of H₂O molecules on the Moon till date.

Previously, water was known to be present mainly in the polar regions of the Moon. Chandrayaan-2 has now found signatures of water at all latitudes, although its abundance varies from place to place. The IIRS characterised hydration features in the north polar region on the far side of the Moon and has also quantified the hydration within a crater.

Besides, the Dual Frequency Synthetic Aperture Radar, a microwave imaging instrument, has reported unambiguous detection of potential water ice at the poles as it has been able to distinguish properties of surface roughness from that of water ice, which is a first.

Minor Elements: The Large Area Soft X-Ray Spectrometer (CLASS) measures the Moon's X-ray spectrum to examine the presence of major elements such as magnesium, aluminium, silicon, calcium, titanium, iron, etc. This instrument has detected the minor elements chromium and manganese for the first time through remote sensing, thanks to a better detector. The finding can



Earlier this week, the Indian Space Research Organisation (ISRO) released the information gathered by the scientific payloads till now, some of which were still to be analysed and assessed.

lay the path for understanding magmatic evolution on the Moon and deeper insights into the nebular conditions as well as planetary differentiation.

CLASS has mapped nearly 95% of the lunar surface in X-rays for the first time.

Sodium, also a minor element on the Moon surface, was detected without any ambiguity for the first time. Scientists at ISRO believe that based on the CLASS findings with respect to sodium, “a direct link of exospheric sodium to the surface can be established (with global data)”, a correlation that remains elusive till date. The finding also opens up the avenue to explore processes causing the sodium to be present on the surface as well as the exosphere.

Studying the Sun: One of the payloads, called Solar X-ray Monitor (XSM), besides studying the Moon through the radiation coming in from the Sun, has collected information about solar flares. XSM has observed a large number of microflares outside the active region for the first time, and according to ISRO, this “has great implications on the understanding of the mechanism behind heating of the solar corona”, which has been an open problem for many decades.

How does all this help?

While the Orbiter payloads build upon existing knowledge of the Moon in terms of its surface, sub-surface and exosphere, it also paves the path for future Moon missions. Four aspects — mineralogical and volatile mapping of the lunar surface, surface and subsurface properties and processes involved, quantifying water in its various forms across the Moon surface, and maps of elements present on the moon — will be key for future scope of work.

A key outcome from Chandrayaan-2 has been the exploration of the permanently shadowed regions as well as craters and boulders underneath the regolith, the loose deposit comprising the top surface extending up to 3-4m in depth. This is expected to help scientists to zero in on future landing and drilling sites, including for human missions.

Some key future Moon missions that hope to make use of such data include the Japan Aerospace Exploration Agency (JAXA)-ISRO collaboration Lunar Polar Exploration (LUPEX) mission scheduled for launch in 2023/2024. Its aim is to obtain knowledge of lunar water resources and to explore the suitability of the lunar polar region for setting up a lunar base.

NASA’s Artemis missions plan to enable human landing on the Moon beginning 2024 and target sustainable lunar exploration by 2028. The Chinese Lunar Exploration Programme too plans to establish a prototype of the International Lunar Research Station (ILRS) at the lunar south pole and build a platform supporting large-scale scientific exploration.

The most obvious miss has been the opportunity to demonstrate the technology to make a soft-landing in outer space. ISRO scientists maintain that the accident was caused by a relatively small error that has been identified and corrected. But, to demonstrate this technology all over again, ISRO would have to send a fresh mission, Chandrayaan-3, planned for next year. It is expected to have only a lander and rover, and no Orbiter.

The lander Vikram and rover Pragyaan were carrying instruments to carry out observations on the surface. These were supposed to pick up additional information about the terrain, and composition and mineralogy. While the instruments on board the Orbiter are making “global” observations, those on the lander and rover would have provided much more local information. The two diverse sets of data could have helped prepare a more composite picture of the Moon.

<https://indianexpress.com/article/explained/isro-chandrayaan-2-mission-to-the-moon-water-molecule-7499795/>

चंद्रयान-2: फेल लैंडिंग में भी दिए चंद्रमा की सतह के अंदर जलीय बर्फ और बाहर ज्वालामुखी की मौजूदगी के सबूत

सार

चंद्रयान-2 के प्रक्षेपण के दो साल पूरा करने के मौके पर इसरो ने इस सप्ताह चंद्र विज्ञान कार्यशाला का आयोजन किया गया। इस दो दिवसीय कार्यशाला में चंद्रयान-2 अंतरिक्षयान के चंद्रमा की कक्षा में दो साल पूरे होने का जश्न मनाया गया।

विस्तार

बंगलुरु: दो साल पहले चंद्रमा पर लैंडिंग करते समय संपर्क टूट जाने के कारण विफल घोषित कर दिए गए चंद्रयान-2 अभियान ने इस असफलता के बावजूद वैज्ञानिक समुदाय को ऐसा डाटा उपलब्ध कराया है, जिसे नई खोज की श्रेणी में शामिल किया जा सकता है।

यह दावा भारतीय अंतरिक्ष अनुसंधान संगठन (इसरो) ने किया है। इनमें चंद्रमा की सतह के अंदर जलीय बर्फ और बाहर ज्वालामुखी की मौजूदगी के सबूत भी शामिल हैं। इन दोनों खोज को बेहद अहम माना जा रहा है।

इसरो का कहना है कि चंद्रयान-2 अंतरिक्षयान में लगे उपकरणों से हाल ही में जुड़े संपर्क से हासिल हुए डाटा ने इस अभियान को 98 फीसदी तक सफल साबित किया है। इतना ही नहीं यान का ऑर्बिटर अब भी काम कर रहा है और अगले पांच साल तक लगातार अहम डाटा भेजता रहेगा यानी अभी चंद्रयान-2 के जरिये चंद्रमा की सतह के बारे में जानने के कई मौके मिलेंगे।

इस मौके पर 2021 का उद्घाटन किया गया। इस मौके पर इसरो के चेयरमैन के. सिवन ने वैज्ञानिकों के उपयोग के लिए चंद्रयान-2 से हासिल हुए आंकड़े और विज्ञान दस्तावेजों को जारी किया। साथ ही उन्होंने चंद्रयान-2 के कक्ष पेलोड का डाटा भी जारी किया।

ऑनलाइन माध्यम से आयोजित कार्यशाला में अंतरिक्ष विभाग (डीओएस) में सचिव की भी भूमिका निभा रहे सिवन ने कहा, चंद्रयान-2 में लगे उपकरणों से आए डाटा से कई दिलचस्प वैज्ञानिक निष्कर्ष निकले हैं। इन्हें साइंस जर्नल में प्रकाशित कराया जा रहा है और अंतरराष्ट्रीय बैठकों में भी पेश किया जा रहा है।

इसरो के मुताबिक, चंद्रयान-2 में लगे मास स्पेक्ट्रोमीटर चेंस-2 ने पहली बार एक ध्रुवीय कक्षीय मंच से चंद्रमा के बाहरी वातावरण की आवेशहीन संरचना का अध्ययन किया है। इस दौरान चंद्रमा के मध्य और उच्च अक्षांशों पर एरगॉन-40 की परिवर्तनशीलता से जुड़ी अहम जानकारी मिली है।

साथ ही इसके आर्बिटर में लगे लार्ज एरिया सॉफ्ट एक्स-रे स्पेक्ट्रोमीटर (क्लास) उपकरण ने एक्स-रे स्पेक्ट्रम के जरिये चंद्रमा की सतह पर क्रोमियम और मैंगनीज जैसे मूल्यवान खनिजों की मौजूदगी के संकेत दिए हैं।

इसरो ने कहा कि चंद्रयान-2 ने अपने इमेजिंग इंफ्रारेड स्पेक्ट्रोमीटर उपकरण (आईआईआरएस) की मदद से पहली बार चंद्रमा की जलयोजन विशेषताओं का पता लगाया है। इस उपकरण ने चंद्रमा की सतह पर हाइड्रोक्सिल (ओएच) के साथ ही पानी (एच₂ओ) की बर्फ की मौजूदगी के भी स्पष्ट संकेत दिए हैं।

इससे पहले चंद्रयान-1 और नासा के क्लेमेंटाइन मिशन ने भी चंद्रमा पर पानी की मौजूदगी के संकेत दिए थे, लेकिन वे पानी की प्रकृति को स्पष्ट नहीं कर पाए थे। डीएफएसएआर उपकरण ने ध्रुवीय क्षेत्रों में

चंद्रमा की आकृति संबंधी विशेषताओं की सफल हाई रेजोल्यूशन मैपिंग की है। चंद्रयान-2 ने 100 किमी की दूरी से चंद्रमा की तस्वीरें ली हैं। इनमें चंद्र सतह पर पहाड़ों की आकृति और ज्वालामुखी के टीले स्पष्ट पहचाने गए हैं।

सूर्य की माइक्रोफ्लेयर का अहम डाटा मिला

सौर एक्स-रे मॉनिटर (एक्सएसएम) उपकरण ने सूर्य से आने वाले रेडिएशन के माध्यम से चंद्रमा का अध्ययन करने के अलावा, सौर माइक्रोफ्लेयर्स के बारे में अहम जानकारी जमा की है। एक्सएसएम ने पहली बार सक्रिय क्षेत्र के बाहर बड़ी संख्या में माइक्रोफ्लेयर देखे हैं, और इसरो के अनुसार, इसका सौर कोरोना (सूर्य का बाहरी वायुमंडल) को गर्म करने के पीछे के तंत्र की समझ पर बहुत प्रभाव पड़ता है, जो कई दशकों से एक समस्या रही है।

आठ उपकरण लगे हुए हैं ऑर्बिटर में

इसरो के मुताबिक, चंद्रयान-2 के ऑर्बिटर में आठ उपकरण लगे हैं, जो अलग-अलग तरीकों के जरिए लगातार चंद्रमा को लेकर अपने प्रयोग कर रहे हैं और डाटा भेज रहे हैं।

इन उपकरणों में लार्ज एरिया सॉफ्ट एक्स-रे स्पेक्ट्रोमीटर (क्लास), सोलर एक्स-रे मॉनिटर (एक्सएसएम), चंद्र एटमॉस्फेरिक कंपोजिशन एक्सप्लोरर-2 (चेस-2), ड्यूल फ्रीक्वेंसी सिंथेटिक अपर्चर रडार (डीएफएसएआर), इमेजिंग इंफ्रारेड स्पेक्ट्रोमीटर (आईआईआरएस), टेरेन मैपिंग कैमरा (टीएमसी), ऑर्बिटर हाई रेजोल्यूशन कैमरा (ओएचआरसी) और ड्यूल फ्रीक्वेंसी रेडियो साइंस (डीएफआरएस) शामिल हैं।

यह था चंद्रयान-2 मिशन

चंद्रमा के दक्षिणी ध्रुव की पहली बार छानबीन के लिए इसरो ने अपने चंद्रयान-2 अंतरिक्ष मिशन को 22 जुलाई, 2019 को रवाना किया था। इस यान में प्रज्ञान रोवर और विक्रम लैंडर लगे हुए थे, जिन्हें चंद्रमा की सतह पर लैंड करना था। चंद्रमा पर 6 सितंबर को लैंडिंग के दौरान इसरो का संपर्क रोवर और लैंडर से टूट गया था। लेकिन चंद्रयान-2 का ऑर्बिटर अब भी काम कर रहा है और लगातार अपना डाटा भेज रहा है।

<https://www.amarujala.com/india-news/isro-says-chandrayaan-2-orbiter-payloads-made-discovery-class-findings>

New research center to tackle space junk traffic dangers

- *University of Warwick convenes researchers to investigate challenges of monitoring objects in Earth orbit in new Center for Space Domain Awareness*
- *Research into sustainable use of space aims to support UK aim to become a responsible spacefaring nation*
- *Projects will investigate new methods to track debris in orbit and space weather that threaten spacecraft*
- *Established as congestion of near-Earth space through new satellites and mega-constellations is anticipated to expand rapidly in coming years*

New ways of tackling the threat that space junk in our skies poses are being explored by University of Warwick scientists, as they pioneer new research that could help the UK fulfil its ambition to become a responsible spacefaring nation.

Scientists at a new Center for Space Domain Awareness are to focus attention on threats to the technology filling the skies above our heads in anticipation of a huge expansion in the number of satellites that provide vital services such as communications, navigation, and Earth observation.

The University of Warwick is launching the Center for Space Domain Awareness to create a critical mass of research that tackles the growing threats to technology in Earth orbit. From the space junk that could collide with orbiting satellites, to the solar winds that could interfere with their electronics, the researchers at the new Center will pioneer new work to understand and characterize the near-Earth environment to support scientific, commercial, governmental, and military applications.

Supported by the Defence Science and Technology Laboratory (Dstl) and UKSA, the new Center for Space Domain Awareness will be the first research center in the UK dedicated to investigating the sustainable use of the near-Earth environment. The Center is launched today (8 September) at the annual meeting of GNOSIS (The Global Network on Sustainability in Space), a Science and Technology Facilities Council (STFC) network of scientists and representatives from industry that aims to raise awareness of the problem of space debris and of space sustainability.

Professor Don Pollacco, Director of the new Center and Professor in the University of Warwick Department of Physics, said: “The near-Earth environment is becoming increasingly important, and yet we don’t know that much about what’s really going on there. At the Center for Space Domain Awareness, we’ll be concentrating on studying the solar wind and its impact on satellites and the Earth’s atmosphere, and on the debris situation in all orbital regimes and its impact on spacecraft.

“Both those areas have become important, especially in terms of the UK’s ambition to become a spacefaring country, and the responsibility that entails.”

Since the start of space exploration around 6,000 satellites have been launched into orbit and that number is expected to increase massively, particularly with plans from some organizations for ‘mega-constellations’ of thousands of satellites.

Most of these are found in low-Earth orbit (LEO), less than ~1200km, as these orbits have become routinely (and relatively cheaply) accessible from the ground and are the ideal distance to obtain short latency for communications and high-resolution imagery.



Illustration showing some of the hazards that the new Center for Space Domain Awareness will investigate.
Credit/Copyright: University of Warwick/Mark Garlick

While our satellites are key to the space-for-Earth industries such as telecommunications and internet infrastructure (including banking) and Earth Observation, the near-Earth environment has become littered with debris from multiple space launches, as well as decommissioned spacecraft that have been left to burn up in the atmosphere. The scientists at the University of Warwick have been working to develop new ways to search for debris in orbit through projects such as DebrisWatch, as well as investigating how the solar wind, given off by our Sun, can affect the operations of spacecraft.

Professor Pollacco added: “The bulk of modern society is dependent on space. But we now have a space traffic issue. Sooner or later, this is all going to become a big issue. From our point of view, the idea is to get onto it a lot earlier.

“In terms of debris, we don’t know about the distribution with orbital height but we know that there are some orbits that have significant debris in. The material is moving quite fast, and its momentum can be significant. Something very small can take out a whole spacecraft.

“We also want to study the impact of charged build-up from the solar wind on spacecraft electronics.”

Jacob Geer, Head of Space Surveillance and Tracking at the UK Space Agency, said: “Without satellites, we wouldn’t be able to connect with our families at the touch of a button or check the weather before leaving the house. As we become increasingly reliant on these services, the threat of space debris could cause havoc for our day-to-day activities.

“This center will support the UK’s growing need to track objects in space and shows how active our universities are in tackling space debris. We should see many civil and military benefits from this research as we look at ways to reduce and tackle the increasing congestion in space.”

Jason Green, STFC Associate Director External Innovation, said: “Using research-based expertise to solve some of society’s most pressing problems is the main aim of the STFC networks, such as GNOSIS.

“The GNOSIS network has provided the catalyst for this new center, which will no doubt enhance the UK’s expertise in this area.

“The center will utilize STFC’s experience in applying techniques from our research portfolio to tackle real-world challenges, along with the commercial connections developed within the GNOSIS network.”

Dr. William Feline, Space Situational Awareness Project Technical Authority at Dstl, said: “Dstl has been working with Professor Pollacco and his team for a number of years in tackling the challenge of understanding how best to monitor satellites and debris in Earth orbit. The unique capabilities that they have brought to bear on the problem, including their world-class observatory facilities on La Palma in the Canary Islands, have rapidly accelerated the UK’s capabilities in this area. As a result, Dstl recently sponsored a Fellowship in Space Situational Awareness at the University of Warwick. I’m really pleased to witness the growth in UK expertise which has helped lead to the creation of this new Center and I’m looking forward to working with them on the challenges faced by the UK and the world.”

Katherine Courtney, Chair of the GNOSIS Board, said: “The volume of space traffic is increasing at a pace unimaginable just a few years ago. Nations and companies all over the world have growing ambitions for new space missions. The risks posed to those spacecraft from space weather, congestion and debris are a global concern.

“The Global Network on Sustainability in Space (GNOSIS) brings together scientists and industry to solve problems of how to safeguard the sustainable use of space for all. This new Center for Space Domain Awareness being announced today will help accelerate progress in understanding the nature and scale of the problems and will generate fresh insights into how to combat those. We are pleased GNOSIS has been able to play a role in the Center’s formation and look forward to its future success.”

<https://scitechdaily.com/new-research-center-to-tackle-space-junk-traffic-dangers/>

High average output power achieved in PAPS photocathode drive laser system

By Liu Jia

The photocathode drive laser is one of the key parts of the beam test system of the Platform of Advanced Photon Source (PAPS). Recently, the researchers from Institute of High Energy Physics (IHEP) of the Chinese Academy of Sciences obtained the output power exceeding 116 W after the main amplifier of the laser. The study was published in *Optics Express*.

Electron sources with laser-driven photocathodes are widely used in free electron lasers (FELs) and energy recovery linacs (ERL) due to their low emittance beam and controllable bunch length. In order to obtain higher quality electron beams, various laser beam shaping methods are commonly used in this type of electron source.

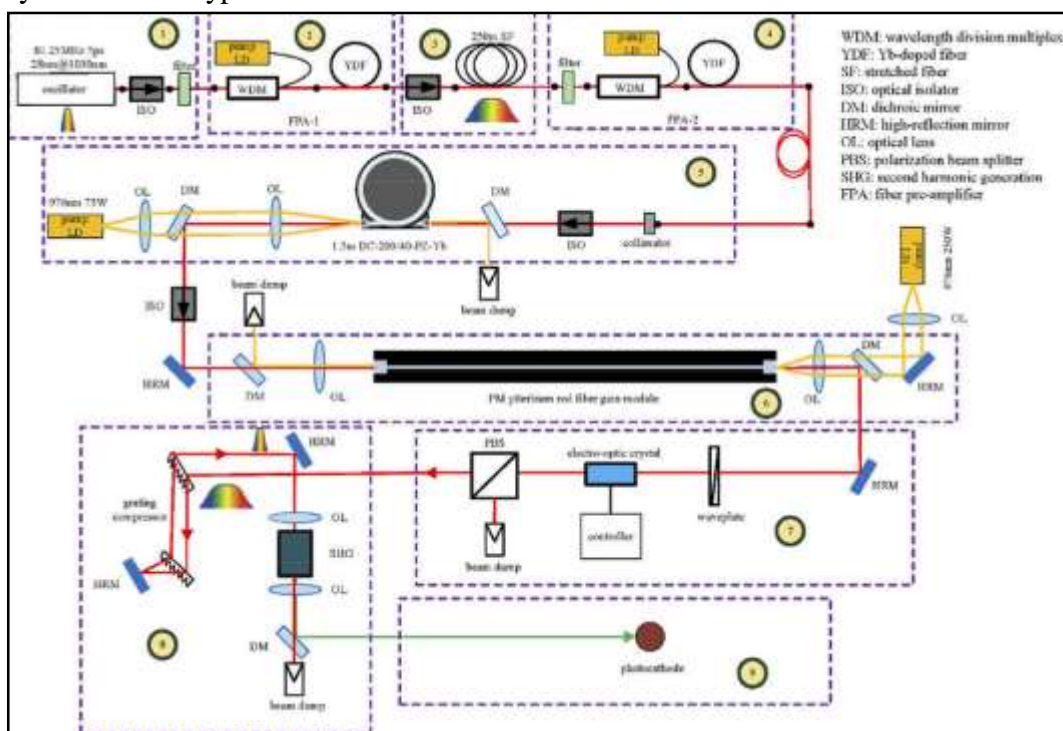


Fig. 1. Layout of the photocathode drive laser system. Credit: DOI: 10.1364/OE.438199

However, due to the reflection and absorption by the shaping crystals, the induced energy loss of the laser beam may be as high as 90%. This energy loss limits the laser power projected on the photocathode, and hence the average electron beam current. A direct and effective way to overcome this problem is to provide higher laser power for the shaping process.

In this study, the researchers developed an all-fiber laser system in achieving higher laser power, with a rod ytterbium-doped photonic crystal fiber as the main amplifier.

This system has been producing 116.2 W of average infrared output power and 39.4 W of green laser output power after frequency multiplication.

The results of this study paves the way for overcoming various difficulties in long-distance transmission and achieving high current and high-quality electron beams.

More information: Hang Xu et al, High power drive laser system for photocathode at IHEP, *Optics Express* (2021). DOI: 10.1364/OE.438199

Journal information: *Optics Express*

<https://phys.org/news/2021-09-high-average-output-power-paps.html>

How a state-of-the-art optics system will make the Advanced Photon Source upgrade possible

To provide X-ray beams that are both very bright and very tightly focused, an Argonne team had to create a new system of mirrors, lenses and equipment for the upgraded Advanced Photon Source.

In the movie "Aladdin," Robin Williams voiced an enormous blue genie who lived inside a tiny magic lamp. The character described his situation this way: "Phenomenal cosmic power! Itty bitty living space!"

In a way, that's the challenge for the team designing the optics system for the upgrade of the Advanced Photon Source (APS), a U.S. Department of Energy (DOE) Office of Science User Facility at DOE's Argonne National Laboratory. When the facility comes back online, currently scheduled for 2024, the upgraded APS will deliver X-ray beams that are up to 500 times brighter than those generated at the current facility. It's the job of the optics team to figure out how to focus those intense beams down to incredibly small sizes.

In short, these phenomenally bright beams need to be reduced to itty-bitty spot sizes, often smaller than a single micron, meaning smaller than bacteria or blood cells. Scientists will use these tightly focused, extremely bright beams to uncover the properties of novel materials for new devices, for instance, or to help develop the next generation of medicines that will improve our daily lives.

Light sources such as the APS use a combination of mirrors, complex devices called monochromators, and lenses to manipulate and focus X-ray beams in various ways. These components are all installed in experiment end stations called beamlines located around the APS. Scientists from around the world use those X-rays for scientific discovery. Upgrading this machine will require new technology and newly designed optical components that are more precise than those in use at the current APS.

"All of the beamlines—including nine newly built ones and 15 with significant enhancements—will be state of the art, and designed to do something we couldn't do before," said Lahsen Assoufid, leader of the Optics Group in Argonne's X-ray Science Division (XSD). "We are designing all-new optics for the nine new beamlines. There are no existing optics we can re-use for them."

Following the upgrade, the APS will generate an X-ray source that is about 10 microns vertically and 30 microns horizontally, much smaller than the one the facility delivers now. Assoufid and his team are charged with designing a system that will allow scientists to focus that very bright beam down to incredibly small sizes. The system must do so while preserving the X-rays' coherence as well. Coherence is the quality of light that allows it to carry information when it bounces off of surfaces. When these upgraded X-ray beams diffract off of a sample, they will deliver more info about that sample to the detectors, resulting in a more detailed picture.

"We want to make sure that coherent beam is preserved," Assoufid said. "I think that's the biggest challenge. We want the mirrors to preserve the beam quality in the focusing optics. We want all this coherent light in a small spot size, to speed up measurement time."

Xianbo Shi is a physicist with XSD, and he has been designing several of these new systems with the help of the staff at each beamline he works with. In total, he said, the APS Upgrade is



Jun Qian, metrology engineer in the APS Optics Group at Argonne, observes his reflection in one of the highly polished mirrors for the APS Upgrade. These mirrors will focus the powerful APS X-ray beams to incredibly small sizes. Credit: J.J. Starr/Argonn

going to require more than 1,700 lenses and nearly 60 highly polished mirrors. Each of the optical systems had to be specially designed to exacting detail. So exacting, in fact, that the technology did not exist to design them efficiently—the APS Upgrade optics team had to develop their own software, improving on the state of the art, before they could move forward.

"At each step, we use the best software and develop on top of it," Shi said. "We have to design the software so we can design the optics."

The mirrors that have been designed, Shi said, are the most demanding state of the art in the world. There are only a couple companies in the world that can make them, he said, because in order to preserve the qualities of the beam, the mirrors have to be almost perfectly smooth. This goes beyond traditional mechanical chemical polishing and into removing atoms from their surfaces one by one.

In fact, Assoufid said, there is only one company in the world that can deliver the smoothness some of these mirrors require. About 20 of the mirrors needed for the upgrade will come from this company, he said. It takes about year to make mirrors like these, and if they don't pass inspection, the company will need to start over almost from scratch.

The lenses don't need to be quite as smooth, Shi said, but their design and manufacture is still extremely detailed. The lenses are concave, which means they curve inwards. That curve needs to be created exactly to design specifications so that they focus the beam as intended.

The optics team has also been developing technology using artificial intelligence to allow some beamlines to change the size of the beam quickly and precisely, without needing the scientists to make adjustments. ATOMIC, one of the new feature beamlines, is designed to probe the structural, chemical and physical properties of samples with unprecedented precision. Sometimes that will require scientists focusing the size of the beam on the fly.

"Zoom mirror optics means it needs two pairs of focusing mirrors, so the beam size can change at the sample," Assoufid explained. "Beamline scientists don't have time to align the mirrors, so it has to be done automatically. If they want to focus the beam in one spot, and then change the size, they can image their sample at different scales."

The mirrors and lenses needed for the APS Upgrade are so precise that some of them can only be tested in an actual X-ray beam. As they arrive at the lab from the companies making them, the team will be verifying them at Sector 1 of the APS as well as performing the traditional optical metrology. Each mirror takes up to a week or more to test, and the team had to develop new tools and technology to do this. They have also been creating new diagnostic systems for each of the beamlines, measuring what previously could not be measured.

"The beam quality is important, so we need a way to measure it," Shi said. "So we spent some effort on developing a new wavefront testing technology. It improves on the state of the art. We can monitor the beamline when changing optics and gather information to control those optics."

The new mirrors, lenses and other equipment will be installed during the one-year period when the APS is shut down for upgrade construction. The installation period is scheduled to begin in April 2023. When the new optics system is finished, Assoufid said, the effect will be like giving the APS a new pair of glasses. What was once blurry and hard to see will now snap into focus.

"I will be happy when we see first light," he said. "We've made a lot of progress, but there's a lot of work to be done. I'm excited, but I will be fully satisfied when it's all finished."

Provided by [Argonne National Laboratory](https://phys.org/news/2021-09-state-of-the-art-optics-advanced-photon-source.html)

<https://phys.org/news/2021-09-state-of-the-art-optics-advanced-photon-source.html>

COVID-19 Research News



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Sun, 12 Sept 2021 11:59AM

Knowhow of Economical and Environment-Friendly Saline Gargle RT-PCR technique transferred to MSME Ministry

Saline Gargle RT-PCR method should be implemented especially in rural and tribal areas for faster, citizen-friendly COVID-19 testing: Union Minister Nitin Gadkari

Saline Gargle RT-PCR Innovation can be licensed to all eligible parties, for mass production: CSIR-NEERI

In a notable step forward in India's fight against COVID-19, Nagpur-based National Environmental Engineering Research Institute (NEERI) under the Council of Scientific and Industrial Research (CSIR) has transferred the know-how of indigenously developed Saline Gargle RT-PCR technique, used for testing COVID-19 samples. The Saline Gargle RT-PCR technology is simple, fast, cost-effective, patient-friendly and comfortable; it also provides instant test results and is well-suited for rural and tribal areas, given minimal infrastructure requirements.

CSIR-NEERI stated that the innovation developed by the institute has been 'dedicated to the nation' to serve the society. The knowhow has been transferred to the Union Ministry of Micro, Small & Medium Enterprises (MSME), on a non-exclusive basis. This would enable the innovation to be commercialized and licensed to all capable parties, including private, government and various rural development schemes and departments.

The licensees are expected to set up manufacturing facilities for commercial production in the form of easily usable compact kits. In the light of the prevailing pandemic situation and probable third wave of COVID-19, CSIR-NEERI fast-tracked the know-how transfer process to potential licensees for its wider dissemination across the nation.

The ceremonial transfer of the Standard Operating Procedure and Know-How of the Saline Gargle RT-PCR technique was done in the presence of Union Minister Shri Nitin Gadkari yesterday, 11th September 2021.

On the occasion, the Union Minister for Road Transport & Highways said: "The Saline Gargle RT-PCR method needs implementation across the nation, especially in resource-poor regions like rural and tribal areas. This would result in faster and more citizen-friendly testing and will strengthen our fight against the pandemic. The MSME unit had approached CSIR-NEERI for commercializing the Saline Gargle RT-PCR technology developed by CSIR-NEERI.



The principal inventor of Saline Gargle RT-PCR technology is NEERI scientist Dr. Krishna Khairnar and the team of research scholars of Environmental Virology, at CSIR-NEERI, Nagpur.

Scientist and Head, EVC, CSIR-NEERI (Innovator of Saline Gargle RT-PCR), Dr Krishna Khairnar; Director, CSIR-NEERI, Dr. Srivari Chandrasekhar; Chairman, Technology Transfer, CSIR-NEERI, Dr Atul Vaidya; MSME Unit Director Shri Rajesh Daga and MSME Unit Director Shri Kamlesh Daga were also present during the transfer of know-how to MSME Unit.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1754297>



पत्र सूचना कार्यालय
भारत सरकार

विज्ञान एवं प्रौद्योगिकी मंत्रालय

Sun, 12 Sept 2021 11:59AM

सस्ती और पर्यावरण के अनुकूल सेलाइन गार्गल आरटी-पीसीआर तकनीक की जानकारी एमएसएमई मंत्रालय को हस्तांतरित

सेलाइन गार्गल आरटी-पीसीआर पद्धति विशेष रूप से ग्रामीण और जनजातीय क्षेत्रों में त्वरित, नागरिक-अनुकूल कोविड-19 जांच के लिए कार्यान्वित की जानी चाहिए: केंद्रीय मंत्री नितिन गडकरी

सेलाइन गार्गल आरटी-पीसीआर नवोन्मेषण का व्यापक पैमाने पर उत्पादन करने के लिए सभी पात्र पार्टियों को लाइसेंस दिया जा सकता है: सीएसआईआर-नीरी

कोविड-19 के खिलाफ भारत की लड़ाई में एक उल्लेखनीय कदम उठाते हुए, वैज्ञानिक और औद्योगिक अनुसंधान परिषद (सीएसआईआर) के तहत नागपुर स्थित राष्ट्रीय पर्यावरणगत इंजीनियरिंग अनुसंधान संस्थान (एनईईआरआई) ने स्वदेशी रूप से विकसित सेलाइन गार्गल (नमक घोल के गरारे) आरटी-पीसीआर तकनीक जिसका उपयोग कोविड-19 नमूनों के परीक्षण के लिए उपयोग किया जाता है, की जानकारी हस्तांतरित कर दी है। सेलाइन गार्गल आरटी-पीसीआर प्रौद्योगिकी सरल, त्वरित, सस्ती, रोगी के अनुकूल और आरामदायक है; यह त्वरित जांच परिणाम भी उपलब्ध कराती है और न्यूनतम बुनियादी ढांचा आवश्यकताओं को देखते हुए ग्रामीण और जनजातीय क्षेत्रों के लिए सर्वथा उपयुक्त है।

सीएसआईआर-नीरी ने कहा कि संस्थान द्वारा विकसित नवोन्मेषण समाज की सेवा के लिए 'राष्ट्र को समर्पित' किया गया है। इस जानकारी को गैर-विशिष्ट आधार पर केंद्रीय सूक्ष्म, लघु और मध्यम उद्यम मंत्रालय (एमएसएमई) को हस्तांतरित कर दिया गया है। यह नवोन्मेषण निजी, सरकारी और विभिन्न ग्रामीण विकास योजनाओं और विभागों सहित सभी सक्षम पार्टियों को वाणिज्यीकरण करने और लाइसेंस प्राप्त करने में समर्थ बनाएगा।



लाइसेंसधारकों से आसानी से प्रयोग करने योग्य कॉम्पैक्ट किट के रूप में व्यावसायिक उत्पादन के लिए विनिर्माण सुविधाएं स्थापित करने की अपेक्षा की जाती है। महामारी की व्याप्त स्थिति तथा कोविड-19 की संभावित तीसरी लहर को देखते हुए सीएसआईआर-नीरी ने देश भर में इसके व्यापक प्रसार के लिए संभावित लाइसेंसधारियों को जानकारी हस्तांतरण करने की प्रक्रिया तेज कर दी है।

केंद्रीय मंत्री श्री नितिन गडकरी की उपस्थिति में कल 11 सितंबर, 2021 को मानक प्रचालन प्रक्रिया और सेलाइन गार्गल आरटी-पीसीआर प्रौद्योगिकी का औपचारिक हस्तांतरण किया गया।

इस अवसर पर, केंद्रीय सड़क परिवहन और राजमार्ग मंत्री ने कहा: “सेलाइन गार्गल आरटी-पीसीआर पद्धति को पूरे देश में, खासकर संसाधन की दृष्टि से निम्न ग्रामीण और जनजातीय क्षेत्रों में कार्यान्वित करने की आवश्यकता है। इसका परिणाम त्वरित और अधिक नागरिक-अनुकूल जांच के रूप में आएगा तथा महामारी के खिलाफ हमारी लड़ाई को और सुदृढ़ करेगा। एमएसएमई इकाई ने सीएसआईआर-नीरी द्वारा विकसित सेलाइन गार्गल आरटी-पीसीआर प्रौद्योगिकी के व्यावसायीकरण के लिए सीएसआईआर-नीरी से संपर्क किया था।

सेलाइन गार्गल आरटी-पीसीआर प्रौद्योगिकी के प्रमुख आविष्कारक एनईईआरआई के वैज्ञानिक डॉ कृष्ण खैरनार और सीएसआईआर-नीरी, नागपुर में पर्यावरण विषाणु विज्ञान के रिसर्च स्कॉलर की टीम है।

एमएसएमई इकाई को जानकारी के हस्तांतरण के दौरान सीएसआईआर-नीरी (सेलाइन गार्गल आरटी-पीसीआर का नवोन्मेषक) के वैज्ञानिक और ईवीसी के प्रमुख डॉ कृष्णा खैरनार, सीएसआईआर-नीरी के निदेशक डॉ. श्री वरी चंद्रशेखर, सीएसआईआर-नीरी के प्रौद्योगिकी हस्तांतरण के अध्यक्ष डॉ अतुल वैद्य, एमएसएमई इकाई के निदेशक श्री राजेश डागा और एमएसएमई इकाई के निदेशक श्री कमलेश डागा भी उपस्थित थे।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1754329>



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Study finds why people with diabetes develop severe COVID-19

A recent study by a team of international clinical researchers reveals the mechanism behind cytokine storm during coronavirus infection.

Throughout the COVID-19 pandemic, clinicians have noted that certain patients are at especially high risk of developing severe illness or dying from coronavirus infection.

Type 2 diabetes- a condition affecting more than 10 per cent of the US population-- is one of the main risk factors for severe COVID-19 illness. New research from U-M uncovers why this might be and offers hope for potential therapy.

The culprit appears to be an enzyme called SETDB2. This same enzyme has been implicated in the non-healing, inflammatory wounds found in people with diabetes.

Working in the lab of Katherine Gallagher, M.D. of the Michigan Medicine Departments of Surgery and Microbiology and Immunology, researcher W. James Melvin, M.D., and his colleagues decided to probe a possible link between the enzyme and the runaway inflammation they witnessed first-hand in COVID patients in the ICU.

Starting with a mouse model of coronavirus infection, they found that SETDB2 was decreased in immune cells involved in the inflammatory response, called macrophages, of infected mice with

diabetes. They later saw the same thing in monocyte-macrophages in the blood from people with diabetes and severe COVID-19.

"We think we have a reason for why these patients are developing a cytokine storm," said Melvin.

In the mouse and human models, noted Melvin and Gallagher, as SETDB2 went down, inflammation went up. In addition, they revealed that a pathway known as JAK1/STAT3 regulates SETDB2 in macrophages during coronavirus infection.

Taken together, the results point to a potential therapeutic pathway. Previous findings from the lab demonstrated that interferon, a cytokine important for viral immunity, increased SETDB2 in response to wound healing. In their new study, they found blood serum from patients in the ICU with diabetes and severe COVID-19 had reduced levels of interferon-beta compared to patients without diabetes.

"Interferon has been studied throughout the pandemic as a potential therapy, with efforts going back and forth between trying to increase or decrease interferon levels," said Gallagher. "My sense is that its efficacy as a therapy will be both patient and timing specific."

To test this, the study team administered interferon beta to coronavirus-infected diabetic mice and saw that they were able to increase SETDB2 and decrease inflammatory cytokines.

"We're trying to home in on what controls SETDB2, which is sort of the master regulator of a lot of these inflammatory cytokines that you hear about as being increased in COVID-19, such as IL-1B, TNFalpha, and IL-6," explained Gallagher.

"Looking upstream at what's controlling SETDB2, interferon is at the top end, with JaK1 and STAT3 in the middle. Interferon increases both, which increases SETDB2 in a sort of cascade."

This is important, she added, because identifying the pathway presents other potential ways of targeting the enzyme.

Melvin and Gallagher hope the findings of this study will inform ongoing clinical trials of interferon or other downstream components of the pathway, including epigenetic targets, for COVID-19. Their work also highlights the need to understand the timing and cell-specificity of therapy and to tailor its application to patients' underlying conditions, especially patients with diabetes.

"Our research is showing that maybe if we are able to target patients with diabetes with interferon, especially early in their infection, that may actually make a big difference," Melvin said.

Other U-M researchers involved in this study include Christopher O. Audu, Frank M. Davis, Sriganesh B. Sharma, Amrita Joshi, Aaron DenDekker, Sonya Wolf, Emily Barrett, Kevin Mangum, Xiaofeng Zhou, Monica Bame, Alex Ruan, Andrea Obi, Steven L. Kunkel, and Bethany B. Moore.

<https://timesofindia.indiatimes.com/life-style/health-fitness/health-news/study-finds-why-people-with-diabetes-develop-severe-covid-19/articleshow/86135586.cms>

