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समाचार पत्रों से चयित अंश Newspapers Clippings

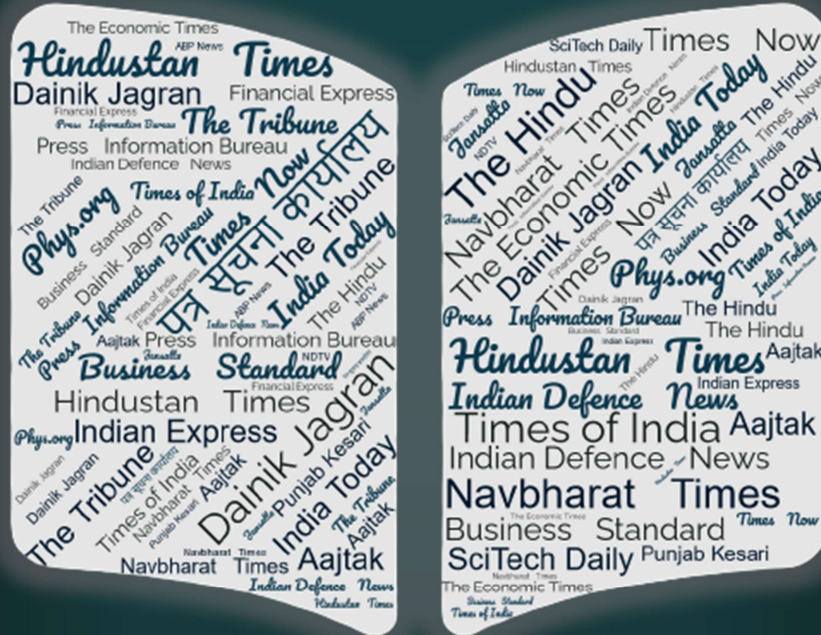
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Defence News

Defence Strategic : National/International



Press Information Bureau
Government of India

Ministry of Defence

Thu, 22 Dec 2022

रक्षा अधिग्रहण परिषद ने सशस्त्र बलों और भारतीय तट रक्षक बल के लिए 84,328 करोड़ रुपये के 24 पूंजीगत अधिग्रहण प्रस्तावों की आवश्यकता की स्वीकृति को मंजूरी दी

इनमें 82,127 करोड़ रुपये के 21 प्रस्तावों को स्वदेशी स्रोतों से खरीद के लिए मंजूरी दी गई है

इन प्रस्तावों में फ्यूचरिस्टिक इन्फैंट्री कॉम्बैट व्हीकल, हल्के टैंक, नौसेना पोत-रोधी मिसाइल, बहुउपयोगी पोत, मिसाइल प्रणाली की नई रेंज, लंबी दूरी के निर्देशित बम और अगली पीढ़ी के अपतटीय पेट्रोल पोत शामिल हैं

रक्षा मंत्री श्री राजनाथ सिंह की अध्यक्षता में रक्षा अधिग्रहण परिषद (डीएसी) ने 22 दिसंबर, 2022 को आयोजित अपनी बैठक में 24 पूंजी अधिग्रहण प्रस्तावों के लिए आवश्यकता की स्वीकृति (एओएन) को मंजूरी दी है। कुल 84,328 करोड़ रुपये के इन प्रस्तावों में भारतीय सेना के लिए छह, भारतीय वायु सेना के लिए छह, भारतीय नौसेना के लिए 10 और भारतीय तटरक्षक बल के लिए दो प्रस्ताव शामिल हैं। यह उल्लेखनीय है कि इनमें स्वदेशी स्रोतों से खरीद के लिए 82,127 करोड़ रुपये (97.4 फीसदी) के 21 प्रस्तावों को मंजूरी दी गई है। डीएसी की यह अद्वितीय पहल न केवल सशस्त्र बलों का आधुनिकीकरण करेगी, बल्कि 'आत्मनिर्भर भारत' के लक्ष्य को प्राप्त करने के लिए रक्षा उद्योग को भी पर्याप्त बढ़ावा देगी। इस एएनओ को मंजूरी प्रदान किए जाने से भारतीय सेना परिचालन तैयारियों के लिए परिवर्तनकारी मंचों और उपकरणों, जैसे कि फ्यूचरिस्टिक इन्फैंट्री कॉम्बैट व्हीकल, हल्के टैंक और माउंटेड गन प्रणाली से युक्त होगी। इन स्वीकृत प्रस्तावों में हमारे सैनिकों के लिए बेहतर सुरक्षा स्तर वाले बैलिस्टिक हेलमेट की खरीद भी शामिल है। नौसेना की पोत-रोधी मिसाइलों, बहुउद्देश्यीय पोतों और उच्च सहनशक्ति वाले स्वायत्त वाहनों की खरीद के लिए दी गई इस मंजूरी से भारतीय नौसेना की क्षमताओं को बढ़ावा देने वाली समुद्री ताकत में और अधिक बढ़ोतरी होगी। मिसाइल प्रणाली की नई रेंज, लंबी दूरी के निर्देशित

बम, पारंपरिक बमों के लिए रेंज संवर्द्धन किट और उन्नत निगरानी प्रणाली को शामिल करके भारतीय वायु सेना को और अधिक घातक क्षमताओं के साथ मजबूत किया जाएगा। भारतीय तट रक्षक के लिए अगली पीढ़ी के अपतटीय गश्ती जहाजों की खरीद तटीय क्षेत्रों में निगरानी क्षमता को नई ऊंचाइयों तक बढ़ाएगी।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1885899>



Thu, 22 Dec 2022

Defence Ministry Approves Capital Procurement Proposals worth Rs 84,328 Cr

The defence ministry on Thursday approved the procurement of a number of military platforms and weapons including light tanks, anti-ship missiles and long range guided bombs at a cost of Rs 84,328 crore to boost combat capabilities of the armed forces. The procurement proposals were cleared by the Defence Acquisition Council (DAC) headed by Defence Minister Rajnath Singh. The Acceptance of Necessity (AoN) for the procurement came amid a spike in tensions between India and China after troops from the two sides were engaged in a clash along the Line of Actual Control (LAC) at Yangtse in the Tawang sector of Arunachal Pradesh.

The defence ministry said the DAC accorded approval for 24 capital acquisition proposals which include six for Indian Army, six for Indian Air Force, 10 for the Indian Navy and two for Indian Coast Guard, adding the total value of the procurement would be Rs 84,328 crore. It said the proposals include procurement of futuristic infantry combat vehicles, light tanks, naval anti-ship missiles, multi-purpose vessels, new range of missile systems, long range guided bombs and next generation offshore patrol vessels. The ministry said 21 proposals worth Rs 82,127 crore, will be procured from indigenous sources.

<https://indianexpress.com/article/india/defence-ministry-approves-capital-procurement-proposal-8339331/>



Fri, 23 Dec 2022

Air Chief Flags 'Critical Deficiencies' in Indian Air Force

Indian Air Force (IAF) chief Air Chief Marshal VR Chaudhari on Thursday said critical deficiencies in the air force needed to be swiftly addressed to retain combat edge, his comments coming at a time when IAF is grappling with a shortage of fighter squadrons and looking at inducting force multipliers such as mid-air refuellers and airborne warning and control systems (AWACS). "There are certain critical deficiencies like shortage of fighter squadrons and force

multipliers which must be addressed on priority to retain our combat edge,” Chaudhari said while delivering the inaugural address at the 19th Subroto Mukerjee Seminar in New Delhi. The air force currently operates around 30 combat squadrons as against an optimum 42. More refuellers and AWACS are also needed to bolster the air force’s potential. “From an airpower perspective, IAF will be expected to contribute across the full spectrum of conflict. Airpower has the capability to deter, defend and if required, punish the adversary in a conflict,” IAF chief said.

He said IAF needed to evolve into an aerospace power by developing the capability to fight and win future wars. India’s neighbourhood continues to remain volatile and uncertain, Chaudhari said. “Amidst this volatility, we must enhance our collective strength by partnering with nations which share common beliefs and values. We must use our image as a stable country with considerable economic heft to forge mutually beneficial relationships and strategic partnerships.”

Chaudhari touched upon the great power politics in the Indo-Pacific region, where an established super power (US) is increasingly being challenged by an established regional power with global ambitions (China). “The outcome of this great power competition will have repercussions for all major players in the region. In the existing world order, where national interests and realpolitik dictate the actions of state players, there would always be an overlap between competition and cooperation,” he said. “When we look at India, there are many things that are going our way. Our economic progress, military might, political stability and diplomatic deftness has put us in the centre stage and announced to the world that India has arrived,” he said.

He also highlighted the importance of self-reliance. “We need to focus more on research and development with an aim to manufacture on our own rather than relying on minor indigenisation of foreign products.”

<https://www.hindustantimes.com/india-news/air-chief-flags-critical-deficiencies-in-indian-air-force-101671744850333.html>



Fri, 23 Dec 2022

India’s Neighbourhood is Volatile and Uncertain, Essential to Retain Strategic Autonomy: IAF Chief

Our neighbourhood continues to remain “volatile and uncertain” and amidst this volatility, we must enhance our collective strength by partnering with nations which share common beliefs and values, Indian Air Force (IAF) Air Chief Marshal (ACM) V.R. Chaudhari said on Thursday while also taking note of the great power politics in the Indo-Pacific.

“We must use our image as a stable country with considerable economic heft to forge mutually beneficial relationships and strategic partnerships. It is essential that we retain our strategic autonomy and to do that, in my opinion, a strategy of balancing... would be the way forward,” ACM Chaudhari said addressing the 19th Subroto Mukherjee seminar organised by Centre for Air Power Studies. Referring to the Indo-Pacific region, ACM Chaudhari said we see great power politics in play where an “established super power is increasingly being challenged by an established regional power with global ambitions” and the outcome will have repercussions for

all major players in the region. Stating that in the existing world order, where national interests and realpolitik dictate the actions of state players, there would always be an overlap between competition and cooperation, the Air Chief said we must develop our own strategy to survive and thrive amidst this competition without losing sight of our long-term objectives. “This has been on display through India’s balanced position at UN on the ongoing conflicts as well as its decision to act in its national interests regarding importing oil at best prices despite pressure from various quarters,” he said adding the actions that we take today and the policies that we adopt will determine the trajectory of our position in the world order in the coming decades.

On the role of IAF, ACM Chaudhari said the IAF needs to evolve into an aerospace power and to do so, there is a need to develop the capability to fight and win tomorrow’s wars, while nothing that there are certain critical deficiencies like “shortage of fighter squadrons and force multipliers which must be addressed on priority to retain our combat edge”.

<https://www.thehindu.com/news/national/neighbourhood-volatile-and-uncertain-essential-to-retain-strategic-autonomy-iaf-chief/article66292559.ece>



Press Information Bureau
Government of India

Ministry of Defence

Thu, 22 Dec 2022

17th Round of India-China Corps Commander Level Meeting

The 17th round of India- China Corps Commander Level Meeting was held at Chushul-Moldo border meeting point on the Chinese side on 20th December 2022. Building on the progress made after the last meeting on 17th July 2022, the two sides exchanged views on the resolution of the relevant issues along the LAC in the Western Sector in an open and constructive manner. They had a frank and in-depth discussion, keeping in line with the guidance provided by the State Leaders to work for the resolution of the remaining issues at the earliest which would help in restoration of peace and tranquility along the LAC in the Western Sector and enable progress in bilateral relations.

In the interim, the two sides agreed to maintain the security and stability on the ground in the Western Sector. The two sides agreed to stay in close contact and maintain dialogue through military and diplomatic channels and work out a mutually acceptable resolution of the remaining issues at the earliest.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1885707>

India, China Not Patrolling Several Points in Eastern Ladakh as Agreed: Government Source

As several patrolling points in eastern Ladakh remain inaccessible to Indian troops more than two years after the Galwan clash with Chinese forces, a source in the defence establishment told The Hindu that after disengagement, in some well-known areas, neither side is patrolling, as per the understanding reached during their talks. The source said that “patrolling by both sides was affected in certain areas due to the events of 2020.” These points were regularly patrolled before April-May 2020 when China started amassing troops close to the Line of Actual Control (LAC) in eastern Ladakh.

‘Neither side patrolling’

“Post disengagement from the areas that are well known, both sides are not patrolling as per the understanding reached during the talks. The understanding to disengage is based on the principle of equal and mutual security without prejudice to the LAC claims. Both sides are currently engaged in talks to resolve the balance issues including aspects of patrolling,” the defence source said.

On June 15, 2020, after 20 Indian soldiers were killed in violent clashes with the Chinese People’s Liberation Army (PLA), several measures were taken to ease the situation at the LAC which included the creation of “no-patrolling zones” or “buffer zones” by both sides. At least four PLA soldiers were also killed during the Galwan clashes.

There are 65 PPs in eastern Ladakh, starting from the base of the Karakoram to Chumar. PPs are the end points along the undefined LAC up to which the Indian troops patrol after starting from their respective base camps. PPs are often used to assert territorial claims along the undefined LAC.

‘Patrols were interrupted’

In September 2020, Defence Minister Rajnath Singh had informed the Parliament that face-offs with the Chinese PLA happened because “patrols were interrupted” and there was no commonly delineated LAC, meaning that there was an overlap in LAC perception in many areas. Some of the PPs that are not being patrolled are PP 5-9 in Samar Lungpa, PP 10-13 in Depsang, PP 14, PP 15, PP 17A, Finger 3-8 on the North Bank of Pangong Tso, PP 36 and 37 in Demchok, and PP 50 and 51 at Charding Nilung Nala (CNN) Junction, the government source said. As reported by The Hindu on September 20, the village head of one of the last settlements along the LAC in Chushul said on Tuesday that in the past year, at least three large grazing areas near the village have been turned into “buffer zones” and graziers have lost access to 41 km of land. The government source said that there are 19 grazing areas, all in Ladakh, that locals have not been able to access due to the ongoing crisis. Following the standoff in 2020, there was a spurt in infrastructure development in the border areas. Arrangements were made to accommodate 22,000 troops, and approximately 450 armoured vehicles, tanks and guns have been constructed in the last two years.

India and China are positioned in close proximity at multiple locations along the LAC and the senior military commanders have held 17 rounds of meetings so far.

<https://www.thehindu.com/news/national/india-china-not-patrolling-several-points-in-eastern-ladakh-as-agreed-government-source/article66293635.ece>



Thu, 22 Dec 2022

India Launches First New Anti-Submarine Craft After Delays

India's L&T Shipbuilding has launched the first vessel in a new class of anti-submarine warfare shallow water craft (ASW SWC) destined for the Indian Navy. The vessel, which was initially scheduled for delivery to the Indian Navy in October 2022, was launched on 20 December at L&T's shipyard in Kattupalli, Chennai. It has been named Arnala and it was laid down by L&T Shipbuilding in June 2022. The ASW SWC is part of a programme to equip the Indian Navy with a total of 16 submarine-hunting vessels that are capable of operating efficiently within India's coastal and littoral waters. These new vessels will replace India's Abhay-class corvettes, which have been progressively retired since 2017.

Construction of the vessels is split evenly between India's Cochin Shipyard Limited (CSL) and a Garden Reach Shipbuilders & Engineers (GRSE) and L&T Shipbuilding teaming arrangement. The contract with the GRSE teaming was inked with the Ministry of Defence in April 2019.

The 900-tonne ASW SWC has an overall length of about 77.6 m, a beam of 10.2 m, and a draught of 2.7 m. It will be capable of achieving a top speed of 25 kt and an endurance of about 1,800 n mile, according to details provided by the defence ministry. The ASW SWC will be equipped with torpedoes, rockets, a hull-mounted sonar, and a low-frequency variable depth sonar. The shipyards involved in the programme have provided scant details of the vessels' combat systems. However, a media statement issued by the defence ministry to mark Arnala's launch described the vessel as one that would have “over 80% indigenous content”.

<https://www.janes.com/defence-news/news-detail/india-launches-first-new-anti-submarine-craft-after-delays>

THE ECONOMIC TIMES

Thu, 22 Dec 2022

French Defence Firm CEO Calls on CDS Anil Chauhan, Discuss Mutual Defence Cooperation

In order to give a boost to the Defence partnership between India and France, Pierre-Eric Pommellet, the Chairman and CEO of French Naval Group, called on India's Chief of Defence

Staff (CDS), General Anil Chauhan on Wednesday, December 21, said the Defence Ministry. According to the Defence Ministry, the two discussed the ongoing defence collaboration between the two countries and explored further opportunities under India's 'Atmanirbhar Bharat' initiative. The Naval Group is a major French industrial group specialising in naval defence design, development and construction with its headquarters in Paris. India's defence relations with the French reached new heights with India buying 36 Rafale fighters for the Indian Air Force in 2016. Earlier, following a meeting with French Defence Minister at the Third India-France Annual Defence Dialogue in December 2021, Indian Defence Minister Rajnath Singh had said that a French company will be manufacturing an engine in India in collaboration with an Indian firm. The Naval group's first Barracuda class submarine entered into service in the French Navy in June 2022. Earlier, during the commissioning of INS Vela in December last year, the then Chief of the Indian Navy Admiral Karambir Singh had said that the P-75 project represents the growing strategic congruence between India and France.

<https://economictimes.indiatimes.com/news/defence/french-defence-firm-ceo-calls-on-cds-anil-chauhan-discuss-mutual-defence-cooperation/printarticle/96428073.cms>



Thu, 22 Dec 2022

Defence Body Warns of Data Breaches and Ransomware Attacks, Advises Staff to Follow Cert-In Guidelines

The Controller General of Defence Accounts (CGDA), which oversees the Defence Accounts Department (DAD) in the Ministry of Defence, recently notified its employees of an increase in data breaches and data leaks from government offices and advised its staff to adhere to an advisory issued by the Indian Computer Emergency Response Team (CERT-In) in order to prevent such cyber threats.

"A rise in incidents of data breach and data leaks affecting data/PCs and emails is being continuously observed in the official environment. Attackers use a variety of techniques to gain access to the internal network's servers and databases," said the Controller General of Defence Accounts in an official circular issued on 6 December. "Also attackers exfiltrate data and then deploy ransomware to encrypt the data they have stolen and release stolen data in public domain," the circular said.

This comes just a few weeks after the All India Institute of Medical Sciences (AIIMS) was hit by a massive ransomware attack that rendered its digital systems inoperable, making operations such as the generation of unique health identification numbers, new registrations, laboratory reports, billing, and patient discharge inaccessible. This advisory is significant because the DAD is responsible for payment, financial advice, internal audits, and accounting of the expenditures and receipts of the Armed Forces, including the Coast Guard, Defense Research and Development Organization laboratories, and defence ordnance factories.

CERT's advisory regarding data breaches

The CGDA said that CERT-In has issued a set of guidelines on how to avoid data breaches, which it urged employees to follow. One of these guidelines from CERT-In, which appeared in the CGDA's circular, stated: "Employees must be advised to avoid mixing personal with work email and/or work documents, or allowing someone they shouldn't to use their official device or sharing official information with them." The CERT-In advisory also urged employees to identify and classify sensitive/personal data, as well as to take measures to encrypt such data.

Here are some additional directives from CERT-In that were mentioned in the CGDA circular:

- CERT-In advised users to check their systems for keyloggers. A keylogger monitors and records each keystroke or single key depression on a keyboard.
- It advised against enabling the "remember password" option in email.
- Use strong and unique passwords, and keep all computer software up to date.
- It also warned against clicking links in "unsolicited" SMS messages or emails.
- CERT-In advised that when making online payments, the website should utilise HTTPS and have valid certificates.
- It also advised not to share personal information over phone calls and to use Linux on internet-connected PCs.

Second such advisory by CGDA

The defence body warned its employees in August about a cyber security threat in which users were being targeted by a fake WhatsApp-like app in order to trick them into providing their login information. According to the CGDA's August 24 circular, malicious content was embedded in a fake messaging app called WHSAPP.APK that mimicked WhatsApp. "This HQrs (headquarters) have been received inputs (sic) from MoD and credible Govt Agency that a new squatting campaign is being used by threat actors to target users and convince them to hand over their login credentials," the circular read.

Squatting, also known as cybersquatting, is the fraudulent act of registering domain names that appear to be related to already-existing domains or brands with the intention of making money off of user errors, according to Palo Alto Networks, a US-based cybersecurity firm.

<https://www.moneycontrol.com/news/business/defence-body-warns-of-data-breaches-and-ransomware-attacks-advises-staff-to-follow-cert-in-guidelines-9745741.html>



Thu, 22 Dec 2022

Game-Changer: India Procures Estonian Unmanned Ground Vehicle Themis

By Huma Siddiqui

The Indian Army has recently procured Milrem Robotics' Tracked Hybrid Modular Infantry System (TheMIS) unmanned ground vehicle (UGV) from Estonia. TheMIS has been making waves in the military technology sector, and India became the latest country to add it to its

arsenal. “The addition of THeMIS to the Indian Army would provide a significant boost to their capabilities. Its versatility and advanced technology makes it a valuable addition to any military’s arsenal and it has already proven itself to be effective in the battlefield. It is likely that THeMIS would be used for a variety of missions in the Indian army, including reconnaissance, surveillance, transportation, and logistics tasks,” a senior officer explained.

During the ongoing Parliamentary session, Minister of State for Defence Ajay Bhatt said that in the last three years India has imported TheMIS Unmanned Ground Vehicle, Loitering munitions as well as Closed in Weapon Systems, 7.62X51 mm Arsenal Machine gun and ground support missile test equipment.

About TheMIS Unmanned Ground Vehicle

THeMIS is a versatile and highly advanced UGV that has a range of potential applications in military operations, from reconnaissance and surveillance to logistics and transportation. With its ability to operate in a variety of environments and complete tasks with a high degree of autonomy, THeMIS has the potential to significantly enhance the capabilities of the Indian military.

Shoulder to Shoulder: True Infantry System

The THeMIS unmanned ground vehicle (UGV) by Milrem Robotics has been proven effective in various exercises, experiments, and even the Operation Barkhane mission in Mali. Its primary purpose is to reduce the number of troops needed on the battlefield by performing a variety of roles, including transportation, ordnance disposal, intelligence operations, and even being weaponized. THeMIS has an open architecture that allows it to be quickly configured for different missions.

Which countries have this?

It has already been purchased by 16 countries, 8 of which are members of NATO, including the United States, the United Kingdom, Spain, Norway, the Netherlands, Germany, France, and Estonia. The system can be configured to be used for logistics, combat, intelligence, surveillance and reconnaissance (ISR) or Explosive Ordnance Disposal (EOD). The UGV has a payload capacity of 750 KG with an open architecture. THeMIS is a small, tracked unmanned vehicle that is 7.8 feet long and 3.75 feet high. Hence, it can be fitted with a variety of payloads depending upon the demand of the operation or the unit. It may be used for normal cargo, mortar or CASEVAC, a platform for rapid evacuation and in a combat role; the payload offerings include cannons, javelin missiles, counter unmanned aerial system (UAS) systems and even loitering munitions. It is a highly advanced UGV that is equipped with a range of technical features to support military operations. It has a maximum speed of 20 km/h and a maximum payload capacity of 1,250 kg and is equipped with advanced sensors and cameras that allow it to perform tasks with a high degree of autonomy and navigate challenging terrain. It is powered by a hybrid-electric drive system that combines an internal combustion engine with an electric motor, providing a range of up to 15 hours on a single tank of fuel. THeMIS is also designed to be highly rugged and durable, with a reinforced steel and aluminum body that can withstand rough terrain and extreme weather conditions.

Battle Hardened

Ukraine’s ongoing war has become a major testing ground for autonomous and uncrewed vehicles powered by artificial intelligence. While the use of military robots is not a new concept

– remote-controlled war machines were used during World War II and the US deployed fully-autonomous assault drones in 2020 – the proliferation of a new type of combat vehicle is being witnessed in Ukraine.

Milrem Robotics has recently announced that the German Ministry of Defence has ordered 14 of its THeMIS unmanned ground vehicles (UGVs) to be sent to the Ukrainian forces for immediate use. The THeMIS UGVs will be used for casualty evacuation and for finding and removing landmines and similar devices, and will not be armed. However, it is likely that the Ukrainian forces will find other uses for the THeMIS UGVs, such as carrying equipment and supplies, as they are equipped with Milrem's "Intelligence Function Kit" which includes the "follow me" ability. It is also possible that the THeMIS UGVs could be re-equipped with combat modules or have homemade autonomous weapon systems mounted on top of them. With the addition of these 14 UGVs, the Ukrainian forces will have the world's largest complement of THeMIS UGVs. Based on information available in public domain, in an effort to close the gap in its technological knowledge, Russia's Centre for Analysis of Strategies and Technologies (CAST) has offered a cash reward for the capture of a THeMIS unmanned ground vehicle (UGV). CAST recognizes that Russia is behind in the development of autonomous vehicles and hopes to use a captured THeMIS to accelerate the development of Russian technology in this area.

<https://www.financialexpress.com/defence/game-changer-india-procures-estonian-unmanned-ground-vehicle-themis/2923614/>

THE ECONOMIC TIMES

Thu, 22 Dec 2022

Defence Chiefs of US and India Discuss Issue of Global Security amidst Increased Tension on India-China Border

Seeking to deepen US-India military ties, the defence chiefs of the two countries have shared their assessments of the regional and global security environment and discussed ways to deepen bilateral cooperation and interoperability. The call between US Joint Chiefs of Staff Gen Mark A Miley and his Indian counterpart Chief of the Indian Defence Force Gen Anil Chauhan took place amidst increased tension between India and China on the border. "The two military leaders shared assessments of the regional and global security environment and discussed ways to deepen bilateral military ties and interoperability," Joint Staff Deputy Spokesperson Joseph R. Holstead said on Wednesday in a readout of the call. "The US and India share a strong military-to-military relationship under the US-India Major Defence Partnership," Holstead said, adding that India plays a "key role" in maintaining a free Indo-Pacific. "India is a key regional leader and an important partner in maintaining a free and open Indo-Pacific," he said.

The US, India and several other world powers have been talking about the need to ensure a free, open and thriving Indo-Pacific in the backdrop of China's rising military manoeuvring in the resource-rich and strategically important region. China claims nearly all of the disputed South China Sea, though Taiwan, the Philippines, Brunei, Malaysia and Vietnam all claim parts of it. Beijing has built artificial islands and military installations in the South China Sea. China also has territorial disputes with Japan in the East China Sea.

In 2017, the US, Australia, India and Japan gave shape to the long-pending proposal of setting up the Quad to develop a new strategy to keep the critical sea routes in the Indo-Pacific region free of any influence. The Chinese and Indian troops were engaged in a fresh clash in the Yangtse area of Arunachal Pradesh's Tawang sector on December 9, which is the first such major flare-up after the deadly hand-to-hand combat in the Galwan Valley in June 2020 that marked the most serious military conflict between the two sides in decades.

<https://economictimes.indiatimes.com/news/defence/defence-chiefs-of-us-and-india-discuss-issue-of-global-security-amidst-increased-tension-on-india-china-border/articleshow/96417782.cms>

ThePrint

Thu, 22 Dec 2022

India, Japan to Conduct 1st Bilateral Air Combat Exercise Next Month to Enhance Mutual Skills

In a key move, India and Japan will carry out their maiden bilateral air combat exercise early 2023 seeking to increase the interoperability between the two countries amid tensions with China. The exercise, which will see India's Su 30 MKI in action, will be carried out from 16 January to 26 January at the Hyakuri Air Base and its surrounding airspace in Omitama, and the Iruma Air Base in Sayama. Sources in the Indian defence establishment said the aim of the combat exercise with Japan Air Self Defense Force (JASDF) was to strengthen defence cooperation between the forces, enhance tactical skills and promote mutual understanding.

As per the plan, over 150 IAF personnel will take part in the exercise. According to a statement released by the JASDF, the participating units will include four F-2s, 7th Air Wing (Hyakuri), four F-15s, Air Tactics Development Wing (Komatsu) and Central Aircraft Control and Warning Wing (Iruma). "This is the first time that IAF is conducting an air combat exercise with Japan. The purpose of this is to enhance tactical skills on both sides through several activities, seminars, and drills. This will also further foster the bilateral relations between the two nations," a source said explaining the significance of the programme.

India and Japan do conduct both Army and Navy level exercises. In February this year, both armies came together for "EX DHARMA GUARDIAN-2022" in Belagavi, Karnataka, where they trained in house-interventions drills, raid on terrorist hideouts in semi-urban terrain, combat first aid, unarmed combat and close-quarter combat firing. The bilateral Army exercise was started in 2018 while the Indian Navy has been conducting the Japan India Maritime Exercise (JIMEX), every year since 2012. The primary focus of the naval exercise has been on anti-submarine warfare and Air Defence tactics. Japan, which has largely remained pacifist since World War II, is now increasingly focusing on defence preparedness. Last week, Japan unveiled its USD 320 billion security strategy which includes drastically expanding its defence capabilities and developing new "counter strike" capabilities. The surprising five-year plan will make Japan the world's third-biggest military spender after the United States and China, based on current budgets.

<https://theprint.in/defence/india-japan-to-conduct-1st-bilateral-air-combat-exercise-next-month-to-enhance-mutual-skills/1277481/>

Philippines Orders Strengthened Military Presence after 'Chinese Activities' Near Islands

The Philippines' defence ministry on Thursday ordered the military to strengthen its presence in the South China Sea after monitoring "Chinese activities" in disputed waters close to a strategic Philippine-held island. The ministry did not specify what activities those were and its statement follows a report this week of Chinese construction on four uninhabited features in the disputed Spratly islands, news that Beijing has dismissed as "unfounded". Any encroachment or reclamation on features within the Philippines' 200-mile exclusive economic zone "is a threat to the security of Pagasa island, which is part of Philippine sovereign territory," the ministry said in a statement, using the Filipino name for Thitu island. "We strongly urge China to uphold the prevailing rules-based international order and refrain from acts that will exacerbate tensions," it added. The Chinese embassy in Manila reiterated that China strictly abides by a consensus reached among claimants that included not developing uninhabited reefs and islands. Asked to respond to the defence ministry's statement, it said both countries would "properly handle maritime issues through friendly consultations." China claims most of the South China Sea, through which billions of dollars worth of goods pass each year. Brunei, Malaysia, the Philippines, Taiwan and Vietnam also have overlapping claims to various islands and features.

Thitu is the most strategically important of nine features the Philippines occupies in the Spratlys, located close to Subi Reef, one of seven artificial islands that China has built on submerged reefs, some with surface-to-air missiles, aircraft hangars and runways. The Philippine military's Western Command in a statement said it had observed via regular navy and air patrols a "persistent presence" of Chinese militia near Thitu island and around Lankiam Cay, Whitsun Reef and Sandy Cay. It did specify what the Chinese boats were doing.

<https://economictimes.indiatimes.com/news/defence/philippines-orders-strengthened-military-presence-after-chinese-activities-near-islands/printarticle/96427506.cms>



Japan Adopts a Radical Defence Plan Amid China Threat; to Redefine Next-Gen Military Capabilities

By Manish Kumar Jha

Japan's Prime Minister Fumio Kishida unveiled a radical strategy for building military capabilities. He announced the biggest-ever military budget for the Japan Self-Defence Forces (JSDF). He set the military spending over the next five years to \$318 billion. Breaking the

historic stance of being a pacifist military, Japan has embarked on a capability-building roadmap as the country seeks defence build-up including the use of the pre-emptive strike. Japan also aims to double its military budget in the next five to 10 years to about 2% of GDP. This is breaking away from Japan's self-defence-only post-war military doctrine.

The pace of the announcement reflects the urgency as Defence Minister Yasukazu Hamada also signalled that Finance Minister Shunichi Suzuki is to work on a budget plan to increase Japan's 2023-2027 military spending by more than 50% from 27.5 trillion yen. Overall, the plan is to double Japan's annual defence budget to about 10 trillion (\$70 billion).

The radical defence budget

The defence paper outlines emphatically that Japan will significantly enhance the necessary defence capabilities in order to respond to these changes, working to build a "Multi-Domain Defence Force" equipped with capabilities in space, cyberspace and the electromagnetic spectrum, capabilities in the maritime and air domains, comprehensive air and missile defence capabilities to respond to diverse airborne threats, standoff defence capability, manoeuvring and deployment capability, and secure ammunition and ensure maintenance of equipment. Based on this concept, Japan has decided to move up budget implementation for projects planned for the FY2023 initial budget on an unprecedented scale, in order to accelerate its defence capability enhancement from FY2022. The defence budget cuts across the three divisions of Japan Self-Defence Forces (JSDF).

The critical Air-Superiority

Japan is already part of the most advanced combat jet programme—F-35. The Japan Self-Defence Forces have acquired stealthy fifth-generation F-35A (8 fighters) and F-35B (4 fighters). Next, Japan also wants to upgrade its stable warhorse F-15. The F-15 will go through massive upgradation which is aimed at maintaining the number of squadrons. The F-15 upgradation will continue until the development of the next-generation combat concept—F-X reaches the prototype stage.

The cost of project F-X is estimated at around \$40 billion and the government has already allocated \$700 million this year. At the same time, The UK, Italy, and Japan have announced the joint working mechanism for the Global Combat Air Programme (GCAP) which is a new partnership to develop combat jets. The UK government which is leading the project is aimed to deliver the next generation of combat air fighter jets. It is still not clear in case the F-X and Global Combat Air Programme could be merged.

Certainly, in that case, the GCAP will be among the biggest programme for sixth-generation combat jets. Already, with the announcement of GCAP, the UK merges its fighter jet project—the Tempest— with Italy and Japan for the sixth-generation fighter jet. According to the official involved in the project, the Global Combat Air Programme (GCAP) will leverage the UK's Tempest and Japan's F-X programmes. As per the recent announcement, GCAP will incorporate a network of capabilities such as uncrewed aircraft, advanced sensors, cutting-edge weapons, and innovative data systems. What compliments is the development of upgraded Type-12 surface-to-ship guided missile (surface-, ship-, and air-to-ship missile and launch-project for the critical Hyper Velocity Gliding Projectile (HVGP) for the defence of the remote island.

Under the new plan, Japan is also relaunching the project for the development of a surface-to-air missile system for base air defence and a new close-range surface-to-air missile. Not limited to

the combat jet, the defence ministry of Japan has called for the Procurement of a new utility helicopter (UH-2). It addresses the gaps in its rotary wing and projects a plan to strengthen its area of tactical operation of conducting airborne maneuver and transport and deploying units immediately. Japan will build the next-generation UH-2 based on the success of UH-1J utility helicopter.

Japan leverages the full spectrum of air superiority, including the space domain. While the JSADF does have a critical project in the unmanned domain, especially in the Intelligence, Reconnaissance and Surveillance (ISR), the new plan rather focuses on space assets. The plan talks about AI technology for tracking moving targets using satellite constellations. The fusion of AI is all about ISR activities using satellite constellations to predict the positions of multiple moving targets automatically. Analysts have pointed out the effectiveness of satellite-based ISR for covering oceanic geography. In fact, the concept of ISR activities through the satellite constellation is what India is also addressing. Instead of drone-based ISR, it works in frequent intervals and makes it possible to keep track of targets. Japanese military analysts have also indicated the emphasis on high-sensitivity, broadband infrared detector elements and high-performance infrared sensors. It will empower Japan to have the most advanced and critical assets to collect intelligence imagery from further distances than existing sensors, including the space domain.

Strengthening Capabilities in Electromagnetic Domain

Japan's defence capability has always remained focused on the new-tech and evolving military technology. The efficacy of the systems and weapons based on electromagnetic technology is everywhere to see—even though that is in its early stage. In its development roadmap, Japan has put the thrust on electronic warfare aircraft and support air operations which are all based on effective communication jamming. It plans to demonstrate high-power microwave (HPM) radiation technology. The Research on high-energy laser systems is in the advanced stage. It includes conducting research on electronic warfare evaluation technology and addressing future EW evaluation systems to accurately understand and evaluate the performance of increasingly sophisticated and high-performance electronic warfare devices.

Maritime firepower

Japan is a maritime nation. The budgetary allocation has almost been doubled in order to respond to the modernization of the maritime and air forces of neighbouring countries, including China. So, one of the key areas is to implement necessary upgrades to improve anti-ship attack capabilities, including the installation of improved Type-12 surface-to-ship guided missile capabilities (air-to-ship launch type), and enhance network functions. Besides its operational submarine, it also includes the refurbishment of deadly Izumo-class destroyers.

India-Japan defence collaboration

Japan is well aligned with India on the strategic front but the defence cooperation is limited to high-stake military exercises. India and Japan are both parts of the Indo-Pacific Strategy and conduct high-tempo military exercises in the maritime domain alongside the U.S. and Australia.

In the past, Japan offered its amphibious aircraft –the US-2 to India which failed to materialize. Broadly, that is it as far the military equipment is concerned. While the key factor always remained around the restrictions on arms export under the strict guidelines backed by the Constitution. In fact, the radical move towards adopting the new military doctrine is still under

debate in Japan which restricts the military tech transfer to another country. While that remains a challenge, Japan has shown a willingness to supply advanced subsystems to India for the warships. India is keen to have hi-calibre stealth antennas for its warships.

One of the possibilities lies in joint cooperation in a next-generation submarine project P-75I. The ambitious project is under the strategic partnership model which requires a submarine to be fitted with Air Independent Propulsion System (AIP). In fact, Japan does possess such a capability, especially in the area of advanced lithium batteries. Japan's Soryu-class submarine has the proven technology to remain submerged for a long time. In fact, Japan is pushing the boundaries in assimilating new tech in its newly launched Taigei-class diesel-electric attack submarine for the Japan Maritime Self-Defence Force (JMSDF). The powerful submarine is equipped with lithium-ion in place of lead acid. More so, Japan is the only country in the world to have succeeded in fitting lithium-ion batteries in the attack submarine. In addition to maritime collaboration, the scope of the cooperation can extend to aero-engine design and manufacturing. It fits so well under the depth of India-Japan strategic relations. In fact, Japan has re-focused on the development of F-X, designing and manufacturing engines and starting on the basic design of the airframe. It matches the similar approach that India is also gearing towards post-LCA Tejas' induction in the IAF. It presents a great opportunity for the joint development of an aero-engine for India's next-generation Advanced Medium Combat Aircraft (AMCA) and LCA Tejas Mk2.

<https://www.financialexpress.com/defence/japan-adopts-a-radical-defence-plan-amid-china-threat-to-redefine-next-gen-military-capabilities/2923769/>

THE ECONOMIC TIMES

Thu, 22 Dec 2022

Russian Defence Minister Sergei Shoigu Visits Troops in Ukraine

The Russian Defence Ministry said on Thursday that Defence Minister Sergei Shoigu had visited army units fighting in Ukraine, Russian state-owned news agency RIA reported.

RIA cited the ministry as saying that Shoigu had visited Russian units deployed to the "area of the special military operation", using Moscow's term for the conflict in Ukraine. It did not specify where the visit took place.

<https://economictimes.indiatimes.com/news/defence/russian-defence-minister-sergei-shoigu-visits-troops-in-ukraine/articleshow/96426861.cms>

Putin OKs ‘Limitless’ Defence Budget, Boosting Military Size to 1.5 Million; Have West’s Sanctions Failed to Cripple Russia?

By Parth Satam

Russian President Vladimir Putin approved increasing the size of Russia’s armed forces to 1.5 million from 1 million, while his government is advertising hefty pay to struggling families for joining the reserves in the three-month-old temporary mobilization. Russia seems to have calculated that the war will head well into next year, with US and Europe continuing to arm Ukraine, overlooking their own depleting arms stocks and dire economic conditions. In an annual televised conference, Putin accepted the proposal by Defence Minister Sergei Shoigu, who also recommended 695,000 of the combatants be professionally contracted soldiers.

Putin himself said there were no “funding restrictions” for the military, which he called “tragic” and is helpless towards, blaming the West for “dragging out” the conflict. Earlier this month, he anticipated that Russia could be fighting in Ukraine for a long time. On Wednesday, the President Joe Biden administration approved another \$2 billion worth of security assistance to Ukraine, including a Patriot surface-to-air missile (SAM) system. The announcement came in the backdrop of Ukraine President Volodymyr Zelenskyy addressing the United States Congress the same day in his first outside his country since the war began. But embarking on what might be a long-running heightened military budget indicates Russia has the financial wherewithal, itself implying the raft of Western sanctions have not severely impacted the Russian economy. During the conference, Putin also acknowledged “problems” and “issues” with the call-up of 300,000 reservists, which began in September.

Why Is Russia Recruiting More Soldiers?

The overall resilient economy that admittedly weathered the multiple sanctions by the West and did not “collapse” as predicted is possibly driving the recruitment campaign. The impact of sanctions has been observed to be limited and mixed. Russia, therefore, appears confident that it can afford the hefty financial remunerations to soldiers. It has used only 40% of its military wherewithal with around 150,000 soldiers. The war is being conducted by only two military districts (Western and Southern) with no mobilizations from other regions. Ukraine had briefly choked Russia’s long-range gun and rocket artillery by hitting its long supply lines. Russia thus introduced loitering munitions (or kamikaze, suicide drones) like the Lancet series and the Iranian-origin Shahed-136. Such Ukrainian tactical successes might keep increasing with military assistance from the North Atlantic Treaty Organization (NATO), possibly continuing despite NATO countries’ economic crises. The partial mobilization in September was therefore aimed at bolstering the Russian army’s rear echelons, while professionally trained soldiers in the frontlines can go on the offensive to completely take the remaining areas in the separatist regions. Pressure from the US has forced European countries like Germany and France to maintain a hardline on Russia, despite periodic murmurings of aspiring for independence in their

foreign policy. President Emmanuel Macron's recent statement about accommodating Russian concerns also, where he asked for "security guarantees" for Moscow, jolted both hawkish Baltic nations and came after he visited Washington. The US and Europe's apparent refusal to participate directly in the war and the silent majority in Europe opposing Ukrainian's accession into NATO has been the most significant indicator of geopolitical competition driving the confrontation with Moscow, rather than the perception of a Russian threat.

The Promotional Videos

The enacted advertisements showed a decorated Russian veteran requesting his daughter to break open her piggy bank, where she had saved money to buy a new mobile phone. The father's employer has not paid his staff's wages. Grudgingly handing him the money, she is also shown empathizing with his condition to a friend, pointing to his physical and psychological scars from war. The friend, too, shares the experience with her father being a veteran. The father in the promotional video overhears the conversation, keeps back the piggy bank, and steps out of the house. He is shown returning six months later in military fatigues, where his daughter hugs him, and he hands a new mobile phone, indicating he chose to join again and has been compensated handsomely for his military service. In another video, an old man is cutting back on buying groceries and is reluctantly forced to put up his car for sale. Just as he is about to conclude the transaction, his young son turns up in battlefield fatigues and tears up the contract, forcing the buyer to storm off. The son presumably tells his father that since he has decided to volunteer in the military, they wouldn't have financial hardships.

Russian Economy Hurt But Not Destroyed

Positive economic indicators like surplus government revenue from energy sales; strengthening national currency (Rouble); and a massive trade surplus exist alongside falling inflation which is not as low as hoped; shrinking GDP; subdued consumer demand; and reduced industrial production. Most mainstream reports note the Russian economy to have taken a hit owing to the exit of foreign firms and lack of access to foreign technology, anticipating a 40% decline over the next few years, commonly quoting a Yale University study. But the same reports also cite International Monetary Fund (IMF) studies from early August that "upgraded" their outlook for Russian Gross Domestic Product (GDP) by 2.5 percentage points. By June, in its fifth rate cut, the Central Bank of Russia (CBR) slashed its key interest rate by a whopping 150 basis points (8% from 9.5%), bringing it to the pre-war level. This is because inflation fell from 17.1% in May to 15.9% in June, finally settling at 12.7% in December. It had initially hiked interest rates from 9.5% to 20% by late February as an emergency measure immediately after it began the war.

While the inflation rate is still well above the CBR's 4% target, the steady, consistent drop means Russia can afford its citizens spending and consuming goods. At the same time, Russia earned \$98 billion from fossil fuel exports in the first 100 days of the war alone.

The revenue is expected to touch \$337 billion by the end of this year – a 31% increase from 2021. Its current account surplus was a record high of \$167 billion between January and July, more than triple that of 2021. Thus, opinion remains divided amongst Western experts on the damage inflicted by sanctions, as the IMF notes short-term resilience in the Russian economy.

CNBC characterized this impact as "floundering, not drowning," where the "immediate collapse" predicted by some was not seen, though the Russian economy continues to contract by

4% year-on-year. Its biggest export is an essential commodity like fossil fuels, demanding payments in Roubles for its sales, and immediate capital controls (preventing the foreign currency from leaving the economy) have been partially credited with the ability of the Russian economy to largely prevail over the sanctions.

<https://eurasianimes.com/putin-oks-limitless-defence-budget-boosting-military-size-to-1-5-million-have-wests-sanctions-failed-to-cripple-russia/>



Fri, 23 Dec 2022

From Patriot to Crotale: Ukraine's Advanced Air Defence Systems to Fight Against Russia

Ukraine is having to master a patchwork of different air defence systems, with the latest addition -- the American-made Patriot -- bringing new capabilities but also complexity, analysts say. Kyiv has taken delivery of the German IRIS-T, the French Crotale, the Norwegian NASAMS, as well as the Italian Aspide 2000, the US-made HAWK and soon the Patriot. "From a strictly military point of view, having a wide variety of systems is not easy... There are major logistical difficulties in putting in place multiple systems," said Camille Grand, researcher for the ECFR think tank and former deputy secretary general at NATO. Posing the same challenges as Western-delivered artillery and armoured vehicles that have flooded into Ukraine since February, each system requires different training and maintenance, forcing Ukrainian forces to learn quickly and adapt.

Ukraine also has its own Soviet-era air defences based on the Buk-m1 or S-300 systems which are far less effective. "We are not going to see perfect communication and interoperability between all these systems, because of their diversity, because of the complexity of implementing them, but we can imagine that the Ukrainian air defence command will manage to integrate them side-by-side," Grand added. The sheer variety of systems could pose dangers as well as operational challenges, a French military source said. "When the systems have not been designed to be interoperable, making them work together and optimising their use constitutes a real challenge for the command centre," the source said. "The risk that we can have with surface-to-air defence systems is in particular that of friendly fire, all the more so at a time when Ukraine is using air weapons much more than at the beginning of the conflict," the source added. A Ukrainian air defence missile is believed to be the source of a deadly explosion in eastern Poland last month which initially raised fears that Russia had struck NATO territory.

Air war

Air defence has become of crucial importance for Ukraine since October when Russia began a strategy of striking Ukraine's civilian infrastructure, depriving millions of Ukrainians of water, electricity and heating. The key to a successful system is creating what the military calls a "multi-layered" ground-to-air defence capability that can intercept short-range attacks at low altitude, medium range attacks at medium altitude, and long range at high altitude. Air defence batteries need to be positioned around strategic locations, such as large cities or key infrastructure centres, where they can take down ballistic missiles, cruise missiles or drones.

The Patriot missiles, which cost three million dollars each, can shoot down cruise missiles, short-range ballistic missiles and aircraft at a height significantly higher than the systems currently in place. The United States promised to provide the Patriot for the first time as Ukraine's leader Volodymyr Zelensky made a lightning trip on Wednesday to Washington. The pledge comes at a time when Western and Ukrainian defence experts are concerned about the possible delivery of Iranian ballistic missiles to Russia. "If there was one system available to cover the entire territory of Ukraine, obviously that would have been the ideal case scenario," Viktoriya Fedorchak, a Ukrainian researcher working for the Swedish Defence University, told AFP. "But we're talking about realistic availability of different capabilities that Ukraine's allies can provide. This diversity is the reality Ukraine needs to deal with and the country needs to get the most out of it."

Russian President Vladimir Putin is already aware how the Patriot delivery could change the balance of power. "Those who are confronting us say this is a defensive weapon... there will always be an antidote. So the people who are doing this are doing it in vain. It's just prolonging the conflict, that's all," Putin told reporters on Thursday.

<https://www.ndtv.com/world-news/from-patriot-to-crotale-ukraines-advanced-air-defence-systems-to-fight-against-russia-3631241>



Fri, 23 Dec 2022

Beyond Weapons: On Ukraine President Zelensky's Visit to Washington

Ukraine President Volodymyr Zelensky's visit to Washington, his first overseas travel since Russia's invasion on February 24, and the Biden administration's decision to send a new \$1.8 billion military aid package, including Patriot missile defence systems and precision-guided missiles, are a testament to the deep relationship Ukraine and the U.S. share in the time of war. Ukraine has already received American financial and military funding from approved assistance worth around \$54 billion. The U.S. supply of long-range missiles (HIMARS) has played a major role in Ukraine's recent battlefield advances in Kharkiv and Kherson, after its heavy losses in Donbas. The Patriot missile system is expected to strengthen Ukraine's air defences at a time when Russia is bombarding the energy grid and water supplies. In Washington, President Joe Biden discussed a 10-point peace formula with Mr. Zelensky (the details are unknown) and also promised continued support "for as long as it takes". Both leaders tried to send out a message of unity amid concerns of cracks in the western alliance as the war is continuing indefinitely with its massive economic costs.

The U.S. has gradually stepped up its supply of weapons to Ukraine, but is still wary of sending offensive weapons out of fears of escalating the conflict. Ukraine has relentlessly campaigned for more advanced weapons, including U.S. aircraft, tanks and long-range tactical missiles. While Mr. Biden said his administration would continue to back Ukraine, he also warned of the risks of sending offensive weapons to Ukraine, which could "break up NATO, the EU and the rest of world". Currently, Ukraine has a battlefield advantage, recapturing swathes of territories in the northeast and south. But Russia has air superiority. The Patriot missiles could offer some protection to Ukraine but could also prompt Russia to carry out heavier attacks. This leaves Mr.

Biden in a dilemma. He is ready to bolster Ukraine's defence but does not want to provoke a wider war between Russia and NATO. His Ukraine policy should not be an open-ended weapons supply package. The U.S. could help its ally but it should also push for a sustainable solution to the conflict. It should use its continued support to Ukraine to mount pressure on Russia — as its weapons play a critical role in Kyiv's counterattacks — and persuade Ukraine to resume direct negotiations. At this point, no military solution seems likely. Unless there is a credible push for talks, the war is likely to continue for the foreseeable future.

<https://www.thehindu.com/opinion/editorial/beyond-weapons-the-hindu-editorial-on-ukraine-president-volodymyr-zelenskys-visit-to-washington/article66293333.ece>

ThePrint

Thu, 22 Dec 2022

Ukraine's 'Cat and Mouse' Battle to Keep Russian Missiles at Bay

By Tom Balmforth

Russian cruise missiles sped towards their target this month, a Ukrainian pilot gave chase in an old Soviet MiG-29 fighter jet and locked onto two of them, but could not take the shot: they were nearing a large town and it was too risky.

He said he passed the targets on to Ukraine's ground-based air defences which shot them down, as they have done hundreds of missiles since October, blunting the impact of a Russian air campaign that aims to destroy the country's power grid. "Fortunately for us, they succeeded," the 29-year-old pilot, whose codename is Juice, told Reuters, describing the Dec. 5 incident. Such skirmishes are common in the skies over Ukraine, and their outcomes have a direct bearing on the lives of millions of people who are left without heat, power or running water during the freezing winter if defences fail.

Ukraine calls the attacks a war crime, aimed at cowing innocent civilians. Russia says the electricity grid is a legitimate military target in its "special operation". The Pentagon has said Russia's missile strikes are partly designed to exhaust Kyiv's supplies of air defences and finally achieve dominance of the skies above the country. Ukrainian President Volodymyr Zelenskiy travelled to Washington on Wednesday to seek "weapons, weapons and more weapons", including a Patriot missile battery that would shore up the country's defences against incoming missiles and drones. The attacks on energy targets disrupt everyday life, including vital services like hospitals and schools, and threaten to further cripple the economy. It is already set to shrink by at least a third this year, as shops and heavy industry struggle to keep the lights on.

Russia has launched nine, large-scale air attacks – usually firing more than 70 missiles at a time – since Oct. 10, knocking out power, running water, mobile signals and heating. Ukraine's record of downing missiles has ranged from around 50% to as much as 85%, with more recent attacks coming closer to the higher end, according to Reuters calculations based on Ukrainian data. After the most recent attack on Friday it said it had shot down 60 out of 76 incoming missiles. Still, those which come through inflict serious damage. Ukraine was forced to

implement emergency blackouts nationwide, and much of Kyiv region has been without power and water for several days.

‘CAT AND MOUSE’

Spread thinly across a country double the size of Italy, air defence units are deployed mostly near cities and key infrastructure, while fighter pilots like Juice cover the expansive gaps in between. It is a tall order. Juice says he has not shot down a single drone or missile in his MiG-29, which came off the assembly line before Ukraine won independence from Soviet Moscow in 1991. “Our jets are not capable enough to do that efficiently,” said the pilot, who is in a constant high state of readiness at a location in central Ukraine that he would not disclose. He said it was hard spotting incoming targets with old radars, especially in the case of low-flying, slow-moving Shahed drones that look like moving trucks on the radar screen. On occasions, like Dec. 5, Juice was unable to fire at targets because he was too close to densely populated areas.

It is ground-based air defence units that shoot down the vast majority of missiles and drones, not ageing warplanes, Air Force spokesman Yuriy Ihnat said. “Both missiles and drones fly along the course of rivers to be as low as possible and disappear from radars. If they are low enough, they just disappear ... Then they pop up again; it’s a game of cat and mouse,” said Ihnat. After major missile barrages, a days-long pause tends to follow as Russian intelligence assesses what was hit and what was missed, tracks the repositioning of Ukrainian air defences and looks for weak spots to exploit, Ukrainian officials told Reuters. “Air defences don’t remain in one place: we can’t cover the whole country...” Ihnat said. For Ukraine, intelligence gathering by both domestic and Western spy agencies plays a major role in preparing for Russian air strikes, Denys Smazhnyi, a senior air defence training official, told Reuters. “So we usually know what objects are under attack, we can build around those objects some kind of air defence,” he said.

DWINDLING MISSILE STOCKS

Ukraine’s military intelligence chief has estimated that Russia may only have enough high-precision weapons for few more major air strikes. But Ukrainian officials also acknowledge that their own stocks of defensive weapons are dwindling as the invasion nears the 10-month mark. Despite Western supplies of air defence systems to Ukraine including the sophisticated U.S. NASAMS and German IRIS-T systems, Soviet-era systems make up the core of Ukrainian air defences, said Ihnat. “Our Soviet air defence system is being depleted – that is the S-300 and the BUK, which are the foundation. We cannot maintain that indefinitely because all the unique spare parts of those systems are made in Russia,” he added.

Western air defence systems supplied to Ukraine have performed well, but supplies are far short of what is needed, according to both air force officials. “The Russian equipment is getting older; we are losing missiles. I’m not (saying) they will run out in a few days or a few weeks ... It will still depend on the intensity of the Russian attacks,” said Smazhnyi. By Dec. 7, Russia launched more than 1,000 missiles and rockets at Ukraine’s power grid, its operator said. On Wednesday, the United States announced \$1.85 billion in additional military assistance for Ukraine, including a transfer of the Patriot Air Defense System, Smazhnyi said such systems would provide protection against ballistic missiles that Ukraine is now exposed to. Ihnat said IRIS-T production was already at maximum capacity and that Ukraine should therefore focus on obtaining as many NASAMS supplies as it could. “We’re almost through one month of winter, we have one more and then February, which is short. I think we’ll survive. But it’s better to supply missiles than generators,” he said. Juice, who speaks fluent English, said many of his peers in the Air Force

were taking English lessons in their free time in anticipation that Ukraine would one day receive Western aircraft such as the U.S. F-16 multi-role fighter jet. There has been no sign that any delivery of F-16 was imminent or agreed, and Ihnat said the pilots were acting on their own. “Everyone understands that sooner or later we will switch to F-16s or some other type of plane and English knowledge will be needed.”

<https://theprint.in/world/ukraines-cat-and-mouse-battle-to-keep-russian-missiles-at-bay/1277037/>

The Tribune

Thu, 22 Dec 2022

China Sends 39 Warplanes, 3 Ships towards Taiwan

China’s military sent 39 planes and three ships toward Taiwan in a 24-hour display of force directed at the island, Taiwan’s defence ministry said on Thursday. China’s military harassment of self-ruled Taiwan, which it claims is its own territory, has intensified in recent years, and the Communist Party’s People’s Liberation Army has sent planes or ships toward the island on a near-daily basis. Between 6 am on Wednesday and 6 am on Thursday, 30 of the Chinese planes crossed the median of the Taiwan Strait, an unofficial boundary once tacitly accepted by both sides, according to Taiwan’s Ministry of National Defence.

Taiwan scrambled combat jets to warn away 39 Chinese aircraft that entered its southeastern air defence zone, the island’s defence ministry said on Thursday. Taiwan has complained of repeated missions by the Chinese air force over the last two years, often in southern areas of its air defence identification zone, or ADIZ. Thursday’s incursion included 21 fighters and four H-6 bombers, as well as early warning, antisubmarine and aerial refuelling aircraft, Taiwan’s defence ministry said in a report detailing Chinese activities in its ADIZ over the last 24 hours. Among the planes were 21 J-16 fighter jets, 4 H-6 bombers and two early-warning aircraft.

Taiwan said it monitored the Chinese moves through its land-based missile systems, as well as on its own navy vessels. China’s military held large military exercises in August in response to US House speaker Nancy Pelosi’s visit to Taiwan. Beijing views visits from foreign governments to the island as de facto recognition of the island as independent and a challenge to China’s claim of sovereignty.

<https://www.tribuneindia.com/news/world/china-sends-39-warplanes-3-ships-towards-taiwan-463726>

Outlook

Thu, 22 Dec 2022

Russia, China Hold Joint Naval Drills in East China Sea

Russian and Chinese warships on Thursday practised joint action in the East China Sea, continuing a series of drills that reflect a growing defence cooperation between the two countries. The Russian Defence Ministry said the Varyag missile cruiser, the Marshal

Shaposhnikov destroyer and two corvettes of Russia's Pacific Fleet were taking part in the drills that began on Wednesday. China has deployed two destroyers, a diesel submarine and several others ships for the exercise. Russian and Chinese aircraft were also taking part in the week-long maneuvers that will involve firing exercises and anti-submarine drills, according to the ministry. "The main goal of the drills is to strengthen naval cooperation between the Russian Federation and the People's Republic of China and to maintain peace and stability in the Asia Pacific region," the ministry said. Military ties between Moscow and Beijing has grown stronger since Russian President Vladimir Putin sent his troops into Ukraine on February 24.

China, which has declared a "no limits" friendship with Russia, has pointedly refused to criticise Moscow's actions, blaming the US and NATO for provoking the Kremlin, and has blasted the punishing sanctions imposed on Russia. Russia, in turn, has strongly backed China amid the tensions with the US over Taiwan.

In November, Tu-95 bombers of the Russian air force and Chinese H-6K bombers flew joint patrols over the Sea of Japan and the East China Sea. As part of the drills, the Russian bombers landed in China for the first time, and the Chinese bombers flew to an air base in Russia. In September, China sent more than 2,000 troops along with more than 300 military vehicles, 21 combat aircraft and three warships to take part in a sweeping joint exercise with Russia.

<https://www.outlookindia.com/international/russia-china-hold-joint-naval-drills-in-east-china-sea-news-247401>



Fri, 23 Dec 2022

Naval Drills with China Response to 'Aggressive' U.S.: Russian Army Chief

Russia's army chief on Thursday called joint naval drills between Russian and Chinese warships a response to increasingly aggressive US military posturing in the Asia-Pacific region. "This cooperation is a natural reaction to the aggressive build-up of US military potential in the region... The exercises we are conducting are in strict accordance with international law," Valery Gerasimov said in a briefing.

Russia announced it was dispatching several warships to join war games between December 21 and 27 off the coast of China to strengthen naval cooperation. "The purpose of these events is to increase the combat readiness of the troops and forces of the two countries and the ability to withstand new challenges and threats," Mr. Gerasimov said in a briefing with foreign military representatives. The defence ministry said the exercises would include live fire drill with missiles and artillery and include practising measures to counter submarines. "We are not going to create any alliances and new dividing lines in the region, like Washington has," Mr. Gerasimov added Thursday.

China and Russia have drawn closer in recent years as part of what they call a "no-limits" relationship acting as a counterweight to the global dominance of the United States. Former

Russian leader Dmitry Medvedev earlier this week travelled to China to meet with President Xi Jinping for talks that Medvedev said included international security and the conflict in Ukraine.

<https://www.thehindu.com/news/international/naval-drills-with-china-response-to-aggressive-us-russian-army-chief/article66293857.ece/amp/>



Thu, 22 Dec 2022

F-35B Crash: US Stealth Fighter's Auto-Ejection Feature Can 'Throw Out' the Pilot without Pressing the Button

By Ashish Dangwal

On December 15, a Lockheed Martin-owned F-35B Lightning II was involved in a mishap as it attempted to land on a runway at the Naval Air Station Joint Reserve Base (NAS-JRB) Fort Worth in Texas. The reasons for the F-35 crash last week are still being investigated. But the incident's footage revealed one interesting aspect of the plane: an "auto-eject" feature that, under certain circumstances, may activate the jet's Martin-Baker US16E ejection seat without 'pressing the button.' The F-35B has a short take-off and vertical landing capability. The F-35B is first seen hovering over the runway in the video. The plane begins to descend vertically at a relatively rapid rate as the video continues. The jet briefly touches down after that, bounces back into the air, suddenly pitches forward, and then quickly descends again, hitting the runway with its nose. The jet's nose gear breaks off due to the forceful impact.

The pilot is then observed ejecting from the aircraft. The incident had brought attention to the US16E ejection seat's purported "zero-zero" capabilities, as previously reported by the EurAsian Times. The term "zero-zero" describes the ejection seat's ability to work safely and save the pilot's life at zero height and zero speed, even while the aircraft is motionless on the ground. However, it is unknown if the aircraft's auto-eject mechanism was activated during the incident on December 15. On December 17, Rob Wingfield, a former USAF officer, also noted that the Martin-Baker Mk16E/US16E ejection seat (fitted in the F-35) does have auto ejection when used in STOVL aircraft. Wingfield tweeted, "the Mk16E / US16E ejection seat by @MB_EjectEject (installed in the F-35) does come with auto ejection when installed in STOVL aircraft. I'm wondering if the Texas F-35 mishap pilot punched on his own or the seat made that decision for him."

The ability to auto-eject is also listed as one of the characteristics of the US16E on Martin-Baker's website. According to previously made public material by the F-35 JPO, the F-35B is the only variant of the Joint Strike Fighter to be equipped with this system.

Auto-Ejection Feature In Lockheed Martin F-35B

The F-35 comes in three main variants, each of which differs significantly from the others in various ways. However, the F-35B has a unique core layout because of this unique propulsion configuration. The F-35B is currently in service with the United States Marine Corps, the Royal Air Force of the United Kingdom, and the Italian armed forces. In RAF and Royal Navy service,

the F-35B superseded all versions of the Harrier jump aircraft, another vertical take-off and landing-capable combat fighter. It is also expected to eventually replace the Harrier in the US Marine Corps. It is worth noting that the Cold War-era Soviet Yak-38 and Yak-141 jump planes had engine configurations more akin to the F-35B. However, both had vertically mounted jet engines rather than lift fans and auto-eject systems.

“Why do we need auto-eject?” Graham Tomlinson, a test pilot with BAE Systems who participated in early F-35B flight testing, explained during a discussion organized by the Royal Aeronautical Society in 2020. He said that the Harrier lacks an auto-eject feature. Throughout its lifespan, they’ve experienced one or two engine issues that caused it to sink into the water or the ground as the pilot ejected. As a result, when the engine starts to sputter and cough, the thrust loss is roughly symmetric and comes close to the center of gravity, Tomlinson added. On the other hand, “On the F-35B, if you lose the core engine, you get an instant pitch up. If you lose the lift fan, you get an instant pitch down,” he noted.

He emphasized that the simulations had indicated that a failure in F-35B would make things dangerous; if the drive shaft were to break during a hover, an F-35B would end up toppling over nose down in less than two seconds. It is unclear exactly how or by what criteria the auto-eject system judges that the aircraft is not within the pilot’s control and initiates the ejection sequence. Its precise status on the F-35B fleet is also unknown. To help prevent the pilot from ejecting in dangerous circumstances, it is known that the US16E seats on all F-35 models are also connected to the aircraft’s flying systems. It is yet to be observed how the inquiry resolves the mystery surrounding the accident on December 15 and whether the F-35B’s auto-eject system turns out to have had any role. In any case, the Joint Strike Fighter B variant’s auto-eject capability is an intriguing and little-known function that is reportedly crucial for the jet’s unusual capacity to hover in midair.

<https://eurasianimes.com/f-35b-crash-us-stealth-fighters-auto-ejection-feature-can-throw-out-the-pilot/>

Business Standard

Thu, 22 Dec 2022

IAEA Chief Discusses Ukraine Nuclear Plant Protections with Russia

The head of the UN nuclear watchdog met on Thursday in Moscow with officials from Russia's military and state atomic energy company as he pursues a long-running drive to set up a protection zone around a Russian-occupied nuclear power plant in Ukraine. Russian company Rosatom described the talks on measures needed to safeguard Ukraine's Zaporizhzhia Nuclear Power Plant and the surrounding region as substantive, useful and frank. International Atomic Energy Agency Director General Rafael Grossi indicated that more negotiations were needed after another round of necessary discussions". It's key that the zone focuses solely on preventing a nuclear accident, he tweeted. I am continuing my efforts towards this goal with a sense of utmost urgency.

The meeting in Moscow came a day after Ukrainian President Volodymyr Zelenskyy made a defiant wartime visit to the US capital, his first known trip outside his country in the nearly 10

months since Russia invaded. The visit to Washington was aimed at reinvigorating support for Ukraine in the US and around the world at a time when Russia appears to have lost battlefield momentum. There is concern that Ukraine's allies are growing weary of providing the military and economic assistance that have enabled Ukraine to keep fighting. The Russian military on Thursday reported that Defence Minister Sergei Shoigu paid a visit to Russian troops on the front line what the Kremlin calls its special military operation in Ukraine. The exact location of the visit was not disclosed.

A video released by the Russian Defence Ministry showed Shoigu inspecting temporary troop quarters in dugouts and talking to military commanders. Before his trip to Washington, Zelenskyy met with Ukrainian troops in the eastern city of Bakhmut, the recent focus of some of the war's most intense combat. Russian President Vladimir Putin has never been seen travelling to front-line areas.

Russian newspaper Rossiyskaya Gazeta reported that Putin visited his Ukraine command headquarters last week, but its location wasn't disclosed, and it wasn't even clear if it was in Ukraine. The IAEA's Grossi has urged Russia and Ukraine for over three months to agree on a safety zone around Europe's largest nuclear power station. Zaporizhzhia province and areas across the Dnieper River from the nuclear power plant have been under regular shelling since Russia invaded Ukraine on February 24.

Ukrainian officials have repeatedly called for a demilitarised zone around the plant, which was seized by Russian forces early in the war. Although all six of the plant's reactors are shut down, the reactor core and used nuclear fuel must still be cooled for lengthy periods to prevent them overheating and triggering dangerous meltdowns like the ones that occurred in 2011 when a tsunami hit the Fukushima plant in Japan. Ukraine saw the world's worst nuclear accident, at Chernobyl in 1986.

Ukraine and Russia have blamed each other for the repeated shelling, which has led on multiple occasions to the Zaporizhzhia plant losing the electricity needed to operate the cooling system. Ukrainian officials earlier this month also accused Russian troops of installing multiple rocket launchers at the site. Grossi said in November that the main issues under discussion involve military equipment and the radius of the safety zone. He said the IAEA's proposal is very simple: "Don't shoot at the plant, don't shoot from the plant.

https://www.business-standard.com/article/international/iaea-chief-discusses-ukraine-nuclear-plant-protections-with-russia-122122200873_1.html

Science & Technology News



**Press Information Bureau
Government of India**

Ministry of Science & Technology

Thu, 22 Dec 2022

Government Informs Rajya Sabha that it has Collaborated with a Number of International Institutions to Facilitate Indian Students for their Research in Science

Dr Jitendra Singh said, 363 research scholars pursued their research in science during the last three years in these institutions

The Government today informed the Rajya Sabha that it has collaborated with a number of international institutions to facilitate Indian students for their research in science. In a written reply to a question, Union Minister of State (Independent Charge) Science & Technology; Minister of State (Independent Charge) Earth Sciences; MoS PMO, Personnel, Public Grievances, Pensions, Atomic Energy and Space, Dr Jitendra Singh said that, 363 research scholars pursued their research in science during the last three years in these institutions.

The collaboration has been established with select institutions, viz. European Organization for Nuclear Research (CERN), Geneva; Brookhaven National Laboratory, USA; Elettra Sincrotrone, Trieste, Italy; Fermi National Accelerator Laboratory (Fermilab), USA; Norwegian Polar Institute, Norway; Purdue University, USA; University of Alberta, Canada; Large Heavy Ion National Accelerator, France; Flerov Laboratory of Nuclear Reactions (FLNR), Joint Institute of Nuclear Research (JINR), Russia and Facility for Anti proton and Ion Research (FAIR), Germany.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1885810>



**Press Information Bureau
Government of India**

Ministry of Science & Technology

Thu, 22 Dec 2022

An Innovator from India Makes the Country Proud by Winning a Competition at the 3rd ASEAN India Grassroots Innovation Forum in Cambodia

Ms Shalini Kumari from India received first prize in the Grassroots Innovation Competition at the 3rd ASEAN India Grassroots Innovation forum for her innovation 'Modified walker with

adjustable legs'. The technology which was transferred to the industry, Vissco Rehabilitation Aids, a leading manufacturer of orthopaedic products in the country, is available for purchase through Brick and Mortar stores and also through marketplaces like Amazon India for purchase by common people of the country. Ms Shalini Kumari received the prize from H.E Dr. Hul Seingheng, Cambodia COSTI Chairman and Director General, General Department of Science, Technology & Innovation under the Ministry of Industry Science, Technology & Innovation (MISTI), Kingdom of Cambodia. She has won the cash prize of USD 1,500 by virtue of being the winner of first prize.

The three-day 3rd ASEAN India Grassroots Innovation forum organized by the ASEAN Committee on Science, Technology and Innovation (COSTI) in partnership with the Department of Science and Technology (DST), Government of India and the National Innovation Foundation (NIF) – India concluded today at Phnom Penh, Cambodia in the presence of H.E. Kitti Settha Pandita Cham Prasidh, Hon'ble Minister of Industry, Science, Technology and Innovation, Kingdom of Cambodia. The forum consisted of Grassroots Innovation Competition, Student Innovation Competition, Panel discussions, Keynote speeches and an exhibition of innovations consisting of participants from India and the ASEAN Member States (AMS).

Speaking on the occasion, the Hon'ble Minister from Cambodia expressed his optimism that the participants would have learnt from experiences of each other. About 100 technologies from 9 countries were on display during the three-day exhibition. On this occasion, Mr Richhpal Singh, Charge d Affairs, Embassy of India in the Kingdom of Cambodia and Dr. Zurina Moktar, Head - Science and Technology Division, ASEAN Secretariat were also present. On the side-lines of 3rd ASEAN India Grassroots Innovation forum, a Government 2 Government meeting was also held in Cambodia which included representation from ASEAN Member States, India and ASEAN Secretariat.

The 2nd and 3rd prize has been won by grassroots innovators from Philippines and Myanmar respectively who have won USD 1000 and USD 500 respectively. Altogether, a total of 45 grassroots innovators have participated and representing 9 nationalities in this competition. The first and second prize in the Student Innovation competition has been won by participants from Thailand whereas the third prize has been won by the student from Lao PDR. A total of 37 participants have participated, representing 9 countries.

he first prize winner from India Ms Shalini Kumari at the forum, a resident of Patna in Bihar; she was first recognized by the National Innovation Foundation (NIF) – India, an autonomous body of the Department of Science and Technology (DST), Government of India through IGNITE Competition in the year 2011 for the same technology.

The ASEAN India Grassroots Innovation forum organized annually COSTI in partnership with DST, Government of India and the National Innovation Foundation (NIF) – India comprises of seminar sessions, innovation competitions, and an exhibition. By bringing together key players, namely government officials, grassroots innovators, student innovators, academics, business actors, and the wider community, this forum provides a platform to promote and strengthen the development of the grassroots innovation ecosystem. The 1st two forums were organized in Indonesia (2018) and Philippines (2019) respectively while there was a brief pause of two years owing to the pandemic.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1885603>



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Ministry of Science & Technology

Thu, 22 Dec 2022

Need to Build on Community Strength & Customize Role of Technology According to their Needs Highlighted at National Conclave on Techneev@75

The need to build on the strength of the community and customize the role of technology according to the systemic needs of the community for changing their life and livelihood was highlighted at the National Conclave on Techneev@75, organized last evening in Delhi. “Innovations often come from people who are hungry and are looking for solutions to their problems. Several efforts are being made to scale up such technologies and address gaps in them. Working together towards this will help bring forth the edge that technology needs for successful implementation,” said Secretary Department of Science and Technology (DST) Dr. S Chandrasekhar at the inauguration of the National Conclave on Techneev@75. He added that we need to recognize the strength of local knowledge systems, bring in necessary S&T interventions, market the innovations, and find innovative mechanisms to reach the masses.

The National Conclave is the culmination of the yearlong Techneev@75 program organised jointly by the Department of Science Technology (DST), Department of Biotechnology (DBT), the Council of Scientific and Industrial Research (CSIR), and the Ministry of Earth Sciences (MoES) to bring together communities, societal change makers, and experts on one platform, showcased the significant outcomes and discussed key learnings and the way forward to explore how absorption of science and technology could be augmented at the _community level. It set a framework for strengthening the local innovation system in collaboration with the formal innovation System.

Dr. Debapriya Dutta, Head SEED Division, DST elaborated on how community change makers played a crucial role in adopting technology by the communities and emphasized the need for demystifying the role of technology in improving the life and livelihood of the community.

The learning from Techneev@75 program, including the models for strengthening the local innovation system, exploring the PPP model for sustainable livelihood system, S&T-based rural entrepreneurship development, commercialization and market orientation of local products, effective capacity building mechanisms and digitally enabled livelihood systems were presented at the conclave, by Dr. Kinkini Dasgupta Misra, Scientist, Vigyan Prasara. Awards were presented to the winners of collage-making and video-making competitions conducted as a part of the TechNeev@75. The conclave also included experience sharing of noted science filmmakers, feedback from Techneev@75 coordinators, and a way forward session.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1885602>

India to Embark on Beneath-the-Sea Aquatic Exploration Mission 'Samundrayaan' by 2026

India, with a unique maritime position, is embarking on the mission of 'Samundrayaan' with to make a wider beneath-the-sea exploration of the aquatic ecosystem. In a written reply to the Parliament, the Union minister of Earth Science Dr Jitendra Singh said that the mission is likely to be set-off by 2026. Under the mission 'Samundrayaan', the government is working on sending a team of three marine researchers to 6000-metre depth in a vehicle called 'MATSYA 6000' which is being designed and developed by the National Institute of Ocean Technology (NIOT) at Chennai under the Ministry of Earth Sciences.

"The manned submersible facilitates the direct observation by the human in the deep ocean in exploring mineral resources rich in Nickel, Cobalt, rare earth, manganese and other resources which can be used for scientific analysis", he said.

The mission is aimed at having a good impact on about 7517 km long coastline, spread over 9 coastal states and 1,382 islands. This will give a boost to the government's effort of making positive changes in the 'Blue Economy' as one of the ten core dimensions of growth.

The minister also informed that the mission 'Samundrayaan' has also immediate spin-offs in the form of underwater engineering innovations in asset inspection, tourism and promotion of ocean literacy. The government has formally launched the Samundrayaan mission in October 2021 for making a wider exploration beneath the sea aquatic ecosystem. Detailing about the MATSAYA-6000 vehicle, he said that the vehicle has an endurance of 12 hours in case of emergency for human safety. Meanwhile, sources said that the Indian Space Research Organization, IITM and DRDO would also be participating together.

<https://www.newindianexpress.com/nation/2022/dec/22/india-to-embark-on-beneath-the-sea-aquatic-exploration-mission-samundrayaan-by-2026-2530664.html>

The Uncontrolled Re-Entries of Satellites

By Vasudevan Mukunth

What are the different stages of a rocket launch? How does uncontrolled re-entries of rockets into the earth's orbit cause damage? What are the dangers highlighted in the letter written by the Outer Space Institute (OSI)

The story so far: More than 140 experts and dignitaries have signed an open letter published by the Outer Space Institute (OSI) calling for both national and multilateral efforts to restrict

uncontrolled re-entries — the phenomenon of rocket parts falling back to earth in unguided fashion once their missions are complete. Among others, the letter is addressed to S. Somanath, chairman of the Indian Space Research Organisation (ISRO).

What are the stages of a rocket launch?

The Soviet Union launched the first artificial satellite in 1957. Today, there are more than 6,000 satellites in orbit, most of them in low-earth (100-2,000 km) and geostationary (35,786 km) orbits, placed there in more than 5,000 launches. The number of rocket launches have been surging with the advent of reusable rocket stages.

Rockets have multiple stages. Once a stage has increased the rocket's altitude and velocity by a certain amount, the rocket sheds it. Some rockets jettison all their larger stages before reaching the destination orbit; a smaller engine then moves the payload to its final orbit. Others carry the payload to the orbit, then perform a deorbit manoeuvre to begin their descent. In both cases, rocket stages come back down — in controlled or uncontrolled ways.

What is an uncontrolled re-entry?

In an uncontrolled re-entry, the rocket stage simply falls. Its path down is determined by its shape, angle of descent, air currents and other characteristics. It will also disintegrate as it falls. As the smaller pieces fan out, the potential radius of impact will increase on the ground. Some pieces burn up entirely while others don't. But because of the speed at which they're travelling, debris can be deadly. A 2021 report of the International Space Safety Foundation said, "an impact anywhere on an airliner with debris of mass above 300 grams would produce a catastrophic failure, meaning all people on board would be killed". Most rocket parts have landed in oceans principally because earth's surface has more water than land. But many have dropped on land as well.

Why are scientists worried about the re-entries?

The OSI letter cited examples of parts of a Russian rocket in 2018 and China's Long March 5B rockets in 2020 and 2022 striking parts of Indonesia, Peru, India and Ivory Coast, among others. Many news reports have focused on Chinese transgressions of late, but historically, the U.S. has been the worst offender. Parts of a SpaceX Falcon 9 that fell down in Indonesia in 2016 included two "refrigerator-sized fuel tanks". If re-entering stages still hold fuel, atmospheric and terrestrial chemical contamination is another risk. As per the letter, "Conservative estimates place the casualty risk from uncontrolled rocket body re-entries as being on the order of 10% in the next decade" and that countries in the 'Global South' face a "disproportionately higher" risk of casualties.

The U.S. Orbital Debris Mitigation Standard Practices (ODMSP) require all launches to keep the chance of a casualty from a re-entering body to be below 0.01%. But the U.S. Air Force and the NASA have waived this requirement on multiple occasions. A July 2022 study by researchers in Canada found that this threshold, which some other countries have also adopted, is "arbitrary and makes little sense in an era when new technologies and mission profiles enable controlled re-entries," and because many places have become more densely populated. There is no international binding agreement to ensure rocket stages always perform controlled re-entries nor on the technologies with which to do so. The Liability Convention 1972 requires countries to pay for damages, not prevent them. These technologies include wing-like attachments, de-orbiting

brakes, and extra fuel on the re-entering body, and design changes that minimise debris formation.

What can make minimum damage?

While the OSI letter admits that any kind of re-entry will inevitably damage some ecosystem, it recommends that bodies aim for an ocean in order to avoid human casualties. The letter concludes by asking that future solutions be extended to re-entering satellites as well. Advances in electronics and fabrication have made way for smaller satellites, which are easier to build and launch in large numbers. These satellites experience more atmospheric drag than if they had been bigger, but they are also likelier to burn up during re-entry.

India's 300-kg RISAT-2 satellite re-entered earth's atmosphere in October after 13 years in low-earth orbit. The ISRO tracked it with its system for safe and sustainable space operations management from a month beforehand. It plotted its predicted paths using models in-house. The RISAT-2 eventually fell into the Indian Ocean on October 30.

<https://www.thehindu.com/opinion/op-ed/explained-the-uncontrolled-re-entries-of-satellites/article66292610.ece>.

