



Image Courtesy: pib.gov.in

Aerial Display on 20 July 2024 at Air Force Station Bhisiana on Kargil Vijay Diwas Rajat Jayanti 2024.

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“The impact of technology infusion into war fighting has made it crystal clear that we in the Armed Forces need to be more agile and flexible in both thoughts and actions.”¹

*- Air Marshal AP Singh PVSM AVSM
Vice Chief of the Air Staff*

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Aerial Display on 20 July 2024 at Air Force Station Bhisiana on Kargil Vijay Diwas Rajat Jayanti 2024

Posted On: 20 JUL 2024 5:34PM by PIB Delhi

Kargil Vijay Diwas Rajat Jayanti was celebrated at Air Force Station Bhisiana with great pride and fervour to honour the bravery, valour and sacrifices in the service of the nation by the Indian Armed Forces. This significant event marks the 25th anniversary of India's victory in the Kargil conflict in 1999 following the culmination of Operation Safed Sagar of the Indian Air Force and Operation Vijay of the Indian Army. It was indeed a significant milestone in the history of military aviation, wherein, air power was successfully employed against targets at such high altitude. The No. 17 Squadron of the IAF, operating MiG 21 Type 96 aircraft, also known as "Golden Arrows" based then at Air Force Station Bhisiana, participated actively in the operations, undertaking several reconnaissance and strike missions to flush out the enemy troops. Towards this, the squadron was awarded the coveted 'Battle Honours' for its meritorious service during operations. This prestigious unit has also won the maximum number of honours and awards amongst the Air Force Units, which participated in Operation Safed Sagar, including a Vir Chakra, which was awarded to Sqn Ldr Ajay Ahuja (posthumously) for his act of bravery during the conflict.

The solemn occasion was marked by a wreath laying ceremony at the War Memorial at AF Stn Bhisiana on 20 Jul 24 by Air Marshal PK Vohra, Senior Air Staff Officer, Western Air Command. The event was also graced by the presence of former Chief of the Air Staff, Air Chief Marshal BS Dhanoa (Retd), Mrs Alka Ahuja {Spouse of (Late) Sqn Ldr Ajay Ahuja}, Op Safed Sagar awardees and IAF officers. The Chief Guest felicitated and interacted with the next-of-kin during the event. An aerial display was conducted which included para-drop by the Akash Ganga Skydiving team, flypast in 'Vic' formation by three Rafale and three Jaguar fighter aircraft, Slithering and Small Team Insertion and Extraction (STIE) operations by the Mi-17 1V helicopter, and low level aerobatics by Su-30 MKI fighter aircraft. The event also witnessed a flypast in the "Arrow Head" and Missing Man" formations flown by MiG-29 aircraft in the memory of the brave Air Warriors. The spectators were also mesmerised by the scintillating display by the Air Force Band and Air Warrior Drill Team.

More than 5000 spectators, including school children witnessed the aerial display which showcased the brave spirit, precision and dedication of the Air Warriors, and left an indelible impression on the young generation on IAF's conduct of Op Safed Sagar.

The Kargil Vijay Diwas celebration at AF Station Bhisiana not only honoured the bravery and sacrifices of the brave soldiers but also reinforced a commitment in the young generation to uphold the values of courage, dedication and patriotism that define our nation. As our nation looks forward to the future, the rich legacy of our heroes, reminded by this event, will continue to inspire us to protect and serve with an unwavering resolve.

¹ <https://indianexpress.com/article/india/atmanirbharta-cant-be-achieved-at-the-cost-of-national-security-iaf-vice-chief-air-marshall-ap-singh-9464528/>

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Opinions and Analysis

What Ails India's Aero Defence Modernisation

Air Vice Marshal Anil Golani (Retd)

Director General, Centre for Air Power Studies|

02 July 2024

Source: Hindustan Times | <https://www.hindustantimes.com/opinion/what-ails-india-s-aero-defence-modernisation-101719934681923.html>



Indian Air Force (IAF) cadets watch the Surya Kiran Aerobatic Team (SKAT) fly in formation during a graduation ceremony at the Air Force Academy in Dundigal, on the outskirts of Hyderabad on June 15, 2024. (Photo by Noah SEELAM / AFP) (AFP)

Investment in military capability cannot be ignored if deterrence has to succeed and also because wars will invariably get costlier.

India's military strategy needs to conform to its national posture of strategic autonomy. India has always been loath to military treaties or alliances, and its military engagement with friendly foreign countries are aimed at building partnerships, learning from each other's best practices, ensuring interoperability, and the ability to partner and assist during humanitarian assistance and disaster relief (HADR) missions.

India has earned global recognition for its swift response to disasters. However, the country realises that it has to be on its own to resolve its boundary disputes and other intractable issues with its neighbours. Military capability, therefore, should be its primary focus.

The government must continue with the self-reliance policy to galvanise domestic industry to meet the needs of the armed forces. Research and development, ease of doing business, strategic partnerships for the transfer of critical technologies, indigenous manufacturing, and defence exports need greater attention.

With the phasing out of the Mig 21 and Mig 27 aircraft, the Indian Air Force (IAF)'s fighter aircraft inventory is down to 30 squadrons against an authorised strength of 42 squadrons. While the IAF is fully invested in the Tejas programme, its production needs to be scaled up to meet the promised timelines. A critical lacuna in the development of the Tejas Mk II and the Advanced Medium Combat Aircraft (AMCA) is the lack of an indigenous aero-engine. Collaboration with GE or Safran for indigenous development of the engine needs to be pursued in earnest. This would take time to fructify and, in the interim the Multi Role Fighter Aircraft (MRFA) can't be ignored. Its induction would be the fastest way to build up combat capability while the indigenous Tejas Mk II and AMCA programmes run concurrently. The IAF must be involved as a stakeholder at the highest level for the programme to succeed.

The acute shortage of Airborne Warning and Control Systems/Airborne Early Warning and Control (AWACS/AEW&C) has an adverse effect on the combat capability of the IAF.

With four old Airbus A321 aircraft having been transferred to the IAF inventory, the Cabinet Committee on Security has accorded the design and development of two aircraft. The programme for indigenous development has to be prioritised and put on fast track with appropriate budgetary allocations. In addition, the procurement of six aircraft for AEW&C has to be fast-tracked. The Acceptance of Necessity (AoN) for Flight Refuelling Aircraft was accorded on February 16, many years after the requirement of the same had been projected by the IAF. The limited availability of these combat enablers affects the training status of IAF personnel.

The capital acquisition procedure is not in sync with the emergent requirements of the armed forces. While the need for procedures and probity is well understood, the timelines leave much to be desired. The Defence Acquisition Procedure (DAP) 2020, which gives thrust to indigenous design and development, also lays down ambitious timelines that are often not met. The delays can be attributed to incessant observations from the finance ministry and the lack of accountability to meet the desired timelines. There exists an urgent need to review the DAP for faster execution. To give an example, the requirement of an Integrated Perimeter Security System (IPSS) that was felt after the January 2016 Pathankot terror attack took more than seven years to be implemented. The MRFA has been languishing with no clarity in sight.

The private sector is gradually rising to meet the requirements of indigenous production. The Defence Public Sector Undertakings (DPSUs) on the other hand are behemoths with a sense of entitlement that have an entrenched work culture,

rarely delivering what is promised. The need to corporatise DPSUs is the need of the hour. In addition, a private-public partnership model needs to be evolved with the DPSUs outsourcing more and more to the private industry.

With aerospace power being critical for future conflicts, it becomes imperative for the nation to focus on this important tool of national power. Military modernisation is a continuous process, and capability takes years to build; it needs commitment, resolve, and financial outlay. Conflicts, on the other hand, rarely knock before they happen. If they do, the time available may not be enough for an appropriate response. Investment in military capability cannot be ignored if deterrence has to succeed and also because wars will invariably get costlier. Reform, transform, and perform or perish should be the mantra for the new government in the military domain.

What do Chinese Stealth fighters on a Tibetan Base mean for India

Air Marshal Diptendu Choudhury (Retd) |
02 July 2024

Source: *Indian Express* | <https://indianexpress.com/article/opinion/columns/what-do-chinese-stealth-fighters-on-a-tibetan-base-mean-for-india-9426988/>



The J20 is touted as the stealth counter to the US F22, with its internal carriage capability of long-range air-to-air missiles and precision-guided munitions. (Source: Wikimedia Commons)

The recent satellite image of China's fifth generation stealth fighters, the J20 Mighty Dragon, parked on the main tarmac of Shigatse air base in Tibet, along with J10 Vigorous Dragon fighters at an altitude of 12,408 feet, has set off a flurry of speculation and raised concerns. This has led to comparisons between the J20 and the 4.5 generation Indian Rafale and triggered a bean count of platforms as a measure of the two Air Forces. Number crunching, however, does not reflect the true military measure of air power, which includes weapons capability and roles, employment tactics and concepts of operation, and most importantly, skill sets, experience and combat readiness status of the aircrew.

The J20 is touted as the stealth counter to the US F22, with its internal carriage capability of long-range air-to-air missiles and precision-

guided munitions. Their presence showcases the People's Liberation Army Air Force's (PLAAF) high-end platforms, its ability to use its high-altitude air bases for fighter operations, and its growing ability to project air power in the region to counter the Indian Air Force's forward deployment of Sukhois and Rafales. It is also a political signal that the border dispute with India is no longer a territorial issue, but one of sovereign airspace. More regular activation of its bases in the future will see increased air activity across our borders close to disputed spaces, and more frequent air violations to test India's response.

What is also clear is that all the aircraft are lined up on the open tarmac, with the absence of any blast-protected airfield infrastructure and dispersed hardened aircraft shelters and no efforts at camouflage. The visible absence of supporting ground equipment necessary for extended fighter operations, on and around the tarmac, indicates the high probability of a temporary deployment. The mix of platforms and the presence of the KJ 500 underscores PLAAF's increasing conduct of complex large missions and growing capabilities in projecting air power over long distances.

Beijing has steadily built a robust border infrastructure to sustain its mobility and logistics support, increased its army deployments to improve the force ratios, and has continued to sustain its political stand with military presence, despite 29 sessions of the Working Mechanism for Consultation and Coordination on the India-China Border. Ceding to the strident demands for the creation of buffer zones in disputed areas, ostensibly as a precursor to disengagement, could set a dangerous precedent for demands of aerial buffer zones in future — this suits the Chinese to strategically restrict the IAF presence and

operations in the region. Forward airstrips close to the border and sovereign air spaces over the disputed areas could become “no-fly zones”, inaccessible to the IAF aircraft for intelligence, surveillance, and reconnaissance missions, AD combat air patrols, as well as air mobility and air logistics, if the current situation is not carefully addressed.

For now, the IAF’s mainstay fleet of fourth-gen fighters comprising Su30s, MiG29, and M2000, supplemented by two squadrons of the 4.5 Gen Rafale provides an asymmetric advantage, which China is working to neutralise on priority. The government is seized of the declining combat air power inventory of the IAF, but it is the absence of urgency to address this strategic criticality in India’s continental threat that is of serious concern. Two squadrons of 4.5 generation Rafales are nowhere near enough to meet our current and future security requirements, given the over 7,000 km of hostile borders, and the immense volume of sovereign air spaces to be defended. To keep China at bay militarily, the urgent fulfilment of the Multi-Role Fighter Aircraft (MRFA) gap to bolster the 4.5-generation inventory, is not just an IAF requirement but a national security imperative for several reasons.

India’s already delayed fifth-generation multirole fighter jet, the Advanced Medium Combat Aircraft (AMCA), is expected to take a decade before it can be inducted into service. By then, China would have already developed its sixth-gen fighter to keep pace with the US. The next problem is that the upgraded MiG29, Mirage 2000 and Jaguar fleets would reach obsolescence before the AMCA squadrons become operational. This will deplete the high-end platform inventory of the IAF and skew the force ratio further, both

in quantum and quality. Finally, even with the optimal bolstering of the indigenous production capacity which will take over a decade, it will be too late to arrest the further decline in India’s combat air power. By the time the Tejas Mk 1A, the Mk 2 and the AMCA go into full-scale production over the coming years, China would have altered the air power and military balance in the region irretrievably in its favour. Thus, the urgent fulfilment of the long-pending 114 medium multi-role fighter aircraft requirement is a critical national security requirement.

Given the large numbers, a bilateral partnership with France for additional jointly-produced Rafales in India, with an attendant long-term agreement for joint upgrades and technology transfer access on future 4.5 generation-plus variants of the platform and its weapons suite, makes strategic sense. It will enable a steady and stable induction from a reliable partner, ensure greater platform commonality, assure future platform and weapons upgrades, and future engine development for the AMCA. It will also balance the inventory, reduce dependence on Russia and prevent the reliance on a temperamental US military industry, while fostering indigenous defence production.

As China seeks to offset or at the least balance the IAF’s air power advantage, its greatest adverse impact will be on India’s deterrence posture and military capability. It will be a mistake to cede India’s current advantage.

The Nuclear Specter Surfaces to Remind of the Horrors

Prashant Dikshit | 13 July 2024

Source: [Financial Express](https://www.financialexpress.com/opinion/the-nuclear-specter-surfaces-to-remind-of-the-horrors/3552463/) | <https://www.financialexpress.com/opinion/the-nuclear-specter-surfaces-to-remind-of-the-horrors/3552463/>



Annie Jacobsen's "Nuclear War: A Scenario" vividly illustrates the terrifying steps leading to a global nuclear catastrophe, urging readers to remain vigilant against the threat of nuclear holocaust. (Photo: AFP)

Annie Jacobsen's book "Nuclear War: A Scenario" crystalizes the horrors of a nuclear war in her "page-turning thriller" about how, step by tragic step, the world as we know might be destroyed by nuclear weapons. In my view this document should be read as a classic in real terms as it vehemently goes on to remind us that we do not allow the specter of a nuclear holocaust to be deleted from our databases.

The horrific scenario is brought home to us by the latest 2024 SIPRI report that we are living with over 12121 nuclear weapons all over the world among adversaries spread globally. The USA and Russia are estimated to have 1770 and 1710 warheads deployed respectively at all times. And the UK, France and China have 120, 280 and 24 warheads on readiness. There are 5684 stored warheads and a military stockpile of 9585 warheads.

To further strengthen this scenario there is a Reuters story which informed us that "Russia would hold a military exercise that will include practice for the use of tactical nuclear weapons. This is the story as of May 6, 2024.

The military drills will include practice for the preparation and deployment for use of non-strategic nuclear weapons. Missile formations in Russia's Southern Military District and naval forces will take part.

During the exercise, a set of measures will be carried out to practice the issues of preparation and use of "so called" non-strategic nuclear weapons. This is a misnomer for tactical nuclear weapons. The exercise is seemingly aimed at ensuring Russia's territorial integrity and sovereignty "in response to provocative statements and threats by certain Western officials against the Russian Federation", Russia claims. Vladimir Putin's forces have rehearsed using tactical nuclear weapons at an early stage of conflict with a major world power, according to leaked Russian military files that include training scenarios for an invasion by China as well. Russia views its nuclear arsenal as a cornerstone of its defence policy — and how it trains forces to be able to carry out a nuclear first strike in some battlefield conditions. The exercises "show that the operational threshold for using nuclear weapons is pretty low if the desired result can't be achieved through conventional means." Russia's tactical nuclear weapons, which can be delivered by land or sea-launched missiles or from aircraft, are designed for limited battlefield use in Europe and Asia, as opposed to the larger "strategic" weapons intended to target the US.

Russia has the world's largest arsenal of nuclear weapons and we are made to believe that a tactical nuclear device has no strategic connotation!!! Although, studies have revealed modern tactical warheads can still release significantly more energy than the weapons dropped on Nagasaki and Hiroshima in 1945.

Russia also went on to sign a mutual weapons supply treaty with North Korea on 24th June 2024 essentially to augment and replenish its arsenal and essentially its inventory of ballistic missiles adequately capable of delivering of tactical nuclear warheads

As if not to be left behind, in April 2023, the US Strategic Command conducted exercise Global Thunder 2023, which successfully tested and validated the nation's nuclear command, control, and operational procedures. It was being planned for a year before it was conducted. It prepares "Strategic Command personnel and units to train with allied nations and partner organizations to strengthen integration and enhance the readiness, effectiveness, and safety of America's strategic deterrence force needed to confront global challenges".

The NATO allies kept pace and on January 24, 2024 launched their biggest military exercise in decades with 90,000 personnel set to take part in months-long manoeuvres spanning the North Atlantic and Europe. The exercises are taking place mainly on the plains of Poland and Norway, but also in Germany, the Baltic States, Romania, Finland, Slovakia, Greece and Sweden. This exercise "Steadfast Defender", it was claimed, will test the Alliance's ability to react and respond to Russia's "special military operation" in Ukraine and the threats made by

its president, Vladimir Putin, to countries on Europe's eastern flank.

Thus, we have fully burgeoned the situation for a nuclear confrontation. China did not want to be left behind and has added 90 more warheads to its arsenal and placed them on high alert. The reasons for this enhancement are clearly baffling. But there are views which claim that India's test of Multiple Independently Targetable Reentry Vehicles (MIRV) on March 11, 2024 on the Agni V may have spurred the Chinese action. Although the Indian Research Establishment may merely be wanting to join the select group of USA, France, Russia, China and the United Kingdom which have this potential. Perhaps India did not want to be left behind!!! Strategic Compulsions!!

We cannot escape a perception that we are thus confronted with an excruciatingly adversarial typical cold war nuclear scenario whilst all arms limitation talks have come to naught between the superpowers. That is the point to note.

Air Power

IAF's Largest Multilateral Exercise Tarang Shakti to see Participation of Over 150 Aircraft

Dinakar Peri | 31 July 2024

[Source: The Hindu | https://www.thehindu.com/news/national/iafs-largest-multilateral-exercise-tarang-shakti-to-see-participation-of-over-150-aircraft/article68469453.ece](https://www.thehindu.com/news/national/iafs-largest-multilateral-exercise-tarang-shakti-to-see-participation-of-over-150-aircraft/article68469453.ece)



The Indian Air Force will host Tarang Shakti in two phases in August and September. File | Photo Credit: PTI

The Indian Air Force is all set to host its largest multilateral exercise, Tarang Shakti, in two phases in August and September. Eighteen countries, 10 of them with air assets, will join the exercise which will see a total of 150 aircraft, both foreign and IAF, soar into the skies over Sullur and Jodhpur. The exercise will be a landmark event and has no particular nation or theme “in mind”, Air Marshal A.P. Singh, Vice-Chief of Air Staff, said on Wednesday.

“Invitations have been extended to 51 countries. Ten countries will be participating with assets and 18 as observers with one more country likely to join,” Air Marshal Singh said while briefing the media. “The aim is to foster interoperability and share best practices and also to showcase indigenous defence industry.”

Besides the observer countries, Germany, France, Spain and the U.K. are scheduled to take part in Phase-1, while Phase-2 will see participation of Australia, Bangladesh, Greece, Singapore, the United Arab Emirates and the U.S.

Given the diverse participation and to cater to the requirements of friendly foreign countries, the IAF has decided to do it in two phases, the Vice-Chief explained. Several countries which are taking part in the multilateral exercise Pitch Black in Australia will join the exercise on their return leg.

Each phase of the exercise will see participation of 70-80 air assets. Phase-1 will be held from August 6-14 at Sullur, a town located in the Coimbatore district of Tamil Nadu, and see participation of 32 foreign aircraft, Exercise Director Air Vice-Marshal Rajat Mohan said. Similarly, Phase-2 to be held from September 1-14 at Jodhpur will see participation of 27 fighters, two refuelling aircraft, two airborne early warning aircraft, and four C-130 Special Forces aircraft from foreign countries, Phase-2 Director Air Commodore S.K. Taliyan said. The IAF will field over 40 aircraft each in both the phases. The Indian Navy will participate in Phase-1 with its Mig-29K carrier borne fighters.

Russia was invited but they conveyed their inability to participate in the exercise at this time, against the backdrop of the continuing war in Ukraine.

A defence industrial exposition is also planned at Sullur and Jodhpur with 68 participants confirmed so far including defence public sector undertakings, private firms, and start-ups.

One of the main objectives is to showcase the booming indigenous ecosystem and to show its resolve to Atmanirbharta, the IAF will field all the indigenous platforms in service in addition frontline platforms such as the Light Combat Aircraft, Advanced Light Helicopter, and Light Combat Helicopter.

The IAF has significantly increased its participation in bilateral and multilateral exercises in the recent past. Since 2001, the IAF has participated in 91 international air exercises. Of these, 32 exercises were held/hosted by the IAF.

Germany will deploy fighter jets and also a A400M transport aircraft, as reported by The Hindu earlier. The A400M aircraft would be showcased to the IAF given that it is also a contender in its Medium Transport Aircraft tender that is under way.

“We also aim to strengthen our cultural and diplomatic relations. Cultural exchanges have been planned as is the practice in all multilateral exercises,” Air Marshal Singh said. “The overarching aim is to build mutual trust, explore avenues for interoperability, and also showcase our indigenous industry and prowess.”

DRDO Successfully Conducts Maiden Flight-Test of Phase-II Ballistic Missile Defence Interceptor off Odisha Coast

24 July 2024

Source: Times of India | <https://timesofindia.indiatimes.com/india/drdo-successfully-conducts-maiden-flight-test-of-phase-ii-ballistic-missile-defence-interceptor-off-odisha-coast/articleshow/111993928.cms>



Missile test

NEW DELHI: The Defence Research & Development Organisation (DRDO), on Wednesday successfully conducted a flight test of the Phase-II Ballistic Missile Defence System at ITR, Chandipur in Odisha.

The test commenced at 4.20 pm (1620 hours) when a Target Missile, simulating an adversary's Ballistic Missile, was launched from LC-IV Dhamra.

Sharing a post on X, the Defence Production India said: "Boosting Aatmanirbhar Defence. DRDO for today's successful flight test of Phase-II Ballistic Missile Defence System and stated that the test has again demonstrated our Ballistic Missiles Defence capability."

The weapon system radars, strategically positioned on both land and sea, promptly detected the incoming Target Missile and

activated the AD Interceptor system in response. At 4.24, the Phase-II AD Endo-atmospheric missile was launched from LC-III at ITR to intercept the Target Missile.

This system comprises Long Range Sensors, a low latency communication system, the Mission Control Centre (MCC), and advanced Interceptor missiles.

In another post on X, the defence ministry said: "Today, 24th July 2024, the DRDO India successfully flight-tested Phase-II Ballistic Missile Defence System. Raksha Mantri Shri Rajnath Singh has congratulated DRDO for today's successful flighttest of Phase-II Ballistic Missile Defence System and stated that the test has again demonstrated our Ballistic Missiles Defence capability."

The flight test successfully accomplished all the predetermined objectives, effectively validating the entire network-centric warfare weapon system.

IAF Thrilled as Russia's S-400 Shoots Down 80% of Aircraft During Drill

Senjo M R | 27 July 2024

[Source: Economics Times | https://www.rediff.com/news/report/iaf-thrilled-as-russias-s-400-shoots-down-80-of-aircraft-during-drill/20240727.htm](https://www.rediff.com/news/report/iaf-thrilled-as-russias-s-400-shoots-down-80-of-aircraft-during-drill/20240727.htm)



The IMAGE: A view of the S-400 air defence missile systems. Photograph: Reuters

The Sudarshan S-400 air defence missile system achieved a major success in a recent exercise where it 'shot down' 80 percent of the 'enemy' fighter aircraft package while forcing others to retreat, aborting their missions.

The exercise was carried out by the Indian Air Force in a theatre where the force has deployed one of its squadrons of the long-range air defence missile system, defence sources told ANI.

The exercise was conducted by the Indian Air Force to showcase full integration of air defence missile system into the force, they said.

During the exercise, real fighter aircraft were flying to test the capabilities of the S-400 weapon system, now called Sudarshan by the Indian Air Force after the mighty Sudarshan chakra of Lord Krishna.

The Sudarshan, 'locking on and targeting' in simulated action, could 'shoot down' 80 percent of the 'enemy' offensive package.

The other remaining aircraft aborted their mission which was to 'attack' their targets within Indian territory and were intercepted by the air defence system.

The Indian Air Force has now fully integrated the system, whose three squadrons have already been inducted and two more are expected to be supplied in 2026.

The Indian side has requested that Russia expedite the delivery of the systems. The Indian side, during a high-level visit to Russia, also requested the Russian side deliver the system.

India and Russia signed an over Rs 35,000 crore deal for five squadrons of S-400.

The Indian Air Force, which recently received the indigenous MR-SAM and Akash missile systems as well as the Israeli Spyder quick reaction surface-to-air missile systems, believes the S-400 will be a game changer for it.

The Indian Defence Acquisition Council recently cleared the procurement of the Indian Long Range Surface Air Missile System under Project Kusha.

The development came after the project was approved by the Cabinet Committee on Security.

The Indian Air Force, which recently received the indigenous MR-SAM and Akash missile systems as well as the Israeli Spyder quick reaction surface-to-air missile systems, believes

the S-400 will be a game changer for it.

The Indian Air Force has significantly improved its air defence capabilities in recent years.

Air defence systems have been deployed in a big way by the Chinese military across the Line of Actual Control, while India has also deployed its own systems in a big way there.

Ukraine Drones Reportedly Hit Russian Airfield in Arctic

Jordyn Dahl | 28 July 2024

[Source: Politico | https://www.politico.eu/article/ukraine-drone-hits-russian-airfield-in-arctic-report/#:~:text=The%20drones%20](https://www.politico.eu/article/ukraine-drone-hits-russian-airfield-in-arctic-report/#:~:text=The%20drones%20)



Ukrainian drones targeted the airfield. | Sergei Supinsky/ AFP via Getty Images

Ukrainian drones struck Russia's Olenya airfield in the far north of the country on Saturday, hitting a strategic bomber, according to Ukrainian and other media reports.

The drones targeted a Tupolev Tu-22M3 supersonic long-range missile carrier at the "strategic aviation" base, Ukrainian Pravda reported, citing Ukraine's intelligence unit.

Russia has not commented on the attack and Ukrainian military offered no further details.

Located in the Arctic on the Kola Peninsula, the Olenya air base is more than 1,900 kilometers north of Ukraine, but a mere 200 kilometers from the Finnish border.

In response to the drone strikes, Finnish President Alexander Stubb said: "We have no cause for concern in Finland. We have the situation under control and are able to respond," according to Ukrainian Pravda.

Olenya airfield has been used by Russian forces to attack civilian infrastructure in Ukraine with cruise missiles. It was Tu-95MS bombers from Olenya that less than a month ago bombed the children's hospital in Kyiv, according to reports.

While not acknowledging or commenting on the Olenya drone strike, Ukrainian President Volodymyr Zelenskyy issued a statement on Saturday praising his military's attacks on Russian bases in the occupied regions of Ukraine. "Each destroyed Russian airbase, each destroyed Russian military aircraft — whether on the ground or in the air — means saving Ukrainian lives," he said.

Space

US Prepares Jamming Devices Targeting Russia, China Satellites

Anthony Capaccio | 19 July 2024

[Source: Bloomberg | https://www.bloomberg.com/news/articles/2024-07-19/us-space-force-prepares-jammers-to-blunt-russia-china-satellites](https://www.bloomberg.com/news/articles/2024-07-19/us-space-force-prepares-jammers-to-blunt-russia-china-satellites)



Test of the new Remote Modular Terminal to be deployed in coming months. Source: U.S. Space Force

The US is about to deploy a new ground-based jammer designed to blunt Chinese or Russian satellites from transmitting information about US forces during a conflict, the Space Force disclosed.

The Pentagon's space service branch tested the system for the first time earlier this year at two different locations, with control of the system at a third. The devices aren't meant to protect US satellites from Chinese or Russian jamming but "to responsibly counter adversary satellite communications capabilities that enable attacks," the Space Force said in a statement to Bloomberg News.

The Pentagon strives — on the rare occasions

when it discusses such space capabilities — to distinguish its emerging satellite-jamming technology as purely defensive and narrowly focused. That’s as opposed to a nuclear weapon the US says Russia is developing that could create high-altitude electromagnetic pulses that would take out satellites and disrupt entire communications networks.

The first 11 of 24 Remote Modular Terminal jammers will be deployed in several months, and all of them could be in place by Dec. 31 at undisclosed locations, according to the Space Force statement. The terminals “are small, transportable and low-cost satellite communications jammers that can be deployed in austere environments to protect” US forces, the Space Force’s Rapid Capabilities Office said in a posting online.

The new terminals augment a much larger jamming weapon called the Counter Communications System that’s already deployed and a mid-sized one called Meadowlands “by providing the ability to have a proliferated, remotely controlled and relatively relocatable capability,” the Space Force said. The Meadowlands system has encountered technical challenges that have delayed its delivery until at least October, about two years later than planned.

China has “hundreds and hundreds of satellites on orbit designed to find, fix, track, target and yes, potentially engage, US and allied forces across the Indo-Pacific,” General Stephen

Whiting, head of US Space Command, said Wednesday at the annual Aspen Security Forum. “So we’ve got to understand that and know what it means for our forces.”

‘Off-the-Shelf Components’

The Space Force’s operations chief has said the US and its allies need to be able to block space-enabled attacks on US and allied forces in a way that won’t generate debris in space. In response, the Rapid Capabilities Office developed the small terminals and hired Sterling, Virginia-based contractor Northstrat Inc. to operate the jammers.

“We intentionally designed a small and modular system using commercial off-the-shelf components,” the Space Force said.

US officials say their weapons are “responsible” ones that wouldn’t destroy satellites but only disable them temporarily. Still, they aren’t “defensive weapons” but rather “are intended to attack rival capabilities,” according to Victoria Samson, the chief director of space security and stability at the Secure World Foundation, which produces an annual report on counterspace weapons.

“You can argue that it will only be used defensively, but I would say that that is an offensive counterspace capability,” Samson said. “Add it to the very small list of public US offensive counterspace capabilities” that

are “reversible, temporary, non-escalatory and allow for plausible deniability in terms of who the instigator is.”

Lebanon Files Complaint with UN Over Alleged Israeli GPS Jamming

Agnes Helou | 17 July 2024

Source: Breaking Defence | <https://breakingdefence.com/2024/07/lebanon-files-complaint-with-un-over-alleged-israeli-gps-jamming/>



An airplane lands at the Rafik Hariri International Airport in Beirut, Lebanon, July 1, 2020. (Photo by Bilal Jawich/Xinhua via Getty Images)

BEIRUT — Lebanon has filed a formal complaint against Israel regarding purported GPS jamming that it says has endangered civil aviation in the country.

The Lebanese Ministry of Telecommunications announced Tuesday on X that it filed the complaint and “directed [it] to the United Nations and the International Telecommunication Union (ITU) for consideration” through the ministry of foreign affairs.

Lebanon has complained for months about electronic interference, especially in the southern half of the country, which it blames on Israel. Israel has been trading fire with Lebanese Hezbollah along the border since renewed

fighting in Gaza in October.

In April, Breaking Defense reported on increased GPS jamming in the country, and experts said then that the jamming is most likely related to Jerusalem’s effort to disrupt Hezbollah attacks. At the time, experts like Secure World Foundation’s Brian Weeden said that “many bombs, drones, and other weapons use GNSS [global navigation satellite systems] for guidance these days [...] so interfering with GNSS signals is seen as a prudent defensive move.”

Lebanon has long signaled its intention to file a complaint amid increased interference, including after a March incident in which a Turkish airline flight couldn’t land in Beirut International Airport. In some cases pilots have been asked to use land-based control stations for their landing and take-off from the country.

“Several [systems] use radio signals in various ways to provide fixed navigational reference points, while others provide dedicated services at airports to aid in landings. Many aircraft also still have inertial navigation systems (INS), which are mechanical devices that are set before takeoff and can maintain a position somewhat during flight,” Weeden told Breaking Defense in April. Inertial navigation systems keep track of position, speed, altitude and other data without the need to use radio signals or GPS.

GPS, the US-developed GNSS system, is the most prevalent worldwide; a handful of systems developed by other nations are also in use.

The website GPSJam.org has used publicly broadcast aircraft data to track what appears to be GNSS interference in the region showed a

geographical increase over Lebanon in March. The most recent maps show apparent jamming affecting most of the country.

Israel does not appear to have publicly commented on the jamming complaint.

Space Force Mulling Nuclear Protection for Missile-Tracking Satellites

Courtney Albon | 16 July 2024

Source: *Defence News* | <https://www.defensenews.com/space/2024/07/26/space-force-mulling-nuclear-protection-for-missile-tracking-satellites/>



Lockheed Martin and Northrop Grumman are building satellites as part of the the Space Force's Next-Generation Overhead Persistent Infrared program. (Lockheed Martin)

The Space Force has launched a study to consider what capabilities to host on future satellites that detect and track advanced, high-speed weapons.

Col. Rob Davis, who oversees space sensing acquisition efforts for the service, said Thursday that as part of that work, the Space Force is weighing the right approach for ensuring such spacecraft can survive a nuclear threat.

“We’re currently working with the Space Warfighting Analysis Center, the SWAC, to help us figure out what’s the next generation of those capabilities,” Davis said during a virtual National Security Space Association event.

The service is in the early days of a long-term plan to strengthen its missile tracking capabilities against threats from China and Russia, both of whom are developing hypersonic missiles that can travel and maneuver at Mach 5 speeds. The two countries are also building, and in some cases testing, anti-satellite weapons that could impede safe operations in orbit.

The Space Force currently relies on large, expensive satellites to perform its missile warning mission. These spacecraft, part of the Space-Based Infrared System, are radiation-hardened, which means they’re equipped with structures and materials that allow them to withstand a nuclear attack.

The service’s new strategy moves away from those more exquisite capabilities and hinges instead on building and fielding large numbers of small satellites in lower orbits. The Space Development Agency, or SDA, and Space Systems Command, or SSC, are leading this effort, with SDA making plans to launch hundreds of satellites to low Earth orbit, up to 1,200 miles above sea level. SSC is focused on medium Earth orbit capabilities, residing between low earth and geosynchronous orbit, about 22,000 miles up.

To date, SDA has launched eight low earth orbit missile tracking satellites. SSC is slated to launch its first medium Earth orbit, or MEO, spacecraft in 2026. Both organizations are delivering satellites in batches and plan to launch

new versions every few years.

Over time, the Space Force will phase out the older systems and rely solely on this new architecture. However, in the near term, the service is working with Lockheed Martin and Northrop Grumman to build five radiation-hardened Next-Generation Overhead Persistent Infrared, or Next-Gen OPIR, satellites to replace the Space-Based Infrared System.

Davis acknowledged that thus far, the Space Force has focused more on improving its ability to track faster, harder-to-spot targets and less on making sure the new satellites are hardened against and could operate through a nuclear attack. That's partly due to the urgency of the tracking capability but is also owed to the cost that comes with making the spacecraft more survivable.

One goal of the study, Davis said, is to find options for nuclear protection that fit within the service's long-term architecture plans.

“We can't forget those other important requirements,” he said. “With an agile approach to development, we'll look at the outcome of that study. And it may affect future epochs or potentially future tranches of both SDA's work and our work to make sure we're meeting the full requirements for the nation.”

Low-Intensity Explosion Caused Russian Satellite to Spew Debris

Jeff Foust | 06 July 2024

[Source: Space News | https://spacenews.com/low-intensity-explosion-caused-russian-satellite-to-spew-debris/](https://spacenews.com/low-intensity-explosion-caused-russian-satellite-to-spew-debris/)



A model of the Resurs-P spacecraft like the one that suffered a breakup event in low Earth orbit June 26.

Credit: Vitaly V. Kuzmin CC BY-SA 4.0

TOKYO — A Russian satellite likely suffered a “low-intensity explosion” that created hundreds of pieces of debris in low Earth orbit, according to one company’s analysis.

Both U.S. Space Command and private space situational awareness providers reported that Resurs P1, a defunct Russian remote sensing satellite, suffered a breakup event on June 26. That event created more than 100 pieces of debris that could be tracked by ground-based sensors.

The cause of the breakup remains unclear, but LeoLabs, which was the first to publicly report the event, believes that a “low-intensity explosion” either from a collision or within the spacecraft itself created the debris. That explosion has created at least 250 debris

fragments at altitudes extending as high as 500 kilometers.

That conclusion came from the company's analysis of that debris cloud, using its own tools to look at the number of distribution of debris objects to better understand what created it.

"While much of the debris cloud has yet to be analyzed fully, our preliminary assessment concludes that the most likely cause of the event is a low intensity explosion," LeoLabs concluded in a July 3 statement posted on LinkedIn. "This explosion could've been triggered by external stimuli such as an impact by a small fragment (not currently cataloged) or an internal structural failure leading to a propulsion system failure."

That analysis rules out speculation that the satellite might have been used as a target for an anti-satellite weapons test, much like Cosmos 1408 in November 2021. There had been no other indications, such as statements from the Russian or American militaries or airspace restrictions, to suggest such a test was planned or carried out.

The explosion does not appear to have caused the satellite itself to completely break apart. Optical observations of Resurs P by Sybilla Technologies, a Polish space situational awareness company, report that the main satellite is still there, rotating with a period of two to three seconds.

Images taken before the breakup by HEO, an Australian company that uses commercial satellites to image other space objects, show that the solar panels on Resurs P1 and two follow-on spacecraft, P2 and P3, failed to fully deploy. It's not clear if this deployment malfunction is linked in any way to the breakup.

While the fragmentation event does not appear to be a worst-case scenario, it still creates a hazard for other satellites in low Earth orbit. The altitude of some of the debris, LeoLabs noted, takes it through the orbits used by many other operational satellites as well as the International Space Station and China's Tiangong space station. Those objects will likely remain in orbit for "weeks to months" before atmospheric drag causes them to decay.

"This event demonstrates the ongoing risk of defunct spacecraft in orbit," the company concluded. Resurs P1 was decommissioned in 2021 and will reenter later this year as its orbit, currently about 355 kilometers, decays.

It is not alone, LeoLabs added. "There are over 2,500 long-lived intact derelict hardware (i.e., abandoned rocket bodies and non-operational payloads) that may suffer a similar fate to Resurs P1 over time."

Global Aerospace Industry

Italy Air Force Eyes New Tanker Competition after Dropping Boeing Buy

Tom Kington | 12 July 2024

Source: Defence News | https://www.defensenews.com/global/europe/2024/07/12/italian-air-force-eyes-airbus-tankers-after-dropping-boeing-planes/?utm_source=sailthru&utm_medium=email&utm_campaign=c4-overmatch



An Airbus A330 Multi Role Tanker Transport refuels an F-16D fighter from the Republic of Singapore Air Force. (Airbus)

ROME — Italy is mulling a competition to find a new tanker aircraft after suspending plans to buy six new Boeing KC-46 tankers, sources have told Defense News.

The competition, which could be held this year, will likely see the Airbus A330 MRTT tanker in contention to replace the Italian Air Force's four Boeing 767-based tanker aircraft which entered service from 2011.

Should the Airbus aircraft be picked, it would mark an important shift for Italy after relying on Boeing tankers for over a decade.

In 2021 Italy announced plans to upgrade

its B-767 tankers and purchase two more, but the following year Rome changed tack, opting instead to buy six new KC-46 aircraft, aligning itself with the United States, which has acquired the more modern aircraft.

Italy's plans all changed last month, however, when defense planners issued a document stating the €1.1 billion (\$1.2 billion), six-aircraft KC-46 purchase had been halted "due to changed and unforeseen needs."

No further explanation was given, although the decision could be linked to issues over the cost and promised delivery time of the new aircraft, Defense News has learned.

The KC-46 has been plagued by problems including a troublesome Remote Vision System, aimed at giving boom operators a view of refueling operations. The delivery of a replacement dubbed the RVS 2.0 is set to slip to 2026, the U.S. Air Force said in March.

Italy's suspension of its purchase has prompted plans for a possible competition "to be held within months" said a source who spoke on condition of anonymity because he was not permitted to speak on the record.

Officials have not ruled out a KC-46 buy, but want to see what else is on the market, the source added.

The most likely alternative is the Airbus A330 MRTT, which has been acquired by France, Spain and the U.K.

The Italian Air Force is meanwhile planning to spend €7.5 billion on 24 new Eurofighter jets to

replace 26 older versions due of service in 2028.

Germany Buys more Patriots as it Supplements Ukraine’s Air Defense

Jen Judson | 11 July 2024

[Source: Defence News | https://www.defensenews.com/land/2024/07/11/germany-buys-more-patriots-as-it-supplements-ukraines-air-defense/?utm_source=sailthru&utm_medium=email&utm_campaign=c4-overmatch](https://www.defensenews.com/land/2024/07/11/germany-buys-more-patriots-as-it-supplements-ukraines-air-defense/?utm_source=sailthru&utm_medium=email&utm_campaign=c4-overmatch)



A German soldier stands to attention in front of a German Patriot missile launcher at the Gazi barracks in Kahramanmaras, southern Turkey on March 25, 2014. Germany has been a long-time customer of Patriot and has ramped up its purchase of the system in 2024 as it continues to supplement Ukraine's efforts to beat back Russia's invasion. (Photo by John MacDougall/AFP

Getty Images)

Raytheon has won a second contract this year, worth \$1.2 billion, to provide major Patriot air and missile defense system components to Germany as the country sends additional Patriot systems to Ukraine.

Raytheon received a previous contract — for the same amount — from Germany for Patriot systems in March. Raytheon will deliver four

complete Patriot fire units under the previous contract and four fire units under the new deal, according to a company spokesperson.

Germany, along with the U.S. and Romania, recently agreed to donate additional Patriot batteries to Ukraine as the war-torn country continues to fend off Russia’s invasion which began in February 2022.

The contract will provide Patriot Configuration 3+ radars, launchers, command-and-control stations, spares and support, Raytheon, an RTX company, said in a July 11 statement.

Patriot’s dominance in Ukraine has attracted fresh attention and potential customers from around the world. Germany is a longtime user of Patriot. Patriot serves as the air defense for 19 countries.

“Patriot remains the tried-and-true stalwart of air and missile defense, relied upon by our global customers to deter aggression and defend their interests,” Tom Laliberty, Raytheon’s land and air defense systems president, said in the statement. “With each additional Patriot system, Germany is enhancing its own air defenses and strengthening NATO’s defense posture.”

Germany is also involved in a coalition of European states that have jointly ordered up to 1,000 Patriot missiles worth roughly \$5.5 billion. The NATO Support and Procurement Agency is managing the purchase between Germany, the Netherlands, Spain and Romania and awarded a \$5.5 billion production and delivery contract for the missiles to a joint venture between Raytheon and MBDA Germany.

Air India Selects Honeywell for Aftermarket APU support

29 July 2024

[Source: Aerospace Global News | https://aerospaceglobalnews.com/news/air-india-selects-honeywell-for-aftermarket-apu-support/](https://aerospaceglobalnews.com/news/air-india-selects-honeywell-for-aftermarket-apu-support/)



The A321XLR can fly ranges of nearly 4,700 nm
Credit: Airbus.

Air India has signed a long-term agreement with Honeywell for Auxiliary Power Unit (APU) support, covering the carrier’s existing and new fleets.

“We are delighted to strengthen our collaboration with Air India and help its fleet modernisation efforts, as part of a long-standing commitment to supporting the carrier’s innovation and growth objectives,” commented Ashish Modi, president of Honeywell India.

Under the agreement, Honeywell will deliver comprehensive APU aftermarket support to “ensure the continued reliability and efficiency of Air India’s extensive fleet of more than 300 aircraft,” including the A320, Boeing 777 and the new 190 Boeing 737-8 aircraft. Honeywell’s 131-9A, 131-9B and 331-500 series APUs will be included in the agreement.

“This agreement forms part of our global growth and transformation plans, to help achieve more efficient, reliable operations, with maximised fleet availability, through Honeywell’s advanced technology services that enable us to continue meeting the needs of our valued customers,” added Sisira Kanta Dash, chief technical officer at Air India.

DAC Approves Amendment to MQ-9B UAV Deal with U.S.

29 July 2024

[Source: The Hindu | https://www.thehindu.com/news/national/dac-approves-procurement-of-advanced-land-navigation-system-for-army-22-interceptor-boats-for-coast-guard/article68460075.ece](https://www.thehindu.com/news/national/dac-approves-procurement-of-advanced-land-navigation-system-for-army-22-interceptor-boats-for-coast-guard/article68460075.ece)



Defence Minister Rajnath Singh. File | Photo Credit: PTI

The Defence Acquisition Council (DAC) chaired by defence minister Rajnath Singh on Monday reviewed and approved amendments to the deal for 31 MQ-9B High Altitude Long Endurance (HALE) Unmanned Aerial Vehicles (UAV) from General Atomics of the US, according to defence sources. The DAC also gave approval to proposal regarding the scheduled refit of aircraft carrier INS Vikramaditya later

this year, sources said.

“The amendments approved are within the scope of the Acceptance of Necessity (AoN) that was granted for the MQ-9B deal. They are related to the indigenous content and related aspects,” a defence source said.

Official sources said that the US has completed the process from its end with letter of offer and acceptance to India delivered early March and its now for India to complete the procedure before the deal can be signed. In the final step, the deal has to be approved by the Cabinet Committee on Security, before it can be inked. With the Quad leaders summit scheduled to be hosted by India in December, the MQ-9B deal as well as the GE-414 jet engine deal are expected to be concluded during the visit of the U.S. President to India.

India is looking to procure 31 MQ-9B UAVs, 15 Sea Guardians for the Indian Navy and 16 Sky Guardians – eight each for the Indian Army and Air Force, estimated to cost \$3.99 billion. As part of the deal, General Atomics is scheduled to establish a Global Maintenance, Repair and Overhaul (MRO) facility in India which would count towards offset obligations.

The DAC also accorded AoN, the first step of the procurement process, for procurement of Advanced Land Navigation System (ALNS) for Armoured Fighting Vehicles (AFVs) of the Army and 22 Interceptor Boats for the Coast Guard. “The ALNS Mk-II is compatible with Indian Regional Navigation Satellite System, NAVigation using Indian Constellation (IRNSS, NavIC), India in addition to Global Positioning System (GPS) and Global Navigation Satellite System (GLONASS),” the defence ministry said

in a statement. “The system is spoof-proof with high levels of encryption.”

The ALNS Mk-II offers compatibility with defence series maps resulting in very high accuracy in navigational applications for AFVs, according to the statement. This equipment will be procured from Bharat Electronics Limited, Chennai under Buy [Indian-Indigenously Designed Developed and Manufactured (IDDM)] category of the procurement procedure.

The second AoN is for procurement of 22 Interceptor Boats for the Coast Guard with latest state-of-art system capable of quick interception and shallow water operation in territorial waters, the Ministry said. “These boats will be used for coastal surveillance & patrolling, search & rescue operations, including medical evacuation,” it added.

Indian Aerospace Industry

Kaveri Engine Cleared for Tejas Integration After Safran Audit

01 July 2024

Source: *Brahmastra* | <https://www.brahmastra.ltd/post/kaveri-engine-cleared-for-tejas-integration-after-safran-audit>



The DRDO/GTRE Kaveri engine has been cleared for aircraft integration following an audit by Safran of France. This is a significant development in the Kaveri engine program, which has been in development for many years.

According to the news reports, the Kaveri engine will likely be integrated with a limited serial production Tejas aircraft for testing. This integration will serve as a crucial step in advancing India's indigenous engine technology, though it is not intended as a replacement for the existing F-404 engines in operational fighter jets.

The integration of the Kaveri engine derivative into the LCA-Tejas Trainer aircraft is part of a coordinated effort between DRDO and the Gas Turbine Research Establishment (GTRE). This initiative aims to utilize the trainer aircraft as a Flying Testbed, enabling extensive testing and refinement of the engine in real-flight conditions.

Two prototypes, designated PV-5 (KH-T2009) and PV-6 (KH-T2010), will be central to this testing phase. Originally developed to test the twin-seater variant of the LCA-Tejas Mk1 fighter jet, at least one prototype is being repurposed to facilitate the integration and testing of the Dry Kaveri engine.

GTRE has already commenced receiving new batches of the Dry Kaveri engines, which have been specifically ordered for this testing program. These engines are scheduled for high-altitude trials, which are essential to assess their performance under varied and extreme conditions.

In parallel with the integration efforts, GTRE is also working on developing new afterburner modules for the Kaveri engine. The addition of these modules is expected to increase the combined thrust to approximately 73-75kN, which is slightly lower than the 84kN thrust generated by the current F-404 engines used in the LCA-Tejas Mk1.

The successful integration and testing of the Kaveri engine on the Tejas aircraft would be a significant milestone for India's indigenous engine development program, and could pave the way for its future use in other Indian military aircraft.

DRDO Sanctions Seven New Projects to the Private Sector Under Technology Development Fund Scheme

11 July 2024

Source: PIB | <https://pib.gov.in/PressReleasePage.aspx?PRID=2032334>

Providing impetus to Aatmanirbharta, Defence Research & Development Organisation (DRDO) has awarded seven new projects to industries under the Technology Development Fund scheme for various requirements of the Armed Forces and aerospace & defence sectors. These project sanctions are a testimony to the continuing endeavour of DRDO in nurturing Industries, especially MSMEs & start-ups, in defence and aerospace domains. The indigenous development of these technologies will strengthen the military industrial ecosystem. The details of the sanctioned projects are given below:

Indigenous Scenario and Sensor Simulation Toolkit

The project involves development of an indigenous toolkit for simulator training of pilots in realistic scenarios. This will help in full mission planning and large force engagement. The project has been awarded to start-up, Oxygen 2 Innovation Pvt Ltd, Noida.

Underwater Launched Unmanned Aerial Vehicle

The project relates to a versatile marine battlefield accessories which can be deployed in multiple combat roles. The objective is Intelligence, Surveillance and Reconnaissance (ISR) and Maritime Domain Awareness (MDA). The project has been awarded to Sagar Defence

Engineering Pvt Ltd Pune.

Long-range Remotely Operated Vehicles for Detection & Neutralisation

The vehicles are dual-use systems that will enable detection, classification, localisation & neutralisation of underwater objects while keeping the key assets away from the suspected operational area. The project has been awarded to a start-up, IROV Technologies Pvt Limited, Kochi.

Development of Ice Detection Sensor for Aircraft

The project aims to develop detecting icing condition inflight, caused by super cooled water droplets that freezes after their impact against the aircraft external surfaces and is utilised by the aircraft for turning on the aircraft Anti-icing mechanism. It has been awarded to Craftlogic Labs Pvt Ltd, Bengaluru.

Development of Radar Signal Processor with Active Antenna Array Simulator

The project will enable deployment of multiple target system for test and evaluation of multiple short range aerial weapon system. It serves as the basic building block for larger radar systems. The project has been sanctioned to Data Pattern (India) Limited, Chennai.

Development of Indian Regional Navigation Satellite System-based Timing Acquisition & Dissemination System

The project has been sanctioned to Accord Software & Systems Pvt Ltd, Bengaluru. It aims

to enable indigenisation of timing acquisition and dissemination system, use of Indian Constellation for acquiring time & development of customised and flexible timing system as per range requirements.

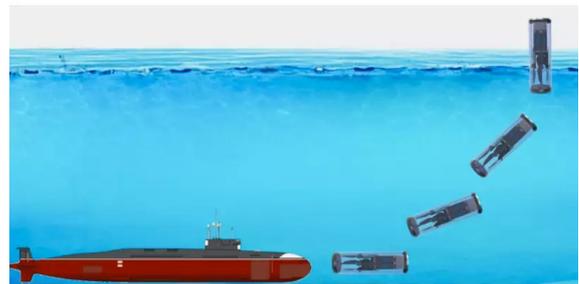
Development of Graphene Based Smart & E-textiles for Multifunctional Wearable Applications

The start-up, Alohatech Private Limited, Coimbatore has been sanctioned the project. It will develop a conductive yarn and fabric-making processes using graphene nanomaterials and conductive inks. The outcome will be advanced nanocomposite materials-based E-textiles utilising the inherent advantages for practical clothing applications.

DRDO Plans India's First Underwater-Launched UAV, Awards Contract to Pune Startup Sagar Defence

Shyam Nandan Upadhyay | 25 June 2024

Source: Times of India | https://timesofindia.indiatimes.com/india/drdo-plans-indias-first-underwater-launched-uav-awards-contract-to-pune-startup-sagar-defence/articleshow/110919999.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst



NEW DELHI: To boost India's underwater military capabilities, Defence Research and Development Organisation (DRDO) has decided to develop a first-of-its-kind underwater-launched unmanned aerial vehicles (ULUAVs), with help from a Pune-based defence startup, that will be launched from a submarine. DRDO's Technology Development Fund (TDF) has awarded the technology development contract for ULUAVs to Sagar Defence Engineering Pvt Ltd after selecting it out of the 17 firms through a competitive bidding process.

DRDO's Defence Research & Development Laboratory (DRDL) will assist Sagar Defence, which had earlier developed a maritime spotter drone for the Indian Navy, in ULUAV technology development. The agreement with Sagar Defence was signed in the presence of DRDL director Dr G A S Murthy and Indian Navy officials.

A ULUAV will have the capability to be deployed quickly, safely and autonomously from a moving submarine. It will have high endurance and long range, giving it a huge surprise element advantage. It will enable discreet surveillance missions, allowing submarines to monitor potential threats without revealing their presence.

Mridul Babbar, director & vice-president of business development, Sagar Defence, told TOI, "This ULUAV technology is going to be highly advanced. Only a few countries in the world possess ULUAVs but they are not highly advanced. However, DRDO has entrusted us to develop a ULUAV that will have a longer endurance. And we are the first to develop this technology in India. This ULUAV will be for maritime and underwater domain awareness and will be used for data gathering." This will be expandable and in future, weapons can also be installed on it, he added.

The project signifies Modi govt's proactive approach to fostering indigenous innovation and technological advancement.

Sagar CEO Captain Nikunj Parashar said, "This contract not only underscores the trust and confidence that DRDO has in our capabilities but also serves as a testament to the strides we are making in defence innovation."

By harnessing the capabilities of unmanned aerial vehicles in underwater environments, the defence industry stands to gain a decisive edge in intelligence, surveillance and reconnaissance, enhancing situational awareness and operational effectiveness across the maritime domain.

India Develops SEBEX 2: A Revolutionary Explosive

04 July 2024

Source: *Financial Express* | <https://www.financialexpress.com/business/defence-india-develops-sebex-2-a-revolutionary-explosive-3543038/>



SEBEX 2, boasting a TNT equivalence of 2.01, represents a major advancement in destructive power. (Photo: Twitter/IndianNavy)

India has achieved a significant milestone in defence technology with the development and certification of SEBEX 2, a new explosive that is 2.01 times more lethal than standard TNT (Trinitrotoluene). This high-performance explosive, evaluated and certified by the Indian Navy, represents one of the most powerful non-nuclear explosives globally. The advancement is expected to substantially enhance the destructive power of various munitions, including warheads, aerial bombs, and artillery shells, without increasing their weight.

Revolutionary Advancements in Lethality

The lethality of an explosive is often measured in terms of TNT equivalence, which indicates the explosive's destructive power compared to TNT. Currently, the most potent

conventional explosive used in India, such as in the BrahMos missile warhead, has a TNT equivalence of about 1.50. In contrast, most conventional explosives globally have a TNT equivalence of 1.25 to 1.30. SEBEX 2, with its TNT equivalence of 2.01, marks a significant leap in destructive capability.

Developed by Economic Explosives Limited (EEL) under the Make in India initiative, SEBEX 2 is based on high-melting explosive (HMX) technology. This composition significantly enhances the lethality of munitions that rely on blast and fragmentation effects to damage targets. The new formulation has undergone extensive testing and evaluation by the Navy, culminating in its certification under the Defence Export Promotion Scheme.

Potential for Global Impact

The development of SEBEX 2 not only boosts India's defence capabilities but also positions the country as a significant player in the global defence market. The explosive's high lethality and improved efficiency make it an attractive option for forces worldwide looking to upgrade their existing weapon systems. The potential for export is substantial, as militaries around the globe seek to enhance their offensive capabilities without increasing the weight or size of their munitions.

Further Innovations in Explosives

EEL is not stopping with SEBEX 2. The

company is also working on another variant that is expected to have an explosive power graded at 2.3 times that of TNT. This new variant is anticipated to be ready within the next six months, promising even greater enhancements in the lethality of munitions.

In addition to SEBEX 2, the Navy has also certified other innovative explosives developed by EEL. SITBEX1, the company's first thermobaric explosive, generates prolonged blast durations with intense heat, making it highly effective against enemy bunkers, tunnels, and other fortified positions. This explosive has been used in recent conflicts to cause large-scale damage on the battlefield.

Enhanced Safety with SIMEX 4

Safety is a critical concern in the storage, transport, and operation of explosives. To address this, the Navy has certified SIMEX 4, an insensitive munition developed by EEL. SIMEX 4 is much safer than standard explosives, significantly reducing the risk of accidental ignition. This feature makes it particularly suitable for applications where safety is paramount, such as in torpedo warheads housed in the confined spaces of submarines.

Proven Track Record

EEL's development of these advanced explosives under the Make in India initiative showcases the country's growing capability in defence technology. The use of high-melting explosive (HMX) in these formulations underscores their enhanced performance and reliability. These innovations not only improve the effectiveness of India's munitions but also

contribute to the broader goal of self-reliance in defence production.

Commentary

1. Next Gen Aero Engines - <https://www.sps-aviation.com/story/?id=3551&h=Next-Gen-Aero-Engines&s=08>
2. Trends in Military Uncrewed Aerial Systems - <https://www.iadb.in/2024/07/21/trends-in-military-uncrewed-aerial-systems/?s=08>

Further Reading

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“The term ‘Aerospace’ was introduced in 1958 by the USAF Chief of Staff, General Thomas D White, as a new construct that depicted air and space as a seamless continuum stretching from the Earth’s surface to infinity.”



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