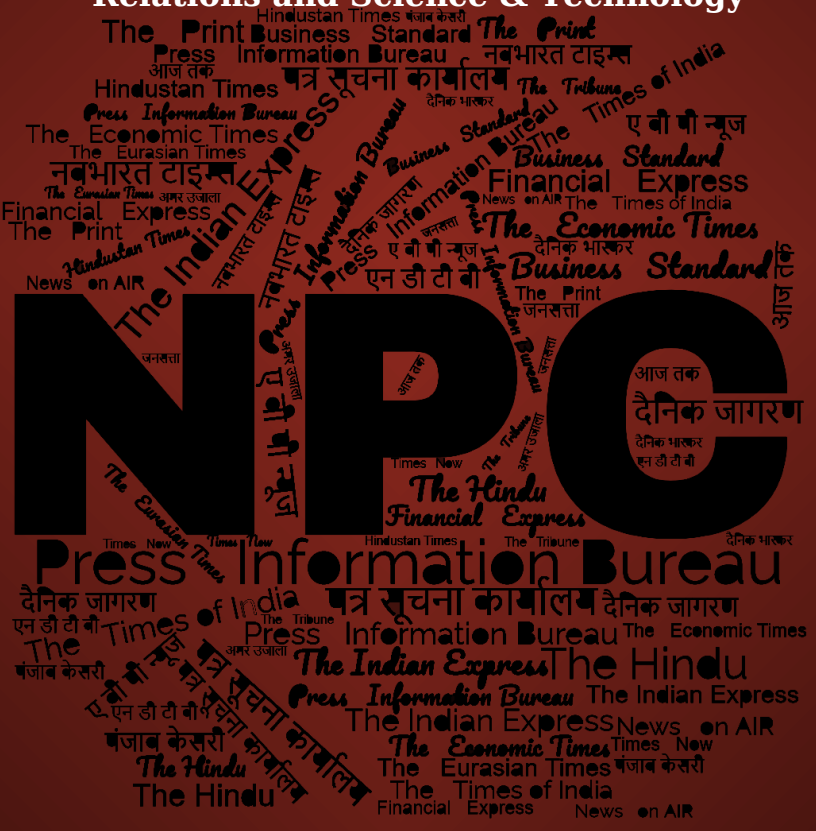
अगस्त
Aug
2023

खंड/Vol. : 48 अंक/Issue : 148
05-07/08/2023

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

A Daily service to keep DRDO Fraternity abreast with DRDO Technologies, Defence Technologies, Defence Policies, International Relations and Science & Technology



रक्षा विज्ञान पुस्तकालय
Defence Science Library
रक्षा वैज्ञानिक सूचना एवं प्रलेखन केंद्र
Defence Scientific Information & Documentation Centre
मेटकॉफ हाउस, दिल्ली - 110 054
Metcalfe House, Delhi - 110 054

CONTENTS

DRDO News

DRDO Technology News

REPUBLICWORLD.COM

Fri, 04 Aug 2023

Indian Navy & DRDO Achieve Milestone in BMD Capability with Sea-based Interceptor Trial

In a significant development in India's defence capabilities, the Defence Research and Development Organisation (DRDO) and the Indian Navy had conducted the successful maiden flight trial of a sea-based endo-atmospheric interceptor missile in the Bay of Bengal region on April 21, 2023.

The purpose of this trial was to engage and neutralise a hostile ballistic missile threat, thereby propelling India into the elite club of nations possessing Naval Ballistic Missile Defense (BMD) capability.

Prior to this milestone, DRDO had already demonstrated its prowess with a land-based BMD system, effectively neutralising ballistic missile threats from adversaries.

At the heart of this achievement lies INS Anvesh, formerly known as the DRDO Technology Demonstration Vessel. This state-of-the-art missile range instrumentation ship was meticulously designed by the DRDO and constructed by Cochin Shipyard Limited (CSL) to serve as a critical sea-based platform for India's ballistic missile defence programme.

The conceptualisation and design of the vessel were undertaken by Vik-Sandvik Design India Pvt Ltd, as reported by Naval News.

INS Anvesh: The "Floating Test Range"

The commissioning of INS Anvesh (A41) on March 11, 2022, took place in a secretive ceremony. The ship was specifically designed to pave the way for future naval BMD capabilities and played a pivotal role in the Phase-II BMD trials. To effectively support Phase-II BMD trials, INS Anvesh is equipped with essential features, including roll damping tanks, a missile integration and checkout bay, a data processing room, and a mission control centre.

Additionally, four ship launch systems, a 15-ton crane, and an A-frame for cargo handling are positioned aft on the vessel. The ship launch systems, designed by Electro-Pneumatics & Hydraulics, ensure smooth acceptance, secure transport, and vertical launching of the missile from the checkout bay.

Phase-II of India's BMD program focuses on the development of two atmospheric interceptors, the AD-1 endo-atmospheric interceptor and the AD-2 exo-atmospheric interceptor. The successful maiden flight trial of AD-1 on November 2, 2022, marked a significant advancement in India's BMD capabilities.

As the development of AD-1 progresses, this missile will also undergo testing and deployment from naval platforms.

Beyond BMD Missiles: INS Anvesh's Versatility

In a collaborative effort, the Indian Navy's missile tracking, and surveillance vessel INS Dhruv also actively participated in the trial. This joint endeavour showcased the navy's commitment to enhancing its capabilities in tracking and intercepting hostile ballistic missiles.

INS Anvesh's significance extends beyond BMD missiles, as the vessel is equipped to test a range of crucial components, including radars, sonars, telemetry equipment, and propulsion systems.

As the Indian Navy's first medium voltage Integrated Full Electric Propulsion (IFEP) vessel, INS Anvesh boasts an impressive total output of 14 MW, generated by diesel generators that power steerable contra-rotating propulsion thrusters.

Naval AAAU Active Antenna Array Unit

Further fortifying India's naval prowess, DRDO's S-band Ship-Borne Radar (SBR) is set to replace the IAI Elta EL/M-2248 MF-STAR as the Indian Navy's primary radar. As part of this enhancement, Astra Microwave Products Ltd is building the Active Antenna Array Unit (AAAU) for the SBR. Upon completion, the SBR will be tested onboard INS Anvesh, boosting the navy's ability to track ballistic missiles and bolstering the future surface combatants' capabilities to thwart endo-atmospheric ballistic targets.

The successful sea-based interceptor trial and the integration of advanced systems onboard INS Anvesh demonstrate India's continued dedication to fortifying its defence capabilities. These advancements pave the way for enhanced security and further solidify India's position as a formidable force in the global defence arena.

https://www.republicworld.com/india-news/general-news/indian-navy-and-drdo-achieve-milestone-in-bmd-capability-with-sea-based-interceptor-trial-articleshow.html

The Tribune

Sun, 06 Aug 2023

DRDO to Develop Two New Systems to Counter Hazards Posed by Avalanches

As the hazard posed by avalanches continues to be a concern in the mountainous, snow-bound regions, the Defence Research and Development Organisation (DRDO) is developing two new systems for providing early warning on the occurrence of avalanches and to detect victims buried under snow.

An avalanche detection radar will be developed that will provide real-time information on the occurrence of an avalanche and trigger and alert. Alongside this, a hand-held radar will be developed that will use radio frequency tags to detect buried persons.

According to DRDO officials, in-principle approval for the projects has been received and the development will be undertaken in collaboration with the industry. DRDO’s Defence Geoinformatics Research Establishments (DGRE) based at Chandigarh has been tasked to execute the projects.

DGRE’s mandate is to map, forecast, monitor, control and mitigate landslides and avalanches in the Himalayas, both in the northern as well as eastern theatres, to ensure safe mobility of troops in inhospitable terrain.

DRDO scientists said that the avalanche detection radar will use Doppler technology as this has emerged as an effective technique for avalanche monitoring and detection during the early period of its formation, thereby providing critical time to take precautionary measures like moving to safer places and managing road traffic.

The radar will use contemporary technologies and artificial intelligence to collect and process data into actionable information and issue an alert when required. It will be deployed in high altitude areas at sites that are known to be avalanche prone.

The light-weight, hand-held battery powered harmonic radar system on the drawing board will be used to detect a buried avalanche victim locating the presence of a radio frequency tag worn by an individual.

The radar will emit a directional signal when it hits the radio tag and give out an audio warning. By judging the amplitude of the audio signal, trained rescue personnel will be able to pinpoint the location of the victim, scientists said.

Many places in the Himalayas, including those in the vicinity of military camps, civilian settlements and roads, are prone to avalanches and landslides. This hazard, according to experts, is showing an increasing trend due to several factors such as climatic change and global warming, anthropological activities and unscientific and poorly planned construction activities in sensitive zones. There have been several instances in the recent past where the lives of soldiers as well as civilians have been lost due to avalanches, besides property and infrastructure being damaged.

https://www.tribuneindia.com/news/nation/drdo-to-develop-two-new-systems-to-counter-hazards-posed-by-avalanches-532666

Telangana Today

Fri, 04 Aug 2023

University of Hyderabad, DRDO Collaborate

The University of Hyderabad (UoH) and Defence Research and Development Organisation (DRDO) on Friday signed a Memorandum of Understanding (MoU) to undertake multidisciplinary basic and applied research in the research verticals – design and development of high energy materials.

The MoU signed by Director, DRDO, DFTM Kailash Kumar Pathak and UoH Registrar Devesh Nigam, will be in force for 25 years. The MoU will facilitate and undertake multidisciplinary directed basic and applied research design and development of high energy materials.

The Advanced Centre of Research in High Energy Materials (ACRHEM), which is now rechristened as DIA-CoE, UoH, was established in the year of 2005 and supported by the DRDO since then. The Centre will work on High Energy Materials (HEMs), energetic polymers and nanomaterials and laser based technologies for detection and discrimination and initiation of HEMs and chemicals

DIA-CoE, UoH director V Kameswara Rao said between December 2016 and February 2023 (phase III) several products developed at the centre and demonstrated at DRDO Laboratories, some of them are being used by DRDO in its projects. The centre has good infrastructure for doing R&D in the area of HEMs, he added.

https://telanganatoday.com/university-of-hyderabad-drdo-collaborate

Press Information Bureau
Government of India

Ministry of Defence

Fri, 04 Aug 2023

Self-Reliance in Defence Sector

Government has taken adequate steps to make the country self-reliant by developing indigenous advanced technologies and complex systems. Following are the initiatives/ steps taken by Government for indigenisation of manufacturing of technology-intensive defence equipment and weapons and for creating a domestic defence production eco-system:

Defence Acquisition Procedure (DAP 2020) is promulgated to maximize acquisition of defence equipment through indigenous sources and promote domestic manufacturing. Government of India has ensured that the most preferred option for capital acquisition is 'Buy Indigenously Designed Developed and Manufactured (IDDM)' category equipment followed by 'Buy (Indian)' category. The 'Make' categories aim to achieve the objective of self-reliance by involving greater participation of Indian industrial eco-system including private sector.

The provisions of Government funding have been introduced for Make-I, Technology Development Fund (TDF) and Innovations for Defence Excellence (iDEX) projects. TDF Scheme executed by DRDO supports indigenous development of components, products, systems and technologies by MSMEs and Start-ups. Funding under TDF scheme was enhanced from Rs 10 crore to Rs 50 crore per Project, and the same under iDEX Prime scheme has been enhanced from Rs 1.5 crore to Rs 10 crore It will give further boost to the vision of 'Aatmanirbharta in defence'.

Four 'Positive Indigenization Lists' of defence equipment and platforms for which there would be an embargo on the import. The 'Development cum Production Partner (DcPP)' model of DRDO is implemented where-in Industry is taken up as DcPP in system development projects. Both development and production units are manufactured by industry along with life cycle support.

DRDO test facilities have been opened to the industries for utilisation. The test facilities have been listed on DRDO website and have been communicated to them. The facilities are being utilized by the industries. Two Defence Industrial Corridors have been set up in Uttar Pradesh and Tamil Nadu to catalyse indigenous production of defence and aerospace-related items.

Defence R&D has been opened up for industry, start-ups and academia with 25% of defence R&D budget earmarked for the purpose. This is being implemented through various existing schemes and new schemes have been proposed.

In order to promote indigenous design and manufacturing, funds have also been earmarked for procurement from indigenous sources. For the FY 2023-24, funds have been earmarked in the ratio

67.75:32.25 between Domestic and Foreign procurement in the Capital Acquisition Budget of the Ministry of Defence (MoD). In addition, the MoD has also directed for spending an amount of Rs 1,500 crore towards procurement from start-ups.

Nil Transfer of Technology (ToT) fees are being charged from DcPPs/PAs/LSI.

Industries have been provided with free access for DRDO patents.

Lists of systems which will be developed by industry only have been identified by DRDO. The same has been promulgated by MoD. DRDO will not develop such systems.

DRDO is skilling youth (Internships, apprenticeship, electives in B Tech, M Tech courses) to make ready for Defence industries.

Acceptance of Necessity (AoN) for 43 DRDO developed/ being developed systems has been accorded for induction in the Services during the last three years i.e. 11 in 2021, 25 in 2022 and seven in 2023. During the last three financial years (2020-21 to 2022-23), 122 contracts have been signed for capital procurement of defence equipment, out of which, 100 contracts accounting for 87% of total contracts value, have been signed with Indian vendors for capital procurement of Defence equipment.

Ratio of import-export in defence sector for the year 2013-14 as compared to 2021-22 is given below:

(Rs in crore)

Year	**2013-14**	**2021-22**
Import Value (Capital + Revenue)	41,198.61	50,061.67
Export value	1,153	12,815
Ratio (Import to Export)	35.73	3.90

This information was given by Raksha Rajya Mantri Shri Ajay Bhatt in a written reply to Shri Chandra Prakash Joshi and Shrimati Rekha Verma in Lok Sabha today.

https://pib.gov.in/PressReleasePage.aspx?PRID=1945710

Press Information Bureau
Government of India

Ministry of Defence

Fri, 04 Aug 2023

Lok Sabha Passes Inter-Services Organisation (Command, Control & Discipline) Bill – 2023

The Lok Sabha has passed the Inter-Services Organisation (Command, Control & Discipline) Bill - 2023. The bill seeks to empower Commander-in-Chief and Officer-in Command of Inter-Services

Organisations (ISOs) with all disciplinary and administrative powers in respect of the personnel serving in or attached to such organisations.

Currently, the Armed Forces personnel are governed in accordance with the provisions contained in their specific Service Acts - Army Act 1950, Navy Act 1957 and Air Force Act 1950. The enactment of the Bill will have various tangible benefits such as maintenance of effective discipline in inter-services establishments by the Heads of ISOs, no requirement of reverting personnel under disciplinary proceedings to their parent Service units, expeditious disposal of cases of misdemeanour or indiscipline and saving of public money & time by avoiding multiple proceedings.

The Bill would also pave the way for much greater integration and jointness amongst the three Services; lay a strong foundation for creation of Joint Structures in times to come and further improve the functioning of the Armed Forces.

Introducing the Bill in the Lok Sabha, Raksha Mantri Shri Rajnath Singh termed it as part of a series of military reforms being undertaken by the Government, led by Prime Minister Shri Narendra Modi, with the aim to empower the nation. He described the bill as an important step taken towards integration and jointness among the Armed Forces to face the future challenges in an integrated manner.

Salient Features

- The ‘ISO Bill - 2023’ shall be applicable to all personnel of regular Army, Navy, and Air force, and to persons of other forces as notified by the Central Government, who are serving in or attached to an Inter-Services Organisation.
- This Bill empowers the Commander-in-Chief, Officer-in-Command or any other officer specially empowered in this behalf by the Central Government with all the disciplinary and administrative powers in respect of personnel serving in or attached to their Inter-Services Organisations for the maintenance of discipline and proper discharge of their duties, irrespective of the service to which they belong.
- The Commander-in-Chief or the Officer-in-Command means General Officer/Flag Officer/Air Officer who has been appointed as Commander-in-Chief of Officer-in-Command an Inter-Services Organisation.
- To maintain Command and Control in absence of the Commander-in-Chief or the Officer-in-Command, the officiating incumbent or the officer on whom the command develops in absence of a C-in-C or Oi/C, will also be empowered to initiate all disciplinary or administrative actions overs the service personnel, appointed, deputed, posted or attached to an Inter-Services organisation.
- The Bill also empowers the Commanding Officer of an Inter-Services organisation to initiate all disciplinary or administrative actions over the personnel appointed, deputed, posted or attached to that Inter-Services Organisation. For the purpose of this Act, Commanding Officer means the officer in actual command of the unit, ship or establishment.
- The Bill empowers the Central Government to constitute an Inter- Services Organisation.

The ‘ISO Bill-2023’ is essentially an Enabling Act and it does not propose any change in the existing Service Acts/Rules/Regulations which are time-tested and have withstood judicial scrutiny over the last six decades or more. Service personnel when serving in or attached to an Inter-Services Organisation will continue to be governed by their respective Service Acts. What it does is to empower Heads of Inter-Services Organisations to exercise all the disciplinary and

administrative powers as per the existing Service Acts/Rules/Regulations, irrespective of the service they belong to.

https://pib.gov.in/PressReleasePage.aspx?PRID=1945699

THE HINDU

Fri, 04 Aug 2023

As Theatre Commands Take Shape, Lok Sabha Clears Inter-Services Organisation Bill

As momentum gains for the proposed reorganisation of the Indian military into integrated theatre commands, the Lok Sabha on Friday (August 4) passed the Inter-Services Organisation (Command, Control and Discipline) Bill, 2023. It seeks to empower Commander-in-Chief and Officer-in Command of Inter-Services Organisations (ISOs) with all disciplinary and administrative powers in respect of the personnel serving in or attached to such organisations, a Defence Ministry statement noted.

Introducing the Bill in the Lok Sabha, Defence Minister Rajnath Singh termed it as part of a series of military reforms being undertaken by the government with the aim to empower the nation. He described the Bill as an important step taken towards integration and jointness among the Armed Forces to face the future challenges in an integrated manner.

“The Bill empowers the Central government to constitute an Inter-Services Organisation,” the Ministry said on its salient features. In this, the Bill acts as a precursor to the reorganisation of the military into integrated theatre commands on which there is consensus now for the creation of two land-based intergraded commands and one maritime theatre command.

Currently, armed forces personnel are governed in accordance with the provisions contained in their respective Service Acts — The Army Act, 1950; The Navy Act, 1957; and The Air Force Act, 1950. “The enactment of the Bill will have various tangible benefits such as maintenance of effective discipline in inter-services establishments by the Heads of ISOs, no requirement of reverting personnel under disciplinary proceedings to their parent Service units, expeditious disposal of cases of misdemeanour or indiscipline and saving of public money and time by avoiding multiple proceedings,” the Ministry said.

The Bill was earlier introduced in the Lok Sabha on March 15, 2023, and was referred to the Standing Committee on Defence by the Speaker on April 24, for examination and report. The committee had the oral evidence of the representatives of the Ministry of Defence on the Bill on May 29, 2023 following which the draft report was considered and adopted by the Standing Committee on July 20, 2023.

‘Enabling Act’

The ‘ISO Bill-2023’ is essentially an ‘enabling Act’ and it does not propose any change in the existing Service Acts/Rules/Regulations which are time-tested and have withstood judicial scrutiny over the last six decades or more, the Ministry said.

The Ministry further stated that the Bill would also pave the way for much greater integration and jointness amongst the three Services; lay a strong foundation for the creation of Joint Structures in times to come and further improve the functioning of the armed forces.

Listing out the salient features of the Bill, the Ministry said that the'ISO Bill-2023' shall be applicable to all personnel of the regular Army, Navy, and Air force, and to persons of other forces, as notified by the Central government, who are serving in or attached to an Inter-Services Organisation.

In high-level military reforms, the post of Chief of Defence Staff (CDS) was created in 2019 with the mandate of ensuring the "jointness" of the three services in operations, logistics, transport, training, support services, communications, repairs and maintenance. The top priority for the CDS is the proposed reorganisation of the armed forces into integrated theatre commands. The effort was delayed due to a lack of consensus between the Services and was stalled by the death of the 1st CDS General Bipin Rawat, and then the delay in the appointment of his successor. With General Anil Chauhan taking charge as the second CDS, the stalled process was put back on track and is in advanced stages.

https://www.thehindu.com/news/national/as-theatre-commands-take-shape-parliament-clears-inter-services-bill/article67157616.ece

REPUBLICWORLD.COM

Sun, 06 Aug 2023

Big Push to Defence: Indian Army Inducts Swathi Mk2 Radar for Mountain Surveillance

To fortify the nation's battlefield surveillance and reconnaissance capabilities, the Indian Army inducted the lighter and more compact version of the indigenously developed Weapon Locating Radar (WLR-M) called "Swathi Mountains." The induction ceremony took place on August 5, 2023, at Agra, where Lieutenant General JB Chaudhari, the Deputy Chief of the Army Staff (DCOAS) for Capability Development and Sustenance (CD&S), flagged off the radar system.

The Swathi Mountains WLR is an advanced electronically scanned phased array radar, specifically designed for operations in mountainous and high-altitude areas and was developed by Bharat Electronics Limited (BEL) in Bengaluru.

What is a Weapon Locating Radar?

The Weapon Locating Radar (WLR) stands as a critical asset for modern militaries, employing advanced signal processing techniques to autonomously detect and track hostile artillery, mortars, and rocket launchers. Notably, it even tracks friendly fire trajectories, enabling precise calculations for more accurate artillery strikes. The radar's sophistication lies in its ability to detect and track small projectiles across the battlefield while factoring in environmental conditions for precise launch and impact point estimations.

A hallmark of the WLR is its high mobility and swift deployment capabilities, allowing it to adapt to changing operational requirements efficiently. Its slewable platform further enhances its agility, enabling scanning of different areas without the need for physical repositioning. Ensuring effectiveness in hostile environments, the radar is designed with survivability and resistance to electronic warfare measures in mind. The WLR also acts as a potent friendly force multiplier by providing critical information on enemy weapon systems.

The older version of India's Swathi WLR (Plains) operates on a passive phased array system with side lobe levels, making it capable of handling simultaneous fire from weapons deployed at multiple locations. It can effectively process a high density of returned signals caused by various

factors such as weather conditions, ground clutter, and aerial objects, enabling it to provide real-time information for mission success.

Swathi Plains vs. Swathi Mountains

The Swathi radar comes in two versions: the Swathi Plains (WLR) and the Swathi Mountains (WLR-M). The Swathi Plains version is primarily designed to locate hostile guns, mortars, and rockets, and it can also track the fall of shot from friendly weapons for corrective measures on flat terrains like Plains, as the name of the version suggests.

On the other hand, the Swathi Mountains version, the one inducted yesterday, is a more compact and mobile version specifically designed for operations in mountainous and high-altitude terrains.The WLR-M, or Swathi Mountains, is capable of detecting mortar shells and rockets and tracking projectiles. It classifies projectile and non-projectile targets, rejecting unwanted signals like birds, clutter, and aircraft. Moreover, it offers trajectory estimation and launch/impact point extrapolation, automatically correcting for height to enhance accuracy. The radar system is equipped to store and display trajectory data and maintain communication with higher echelons for better coordination.

Swathi's Success

The Ministry of Defence signed contracts on March 30, 2023, for the procurement of an improved Akash Weapon System and 12 Weapon Locating Radars (WLR) Swathi (Plains) for the Indian Army, worth over Rs 9,100 crore.Prime Minister Narendra Modi stated, "A welcome development, which will boost self-reliance and particularly help the MSME sector."

Last year, the IA ordered six additional Swathi WLR-M systems. With the inclusion of the recent orders for the Swathi Plains radar, the IA will soon operate a total of 48 such systems. The initial order of Swathi radars was delivered by BEL in 2007 and was accepted by the IA in 2008. As of today, according to estimates, the IA operates 30 Swathi MK 1 radars, with 12 more on order. Additionally, the induction of MK 2 radars began yesterday.

Also, in March 2020, India exported four Swathi Weapons Locating Radars to Armenia valued at $40 million. Both countries are currently discussing expanding their collaboration for defence equipment sales.

https://www.republicworld.com/india-news/general-news/big-push-to-defence-indian-army-inducts-swathi-mk2-radar-for-mountain-surveillance-articleshow.html

THE HINDU

Sat, 05 Aug 2023

Indian Navy Launches Fresh Hunt to Buy 12 Minesweepers from Indian Shipyards

The Indian Navy has launched a fresh hunt to buy 12 mine counter-measure vessels (MCMVs) from Indian shipyards to strengthen its mine-warfare capabilities, officials aware of the matter said on Friday.

The minesweepers, capable of finding, destroying and laying mines, would be constructed over a period of eight years, with the order to be split between the lowest and the second-lowest bidding shipyards, according to a government request for information (RFI) published on Thursday.

The latest attempt to buy the MCMVs comes after at least three failed attempts during the last 15 years.

The development is significant as the navy currently does not operate even a single minesweeper, with the last among a fleet of six such vessels (bought from the erstwhile Soviet Union in the late 1970s) being decommissioned four years ago, the officials said asking not to be named.

“Twelve MCMVs are planned to be acquired. The anticipated delivery timeline for the MCMVs is proposed between 2030 and 2037. The order is planned to be split between L1 (lowest bidder) and L2 shipyards in the ratio of 8:4, wherein L2 shipyard will be required to construct the ships at the L1 cost,” the RFI said.

The development comes five years after negotiations with a South Korean shipyard for new minesweeper vessels collapsed at the final stage, delivering a blow to the Indian Navy’s efforts to bolster its mine-warfare capabilities.

The ₹32,640-crore programme for 12 MCMVs to be built at Goa Shipyard Limited (GSL) in collaboration with a Busan-based yard, Kangnam Corporation, was then pegged as one of the costliest Make in India initiatives.

Also, in 2014, the government had scrapped a contract to build minesweepers in India in partnership with Kangnam Corporation amid allegations that the Korean firm had hired middlemen to swing the deal in its favour.

The RFI lists out the roles the vessels should be able to perform.

“The MCMVs should be able to carry out operational roles, including mine counter-measure operations using unmanned MCM suite, channel mapping, route survey and sanitisation, search and rescue and humanitarian assistance and disaster relief, and mine laying,” it said. The MCMVs should be capable of operating in Indian Ocean region, the RFI said.

https://www.hindustantimes.com/india-news/indian-navy-launches-fresh-hunt-to-buy-12-mine-counter-measure-vessels-mcmvs-from-indian-shipyards-101691176921826.html

THE ECONOMIC TIMES

Fri, 04 Aug 2023

11,414 Women Serving in Three Services: Government Data

Eleven thousand four hundred fourteen women personnel are serving in the three services with the Army having the maximum of 7,054 of them, government data placed before Lok Sabha showed on Friday. The total number includes officers, other ranks as well as those in medical, dental and nursing services.

The number of women personnel employed in the three services excluding those in medical, dental and nursing services comes to 4,948.

According to details provided by Minister of State for Defence Ajay Bhatt while replying to a question in Lok Sabha, the Army has 1,733 women officers while 100 women personnel are employed in other ranks.

The data on women personnel in the Army is up to January 1.

In the Indian Air Force, the number of women officers is 1,654 while 155 are working as Airmen (agniveer-vayu) as on July 1, Bhatt said.

In the Navy, 580 women are posted as officers while 726 are operating as sailors (agniveers) as on July 26.

In the Army, Bhatt said 1,212 women are working in the Army Medical Corps, while the number in Army Dental Corps and Military Nursing Service is 168 and 3,841.

In the Navy, 151 women are in the medical corps, 10 in dental corps and 380 in nursing service.

In the Indian Air Force, 274 women are in the medical corps, five in the dental corps and 425 in military nursing service, according to the details provided by Bhatt.

"In Indian armed forces, there is no distinction in the deployment and working conditions of male and female officers in the Arms and services in which they serve. The postings are as per organisational requirements," he said.

Bhatt said training, postings, promotions, terms of engagement etc are common for both women and men.

"The rules regarding employability in Indian Armed Forces are gender neutral and provide equal opportunities to men and women," he said.

https://economictimes.indiatimes.com/news/defence/11414-women-serving-in-three-services-government-data/articleshow/102430930.cms

ThePrint

Fri, 04 Aug 2023

Nearly 40% BRO Roads Built in Last Three Years were in Ladakh & Arunachal, Govt Data Shows

Nearly 40 percent of the roads that the Border Roads Organisation (BRO) has constructed in the last three years fall in Ladakh and Arunachal Pradesh, shows data submitted by Minister of State for Defence Ajay Bhatt in a written response to a question in Lok Sabha.

This comes in the backdrop of India’s standoff with China along the Line of Actual Control (LAC) since 2020.

In his response, Bhatt said that of the total of 2,445 km of roads constructed in all of India’s border states/UTs, 507 km — the largest chunk — was in Arunachal Pradesh. This was followed by 453 km in Ladakh, and 443 km in Jammu & Kashmir.

The rest were constructed in nine states — Uttarakhand, Mizoram, Nagaland, Manipur, Sikkim, West Bengal, Himachal Pradesh, Rajasthan, and Punjab — and in the Union territory of Andaman & Nicobar, Bhatt said.

This comes in the middle of India’s massive push for border infrastructure — a significant turnaround from its decades-old policy of being wary of strengthening road connectivity along the LAC for fear of Chinese aggression.

One of the big projects initiated by the Narendra Modi government is the Arunachal Frontier Highway. Envisaged by the Army in 2012 and one of the country’s biggest and toughest projects, it is a 2,000-km long road that follows the McMahon Line and will begin from Mago in Arunachal Pradesh, adjacent to Bhutan, and pass through Tawang, Upper Subansiri, Tuting, Mechuka, Upper

Siang, Debang Valley, Desali, Chaglagam, Kibithu, Dong, before ending at Vijayanagar near the Myanmar border.

Funds sanctioned

According to the information that Bhatt gave in the House, the government had sanctioned Rs 923 crore — the highest in the last two years — for the BRO in the 2022-23 fiscal. Of this, the organisation had spent Rs 846 crore.

This is in comparison to the Rs 870 crore (sanctioned) and Rs 841 crore (spent) in 2020-21 and the Rs 752 crore (sanctioned) and Rs 744 crore (spent) in 2021-22.

In border areas, the BRO constructs roads according to the armed forces' priorities.

The central government had enhanced administrative and financial powers of various BRO executives to reduce the planning time, Bhatt said in his response, adding that the organisation has adopted new technologies and has inducted equipment such as heavy excavators, spider excavators, and lightweight crawler rock drills.

https://theprint.in/defence/nearly-40-bro-roads-built-in-last-three-years-were-in-ladakh-arunachal-govt-data-shows/1701213/

THE ECONOMIC TIMES

Sat, 05 Aug 2023

Iran Boosts Navy with Missiles, Drones as US Offers Guards for Gulf Ships

Iran has equipped its Revolutionary Guards' navy with drones and 1,000-km (600-mile) range missiles, Iranian news agencies reported on Saturday, as the U.S. offers to put guards on commercial ships going through the Gulf's Strait of Hormuz.

"Various types of drones ... and several hundred cruise and ballistic missiles with a range of 300 to 1,000 km are among the systems and equipment that were added to the capabilities of the Guards' navy today," state news agency IRNA said.

Earlier this week, Washington said it could soon offer to put armed sailors and Marines on commercial ships in the region following Iran's seizure and harassment of vessels.

Last month, it said it would send additional F-35 and F-16 fighter jets, along with a warship to the Middle East, to monitor waterways. About a fifth of the world's crude oil passes through the Strait of Hormuz between Iran and Oman.

Tehran usually says detained vessels have committed shipping violations. Some have been released only after foreign countries have freed detained Iranian ships.

Revolutionary Guards' Navy Commander Alireza Tangsiri told state TV that the new missiles had better precision as well as longer range. "The cruise missiles can attack several targets simultaneously and the commands can be altered after take-off."

https://economictimes.indiatimes.com/news/defence/iran-boosts-navy-with-missiles-drones-as-us-offers-guards-for-gulf-ships/articleshow/102447985.cms

Hindustan Times

Sat, 05 Aug 2023

Russia Doubles 2023 Defence Spending Plan

Russia has doubled its 2023 defence spending target to more than $100 billion - a third of all public expenditure - a government document reviewed by Reuters showed, as the costs of the war in Ukraine spira. The figures show that in the first half of 2023 alone, Russia spent 12%, or 600 billion roubles, more on defence than the 4.98 trillion roubles ($54 billion) it had originally targeted for 2023. Defence spending in the first six months of 2023 amounted to 5.59 trillion roubles, 37.3% of a total 14.97 trillion roubles spent in the period, the document showed.

https://timesofindia.indiatimes.com/world/europe/russia-doubles-2023-defence-spending-plan/articleshow/102438223.cms

THE ECONOMIC TIMES

Fri, 04 Aug 2023

US Nuclear Submarine Visits Western Australia as Allies Increase Defence Preparedness

A U.S. Navy nuclear submarine arrived in Western Australia on Friday as allies Canberra and Washington deepen defence ties and prepare to transfer nuclear submarine capability to Australia.

The U.S. Navy Virginia-class submarine arrived at HMAS Stirling for a scheduled port visit as part of a patrol of the Indo-Pacific, officials said.

Port Stirling will undergo an A$8 billion expansion to become a base for U.S. and British nuclear submarines from 2027, under the AUKUS partnership of Australia, the United States and Britain.

Australia plans to buy three nuclear-powered and conventionally armed submarines next decade from the United States, before building a new nuclear submarine class in Australia in the 2040s.

The U.S. military does not have a base in Australia but it is increasing the type and number of forces it rotates there. It will also stockpile military stores this year and establish a joint intelligence centre next year, defence and foreign ministers from the two nations said on Saturday.

The United States will also be involved in upgrades to multiple air bases in Australia's north, missile production and space cooperation, they said.

Australia and the United States are conducting two major military exercises this month, as Australia seeks to boost its defence preparedness.

Two Indian navy ships will join the Malabar Exercise, with Quadrilateral Security Partners the U.S., Australia and Japan, off the east coast of Australia next Friday.

Talisman Sabre, involving 34,000 personnel from 13 nations closed on Friday. Chief of Joint Operations, Lieutenant General Greg Bilton, said the exercise "tested our combined capabilities across sea, land, air, cyber and space operations".

https://economictimes.indiatimes.com/news/defence/us-nuclear-submarine-visits-western-australia-as-allies-increase-defence-preparedness/articleshow/102421833.cms

THE ECONOMIC TIMES

Sat, 05 Aug 2023

ISRO Transfers Satellite Bus Technology to Private Firm

ISRO on Saturday said it has transferred the IMS-1 Satellite Bus Technology to Alpha Design Technologies Pvt. Ltd in a step towards enhancing private industry participation in the country's space sector. NewSpace India Limited (NSIL), the commercial arm of ISRO, facilitated the technology transfer through an agreement signed during an event held at the NSIL headquarters on August 2, the space agency said on its website.

The technology transfer documents were formally handed over by D Radhakrishnan, Chairman and Managing Director of NSIL to Col. H S Shankar (Retd.), Chairman and Managing Director of ADTL.

ADTL is one of the two private players identified to receive the transfer of this technology through Interest Exploratory Note (IEN) published by NSIL, it said.

This transfer marks the beginning of satellite bus technologies developed by ISRO being transferred to private industries. Further, the PSLV is under productionisation by a consortium of industries. ISRO has been enabling private players to develop space technologies by facilitating and extending the expertise thus ensuring both out-bound and in-bound approaches.

The satellite bus, developed by ISRO's U R Rao Satellite Centre (URSC), is a versatile and efficient small satellite platform designed to facilitate low-cost access to space. The bus serves as a dedicated vehicle for various payloads, enabling earth imaging, ocean and atmospheric studies, microwave remote sensing, and space science missions while ensuring a quick turnaround time for satellite launches.

The IMS-1 bus, weighing about 100 kg, accommodates a 30kg payload. Solar arrays generate 330W power with a raw bus voltage of 30-42 V, ISRO said, adding it offers a 3-axis stabilised with four reaction wheels with a 1 Newton thruster that provides +/- 0.1 degree pointing accuracy.

It is a forerunner for IMS-2 bus technology, capable of improved features, and IMS-1 bus is utilised in previous ISRO missions like IMS-1, Youthsat and Microsat-2D, it said.

By transferring the IMS-1 technology to the private sector, ISRO/DoS (Department of Space) aims to bolster India's industrial growth in the space sector and foster technological self-reliance, it further said, adding the development opens up new avenues for private players to contribute to space research and exploration, in line with India's vision to expand its presence in the global space market.

Alpha Design Technologies Pvt. Ltd is an aerospace and defence company, with expertise in engineering, manufacturing, and system integration. It has been a key player in various projects related to defence, space and homeland security, contributing significantly to India's technological progress in these domains.

https://economictimes.indiatimes.com/news/science/isro-transfers-satellite-bus-technology-to-private-firm/articleshow/102447445.cms

THE TIMES OF INDIA

Mon, 07 Aug 2023

Chandrayaan-3 only 4,313km from Moon, Says ISRO

ISRO late on Sunday completed its first Moon-bound manoeuvre, a day after Chandrayaan-3 was guided into an elliptical lunar orbit. The spacecraft's altitude at Apolune (farthest point from Moon) was reduced from 18,074km to 4,313km

"The spacecraft successfully underwent a planned orbit reduction manoeuvre. The retro-firing of engines brought it closer to the Moon's surface, now to 170 km x 4313 km. The next operation to further reduce the orbit is scheduled for August 9, 2023, between 1pm and 2pm," ISRO said.

— isro (@isro)

Since the launch on July 14, Chandrayaan-3 has completed eight major manoeuvres — five Earth-bound manoeuvres between July 15 and 25, which raised its altitude to more than 1.2-lakh-km at Apogee (farthest point from Earth), the trans-lunar injection (TLI) on August 1, which put it in a path towards Moon at an altitude of nearly 3.6-lakh-km, the lunar orbit insertion (LOI) on Saturday and the first lunar-bound manoeuvre.

With the completion of Sunday's lunar manoeuvre, Isro will be left with three more Moon-bound manoeuvres to progressively reduce the spacecraft's altitude before it attempts to separate the landing module — Vikram (the lander) and Pragyan (the rover) — from the propulsion module.

Before the landing module breaks away from the propulsion module, the integrated spacecraft will have to achieve a 100km circular orbit from the current elliptical orbit around Moon.

Post lander separation, Vikram, carrying Pragyan inside, will be put in a 100km x 30km orbit around Moon and Isro will attempt to soft-land the lander on the lunar surface, scheduled as on date, for 5.47pm on August 23.

The landing will be achieved through a series of complex braking manoeuvres to soft-land in the South polar region.

https://timesofindia.indiatimes.com/india/chandrayaan-3-gets-closer-to-lunar-surface/articleshow/102480067.cms

Hindustan Times

Mon, 07 Aug 2023

ICMR Eyes Research on Resistance to Antibiotics

To better treat antibiotic-resistant infections in hospitals, the Indian Council of Medical Research and the Global Antibiotic Research and Development Partnership has launched an observational study in the country, according to people familiar with the matter.

Data of close to 200 patients being treated for infections caused by carbapenem-resistant organisms across six hospitals in the country will be analysed during the course of the study. Carbapenem is a class of antibiotics usually reserved for known or suspected multidrug-resistant bacterial infections.

"We are seeing rising rates of resistance to carbapenems, the class of last-line antibiotics most commonly used to treat hospital-associated multidrug-resistant bacterial infections," said François Franceschi, project lead for serious bacterial infections at GARDP. "This study is designed to give

us some of the answers we need to provide better treatments for people who develop these deadly antibiotic-resistant infections." The study is being carried out at the Kasturba Medical College in Manipal, Karnataka, Christian Medical College in Vellore, Tamil Nadu, Tata Medical Centre in Kolkata, P D Hinduja Hospital & Medical Research Centre in Mumbai, Postgraduate Institute of Medical Education and Research in Chandigarh and Sir Ganga Ram Hospital in New Delhi.

The study will look at the distribution, patterns and determinants of health and disease conditions, as well as the treatments administered to both adults and children with severe bacterial infections caused by carbapenem-resistant enterobacterales (CRE) and pseudomonas aeruginosa (CRPA), the global parnership said in a statement.

Infections caused by these bacteria are difficult to treat because they do not respond to commonly used last line antibiotics. Data will also be collected on the clinical outcomes for patients with confirmed CRE and CRPA infections in the six hospitals selected by the study.

These infections have been recognized as critical in the Indian priority pathogen list, which guides research, discovery and development of new antibiotics in India.

"Treating Pseudomonas infections has become significantly more difficult because of antibiotic resistance. Without enough antibiotics in the pipeline to address this challenge and as access to newer drugs is not available in India, the situation appears grim," said Dr Soumyadip Chatterjee, principal investigator for the study at the department of infectious diseases, Tata Medical Centre, Kolkata.. "More research as well as active involvement of regulators and policymakers is vital," he said in a statement. "The study will provide crucial information that could ultimately be used to improve treatments and help reduce deaths and illness associated with bacterial infections."

A 2019 Lancet study highlighted the fact that antimicrobial resistance (AMR) poses a major threat to human health around the world. Nearly 1.3 million deaths in 2019 were attributable to AMR, the study found. "On the basis of our predictive statistical models, there were an estimated 4·95 million (3·62–6·57) deaths associated with bacterial AMR in 2019, including 1·27 million (95% UI 0·911–1·71) deaths attributable to bacterial AMR," the Lancet paper said.

The results of the latest study will serve to better prepare hospitals involved in carrying out future interventional trials of novel therapeutics able to combat carbapenem-resistant infections, GARDP said. The observational study is also underway at five hospitals in South Africa.

GARDP is a Swiss not-for-profit organization developing new treatments for drug-resistant infections that pose a grave threat to health. It was established by the World Health Organization and the Drugs for Neglected Diseases initiative in 2016.

https://www.hindustantimes.com/india-news/observational-study-launched-in-india-to-improve-treatment-for-antibiotic-resistant-infections-in-hospitals-101691349094166.html

THE TIMES OF INDIA

Mon, 07 Aug 2023

Apsara, 67-Year-Old Nuclear Reactor at BARC, to be Converted into Museum

Globally, it could be the first of its kind — a nuclear reactor being converted into a museum for the public. The reactor is Apsara at Bhabha Atomic Research Centre (BARC) at Trombay, which became critical 67 years ago at 3.45pm on August 4, 1956, ushering in the nuclear era for not only

India, but Asia as well. It was dedicated to the nation by Jawaharlal Nehru on January 20, 1957. The one megawatt reactor was shut down in 2009 for refurbishment and restarted on September 10, 2018, as Apsara U. Scientists used it for basic research in the fields of nuclear physics, medical application, material science and radiation shielding.

Apsara U was decommissioned a few years later. The museum project has been on the cards for quite some time.

On Saturday evening, prior to the unveiling the memoirs of former Indian nuke chief R Chidambaram, 'India Rising: Memoirs of A Scientist', co-authored by Suresh Gangotra, BARC director and chairman of the Atomic Energy Commission A K Mohanty confirmed to TOI: "We are working on converting Apsara into a museum which will provide a glimpse of the history of India's nuclear programme to the public."

Saying that it could be a first-of-its-kind project in the world, he added: "The current plan envisages among other things showing the place where Homi Bhabha used to sit in the reactor and also the old BARC training school. We plan to consult officials of the Nehru Science Centre regarding this project."Considering that BARC is a high security zone as it is the heartbeat of India's nuclear weapons programme, the challenge before the planners is how to give public access to the proposed museum without compromising on security. According to a provisional plan, visitors will enter the museum from the south gate of BARC near the refineries.

When asked about the project timeline, Mohanty said it could be a year or little more and refused to divulge more details. "We are still working on it," he added.

Other officials of the department of atomic energy who spoke to TOI said that once the Apsara museum attains "criticality", schoolchildren will be brought in batches.

The Apsara reactor figures in the TV serial 'Rocket Boys', in which Dr Bhabha played by Jim Sarbh drinks champagne and jumps into the reactor once it becomes operational. It was an example of cinematic liberty.

Former Indian nuke chief M R Srinivasan, in his autobiography 'From Fission to Fusion', recalls that Apsara began with a challenge."Homi Bhabha and John Cockcroft, director of the United Kingdom Atomic Energy Establishment, bet whether Bhabha could commission the first Indian research reactor within 12 months of UK's agreement to lease out fabricated fuel."

The department of atomic energy decided on March 15, 1955, to build what is known as a "swimming pool-type research reactor" and finalised the design by July 1955. Srinivasan said Bhabha wanted the reactor to be built entirely in India, except for the fuel elements which had to be imported. He added that the site where Apsara was built featured at one time Sandow Castle, a property belonging to a Parsi family, and a dargah of a Muslim saint. Various units in the city fabricated components for the reactor, like TIFR, the New Standard Engineering Company at Chinchpokli and Mazgaon Docks.

Srinivasan recalled that the first attempt to make the reactor was set for July 31, 1956. "It was a typical monsoon with pouring rain and strong winds. Late in the evening, after a picnic dinner, the startup was attempted." But it ran into a technical problem. In the second attempt on August 4, 1956, Bhabha said only key personnel should be present in the control room.

Among the visitors to Apsara were former Chinese PM Chou En Lai, the Dalai Lama and Panchen Lama from Tibet and Emperor Haile Selassie of Ethiopia.

https://timesofindia.indiatimes.com/india/apsara-67-year-old-nuclear-reactor-at-barc-to-be-converted-into-museum/articleshow/102480458.cms

THE TIMES OF INDIA

Mon, 07 Aug 2023

Intensive Engineering Lab Experience, a Shot at Invention and Patents

Arvind P from IIT Madras and Muhammed Aslam S from NIT Calicut experienced several exasperated moments looking for a real problem untile they spoke to some doctors who asked them if they could re-engineer the asthma inhaler.

Almost 42 days and 42 nights later, the students had a prototype that addressed the issue of an improper inhaler technique. They altered the design by introducing a lock mechanism, a valve, a loaded compression spring and a single air passage. On activating the canister, the lock mechanism and loaded compression spring swiftly prompting the valve to open. This results in an influx of air and facilitates the synchronisation of airflow and the release of medication, thus increasing the efficacy of drug delivery.

Not only did their invention improve the pressurised metered dose inhaler which, in its current design, requires patients to often pump a second dose of the medication, the new ‘Valved Asthma Inhaler’ also led to a reduction in the dosage of medication taken by patients, as it propels medication deep into the lungs.

The 20-year-olds now have a provisional patent in their names. This is the path less taken. Before starting their third year, most engineering students head to internships, some others apply to spend six weeks immersed in a residential programme called Invention Factory.

Conducted in partnership with two US Cooper Union professors, also the programme founders, Alan Wolf and Eric Lima, Invention Factory is a six-week intensive summer programme in inventing where students work in teams from science, engineering and design institutes across India.

The programme originated in the US and ran for the first time in India in 2018 at IIT Gandhinagar. It continued at IITGN in 2019 and was offered simultaneously at IITGN and IIT Bombay in 2022. Invention Factory operated in three locations in 2023, with IIT Jammu being the most recent addition. It is offered by IITB alumni and is free for students who are selected. While it may yet not be as competitive as the IIT entrance exam, hundreds of students from the IITs, NITs and BITS have been applying to join this programme. By the end of six weeks, all students have written and filed a provisional patent application for their invention.

“In just four editions, the programme has taken 146 students who in teams of two have successfully filed 74 provisional patents in the US and India. Our 100% success rate is attributed to our top-notch practitioners and teachers of innovation who in six short weeks transform bright undergraduates with no prior experience in prototyping, pitching or patenting and transform them into inventive problem solvers and confident communicators and future innovators for India,” said Damayanti Bhattacharya, CEO of Maker Bhavan Foundation, which conducts the annual programme. The plan is to expand Invention Factory to a larger circle of institutes as more donors are being roped in.

From material to access to machinery, from lodging-boarding to mentorship by American professors and IIT faculty who are hired for six weeks, from stipend to cash awards and the provisional patent fee, four IIT-B alumni currently support the programme entirely.

When Ruyintan (Ron) Mehta, a serial entrepreneur in the plastic industry, was invited to be an evaluator for Invention Factory in the USA, he knew he wanted to bring this programme to India.

He traced the tendrils that went back to when the craze for coding overtook the love for making. “When I looked at the number of patents filed by various countries, India is way below China and the USA. Our engineering students have forgotten to make products with their hands. When I saw this programme in the USA, I spoke to some of my batchmates and we all decided to fund this entirely and bring it to India,” said Mehta, who studied chemical engineering at IIT Bombay from 1965-1970. His campusmates, Hemant Kanakia, Raj Mashruwala and Sudarshan Saraf, were equally thrilled to chip in.

For students who are losing touch with what it means to make with their hands, Invention Factory is an ode to the enchantment of engineering. It is an aspiring engineer’s laboratory; in a space of six dissolved weeks here is where they explore, absorb, create and solve what they believe is a pressing problem, and leave transformed, henceforth, forever, looking at re-engineering every product around them to make each one better, each one more efficient. And in that, keeping the real engineer in them always alive.’

https://timesofindia.indiatimes.com/india/intensive-engineering-lab-experience-a-shot-at-invention-and-patents/articleshow/102481989.cms

THE HINDU

Fri, 04 Aug 2023

Proposed National Research Foundation to Provide ‘Strategic’ Direction, Generate Private Funding

Science minister, Jitendra Singh tabled the Anusandhan National Research Foundation Bill in the Lok Sabha on Friday. The Bill proposes to establish the National Research Foundation, a new body that will provide “high level strategic direction for research, innovation and entrepreneurship.”

NRF to replace SERB

The NRF replaces the Science and Engineering Research Board, established in 2008. The objective then was to establish a “…Board with administrative, financial powers and operational flexibility to promote basic research in science and engineering in order to achieve higher levels of excellence in internationally-competitive basic research.”

The NRF however proposes a more expansive definition of research which includes science, engineering, information technology, liberal arts, social sciences and the humanities. The SERB only envisaged funding research, whereas the NRF – a reading of the text suggests – can fund and receive money from private sources, philanthropic and international organisations. With the repeal of the SERB, all the funds available to that organisation will now be available to the NRF.

The SERB was comprised of a governing board, chaired by the Secretary, Department of Science and Technology and had as its members secretaries from various scientific ministries, health ministry, Indian Council of Medical Research, representatives from government research labs.

PM to preside

The NRF governing board will be presided over by the Prime Minister of India (PM) and have the minister of science and education as ‘vice president.’ There is also an explicit inclusion of five members from business and industry, who can be nominated to the Board by the PM. The NRF will

have an executive council to manage day-to-day affairs. The eligibility criteria determining membership to the council and advisory committees, are essentially like that of the SERB. The NRF will be "administratively" managed by the Department of Science and Technology.

"The bill, after approval in the Parliament, will establish NRF, an apex body to provide high-level strategic direction to scientific research in the country as per recommendations of the National Education Policy (NEP), at a total estimated cost of Rs 50,000 crores over five years (2023-28)," the Science Ministry said in a statement.

Mr Singh in an interaction last month said that a key ambition of the government, via the NRF, was to increase private sector contribution to research and more research funding for state universities. However except for a reference to "encouraging" private and public sector units to invest in research, there is nothing to suggest greater fund flow to state universities.

"It's an effort well begun. However, like all Bills, the details will be spelt out in the Rules and we'll only then know if this will be substantively different from the SERB," a senior scientist, who was privy to the drafting of the NRF Bill, told The Hindu on condition of anonymity.

Private funding still low

Statistics from the Ministry of Science and Technology suggest that only 36% of India's research expenditure – of roughly ₹1.2 lakh crore – came from the private sector in 2019-20, when the latest such figures were published. This is one of the reasons why India's expenditure on R&D hovers around 0.6% of Gross Domestic Product (GDP), well below the 1-2% that is characteristic of countries with a stronger science and technology infrastructure and the global average of 1.8%.

In China, Japan, South Korea and the U.S., the private sector contributed 70% of the research expenditure. About 70% of India's research funds were taken up by the Defence Research and Development Organisation, the Department of Space (DoS), the Department of Atomic Energy and the Indian Council of Agricultural Research (ICAR). The Ministry of Science and Technology, the Council of Scientific and Industrial Research (CSIR) and the Indian Council of Medical Research (ICMR) garnered about 20%.

https://www.thehindu.com/news/national/proposed-national-research-foundation-to-provide-strategic-direction-generate-private-funding/article67158726.ece