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A Daily service to keep DRDO Fraternity abreast with DRDO
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गुरुवार, 06 अक्टूबर 2022

DRDO ने बनाई हथियारों से लैस मानवरहित नाव, समुद्र में रिमोट कंट्रोल के जरिए होगी नियंत्रित

रक्षा अनुसंधान एवं विकास संगठन यानी DRDO ने बुधवार को DefExpo-2022 से पहले पुणे में दूर से नियंत्रित होने वाली मानवरहित, हथियारबंद 3 नावों का सफल परीक्षण किया। डीआरडीओ के अनुसंधान एवं विकास प्रतिष्ठान के ग्रुप डायरेक्टर पीएम नाइक ने बताया कि इस नाव पर कोई इंसान नहीं होगा, इसे नियंत्रित करने के लिए वीडियो फीड को ग्राउंड कंट्रोल स्टेशन पर ट्रांसफर किया जाएगा। इन नावों का उपयोग समुद्री सीमा की निगरानी के लिए होगा। दुश्मन की गतिविधियों का पता लगाने और पेट्रोलिंग के लिए यह नाव उपयोगी है। किसी भी आपात स्थिति में दुश्मन का मुकाबला करने के लिए नाव पर हथियार भी फिट किए गए हैं। पीके नाइक ने कहा कि वर्तमान में अपनी टीम का विश्वास स्तर बनाने के लिए हम भामा-आसखेड बांध में इस नाव का परीक्षण कर रहे हैं। डीआरडीओ द्वारा विकसित इस नाव का अभी नामकरण नहीं किया गया है। ट्रायल के दौरान हथियारों से लैस इस नाव को दूर से बैठकर रिमोट कंट्रोल के जरिए नियंत्रित किया गया। हालांकि, अभी यह नहीं बताया गया है कि इस नाव को इंडियन नेवी और कोस्ट गार्ड में कब तक शामिल किया जाएगा।

डीआरडीओ की यह मानवरहित नाव इलेक्ट्रिक और मोटर इंजन से चलती है और एक बार में 24 घंटा लगातार पानी में रहकर पेट्रोलिंग कर सकती है। डीआरडीओ ने दुश्मनों से इस नाव को बचाने के लिए विशेष तकनीक का इस्तेमाल किया है। अगर नाव दुश्मन के कब्जे में आ जाती है, तो इसके अंदर मौजूद कंट्रोल बोर्ड खुद ही डिस्टॉय हो जाएंगे। जिससे कोई गोपनीय सूचना या महत्वपूर्ण डेटा दुश्मन के हाथ न लगे। इस नाव के जरिए देश की समुद्री सीमा में घुसने की कोशिश करने वाले दुश्मन को कंट्रोल रूम में बैठकर एक बटन के जरिए खत्म किया जा सकेगा। इसमें लगे सोनार और रडार सिस्टम की मदद से सरफेस सर्विलांस के अलावा यह नाव एंटी सबमरीन वॉरफेर और माइंस काउंटर मेसर में भी काम कर सकती है। यह पूरी तरह से भारत में निर्मित है, जिसे सागर डिफेंस इंजीनियरिंग नाम की कंपनी ने DRDO के साथ मिलकर विकसित किया है।

सर्विलांस कैमरों और हथियारों से लैस इस मानवरहित नाव को एक बार समुद्र में छोड़े जाने के बाद रिमोट, कंप्यूटर और सैटेलाइट के जरिए इसे दूर से बैठकर नियंत्रित किया जाएगा। पानी पर तैरती इस नाव के चारों ओर 1 किलोमीटर की परिधि का 360 डिग्री दृश्य कंट्रोल रूम में बैठकर लाइव देखा जा सकेगा। ऐसे में अगर कोई संदिग्ध नाव या हमलावर दिखता है तो कंट्रोल रूम में बैठे-बैठे ही नाव पर लगे हथियारों के

जरिए उन पर फायरिंग की जा सकेगी. मानवरहित एरियल व्हीकल और ड्रोन के बाद यह डीआरडीओ का एक बहुत महत्वपूर्ण प्रोजेक्ट है, जिसके जरिए भारत की समुद्री सीमा की निगरानी कई गुना सुदृढ़ होगी. भारत की समुद्री सीमाएं हमेशा से देश की सुरक्षा के लिहाज से बहुत महत्वपूर्ण रही हैं. तकनीक आधारित यह नाव भारतीय नौसेना और तटरक्षक बलों को इस चुनौती से निपटने में मदद करेगी.

<https://hindi.news18.com/news/maharashtra/drdo-built-an-unmanned-boat-equipped-with-weapons-will-be-controlled-through-remote-control-dpk-4699583.html>



गुरुवार, 06 अक्टूबर 2022

पास गए बिना भारतीय नौसेना के जवान कर पाएंगे दुश्मन का सफाया, DRDO ने बनाया हथियारों से लैस खास बोट

भारतीय नौसेना के जवान आने वाले दिनों में दुश्मन के पास गए बिना उनका सफाया कर सकते हैं। इसके लिए DRDO (Defence Research and Development Organisation) ने खास बोट तैयार किया है। इसे हथियारों से लैस किया गया है। इस बोट को रिमोट की मदद से दूर से ही ऑपरेट किया जा सकता है।

महाराष्ट्र के पुणे में DRDO ने रिमोट से कंट्रोल होने वाले तीन हथियारबंद बोट को टेस्ट किया। इस बोट पर किसी इंसान को तैनात करने की जरूरत नहीं होती। इसे युद्धपोत या पेट्रोलिंग करने वाले जहाज पर रखा जा सकता है और जरूरत पड़ने पर समुद्र में उतारकर इस्तेमाल किया जा सकता है।

टोही अभियान और गश्त के लिए होगा इस्तेमाल

डीआरडीओ के अनुसंधान एवं विकास प्रतिष्ठान के समूह निदेशक पीएम नाइक ने बताया कि बोट में लगा कैमरा ग्राउंड कंट्रोल स्टेशन तक रियल टाइम वीडियो फीड भेजता है। यह नाव टोही अभियान और गश्त के लिए उपयोगी है। नाव पर हथियार लगाया गया है। जरूरत पड़ने पर इसकी मदद से दुश्मन पर हमला किया जा सकता है। हम वर्तमान में भामा आस्केड बांध में इसका टेस्ट कर रहे हैं।

4 घंटे तक काम करता है बोट

गौरतलब है कि DRDO ने इन नावों को प्राइवेट डिफेंस मैनुफैक्चरिंग स्टार्ट-अप सागर डिफेंस इंजीनियरिंग के सहयोग से विकसित किया है। इस नाव के इस्तेमाल से नौ सैनिकों को जान जोखिम में नहीं डालना पड़ेगा। बोट करीब 4 घंटे तक काम कर सकता है। वर्तमान में बोट की अधिकतम रफ्तार 18.52 किलोमीटर प्रतिघंटा है। इसे बढ़ाकर 46 किलोमीटर प्रतिघंटा किया जाएगा। इन नावों के कुछ वैरिएंट में लिथियम बैटरी के साथ इलेक्ट्रिक प्रोपल्शन सिस्टम का इस्तेमाल किया गया है, जबकि कुछ में पेट्रोल से चलने वाला ऑन बोर्ड इंजन है।

<https://hindi.asianetnews.com/national-news/drdo-tests-3-unmanned-remotely-controlled-weaponised-boats-in-pune-vva-rjb948>

Thu, 06 Oct 2022

Ahead of DefExpo-2022, DRDO Tests 3 Unmanned Remote-Controlled Weaponised Boats in Pune

Ahead of Defense Expo 2022, DRDO officials in Maharashtra tested three remotely unmanned, weaponised boats in Pune. On Thursday, the three remote-controlled armed boats were tested with no man on the vessel. Notably, these boats were developed by DRDO in collaboration with the private start-up Sagar Defense Engineering, a defence production start-up. PM Naik further informed that the boats are useful for surveillance purposes, patrols, and reconnaissance of overall maritime security. Notably, the boats have an endurance of about four hours. Currently, the boat can sail at a maximum speed of 10 nautical miles/hour, but this can be further increased to 25 nautical miles. Some variants of these boats use an electric propulsion system with lithium batteries, while others have a petrol engine on board.

<https://www.republicworld.com/india-news/general-news/ahead-of-defexpo-2022-drdo-tests-3-unmanned-remote-controlled-weaponised-boats-in-pune-articleshow.html>



Wed, 05 Oct 2022

India's New Astra Missile – All You Want to Know

The Indian Air Force (IAF) has test launched indigenous beyond-visual-range-air-to-air missile (BVRAAM) Astra Mk-II from a Su-30MKI fighter aircraft. Ahead of the Indian Air Force Day (October 8) celebrations a promo video shared with the media during the annual presser in New Delhi as shots of an Astra Mk-II (BVRAAM) being launched. This is the first time the video of the launch has been released. The Astra-MkII has a longer range than its predecessor Astra Mk-1, and will contribute significantly to the IAF's air dominance.

More about Astra-Mk II

The Astra-II missile is said to have a range of 160 km. Not much is known about the technical characteristics of the missile. But Astra IR (80 km range) Astra-I and Astra-II, and the future Astra-III missile have a common ejector launcher 'Astra launcher', which was also tested along with Astra-II missile as per the images released by the IAF.

History

The early 1990s marked the beginning of Astra rocket development. The French rocket Matra Super 530D was then used as a starting point. In 2004, the Indian Ministry of Defence started funding the development. Astra is 3.8 metres long and 175 millimetres wide (254 mm including wings). The entire mass of the rocket surpasses 150 kilogrammes. According to the Astra mk1s

technical description, it can attack targets flying at speeds of up to Mach 1.4 at a distance of 110 kilometres. After launch, the Astra employs 'Inertial Mid-Course Guidance' through a secure data connection from its mother aircraft, followed by 'Active Radar Homing' from its seeker's head for terminal guidance. DRDO had decided to equip the Astra missile's terminal guidance with the Russian 'Agat 9B1103M' active radar seeker during the development phase. The Russian active radar seeker was used throughout the whole of Astra's D&D, including firing testing, up to 2017. DRDO has developed a fully-functional Ku-band active radar seeker for India. This indigenous, form-fitting seeker has been placed on all Astra missiles. Thus, India now has its first BVR AAM with an indigenous active radar seeker built indigenously.

The Astra-1 is meant to carry a 15-kilogramme pre-fragmented high explosive warhead that is ignited by a radio proximity fuse. The missile's Electronic Counter-Countermeasure (ECCM) capabilities allow for unrestricted operation in an Electronic Counter-Countermeasure (ECM) environment. The Astra Mark 1, which also finished testing, has a maximum head-on launch range of 100 kilometres, a speed of 4.5 Mach, and launch clearance up to 20 kilometres in height (66,000 ft). The Astra may either be launched by the mother ship or in buddy mode. Extensive and rigorous trials have validated the Astra missile's warhead capability, maximum launch ranges against head-on and manoeuvring targets, long-range target engagement capability, clear missile separation at supersonic speeds, and launch under high 'G' forces, and multiple missile launches against multiple targets. The IAF has already placed an order for Astra Mk1 missiles. In June, a statement from the MoD stated that Astra Mk1 was conceived and built based on the personnel needs provided by the IAF, catering for beyond visual range as well as close combat engagement, decreasing the reliance on foreign suppliers. And the domestic production of missiles of this kind was not possible, the statement said.

The Astra Mk1 deal of Rs 2,971 crore will be completed in six years. The DRDO has finalised the transfer of missile technology and accompanying equipment to Bharat Dynamics Limited (BDL), and manufacturing has already begun, according to a statement. The Su-30MKI fighter is already equipped with the Astra air-to-air missile and the IAF currently possesses around 270 Su-30MKI aircraft. Astra missiles are also being integrated into the indigenous Light Combat Aircraft (LCA) 'Tejas'.

During the testing, Financial Express Online has reported the Astra-1 missiles were fired over the entire flight envelope of the Su-30MKI, engaging, destroying, and satisfying all mission objectives for all assigned manoeuvring and non-manoevring aerial targets. Also, according to officials, two IAF Su-30 MKI aircraft have been based in Nashik for dedicated testing of Astra missiles. The physical differences between Astra I and II are not much. Astra II missile is known to have a dual pulse solid rocket motor giving it a longer range. It is expected to have an AESA radar seeker. The design, too, appears to be similar, judging by the photographs. The proximity fuze is expected to be a laser proximity fuze. Astra missiles have a smokeless propulsion system.

<https://www.financialexpress.com/defence/indias-new-astra-missile-all-you-want-to-know/2701350/>

The Tribune

Thu, 06 Oct 2022

DRDO to Develop Training Aids for Dogs of Security Forces

In the first project of its kind in the country, the Defence Research and Development Organisation (DRDO) has taken up the task to develop training aids for dogs used by the security forces. According to sources, DRDO will develop 'Target Odour Scent Pads' for the Indo-Tibetan Border Police Force's National Training Centre for Dogs located at Bhanu near Chandigarh. The centre trains dogs for several paramilitary and police forces. The scent pads are meant to condition dogs to a particular target smell during their training. At present, live materials such as explosives and narcotics are used, which raise security, storage and transport issues. Imported scent pads are available in the international market, but these are expensive. According to available information, one scent kit for narcotics explosives or other contraband costs between Rs 30,000 to Rs 40,000. One kit can be only used for a limited number of times making the use of imported kits economically unviable.

According to the sources, dogs could be conditioned much better to detect particular smells with the use of scent pads as these release pure target odour without the smell of various other items being mixed up as in the case of using live materials. A meeting was held in this regard between Dr Sangita Rao Achary Addanki, Director of DRDO's Directorate of Low Intensity Conflict, and Dr Sudhakar Natarajan, Deputy Inspector General, heading ITBP's veterinary department this week. Biochemistry and material physics experts at DRDO Headquarters in New Delhi and Defence Research and Development Establishment, Gwalior, which is engaged in the research and development of detection and protection against toxic chemical and biological agents, will execute the project.

<https://www.tribuneindia.com/news/punjab/drdo-to-develop-training-aids-for-dogs-of-security-forces-438533>



Press Information Bureau
Government of India

Ministry of Defence

Tue, 04 Oct 2022 1:44 PM

Sanjeev Kishore Takes Over as New Director General Ordnance (C&S)

Shri Sanjeev Kishore, a 1985 batch officer of the Indian Ordnance Factory Service (IOFS), has taken over as the Director General Ordnance (C&S) with effect from 01-10-2022 upon the superannuation of Shri M K Grag. Before taking over the charge of DGO (C &S), Shri Kishore was the Additional Director General Ordnance at the Directorate of Ordnance (Coordination & Services), Kolkata.



Shri Kishore has held many senior positions, including that of the first CMD of Armoured Vehicles Nigam Ltd (AVNL), one of the seven new DPSUs formed by the Government of India in 2021. He has ensured smooth transition of Armoured group of factories from Government department to a corporation. AVNL recorded profit in its first six months of operation under his leadership.

Prior to the appointment of CMD, Shri Kishore was also posted as the Senior General Manager of Heavy Vehicles Factory (HVF) Avadi and General Manager of Opto Electronics Factory (OLF), Dehradun. Shri Kishore has served in diverse roles and in varied technological environments. He has been awarded Santu Sahaney Memorial Shield and Ayudh Bhushan award for his meritorious services for enhancing defence production.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1865033>

Thu, 06 Oct 2022

Indian Air Force will have 35 -36 Combat Squadrons by Mid 2030s Says IAF Chief

To tide over the acute fleet shortage the Indian Air Force is looking forward to induction of the indigenous Light Combat Aircraft 'Tejas' and is also in the process of finalizing a separate proposal with the foreign partners for more fighter jets. On Tuesday at the annual press conference ahead of the Indian Air Force Day on Oct 8, Chief of Air Staff, Air Chief Marshal VR Chaudhari said: "It will be impossible to keep watch and do combat air patrol across the country with the given number of 31 squadrons." He said that the target of 42 fighter squadrons will remain even though it may take a decade to meet it.

While citing the growing strength of the Pakistani and Chinese Air Forces, Vice Chief of Air Staff Air Marshal Sandeep Singh, made it clear that there was no question to review the sanctioned strength of 42 squadrons of fighter jets. When it came to combating opponents with bigger numbers and operating in vast geographical areas the numbers of fighter squadrons was absolutely necessary. It will be impossible to keep watch and do combat air patrol across the country with the given number of 31 squadrons, the chief told the media persons in New Delhi. He said that the target of 42 fighter squadrons will remain even though it may take a decade to meet it.

Acquisition plans

In response to several questions related to the shortage of fighter squadrons the chief explained that an order for 83 Light Combat Aircraft 'Tejas' Mk 1A is already in place. According to the chief, the IAF will get another 10 jets of the first lot of 40 'Tejas' which will be delivered this year. Adding, the proposal to make 114 medium-range fighter aircraft (MRFA) in India is in the process of being firmed up based on the technical requirements and soon the Request for Proposal will be sent out.

Why the delay?

The government has been in discussions with the OEM to increase the indigenous content in the fighter jets and to have greater 'Make in India' commitment.

Status of the additional Su-30 MKI and MiG-29

"The project to get additional 12 Su-30 MKI and 21 MiG-29 has been deferred," the chief said in response to a question.

Long-term acquisition Plans

He said that the force was committed to Tejas Mk2 and will get six squadrons and also the Advanced Medium Combat Aircraft (AMCA). Both Tejas Mk2 and the 5th generation AMCA are still in the design phase.

Phase out plans

By 2024, the IAF has plans to phase out three squadrons of MiG-21 Bison. This will be followed by the phasing out of six squadrons of the ageing Jaguar fighter fleet starting 2025 and continuing till 2032. By late next decade three squadrons each of the upgraded Mirage 2000 and MiG-29 fleets would be scheduled to be phased out. In response to media queries, the IAF Chief said by mid next decade all these aircraft will be number plated.

Position of the fighter fleet in IAF

The number has gone down to 31 fighter jets squadrons. And roughly each squadron has 18 fighters. Last month the strength of fighter squadrons fell to 31 as the Srinagar based MiG-21 Bison squadron was phased out.

Background

The IAF has an authorised strength of 42 fighter squadrons which stands at 31 and this number includes two squadrons of the French Rafales and the indigenous LCA 'Tejas'

When will it be 42 squadrons?

According to the chief, even if all the procurement planned goes on without any delays or any glitches the number of squadrons by 2035-36 will just touch 35 as against the sanctioned 42. The focus is not on numbers but on technology and quality.

<https://www.financialexpress.com/defence/indian-air-force-will-have-35-36-combat-squadrons-by-mid-2030s-says-iaf-chief/2701254/>



Tue, 04 Oct 2022

Graphene: Building the Future Military

Graphene, which is two-dimensional carbon, is being touted as the next big thing that will change every aspect of complex military hardware in the near future. This revolutionary graphene which has most commonly been used in pencil is set to make revolutionary changes in the different military platforms and equipment like protection armour.

MKU using Graphene in Body Armour

Kanpur based MKU confirmed to Financial Express Online that they are using this in the body armour they are making. "The company has started using Graphene in the body armour for our customers," said a top company official. In an earlier conversation, Neeraj Gupta, Managing Director, MKU had said that his company has been investing a lot in R&D and product upgrade, "This is important as the focus is on making the body armour easier for soldiers to carry and be comfortable."

Graphene in the Military - 'New kid on the block'

One square metre of graphene is hardly 0.77 mg in weight. Yet, it is 200 times stronger than steel, but its density is akin to carbon fibre, which is five times lighter than steel. Military applications are one of the most extreme, owing to the harshest and difficult terrains in the world.

Since the soldiers in the middle are performing extraordinary operations to protect them, military research globally is the most expensive endeavour. And graphene seems the perfect candidate for more research to understand its usage in the military. According to the information available in the public domain, the strength and density characteristics of graphene make it the ideal candidate for personal protection, especially ballistic protection applications. A Spanish research team has created a nano-composite material reinforced with graphene that has improved it to withstand the impact of military ammunition.

While graphene was strengthening the impact resistance in Spain, in the United Kingdom, graphene and silk are being tested to reduce the weight of personal protective armour. They successfully added graphene to silk, creating a lightweight, transparent yet sturdy material. The team believes that their silk graphene can also be used in space and medicine beyond the military. “Graphene is set to aid military aviation majorly. Its robust properties make it ideal for components like the aircraft fuselage that sustains extreme temperatures. It can also be used in de-icing technologies. We have already seen graphene composites offer better impact resistance, making them ideal for helicopter and aircraft structures. Specifically for fighter aircraft, graphene-based paints can keep them off enemy radars by decreasing the radar footprint,” Girish Linganna, Aerospace & Defence Analyst explained to Financial Express Online.

Graphite and diamond

While both graphite and diamond are isotopes of carbon, of course, they are day and night apart. Why so? This has to do with the arrangement of carbon atoms. In a diamond, each atom is directly connected to four other atoms. All these are equidistant. Hence, the strength of the bond between any two atoms is equal. However, in graphite, we observe that a carbon atom bonds with three other atoms in the same plane. These carbon atoms, in the same plane, when replicated, form a honeycomb sheet of carbon atoms. However, a carbon atom must bond with four other atoms to be stable. So, this sheet of carbon atoms weakly bonds with another sheet.

“This difference in structure shows how the strength of the bonds relates to the strength of the diamond and the ease of writing with graphite. But if graphite is formed of sheets of carbon atoms, is it possible to isolate a single sheet?

This is a question that two researchers at the University of Manchester, UK, sought an answer to. They took a pencil and transferred some of the graphite to a tape. After that, they kept stripping off sheets using tape and its adhesive properties. Eventually, they isolated a single honeycomb sheet of carbon atoms known as graphene. Andre Geim and Kostya Novoselov, the researchers behind this feat, were awarded the Nobel Prize in 2010,” adds Girish Linganna. Graphene, a single layer of graphite, carries extraordinary properties owing to its two-dimensional structure. It is incredibly robust and stable, conducts heat and electricity excellently, and is an excellent material for composite materials which are lighter and impact resistant.

Power up the EV industry

The revolutionary nature of graphene is not restricted to defence. We have witnessed many technologies intended for military use being repurposed for civil applications, with the internet being one primary example. Graphene is similarly capable of being the missing piece in the electric vehicles industry. EVs are quickly gaining popularity, with governments being bullish on their prospects worldwide. However, a fossil fuel car’s ability to immediately recharge itself continues to irk prospective EV buyers. Graphene batteries could settle this once and for all.

Graphene aluminium-ion batteries can store more energy and charge sixty times faster than a conventional aluminium-ion battery.

Not only can graphene batteries provide blazing fast charging, but they also make EVs safer. The past summer claimed many EVs which could not sustain the temperature, and their batteries combusted. With graphene, the ignitable electrolyte part of the lithium-ion battery will be replaced and add to the safety of the passengers.

<https://www.financialexpress.com/defence/graphene-building-the-future-military/2700554/>



Wed, 05 Oct 2022

Navy to Soon Induct India's 1st Passenger Drone 'Varuna'

Indian Navy will soon induct the country's first human-carrying drone named "Varuna", developed by the Indian startup Sagar Defence Engineering Private Limited in Pune. A demo of this personal air vehicle, an autonomous multi-copter drone capable of carrying the passenger, was shown at the plenary session of Naval Innovation and Indigenisation Seminar held in July this year. A Chakan-based Sagar Defence Engineering Private Limited company has designed and manufactured 'Varuna'. The manufacturers claim that this drone can move goods including liquids, equipment, and human beings with a standardized payload attachment, according to the *Hindustan Times*.

This passenger drone, remotely controlled or flown automatically along predetermined routes, can hold a range of payloads in the area between its landing gear. It has the capability to carry payloads up to 130 kg, and can cover 25 km in just 30 minutes. Capt. Nikunj Parashar, founder of Sagar Defence Engineering along with his two co-founders Babbar and Lakshay Dang, have designed the drone for the Indian Navy. The sole purpose of this drone is to develop an indigenous technology that can be incubated and fielded to safeguard frontline warriors on the battlefield and strengthen the surveillance and security of the nation, as per *HT* reports. Babbar said that when the project began, the organization's initial concerns were the necessary clearances and funding for this project, however, they were blessed to get the handholding by the Navy, iDEX team and ministry of defence, who connected the manufactures' team with Mazgaon Dockyard Limited for funding. This passenger drone carries numerous benefits including casualty evacuation in case of road accidents, use as an air ambulance in remote villages, use as an air taxi in metro cities, emergency evacuations, disaster relief and medical emergencies, etc.

<https://www.livemint.com/news/india/navy-to-soon-induct-india-s-1st-passenger-drone-varuna-watch-video-11664940245046.html>

Indian Defence's Drone Policy is on the Right Track

The decision of the Indian Air Force (IAF) to acquire 100 mini unmanned aerial vehicles (UAVs), or drones, will allow the organisation to hone its operational capabilities without looking over its shoulder all the time. The IAF going in for such a large suite of UAVs is obviously to strengthen its air base defences after the drone attack on a Jammu air base last year. That was a rude wake-up call for the Ministry of Defence (MoD) on the clear and present danger posed by armed drones that sneak in from across the western and northern borders. The MoD is now shopping for mini UAV platforms equipped with electro-optic and thermal imaging capability to detect targets on land and air from afar. This serves the dual purpose of thwarting cross-border terrorist activity as well as dealing with intruder drones. Not surprisingly, the IAF has awarded the contract for the UAVs to an Indian company in line with the government's resolve to indigenise defence acquisitions. It also complements the IAF's plan to protect air bases in the subcontinent with home-grown anti-drone systems.

UAVs have come a long way since American inventors Elmer Sperry and Peter Hewitt designed the first 'aerial torpedo' in 1916 by integrating three key technologies — automatic stabilisation, remote control and autonomous navigation — on a single aero-model. In 1930, defence scientists in Britain and the US used the aerial torpedo to develop radio controlled 'target drones' to train anti-aircraft gunners. But the potential of UAVs as a weapon of choice for armies was largely ignored even during the Cold War when the military-industrial complexes of the US and the erstwhile USSR merely considered UAVs as nuisance weapons. What a contrast from the current combat drones, with their reach and lethality, which are critical force multipliers indispensable to militaries across the world!

India was a late starter in the global military drone market which is currently estimated to be worth \$12 billion, and predicted to grow to \$31 billion in the next seven years. The country's indigenous UAV programme was launched in the early 1980s when the IAF modified the American Northrop Chucker remotely piloted vehicle as a desi drone. Eventually, the Defence Research and Development Organisation (DRDO) would use this as a template to develop the Lakshya target drone for practice firing of beyond-visual-range missiles. The DRDO has since followed it up with several short range drones like the catapult-launched Nishant and its advanced variant, Gagan, equipped with a Synthetic Aperture Radar that produced high-resolution 3-D images. The real deal, however, is the vaunted Medium Altitude Long Endurance UAV, Rustom 2 with auto landing capabilities ideal for surveillance and reconnaissance. A more advanced High Altitude Long Range drone is also being developed with an eye on the Sino-Indian border in eastern Ladakh.

New industry friendly policies announced by the government have clearly enabled India's armed forces to explore the full potential of UAVs as force multipliers with the help of private players. This is evident in the expanding performance umbrella of the IAF's UAVs from their recce and surveillance profiles to more dynamic roles like UAV assisted fighter/helicopter strikes and laser designation of targets. Army drones, once the exclusive preserve of the artillery, are now

managed by the Army Aviation Corps to ensure their optimal use. The Army is also procuring loitering munitions (drones carrying warheads that ‘loiter’ in the air before diving on ground targets) from Indian companies and these compare favorably with the Israeli-made Harop possessed by the IAF. MoD sources speak of plans to have various UAVs in army battalions before the decade is out, while the IAF would build half a dozen combat drone squadrons in the same time frame. The Indian Navy (IN) too has a shopping list for advanced shipborne drone systems to successfully counter Chinese influence in the Indian Ocean Region.

A major handicap for India’s armed forces is the absence of homegrown unmanned combat aerial vehicles like the US Predators and Reapers which are controlled by satellites and hit targets with missiles before returning to re-arm and carry out fresh sorties. This may change soon if the recent maiden flight of India’s Stealth Wing Flying Testbed — the prototype of a stealth combat drone — is any indication. Offensive UAV platforms like these however need to be complemented by a robust anti-drone capability like the IN’s Israeli Smash 2000 rifles that can track and destroy hostile UAVs. The army has its own jamming system which can detect and bring down quad copters (multi-rotor drones with four arms) at more than three kilometers; this is currently deployed along the western border and is a boon for troops stationed there.

But the challenge for defensive military technologies is that they are easily outpaced by offensive capabilities like, say, ‘swarm drones’ — many drones attacking targets at the same time — fooling jammers and radars which identify the UAV horde as a single object. Defence planners know this only too well as they try to second guess the rapid mutation of disruptive technologies like drones.

<https://www.moneycontrol.com/news/opinion/indian-defences-drone-policy-is-on-the-right-track-9280041.html>

Firstpost.

Tue, 04 Oct 2022

From LCH Prachand to INS Vikrant, How ‘Make in India’ Defence is Transforming the Nation

The ‘Make in India’ programme received a great boost when India inducted the Light Combat Helicopter Prachand. The recent projects, showcasing India’s capabilities in the defence sector, has caught China and Pakistan on the back foot Prime Minister Narendra Modi’s vision for an ‘aatmanirbhar Bharat’ (self-reliant India) in the defence manufacturing sector is slowly but steadily becoming a reality. On Tuesday, India took another big step towards self-reliance as it inducted the first batch of indigenously developed Light Combat Helicopters (LCH), now called Prachand.

The fleet comprising four helicopters was inducted into the IAF at a ceremony at the Jodhpur Air Force Station in the presence of Defence Minister Rajnath Singh, Chief of Defence Staff General Anil Chauhan, Chief of Air Staff Air Chief Marshal V R Chaudhari and other senior military officials. The LCH, developed by state-run aerospace major Hindustan Aeronautics Limited (HAL), is a 5.8-tonne twin-engine chopper armed with air-to-air missiles, 20-mm turret guns and

rocket systems, and is capable of destroying enemy tanks, bunkers, drones and other assets in high-altitude regions.

In a tweet, Prime Minister Narendra Modi said, “The induction of LCH Prachand is a special moment for the collective resolve of 130 crore Indians to make our nation strong and self-reliant in the defence sector. Congratulations to every Indian!” Here’s a look at the other made in India defence equipment and how it’s transforming the nation’s defence sector.

INS Vikrant

After a 13-year wait, India had its moment in the sun when it inducted the first indigenously-built aircraft carrier, INS Vikrant on 2 September in a ceremony in Kerala. The 44,000-tonne indigenous aircraft carrier, India’s largest and most complex warship, stretches 262 metres in length, exceeding that of two football fields and is 62 metre wide and came with an estimated price tag of Rs 20,000 crore. At the event, Prime Minister Narendra Modi had said that INS Vikrant was a living embodiment of the “spirit of the Panch Prans”, the five nationalistic goals he had spoken about from the Red Fort in his Independence Day speech. “Vikrant is huge, massive and vast.... Vikrant is distinguished, Vikrant is also special. Vikrant is not just a warship. This is a testament to the hard work, talent, influence and commitment of India in the 21st century,” Modi had said. With this milestone, India joined an elite league of nations that are capable of developing such large and complex warships. According to recent figures, there are a total of 46 aircraft carriers in the world, including 25 Helo carriers (a warship whose primary purpose is to operate helicopters).

Tejas

After the success of the Tejas, manufactured in India by HAL, the Centre recently gave its approval for the Tejas Mark-2. Described as a 4.5-generation machine, it is believed to be a more potent version of the indigenous Tejas multirole combat jet. According to a report published by *Hindustan Times*, the government has sanctioned around Rs 10,000 crore for the project, and the Tejas Mk-2 is likely to take first flight in two years, setting the stage for its production and subsequent operational availability around 2028. Tejas Mark-2 would have a longer combat range and greater capacity to carry weapons. Sources have said that the new fighter jet will be equipped with superior radar, better avionics and electronics. The Tejas Mark-1 was designed to replace obsolete MiG-21s, while Tejas Mark-2 would succeed Mirage-2000s, Jaguars and MiGs-29s in Indian Air Force's (IAF's) combat fleet.

AK-203 Rifles

In September, India and Russia finalised a major deal for manufacturing AK-47 203 rifles in India. The AK-47 203 is the latest and most advanced version of the AK-47 rifle, which will replace the Indian Small Arms System (INSAS) 5.56x45 mm assault rifle. As per the Rs 5,100-crore deal, more than 500,000 AK-203 assault rifles would be manufactured at a facility in the Amethi district of Uttar Pradesh by a joint venture, Indo-Russian Rifles Private Ltd (IRRPL). IRRPL was set up jointly between Advanced Weapons and Equipment India Limited and Munitions India Limited and Russia’s Rosoboronexport and Kalashnikov.

Howitzers and ATAGs

The Indian Army is all set to initiate the process of procuring 100 additional K9 Vajra-T 155 mm/52 calibre tracked self-propelled gun systems. The K9-Vajras are made at Armoured Systems Complex of Larsen and Toubro (L&T) in Gujarat under the Centre’s ‘Make in India’

initiative. Moreover, India recently tested its indigenously developed howitzer gun, ATAG, at the Independence Day ceremony at the Red Fort. The Advanced Towed Artillery Gun System (ATAGS) was used alongside the traditional British-origin '25 Pounders' artillery guns for the 21-gun salute. The ATAGS is an indigenous 155 mm x 52 calibre howitzer gun developed by the Defence Research and Development Organisation (DRDO) with its Pune-based facility Armament Research and Development Establishment (ARDE) being the nodal agency.

Swarm drones

In August, the Indian Army inducted two sets of swarm drones for surveillance and punitive operations. The swarm drones were procured from two Indian startups — Bengaluru-based NewSpace Research and Technology, run by former Indian Air Force officer Sameer Joshi, and Noida-based Raphe mPhibr Private Limited. Swarm drones refer to several unmanned aerial vehicles that operate in coordination. These are equipped with Artificial Intelligence (AI) and can communicate with each other as well as with the control station.

The drones are operable at high-altitudes, rough-weather conditions and can fly at a speed of 100 km per hour and has ability to strike multiple drones at the target. Swarm drones can carry out a wide range of missions, such as strikes against tanks, infantry combat vehicles, ammunition holding areas, fuel dumps and terror launch pads.

<https://www.firstpost.com/explainers/from-lch-prachand-to-ins-vikrant-how-make-in-india-defence-is-transforming-the-nation-11384241.html>



Wed, 05 Oct 2022

Light Combat Helicopter: A Great Step Forward for Self-Reliance in Defence Production

The **induction of the Hindustan Aeronautics Limited-made Light Combat Helicopter into the Indian Air Force**, the first of an initial order of 10 for the Air Force and five for the Army, is a timely boost to the country's atmanirbharta goals in defence hardware. The aircraft, arguably the lightest fighter helicopter in the world, is 45 per cent indigenous right now, but will become more Indian in the years to come. Named Prachand, or fearless, this versatile 5.8 tonner is said to be the only helicopter that can land and take off at heights of 15,000 ft, loaded with weapons and fuel. It can operate at altitudes of upto 20,000 ft, higher than any other attack helicopter available to the Indian military. That makes it ideal for deployment at the Line of Actual Control.

Indeed, the Indian Air Force flew a pair of LCH at the LAC in 2020, in a kind of live trial of the aircraft in a real time operational setting, giving it, as it were, a final thumbs up. Not that it had not been adequately tested already. The need for an LCH was first felt during the Kargil war against Pakistan. After developing the platform, HAL carried out several tests from 2010 to 2019, including a landing at Siachen in 2015. The LCH thus became the first attack helicopter to land on the world's highest battlefield. Not counting the two decades it has taken from drawing board to induction — the delay was not so much a problem with the aircraft, but the glacial speed at which the defence procurement bureaucracy works — the LCH is a major breakthrough.

However, HAL has no time to rest on its laurels. One consequence of the Russian war in Ukraine is that it has brought into sharper focus the extent of India's dependency on Moscow for defence hardware, and the urgent need for indigenisation to the extent possible. In March, the Ministry of Defence identified 18 major platforms for "make in India" and the 2022-23 defence budget reflects this with an allocation of 25 per cent of the defence research and development for Indian industry-led efforts in this direction. HAL's indigenous multi-role helicopter, being developed to take the place of Mi17s that have started to be phased out, is the next big challenge. Beyond equipping the Indian military, the government evidently believes after successfully selling the joint India-Russia Brahmos missiles to the Philippines that the international market awaits Indian defence production. Will there be a demand for India-made defence helicopters? It is hard to say, but the logic of self-reliance in defence production demands international standards. The LCH is a great start.

<https://indianexpress.com/article/opinion/editorials/light-combat-helicopter-a-great-step-forward-for-self-reliance-in-defence-production-8190123/>

नवभारत टाइम्स

बुधवार, 05 अक्टूबर 2022

जंगी ताकत बढ़ाने वाला भारत का 'प्रचंड' कदम

अरुणेश पठानिया

मेक इन इंडिया अभियान के तहत भारत ने देश में बने हल्के लड़ाकू हेलिकॉप्टर (एलसीएच) 'प्रचंड' को वायुसेना में शामिल कर आत्मनिर्भर भारत योजना के तहत बड़ा कदम बढ़ाया है। हिंदुस्तान एयरोनॉटिक्स लिमिटेड ने साढ़े पांच टन वजनी 'प्रचंड' को देश की सामरिक जरूरत के हिसाब से डिवेलप किया है, जो पांच हजार मीटर की ऊंचाई पर हमला करने की क्षमता रखने वाला दुनिया का पहला हेलिकॉप्टर है।

यह सही है कि हेलिकॉप्टरों की सैन्य जरूरत की आपूर्ति पूरी तरह से स्वदेशी तकनीक पर लाने में अभी थोड़ा और वक्त लगेगा, लेकिन 'प्रचंड' की इन ताकतों को कोई भी नजरअंदाज नहीं कर सकता:

- 5.8 टन वजन के और दो इंजन वाले इस हेलिकॉप्टर कई हथियारों से लैस हैं।
- यह हवा से हवा में दागी जाने वाली मिसाइल और रॉकेट प्रणाली से लैस है।
- 'स्टीलथ' खूबी और बख्तरबंद सुरक्षा प्रणाली भी इसमें है।
- यह रात को हमला करने और आपात स्थिति में सुरक्षित उतरने में कारगर है।
- यह अत्यधिक ऊंचाई वाले क्षेत्रों में टैंक, बंकर, ड्रोन को नष्ट करने का दमखम रखता है।

LUH भी तैयार

रणनीतिक लिहाज से भले ही भारत ने अमेरिका से अपाचे और चिनूक जैसे अत्याधुनिक हेलिकॉप्टर खरीदे, लेकिन देश अब स्वदेशी तकनीक पर ज्यादा भरोसा जता रहा है। इस कड़ी में भारत अब इंडियन मल्टी रोल हेलिकॉप्टर (आईएमआरएच) और हेवी लिफ्ट हेलिकॉप्टर डिवेलप कर रहा है। वहीं, साठ और सत्तर के दशक

के चेतक और चीता हेलिकॉप्टरों की जगह लेने के लिए स्वदेशी लाइट यूटिलिटी हेलिकॉप्टर (एलयूएच) भी तैयार हो चुका है। आइए देखते हैं कि स्वदेशी हेलिकॉप्टरों में भारत ने अब तक क्या-क्या किया है:

1962 में विदेशी सहभागिता से दो टन वजनी पहला हेलिकॉप्टर चेतक बनाया गया।

1977 में अधिक ऊंचाई वाले क्षेत्रों में कारगर विदेशी सहभागिता से चीता हेलिकॉप्टर का निर्माण हुआ।

1990 में चीता के मूल डिजाइन पर उच्च पर्वतीय क्षेत्रों में कारगर बेहद हल्का लड़ाकू हेलिकॉप्टर लैंसर बनाया गया।

2002 में चीता हेलिकॉप्टर को रीडिजाइन कर उच्च पर्वतीय क्षेत्रों में कारगर चीतल हेलिकॉप्टर बनाया गया।

2002 में साढ़े पांच टन वजनी दोहरे इंजन वाले पहले स्वदेशी हेलिकॉप्टर ध्रुव का निर्माण हुआ।

2020 में चीता और चेतक की जगह शामिल किए जाने वाले लाइट यूटिलिटी हेलिकॉप्टर (एलयूएच) का निर्माण किया गया।

जल्द आएगा IMRH

इन दिनों एचएएल 13 टन वजनी इंडियन मल्टी रोल हेलिकॉप्टर (IMRH) बनाने की दिशा में तेजी से बढ़ रहा है। इस हेलिकॉप्टर को मीडियम वेट कैटिगरी में रखा गया है। इसका प्रोटोटाइप बनकर तैयार हो चुका है। अगर सही समय पर निर्माण पूरा हो गया तो 2030 से पहले स्वदेशी तकनीक से बना यह हेलिकॉप्टर रूस के एमआई-8 और सेवारत एमआई-17 हेलिकॉप्टर की जगह लेगा। इसकी खासियत यह है कि इसे सामान ढोने के साथ अटैक हेलिकॉप्टर के तौर पर भी डिवेलप किया जा रहा है। इसे हवा से हवा में युद्ध, पनडुब्बियों-युद्धपोतों के खिलाफ, और वीवीआईपी ज्यूटी में इस्तेमाल किया जाएगा। इसका इंजन विकसित करने में विदेशी मदद ली जा रही है।

घटेगी निर्भरता

भारत मध्यम और भारी वजन वाले हेलिकॉप्टरों के लिए रूस और अमेरिका पर निर्भर रहा है। देश में पहले केवल रूस से ही हेलिकॉप्टर लिए जाते थे, जिसमें एमआई-8, एमआई-17, एमआई-24, कोमोव जैसी मशीनें शामिल हैं। लेकिन रूस से हेलिकॉप्टर खरीद लगभग बंद हो चुकी है। अब भारत अमेरिका से इसकी खरीदारी कर रहा है। उससे दो बड़े रक्षा सौदे अपाचे और चिनूक के हुए हैं। 6 नए अटैक हेलिकॉप्टर अपाचे सेना के लिए और खरीदे जा रहे हैं। इस निर्भरता को कम करने के लिए एचएएल आईएमआरएच लगभग तैयार कर चुका है, जिससे रूसी हेलिकॉप्टर भारतीय सेनाओं से लगभग बाहर हो जाएंगे। इसके अलावा एचएएल भारी हेलिकॉप्टर डिवेलप करने के प्रॉजेक्ट को भी हरी झंडी दे चुका है।

नौसेना की ताकत

भारतीय नौसेना इस समय अपने युद्धपोतों पर सात हेलिकॉप्टर इस्तेमाल कर रही है, जिसमें पांच विदेश से मंगाए हुए हैं। विमानवाहक युद्धपोत विक्रांत और विक्रमादित्य के लिए विदेशी हेलिकॉप्टरों पर निर्भरता अधिक है। अमेरिका से सी-किंग हेलिकॉप्टर इसीलिए खरीदे गए हैं। भविष्य में विक्रांत पर विदेशी कमोव और सी-किंग के साथ स्वदेशी ध्रुव भी तैनात होगा। चेतक की जगह एचएएल 111 स्वदेशी एलयूएच नेवी को देगा।

<https://blogs.navbharattimes.indiatimes.com/nbteditpage/indian-made-helicopter-prachand-is-a-big-boost-for-iaf/>

Defence Secretary Co-Chairs India-UK Defence Consultative Group Meeting

In July, national security advisor Ajit Doval met his then UK counterpart, Stephen Lovegrove, and discussed cooperation in cyber, maritime, Indo-Pacific, regional security, and tackling violent extremism. Defence secretary Ajay Kumar co-chaired the India-UK Defence Consultative Group (DCG) meeting with his British counterpart, David Williams, in London on Tuesday. In a statement, the defence ministry said that the two reviewed the progress of service-level bilateral groups and other defence cooperation mechanisms and discussed defence and industrial cooperation. In July, national security advisor Ajit Doval met his then UK counterpart, Stephen Lovegrove, and discussed cooperation in cyber, maritime, Indo-Pacific, regional security, and tackling violent extremism.

They took forward discussions earlier held between Prime Minister Narendra Modi and his then counterpart, Boris Johnson, and discussed cooperation in the technology and defence sectors with a focus on the Atmanirbhar Bharat initiative. Kumar and Williams discussed defence industrial cooperation, cyber and artificial intelligence, and agreed to work together for strengthening the defence relationship. He also held a meeting with national security advisor Sir Tim Barrow.

<https://www.hindustantimes.com/india-news/defence-secretary-co-chairs-india-uk-defence-consultative-group-meeting-101664939067059.html>



**पत्र सूचना कार्यालय
भारत सरकार**

रक्षा मंत्रालय

बुधवार, 05 अक्टूबर 2022 6:55 अपराहन

कुवैत में फर्स्ट ट्रेनिंग स्क्वाड्रन

आईएनएस तीर, सुजाता और सीजीएस सारथी से युक्त फर्स्ट ट्रेनिंग स्क्वाड्रन (1TS) के जहाज 04 अक्टूबर 2022 को पोर्ट अल-शुवैख, कुवैत पहुंचे। जहाजों को उनकी प्रशिक्षण तैनाती के अंतर्गत फारस की खाड़ी में तैनात किया गया है। स्कूली बच्चों के अलावा कुवैती नौसेना बलों के वरिष्ठ अधिकारियों, बॉर्डर गार्ड्स एवं भारतीय दूतावास के वरिष्ठ अधिकारियों द्वारा जहाजों का गर्मजोशी से स्वागत किया गया। तीन दिवसीय पोर्ट कॉल में पेशेवर जुड़ाव, क्रॉस शिप विज़िट, सामुदायिक आउटरीच तथा सामाजिक संपर्क शामिल हैं।

कोच्चि स्थित फर्स्ट ट्रेनिंग स्क्वाड्रन के जहाज दक्षिणी नौसेना कमान, भारतीय नौसेना की प्रशिक्षण कमान का हिस्सा हैं। फर्स्ट ट्रेनिंग स्क्वाड्रन की तैनाती का उद्देश्य प्रशिक्षुओं को समुद्र एवं बंदरगाह के विभिन्न

चरणों के संचालन के प्रति अभ्यस्त कराने के वातावरण से परिचित कराना है। वर्तमान तैनाती प्रशिक्षुओं को हमारे समुद्री पड़ोस में मित्र देशों के साथ भारत के सामाजिक-राजनीतिक, सैन्य एवं समुद्री संबंधों को उजागर करने का अवसर प्रदान करती है।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1865473>

THE ECONOMIC TIMES

Wed, 05 Oct 2022

Indian Navy Ships Visit Kuwait Pushing Defence Ties

Signalling growing defense ties between India and Kuwait, the ships of First training Squadron of Indian Navy – INS Tir and INS Sujata along with the Indian Coast guard Ship Sarathi arrived at the Shuwaikh Port on Tuesday, for a training exchange visit. The visit of the ships heralds a new chapter in the bilateral defense ties after the visit of INS Teg in July 2022. INS Tir (Meaning Arrow) is the first dedicated Cadet Training Ship to be built by Mazgaon Dock Limited, Mumbai and was commissioned on February 21, 1986.

INS Sujata is an indigenously built Sukanya class Offshore Patrol vessel of the Indian Navy commissioned on Nov 3, 1993. The ship undertakes fleet support operations, humanitarian assistance missions, offshore patrolling, ocean surveillance and escort duties. A cadet training ship since past nine years, the officer cadets are exposed to practical aspects of navigation and seamanship onboard this ship before moving on to complex assignments. On their arrival at the Al-Shuwaikh port in Kuwait, the ships were given a warm welcome by officials of the Kuwait Naval Forces, Border Guards and Indian Embassy.

<https://economictimes.indiatimes.com/news/defence/indian-navy-ships-visit-kuwait-pushing-defence-ties/articleshow/94661913.cms>

THE ECONOMIC TIMES

Tue, 04 Oct 2022

Russian Defence Ministry Maps Suggest Rapid Pullbacks in Ukraine

Russian defence ministry maps presented on Tuesday appeared to show rapid withdrawals of Russian invasion forces from areas in eastern and southern Ukraine where they have been under severe pressure from a Ukrainian counteroffensive. The ministry's daily video briefing made no mention of any pullbacks, but on maps used to show the location of purported Russian strikes, the shaded area designating Russian military control was much smaller than the day before. In northeast Ukraine, where Russia suffered a rout last month, its forces along a frontline running some 70 km southward from Kupiansk along the River Oskil appeared to have retreated some 20 km to the east, as far as the border of Luhansk province.

This would mean they had vacated the last remnants of Ukraine's Kharkiv province - where Russia for several months maintained an occupation administration - but for a small patch between the town of Dvorichna and the Russian border. In southern Ukraine's Kherson province, Russia's line of control on the right bank of the Dnipro river had shifted 25 km southward on the map, to a line running westward from the riverside town of Dudchany. Both areas are battlefields where Ukraine has been reporting advances, albeit without giving full details. It would not be the first time that Moscow had acknowledged a withdrawal so obliquely. On Sept. 11, a map presented by the defence ministry showed that Russian forces had abandoned most of the parts of Kharkiv that they had controlled, as far east as the Oskil, after a lightning Ukrainian offensive.

<https://economictimes.indiatimes.com/news/defence/russian-defence-ministry-maps-suggest-rapid-pullbacks-in-ukraine/articleshow/94649607.cms>

ThePrint

Wed, 05 Oct 2022

Pakistan Army Chief Gen Bajwa Meets with US Defence Secretary, NSA; Discusses Bilateral Cooperation

Pakistan's Army chief General Qamar Javed Bajwa has called on US Secretary of Defence Lloyd Austin, National Security Adviser Jacob Sullivan and other top officials and discussed matters of mutual interest, regional security and bilateral cooperation in various fields. Bajwa's visit to the United States comes weeks before he is expected to retire after an extended six-year tenure. "This long-standing partnership continues today with discussions focused on opportunities to address key mutual defence interests," the Pentagon said in a statement on Tuesday. Austin hosted Gen Bajwa at the Pentagon during the 75th anniversary of relations between the United States and Pakistan, said the statement. During the meeting on Tuesday, the leaders discussed matters of mutual interest, regional security and bilateral cooperation in various fields, the Dawn newspaper said. Bajwa also met Deputy Secretary of State Wendy Sherman.

The Army chief thanked the US officials for their support and reiterated that assistance from "our global partners would be vital for the rescue and rehabilitation of flood victims in Pakistan," it quoted a Pakistani military statement as saying. The floods have killed over 1,600 people and displaced more than 33 million others in Pakistan. The floods have left a third of the country submerged under water and caused estimated damage of nearly USD 30 billion. Both sides noted that Pakistan and the US had a long history of bilateral cooperation and that both countries shall continue improving their economic, trade and investment ties. His visit to the US comes days after Pakistani Foreign Minister Bilawal Bhutto Zardari's trip to the country. During his visit, Bilawal met top officials of the Biden Administration, including Secretary of State Tony Blinken. America's engagement with Pakistan, in particular with its military, has increased in recent months. Last month, the US announced a USD450 million F-16 fighter jet sustenance package for Pakistan.

<https://theprint.in/world/pakistan-army-chief-gen-bajwa-meets-with-us-defence-secretary-nsa-discusses-bilateral-cooperation/1155390/>

Pentagon OKs ‘Dual-Stage Missile Program’ for US Air Force; Boeing Bags Contract to Develop LRAAMs

The Pentagon has taken it upon itself to ensure that the US Air Force is well-prepared to tackle the challenges that adversaries present. In what could be a massive shot-in-the-arm for the service, Pentagon has approved funding for an ambitious dual-stage missile program to maximize firepower lethality. The US Air Force has awarded Boeing a new contract for work on producing compact and very long-range air-to-air missile designs based on a modular missile concept the company had presented last year. According to the Pentagon’s daily contracting notice, the Air Force Research Laboratory (AFRL) has awarded Boeing a \$9.8 million contract to research advanced missile sub-system components to support the Compact Air-to-Air Missile and Extended Range Air-to-Air Missile Systems. The award will run through September 28, 2027.

The decision comes as a big win for Boeing as it recently lost the contract for developing the Hypersonic Attack Cruise Missile (HACM) to another US Defense contractor Raytheon Technologies. In addition, it marks the realization of a very ambitious concept unveiled by Boeing Aerospace in 2021. As with other US military air-to-air missile systems, the weapon, known as the Long-Range Air-to-Air Missile, or LRAAM, featured a two-stage configuration with a “kill vehicle” attached to a booster component that falls away when it is burned out. At the time of its unveiling, Boeing claimed that it had developed the LRAAM design based on the so-called Broad Area Announcement (BAA) issued by the US Air Force Research Laboratory (AFRL) in response to a request for proposals for a variety of cutting-edge technologies desired for upcoming long-range air-to-air missiles.

According to AFRL, design submissions could use air-breathing engines like ramjets and single and multi-stage rocket motors. In the funding approval notice by the US Department of Defense, the specific details about the Compact Air-to-Air Missile (CAAM) and Extended Range Air-to-Air Missile (ERAAM) design or future designs are not explicitly mentioned. The funding, nonetheless, represents the US Air Force’s resolve to invest in more lethal and long-range missile programs like the AIM-260 Joint Advanced Tactical Missile. Currently, the service majorly deploys the AIM-9X Sidewinder and the AIM-120D Advanced Medium Range Air-to-Air Missile (AMRAAM), which it seeks to replace with more potent successors.

The US Air Force is also exploring Long Range Engagement Weapon (LREW), a concept for a next-generation beyond visual range air-to-air missile to be prospectively integrated into the F-15EX fighters. This program being worked on by Raytheon is independent of the AIM-260 JATM developed by Lockheed Martin. The writing, thus, is on the wall that the US Air Force wants to replace its existing fleet of air-to-air missiles with longer-range and more lethal missiles. Besides Raytheon and Lockheed Martin, approval of funding for a Boeing concept is another step in that direction.

Boeing Air-To-Air Missile Development

The publicly displayed version of Boeing's LRAAM missile idea consists of two main parts: a booster section and a "kill vehicle," both of which have a very similar structure. In this form, the booster would initially accelerate and propel the weapon for a period of its flight before stopping. The kill vehicle would then start up another rocket motor, which would power the missile for the remainder of its flight. In essence, it is an air-to-air missile with two stages. It is a dual-stage propulsion design. However, most other details about the concept and design remain classified by Boeing as of this moment.

Compact missile designs had previously been considered a means to boost firepower capacity by the US Air Force, which could be crucial in future high-end confrontations with adversaries like China, which has advanced missile capabilities. This becomes even more significant in the case of near-peer conflict like the one that could be fought in the Indo-Pacific. As a result of numerous cutting-edge uncrewed aircraft projects, many of which include ideas for armed drones that could cooperate with crewed combat jets in air combat situations, interest in smaller air-to-air missiles is developing even more. Therefore, the interest in compact-range missiles is as significant as long-range missiles that would come in handy for air combat.

At the time of unveiling its missile concept last year, Boeing had said that the weapon makes use of technology that it developed for other projects, and work on the concept used cutting-edge digital engineering and design procedures, which are becoming more and more common among American defense contractors and the US military itself. Operationally, a highly modular architecture might allow field units to manufacture several tiers of missiles with various capabilities as required based on mission needs.

<https://eurasianimes.com/pentagon-oks-dual-stage-missile-program-for-us-air-force-boeing/>



Wed, 05 Oct 2022

China Follows Russia's 'Nuke Threat'; Flashes its Carrier Killer Nuclear Missiles Amid Tensions with the US

The latest footage was produced for an eight-part documentary series for state-owned China Central Television. It featured anti-aircraft carrier DF-21D and DF-26B ballistic missiles and new-generation DF-41 intercontinental ballistic missiles (ICBM). These missiles, which have long been considered a severe threat to American aircraft carriers, can block the US Navy from safely conducting operations close to the Chinese coast. China has two ballistic missiles dubbed "carrier killers," the (Dong-Feng) DF-21D and DF-26, that could strike moving aircraft carriers. The DF-26, according to defense observers, is capable of carrying out precise nuclear or conventional attacks against land and sea targets. Meanwhile, experts, who believe the video is aimed at strategic deterrence, stated that the DF-41 ICBM could carry several nuclear warheads and have a range of nearly 12,000 kilometers (7,450 miles), allowing it to strike any location on the US mainland.

The CCTV series was broadcast last week to commemorate the 73rd anniversary of the founding of the People's Republic. It featured at least a dozen DF-26B missiles with launchers or the equivalent of an entire missile brigade. Song Zhongping, a former People's Liberation Army instructor, was quoted by SCMP as saying, "Showcasing Dongfeng series strategic weapons is a subtle warning to the United States, which is instigating other countries to put on pressure on Beijing over the Taiwan issue, as the fierce Ukraine war also poses a dilemma for China." He pointed out that the PLA Rocket Force's strategic weapons were intended to be displayed in National Day military parades, but because China only holds such significant events once every ten years or every five years, the PLA can also use video footage to demonstrate its might to its American counterpart. "The dual-capable missiles – able to carry both conventional and nuclear warheads – would pose a great threat to the US aircraft carrier strike groups," Zhongping warned. According to Zhongping, the conventional warheads on the dual-capable DF-21D and DF-26 missiles are strong enough to prevent US warships from approaching Chinese waters because of their precision strike capacity.

DF-21D and DF-26B Missiles

It is believed that the DF-21D and DF-26 have warheads with sufficient mobility to attack big, relatively slow-moving ships like aircraft carriers. In August 2020, the PLA Rocket Force fired two "aircraft carrier killer" missiles into the South China Sea just one day after accusing the US of deploying a U-2 spy plane into a "no-fly zone" during a PLAN live-fire naval rehearsal off China's northern coast. The DF-21D is designed to maneuver dynamically during its reentry phase, giving it the capacity to attack moving warships. It is believed to carry a conventional payload and has an estimated range of around 1,800 kilometers.

"TV footage aired earlier by PLA channel 81 TV showed nearly two dozen DF-26B missiles and launchers, or at least two such missile brigades, as being combat ready," the report noted. According to posts on Chinese social media platforms, one of the DF-26B brigades is reportedly stationed in the northeastern city of Dalian under the Northern Theater Command. The report further highlighted that China has also established new missile brigades stationed in its eastern and southern theater commands, which are responsible for the security of the South China Sea and Taiwan Strait, respectively.

The CCTV series' opening episode, Forging Heroes to Revival, which consists of eight parts, also featured demonstrations of the DF-15 and DF-16 short-range ballistic missiles. These were part of the massive live-fire military drill that the PLA staged around Taiwan on August 4. This was in response to a significant rise in tensions brought on by US House Speaker Nancy Pelosi's trip to Taipei. China views self-governing Taiwan as a province that would one day fall under its sovereignty. The "reunification" of China with Taiwan "must be fulfilled," according to President Xi Jinping, who hasn't ruled out the possibility of using force to accomplish the goal. On the other hand, Taiwan considers itself separate from the Chinese mainland since it has a different constitution and democratically elected officials. The US president has previously stated that the country will support Taiwan against any PLA attack.

<https://eurasianimes.com/china-follows-russias-nuke-threat-flashes-its-carrier-killer-nuclear-missile/>



मंगलवार, 04 अक्टूबर 2022

मिलिए मेडिसिन के क्षेत्र में पुरस्कार विजेता स्वांते पाबो से, जानें उनके बारे में सबकुछ

स्वांते पाबो को उनकी असाधारण खोज के लिए सोमवार को मेडिसिन में 2022 के नोबेल पुरस्कार से सम्मानित किया गया है. पाबो स्वीडन के एक जेनेटिस्ट है, उन्हें 'मानव के क्रमिक विकास' पर खोज के लिए इस सम्मान से नवाजा गया है. स्वीडिश वैज्ञानिक ने हमारी प्रतिरक्षा प्रणाली में महत्वपूर्ण खोज किया है. स्वांते पाबो, सुने बर्गस्ट्रॉम के बेटे हैं, जिन्होंने 1982 में चिकित्सा में नोबेल पुरस्कार जीता था. इंडिया टुडे के अनुसार पाबो ने आधुनिक मानव और हमारी करीबी विलुप्तप्राय प्रजाति निएंडरथल और डेनिसोवंस के 'जीनोम' की तुलना के लिए शोध की अगुवाई की है. इसमें उन्होंने यह साबित किया कि इन प्रजातियों के बीच मिश्रण है. स्वांते पाबो ने मानव विकास पर अपनी खोजों से हमारी प्रतिरक्षा प्रणाली में महत्वपूर्ण अंतर्दृष्टि प्रदान की है. यह हमें हमारे विलुप्त कजिन्स (चचेरे भाइयों) की तुलना में अद्वितीय बनाता है. पाबो ने नई तकनीकों के विकास का नेतृत्व किया जिसने शोधकर्ताओं को आधुनिक मनुष्यों के जीनोम तथा निएंडरथल व डेनिसोवन्स के अन्य होमिनिनों की तुलना का मार्ग सुझाया है.

कौन हैं स्वांते पाबो?

1955 में स्वीडन के स्टॉकहोम में जन्मे, स्वांते पाबो वर्तमान में लीपजिग में मैक्स प्लैंक इंस्टीट्यूट फॉर इवोल्यूशनरी एंथ्रोपोलॉजी के निदेशक हैं. उन्होंने उप्साला विश्वविद्यालय में अपनी चिकित्सा की पढ़ाई पूरी की और 1980 में सेल बायोलॉजी विभाग, उप्साला और रोश इंस्टीट्यूट फॉर मॉलिक्यूलर बायोलॉजी में अंशकालिक अनुसंधान और शिक्षण शुरू किया. उन्होंने 1986 में अपनी पीएचडी की डिग्री प्राप्त की और उसी वर्ष इंस्टीट्यूट फॉर मॉलिक्यूलर बायोलॉजी II में पोस्टडॉक्टरल शोध शुरू किया था. उन्होंने जर्मनी के म्यूनिख विश्वविद्यालय में भी शोध की पढ़ाई की. मेडिसिन के क्षेत्र में नोबेल पुरस्कार की घोषणाओं के बाद इस पुरस्कार की शुरुआत हो गई है. आज मंगलवार को भौतिकी पुरस्कार के साथ जारी है, बुधवार को रसायन शास्त्र और गुरुवार को साहित्य के क्षेत्र में पुरस्कार मिलेगा. 2022 के लिए नोबेल शांति पुरस्कार की घोषणा शुक्रवार को और अर्थशास्त्र पुरस्कार की घोषणा 10 अक्टूबर को की जाएगी.

<https://hindi.news18.com/news/nation/nobel-prize-2022-meet-svante-pabo-the-prize-winner-in-the-field-of-medicine-know-everything-about-him-4689227.html>

Meet Svante Paabo, the 2022 Nobel Prize Winner in Medicine. His Father Won it in 1982

Svante Paabo was on Monday awarded the 2022 Nobel Prize in Medicine for his extraordinary discovery which proved modern humans share DNA with extinct relatives Neanderthals and Denisovans. The Swedish scientist provided key insights into our immune system and what makes us unique compared with our extinct cousins. Svante Paabo is the son of Sune Bergstrom, who won the Nobel prize in medicine in 1982. Announcing the award, the Nobel committee said that the scientists sequenced the genome of the Neanderthal, an extinct relative of present-day humans, and made the sensational discovery of a previously unknown hominin, Denisova. "Paabo and his team also surprisingly found that gene flow had occurred from Neanderthals to Homo sapiens, demonstrating that they had children together during periods of co-existence," Anna Wedell, chair of the Nobel Committee said.

Who is Svante Paabo?

Born in Stockholm, Sweden in 1955, Svante Paabo is currently the director of the Max Planck Institute for Evolutionary Anthropology in Leipzig. He completed his medical studies at the University of Uppsala and began part-time research and teaching at the Department of Cell Biology, Uppsala, and Roche Institute for Molecular Biology in 1980. He got his Ph.D. degree in 1986 and began Postdoctoral research at the Institute for Molecular Biology II in the same year. He performed his prizewinning studies in Germany at the University of Munich. Paabo has spearheaded the development of new techniques that allowed researchers to compare the genome of modern humans and that of other hominins — the Neanderthals and Denisovans.

"Paabo's seminal research gave rise to an entirely new scientific discipline; paleogenomics. By revealing genetic differences that distinguish all living humans from extinct hominins, his discoveries provide the basis for exploring what makes us uniquely human," the Nobel Committee said in its announcement. The medicine prize kicked off a week of Nobel Prize announcements. It continues Tuesday with the physics prize, with chemistry on Wednesday and literature on Thursday. The 2022 Nobel Peace Prize will be announced on Friday and the economics award on October 10. The prizes carry a cash award of 10 million Swedish kronor (nearly \$900,000) and will be handed out on Dec. 10.

<https://www.indiatoday.in/science/story/meet-svante-paabo-the-2022-nobel-prize-in-medicine-winner-his-father-won-it-in-1982-2007858-2022-10-03>

भौतिकी का नोबेल पुरस्कार 'क्वांटम मेकैनिक्स' में योगदान के लिए तीन वैज्ञानिकों को देने की घोषणा

स्टॉकहोम, चार अक्टूबर (एपी) भौतिकी का इस वर्ष का नोबेल पुरस्कार क्वांटम सूचना विज्ञान पर कार्य करने के लिए एलै एस्पै, जॉन एफ क्लाउसर और एंटन साइलिंगर को दिया गया है। रॉयल स्वीडिश एकेडमी ऑफ साइंसेज के महासचिव हैंस एल्लेग्रेन ने स्टॉकहोम के कैरोलिस्का इंस्टीट्यूट में मंगलवार को विजेता की घोषणा की। चिकित्सा का नोबेल पुरस्कार सोमवार को स्वीडिश वैज्ञानिक स्वैते पैबो को देने की घोषणा की गई थी। उन्हें मानव के क्रमिक विकास पर शोध के लिए यह पुरस्कार दिया गया। रसायन विज्ञान के नोबेल पुरस्कार की घोषणा बुधवार को की जाएगी। साहित्य का नोबेल पुरस्कार स्टॉकहोम, चार अक्टूबर (एपी) भौतिकी का इस वर्ष का नोबेल पुरस्कार क्वांटम सूचना विज्ञान पर कार्य करने के लिए एलै एस्पै, जॉन एफ क्लाउसर और एंटन साइलिंगर को दिया गया है।

रॉयल स्वीडिश एकेडमी ऑफ साइंसेज के महासचिव हैंस एल्लेग्रेन ने स्टॉकहोम के कैरोलिस्का इंस्टीट्यूट में मंगलवार को विजेता की घोषणा की। चिकित्सा का नोबेल पुरस्कार सोमवार को स्वीडिश वैज्ञानिक स्वैते पैबो को देने की घोषणा की गई थी। उन्हें मानव के क्रमिक विकास पर शोध के लिए यह पुरस्कार दिया गया। रसायन विज्ञान के नोबेल पुरस्कार की घोषणा बुधवार को की जाएगी। साहित्य का नोबेल पुरस्कार बुधवार को दिया जाएगा। नोबेल शांति पुरस्कार, 2022 की घोषणा शुक्रवार को और अर्थशास्त्र के क्षेत्र में नोबेल पुरस्कार की घोषणा 10 अक्टूबर को की जाएगी।

<https://navbharattimes.indiatimes.com/world/rest-of-europe/nobel-prize-in-physics-announced-to-three-scientists-for-their-contribution-to-quantum-mechanics/articleshow/94642059.cms>



Tue, 04 Oct 2022

Three Scientists Share Physics Nobel for Quantum Mechanics

The 2022 Nobel Prize in Physics has been awarded “for experiments with entangled photons, establishing the violation of Bell inequalities, and pioneering quantum information science,” the academy said. The 2022 physics laureates’ development of experimental tools has laid the foundation for a new era of quantum technology. Being able to manipulate and manage quantum states and all their layers of properties gives us access to tools with unexpected potential. Intense research and development are underway to utilise the special properties of individual particle systems to construct quantum computers, improve measurements, build quantum networks and establish secure quantum encrypted communication. This year’s Nobel Prize laureate John Clauser built an apparatus that emitted two entangled photons at a time, each towards a filter that

tested their polarisation. The result was a clear violation of a Bell inequality and agreed with the predictions of quantum mechanics.

Alain Aspect – awarded the 2022 Nobel Prize in Physics – developed a setup to close an important loophole. He was able to switch the measurement settings after an entangled pair had left its source, so the setting that existed when they were emitted could not affect the result. Anton Zeilinger, 2022 Nobel Prize laureate in physics, researched entangled quantum states. His research group has demonstrated a phenomenon called quantum teleportation, which makes it possible to move a quantum state from one particle to one at a distance.

The 2022 Nobel Prize laureates in physics have conducted groundbreaking experiments using entangled quantum states, where two particles behave like a single unit even when they are separated. The results have cleared the way for new technology based upon quantum information. The 2022 physics laureates' development of experimental tools has laid the foundation for a new era of quantum technology. Being able to manipulate and manage quantum states and all their layers of properties gives us access to tools with unexpected potential, the academy said. Intense research and development are underway to utilise the special properties of individual particle systems to construct quantum computers, improve measurements, build quantum networks and establish secure quantum encrypted communication, it added.

Anton Zeilinger, one of the winners of the prize, said, "I'm still very shocked but it is a very positive shock. I was surprised to get the call an hour ago." His area of research has demonstrated a phenomenon called quantum teleportation, which makes it possible to transfer a quantum state from one particle to one at a distance. Explaining the concept of quantum teleportation, he said that it uses the features of entanglement which can be used to transport information, carried by the object, to another place where the object is then reconstituted. This can be done without knowing the information, because to know the information would violate Heisenberg's uncertainty principle which states that the position and the momentum of an object cannot both be measured exactly, at the same time, even in theory.

"So far this can be done on very small particles. It is fundamentally important for transferring information between quantum computer," he said. Last year, the academy honoured Syukuro Manabe, of Japan and the United States, and German Klaus Hasselmann for their research on climate models, while Italian Giorgio Parisi also won for his work on the interplay of disorder and fluctuations in physical systems. The physics prize is followed by chemistry on Wednesday, with the literature and peace prizes announced on Thursday and Friday respectively. Swedish paleogeneticist Svante Paabo, who sequenced the genome of the Neanderthal and discovered the previously unknown hominin Denisova, on Monday won the Nobel Medicine Prize.

<https://www.thehindu.com/sci-tech/science/three-scientists-share-physics-nobel-for-quantum-mechanics/article65969760.ece>

अणुओं पर अनुसंधान के लिये तीन वैज्ञानिकों को दिया गया रसायन का नोबेल पुरस्कार

स्टाकहोम, पांच अक्टूबर (एपी) रसायन विज्ञान में इस वर्ष का नोबेल पुरस्कार कैरोलिन आर बर्टोज़ी, मोर्टन मेल्डल और के. बैरी शार्पलेस को समान भागों में 'अणुओं के एक साथ विखंडन' का तरीका विकसित करने के लिए प्रदान किया गया है। रॉयल स्वीडिश एकेडमी ऑफ साइंसेज के महासचिव हैंस एलेग्रेन ने बुधवार को स्वीडन के स्टॉकहोम में करोलिंस्का इंस्टीट्यूट में विजेताओं की घोषणा की। उनके काम को क्लिक रसायन और बायोऑर्थोगोनल प्रतिक्रियाओं के रूप में जाना जाता है। इसका उपयोग कैंसर की दवाएं बनाने, डीएनए मैपिंग करने और एक विशिष्ट उद्देश्य के अनुरूप सामग्री बनाने के लिए किया जाता है। बर्टोज़ी कैलिफोर्निया स्टॉकहोम, पांच अक्टूबर (एपी) रसायन विज्ञान में इस वर्ष का नोबेल पुरस्कार कैरोलिन आर बर्टोज़ी, मोर्टन मेल्डल और के. बैरी शार्पलेस को समान भागों में 'अणुओं के एक साथ विखंडन' का तरीका विकसित करने के लिए प्रदान किया गया है।

रॉयल स्वीडिश एकेडमी ऑफ साइंसेज के महासचिव हैंस एलेग्रेन ने बुधवार को स्वीडन के स्टॉकहोम में करोलिंस्का इंस्टीट्यूट में विजेताओं की घोषणा की। उनके काम को क्लिक रसायन और बायोऑर्थोगोनल प्रतिक्रियाओं के रूप में जाना जाता है। इसका उपयोग कैंसर की दवाएं बनाने, डीएनए मैपिंग करने और एक विशिष्ट उद्देश्य के अनुरूप सामग्री बनाने के लिए किया जाता है। बर्टोज़ी कैलिफोर्निया में स्टैनफोर्ड विश्वविद्यालय में स्थित हैं, मेल्डल डेनमार्क के कोपेनहेगन विश्वविद्यालय से हैं और शार्पलेस कैलिफोर्निया के स्क्रिप्स रिसर्च से संबद्ध हैं। शार्पलेस ने पहले 2001 में नोबेल पुरस्कार जीता था। वह दो बार पुरस्कार प्राप्त करने वाले पांचवें व्यक्ति हैं। निएंडरथल डीएनए के रहस्यों को उजागर करने वाले वैज्ञानिक को सम्मानित करने वाले चिकित्सा पुरस्कार के साथ सोमवार को नोबेल पुरस्कार की घोषणाओं का सप्ताह शुरू हो गया। तीन वैज्ञानिकों ने संयुक्त रूप से मंगलवार को भौतिकी में यह पुरस्कार जीता कि छोटे कण अलग होने पर भी एक दूसरे के साथ संबंध बनाए रख सकते हैं।

<https://navbharattimes.indiatimes.com/world/rest-of-europe/nobel-prize-in-chemistry-awarded-to-three-scientists-for-research-on-molecules/articleshow/94661557.cms>



Thu, 06 Oct 2022

Nobel Prize for 3 Chemists Who Made Molecules 'Click'

Three scientists from the United States and Denmark were jointly awarded this year's Nobel Prize in chemistry for developing a way of "snapping molecules together" that can be used to

design better medicines. Carolyn R. Bertozzi, Morten Meldal and K. Barry Sharpless were cited for their work on click chemistry and bioorthogonal reactions, which are used to make cancer drugs, map DNA and create materials that are tailored to a specific purpose. "It's all about snapping molecules together," said Johan Aqvist, a member of the Royal Swedish Academy of Sciences that announced the winners Wednesday at the Karolinska Institute in Stockholm, Sweden. Sharpless, who previously won a Nobel Prize in 2001 and is now the fifth person to receive the award twice, first proposed the idea for connecting molecules using chemical "buckles" around the turn of the millennium, said Aqvist.

"The problem was to find good chemical buckles," he said. "They have to react with each other easily and specifically." Meldal, based at the University of Copenhagen, Denmark, and Sharpless, who is affiliated with Scripps Research, California, independently found the first such candidates that would easily snap together with each other but not with other molecules, leading to applications in the manufacture of medicines and polymers. Bertozzi, who is based at Stanford University in California, "took click chemistry to a new level," the Nobel panel said.

She found a way to make click chemistry work inside living organisms without disrupting them, establishing a new method known as bioorthogonal reactions. Such reactions are now used to explore cells, track biological processes and design experimental cancer drugs that work in a more targeted fashion. Bertozzi said she was "absolutely stunned" to receive the prize. "I'm still not entirely positive that it's real, but it's getting realer by the minute," she said. Last year the prize was awarded to scientists Benjamin List and David W.C. MacMillan for finding an ingenious and environmentally cleaner way to build molecules that the Nobel panel said is "already benefiting humankind greatly."

A week of Nobel Prize announcements kicked off Monday with Swedish scientist Svante Paabo receiving the award in medicine for unlocking secrets of Neanderthal DNA that provided key insights into our immune system. Three scientists jointly won the prize in physics Tuesday. Frenchman Alain Aspect, American John F. Clauser and Austrian Anton Zeilinger had shown that tiny particles can retain a connection with each other even when separated, a phenomenon known as quantum entanglement, that can be used for specialized computing and to encrypt information. The awards continue with literature on Thursday. The 2022 Nobel Peace Prize will be announced on Friday and the economics award on Monday.

<https://www.dailypioneer.com/2022/world/nobel-prize-for-3-chemists-who-made-molecules---click-.html>



Wed, 05 Oct 2022

36 One Web Satellites Integrated, ISRO to Launch Constellation on GSLVMk-III This Month

The Indian Space Research Organisation is set to launch 36 satellites, part of a constellation by OneWeb in the final weeks of this month. The satellites have been integrated into the fairing of the rocket, which will carry them into Low Earth Orbit for deployment. "Exciting news from the Satish Dhawan Space Centre as we confirm the successful integration of all 36 satellites to our

dispenser for OneWeb Launch 14," the company said in a tweet. The satellites will be launched onboard the Geosynchronous Satellite Launch Vehicle Mark-III (GSLVMk-III). The rocket will liftoff at the end of this month from the Satish Dhawan Space Centre in Sriharikota on a journey to deploy the internet constellation. Isro is yet to say anything on the final launch date for the mission, which will be the third big mission for the Indian space agency this year.

Isro is currently integrating the GSLV, which will later be mated with the launch fairing that will carry the satellites. The lift-off is expected to happen late in the night in the final weeks of the month. The satellites arrived in India late last month after which work on their integration has been ongoing. The company in a release said that with this launch, OneWeb will have more than 70 per cent of its planned Gen 1 Low Earth orbit (LEO) constellation in orbit as it progresses to deliver high-speed, low-latency connectivity services around the world. The launch will be the company's 14th mission to deploy these satellites into orbit.

Radhakrishnan D, Chairman-cum-Managing Director, NewSpace India Limited had said that undertaking the launch of 36 OneWeb satellites onboard GSLV-MkIII from India is a historic moment for NSIL and Isro. We are excited to see the arrival of the satellites and the ground support equipment in India in preparation for the launch. NSIL has signed two launch contracts with OneWebb for deploying the broadband satellite constellation. The October launch will be the first commercial launch for GSLV-MkIII, which was previously used to launch the ambitious Chandrayaan-2 mission to the Moon.

<https://www.indiatoday.in/science/story/36-oneweb-satellites-integrated-isro-to-launch-constellation-on-gslvmk-iii-this-month-2008487-2022-10-05>

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