August
2022

# समाचार पत्रों से चयित अंश
# Newspapers Clippings

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**खंड** : 47 **अंक**: 159 24 **अगस्त** 2022

Vol.: 47 Issue: 159 24 August 2022




रक्षा विज्ञान पुस्तकालय
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पत्र सूचना कार्यालय
भारत सरकार

**रक्षा मंत्रालय**

***मंगलवार, 23 अगस्त 2022 3:11 अपराह्न***

# डीआरडीओ और भारतीय नौसेना ने ओडिशा तट पर सतह से हवा में मार करने वाली कम दूरी की मिसाइल के लंबवत प्रक्षेपण का सफलतापूर्वक परीक्षण किया

रक्षा अनुसंधान और विकास संगठन (डीआरडीओ) और भारतीय नौसेना ने 23 अगस्त, 2022 को ओडिशा के तट पर चांदीपुर के एकीकृत परीक्षण रेंज (आईटीआर) से कम दूरी की सतह से हवा में मार करने वाली मिसाइल (वीएल-एसआरएसएएम) के लंबवत प्रक्षेपण का सफलतापूर्वक परीक्षण किया। लंबवत प्रक्षेपण क्षमता के प्रदर्शन के लिए एक उच्च गति वाले मानव रहित हवाई लक्ष्य के खिलाफ भारतीय नौसेना के पोत से यह परीक्षण किया गया। स्वदेशी रेडियो फ्रीक्वेंसी (आरएफ) सीकर से युक्त मिसाइलों ने उच्च सटीकता के साथ इस लक्ष्य पर निशाना साधा गया। डीआरडीओ ने इस वीएल-एसआरएसएएम प्रणाली को स्वदेशी रूप से डिजाइन और विकसित किया है।

चांदीपुर स्थित आईटीआर ने इस परीक्षण प्रक्षेपण के दौरान रडार, इलेक्ट्रो-ऑप्टिकल निगरानी प्रणाली (ईओटीएस) और टेलीमेट्री प्रणाली जैसे विभिन्न रेंज उपकरणों के माध्यम से प्राप्त किए गए प्रक्षेपण संबंधी डेटा का उपयोग करके प्रक्षेपण पथ और वाहन (मिसाइल) प्रदर्शन मापदंडों की निगरानी की। इस प्रक्षेपण की निगरानी रक्षा अनुसंधान और विकास प्रयोगशाला (डीआरडीएल), हैदराबाद स्थित रिसर्च सेंटर इमारत (आरसीआई) व पुणे स्थित आरएंडडी इंजीनियर्स जैसे सिस्टम के डिजाइन व विकास में शामिल विभिन्न डीआरडीओ प्रयोगशालाओं के वरिष्ठ वैज्ञानिकों ने की थी। रक्षा मंत्री श्री राजनाथ सिंह ने वीएल-एसआरएसएएम के सफल

प्रक्षेपण परीक्षण पर डीआरडीओ, भारतीय नौसेना और संबंधित टीमों को बधाई दी है। उन्होंने कहा कि यह मिसाइल भारतीय नौसेना की शक्ति बढ़ाने वाली साबित होगी।

इसके अलावा रक्षा अनुसंधान और विकास विभाग के सचिव व डीआरडीओ के अध्यक्ष ने भी सफल प्रक्षेपण परीक्षण में शामिल टीमों को बधाई दी। उन्होंने कहा कि इस परीक्षण ने हथियार प्रणाली की प्रभावशीलता को साबित किया है। उन्होंने आगे कहा कि यह समुद्री-स्किमिंग लक्ष्यों सहित निकट सीमा पर विभिन्न हवाई खतरों को बेअसर करने के लिए भारतीय नौसेना को और अधिक मजबूत बनाएगा।

*https://pib.gov.in/PressReleasePage.aspx?PRID=1853921*

अमर उजाला

*मंगलवार, 23 अगस्त 2022*

# DRDO और भारतीन नौसेना ने VL-SRSAM का किया सफलतापूर्वक परीक्षण, जानें इस मिसाइल की खूबियां

रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) और भारतीय नौसेना ने मंगलवार को जमीन से हवा में मार करने वाली ' वर्टिकली शॉर्ट रेंज सरफेस टू एयर मिसाइल'(VL-SRSAM) का सफलतापूर्वक परीक्षण किया। ओडिशा के चांदीपुर तट पर भारतीय नौसेना के जहाज से डीआरडीओ और भारतीय नौसेना ने वर्टिकल लॉन्च शॉर्ट रेंज सरफेस-टू-एयर मिसाइल का परीक्षण किया। डीआडीओ के अधिकारियों ने इसकी जानकारी दी। VL-SRSAM को भारतीय नौसेना के लिए स्वदेशी रूप से डिजाइन और विकसित किया गया है। रक्षा अनुसंधान और विकास संगठन (डीआरडीओ) के अधिकारियों के अनुसार यह मिसाइल लगभग 15 किमी की दूरी पर स्थित दुश्मन के टारगेट को तबाह कर सकती है।

**जानें VL-SRSAM मिसाइल प्रणाली क्या है?**

VL-SRSAM मिसाइल के परीक्षण का मुख्य उद्देश्य भारतीय नौसेना के युद्धपोतों पर इसकी तैनाती करना है। इस मिसाइल को रक्षा अनुसंधान और विकास संगठन(डीआरडीओ) की तीन सुविधाओं द्वारा संयुक्त रूप से डिजाइन और विकसित किया गया है। मिसाइल में समुद्री-स्किमिंग लक्ष्यों सहित निकट सीमा पर विभिन्न हवाई खतरों को बेअसर करने की क्षमता है। समुद्री स्किमिंग की रणनीति का उपयोग विभिन्न जहाज-रोधी मिसाइलों और कुछ लड़ाकू विमानों द्वारा किया जाता है ताकि युद्धपोतों पर रडार द्वारा पता लगाने से बचा जा सके। यह

मिसाइल समुद्र की सतह के बेहद करीब से उड़ान भरती हैं और इस तरह इनका पता लगाना और बेअसर करना मुश्किल होता है।

**VL-SRSAM का डिजाइन**

इस मिसाइल को 40 से 50 किमी की दूरी पर और लगभग 15 किमी की ऊंचाई पर उच्च गति वाले हवाई लक्ष्यों पर हमला करने के लिए डिजाइन किया गया है। डीआरडीओ के अधिकारियों ने कहा है कि इसका डिजाइन एस्ट्रा मिसाइल पर आधारित है जो कि एक विजुअल रेंज से परे हवा से हवा में मार करने वाली मिसाइल है।

**VL-SRSAM मिसाइल की प्रमुख विशेषताएं**

VL-SRSAM मिसाइल की दो प्रमुख विशेषताएं हैं क्रूसिफॉर्म विंग्स और थ्रस्ट वेक्टरिंग। क्रूसिफॉर्म में पंख चार छोटे पंख होते हैं जो चारों तरफ एक क्रॉस की तरह व्यवस्थित होते हैं और प्रक्षेप्य को एक स्थिर मुद्रा देते हैं। वहीं थ्रस्ट वेक्टरिंग अपने इंजन से कोणीय वेग और मिसाइल को नियंत्रित करने वाले थ्रस्ट की दिशा बदलने में मदद करता है।

**VL-SRSAM मिसाइल का रणनीतिक महत्व**

नौसेना के एक पूर्व अधिकारी ने कहा कि नौसेना को अपने युद्धपोत को जहाज-रोधी मिसाइलों और विरोधी विमानों से बचाने के लिए विभिन्न रक्षा तंत्रों को नियोजित करना पड़ता है। सदियों पुरानी विधियों में से एक है चैफ्स - जो दुनिया भर में दुश्मन के रडार और रेडियो फ्रीक्वेंसी (आरएफ) मिसाइल से नौसेना के जहाजों की रक्षा के लिए इस्तेमाल की जाने वाली एक काउंटरमेजर तकनीक है। दूसरा तरीका एंटी शिप मिसाइलों का मुकाबला करने के लिए मिसाइलों को तैनात करना है। इन प्रणालियों में एक त्वरित पहचान तंत्र, त्वरित प्रतिक्रिया, उच्च गति और उच्च गतिशीलता होनी चाहिए। VL-SRSAM मिसाइल इन सभी गुणों का दावा करता है। हालांकि, भारतीय नौसेना के जहाजों पर तैनाती के लिए तैयार होने के लिए इसे विभिन्न परिस्थितियों और विन्यासों में परीक्षणों से गुजरना होगा।

*https://www.amarujala.com/india-news/drdo-and-indian-navy-successfully-flight-tested-vertical-launch-short-range-surface-to-air-missile*

Press Information Bureau
Government of India

**Ministry of Defence**

***Tue, 23 Aug 2022 3:11 PM***

# DRDO & Indian Navy Successfully Flight-Test Vertical Launch Short Range Surface-To-Air Missile off Odisha Coast

Defence Research & Development Organisation (DRDO) and Indian Navy successfully flight tested Vertical Launch Short Range Surface-to-Air Missile (VL-SRSAM) from the Integrated Test Range (ITR), Chandipur off the coast of Odisha on August 23, 2022. The flight test was carried out from an Indian Naval Ship against a high-speed unmanned aerial target for demonstration of vertical launch capability. The missiles, equipped with indigenous Radio Frequency (RF) seeker, intercepted the target with high accuracy. The VL-SRSAM system has been indigenously designed and developed by DRDO. During the test launch, flight path and vehicle performance parameters were monitored using flight data, captured by various Range instruments such as Radar, Electro-optical tracking system (EOTS) and Telemetry systems deployed by ITR, Chandipur. The launch was monitored by senior scientists from various DRDO labs involved in the design and development of the system such as Defence Research & Development Laboratory (DRDL), Research Centre Imarat (RCI), Hyderabad and R&D Engineers, Pune.

RakshaMantriShriRajnath Singh has complimented DRDO, Indian Navy and associated teams on the successful flight trial of VL-SRSAM and stated that the missile will prove to be a force multiplier for the Indian Navy. Secretary Department of Defence R&D & Chairman DRDO congratulated the teams involved in the successful flight test and said that the trial has proved the effectiveness of the weapon system. He added that it will further strengthen the Indian Navy for neutralising various aerial threats at close ranges including sea-skimming targets.

*https://pib.gov.in/PressReleasePage.aspx?PRID=1853841*


***Tue, 23 Aug 2022***

# Indigenously-Developed VL-SRSAM Missile System Successfully Flight-Tested By DRDO, Indian Navy

The Defence Research and Development Organisation (DRDO) and Indian Navy on Tuesday successfully flight-tested the indigenously designed and developed Vertical Launch Short Range Surface-to-Air Missile (VL-SRSAM) from the Integrated Test Range (ITR) in Chandipur off the coast of Odisha. The flight test was carried out from a naval ship against a high-speed unmanned aerial target for demonstration of vertical launch capability. Issuing an official statement, the

Ministry of Defence said, “The missiles, equipped with indigenous Radio Frequency (RF) seeker, intercepted the target with high accuracy."

During the test launch, flight path and vehicle performance parameters were monitored using flight data, captured by various range instruments such as radar, electro-optical tracking system (EOTS) and telemetry systems deployed by ITR in Chandipur. “The launch was monitored by senior scientists from various DRDO labs involved in the design and development of the system such as Defence Research and Development Laboratory (DRDL), Research Centre Imarat (RCI) in Hyderabad and R&D Engineers in Pune," the statement reads.

Complimenting DRDO, Indian Navy and teams associated with it, Defence Minister Rajnath Singh said that the missile will prove to be a force multiplier for the Indian Navy. Secretary Department of Defence R&D and Chairman DRDO also congratulated the teams involved in the successful flight test and said that the trial has proved the effectiveness of the weapon system. “It will further strengthen the Indian Navy for neutralising various aerial threats at close ranges including sea-skimming targets," the defence ministry said.

*https://www.news18.com/amp/news/india/indigenously-developed-vl-srsam-missile-system-successfully-flight-tested-by-drdo-indian-navy-5806117.html*

FINANCIAL EXPRESS
Read to Lead

***Tue, 23 Aug 2022***

# India Successfully Test-Fires VL-SRSAM

The VL-SRSAM was flight-tested by the Defence Research and Development Organisation (DRDO) and the Indian Navy. The flight test was carried out from an Indian naval ship against a high-speed unmanned aerial target for demonstration of vertical launch capability, DRDO sources said. The missiles, equipped with indigenous radio frequency (RF) seeker, intercepted the target with high accuracy. The VL-SRSAM system has been indigenously designed and developed by DRDO. “During the test launch, flight path and vehicle performance parameters were monitored using flight data, captured by various range instruments such as radar, electro-optical tracking system (EOTS) and telemetry systems deployed by ITR, Chandipur,” they said.

An official statement said that the launch was monitored by senior scientists from various DRDO laboratories involved in the design and development of the system such as Defence Research and Development Laboratory (DRDL), Research Centre Imarat (RCI), Hyderabad and R&D Engineers, Pune. Defence Minister Rajnath Singh has complimented DRDO, Indian Navy and associated teams on the successful flight trial of VL-SRSAM and stated that the missile will prove to be a force multiplier for the Indian Navy. Secretary, Department of Defence R&D and Chairman of DRDO, G Satheesh Reddy, congratulated the teams involved in the successful flight test and said that the trial has proved the effectiveness of the weapon system. “It will further strengthen the Indian Navy for neutralising various aerial threats at close ranges including sea-skimming targets,” Reddy added.

*https://www.financialexpress.com/defence/india-successfully-test-fires-vl-srsam/2641299/lite/*

# DRDO On Twitter

# Defence News

## Defence Strategic : National/International

Press Information Bureau
Government of India

**Ministry of Defence**

***Tue, 23 Aug 2022 8:06PM***

# Raksha Mantri Holds Bilateral Meetings with his Uzbek, Kazakh and Belarusian Counterparts on the First Day of his Visit to Tashkent; Ways to Enhance Defence Cooperation with the Three Countries Discussed

### Shri Rajnath Singh to attend Shanghai Cooperation Organisation Defence Ministers' meeting tomorrow

RakshaMantriShriRajnath Singh, on August 23, 2022, reached Tashkent, Uzbekistan on a three-day official visit. On the first day of his engagements, ShriRajnath Singh held bilateral meetings with his Uzbek counterpart Lieutenant General BakhodirKurbanov; Defence Minister of Kazakhstan Colonel General ZhaksylykovRuslanZhakslykov and Belarusian Defence Minister Lieutenant General Viktor Khrenin. The entire spectrum of defence cooperation with the three countries was reviewed during the meetings, with focus on identifying avenues to expand mutually beneficial collaboration. Issues of mutual interest were also discussed.

On August 24, 2022, the RakshaMantri will attend the Annual Meeting of the Defence Ministers' of Shanghai Cooperation Organisation (SCO) Member States. Defence cooperation issues among the SCO Member States will be discussed during the meeting. A joint communiqué is expected to be issued after the deliberations.During the stay in Tashkent, ShriRajnath Singh will pay homage at the monument of late Prime Minister LalBahadurShastri and meet Indian Diaspora in Uzbekistan.

*https://pib.gov.in/PressReleasePage.aspx?PRID=1853955*

FINANCIAL EXPRESS
Read to Lead

*Tue, 23 Aug 2022*

# IAC-1 `Vikrant' to be Commissioned Next Month, Countdown Begins

India will join a select group of countries which have the ability to design and build indigenous aircraft carriers when Prime Minister NarendraModi will commission IAC-1 `Vikrant' in the first week of September.The ceremony according to reports is expected to take place on September 2, at the Cochin Shipyard (CSL) – the yard where the ship has been built will be attended by top officials of the armed forces, as well as other dignitaries.

**Vikrant Vs Fujian**

Both Indian and Chinese navies have received new aircraft carriers and is indication of the strengthening of military potential in confrontation with disputed world powers. IAC-1 Vikrant is expected to play a major role in strengthening the capabilities of the Indian Navy to counter the growing Chinese threat in the waters around India.This aircraft carrier which is larger and more advanced than her predecessor is built at a cost of Rs 20,000 crore has been designed by Indian Navy's in-house Directorate of Naval Design (DND) and built by the CSL, under the Ministry of Ports, Shipping and Waterways. Its predecessor had played a very critical role in the 1971 Indo-Pak War.

India had ex-British carriers in service from 1961 to 1997 and from 1987 to 2016, and INS Vikramaditya, a modified Kiev-class carrier purchased from Russia and commissioned in 2013, is currently the flagship of the Indian Navy.With a length of 262 meters and a displacement of 45,000 tons, the Vikrant is the largest warship that India has built but is half the tonnage of the Fujian carrier. And 76 per cent of its components are developed in the country. It can carry 30 jets and helicopters, and, like INS, Vikramaditya uses a STOBAR launch assembly with a ski jump ramp.The Vikrant is powered by four General Electric LM2500+ gas turbines on two shafts producing over 80 megawatts (1,10,000 hp) of power. Tata Power Strategic Engineering Division developed the ship's Combat Management System (CMS) in collaboration with the Weapon and Electronics System Engineering Establishment and MARS, Russia.

The IAC's initial air wing is expected to be made up of the MiG-29K, a carrier version of the Russian-made MiG-29K, American Lockheed Martin/Sikorsky MH-60R multirole naval helicopters, Indian ALH Dhruv and Kamov Ka-31 AEW helicopter, from Russia.The MiG-29K aircraft served on the INS Vikramaditya, but due to poor experience, India is looking for 26 new fighter aircraft on the carrier and is to make a choice soon – it will either be the French Rafale M or the US FA-18 Super Hornet.The new carrier with around 2,300 compartments, special facilities for women officers and built to host 1700 crew, will boost Indian Navy's quest for Blue Navy and its dominance in the Indian Ocean Region (IOR).

**Fujian Carrier**

The Fujian carrier is designed and built in China, and the Vikrant in India. Both carriers will take some time to reach their potential, but they are already the most advanced aircraft carriers.Fujian is China's third aircraft carrier and the first to be completely designed and built in China. It is

considered a potential rival to the US nuclear-powered supercarriers. The Type 003 class carrier is more than 315 meters long and weighs 80,000 tons when fully loaded. This makes it slightly larger than its predecessors, the Type 001 Liaoning and the Type 002 Shandong, which were 304 meters long and displaced 60,000 to 70,000 tons. The Liaoning is a Soviet carrier China purchased in 1998 and extensively modified before entering service in 2012. The Shandong is based on the Liaoning and entered service in 2019.

All three Chinese carriers use conventional engines instead of nuclear reactors, which limits their power and the time they can spend at sea. However, the biggest change is the replacement of the short take-off-arrested-recovery (STOBAR) assembly with the catapult-assisted take-off-arrested-recovery (CATOBAR) assembly used on US aircraft carriers.

**STOBAR & CATOBAR**

STOBAR allows jets to take off on shorter decks but limits the fuel and weapons they can carry on take-off. The CATOBAR assembly can launch jets with higher payloads and more fuel, which is suitable for China's only fixed-wing carrier-based aircraft in service, the J-15. Parts of the flight deck were covered when launching in Shanghai on June 17 this year, covering its catapults. But they are believed to use an electromagnetic aircraft launch vehicle (EMALS) to launch aircraft more effectively and frequently. Until Fujian, the only carriers with EMALS were US Navy Ford-class nuclear-powered ships.

Fujian is expected to carry more than 36 aircraft; the number currently carried by Liaoning and Shandong, and will include J-35 and J-15 fighters, UAVs and Z-18 helicopters. The composition and size of the aviation group are still unknown. The dimensions and displacement of the ship, in theory, make it possible to have on board about 40-60 aircraft and helicopters for various purposes, as well as to ensure their operation and combat use.Due to the length of 320 m and displacement of 80-85 thousand tons, the "Fujian" has already become the largest ship in the history of the PRC fleet. In addition, it turns out to be the largest and heaviest non-nuclear warship in the world, incl. among aircraft carriers.The new aircraft carrier differs markedly from previous ships for the PLA Navy. During its design and construction, new ideas and components were used, due to which it was planned to obtain a number of advantages.

*https://www.financialexpress.com/defence/iac-1-vikrant-to-be-commissioned-next-month-countdown-begins/2641111/lite/*

The Indian EXPRESS

***Tue, 23 Aug 2022***

# If Defence Personnel Die in Service, Kin will Get Rs 1 Crore: Gujarat

The Gujarat government on Monday announced Rs 1 crore compensation for the families of defence or paramilitary personnel who die "under any circumstances" while in service, revising a 2016 resolution which granted Rs 1 lakh compensation only to the families of defence/ paramilitary personnel who were killed in action or died in the field.The 2016 resolution stipulated that the compensation was only for families of defence/ paramilitary personnel who were killed in a terror or Naxal attack; in firing or bomb blast on the border; while trying to catch

a suspect in combing operation or while maintaining law and order (drowning, fire-fighting, collapse of a tree or a building, vehicular accident, death by bullet injuries or bomb blast); died of hypothermia in extreme cold terrain; died of heat stroke in extreme hot terrain.

In the resolution issued by the state home department on Monday, as seen by The Indian Express, the state government has now made the assistance available to all defence/ paramilitary personnel from Gujarat who die during service."As per the 2016 resolution, the financial assistance was available to the families only if the defence or paramilitary personnel from Gujarat were killed under the five defined circumstances. Now, it will be given to the families of personnel who die during service under any circumstances," confirmed an official of the home department who did not want to be named.The decision comes a day after the Army announced its recruitment rally from 20 districts of Gujarat, from October 15 to November 8, under the short-term Agnipath scheme. It also comes amid protests by ex-servicemen from Gujarat over various issues, including increased compensation for families of slain soldiers.

According to the new resolution, effective from Monday, the monthly assistance of Rs 1,000 for the widows of slain defence/ paramilitary personnel has also been revised to Rs 5,000. Earlier, in case the soldier was unmarried, his mother was entitled to get Rs 50,000 compensation and Rs 500 per month. This has been increased to Rs 5 lakh, and Rs 5,000 each for both parents.

While two children of the defence/ paramilitary personnel were entitled to get a monthly assistance of Rs 500 each till they completed their studies or attained the age of 25 years, they will now get Rs 5,000 each.Earlier, the personnel who sustained 50 per cent or more injury or disability under certain circumstances while on duty were entitled to a fixed one-time assistance of Rs 50,000 and Rs 1,000 per month. In the revised resolution, the one-time assistance has been increased to Rs 2.50 lakh, with Rs 5,000 as monthly assistance.The state government has also increased the monetary awards for defence personnel who get gallantry awards: Rs 1 crore for ParamVir Chakra, up from Rs 22,500; Rs 1 crore for Ashok Chakra, up from Rs 20,000; Rs 50 lakh for Mahavir Chakra, up from Rs 15,000; Rs 50 lakh for Kirti Chakra, up from Rs 12,000.

The financial assistance and monetary awards are being provided from the Chief Minister's Jawan Relief Fund that was created after the Kargil War, said the resolution.Minister of State for Home Harsh Sanghavi said the state government has also asked a high-level committee of secretaries to look into other demands of ex-servicemen.

*https://indianexpress.com/article/cities/gandhinagar/if-defence-personnel-die-in-service-kin-will-get-rs-1-crore-gujarat-8105796/*

FINANCIAL EXPRESS
Read to Lead

***Tue, 23 Aug 2022***

# Tupolev TU-160: The Ace of Air Warfare

***By Lt Col JS Sodhi***

Omar N Bradley's famous quip "Airpower has become predominant, both as a deterrent to war, and-in the eventuality of war-as the devastating force to destroy an enemy's potential and fatally undermine his will to wage war" has immense relevance for India which is located a precarious

geopolitical location as it has two hostile neighbours China and Pakistan, on its eastern and the western borders respectively. As India enters into the final stages of talks with Russia for purchase of six Tupolev Tu-160 strategic bombers, this deal would go on to be a game changer in India's safety and security, when it is inked. Only three countries in the world – USA, Russia and China possess strategic bombers in its air force. The Indian Air Force (IAF) would be the fourth air force in the world to possess the deadly and destructive strategic bombers after the Tupolev Tu-60 strategic bombers, nicknamed White Swan, starts joining its fleet. NATO has named the Tupolev-Tu160s as Blackjack.

A strategic bomber is a medium to long range aircraft designed to drop enormous quantities of air-to-ground munitions onto a distant target in an enemy nation with the aim of destroying and debilitating the enemy's capability and capacity to wage a war. The basic difference between fighter aircrafts and strategic bombers is that while the fighter aircrafts are employed for air interdiction operations and limited ground destruction of enemy combatants, the devastation caused by a strategic bomber is phenomenal as it cripples and collapses an enemy's strategic assets to unprecedented levels by destroying logistical establishments, factories, cities, major infrastructure and military installations. An important reason of the thinking of the IAF to acquire the White Swan is that China has deployed its H-6K strategic bombers near the Indian borders. H-6Ks were first sighted near the Indian borders on November 11, 2021 which was the 72$^{nd}$ Raising Day of the Chinese air force which is called the People's Liberation Army Air Force (PLAAF).

The PLAAF has 231 H-6 strategic bombers and 36 H-6K strategic bombers, making it the biggest air force in the world in terms of strategic bombers. US Air Force comes a distant second with 156 B-1, B-2 and B-52 strategic bombers whilst the Russian Air Force has 135 Tu-22s, Tu-95s and Tu-160s. Clearly, the first baby step has been taken by India in acquiring six TU-160s to match up with the enormous strategic bombers fleet with the PLAAF. The Tupolev Tu-160 is operated by a crew of 4 personnel comprising a pilot, co-pilot, bombardier and a defensive systems officer. The aircraft has a length of 54.1 metres and a wingspan of 55.7 metres. It has a maximum speed of 2,220 kilometres per hour and an operational range of 12,300 kilometres. It has two internal weapon bays which can house 45,000 kilograms of ordnance.

The strategic bombers being large size aircrafts have a large Radar Cross Section (RCS), and hence are extremely vulnerable to both airborne and air defence systems. The strategic bombers are generally operated from the airbases located in depth. Having a strategic bomber in a nation's air fleet is a matter of immense pride for a nation, apart from the great fire power and is a psychological deterrent for the enemy. A strategic bomber is expensive to maintain and requires great technical expertise in its operations. Thus, only a miniscule number of nations have a strategic bomber. India is about to enter that coveted group of nations which possess a strategic bomber. GiulioDouhet rightly remarked "In order to ensure an adequate national defence, it is necessary and sufficient to be in a position in case of war to conquer the command of the air".

*https://www.financialexpress.com/defence/tupolev-tu-160-the-ace-of-air-warfare/2641354/lite/*

Business Standard

*Wed, 24 Aug 2022*

# Is India Becoming More Self-Reliant in Defence?

In his Independence Day speech, Prime Minister NarendraModi called for innovation in defence products. And just fortnight ago, Army Chief General MK Pande had said that the country's interests are best served by being self-reliant, especially in defence productions. And that the future wars cannot be fought and won on what he called "borrowed technology". India has come a long way since 1971, when the war with Pakistan saw the Indian Navy use its aircraft carrier, INS Vikrant, and its Seahawk aircraft to blockade Bangladesh. INS Vikrant was previously known as HMS Hercules, before India acquired it from the United Kingdom. Fast-forward to 2022. In July, India's first indigenous aircraft carrier, also christened Vikrant, was handed over to the Navy. It will be commissioned later this month. It is not just INS Vikrant. The country has been making strides towards self-reliance. Hindustan Aeronautics Limited is aiming to secure a deal for its Tejas Light Combat Aircraft in Malaysia.

In January, India had signed a 375-million-dollar contract for the supply of BrahMos cruise missiles to the Philippines. This constituted India's largest-ever weapons sale abroad. The government numbers show an encouraging trend. As a proportion of total procurement, capital expenditure on imported defence equipment declined from 41.89 per cent in FY20 to 35.28 per cent in FY22. But a closure look reveals another story. It remains unclear how these import numbers were arrived at. Under the Defence Procurement Procedure 2016, the extent of indigenous content in the procured equipment is calculated by excluding specific elements from its total cost at all stages of manufacturing, production, and assembly. These elements are the direct costs of all materials and products imported into India, along with the direct and indirect costs of all services obtained from foreign entities or citizens. All license fees, royalties, technical fees and other fees or payments paid out of India and statutory levies in India like taxes, duties, and cesses also have to be excluded. But, there is a question mark on whether or not this method has been adhered to in both letter and spirit.

If you cannot measure it, you cannot manage it. But, how you measure also matters, especially if the goal is increasing defenceindigenisation. And, DPP 2016's 'monetary-value' calculation method might not be the most suitable one. Becoming self-sufficient in core technologies remains the real challenge. At present, the Tejas is powered by an American engine. As will India's future stealth combat aircraft. Although India is exploring collaboration with foreign defence majors for co-producing engines for the latter. Meanwhile, the Navy's ships rely on power plants designed by foreign firms. And, India is again hunting for a foreign conventional submarine design, despite the Make in India Scorpène initiative.

The government might also have to set its sights higher. As of the 5th of August, three positive indigenisation lists comprising 310 items have been released. These lists clearly spell out the timelines beyond which these items must be compulsorily procured from Indian companies. Though laudable, this indigenisation initiative has its own limitations. AjaiShukla of Business Standard says these lists lack ambition. All of their items are already indigenised. They don't present an accurate picture of indigenisation challenges. Shukla also argues that Make in India for defence products is handicapped by the absence of large orders. In the past, there have also

been cases where products designed, developed and manufactured in India failed to qualify for indigenous status because of the government's tendency to place such small orders that it was uneconomical to carry out import-substitution for many components.

AjaiShukla of Business Standard says, buying just 40 Tejas jets was example of anaemicgovt orders. Order for 83 Tejas jets has improved economies of scale. As Lt Gen H S Panag has pointed out, successive Indian governments have failed to formalise and declare a formal national security strategy. Such a strategy would form the basis of all defence planning, capability development, and fund allocation. In its absence, the Atmanirbhar mission will remain delinked from India's long-term strategic needs. It remains to be seen if the current government will remedy this.

*https://www.business-standard.com/podcast/current-affairs/is-india-becoming-more-self-reliant-in-defence-122082400094_1.html*

THE TIMES OF INDIA

***Wed, 24 Aug 2022***

# Gujarat Expects Defence Corridor Before Oct

While the Union government announced that its premier defence exhibition, DefExpo 2022, will be held in Gandhinagar from October 18 to 22, theGujrat BJP government expects the Union government will accept its demand for grant of a defence industrial corridor to Gujarat. States such as Uttar Pradesh, Tamil Nadu and others have been granted defence industries corridors by the Union government. The exhibition was earlier to be held between March 10 and 14 in Gandhinagar but was postponed due to the RussiaUkraine war and the Covid-19 pandemic. Former chief minister Vijay Rupani had written to the Union government and requested allocation of a defence industries corridor (DIC) and other facilities in Gujarat. States such as Uttar Pradesh and Tamil Nadu were granted DICs in 2020.

The letter, written to the Union defence ministry during Vijay Rupani's term, states, "Under the Make in India drive of Prime MinisterNarendraModi, the government of India is promoting defence industrial corridors (DICs) in the country.However despite several requests, Gujarat has not yet been allocated a DIC or any defence public sector unit (PSU) or any activity of DRDO (Defence Research and Development Organization) laboratories." The letter further states, "Gujarat is an industrial state and has a very conducive environment for the defence industry. Gujarat has a good environment for multiple defence corridors such as Kutch, Rajkot, Ahmedabad (Sanand), Surendranagar, Surat, Bharuch, and other places. The Gujarat government is keen to promote the defence industry in the state.

Gujarat government can provide land and other facilities at the Dholera special investment region (SIR) also if the government of India proposes a defence industrial corridor in the Dholera SIR." A key officer in the state government said as DefExpo is being held again, and the government has again taken up the matter with the central government. "We have made a demand for a defence industrial corridor and production units of major defence PSUs in Gujarat. We are hopeful that GOI will consider our demand as it will attract defence manufacturing units to Gujarat." Sources in the government said Gujarat has ample scope for development of arms and ammunition, defence vehicles manufacturing and manufacturing of sophisticated defence

equipment. About 22 companies have defence manufacturing licenses for Gujarat from the government of India, but most are waiting for long-term orders from the Union government to start their operations. L&T has started a tank manufacturing plant at Hazira near Surat.

*https://timesofindia.indiatimes.com/city/ahmedabad/gujarat-expects-defence-corridor-before-oct/articleshow/93742214.cms*

*मंगलवार, 23 अगस्त 2022*

# क्या है MQ-9B प्रीडेटर ड्रोन की खासियत? जानें भारत के लिए कितना अहम है ये अमेरिकी हथियार

भारत के दुश्मनों की नींद अब और हराम हो जाएगी. भारत अमेरिका से एमक्यू-9बी ड्रोन (MQ-9B Predator Drones) की खरीद करने जा रहा है. बताया जा रहा है कि इस खतरनाक प्रीडेटर ड्रोन को लेकर अमेरिका (America) के साथ बातचीत फाइनल स्टेज में है. लंबे वक्त तक हवा में रहने की क्षमता से लैस इस ड्रोन को तीनों सेनाओं के लिए खरीदने की योजना है. भारतीय सेना (Indian Army) में इस ड्रोन के शामिल होने के बाद ना सिर्फ एलएसी (LAC) पर बल्कि हिंद महासागर में भी भारत की ताकत बढ़ेगी. अमेरिका से इस सौदे के तहत 30 ड्रोन की खरीदने की बात हो रही है. MQ-9B भी MQ-9 रीपर का ही एक वेरिएंट है. अभी हाल में इसी हथियार का इस्तेमाल करके अमेरिका ने अल-कायदा प्रमुख अल-जवाहिरी पर हेलफायर मिसाइल से हमला किया था और उसे मार गिराया था.

**MQ-9B प्रीडेटर ड्रोन की ताकत और खासियत?**

• प्रिडेटर ड्रोन लंबे वक्त तक हवा में रहने में सक्षम
• 35 घंटे तक हवा में रह सकता है
• अधिक ऊंचाई वाले इलाकों की निगरानी के लिए खास तकनीक से लैस
• समुद्री सतर्कता और जमीन पर मौजूद लक्ष्यों को निशाना बनाने में सक्षम
• खुफिया जानकारी जुटाने और दुश्मन के ठिकानों को बर्बाद करने की ताकत
• असैन्य हवाई क्षेत्र की जरूरतों को पूरा करने में भी सक्षम
• अमेरिकी रक्षा कंपनी जनरल एटॉमिक्स ने किया है तैयार

**भारत के लिए कितना अहम है ये अमेरिकी ड्रोन?**

चीन के साथ लगती सीमा (LAC) और हिंद महासागर के पास सतर्कता बढ़ाने में एमक्यू-9बी ड्रोन (MQ-9B Predator Drones) काफी अहम साबित होगा. प्रीडेटर ड्रोन (Predator Drones)को लंबे समय तक हवा में रहने और अधिक ऊंचाई वाले इलाकों की निगरानी के लिए विशेष तौर से डिजाइन किया गया है. भारतीय सशस्त्र बल पूर्वी लद्दाख (East Ladakh) में चीन (China) के साथ गतिरोध के बाद ऐसे हथियारों की खरीद पर ध्यान फोकस कर रहे हैं. भारतीय नौसेना हिंद महासागर क्षेत्र में पीएलए युद्धपोतों सहित चीन की बढ़ती सैन्य गतिविधियों पर पैनी नजर रखने के लिए अपने निगरानी तंत्र को मजबूत कर रही है. तीनों सेनाओं को 10-10 ड्रोन दिए जाने की बात कही जा रही है.

*https://www.abplive.com/news/india/defence-news-india-mq-9b-predator-drones-deal-with-america-in-advanced-stage-know-how-important-this-us-weapon-for-india-2198542*

IDN INDIAN DEFENCE NEWS
Global Defence, Aerospace & Security

***Wed, 24 Aug 2022***

# Russian Arms Giant Rostec Seeks Help from Indian Offset Partners Amidst Ukraine Crisis: Report

The ongoing war in Ukraine has significantly hampered Russian defence exports and the country's own military supplies. The supply chain crisis has led the Russian defence industry to turn towards the Indian defence industry to supply spare parts and human resources to their clientele as stipulated in their contracts. ROSTEC, the Russian defence conglomerate overseeing Moscow's military-industrial complex, has reportedly approached an undisclosed number of Indian companies to supply them with parts for artillery, tanks, air-defence systems, and other exported supplies. The need for Indian engineers with the technical know-how on these systems has also been sought. Open-source-intelligence (OSINT) indicates that ROSTEC reached out to the following Indian firms: Armoured Vehicles Nigam, Advanced Weapons & Equipment India, and Yantra India, all of these are publicly owned indigenous companies with factories all across the country. Armoured Vehicles Nigam, Advanced Weapons & Equipment India, and Yantra India did not respond to requests for comment.

These companies have previously been known to manufacture Russian military material under licence over the past few decades. The Indian firms have been reportedly asked to help the Russian companieshonour the contracts made with their clients and also help supply the Russian military machine in the ongoing armed conflict. ROSTEC, in particular, has had its supply chain disrupted due to the war, with supplies to their armed forces and export supplies taking a significant toll, especially in Southeast Asia. ROSTEC did not respond to requests for comment. Adding to the Russian defence industry's woes are that South Asian and African customers seem hesitant to enter into a contract with Russian companies due to sanctions imposed by the United States and the European Union (EU). The impact of sanctions has seemingly deterred South Asian and African clients from entering into a contract, especially ones to handle the

maintenance of materials which have already been delivered, as they fear the prospect of being excluded from the financial markets of the West.

Two Indian companies, KrasnyDefence Technologies (formerly known as Krasny Marine Services) and Crown Group, have been asked by Russia's United Shipbuilding Corporation (USC) to provide specialised personnel [Human Resources] to both operate and maintain Russian weapons and vessels in various Southeast Asian countries. It may be poignant to note that the son of a former Indian Navy Chief, Admiral S.M Nanda, Lieutenant Commander Suresh Nanda (r), heads Crown Group and has reportedly had associations with USC in India for the past several years. KrasnyDefence Technologies and Crown Group did not respond to requests for comment. India is already pitching to support the Russian customers in South East Asia and Africa. Hindustan Aeronautics Limited has pitched its services to maintain and service the Malaysian Su-30 MKM. As one of the largest producers of Russian-origin Su-30 aircraft, HAL recently stated that it can provide the necessary support to the RMAF for the Su-30 MKM fleet, which is experiencing low serviceability due to the ongoing Russia-Ukraine crisis. On August 18, HAL signed an agreement to open an office in Kuala Lumpur.

In Africa, Uganda has signed an agreement with India's Hindustan Aeronautics Limited (HAL) for the maintenance and technical support of the Ugandan Air Force's Sukhoi Su-30MK2 fighter jets. The MOU was signed on March 4, 2022, by the Indian High Commission in Uganda and Uganda Peoples Defence Forces Commander Charles Lutaaya, according to the Ugandan news website The Independent. So far, United Aircraft Corporation of Russia, specifically the Komsomolsk-on-Amur Aircraft Plant, has been in charge of its maintenance. Following accidents in 2012 and 2016, the plant repaired Ugandan jets.

Neither the Ugandan military nor HAL have provided any information regarding the reason for the change from Russian to Indian maintenance support. The Ugandan Air Force initially possessed six Su-30s; however, one crashed in 2020, killing both pilots. "India is one of the largest users of former Soviet and Russian equipment outside Russia and has immense expertise in maintaining Russian equipment. It has been building the Russian Su-30s in its Nashik plant. Coincidently, 11 Base Repair Depot (11 BRD) of Air Force Station at Ojhar, also in Nasik, has been overhauling the Mig-29s for a long and has accumulated a lot of indigenised parts for the aircraft. HAL manufactures RD-33 Series-3 Engine for the IAF Mig-29s. India can offer its services for the maintenance of Russian Su-30 and Mig-29 aircraft to operators in Asia and elsewhere," said GirishLinganna, Indian Defence Analyst and Consulting Editor at Frontier India.

"The Indian Air Force is also retiring its MiG-21s by 2025. India can offer spare parts and repair services to interested users around the globe," he added. New Delhi is walking the diplomatic tightrope with Moscow, and its defence and oil sectors, while maintaining its role as a strategic partner to the West, particularly Washington in Southeast Asia, amidst the ongoing geopolitical upheaval.

*http://www.indiandefensenews.in/2022/08/russian-arms-giant-rostec-seeks-help.html?m=1*

Hindustan Times

*Tue, 23 Aug 2022*

# Ukraine Sanctions on Russia Virtually Ground Pak's JF-17 Fighter Programme

A day after the Indian Air Force (IAF) successfully targeted the Jaish-e-Mohammed (JeM) terror training camp at Balakot on February 26, 2019, to avenge the Pulwama terror strike, the Pakistanis launched a counter with US F-16 fighters and Chinese JF-17 fighters south of PirPanjal in Jammu and Kashmir. There is documentary evidence that the Pakistan Air Force relied only on F-16s to target unspecified targets in the Nowshera-Rajouri-Poonch sector across the LoC with JF-17 fighters not involved in the action at all. The Pakistani strike was intercepted by Indian fighters with Wing Commander AbhinandanVarthaman shooting down a much superior F-16 before crashing his vintage MiG-21 Bison in Pakistan-occupied Kashmir (PoK). While the US F-16 fired air-to-air missiles at Indian fighters, the much-touted Sino-Pak developed JF-17 was just for show and did not see the air battle and remained hidden behind the American fighters. The JF-17 programme today is in the doldrums due to a lack of spare parts for the Russian-made Klimov RD 93 aircraft engine.

Stung by multiple failures of JF-17 aircraft, primarily due to the serviceability of RD-93 engines, Pakistan had directly approached Russia for procuring the RD-93 engines, bypassing China. In the aftermath of multiple negotiations by Islamabad with Moscow, Russian engine company Kilmov has now indicated its willingness to supply RD-93 engines and its associated repair systems and maintenance facilities to JF-17 aircraft. However, in 2018, M/s Rosoboronexport, which is authorised to export defence equipment including RD- 93 engines and spares, was sanctioned by the US, thereby adversely affecting the sourcing of RD-93 engine spares by the PAF. The sanctions restrict Rosoboronexport from undertaking US dollar transactions, which the two governments and the concerned banks have now been attempting to sort out.

Russia has been strengthening its defence ties with Pakistan by allowing it to procure the RD-93 engine directly from it as opposed to using China as an intermediary as was the case previously. However, international relations are in a state of flux and strategic equations are changing fast with Russia coming under pressure from the West and looking for support from others. It is apparent that Russia is moving close to China in the evolving geo political matrix which is sought to be exploited by Pakistan.

**Pakistan Air Force saddled with underperforming JF-17 aircraft**

The JF-17 fighter jets, developed jointly by Pakistan and China, which was supposed to be a low-cost, lightweight, all-weather, multi-role fighter with a Chinese airframe, has now become a liability for Islamabad as it failed to keep up with the hype of being the best fighter aircraft in the world. Islamabad's experience with the JF-17 aircraft, particularly its Russian-made RD-93 engines, tells a completely different story besides casting serious doubt on the quality of these aircraft. The Pakistan military leadership had expected a fighter aircraft, something akin to the Russian Su-30 MKI or the French Mirage 2000 but the JF-17 aircraft fell well short of their high hopes as the aircraft performed poorly against the Indian Air Force's Mirage 2000 and Su-30s.

Incidentally, since its induction into the Pakistan Air Force (PAF) in 2009, the JF-17 recorded a string of crashes, casting serious doubts on the fitness of the aircraft as the PAF found much to its chagrin, that the JF-17 aircraft is nowhere near the boastful claims made by China due to problems encountered in the performance of Russian made RD-93 engines, installed in the aircraft.

Compounding the problem, the PAF has been encountering challenges in the serviceability of the aircraft due to a shortage of spares and engines. A large number of Russian RD 93 engines, installed in the JF-17 aircraft have developed cracks in guide vanes, exhaust nozzles and flame stabilisers, and the PAF has been struggling hard to replace these engines due to contractual obligations which forces Pakistan to procure the RD-93 engines from Russia only through China. Adding to the woes of the PAF, the China National Aero Technology Export & Import Corporation's (CATIC) tepid response in providing necessary spares and support for the RD-93 engines of PAF's JF-17 aircraft led to the grounding of more than half of the total number of these aircraft (137) held by the PAF.

*https://www.hindustantimes.com/world-news/exclusive-ukraine-sanctions-on-russia-virtually-ground-pak-s-jf-17-fighter-programme-101661237800526.html*

DefenseNews

***Tue, 23 Aug 2022***

# What did China and Iran Bring to Russia's Army 2022 Defense Expo?

Chinese and Iranian vendors pitched their military technology at last week's Army 2022 defense expo held near Patriot park in Moscow, Russia. For its part, China showed off a variety of defense products to Russian officials and the general public, including armored vehicles, military ambulances, the JF-17 fighter jet equipped with the Russian RD-93 engine, and the J-31 jet, an analog of the Russian-made Su-57. Russian Defense Minister Sergei Shoigu visited the Chinese stand during the expo, which took place Aug. 15-21. Russia has shown a general reluctance to buy foreign-made military equipment. However, one Russian company, Intellect Machine JSC, presented a grenade launcher attached to a Chinese-made robot resembling a dog. Russian media reported the robot, made by Unitree Robotics, is available for purchase through the Chinese online retailer AliExpress. China's presence at the expo was primarily symbolic, a defense industry insider told Defense News.

"Before, at every [Russian] military exhibition, you can see Chinese people with cameras [taking note of what's available]. But today, the Chinese less needed to buy Russian weaponry since they have many of their own based on Russian designs," the source said, speaking on the condition of anonymity because he was not authorized to speak to foreign media. An Iranian vendor showed off guided bombs, the Saba-248 medium-lift helicopter and the Mohajer-6 drone, most of which were mockups. Although Russian media praised the Mohajer-6, there is no official report about the county buying the drone. U.S. national security adviser Jacob Sullivan claimed in July that a Russian delegation visited Iran at least twice to see its locally made drones.

An Iranian exhibitor told journalists visiting the booth that Russia has expressed interest in purchasing Iranian technology to provide satellite images of cities, adding the product can be used for both civilian and military purposes. The Russian Defense Ministry reported on its website that it signed 36 contracts involving 24 defense industry companies at the Army 2022 expo, totaling 525 billion rubles (U.S. $9 billion). The ministry also noted it expects to get more than 3,700 samples of military equipment.

*https://www.defensenews.com/industry/techwatch/2022/08/23/what-did-china-and-iran-bring-to-russias-army-2022-defense-expo/*

# Science & Technology News

Press Information Bureau
Government of India

**Ministry of Science & Technology**

***Tue, 23 Aug 2022 6:13 PM***

## Special Issue of 'Vigyan Pragati' Released Today

### The Special Issue of NIScPR's Magazine Contains Indian Organizations Engaged in Science Popularization

CSIR-National Institute of Science Communication and Policy Research (CSIR-NIScPR), New Delhi organized the release function of the Special issue of its Popular Science Hindi magazine "Vigyan Pragati" on 23 august 2022. In the year 2022, this popular magazine of NIScPR has completed the glorious 70 years of spreading science among the public. The very first issue of this magazine was published in August, 1952. This special issue (August 2022) of 'Vigyan Pragati' contains India's leading organisations engaged in science popularization. Both government and voluntary organisations have been covered in this special issue. This programme is the part of *Azadi Ka Amrit Mahotsav*.

The event started with lighting the lamps as a gesture of demolition of the darkness of misinformation with the light of scientific knowledge. Prof. Ranjana Aggarwal, Director, CSIR-NIScPR warmly welcomed the Chief guest Dr. shekhar C. Mande and the Guest of Honor Dr. Sharmila Mande. In her address, she described the rich legacy of the science magazine 'Vigyan Pragati' and CSIR-NIScPR's contributions towards science popularisation. She added that science is not a sole part of western culture. India has been practicing science since ancient times and has a rich scientific legacy and traditional knowledge of our nation. She also mentioned Acharya P.C. Ray, for playing an important role in science popularisation in the nineteenth century.

Guest of Honour Dr. Sharmila Mande, Chief Scientist, TCS Research & Innovation, highlighted the role of science communication in regional languages. She added that in this way, innovations in the field of Science and Technology can reach out to larger population of the society. Chief

Guest Dr. Shekhar C. Mande, former Secretary, DSIR & former Director General of CSIR emphasized the role of science and scientific temper in the progress of the nation. He was concerned about the general perception of people towards science, despite having a rich scientific history. He mentioned that there still is a gap between the scientific community and society. He said that science is not finished until it's communicated. Further, he stressed on historical achievements of CSIR institutions for the betterment of society. He said always there have been tough times for science whether it was the colonial period or the challenging time of COVID pandemic or any natural disaster, CSIR never stepped back from its responsibility. One may not know about the contributions of CSIR but unknowingly CSIR is part of everyone's daily life. Dr. Shekhar recalled the contribution of 'Vigyan Pragati' in the last 70 years and told this magazine and its popular science content should reach aggressively to the common people. It will decide the fate of the nation in the upcoming 25 years when India will be completing 100 years of Independence.

At the end of the programme, Dr. Manish Mohan Gore, Scientist, CSIR-NIScPR and the Editor, Vigyan Pragati proposed vote of thanks. He presented the brief description of the special issue of the magazine. The special issue (August 2022) of the magazine includes public-funded institutions as well voluntary organizations working for science popularization across the country. He said some of the organizations felt the importance of science popularisation even before independence and started working on taking science to the common people. He assured that 'Vigyan Pragati' will work toward penetrating deep into the society so that science can be reached a larger audience of the country.

*https://pib.gov.in/PressReleasePage.aspx?PRID=1853908*

Press Information Bureau
Government of India

**Ministry of Science & Technology**

***Tue, 23 Aug 2022 4:48 PM***

# Study of Dust from Cosmic Dance of a White Dwarf and Companion Star could Unravel Mysteries Behind Start of Life

In the winter months of 2007, astrophysicists from all over the world had made a beeline to observatories on mountaintops to observe a bright explosion born out of the cosmic dance of a white dwarf and its companion star resulting in thick dust around an imploding novae. Dr R K Das, scientist from SN Bose Centre for Basic Science (SNBCBS) who had stationed himself at Mount Abu Observatory, and his team, observed the imploding novae called Nova V1280 Scorpii and found that a thick dust formed around it after a month and lasted for about 250 days. The team from SNBCBS, an autonomous institute of Department of Science and Technology (DST) used the observed data on infrared spectra of the imploding novae and constructed simple models which helped them estimate its parameters like hydrogen density, temperature, luminosity and elemental abundances during pre- and post-dust phase. They have found high abundance of certain elements like carbon, nitrogen and oxygen in the ejecta along with a mixture of small amorphous carbon dust grains and large astrophysical silicate dust grains.

The dust formation was observed in parallel by international collaborators of the team from the Very Large Telescope Interferometer in Chile. This helped them take precision measurements of the rate of expansion of the dust shell around a nova for the first time. The stellar event which was golden opportunity for scientists to study the exploding stellar matter was an example of space-dust collisions which could propel organisms over enormous distances between planets to start life on a planet. Their study of novae dust could help in understanding the nature and characteristics of the dust and associated processes. Cosmic dust or extra-terrestrial dust formation in the hostile environment of novae ejection has been an open question for many years. Hundreds of kilograms of such dust fall on the Earth every day. However, formation, nature and composition of the dust are not properly understood yet. Dr. Das explained that dust formation in novae ejecta is not a common phenomenon. It has been observed only in a few novae within 30 to 100 days after an outburst, as compared to interstellar dust, which typically takes a few thousand years to form and hence provided opportunity to study the dust formation process in novae.

The team varied the parameters over a wide range and constructed more than fifty thousand models generating spectrum for each model. Finally, they fit the observed spectrum with the model generated ones. From the best fit, they estimated the parameters during pre- and post-dust phase. Such a detailed modelling of a dust forming Nova had never been done before. The entire process took a couple of years. Besides high abundance of isotopes certain elements like carbon, nitrogen and oxygen in predust phase of the imploding novae as compared to solar values, the scientists found a mixture of small amorphous carbon dust grains and large astrophysical silicate dust grains present in the ejecta in the postdust phase. Some complex organic compounds like amorphous organic solids with a mixed aromatic–aliphatic structure were found which play an important role in formation of molecular cloud in stars and planets. The study was published in the journal Astrophysical Journal recently. The team has suggested that as the expanding dust shell of V1280 Scorpii Nova continued to expand these dust grains will eventually mix with interstellar matter. But that will take thousands of years - a small time in the cosmic time scale.

*https://pib.gov.in/PressReleasePage.aspx?PRID=1853875*

Firstpost.

***Tue, 23 Aug 2022***

# Out of this World! All You Need to Know about Yaanam, World's First Science Documentary in Sanskrit

The 44-minute-long Sanskrit documentary, based on the autobiography of ISRO's former Chairman Dr K Radhakrishnan, revolves around the success of India's Mangalyaan mission. The documentary, directed by national award winning director VinodMankara, premiered on 21 August in Chennai. Well, it's true and it's happening. The documentary called *Yaanam* (journey) will be the first science documentary in Sanskrit. The 44-minute documentary attempts to tell the story of the Indian Space Research Organisation's (ISRO) scientists who worked on the Mangalyaan mission. National award winner VinodMankara, who directed the project, said that *Yaanam* is entirely narrated in the ancient Indian language Sanskrit. The documentary premiered on 21 August in Chennai.

**What is the documentary about?**

The documentary *Yaanam* is based on the autobiography of ISRO's former Chairman Dr K Radhakrishnan called *My Odyssey*. Through the documentary, director VinodMankara hopes to showcase the expertise and capabilities of ISRO and its scientists. The film also reveals how India was able to make an interplanetary journey in its first attempt with the help of ISRO's scientists. The movie shows the process of rocket making, its launching and how scientists controlled the interplanetary travel.

Mankara further said that the documentary is made by putting together the archival videos of the Mangalyaan mission.

The producer of the project, Dr AV Anoop was quoted in a report by *WION* saying, "I had read the entire biographical account of Dr Radhakrishnan and at one point in time Vinod (the director) told me about the documentary idea and also checked with Dr Radhakrishnan (former ISRO chairman), and that's how the project took off. The entire team is excited and we will be organising special screenings for the scientific community." The project will feature both Dr Radhakrishnan and Dr S Somnath (current ISRO chairman).

*The Mangalyaan mission was India's first successful attempt at an interplanetary journey. Image Courtesy: ISRO*

**But why in Sanskrit?**

The entire team of *Yaanam* made sure that the ISRO scientists whose footage has featured in the film spoke and explained the significance of their work in Sanskrit. VinodMankara said, according to a report by *PTI*, that since majority of the ancient texts on space and astrology in India are compiled in Sanskrit, he decided to make his movie in Sanskrit.

His movie *Priyamanasam* had won the national award for the best feature film in Sanskrit language. *Yaanam* is Mankara's second Sanskrit movie. According to a report by *WION*, he said "There is a misconception that Sanksrit is a language that is only meant for devotion and and scriptures. Even my first Sanskrit film *Priyamanasam* was made to break this misconception. The Sanskrit language has a wider scope and now *Yaanam* is my second Sanskrit film project. This documentary has been made in such a way that it can easily be understood for even the common man and those with least exposure to space science."

**What is the Mangalyaan mission?**

The Mangalyaan mission was India's first successful attempt at an interplanetary journey. With the successful launch of the mission in 2013, Mangalyaan made India the first country in Asia and the fourth in the world to get to the planet. The mission's objective is to understand Martian

atmosphere by studying its surface features, minerology, morphology and atmosphere. As of 2018, the Mars Orbiter Mission (MOM) completed four years in its orbit around the planet. According to a report by *Business Standard*, ISRO is now planning to launch a follow-up mission called MOM-2 in 2024.

**Another movie on Mangalyaan**

In 2019, the Akshay Kumar and VidyaBalan starrer *Mission Mangal* told the story of the women scientists involved in India's first mission to Mars. The movie, even though the characters were fictional in nature, portrayed the struggle and achievements of the women who made MOM a successful endeavour.

*https://www.firstpost.com/explainers/out-of-this-world-all-you-need-to-know-about-yaanam-worlds-first-science-documentary-in-sanskrit-11101461.html*

INDIA TODAY

***Tue, 23 Aug 2022***

# We Knew there was Water on Mars. Now We have a Map Showing its Location

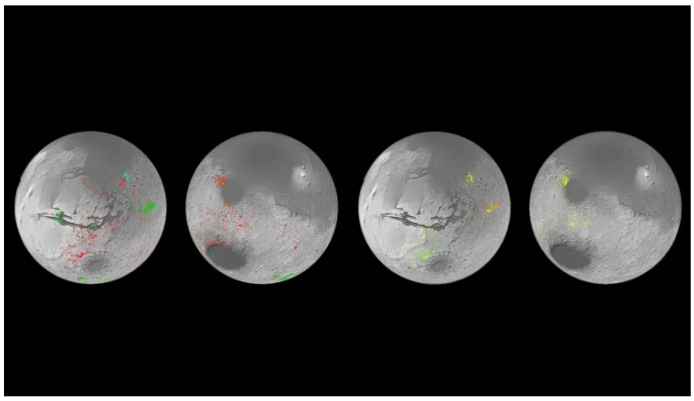
Mars, the closest candidate we have to be a potential home in the future, once had life-supporting water. However, over billions of years of evolution, the water was lost and there are no traces of it on the surface today. However, chemical and spectral analysis have established that there were once flowing rivers and lakes on the Red Planet. The European Space Agency (ESA) has now moved a step closer and released the first water map of Mars, showing possible locations where humans could land in the future. The maps show in detail the mineral deposits across the planet jotted down over the last decade of research and observations. Before humans set foot on Mars, the map could help identify possible locations suited for missions that could provide optimum scientific value as well.

**Finding Water**

Europe's Mars Express Observatory and America's Mars Reconnaissance Orbiter worked together to identify these locations that have abundances of aqueous minerals. These minerals are made from rocks that have been chemically altered by water in the past and over time changed into clay and salts. While scientists had identified thousands of such mineral locations in a few parts of the planet, observations that spanned over the last decade have revealed hundreds of thousands of such areas in the oldest parts of the planet as well. "This work has now established that when you are studying the ancient terrains in detail, not seeing these minerals is actually the oddity," John Carter, Institutd'AstrophysiqueSpatiale (IAS) said in a statement. Finding aqueous minerals throughout the planet establishes that water was not limited to just a few locations on Mars, instead, it played a huge role in shaping the geology all around the planet. Geologists are now pondering over the question of whether water was persistent or confined to shorter, more intense episodes.

**From Water To Clay To Minerals**

John Carter explains that scientists initially thought that only a few types of clay minerals on Mars were created when it was wet.



*Data from ESA's Mars Express and NASA's Mars Reconnaissance Orbiter have been used to create the first detailed global map of hydrated mineral deposits on Mars.*

However, the new map indicates something else. He says that while many of the Martian salts probably did form later than the clays, the map shows many exceptions where there is intimate mixing of salts and clays and some salts that are presumed to be older than some clays. “The evolution from lots of water to no water is not as clear cut as we thought, the water didn’t just stop overnight. We see a huge diversity of geological contexts, so that no one process or simple timeline can explain the evolution of the mineralogy of Mars. That’s the first result of our study. The second is that if you exclude life processes on Earth, Mars exhibits a diversity of mineralogy in geological settings just as Earth does,” he added in the statement released by ESA.

Geologists used data from the Omega instrument on Mars Express and the Compact Reconnaissance Imaging Spectrometer for Mars (CRISM) on MRO to survey the planet. While Omega provides global coverage of Mars at higher spectral resolution and with a better signal-to-noise ratio, Crism provided high-resolution spectral imaging of the surface (down to 15 m/pixel) for highly localised patches of Mars.

*https://www.indiatoday.in/science/story/we-knew-there-was-water-on-mars-now-we-have-a-map-showing-its-location-1991475-2022-08-23*