

September  
2022

# समाचार पत्रों से चयित अंश Newspapers Clippings

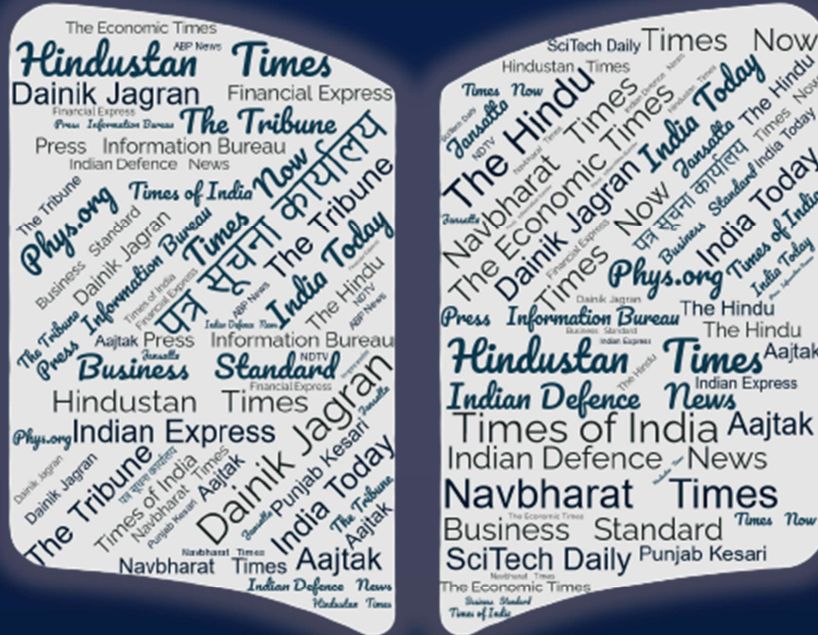
A Daily service to keep DRDO Fraternity abreast with DRDO  
Technologies, Defence Technologies, Defence Policies,  
International Relations and Science & Technology

खंड : 47 अंक : 184

28 सितम्बर 2022

Vol.: 47 Issue: 184

28 September 2022



रक्षा विज्ञान पुस्तकालय

Defence Science Library

रक्षा वैज्ञानिक सूचना एवं प्रलेखन केंद्र

Defence Scientific Information & Documentation Centre

मेटकॉफ हाउस, दिल्ली - 110 054

Metcalf House, Delhi - 110 054

# CONTENTS

S. No.	TITLE	Page No.
	<b>DRDO News</b>	<b>1-4</b>
	<b>DRDO Technology News</b>	<b>1-4</b>
1.	डीआरडीओ ने किया VSHORADS मिसाइल का सफल परीक्षण, हवाई खतरों को करेगी बेअसर	<i>Amar Ujala</i> 1
2.	Successful Flight Tests of Very Short Range Air Defence System (VSHORADS) Missile by DRDO	<i>Press Information Bureau</i> 1
3.	DRDO Tests of Very Short Range Air Defence System Missiles Successful	<i>The Indian Express</i> 2
4.	'Sky is the Limit' – BrahMos Boosts India into the 'Elite Club,' DRDO Now Banks on 'Key Weapons' to Hit \$5B Export Target	<i>The Eurasian Times</i> 3
	<b>Defence News</b>	<b>5-23</b>
	<b>Defence Strategic: National/International</b>	<b>5-23</b>
5.	Indian Navy's P8I Aircraft Participates in Exercise Kakadu	<i>Press Information Bureau</i> 5
6.	Raksha Mantri Exhorts Indian Defence Industry to Identify & Manufacture State-of-the-Art Cost-Effective Products to Realise the Vision of 'New India'	<i>Press Information Bureau</i> 5
7.	Raksha Mantri Shri Rajnath Singh reviews DefExpo 2022 Preparations in New Delhi	<i>Press Information Bureau</i> 7
8.	भारत का 2025 तक रक्षा विनिर्माण क्षेत्र में 1.75 लाख करोड़ रुपये के कारोबार का लक्ष्य: राजनाथ सिंह	<i>Navbharat Times</i> 9
9.	Indian Army's Artillery Getting Modernised to Deal with Adversaries: Sources	<i>Financial Express</i> 9
10.	ज्यादा देर हवा में रुके लम्बी दुरी नापे ऐसे यान चाहिए सेना को	<i>Navbharat Times</i>
11.	चीन बॉर्डर पर सेना ने बढ़ाई गोलाबारी की क्षमता, रॉकेट-तोप की तैनाती के बाद अब ये है आगे का प्लान	<i>Navbharat Times</i> 13
12.	Indian Army Eyes Major Firepower Upgrade to Counter China	<i>Hindustan Times</i> 14
13.	Army Set to Induct Kamikaze Drones, Deploys More 'Winterised' Howitzers on China Front	<i>The Times of India</i> 16
14.	China Threat in Mind, Army to Order Another 100 K9 Vajra Howitzers From L&T, More to Follow	<i>The Print</i> 17
15.	ATAGS Guns in Advanced Stage, User Trails Conducted Successfully: Defence Sources	<i>ANI News</i> 18
16.	Defence Manufacturer Saab to Set Up New Facility in India, Make Weapons System	<i>Reuters</i> 19
17.	Swedish Defence Firm Saab Plans to Manufacture Carl-Gustaf M4 Weapon in India	<i>Hindustan Times</i> 20
18.	Jaishankar, Austin Discuss New Opportunities for Bilateral Defence Industrial Cooperation	<i>The Times of India</i> 22
	<b>Science &amp; Technology News</b>	<b>23-29</b>
19.	Union Minister for Science and Technology Dr Jitendra Singh Addresses 10th BRICS meet, Calls for Joint Fight Against Common Challenges	<i>Press Information Bureau</i> 23

20.	The NASA Spacecraft-Asteroid Collision	<i>The Hindu</i>	25
21.	NASA Rolling Back Artemis 1 Rocket, Spacecraft Back to Assembly Building	<i>The Indian Express</i>	27
22.	CMFRI Scientists Develop Herbal Remedy for Fatty Liver	<i>The Daily pioneer</i>	28

---

# अमरउजाला

मंगलवार, 27 सितंबर 2022

## डीआरडीओ ने किया VSHORADS मिसाइल का सफल परीक्षण, हवाई खतरों को करेगी बेअसर

डीआरडीओ (रक्षा अनुसंधान और विकास संगठन) ने 27 सितंबर 2022 को ओडिशा के तट से दूर एकीकृत परीक्षण रेंज, चांदीपुर से पोर्टेबल लॉन्चर से वेरी शॉर्ट रेंज एयर डिफेंस सिस्टम (VSHORADS) मिसाइल की दो सफल परीक्षणों को अंजाम दिया। VSHORADS एक मैन पोर्टेबल एयर डिफेंस सिस्टम (MANPAD) है जिसे डीआरडीओ के रिसर्च सेंटर इमरत (RCI), हैदराबाद द्वारा अन्य डीआरडीओ प्रयोगशालाओं और भारतीय उद्योग भागीदारों के सहयोग से स्वदेशी रूप से डिजाइन और विकसित किया गया है। VSHORADS में कई नवीन तकनीकों को शामिल किया गया है, जिसमें लघु प्रतिक्रिया नियंत्रण प्रणाली और एकीकृत एवियोनिक्स शामिल हैं, जो परीक्षणों के दौरान सफलतापूर्वक संचालित किए गए।

कम दूरी पर कम ऊंचाई वाले हवाई खतरों को बेअसर करने के लिए बनाई गई मिसाइल को दोहरे तेजी वाली ठोस मोटर द्वारा संचालित किया जाता है। आसान उड़ान सुनिश्चित करने के लिए लांचर सहित मिसाइल के डिजाइन को अनुकूलित किया गया है। दोनों उड़ान परीक्षण मिशन के उद्देश्यों को पूरी तरह से पूरा कर चुके हैं।

<https://www.amarujala.com/india-news/drdo-conducted-two-successful-test-flights-of-very-short-range-air-defence-system-vshorads-missile>



**Press Information Bureau**  
**Government of India**

Ministry of Defence

*Tue, 27 Sept 2022 6:20PM*

### **Successful Flight Tests of Very Short Range Air Defence System (VSHORADS) Missile by DRDO**

DRDO conducted two successful test flight of Very Short Range Air Defence System (VSHORADS) missile on 27 Sep 2022 from a ground based portable launcher at the Integrated Test Range, Chandipur, off the coast of Odisha. VSHORADS is a Man Portable Air Defence System (MANPAD) designed and developed indigenously by DRDO's Research Centre Imarat

(RCI), Hyderabad in collaboration with other DRDO laboratories and Indian Industry Partners. VSHORADS missile incorporates many novel technologies including miniaturized Reaction Control System (RCS) and integrated avionics, which have been successfully proven during the tests. The missile, meant for neutralizing low altitude aerial threats at short ranges is propelled by a dual thrust solid motor. The design of the missile including launcher has been highly optimized to ensure easy portability. Both the flight tests have completely met the mission objectives.

Hon'ble Raksha Mantri, Shri Rajnath Singh complimented and appreciated the efforts of DRDO and industry partners and said that this new missile equipped with modern technologies will give further technological boost to the Armed Forces. Secretary DDR&D and Chairman DRDO congratulated the entire VSHORADS team for this tremendous success.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1862617>



*Wed, 28 Sept 2022*

## **DRDO Tests of Very Short Range Air Defence System Missiles Successful**

THE Defence Research and Development Organisation (DRDO) Tuesday conducted two successful test flights of Very Short Range Air Defence System (VSHORADS) missiles capable of neutralising low altitude aerial threats at short ranges. In a tweet, the DRDO said, "Very Short Range Air Defence System (VSHORADS) missile was successfully flight tested from a ground based portable launcher, off the coast of Odisha." The VSHORADS missiles were launched Tuesday from a ground-based portable launcher at the Integrated Test Range (ITR) of the DRDO at Chandipur, off the coast of Odisha. The missile is a Man Portable Air Defence System (MANPAD) designed and developed indigenously by DRDO's Research Centre Imarat (RCI), Hyderabad in collaboration with other DRDO facilities and various Indian industry partners.

A press statement from the Ministry of Defence said the design of the missile, including launcher, has been highly optimised to ensure easy portability. "Both the flight tests have completely met the mission objectives," the release stated. Officials said the air defence missile incorporates many novel technologies including miniaturised Reaction Control System (RCS) and integrated avionics, which have been successfully tested during the trials. The missile has been designed to neutralise low altitude aerial threats at short ranges and is propelled by a dual thrust solid motor. The MoD said Defence Minister Rajnath Singh complimented and appreciated the efforts of the DRDO and industry partners and said this new missile equipped with modern technologies will give further technological boost to the Armed Forces. DRDO Chairman Dr Samir V Kamat congratulated the entire VSHORADS team on the successful tests.

<https://indianexpress.com/article/cities/pune/drdo-tests-of-very-short-range-air-defence-system-missiles-successful-8176722/>

## **‘Sky is the Limit’ – BrahMos Boosts India into the ‘Elite Club,’ DRDO Now Banks on ‘Key Weapons’ to Hit \$5B Export Target**

*By Sakshi Tiwari*

“The Indian Defense sector, the second largest armed force, is at the cusp of revolution. Defense exports grew by 334% in the last five years; India is now exporting to over 75 countries due to collaborative efforts,” PIB tweeted on September 25. In the fiscal year 2021–2022, India’s exports of defense and technology products reached a record high of Rs 12,815 crore, up 54.1% over the previous year. It is pertinent to note that exports increased by approximately eight times in the fiscal year 2022 compared to the last financial year.

According to the reports, India’s defense exports were valued at Rs 8,434 crore (\$103M) in 2020–21, Rs 9,115 crore (\$112M) in 2019–20, and Rs 2,059 crore (\$253M) in the 2015–16 periods. India primarily sells defense goods to the Philippines, and other nations in South-East Asia, the Middle East, and Africa. The government has revealed that the country exports defense items and arms to about 75 countries worldwide. The announcement comes a few months after the Indian Defense Ministry announced in March 2022 that the value of India’s arms exports had surged by around six times since 2014, with the financial year’s total reaching Rs 11,607 crore (\$1.4B), Economic Times reported.

Indian Defense Minister Rajnath Singh stated that his country was among the top 25 exporters in October 2021. The Indian Ministry of Defense modified its process for procuring weapons in April by restricting it to solely domestically produced weapons with a few exceptions. These modifications were made as part of the present administration’s “Make in India” initiative, which was introduced in 2014 to promote domestic production. According to Singh, the Indian defense ministry has created a list of more than 300 different systems that will not be imported.

### **A Long Journey For Defense Export Gains**

The Government of India has adopted a two-pronged approach of minimizing defense imports while encouraging defense exports to other friendly countries. The Department of Defense Production (DDP) has announced lists containing sub-systems, assemblies, sub-assemblies, and components to reduce imports by Defense Public Sector Undertakings (DPSUs). Light tanks, helicopters, and unmanned aerial vehicles are among the strategic defense equipment on the list for which imports would be prohibited once the deadlines are set against them. By 2025, the Defense Ministry wants to produce 1.75 lakh crores of weapons, including 35,000 crores (roughly \$5 billion at an exchange rate of 1:70) for export.

Defense Minister Rajnath Singh stated last month that India’s Defense Public Sector Undertakings are poised to play a significant role in accomplishing this target, contributing

between 70 and 80%. The \$375 million (Rs 2,770 crore) contract to export BrahMos supersonic cruise missiles to the Philippines was a vital export agreement signed in January of this year. The agreement between India and the Philippines is part of India's initiative to produce arms domestically. The BrahMos order would be the country's largest export, even as India had won a \$40 million deal for the DRDO-developed weapon locating radar systems from the Armenian government.

As per estimates, this agreement will open the door for additional contracts with the Philippines and other ASEAN nations like Indonesia and Vietnam. According to reports, Southeast Asian nations, outside the Philippines, such as Thailand, Indonesia, and Vietnam, have shown interest in the land and sea-based variations of BrahMos. Potential clients include Saudi Arabia, the United Arab Emirates, Argentina, Brazil, South Africa, and South Africa. The UAE and Saudi Arabia could be likely customers of BrahMos and Akash air defense missiles. With over 96% indigenization, Akash is one of the most crucial missiles in the country. The surface-to-air missile was inducted into the Indian Air Force (IAF) in 2014 and the Army in 2015. DRDO Chairman, Dr. G Satheesh Reddy, stated that some surface-to-air missiles developed indigenously have piqued the interest of various nations.

“Surface to air missile Akash, Astra missile, anti-tank missiles, radars, tornadoes have gained the interest of various nations. Lots more systems are being developed which are advanced technology in nature and have export potential,” Reddy told ANI. India has also earnestly tried to sell its Light Combat Aircraft Tejas to potential partners. It has emerged as a top contender for the Malaysian light attack fighter. In addition to that, Egypt is considering the purchase of up to 70 Tejas light combat aircraft. Cairo is also considering buying Indian-made missile systems and the Advanced Light Helicopter and Light Combat Helicopter. State-owned Hindustan Aeronautics has offered Argentina the indigenous Light Combat Aircraft ‘Tejas’ Mark IA and 2-seater trainers. The South American country is reportedly evaluating India's Tejas and China/Pakistan's JF-17.

Besides Tejas, India is also eyeing the export of its Advanced Light Helicopter (ALH) Dhruv Mk3. The Philippines has been evaluating the maritime variant of the Dhruv ALH for maritime policing capabilities. In January this year, HAL signed a contract with Mauritius to deliver one Advanced Light Helicopter MK2 for the Mauritius Police Force. The indigenous LCA Tejas, artillery guns, battle tanks, missiles, anti-tank mines, and explosives are among the 156 defense equipment India approved for export in February 2021.

There are 19 aeronautical systems, 41 armament and co-missile systems, 27 electronic and communication systems, ten life protection items, four microelectronic devices, 28 naval systems, 16 nuclear, biological, and chemical (NBC) equipment items, and seven other materials, according to the list released by the Defense Research Development Organization (DRDO) last year. With the Russian defense industry preoccupied with an unending war and crippled under sanctions imposed by the West, India is competing hard to fill in the shoes of a mammoth defense supplier like Moscow.

<https://eurasianimes.com/boosted-by-brahmos-lucrative-lca-tejas-deals-in-pipeline-india/>

## Defence News

### Defence Strategic : National/International



Press Information Bureau  
Government of India

Ministry of Defence

*Tue, 27 Sept 2022 7:09 PM*

#### **Indian Navy's P8I Aircraft Participates in Exercise Kakadu**

A P8I Long Range Maritime Patrol Aircraft of the Indian Navy participated in the Multinational Maritime Exercise Kakadu 2022 hosted by Royal Australian Navy in Darwin from 12 to 25 Sep 22, along with INS Satpura. The exercise had the participation of 34 aircraft from over 20 nations. The maiden participation of the P8I provided an enhanced exposure to the aircrew, augmenting the understanding of the varied nuances of collaborative Anti-Submarine and Anti-Surface Warfare operations in a complex multi-threat scenario. The seamless operations conducted by P8I in consonance with the exercise theme 'Partnership, Leadership, Friendship' along with USN and RAAF P8s enabled refining joint SOPs and enhance interoperability and reaffirm Indian Navy's commitment to the Indo-Pacific.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1862641>



Press Information Bureau  
Government of India

Ministry of Defence

*Tue, 27 Sept 2022 3:39 PM*

#### **Raksha Mantri Exhorts Indian Defence Industry to Identify & Manufacture State-of-the-Art Cost-Effective Products to Realise the Vision of 'New India'**

**Urges them to increase investment in defence corridors in Uttar Pradesh & Tamil Nadu to make India a global manufacturing hub**  
**Constantly working towards bolstering national security: Shri Rajnath Singh at 5th Annual Session of SIDM in New Delhi**

Raksha Mantri Shri Rajnath Singh has called upon the Indian defence industry to identify and manufacture state-of-the-art cost-effective products/technologies to realise Prime Minister Shri Narendra Modi's vision of a 'New India' that not only caters to its own needs, but also fulfils international requirements. He was addressing the 5<sup>th</sup> Annual Session of Society of Indian



Defence Manufacturers (SIDM) in New Delhi on September 27, 2022. Shri Rajnath Singh asserted that the Government fully understands the importance of a fool-proof security apparatus and is constantly working towards bolstering all dimensions of national security to take the country to greater heights. “Only a secure and strong nation can achieve the heights of success. No matter how rich or knowledgeable a nation is, its prosperity is threatened if national security is not ensured. We are focussing on national security and economic prosperity to make India one of the strongest countries in the world,” he said.

The Raksha Mantri stated that former Prime Minister Atal Bihari Vajpayee considered the private sector as a game-changer and the present government, led by Prime Minister Shri Narendra Modi, is carrying forward that vision with great zeal. He said, the number of reforms undertaken by Ministry of Defence in the last few years to increase private sector participation have created an enabling environment for defence companies to ensure the country’s holistic development as well as their own. Shri Rajnath Singh listed out the steps taken to encourage the private sector, including earmarking 68 per cent of capital procurement budget for domestic industry in 2022-23, out of which, 25 per cent has been allocated for the private sector. In addition, 25 per cent of defence R&D budget has been earmarked for private industry and start-ups which will pave the way for innovation of new defence technologies in India. Other measures include issuance of positive indigenisation lists; unveiling of Defence Acquisition Procedure 2020; opening up of opportunities to build Mega Defence Programme including fighter aircraft, helicopters, tanks and submarines through a strategic partnership model and Innovations for Defence Excellence (iDEX) initiative which has created an ecosystem for innovation and technology development in defence and aerospace sectors.

The Raksha Mantri pointed out that the constantly-evolving global scenario has led to increase in demand for military equipment across the world, with countries focussing on bolstering their security systems. He urged the industry to take advantage of this current golden period of the Indian defence sector, exhorting them to further enhance their participation through increased investment in the two defence corridors set up in Uttar Pradesh and Tamil Nadu, with the aim to achieve the vision of ‘Aatmanirbhar Bharat’. “According to a recent report of Stockholm International Peace Research Institute (SIPRI), in 2021, world military spending crossed US \$2 trillion for the first time. It has increased by 0.7 per cent as compared to 2020 and 12 per cent as compared to 2012. Our armed forces will also spend a substantial amount on capital procurement in the years to come. This shows that the security needs of the world are set to increase. India is capable of meeting those needs, both in terms of quality and cost-effectiveness. Public sector, private sector, academia and research & development organisations, with SIDM as their nodal point, must continue to work together to achieve this objective,” said Shri Rajnath Singh.

The Raksha Mantri appreciated the fact the efforts made by the Government have started to yield positive results as there has been an increase in the number of contracts being awarded to the domestic industry. He added that as a result of the efforts, over 10,000 MSMEs have joined the defence sector, with an increase being witnessed in research & development, start-ups, innovation and employment. “Seven-eight years ago, our defence exports were not even Rs 1,000 crore. They have now crossed Rs 13,000 crore. We have set a target of Rs 1.75 lakh crore of defence production by 2025, which includes export of Rs 35,000 crore,” said Shri Rajnath Singh. On the recent surge in defence stocks, the Raksha Mantri stated that the increasing market valuation of the companies is a reflection of the trust of big investors, Services and the nation in the entities which are contributing to national security. Terming SIDM as a bridge between the

government & the industry, Shri Rajnath Singh urged the companies to approach the association with any queries & grievances, assuring all support of Ministry of Defence. He, however, also stressed that while there is a responsibility of the industry towards its balance sheet, it also has a responsibility towards the Nation. He called upon them take full care of the interests of all stakeholders, including making timely payment to MSMEs and vendors in their supply chain, promoting use of clean technologies and discharging Corporate Social Responsibilities.

The Raksha Mantri, while commending the growth of SIDM, stated that in just five years of its inception, about 500 members have joined the association, which is an indicator of the progress of the Indian defence industry. He described the expansion of SIDM outside Delhi as a reflection to the industry's trust as well as the association's resolve to protect the interests of the local companies, with the main aim of strengthening national security. The 5<sup>th</sup> Annual Session of SIDM was organised on the theme 'India@75: Shaping for India@100', with the aim to position India as one of the top countries in defence manufacturing. The session witnessed participation from the top leadership of the Ministry of Defence, Indian Armed Forces, Industry & Foreign Defence Attachés based in India. Chief of the Air Staff Air Chief Marshal VR Chaudhari, Vice Chief of the Naval Staff Vice Admiral SN Ghormade, Vice Chief of the Army Staff Lt Gen BS Raju, President, SIDM Shri SP Shukla.

On the occasion, Shri Rajnath Singh felicitated the winners of the 2<sup>nd</sup> edition of SIDM Champions Award. Bharat Electronics Limited, Bharat Forge Ltd and Larsen & Toubro Ltd were among the winners who were felicitated in different categories such as Technology Innovation to address capability gaps, Import Substitution and Infrastructure for Design/Development & Testing.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1862541>



**Press Information Bureau**  
**Government of India**

**Ministry of Defence**

*Tue, 27 Sept 2022 1:02 PM*

## **Raksha Mantri Shri Rajnath Singh reviews DefExpo 2022 Preparations in New Delhi**

**Gandhinagar set to host the biggest-ever DefExpo; Record 1,136 companies  
register for the event**

**Live demonstrations, ship visits & biggest-ever drone-show planned for  
general public**

Raksha Mantri Shri Rajnath Singh reviewed the preparations of the forthcoming DefExpo 2022 at a meeting in New Delhi on September 27, 2022. During the meeting, the Raksha Mantri was briefed by officials about the extensive arrangements being made by multiple stakeholders for the event. He expressed satisfaction at the preparations, while encouraging the officials to make the DefExpo 2022 the best-ever defence exhibition. Raksha Rajya Mantri Shri Ajay Bhatt, Defence Secretary Dr Ajay Kumar and other senior officials of Ministry of Defence were present in the meeting. The 12th edition of DefExpo, scheduled to be held in Gandhinagar, Gujarat

between October 18-22, 2022, will be the biggest ever as a record 1,136 companies have registered for the event as on September 27, 2022 and the numbers are expected to rise.

The event is being planned in the largest ever total area of over one lakh sqm (previous edition being 76,000 sqm). The theme of 12th DefExpo is 'Path to Pride' which is in line with Prime Minister Shri Narendra Modi's vision to transform India into a strong and self-reliant nation by supporting, showcasing and forging partnerships for the Indian Aerospace and Defence manufacturing sectors with Indian as well as global customers. The event will showcase the might of the domestic defence industry which is now powering 'Make in India, Make for the World' resolve of the Government and the nation at large.

The event will be the first-ever edition exclusively for Indian companies. Indian companies, Indian subsidiaries of Foreign OEMs, Division of company registered in India, Exhibitor having Joint Venture with an Indian company will be considered as Indian participants. The DefExpo 2022 will also mark the celebration of one year of the formation of the seven new defence companies, carved out of the erstwhile Ordnance Factory Board. All these companies will be participating for the first time at DefExpo. The 12th DefExpo will be a five-day exhibition, with October 18-20 being business days and October 21 & 22 for public display. For the first time, the event will be held in a four-venue format. The inaugural ceremony and seminars will be held at Mahatma Mandir Convention and Exhibition Centre; Exhibition at Helipad Exhibition Centre; Live Demonstrations at Sabarmati River Front and ship visits for public by Indian Navy & Indian Coast Guard at Porbandar. The biggest-ever drone-show by IIT Delhi start-up M/s Botlabs, which is an iDEX winner, has also been organised.

In addition, the exhibition will host the 2nd edition of the India-Africa Defence Dialogue, in which several Defence Ministers from African countries are expected to participate. A separate Indian Ocean Region plus conclave has also been planned. The India Pavilion - a marque pavilion of Department of Defence Production, Ministry of Defence - will showcase the maturity of indigenous defence products, start-ups, latest technology, including Artificial Intelligence in defence, and will present India's vision for 2047. It has been named 'Path to Pride'. Over 50 start-ups will showcase their products at the pavilion. For the first time, States/Union Territories have been invited to set up pavilions at the event, with several confirming their participation. More than 300 partnerships in terms of MoUs, Transfer of Technology agreements and product launches are being finalised. In another first, Raksha Mantri Awards for Excellence in Defence Manufacturing will be presented during the DefExpo.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1862482>

## नवभारत टाइम्स

मंगलवार, 27 सितंबर 2022

### भारत का 2025 तक रक्षा विनिर्माण क्षेत्र में 1.75 लाख करोड़ रुपये के कारोबार का लक्ष्य: राजनाथ सिंह

रक्षा मंत्री राजनाथ सिंह ने मंगलवार को कहा कि भारत ने 2025 तक रक्षा विनिर्माण क्षेत्र में 1.75 लाख करोड़ रुपये के कारोबार का लक्ष्य रखा है और सैन्य उपकरणों के घरेलू उत्पादन को बढ़ावा देना सरकार

की प्राथमिकता है। उन्होंने एक कार्यक्रम को संबोधित करते हुए कहा कि सरकार ने घरेलू रक्षा उद्योगों को समर्थन देने के प्रयासों के तहत घरेलू कंपनियों से सैन्य उपकरणों की खरीद के लिए इस साल के रक्षा बजट में लगभग 85,000 करोड़ रुपये की राशि अलग से रखी है। सिंह ने कहा कि रक्षा मंत्रालय अलग-अलग समयसीमा के बाद 309 रक्षा वस्तुओं का आयात न करने से संबंधित तीन सूची पहले ही जारी कर चुका है। उन्होंने रक्षा उत्पादन के लिए रणनीतिक साझेदारी मॉडल पर भी प्रकाश डाला, जिसका उद्देश्य देश में लड़ाकू जेट, सैन्य हेलीकॉप्टर, टैंक और पनडुब्बियों के उत्पादन को प्रोत्साहित करना है।

सोसाइटी ऑफ इंडियन डिफेंस मैनुफैक्चरर्स (एसआईडीएम) की वार्षिक आम बैठक में उन्होंने कहा, "हमें बस चलते रहना है, बिना थके चलते रहना है।" भारतीय अर्थव्यवस्था के बारे में बात करते हुए रक्षा मंत्री ने कहा कि देश को पिछले वित्त वर्ष में कुल 83.57 अरब डॉलर का प्रत्यक्ष विदेशी निवेश प्राप्त हुआ जो एक "रिकॉर्ड" है। उन्होंने कहा कि पूरी दुनिया भारत में निवेश करने को लेकर दिलचस्पी दिखा रही है क्योंकि देश एक आकर्षक निवेश गंतव्य के रूप में उभरा है। सिंह ने कहा, "यह दर्शाता है कि अब बहुत तेज गति से आगे बढ़ने का समय है।"

<https://navbharattimes.indiatimes.com/business/business-news/indias-target-of-rs-175-lakh-crore-business-in-defense-manufacturing-by-2025-rajnath-singh/articleshow/94478083.cms>



*Tue, 28 Sept 2022*

## **Indian Army's Artillery Getting Modernised to Deal with Adversaries: Sources**

The modernisation of the Artillery of the Indian Army has gathered momentum with several important projects in the pipeline. And guns made in India are now being operationalised in the High Altitude Areas along the northern borders and along Line of Control. The focus of this whole process has been on indigenisation under the Make in India initiative, this means now all the gun systems being used by the Indian Army in the last five years have been designed and developed in the country except the Ultra-Light Howitzer.

### **What is Artillery?**

According to sources in the defence establishment Artillery consists of missiles, Unmanned Aerial Vehicles (UAVs), guns and rockets. The UAVs have the capability to launch munitions far beyond the power and range of the infantry firearms.

### **Dhanush**

In 2019, the Indian Army had signed a deal to procure 114 Dhanush 155 mm/45-calibre towed howitzers. These guns which have a strike range of 38 km have already been inducted in the Indian Army which has got 18 of them so far. These guns which were manufactured at the erstwhile Jabalpur-based Gun Carriage Factory (GCF), at a cost of Rs 14.50 crore, and each shell at Rs 1 lakh, are already active along the borders of China and Pakistan. And, according to the source quoted above, by March 2023 the Army is expected to induct the second regiment of this gun.

With this gun Indian Army's fire power has been augmented and paved the way for development of private gun manufacturing industry in India. The factory already has Bulk Production Clearance (BPC) for the production of 114 Dhanush, country's first indigenous 155mm x 45 calibre artillery gun. Before induction the gun had undergone trials and tests under extreme conditions in different phases in terrains like Leh, Sikkim, Balasore, Odisha, and Babina in Jhansi. So far the indigenous material in this gun is around 90 percent and the private as well as public sector has been part of this project and these include: SAIL, BEL and OFB. The Indian Army, Defence Research and Development Organisation (DRDO) and DGQA are all part of this project. This gun has been mechanically and electronically upgraded on the basis of the first phase of Transfer of Technology (ToT) deal under the Bofors contract of the 1980s.

### **K-9 Vajra**

Amidst the ongoing border standoff between the troops of Indian and Chinese armies since May 2020 in eastern Ladakh, the K9-Vajra self-propelled howitzer which weighs around 50 tonnes has been deployed by the Indian Army. These guns which are capable of firing 47-kg of bomb at the higher altitude have been deployed to help the Army to strengthen its position against the enemy. According to the source, so far 100 K9 Vajra gun systems have been inducted and recently, DAC headed by defence minister Rajnath Singh has already given its approval for procurement of additional 100 K9 Vajra. And the process is set rolling and the Request for Proposal is going to be sent out soon.

Since these guns are already inducted in the army, there will be no further trials, now the vendor just has to submit the commercial bid and based on that the cost negotiations will take place. These guns are deployed in desert areas, now the Army intends to deploy them in extreme cold temperature and for this the vendor will be asked to install winterization kits that include: lubricants, oil, and protection of battery, among others from freezing in the sub-zero temperature. These 155mm/52 calibre guns which have a striking capability of 50 km have been made at the Armoured Systems Complex of Larsen and Toubro (L&T) located in Gujarat. It is under the 'Make in India' initiative at a cost of Rs 4,500 crore.

### **Sharang**

This 130 mm gun system with a life and technology enhancement has a better accuracy, range, and consistency corroborating Indigenous Defence Capability. The Army is getting prepared to get the 4<sup>th</sup> Regiment. The total volume required is 300 and this is expected to be completed in a year's time. The source added that 15 Regiments are to be equipped with the Sharangs. And, "there is a need to upscale our capabilities and capacities, whether it is OFB, DPSUs or any other."

### **Pinaka weapon system**

The indigenous more advanced Pinaka weapon systems are in offing, said the source and informed that a contract for six more regiments have been signed by the Army and soon the delivery will start. And these six regiments are going to be equipped with mechanically and electronically improved weapon systems which are capable of firing different ammunition over longer ranges.

### **When will the Army be independent from importing Rocket Systems?**

“We have dependence on Grad Multi Barrel Rocket launchers. Presently we have five regiments and Smerch which has been procured from Russia. But, the indigenous Pinaka has been a great success, not only in terms of launchers but also in bouquet of ammunition.” Soon there will be trials for extended range of the Pinaka and the plan is to increase its range. With the help of the Defence Research and Development Organisation (DRDO) the Army is exploring the possibility of extending the range to 100-125 kms. In response to Chinese positioning of its artillery, the Indian Army has deployed one regiment of the Pinaka Rocket System along the Line of Actual Control in the northern borders. Financial Express Online has already reported that DAC gave approval for Guided Extended Range rockets for Pinaka.

### **Loitering Munitions**

Loitering Munitions has proved their deadly effects in various conflicts globally. For the Indian Army it will be through Emergency procurement. Last year the Army signed a contract and the delivery is expected to take place shortly. Also, the process of making it indigenously is on. And Indian companies are working on it and some are working together with Original manufacturers and soon they will master the technologies involved in this. Once loitering munitions are inducted it will help in augmenting the army’s target acquisition and precision strike capability and surveillance.

### **ATAGS**

These are in the advanced stages of trials. And have been designed and developed through a partnership between DRDO and the domestic industry. This system has many firsts to its credit, said the source. It has a 25 litre chamber, long range, and sustained and rapid rates of fire. The user trials so far have been satisfactory and few procedural issues are in the midst of being taken care of.

### **Ultra-Light Howitzers M777**

These have already been validated in the Ladakh and Arunachal Pradesh regions. So far there are no plans to procure more of these Ultra-Light Howitzers. So far India bought 145 ULH at US \$ 750 million from the US to address specific operational requirements in specific sectors especially in the high altitude areas of northern borders and other tough terrains. These 155 mm/39-caliber M777 howitzers have a range of up to 30km. And they are capable of carrying out strikes at ranges of over 40 km in some areas.

<https://www.financialexpress.com/defence/indian-armys-artillery-getting-modernised-to-deal-with-adversaries-sources/2693176/lite/?utm>

## ज्यादा देर हवा में टिकें, लंबी दूरी नापें, ऐसे यान चाहिए सेना को

Poonam.Pandey  
@timesgroup.com

■ नई दिल्ली : भारतीय सेना को लंबी दूरी के और लंबे वक्त तक उड़ान भर सकने वाले मानवरहित यान यानी अनमैड एरियल वीइकल (यूएवी) चाहिए। सेना की तोपखाना (आर्टिलरी) रेजिमेंट को इसकी जरूरत है। इन यूएवी से आर्टिलरी की फायर पावर को दिशा देने में मदद मिलेगी। साथ ही हमले के बाद उसका आकलन करने में यह बड़ी मदद करेगा।

सेना टेक्टिकल यूएवी तलाश रही है। अभी उसके पास मीडियम एल्टिट्यूड लॉन्ग एंज्योरेंस यूएवी हैं। इस तरह के यूएवी आर्मी एविएशन इस्तेमाल करती है। वहीं सेना की आर्टिलरी रेजिमेंट को ऐसे यूएवी चाहिए जिससे निरीक्षण चौकी पर तैनात अधिकारी को गोलाबारी कराने में मदद मिले और हमला कितना विध्वंसक था, इसके आकलन में भी मदद मिले।

सेना के एक अधिकारी ने कहा कि जमीन के स्तर पर होने वाली सर्विलांस की अपनी सीमाएं हैं, इसलिए हमें मिनी यूएवी की तलाश है। हमें दो तरह के यूएवी चाहिए जो वर्टिकल टेकऑफ और लैंडिंग कर सकें। एक ऐसे यूएवी भी हम देख रहे हैं जिनकी रेंज 15-20 किलोमीटर हो और हवा में बने रहने की क्षमता यानी एंज्योरेंस 2 घंटे से ज्यादा हो। दूसरा ऐसा यूएवी चाहिए जो लॉन्ग रेंज यानी करीब 80 किलोमीटर की रेंज का हो और



### सेना की आर्टिलरी रेजिमेंट अपग्रेड की तैयारी में



- सेना टेक्टिकल अनमैड एरियल वीइकल देख रही है
- मौजूदा समय में जो यूएवी सेना के पास हैं, उनसे अलग होंगे ये
- ऐसे यूएवी चाहिए जो वर्टिकल टेकऑफ और लैंडिंग कर सकें
- साथ ही उनकी रेंज 15-20 किलोमीटर हो और दो घंटे तक हवा में बने रह सकें

उसका एंज्योरेंस चार घंटे से ज्यादा हो। उन्होंने कहा कि जैसे आर्टिलरी रेजिमेंट स्मर्च मल्टीपल रॉकेट लॉन्चर सिस्टम का इस्तेमाल करती है, जिसकी रेंज 90 किलोमीटर है तो हमें उतनी दूरी तक देखने की जरूरत है। इस हिसाब से ही यूएवी और उसकी रेंज चाहिए।

**तोपखाने में भी बदलाव की तैयारी** : भारतीय सेना अपनी आर्टिलरी रेजिमेंट को मीडियम रेंज में बदलने की योजना पर भी काम कर रही है। अभी सेना के

तोपखाने में अलग-अलग रेंज की गन हैं। इसमें 105 एमएम कैलिबर की गन है तो 155 एमएम कैलिबर की गन भी। योजना है कि पूरे तोपखाने को मीडियम रेंज में 155 एमएम में बदला जाए। यह इंटरनैशनल स्टैंडर्ड भी है और इससे सभी सिस्टम में एक तरह के एम्युनिशन भी इस्तेमाल हो सकेंगे। हालांकि तोपखाने के मीडियमाइजेशन (सभी सिस्टम मीडियम रेंज के) की प्रक्रिया 2024 तक ही पूरी हो पाएगी।

# नवभारत टाइम्स

मंगलवार, 27 सितंबर 2022

## चीन बॉर्डर पर सेना ने बढ़ाई गोलाबारी की क्षमता, रॉकेट- तोप की तैनाती के बाद अब ये है आगे का प्लान

सेना ने चीन से लगी सीमा पर कई तरह के रॉकेट और तोप तैनात कर गोलाबारी की अपनी ताकत में काफी इजाफा किया है। साथ ही, इसकी योजना और 100, के-9 वज्र होवित्जर और मानव रहित यान (UAV) सहित बड़ी संख्या में अतिरिक्त सैन्य उपकरण खरीदने की है। भारतीय थल सेना की तोपखाना इकाइयां, के-9 वज्र 'ट्रैकड सेल्फ प्रोपेल्लड होवित्जर', अत्यधिक हल्के एम-777 होवित्जर, पिनाका रॉकेट प्रणालियां और धनुष तोप प्रणालियां पहले ही तैनात कर चुकी हैं। रक्षा प्रतिष्ठान सूत्रों ने बताया कि सेना की योजना वास्तविक नियंत्रण रेखा (LAC) पर अपनी तोपखाना इकाइयों को 90 किमी की रेंज वाले मानव रहित यान से लैस करने की है।

एक सूत्र ने बताया, 'हम 15-20 किमी की दूरी तय करने वाले और चार घंटों तक 80 किमी के दायरे में निगरानी करने वाले मानव रहित यान खरीदने पर विचार कर रहे हैं।' सूत्रों ने बताया कि सेना 100 और के-9 वज्र होवित्जर की नई खेप हासिल करने वाली है। यह 2017 में इस तरह की 100 तोपों के लिए दिए गये ऑर्डर के अतिरिक्त होगी। सूत्र ने कहा, 'रक्षा खरीद परिषद ने 100 और के-9 वज्र का ऑर्डर करने के प्रस्ताव को मंजूरी दे दी है। अनुरोध प्रस्ताव जल्द ही जारी किया जाएगा।' के-9 वज्र को मुख्य रूप से रेगिस्तानी क्षेत्र में तैनात करने के लिए खरीदा गया था लेकिन पूर्वी लद्दाख गतिरोध के बाद सेना ने काफी संख्या में होवित्जर को अधिक ऊंचाई वाले क्षेत्र में तैनात किया है। सूत्रों ने कहा, 'हम शीतकालीन किट भी खरीद रहे हैं ताकि होवित्जर शून्य डिग्री सेल्सियस से कम तापमान में भी काम कर सके।' उन्होंने साथ ही कहा कि उत्तरी सीमा पर अधिक ऊंचाई वाले स्थानों पर वज्र तोपें पहले से ही तैनात हैं। सूत्रों ने बताया कि सेना 'एडवांस्ड टोव्ड आर्टिलरी गन सिस्टम' (एटीएजीएस) और 'माउंटेड गन सिस्टम' खरीदने की प्रक्रिया में भी जुटी हुई है। उन्होंने बताया कि पिनाका की छह और रेजिमेंट खरीदी जा रही है और उनकी आपूर्ति शीघ्र शुरू हो जाएगी।

उन्होंने कहा कि नई पिनाका रेजिमेंट को इलेक्ट्रॉनिक एवं यांत्रिक रूप से उन्नत की गई हथियार प्रणालियों से लैस किया जाएगा। ये लंबी दूरी तक विभिन्न तरह के गोले दाग सकेंगे। उन्होंने बताया कि पिनाका की एक रेजिमेंट उत्तरी सीमा पर अधिक ऊंचाई वाले स्थान पर तैनात की गई है। सूत्र ने कहा, 'हम स्वदेश विकसित लोइटरिंग वेपन सिस्टम खरीदने की प्रक्रिया में भी जुटे हुए हैं, जो हमला क्षमता को बढ़ाएगी।'

<https://navbharattimes.indiatimes.com/india/the-army-increased-the-capacity-of-firepower-by-deploying-many-types-of-rockets-and-artillery-along-the-borders-with-china-/articleshow/94486448.cms>



## **Indian Army Eyes Major Firepower Upgrade to Counter China**

The army has already operationalised its first Dhanush regiment along the China border, and is now looking at raising a second regiment with 18 guns by March 2023. Pursuing a major firepower upgrade, the Indian Army is set to induct more artillery guns, longer range rockets and loitering munition to bolster its capabilities along the China border, people familiar with the development said on Tuesday on the condition of anonymity. India and China have been locked in a stand-off along the Line of Actual Control in eastern Ladakh since May 2020.

The army's overarching artillery capability boost will involve the induction of more 155mm/52-calibre tracked self-propelled K9 Vajra-T guns, additional 155mm/45-calibre Dhanush towed guns, the new 155mm/52-calibre advanced towed artillery gun system (ATAGS) and upgraded guns named Sharang, said one of persons cited above on the eve of Gunners' Day. (Here, 155 mm denotes the diameter of the shell and calibre relates to barrel length.) Artillery regiments are also on course to induct longer range Pinaka rocket systems, precision ammunition, loitering munition, unmanned aerial vehicles and reconnaissance and observation systems to scale up their capabilities, said a second person monitoring the army's artillery modernisation.

"The focus is on modernisation through indigenisation. All gun systems procured in the last five years or being procured, are indigenous, except the M777 ultra-light howitzers imported from the US. Some important capability upgrade is planned in the coming years," he said. The army is set to initiate the process of buying 100 more K9 Vajra-T guns, manufactured by private sector defence major Larsen & Toubro with technology transfer from South Korean firm Hanwha Techwin (HTW), HT has learnt. It has already inducted 100 such guns under a 2017 contract worth \$720 million, and some of them have been deployed in the Ladakh sector after some upgrades to operate in mountains as the guns were originally meant for deserts.

"The defence acquisition council approval for the additional K9 guns is already there. The acquisition will be faster as the guns are already in service and no trials are needed. The tender for the additional order will be out any day," said the first person. The new guns will come with winterisation kits, he said, indicating that the army plans to use the weapon system in mountains. The army has already operationalised its first Dhanush regiment along the China border, and is now looking at raising a second regiment with 18 guns by March 2023, the people said.

"The Dhanush gun system has been inducted and operationalised in high altitude along the northern borders (with China). The gun is an electronically and mechanically upgraded version of the Bofors gun. It represents a huge step towards self-reliance in defence manufacturing," the first person added. The ATAGS is undergoing final trials and inching closer towards its eventual induction in the army, the people said. In a first, the indigenous howitzer was deployed for the ceremonial 21-gun salute at the 75th Independence Day ceremony at Red Fort along with British guns that have been traditionally used for the event.

The Defence Research and Development Organisation (DRDO) began the ATAGS project in 2013 to replace older army guns with a modern 155 mm artillery gun. It partnered with two

private firms, Bharat Forge Limited and Tata Advanced Systems Limited, for manufacturing the gun, which has a firing range of 48 km. The army order for 150 ATAGS will be split between the lowest and the second lowest bidders in 70:30 ratio, said a second person. “User trials of ATAGS have been satisfactorily conducted. A few procedural issues are being taken care of. It a good system and worthy and induction,” he said. The modernisation is taking place under the army’s field artillery rationalisation plan (FARP), cleared in 1999. The ₹50,000-crore FARP lays down the road map for inducting new 155mm weaponry, including tracked self-propelled guns, truck-mounted gun systems, towed artillery pieces and wheeled self-propelled guns.

“The FARP has gone through some reviews. Towed guns are the army’s biggest requirement. These guns will replace the 105 mm Indian field guns and 130 mm guns. The artillery will get mediumised fully (with 155 mm guns) by 2040. The private sector should develop a consortium model to meet the army’s gun requirements,” said the second person. The original FARP sought to equip around 170 artillery regiments with a mix of nearly 3,000 guns. The upgraded Sharang artillery guns are also an important element of the ongoing modernisation. The army already has three Sharang regiments, it’s raising a fourth one, and eventually plans to have 15 such regiments, said a third person. The Sharang project involves upgrading the army’s vintage Soviet-origin 130mm M-46 towed artillery pieces to 155 mm/45-calibre standard. The upgraded guns have an enhanced range — up from 27 km to 37 km — and better terminal effectiveness.

#### **Rocket systems with better range are also in the works.**

“We are raising six more Pinaka regiments with longer range rockets, up from 36 km to 48 km. Then there are guided extended range rockets that can hit targets 75 km away. This is all indigenous. These new regiments will be equipped electronically and mechanically improved weapon systems capable of firing variety of ammunition over longer ranges,” said the third person, adding that the rocket system will enhance the army’s long-range firepower along the northern borders. Artillery regiments will also soon begin inducting loitering ammunition ordered through the emergency procurement route last year, and the focus will now be indigenising aerial targeting systems, the people said.

The M777 light howitzer has emerged as the centrepiece of the army’s weapon deployment in the northern and eastern sectors to counter the Chinese military build-up, with the gun’s tactical mobility - it can be transported by Chinook helicopters - giving the army multiple options for a firepower boost in remote areas. Artillery is a battle-winning factor but the army has lagged behind in modernising the crucial combat arm, said former director general of military operations Lieutenant General Vinod Bhatia (retd). “The measures being taken now will significantly enhance our combat effectiveness, especially along the northern borders with China,” Bhatia said.

<https://www.hindustantimes.com/india-news/indian-army-eyes-major-firepower-upgrade-to-counter-china-101664280649581-amp.html>

# THE TIMES OF INDIA

*Tue, 27 Sept 2022*

## **Army Set to Induct Kamikaze Drones, Deploys More 'Winterised' Howitzers on China Front**

The Army will soon induct 'loitering munitions' amid the continuing military confrontation with China in eastern Ladakh, while the force also cranks up long-range high-volume firepower with 'winterised' howitzers and advanced rockets backed by drones and weapon-locating radars along the northern borders. Deliveries of the precision-strike loitering munitions, which are relatively smaller and cheaper explosive-armed kamikaze drones that wait to select high-value enemy targets and then crash into them, are set to begin under an emergency procurement contract inked with an Israeli-Indian private joint venture last year.

“The Army is also in the process of procuring indigenously-developed advanced loitering weapon systems with enhanced strike capabilities. There has been an enthusiastic response from Indian companies in manufacturing such systems,” defence establishment sources said on Tuesday. After the Azerbaijan-Armenia conflict, the deadly effect of loitering munitions or autonomous missiles has been reinforced by the ongoing Ukraine-Russia war. Ukrainians have used Switchblade 300 and Phoenix Ghost loitering munitions supplied by the US as well as locally assembled weapons to stem Russian advances.

The 29-month long standoff with China has also seen the Army deploy a wide array of big artillery guns along the 3,488-km long Line of Actual Control, stretching from eastern Ladakh to Arunachal Pradesh. These range from the old 105mm field guns and Bofors howitzers to the 'upgunned' Dhanush and Sharang guns, M-777 ultra-light howitzers and K-9 Vajra self-propelled tracked guns. The Army is now looking to induct another 100 K-9 Vajra guns, which have a strike range of 28-38 km, from the joint venture between L&T and South Korean Hanwha Defence. One K-9 regiment with 'winterisation kits' has already been deployed in eastern Ladakh from the 100 such 155mm/52-caliber guns inducted earlier for Rs 4,366 crore.

“The K-9 guns were originally procured for deserts. But after the Chinese incursions in May 2020, they have been modified to ensure their batteries, oil, lubricants and other systems do not freeze in sub-zero temperatures. The next 100 K-9 guns will come with winterised kits,” another source said. Induction of indigenous Pinaka multi-launch artillery rocket systems, with a strike range of 38-km, have also added more muscle along the frontier. With DRDO developing a variety of ammunition for the Pinaka, including rockets with over 45-km extended range and 75-km guided extended range, six more Pinaka regiments for Rs 2,580 crore will be delivered to the Army to add to its existing four.

The force, of course, also has three Smerch and five Grad rocket regiments of Russian-origin. As for the M-777 howitzers, which can be swiftly airlifted to forward areas by Chinook helicopters, the bulk of the 145 guns ordered for over Rs 5,000 crore from the US have also been inducted along the LAC. The seventh regiment of these howitzers, with a strike range of 30-km, is now also been operationalized, the sources said. Then there are the home-grown 155mm/52 caliber advanced towed artillery gun systems (ATAGS), with a maximum strike range of 48-km, developed by DRDO with production partners Tata Advanced Systems and Bharat Forge. After successful winter

and summer firing trials, the ATAGS is now undergoing environment and maintainability tests slated for completion in another two months. Commercial negotiations will then follow for the initial order for 150 guns at an estimated cost of Rs 3,365 crore to be split between Tata and Bharat Forge. “ATAGS is a robust indigenous system,” the source said. The orders for ATAGS will only go up because the Army has a long-term requirement for 1,580 such guns, as reported earlier by TOI.

<https://timesofindia.indiatimes.com/india/army-set-to-induct-kamikaze-drones-deploys-more-winterised-howitzers-on-china-front/articleshow/94490192.cms>

## ThePrint

Tue, 27 Sep 2022

### China Threat in Mind, Army to Order Another 100 K9 Vajra Howitzers From L&T, More to Follow

Faced with a belligerent China on the Line of Actual Control (LAC), the Army is set to order 100 more K9 Vajra Tracked Self-Propelled Howitzer from private defence major Larsen and Toubro (L&T) for their deployment at the northern borders. The Army is also trying to fast-track the remaining trials of the indigenous Advanced Towed Artillery Gun System (ATAGS) 155mm/52 calibre howitzers, which were used for the ceremonial firing at the Red Fort on Independence Day. The new order for 100 more 155mm/52 calibre Vajras will be a repeat for the South Korean guns that are manufactured indigenously by L&T at its facility in Gujarat.

In 2017, L&T won the Rs 4,500-crore contract to supply 100 units of K9 Vajra under the ‘Make in India’ initiative for which it signed a transfer of technology contract with South Korean company Hanwha Corporation. According to L&T, K9 Vajra are delivered with more than 80 per cent indigenous work packages and above 50 per cent indigenisation (by value) at the programme level. The company says it had started indigenisation, right from the inception of the programme, by replacing 14 critical systems in the Korean ‘K9 Thunder’ with indigenously developed and produced systems for the trial gun fielded for user evaluation trials. L&T had delivered all the guns ahead of schedule with the last being handed over in February last year.

#### Plan is for 200 more Vajras

“We have got the clearance from the Ministry of Defence to order for 100 more Vajras. The Request for Proposal (RFP) will be issued to L&T soon after which the cost negotiations will be carried out. We will fast-track the process and hope to have the deliveries started soon,” a source in the defence and security establishment said. The Print has learnt that there could be another order for 100 more Vajras after the new one is executed and that the Army’s plan is to eventually have 300 of these guns that were initially bought for the deserts.

But with the tensions breaking out at LAC in May 2020, the Army decided to deploy three of these tracked howitzers in Eastern Ladakh as a trial measure. These guns were fitted with winterisation kits that would enable the howitzers to work in sub-zero temperature even though they were designed to operate in deserts. As reported by ThePrint, the gun system proved its mettle following which the Army deployed a full regiment (20 guns make one regiment) of these howitzers in Eastern Ladakh to add to its fire power.

“We have already bought winterisation kits for the existing 100 Vajras. The new ones are being bought for the mountains and will come with winterisation kits,” another source explained. The winterisation kits consist of nine items including specialised oil, lubricants, heating systems and small changes to the gun’s fire and control system, besides others.

### **Vajras were originally meant for deserts**

When the Army did the trials for Vajras before it placed the order in 2017, it was carried out in deserts and not in high-altitude areas where the howitzer’s systems work differently in rarefied atmosphere and extreme cold. “When the Ladakh crisis started, we had to rethink our strategy. We put these guns in Ladakh for trials and they performed well surpassing our expectations. And hence, we have decided to go in for more,” a third source said.

Sources explained that the Army is looking for 200 more Vajras but could not have placed a repeat order higher than the original. They added the new order will be for 100 howitzers and a subsequent order could be placed at a later date once the second order is delivered. Because these are powerful tracked howitzers, the Army can deploy them extensively in the mountains too giving it more firepower. The Army has already bought 145 M777 lightweight howitzers from the US to be deployed exclusively in the mountains. These lightweight howitzers are easily transportable by the Chinook helicopters and can be moved from one valley to another with ease.

### **ATAGS being fast-tracked**

Giving details of ATAGS, the sources said the Army is fast tracking the remaining trials for faster induction of the gun system, which is being developed jointly by the Defence Research and Development Organisation (DRDO) and private players Bharat Forge and TATA. Sources said that the firing trials were complete and the gun has done very well.

It has also undergone maintainability trials and is currently undergoing environmental trials. During this phase, various parts of the howitzer are put through rigorous environmental tests like dust, cold, and heat to see how they perform in each condition. “The two companies have recently given us more than one part of the same piece so that the trials can be expedited. After this, there is a process to follow for the acquisition which will include cost negotiations and others. Hopefully, the entire process will be completed sooner than later,” a source said.

<https://theprint.in/defence/china-threat-in-mind-army-to-order-another-100-k9-vajra-howitzers-from-lt-more-to-follow/1144787/>



*Wed, 28 Sep 2022*

## **ATAGS Guns in Advanced Stage, User Trails Conducted Successfully: Defence Sources**

Advanced Towed Artillery Gun System (ATAGS) gun is in the advanced stage as user trials have been conducted successfully and left with few procedural trails, informed defence sources on Tuesday.

"ATAGS is a Greenfield project, designed and developed through a successful partnership between DRDO and the Indian private sector. User trials have been satisfactorily conducted; a few procedural issues are being taken care of. It is a good system worthy of induction," according to the sources of the Defence establishment. Sources also revealed that the Indian army is ready to induct more K-9 Vajra to enhance firepower support for Mechanised Formations. The Defence Acquisition Council (DAC) approval has been received for the induction of additional regiments. "Previous induction has enhanced the Indian Army's capability manifolds in terms of firepower and shock action. Vajra - Self-Propelled Gun roars in high-altitude areas along the northern borders. The system has already been validated and deployed in high altitude areas along Northern borders," it added. Sources mentioned that the Indian army sees the country transforming as "Atmanirbhar" in loitering munition technology and graduating as a global leader. "Keeping in league with the prospective battlefield requirements, the Indian Army has already contracted Loitering Munition System thereby augmenting our surveillance; target acquisition and precision strike capability. We are also in the process of procuring indigenously designed and developed, advanced Loitering Weapon System with enhanced strike capability," it said. It further said that they received enthusiastic responses from the Industry wherein many firms have expressed their capability to manufacture the weapon system," as per sources.

Defence establishment sources added the Advance Fire Control Automation is fielded in Indian Artillery along Northern Borders. "Upgraded version of an automated fire control system for artillery weapon system fielded for all artillery units deployed along Northern Borders. Its capability enhanced to deliver artillery firepower in the swift time frame and with more accuracy," the source highlighted.

<https://www.aninews.in/news/national/general-news/atags-guns-in-advanced-stage-user-trials-conducted-successfully-defence-sources20220927223052/>



*Tue, 27 Sept 2022*

## **Defence Manufacturer Saab to Set Up New Facility in India, Make Weapons System**

*By Devjyot Ghoshal*

Swedish defence products company Saab (SAABb.ST) will set up a facility to manufacture its Carl-Gustaf M4 weapons system in India, a top executive said on Tuesday, as the company looks to ramp up production. The facility will begin production in 2024, Senior Vice President Gorgen Johansson told reporters at a news conference. Johansson declined to provide detail on the investment that the company is likely to make in the facility. The Carl-Gustaf M4 is a recoilless rifle which has been ordered by the Indian armed forces. The new facility will support its production as well as components for users of the system around the world, the company said in a statement. "We haven't done this in any other country", Johansson said.

India - the world's largest buyer of Russian arms - has been pushing to expand its defence manufacturing capacity in recent years and grow its military exports. From around 10 billion rupees (\$122.62 million) of defence exports some eight years ago, India is now exporting more than 130 billion rupees of military equipment, Indian defence minister Rajnath Singh said on Tuesday. "We have set a target of 1.75 trillion of defence production by 2025, which includes export of 350 billion," Singh told a gathering of defence manufacturers. There's been an increased interest in the Carl-Gustaf weapon system, which can be used against tanks, since the conflict in Ukraine. "More countries will seek anti-tank capabilities going forward," Johansson said.

Earlier this year, Saab said it would boost capacity to meet rising demand. Russia's invasion of Ukraine, which Moscow calls a "special military operation", has prompted many countries, including Saab's home market Sweden, to boost defence budgets.

<https://www.reuters.com/business/aerospace-defense/defence-manufacturer-saab-produce-carl-gustaf-m4-weapons-system-india-2022-09-27/>



*Tue, 27 Sept 2022*

## **Swedish Defence Firm Saab Plans to Manufacture Carl-Gustaf M4 Weapon in India**

The M4 weapon system is capable of firing a variety of ammunition, including anti armour and illumination rounds, with the maximum range being 1,500 metre.



*The Carl-Gustaf M4 weapon.*

Swedish defence firm Saab on Tuesday announced its plan to set up a manufacturing facility in India for the Carl-Gustaf M4 shoulder-fired weapon system under the NDA government's 'Make in India' initiative to bolster indigenous defence manufacturing, a company official said. Production at the new facility is expected to begin in 2024, even though the firm is yet to reveal the location. A new company, Saab FFV India, will make the latest rocket launchers in India for

the Indian armed forces, along with components for users of the weapon system around the world, the company said. The facility will be the firm's first manufacturing facility for the Carl-Gustaf M4 weapon system outside Sweden. Saab is currently in talks with the army to take the proposal forward. The Carl-Gustaf weapon system has been in service with the Indian Army since 1976, and its earlier M2 and M3 variants have been licence-produced in India.

It is a natural step to set up a production facility for Carl-Gustaf M4 in India given Saab's long and close association with the Indian Army as one of the foremost users of the system, Saab's dynamics-business chief Gorgen Johansson said. "We are glad to be able to contribute to the [Indian] government's goals of developing a world class defence industry and proud to offer the Indian armed forces our Carl-Gustaf M4 made in India," he added. The company is looking at the 100% foreign direct investment (FDI) route to set up the new venture, but will pursue the 74% FDI option with an Indian partner if the former doesn't work out. India allows 100% FDI in defence only on a case-by-case basis.

The Narendra Modi-led central government has taken several steps in recent years to promote self-reliance in the defence manufacturing sector, including increasing FDI from 49% to 74%, notifying three lists of 310 weapons and systems that cannot be imported, and creating a separate budget to buy locally made military hardware. "The Carl-Gustaf is a proven weapon system which the army has used for decades. The setting up of a local manufacturing facility for the M4 variant by Saab is in line with the Make in India initiative. We need more original equipment manufacturers to set up manufacturing facilities in India. It will provide a boost to the Atmanirbhar Bharat (self-reliant India) campaign," said military affairs expert Lieutenant General Vinod Bhatia (retd). The M4 weapon system is capable of firing a variety of ammunition, including anti armour and illumination rounds, with the maximum range being 1,500 metre.

Saab will partner with Indian suppliers, and the systems manufactured in the facility will fully meet the requirements of the Make in India initiative, company officials said. Saab FFV India will deploy complex technologies, including the latest sighting technology and advanced manufacturing techniques, for the Carl-Gustaf M4 weapon. The Swedish firm said it will continue its partnership with Munitions India Limited and Advanced Weapons and Equipment India Limited, two of the seven firms carved out of the erstwhile Ordnance Factory Board, to manufacture the earlier M3 variant of the Carl-Gustaf weapon and ammunition.

<https://www.hindustantimes.com/india-news/swedish-defence-firm-saab-plans-to-manufacture-carl-gustaf-m4-weapon-in-india-101664283602626.html>



# THE TIMES OF INDIA

*Tue, 27 Sept 2022*

## **Jaishankar, Austin Discuss New Opportunities for Bilateral Defence Industrial Cooperation**

External affairs minister S Jaishankar and US Defence Secretary Lloyd Austin have discussed new opportunities for bilateral defence industrial cooperation, a move which Pentagon said would enhance New Delhi's contribution as a regional security provider. Jaishankar, who is on a four-day official trip to Washington, drove down to the Pentagon on Monday for a meeting with Austin. The two leaders reviewed priority lines of effort to deepen bilateral defense cooperation, as the United States and India progress toward a more advanced stage in their partnership, according to a Pentagon readout of the meeting. Austin and Jaishankar committed to expanding informationsharing and logistics cooperation to drive deeper operational coordination between the US and Indian militaries.

"They also discussed new opportunities for bilateral defense industrial cooperation in support of India's contributions as a regional security provider, including the launch of a new defence dialogue later this year as the United States and India work more closely together across space, cyber artificial intelligence, and other technology areas," the Pentagon said. During the meeting, the two leaders underscored the value of the deepening collaboration between the US, India, Australia, Japan, and European partners. In this context, the US looks forward to working with India and like-minded partners to promote security, prosperity, and transparency throughout the region, including through the Indo-Pacific Partnership for Maritime Domain Awareness, the Pentagon said, amid China flexing muscles in the strategic region. The United States, India, Japan and Australia have formed the Quad, a four-way grouping.

They have been stepping up cooperation in various fields such as defence and energy amid China's increasing military and economic clout in the region. China claims nearly all of the disputed South China Sea, though Taiwan, the Philippines, Brunei, Malaysia and Vietnam all claim parts of it. Beijing has built artificial islands and military installations in the South China Sea. China also has territorial disputes with Japan in the East China Sea. The relations between India and China have soured over the incursion by Chinese troops in eastern Ladakh in May 2020, leading to a prolonged military standoff that is still unresolved. On the sidelines of the 77th session of the UN General Assembly last week, the Quad strongly opposed any unilateral actions that seek to change the status quo or increase tensions in the Indo-Pacific, amidst China's increasingly intimidatory behaviour in the region.

Welcoming Jaishankar to the Pentagon, recollected his recent phone call with Defence Minister . They exchanged perspectives on a range of issues of shared interest, spanning recent developments in East Asia, the Indian Ocean Region, and the global reverberations of the Ukraine crisis, the readout said. The Pentagon said Austin and Jaishankar reaffirmed their commitment to working together as steadfast partners to advance the United States and India's shared vision for a free, open, and inclusive Indo-Pacific. Meanwhile, after the meeting, Jaishankar tweeted, "Defence and Security cooperation is a key pillar of the contemporary India-US partnership. We noted the steady progress in policy exchange, interoperability, defence trade,

service exercises and military-industrial cooperation." "Exchanged perspectives on the Ukraine conflict, IndoPacific developments, maritime challenges and regional issues," he added.

<https://timesofindia.indiatimes.com/india/jaishankar-austin-discuss-new-opportunities-for-bilateral-defence-industrial-cooperation/articleshow/94487427.cms>

## Science & Technology News



Press Information Bureau  
Government of India

Ministry of Science & Technology

*Tue, 27 Sept 2022 5:57 PM*

### **Union Minister for Science and Technology Dr Jitendra Singh Addresses 10th BRICS meet, Calls for Joint Fight Against Common Challenges**

**India recognises the importance of Science, Technology & Innovation (STI) in bringing together our researchers to tackle new and emerging challenges**

**BRICS countries must deepen cooperation in the areas like Health, Agriculture, Water, Renewable Energy, Biotechnology, Electric mobility, ICT, AI, Robotics and Environment: Dr Jitendra Singh**

**“BRICS STI Declaration 2022” & “BRICS Innovation Action Plan 2022-23” adopted at the 10th Meeting of BRICS S&T Ministers**

Addressing the 10th BRICS meet of Science & Technology Ministers through virtual mode today, Union Minister of State (Independent Charge) Science & Technology; Minister of State (Independent Charge) Earth Sciences; MoS PMO, Personnel, Public Grievances, Pensions, Atomic Energy and Space, Dr Jitendra Singh called for joint fight against common challenges. In his opening remarks, he said that Brazil, Russia, India, China, and South Africa (BRICS) countries face many similar challenges such as ensuring food, affordable healthcare and energy access for its people, and addressing environmental problems like climate change, biodiversity loss etc. The Minister also underlined the importance of Science, Technology & Innovation (STI) in bringing together our researchers to tackle new and emerging challenges.

Mr. Wang Zhigang, Minister, Ministry of Science and Technology, China, Dr. Bonginkosi Emmanuel Nzimande, Minister, Department of Higher Education, Science and Innovation, South Africa, Mr. Paulo Alvim, Minister, Ministry of Science, Technology and Innovation, Brazil, Mr. Valery Falkov, Minister, Ministry of Science and Higher Education, Russia took part in the 10th BRICS STI Ministerial Meeting along with senior officials and scientists. Dr Jitendra Singh said, in order to resolve these challenges, it is imperative for us to join hands to innovate affordable scientific solutions. He pointed out that there are several areas where the lives of our people are directly benefited from our mutual cooperation like the establishment of a vaccine R&D centre, BRICS Network University, establishment of shared satellite constellation, mutual recognition of pharma products, etc.

The Minister said, BRICS Young Scientist Conclave, BRICS Youth Summits, BRICS Sports, and increase in exchanges amongst our scientific organizations, researchers and civil society have also strengthened our people-to-people contact. Dwelling on the main session theme on “Strengthening BRICS STI Cooperation”, Dr Jitendra Singh said, BRICS countries must deepen cooperation in the areas like Health, Agriculture, Water, Renewable Energy, biotechnology, Electric mobility, ICT, AI, Robotics and Environment. He said, the network of BRICS countries can collaborate to develop joint S&T solutions, commercialized to fit their local economies.

Dr Jitendra Singh said, India would support BRICS efforts in developing innovative and inclusive solutions, including digital and technological tools to promote sustainable development and facilitate affordable and equitable access to global public goods for all. The Minister pointed out that in time to come, BRICS shall hold global importance for being the most populated marketplace, driven by the knowledge economy and underlined that BRICS countries can collaborate to develop joint S&T solutions suited to local economies. Referring to India’s efforts and march in STI area, Dr Jitendra Singh said, Prime Minister Mr. Narendra Modi has always emphasized that ultimate aim of all scientific endeavour is to bring “Ease of Living” for common man; and a “science-based development”. He said, India is moving along the mantra of ‘Jai Jawan, Jai Kisan, Jai Vigyan, and Jai Anusandhan,’ which essentially believes in coordination of various sectors to make India a global centre of research and innovation.

Dr Jitendra Singh said, in the last eight years, Government R&D expenditure has almost doubled. In this year's budget, Rupees 14,800 Crore has been allocated for Ministry of Science and Technology. A budget of Rs. 5,000 crore has been allocated for the creation of a National Research Foundation (NRF). He said, as a result of increased investment, India has reached 3rd position in scientific publication as per NSF database and the country has featured within the top 50 innovative economies globally (at 46th rank), as per Global Innovation Index (GII). It has also reached 3rd Position in terms of number of PhDs, in size of Higher Education System; as well as in terms of number of Start-ups, the Minister added. Dr Jitendra Singh said, Artificial Intelligence (AI) is poised to disrupt our world and India, being the fastest growing economy with the second largest population in the world, has a significant stake in the AI revolution. Recognizing this, we have established 25 Technology Innovation Hubs (TIHs) in the country. International collaboration is embedded in it and we welcome researchers from foreign countries for collaborative research and sharing of knowhow, the Minister emphasised.

In the closing session, where BRICS STI Declaration 2022 was adopted, Dr Jitendra Singh said, advancing BRICS innovation enterprises, developing next generation BRICS scientific leadership and enabling resource sharing should be our guiding strategy of BRICS STI partnership. He said, BRICS countries may explore opportunities of technology transfer &

mechanism thereof and adaptation of intra-BRICS technologies among member nations. He said, “The BRICS Innovation Action Plan 2022-23” adopted would help sharing best practices and networking among BRICS Innovation ecosystem and innovation actors. India looks forward to deepen the BRICS collaboration in the field of Science, Technology and Innovation. Dr Jitendra Singh thanked China for hosting 2022 BRICS Summit successfully and organising a series of high-level sectoral meetings including the 10th Meeting of BRICS S&T Ministers and 12th Meeting of Senior officials.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1862610>



*Tue, 27 Sept 2022*

## **The NASA Spacecraft-Asteroid Collision**

the DART (Double Asteroid Redirection Test) spacecraft collided with the space rock Dimorphos (just 160 metres wide). NASA has confirmed that the auto-rickshaw sized 600 kilogram weighing DART, on the football stadium-sized Dimorphos, about five billion kilogram in mass (orbiting around the 780 metres wide primary asteroid Didymos), has deflected the trajectory of the pair of space rocks. This kinetic impact technique, which appears as the climax of Hollywood sci-fi movies like *Deep Impact* and *Armageddon*, is also known as the ‘kick’ method. It could one day save humanity from a potential cataclysmic collision by safely deflecting a killer asteroid on its course towards earth. It could also fuel space mining technologies and unleash the space economy in decades to come.

### **What are asteroids?**

Around a construction site, bits and pieces of leftover bricks, unused steel rods, and emptied paint canisters are usually strewn. Likewise, leftover materials from the formation of the sun, earth and planets, through the accretion and agglomeration of giant gas and rocks, are scattered as comets, asteroids and meteoroids in the solar system. Some of these cross their path and collide with earth from time to time, resulting in a spectacular meteor shower. Most rocks are so small that they burn up completely in the atmosphere due to frictional heating. If they are large enough, the charred piece falls through as a meteorite. The falling piece from a meteoroid 140 metres wide or more will be capable of completely wiping out a city like Chennai. The impact would be devastating if it was one or more kilometres wide.

Neither the plot nor NASA’s Planetary Defense Coordination Office, made famous by the blockbuster Netflix movie *Don’t Look Up* is imaginary. About 66 million years ago, an asteroid about 10-15 kms struck earth. The tsunami, volcanic eruptions and thick dust clouds ensuing from the blow decimated dinosaurs and nearly 75% of all species. What happened in the past can occur in the future. The chances of a giant asteroid striking earth are small; however, if it did occur, the devastation would be cataclysmic, wiping out the entire human civilisation. While dinosaurs were mute spectators, humans can prepare themselves to face the imminent threat. NASA tracks and keeps a close watch on the nearly 26,115 asteroids whose orbits are dangerously close to earth.

### **What was NASA's mission?**

NASA, to put it simply, undertook the 'kick' technique. Compared to the massive Dimorphos, DART is a tiny Goliath. Yet crashing at a breakneck speed of 23,760 kilometres per hour, the momentum is adequate to slash the angular momentum of Dimorphos, making it speed up and move closer to Didymos. All of these reduce the orbital period and the time taken for the moonlet to go around the primary asteroid. The pair's trajectory is thus deflected as the net result of these dynamics. Consider it like this: a fast-moving moped slamming into a truck is sure to undergo a massive crash and burn, yet will veer the massive truck a bit. This is the essence of the 'kick' technique.

The extent of the trajectory change depends on the context. Compare throwing a ball against a solid wall and a sand pit. If the Dimorphos were solid, the crashing craft would make a dent on its surface and skim a tiny bit of its angular momentum, reducing the orbital time by about 75 seconds. However, close-up images transmitted by the DART moments before the fatal collision indicate that Dimorphos is more like a pile of rubble loosely held by gravity. If true, the impact will eject a cascade of debris, each piece carrying away a bit of momentum and energy. And as a net result, the asteroid will suffer a considerable loss. It will speed up more, and the orbit will become nearer to Didymos. The orbital period will then reduce by as much as 10 minutes.

### **What has been the impact assessment?**

The DART craft carried a high-resolution DRACO (Didymos Reconnaissance and Asteroid Camera for Optical navigation) camera to observe the collision and its consequences. The close-up images until its fatal crash are being analysed. In addition, like a kangaroo with a baby in its pouch, a tiny toaster-sized Italian Space Agency-built Light Italian CubeSat for Imaging of Asteroids (LICIACube) took a piggyback ride with the DART. The CubeSat was released and deployed two weeks before the impact. Hovering 50 kilometres from the asteroid, the two cameras aboard the CubeSat have captured the plume of the debris ejected by the collision. At 11 million kilometres, the asteroids appear like a blip of dot even through the best of telescopes. As they waltz around each other, once in 11 hours and 55 minutes, Dimorphos and Didymos line up, eclipsing one another. The total brightness of the pair darkens when Dimorphos passes in front of and behind Didymos.

Astronomers will now spend weeks and months observing the periodic change in the brightness using the telescopes to tease out the altered orbital period. All this data is still in process and will help fine-tune the technology.

### **What are the other possibilities of this technique?**

At the heels of NASA, China is set to deflect a 40m diameter earth-crossing asteroid called 2020 PN1 sometime in 2026. While ostensibly the drive comes from the desire to protect earth from killer asteroids, perhaps the lure of space mining lurks behind. Mining rare earth elements comes with a high environmental cost. In the coming years, the penalty for polluting could make space mining economically viable. If one can tug a mineral-rich asteroid near the Moon or establish a space mining factory between the orbits of earth and Mars, precious mineral resources needed for decades could be easily sourced. The 'kick' technique that deflects asteroids can then be used to move a small asteroid into a convenient position for space mining. Now shelved, NASA's Asteroid Redirect Mission (ARM) aimed at precisely this by bringing a 20-tonne space rock near earth to study and mine. In a way, the DART mission is also part of this frame.

For developing green energy technologies — electric vehicles, solar panels, wind turbines, and energy storage devices – and ushering in the low carbon economy of the future, rare earth elements such as yttrium, niobium, rhodium, palladium, osmium, iridium and scandium are critical. They are short in supply, and asteroid mining, it is believed, could solve the rare earth supply problem.

From the robotic Soviet Luna 16 in the 1970s to U.S. Apollo missions and China’s first lunar sample-return mission, Chang’e 5 — all have brought back lunar soil. NASA’s Stardust spacecraft returned a canister full of dust from comet Wild-2 captured by an aerogel-based sample collector in 2004. Japan Aerospace Exploration Agency (JAXA)’s Hayabusa 1 to 25143 Itokawa, the Hayabusa 2 to 162173 Ryugu, and NASA’s OSIRIS-Rex to near-earth asteroid Benu are missions to extract and return samples from asteroids.

<https://www.thehindu.com/sci-tech/science/explained-the-nasa-spacecraft-asteroid-collision/article65943566.ece>



*Tue, 27 Sept 2022*

## **NASA Rolling Back Artemis 1 Rocket, Spacecraft Back to Assembly Building**

NASA’s Artemis 1 mission’s SLS (Space Launch System) rocket and Orion spacecraft left launch pad 39 at the Kennedy Space Centre at 8.51 AM IST and began its 6.4-kilometre journey back to the Vehicle Assembly Building. The space agency decided to roll back the rocket because the latest weather predictions associated with Hurricane Ian did not give expectations for improved conditions. You can watch a livestream of the rocket being rolled back to the huge Vehicle Assembly Building from the Kennedy Space Centre’s YouTube channel below. “Managers met Monday morning and made the decision based on the latest weather predictions associated with Hurricane Ian, after additional data gathered overnight did not show improving expected conditions for the Kennedy Space Center area. The decision allows time for employees to address the needs of their families and protect the integrated rocket and spacecraft system,” said NASA in the Artemis I blog.

NASA was initially planning to attempt another launch on September 27 but decided to stand down due to the risk from the storm. “During a meeting Saturday morning, teams decided to stand down on preparing for the Tuesday launch date to allow them to configure systems for rolling back the Space Launch System rocket and Orion spacecraft to the Vehicle Assembly Building,” said the space agency, in a blog post at the time. This was shortly after the successful completion of a cryogenic tanking demonstration on September 21. Despite successful completion, the tanking demonstration test did not go smoothly. The SLS rocket sprouted more fuel leaks during the test but engineers managed to get them down to acceptable levels.

Elsewhere, NASA’s DART spacecraft successfully crashed into the asteroid Dimorphos in humanity’s first planetary defence mechanism test. Scientists now await the results of the crash

to see if the “kinetic impactor” method is viable in the event of an asteroid that actually poses a threat to our planet.

<https://indianexpress.com/article/technology/science/nasa-rolling-back-artemis-1-rocket-and-spacecraft-back-to-the-assembly-building-8175522/lite/>



*Wed, 28 Sept 2022*

## **CMFRI Scientists Develop Herbal Remedy for Fatty Liver**

Indian scientists from the Central Marine Fisheries Research Institute (CMFRI) have developed a herbal remedy from seaweeds, also known as “wonder herbs of the ocean”, to treat non-alcoholic fatty liver disease (NAFLD), a condition in which excess fat deposits in the liver. A leading cause of chronic liver, NAFLD prevalence in India is about 9 per cent to 32 per cent. Named as Cadalmin™ LivCure extract, the product is a unique blend of 100 percent natural bioactive ingredients extracted from seaweeds with an eco-friendly green technology to improve liver health, said Kajal Chakraborty, Principal Scientist at the Marine Biotechnology, Fish Nutrition and Health Division of the Central Marine Fisheries Research Institute (CMFRI), a CSIR lab. Pre-clinical trials showed that LivCure extract proved to have the potential to inhibit different enzymes and various target receptors associated with dyslipidemia and pathophysiology leading to NAFLD, he said.

Bioactive pharmacophore leads from seaweeds were used to develop the nutraceutical product. “This helps improve liver health, reduce the disposition of fatty substances, and maintain other liver/lipid parameters within the clinically acceptable limits”, the expert explained. The nutraceutical does not have any side effects as established by detailed preclinical trials. “It has proved that long-term oral administration of this product will not lead to general organ or systemic toxicity”, Chakraborty added. The CMFRI will soon transfer the technology to the interested pharmaceutical firms for commercial production of the nutraceutical, A Gopalakrishnan, Director of CMFRI said. He added that “Seaweeds are often termed as the wonder herbs of the ocean due to their potential pharmaceutical properties. Recently, this marine macroflora is gaining immense attention in nutraceutical industries due to its protective function against various chronic diseases”, he said.

CMFRI scientists have been developing a plethora of nutraceuticals based on marine plants aiming to combat a series of lifestyle diseases, such as type-2 diabetes, arthritis, cholesterol, hypertension, hypothyroidism and osteoporosis, and to improve immunity, an official statement said here. Out of these nutraceuticals, eight products are from seaweeds and one from green mussels. In a bid to cash in on the huge potential of seaweed farming, India has already launched various seaweed cultivation plans in several coastal states, aiming to provide employment to 6-7

lakh people, particularly women. Known as ‘miracle plants of sea’, seaweeds can be used for medicine, fertilizer, animal feed and food and in many other sectors.

<https://www.dailypioneer.com/2022/india/cmfri-scientists-develop-herbal-remedy-for-fatty-liver.html>



