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A Daily service to keep DRDO Fraternity abreast with DRDO
Technologies, Defence Technologies, Defence Policies,
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Fri, 04 Nov 2022

India's DRDO Notches 'Big Success'; Tests Interceptor to Thwart Pakistan & China's Beyond 2000 Km Range Missiles

India's DRDO, on November 2, 2022, successfully tested the AD-1 interceptor missile, one of the two interceptor missiles of its Ballistic Missile Defense (BMD) Phase 2 system. The second interceptor missile, AD-2, is still under development. According to the PIB release announcing the test, the AD-1 "is propelled by a two-stage solid motor and equipped with an indigenously-developed advanced control system, navigation and guidance algorithm to precisely guide the vehicle to the target. "The AD-1 is a long-range interceptor missile designed for both low exo-atmospheric and endo-atmospheric interception of long-range ballistic missiles and aircraft. "During the flight test, all the sub-systems performed as per expectations and were validated by the data captured by several range sensors including Radar, Telemetry, and Electro-Optical Tracking stations deployed to capture the flight data," read the release.

In the photo released by the PIB, you can see the aerodynamic surfaces for maneuvering on the missile's second stage. Aerodynamic surfaces can only be used for maneuvering within the atmosphere. Exo atmospheric manoeuvring requires thrusters. The AD-1, with its limited exo-atmospheric capability, would be able to intercept ballistic missiles with a range of around 3,000 kilometers. Higher-flying, longer-range missiles would be handled by the AD-2, which would likely be a pure exoatmospheric interceptor. Together, the AD-1 and AD-2 can shoot down ballistic missiles up to a 5,000-kilometer range.

Phased Development Of BMD System

DRDO is developing India's BMD system in two phases under a capability-based deployment plan. In the first phase, which has been completed, the DRDO developed a system for defense against missiles with less than a 2,000-kilometer range, like Pakistan's Ghauri and Shaheen missiles and China's solid-fuel Dongfeng-21 (NATO designation: CSS-5). BMD Phase 2 can defend against missiles with ranges greater than 2,000 kilometers that can also deploy decoys or maneuvers. Longer-range missiles climb higher following a ballistic trajectory and hurtle down on the target at much greater speeds than shorter-range missiles. During their final phase, ICBM warheads can reach speeds twice those of intermediate-range missiles. The

Phase 2 system will feature longer-range radars (detection range of 1,500 kilometers as opposed to 600 kilometers for Phase 1 radars) and hypersonic interceptor missiles flying at Mach 6-7 (as opposed to Mach 4-5 for Phase 1 missiles) with agility and the capability to discriminate against ballistic missile defense countermeasures.

Phase 1 Radar

DRDO is developing an Over The Horizon (OTH) radar for Phase 2, based on the Swordfish radar acquired from Israel. Israel will provide some equipment and consultancy for the new radar, which would feature 80% indigenous components.

Missile Testing Infrastructure For BMD Phase 2 System

Phase 2 testing of the BMD system requires two ranges placed well apart along the missile trajectory. DRDO is developing two new missile ranges at Machilipatnam in Andhra Pradesh and Rutland Island in the Andamans. Target missiles would be launched from a floating test range (FTR), a 10,000-ton displacement ship under construction. A DRDO scientist told The Hindu that the FTR “will pave the way for conducting trials for different trajectories, varying altitudes and higher ranges. We can go up to 1,000-1,500 kilometers without any problem. Currently, we have to conduct simulation tests for longer ranges.”

Missile trajectories would be monitored using a missile-range instrumentation ship (MRIS). The ship built by Hindustan Shipyard Limited (HSL) Visakhapatnam has already been handed over to the Indian Navy for operations. The MRIS features an X-Band primary AESA radar and an S-Band secondary AESA radar. The tracking radars can track the inbound flight trajectories of surface and submarine-launched ballistic missiles, including any maneuverable warheads released by the missiles.

<https://eurasianimes.com/india-notches-big-success-interceptor-missile-that-aims-to-thwart/>



Fri, 04 Nov 2022

India can Destroy Enemy Missiles Fired at it from 5000 km away, Says DRDO

The Defence Research and Development Organisation (DRDO) on Thursday said India can now detect and destroy enemy ballistic missiles fired at it from 5,000 km. This comes a day after it launched the newly developed missile defence interceptor AD-1. The missile AD-1 is part of the phase 2 development programme of the Ballistic Missile Defence (BMD) shield and can destroy both ballistic missiles and low-flying fighter aircraft. "We initially developed the phase 1 capability to destroy incoming missiles of 2,000 km. Yesterday's test now helped us to intercept any missile of the 5,000 km strike range," DRDO chairman Samir Kamat said.

"If our enemies target from long range, we now have the capability to intercept. It is a significant jump in our capability against ballistic missiles," he said. Kamat said that once Indian systems pick up the enemy missile, "It will be able to track it, our defence system can be activated and

the missile can be intercepted." He said the missile is mainly endo-atmospheric but it also works in the low exoatmospheric region. "We are parallelly developing for a high exo-atmospheric region", he added. "By 2025, we should be able to prove our capability, including this AD-1 missile as well as the high exo-atmospheric missile. We are fully confident of making this by 2025," Kamat said.

Once the system is developed, the government will take a call on its deployment at different locations. The entire BMD system includes long-range tracking radars which can detect the launch of missiles from submarines, land-based systems, aerial platforms or warships.

<https://www.indiatoday.in/amp/india/story/india-detect-enemy-missile-from-5000-km-away-drdo-ad1-2293091-2022-11-04>



Thu, 03 Nov 2022

'If Enemies Target us...': DRDO Chief on Ballistic Missile Defence System

The AD-1 interceptor missile that completed its maiden test Wednesday is 'a significant jump' in the Indian military's ability to protect the country from long-range ballistic missiles, Defence Research and Development Organisation chief Dr Samir Kamat told news agency ANI Thursday. Dr Kamat said the Phase II BMD (ballistic missile defence) AD-1 can intercept any projectile of the 5,000 km-class. "If enemies target (us) from long range, we now have the capability to intercept. It is a significant jump in our capability against ballistic missiles," he said.

"Once our radars pick it (the enemy missile) up, it (the AD-1) will be able to track it... our defence system can be activated and (the) missile can be intercepted. It is mainly endo-atmospheric but also works in low exo-atmospheric region. We're developing for high exo-atmospheric region." Once operational and integrated, the two systems will provide the country with a multi-layered defence against incoming ballistic missiles, defence ministry officials said. The system offers a hit-to-kill probability of 99.8 per cent. The ministry said the AD-1 can also be deployed against enemy aircraft.

Propelled by a two-stage solid motor, the missile has advanced (indigenously developed) control, navigation and guidance systems to strike with precision. The AD-1 - described by officials as a missile with a 'large kill-altitude bracket' - was test-fired from the APJ Abdul Kalam island off the Odisha coast. Officials said 'all systems performed as per expectations'. Defence minister Rajnath Singh called the missile 'unique' and said it had technology 'available only with a few countries'.

<https://www.hindustantimes.com/india-news/if-enemies-target-us-drdo-chief-on-ballistic-missile-defence-system-101667471591207.html>

DRDO on Twitter



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[#DRDOUpdates](#) | [#DRDO](#) is displaying export ready homegrown technologies in 9th edition of Indo Defence Expo and Forum (IDEF) from 2-5 Nov 2022 in Jakarta, Indonesia. Exhibits include LCA Tejas, AEW&C, BVVR Astra, Akash, Weapon Locating Radar etc.

[#MakeInIndiaMakeForTheWorld](#)



👤 रक्षा मंत्री कार्यालय/ RMO India and A. Bharat
Bhushan Babu

9:14 PM · Nov 3, 2022 · Twitter for iPhone

THE ECONOMIC TIMES

Thu, 03 Nov 2022

Indian Army Gets Exclusive Rights of New Combat Uniform

The Indian Army on Thursday received exclusive Intellectual Property Rights (IPR) of the new Camouflage Pattern and Design of Improved Combat Uniform. The registration process to establish ownership of Indian Army was completed by the Controller General of Patents, Designs and Trademark. The new Digital Pattern Combat Uniform for Indian Army soldiers was unveiled on 15 January 2022 (Army Day). The improved uniform has a contemporary look and functional design. The fabric has been made lighter, stronger, breathable, quick drying and easier to maintain. The uniform's uniqueness is evident with the inclusion of gender specific modifications for women's combat uniform. "The exclusive Intellectual Property Rights (IPR) of the Design and Camouflage Pattern now rests solely with the Indian Army, and therefore manufacturing by any vendor who is not authorised and will be illegal and is liable to face legal repercussions," said the Ministry of Defence on Thursday.

Indian Army can enforce exclusive rights to the design and can file infringement suits by way of a civil action before a competent court of law. Remedies against infringements include interim and permanent injunctions as well as damages. As part of the process of introduction of the new pattern uniform, a total of 50,000 sets have already been procured through Canteen Stores Department (CSD) and delivered to 15 CSD Depots (Delhi, Leh, BD Bari, Srinagar, Udhampur, Andaman & Nicobar, Jabalpur, Masimpur, Narangi, Dimapur, Bagdogra, Lucknow, Ambala, Mumbai and Khadki). Officials said that workshops to train civil and military tailors in stitching the new uniform as per the specified design are being organised in coordination with instructors from the National Institute of Fashion Technology (NIFT), Delhi. Bulk procurement of 11.70 lakh sets to cater for issue to JCOs and ORs as part of individual kit (Life Cycle Concept with life of 15 months) is in progress and is likely to commence from August 2023.

<https://economictimes.indiatimes.com/news/defence/indian-army-gets-exclusive-rights-of-new-combat-uniform/articleshow/95277983.cms>

नवभारत टाइम्स

गुरुवार, 03 नवंबर 2022

भारत का 'आयरन डोम' है बीएमडी, चीन-पाकिस्तान नहीं कर पाएंगे परमाणु हमला, S-400 से होती है तुलना

भारत ने बलिस्टिक मिसाइल डिफेंस (BMD) इंटरसेप्टर मिसाइल का ओडिसा तट पर सफल परीक्षण किया है। यह सिस्टम लंबी दूरी तक मिसाइलों और एयरक्राफ्ट को मार गिराने में सक्षम है। दरअसल, चीन और पाकिस्तान की किलर मिसाइलों, फाइटर जेट और विस्फोटकों से लैस ड्रोन विमानों का खतरा बढ़ता जा रहा है। इसी से निपटने के लिए भारत अब अभेद्य सुरक्षा कवच हासिल कर रहा है और इजरायल की तरह से अपना 'आयरन डोम' बना रहा है। भारत अपने बीएमडी सिस्टम को रूस से मिले एस-400 एयर डिफेंस सिस्टम के साथ ही आगे बढ़ा रहा है। ताजा परीक्षण में बीएमडी की AD-1 इंटरसेप्टर मिसाइल ने सफलतापूर्वक अपने लक्ष्य को हासिल किया। बीएमडी सिस्टम को इस तरह से बनाया गया है कि परमाणु हमले को भी विफल किया जा सके। आइए जानते हैं कि क्या है AD-1 मिसाइल और कैसे भारत अपने स्वदेशी आयरन डोम को मैदान-ए-जंग के लिए तैयार कर रहा है!

डीआरडीओ के बनाए बीएमडी सिस्टम की AD-1 इंटरसेप्टर मिसाइल लंबी दूरी तक मार करने में सक्षम है। इस मिसाइल को वातावरण के बाहर और वातावरण के अंदर मौजूद बलिस्टिक मिसाइलों और फाइटर जेट को मार गिराने के लिए डिजाइन किया गया है। यह मिसाइल दो चरणों वाले सॉलिड मोटर से चलती है। इसमें भारत में विकसित किया गया अत्याधुनिक कंट्रोल और नेविगेशन सिस्टम लगाया गया है। यह नेविगेशन सिस्टम AD-1 मिसाइल को बहुत तेज गति से अपने लक्ष्य की ओर बढ़ने में मदद करती है। डीआरडीओ ने बताया कि इस मिसाइल परीक्षण के दौरान सभी सबसिस्टम ने बखूबी काम किया और पूरे रास्ते में तैनात किए गए सेंसर ने इसकी पुष्टि की है। वैज्ञानिकों ने बताया कि पूरी तरह से सक्रिय बलिस्टिक मिसाइल डिफेंस सिस्टम में हाई पावर रेडार लगे होते हैं।

कारगिल युद्ध के समय पड़ी थी भारत को बीएमडी की सख्त जरूरत

डीआरडीओ के वैज्ञानिकों ने बताया कि इस सिस्टम की मदद से एक बड़े इलाके को दुश्मन के मिसाइल या अन्य हवाई हमलों से बचाया जा सकता है। रक्षा मंत्री राजनाथ सिंह ने कहा कि यह अत्याधुनिक तकनीक दुनिया में कुछ ही देशों के पास मौजूद है। भारत को इस सिस्टम की सख्त जरूरत कारगिल युद्ध के समय साल 1999 में पड़ी थी। पाकिस्तान अपनी मिसाइल क्षमता को लगातार बढ़ा रहा था। चीन भी पाकिस्तान को मिसाइल कार्यक्रम में लगातार मदद दे रहा था। भारत के बीएमडी सिस्टम का पहला चरण माना जाता है कि साल 2010 के आसपास पूरा हो गया था। इस एयर डिफेंस सिस्टम को पृथ्वी मिसाइल की मदद से

तैयार किया गया है। इसकी मदद से दुश्मन की 2000 किमी तक मार करने वाली मिसाइलों को हवा में ही नष्ट किया जा सकता है।

अमेरिकी थॉड की तरह होगा भारत का एयर डिफेंस सिस्टम

सूत्रों के मुताबिक भारत के बीएमडी कार्यक्रम का दूसरा चरण एक अभेद्य एंटी बलिस्टिक मिसाइल सिस्टम बनाने पर फोकस है। भारत का यह सिस्टम ठीक उसी तरह से हो सकता है जिस तरह से अमेरिका का थॉड है। अमेरिका ने दुनिया के कई देशों में थॉड एयर डिफेंस सिस्टम को तैनात कर रखा है और यह मध्यम दूरी यानि 5000 किमी की मारक क्षमता वाली बलिस्टिक मिसाइलों को मार गिराने में सक्षम है। यही नहीं भारत अब AD-II इंटरसेप्टर मिसाइल को बनाने में जुट गया है जो ज्यादा दूरी तक अपने दुश्मन का शिकार कर सकती है। पृथ्वी मिसाइलों के आधार पर बनाया गया एयर डिफेंस सिस्टम 50 से 80 किमी तक मिसाइलों को हवा में ही तबाह कर सकता है। अब इसकी जगह पर प्रदुमन बलिस्टिक मिसाइल इंटरसेप्टर को बनाया जा रहा है। इस सिस्टम के दूसरे चरण को अडवांसड एयर डिफेंस या एएडी कहा जाता है। एएडी निचले स्तर पर उड़ने वाली मिसाइलों को मार गिराने में सक्षम है। इसकी मारक क्षमता 15 से 40 किमी है। भारत की आकाश मिसाइल को एएडी का हिस्सा बनाया गया है।

रूस का एस-400 सिस्टम बनाम भारत का बीएमडी, जानें ताकत

भारत ने अपनी हवाई सुरक्षा को चाक चौबंद करने के लिए रूसी ब्रह्मासूत्र कहे जाने वाले एस-400 सिस्टम को भी खरीदा है। एस-400 को भारतीय वायुसेना में शामिल भी किया जा रहा है। रूस का एस-400 सिस्टम दुनिया के सबसे आधुनिक कहे जाने वाले एयर डिफेंस सिस्टम में शामिल है। यह रूसी सिस्टम हर तरह के हवाई खतरे जैसे मिसाइल, यूएवी और फाइटर जेट को मार गिराने में सक्षम है। इसका बेहद शक्तिशाली रेडॉर पाकिस्तान और चीन से आने वाले किसी भी हवाई खतरे को सूंघने में माहिर है। विशेषज्ञों के मुताबिक एस-400 भारतीय उपमहाद्वीप में गेम चेंजर हथियार है।

इन दोनों ही सिस्टम से अब भारत की हवाई क्षमता कई गुना बढ़ गई है। डीआरडीओ के मुताबिक भारतीय बीएमडी सिस्टम की दुश्मन को मार गिराने की संभावना लगभग 99.8 है। भारत ने इसमें आने वाले भारी खर्च और पाकिस्तान के जवाबी कदम उठाने और परमाणु मिसाइलों की संख्या बढ़ाने के खतरे को देखते हुए अभी तक इस सिस्टम को पूरी तरह से ऑपरेशनल नहीं किया है। दुनिया में अमेरिका, रूस, चीन और इजरायल के पास अपना खुद का बीएमडी है। भारत ने अपने बीएमडी सिस्टम को बनाने में इजरायली मदद भी ली है।

<https://navbharattimes.indiatimes.com/world/science-news/india-tests-ballistic-missile-defence-interceptor-capable-missile-know-how-is-it-different-from-russia-s-400-system/articleshow/95272664.cms>



Press Information Bureau
Government of India

Ministry of Defence

Thu, 03 Nov 2022

Conclusion of Naval Commanders' Conference - 2022/02

The bi-annual Naval Commanders' Conference concluded on 03 Nov 22. The Hon'ble Raksha Mantri interacted with the Senior leadership of the Indian Navy during the Naval Commanders' Conference on 02 Nov 22. He witnessed a Tech Demonstration along the sidelines of the Conference. He appreciated the Navy for the efforts invested towards indigenisation and innovation in the recent years, while urging the Naval Commanders to maintain focus on futuristic capability development for effectively overcoming emerging challenges in the Maritime Domain. The Hon'ble RM also commended the Navy for maintaining a high Operational tempo towards ensuring secure seas for national security and prosperity. He congratulated the Navy for successful commissioning of INS Vikrant, India's first indigenously designed and constructed Aircraft Carrier and adoption of a new Naval Ensign, shedding vestigial linkages to our colonial past.

In consonance with the views of the Hon'ble RM, the Chief of Defence Staff, in his maiden address to the Naval Commanders since assuming charge, reiterated the need for Operational preparedness, Aatmanirbharta and the need for further integration in the Armed Forces towards collectively meeting India's National Security imperatives. The Chief of Army Staff, the Chief of Air Force Staff and the Chief of Integrated Defence Staff to the Chairman, Chiefs of Staff Committee (CISC) also interacted with the Naval Commanders and discussed avenues of further augmenting Tri-Services' synergy and readiness, considering the prevailing Security environment. The Conference provided an opportunity to the Naval Commanders to introspect on important Maritime matters at the Military Strategic level. Along the sidelines of the conference, the Naval Commanders also interacted with various 'Think Tanks' on Strategic issues.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1873547>

THE ECONOMIC TIMES

Thu, 03 Nov 2022

Indian Navy must Remain Combat Ready and Credible Force: Navy Chief

The Indian Navy must remain a "combat-ready, credible, cohesive and future-proof force" to navigate the turbulent security scenario, Navy chief Admiral R Hari Kumar said in an address to top naval commanders amid China's increasing assertiveness in the Indian Ocean region.

Referring to various challenges facing India in the maritime domain, the admiral talked about the "complex security landscape", terrorism, the rise of "non-state actors" and the expanding

influence of "large corporations", saying they are influencing the strategic and security calculus. He was addressing the naval commanders' conference that concluded on Thursday after deliberations for four days. In his remarks, Chief of Defence Staff General Anil Chauhan reiterated the need for operational preparedness, self-reliance and the need for further integration in the armed forces towards collectively meeting India's national security imperatives.

The Navy said the conference provided an opportunity to the naval commanders to introspect on important maritime matters. The Chief of Naval Staff also emphasised on tri-services integration. "There is a national level focus on jointness -- we need to work towards it with complete sincerity of purpose," he said. "In navigating the turbulent security scenario, I am convinced that remaining a combat-ready, credible, cohesive and future-proof force, enabled by a 'ship first' outlook, is vital," the Navy chief said. "This dyad, to my mind, would drive the twin aspects of continuity and change, enabling us to effectively follow an aspirational trajectory into the future," he said. Admiral Kumar said terrorism, gun and narcotics smuggling, and other such threats will continue to pose challenges. "I am equally convinced that keeping the man or woman in the field central to all our endeavours will, automatically, translate into enhanced agility, adaptability, and ability being infused into the Navy," he said.

"Let us continue with our efforts to bring about the changes that we need. To that end, I have clearly articulated my expectations -- each one of which can be achieved, quite simply, by everyone doing their duty and doing it well -- and this will help us in moving from slogan to action," Admiral Kumar said. The Navy chief also spoke on the need for developing infrastructure and focused on issues such as materiel and logistics planning as well as suitable human resource development. All operational and area commanders of the Indian Navy participated in the conference.

<https://economictimes.indiatimes.com/news/defence/indian-navy-must-remain-combat-ready-and-credible-force-navy-chief/articleshow/95284644.cms>

THE ECONOMIC TIMES

Thu, 03 Nov 2022

Army Starts Process to Procure 120 Loitering Munitions, 10 Aerial Targeting System

The Indian Army has started the process to procure 120 loitering munitions and 10 aerial targeting systems to bolster its military might along the frontier with China, officials said on Thursday. The loitering munitions and the aerial targeting systems are being procured under the fast track procedure within the framework of 'buy Indian' category, they said. The officials said the request for proposal or initial tender for the procurement will be issued around November 14. Under the prescribed specifications, the aerial targeting systems will be required to have a range of 100 km.

The Indian Army has been ramping up its overall combat capabilities in view of the lingering border row with China in eastern Ladakh. It has significantly bolstered its fire power along the

frontier with China by deploying a range of rockets and artillery weapons and it plans to procure an array of additional systems including 100 K9 Vajra howitzers and UAVs to further augment combat prowess. The Artillery units of the Indian Army already deployed K-9 Vajra Tracked Self-Propelled Howitzers, ultra-light M-777 howitzers, Pinaka rocket systems and Dhanush gun systems.

<https://economictimes.indiatimes.com/news/defence/army-starts-process-to-procure-120-loitering-munitions-10-aerial-targeting-system/articleshow/95284745.cms?from=mdr>



Fri, 04 Nov 2022

Indian Army Set to Buy Kamikaze Drones in Bid to Improve Aerial Targeting Defence System

In a significant move to up its drone game, the Indian Army is set to buy Kamikaze drones. At least 10 sets of aerial targeting systems along with 120 loitering munition will be bought through the Made-in-India route. Notably, Kamikaze drones are the same drones that were used in the Russia-Ukraine war. While the Indian Air Force has been operating the much larger Harop loitering munition for over a decade, the army is now moving towards the purchase of Kamikaze drones. These drones have the capacity to loiter for hours before hitting the intended target to destroy it completely. The development came after drones or Unmanned Aerial Vehicles (UAV) are increasingly becoming the preferred weapon of choice for the armed forces around in India in recent months.

What are Kamikaze drones?

A Kamikaze drone is an aerial weapon system in which the munition waits passively and attacks the target once located. These munitions allow more selective targeting. Their name comes from the World War 2 era's feared Japanese kamikaze pilots, who conducted suicide attacks by crashing their explosive-filled aircraft into enemy targets. During Russia's invasion of its southern neighbour, Ukraine's military claimed that it encountered Kamikaze drones in their war-torn country in October. The claim was made after Russian President Vladimir Putin warned Ukraine of a nuclear attack.

What are loitering munitions?

Loitering munition is a category of weapon systems, which are unmanned and are designed to engage beyond line-of-sight ground targets with an explosive warhead. They are a mix of a surface-to-surface missile and a drone. Being different from a missile, loiter munitions can be launched in a manner similar to a drone. They can also stay in the air for a longer time, surveying a designated area and seeking targets. Once a target is identified and locked on, they act as a missile to destroy the target aimed. Notably, Loiter munitions are smaller in size, cheaper and less complex systems than combat or armed drones.

<https://www.republicworld.com/india-news/general-news/indian-army-set-to-buy-kamikaze-drones-in-bid-to-improve-aerial-targeting-defence-system-articleshow.html>

Thu, 03 Nov 2022

Indian Army Seeks more than 2,200 Drones

The Indian Army has launched a series of fast-track drone procurement efforts under emergency powers that will see the service spend up to 3 billion rupees (U.S. \$36 million) for each program.

The new tenders are for:

- 163 high-altitude logistics drones.
- 200 medium-altitude logistics drones.
- 1,000 unmanned surveillance helicopters.
- 750 remotely piloted aerial vehicles.
- 80 mini-remotely piloted aircraft systems.
- 10 runway-independent remotely piloted aircraft systems.

According to the Defence Ministry, orders are to be fulfilled within one year after contract signing.

On Oct 16, the Army issued two tenders to procure 363 drones in keeping with its commitment to fight future wars with indigenous solutions. That planned order includes 163 drones that can operate at high altitudes, while the remaining 200 are meant for medium altitudes. The Army requires 60% of each system includes indigenous material. Each drone system should include one UAV, one man-portable ground control station, one color video camera for daytime and one monochromatic nighttime thermal sensor. The system should weigh 100 kilograms (220 pounds) and be able to withstand strong winds at high altitudes. The drone should have a mission range of 10 kilometers (6 miles), an endurance of 40 minutes and a shelf life of 1,000 landings.

On Oct. 18, another tender was issued for the procurement of 1,000 surveillance copters. Each surveillance system should come with one aerial vehicle, one man-portable ground control station, one remote video terminal, one color video camera for daytime, one monochromatic nighttime thermal sensor and two sets of spare batteries. Each surveillance copter should weigh 10 kilograms, have a mission range of 5 kilometers and operate at an altitude of 5,000 meters with one-hour endurance. The system must have a shelf life of 1,000 landings. The tender for 750 remotely piloted aerial vehicles, issued Oct. 21, said the Army wants each system to weigh 2 kilograms and have an endurance of 30 minutes. The government also said it should only take one person 10 minutes to launch the drone, which should be able to operate in the day and night as well as autonomously generate and execute a flight plan based on a 3D scan of an area as defined by the user using augmented reality or coordinates.

The call for 80 mini-remotely piloted aircraft systems, issued Oct. 20, requires the ability to perform tactical surveillance to locate adversaries as well as their equipment and weapons systems in a particular area. Each system is to include two aerial vehicles, two man-portable ground control stations, one launch and recovery system, two remote video terminals, two color

video cameras for daytime, two monochromatic nighttime thermal sensors, and two training payloads. The systems should have a mission range of 15 kilometers, have an endurance of 90 minutes and be able to operate at an altitude of 4,500 meters. The remote vehicles should have a shelf life of 500 landings, or about seven years. The systems should also be suitable to withstand strong wind currents. The open tender for the purchase of 10 runway-independent drones, issued Oct. 28, also calls for four ground control stations, four remote video terminals, and eight sensor packages/payloads for use in the day and night, with inter- and intra-communications systems as well as the facility to transmit imagery in real-time.

The drones are to have a service and shelf life of 10 years. “The system will provide high-resolution imagery to enable target detection, recognition, identification and accurate location of adversary’s location/build-up, location of mortars/guns, movement to troops and vehicles during border management tasks and active operations. It will also facilitate accurate engagement and direction of artillery fire,” the tender read. Based on experience and prior industrial activities, it’s possible these state-run domestic companies could compete for one or more contracts: Bharat Electronics Ltd., Bharat Dynamics Ltd. and Hindustan Aeronautics Ltd. Those in the local private sector likely to bid are: Bharat Forge, Alpha Design Technologies, Adani Defence, Larsen & Turbo, Mahindra Defence Systems, Paras Aerospace, Kadet Defence Systems, ideaForge, Newspace Research and Technologies, VOTL Aviation India, and Tata Advanced Systems.

<https://www.defensenews.com/unmanned/2022/11/03/indian-army-seeks-more-than-2200-drones/>

अमर उजाला

शुक्रवार, 04 नवंबर 2022

अपनी ताकत दिखाएंगे शिवालिक और कमोर्ता, जापान पहुंचे दोनों जंगी जहाज, 4 राष्ट्र लेंगे हिस्सा

भारतीय नौसेना के दो अग्रिम श्रेणी के जंगी जहाज शिवालिक और कमोर्ता जापान में होने वाले मालाबार युद्धाभ्यास में अपना कौशल दिखाएंगे। नौसेना के अधिकारी ने बृहस्पतिवार को बताया कि 9-18 नवंबर के बीच जापान के योकोसूका में होने वाले चार देशों के युद्धाभ्यास में हिस्सा लेने के लिए दोनों जंगी जहाज वहां पहुंच चुके हैं। युद्धाभ्यास में अमेरिका व ऑस्ट्रेलिया हिस्सा लेंगे। दक्षिण व पूर्वी चीन सागर में चीन के बढ़ते सैन्य दखल से उत्पन्न वैश्विक चिंताओं के बीच चारों देश यह युद्धाभ्यास कर रहे हैं। अभ्यास में कई डोमेन के साथ-साथ जटिल सतह, उप-सतह और वायु संचालन में ‘उच्च गति’ अभ्यास देखा जाएगा, जिसमें लाइव फायरिंग ड्रिल भी शामिल है।

अंतरराष्ट्रीय फ्लीट रिव्यू में भी हिस्सा लेंगे दोनों जहाज : नौसेना के दोनों जंगी जहाज 6 नवंबर को सागामी की खाड़ी में होने वाले अंतरराष्ट्रीय फ्लीट रिव्यू में भी हिस्सा लेंगे। आईएफआर की मेजबानी

जापान मैरीटाइम सेल्फ डिफेंस फोर्स (जेएमएचडीएफ) की 70वीं वर्षगांठ को चिह्नित करने के लिए की जा रही है। आईएफआर की समीक्षा जापानी प्रधान मंत्री फुमियो किशिदा करेंगे।

पाकिस्तान सीमा पर गरजे सुखोई-तेजस

भारत-फ्रांस की वायुसेना के सातवें संयुक्त युद्धाभ्यास 'गरुड़' के दौरान बृहस्पतिवार को पाकिस्तान सीमा पर सुखोई व तेजस की गर्जना सुनाई दी। तस्वीर में जोधपुर बेस पर अभ्यास के दौरान जवान।

- 220 फ्रांसीसी सैनिकों की टुकड़ी ले रही युद्धाभ्यास में भाग।
- 4 राफेल व मल्टी रोल टैंकर ट्रांसपोर्ट आए हैं फ्रांस से।

<https://www.amarujala.com/india-news/two-indian-navy-ships-reach-japan-to-participate-in-fleet-review-join-exercise-malabar>

Firstpost.

Thu, 03 Nov 2022

DefExpo 2022 Paves the Way for a New Golden Era of India-Africa Defence Cooperation

By Samir Bhattacharya

The DefExpo 2022 took place in Gandhinagar, Gujarat, between 18 and 22 October 2022. Initially scheduled to take place in March 2022, it was postponed due to logistic challenges. During the meeting, the magnitude of India's flagship Land, Naval, and Homeland Security Systems exhibition ensured that DefExpo 2022 became the most extensive defence exhibition in Asia. The event brought together the nation's all high-end weapons and defence platforms under one roof. As a matter of fact, this was the first event solely dedicated to showcasing Made-in-India marquee products. There were over 1,000 exhibitors registered, the maximum number of exhibitors in the history of DefExpo. Furthermore, as another highlight of the mega-event, the local IIT Delhi start-up Botlabs (an iDEX winner) displayed the largest drone show ever.

India-Africa Defence Ministers' Conference

On the sidelines of DefExpo 2022, the second edition of the India-Africa Defence Dialogue (IADD) took place. In February 2020, parallel to the 11th DefExpo, the first India-Africa Defence Ministers' Conference (IADMC) was held in Lucknow, Uttar Pradesh. The creation of the IADMC led to the successful institutionalisation of defence cooperation between the two continents. During the summit, the Government of India decided to institutionalise the India-Africa Defence Dialogue as a side event alongside the DefExpo. Now, the second IADD that was attended by fifty African countries, including twenty Defence Ministers, seven CDS/Service Chiefs and eight Permanent Secretaries reflects the high priority accorded to India-Africa engagement in defence and security. The dialogue effectively highlighted several facets of the

IADD's theme of the event, "India-Africa: Adopting Strategy for Synergizing and Strengthening Defence and Security Cooperation".

In his keynote address, the Defence Minister of India, Rajnath Singh described the IADD's central theme as the shared determination of African and Indian nations to investigate new frontiers in defence cooperation, such as capacity building, training, cyber security, maritime security, and counterterrorism. He duly emphasised the strong relationship between India and Africa, which is founded on the regional framework of cooperation known as "SAGAR" (Security and Growth for All in the Region) and inspired by the traditional spirit of "Vasudhaiva Kutumbakam" (The World is One Family). Additionally, he engaged in bilateral discussions with several of his counterparts from African countries, such as Mauritania, Gambia, and the Central African Republic (CAR).

As an IADD 2022 result document, "Gandhinagar Declaration" calling for enhancing collaboration in the area of training in all areas of shared interest was also endorsed. Defence Minister Singh made the event's most significant announcement when he launched the "India-Africa Security Fellowship Programme." The Manohar Parrikar Institute for Defence Studies and Analyses (MP-IDSA) will host the fellowship. The fellows would receive some stipend while working in MP-IDSA for a time period of one to three months.

India's Defence Agreements with Africa

The Ministry of Defence targets to achieve exports worth Rs 35,000 crore by 2025, up from last year's Rs 13,000 crore. Clearly, Africa will play a significant role in it. In his address to the Ugandan Parliament in July 2018, Indian Prime Minister Narendra Modi outlined the ten guiding principles of India's engagement with Africa. Principle seven of India's development cooperation explicitly targets developing partnerships in combating terrorism and promoting peacekeeping and cyber security. And keeping his promises, in the last 4-5 years, the security cooperation between India and Africa has indeed become a significant area of collaboration, generating unprecedented opportunities.

Albeit, India-African defence cooperation has a long and rich history. India has opened defence Academies and Colleges in several African nations, including the Naval War College in Nigeria, the Military Academy in Ethiopia, and the Ghanaian Air Force. India has also dispatched training teams to several African nations. These military training units have cooperated with their corresponding equivalents in Botswana, Lesotho, Zambia, Uganda, Namibia, Tanzania, Mauritius, and Seychelles. Additionally, India has taken part in nearly all the African missions so far and has been a part of UN peacekeeping operations (UNPKO) since the first UN Mission in the Congo. India is currently the fourth-largest supplier of soldiers to PKO in Africa. Since independence, India has sent about 200,000 troops and police officers to serve with blue helmets. Currently, 4,483 Indian soldiers are engaged in peacekeeping operations in the following five African countries: Somalia, Sudan, South Sudan, Congo, and Morocco.

India also deployed an all-female police force to Liberia in 2007 as part of the United Nations Mission in Liberia (UNMIL). In the history of UN peacekeeping, this was the first all-female police squad. The women in the force were praised as role models for their exemplary nine years of service. They also helped to increase the number of women serving in the security forces in Liberia and beyond. Furthermore, India has forged strong relationships with African nations thanks to its unique offers for training African military professionals at important Indian institutes like the NDA, IMA, DSSC, and NDC. Because of the professionally designed, yet

apolitical training programmes of the Indian Army, these courses are well appreciated in Africa. Today, there are several army officers in various African countries who received their training from India. H.E. Buhari, the current president of Nigeria, attended Wellington's Defence Services Staff College in Tamil Nadu.

In recent years, India has actively assisted Africa in its attempts to combat terrorism, maintain peace, and strengthen cybersecurity. Africa-India Field Training Exercise-2019 (AFINDEX-19), India's first-ever joint exercise with African nations, took place in Pune in March 2019. The first iteration of the exercise had participation from 17 African countries in total. The AFINDEX-19 exercise was created to assist participating nations in organising and carrying out peacekeeping and humanitarian mine action (HMA) operations. India's maritime cooperation with African nations, particularly those in the East & Southern African region, is also growing. With the Navy of Brazil and South Africa, the Indian Navy took part in Exercise IBSAMAR-VI in South Africa in 2018. Additionally, as part of the exercise, Indian ships were stationed at Seychelles, Mauritius, Reunion, Madagascar, and Comoros nations in the Southern Indian Ocean Region.

The Indian Navy also took part in the VARUNA exercise on Reunion Island. Since September 2022, INS Tarkash has been on operational deployment in the crucial Gulf of Guinea on the West Coast of Africa. After visiting Togo and Nigeria, the ship is currently stationed at Gabon, the first ever visit by an Indian Navy ship to Gabon. For naval forces, the Indian Navy also holds the biannual Milan Exercise. After a four-year hiatus, Milan 2022 was held in March 2022 and featured participation from nearly 40 nations and 26 ships. This year, as an aftereffect of the widespread pandemic, many African countries withdrew. However, African nations like Kenya, Mauritius, and Seychelles took part.

The future of India-Africa Defence Cooperation

India has come a long way from licence production in 1960 to its current 5th generation weaponry. During the previous eight years under Prime Minister Narendra Modi's leadership, India has prioritised the production of defence goods. And today, India has successfully positioned itself as an emerging defence manufacturing powerhouse, with numerous international orders being won by Indian companies in recent years.

In January 2022, India and the Philippines agreed to the export of the Brahmos supersonic cruise missile for \$375 million. The size of this defence export was unprecedented in independent India's history. In order to improve its military capability, the Philippines has also expressed interest in purchasing Tejas light combat aircraft and advanced light helicopters (ALH) made in India. Many other Southeast Asian nations, including Thailand, Vietnam, and Indonesia, may express interest in purchasing defence products made in India. Defence cooperation must be prioritised in the strategic alliance between India and Africa. Indeed, both continents have a long-term strategic need for military diplomacy. Over the years, India's defence and security cooperation approach has remained natural and based on ground requirements. It emphasises the empowerment of African counterparts through training, capacity building, and humanitarian aid.

India's naval capabilities have become the "new frontier" in providing humanitarian assistance and disaster relief (HADR). India has a significant cost advantage over Africa's conventional security partners. The IADD successfully brought out India's vision 2047. This was perfectly in line with Prime Minister Narendra Modi's goal of transforming India into a powerful and independent country by promoting, showcasing, and establishing alliances for the country's aerospace and defence manufacturing industries with domestic as well as international clients.

DefExpo 2022 demonstrated the strength of India's defence manufacturing sector, which is now fuelling the government's and the country's overall drive "Make in India, Make for the World". The time is opportune to take this India Africa Defence cooperation to the next level.

<https://www.firstpost.com/opinion-news-expert-views-news-analysis-firstpost-viewpoint/defexpo-2022-paves-the-way-for-a-new-golden-era-of-india-africa-defence-cooperation-11418211.html/amp>



Press Information Bureau
Government of India

Thu, 03 Nov 2022

Defence Secretary & Chief Operations Officer, Royal Bhutan Army Meet in New Delhi to Enhance Bilateral Defence Cooperation

Chief Operations Officer, Royal Bhutan Army (COO, RBA) Lt Gen Batoo Tshering called on Defence Secretary Shri Giridhar Aramane in New Delhi on November 01, 2022 during his visit to India. During their interaction, they discussed ongoing defence cooperation between the two country's Armies and reviewed areas of mutual interest to increase cooperation. The Defence Secretary congratulated Lt Gen Batoo Tshering on completion of 17 years as the COO, RBA. Lt Gen Batoo Tshering was enthusiastic about the positive connect with Indian Military Training Team and acknowledged their contribution to the well-being of Bhutan since 1962.

Shri Giridhar Aramane acknowledged the National Service Program (Gyalsung) launched by His Majesty Jigme Khesar Namgyel Wangchuck. He discussed possible avenues of cooperation between India and Bhutan in the area of skill development of youth. Lt Gen Batoo Tshering was appreciative of the review he carried out of the Passing Out Parade at Officers Training Academy, Chennai. The Defence Secretary and COO, RBA acknowledged the strong bonds of friendship between India and Bhutan and reinforced the commitment of both sides to continue the bonhomie and friendship.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1873413>



Thu, 03 Nov 2022

India Abstains on Russia-Sponsored Draft Resolution at UNSC for Probe on Ukraine's Alleged Bio Weapons

India has abstained on yet another resolution involving Ukraine, this time a motion sponsored by Russia at the UNSC that sought to establish a commission to investigate claims by Moscow that

the US and Ukraine are carrying out “military biological activities” in laboratories in Ukraine in violation of the biological weapons convention. The resolution failed to get adopted Wednesday as only two Council members – Russia and China – voted in its favour, while the US, the UK and France voted against it and the other Council members, including India, abstained. In the explanation of the vote, Counsellor A. Amarnath from India’s Permanent Mission to the UN said India attaches high importance to the Biological Weapons Convention (BWC), which is the first non-discriminatory disarmament treaty banning a complete category of weapons of mass destruction.

“We remain committed to enhancing the effectiveness of the BWC and strengthening its implementation in letter and spirit,” he said. Amarnath said that India also reiterates the need to negotiate a comprehensive legally binding protocol providing for an effective, universal and non-discriminatory verification mechanism to strengthen the implementation of the Convention. “This is necessary to strengthen the BWC and its implementation by the State Parties and we hope the current situation will provide an impetus for early consideration, negotiation and finalization of such a protocol by the State Parties. Factoring in all these aspects, India has decided to abstain from the resolution,” he said.

US Ambassador Linda Thomas-Greenfield, in her statement on the UN Security Council (UNSC) resolution proposed by Russia on alleged bioweapons in Ukraine, said Washington “voted against this resolution because it is based on disinformation, dishonesty, bad faith, and a total lack of respect for this body.” She said Russia has failed to provide any credible evidence to support these false allegations. “And as you can see from the vote today, no one is buying it except China. I will not devote any more time, energy, or resources to these lies from Russia. Nor should the rest of the Security Council. Not while troops still occupy Ukrainian territory. And not while Russian forces continue to attack Ukrainian civilians and commit war crimes. Instead of letting Russia waste our time, we should focus on the truth and the horrors Russia has inflicted upon the Ukrainian people.

” Russian First Deputy Permanent Representative Dmitry Polyanskiy, speaking before the UNSC vote, said the vote “will mark an important milestone for the Security Council.” In his statement after the resolution failed to get adopted, Polyanskiy said Moscow “will continue to act within the BTWC (Biological and Toxin Weapons Convention) framework and make the necessary efforts to establish all the facts related to the violation by the United States and Ukraine of obligations under the BTWC in the context of the activities of biological laboratories on Ukrainian territory. Sooner or later, all perpetrators will have to be accountable for such illegal activities in front of the global community anyway.”

Referring to comments by Polyanskiy, Thomas-Greenfield said “Russia said this is a milestone. It is. It is a milestone for Russia’s deception and lies. And the world sees it. An overwhelming number of the States Parties that spoke at the Geneva meeting considered that the issues raised by Russia were unsubstantiated and had been conclusively addressed. But that wasn’t enough for Russia.” Amarnath noted that India had participated in consultations in Geneva in September on the matter under consideration and had expressed its views on this issue and had also expressed them during the meetings of the Council earlier. “I reiterate that any matter relating to the obligations under the BWC should be addressed as per the provisions of the Convention and through consultations and cooperation between the relevant parties,” Amarnath said. Amarnath added that India would like to underline the important role of international cooperation in the

field of peaceful biological activities and the related exchange of scientific and technical information.

“India emphasizes the full and effective implementation of Article 10 of the Convention and underlines that biological related activities for peaceful purposes that are fully consistent with the Convention’s obligations should not be undermined,” he said. Last week, Russian Permanent Representative Vassily Nebenzia said at a Security Council meeting that Moscow will put forward the draft resolution that will call for setting up and dispatching a commission to investigate the claims against the US and Ukraine regarding compliance with their obligations under the (BTWC) and activities of biological laboratories in the territory of Ukraine. Nebenzia has said that over a long time, Russia has repeatedly expressed concern over “military biological activities carried out with the most direct assistance and participation of the US Department of Defense (DoD) in laboratories in the territories of the former Soviet republics away from the North American continent and close to the Russian borders.

He has said that such activities are conducted “inter alia indirectly through the Pentagon’s Defense Threat Reduction Agency (DTRA) and private companies that are permanent contractors of the US DoD... This poses a direct threat to the biological security” of Russia. “In the course of the special military operation in Ukraine, the Russian Federation obtained a variety of documents and evidence that disclosed the true nature of military biological activities of the US DoD and its contractors with Ukraine in the military biological area,” he has said.

<https://www.financialexpress.com/defence/india-abstains-on-russia-sponsored-draft-resolution-at-uns-sec-for-probe-on-ukraines-alleged-bio-weapons/2772786/lite/>

Business Standard

Fri, 04 Nov 2022

Handling a High-Tech Chinese Military

By Ajai Shukla

Inaugurating a new production line last Sunday in Vadodara, Gujarat, where Tata Advanced Systems Ltd (TASL) will build C-295 transport aircraft for the Indian Air Force (IAF) in technology partnership with Airbus Defence and Space, Prime Minister Narendra Modi talked up his vision of “*atmanirbharta*.” India, he declared, would soon be a huge manufacturer of transport aircraft, having shed the “makeshift approach” of the previous government where the manufacturing sector barely survived through subsidies.

Yet there remain serious questions over the Indian military’s capabilities, and whether it could prevail in the two-front war that analysts anticipate, with China fighting its version of an “informatised war”, in which killer robots, driven and enhanced by artificial intelligence, machine learning and quantum computing quickly put paid to an Indian Army that is driven in a more conventional manner. Many believe that such a war is unlikely, as China would not want to be seen as needing Pakistani help in slapping down a smaller and weaker India. Even so, an opportunistic Pakistani military might not spurn the opportunity to jump into the fray. Unanswered questions remain, therefore, over whether India has equipped and readied itself for such a contingency, or whether our military would go into battle in 2022-23 using tactics and

equipment very similar to those it used in the 1999 Kargil conflict. What exactly has changed; and what badly needs to?

First, a key development that has transformed the modern battlefield — as observed in glimpses in Azerbaijan-Armenia and also in Ukraine — is the new threat to ground forces posed by remotely piloted vehicles (RPVs), or weaponised drones, that are driven by ultra-modern technologies. These constitute a potent threat to Indian forces, including those in depth. Armed drones, freed to operate by the early destruction of the enemy's air defence weapon systems, can vault over the enemy's forward defences to strike its reserve echelons, tactical infrastructure such as headquarters and communication nodes, logistics units such as ammunition dumps and geographical bottlenecks that force troops to concentrate, presenting lucrative targets. While Pakistan enjoys rough parity with India in legacy weapon systems, it is beginning to enjoy superiority in drone warfare, thanks to the RPVs supplied by China, including the Wing Loong and RPVs obtained from Iran and Turkey.

India does not yet have a doctrine to counter these new threats, or a strategy to underpin a response framework. Even as China perfects its strategy and implements for fifth-generation warfare, our acquisition of drones and counter-drone systems continues to founder on slipshod procurement policies. A key reason for not having a tactical, and operational doctrine for drones is the lamentable absence of a National Security Strategy (NSS), which is essential for formulating strategic, operational and tactical concepts that, in turn, would shape the development of the force. Without a technically proficient national security advisor (NSA), who can direct the making of apex-level policy, the military will not even know what war to prepare for.

It is evident that the current NSA does not accord a high priority to formulating a NSS, having pushed the responsibility on to the chief of defence staff (CDS), the department of military affairs (DMA) and various scientific establishments such as the Defence R&D Organisation. This is undesirable, since the CDS, from the time this post was conceived in 1999, was pointed towards tri-service force structuring, procurement, integration, and re-organisation of the existing single-service theatres into integrated tri-service commands.

Another critical Indian weakness lies in what has been dubbed “Grey Zone warfare”: Which involves information, disinformation, cyber-attacks, gathering electronic, signals and satellite intelligence and altering historical records, as it did in Tawang, Doklam and Ladakh to find a *Jus ad Bellum* (rationale for a war). Chinese special forces could also snap undersea internet cables, leaving India isolated and unable to communicate securely with its allies. China's (and to a growing extent, Pakistan's) domination of India's military in wartime is not just in high-tech fields such as Artificial Intelligence. It is also evident in conventional fields, such as long-range fires to support ground operations. In this, Indian forces that need fire to support ground operations have few choices besides Pinaka rockets and BrahMos cruise missiles. Meanwhile, Pakistan has acquired, or developed the Hatf series of missiles, and a cruise missile that can deliver a nuclear payload. India's ballistic missiles would constitute a form of deterrence, if only China were to leave the command and control systems functional.

The government, instead of making up these deficiencies, dismisses the military's concerns. In the combined commanders' conference, held in 2015 on INS Vikramaditya, Mr Modi collectively asked the commanders present what they considered India's premier military threat. When the generals, air marshals and admirals said they considered China to be India's most

likely threat, Mr Modi would have done well to introduce the generals, admirals and air marshals to some of the tenets of informatised warfare. Instead, he sagely stated: “You may believe that but, from my perspective, I believe that China is not a military threat at all to India.” Less than two years later, Indian troops were in eyeball-to-eyeball confrontation with Chinese troops in Doklam, Sikkim. Five years later, the PM found himself dealing with large-scale Chinese troop incursions in Eastern Ladakh, the deaths of 20 Indian soldiers and the loss of significant Indian territory in the Depsang sector at the northern tip of Ladakh.

Alongside these disadvantages, one significant, and oft-overlooked military advantage that India has against China is the resilience and fighting quality of our combat forces. The difficulties that soldiers face in high mountain terrain severely test even the most rugged of them. In contrast, the average Chinese soldier is a lone male child, pampered by an adoring family and ill-prepared for the hazards and discomforts of the Line of Actual Control (LAC) In the confrontation in Doklam, Sikkim, where Indian and Chinese soldiers were lined up eyeball-to-eyeball, senior Indian commanders recount that they could sense the uncertainty in the Chinese line. While Indian soldiers had to be restrained — verbally as well as physically — from pushing the Chinese troops back, our chief interpreter heard the Chinese officers to the rear of their line threatening to open fire on any of their soldiers who wavered or withdrew from the line.

This man-to-man advantage that Indian jawans on the LAC enjoy over the relatively comfort-loving Chinese soldiers would be eroded once the ranks of hardened jawans, enrolled on long-service tenures, are diluted by significant numbers of so-called Agniveers — soldiers enrolled on short-service tenures of four years. Of these, only 20 per cent (25,000 soldiers from each year’s batch of 125,000) will be retained in service for long-service tenures. There is apprehension amongst the generals that, as the percentage of Agniveers rises, the hard edge of the army will soften. The only redeeming factor is that, in any war with China, India would not be alone. With its growing relations with Indo-Pacific democracies such as Japan, Australia, the UK and the US, New Delhi would react to the inevitable reverses by quickly aligning and combining forces with the AUKUS and Quadrilateral groupings. China would find its forces being split in two directions — the land border with India and the South China Sea maritime theatre. Handling the diplomatic and strategic levers in this conundrum would be a major challenge for New Delhi.

https://www.business-standard.com/article/opinion/handling-a-high-tech-chinese-military-122110301889_1.html

The Tribune

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North Korea ICBM may have Failed in Flight, Officials Say; Allies Extend Major Drills

North Korea fired multiple ballistic missiles on Thursday, including a possible failed intercontinental ballistic missile (ICBM) that triggered an alert for residents in parts of central and northern Japan to seek shelter. Despite an initial government warning that a missile had flown over Japan, Tokyo later said that was incorrect. Officials in South Korea and Japan said

the missile may have been an ICBM, which are North Korea's longest-range weapons, and are designed to carry a nuclear warhead to the other side of the planet. South Korean officials believe the ICBM failed in flight, Yonhap news agency reported, without elaborating. Spokespeople for the South Korean and Japanese ministries of defence declined to confirm the possible failure.

Japanese Defence Minister Yasukazu Hamada said the government lost track of the missile over the Sea of Japan, prompting it to correct its announcement that it had flown over Japan. Retired Vice Admiral and former Japan Maritime Self Defense Force fleet commander Yoji Koda said the loss of radar tracking on the projectile pointed to a failed launch. "It means at some point in the flight path there was some problem for the missile and it actually came apart," he said. Although the warhead came down in the sea between the Korean peninsula and Japan, debris would have been travelling at high speed and may still have passed over Japan, Koda added. North Korea has had several failed ICBM tests this year, according to South Korean and U.S. officials. The United States condemned North Korea's ICBM launch, State Department spokesman Ned Price said in a statement. "This launch is a clear violation of multiple United Nations Security Council resolutions," he said. It also demonstrates the threat from North Korea's unlawful weapons of mass destruction and ballistic missile programmes, Price added.

The launches came after Pyongyang demanded the United States and South Korea stop large-scale military exercises, saying such "military rashness and provocation can be no longer tolerated". It has said that a recent flurry of missile launches and other military activities were in protest against such drills. The allies have been conducting one of the largest air exercises ever, with hundreds of South Korean and US warplanes, including F-35 fighters, staging around-the-clock simulated missions. After Thursday's ICBM launch, the allies agreed to extend the drills past Friday, when they had been scheduled to end, South Korea's Air Force said in a statement. "A strong combined defense posture of the ROK-US alliance is necessary under the current security crisis that is escalating due to North Korean provocations," the statement said, using the initials of South Korea's official name.

Emergency Warnings

North Korea also launched two short-range ballistic missiles on Thursday. The launches came after North Korea fired at least 23 missiles on Wednesday, the most in a single day, including one that landed off South Korea's coast for the first time.

South Korea issued rare air raid warnings and launched its own missiles in response after Wednesday's barrage. On Thursday, the South's transportation ministry announced that air routes had reopened in the area where the missile had fallen, having been closed for around 24 hours. After the first launch on Thursday, residents of Miyagi, Yamagata and Niigata prefectures in Japan were warned to seek shelter indoors, according to the J-Alert Emergency Broadcasting System. "We detected a launch that showed the potential to fly over Japan and therefore triggered the J Alert, but after checking the flight we confirmed that it had not passed over Japan," Hamada told reporters.

The first missile flew to an altitude of about 2,000 kilometres (1,242 miles) and a range of 750 km, he said. Such a flight pattern is called a "lofted trajectory", in which a missile is fired high into space to avoid flying over neighbouring countries. South Korea's Joint Chiefs of Staff said the long-range missile was launched from near the North Korean capital, Pyongyang. About an hour after the first launch, South Korea's military and the Japanese coast guard reported a second

and third launch from North Korea. South Korea said both of those were short-range missiles fired from Kaechon, north of Pyongyang.

Regional Reaction

South Korean Vice Foreign Minister Cho Hyun-dong and US Deputy Secretary of State Wendy Sherman strongly condemned North Korea's series of missile launches as "deplorable and immoral" during a phone call on Thursday, Seoul's foreign ministry said. In brief comments to reporters a few minutes later, Prime Minister Fumio Kishida said, "North Korea's repeated missile launches are an outrage and absolutely cannot be forgiven." Chinese foreign ministry spokesperson Zhao Lijian on Thursday at a regular news briefing avoided commenting directly on the missile launches or potential sanctions on North Korea, instead repeating the standard line from Beijing that it hoped all parties could peacefully resolve issues through dialogue.

U.S. President Joe Biden and his national security team were "assessing the situation," National Security Council spokesperson Adrienne Watson said in a statement, which added that the United States would take "all necessary measures" to ensure security. After North Korea's launches on Wednesday, including one missile that landed less than 60 km (40 miles) off South Korea's coast, South Korean President Yoon Suk-yeol described the flights as "territorial encroachment" and Washington denounced them as "reckless". On Oct. 4, North Korea launched a ballistic missile over Japan for the first time in five years, prompted a warning for residents there to take cover. It was the farthest North Korea had ever fired a missile.

<https://www.tribuneindia.com/news/world/north-korea-icbm-may-have-failed-in-flight-officials-say-allies-extend-major-drills-447270>

Science & Technology News



Press Information Bureau
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An Indigenous Technology from IIT Madras can Now Produce New-Generation Super-Abrasive Tools

A newly developed technology can now produce new-generation multi-point/single-layer superabrasive tools for advanced grinding applications to meet high productivity and energy-efficient material removal requirements. The tools produced also have enhanced tool life. Grinding industries have aired their voices for developing advanced superabrasive cBN/diamond tools that meet high productivity and energy-efficient material removal requirements and customization based on local needs. A research team led by Dr. Amitava Ghosh at IIT Madras has used advanced chemical bonding technology with an application-specific novel formulation

of filler material and controlled spacing of grits on the tools by an indigenously developed semi-automatic grit-printing device.

The team recommends application-specific-advanced coatings to develop such new-generation superabrasive tools. The novel formulation offers an excellent blend of strength, wear resistance, and wetting characteristics (ability to spread well in a liquid state with low contact angle on solid superabrasives during brazing). The grit-planting (planting/placing of grits in pre-defined co-ordinate position on grinding wheel's working surface) setup allows a manufacturer to print grit in customised pattern to suit the requirement of an application. The recommended coating enhances the durability of the bond, thus adding life to the developed tools. In a nutshell, these superabrasive tools can be produced using active brazing technology with remarkably striking attributes of high crystal exposure above bond level. The joint strength and wear-resistant characteristics of bond of these tools are superior to those of their commercial counterparts. These tools can withstand more grinding force, offer significantly higher tool life, and execute load-free grinding of advanced materials with an extremely high material removal rate.

This indigenous tool supported by the Core Research Grant (CRG) of the Science and Engineering Research Board (SERB), a statutory body of the Department of Science and Technology (DST), offers a competitive cost with a superior quality tool, which is also tailor-made as per the needs of industries like aerospace, automobile, mining, and dental surgery. The technology can produce new-generation tools with versatile geometries. The prototypes of various tools have been developed in the laboratory and are being experimentally test-simulated under industrial conditions. This innovative route of showcasing the novel pathway of manufacturing superabrasive tools has been published in "Journal of Manufacturing Process" recently, and patents filed are under review for approval. This technology which fits the requirements of Make-in-India National Mission is under lab validation and is near-ready to be taken up by a start-up or any industry for a full-scale launch. The application-specific indigenous formulation of active fillers for joining superabrasives to metal substrates through state-of-the-art active-brazing technology is a critical novelty that may be exploited for large-scale manufacturing industries.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1873404>



Thu, 03 Nov 2022

World Looking at Indian Science and Tech with Admiration and Expectations: A.P. Governor

Science and technology are important for prosperity, said Governor Biswa Bhusan Harichandan, citing the example of England becoming a world power because of the industrial revolution, U.S. a superpower, primarily because of its technology, be it in the field of transportation, agriculture, high-tech industry or medicine. Addressing the inaugural session of the 88 th annual conference of the Indian Academy of Sciences, hosted by SRM University- A.P. campus, he said science and technology was all about innovation, discovery and research, about trying new things, taking up experimentation and achieving scientific and technological breakthroughs. "It is not only

about doing things that nobody else has ever done before, but also about improving the quality of life through such advancements in science and technology,” he said.

“The world today is looking at India with admiration and expectations that we will contribute to solving global issues plaguing mankind, such as clean energy, water remediation, clean environment and sustainable growth,” he said, adding “this is within our reach, only that our research should be among the best in the world in all disciplines ranging from basic sciences, engineering and humanities.” Mr. Harichandan said the societal expectations from science and technology were increasing and that the scientific community had the responsibility to keep up with the expectations. “I hope you will all agree with me on the need to make science and technology in India more vibrant,” he said.

Referring to the science and technology exhibition organised by the Indian Space Research Organisation (ISRO) and the Department of Atomic Energy (DAE) showcasing rockets and satellites developed by ISRO in the past few decades on the university campus, he urged the students to draw inspiration from the event and opt for a career in the field of science and technology. President of the Indian Academy of Sciences Umesh Waghmare said the Academy’s thrust was on promoting science and establishing a connect with society through science and technology. Commissioner, Collegiate Education, Pola Bhaskar, the university Vice-Chancellor Manoj K. Arora, Pro-Chancellor P. Sathyanarayanan, Pro-Vice-Chancellor D. Narayana Rao, Registrar R. Premkumar and others were present on the occasion.

<https://www.thehindu.com/news/national/andhra-pradesh/world-looking-at-indian-science-and-tech-with-admiration-and-expectations-ap-governor/article66090817.ece>



Thu, 03 Nov 2022

A new Quantum Component Made from Grapheme

Less than 20 years ago, Konstantin Novoselov and Andre Geim first created two-dimensional crystals consisting of just one layer of carbon atoms. Known as graphene, this material has had quite a career since then. Due to its exceptional strength, graphene is used today to reinforce products such as tennis rackets, car tires or aircraft wings. But it is also an interesting subject for fundamental research, as physicists keep discovering new, astonishing phenomena that have not been observed in other materials.

The right twist

Bilayer graphene crystals, in which the two atomic layers are slightly rotated relative to each other, are particularly interesting for researchers. About one year ago, a team of researchers led by Klaus Ensslin and Thomas Ihn at ETH Zurich's Laboratory for Solid State Physics was able to demonstrate that twisted graphene could be used to create Josephson junctions, the fundamental building blocks of superconducting devices. Based on this work, researchers were now able to produce the first superconducting quantum interference device, or SQUID, from twisted graphene for the purpose of demonstrating the interference of superconducting quasiparticles. Conventional SQUIDs are already being used, for instance in medicine, geology and archaeology. Their sensitive sensors are capable of measuring even the smallest changes in magnetic fields. However, SQUIDs work only in conjunction with superconducting materials, so

they require cooling with liquid helium or nitrogen when in operation. In quantum technology, SQUIDs can host quantum bits (qubits); that is, as elements for carrying out quantum operations. "SQUIDs are to superconductivity what transistors are to semiconductor technology—the fundamental building blocks for more complex circuits," Ensslin explains.

The spectrum is widening

The graphene SQUIDs created by doctoral student Elías Portolés are not more sensitive than their conventional counterparts made from aluminum and also have to be cooled down to temperatures lower than 2 degrees above absolute zero. "So it's not a breakthrough for SQUID technology as such," Ensslin says. However, it does broaden graphene's application spectrum significantly. "Five years ago, we were already able to show that graphene could be used to build single-electron transistors. Now we've added superconductivity," Ensslin says. What is remarkable is that the graphene's behavior can be controlled in a targeted manner by biasing an electrode. Depending on the voltage applied, the material can be insulating, conducting or superconducting. "The rich spectrum of opportunities offered by solid-state physics is at our disposal," Ensslin says.

Also interesting is that the two fundamental building blocks of a semiconductor (transistor) and a superconductor (SQUID) can now be combined in a single material. This makes it possible to build novel control operations. "Normally, the transistor is made from silicon and the SQUID from aluminum," Ensslin says. "These are different materials requiring different processing technologies."

An extremely challenging production process

Superconductivity in graphene was discovered by an MIT research group five years ago, yet there are only a dozen or so experimental groups worldwide that look at this phenomenon. Even fewer are capable of converting superconducting graphene into a functioning component. The challenge is that scientists have to carry out several delicate work steps one after the other: First, they have to align the graphene sheets at the exact right angle relative to each other. The next steps then include connecting electrodes and etching holes. If the graphene were to be heated up, as happens often during cleanroom processing, the two layers re-align the twist angle vanishes. "The entire standard semiconductor technology has to be readjusted, making this an extremely challenging job," Portolés says.

The vision of hybrid systems

Ensslin is thinking one step ahead. Quite a variety of different qubit technologies are currently being assessed, each with its own advantages and disadvantages. For the most part, this is being done by various research groups within the National Center of Competence in Quantum Science and Technology (QSIT). If scientists succeed in coupling two of these systems using graphene, it might be possible to combine their benefits as well. "The result would be two different quantum systems on the same crystal," Ensslin says. This would also generate new possibilities for research on superconductivity. "With these components, we might be better able to understand how superconductivity in graphene comes about in the first place," he adds. "All we know today is that there are different phases of superconductivity in this material, but we do not yet have a theoretical model to explain them."

<https://phys.org/news/2022-11-quantum-component-graphene.html>

