

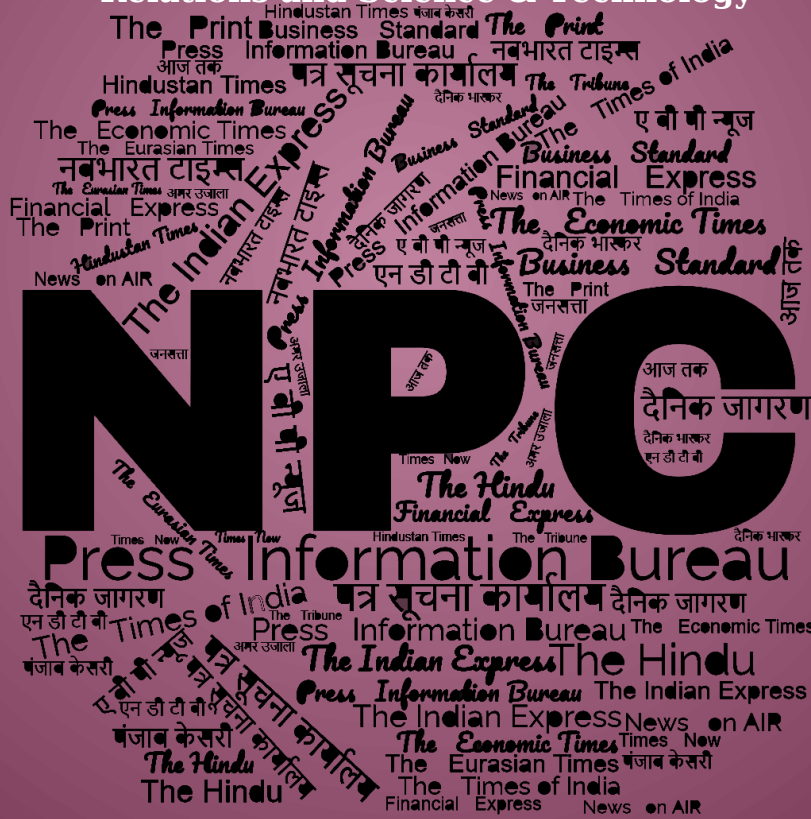
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THE ECONOMIC TIMES

Thu, 19 Oct 2023

India Plans to Equip Russian-origin Su-30MKIs with Indigenous 'Virupaaksha' Radar

Working on upgrading its fleet of its Russian-origin Su-30 MKI combat aircraft, the Indian Air Force is planning to equip them with an indigenous advanced radar named 'Virupaaksha'.

The Indian Air Force is working on the upgrade programme of the Su-30MKI fleet under a package worth over Rs 65,000 crore where 84 planes would be upgraded indigenously with advanced made in India radars and weapon systems.

"The Virupaaksha is an advanced radar being developed indigenously. This would be a strong push to the indigenisation process in military sector," defence officials told ANI.

Virupaaksha is one of the names of god Mahadev worshipped by Hindus living across the world.

The Indian Air Force has already decided to replace the Israeli radar on the LCA Tejas Mark 1A fighter jet with the indigenous Uttam Actors Electronically Scanned Array radar along with the Angad electronic warfare suite.

The Su-30 fighter jets are the mainstay of Indian Air Force with 260 of them already in service. The jets have been inducted in different batches and have now form around 50 per cent of the fighter fleet.

The Su-30MKI fleet upgrade plan is also seen by the Indian Air Force as an opportunity for exports as many countries in the south east Asia and Africa operate the plane and can use these solutions for providing advanced capabilities to their fleets.

India is one of the largest operators of the Su-30MKI fighters and has constantly equipped the planes with new capabilities.

<https://economictimes.indiatimes.com/news/defence/india-plans-to-equip-russian-origin-su-30mkis-with-indigenous-virupaaksha-radar/articleshow/104561110.cms>

THEWEEK

Thu, 19 Oct 2023

CDS Attends Tri-service Table Top Exercise PRAYOG

Chief of Defence Staff Gen Anil Chauhan on Thursday attended a tri-service Table Top Exercise 'PRAYOG' in Eastern Air Command, officials said.

The headquarters of the Integrated Defence Staff (HQ IDS) shared pictures from his visit in a post on X. "General Anil Chauhan #CDS attended a tri-service Table Top Exercise 'PRAYOG' at Eastern Air Command on 19 Oct 23.

"Various scenarios & required preparations for a joint response during criticality in the Eastern Theatre were deliberated between all services. #OperationalSynergy," the HQ IDS posted.

"A #TriService #TableTop Exercise Prayog-23 is presently underway at IAF's Eastern Air Command to deliberate on various operational options & enhance synergy between the Services. The Exercise will see senior officers from all three Services in attendance over the next two days," the EAC of the IAF posted on X earlier in the day.

<https://www.theweek.in/wire-updates/national/2023/10/19/del76-def-cds-exercise.html>



Fri, 20 Oct 2023

Empowering CRPF's Operational Excellence: Innovative Solution Unveiled

In upholding the battle readiness of the force, provisioning and logistics plays a very critical role. At the Annual Provisioning Conference convened by the Central Reserve Police Force (CRPF) Dr Sujoy Lal Thaosan, the Director General of the CRPF, underscored the critical significance of provisioning in achieving operational success.

He noted that the CRPF stands among the best-equipped forces globally but stressed the ongoing necessity for adaptability to meet the ever-evolving needs and demands of the force. The imperative was clear: operational requirements should guide the acquisition of new arms, ammunition, vehicles, and equipment.

During the conference, he unveiled an innovative solution – an Android-based mobile app named “e-KIUL.” This app seamlessly connects the procurement process all the way down to the frontline personnel. Now, the jawans have a means to stay updated on the inventories issued to them and offer user feedback for continuous improvement.

Senior officers, too, weighed in on the current state of procurement and provisioning within their respective formations. They highlighted the challenges and issues demanding attention, emphasizing the urgency of streamlining the process for the benefit of the troops deployed in the field. The focal points of discussion included ensuring that the force is well-equipped to confront operational challenges effectively, with a specific emphasis on facilitating the mobility and safety of troops in sensitive regions.

The need for ongoing modernization efforts in the force, characterized by the induction of cutting-edge equipment and weaponry, was a recurring theme. The discussions also revolved around fostering collaboration with industry partners to promote research and development. Furthermore, the growing role of women within the force, participating in both operational and law enforcement roles, underscored the need for human-centric and gender-specific procurement strategies.

The spirit of “Atmanirbhar Bharat” (self-reliant India) permeated the discussions, with DG CRPF highlighting the prioritization of “Make in India” products in the procurement process. Mrs Sonal V Misra, Inspector General of Provisioning, also introduced a trial software, the ‘Fleet Management System,’ designed to enhance the effectiveness of managing the transport fleet of the

force. In his closing remarks, he reiterated the collective responsibility of provisioning and the unwavering commitment to ensuring that CRPF's troops receive the best equipment promptly. This commitment remains crucial in maintaining the force's operational readiness to confront the ever-evolving internal security challenges effectively.

<https://www.financialexpress.com/business/defence-empowering-crpf-operations-excellence-innovative-solution-unveiled-3279781/>



Thu, 19 Oct 2023

A Covert Infiltration: Redefining Security Measures for Powered Hang Gliders

On October 7th, a daring infiltrator affiliated with the Hamas extremist group embarked on a clandestine mission, breaching the borders of Israel via an unconventional means: a motorized hang glider. This manoeuvre was captured in a video that revealed the exact moment when a group of Hamas operatives descended upon an unsuspecting music festival in Israel, their silent, motorized hang gliders casting ominous shadows.

The boldness of this infiltration did not go unnoticed. The Indian government, deeply concerned about the implications of this event, swiftly moved to bolster its security measures, prompting a comprehensive revision of regulations governing the operation of powered hang gliders. To comprehend the gravity of this decision, it is imperative to first understand the nature of these extraordinary flying contraptions.

Traditional hang gliding is a captivating air sport where pilots navigate the skies in foot-launched, non-motorized, and lightweight aircraft known as hang gliders. Resembling delta wings, these remarkable flying machines have evolved from rudimentary parachute modifications to the sleek, aerodynamic forms we witness today. However, powered hang gliders distinguish themselves by incorporating a small engine seamlessly integrated into the pilot's harness, allowing for motorized flight. In response to this perilous breach and the potential security vulnerabilities it exposed, the Directorate General of Civil Aviation (DGCA) instituted a new set of regulations to govern the operation of powered hang gliders. The paramount objective is to fortify national security and ensure that these motorized hang gliders are used responsibly and only by trained, authorized individuals.

The revised regulations concerning powered hang gliders are as follows:

- No individual shall operate a powered hang glider without obtaining explicit authorization from a DGCA-approved examiner or instructor.
- The examiner or instructor, in this context, must possess a minimum of 50 hours of flight experience on powered hang gliders, with an additional 10 hours on a dual machine. These qualified individuals hold the responsibility of scrutinizing and authorizing others for powered hang glider operations.
- Test flights for powered hang gliders can only be carried out by either a pilot holding a valid Commercial Pilot License (CPL) with at least 25 hours of experience on powered hang gliders or an authorized person with a minimum of 50 hours of powered hang glider flight experience.

Before these revamped regulations, the existing security protocols for powered hang gliders necessitated prospective buyers to seek security clearance from the Ministry of Home Affairs through DGCA. Furthermore, DGCA issued certificates only after thorough background checks, ensuring the credibility of buyers or operators.

It was unequivocally stipulated that powered hang gliders were non-transferable, non-leasable, and could not be sold without the presentation of a DGCA-issued certificate. Additionally, equipping these hang gliders with any remote sensing devices, weaponry, or photography and video recording equipment was strictly prohibited without explicit authorization from the Ministry of Home Affairs, except when required for the aircraft's safe operation as specified in the relevant regulations.

In conclusion, the brazen incursion by the Hamas infiltrator via a motorized hang glider has precipitated a paradigm shift in the oversight of these unique aircraft. The newly implemented DGCA regulations underscore a resolute commitment to national security and aviation safety, ultimately reshaping the landscape for powered hang glider enthusiasts and emphasizing the imperative need for vigilance in their operation.

<https://www.financialexpress.com/business/defence-a-covert-infiltration-redefining-security-measures-for-powered-hang-gliders-3278827/>



Fri, 20 Oct 2023

Strengthening India's Defense against Airborne Threats

By Huma Siddqui

Amidst the ongoing Israel-Hamas war, the Indian Army has been vigilant in its efforts to secure the country's borders from potential threats, including the emergence of unconventional and innovative tactics by terrorist organizations.

The rise of drones as a potential threat has prompted the Indian Army to consider various countermeasures to prevent not only drone incursions but also the infiltration of terrorists via paragliding from across the Line of Control (LOC). The evolving landscape of security concerns necessitates a strategic approach, which combines technology, intelligence, and international cooperation.

Addressing the Drone Threat

Sources in the defence and security establishment told Financial Express Online that the Indian Army has already taken steps to address the drone threat, recognizing that effective measures to identify and counter drones are essential.

It has been reported earlier that the use of drones for espionage, surveillance, and even payload delivery has added a new dimension to national security. "With this in mind, counter-drone measures have been established and are continually being refined."

Identifying Para Gliders

Para gliders, while not as common a threat as drones, require unique countermeasures. "Currently, some short-range radars have been deployed to monitor lower altitudes, which can potentially detect low-flying paragliders," sources quoted above added.

What are the limitations?

However, according to a security expert who wished to remain anonymous, these systems have limitations, and it is crucial to recognize that no radar can pick up a para glider flying just a few hundred feet above the ground.”

How to meet this challenge?

“To address this challenge, it becomes imperative to enhance human intelligence (HUMINT) capabilities. By closely monitoring the activities of para gliders and their possible acquisition from international sources, the Indian Army can proactively detect and deter such threats,” the security expert stated.

Adding, “This demands an intelligence-focused approach to stay one step ahead of potential infiltrators.”

Coordination and Intelligence Sharing

According to the expert, coordination among various security agencies and effective intelligence sharing are critical components of national defense.

To protect India’s borders, “the Border Security Force (BSF) posts along the border and the army posts along the Line of Control (LoC) must be well-prepared and briefed to respond to paragliding attacks. Regular drills and rehearsals are essential to ensure the swift and coordinated response of these forces,” explained a senior officer.

In addition to strengthening domestic coordination, the Indian Army should also consider enhancing international collaboration. “As terrorism knows no boundaries, India should actively engage with its neighboring countries and international partners to share intelligence and information regarding potential threats,” suggested a former diplomat.

This multilateral approach can help in countering threats that may originate beyond Indian borders.

The Way Forward

In an ever-evolving landscape of security challenges, staying ahead of potential threats is an ongoing process. The Indian Army has demonstrated its commitment to safeguarding the nation against unconventional tactics like para gliding by deploying short-range radars and enhancing its counter-drone capabilities. Nevertheless, it is crucial to acknowledge that there are inherent limitations to technology.

To create a more comprehensive defense strategy, the Indian Army should focus on bolstering its HUMINT capabilities, closely monitoring the activities of potential para gliders, and cooperating with international allies to share critical intelligence. Such an approach would ensure that India remains well-prepared to confront emerging threats, even when they take to the skies.

<https://www.financialexpress.com/business/defence-strengthening-indias-defense-against-airborne-threats-3279803/>



Thu, 19 Oct 2023

EAM Jaishankar Meets Singapore Defence Minister

External Affairs Minister S. Jaishankar on Thursday held talks with Singapore Defence Minister Ng Eng Hen and also chaired the regional conference of India's ASEAN and East Asia Ambassadors here.

Mr. Jaishankar, who is here on the second leg of his two-nation visit to Southeast Asia, will also meet Singapore's newly-elected President Tharman Shanmugaratnam and other senior leaders and review bilateral cooperation and explore opportunities for further collaboration.

"Good to meet my friend Defence Minister @Ng_Eng_Hen today. Thank him for addressing our Ambassadors conference. Always appreciate his strategic reading and assessments," he said in a post on X.

The external affairs minister chaired the regional conference of India's ASEAN & East Asia Ambassadors.

"Our deliberations took stock of developments in the region and assessed their implications for India. Insights offered by our Ambassadors are valuable inputs into policy making," he said in another post.

On Wednesday, Singapore Foreign Ministry said in a statement that Mr. Jaishankar's visit reaffirms the close and longstanding ties between Singapore and India, which are built on a strong foundation of strategic trust.

"The visit will be an opportunity for both sides to review our bilateral cooperation, explore collaboration in emerging areas including digitalisation and skills development under the India-Singapore Ministerial Roundtable, and exchange views on regional and global developments," it said.

Mr. Jaishankar arrived in Singapore from Vietnam on the final leg of his two-nation official visit.

<https://www.thehindu.com/news/national/eam-jaishankar-meets-singapore-defence-minister/article67438328.ece>

ThePrint

Thu, 19 Oct 2023

Philippines to Recruit 'Cyber Warriors' for Online Defence

The Philippine military is creating a cyber command to improve defences against almost daily cyber attacks and will relax recruitment rules to ensure it can attract online experts, the chief of the armed forces said on Thursday.

Several government agencies, including the lower house of Congress, have recently reported cyber attacks and the chief of the armed forces said some of the almost daily attacks on the military came from abroad.

"Instead of recruiting soldiers for infantry battalions, this time we will recruit cyber warriors," General Romeo Brawner told reporters.

"There is this general realisation that this new breed of warriors does not have to be muscle strong."

"We have experienced this almost every day," Brawner said, of the attacks, though adding none had been successful.

"We believe some of the attacks are foreign."

Brawner did not say from where he believed the attacks were coming from but tension with China has been high in recent months, largely over disputed territory in the South China Sea.

The Philippines has complained about what it calls aggressive Chinese action including “dangerous manoeuvres” by its coastguard and navy, especially near a disputed shoal.

China has rejected the complaints saying its vessels operate lawfully in its waters.

Cyber defence training was part joint exercises this year with U.S. forces, Brawner said, highlighting the growing importance of cyber resilience in defence strategy.

Brawner also said the military would stop letting telecommunication companies build cell towers in military camps. Bases have been hosting installations operated by several mobile phone firms, including China’s state telecoms giant China Telecom.

Brawner also said that as part of a modernisation drive, he was hoping to get radar equipment from Japan to boost surveillance of territorial waters and the exclusive economic zone.

<https://theprint.in/world/philippines-to-recruit-cyber-warriors-for-online-defence/1810238/>

THE TIMES OF INDIA

Thu, 19 Oct 2023

Israel Deploys Hundreds of Tanks, Soldiers on Gaza Border as 'Ground Offensive' Looms

As a "ground offensive" of the besieged Gaza Strip loomed, hundreds of Israeli tanks were deployed near the border in south Israel on Thursday, waiting for the all-clear from the country's political establishment and the military top brass.

Israeli tanks and troops mounted on armoured vehicles were deployed in the region, seeming to suggest that a ground assault on Hamas in their backyard, Gaza, could begin any time soon.

Meanwhile, the Israel Defence Forces (IDF) said four rockets of nine launched from Lebanese territory were intercepted, adding that several anti-tank missiles were fired from Lebanon towards Israeli forces.

The IDF added that in response to the attacks, Israeli forces targeted the site in Lebanon from where rockets were fired into Israel and also struck at Hezbollah terrorist infrastructure using tank fire.

The Israeli forces also claimed to have thwarted and dismantled a terrorist cell using a UAV (unmanned aerial vehicle) of the IDF.

As Israel gears up for an all-out ground offensive in the Gaza Strip, one of the biggest challenges they face is Hamas' extensive underground tunnel network in the area. Several experts have warned that in the event of a ground offensive, Israel will lose the clear advantage it has over Hamas in terms of firepower, as it will have to fight the enemy on its terrain.

The densely populated area with a network of tunnels is likely to pose a security challenge for the IDF as it prepares for a ground assault.

An Israel Defence Forces spokesperson on Wednesday said they were striking parts of the tunnel network, but it won't be an easy battle.

Earlier, during a joint press briefing with US President Joe Biden, Netanyahu said the crimes that the Hamas terrorists perpetrated on civilians in Israel included rape, burning, kidnapping, and

targeting small children, adding that the death toll from the Hamas terror attacks stood at 1,400 and was likely to mount.

"October 7 is another day that will live in infamy," said Netanyahu.

He reiterated President Biden's statement that "Hamas is worse than ISIS."

He added, "On Oct 7 Hamas murdered 1400 Israelis in a single day...October 7th, is another day that will live in infamy. Mr President, you rightly said that Hamas is worse than ISIS. The civilised world must unite to defeat Hamas."

Additionally, The United States deployed two carrier strike groups, each consisting of an aircraft carrier, its planes, and several escort warships, which appeared to have deterred Hezbollah from attacking Israel in a major war, The New York Times reported.

According to the NYT report, quoting American officials, the US and Israeli Intelligence agencies are working to determine whether Israel's expected ground offensive against Hamas in the Gaza Strip could prompt Hezbollah to launch a large-scale military campaign against Israel from Lebanon.

The US-based daily reported that the officials have assessed that Hezbollah leader Hassan Nasrallah does not want an all-out war with Israel, for fear of the damage it would do to his group and Lebanon. U.S. officials said that assessment could change as more intelligence is gathered and events unfold.

Prime Minister Netanyahu has vetoed proposals from his government of a pre-emptive strike against Hezbollah, according to American officials and others briefed on the discussions.

Earlier, the US Defence Department reiterated its full support to Israel in the ongoing war on Hamas, saying that the US Secretary of Defence was in continuous touch with the Israeli authorities and leaders.

The US Department of Defence (DOD) said in a statement, "Since meeting with Israeli Prime Minister Benjamin Netanyahu, Defense Minister Yoav Gallant and members of the Israeli War Cabinet in Tel Aviv on Friday, Austin has remained fully engaged with the country's leaders as the US works ensure Israel has what it needs to defend itself from further attacks."

Pentagon Deputy Press Secretary Sabrina Singh said in a statement, "Since leaving Israel, he has held calls with MOD Gallant ... on a near daily basis and will likely have another call today", adding, "We are working to meet Israel's needs, which include air defence, precision-guided munitions, artillery and medical supplies."

In addition to quickly sending military aid to Israel, the US has bolstered its presence in the region to deter further aggression.

Over the weekend, US Defence Secretary Austin directed the USS Dwight D. Eisenhower Carrier Strike Group to join the USS Gerald R. Ford Carrier Strike Group, which arrived in the Eastern Mediterranean last week.

The Navy units are part of a broader bolstering of US forces in the region. Last week, the Air Force announced the deployment of F-15 and F-16 fighter squadrons and A-10 attack squadrons to the region, according to a US Department of Defence press release.

<https://timesofindia.indiatimes.com/world/middle-east/israel-deploys-hundreds-of-tanks-soldiers-on-gaza-border-as-ground-offensive-looms/articleshow/104549258.cms>

High-energy Laser to Destroy Airborne Targets — Iron Beam, Israel's 5th Line of Aerial Defence

Looking to shore up its defences against the barrage of rockets launched by Hamas from Gaza and Lebanon-based Hezbollah, Israel may now be considering fast-tracking the deployment of the Iron Beam missile defence system, developed by the Israeli company Rafael, to shore up its aerial defences.

Once fully operational, the Iron Dome will become the fifth element of Israel's integrated missile defence system, joining Arrow 2, Arrow 3, David's Sling and the Iron Dome.

Rafael's 100-kilowatt Iron Beam is designed to neutralise rockets, artillery, and mortars (RAM), besides unmanned aerial systems (UAS), counter-unmanned aerial systems (C-UAS) and anti-tank missiles. It can function by itself or be integrated with other, broader defence systems.

On its website, Rafael Advanced Defense Systems says the Iron Beam can "neutralise a wide range of threats with pinpoint accuracy and protect military forces and civilian populations", adding that it is designed to ensure "limited collateral damage".

Michael Lurie, vice president and head of the land manoeuvre systems directorate at Rafael, and CEO of Rafael USA, told the news portal Janes last year, "We think the system will be the first operational high-energy laser system, not because we're the most advanced technologically... There are other US companies and probably other countries that are technologically very developed, but (Israel has) a very urgent need."

The report added that the development of this new laser weapon was aimed at "creating a capability that is complementary to the fielded Iron Dome system". An air defence system operational since 2011, the Iron Dome has shielded the Israeli population from rockets for more than a decade, even clocking a success rate of up to 90 percent.

"The command-and-control is Iron Dome. The detection is Iron Dome. The decision-making is Iron Dome (for) shoot, don't shoot, and what to shoot," Lurie told Janes.

He added that the Iron Beam is not a replacement for the Iron Dome but complementary to it since there are few scenarios where the laser-based missile defence system may face operational challenges. For instance, during foggy weather or when it's raining.

In the ongoing conflict, Israel has relied on the Iron Dome to intercept the hundreds and sometimes thousands of missiles launched into Israeli territory by Hamas and Hezbollah.

However, since the Iron Dome system requires interceptor missiles, Israel Defence Forces (IDF) have reportedly begun testing for the Iron Beam system, which is a directed energy weapon (DEW) air defence system.

'Easier to move & conceal'

Unveiled at the Singapore Airshow by Rafael in February 2014, the Iron Beam was slated to become operational by 2025, but Israel is now reportedly expediting its deployment to make it operational much sooner.

The Iron Beam is “smaller and lighter than the Iron Dome, which makes it easier to move and to conceal”, reported The Telegraph, adding that since the laser-based missile defence system does not require ammunition, fluctuations in the global supply chain would not be of concern.

Another benefit of using a DEW system is that it is cost-effective, since it does not require missiles to counter hit the incoming object. This system also requires lower operational costs and limited manpower to operate it.

Iron Beam uses a fibre laser to generate a laser beam to destroy an airborne target. Its battery is reportedly composed of an air defence radar, a command and control (C2) unit, and two High Energy Laser (HEL) systems.

The two laser guns can produce 100-150 kw of power in a single second.

Further, the system has a range of up to 7 km and is designed to destroy a target within four seconds of the twin high-energy fibre optic lasers making contact with it. The high-energy laser focuses a beam or several beams of energy to blind, cut or inflict heat damage on the target.

In 2020, the system demonstrated an effective range of 7 km while swiftly neutralising missiles, UAVs and mortar shells within seconds of target engagement. Reports in the media also suggest that plans are underway to increase energy levels.

Uzi Rubin, a missile defence expert at the Israeli Ministry of Defence was quoted by The Telegraph as saying that “the cost of kill (for the Iron Beam) is small”. Rubin explained that instead of the interceptors fired by Iron Dome, which can cost \$60,000 each, a laser beam costs only a few dollars.

<https://theprint.in/defence/high-energy-laser-to-destroy-airbone-targets-iron-beam-israels-5th-line-of-aerial-defence/1810333/>



Fri, 20 Oct 2023

Japan, Australia Agree to Further Step up Defence Cooperation

Japan and Australia agreed Thursday to further expand defence ties, including with joint military exercises, under their upgraded security pact that took effect two months ago amid mutual concern about China’s growing influence in the region.

The two countries have rapidly developed close defence ties in recent years, and Japan considers Australia as a semi-ally, its closest security partner after the United States, its only treaty ally.

Japan’s Defence Minister Minoru Kihara and his Australian counterpart, Richard Marles, also agreed during talks in Tokyo to step up their three-way military cooperation with the United States, the Japanese Defence Ministry said in a statement. Kihara and Marles said that deepening their operational cooperation and joint exercises, and enhancing interoperability, were important steps in increasing their bilateral defense ties.

The two ministers confirmed that there was continuing progress in those areas under their Reciprocal Access Agreement, which took effect in August.

The agreement is aimed at breaking down legal barriers to allow troops to enter each other’s country for training and other purposes.

Other than with the United States, Japan has such defence pacts with only Australia and Britain.

Japanese Prime Minister Fumio Kishida's government adopted a new security strategy last December that focuses on reinforcing strike capability, in a break from Japan's postwar principle of having a military only for self-defence. Under the strategy, Japan also aims to nearly double its defence spending over the next five years, which would make it the world's third-biggest spender after the United States and China. Japan has been building up its defence spending and military power in part to deter China in territorial disputes it has with Beijing over islands that Tokyo controls in the East China Sea.

Australia has stepped up engagement in the South Pacific where it is concerned about China's growing involvement, including the signing of a security pact with the Solomon Islands.

Under the new security agreement, Japan and Australia are discussing exercises deploying F-35A fighter jets to both countries, the Japanese ministry said.

"The Reciprocate Access Agreement is very central to the advancement of our relationship," Marles told Kihara during their talks Thursday.

"From the Australian point of view, we really see, in Japan, we see our future security in the region and in the world."

The ministers confirmed the importance of cooperating on technology and welcomed the conclusion of a contract for the joint development of laser technology by Australia's Defence Department and Mitsubishi Electric Corp. Australia, the Japanese ministry said.

<https://www.dailypioneer.com/2023/world/japan--australia-agree-to-further-step-up-defence-cooperation.html>



Thu, 19 Oct 2023

China's Nuclear Arsenal at More than 500 Warheads - Pentagon Report

China has more than 500 operational nuclear warheads in its arsenal and will probably have over 1,000 warheads by 2030, the Pentagon said in its annual report on Beijing's military that was released on Thursday.

Despite the growing number of China's nuclear weapons, they are still much lower than what Russia and the United States have.

The United States has a stockpile of about 3,700 nuclear warheads, of which roughly 1,419 strategic nuclear warheads were deployed. Russia has about 1,550 nuclear weapons deployed and according to the Federation of American Scientists, a stockpile of 4,489 nuclear warheads.

In the wide ranging report, the Pentagon said China's more than 500 warheads as of May 2023 were on track to exceed projections.

In a previous report, the Pentagon estimated that Beijing had more than 400 operational nuclear warheads in 2021.

"We see the PRC (People's Republic of China) continuing to quite rapidly modernize and diversify and expand its nuclear forces," a senior U.S. official told reporters during a briefing on the report.

"What they're doing now if you compare it to what they were doing about a decade ago, it really far exceeds that in terms of scale and complexity," the official said.

The report added that China's Navy had more than 370 ships and submarines, up from the 340 ships they had last year.

The expanding naval force is central to President Xi Jinping's bid to make China the preeminent military power in the region and Beijing already has the largest Navy in the world.

The report reiterated concern about pressure by Beijing on self-ruled Taiwan, an island China sees as a breakaway province.

Relations between China and the United States have been tense, with friction between the world's two largest economies over everything from Taiwan and China's human rights record to its military activity in the South China Sea.

But Washington has been eager to revive military-to-military communications with China.

Last week the Pentagon said it had accepted an invitation to attend China's top annual security forum in late October, the latest sign of potentially warming ties between the two countries' militaries.

<https://www.reuters.com/world/chinas-nuclear-arsenal-more-than-500-warheads-pentagon-report-2023-10-19/>



Thu, 19 Oct 2023

Putin Discusses 'Some Issues of Particularly Confidential Nature' with Xi, both Vows to Boost Defence Ties

Russian President Vladimir Putin on Wednesday said he had a lengthy and productive discussion with his Chinese counterpart Xi Jinping on "some issues of a particularly confidential nature" as the two leaders vowed to step up their comprehensive strategic coordination and mutually beneficial cooperation.

Putin and Xi met after the opening ceremony of the third Belt and Road Forum (BRF), which is being held here. Putin was the chief guest of the event hosted by Xi. "We had a business lunch in limited attendance, where the Minister of Foreign Affairs was present, aides were present on both sides - and then Chairman Xi offered to talk in private," Putin was quoted as saying by Russia's official Tass news agency.

"We had a tete-a-tete conversation, indeed, as you can imagine, having a cup of tea. We spoke for about an hour and a half or maybe two hours, and we discussed some issues of particularly confidential nature in private," Putin, who has rarely left Russia since invading Ukraine in February last year, said without disclosing the topics discussed with Xi.

According to Putin, the meeting held at Beijing's Great Hall of the People was a very productive and substantial part of the conversation. This is the second meeting between Putin and Xi this year. Earlier in March, the Chinese leader paid a state visit to Russia. Previously, Putin visited China in February of 2022 to take part in the opening ceremony of the Winter Olympics.

China's BRI conclave

In his remarks, Chinese President Xi noted that Putin has attended the BRF three times in a row, demonstrating Russia's support for the Belt and Road Initiative (BRI). Lauding Russia as an important partner as China pursues international Belt and Road cooperation, Xi said the operation of major infrastructure projects such as the China-Russia east-route natural gas pipeline has brought tangible benefits to the people of both countries.

It is not an expediency, but a long-term policy to develop the China-Russia relations featuring permanent good-neighbourly friendship, comprehensive strategic coordination and mutually beneficial cooperation, Xi was quoted as saying by China's official Xinhua news agency.

China supports the Russian people in pursuing the path of national rejuvenation independently and safeguarding national sovereignty, security and development interests, he said. China has come under criticism from the West for standing by Russia, even as it has also tried to show support for Ukraine. President Xi also said the two neighbouring countries should promote high-quality development of China-Russia practical cooperation and actively explore cooperation in strategic emerging industries.

<https://www.indiatvnews.com/news/world/putin-in-cina-russian-president-vladimir-putin-discusses-confidential-issues-with-china-xi-jinping-beijing-moscow-vow-to-boost-defence-economy-ties-2023-10-19-898608>

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Flexible Supercapacitors with Efficient Energy Storage Developed using Conducting Polymer & Nanostructured Inorganic Oxide Hybrids

A hybrid electrode-based flexible symmetric supercapacitor that shows excellent electrochemical properties, cycle stability and high energy density could bring a future solution for efficient energy storage.

Efficient and stable electrode materials for energy storage have always been a hot topic of research as the energy requirements grow day-by-day. The primary goal of researchers working in supercapacitor electrodes is to push the energy density values close to those of batteries. Conducting polymers are pseudocapacitive materials with multi-faceted applications and are capable of delivering the basic requirements for supercapacitor electrodes.

The Materials for Energy Storage and Optoelectronic Devices Group in the Department of Physics, Sanatana Dharma College, Alappuzha has developed a hybrid electrode-based flexible symmetric supercapacitor that shows excellent electrochemical properties, cycle stability and high energy density. The binder-free hybrid electrode consists of high-molecular weight polyaniline (PANI)

prepared via self-stabilized dispersion polymerization and vanadium pentoxide nanostructures prepared by a facile microwave assisted method.

Unlike the conventional PANi based electrodes prepared using the emeraldine base powder cast on flexible substrates as slurry, here the electrodes are prepared from a dispersion of PANi with a secondary dopant in m-cresol. One of the reasons for the excellent performance of the hybrid electrode is this unique preparation method that combines flexible and conducting, high-molecular weight PANi prepared by an organic solvent mediated self-stabilized polymerisation method and highly stable V2O5 nanostructures showing excellent rate-capability making it usable in a wide range of input current values.

The incorporation of this high molecular weight PANi with nanostructured V2O5 effectively addresses the shortcomings of these individual materials and exhibits a synergistic effect as evident from the performance of the hybrid electrode. The flexible supercapacitor device made using these electrodes exhibit superior electrochemical characteristics with very high energy density and cycling stability, being the highest among the values reported for supercapacitors using aqueous electrolytes.

This research work carried out at SD College using the instrumentation facility provided by the Department of Science and Technology (DST) through the Fund for Improvement of S&T Infrastructure (FIST) programme, was recently published in the Chemical Engineering Journal.

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<https://pib.gov.in/PressReleasePage.aspx?PRID=1969175>



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Gaganyaan: What is TV-D1 Mission? Know how ISRO will Conduct it, its Significance, and Challenges

The Indian Space Research Organisation (ISRO) is set to launch the first developmental test flight mission of the Gaganyaan programme on October 21, 2023, at 8:00 am IST, from the First Launch Pad at Satish Dhawan Space Centre, Sriharikota. Gaganyaan's first developmental test flight mission is known as the TV-D1 mission, or the Flight Test Vehicle Abort Mission-1. The mission is important because it will demonstrate the performance of the Crew Escape System, and is the first mission of Gaganyaan's uncrewed flight tests.

As part of the Gaganyaan TV-D1 mission, in-flight abort of the Crew Escape System will be demonstrated. This means that while the Crew Module is in the air, the Crew Escape System will be jettisoned, so that ISRO will be able to check certain flight metres, and whether the Crew Escape System can be effectively separated from the Crew Module to save the lives of astronauts during crewed missions in case a mishap occurs. ISRO expects to conduct more test flight missions in the future.

What is Mach number 1.2? Why will TV-D1 be aborted at Mach number 1.2?

The TV-D1 mission will be aborted at Mach number 1.2. Mach number refers to the ratio of the velocity of an object to the velocity of sound in the surrounding medium. This parameter has been named after Austrian physicist and philosopher Ernst Mach. The fact that the Crew Escape System

will be jettisoned at Mach number 1.2 means that at that time, the velocity of the Crew Module has to be 1.2 times the velocity of sound in air.

"In aerospace engineering, the speeds of different objects can be defined as subsonic, transonic, supersonic, and hypersonic. Subsonic is below the speed of the sound. If something's speed is 1.2 times the speed of sound, it is considered transonic," a senior ISRO scientist, who did not wish to be named, told ABP Live.

So, in the case of TV-D1, the abort demonstration will occur at transonic speed. Mach 0.8 to 1.2 is considered transonic speed.

Anything above 1.2 times the speed of sound to 5 times the speed of sound is supersonic, and anything above 5 times the speed of sound is hypersonic.

"The significance of Mach number 1.2 is that this is the stage at which the launch vehicle is expected to experience the greatest challenge, in terms of vibration and other parameters. So, if some anomalies are likely to occur, they will most probably occur during this stage. Mach 1.2 is about 360 metres per second. The vehicle will be taken to that speed. Once this speed is achieved, the abort command will be given. The Crew Escape System's role is to safely pull out the Crew Module from the launch vehicle, so that the Crew Module and the Crew Escape System go in a direction different from that of the launch vehicle," said the ISRO scientist.

Why is an unpressurised crew module being used for TV-D1?

During TV-D1, an unpressurised crew module will be used. However, in the case of the crewed flight test of Gaganyaan, a pressurised crew module will be used, inside which Earth-like atmospheric pressure conditions will be simulated.

Both the pressurised and unpressurised versions of the Crew Module have the same mass and size. Also, both versions have the same systems for deceleration and recovery, including complete sets of parachutes.

While the Crew Module used for TV-D1 will simulate all the conditions that will be prevalent during the crewed flight of Gaganyaan, the one used for the former will be unpressurised. Explaining the reason behind this, the ISRO scientist said, "Ideally, we should have the pressurised module. But the Crew Escape System will not differentiate between pressurised and unpressurised modules. TV-D1 will be conducted essentially to evaluate or measure the performance of the Crew Escape System. Possibly, in the next flight, a pressurised module will be used. Right now, the focus is the command of abort. ISRO wants to see if the Crew Escape System does its job correctly when it receives the command of abort."

Why are the avionics of the Crew Module in dual redundant mode?

According to ISRO, the avionics systems (electronics applicable to aviation) are in a dual redundant mode. Explaining what dual redundancy means, the ISRO scientist said, "Suppose the main system is not working, an alternate or redundant system should work. If one system is not working, the other system should take over. Two sets of systems are built inside the Crew Module for functions such as navigation, sequencing, telemetry, instrumentation, and power. The Crew Escape System may work properly, but we may not know if navigation fails. Therefore, dual redundancy is there. In case the navigation system the spacecraft are depending on undergoes some problem, the second navigation system, which is identical, will take over. So, there are two sets of systems corresponding to navigation, frequency, telemetry, instrumentation, and power."

What achievements have been made so far in the Gaganyaan programme?

A single-stage liquid rocket will be used to launch the Crew Module, as part of the Gaganyaan TV-D1 mission. However, in case of the crewed flight, LVM-3 (Launch Vehicle Mark III) is likely to

be used, the ISRO scientist said. "LVM3 is human-rated. The Crew Module is designed and fabricated, but there is a long way to go. Propulsion systems are under advanced stages of qualification."

How the TV-D1 mission will be conducted, and the challenges

As part of the TV-D1 mission, the Crew Module will reach an altitude of 11.7 kilometres in about 60 seconds. After reaching that altitude, an abort condition will be simulated. At that time, the speed of the Crew Module will be 1.2 times the speed of sound.

The Crew Escape System will jettison and pull the Crew Module to an altitude of about 17 kilometres, the ISRO scientist said. "After this, the Crew Escape System will be released. The Crew Escape System will fall on its own, under the influence of gravity. The Crew Module has an apex cover. The cover will be removed, and at an altitude of 16.7 kilometres, the parachutes will be deployed so that the velocity of the Crew Module is reduced from about 150 metres per second to 50 to 60 metres per second. When the Crew Module comes down to an altitude of 2.5 kilometres, the main parachute will be deployed. At the last second of touching the surface of the sea, where the altitude will be about nine metres, the velocity will be about 8.5 metres per second. In this way, the Crew Module will touch down. It has a buoyant system because of which it will float on the sea. Colleagues from the Indian Navy will rescue the Crew Module from a location about 10 kilometres from the coast of Sriharikota."

The critical aspect of the Gaganyaan TV-D1 mission is the performance of the Crew Escape System, the scientist said.

Therefore, at an altitude of 17 kilometres, the Crew Escape System and Crew Module will be separated. The Crew Escape System's engines will be fired. The abort sequence will be executed autonomously. After the Crew Escape System is separated, drogue parachutes will be deployed from the Crew Module, when it is at an altitude of 16.7 kilometres. The main parachute will be deployed when the altitude is less than 2.5 kilometres. Finally, the Crew Module will splash down in the sea, about 10 kilometres from the coast of Sriharikota.

What is the significance of the Gaganyaan TV-D1 mission?

The Gaganyaan TV-D1 mission is important because if it is successful, ISRO will be able to conduct further missions that will decide whether the Crew Module, Crew Escape System, and propulsion systems are qualified to perform the future uncrewed as well as crewed flight missions.

When will Gaganyaan's human spaceflight mission be launched?

The ISRO scientist also said that if everything goes to plan, then by the first quarter of 2025, the first crewed flight of the Gaganyaan programme will be launched.

<https://news.abplive.com/science/gaganyaan-test-flight-isro-tv-d1-mission-test-vehicle-development-flight-test-abort-mission-know-how-isro-will-conduct-significance-challenges-1636985>

