

August  
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: 157 19 - 22 अगस्त 2022

Vol.: 47 Issue: 157 19 - 22 August 2022



रक्षा विज्ञान पुस्तकालय

Defence Science Library

रक्षा वैज्ञानिक सूचना एवं प्रलेखन केंद्र

Defence Scientific Information & Documentation Centre

मेटकॉफ हाउस, दिल्ली - 110 054

Metcalfe House, Delhi - 110 054

# CONTENTS

S. No.	TITLE	Page No.
	<b>DRDO News</b>	<b>1-5</b>
	<b>DRDO Technology News</b>	<b>1-5</b>
1.	Indian Pinaka Missile:LACपर तैनात होगी भारत की ये मिसाइल, इसकी खूबियों से कांप उठेगा दुश्मन	<i>Jagran</i> 1
2.	Vietnam Seeks India-Israel Barak-8 Air Defense System Amid Chinese Belligerence	<i>Hindustan Times</i> 3
3.	2nd Order for India? After Brahmos, Vietnam May Purchase Indo-Israeli Barak 8 Missile Defense System – Reports	<i>Eur Asian Times</i> 3
	<b>Defence News</b>	<b>5-40</b>
	<b>Defence Strategic: National/International</b>	<b>5-40</b>
4.	ऑस्ट्रेलिया के डार्विन में अभ्यास पिच ब्लैक 2022 में वायुसेना की भागीदारी	<i>Press Information Bureau</i> 5
5.	IAF Participation in Exercise Pitch Black 2022 at Darwin, Australia	<i>Press Information Bureau</i> 6
6.	Army Chief Visits Dimapur to Review Operational Preparedness of Formations	<i>Press Information Bureau</i> 7
7.	Raksha Mantri Shri Rajnath Singh Interacts With Troops at Headquarters Inspector General Assam Rifles (South) in Manipur	<i>Press Information Bureau</i> 8
8.	Brahmos Supersonic Missiles Can Engage Onshore Targets — Developer	<i>Indian Defence News</i> 10
9.	India Likely to Approve Emergency Acquisition Powers for Defence Forces	<i>Mint</i> 10
10.	India to Upgrade Defence Along LAC, Soon to Procure Mq-9b Drones From US	<i>Mint</i> 11
11.	India, Bangladesh to Ink Defence Pact, Focus on Maritime Security and Joint Production	<i>Financial Express</i> 13
12.	Defence PSU GRSE Making 7 Vessels for Foreign Countries: Official	<i>Business Standard</i> 15
13.	We're Geared Up': Centrepiece of Navy Vikrant is Prepared for Commissioning	<i>Defence Aviation Post</i> 17
14.	Arunachal ' Vibrant village' project to counter China's infradevelopment at LAC	<i>The Statesman</i> 20
15.	To Guard LAC, Army Deploys Tata QRFVS in North East	<i>Asian Age</i> 20
16.	Lack of Consensus Delays Construction of Third Indigenous Aircraft Carrier	<i>Business Standard</i> 21
17.	Hal to Open Office in Kuala Lumpur to Support Malaysian Defence Forces	<i>Business Standard</i> 24
18.	India, Thailand Reviewed Defence, Trade Ties as Jaishankar Visits Bangkok	<i>Mint</i> 25
19.	Customised Defence Deals Offered to Offset Sanctions Impact, Says Senior Russian Military Official	<i>The Hindu</i> 26
20.	Russia Wants to Build Next Generation Tanks, Submarines With India	<i>The print</i> 27
21.	China Tests Air Defence Missile System Near India Border	<i>The Hindu</i> 29
22.	India, China Should Not Pose Threat to Each Other: Beijing	<i>Hindustan Times</i> 30

23.	51 Chinese Warplanes, 6 Warships Infringes on Taiwan's Air Defence Identification Zone	<i>The Times of India</i>	31
24.	Exclusive Satellite Pics: China's New 'Mission Indian Ocean' Targets India	<i>NDTV</i>	33
25.	Loitering Munitions Evoke New Era for Missile Defence	<i>Army Technology</i>	35
26.	Russia Used Hypersonic Missiles in Ukraine 3 Times: Russian Defence Minister	<i>Republicworld.com</i>	37
27.	Russia Deploys Hypersonic Missiles to its Baltic Exclave	<i>Daily Pioneer</i>	38
28.	Japan Mulls Long-Range Missile Upgrades Due to China Threat: Report	<i>Asian Age</i>	38
29.	U.S. Announces New Military Aid, Drones for Ukraine	<i>The Hindu</i>	39
<b>Science &amp; Technology</b>			<b>41-45</b>
30.	ISRO Gets Crew Module from HAL for First Development Launch of Gaganyaan	<i>Mint</i>	41
31.	India's First Truly Indigenously Developed Hydrogen Fuel Cell Bus Developed by KPIT-CSIR in Pune	<i>Pune Newskar</i>	42
32.	ISRO Chairman Keen on Cooperation with Latin American and Caribbean Nations	<i>Financial Express</i>	44
33.	Indian Scientists Develop Smart Biopolymer Than Can Detect Food Freshness	<i>Daily Pioneer</i>	45



Sun, 21 Aug 2022

### **Indian Pinaka Missile: LAC पर तैनात होगी भारत की ये मिसाइल, इसकी खूबियों से कांप उठेगा दुश्मन**

भगवान शिव के धनुष के नाम पर रखे गए राकेट लांचर पिनाक (Pinaka Rocket Launcher) एक बार फिर सुर्खियों में है। इसकी खूबियां ऐसी हैं कि दुश्मान भी कांप उठेगा। सेना का यह लांचर 70 किलोमीटर दूर तक दुश्मन के ठिकानों को नेस्तनाबूद कर सकता है। आइए जानते हैं कि आखिर शिव के पिनाक से क्योंकि चिंतित हैं पड़ोसी मुल्क। इसकी क्या मारक क्षमता है। इसकी क्या खूबियां हैं। भारतीय सेना के लिए यह वरदान कैसे और क्यों बना। इसकी किस क्षमता से सेना इतराती है।

पिनाक का यह अडवांस्ड वर्जन 70 किलोमीटर दूर तक दुश्मनों के ठिकानों को पूरी तरह से ध्वस्त कर सकता है। यह लांचर किसी भी मौसम में फायर कर सकता है। अपने मल्टी बैरल के जरिए यह लांचर 44 सेकेंड में 72 राकेट दाग सकता है। रक्षा मामलों के जानकार डा अभिषेक प्रताप सिंह का कहना है कि डीआरडीओ ने पिनाक को अपनी सैन्य जरूरतों के लिहाज से विकसित किया है। इसके दायरे में पाकिस्तान के कई शहर शामिल हो सकते हैं। यह अन्ये लांचारों की तरह भारी भरकम नहीं है। इसको आसानी से एक स्थाहन से दूसरे स्थासन पर ले जाया जा सकता है। किसी भी इलाके में यह सफल है। इसको लद्दाख और अरुणाचल प्रदेश से चलाना जितना आसान है उतना ही पाकिस्तान से सटे भारतीय सीमा से भी।

यानी सेना का यह लांचर 70 किलोमीटर दूर तक दुश्मन के ठिकानों को नेस्तनाबूद कर सकता है। पिनाक शिव की धनुष की तरह ही विध्वंसक और अचूक है। इसी क्षमता के कारण इसका नाम पिनाक रखा गया। अडवांस्ड तकनीक से लैस यह लांचर अपने दुश्मनों को संभलने का तनिक भी मौका नहीं देता है। इसकी खास बात यह है कि हर मौसम और परिस्थिति में इसका इस्तेमाल किया जा सकता है। यह लांचर 44 सेकेंड में यह 72 राकेट दाग कर दुश्मनों के

ठिकानों को ध्वस्त कर सकता है। यह दुश्मनों को संभलने का मौका नहीं देता है। इसका राजस्थान के पोखरण रेंज में कई सफल टेस्ट और किए गए हैं।

इसका निशाना अचूक है। इसकी इस क्षमता से दुश्मैन सेना के हौसले पस्त हो जाते हैं। निशाना इतना सटीक कि दुश्मन का विनाश तय है। रक्षा अनुसंधान एवं विकास संगठन (DRDO) ने पोखरण रेंज में इस मिसाइल के कई परीक्षण किए हैं। इस टेस्ट के दौरान 24 राकेट अलग-अलग रेंज से फायर किए गए। इस दौरान इसने अपने लक्ष्य को बड़ी ही आसानी के साथ भेद दिया। पिनाक मल्टी बैरल राकेट लांचर सिस्टम को DRDO ने तैयार किया है। एक दशक पहले ही भारतीय सेना में शामिल पिनाक मिसाइल का अब उन्नत संस्करण तैयार किया गया है।

पिनाक इन्हांड रेंज शुरुआती पिनाक का अडवांस्ड वर्जन है। जल्द ही इसका उत्पादन भी शुरू हो जाएगा। इस सिस्टम के सफल टेस्ट ने सेना को जमीन पर हमले का ज्यादा घातक विकल्प दे दिया है। इस हथियार से सेना दुश्मनों के ठिकानों को ध्वस्त कर सकता है। इस हथियार से चीन को करारा जवाब मिलेगा। गौरतलब है कि भारत-चीन सीमा विवाद और हिंसक झड़प के बाद भारत अपनी सैन्य क्षमता में लगातार इजाफा कर रहा है। भारत अपने सैन्य उपकरणों को अत्याधुनिक बना रहा है। भारतीय सेना चीन की किसी भी हरकत से निपटने के लिए अब हर मोर्चे पर बड़ी तैयारी कर रहा है।

इसके पूर्व पिनाक 44 सेकेंड में 12 राकेट दागने वाला मिसाइल लांचर सिस्टम था। इसकी मारक क्षमता महज 38 किमी तक थी। हालांकि अपग्रेड होने के बाद यह 44 सेकेंड में ताबड़तोड़ 72 राकेट दाग सकता है। वहीं यह 75 किलोमीटर दूरी तक सटीक निशाना लगा सकने में भी सक्षम है। वर्ष 1999 के कारगिल युद्ध के दौरान भारतीय सेना ने पिनाक मार्क-1 संस्करण का इस्तेमाल किया था। इसने पहाड़ की चौकियों पर तैनात पाकिस्तानी चौकियों को सटीकता के साथ निशाना बनाया था और युद्ध में दुश्मन को पीछे हटने के लिए मजबूर कर दिया था।

<https://www.jagran.com/news/national-pinaka-missile-of-india-will-be-deployed-on-china-border-lac-pinaka-rocket-features-jagran-special-22997575.html>

## **Vietnam Seeks India-Israel Barak-8 Air Defense System Amid Chinese Belligerence**

Vietnam is beefing up defenses amid China's irrational moves in the Indo-Pacific. Vietnam is eyeing the impressive Barak-8 air defense system in a \$500 million deal. Barak-8 been joint developed by India's DRDO & Israel Ministry of Defense (IMOD). in 2017, India & Israel signed a \$1.6BN contract for supply of the air defense system. Vietnamese sources say the nation is prioritising Barak-8 over Rafael's Spyder. Defence outposts on artificial islands; China claims almost all of South China Sea.

<https://www.hindustantimes.com/videos/vietnam-seeks-india-israel-barak-8-air-defense-system-amid-chinese-belligerence-101660912751109.html>



## **2nd Order for India? After Brahmos, Vietnam May Purchase Indo-Israeli Barak 8 Missile Defense System - Reports**

A delegation of top-ranking officials from Vietnam's Defense Ministry will visit Israel in September, reported Haaretz on August 18. During their visit, the Vietnamese defense officials will discuss the potential purchase of three Barak 8 missile defense systems from Israel Aerospace Industries (IAI).

The delegation will reportedly be headed by the deputy commander of Vietnam's air force and the head of the country's air defenses.

Vietnam already has the Israeli-made Spyder air defense system purchased in 2015 from Rafael Advanced Defense Systems for US\$ 600 million, the largest-ever military deal between Israel and Vietnam.

Reports suggest that Rafael is trying to convince the Vietnamese Air Force to buy three more Spyder systems, but Hanoi is not happy with the company and is instead giving priority to IAI.

The Vietnamese delegation will also meet with the head of the Israel Air Force, the commander responsible for Israel's air defenses, and other senior Israeli defense officials during their visit.

## **Barak-8 Missile System**

The Barak-8 missile defense system is jointly developed by IAI, India's Defense Research & Development Organisation (DRDO), Israel's Directorate of Research and Development (DDR&D), Elta Systems, and Rafael Advanced Defense Systems.

The Barak-8 system is designed to defend against various airborne threats, including helicopters, fixed-wing aircraft, unmanned aerial vehicles, anti-ship missiles, ballistic missiles, and cruise missiles. It can hit targets with pinpoint accuracy up to a range of 70 kilometers.

The missile defense system can be deployed on naval and land-based platforms, and the vertical launch capability of the Barak family of interceptor missiles enables 360-degree coverage.

IAI claims the system's highly advanced seeker can work under all weather conditions and detect threats with low radar cross-sections (RCS) or high maneuverability. Also, the seeker uses a wide and narrow radio frequency (RF) beam, which can lock on to any target at any altitude and thus provide defense against an array of land, air, and sea threats.

After the successful development of Barak-8, IAI further developed the new Barak-MX multi-layered air defense system, which comprises different interceptor missiles for different ranges, just like the Russian S-400 Triumf air defense system.

Most importantly, the Barak-8 missile system is combat-proven. In 2020, during the Nagorno-Karabakh war between Azerbaijan and Armenia, the Barak 8 interceptor missile reportedly shot down a Russian-made Iskander short-range ballistic missile fired by Armenia.

The land-based version of the Barak-8, operated by the Indian Army and the Air Force, is known as MR-SAM, and an extended-range system is currently under development, known as LR-SAM.

Together with the modern multi-purpose radars employed on naval warships or air defense systems, Barak-8 can simultaneously engage multiple targets in a ship's defense.

### **A Win For India; Bad News For China**

Vietnam purchasing the Barak-8 missile system will be a big win for India after a recent purchase of the Indo-Russian BrahMos anti-ship missile system by the Philippines for US\$ 375 million.

India is constantly increasing its defense exports, which will strengthen its domestic defense production, as part of the government's 'Make in India' and 'Atmanirbhar Bharat' (self-reliant) initiatives.

The production of the Barak-8 missile is undertaken by an Indo-Israeli joint venture, KRAS, between Rafael, Kalyani Group, and Bharat Dynamics Limited.

Vietnam's interest in the Barak-8 missile defense system comes against Hanoi's concern over China's belligerence while asserting its maritime claims in the South China Sea (SCS) region, which cover Vietnam's Exclusive Economic Zone (EEZ).

While Vietnam tries to maintain cordial relations with China despite the territorial dispute, in recent years, tensions between the two countries have remained high, adversely impacting the fishing and natural resource exploration activities in the contested waters.

The most recent example was in March when Vietnam accused China of violating its EEZ by conducting military drills in waters between the Hainan province and Vietnam.

As reported earlier by EurAsian Times, Vietnam is also interested in buying the Brahmos missile system from India.

Brahmos or Barak-8 missile systems can enable countries like Vietnam to employ their version of the anti-access/area denial (A2/AD) strategy devised by China to counter the US Navy in the SCS region.

<https://eurasianimes.com/2nd-order-for-india-after-brahmos-sale-to-philippines/>

## Defence News

## Defence Strategic : National/International



पत्र सूचना कार्यालय  
भारत सरकार

रक्षा मंत्रालय

*Fri, 19 Aug 2022 6:40PM*

## ऑस्ट्रेलिया के डार्विन में अभ्यास पिच ब्लैक 2022 में वायुसेना की भागीदारी

ऑस्ट्रेलिया के डार्विन में दिनांक 19 अगस्त 2022 से 08 सितंबर 2022 तक होने वाले अभ्यास पिच ब्लैक 2022 में भाग लेने के लिए भारतीय वायुसेना का एक दल ऑस्ट्रेलिया पहुंच गया है। यह रॉयल ऑस्ट्रेलियन एयर फ़ोर्स द्वारा आयोजित एक द्विवार्षिक एवं बहु-राष्ट्रीय अभ्यास है। यह अभ्यास लार्ज फोर्स एम्प्लॉयमेंट वारफेयर पर केंद्रित होगा। इस अभ्यास का पिछला संस्करण 2018 में आयोजित किया



गया था। अभ्यास का 2020 संस्करण कोविड-19 महामारी के कारण रद्द कर दिया गया था। इस वर्ष के अभ्यास में विभिन्न वायु सेनाओं के 100 से अधिक विमान और 2500 सैन्यकर्मों भाग लेंगे।

ग्रुप कैप्टन वाईपीएस नेगी के नेतृत्व में भारतीय वायुसेना की टुकड़ी में 100 से अधिक वायु योद्धा शामिल हैं, जिन्हें चार सुखोई-30 एमकेआई लड़ाकू और दो सी-17 विमानों के साथ तैनात किया गया है। वे एक जटिल वातावरण में मल्टी-डोमेन एयर कॉम्बैट मिशन को अंजाम देंगे और भाग लेने वाली वायु सेना के साथ सर्वश्रेष्ठ परम्पराएं साझा करेंगे।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1853213>



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

**Ministry of Defence**

*Fri, 19 Aug 2022 6:40PM*

## **IAF Participation in Exercise Pitch Black 2022 at Darwin, Australia**

An Indian Air Force contingent has reached Australia for participating in Exercise Pitch Black 2022 scheduled to be held from 19 Aug 22 to 08 Sep 22 in Darwin. This is a biennial, multi-national exercise hosted by the Royal Australian Air Force (RAAF). It will focus on Large Force Employment warfare. The last edition was conducted in 2018. The 2020 edition of the exercise was cancelled due to the COVID-19 pandemic. This year's exercise will see the participation of over 100 aircraft and 2500 military personnel from various air forces.

The IAF contingent, led by Group Captain YPS Negi, comprises over 100 air warriors, deployed with four Su-30 MKI fighter and two C-17 aircraft. They will undertake multi-domain air combat missions in a complex environment and will exchange best practices with the participating air forces.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1853181>



**Press Information Bureau  
Government of India**

**Ministry of Defence**

*Fri, 19 Aug 2022 7:32PM*

## **Army Chief Visits Dimapur to Review Operational Preparedness of Formations**

General ManojPande, Chief of the Army Staff (COAS) visited HQ 3 Corps at Rangapahar Military Station, Dimapur on 19 August 2022. During the visit, he was accompanied by Lieutenant General RP Kalita, GOC-in-C Eastern Command.

The COAS was briefed by GOC, 3 Corps, IGAR (South) and IGAR (North) on border management and hinterland operations to maintain peace and tranquillity in the region. Expressing satisfaction over the robust deployment posture and operational synergy, the Army Chief commended all ranks of the formation for their stellar contribution to improving the security situation of NE states and Nation building. Emphasising the need to keep abreast with emerging challenges, the COAS also commended all agencies for the synergy between them in maintaining peace in the region.





<https://pib.gov.in/PressReleasePage.aspx?PRID=1853196>



**Press Information Bureau  
Government of India**

**Ministry of Defence**

*Fri, 19 Aug 2022 10:44AM*

## **Raksha Mantri Shri Rajnath Singh Interacts With Troops at Headquarters Inspector General Assam Rifles (South) in Manipur**

**Commends them for performing their duty with courage & conviction and improving the security situation in the state**

**Nation can achieve absolute potential only when its borders are safe, says RM while urging the forces to keep the National Flag high**

Raksha Mantri Shri Rajnath Singh visited Headquarters Inspector General Assam Rifles (South) at Mantripukhri in Manipur on August 19, 2022 and interacted with troops of Red Shield Division and Assam Rifles. He was accompanied by Chief of the Army Staff General Manoj Pande, GOC-in-C Eastern Command Lieutenant General RP Kalita and GOC Spear Corps

Lieutenant General RC Tiwari along with other senior officers of Army and Assam Rifles. During the visit, the RakshaMantri was briefed about the counter-insurgency as well as border management operations on Indo-Myanmar border to maintain peace and tranquility in the region.

Addressing the personnel, ShriRajnath Singh appreciated the officers and soldiers for performing their duty with courage and conviction despite challenges posed by terrain & weather and improving the security situation in Manipur. It's a matter of great pride to stand amongst the Indian Army and Assam Rifles troops, he said.

The RakshaMantri lauded the contribution of Red Shield Division ever since its raising be it in 1971 war, as part of IPKF in Sri Lanka or in its present role. He commended the stellar role of Assam Rifles in the last seven decades and their immense contribution in internal security, securing Indo-Myanmar border and key role in bringing North East into the national mainstream. "For this reason, you are called 'Friends of the North East People' and 'Sentinels of North East'," he stated.

ShriRajnath Singh exhorted the forces to keep the NationalFlag high through unflinching dedication, asserting that the Nation can achieve absolute potential only when its borders are safe. More than 1,000 troops of Red Shield Division and Assam Rifles took part in the interaction with the RakshaMantri.



<https://pib.gov.in/PressReleasePage.aspx?PRID=1853050>

Sat, 20 Aug 2022

## **Brahmos Supersonic Missiles Can Engage Onshore Targets — Developer**

Russian-Indian BrahMos supersonic cruise missiles of all kinds of deployment are capable of engaging either above-water or onshore targets, co-director of BrahMos joint venture from the Russian side Alexander Maksichev told TASS.

"BrahMos JV has already implemented such opportunities and missiles of mobile and seaborne systems can be used now against land-based and sea [targets]," the co-director said. The missile can be used against land-based radio contrast and non-radio contrast targets, Maksichev said. "Our missile is versatile. The result through lengthy trade-offs was that all customers need a versatile missile, capable of being fired against radio contrast and non-radio contrast targets," he added.

<http://www.indiandefensenews.in/2022/08/brahmos-supersonic-missiles-can-engage.html?m=1>



Sat, 20 Aug 2022

## **India Likely to Approve Emergency Acquisition Powers for Defence Forces**

The NarendraModi-led government in India is likely to grant the Indian defence forces emergency acquisition powers, that allows the forces to buy critical weapons systems, any system or equipment under the fast-track route.

The discussion of granting the defence forces the emergency acquisition power will very likely come up in a high-level defence ministry meeting planned to be held next week, governmental officials who are aware of the situation told news agency ANI in the national capital. The power had been granted to the defence forces post-Uri surgical strikes in 2016 during heightened tensions with Pakistan. The powers were furthered for use during the border tensions with China along the Line of Actual Control (LAC) since May 2020.

### **What are emergency acquisition power for critical weapon?**

The emergency acquisition powers allow the defence forces to acquire any new or in-service equipment on a fast-track basis to improve preparedness for conflict situations.

Earlier, the defence forces had the power to sign deals for equipment worth ₹300 crore and the products had to be delivered within three months to one year.

The armed forces have to spend funds on the new acquisitions from their own budgetary allocation and they don't have to take the defence ministry's approval for these deals.

The powers are being granted to the defence forces again by the government at a time when China is showing aggressive manoeuvres on the Taiwan front and holding multiple missile firings and indulging in display of strength in the region.

Meanwhile, Pakistani agencies are also trying to carry out operations along the maritime border with India near the Gujarat coast.

### **How the defence forces have used emergency acquisition powers?**

The defence forces have strengthened their preparedness through these acquisitions as the Indian Air Force and the Army received 'Heron' unmanned aerial vehicles which have now been deployed for surveillance in Ladakh as well as in the northeast for keeping an eye on Chinese activities.

The forces have also got missiles which can hit ground targets from long ranges. The Rafale fighter jets have also received a boost with the induction of the HAMMER missiles which can hit hardened ground targets like bunkers from a long distance.

The Army and the IAF also used these powers to strengthen their small arms as the Sig Sauer assault rifles have been inducted into all three forces now.

Indian armed forces extensively utilised the emergency procurement powers granted to them in different phases by the government to equip themselves with the necessary weaponry to handle any conflict or aggression by enemies on both sides.

The armed forces have a long list of equipment to buy and will use the powers to buy both indigenous as well as foreign manufactured products.

<https://www.livemint.com/news/india/india-likely-to-approve-emergency-acquisition-powers-for-defence-forces-11660997493463.html>



*Sun, 21 Aug 2022*

## **India to Upgrade Defence Along LAC, Soon to Procure MQ-9b Drones From US**

Aiming to upgrade the overall surveillance apparatus along the Line of Actual Control (LAC) with China and in the Indian Ocean, India is in the advanced stage of negotiating with the US to procure 30 MQ-9B Predator armed drones at a cost of over USD 3 billion, people familiar with the development informed on Sunday.

The drones are well equipped to assist the defence forces in a variety of duties including maritime surveillance, anti-submarine warfare, over-the-horizon targeting and hitting stationary ground targets. The long-endurance-hunter-killer drones are being procured for the three defence services.

The MQ-9B drone is a variant of MQ-9 "Reaper" that was reportedly used to fire a modified version of the Hellfire missile which eliminated al-Qaeda leader Ayman al-Zawahiri in the heart of Kabul last month.

Authoritative sources in the defence establishment said that talks between New Delhi and Washington are underway between the states for the procurement of the drones manufactured by US defence major General Atomics, and rejected reports that the deal is off the table.

The information about acquisition is at the advanced stage with discussions between the two governments was given by Dr VivekLall, Chief Executive for the General Atomics Global Corporation.

He said, "We understand that the MQ-9B acquisition programme is at an advanced stage of discussion between the US and Indian governments."

"Any questions on those discussions should be addressed specifically to the respective governments. From a company perspective, General Atomics is ready to support India and values our longtime relationship," Lall added.

The sources said the talks are focused on sorting out certain issues relating to cost component, weapons package and technology sharing.

The fourth two-plus-two foreign and defence ministerial dialogue between India and the US in Washington in April witnessed the proposal for negotiations for the procurement of the drones.

#### India's Experience WithMQ-9B

In 2020, the Indian Navy had taken on lease two MQ-9B Sea Guardian drones from General Atomics for a period of one year for surveillance in the Indian Ocean. The lease period has been extended subsequently.

With frequent interference from the Chinese side, the Indian Navy has been bolstering its surveillance mechanism. The aim is to monitor growing Chinese activities including frequent forays by PLA warships in the Indian Ocean Region.

When asked about the two drones that had been acquired on lease and are operational, Lall said they have performed "very well" and flew close to 3,000 hours in support of the Indian Navy's maritime and land border patrol objectives, covering over 14 million square miles of operating area.

"General Atomics has supported India over the past three years by providing two MQ-9 remotely piloted aircraft as part of a company owned/company operated (COCO) lease agreement," he said.

The MQ-9Bs are designed to not only meet the standards of NATO (North Atlantic Treaty Organization) but also to comply with civil airspace requirements in the US and around the world, according to General Motors.

The procurement proposal has been moved by the Indian Navy and all three services are likely to get 10 drones each.

The medium-altitude long-endurance (MALE) drone is the first hunter-killer unmanned aerial vehicle (UAV) designed for long-endurance and high-altitude surveillance, with the capability of remaining airborne for around 35 hours.

Following the eastern Ladakh standoff with China, Indian armed forces have been focusing on procuring unmanned platforms including armed drones.

In 2019, the US approved the sale of armed drones to India and even offered integrated air and missile defence systems.

In February 2020, India sealed a USD 2.6 billion (one billion=100 crores) deal with the US for the procurement of 24 MH-60 Romeo helicopters from American aerospace major Lockheed Martin for the Indian Navy. The delivery of the helicopters has already begun.

<https://www.livemint.com/news/india/india-to-upgrade-defence-along-lac-soon-to-procure-mq-9b-drones-from-us-11661070867634.html>



*Fri, 19 Aug 2022*

## **India, Bangladesh to Ink Defence Pact, Focus on Maritime Security and Joint Production**

Even as China is making attempts to increase its presence in [Bangladesh](#), New Delhi has started negotiations with Dhaka for robust defence cooperation.

Sources have confirmed to Financial Express Online that “During the forthcoming visit of the Prime Minister Sheikh Hasina of Bangladesh to India from September 5-8, [bilateral defence cooperation](#) agreement is expected to be announced. The draft of the agreement is already ready.”

In 2017, when PM Hasina was in India, the two sides had inked a MoU on Framework Agreement for defence cooperation. And, this Framework Agreement is expected to be upgraded during her forthcoming visit. In the 2019 visit the two sides had discussed deepening cooperation in aerospace research, cyber security, blue economy, and the peaceful use of nuclear energy.

### **Importance of framework defence agreement**



Gautam Lahiri, a senior journalist and Bangladesh commentator, tells Financial Express Online, “Initially New Delhi was trying to push its military hardware to Dhaka. However, sensing the sensitivity of it, India has now changed its strategy to rope in Bangladesh.”

“Now it will be a good initiative if Dhaka and New Delhi agree for joint production of military hardware keeping the needs of that country. Ahead of the visit of PM Hasina to India, this proposal has been discussed at the recently held defence dialogue between the two countries,” he adds.

Financial Express Online has reported that the two countries have already signed a MoU during PM Hasina’s last visit.

According to Lahiri, “The 500 million dollar Line of Credit was also offered but it is still lying unutilized. Earlier both sides agreed to install a coastal radar system to keep a watch in the Bay of Bengal. Hopefully the project may take off after the visit of the Bangladesh PM.”

He elaborated that, “The visit of Indian Army Chief General Manoj Pande to Dhaka sent a positive signal of deeper defence cooperation between the two sides. Since PM Hasina holds the Defence portfolio too, she met with the Indian Army Chief. Enlarged defence cooperation may be agreed upon for mutual benefit of two trusted neighbours.”

### **Chinese presence in Bangladesh and maritime security**

Financial Express Online has reported earlier that China has been trying to expand its presence in the Indian Ocean Region (IOR) and India’s focus is on security and growth for all in the region – an initiative to further relations with not only the neighbouring countries but in the IOR. Both India and Bangladesh are working together to ensure that both reach consensus to secure maritime security in the region.

The two countries have naval training, bilateral exercises with the two navies. Coordinated Patrol along the International Maritime Boundary Line, is some of the issues that are being discussed.

In a desperate bid to expand its influence in the defence domain in Bangladesh and in the IOR, China has delivered two submarines to that country and is in the midst of expediting major defence projects in Bangladesh like building a state of the art submarine base — BNS Sheikh Hasina, in Pekua, near Cox’s Bazar. To expand its presence deeper in Bangladesh, China has even given two of its decommissioned, old submarines to the Bangladesh Navy.

### **Defence cooperation agreement**

The groundwork for the upgraded Bilateral Defence Cooperation agreement was completed at the fourth India-Bangladesh Annual Defence Dialogue on August 11 in New Delhi. This meeting was co- chaired by Defence Secretary Ajay Kumar and Lt General Wakar-Uz-Zaman, Bangladesh Principal Staff Officer of the Armed Forces Division.

Joint production of various equipment and hardware based on the requirements of Bangladesh is something India is interested in and this was the topic on the agenda of talks during the talks in New Delhi recently.

The two countries have great potential for cooperation in defence trade, joint production and co-development which will help in deeper defence cooperation between India and Bangladesh.

According to sources, joint production in the Special Economic Zone of various platforms including torpedoes and armoured vehicles, radars, among others.

A delegation from Bangladesh is expected to participate in the forthcoming Def-Expo 2022, from October 18-22, in Gandhinagar, Gujarat. At this edition of DefExpo, for furthering defence engagements with countries, Prime Minister Narendra Modi is likely to inaugurate the multi-national defence production forum.

### **Execution of line of credit worth \$500 million**

Bangladesh is expected to send a list of items that it is interested in procuring from India using the line of credit worth \$500 million.

### **2nd India-Bangladesh tri- service staff talks (TSST)**

Both sides on August 10, 2022, had the second TSST in New Delhi co-chaired by Deputy Chief of Integrated staff Headquarters, Brigadier Vivek Narang and Brigadier Hussain Muhammad, Director General Operations and plans Directorate of the Bangladesh Armed forces. The two sides discussed the ongoing initiatives taken under the existing bilateral defence cooperation mechanism of all three services. Both sides agreed to further strengthen their bilateral defence engagements.

<https://www.financialexpress.com/defence/india-bangladesh-to-ink-defence-pact-focus-on-maritime-security-and-joint-production/2636394/>

## **Business Standard**

*Sun, 21 Aug 2022*

### **Defence PSU GRSE Making 7 Vessels for Foreign Countries: Official**

Defence PSU Garden Reach Shipbuilders and Engineers Ltd is making seven vessels for foreign countries, out of the 23 ships that are in the different stages of construction, its chairman and managing director Commodore (retd) P R Hari said.

GRSE, which had bagged the prestigious Rs 19,294-crore order for the construction of three advanced stealth frigates under Project 17A for the Indian Navy, has already launched two of these ships and the construction of the third one is in full swing.

"Of the 23 ships being developed by GRSE, seven are for foreign countries," Hari told PTI.

The Kolkata-based warship maker is constructing six patrol boats for Bangladesh and an ocean-going passenger and cargo ferry vessel for Cooperative Republic of Guyana, he said.

After having launched P17A advanced frigate INS Himgiri and large survey vessel INS Sandhayak, GRSE is doing outfitting work on these ships at its FOJ (fitting out jetty) unit before handing these over to the Indian Navy, Hari said.

The second stealth frigate Dunagiri made by the shipyard was launched on July 15 by Defence Minister Rajnath Singh.

Among the ships under construction at its sprawling facilities on the bank of the Hooghly river are four large survey vessels, of which Sandhayak is undergoing outfitting.

"GRSE is also constructing eight anti-submarine warfare water crafts for the Navy," Hari said.

A major supplier for the Indian Coast Guard, the public sector undertaking is making a fast patrol vessel for it, apart from refitting ICGS Sujay, he said.

In its endeavour to introduce green technology in shipbuilding, GRSE has signed a contract with the West Bengal government for the construction of a next-generation electric ferry, Hari said.

"I believe that once delivered, this vessel will be a game changer for inland water transport in India and will also have good export potential," he said.

The shipbuilder, which derives nearly 95 per cent of its revenue from warship making, also manufactures deck machinery items, pre-fabricated portable steel bridges and marine pumps, the official said.

GRSE, which has so far delivered 107 warships with the maiden INS Ajay in 1961 being India's first indigenously-made warship, has been a profit-making company for the last 28 years, he said.

Following thorough modernisation, the shipyard at present can build 20 ships, eight large and 12 small, concurrently, the official said.

A listed company, GRSE, has posted a record quarterly total income of Rs 621 crore in the April-June period of 2022-23, a growth of 81 per cent over the corresponding months in the last financial year, he said.

Profit after tax stood at Rs 50 crore in the quarter ended June 30, 2022, as against Rs 21 crore in the year-ago period, and registered a growth of 138 per cent, he added.

[https://www.business-standard.com/article/current-affairs/defence-psu-grse-making-7-vessels-for-foreign-countries-official-122082100329\\_1.html](https://www.business-standard.com/article/current-affairs/defence-psu-grse-making-7-vessels-for-foreign-countries-official-122082100329_1.html)



*Mon, 22 Aug 2022*

## **‘We’re Geared Up’: Centrepiece of Navy Vikrant is Prepared for Commissioning**

Nearly every guy on board India’s newest aircraft carrier, Vikrant, expresses the same sentiment: They are living the dream. This includes the captain, the fighter pilot, the doctor, the engineer, and even the cook.

Naval fighter pilot Lieutenant Commander Ajay Singh says the best day of his career will come when he lands and takes off from the thin runway on this floating airfield. This demanding job carries high risks and is therefore assigned to only the best pilots. He has his arms outstretched towards the expansive flight deck of the largest warship ever built in India.

When working from an aircraft carrier, there is no room for error. The pilot must do his duties within the confines of this seaside airfield, which is swaying up and down in the enormous surf. There could not have been a finer time to join the Navy, in my opinion; that adrenaline is unequalled,” says Singh, a MiG-29K fighter pilot.

To be sure, the Navy has put Vikrant through its paces during a variety of demanding sea trials for nearly a year in advance of its scheduled commissioning into service. Prime Minister NarendraModi is anticipated to dedicate the first aircraft carrier made in India to the nation on September 1 at Kochi.

However, crucial flight tests must still be completed, and Commodore VidhyadharHarke, the warship’s first hand-picked captain, will place the utmost importance on integrating the air wing of the carrier. He is fully aware of the immense responsibility he will bear in revealing the true potential of this 45,000-ton battleship, which will serve as the admirable focal point of the Indian Navy’s home-grown sea might.

Harke explains what is to come while standing in the warship’s flight control centre, which is surrounded by complicated machinery and displays and looks out over a lone MiG-29K produced in Russia that is parked on the flight deck with its wings folded. “My team and I must meet not only the expectations of the Navy but also those of the entire nation.

Additionally, everyone will be observing us as a carrier battle group as we develop (aircraft carriers always move with escort warships). Vikrant’s integration with the rest of the fleet will be just as important as the complicated flight testing, he believes.

The Vikrant, however, wasn’t built cheaply; it is reported to have cost 20,000 crores.

For a nation that must invest heavily in modern military technology to be combat-ready, but whose defence budget has not kept pace with the demands of its armed forces, which are burdened with legacy equipment, getting greater value for the money from the battleship will be important.

“I’m getting good sleep. I am completely confident in my men’s and my aircraft carrier’s skills. We are prepared and motivated, Harke continues.

A few decks below, Lieutenant Commander Y Harsha VR is in charge of the crucial ship control centre and overseeing sailors working in front of multi-function displays and controls that will enable them to monitor vital indicators of the aircraft carrier’s health while it is at sea. The compartment is filled with the scent of fresh paint, and the new flooring is still covered before the ceremony to officially commission the ship.

“A battleship needs to float and move in order to combat. This is the location where it takes place. We create this miniature town by activating the engines, producing water, distributing power, and stabilising the vessel. We’ve all been waiting for this moment, and it’s now here, says Harsha, who has been on board Vikrant for more than two years.

In the six hours that this correspondent was on board, the Indian Navy provided exclusive access for Hindustan Times to the aircraft carrier and organised a number of briefings on a variety of topics, including operations, the function of the commissioning crews, equipment, threat monitoring systems, communications, and logistics.

“A battleship needs to float and move in order to combat. This is the location where it takes place. We create this miniature town by activating the engines, producing water, distributing power, and stabilising the vessel. We’ve all been waiting for this moment, and it’s now here, says Harsha, who has been on board Vikrant for more than two years.

In the six hours that this correspondent was on board, the Indian Navy provided exclusive access for Hindustan Times to the aircraft carrier and organised a number of briefings on a variety of topics, including operations, the function of the commissioning crews, equipment, threat monitoring systems, communications, and logistics.

AnkitSaraswat, a 29-year-old logistics officer who works in one of the galleys on the fifth deck (Vikrant has 14), says his responsibility is to make sure the crew of 1,700 men is fed.

The males will have a wide variety of options, including croissants, quiche, pastries, and freshly made bread. Morale is boosted by food. Every day, the galleys will produce 5,000 meals. Before we set off, we shall stockpile 100 tonnes of rations. The 50 cooks on board are just as eager to embark on the adventure as the rest of us, Saraswat continues.

Even the chefs are aware of the exclusive status India now enjoys because to Vikrant. The only countries with the potential to construct aircraft carriers are the United States, the United Kingdom, Russia, France, and China. It bears the name of the Navy’s INS Vikrant, an aircraft carrier that served from 1961 to 1997.

The unit that will take action in the event of a fire or flooding on board is the warship's damage control headquarters, located on the fifth deck as well.

The damage control unit, according to the officer in command Lieutenant Commander AkhilSreerangan, 32, monitors 3,000 fire sensors and 750 flood sensors and is set up to take remote countermeasures. The equipment used in the damage control headquarters were produced locally; according to the Navy, Vikrant has a 76% indigenous content.

Vice Admiral MA Hampiholi, head of the Southern Naval Command, who was on board the warship for an inspection, said Vikrant marks a significant advancement for Aatmanirbharta (self-reliance) in defence and will significantly increase the nation's maritime power.

The mini-hospital is ready to deploy, according to medical officer Lieutenant Commander Harsha MR, who is looking forward to "the event of a lifetime." The 40 compartments that make up Vikrant's medical setup, which is staffed by five doctors and fifteen paramedics, include two operating rooms, a hospital with 16 beds, and even a room with a CT scan.

One of Vikrant's electrical officers, Lieutenant ShashankYadav, who is in charge of ensuring seamless internal and external communications, encapsulates the feelings of the younger crew members. Few sailors in the Navy are given this chance. I'm fortunate to be here for my first appointment, declares Yadav.

India now only possesses one aircraft carrier, the INS Vikramaditya, which it purchased used from Russia for \$2.33 billion. However, the Navy has argued that given its extensive area of interest, India needs three such floating airfields. Vikrant will be the fourth aircraft carrier that the Indian Navy has operated. The first, Vikrant (of British origin), served from 1961 to 1997; the second, INS Viraat, served from 1987 to 2016; and the third, INS Vikramaditya, served from 2013 onwards.

The ski-jump will be used by the fighters on board the aircraft carrier to take off, and arrestor wires—or, in Navy lingo, STOBAR (Short TakeoffBut Arrested Recovery)—will be used to retrieve them.

It will fly a 30 aircraft air wing that consists of MiG-29K fighter jets, Kamov-31 helicopters, MH-60R multi-role helicopters, and modern light helicopters. During tests, helicopters have undoubtedly landed on the flight deck 22 times.

The Navy is looking to purchase a new deck-based fighter, and Vikrant will likely fly it. The Navy has already tested the Boeing F/A-18E Super Hornet and the Dassault Aviation Rafale-M.

It serves as a continual reminder that conducting fighter operations from Vikrant is still a work in progress because there is only one MiG-29K on the flight deck, which is 2.5 times the size of a hockey field. It was taken on board the warship in the form of disassembled kits and put together there.

<https://defenceaviationpost.com/were-gearred-up-centrepiece-of-navy-vikrant-is-prepared-for-commissioning/>

## Arunachal 'Vibrant Village' project to counter China's infra development at LAC

**SOUMYADIP MULLICK**  
KOLKATA, 20 AUGUST

In the wake of China's development of infrastructure along the Line of Actual Control (LAC) in Arunachal Pradesh which includes the formation of villages and settling of tribal communities there, the chief of Indian Army's Eastern Command, Lt Gen Rana Pratap Kalita (*in photo*) today said that India's 'Vibrant Village' project would serve as a countermeasure by doing precisely the same on the Indian side of the border.

A report by the Pentagon, presented to the US Congress last year, claimed that China is building a string of civilian settlements near the LAC in Arunachal Pradesh. This move of China is being viewed as a strategy to legitimise its claims over the LAC. Defence experts have pointed out that in case any of these civilians in the villages on the Chinese side of the border cross to the Indi-



an side, and in turn face retaliation by the Indian Army, China could use that as an excuse to launch an attack on India.

The GOC-in-C of Eastern Command, Lt Gen RP Kalita, addressing a seminar today at Bharat Chambers in Kolkata on the topic 'Defending our Borders' said that the conflict between India and China mainly stems from the unclear demarcation of the McMahon Line. Commenting on the question by The Statesman on how the Eastern Command seeks to counter this infrastructure development by

China at the LAC, in Arunachal, he said, "We are aware of the fact that China has been constructing villages close to the borders and shifting population there. This is part of China's dual use of infrastructure which can be used both for civilian and military purposes. We are closely monitoring the developments taking place."

Lt-Gen. Kalita added, "As far as India is concerned, the Union finance minister Nirmala Sitharaman, in her budget speech this year, announced a project called Vibrant Villages. This project looks at developing villages near the Indo-China border in Arunachal, Sikkim and Eastern Ladakh. A lot of migration happens at the border areas and this project is aimed at reverse migration. For this, a source of livelihood will be created for the population in the border villages and they will be provided with requisite infrastructure."

Highlighting how this can

be achieved, he said, "Tourism has immense potential in creating livelihood in the border areas in the states- Arunachal Pradesh and Sikkim. Hence, using this strategy, India will be able to counter China's move of dual use of infrastructure in next couple of years."

Responding to how India's 'Act East' policy can become a success with the AFSPA still in place in several districts of the North Eastern states, he said "AFSPA was brought in to deal with the insurgency in North East states. However, it is not a constant thing. It's a dynamic process and keeps changing. Every year it is renewed based on the situation on the ground, dictated by violence parameters. Recently, the AFSPA has been removed from 21 districts of Assam and partially in Manipur and Nagaland. With the situation improving, we are more likely to see the withdrawal of the AFSPA."

## THE ASIAN AGE

Sun, 21 Aug 2022

### To Guard LAC, Army Deploys Tata QRFVS in North East

To deal with the Chinese threats across the Line of Actual Control, the Indian Army is learnt to have deployed indigenously-built Quick Reaction Fighting Vehicles (QRFV) in the Eastern Command close on the heels of the platform's induction in the Northern Command.

According to sources, the QRFVs, which are meant for rapid transportation of the infantry troops, have been deployed in the high-altitude terrain of Sikkim under the XXXIII Corps (Trishakti Corps) which is a strategic army formation facing China.

The move is bound to increase the mountain warfare prowess of the troops at various places like Thangu, Lagnak La, Dongkya La in the lap of the Himalayas, said a defence official on anonymity.

Built and delivered by Tata Advanced Systems Ltd, the QRFVs, which are 4×4 mine protected, were first inducted in the Ladakh region under the Northern Command of the army last month.

The armored personnel carrier has Stanag level IV blast protection, a 240 HP Engine fitted inside and can carry a payload of up to 2 tons. Its tyres are equipped with run-flat inserts with the system having a 360-degree rotating turret on the roof, 10 firing ports and a seating capacity of 14 soldiers.

<https://www.asianage.com/india/all-india/210822/to-guard-lac-army-deploys-tata-qrfvs-in-north-east.html>

## Business Standard

*Thu, 18 Aug 2022*

### **Lack of Consensus Delays Construction of Third Indigenous Aircraft Carrier**

*By Ajai Shukla*

Last week, an opinion column in this newspaper argued for the early construction of a second indigenous aircraft carrier (IAC-2) for the Indian Navy. The first indigenous carrier, IAC-1, which has been constructed by Cochin Shipyard Ltd, will soon be commissioned as INS Vikrant. Alongside INS Vikramaditya, which was bought from Russia in 2014, the Navy will then operate two 44,000-tonne carriers.

The proposed 65,000-tonne IAC-2, which would take at least another decade in construction, would be the fleet's third carrier. With one of those under repair or refit at any given time, the Navy would still have two carriers available and ready for operations.

The measure of an aircraft carrier's power is its air wing. A carrier roughly embarks one aircraft for each 1,000 tonnes of displacement. Both Vikramaditya and Vikrant displace 44,000 tonnes, allowing each to embark 25-30 fixed wing aircraft, along with 10 helicopters of various kinds. The planned third carrier – the 65,000-tonne IAC-2 – would pack significantly more air power. It would go into battle with 54 fighters (three squadrons of 18 fighters each), enough aircraft for fleet air defence, as well as strikes ashore. In addition, IAC-2 would embark about 10 helicopters, for anti-submarine warfare (ASW), airborne early warning (AEW) and casualty evacuation tasks. Its larger size would also allow it to embark tactical airborne early warning (AEW) aircraft, such as the Northrop Grumman E-2C Hawkeye – a priceless asset in the air



battle. IAC-2 would be imposing enough on the basis of its integral air power alone. But, in fact, IAC-2 would not fight alone. It would be the flagship of a carrier battle group (CBG) that would also include submarines, destroyers, frigates and corvettes, in addition to its own weaponry. These capital warships would give the CBG formidable anti-submarine, anti-surface and anti-aircraft firepower.

Yet, there are several reasons why the Ministry of Defence (MoD) has not ordered the building of IAC-2. First, there is no consensus within the military on the need for a third carrier. The proposal to build one has been publicly questioned by the former Chief of Defence Staff (CDS), General BipinRawat; and by successive Indian Air Force (IAF) chiefs. Given this opposition, the navy has a difficult task ahead to convince the other two services, as well as elements in the navy itself that India needs a third, large, expensive carrier.

### **If you can't lose it, you can't use it**

Second, the navy faces a major hurdle in obtaining the budget needed for what critics now bill as a “Rs 100,000 crore carrier”. In fact, that figure is overblown. The cost of IAC-1 has come to about Rs 20,000 crore; and the MoD Cost Committee has fixed the cost of IAC-2 at Rs 40,000 crore. That caters for IAC-2's larger size (65,000 tonnes, to INS Vikrant's 44,000 tonnes), for its more sophisticated and expensive weapons and sensors, and for inflation.

The purported Rs 100,000 crore figure also includes the cost of an entire air wing, including fighters, helicopters and combat support aircraft. The Navy will have already paid for two air wings – 45 MiG-29K/KUB fighters were bought a decade back, while another 57 “multi-role carrier-borne fighters (MRCBF) are currently being acquired. Since only two CBGs would be sailing at any given time (with the third carrier in the dockyard), the Navy needs only two air wings, not three.

India's tri-service planners believe that the MRCBF's being evaluated for carrier deck operations – Boeing's F/A-18E/F Super Hornet and Dassault's Rafale – have only a “limited affordability.” That leads to a “we cannot afford to lose it” mindset and, thence, to the conclusion: “we cannot afford to use it”. The Navy must acquire only platforms that it can afford to lose and, therefore, to use.

Third, the Navy has unwisely embraced the British and French notion that carriers must be a muscular 65,000 tonnes for the traditional carrier mission of obtaining sea control over a designated oceanic space. Instead of starting with size, naval planners must first identify the carrier's operational role. This flows out of the National Security Strategy (NSS), which is framed by the National Security Council. The NSS dictates the carrier's mission capabilities, from which emerge its size, design, weapons and sensors.

Instead of that derivative process, South Block planners have committed themselves to advice from a US-India “joint working group” (JWG) on carrier design. This is going ahead with a US Navy-style “power projection carrier,” with formidable air power, as well as surface and sub-surface strike capability within the CBG. There has been little examination of whether the Navy's requirements would be better met by a French-type “strike carrier”, which had an air wing built around the Etendard/Super Etendard surface strike aircraft, with a few F-8 Crusaders for fighter type roles that involved protecting the strike aircraft.

The French “shore strike” model is relevant for the Navy, since one of its vital objectives is to keep the service relevant by influencing the all-important land battle. The newest French carrier, *Charles de Gaulle*, services this objective by embarking the Rafale multi-role fighter, which has both air defence and shore-strike capability.

The Technology Perspective and Capability Roadmap of 2018 (TPCR-18), which projects future weapons profiles, is silent on the type of carrier the IAC-2 should be. All that the TPCR-18 says is: Aircraft Carrier, Quantity 01.

### **Ignoring an aircraft carrier pedigree**

Fourth, the Navy has failed to live up to its 60-year-old pedigree of operating aircraft carriers. Both IAC-1 and INS Vikramaditya should be carrying at least 44 aircraft, going by the benchmark of one aircraft for every 1,000 tonnes of carrier. However, both vessels are short of that benchmark because the Navy – ignoring its own design capability, have contracted with a Russian design bureau for designing the aviation complexes of both INS Vikramaditya and IAC-1. Fifth, Indian test pilots complain that the Navy has blindly accepted US statements that the E-2C Hawkeye cannot be launched from a ski-jump. They say the US firms have a vested interest in perpetuating that myth, in order to put a catapult as the launch system on IAC-2.

Perfect by the US Navy since World War II, a conventional catapult has a steam-driven piston system along the flight deck, which “catapults” the aircraft to 200 kilometres per hour, fast enough to get airborne. The catapult that the Indian Navy is considering for IAC-2 uses a powerful electro-magnetic field to accelerate the fighter to take-off speed. Developed by General Atomics and called the “electro-magnetic aircraft launch system” (EMALS), this is on the latest US Navy carriers, starting from the USS Gerald R Ford.

Both current Indian carriers operate as STOBAR (short take-off but arrested recovery) vessels, but it remains to be decided whether IAC-2 would be a STOBAR carrier, or a CATOBAR (catapult assisted take-off, but arrested recovery) vessel. The possibility of putting an EMALS-assisted CATOBAR system on IAC-2 is being discussed in the JWG.

Finally, IAC-2’s size and specifications would depend upon whether the Indian Navy has an operational role for twin-seat Super Hornets, which would make it worth putting in the additional crew requirements that would be needed.

It is noteworthy that the Defence R&D Organisation is developing the indigenous twin-engine deck-based fighter (TEDBF) as a single-seat fighter. The future lies in “manned-unmanned teaming” or (MUM-T), which is the joint operation of manned and “unmanned airborne assets” (UAS) towards a shared mission objective.

MUM-T UAS is increasingly regarded as one of the key innovations that will define future airpower. The system will incorporate smart, connected and modular UAS, connected by a distributed network of intelligence that will act as force multipliers for the manned aircraft. Overall, it is expected to enhance the team’s capabilities, while keeping the pilot out of harm’s way, but still in control.

[https://www.business-standard.com/article/economy-policy/lack-of-consensus-delays-construction-of-third-indigenous-aircraft-carrier-122081801079\\_1.html](https://www.business-standard.com/article/economy-policy/lack-of-consensus-delays-construction-of-third-indigenous-aircraft-carrier-122081801079_1.html)

# Business Standard

*Thu, 18 Aug 2022*

## **HAL to Open Office in Kuala Lumpur to Support Malaysian Defence Forces**

Hindustan Aeronautics Limited has signed an MoU for establishing an office in Kuala Lumpur (Malaysia). The office in Malaysia will help HAL in tapping the new business opportunities for Fighter Lead-in Trainer (FLIT) LCA and other requirements of Royal Malaysian Air Force (RMAF) like Su-30 MKM and Hawk upgrades, the Bengaluru-headquartered company said in a statement on Thursday.

"It will reinforce commitment of India in supporting the Malaysian Defence Forces and industry for sustainable aerospace and defence landscape in Malaysia", it said.

HAL had submitted a proposal to the Ministry of Defence (MINDEF), Malaysia, during October 2021 for supply of 18 FLIT LCAs against a global tender issued by RMAF.

"The final winner of the tender is expected to be declared soon by Malaysian authorities. LCA Tejas stands a fair chance of selection in the bid as it meets all the parameters sought by RMAF," according to HAL.

Further, being one of the largest producers of Russian origin Su-30 aircraft, HAL said it has capabilities to extend the required support to RMAF for Su-30 MKM fleet which is facing low serviceability issues due to ongoing Russia-Ukraine crisis.

HAL can support RMAF for upgrading their Hawk fleet as well. Other HAL platforms like HTT-40, Do-228, Advanced Light Helicopter (ALH), and Light Combat Helicopter (LCH) have the potential to be inducted by RMAF in future, the statement said "Considering the above factors, HAL's office in Kuala Lumpur will take up market promotion of HAL's range of products and services not only in Malaysia but in the entire South East Asia," HAL said. The office will also contribute in increasing serviceability of existing platforms being operated by RMAF and for neighbouring Air Forces in the region, it was stated.

The MoU was signed by GM, LCA, HAL, Ravi K and Major (R) MohdHusairi Bin Mat Zain of Forte Drus, the official representative of HAL in Malaysia.

Defence Secretary Ajay Kumar, High Commissioner of India in Malaysia, B N Reddy and Additional Secretary (Defence Production) Sanjay Jaju, were among those present on the occasion.

[https://www.business-standard.com/article/companies/hal-to-open-office-in-kuala-lumpur-to-support-malaysian-defence-forces-122081800272\\_1.html](https://www.business-standard.com/article/companies/hal-to-open-office-in-kuala-lumpur-to-support-malaysian-defence-forces-122081800272_1.html)

*Thu, 18 Aug 2022*

## **India, Thailand Reviewed Defence, Trade Ties as Jaishankar Visits Bangkok**

During Union Minister of External Affairs S Jaishankar's visit to Thailand, both countries evaluated the progress made in security, trade, defense, connectivity, tourism, and people-to-people ties, the MEA said on Thursday.

S Jaishankar and his Thai counterpart Don Pramudwinai held detailed talks covering a range of bilateral considerations.

The visit which ran from August 16 to 18 was to co-chair the ninth meeting of the India-Thailand Joint Commission.

Thailand is a key member of the 10-nation Association of Southeast Asian Nations (ASEAN) block which influences the whole Asian continent. India has accomplished a major expansion of ties with ASEAN in the last decade. The country is also a strategic partner of India in the region and the bilateral ties, especially on defense and security are on the upswing with Thailand.

"Both Ministers discussed wide-ranging issues of mutual interest and reviewed the progress made in various areas, including political, defense and security, economic & commercial, connectivity, cultural, tourism and people-to-people ties," the MEA said.

The JCM, co-chaired by Jaishankar and Pramudwinai took place on Wednesday in Bangkok.

"Both sides also exchanged views on regional and multilateral issues of mutual interest and reiterated their commitment to further strengthen the multi-dimensional partnership that exists between the two countries," the MEA said. The JCM was preceded by a meeting of senior officials on Tuesday, during which the two sides held depth conversations on various areas of bilateral cooperation as well as regional and multilateral issues. Jaishankar also met Thai Prime Minister Prayut Chan-o-Cha and communicated Prime Minister Narendra Modi's personal greetings and best wishes. The external affairs minister also congratulated the Thai Prime Minister on the 75th anniversary of the commencement of diplomatic relations between India and Thailand and updated him on progress in bilateral and multilateral cooperation.

"They also exchanged views on the key regional and global developments," the MEA said. It said the JCM would guide the further course of bilateral relations.

<https://www.livemint.com/news/india/india-thailand-reviewed-defence-trade-ties-as-jaishankar-visits-bangkok-11660816540798.html>

## **Customised Defence Deals Offered to Offset Sanctions Impact, Says Senior Russian Military Official**

Russian exporters of military products, today, are operating in a new reality and payments for defence deals in U.S. dollar and euro have been reduced to a minimum and they are adopting various measures to offset the impact of sanctions including switching to payments in national currencies, according to Dmitry Shugaev, Director of the Federal Service for Military-Technical Cooperation (FSMTC) of Russia.

“In connection with the current political events, certain logistical problems may arise, which entails changes in the timing of the supply of military products to foreign customers. However, the measures we are taking together with partners, including the Indian side, to find and implement alternative ways of supplying military products will neutralise the barriers erected by Western countries against Russia in the field of military-technical cooperation,” Mr.Shugaev said in response to a question from *The Hindu*.

Elaborating on the steps being taken to streamline payments, Mr.Shugaev said Russian “countermeasures” against sanctions consist of a tailored approach to each of their customers, offering attractive conditions when concluding contracts, adjusting the payment forms and “providing more flexible schemes, abandoning the dollar and switching to other currencies, including national ones.”

“Many of the anti-sanction measures developed by the FSMTC of Russia are welcomed by our partners, as they are mostly in line with their national strategic interests,” he asserted. We are establishing new production and logistical chains, while adapting the tools and capabilities to the changing conditions in order to minimise the negative effect of the “technological blockade” of Russia imposed by unfriendly countries, he added.

Indian Defence Ministry officials had stated that in addition to apprehensions about timely deliveries of spares and equipment due to the war in Ukraine, another issue that has arisen is payments for deals underway since Russia was shut out of the global SWIFT system for money transfers.

The Central banks of the two countries had extensively discussed this issue and small payments have been resumed, officials stated that modalities to undertake larger payments are still being worked out.

India and Russia have already agreed to conduct payments through the rupee-rouble arrangement. With several big-ticket deals including the S-400 under implementation, there are large volume of payments to be made.

### **Countries that sanctioned Russia**

Ukraine-related sanctions on Russia came first from the EU on 22 February. Since then, more countries have slapped sanctions on Russia. Companies have responded by halting operations in Russia in various ways in over 140 instances.

## Meeting timelines

With respect to meeting the timelines, Mr.Shugaev declared that Russia is ready to fulfill its contractual obligations and maintain the previous level, and in some areas even intensify military-technical cooperation with foreign partners. “Believe me, the issues arising in military-technical cooperation are not much different from the common problems in foreign economic activity. They are resolved during negotiations. There is generally no immediate urge to impose penalties on the other side, as relations with partners last long and have a good history. As a rule, we meet halfway,” he asserted.

On the ongoing India-Russia defence cooperation, Mr.Shugaev said in addition to upgrades of military hardware in the inventory of the Indian armed forces, there are other areas of cooperation between our countries, such as creating conditions for servicing the delivered weapons and equipment in India, as well as jointly producing various types of equipment and weapons for sale in third countries.

Stressing they are aligned to the “**Make in India**” initiative, he said, “The emphasis is on setting up the production of weapons and military equipment of Russian design in India and conducting joint research and development.”

However, on joint projects, he added that it should be taken into account that agreement on the terms of cooperation, including in the field of joint R&D, and the “practical implementation of such cooperation require careful study and take quite a lot of time.”

<https://www.thehindu.com/news/national/dollar-payments-in-arms-deals-reduced-working-on-alternatives-senior-russian-official/article65783688.ece>

# ThePrint

*Thu, 18 Aug 2022*

## **Russia Wants to Build Next Generation Tanks, Submarines With India**

Underlining it is the only country in the world which can actually do a complete Transfer of Technology (TOT) in hi-tech defence equipment, Russia has said it wants to build the next generation armoured vehicles and submarines in joint collaboration with India.

Russia also said despite the ongoing war with Ukraine that has prompted international sanctions, it has stood by its contractual obligations and delivery of all systems, including the S-400 air defence system, as per schedule.

The delivery of the second regiment of the S-400 system is already underway.

Russia’s Federal Service for Military Technical Cooperation (FSMTC) head Dmitry Shugaev said: “Work is underway to organise the production of the AK-203 assault rifles in India, the serial production of which is expected to begin in late 2022-early 2023. The implementation of contracts for the construction of Project 11356 frigates in Russia and India is also proceeding as

planned. The current geopolitical situation has not significantly affected the fulfillment of our obligations.

He was speaking on the sidelines of the Army 2022, an international defence show that is being held by Russia in Moscow.

The head of FSMTC, which deals with all military related deals and commercial cooperation with other countries, said the Russian Federation traditionally offers India the cutting edge models of weapons and military equipment.

“Russia is the only country that engages in large-scale cooperation with India in the field of sophisticated military technologies including transfer of knowhow to Indian partners.

“During more than 60 years of military-technical cooperation, our countries have, in fact, implemented the principle of Make in India,” he said.

Shugaev said in all those years — with the help of the USSR, and subsequently Russia — hundreds of enterprises and facilities for military production were created in India, “which currently form the basis of the Indian defense sector”.

“With our assistance, dozens of types of high-tech military products have been localised in India. The current stage of our relations in this area of cooperation is distinguished by India’s desire to accelerate the development of its national military-industrial complex, reduce the dependence on imports of military products and join the ranks of the world’s leading arms exporters.

“We support this desire and are ready for industrial cooperation, looking for joint projects that, on the one hand, would be beneficial for Russian and Indian enterprises, and, on the other, would ensure our relations reach a new level of technological partnership,” he said.

Shugaev added the Russian side was ready for cooperation and had already submitted proposals on the joint development and production of modern types of military equipment.

Asked what these were, he said, “A future main battle tank, infantry fighting vehicle, fifth-generation aircraft, diesel-electric submarines and other types of modern weapons.”

Taking a jab at western countries, he underlined, “Once again I want to emphasise that Russia is ready for the widest technological cooperation, unlike the Western so-called ‘partners’, who promise a lot, but in fact are not very eager to share advanced technologies with India.”

He said the military-technical cooperation between Russia and India has no analogues in the world.

Shiugaev noted that many countries today were planning to set up their own military production through the transfer of technology and the acquisition of competencies.

One of the leaders in this sphere is, of course, India, which implements the Make in India program, he said.

“We do understand these trends and are ready to flexibly respond to them. We have a number of similar projects with India — the BrahMos missile, the localisation of tank rounds, and

Kalashnikov assault rifles, and the construction of ‘11356 frigates’ at an Indian shipyard,” he said.

He said both India and Russia have the potential to build mutually-beneficial cooperation in the supply of weapons and military equipment.

All types of Russian-made military equipment are widely represented in the Indian armed forces — land, sea, aviation and air defense.

“All Russian-made military products supplied for export have an envisaged potential for upgrade, and the equipment delivered to India is no exception.

“In addition to upgrading, there are other areas of cooperation between our countries, such as creating conditions for servicing the delivered weapons and equipment in India, as well as jointly producing various types of equipment and weapons for sale in third countries,” Shiugaev said.

<https://theprint.in/defence/russia-wants-to-build-next-generation-tanks-submarines-with-india/1088438/>



*Thu, 18 Aug 2022*

## **China Tests Air Defence Missile System Near India Border**

China’s State media has broadcast what it said were tests of an updated short-range surface-to-air defence missile system, carried out by the Xinjiang military command in the “Karakoram plateau region” near the India border.

The footage of the tests, in a high altitude region above 4,500 m, was broadcast on August 15, and “appeared to be HQ-17A air defence missiles, part of an integrated system that can fit in a single vehicle,” the Hong Kong-based *South China Morning Post* reported.

The newspaper quoted an unnamed military observer as saying the “show of deterrence” was possibly aimed at India-U.S. high-altitude exercises to be held in October. The live-fire drill was broadcast on State channel China Central Television (CCTV) on the morning of August 15 as India marked the 75th anniversary of Independence.

The CCTV report said the “new type of surface-to-air missile” hit a low-flying target plane. Yue Gang, a retired People’s Liberation Army (PLA) Colonel, told the *Post* the drills “involved a new type of HQ-17A short-range air defence missile, part of a system commissioned by the Xinjiang command in May last year”. “Improvements have also been made to the performance of its search and radar tracking ability,” he said.

“Now the PLA is carrying out high-profile fire strike exercises on the plateau, with the aim of deterrence and countermeasures,” he added.

China’s State media have continued to highlight the PLA’s efforts to improve infrastructure along the western borders and particularly in forward areas close to the Line of Actual Control (LAC), even as the ongoing talks between India and China to resolve the stand-off along the LAC appear to have reached a deadlock.



The PLA has so far shown little inclination in restoring the status quo prior to its April 2020 transgressions, with talks yet to make headway in the remaining friction areas in Hot Springs, Demchok and Depsang.

<https://www.thehindu.com/news/international/china-tests-air-defence-missile-system-near-india-border/article65783976.ece>



*Sat, 20 Aug 2022*

## **India, China Should Not Pose Threat to Each Other: Beijing**

China on Friday soft-pedalled external affairs minister S Jaishankar's statement that Beijing's actions on the border have put ties in an "extremely difficult phase", saying the two countries, instead of posing a threat to each other, should provide each other "development opportunities".

On the dragging border conflict that has plunged bilateral ties to their worst in decades, the Chinese foreign ministry said the two sides have an "effective" dialogue mechanism to resolve it.

Recalling Chinese leader Deng Xiaoping's remarks that an Asian century will happen when India and China come together, Jaishankar on Thursday squarely blamed China for the ongoing Sino-India border tension along the Line of Actual Control (LAC) in eastern Ladakh.

"But the Asian century will be difficult to happen if India and China don't come together. And one of the big questions today is where India-China relations are going," Jaishankar said, addressing a gathering of diplomats, academics and students at the prestigious Chulalongkorn University in Bangkok on Thursday.

"Because at the moment, the relationship is going through an extremely difficult phase because of what the Chinese have done in the last two years in our border areas," the Indian minister said.

Jaishankar's speech was titled "India's Vision of the Indo-Pacific".

New Delhi has consistently dismissed Beijing's allegations of acting in a provocative manner since the standoff began in May 2020, and said that it was the People's Liberation Army (PLA), which trespassed across the LAC in eastern Ladakh and triggered the tension..

Reacting to Jaishankar's statement, Chinese foreign ministry spokesperson, Wang Wenbin said: "A true Asia-Pacific century or Asian century can come only when China, India can and other countries can achieve sound development. China and India or two ancient civilisations, two emerging economies and two big neighbours."

“We have far more common interests than differences”, he said that the two countries have the “wisdom and capability to reinforce each” rather than wear each other down.

“It is hoped that the Indian side can work with China in the same direction to follow through on the common understanding between our two leaders on being each other’s cooperative partners, not causing threats to each other and presenting each other with development opportunities,” Wang said at the regular ministry briefing on Friday.

That would help Sino-India ties to “...come back to the right track of sound and steady development at an early date and uphold common interests of China, India and the developing world,” Wang said.

On a separate, border-related question on disengagement of troops, Wang said: “To start I would like to stress that China-India maintain smooth communication over the border issues. The dialogue is effective.”

Wang was also asked to respond to Jaishankar’s comment on the Quad that the Indo-Pacific region will benefit from the Quad (India, US, Australia and Japan) and opposition to the four-nation bloc is possibly a “unilateralist opposition to collective and cooperative endeavours”.

“China’s position on Quad is consistent and clear. I would like to stress that in a world of peace, cooperation and openness it will get no support if one seeks to create small cliques because it is against the trend of the times,” Wang said

<https://www.hindustantimes.com/india-news/india-china-should-not-pose-threat-to-each-other-beijing-101660935046640.html>

## THE TIMES OF INDIA

*Fri, 19 Aug 2022*

### **51 Chinese Warplanes, 6 Warships Infringes on Taiwan's Air Defence Identification Zone**

Taiwan on Thursday reported that 51 Chinese warplanes and six warships breached its air defence identification zone (ADIZ) including 25 Chinese fighters bombers that flew east of self-governed island's median line. Taiwan's Ministry of National Defense (MND) at 7 pm (local time) announced that as of 5 pm, 51 People's Liberation Army Air Force (PLAAF) fighter jets and bombers and six People's Liberation Army Navy (PLAN) vessels had encroached on Taiwan's ADIZ. Of these aircraft, 25 had either crossed the median line or had been detected flying in the far southwestern corner of the ADIZ to the northeast of the Dongsha Islands, reported Taiwan News.

The 25 warplanes that had flown to the east of the median line were identified as 12 Sukhoi SU-30 fighter jets, six Shenyang J-16 fighter jets, four Chengdu J-10 fighter jets, two Xian H-6 bombers, and one Shaanxi Y-8 electronic warfare plane. The MND said that it responded by scrambling combat patrol aircraft, issuing radio warnings, and deploying air defence missile

systems to monitor the intrusions, reported Taiwan News. That same day, Taiwan's military displayed its Sky Bow III surface-to-air anti-aircraft defense system, 35 mm double-barrelled anti-aircraft guns, and its Tianbing (Skyguard) Air Defense System to the media.

Tensions were further inflamed on Sunday when another US congressional delegation travelled to Taiwan and amid this a social media post by the Chinese People's Liberation Army (PLA) showed footage of the Penghu islands suggesting that its jets were on Taiwan's doorstep.

Tung Pei-lun, the Taiwanese Air Force's vice chief of staff for operations, denied that the recent Chinese drills in the Taiwan Strait came near Penghu saying Beijing uses "cognitive warfare."

All this transpired over the visit of US politicians to the self-governing island days after US House Speaker Nancy Pelosi visited Taiwan which irked China. "China used the exaggerated tricks of cognitive warfare to show how close it was to Penghu, which is not true," Tung said while speaking to the media personnel on Tuesday, reported Russia's state-media RT. The PLA's Eastern Theater Command (ETC), the unit responsible for the region that includes the Taiwan Strait, has held navy and air force drills around Taiwan as a show of force following Nancy Pelosi's visit to Taipei earlier this month. Amid the heightened tensions in the Taiwan Strait, the United States is planning to take steps in the coming weeks and months to counter China's military and economic activity around Taiwan.

Pelosi's trip to Taiwan this month triggered a new round of tensions in the region. Ever since the visit of the US delegation, Beijing launched large-scale military exercises in the vicinity of the island, which included live-fire drills and military aircraft overflights close to Taiwan's airspace.

Addressing a press briefing on Wednesday, State Department spokesperson Ned Price said the US will continue to take steps that are resolute but also calm to uphold peace and stability in the face of Beijing's ongoing efforts to undermine the status quo.

"These steps across a range of areas will unfold over the coming weeks and months because we recognize that this challenge is a long-term," Price said during a press briefing. Last week, a new delegation of US lawmakers visited Taiwan, less than two weeks after Pelosi's visit to the self-ruled island angered China and set off large-scale military drills in the Taiwan Strait. In response to this visit, China's military conducted combat alert patrols and military drills in the waters and airspace around Taiwan. On Tuesday, China staged military exercises in five areas of the South China Sea off the coast of the southeastern Guangdong province. Several zones of the Yellow Sea are also involved in the ongoing drills on August 17-19.

<https://timesofindia.indiatimes.com/world/rest-of-world/51-chinese-warplanes-6-warships-infringes-on-taiwans-air-defence-identification-zone/articleshow/93654581.cms>

## Exclusive Satellite Pics: China's New 'Mission Indian Ocean' Targets India



Chinese naval base in Djibouti, fully operational. With inputs Damien Symon. High-res [here](#)

Satellite images sourced by NDTV indicate that China's naval base in Djibouti, on the Horn of Africa, is now fully operational and supports Chinese warships deployed in the Indian Ocean region.

China's base in Djibouti is its first overseas military base, built at a cost of \$590 million and has been under construction since 2016. It is located by the strategic Bab-El-Mandeb Strait which separates the Gulf of Aden and the Red Sea and guards the approach to the Suez Canal, one of the most critical channels of international commerce.

China's Djibouti base "is built in a fortified way, with layers of defences which appear almost medieval, like a modern day colonial fort. It is clearly designed to withstand direct assault," says Naval Analyst HI Sutton of Covert Shores.

Significantly, the images from imagery provider Maxar show a Chinese Yuzhao-class landing ship (Type 071) docked along a 320-metre-long berthing area located near an apron that supports helicopter operations.

"The base appears fully operational though there is more construction work likely to take place," says Vice Admiral Shekhar Sinha (retired). "They can positively dock ships on both sides of the breakwater. Though the width of the jetty is narrow, it is large enough to take on a Chinese helicopter carrier."

The ship, identified as the Changbai Shan, is a large 25,000-tonne vessel designed to embark up to 800 soldiers and a combination of vehicles, air-cushioned landing craft and helicopters. It is thought to have been accompanied by a frontline Chinese destroyer when it entered the waters of the Indian Ocean this year.

"The Type-071 landing ship is very large and can carry many tanks, trucks and even hovercraft," says HI Sutton. "A fleet of these form the backbone of China's amphibious assault forces, although even more impressive ships are now joining the fleet. Its size and capability means that it is also used for logistics missions, transporting vital supplies."

Yuzhao-class ships are designed to operate as flagships of a Chinese task force engaged in a range of operations from amphibious assaults to humanitarian support. The Chinese Navy has inducted five ships of this class with three more in various phases of fitting-out before they are commissioned.

Images of the fully operational base in Djibouti come at a time when China has docked the 25,000-tonne satellite and ballistic missile tracking ship Yuan Wang 5 in the Sri Lankan port of Hambantota. Sri Lanka belatedly allowed China to dock the ship for replenishment after initially asking Beijing to defer its arrival after concerns voiced by New Delhi.

"With a robust tracking, sensing and communication relay system the Yuan Wang 5 is certainly capable of detecting foreign satellites, aerial assets and missile systems. This allows the vessel to support Chinese military missions far from home," says Damien Symon, a senior researcher with The Intel Lab who has been tracking the movement of the ship as it entered the Indian Ocean.

"The presence of the vessel in the Indian Ocean region allows it to monitor space events located away from the Chinese mainland while possibly providing an extended real time communication network to its overseas bases and ground assets, such as deployments in Djibouti, peacekeeping forces in Africa and anti-piracy maritime missions."

For India, there is a possibility of China being able to directly track key satellite assets. "With the current India-China border crisis seeing no immediate resolution, the deployment of the vessel could possibly allow for monitoring of Indian reconnaissance assets that were reportedly tasked for surveillance missions around border surveillance, terrorist infiltration detection and anti-terrorist operations."

China's presence in both Sri Lanka and Djibouti are closely linked to its economic investments in both countries under its long-term 'Belt and Road Initiative'. Beijing holds the majority of Djibouti's debt which is reportedly more than 70 per cent of the gross domestic product, or GDP, of the African nation. And has effectively taken possession of the Hambantota port through the

creation of a joint entity with Sri Lanka for a lease of 99 years. This is after Colombo was unable to repay \$100 million annually for the \$1.7 billion loan that it had taken for the construction of the port, the first phase of which was completed in 2010.

Former Indian Navy Chief Admiral ArunPrakash says New Delhi should be under no illusion about China's maritime intentions or capabilities. "It's now been 14 years since they established a standing patrol off the Horn of Africa. Initially there was a lot of scepticism of their ability to maintain a distant presence. But they have shown that they can do this. They have kept ships on station for six to nine months."

China's presence in Djibouti is part of a detailed plan to establish its presence in the Indian Ocean, directed not just at the US Navy which has major bases in the Persian Gulf but also at the Indian Navy, the next largest in the region. The port of Gwadar in Pakistan will also be key to any further expansion in the region.

"What we see happening today is a manifestation of a well-planned, deliberate strategy of spreading their maritime influence," says Admiral Prakash.

This strategy has already seen China operate nuclear-powered attack submarines in the Indian Ocean and may see carrier battle groups operate in these waters as well, a reality that top US Navy commanders have sounded an alert on.

When asked about this in 2017, Admiral Harry Harris Jr., then the Commander of the United States Pacific Command, told NDTV, "There's nothing to prevent them from sailing in the Indian Ocean today."

[https://webcache.googleusercontent.com/search?q=cache:Dtc\\_vializoJ:https://www.ndtv.com/world-news/chinas-indian-ocean-base-in-djibouti-fully-operational-warship-docked-in-satellite-pics-3264696&cd=1&hl=en&ct=clnk&gl=in](https://webcache.googleusercontent.com/search?q=cache:Dtc_vializoJ:https://www.ndtv.com/world-news/chinas-indian-ocean-base-in-djibouti-fully-operational-warship-docked-in-satellite-pics-3264696&cd=1&hl=en&ct=clnk&gl=in)

## ARMY TECHNOLOGY

*Thu, 18 Aug 2022*

### **Loitering Munitions Evoke New Era for Missile Defence**

Supplying the Ukrainian war effort has brought with it lessons in future military readiness. Loitering munitions' further success in Ukraine has put them in the favour of US and UK armed services, while the proliferation of this and other kinds of novel aerial weaponry have motivated the UK Ministry of Defence (MoD) to revolutionise its air defence systems.

#### **Air defence system ambitions**

Providing Starstreak anti-aircraft missiles has highlighted the need for UK air defence systems that are cheaper and faster to produce. As early as 21 February this year the UK government

made the announcement that it would provide Ukraine with StarStreak high-velocity man-portable anti-air missiles to allow the Ukrainian force to better defend the skies.

“Starstreak missiles...are expensive, difficult to use, and require weeks of training to operate effectively,” said Madeline Wild, aerospace, defense& security analyst at GlobalData.

“This isn’t ideal in times of crisis, as we have seen in Ukraine, as the production of these weapons must be faster and cheaper so that reserves can be replenished quickly.”

On 5 August, UK MoD announced intentions to improve its Land Ground Based Air Defence (Land GBAD) programme. Set to be delivered in ten years, it offers the country a necessary capability boost.

**“Novel aerial weapons, and the proliferation of UAV technology... [are] creating the highest level of air and missile threats for three decades.”**

“Expected to be delivered by 2032, the Land GBAD programme will improve the UK’s defence against conventional UAVs, quadrocopters , and hypersonic missiles, for which there is a growing prevalence.”

According to GlobalData, the global military UAV market is currently valued at \$7.6bn in 2022. Estimates for its expansion project a compound annual growth rate (CAGR) of 4.47% to reach \$11.7bn by 2032.

Wild continued: “The development of novel aerial weapons, and the proliferation of UAV technology, have been cited by the British Army in 2021 as creating the highest level of air and missile threats for three decades.

“Unlike Starstreak SHORAD and Sky Sabre M-RAD systems, this programme will encompass all aspects of air defence. These platforms will be integrated under the Land GBAD programme.

“In the meantime, other platforms will be delivered to fill the gap until the Land GBAD is delivered...” said Wild, citing the Sky Sabre M-RAD and a new SHORAD system as examples.

### **Loitering munitions attract attention**

The conflict in Ukraine has seen significant use of loitering munitions against armoured vehicles and personnel. Their autonomous capabilities and ease of use means that they can be used at a tactical level, and eliminate the need to rely on the resource heavy infrastructure needed for Uncrewed Combat Aerial Vehicles (UCAVs).

GlobalData’s report, ‘Thematic Research: Loitering Munitions’, notes that loitering munitions are capable of staying in the air while they search for a target, with some capable of returning to base in the case of an unsuccessful target identification.

Apart from holding several domestically developed models, Ukraine has received loitering munitions from the US, including the ‘Phoenix Ghost’, designed in part to meet key Ukrainian needs.

The US Marine Corps are seeking increased access to loitering munitions, after officially adopted the capability in 2021, while the US army have experimented with the Spike Firefly, a system. Elsewhere, the French Army is planning to purchase AeroVironment Switchblades to supplement its forces.

Although loitering munitions found notoriety during the Nagorno-Karabakh War, western militaries had ‘dabbled’ in funding the new systems much earlier, said William Davies, associate analyst at GlobalData. “In 2010, the Royal Navy sought to procure loitering munitions for their Type 45 destroyers but cancelled the programme in 2017 after having spent £207m on the project.

“There could be some element of concern that loitering munitions may be viewed as a magic bullet by defence planners, potentially drawing funds away from other programmes.”

“AeroVironment Switchblades have also been part of the loitering munitions provided by the US to Ukraine. These inexpensive systems have equipped Ukraine’s forces with surveillance and offensive capabilities to strike against Russian armour and personnel.

“The proliferation of these systems will continue to grow, with the likelihood of smaller militaries fielding variants in the future. But it is too soon to say if their use will be fully adopted by larger militaries who may still see them as a novel solution to a problem, they themselves are not suffering from.”

<https://www.army-technology.com/analysis/loitering-munitions-evoke-new-era-for-missile-defence/>



*Mon, 22 Aug 2022*

## **Russia Used Hypersonic Missiles in Ukraine 3 Times: Russian Defence Minister**

Russia has used its hypersonic Kinzhal missile system three times in Ukraine to hit highly important targets, Russian Defence Minister Sergei Shoigu said in an interview on Sunday.

"It was used by us three times during the special military operation (in Ukraine), and three times showed its brilliant characteristics," Shoigu told a reporter from the state broadcaster Rossiya 1.

Russia claims the missile system has a speed of Mach 10 with a range of 2,000 kilometres (about 1,250 miles) and can manoeuvre during flight to evade radar detection and air defence systems.

Kinzhal, Russian for "dagger", was revealed by President Vladimir Putin in 2018 alongside a host of weapons meant to put Russia in lockstep with its geopolitical rival, the United States.

<https://www.republicworld.com/world-news/russia-ukraine-crisis/russia-used-hypersonic-missiles-in-ukraine-3-times-russian-defence-minister-articleshow.html>



*Fri, 19 Aug 2022*

## **Russia Deploys Hypersonic Missiles to its Baltic Exclave**

The Russian military said Thursday that it has deployed warplanes armed with state-of-the-art hypersonic missiles to the country's Kaliningrad region, a move that comes amid soaring tensions with the West over Moscow's action in Ukraine. Russia's Defense Ministry said three MiG-31 fighters with Kinzhal hypersonic missiles arrived at the Chkalovsk airbase in the Baltic Sea enclave as part of “additional measures of strategic deterrence.” The ministry said the warplanes will be put on round-the-clock alert. A video released by the Defense Ministry showed the fighters arriving at the base but not carrying the missiles, which were apparently delivered separately.

The deployment of Kinzhal missiles to Kaliningrad as Russia's campaign in Ukraine nears the sixth-month mark appeared intended to showcase the Russian military's capability to threaten NATO assets. The region borders NATO members Poland and Lithuania.

Moscow has strongly criticised the deliveries of Western weapons to Ukraine, accusing the U.S. And its allies of fuelling the conflict. The Russian military says the Kinzhal has a range of up to 2,000 kilometers and flies at 10 times the speed of sound, making it hard to intercept.

Russia has used the weapon to strike several targets in Ukraine.

Kaliningrad's location has put it in the forefront of Moscow's efforts to counter what it described as NATO's hostile policies.

The Kremlin has methodically bolstered its military forces there, arming them with state-of-the-art weapons, including precision-guided Iskander missiles and an array of air defense systems.

<https://www.dailypioneer.com/2022/world/russia-deploys-hypersonic-missiles-to-its-baltic-exclave.html>

## **THE ASIAN AGE**

*Mon, 22 Aug 2022*

## **Japan Mulls Long-Range Missile Upgrades Due to China Threat: Report**

Japan is considering the deployment of more than 1,000 long-range cruise missiles to increase its ability to counter growing regional threats from China, local newspaper Yomiuri Shimbun reported on Sunday. The country plans to upgrade its existing surface-to-ship missiles to extend their range from 100 kilometres (62 miles) to about 1,000 kilometres (620 miles), which

would be enough to reach Chinese coastal areas as well as North Korea, the newspaper reported, citing unnamed sources. Upgrades would also need to be made to allow Japan's existing ships and aircraft to be able to fire the new missiles, which could hit land-based targets, the newspaper reported.

The missiles would be deployed in and around the southwestern Kyushu region and on the small islands that dot Japan's southwestern waters near Taiwan, Yomiuri reported. Japanese officials could not immediately be reached for comment on the issue. The plan is part of Japan's attempt to narrow the missile capacity gap with China, while also addressing threats from North Korea, the newspaper said. Japan's military is not officially recognised under the country's post-war constitution and defence spending is limited to funding nominally defensive capabilities. Recent geopolitical tensions, including Russia's invasion of Ukraine and China's increasingly aggressive stance over Taiwan, have prompted growing calls in Japan to review defence programmes.

Japanese Prime Minister Fumio Kishida has vowed to significantly boost defence spending, which has been kept close to around one percent of GDP. Local media also reported that Japan's defence ministry is likely to request 5.5 trillion yen (\$40.2 billion) for the next fiscal year, up slightly from the 5.18 trillion requested for the current fiscal year. But the ministry was also expected to ask approval for a list of unpriced items, including the development cost to upgrade the long-range cruise missiles, the Asahi Shimbun newspaper said.

<https://dailiasianage.com/news/292054/japan-mulls-long-range-missile-upgrades-due-to-china-threat-report>



*Sat, 20 Aug 2022*

## **U.S. Announces New Military Aid, Drones for Ukraine**

The U.S. for the first time Friday said it will give Ukraine Scan Eagle surveillance drones, mine-resistant vehicles, anti-armor rounds and howitzer weapons to help Ukrainian forces regain territory and mount a counteroffensive **against Russian invaders**.

A senior defence official told reporters that a new \$775 million aid package will include 15 Scan Eagles, 40 mine-resistant, ambush-protected vehicles known as MRAPs with mine-clearing rollers, and 2,000 anti-armor rounds that can help Ukraine troops move forward in the south and east, where Russian forces have placed mines. The official said the U.S. is looking to help shape and arm the Ukrainian force of the future as the war drags on.

“These capabilities are carefully calibrated to make the most difference on the battlefield and strengthen Ukraine’s position at the negotiating table,” Secretary of State Antony Blinken said in a statement.

Ukrainian President Volodymyr Zelenskyy tweeted his appreciation for the package Friday, saying “We have taken another important step to defeat the aggressor.”

This latest aid comes as Russia's war on Ukraine is about to reach the six-month mark. It brings the total U.S. military aid to Ukraine to about \$10.6 billion since the beginning of the Biden administration. It is the 19th time the Pentagon has provided equipment from Defence Department stocks to Ukraine since August 2021. The U.S. has provided howitzer ammunition in the past, but this is the first time it will send 16 of the weapon systems. The aid package also includes 1,500 anti-tank missiles, 1,000 javelin missiles and an undisclosed number of high-speed, anti-radiation or HARM missiles that target radar systems. The Ukrainian forces have been successfully using various precision artillery systems to try and hold off Russian forces and take back territory Moscow has gained.

The defence official briefed reporters on the new weapons aid on condition of anonymity under ground rules set by the Defence Department.

For much of the last four months of the war, Russia has concentrated on capturing the Donbas region of eastern Ukraine, where pro-Moscow separatists have controlled some territory as self-proclaimed republics for eight years.

Russian forces have made some incremental gains in the east, but they have also been put on the defensive in other regions, as Ukraine ratchets up its attacks in Ukraine's Black Sea peninsula of Crimea. The Russian-occupied territory was seized by Moscow in 2014. Nine Russian warplanes were reported destroyed last week at an airbase on Crimea in strikes that highlighted the Ukrainians' capacity to strike deep behind enemy lines.

Russian leaders have warned that striking facilities in Crimea marks an escalation in the conflict fueled by the U.S. and NATO allies and threatens to pull America deeper into the war.

One Western official said Friday that the war is at a "near operational standstill," with neither side able to launch major offensives. The official, who spoke on condition of anonymity to discuss military assessments, said the whole tempo of the campaign has slowed, partly because both sides recognise that "this is a marathon not a sprint and that expenditure rates and conserving their munitions is important."

But the U.S. and Western officials both said that Ukraine has been able to launch successful attacks deep behind Russian battle lines, which is eroding logistics support and command and control of Moscow's forces, and harming their morale.

The U.S. official said that while Ukrainian troops have not been able to retake a lot of territory, they have been able to significantly weaken Russian positions in a number of places.

Efforts to tamp down the fighting have also continued. On Thursday, Turkey's leader and the U.N. chief met in western Ukraine with Ukrainian President Volodymyr Zelenskyy. They discussed a range of issues including prisoner exchanges and an effort to get U.N. atomic energy experts to visit the Zaporizhzhia nuclear power plant in southern Ukraine.

The facility has been controlled by Russian forces since shortly after the invasion began on February 24 and has been the target of a number of explosions. Kyiv and Moscow accuse each other of shelling the plant, stoking international fears of a catastrophe on the continent.

Turkish President Recep Tayyip Erdogan said he would follow up with Russian President Vladimir Putin, given that most of the matters discussed would require the Kremlin's agreement.

<https://www.thehindu.com/news/international/russia-ukraine-crisis-us-announces-new-military-aid-drones-for-ukraine/article65790157.ece>



*Thu, 18 Aug 2022*

## **ISRO Gets Crew Module from HAL for First Development Launch of Gaganyaan**

The Indian Space Research Organisation (ISRO) has showcased two space equipment built by Hindustan Aeronautics Limited (HAL), to be used in the first unmanned development launch of India's manned space mission, Gaganyaan. Announced by the Indian central space agency earlier today, this is the second crew module fairing (CMF) that ISRO has taken delivery of for Gaganyaan.

The CMF is a protective structure that surrounds the actual housing for India's to-be space scientists, built to withstand extreme conditions of heat, pressure and atmospheric friction. The structure will be tasked with keeping astronauts safe during the egress, ingress and landing procedures of the Gaganyaan mission. Unnikrishnan Nair, director of ISRO's Vikram Sarabhai Space Center (VSSC), took delivery of the CMF structure, as well as a high-altitude escape motor Thrust-transfer Structure (HTS).

The latter will be tasked with firing an escape motor to keep humans aboard the mission safe, and work towards transferring the requisite engine power to a crew escape module — in case of failure of any equipment aboard ISRO's mission.

In June this year, ISRO's VSSC also took delivery of the first CMF structure, built by Bengaluru-based Alpha Design Technology Limited. While both the CMF modules are likely to be used in some form, ISRO confirmed that the CMF it received from HAL earlier today would be used in the first trial or development mission of Gaganyaan.

In May this year, ISRO achieved human spaceflight rating, or validated its solid stage rocket booster for the Gaganyaan mission.

The booster was a modified version of the solid rocket booster used in the agency's Geosynchronous Satellite Launch Vehicle (GSLV)-Mark III, and will be used to power the Gaganyaan mission's first stage.

On 30 June, speaking after the successful launch of ISRO's Polar Satellite Launch Vehicle (PSLV)'s C-53 mission, S Somanath, chairman of ISRO, said that the Gaganyaan mission will go through multiple tests and development flights, and the manned mission launch will not happen any time before 2024. Highlighting the risks associated with human spaceflight, Somanath said that the agency would "like to do it very carefully".

He added that concerns regarding the safety of astronauts aboard the Gaganyaan crew module can be alleviated by “ruggadising the object, testing it more number of times and introducing intelligence in the rocket so that it can identify problems, and let the aircraft know (how) pilots can escape.

<https://www.livemint.com/news/india/isro-gets-crew-module-from-hal-for-first-development-launch-of-gaganyaan-11660799875580.html>



*Sun, 21 Aug 2022*

## **India's First Truly Indigenously Developed Hydrogen Fuel Cell Bus Developed by KPIT-CSIR in Pune**



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 today launched India's first truly indigenously developed Hydrogen Fuel Cell Bus developed by KPIT-CSIR in Pune.

Dr Jitendra Singh told the gathering that Prime Minister Modi's Hydrogen Vision is important for India to ensure AtmaNirbhar means of affordable and accessible clean energy, meeting climate change goals, and creating new entrepreneurs and jobs. He said, Green hydrogen is an excellent clean energy vector that enables deep decarbonization of difficult-to-abate emissions

from the refining industry, fertiliser industry, steel industry, cement industry and also from the heavy commercial transportation sector.

Dr Jitendra Singh informed that the fuel cell utilizes Hydrogen and Air to generate electricity to power the bus and the only effluent from the bus is water, therefore making it possibly the most environmentally friendly mode of transportation. For comparison, a single diesel bus plying on long distance routes typically emits 100 tons of CO<sub>2</sub> annually and there are over a million such buses in India.

Dr Jitendra Singh said, the high efficiency of fuel cell vehicles and the high energy density of hydrogen ensures that the operational costs in rupees per kilometre for fuel cell trucks and buses are lower than diesel powered vehicles and this can bring freight revolution in India. Moreover, Fuel Cell vehicles also give zero green-house gas emissions. The Minister lauded the joint development efforts of KPIT and CSIR-NCL and pointed out that the technology prowess of Indian scientists and engineers is no less than the best in the world and also at much lower costs. Dr Jitendra Singh pointed out that about 12-14% CO<sub>2</sub> emissions and particulate emissions come from diesel powered heavy commercial vehicles and these are decentralised emissions and hence difficult to capture. The Minister said, Hydrogen fuelled vehicles provide an excellent means to eliminate the on-road emissions from this sector. He said, India is also aiming to increase inland waterways for freight and passenger transport. Dr Jitendra Singh concluded that by achieving these goals, India can pole-vault from being net importer of fossil energy to becoming net exporter of clean hydrogen energy and thus, providing global leadership to India in hydrogen space by becoming a large green hydrogen producer and supplier of equipment for green hydrogen.

Later, Dr Jitendra Singh inaugurated the Bisphenol-A pilot plant in CSIR-NCL and said these pilot plants have successfully demonstrated novel process technologies developed by NCL under CSIR's Covid-19 mission program and Bulk Chemicals mission program.

Dr Jitendra Singh said, Bisphenol-A (BPA) is an important feedstock for the production of epoxy resins, polycarbonate and other engineering plastics. He said, the global market for Bisphenol-A is projected to reach 7.1 Million Tons by 2027, growing at a CAGR of 2% over the analysis period 2020-2027. The entire estimated annual demand of 1, 35,000 tons in India is imported today. The Minister hoped that CSIR-NCL's technology will enable import substitution of this important raw material and help in India's Atmanirbhar initiative.

The uniqueness of the process developed by CSIR-NCL is a novel downstream process technology, which makes this indigenous technology competitive with global benchmarks. The process is ready for technology transfer and further co-development to commercial scale

<https://www.punekarnews.in/indias-first-truly-indigenously-developed-hydrogen-fuel-cell-bus-developed-by-kpit-csir-in-pune/>

Sat, 20 Aug 2022

## **ISRO Chairman Keen on Cooperation with Latin American and Caribbean Nations**

In an effort to deepen space cooperation with countries across the globe, the Indian Space Research Organisation (ISRO) has MOUs and mutual cooperation agreements with 61 countries so far and it is increasing. ISRO is keen to establish ground stations in the South American region for downloading remote sensing data for their utilisation and also for the use of India.

In an exclusive interaction with Financial Express Online, Somanath S, Secretary DOS / Chairman ISRO, said, “Connecting with countries of Latin America and Caribbean region is of importance to ISRO, considering the increased interest in space activities there, especially the formation of Latin American and Caribbean Space Agency (ALCE).” We would like to showcase the ISRO capabilities in remote sensing, data utilisation of governance and resources mapping, and connect with Indian industries in the space sector,” ISRO Chairman said. According to him, “Agreements for space cooperation are already in place with Argentina, Bolivia, Brazil, Chile, Colombia, Mexico and Peru. Further engagements with Panama and Dominican Republic are on the anvil. Indian satellite data has been used by Brazil for monitoring Amazon forests since 2009.” “At ISRO we have developed a mobile app for Mexico for monitoring forest fires. Officials from these countries have undergone training on small satellite building and training on space applications. We have launched satellites for Argentina, Brazil, Chile and Colombia in PSLV.” Responding to a question if ISRO is working on the JOVE project with Costa Rica, Ecuador, the chairman said “There are no engagements with these countries on this project.”

### **ISRO & Africa :**

In Africa, currently many of them are in the nascent stage, setting up their national space agencies, creating space policies and space activities under different scientific establishments. “It is important for us to engage with them at the agency level and government level for exploring opportunities in satellite application, building space infrastructure in their countries with the support of Indian industries,” he explained. “African Space agency steered by Egypt is an example. They are also in discussion with many other established space agencies to support them. India has signed space cooperation agreements with Algeria, Egypt, Mauritius, Morocco, Nigeria, Sao Tome and Principe, South Africa and Tunisia,” he said. ISRO is in discussion with Madagascar and Kenya for space co-operation. And have had engagements with these space agencies through imparting training in microsatellite building, remote sensing applications and the like.

<https://www.financialexpress.com/defence/financial-express-online-exclusive-isro-chairman-keen-on-cooperation-with-latin-american-and-caribbean-nations/2637665>

## **Indian Scientists Develop Smart Biopolymer Than Can Detect Food Freshness**

A team of Indian scientists has developed a smart biodegradable biopolymer nano-composite film which can detect relative humidity in the packaged foods to know the level of food freshness.

The research conducted by the scientists from the Institute of Advanced Study in Science and Technology (IASST), an autonomous institute of the Department of Science and Technology has been published in the International Journal of Biological Macromolecules.

A team of scientists from the Institute of Advanced Study in Science and Technology (IASST), an autonomous institute of the Department of Science and Technology has developed a smart biodegradable biopolymer nanocomposite which can detect relative humidity in the packaged foods. This can help monitor packed food freshness.

According to the team head Prof. DevasishChowdhury, Professor in the Physical Sciences Division, and his INSPIRE Senior Research Fellow (SRF) student SazzadurRahman, two biopolymers, Guar Gum (a variety of beans obtained from plant) and Alginate (obtained from brown algae), were blended with carbon dots (nanomaterial) to make a nanocomposite film that was successfully used to detect relative humidity.

“The fabricated nanocomposite film was an excellent smart sensor based on the fluorescence ‘on-off’ mechanisms against humidity,” the scientists said.

The nanocomposite film shows change in fluorescence in presence of high humidity. Hence, the fabricated nanocomposite film can monitor the packed food freshness using just a UV light source. “Smart and active packaging can help consumers select a fresh product without breaking the pack. Such innovative packaging boosts sales and reduces consumers' time to identify fresh food products,” said Prof. Chowdhury.

The innovation can be utilised in the food industry that has an increasing need for non-toxic, biodegradable, low-cost, and environmentally friendly material for use as packaging material to replace petroleum-based material like plastics.

Besides, it also needs smart and active packaging materials to detect and report food quality in a real-time fashion. Such smart and active packaging systems respond to signals while interacting with the food packaging environment.

<https://www.dailypioneer.com/2022/india/indian-scientists-develop-smart-biopolymer-than-can-detect-food-freshness.html>



