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समाचार पत्रों से चयित अंश
Newspapers Clippings

डीआरडीओ समुदाय को डीआरडीओ प्रौद्योगिकियों, रक्षा प्रौद्योगिकियों, रक्षा नीतियों, अंतर्राष्ट्रीय संबंधों और विज्ञान एवं प्रौद्योगिकी की नूतन जानकारी से अवगत कराने हेतु दैनिक सेवा

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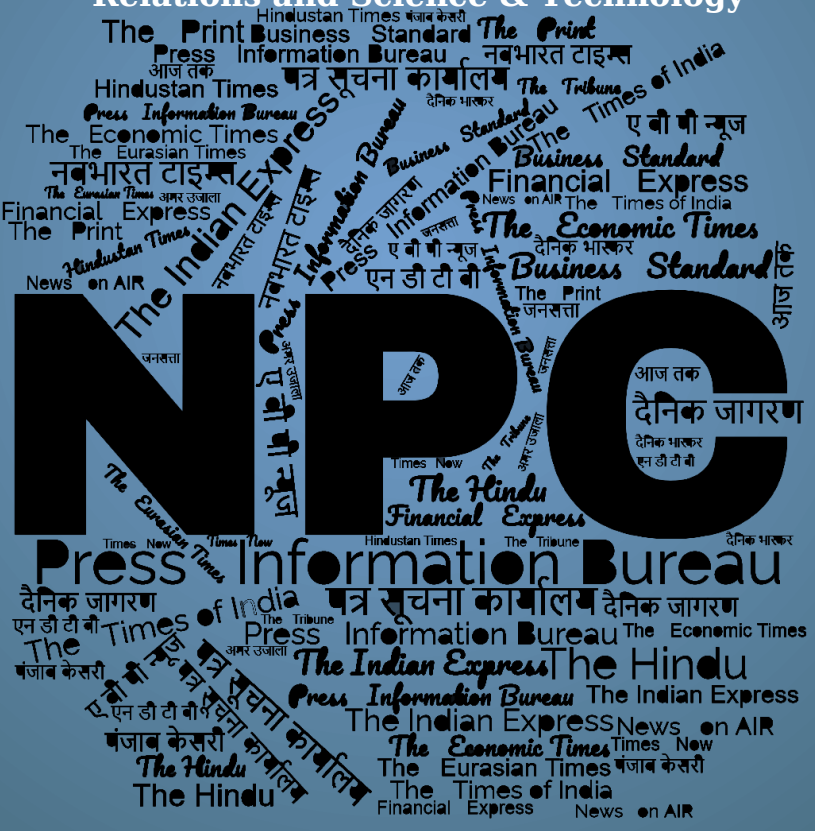

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CONTENTS

Defence News

Defence Strategic: National/International

जागरण

Fri, 16 Jun 2023

PM मोदी की अमेरिका यात्रा से पहले बड़े रक्षा सौदे को मंजूरी, अमेरिका से MQ-9B प्रीडेटर ड्रोन खरीदेगा भारत

प्रधानमंत्री नरेन्द्र मोदी की इसी माह प्रस्तावित अमेरिका यात्रा की तैयारियों के बीच रक्षा मंत्रालय ने गुरुवार को अमेरिका से एमक्यू-9 बी प्रीडेटर ड्रोन खरीदने के सौदे को मंजूरी दे दी। तीन अरब डॉलर यानी लगभग 24 हजार करोड़ रुपये के इस समझौते के तहत 30 प्रीडेटर ड्रोन खरीद जाएंगे। इस पर अब अंतिम फैसला सुरक्षा मामलों की कैबिनेट समिति (सीसीएस) द्वारा लिया जाएगा।

इन ड्रोन को खासतौर पर चीन और पाकिस्तान की हरकतों पर नजर रखने के लिए तैनात किया जाएगा। यहां बता दें कि एमक्यू-9 बी ड्रोन एमक्यू-9 'रीपर' का वैरिएंट है, जिसका उपयोग हेलफायर मिसाइल के एक संशोधित स्वरूप का इस्तेमाल करने में किया जाता है।

एमक्यू-9 बी के दो वैरिएंट हैं-स्काई गार्जियन और सी गार्जियन। गुरुवार को एमक्यू-9 बी सी गार्जियन की खरीद को मंजूरी दी गई है। रक्षा सूत्रों ने बताया कि प्रीडेटर ड्रोन के सौदे को रक्षा मंत्री राजनाथ सिंह की अध्यक्षता में हुई रक्षा खरीद परिषद (डीएसी) की बैठक में मंजूरी दे दी गई।

थल सेना और वायु सेना को मिलेंगे आठ-आठ ड्रोन

रक्षा खरीद पर निर्णय लेने के लिए डीएसी रक्षा मंत्रालय में सर्वोच्च निकाय है। सीसीएस द्वारा उस पर अंतिम स्वीकृति दी जाती है। भारतीय नौसेना को इस सौदे से सबसे ज्यादा फायदा होगा। उसे निगरानी के लिए कुल 14 ड्रोन दिए जाएंगे।

इसके अलावा थल सेना और वायु सेना को आठ-आठ ड्रोन मिलेंगे। अमेरिका और इजराइल के अलावा किसी और के पास इतने बेहतरीन और आधुनिक ड्रोन नहीं हैं। बता दें कि पीएम मोदी 21 से 24 जून तक अमेरिका के दौरे पर जाने वाले हैं। वहां व्हाइट हाउस में अमेरिकी राष्ट्रपति जो बाइडन उनकी मेजबानी करेंगे।

प्रीडेटर ड्रोन की खूबी

हंटर किलर यूएवी श्रेणी के इस मानवरहित ड्रोन की सबसे बड़ी खासियत यह है कि दुश्मन को इसके आने-जाने की भनक तक नहीं लगती। इस ड्रोन के पंखों की लंबाई 20 मीटर है जबकि इसकी लंबाई 11 मीटर है। यह ड्रोन 35 घंटे तक लगातार उड़ान भर सकता है।

हवा में 444 किलोमीटर प्रतिघंटा की रफ्तार से यह उड़ सकता है। ये 50 हजार फीट की ऊंचाई तक उड़ान भर सकता है। ड्रोन हेलफायर मिसाइल व बम समेत 1746 किलो के वजन को अपने साथ लेकर उड़ने की क्षमता रखता है। एक बार उड़ान भरने के बाद यह करीब 1900 किलोमीटर तक निगरानी कर सकता है।

अन्य ड्रोन की तुलना में अधिक दूरी तक उड़ान भरने और किसी भी एयरक्राफ्ट की तुलना में मिशन को सफल बनाने में अधिक सक्षम है। दिन हो या रात, स्काई गार्जियन और सी गार्जियन की मदद से यह किसी भी हालात में पूरी गति से साफ वीडियो प्राप्त कर सकता है।

जानिये क्यों जरूरी है भारत के लिए ये ड्रोन

एमक्यू-9 बी ड्रोन को भारत की राष्ट्रीय सुरक्षा और रक्षा जरूरतों की दृष्टि से महत्वपूर्ण माना जा रहा है। वर्तमान में भारत के अपने पड़ोसी देशों चीन और पाकिस्तान से रिश्ते तनावपूर्ण हैं। इस लिजाज से ये ड्रोन मिलने से सेना की ताकत बढ़ेगी।

इससे चीन के साथ लगती वास्तविक नियंत्रण रेखा पर भारत के निगरानी तंत्र में बड़ा बदलाव आएगा। चीजों पर बारीकी से निगरानी रखी जा सकेगी। भारतीय नौसेना इसके जरिये ¨हद महासागर में गतिविधियों पर भी पैनी नजर रख सकेगी।

एमक्यू-9 बी ड्रोन के जरिए हुई थी आतंकी सुलेमानी की हत्या

इसी ड्रोन की मदद से अमेरिका ने मार गिराए थे आतंकी सुलेमानी और जवाहिरी अमेरिका ने तीन जनवरी 2020 को बगदाद हवाई अड्डे पर एमक्यू-9 ड्रोन के जरिये मिसाइल हमले में ईरानी कुद्स फोर्स के कमांडर कासिम सुलेमानी और इराकी पॉपुलर मोबिलाइजेशन फोर्स के डिप्टी कमांडर अबू महदी अल-मुहांडिस को मार गिराया था।

यही नहीं, इसी ड्रोन से अमेरिका ने अगस्त 2022 में अफगानिस्तान के काबुल में अलकायदा के सरगना अयमान अल जवाहिरी को ढेर किया था। इस ड्रोन से हेलफायर आरएक्स-9 मिसाइल दागी गई। इसने एकदम सटीक निशाना साधा।

https://www.jagran.com/news/national-big-defense-deal-approved-ahead-of-pm-modi-us-visit-india-to-buy-mq-9b-predator-drone-from-us-23442778.html

Hindustan Times

Fri, 16 Jun 2023

Indian Military to Acquire Teeth with F-414 Engines and Deterrence with MQ-9B Drones

The Narendra Modi government's decision to approve a tri-service proposal to acquire 31 MQ 9-Predator B armed drones from the US on the eve of the Prime Minister's state visit to the US on June 21 is the first major purchase after Indian Navy acquired 24 MH 60 R anti-submarine warfare helicopters from America in February 2020. The last major acquisition was done on the eve of then US President Donald Trump's visit to India.

The Defence Acquisition Council (DAC) headed by Defence Minister Rajnath Singh approved the acceptance of necessity (AON) for purchasing the armed drones after the Cabinet Committee on Security (CCS) headed by PM gave a nod to General Electric manufacturing F-414 jet engines in India through 100 per cent manufacturing route in collaboration with HAL on June 14. India, however, did not accept Boeing's proposal to make F-18 fighters in the country.

The two deals with the US not only indicate the deepening of bilateral defence cooperation but also the realization within the Indian military that the era of stand-off weapons delivery platforms has come to stay. The Predator-B drone is a top-of-the-line weapon platform that is used for high-value targeting of the enemy with its four Hell-Fire air-to-ground missiles and precision bombs. With the Indian DRDO not being able to come up with a viable armed drone, the Modi government had no

options but to go for outright purchase of Predator-B drones through the foreign military sales route in order to ensure that the entire USD 3.5 billion deal has only government to government involvement with no scope for any lobbyist or middle-men. Under the FMS route, the US government will fix the price of the drones after negotiations with the manufacturer (General Atomics in this case) and then sell it to the government of India with a minimum processing fee. The deal will have to be cleared by the CCS after the final negotiations are complete. The drone deal also means that the US will extend the lease of two Sea Guardian drones currently deployed by the Indian Navy. The lease of two drones was expiring in January 2024.

The decision to manufacture the F-414 engine in India will seriously push both the DRDO, which is designing and developing the Tejas Mark II fighter, and the HAL, which will manufacture the engine, so that theIndian Air Force (IAF) has requisite number of fighter squadrons at the turn of this decade. There is also a possibility that GE with approval from the US government also decides to manufacture higher thrust engines in India.

With China making inroads into the Indian sub-continent particularly in Pakistan, Myanmar and Sri Lanka through the Belt-Road-Initiative leverage, India cannot afford to let go of its guard as Islamabad has decided to move towards the Middle-Kingdom as its special strategic partner after being a client state of US for the past decades. Given the rock-bottom economic conditions of these three Indian neighbours, China will use its money power to use these countries for expanding its footprint in the Indian Ocean. It is for this very reason that the Modi government has decided to purchase 15 Predator B drones only for the Indian Navy so that its maritime domain awareness in the Indo-Pacific increases manifolds. The long-endurance Predator B will also be used to target drug shipments coming out of the Af-Pak region as well as the golden crescent on the eastern borders of India. The hi-tech platform will not only track warships from adversaries in the Indian Ocean but also be part of a Quad surveillance network to ensure that sea lanes of communications remain open for all legal shipping.

The F-414 engine deal and the acquisition of Predator B drones from the US will not only add teeth to the Indian military but also act as a huge deterrence to adversaries who want India to be confined as a regional power and not aspire for a global leader.

https://www.hindustantimes.com/india-news/indian-military-to-acquire-teeth-with-f-414-engines-and-deterrence-with-mq-9b-drones-101686886962314.html

mint

Thu, 15 Jun 2023

Defence Ministry Signs ₹500 Crore Contract to Strengthen Indian Army's Communication System

The Ministry of Defence (MoD) on Thursday announced that it has inked a contract with ICOMM Tele, for the procurement of 1,035 numbers of 5/7.5 Ton Radio Relay Communication equipment containers.

The value of the contract which is under the Buy (Indian) Category is nearly ₹500 crore, it added.

According to the ministry, the delivery of the containers is scheduled to commence from the current Financial Year 2023-24.

“The Radio Relay Containers will address a long overdue requirement of mobile communication detachments of the Indian Army. These containers will be utilized to provide a protected environment for communication equipment to function in a failsafe and reliable manner," it added.

The containers would be mounted on authorized specialist vehicles and moved as per operational requirements.

“The company would produce the containers with all equipment and sub-systems sourced from indigenous manufacturers. This will give further boost to the indigenous manufacturing of defence equipment and stimulate the private sector to actively engage in realizing the vision of Aatmnirbhar Bharat," the ministry said.

The development of such state-of-the-art equipment will also help in boosting exports to friendly countries, it added.

https://www.livemint.com/news/india/defence-ministry-signs-rs-500-crore-contract-to-strengthen-indian-army-s-communication-system-11686842111740.html

FINANCIAL EXPRESS
Read to Lead

Thu, 15 Jun 2023

GRSE Launches Two Anti-Submarine WPrships for Navy

India’s defence entity, Garden Reach Shipbuilders and Engineers (GRSE) launched two warships of different classes together on 13 June.

Alongside, the keel of a third vessel was also laid.

Two warships — INS Anjadip, the 3rd Anti-Submarine Shallow Water Craft (ASW SWC) and the 4th Survey Vessel Large (SVL) were launched by the Indian navy.

The Keel for the 7th ASWSWC being built by GRSE was also laid during the day in the presence of Vice Admiral R B Pandit, Commander-in-Chief, Strategic Forces Command.

In total, GRSE is now building eight ASWSWCs and four SVLs for the Indian Navy and the Ships are at various stages of completion.

In the series, INS Anjadip was the third vessel of this series to be launched and INS Sanshodhak is the fourth and last in the series of SVLs being built by GRSE.

INS Anjadip is named after an island close to India’s Western coast that is now part of the Indian Naval base INS Kadamba. In fact, Anjadip offered strong resistance in 1961, when India took back Goa from the Portuguese.

This ship is also the reincarnation of a Soviet-era ASW Ship of the Indian Navy which was decommissioned in Dec 2003.

Such ships offer multiple advantages for example, ASWSWCs require less draft and can operate close to the coast.

Such ships provide capabilities against underwater threats and neutralize enemy assets such as midget submarines and mines.

Equipped with advanced sonar and armed with the latest weaponry, such as lightweight torpedoes and ASW rockets, these warships will pack a tremendous punch, once they become operational.

The SLV – Sanshodhak– in Hindi stands for “discoverer or investigator”.

The SVL will carry out hydrographic surveys to chart the ocean floor and provide valuable information on our seas and oceans for defence purposes.

According to the official from GRSE, all the ships built by GRSE now have nearly 90% indigenous content.

As Vice Admiral R B Pandit pointed out, “I note with a sense of pride that GRSE, over the last six decades has grown in capability delivering over 100 warships to the nation. These range from Fast Patrol Vessels to Landing crafts, Survey Vessels, Corvettes, Frigates and Fleet Tankers, reflecting a very high degree of competence and capability nurtured by the Yard over the years.”

“I further congratulate GRSE & L&T Shipbuilding for a successful partnership. The collaboration between the two is a befitting example of a Public-Private partnership which is a desired framework for the indigenous warship construction capabilities. This successful model will be closely watched and I am sure it would set the path for similar future collaborations in warship construction in our country. Given the positive spirit and enthusiasm, I see today in the entire warship-building ecosystem in our country, I am confident that this will grow from strength to strength and contribute to the economic well-being of our nation way beyond its fair share, he said.

On the launch, Cmde P R Hari also outlined that the ASW Shallow watercraft project has 8 ships, and the Survey Vessel Large Project-04 ships.

“We launched the first SVL in 2021 and thereafter we have been launching a ship every six months with the last ship being launched today. As far as the ASW Shallow watercraft project is concerned, we are churning out a ship every 3 months and we intend to maintain this tempo,” Cmde said.

https://www.financialexpress.com/business/defence-grse-launches-two-anti-submarine-warships-for-navy-3127434/

THE HINDU

Thu, 15 Jun 2023

Defence Minister Rajnath Singh Pays Tributes to 'Heroes of Galwan'

The courage, bravery and sacrifice of the Army personnel killed in the Galwan Valley clashes will continue to inspire coming generations, Defence Minister Rajnath Singh said on June 15 while paying homage to them on the third anniversary of the conflict.

The clashes in June 2020 was the most serious military conflict between India and China in decades.

"Today, we pay homage to those brave soldiers who made supreme sacrifice while protecting our nation in Galwan Valley. Their courage, bravery and sacrifice will continue to inspire coming generations," the Defence Minister tweeted.

Today, we pay homage to those brave soldiers who made supreme sacrifice while protecting our nation in Galwan valley. Their courage, bravery and sacrifice will continue to inspire coming generations.

— Rajnath Singh (@rajnathsingh) June 15, 2023

The eastern Ladakh border standoff escalated significantly following the clashes on June 15, 2020, in which 20 Indian Army personnel laid down their lives.

In February 2021, China officially acknowledged that five Chinese military officers and soldiers were killed in the clashes though it is widely believed that the death toll on the Chinese side was much higher.

The Indian and Chinese militaries are engaged in talks to reduce tensions along the frontier as the two sides are still locked in a standoff in a few friction points though they managed to disengage from some others.

Following the escalation in tension in the eastern Ladakh standoff, the Army has taken a series of measures to boost its operational capabilities in the eastern sector that include procurement of all-terrain vehicles, precision-guided ammunition, high-tech surveillance equipment, radars and weapons.

The militaries of the two countries have held 18 rounds of high-level talks so far with the objective of taking forward the disengagement process in the remaining friction points and restoring peace and tranquillity along the Line of Actual Control (LAC) in eastern Ladakh.

The 18th round of high-level military talks between the two sides were held on April 23 during which they agreed to stay in close touch and work out a mutually acceptable solution to the remaining issues in eastern Ladakh at the earliest.

The two sides completed disengagement in several areas following extensive diplomatic and military talks.

India has been maintaining that its ties with China cannot be normal unless there is peace in the border areas. On June 8, External Affairs Minister S. Jaishankar said that any expectation of normalisation of India's ties with China when the border situation in eastern Ladakh is not normal is unfounded.

"The fact is the relationship is impacted. And the relationship will continue to be impacted. If there is any expectation that somehow we will normalise [ties] while the border situation is not normal, that's not a well-founded expectation," he said.

The eastern Ladakh border standoff erupted on May 5, 2020, following a violent clash in the Pangong lake area.

https://www.thehindu.com/news/national/defence-minister-rajnath-singh-pays-tributes-to-heroes-of-galwan/article66972238.ece

FINANCIAL EXPRESS
Read to Lead

Thu, 15 Jun 2023

US-India iCET Breaks Deadlock on Critical Tech; Task Force for Jet Engine, AI & Semiconductors

In one of its kind, the top leaders of the two largest democracies and technological powerhouse, converge on critical and advanced technologies, shaping the future. The scale of discussion was a breakthrough in addressing next-generation technologies that will be definitive to India-US relations with a potential to impact the full spectrum of advanced, futuristic and emerging tech in its entirety.

The visit of US National Security Adviser Jake Sullivan to India focused on building a partnership which opened under the India-US Initiative on Critical and Emerging Technologies (iCET).

From the start, the iCET emerged as the idea which was led by the National Security Advisers (NSAs): Ajit Doval and Jake Sullivan.

Breaking the usual pace of high-level diplomatic lethargy and a tardy approach, the discussion radically touched upon such critical areas as artificial intelligence (AI), quantum computing, semiconductors, sensors and chips, telecommunications for defence, aerospace and beyond.

As Ajit Doval, NSA pointed out during the Roundtable on iCET, "It is going to emerge as one of the very important pillars in the India-US bilateral strategic partnership." Following the launch of the India-US Initiative on Critical and Emerging Technologies (iCET) by Prime Minister Modi and President Joseph Biden on the sidelines of the QUAD Summit in Tokyo on 24 May 2022, the two NSAs have also driven a concerted effort between the two countries to engage on the identified areas of collaboration and set new priorities and objectives for iCET.

The essence of iCET

While the fervour of Indo-US talks is now largely on acquiring jet-engine technologies for the crucial modernization of the Indian armed forces, there are other critical technologies which need greater focus.

The iCET in its initial round has been able to break into such substantial discussions ranging from quantum communications, and its futuristic application in security to designing, fabricating and developing advanced chips based on semiconductors.

The agenda now projects a task force on artificial intelligence (AI), telecom manufacturing, space and notably advanced materials.

While all remains under critical areas, the tech collaboration on advanced materials stands out for the propulsion systems ranging from jet engine for combat aircraft to naval warships.

The iCET clearly marks semiconductor fabrication as a top priority which is fundamental to the sensors and AI applications in commercial, military space.

What also came out, especially in the space domain is the joint satellite mission.

What is unfolding?

"We have been able to kickstart the Indo-US Quantum Coordination Mechanism, signed an MoU on semi-conductors, the public-private dialogue on telecom engaging stakeholders from the government, Industry and academia to further open collaboration in Open RAN, 5G and 6G has been kickstarted, detailed dialogue on biotech is being held, important exchanges on AI have taken place, and there is positive momentum under the defence and space pillars," NSA Doval explained.

What is added, unlike the earlier set mechanism of such high-level talks, constrained within the confines of governments that it breaks into a new radical format to include leading academia, research labs and industries across India and the U.S.

In fact, the NSA emphatically said: "iCET is not a government-to-government arrangement alone, but a collaborative initiative of industry, academia, research bodies and think tanks, all making a common endeavour to see India and US in a higher orbit, an orbital jump to our strategic relations, where we are able to build technology capabilities and exploit opportunities."

This remains the key as US NSA said that iCET is more than just tech in ways that will strategically and economically help us. He noted that the industry is providing the power and propulsion for this initiative.

Tech barriers

Amid the high talks, the iCET is also subjected to the trials even though it is emerging from the shadow of the earlier bilateral Defence Technology and Trade Initiative (DTTI) between New Delhi and Washington, which failed to gather steam.

The strict -export control mechanism of the U.S. remains the key challenge which also needs approval from Congress despite the good progress made between the government.

That is the case for the elusive jet engine technology which is under discussion with US aerospace original equipment manufacturer (OEM) GE Aerospace.

India is acquiring GE's F414 jet engine which will power Indian fighter jets including the Tejas Mk II, Advanced Medium Combat Aircraft (AMCA) as well as the indigenous Twin Engine Deck Based Fighter (TEDBF) for the Indian Navy. The thrust is on the transfer of technology or joint collaboration for the highly complex jet engine manufacturing in India.

However, the Routable which took place in New Delhi opened with a resolve as Sullivan highlighted that one of the key focuses of the initiative is to remove barriers to collaboration on both sides to maximize the full potential of bilateral cooperation and diversify global semi-conductor supply chains, and lead the revolution in AI, advanced computing, biotech and quantum.

Further, Pentagon press secretary Brigadier General Patrick Ryder in his February 8 press briefing summed up that the iCET would "accelerate a shift from defence sales to defence joint production and development and promote integration between US and Indian defence firms".

https://www.financialexpress.com/business/defence-us-india-icet-breaks-deadlock-on-critical-tech-task-force-for-jet-engine-ai-amp-semiconductors-3126955/

Hindustan Times

Fri, 16 Jun 2023

PM's US Visit to be a Watershed, Says General Atomics Global Corp Chief Executive

Vivek Lall, the chief executive of General Atomics Global Corporation, has said that Prime Minister Narendra Modi's State visit to the US will be a "watershed", and lauded Modi and President Joe Biden for taking the defence relationship to the next level.

General Atomics Global Corporation has developed the Predator drones that India is all set to purchase. On Thursday, the Defence Acquisition Council (DAC) cleared the procurement of the unmanned aerial vehicles. The decision will have to be cleared by the cabinet committee on security. During Modi's visit, India is expected to issue a letter of request for 31 drones worth $3 billion to the US government, to be split among the three services. The acquisition will happen under the foreign military sales (FMS) mechanism of the US Department of Defense, which, as HT reported on Wednesday, has just been tweaked to incorporate the needs of allies and partners and meet their needs on an expeditious basis.

Lall, a veteran of the US defence industry, said, "The US-India defence relationship has been one of great convergence in the last few years and has grown from strength to strength with India and the US having signed several foundational agreements. Military to military ties have been ever increasing. And now with the initiative on critical and emerging technologies, defence innovation is a key part of that effort. The decades ahead will see growth and convergence in defence".

Lall said that the partnership has now moved to critical areas of technology, such as artificial intelligence, quantum, space. “It is very significant that those seeds are sown”.

When asked if India and the US were finally addressing the concerns of the other side that have inhibited the growth in defence ties — Washington DC has wanted India to buy more weapon systems, Delhi has wanted the US to ease export controls and invest in co-production and co-development — Lall said that the Modi’s visit was a “watershed event” and will be “historic”. “PM Modi and President Biden have definitely taken the relationship to a new level. The relationship gets a strong pivot over what’s been created. I do see the visit as a great catalyser.” Modi had met Lall during his last visit to the US in September 2021.

Looking ahead, Lall said that industrial ties between countries — at the level of start-ups, small, medium and large enterprises — will be key. “Understanding and collaboration, true research and development, and innovation will be key to sustained growth. When you look at the industrial setup on both sides, there is great keenness to work together because of shared interests in terms of tech and innovation.”

With India having leased two MQ-9B drones as the border crisis with China intensified in 2020 — a lease that was enabled by rapid US government clearances — Washington has expected New Delhi would pursue a larger acquisition deal. The issue repeatedly came up in several high-level conversations between the two sides in recent months and Thursday’s clearance is being seen in Washington as a clear sign of the Indian commitment to deepen the defence partnership.

https://www.hindustantimes.com/india-news/indias-3bn-drone-deal-with-us-to-be-a-watershed-moment-says-ceo-of-general-atomics-global-corporation-vivek-lall-101686849316150-amp.html

FINANCIAL EXPRESS
Read to Lead

Thu, 15 Jun 2023

Tanzania’s Significance for India: A Gateway to African Collaboration and Mutual Growth

Tanzania, with its strategic location and vast potential, holds immense importance for India as a key partner in Africa. External Affairs Minister Dr S Jaishankar is heading towards Tanzania soon. During his visit and meetings with his counterpart and the top leadership the focus is expected to be on strengthening economic partnership, maritime connectivity, pharmaceuticals, and energy security among other issues. There is also immense potential for cooperation in the defence and space sectors too.

By leveraging shared strengths and mutual interests, India and Tanzania can forge an enduring partnership that promotes economic growth, regional integration, and people-centric development, while contributing to the shared vision of a prosperous and interconnected Africa-India alliance.

Economic Partnership

Tanzania serves as an essential gateway for Indian businesses seeking opportunities in Africa. The African nation offers a diverse and robust economy that offers avenues for trade and investment across various sectors, including agriculture, mining, energy, infrastructure, pharmaceuticals, and information technology. India’s expertise in these domains can contribute significantly to Tanzania’s economic development and vice versa, enhancing bilateral trade and cooperation.

Strategic Maritime Connectivity

Tanzania's coastline along the Indian Ocean provides crucial maritime connectivity and trade routes. The port of Dar es Salaam, the largest port in East Africa, plays a pivotal role in facilitating trade and commerce not only for Tanzania but also for landlocked countries in the region. India's engagement in port development and logistics infrastructure projects can enhance connectivity, promote trade, and strengthen economic integration in the region.

Energy Cooperation

It has substantial energy resources, including natural gas and renewable energy potential. India's expertise in the energy sector, particularly in exploration, production, and capacity building, can contribute to Tanzania's energy security and help in harnessing its resources effectively. Collaborative efforts in the energy domain can pave the way for sustainable development and enhance access to reliable and affordable energy sources.

Development Partnership

India has been actively involved in developmental projects in Tanzania, focusing on sectors such as agriculture, healthcare, education, and capacity building. Additionally, the Indian Technical and Economic Cooperation (ITEC) program plays a vital role in enhancing skills and expertise among Tanzanian professionals through training and capacity-building initiatives.

People-to-People Relations

The long-standing cultural and historical connections between India and Tanzania have nurtured strong people-to-people relations. Indian diaspora in Tanzania, along with Tanzanian students studying in India, contribute to the exchange of knowledge, cultural diversity, and mutual understanding between the two nations. These deep-rooted bonds serve as a foundation for strengthening cooperation in various fields and fostering a sense of shared heritage.

Defence Cooperation

Joint Training and Exercises

India's robust defence forces can contribute significantly to the training and capacity-building efforts of Tanzania's armed forces. Joint military exercises and training programmes can enhance interoperability, exchange best practices, and strengthen the capabilities of both nations in areas such as counter-terrorism, peacekeeping operations, and maritime security.

Defence Industry Partnership

India's advanced defence industry can provide Tanzania with access to cutting-edge technology, equipment, and defence manufacturing expertise. Collaboration in defence production, research and development, and technology transfer can bolster Tanzania's defence capabilities and promote indigenous manufacturing.

Maritime Security Cooperation

Given their shared coastlines along the Indian Ocean, the two countries can cooperate in maritime security, including combating piracy, illegal fishing, and maritime domain awareness. Exchange of information, joint patrolling, and capacity-building initiatives can help ensure the safety and security of sea routes and promote regional stability.

Humanitarian Assistance and Disaster Relief

Strengthening cooperation in humanitarian assistance and disaster relief operations can enhance disaster management capabilities in both countries. India's experience in handling natural disasters and its expertise in providing relief operations can be shared with Tanzania, contributing to disaster resilience and effective response mechanisms.

Space Collaboration

Collaboration in space exploration and technology can open up new horizons for India-Tanzania cooperation.

Satellite Communication and Remote Sensing

India's expertise in satellite communication and remote sensing technologies can support Tanzania in various domains such as telecommunications, disaster management, agriculture, and resource mapping. Joint projects in satellite development, data sharing, and applications can foster socio-economic development and address common challenges.

Capacity Building and Education

The Indian Space Research Organisation (ISRO), can provide training and capacity-building opportunities for Tanzanian scientists and engineers. Exchange programs, scholarships, and joint research initiatives can enhance human capital development and scientific collaboration in the space sector.

Weather and Climate Studies

India's capabilities in weather forecasting and climate studies can be shared with Tanzania to enhance its meteorological services and disaster preparedness. Collaborative efforts in climate modeling, data analysis, and early warning systems can assist Tanzania in mitigating the impact of extreme weather events and climate change.

Earth Observation and Natural Resource Management

Satellite-based earth observation and mapping can contribute to effective natural resource management in Tanzania. By leveraging India's expertise in earth observation satellites and data analysis, it can optimize resource utilization, monitor environmental changes, and promote sustainable development practices.

Cybersecurity Cooperation

As technology advances, cybersecurity becomes a critical aspect of national security. Both countries can collaborate in strengthening their cybersecurity frameworks, sharing best practices, and conducting joint exercises to enhance resilience against cyber threats. This cooperation can help protect critical infrastructure, safeguard digital assets, and foster trust in the digital domain.

https://www.financialexpress.com/business/defence-tanzanias-significance-for-india-a-gateway-to-african-collaboration-and-mutual-growth-3126484/

THE TIMES OF INDIA

Thu, 15 Jun 2023

Lessons India Needs to Learn from Russia-Ukraine War

By Dr. Prashant Prabhakar Deshpande

Many military practitioners across the world including India had believed that conventional war fighting equipment such as tanks and fighter planes were on their way out. In fact, in 2020, the then Indian Army chief, General M M Naravane, is reported to have said that military icons of the 20th century were on their way out. However, defence experts feel that the Russia-Ukraine war has shown that conventional firepower still matters.

Experts opine, cyber warfare and disinformation campaigns played a crucial role in preparing the ground for Russian conventional military operations. Conventional war therefore will continue to

play a big role in future conflicts too, at least for the next two decades, and countries therefore will need to have a right mix and that it will be foolish to rule out anything as of now.

Lt Gen Ajai Kumar Singh, General Officer Commanding-in-Chief of the Southern Command headquarter, Pune, opines that the Indian Army and armed forces need to learn from the ongoing Russia-Ukraine war.

Pointing out that the strategic thinking before the Russia-Ukraine war had been that possibly the conventional wars are a thing of the past and that small conflict, short and swift battles, are the order of the day. He expressed that India, with two active borders, must always be prepared for a conventional conflict, as the capabilities and intentions can change any time and relations can deteriorate. Indian Armed Forces therefore have to be prepared for any eventuality.

Five Takeaways for India from Russian-Ukraine War

The Russia-Ukraine war has thrown up multiple lessons for militaries across the world, including that of India, according to the defence experts. The conflict has shaken the European countries like Germany out of their slumber and belief that the continent would never see a war again, prompting Germany to double her defence budget.

A big takeaway from the Russia-Ukraine conflict for India, according to defence experts, has been the need to become self-sufficient in the defence sector. It has been pointed out that India needs to have an ecosystem in place so that there is an uninterrupted flow of defence supplies. Government's push for indigenisation of various equipment and ammunition has been considered to be a step in the right direction by the defence experts.

Another big takeaway for the Indian military is the possibility of future wars being long, protracted ones. It is said preparations for war have so far been based on the notion that all future conflicts will be short and swift, which may also involve cyber warfare. It is pointed out in this connection that while 1971 Bangladesh Liberation War was a short one, Kargil conflict was a little protracted one, limited to a particular sector.

It is pointed out that any conventional conflict on India's northern border with Pakistan can be a protracted war with the intensity changing from time to time. The focus therefore has to be on having enough war reserves to sustain for a longer duration.

Conventional firepower & importance of infantry

According to defence experts, although future wars will involve cyber warfare and war in space, conventional war fighting will continue to play a big role in future conflicts, at least for the next two decades. Countries therefore will need to have the right mix & that it will be foolish to rule out anything as of now, according to them.

Another lesson to be learnt is that a well-trained infantry still matters in war. While there may not be trench warfare-like situations, a country will need well trained soldiers in good numbers to push in and occupy enemy territories, once the big firepower does its job, opine experts.

Drones give an edge, but have limitations

Defence experts refer to smart utilisation of drones in the early stages of war by Ukraine to target Russian armoured columns and artillery positions. However, they opine that while drones are cheap and good to hit at enemy positions, their effectiveness is questionable in a heavily challenged air space. The drones are said to be useful for surveillance and for carrying out attacks close to the border. However, like a fighter, drones will not be able to carry out deeper penetration, it is opined.

Need for unified and inter-linked fighting strategy

The early setback to the Russian onslaught, according to experts, had been because of lack of coordination amongst armoured columns, mounted infantry, self-propelled artillery, air defence, air power and logistics, indicating lack of a combined arms formation. It was like each arm was fighting its own battle without any actual coordination on the ground.

It has been opined, the morale of the Russian troops got hit because of these early setbacks, while that of the Ukrainians rose due to their ability to strike the powerful Russian military.

The need of a unified approach to war, which would entail using capabilities of all the three services in a dedicated manner, is therefore underlined by defence experts. It has been pointed out in this connection that the 1971 Bangladesh Liberation war was a success, because the three Services, Army, Navy, and Air Force fought together.

Epilogue

So far India's war efforts seem to have focussed on a short, swift war lasting a couple of weeks. This might have proven useful while dealing with Pakistan. However, China's case is different, as China can afford to drag a war for a longer period, but India cannot, as war reserves for fifteen days of intense fighting or even thirty days may not be sufficient in war with China, according to defence experts.

The response of both European powers and Global South to the Russian invasion of Ukraine has exposed the limits of fair-weather friends. Indian interests therefore, according to experts, lie with those in the Indo-Pacific and elsewhere who fear China and whose interests run parallel to India's.

https://timesofindia.indiatimes.com/blogs/truth-lies-and-politics/lessons-india-needs-to-learn-from-russia-ukraine-war/

The Indian EXPRESS

Fri, 16 Jun 2023

Ex-Navy Chief Arun Prakash Writes: Three Years after Galwan, Defending against Chinese Aggression

By Arun Prakash

Ahead of the third anniversary of the India-China Galwan clash, Senior Colonel Zhao Xiaozhuo of the PLA Academy of Military Sciences, reminded us, at the recent Shangri-La Dialogue in Singapore, of China's "complex and systematic" build-up of defence capabilities, adding ominously: "India is unlikely to catch up to China in the coming decades because of its weak industrial infrastructure."

It is up to India's decision-makers to either dismiss this comment as an attempt at psychological warfare or to use it as a whip for accelerating the atmanirbharta campaign. The harsh fact is, that despite being a nuclear-weapon state and space power, with the world's third-largest defence budget, India remains a top importer of military hardware — much of it from Russia and Ukraine.

Russia's continued reliability as a supplier of defence equipment and spare parts has been cast in serious doubt by two developments. First, its growing friendship and dependence on Beijing will fetter Moscow's freedom of action. Second, Russia's military-industrial complex, burdened by the Ukraine war and hobbled by US sanctions, is no longer in a position to support our armed forces. It's time India explores alternatives.

Under these circumstances, the Indo-US relationship seems to have blossomed at the right time. A fortnight ahead of Prime Minister Narendra Modi's visit to Washington, Defence Minister Rajnath Singh and his US counterpart, Lloyd Austin, met in New Delhi, to firm up an ambitious roadmap for defence cooperation on an unprecedented scale.

There is much jubilation at the likelihood of an agreement for licenced-production of the General Electric F414 turbofan aero engine in India. This would be a welcome development for our aerospace industry as well as the military, since the uncertain availability of an aero-engine has been an imponderable, dogging India's indigenous fighter projects. However, euphoria about the overnight attainment of atmanirbharta needs to be tempered by past experience. The two terms most misused by India's technologists and misinterpreted by its military and politico-bureaucratic establishments are "indigenisation" and "transfer of technology." This anomaly is best illustrated by India's aerospace sector.

Hindustan Aeronautics Ltd (HAL), founded by visionary industrialist Seth Walchand in 1940, is today a giant defence PSU (DPSU). Post-independence, HAL delivered the first licence-built British Gnat fighter in 1962, followed by the Soviet MiG-21 in 1973. Over the years, HAL has produced 175 Gnats, more than 800 MiG-21s, 200 Sukhoi-30s and hundreds of other aircraft of Indian and foreign design.

HAL's Engine Division, which started by producing the British Orpheus jet-engine (for the Gnat and Marut fighters) in the late-1950s, has, since then, manufactured a few thousand British, French, and Soviet jet-engines, of many types, under licence. These seemed commendable achievements for a nation still struggling with the challenges of industrialisation. We deluded ourselves by proudly believing that we were manufacturing "indigenous" hardware for our fighting forces.

The unfortunate truth was that our DPSUs were engaged merely in the assembly of kits or undertaking "licenced production", while claiming "indigenous production" and "transfer of technology" (ToT). The DPSUs (and DRDO) failed to seek, from the foreign licensors, transfer of "know-how" as well as "know-why" of aircraft and engine design. Our scientists and engineers, therefore, acquired only "screwdriver technology", and India's lack of design expertise became painfully manifest in two instances: DRDO's developmental GTX/Kaveri jet-engine project, which has languished since 1989, and the modernisation of HAL-built MiG-21s, which had to be outsourced to Russia and Israel in 1996.

India's failure to seek and acquire technology from foreign manufacturers, even after prolonged production runs, was a missed opportunity, with much of the onus falling on the MoD. While successive defence ministers failed to formulate a long-term vision for the nation's giant defence-industrial complex, MoD bureaucrats lacked the expertise and commitment to energise lethargic DPSUs and ordnance factories. The "stove-pipe" structure of MoD engendered a lack of synergy between the military leadership and the DRDO.

China, starting in 1949 from an industrial baseline similar to India's, took a different route and is, today, vying with the USA for global technological leadership. This achievement bears analysis. In the early 1950s, the USSR had undertaken a massive transfer of arms to China, but as ideological fissures emerged and the Soviets threatened to stop aid, the Chinese leadership ordered the appropriation of drawings and technological data relating to Soviet weapons. Once the split actually occurred, in the mid-1960s, the Chinese launched a national mission of reverse-engineering (guochanhua) of Soviet weaponry. Its first phase enabled China to establish serial production of Soviet-origin weaponry — tanks, artillery, submarines and jet fighters. Subsequent cycles of guochanhua have helped China acquire the latest military and dual-use technologies through purchase, coercion and, often, via industrial espionage.

In 1986, Chairman Deng Xiaoping ordered the development of an indigenous aeroengine to replace the Soviet-supplied power plants in use by the PLA Air Force (PLAAF). Since the Russians refused to part with key technologies, China chose the Franco-American CFM-56 turbofan as the core technology template for their WS-10 project. After two decades and a few billion dollars, the performance and reliability of the WS-10 prototype was found wanting. There is an object lesson in the way China persevered with this project, and by 2020, the WS-10 was accepted by the PLAAF for powering its frontline fighters.

With China's belligerence showing no signs of abating, the prospect of a "path-breaking" defence-industrial partnership with the US is welcome. Our decision-makers and negotiators must, however, take a long-term view, bearing two issues in mind. First, no state or corporation parts willingly with precious technology, and we must be prepared to pay a significant price — financial and/or political. Second, unless resolutely negotiated in the minutest detail, it is easy for foreign companies to fob-off "licenced-production" as ToT.

We must ensure that our technical personnel acquire advanced expertise in arcane disciplines, related to diverse fields so that they become future designers and creators — not mere assemblers of knocked-down kits.

https://indianexpress.com/article/opinion/columns/ex-navy-chief-arun-prakash-writes-three-years-after-galwan-defending-against-chinese-aggression-8665373/

The Tribune

Thu, 15 Jun 2023

Chinese Hackers 'Break into' Networks of Global Institutes

Suspected state-backed Chinese hackers used a security hole in a popular email security appliance to break into the networks of hundreds of public and private sector organisations globally, nearly a third of them government agencies including foreign ministries, the cybersecurity firm Mandiant said on Thursday.

"This is the broadest cyber espionage campaign known to be conducted by a China-nexus threat actor since the mass exploitation of Microsoft Exchange in early 2021," Charles Carmakal, Mandiant's chief technical officer, said in a emailed statement. That hack compromised tens of thousands of computers globally.

In a blog post on Thursday, Google-owned Mandiant expressed "high confidence" that the group exploiting a software vulnerability in Barracuda Networks' Email Security Gateway was engaged in "espionage activity in support of the People's Republic of China". It said the activity began in October.

The hackers sent emails containing malicious file attachments to gain access to targeted organisations' devices and data, Mandiant said.

Of those organisations, 55 per cent were from the Americas, 22 per cent from Asia Pacific and 24 per cent from Europe, West Asia and Africa and they included foreign ministries in Southeast Asia, foreign trade offices and academic bodies in Taiwan and Hong Kong, the company said in a statement.

https://www.tribuneindia.com/news/world/chinese-hackers-break-into-networks-of-global-institutes-517581

THE ECONOMIC TIMES

Thu, 15 Jun 2023

May Use Nuclear Weapons only for Defence: Russia Foreign Ministry

Maria Zakharova, spokeswoman of the Russian Foreign Ministry told a news briefing on Thursday that Russia's hypothetical use of nuclear weapons may happen exclusively and will be possible only for defensive purposes, reported TASS.

The hypothetical use of nuclear weapons by Russia comes after Ukrainian forces are claiming some success in their offensives in the south and east, while Russia said its troops repelled Ukrainian offensive operations in the Zaporizhzhia region.

The Russian Foreign Ministry has claimed of using nuclear weapons in extraordinary circumstances like for defensive purposes, reported Russia's news agency.

Zakharova said, "Russia's nuclear deterrence policy is strictly defensive. The hypothetical use of nuclear weapons is clearly limited by extraordinary circumstances within the framework of strictly defensive purposes." She also noted that Moscow was fully committed to the principle of the inadmissibility of nuclear war. Zakharova stressed, "There can be no winners in it. It must never be unleashed. We consistently call on all other parties to the joint statement of the leaders of the five nuclear states on the prevention of nuclear war and the inadmissibility of an arms race to adhere to these postulates."

Meanwhile, a senior Ukrainian military commander has claimed that more than 100 square kilometres of territory have been regained in its counteroffensive against Russia, reported CNN.

Ukraine's Brigadier-General Oleksii Hromov told a media briefing, "We are ready to continue fighting to liberate our territory even with our bare hands."

Military officials also said that the Ukrainian army has moved forward by 3km (1.9 miles) near the village of Mala Tokmachka in the Zaporizhzhia region and by up to 7km (4.3 miles) near a village south of Velyka Novosilka in the Donetsk region, as per CNN.

Moreover, the United States, the United Kingdom, the Netherlands and Denmark have joined hands to deliver "high priority" air defence equipment to Ukraine.

In a joint statement, on Thursday, these nations announced that hundreds of short- and medium-range air defence missiles and associated systems would be delivered to Ukraine.

The statement added that the delivery of the equipment has begun and "should be complete within several weeks."

The help was declared before the meeting of the US-led Ukraine Defense Contact Group in Brussels, Belgium, TASS reported.

https://economictimes.indiatimes.com/news/defence/may-use-nuclear-weapons-only-for-defence-russia-foreign-ministry/articleshow/101025840.cms

THE TIMES OF INDIA

Thu, 15 Jun 2023

Two North Korean Missiles Land in Japan's Economic Waters: Tokyo Defence Official

Two ballistic missiles fired by North Korea landed in the waters within Japan's exclusive economic zone on Thursday, a Tokyo defence ministry official told reporters.

"Two ballistic missiles fell inside the EEZ," the official said. The zone extends up to 200 nautical miles from Japan's coast, beyond the limits of its territorial waters.

https://timesofindia.indiatimes.com/world/rest-of-world/two-north-korean-missiles-land-in-japans-economic-waters-tokyo-defence-official/articleshow/101021784.cms

ThePrint

Thu, 15 Jun 2023

US Defence Boss Austin Urges Allies to 'Dig Deep' with Arms for Ukraine

U.S. Defense Secretary Lloyd Austin called on Kyiv's allies on Thursday to "dig deep" to provide more arms and ammunition to fight Russia's invasion, particularly for air defences.

Addressing a meeting of defence ministers from the U.S.-led Contact Group of some 50 countries that give military aid to Ukraine, Austin stressed Kyiv needed both short-term and long-term support as the war was a "marathon, not a sprint".

At the meeting at NATO headquarters in Brussels, Austin noted the group had already given Patriot, IRIS-T and NASAMS air defence systems that had protected Ukraine from Russian missile attacks. But he said Ukraine needed even more.

"I ask that the members of this Contact Group continue to dig deep to provide Ukraine with the air defence assets and munitions that it so urgently needs to protect its citizens," Austin said in opening remarks.

"We'll also continue to adapt our assistance to meet the changing circumstances on the ground in the changing needs of Ukraine's forces."

It was the 13th meeting of the contact group, which Washington set up last year to coordinate western aid for Kyiv.

Ukrainian Defence Minister Oleksii Reznikov attended the meeting and was expected to brief his counterparts on Ukraine's counteroffensive to retake more territory from Russian forces, which Kyiv launched this month. The campaign is expected to use hundreds of tanks and armoured vehicles supplied by the West.

Later in the day, NATO defence ministers will meet separately with Reznikov to discuss their support for Kyiv.

The meeting comes as NATO members are engaged in intense discussions over Ukraine's desire to join the alliance and long-term plans to assure the country's security after the war ends.

The NATO ministers will also meet with defence industry bosses to urge them to ramp up production capacity so NATO allies can provide more munitions to Ukraine and replenish their own stocks, severely depleted by donations to Kyiv.

NATO is also pushing industry to adopt more common standards so allies can operate together more easily.

https://theprint.in/world/us-defence-boss-austin-urges-allies-to-dig-deep-with-arms-for-ukraine/1627440/

Science & Technology News

INDIA TODAY

Thu, 15 Jun 2023

How Long will Chandrayaan-3 Mission Last on the Moon? ISRO Reveals

The Indian Space Research Organisation (ISRO) is in the final stages of preparation for the Chandrayaan-3 mission to the Moon.

This ambitious mission follows the Chandrayaan-2 mission, which crash-landed on the Moon's surface four years ago.

Currently, the integration of Chandrayaan-3 with the GSLV Mk-III rocket is underway, but the Indian space agency has yet to announce the final launch date for this momentous mission.

However, based on orbital dynamics, the launch window is expected to open during the second week of July. ISRO chief S Somnath has expressed his intention to stick to this timeline for the mission's lift-off between July 12 and July 19. The precise launch date will be disclosed in the coming days.

Once the mission reaches the Moon and successfully lands on its surface, the question arises: how long will it endure in the challenging, airless environment of our celestial neighbor?

HOW LONG WILL CHANDRAYAAN-3 LAST?

The Chandrayaan-3 mission, sharing a similar design and mission profile with its predecessor, is projected to have the same operational lifespan upon arrival on the Moon's surface.

According to ISRO, the Chandrayaan-3 lander and rover have been engineered to function for a single lunar daylight period, which roughly translates to about 14 Earth days.

Chandrayaan-2 had a comparable mission duration before it encountered a mishap on the far side of the Moon. While Chandrayaan-3 is designed for a 14-day duration, it is possible that the mission could surpass this timeframe.

LONG-LASTING MISSIONS

ISRO has gained recognition for executing challenging missions with extended operational lifespans, high reliability, and significant scientific breakthroughs.

The first edition of the lunar mission, Chandrayaan-1, was launched on October 22, 2008, and successfully operated for 312 days until it exhausted its fuel on August 25, 2009. This mission marked a major triumph for ISRO, elevating India's status as a leading spacefaring nation and eventually leading to the discovery of water on the Moon.

Another notable example is the Mars Orbiter Mission (MOM), also known as Mangalyaan, which was launched on November 5, 2013. Mangalyaan achieved Martian orbit on September 24, 2014, making it the first spacecraft to accomplish such a feat on its inaugural attempt.

Although initially designed for a one-year operational lifespan, Mangalyaan remained operational for over six years, until September 24, 2020.

Similar expectations are held for Chandrayaan-3. ISRO is confident in its successful landing on the Moon's surface, building upon their track record of enduring and highly successful missions.

https://www.indiatoday.in/science/chandrayaan-3/story/how-long-will-chandrayaan-3-mission-last-on-the-moon-isro-reveals-2393312-2023-06-15

The Tribune

Fri, 16 Jun 2023

First Synthetic Human Embryo Model Created from Stem Cells

In a major breakthrough, scientists from the University of Cambridge and California Institute of Technology have reported creating the world’s first synthetic human embryo models using stem cells and without using eggs or sperm.

These structures have no organs like the brain or the heart and are at very early stages of human development.

But these have cells that would proceed to form the placenta, yolk sac and the embryo, said scientists about a research that is yet to be published in journals but has been accepted for publication.

The Guardian first reported the findings presented at the annual meeting of the International Society for Stem Cell Research in Boston held on Wednesday.

“We can create human embryo-like models by the reprogramming of embryonic stem cells,” Magdalena Zernicka-Goetz of the University of Cambridge and Caltech told the gathering. She said the embryo-like models that her lab created were grown from single human embryonic stem cells that developed into three distinct tissue layers.

“These synthetic embryos have cells that would typically go on to develop a yolk sac, a placenta and the embryo itself,” said a British media report. Goetz separately told CNN that the embryonic models she created are also the first to have germ cells that would go on to develop into eggs and sperm.

“But I wish to stress that these are not human embryos. These are embryo models but they are very similar to human embryos and could help understand reasons behind recurrent miscarriages and genetic disorders since most pregnancies fail around the time of the development at which we build these embryo models. To my knowledge, this is the first time a human model embryo has been created with three tissue layers,” she said.

Scientists said the study was triggered by their need to understand the black box period of human development. The black box period is the period following 14 days after fertilisation, which is the agreed limit for scientists to grow and study embryos in a lab.

The discovery could promote research into the early stages of development by reducing dependence on human embryos arising from in vitro fertilisation (IVF).

Scientists in India said the work presented vast research possibilities but equally posed ethical questions. Human embryos developed from IVF are governed by laws but there are no regulations on stem cell-based models of human embryos. The Guardian, quoting experts, said there was no immediate prospect of clinical use of synthetic human embryos and it would be illegal to implant them into a patient's womb.

Also, the potential of these model embryos maturing beyond the earliest stages of development is currently unknown. Right now, synthetic human embryos are confined to test tubes.

"Our aim is not to create life but to prevent its loss, and understand why embryos sometimes fail to develop after fertilisation and implantation," Goetz was quoted by foreign media as saying.

https://www.tribuneindia.com/news/nation/first-synthetic-human-embryo-model-created-from-stem-cells-517430