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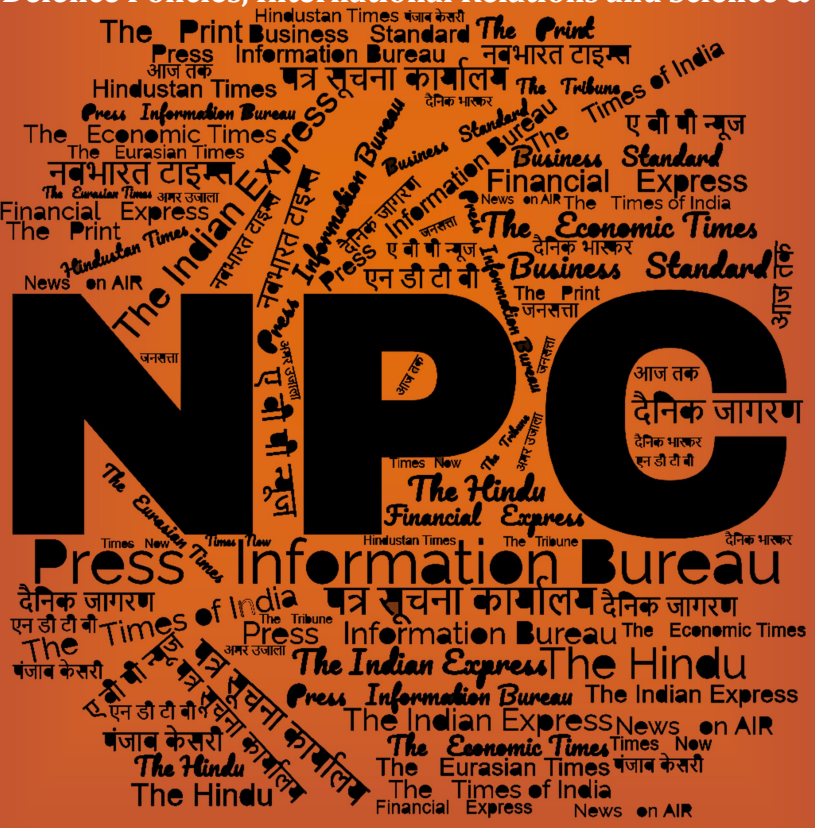

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Mon, 06 Mar 2023

Empowering DRDO Crucial for Achieving Atmanirbharta in Defence

By Air Marshal Anil Chopra

The Defence Research and Development Organisation (DRDO) under the Ministry of Defence (MoD) of the Government of India, was set up in 1958 and charged with research and development for Indian military systems. With a network of 52 laboratories that are engaged in developing defence technologies covering various fields like aeronautics, armaments, electronics, land combat engineering, life sciences, materials, missiles, and naval systems, DRDO is India's largest and most diverse research organisation. It includes around 5,000 scientists and about 25,000 other subordinate scientific, technical, and supporting personnel. In 1982, the 52 labs were merged to form 30 laboratories and establishments. Many military officers and personnel have been working on deputation with the DRDO.

Historical Background

DRDO began the initial development of surface-to-air missiles (SAM) in the 1960s. It later became the Integrated Guided Missile Development Programme (IGMDP) in the 1980s. The program involved a comprehensive range of missiles, including the Agni re-entry technology, Prithvi ballistic missile, Trishul, Akash and Nag missiles. The program was completed in 2008. In 2010, a Defence Technology Commission was set up with the defence minister as its chairman. Since its establishment, the DRDO developed some other major systems and critical technologies such as aircraft, aircraft avionics, UAVs, small arms, artillery systems, EW Systems, tanks and armoured vehicles, sonar systems, command and control systems and missile systems. Despite years of R&D, India continued to import a bulk of its defence needs. More recently, the DRDO began working closely with the private sector, research and education institutes including IITs and NITs.

Agni Missile Series

The Agni missile is a family of medium to intercontinental range ballistic missiles. Agni missiles are long-range, nuclear weapons capable, surface-to-surface ballistic missiles. The Agni-I (1200 km) was developed under the IGMDP and tested in 1989. Later, it was designated as a special program. Some variants of the missiles are in service. The Agni V (8,000 km) is reportedly

operational. Agni VI (12,000 km) is under development. Agni-Prime (Agni-P) is a medium-range ballistic missile with significant upgrades including a manoeuvrable re-entry vehicle (MaRV), improved propellants, navigation and guidance systems. It will be road mobile, solid-fuel MRBM, transportable by a truck and launched via a canister.

DRDO Successful Ground Systems

Indian forces are using numerous indigenous technologies produced by the DRDO. Among the ground systems are the Arjun MBT Mk IA, 'Pinaka' multi-barrel rocket launcher, 130 mm SP Vijayanta Catapult, HELINA (Nag) missile, 46-metre Modular Bridge, Armoured Recovery and Repair Vehicle (Arjun ARRV), Parachutes (including heavy drop), weapon locating radars, IR sensors, specialised foods, among many others. The Arjun Mk1A is under induction and the more advanced Arjun Mk2 Next Generation Main Battle Tank (NGMBT) is under development. An unmanned ground vehicle variant is also planned.

Akash is a medium-range (50 km), mobile, surface-to-air missile (SAM) system produced by Bharat Dynamics Limited (BDL) in large numbers for the Indian Air Force (IAF) and the Indian Army (IA). Bharat Electronics (BEL), Tata Power Strategic Engineering Division and Larsen & Toubro (L&T) are partners in the program.

BrahMos and Astra Missiles

The BrahMos is a medium-range, stealth, ramjet, supersonic cruise missile that can be launched from submarines, ships, aeroplanes or land, notably being the fastest supersonic cruise missile in the world at the time of its introduction. It is a joint venture between the DRDO and Russia's Mashinostroyeniya, who together have formed BrahMos Aerospace. The missile is based on the Russian P-800 Oniks supersonic anti-ship cruise missile. A hypersonic version (Mach 7-8), BrahMos-II, is under development and is expected to be ready for testing by 2024. Having become a member of the Missile Technology Control Regime (MTCR), new generation variants with an 800 km range (later 1500 km) and even better accuracy are under development.

Astra is an all-weather, supersonic, beyond-visual-range (110 km) air-to-air missile by the DRDO, integrated into the IAF Sukhoi Su-30MKI. These will also come onboard Dassault Mirage 2000, HAL Tejas and Mikoyan MiG-29 in the future. The longer-range Mk2 variant is also under testing. There is a vertical launch variant surface-to-air missile version for Indian Navy.

Airborne systems and Ground-Based Radars

The Aeronautical Development Agency (ADA) was set up under the DRDO to manage fighter aircraft development. With the success of Light Combat Aircraft (LCA) 'Tejas', India's fighter aircraft production eco-system is now in place. More advanced variants like LCA Mk1A and Mk2, Twin Engine Deck Based Fighter (TEDBF) are under development. Also under development is the fifth-generation, stealth, Advanced Medium Combat Aircraft (AMCA).

DRDO also successfully integrated the 'Netra' AEW&C aircraft. DRDO's Electronics and Radar Development Establishment (LRDE) along with primary production partners BEL and various private firms like Mistral Solutions in Bengaluru, Astra microwave in Hyderabad and Data Patterns in Chennai have made a variety of ground-based radars. These include a variety of battlefield surveillance, fire control, and medium-power radars. They are now integrating the active electronically scanned array (AESA) radar 'Uttam' on LCA. A large and more powerful variant of the radar is being developed for LCA Mk2, Su-30 MKI, and AMCA. The DRDO is

also working on an electronic warfare suite, Head-Up Displays, airborne IR systems, and pilot support systems, among others. DRDO labs are also working on precision munitions.

DRDO UAVs

'Rustom' Medium Altitude Long Endurance unmanned air vehicle (UAV) is being developed by DRDO for the three services. These will have short endurance tactical variant, and a larger 24-hour endurance TAPAS-BH-201 (Rustom-2). 'Ghatak' autonomous jet-powered stealthy unmanned combat air vehicle (UCAV) is being developed for the IAF. The flying-wing concept craft will be powered by a turbofan engine. It will have an internal weapons bay. The first flight of a scaled down test bed was carried out in July 2022.

Aero-Engine

DRDO's Gas Turbine Research Establishment (GTRE) has been working on a fighter aircraft engine for many decades. The GTX-35VS Kaveri developed by GTRE was meant to power the LCA. However, the program failed to satisfy the necessary technical requirements and was de-linked from the aircraft. There are very few aero-engines manufacturers in the world and they closely guard technologies. DRDO is now looking for a foreign partner. Success in aero-engine is most important. A national-level task force must run this project.

Naval Systems

The Naval Systems & Materials (NS&M) Cluster comprises of six laboratories with headquarters at Visakhapatnam. They develop underwater sensors and surveillance systems; underwater weapons and associated systems; Air Independent Propulsion systems; protection technologies for marine platforms among others. In addition to the ship-based radars and missile systems derived from land variants, the Varunastra is an Indian advanced heavyweight anti-submarine torpedo developed by NSTL and manufactured by Bharat Dynamics Limited. NSTL also developed the Maareech Advanced Torpedo Defence System. USHUS is an integrated sonar system. The Advanced Light Torpedo (TAL) Shyena has also been developed and exported.

Electronic Warfare

DRDO's Combat Aircraft Systems Development & Integration Centre (CASDIC) develops many avionics and airborne electronic warfare systems. Samyukta is a mobile integrated electronic warfare system developed jointly by DRDO, BEL, Electronics Corporation of India Limited, and Corps of Signals of the Indian Army. Programme SAMUDRIKA aims at the design and indigenous development of a family of Seven Electronic Warfare Systems meeting the requirements of Navy for different platforms. Among the airborne systems developed is the 'Tarang' RWR, ESM systems, and internal EW systems for Jaguar, among others.

ASAT

On March 27, 2019, India tested the anti-satellite weapon (ASAT) codenamed Mission Shakti. The target of the test was a satellite present in a low Earth orbit, which was hit with a kinetic kill vehicle, which was a modified anti-ballistic missile interceptor Prithvi Defence Vehicle Mark-II. The test made India the fourth country after the United States, Russia and China to have tested an ASAT weapon. The test also gave India the capability to intercept an intercontinental ballistic missile (ICBM).

DRDO Supports Gaganyaan Mission

DRDO is working closely with the Indian Space Research Organisation (ISRO) on India's crewed orbital spacecraft project 'Gaganyaan' for critical human-centric systems and technologies like space-grade food, crew healthcare, radiation measurement and protection, parachutes for the safe recovery of the crew module and fire suppression system etc.

Transfer of Technology to Private Sector

In September 2019, DRDO formulated the 'DRDO Policy and Procedures for Transfer of Technology' and released information on 'DRDO-Industry Partnership: Synergy and Growth and DRDO Products with Potential for Export.' During the Vibrant Goa Global Expo and Summit 2019, DRDO signed technology transfer contracts with 16 Indian companies, including 3 start-ups, to produce products for the IAF. DRDO under Development cum Production Partner programme (DcPP) allowed the handholding of domestic private sector industries to improve their development and production cycle of complex defence systems. VL-SRSAM (Vertical Launch-Short Range Surface to Air Missile) and Advanced Towed Artillery Gun System (ATAGS) became some of the successful projects of this program. Kalyani Group is developing the DRDO ATAGS.

In December 2021, HAL secured an order for the manufacturing, assembly, integration, testing and supply of DRDO Abhyas from the Aeronautical Development Establishment. Abhyas is a high-speed expendable aerial target (HEAT). The order will be completed under DcPP with a private sector industry. In December 2021, Ashok Leyland also signed a partnership agreement with Combat Vehicles Research and Development Establishment (CVRDE) to develop 600 hp engines for Future Combat Vehicle Program.

In December 2021, Instruments Research and Development Establishment (IRDE) transferred technologies for developing a border surveillance system to the Indian private sector company Paras Defence and Space. Defence Institute of Physiology and Allied Sciences (DIPAS) transferred technology to manufacture extreme cold weather clothing system to RHD Business Services, SBNX Innovation, Shiva Texyarn Limited, Kusumgar Corporates and Ginni Filaments Limited. Clearly, the public-private partnership has been given a fillip. Much more still needs to be done, and is expected to unfold.

Roadmap Ahead

While addressing the DRDO fraternity on January 2, 2020, Prime Minister Narendra Modi had said, "DRDO should work on a medium and long-term roadmap in this decade and should start defining actionable points within a set timeframe." DRDO has made a roadmap for 2021-2030 for all its laboratories and establishments.

DRDO's targets in the coming decade include airborne platforms such as the LCA Mk2, TEDBF, AMCA, Remotely Piloted Strike Aircraft (RPSA), HALE UAVs, and air-launched UAVs. DRDO is working on India's first indigenous aircraft ejection seat, and also more advanced parachute systems. DRDO will also give a bash at 110 kN thrust class aero-engine. They will look at next-generation armaments including propellants. Ground-based and airborne directed energy weapons will be an area of focus and will include high-powered lasers. Sensor data fusion and electronic warfare will be another area. Secure aerial data links and advanced surface and sub-surface communications and regenerative satellite payloads will be developed. DRDO will also look at detection and protection from Nuclear Biological and Chemical (NBC) threats. Hybrid exoskeleton systems for ground and space applications are an area of research.

Long-range SAMs and hypersonic cruise missiles hopefully will be accelerated. Artificial Intelligence (AI) and microchips is another area of DRDO focus. Stealth materials and design is another important area. These would also include low-observable materials and low IR signature. DRDO also needs to increase interaction with academia and the private sector.

DRDO had a huge presence at Aero India 2023. The success of the DRDO projects is crucial for India's atmanirbharta in defence production. What matters is the number of systems actually inducted in the armed forces. For strengthening R&D in Defence, the allocation to DRDO has been enhanced by 9 percent, with a total allocation of Rs 23,264 crore for 2023-24. The DRDO must work towards deliverable systems for every Rupee spent. The time to act is now, lest it becomes too late.

https://www.news18.com/news/opinion/opinion-empowering-drdo-crucial-for-achieving-atmanirbharta-in-defence-7228597.html

DRDO on Twitter

Defence News

Defence Strategic : National/International

Press Information Bureau
Government of India

Ministry of Defence

Mon, 06 Mar 2023

Raksha Mantri Reviews Operational Capabilities of Indian Navy during Naval Commanders' Conference aboard INS Vikrant

Calls for futuristic capability development to deal with emerging maritime security challenges

"Future conflicts will be unpredictable; We need to be ready"

Indian Navy standing firm in protecting national interests, strengthened India's position as 'Preferred Security Partner' in Indian Ocean Region, says Shri Rajnath Singh

"Defence sector has emerged as a major demand creator; Orders worth over $100 billion expected in the next 5-10 years"

Raksha Mantri Shri Rajnath Singh reviewed the operational capabilities of the Indian Navy during the Naval Commanders' Conference held aboard India's first Indigenous Aircraft Carrier INS Vikrant on March 06, 2023. He interacted with the Naval Commanders and witnessed the operational demonstrations at sea, highlighting the Navy's capability to undertake multi-dimensional missions towards safeguarding the maritime interests of the country.

In his address to the Commanders, the Raksha Mantri lauded the Navy for standing firm and protecting national interests with courage &dedication. He exhorted them to continue focussing on futuristic capability development to effectively overcome the emerging security challenges in the maritime domain. "Future conflicts will be unpredictable. The constantly-evolving world order has forced everyone to re-strategise. Constant vigil on the Northern & Western borders as well as the entire coastline must be maintained. We need to be ready to deal with all future challenges," he said.

Shri Rajnath Singh described secured borders as the first requirement to ensure social and economic progress, asserting that India, under Prime Minister Shri Narendra Modi's leadership, is moving forward in 'Amrit Kaal' with renewed thrust & zeal to achieve this objective. Emphasising that economic prosperity and security scenario go hand-in-hand, he pointed out that the defence sector has emerged as a major demand creator, which has been boosting the economy and ensuring the country's development.

"In the next 5-10 years, orders worth over $100 billion are expected to be placed through the defence sector and it will become a major partner in the economic development of the country. Today, our defence sector is on the runway, soon when it takes off, it will transform the country's economy. If we want to see India among the top economic powers of the world by the end of 'Amrit Kaal', we need to take bold steps towards becoming a defence superpower," the Raksha Mantri said. Shri Rajnath Singh also made special mention of the credible and responsive presence of the Navy in the Indian Ocean Region. He stated that Mission-Based Deployments of the Navy have strengthened India's position as a 'Preferred Security Partner' of friendly foreign countries in the region.

The Raksha Mantri reiterated the need for a huge country like India to be completely self-reliant and not dependant on others for its security. He listed out numerous steps taken by the Government to achieve 'Aatmanirbharta' in defence, including notification of four Positive Indigenisation Lists, increase in FDI limit and creating a favourable environment for Indian vendors including MSMEs. He termed the recent announcement of earmarking record 75% of the defence capital procurement budget for domestic industry in 2023-24 as a testament to the Government's firm commitment to achieve self-reliance in defence manufacturing.

Shri Rajnath Singh commended the Navy for being at the forefront of indigenisation and innovation through inductions of ships & submarines and development of niche technologies, in consonance with the 'Aatmanirbhar Bharat' vision. On the commissioning of INS Vikrant, he stated that it further reinforced the belief that India's Naval designing and development is at a promising stage and more progress will be made in the times to come.

The operational demonstrations witnessed by the Raksha Mantri included complex Aircraft Carrier and Fleet operations, weapon firings by ships & aircraft and Underway Replenishment at Sea. In addition, a demonstration of indigenous products, including spotter drone, fire-fighting bot was witnessed by the Raksha Mantri. The strides taken by the Indian Navy towards 'pole-vaulting' the technological curve, through indigenous sources in the domains of Big Data Analytics, Artificial Intelligence, Laser technology and cryptography were also demonstrated.

https://pib.gov.in/PressReleasePage.aspx?PRID=1904622

Hindustan Times

Tue, 07 Mar 2023

'Future Conflicts to be Unpredictable..': Rajnath Singh to Naval Commanders Onboard INS Vikrant

Defence minister Rajnath Singh on Monday said future conflicts would be unpredictable and stressed on the need for constant vigil while reviewing the operational capabilities of the Indian Navy during the bi-annual Naval Commanders' Conference held on board India's first indigenous aircraft carrier INS Vikrant.

He also said if India was to be among the top economic powers of the world by the end of Amrit Kaal (the next 25 years leading up to the 100th anniversary of Independence), it was important to "take bold steps towards becoming a defence superpower.

“Future conflicts will be unpredictable. The constantly-evolving world order has forced everyone to re-strategise. Constant vigil on the northern and western borders as well as the entire coastline must be maintained. We need to be ready to deal with all future challenges,” Singh said in his address to the navy brass.

The defence minister asked them to continue focussing on futuristic capability development to overcome emerging security challenges in the maritime domain.

The holding of the top navy meet on board the aircraft carrier brought into sharper focus the country’s steps towards achieving self-reliance in the defence manufacturing sector. The 45,000-tonne Vikrant was built at Cochin Shipyard at a cost of ₹20,000 crore, and was commissioned into the navy six months ago.

The minister also spoke of self-reliance and said it was critical for a big country such as India to be completely self-reliant, and not depend on others for its security. He said the earmarking of 75% of the defence capital procurement budget for the domestic industry in 2023-24 was a testament to the government’s commitment to self-reliance in defence manufacturing.

He added that securing the country’s borders was the first requirement to ensure social and economic progress. Stressing that economic prosperity and security go hand-in-hand, he said the defence sector had emerged as a major demand creator, which had been boosting the economy and ensuring the country’s development.

“In the next 5-10 years, orders worth over $100 billion are expected to be placed through the defence sector and it will become a major partner in the economic development of the country. Today, our defence sector is on the runway; soon when it takes off, it will transform the country’s economy. If we want to see India among the top economic powers of the world by the end of ‘Amrit Kaal’, we need to take bold steps towards becoming a defence superpower.”

Singh witnessed operational demonstrations at sea that highlighted the navy’s capability to undertake multi-dimensional missions towards safeguarding India’s maritime interests, the defence ministry said in a statement.

The operational demonstrations included complex aircraft carrier and fleet operations, weapon firings by ships and aircraft, and underway replenishment at sea, the statement added.

Only the opening day of the five-day conference was planned on Vikrant. The discussions at the conference will cover issues related to operations, combat readiness, logistics, training, human resource development, jointness and indigenisation. The developments in the Indian Ocean region, where China seeks to increase its presence, are also likely to be discussed.

Rarely are such top conferences held on board warships. In December 2015, Prime Minister Modi chaired the combined commanders’ conference on board INS Vikramaditya, India’s other aircraft carrier, off the Kochi coast. That was the first time the combined commanders’ conference, involving the top brass of the three services, was held on board an aircraft carrier. Modi has been in favour of big events being held outside the national capital.

https://www.hindustantimes.com/india-news/future-conflicts-to-be-unpredictable-constant-vigil-must-rajnath-singh-101678112629262-amp.html

FINANCIAL EXPRESS
Read to Lead

Mon, 06 Mar 2023

Defence Sector to Order over $100 Billion in the Next 5-10 Years, says Rajnath Singh

"The defence sector has emerged as a major demand creator and orders worth over $100 billion are expected in the next 5-10 years," said Defence Minister Rajnath Singh during the Naval Commanders' Conference.

Rajnath Singh was reviewing the operational capabilities of the Indian navy during the Naval Commanders' Conference held aboard India's first Indigenous Aircraft Carrier INS Vikrant on March 06.

In his address to the Commanders, the defence minister lauded the Navy for standing firm and protecting national interests with courage and dedication.

"Future conflicts will be unpredictable. The constantly-evolving world order has forced everyone to re-strategise. Constant vigil on the Northern & Western borders as well as the entire coastline must be maintained. We need to be ready to deal with all future challenges," he said. Emphasising that economic prosperity and security scenario go hand-in-hand, he pointed out that the defence sector has emerged as a major demand creator, which has been boosting the economy and ensuring the country's development.

Defence economy

"In the next 5-10 years, orders worth over $100 billion are expected to be placed through the defence sector and it will become a major partner in the economic development of the country. Today, our defence sector is on the runway, soon when it takes off, it will transform the country's economy. If we want to see India among the top economic powers of the world by the end of 'Amrit Kaal', we need to take bold steps towards becoming a defence superpower," the defence minister said.

The defence minister also highlighted the credible presence of the Indian navy in the Indian Ocean Region, "…that Mission-Based Deployments of the navy have strengthened India's position as a 'Preferred Security Partner' of friendly foreign countries in the region."

He termed the recent announcement of earmarking record 75% of the defence capital procurement budget for domestic industry in 2023-24 as a testament to the government's firm commitment to achieving self-reliance in defence manufacturing.

The government, in the last three years, has accorded Acceptance of Necessity (AoN) to 163 proposals worth Rs 2,46,989.38 crores, under various categories of Capital procurement.

According to the data from the MoD, domestic procurement stood at 54 percent of the total procurement in 2018-19. The figure jumped to 59 percent in 2019-20 and to 64 percent in 2020-21. In 2022, it has been increased to 68 percent for domestic procurement.

On the commissioning of INS Vikrant, he stated that it further reinforced the belief that India's Naval design and development is at a promising stage and more progress will be made in the times to come.

The operational demonstrations included aircraft carrier and fleet operations, weapon firings by ships & aircraft and underway replenishment at Sea.

https://www.financialexpress.com/defence/defence-sector-to-order-over-100-billion-in-the-next-5-10-years-says-rajnath-singh/3001278/

Press Information Bureau
Government of India

Ministry of Defence

Mon, 06 Mar 2023

Indo-France Joint Military Exercise FRINJEX-2023 to Commence at Thiruvananthapuram

The maiden Joint Military Exercise FRINJEX-23 between Indian Army and French Army will be conducted at Pangode Military Station, Thiruvananthapuram, Kerala on 07th and 08th March 2023. It is for the first time armies of both the nations are engaging in this format with each contingent comprising of a Company Group each from the Thiruvananthapuram based Indian Army troops and French 6th Light Armoured Brigade.

The exercise is aimed at enhancing inter-operability, coordination and cooperation between both forces at tactical level. The scope of the exercise involve establishment and operationalisation of a joint command post to secure an envisaged area for undertaking joint humanitarian assistance and disaster relief, establishing an Internally Displaced Population (IDP) camp and move of disaster relief material. The Joint exercise will further cement defence cooperation with France which is a key aspect of the overall Indo-France strategic partnership.

https://pib.gov.in/PressReleasePage.aspx?PRID=1904604

THE NEW INDIAN EXPRESS

Tue, 07 Mar 2023

Armies of India, France to Hold Joint Exercise on Tactical Coordination

The maiden joint military exercise 'Frinjex-23' to be held between the Indian Army and French Army at Pangode Military Station, Thiruvananthapuram, on March 7-8 will see a new format.

The Indian Army said in a statement, "It is for the first time armies of both the nations are engaging in this format with each contingent comprising of a Company Group each from the Thiruvananthapuram-based Indian Army troops and French 6th Light Armoured Brigade."

The exercise is aimed at enhancing interoperability, coordination and cooperation between both forces at tactical level. The scope of the exercise involves the establishment and operationalisation of a joint command post to secure an envisaged area for undertaking joint humanitarian assistance and disaster relief, establishing an Internally Displaced Population (IDP) camp and moving disaster relief material. "The Joint exercise will further cement defence cooperation with France which is a key aspect of the overall Indo-France strategic partnership," the Army said. There is an institutionalised format of military exercises between the three services of the two countries, namely Exercise Shakti (Army), Exercise Varuna (Navy) and Exercise Garuda (Air Force). On the military front, various staff courses, training programmes etc. also take place regularly. Cooperation in defence is the cornerstone of the India-France strategic partnership.

The two countries established a Ministerial level Defence dialogue starting in 2018. The Indian armed forces have been operating French defence equipment for long. This includes the Jaguar, Mirage-2000 and Rafale jets.

https://www.newindianexpress.com/nation/2023/mar/07/armies-of-india-france-to-hold-joint-exerciseon-tactical-coordination-2553883.html

R. REPUBLICWORLD.COM

Mon, 06 Mar 2023

Aatmanirbhar Strike at Arabian Sea: Why Brahmos Missile Launch is Significant

In another boost for the Aatmanirbhar Bharat campaign, the Indian Navy on March 5, Saturday successfully carried out a precision strike test in the Arabian Sea. An Indian naval ship fired the BrahMos missile armed with the indigenous seeker and booster designed by the Defence Research and Development Organisation (DRDO). The missile test was carried out by a Kolkata class-guided missile destroyer warship.

What is BrahMos?

The BrahMos missile flies at a speed of 2.8 mach, almost three times the speed of sound. This missile flies at a speed of 2.8 Mach or almost three times the speed of the sound. The anti-ship version of the supersonic cruise missile was successfully test-fired jointly by the Indian Navy and the Andaman and Nicobar Command in April 2022. A cruise missile that can be fired from land, sea and air, is said to be the fastest anti-ship cruise missile.

The BrahMos missile can hit ship, land and air-based targets and radar stations. It has a low radar cross-section, making it difficult to detect and intercept. It is powered by a solid-fuel rocket motor and uses an inertial guidance system with terminal active homing. It is also equipped with advanced features like stealth technology, digital scene matching, and area correlation, which enables it to navigate complex terrain with great precision.

How India is sending BrahMos to the world

In 2016, India became a member of MTCR (Missile Technology Control Regime). India has also started exporting BrahMos missiles. In January 2022, India sealed a USD 375 million deal with

the Philippines for supplying three batteries for the missile. Its propulsion is based on the Russian missile, and missile guidance has been developed by BrahMos Aerospace. The missile is expected to reach a total order of USD 13 billion.

The India-made seeker and booster

The missile is equipped with Indigenous seeker and booster. It is developed by DRDO. It is one of the world's most powerful missiles which is developed in a joint venture between India's DRDO and Russia's NPO Mashinostroyeniya and together they have formed the Brahmos Aerospace. The name of this missile comes from the Brahmaputra river of India and Russia's Moskova river. Together they form the Brahmos missile sysytem.

The seeker on the missile system will perform an onboard target sensing for the flight guidance. Its ultimate purpose is to bring the intercepting missile warhead within a lethal radius of the target. Missile booster is a solid rocket booster which is used by many missiles around the world. It is attached to the first stage of the missile. Boosters can be solid or liquid propellant.

https://www.republicworld.com/india-news/general-news/aatmanirbhar-strike-at-arabian-sea-why-brahmos-missile-launch-is-significant-articleshow.html

INDIA TODAY

Mon, 06 Mar 2023

India's Military Intel Agencies Fire Fresh Salvo against Chinese Mobile Phones, Apps

Military intelligence agencies have issued fresh advisories to their units to ensure that the troops are not using Chinese mobile phones due to the threat from malware and spyware on them.

“The formations and units are to sensitise their personnel through various forms and channels to exercise caution with such (Chinese) mobile phone devices,” the advisory issued by the defence intelligence agencies said.

The military agencies asked units to “discourage troops and their families from purchasing or using phones from countries hostile to India”.

The advisory has been issued by the forces as there have been cases where malware and spyware have allegedly been found in Chinese mobile phones by the agencies, the sources said.

The spy agencies have asked the units and formations to “carry out the transition to other phones against the phones” mentioned in the list attached with the advisory.

The Chinese mobile phones available in the commercial market in the country include Vivo, Oppo, Xiaomi, One Plus, Honor, Real Me, ZTE, Gionee, ASUS and Infinix.

The spy agencies have been very active against Chinese mobile phone applications in the past and multiple such applications were deleted from military personnel’s phones. The forces have also been acting against Chinese applications and banned a number of them, including micro-

blogging site Weibo, WeChat messenger, file transfer app Shareit, popular mobile web browser UC browser, and multiple account logger, Parallel Space.

Besides, a number of applications found on popular Chinese smartphone brands are also on the banned list.

https://www.indiatoday.in/india/story/military-intel-agencies-fire-fresh-salvo-against-chinese-mobile-phones-apps-2343420-2023-03-06

Hindustan Times

Tue, 07 Mar 2023

Women Trailblazers Hail Army for Opening New Frontiers

Several women officers, who are trailblazers in the Indian Army and serving in challenging roles, believe that the army is opening new frontiers for women at a swift pace, and grooming them to hold leadership positions in select streams on a par with their male counterparts.

The army has removed several barriers for women in recent years.

Captain Shiva Chouhan, the first woman officer to be deployed on the Siachen glacier, says, "Women are getting the same exposure as men in the army. There can be no other experience like being posted to Siachen. This opportunity has taught me how to face the fiercest odds with a smile."

The 25-year-old officer is from the Corps of Engineers, and deployed at the Kumar post at a height of 15,632 feet. Like other soldiers, she will have a three-month stint in the frozen landscape where the temperature can dip to minus 60 degrees.

In the run-up to Women's Day on March 8, Chouhan says there was some element of fear of the unknown before she took on the challenging assignment, but "it has turned out to be the most memorable journey of my life." She trained at the Chennai-based Officers Training Academy and was commissioned into the army in May 2021.

"I feel no other career can provide you as much exposure as the army does. At 25, I feel I can deal with the toughest of situations with ease," she says.

The army has begun assigning women officers to command roles for the first time, outside the medical stream, and around 50 of them are set to head units in operational areas, including forward locations, under the Northern and Eastern Commands that are responsible for guarding India's borders with China. The opening of command roles to women became possible only after the army began granting them permanent commission in 2020.

The army has come a long way since it began inducting women in the short-service stream three decades ago, and the force has taken a raft of measures in recent years to open more doors for them, says Major Aaina Rana, the first commanding officer of the 75 Road Construction Company (RCC) at Pipalkoti in Uttarakhand's Chamoli district.

"The colour of our uniforms is the same as our male counterparts, we draw the same salary, and do the same work. The transition was smooth for me when I took over as the first commanding

officer of 75 RCC in August 2021. There was no gender angle. It's only a matter of time before the army starts allowing women into combat arms," says Rana, who is responsible for providing forward connectivity along the India-China border.

In January, army chief General Manoj Pande said the commissioning of women officers in the regiment of artillery was on the cards, while stressing that their empowerment was a focus area in which the army had made good progress. To be sure, tanks and combat positions in infantry are still no-go zones for women.

"Women officers are now being given command roles outside the Army Medical Corps. The day is not far when women will be represented well in the higher echelons of the army," says Major Shailli Gehlawat, an army doctor serving with the United Nations Interim Security Force for Abyei. While Gehlawat was posted to Abyei seven months ago, the army in early January deployed its largest contingent of 27 women peacekeepers in Sudan's disputed region of Abyei, where they are performing security-related tasks in the challenging UN mission.

"Women have in-built strength to take on all challenges. Some realise that only after encountering tough situations," says the 33-year-old.

The army is offering women officers a raft of opportunities that have given them new hard-earned identities, empowered them and helped bridge the gender gap significantly in a traditionally male-dominated field.

With more doors being opened for them, the contribution of women officers to the army will only increase in the coming years, says Captain Deeksha C Mudadevannanavar, a woman officer serving as a regimental medical officer (RMO) with an elite Special Forces unit.

"I have been with the unit for around four months, and everyone treats me like they would treat any other officer," says the 28-year-old.

Women in uniform are no longer on the fringes but are being assigned central roles on a par with their male counterparts across the three services – they are flying fighter planes, serving on board warships, being inducted in the personnel below officer cadre, eligible for permanent commission, and undergoing training at the National Defence Academy.

https://www.hindustantimes.com/india-news/women-trailblazers-hail-army-for-opening-new-frontiers-101678131766468.html

THE ECONOMIC TIMES

Mon, 06 Mar 2023

India Ready to Help Bangladesh with its Defence Modernisation Efforts: Envoy

India is ready to help Bangladesh with its defence modernisation efforts and has identified defence industry cooperation with Dhaka as an emerging focus area of the bilateral partnership, including joint development and production, India's envoy here has said. The Indian High

Commission here on Sunday organised a seminar here on Indian defence equipment to promote defence industry cooperation between India and Bangladesh.

Speaking at the event, Indian High Commissioner to Bangladesh Pranay Verma identified defence industry cooperation between the two countries as an emerging focus area of their defence partnership, a press release by the High Commission said.

Verma highlighted the accomplishments of Indian's defence industry over the last decade driven by the "Make in India, Make for the World" vision of Prime Minister Narendra Modi.

The High Commissioner invited Bangladesh Armed Forces to benefit from India's cost-effective, high-quality defence equipment and technology and proposed joint development and production.

He expressed Delhi's readiness to partner with Dhaka in its defence modernisation through the USD 500 million Defence Line of Credit extended by the Indian government to the Bangladeshi government and urged the defence industry on both sides to take full advantage of this arrangement.

Chief of General Staff (CGS) of the Bangladesh Army, Lt. Gen. Ata-ul Hakim Sarwar Hasan, attended the event and made keynote remarks along with Verma.

Hasan also praised India's defence manufacturing capabilities and proposed cooperation between the two sides for a closer defence industry partnership, the press release said.

Several key Indian defence manufacturers, from the public and the private sectors, participated and presented their defence products and platforms.

Representatives from Bangladesh Armed Forces, paramilitary forces, and law enforcement agencies also attended the seminar.

India and Bangladesh have a close and friendly defence relationship that covers diverse areas of cooperation and is guided by the spirit of their shared sacrifices during the Liberation War of 1971, the press release said.

https://economictimes.indiatimes.com/news/defence/india-ready-to-help-bangladesh-with-its-defence-modernisation-efforts-envoy/articleshow/98451035.cms

नवभारत टाइम्स

Mon, 06 Mar 2023

भारत से डर गया चीन! डोकलाम के पास घटाई अपनी सेना की तैनाती

चीन ने सिक्किम के दूसरी तरफ अपनी सेना की तैनाती कम की है। पिछले साल जून में चीन ने यहां पर सैनिकों की संख्या डबल कर दी थी। जिसके जवाब में भारतीय सेना ने भी तैनाती बढ़ाई। डोकलाम के पास करीब एक महीने तक तनाव चरम पर था और फिर धीरे धीरे यह कम हुआ। अब चीन ने वहां तैनाती सामान्य की है। हालांकि भारतीय सेना अलर्ट है।

'हम अपनी मुस्तैदी कम नहीं करते'

सेना के एक अधिकारी के मुताबिक चीन चाहे तैनाती कम करे या ज्यादा हम अपनी मुस्तैदी कम नहीं करते। पिछले साल चीनी सैनिकों ने यहां टोरसा नाला क्रास किया और जामफेरी रिज की तरफ बढ़ने की कोशिश की। हालांकि भारतीय सेना को एक्शन में देख वह वापस चले गए। जब 2017 में डोकलाम में विवाद हुआ था तब भी भारत की तरफ से चीन को साफ साफ कह दिया गया था कि अगर वह टोरसा नाला क्रॉस करेंगे तो हम इसका डटकर बदला लेंगे। चीनी सेना का टोरसा नाला क्रॉस करना इसलिए खतरा है क्योंकि अगर चीनी सेना जामफेरी रिज तक पहुंचती है तो इससे भारत के सिलिगुड़ी कॉरिडोर पर खतरा हो जाएगा।

सिलिगुड़ी कोरिडोर सामरिक रूप से बेहद अहम

भारत का सिलिगुड़ी कोरिडोर सामरिक रूप से बेहद अहम है। इसे चिकन नेक भी कहते हैं। यह बहुत संकरा रास्ता है जिससे पूरा नॉर्थ ईस्ट देश के बाकी हिस्से से जुड़ता है। डोकलाम सिक्किम-भूटान और तिब्बत का ट्राई जंक्शन है।

चीन ने दो कंबाइंड आर्म्ड ब्रिगेड तैनात

सूत्रों के मुताबिक पिछले साल जून में चीन ने सिक्किम के दूसरी तरफ अपनी दो कंबाइंड आर्म्ड ब्रिगेड यानी सीएबी तैनात कर दी थी। चीन की 52- मिडियम कंबाइंड आर्म्ड ब्रिगेड का हेडक्वॉर्टर चुंबी वैली के पास है और यह हमेशा वहां तैनात रहती है। लेकिन चीन ने जून में यहां 53-लाइट कंबाइंड आर्म्ड ब्रिगेड भी तैनात कर दी थी। सूत्रों के मुताबिक अब 53-कंबाइंड आर्म्ड ब्रिगेड को उसके पीस लोकेशन सेथांग में वापस भेज दिया गया है।

https://navbharattimes.indiatimes.com/india/china-deploys-its-army-with-reduced-deployment-near-doklam/articleshow/98460155.cms

Business Standard

Tue, 07 Mar 2023

Higher Defence Spending is Purely to Safeguard Nation's Sovereignty: China

China defended its growing defence budget and said that the military spending is purely to safeguard the country's sovereignty, security and interests, The Global Times reported.

Tan Kefei, a spokesperson of the People's Liberation Army and People's Armed Police delegation to the first session of the 14th National People's Congress made these remarks on Monday at two ongoing sessions, after the country announced its plan to raise the defence budget by 7.2 per cent in 2023.

"The Chinese government adheres to the policy of coordinated development of national defence development and economic development, and it reasonably sets the scale of defence expenditure based on the needs of national defence and the development level of the national economy," Tan said. Foreign media should look at their own countries' military expansions before hyping the "China threat" theory, analysts said.

The eight-day annual session of China's National People's Congress opened on March 4 in the presence of around 3000 delegates and President Xi Jinping and other leaders. The session assumed importance in the backdrop of new geo-political threats facing China and its lowest growth in decades at 3 per cent in the year 2022.

Outgoing Premier of China Li Keqiang, while addressing the opening of the annual session and presenting the government's annual work report (AWR), revealed that the growth target for China for the year 2023 would be "around 5 per cent". The AWR also highlighted that over 12 million jobs were added in 2022 while the urban unemployment rate fell to 5.5 per cent. He suggested that the Chinese government "should give priority to the recovery and expansion of consumption". Li will finish his decade as the country's premier, who was in charge of the economy, at the end of the eight-day National People's Congress (NPC).

The AWR dwelt on several issues including security preparedness, Taiwan's independence, and the military budget for the year 2023, among others. Outgoing Premier Li Keqiang told delegates to the NPC that "external attempts to suppress and contain China is escalating".

In view of this, he suggested, "The armed forces should intensify military training and preparedness across the board, develop new military strategic guidance, devote greater energy to training under combat conditions and make well-coordinated efforts to strengthen military working all directions and domains."

Contrary to its new purported security paradigm which apparently reflected China's willingness to shun its military expansionism and realization of a necessity to adopt a reconciliatory rather than confrontationist approach, the AWR signals China's more aggressive approach in the times to come. This became amply clear as China unveiled its military budget for 2023 which will increase by 7.2 per cent to roughly RMB 1.55 trillion (USD 224 billion).

China's defence budget is the second largest in the world after the US over USD 800 billion. But the US is known for its role in saving democracy and people's lives in war-torn regions of the world. It is for the third consecutive time that China's official defence outlay has crossed the USD 200 mark. China has once again come under scanner amid rising geo-political tensions, its alleged covert support to Russia in the Ukraine war and its increasing belligerence over Taiwan and the South China Sea region.

Experts have pointed out that China's defence budget is much higher than what is officially claimed. China has already the largest standing army and navy in the world. The ramped-up spending comes during a low point in relations between China and the United States. Beijing and Washington have butted heads in recent years over trade, human rights and other issues, but relations soured even further last month when the US shot down a Chinese balloon it said was being used for surveillance -- a claim strenuously denied by Beijing.

The announcement to increase the defence budget could be traced to the realisation in the communique of the second plenary session, which emphasized that "at present changes of a magnitude not seen in a century are accelerating across the world, which has entered a new

period of turbulence and change. Our country has entered a period of development in which strategic opportunities, risks, and challenges are concurrent and uncertainties and unforeseen factors are rising, and we have to be ready to withstand high winds, choppy waters, and even dangerous storms."

The sustained growth in defence spending despite sagging economic expectations showed that "security is now much more important for the national leadership" than before, said Alfred Muluan Wu, an associate professor at the University of Singapore's Lee Kuan Yew School of Public Policy.

On Taiwan, the AWR called for resolute steps to oppose "Taiwan's independence" and maintained Beijing's stand calling for a "peaceful reunion." Top American officials have also repeatedly warned that China might invade Taiwan in the coming years, pointing to Beijing's increasingly assertive military moves around the self-ruled island, which it sees as its own territory and has vowed to bring under its control.

Niklas Swanstrom, director of the Stockholm-based nonprofit the Institute for Security and Development Policy said Beijing appeared to be "investing in its capacity to take over Taiwan and keep the US out of the region". But James Char, an expert on China's military at Singapore's Nanyang Technological University pointed out that several countries across Asia were boosting their defence spending, in part due to "their respective threat perceptions of the regional security landscape".In a bid to indirectly rebut the alleged effort of Beijing to support Russia in its war against Ukraine, Premier Li said China should remain "committed to an independent foreign policy of peace". However, he did not mention the Russian invasion of Ukraine.

Earlier the Second Plenary Session of the 20th Central Committee of the Communist Party of China was held in Beijing from February 26 to 28, 2023. The session deliberated and adopted a plan on the reform of Party and state institutions with the agreement to submit part of the reform plan to the first session of the 14th NPC for deliberation so as to modernise the national system and capacity of governance.

The plenary session also agreed that the Political Bureau of the CPC has held high the great banner of socialism with Chinese characteristics, which fully implemented Xi Jinping's thoughts on socialism with Chinese characteristics for a new era and adhered to pursuing progress while ensuring stability. Xi Jinping is now poised for a third term as president and his handpicked loyalists would ensure that there is no dissension within the party and the government about China's future trajectory.

The NPC in line with existence go for the reappointment of Xi as president after he locked in another five years as head of the party and the military -- the two most significant leadership positions in Chinese politics in the October congress.

Last year, China widely missed its 5.5 per cent growth target as economic activities were stifled due to the Covid-19 containment policies and with property crisis. In 2023, the chances of China's economic recovery and realization of its target growth look possible given the very low base of economic activities last year. The conclave will also see the unveiling of Xi's confidant and former Shanghai party Chief Li Qiang as the new premier. In the remaining days, delegates to the NPC -- and to the concurrent "political consultative conference" (CPPCC) will also discuss various institutional and economic issues. The meetings serve as a forum for attendees to present pet projects, but they have little say in broader questions of how China is run.

This week's NPC meeting will formalize Xi's leadership of the country's third time as president, equaling Mao Zedong, China's first leader, in terms of long tenure. Thus, Xi Jinping is set to deepen his control of China's government and economy as the two sessions end and confirm Xi's third term.

https://www.business-standard.com/article/international/higher-defence-spending-is-purely-to-safeguard-nation-s-sovereignty-china-123030700196_1.html

THE TIMES OF INDIA

Tue, 07 Mar 2023

Russia Defence Minister in Rare Visit to Occupied Areas in Ukraine

Sergei Shoigu, the Russian defence minister, made a rare visit to occupied Ukrainian territory amid the lackluster performance of Russia's renewed military offensive and growing tensions with the Wagner mercenary group, a prominent paramilitary ally. Shoigu toured the occupied southern Ukrainian city of Mariupol, according to videos and statements released by the Russian defence ministry Monday. He also visited a Russian military base in the eastern Donetsk region Saturday. Shoigu's visit to Ukraine came days after Yevgeny Prigozhin, the leader of the Wagner group, Russia's largest paramilitary force, escalated his criticism of Shoigu and other senior military commanders, accusing them of being out of touch with frontline reality and prioritizing politics over military performance.

A year into the war in Ukraine, the Russian military has suffered staggering losses - approaching as many as 200,000 troops killed or wounded, Western officials say, and thousands of tanks and armored vehicles destroyed or captured by Ukraine. The video montages released by the defense ministry showed a stony-faced Shoigu looking over maps and talking to subordinates in Ukraine. The somber scenes, many of them muted, stood in contrast to Prigozhin's histrionic frontline video dispatches, in which he has paraded people he said were Ukrainian prisoners of war on the rooftop of a bombed-out building, challenged the Ukrainian president to a duel from an airborne fighter jet and overseen the loading of coffins filled with what he claimed were fallen Ukrainian soldiers.

https://timesofindia.indiatimes.com/world/europe/russia-defence-minister-in-rare-visit-to-occupied-areas-in-ukraine/articleshow/98460981.cms

REUTERS

Mon, 06 Mar 2023

US Flies B-52 in Joint Drill with S.Korea - S.Korea Defence Ministry

The United states deployed a B-52 bomber for a joint drill with its ally South Korea on Monday, in a show of force against North Korea's nuclear and missile threats, South Korea's defence ministry said.

B-52 bombers are capable of carrying nuclear weapons.

The air drill came ahead of combined large-scale exercises including amphibious landings starting later this month.

North Korea has traditionally called for those joint exercises to be called off, branding them as a prelude to invasion.

They have in the past drawn sharp reactions from Pyongyang including missile tests and nuclear threats, and North Korea's foreign ministry on Sunday demanded an immediate halt to U.S. - South Korea combined military drills, saying they were raising tensions.

With denuclearisation talks stalled, North Korea conducted a record number of missile launches last year. As South Korea has lifted anti-COVID measures, the allies are returning to large-scale drills.

South Korea and the United States will achieve "peace through strength" by stepping up joint drills, the ministry in Seoul said in a statement.

https://www.reuters.com/world/asia-pacific/us-flies-b-52-joint-drill-with-skorea-skorea-defence-ministry-2023-03-06/

Science & Technology News

जनसत्ता

Tue, 07 Mar 2023

जीवनकाल पूरा कर चुके उपग्रह की अंतरिक्ष से आज वापसी

भारतीय अंतरिक्ष अनुसंधान संगठन (इसरो) अपना जीवनकाल पूरा कर चुके मेघा ट्रापिक्स-1 (एमटी1) उपग्रह को सात मार्च को पृथ्वी की निचली कक्षा में पुन: प्रवेश कराने के चुनौतीपूर्ण अभियान को अंजाम देने की तैयारी कर रहा है। पृथ्वी के वायुमंडल में प्रवेश कराने के बाद इस उपग्रह को प्रशांत महासागर में गिराया जाएगा।

इसरो और फ्रांसीसी अंतरिक्ष एजंसी सीएनईसी ने उष्णकटिबंधीय मौसम और जलवायु अध्ययन के लिए 12 अक्तूबर 2011 को संयुक्त रूप से एमटी1 का प्रक्षेपण किया था। बंगलुरु स्थित अंतरिक्ष एजंसी ने रविवार को कहा कि इस उपग्रह का जीवनकाल मूल रूप से तीन साल का था, लेकिन यह 2021 तक क्षेत्रीय और वैश्विक जलवायु माडल के साथ एक दशक से अधिक समय तक अहम डेटा सेवाएं उपलब्ध कराता रहा। बयान के अनुसार, नियंत्रित तरीक से इसे पृथ्वी के वायुमंडल में एक सुरक्षित क्षेत्र में पुन: प्रवेश कराया जाएगा। करीब 1,000 किलोग्राम वजनी इस उपग्रह में तकरीबन 125 किलोग्राम ईंधन बचा है जिससे इसके दुर्घटनावश टूटने का खतरा पैदा

हो सकता है। आम तौर पर बड़े उपग्रह/राकेट को पुन: प्रवेश नियंत्रित तरीके से कराया जाता है ताकि जमीन पर किसी के हताहत होने का जोखिम सीमित किया जा सके।

इस उपग्रह को गिराने के लिए प्रशांत महासागर में एक निर्जन स्थान को चुना गया है। इसरो की ओर से दी गई जानकारी के अनुसार, अगर इस उपग्रह को इसी कक्षा में छोड़ दिया जाए, तो यह 100 साल से अधिक काल तक धरती की कक्षा में चक्कर काटता रहेगा, लेकिन उसमें बचे काफी मात्रा में ईंधन के चलते इसके टूटने और जोखिम पैदा करने के खतरे अधिक हैं। इसलिए प्रशांत महासागर में एक निर्जन स्थान पर इसे गिराने की योजना बनाई गई है। इसके लिए उपग्रह में बचे ईंधन का उपयोग करते हुए उसे नियत्रित तरीके से वायुमंडल में पुन: प्रवेश कराया जाएगा।

उपग्रह को पृथ्वी की निचली कक्षा से हटाना है

मेघा ट्रापिक्स उपग्रह को अब संयुक्त राष्ट्र के इंटर एजंसी अंतरिक्ष मलबा समन्वय समिति (यूएन/आइएडीसी) के दिशानिर्देशों के अनुसार, पृथ्वी की निचली कक्षा से हटाना है। एजंसी के तय मानकों के अनुसार, इसे ऐसी कक्षा में लाया जाना चाहिए, जहां उसका जीवनकाल 25 साल से कम हो। लगभग एक हजार किलोग्राम वजनी मेघा ट्रापिक्स अभी 867 किमी की ऊंचाई वाली कक्षा में है।

https://www.jansatta.com/national/isro-preparing-carry-challenging-mission-re-entering-megha-tropics-1-mt1-satellite-completed-its-life-cycle-entering-earths-atmosphere/2690671/

THE ECONOMIC TIMES

Mon, 06 Mar 2023

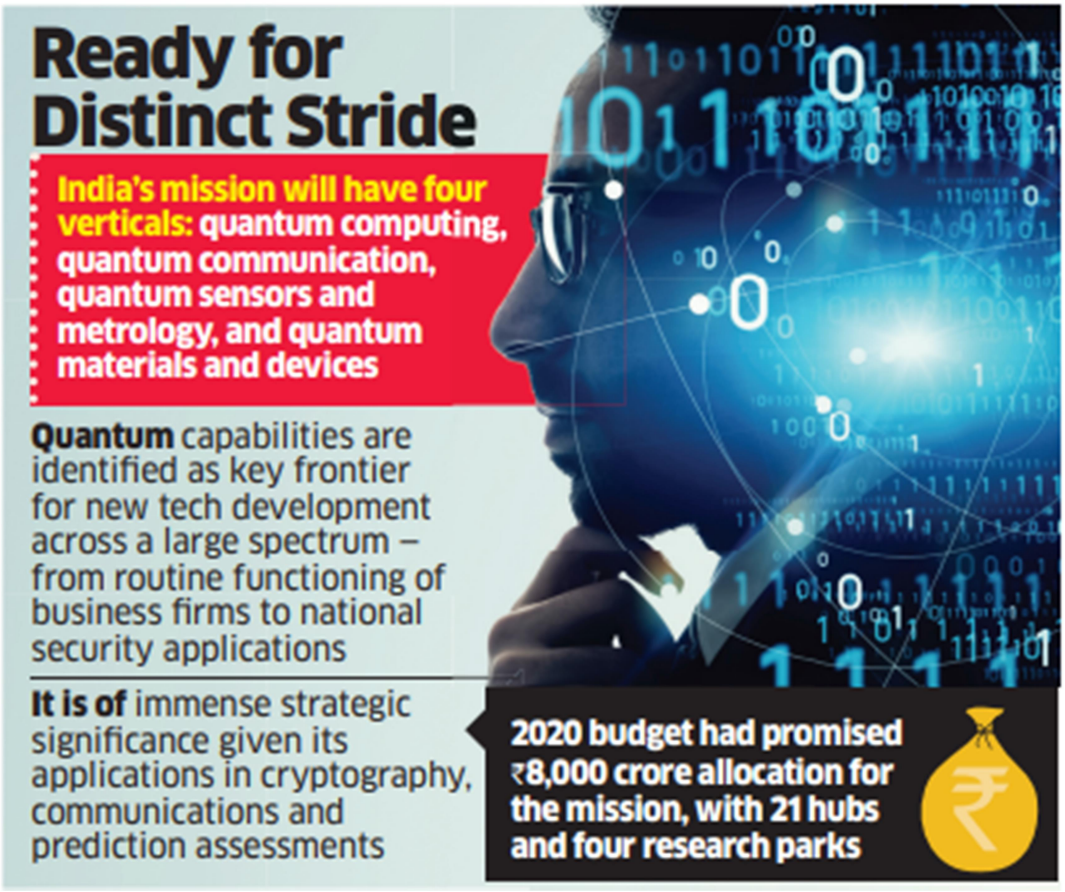
India's Deep Tech Scientific Missions all set for Quantum Jump

Three years after it was first announced, the Centre is set to launch the National Quantum Mission - one of the few deep technology scientific missions to be taken up by India. This mission will put India into the big league of new technology. There is, however, a considerable catching up to do.

So far, advanced quantum computing has been attempted only by a handful of developed nations, such as the US, Germany, France and Japan.

China is the only developing nation to be working on advanced quantum technology. China stepped into the race in 2008 and boasts of high-end quantum tech-based satellite capabilities and super computers. India has taken three years to finetune its mission plan and will have the

challenges of scaling it up by involving the private sector, which are key global players on quantum R&D and applications.



Top global firms, such as Google, Microsoft and IBM, are already running quantum R&D programmes and many Indian start-ups have also come into the field.

An overarching national policy framework is, however, missing. ET gathers that the mission is lined up for the Union Cabinet's approval, which is expected very soon.

It is envisaged that India's mission will have four verticals: quantum computing, quantum communication, quantum sensors and metrology, and quantum materials and devices.

Quantum capabilities are identified as a key frontier for new technology development across a large spectrum - from routine functioning of business firms to national security applications. It is of immense strategic significance given its applications in cryptography, communications and prediction assessments, officials in the know told ET.

The mission will be steered by Department of Science and Technology (DST) and will have close engagement with Department of Atomic Energy, Department of Space, Defence Research and Development Organisation, telecom as well as top educational institutes, it is gathered.

The PM's Science, Technology and Innovation Advisory Council had said that building excellence in the space is 'essential for national security and the development of quantum

computers, quantum chemistry, quantum communication, new materials, quantum sensors and quantum cryptography'.

The 2020 budget had promised a ₹8,000 crore allocation for the mission, with 21 hubs and four research parks. DST has also set up a quantum-enabled science and technology research program to boost research in the field.

https://economictimes.indiatimes.com/news/india/indias-deep-tech-scientific-missions-all-set-for-quantum-jump/articleshow/98460315.cms