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Fri, 22 Sep 2023

Air Force to Get 6 More Indigenous Netra-I Surveillance Aircraft

The Indian Air Force is set to buy six new indigenous Netra-I surveillance aircraft in an effort to boost its surveillance capabilities along the borders with China and Pakistan. The Netra-I Airborne Early Warning and Control aircraft programme is based on the Brazilian Embraer aircraft.

The Air Force already has two Netra-I aircraft which were developed by the Defence Research and Development Organisation (DRDO) and six more will be bought in a revival of the programme as. "As per the plans, the six new aircraft would be made in India by the DRDO and would be provided to the Air Force in a project of over Rs 8,000 crore," government officials told India Today TV.

The surveillance planes will be made by modifying the Embraer ERJ-145 aircraft.

The DRDO had earlier planned to build six Airborne Warning and Control Systems (AWACS) on an Airbus 330 aircraft for which a facility was planned to be created in Bengaluru. It is also working on modifying A-321 aircraft for the Netra-2 project for surveillance planes.

<https://www.indiatoday.in/india/story/air-force-to-get-more-indigenous-netra-i-surveillance-aircraft-2438851-2023-09-22>



Fri, 22 Sep 2023

Six Months on, HAL's Trainer Aircraft for IAF Awaits Full Safety Certification

Six months after the defence ministry signed a contract with the state-owned Hindustan Aeronautics Limited (HAL) to procure 70 HTT-40 basic trainer aircraft for the Indian Air Force (IAF), the indigenously-made aircraft is still awaiting the full airworthiness certification from the Centre for Military Airworthiness and Certification (CEMILAC), leading to concerns over a possible delay in its planned delivery schedule.

Sources in the government said that while CEMILAC had accorded provisional airworthiness compliance to HTT-40 with several “critical limitations”, the aircraft will have to obtain complete airworthiness certificate prior to start of production, which at present, HAL is in the process of obtaining.

CEMILAC—a regulatory body under the Defence Research Development Organisation (DRDO) is responsible for providing airworthiness certification of all military aircraft, helicopters, Unmanned Aerial Systems (UAS), aero-engines and other air launched weapons thus certifying them for flight safety.

In March this year, the defence ministry signed a Rs6,800 crore contract with HAL to procure 70 HTT-40s aimed at filling a critical gap in the availability of aircraft for the initial training of pilots.

Sources in HAL said that the HTT-40 has already been certified against FAR 23 (Federal Aviation Regulation).

“The aircraft is yet to be certified against the ASQR (Air Staff Quality Requirements) issued by IAF. The draft “Release to Service Document” is submitted to RCMA (Regional Centre of Military Airworthiness.) This is expected to be cleared by October 2023,” a source in HAL said.

The source said that HTT 40 is abiding by the timeline, adding that major jigs and fixtures have been ordered by HAL and materials procurement activities are under way.

“All the aircraft will be supplied over a period of six years, say by 2029, though we cannot put the exact time frame for the first and the last deliveries,” the source said.

The major gap in the availability of adequate trainer aircraft for pilots in IAF became pronounced after the HAL-made trainer aircraft HPT-32 was grounded around 2010.

As an interim arrangement, the IAF had procured 75 Pilatus PC-7 Mk II planes from Switzerland under a contract signed in 2012 to meet the critical shortfall in pilots’ training, and in the absence of an indigenous basic trainer aircraft at the time, was provided with the option of placing a follow-on order of another 38 aircraft, the requirement for which was cleared by the Defence Acquisition Council.

A government statement earlier stated that the induction of the aircraft is set to start September 2025 onwards and will continue till 15 March 2030, adding that the procurement will also include a Full Mission Simulator for the aircraft to supplement the aerial training, allowing pilots to practice different profiles on ground prior to the sorties.

However, with no final certification yet, concerns have emerged over HTT-40 meeting the promised delivery schedule.

One official familiar with the developments in this matter told The Indian Express that a delay in getting indigenous basic trainer aircraft was among the factors contributing to the shortfall of pilots in the IAF.

“The IAF decided on procuring the aircraft to support the indigenous project even when it was yet to be certified and meet many performance parameters in training,” an official said, adding that the contract for HTT-40 was signed before the aircraft demonstrated entry and safe recovery from inverted spin—a mandatory requirement for undertaking training, the official added.

Officials, however, stressed on the requirement of the final certification, adding that HTT-40 will be flown solo by pilots learning to fly for the first time and thus needs to be a “forgiving” aircraft with a “very high degree of safety” built into it.

Manufactured by HAL and indigenously designed and developed by its Aircraft Research & Design Centre, HTT-40 is powered by a four bladed turbo-prop engine.

As per HAL, the aircraft will be fitted with a state-of-the-art glass cockpit, modern avionics and latest safety features, including a zero-zero ejection seat. It has a maximum speed of 450 kilometers per hour and a maximum service ceiling of six kilometers.

<https://indianexpress.com/article/india/six-months-on-hals-trainer-aircraft-for-iaf-awaits-full-safety-certification-8950748/>



Thu, 21 Sep 2023

Indo-Pacific Armies Chiefs Conference: Prioritizing Collaboration while Addressing Regional Dynamics

Stage is set for India to host the Indo-Pacific Armies Chiefs Conference (IPACC) next week in Delhi. China and the ongoing tensions with Taiwan won't be the main focus of the conference.

When asked if the tensions in the Taiwan Strait would be discussed, Major General Abhinaya Rai, Additional Director General (Strategic Planning), clarified that it wouldn't be the central topic. Instead, the conference's emphasis would be on collaboration.

This approach aligns with India's stance in the Quad, a strategic security group that includes the US, India, Japan, and Australia. The Quad has repeatedly emphasized that it's not an "anti-China" alliance, although China disagrees.

The Taiwan Strait, which separates Taiwan from mainland China, is a contentious issue. China regards Taiwan as a breakaway province, while Taipei claims to be a sovereign state. The US officially supports the one-China policy but opposes unilateral changes to the status quo from either side. It has pledged military support to Taipei in the face of Chinese aggression.

The US Department of Defence has recently reinforced deterrence measures in the Taiwan Strait to discourage aggressive actions by China.

The IPACC will run concurrently with the Indo-Pacific Armies Management Seminar (IPAMS) and Senior Enlisted Leadership Forum. The theme for the two-day event on September 25 and 26 is 'Together for Peace: Sustaining Peace and Stability in the Indo-Pacific Region.'

This marks the 13th edition of IPACC, organized by the US Army since 1999, with India's participation beginning in 2011. IPAMS, initiated in 1978, is in its 47th edition, with India joining in 2019.

Financial Express Online has reported earlier that approximately 30 nations will participate in both IPACC and IPAMS, aiming to build trust, understanding, and cooperation among land forces in the region and promote a free and open Indo-Pacific. The conference agenda primarily revolves around cooperation, interoperability, humanitarian assistance, crisis response, military diplomacy, and sustaining peace and stability.

Major General Rai highlighted that IPAMS has a broad mandate, potentially evolving at various levels, including chiefs, mid-level segments, and foundational soldiers. He stressed the opportunity for strengthening common perspectives and not fixating on a single issue like Taiwan.

Regarding India's relations with the Association of Southeast Asian Nations (ASEAN), he emphasized the shared desire for a "free, open, and inclusive" Indo-Pacific. ASEAN, a coalition of

Southeast Asian nations with territorial disputes with China in the South China Sea, seeks cooperation and openness rather than rivalry.

In discussions with ASEAN countries, it is crucial to establish a common understanding of territorial disputes in the Indo-Pacific and work collaboratively while ensuring interoperability, Major General Rai added.

The military's role in Humanitarian Assistance and Disaster Relief (HADR) operations and addressing climate change will also be on the agenda.

<https://www.financialexpress.com/business/defence-indo-pacific-armies-chiefs-conference-prioritizing-collaboration-while-addressing-regional-dynamics-3250484/>



Fri, 22 Sep 2023

Boeing and Indian Navy Celebrate Milestone: Successful Depot Level Inspection of P-8I Aircraft Marks Self-Reliance Triumph

India has reached a significant milestone in its journey towards self-reliance in aircraft maintenance. This achievement comes in the form of the Depot Level Inspection of eight P8I aircraft, which was undertaken by M/s Air Works, a homegrown Maintenance Repair Overhaul (MRO) facility located in Hosur, Karnataka. The successful completion of this inspection marks a crucial step in testing India's indigenous capabilities to support its Long Range Maritime Patrol Aircraft, enhancing the country's self-sufficiency in engineering and maintaining strategically vital aviation platforms.

The Depot Level Inspection involved extensive repairs of the aircraft, including the degutting of structural components and panels, the removal and repair of auxiliary fuel tanks, and a comprehensive inspection of the internal fuselage. This meticulous process ensures that the aircraft remain in optimal condition and continue to serve their critical roles effectively.

The P8I aircraft were procured from M/s Boeing through a Direct Commercial Sales contract initiated by the Ministry of Defence. These aircraft are based on the Boeing 737-800 platform, modified to meet military requirements. Impressively, approximately 80% of the aircraft's maintenance needs can be addressed by local MROs and industries.

Recognizing this potential, the Indian Navy worked closely with M/s Boeing to certify local MROs for the crucial task of Depot Level Inspection, which must be conducted every eight years from the date of production. Following a thorough evaluation process, M/s Boeing officially certified M/s Air Works to undertake Depot Level Inspection of the P8I fleet.

This successful Depot Level Inspection conducted by M/s Air Works not only demonstrates the competence of India's indigenous MROs but also highlights their readiness to become significant contributors to the Indian Defence Forces. They now offer services that are globally competitive and align with India's vision of AatmaNirbharta (self-reliance) in the realm of defence manufacturing and maintenance.

Meanwhile ...

Boeing on Thursday highlighted the significant progress achieved in the indigenization of its P-8I maritime surveillance aircraft's manufacturing and sustainment.

At a media interaction in New Delhi, the company provided information about the platform's future prospects, indicating increased investment and economic impact as part of their AatmaNirbhar Bharat strategy. Currently, twelve P-8I aircraft are serving the reconnaissance and surveillance needs of the Indian Navy in the Indo-Pacific region.

The US based aerospace company has already contributed significantly to the Indian economy, with an economic impact of US\$1.7 billion to support the existing P-8I aircraft fleet used by the Indian Navy. Furthermore, Boeing envisions that expanding the P-8I fleet to 18 aircraft will result in approximately US\$1.5 billion in additional investments. This expansion will also create more opportunities for indigenous production within India's aerospace and defence sector by 2032.

Salil Gupte, President of Boeing India, expressed Boeing's commitment to advancing the AatmaNirbhar Bharat vision. He stated that as they respond to the Indian Navy's demand for more P-8I aircraft, they are actively seeking to enhance engineering, manufacturing, and sustainment capabilities in India. This effort aims to benefit both Indian and global customers.

Since its introduction in 2013, the P-8I aircraft, based on the 737 Next Generation platform, has become an integral part of the Indian Navy's fleet. It has accumulated over 40,000 flight hours with high mission readiness rates. Boeing played a pivotal role in establishing the Ashok Roy Training Simulator Complex at INS Rajali, and the Kochi training complex, inaugurated in April of this year, features a state-of-the-art simulator for P-8I aircrew and technical team training. This ground-based training reduces on-aircraft training time, enhancing mission proficiency and aircraft availability for the Indian Navy.

Dan Gillian, Vice President and General Manager of Mobility, Surveillance, and Bombers at Boeing Defense, Space & Security, expressed pride in partnering with the Indian Navy on the P-8 aircraft. He highlighted its versatility as a proven multi-mission aircraft, which enhances interoperability and maritime security in India and the Indo-Pacific. Boeing is also committed to expanding its P-8 supplier network in India, which currently includes 15 public and private Micro, Small & Medium Enterprises that are part of Boeing's global supply chain and provide critical parts, components, and services for the P-8.

The P-8 fleet, with over 160 aircraft in service and more than 500,000 mishap-free flight hours globally, has been adopted by various allied nations, including the United States, the UK, Germany, Norway, Australia, New Zealand, and South Korea.

<https://www.financialexpress.com/business/defence-boeing-and-indian-navy-celebrate-milestone-successful-depot-level-inspection-of-p-8i-aircraft-marks-self-reliance-triumph-3251173/>



Thu, 21 Sep 2023

India Needs a Strategic Deterrence

By Lt Col Umang Kohli

It is often seen how whenever friction between India and China shoots up and incidents like Galwan or Ten Dash Line take place, there's a talk about India's capability for strategic deterrence. What most analysts and journalists do not understand is the connotation of strategic deterrence

beyond the realms of nuclear deterrence. What needs to be pondered over is the credibility and viability of nuclear deterrence. Can a stockpile of nuclear arsenal deter a country like China from entering India's territory or launching a diplomatic offensive like issuing a map showing at least one state of the Indian Union under its territory?

Nuclear deterrence almost sounds like a fidayeen attack at a national level. Come to think of it, it is majorly self-destructive and can be used only under desperate circumstances. Even tactical nuclear weapons can only be used when the situation is desperate. Now coming to the important point: What is India's strategic military deterrence? Can India prevent incidents like Galwan in the future? And if not, then what does India need to do to really build up strategic military deterrence? Does a threat of a small nibbling action along LAC really rattle China or deter it? Are we naive enough to think that a mere rehash and realignment of our existing military infrastructure can act as a credible deterrence?

India's military thought process needs to undergo major transformation and it must seek for "strategic partnerships" with friendly countries to create a credible deterrence in the short run. It needs to expand its influence not only in the Indian Ocean but also in the Indo-Pacific and beyond. This transformation also needs to include a shift from an emphasis on being an arms importer to an exporter of defence articles and an increased emphasis on bilateral exercises and training with important players in the region. Gone are the days of non-alignment, a strategic deterrence requires diplomatic and strategic alignment with friendly countries to build a credible military deterrence against a country like China. There is space for having alignments and alliances that are military in nature, given how the PLA and Chinese Navy have done the same in the last decade. The time has now come for India to have military bases in various parts of the world just like how the United States and China have. The possibility of having military bases in countries like the Philippines, Papa Guinea, Taiwan, Japan etc. needs to be explored too.

China has more than 370 warships and a capacity to build another 200 within a span of a few months. India, in comparison, has a limited ship-building capability and a much smaller warship fleet. India's capability to fight an 'integrated' amphibious battle needs to be enhanced significantly to build a strategic military deterrence. India could obviously always leverage countries on the West of China, that share a hostile relationship with it, for its integrated amphibious battles.

A credible military deterrence which is non-nuclear in nature would also encompass a change of mindset from being mostly defensive and Pakistan-centric to being largely offensive, broad-based, and flexible. To be able to plan and launch offensives and manoeuvres which could be intercontinental in nature, the office of the CDS needs to be directly under the PMO and not under the Defence Ministry. The office of the CDS, like the office of the NSA, needs to coordinate on matters which are inter-ministerial in nature. Obviously, coordination between the Defence Ministry, Foreign Affairs Ministry and even the Home Ministry would be critical in creating an effective strategic military deterrence.

Till the time trade routes are protected in all respects, they are susceptible to being vulnerable. China in the last two decades has built its military infrastructure to protect and secure trade corridors. The US too has developed its military infrastructure to protect its investments in other countries. The US has investments in countries like Ukraine, Taiwan, South Korea, Bahrain etc. and has shaped geo-politics in these regions and we can see the US also has a strong military presence in these areas. It's time India also tried to develop a joint economic and military strategy and protect its national interest. Enhancing the capability of our Navy and Coast Guard would go a long way in this direction. Economic power and military domination of trade routes act as a strategic deterrence against incidents like the one we saw in Galwan for China would fear economic losses of a national magnitude.

Hybrid cold wars tend to have skirmishes, powerplay and economic fallouts and these economic fallouts affect the day-to-day life of each citizen. A credible strategic military deterrence should be in place, as it ensures a safe economic environment both in and outside the country.

Another two areas of strategic deterrence are control of energy and technology. It always helps to be ahead of the curve as far as technology is concerned. The US, Russia and China have used both technology and energy as tools to shape geopolitics. It's time India identified niche areas where military technology can be suitably employed to act as a strategic deterrence against anyone who decides to take it for granted. Space technology is an area where India is doing exceedingly well. There is a requirement of private public partnerships to take space technology to a level where it gives India a strategic edge.

<https://www.financialexpress.com/business/defence-india-needs-a-strategic-deterrence-3250104/>



Thu, 21 Sep 2023

Taiwan Unveils Advanced Drones to Bolster its Defense Strategy at TADTE 2023

The 2023 Taipei Aerospace and Defense Technology Exhibition (TADTE), held at the Nangang Exhibition Center from September 14th to 19th, marked a significant moment for Taiwan's defence capabilities. The National Chung Shan Institute of Science and Technology (NCSIST) showcased a compelling array of cutting-edge drones, underlining Taiwan's commitment to enhancing its asymmetric warfare capabilities.

At the heart of the exhibition were ten of NCSIST's latest advanced drones, each with unique capabilities designed to bolster Taiwan's defence. Among these, the Loitering Unmanned Aircraft Types I and II captured significant attention.

The Loitering Unmanned Aircraft Type I drone is deployable by a single soldier, shares similarities with the American-built Switchblade loitering munition. Equipped with precision capabilities for Beyond Visual Range strikes using image tracking and pattern recognition, the Type I drone boasts a 15-minute flight time and an operational range of up to 10 km.

Meanwhile, the Loitering Unmanned Aircraft Type II requires a crew of three. This tube-launched unmanned aircraft excels in both day and night operations. Armed with a high-explosive warhead, it is proficient in saturation attacks on fixed and mobile targets, making it compatible with various vehicles, including Humvees.

Decoy drones and beyond

NCSIST also unveiled a decoy unmanned aircraft designed to activate enemy radars, working in conjunction with the Chien Hsiang anti-radiation loitering munition for detection and destruction. The Chien Hsiang drone, capable of travelling up to 1,000 kilometres and reaching speeds of 500 to 600 kph during target dives, is set to produce 104 of these loitering munitions by 2025. Both drones feature fire-and-forget technology, ensuring operability in all weather conditions.

The Teng Yun, a long-range, long-endurance unmanned aircraft, further impressed attendees. With a flight endurance of up to 20 hours and a travel range exceeding 1,100 km, it plays a pivotal role in day and night Intelligence, Surveillance, and Reconnaissance (ISR) missions.

Taiwan's ambitious drone acquisition plan

Taiwan's strategic vision for its defence was underscored by its strong emphasis on drones. The recent defence ministry white paper, released on September 12th, revealed plans to acquire 7,700 unmanned aerial vehicles by 2028, with 700 designated as military-grade and 7,000 as commercial-grade. Notably, five military prototypes have already been completed, with 36 units set for military delivery by July 31st, reflecting Taiwan's unwavering commitment to modernizing its defence capabilities.

Drones have emerged as game-changing assets in modern warfare, with their significance underscored by ongoing conflicts such as that in Ukraine. For Taiwan, these unmanned aerial vehicles are instrumental in strengthening its defence against potential threats, particularly from China.

<https://www.republicworld.com/world-news/china/taiwan-unveils-advanced-drones-to-bolster-its-defense-strategy-at-tadte-2023-articleshow.html>



Fri, 22 Sep 2023

Taiwan Says Detects 24 Chinese Military Aircraft in Air Defence Zone

Taiwan's defence ministry said on Friday that over the previous 24-hour period it had detected 24 Chinese air force aircraft entering into Taiwan's air defence zone, part of a regular pattern of what Taipei calls Chinese harassment.

At least 17 of the aircraft crossed the median line of the Taiwan Strait, according to a map the ministry published.

The median line previously served as an unofficial barrier between the two sides until China's air force began regularly crossing it last year.

<https://www.reuters.com/world/asia-pacific/taiwan-says-detects-24-chinese-military-aircraft-air-defence-zone-2023-09-22/>



Thu, 21 Sep 2023

UK Defence Committee Raises Alarm over Shortage of Combat Planes

The deployment of the British navy's top aircraft carrier, the HMS Queen Elizabeth, grabbed the headlines in leading British news outlet as it was deployed in the Northern Atlantic with only eight fighter jets, triggering concerns over UK's massive shortages of combat planes.

Built at a cost of 4 billion pounds, the 920-ft long vessel has the capacity to accommodate 36 stealth jets and to carry 24 such aircraft on operations. However, the British vessel has been leading an international patrol around Norway and the North Atlantic with only eight fifth-generation fighters on board for the Operation Firedrake., The Telegraph reported.

Recently, the Defence Select Committee had warned about the dwindling numbers of planes in the RAF following “deeply damaging cuts”.

The report by the committee criticised the early retirement of the C-130J Hercules fleet and the downsizing of the E-7 Wedgetail procurement programme from five planes to three.

It said that the RAF was “dangerously exposed” as a result of cuts.

“We should be concerned, as we have far fewer F-35Bs than we should have,” former Royal Navy officer Commander Tom Sharpe, told the Mail.

“More of the F-35Bs should have been delivered by this time too, so that is another factor.

“For these reasons, I'm not surprised to learn HMS Queen Elizabeth is deploying with so few combat aircraft. This scenario has been many years in the making.”

Responding to the report, an MoD spokeswoman told Telegraph: “The number of aircraft deployed on the carrier is decided by a variety of operational factors including the anticipated threat, aircraft needed for the deployment task and the requirement to continue to train personnel at RAF Marham to expand the Lightning force.

“This year UK F-35s have been exercising with NATO, US and European partners and have deployed once more on our aircraft carriers. We remain committed to growing the F-35 fleet with more to be delivered this year.”

During the previous deployments of the HMS Queen Elizabeth, the Royal Navy has been forced to borrow planes from the US Marine Corps, according to Mail.com.

HMS Queen Elizabeth will undertake a series of exercises with Western partners before returning to the UK in December.

<https://www.wionews.com/world/uk-defence-committee-raises-alarm-over-shortage-of-combat-planes-638294>



Fri, 22 Sep 2023

US Reviving Cold War Underwater Surveillance Network to Tackle China

A Reuters report has indicated that the US is working to resuscitate its Cold War-era submarine surveillance network in the wake of China’s rising naval power.

According to the report, the US Navy has renamed its monitoring system at Whidbey Island off Seattle to Theater Undersea Surveillance Command, with the new mission of modernising America’s existing network of underwater acoustic spy cables and retrofitting a fleet of surveillance ships with cutting-edge sensors and subsea microphones.

Decades ago, the initial network of covert spy cables was strategically placed on the ocean floor to monitor Soviet submarines.

US Navy investing in new technologies

The Navy's current strategy involves deploying unmanned sea drones to detect adversary vessels, positioning portable "underwater satellite" sensors on the seafloor for submarine surveillance,

utilising satellites to track ships through radio frequencies, and harnessing AI software for swift maritime intelligence analysis.

The US Navy has also been signing new contracts quite aggressively to renew its submarine infrastructure, further confirming the speculations.

Over 30 agreements related to the surveillance program have been inked within the past three years. These pacts involved defence industry leaders and burgeoning startups specialising in unmanned sea drones and AI processing.

Additionally, a Reuters investigation into ship-tracking data and satellite images unveiled fresh insights into the Navy's covert undersea cable installation efforts.

China also developing a similar programme

Meanwhile, China is actively developing its own maritime espionage programme, named the "Great Underwater Wall," according to two US Navy insiders cited by Reuters.

This network, presently in construction, comprises sonar-equipped cables laid along the South China Sea seafloor—a region marked by territorial conflicts between Beijing and its neighbours. China is also assembling a fleet of underwater and surface sea drones for submarine detection.

China's maritime interests extend into the Pacific, with the state-run China Academy of Sciences disclosing its operation of two underwater sensors in 2018: one in the Mariana Trench's Challenger Deep, Earth's deepest point, and the other near Yap, an island in the Federated States of Micronesia.

While China asserts these sensors serve scientific purposes, US Navy sources suggest they could potentially monitor submarine movements near the US naval base on Guam, a Pacific island territory.

<https://www.wionews.com/world/us-reviving-cold-war-underwater-surveillance-network-to-tackle-china-638422>

Science & Technology News



Press Information Bureau
Government of India

Ministry of Science & Technology

Thu, 21 Sep 2023

Government Comes out with a New set of National Awards in the Field of Science, Technology and Innovation Known as “Rashtriya Vigyan Puraskar”

The Rashtriya Vigyan Puraskar shall be one of the highest recognitions in the field of science, technology, and innovation in India

The Government of India has come out with a new set of National Awards in the field of Science, Technology and Innovation known as “Rashtriya Vigyan Puraskar”.

The objective of the Rashtriya Vigyan Puraskar (RVP) is to recognize the notable and inspiring contribution made by the scientists, technologists, and innovators individually or in teams in various fields of science, technology and technology led innovation.

The Rashtriya Vigyan Puraskar shall be one of the highest recognitions in the field of science, technology, and innovation in India. Scientists/ technologists/innovators working in government, private sector organizations or any individual working outside any organization, who have made distinguished contributions in terms of path-breaking research or innovation or discovery in any field of science, technology, or technology- led innovation shall be eligible for the awards. People of Indian Origin staying abroad with exceptional contributions benefiting the Indian communities or society shall also be eligible for the awards. The awards shall be given in following four categories:-

- Vigyan Ratna (VR) award will recognize lifetime achievements & contributions made in any field of science and technology.
- Vigyan Shri (VS) award will recognize distinguished contributions in any field of science and technology.
- Vigyan Yuva-Shanti Swarup Bhatnagar (VY-SSB) award will recognize & encourage young scientists up to the age of 45 years who made an exceptional contribution in any field of science and technology.
- Vigyan Team (VT) award to be given to a team comprising of three or more scientists/researchers/innovators who have made an exceptional contribution working in a team in any field of science and technology.

Scientists, technologists, and innovators working in any field of science in government or private organizations who have contributed or carried out a path breaking research, technology led innovation or discovery in any field of science or development of innovative technologies/products having significant societal impact shall be eligible for the award.

Scientists, technologists, and innovators of Indian origin abroad with exceptional contributions benefitting the Indian communities or society at large shall also be eligible.

The Rashtriya Vigyan Puraskar shall be given in the 13 domains, namely Physics, Chemistry, Biological Sciences, Mathematics & Computer Science, Earth Science, Medicine, Engineering Sciences, Agricultural Science, Environmental Science, Technology & Innovation, Atomic Energy, Space Science and Technology, and Others. The representation from each domain/field, including gender parity will be ensured. All nominations received for the Rashtriya Vigyan Puraskar awards shall be placed before the Rashtriya Vigyan Puraskar Committee (RVPC) to be headed by the Principal Scientific Adviser (PSA) to Government of India and comprising Secretaries of Science Departments, members of Science and Engineering Academies and some distinguished scientists and technologists from different fields of science and technology.

The nominations for this bouquet of awards will be invited every year on 14th January which would remain open till 28th February (National Science Day) every year. These awards shall be announced on 11th May (National Technology Day) every year. The Award Ceremony for all categories of awards will be held on 23rd August (National Space Day). All Awards will have a Sanad & a medal.

These new National Awards is a transformative step in recognizing achievements of Scientific community at the highest level by the Government of India. With transparency and fairness in the entire selection process, work done by all sections of Scientific Innovators and Technologists will be awarded providing at par status with other National Awards

<https://pib.gov.in/PressReleasePage.aspx?PRID=1959262>

ISRO Hoping to Wake up Chandrayaan-3's Vikram and Pragyan on September 22

The Indian Space Research Organisation (ISRO) is looking to awaken the Chandrayaan-3's Vikram Lander and Pragyan Rover as dawn will be breaking on the moon on September 22.

The lander and the rover went to sleep after the end of one lunar day (14 earth days).

On September 2, the Pragyan was put in sleep mode and two days later on September 4, the space agency put Vikram too in sleep mode with its payloads switched off. Both the Vikram's and Pragyan's receivers however have been kept on.

Now, on September 22, with sunlight back on the moon, ISRO is hoping that their solar panel would get charged and that it could establish contact with the two.

Once the sun sets on the moon after the completion of one lunar day, temperature could plunge below minus 200°C.

“The temperature there goes down to -200 degrees [Celsius]. In such an environment, there is no guarantee that the battery, electronics will survive, but we did some tests and we get the feeling that they will survive even in such harsh conditions,” Mr. Somnath had said earlier.

Since their landing on the moon on August 23, Vikram and Pragyan have carried out many in-situ measurements like confirmation of the presence of Sulphur in the region, and detecting the presence of minor elements, among others.

Vikram also achieved a significant milestone as it successfully undertook a hop experiment when the lander on command fired the engines, elevated itself by about 40 cm, and landed safely at a distance of 30–40 cm away.

This successful hop experiment and kickstart could have significant bearing on the future missions which are launched with an objective to bring back samples from the moon and also future human missions to the moon.

If ISRO manages to wake up Vikram and Pragyan it would be a bonus for the space agency as it would be hoping to carry out some more experiments on the moon.

The Chandrayaan-3 spacecraft was launched on July 14 and touched down on the lunar surface on August 23, making India the fourth country to successfully land on the moon, and the first nation to touch down on the polar region of the moon.

<https://www.thehindu.com/sci-tech/science/isro-hoping-to-wake-up-chandrayaan-3s-vikram-and-pragyan-on-september-22/article67331105.ece>

AI की मदद से मुमकिन हुआ सुपरबग का इलाज

2019 में वैज्ञानिकों ने AI से हैलिसिन एंटीबायोटिक ईजाद की, इस साल एक और अबाउसिन एंटीबायोटिक खोजी। दोनों एंटीबायोटिक सुपरबग का तोड़ हैं



राहुल पाण्डेय

पिछले साल फिजिक्स और एस्ट्रोनामी की फील्ड में जितनी भी रिसर्च आई, उनके 7.2 फीसदी पेपर में AI को जगह मिली तो वेटनरी रिसर्च में यह हिस्सा 1.4 फीसदी का रहा। वहीं, इस साल डीप लर्निंग की वजह से 99 फीसदी से अधिक रिसर्च एरिया AI की मदद से रिजल्ट देने लगे हैं। पहले इसके लिए कंप्यूटर साइंस में डिग्री और प्रोग्रामिंग लैंग्वेज जाननी जरूरी थी, लेकिन अब ChatGPT यह काम कर दे रहा है। वैज्ञानिकों के पास अब एक ऐसा रिसर्च असिस्टेंट है, जो किसी भी पैटर्न या को-रिलेशन को देखने या जांचने के लिए बड़े से बड़ा डेटा चुटकियों में एनालाइज कर सकता है।

प्रोटीन और कैंसर : विज्ञान में AI का यूज अब कई तरीकों से किया जा रहा है। AI अब दवा की खोज में विशेष गुणों वाले अणुओं या कोशिकाओं में जरूरी खासियत रखने वाली चीजों को पहचान सकता है। यह अब प्रोटीन जैसी जटिल संरचना का ही नहीं, आकाशगंगाओं के बनने की प्रक्रिया का भी विश्लेषण कर सकता है। वैज्ञानिक अभी तक नहीं जानते थे कि प्रोटीन मुड़ते कैसे हैं। लेकिन 2021 में गूगल डीप-माइंड ने 'अल्फाफोल्ड' डिवेलप किया। इसने अपने अमीनो-एसिड सीक्वेंस से प्रोटीन संरचना की भविष्यवाणी करना सिखाया। 'अल्फाफोल्ड' से ही वैज्ञानिकों ने एक ऐसे प्रोटीन की संरचना का पता लगाया, जो लिवर कैंसर के फैलने पर असर डालता है और जिससे इसके इलाज का नया रास्ता खुलता है।

भेड़िये और रोबॉट : अब तो AI का यूज हिग्स बोसोन जैसे मूल कण को दिखाने सहित क्षेत्र के हिसाब से भेड़िये के बदलते स्वभाव तक को जानने के लिए किया जा रहा है। हाल-फिलहाल AI ने विज्ञान के क्षेत्र में जो सबसे बड़ा बदलाव किया है, वह है समूची साइंटिफिक प्रैक्टिस को बदलना और उसके जरिए और भी अधिक ताकतवर चीजों की खोज करना। इनमें कुछ चीजें तो खासी आशा पैदा करती हैं।

- एक तो साहित्य आधारित खोज (Literature Based Discovery-LBD) है, जिसमें ChatGPT की मदद से साइंटिफिक लिटरेचर का विश्लेषण किया जा रहा है, जिनसे ऐसी नई परिकल्पनाएं, नए सूत्र या विचार मिल सकें, जिन्हें पहचानने से इंसान चूक गया।
- LBD सिस्टम इतना ताकतवर है कि यह

किसी भी फील्ड में ब्लाइंड स्पॉट की पहचान कर सकता है। यहां तक कि यह भविष्यवाणी कर सकता है कि आने वाले वक्त में कैसे-कैसे आविष्कार होंगे?

- दूसरा क्षेत्र है रोबॉट साइंटिस्टों का। ये ऐसे रोबॉटिक सिस्टम हैं जो मौजूद डेटा और साहित्य का AI से विश्लेषण करते हैं, फिर नई परिकल्पना बनाते हैं। इसके बाद ये बायोलॉजी सहित विज्ञान के कई क्षेत्रों में इसी परिकल्पना के हिसाब हजारों एक्सपेरिमेंट भी करते हैं।
- इंसान एक एक्सपेरिमेंट से मिले खराब अनुभवों को दूसरे एक्सपेरिमेंट में लागू करने से हिचकता है, मगर रोबॉट साइंटिस्टों के साथ ऐसा कोई लोचा नहीं है। उनमें ऐसा कोई पूर्वाग्रह नहीं होता, इसलिए वे ऐसे भी रास्ते तलाश सकते हैं, जिनके बारे में इंसान ने कभी सोचा तक नहीं है।

बढ़ता भरोसा : वैसे, वैज्ञानिकों के टूलकिट में तो AI 1960 से ही मौजूद है, लेकिन वैज्ञानिक तब खुद पर ज्यादा भरोसा करते थे। धीमे-धीमे ही सही, लेकिन वैज्ञानिकों को AI पर कुछ-कुछ भरोसा हो रहा है। मसलन, 2019 में MIT के वैज्ञानिकों ने AI मॉडल के जरिए हैलिसिन नाम की एक नई एंटीबायोटिक ईजाद की, तो इस साल मई में उन्होंने एक और एंटीबायोटिक अबाउसिन खोजी। वैज्ञानिकों का दावा है कि ये दोनों एंटीबायोटिक सुपरबग का तोड़ हैं। वही सुपरबग, जो लगातार दुनिया भर की एंटीबायोटिकों को बेअसर करता जा रहा है।

चुटकी में हल : AI टेक्नॉलजी अब वैज्ञानिकों को न्यूरोन्स का कामकाज समझने में मदद कर रही है तो व्हेल मछली की आवाज तक डीकोड कर रही है। यही वजह है कि दुनिया की सबसे जटिल समस्याओं से निपटने वाले रिसर्चर अब मौसम की भविष्यवाणी से लेकर न्यूक्लियर फ्यूजन तक को कंट्रोल करने में AI की मदद ले रहे हैं। अगर यह तकनीक इसी तरह से रिसर्च की प्रॉडक्टिविटी बढ़ाने में कामयाब रहती है, तो वह दिन दूर नहीं कि जब जलवायु से लेकर असाध्य बीमारियों तक का इलाज खोजना बस चुटकी बजाने जितना आसान काम होगा।

