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Defence News

Defence Strategic: National/International

Aatmanirbhar Bharat: MoD inks Rs 2,960 crore contract with BDL for Medium-Range Surface-to-Air Missiles for Indian Navy

Source: Press Information Bureau, Dt. 16 Jan 2025,

URL: <https://pib.gov.in/PressReleasePage.aspx?PRID=2093286>

Ministry of Defence (MoD) has signed a contract with Bharat Dynamics Limited (BDL) for the supply of Medium-Range Surface-to-Air Missiles (MRSAM) for the Indian Navy at a cost of approximately Rs 2,960 crore. The contract was inked by the officials of MoD and BDL in the presence of Defence Secretary Shri Rajesh Kumar Singh in New Delhi on January 16, 2025.

The MRSAM system is a standard fit, onboard multiple Indian Naval Ships and is planned to be fitted on the majority of the future platforms planned for acquisition. The contract marks a critical milestone in the ongoing efforts to bolster India's defence capabilities and indigenise advanced military technology.

With the emphasis on 'Aatmanirbhar Bharat', the missiles would be supplied by BDL under 'Buy (Indian)' category with largely indigenous content. The contract would generate employment of approx. 3.5 lakh mandays in the defence industry, including various MSMEs.

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India targets global defence market with Dornier 228 offer for Malaysian Coast Guard, including tech transfer

Source: The Economic Times, Dt. 16 Jan 2025,

URL: <https://economictimes.indiatimes.com/news/defence/india-targets-global-defence-market-with-dornier-228-offer-for-malaysian-coast-guard-including-tech-transfer/articleshow/117309015.cms>

India has offered domestically produced Dornier 228 aircraft for a requirement of the Malaysian Coast Guard, differentiating itself from the competition with a proposal that will include setting up of maintenance facilities and technology transfer.

Sources said that the aircraft, which has a proven record in the Indian Navy and Coast Guard, will go up for competition against western platforms but is likely to emerge as a very cost-effective solution. The requirement is for seven aircraft that can perform a variety of coastal tasks.

The Dornier platform has undergone significant modernisation over the years and has a glass cockpit, maritime patrol radar, electro optic infra-red device, mission management system among other modern aids. It is manufactured in Kanpur with ongoing orders for the Navy and Coast Guard.

The aircraft has been an integral part of the Indian Coast Guard and has been instrumental in both surveillance and search and rescue operations. Recently, a coast guard Dornier, undertaking a patrol near the Andaman islands, identified a suspicious vessel, leading to the largest-ever narcotics recovery at sea.

India has been trying to actively increase its defence exports, with all public sector companies as well as Indian missions abroad given clear guidelines to explore all possibilities. Industry leaders say that the support being provided by Indian missions abroad is unprecedented and has resulted in significant penetration into markets that were earlier deemed to be too difficult to enter.

Rising Defence Exports

Officials said defence exports, which were to the tune of ₹2,000 crore annually a decade ago, have risen to ₹21,000 crore in the latest financial year. The target is to increase this over the next few years, an initiative that is being helped by a global requirement of weapon systems and artillery ammunition in particular.

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Ancient wisdom meets AI: Army showcases evolution of warfare

Source: The Economic Times, Dt. 16 Jan 2025,

URL: <https://economictimes.indiatimes.com/news/defence/ancient-wisdom-meets-ai-army-showcases-evolution-of-warfare/articleshow/117285840.cms>

Using vivid digital images generated through AI-based tools, the Indian epics, historic military battles and monumental tales of valour through the centuries were brought alive in a grand show in Pune to mark the 77th Army Day. The nearly 90-minute military extravaganza titled 'Gaurav Gatha' had an exhilarating mix of live combat demonstrations using tanks, mounted personnel, laser and drone shows, and digital displays on giant screens. It was witnessed by Defence Minister Rajnath Singh, CDS Gen Anil Chauhan, Army Chief Gen Upendra Dwivedi, and others on Wednesday evening.

Hosted at the Bhagat Pavillion, named after legendary Victoria Cross awardee Lt Gen P S Bhagat, on the premises of the Bombay Engineers Group (BEG) and Centre at Khadki, it showcased the evolution of warfare from the ancient period to the contemporary era, drawing themes from the 'Ramayana' and the 'Mahabharata' and modern wars.

The narration, backed with life-like images generated through artificial intelligence-based software, also told the evolution of the 'Indian Yodha' from ancient battlefields to modern war zones that now extend to the realm of cyberspace.

The show began at dusk with a burst of firecrackers sending plumes of multi-colour smoke in the air, setting the stage for dramatic retelling of stories of battles fought in epics, the mutinies and resistances during the colonial rule and some of the major wars fought since India's independence in 1947.

After combat demonstration that involved rolling tanks, military personnel and even the 'robotic mule' -- inducted last year and showcased for the first time in the Army Day Parade here in the morning -- some of the ancient fighting techniques such as 'Gatka' used by Sikh warriors, and Kalaripayattu of south India were displayed.

The charged-up atmosphere then gave way to echoing of stories of ancient India and its military wisdom, the powerful life-like images adding to the layer of 'shaurya gatha'.

In the first segment, 'Prachin Ranniti', Lord Ram and his 'vanar sena' fighting a battle in the mythical Lanka of demon King Ravana in the epic 'Ramayana' was shown on the screen, followed by a new-age retelling of the battle of Kurukshetra as portrayed in the 'Mahabharata'.

The images of Lord Krishna offering war lessons and teaching 'dharma' to warrior Arjun, on the land of Kurukshetra, were vividly depicted through digital images generated using Artificial Intelligence (AI) software.

The narration during the show mentioned 'Project Udbhav' which aims to promote indigenous discourse in the Army by integrating India's ancient strategic acumen into the contemporary military domain with a focus on making the force "future-ready".

The Army has explored the epic battles of the Mahabharata, heroic exploits of eminent military figures and India's rich heritage in statecraft under this project that aims to enrich the nation's outlook in the defence domain, the then Army Chief Gen Manoj Pande had said in May last year.

While the stories of the 'Ramayana' and the 'Mahabharata' have been told and retold through various media through the ages, it was the AI factor that made the epics alive.

Raj Vardhan Patil, 21, a college student and an NCC cadet who lives at Dighi on the outskirts of Pune city, said the "images generated through AI (software) made the whole experience rather surreal".

"And, these were moving images, so one could see Hanuman ji in action, and freedom fighters and war heroes were brought alive, people whom we read about in history books," he told PTI.

A senior Army official said these creations using AI-based software were a result of the hard work of "both in-house talent of the Army and collaboration with civilian partners working in this domain".

The broad themes of the show were -- 'Prachin Ranniti' drawing from epics of Ramayana and Mahabharata, 'Yudh Kala', 'Yudh Parivartan', 'Yudh Pradarshan', 'Shaurya Gatha', 'Vijayotsav', and 'Samarth Bharat, Saksham Sena' -- the theme of the 77th Army Day Parade.

Women warriors such as Rani Laxmibai, Rani Abbakka and others were extolled for their valour and leadership during the show.

In the 'Shaurya Gatha' segment, stories of four post-Independence wars -- 1947 Indo-Pak war, 1965 Indo-Pak war, 1971 Indo-Pak war, and 1999 Kargil war -- were depicted using digital images, drone show in the night sky and combat demonstrations on the ground.

The show generated both a sense of pride and immense patriotism among the viewers, marking a befitting finale for the Army Day celebrations at Pune -- home of the Southern Command -- that hosted the annual parade for the first time in its history.

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Indian, Argentine armies successfully summit Mt Aconcagua on 'Army Day 2025'

Source: The Economic Times, Dt. 16 Jan 2025,

URL: <https://economictimes.indiatimes.com/news/defence/indian-argentine-armies-successfully-summit-mt-aconcagua-on-army-day-2025/articleshow/117301076.cms?from=mdr>

In a remarkable feat on the occasion of Army Day 2025, a joint mountaineering expedition of the Indian Army and the Argentine Army successfully summited Mt Aconcagua, the tallest peak in the Americas standing at an altitude of 6,995 meters.

The expedition, which began on January 3, 2025, featured an eight-member Indian team led by Lieutenant Colonel Manoj Joshi and a 15-member Argentine contingent. The teams reached the summit on January 15, 2025.

"On the occasion of Army Day 2025, a joint mountaineering expedition of the Indian Army and the Argentine Army, successfully summited the majestic Mt Aconcagua, the highest peak in the Americas with a towering altitude of 6995 metres. The introductory joint military expedition began on 03 January 2025, featuring an eight-member Indian team, led by Lieutenant Colonel Manoj Joshi alongside a 15-member Argentine contingent which finally summited on 15 January 2025," the Indian Army made the announcement on X.

"This expedition enhances bilateral defence ties, underscoring the value of collaborative efforts to strengthen mutual understanding and trust between the armed forces of the two nations," it added.

Closing the statement, the Indian Army stated, "Jointly Rising to New Heights."

Indian Ambassador to Argentina, Dinesh Bhatia lauded the achievement and congratulated the mountaineering teams.

India and Argentina share a long-standing relationship built on shared values, mutual respect, and understanding. Their diplomatic relations, elevated to the level of Strategic Partnership during the State Visit of the then-President of Argentina to India in February 2019, continue to expand across diverse sectors, including defence, mining, cultural, and scientific cooperation.

The partnership's history traces back to 1943 when India established a Trade Commission in Buenos Aires, later converted into an embassy in 1949, making it one of India's first embassies in South America. Argentina's diplomatic engagement with India began with a consulate in Kolkata in the 1920s, which was shifted to Delhi as an embassy in 1950. Argentina has also maintained a Consulate General in Mumbai since 2009.

The Indian community in Argentina, numbering around 2,600, predominantly resides in Buenos Aires, with many working for multinational corporations such as Cognizant Technologies and IBM. Earlier migrants, now in their third or fourth generations, live in provinces like Salta and Jujuy, where they continue to contribute to cultural and economic exchanges.

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'Excellent progress' in India-UK defence ties

Source: The Times of India, Dt. 17 Jan 2025,

URL: <https://timesofindia.indiatimes.com/india/excellent-progress-in-india-uk-defence-ties/articleshow/117311536.cms>

India and the UK on Thursday reviewed their ongoing bilateral defence cooperation, noting the "excellent progress" in niche areas like electric propulsion for warships and jet engines.

Defence minister Rajnath Singh and his counterpart John Healey, in a telephonic conversation, also agreed on the need to maintain momentum in the bilateral cooperation.

"The two ministers also reviewed the ongoing programme on the exchange of military instructors in each other's training institutes.

With the increased focus of the UK on the Indo-Pacific, both sides will explore the possibilities of joint work and enhanced maritime engagements in 2025," an official said.

Last Sept, the two countries inked a statement of intent (SoI) on cooperation in joint design, development and production of electric propulsion systems for Indian warships. The SoI will now serve as a broader framework for electric propulsion of future naval ships.

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Indian Army Adds Black Hornet Nano Drone To Fleet For Enhanced Surveillance And Infiltration Prevention Along Pakistan Border

Source: ETV Bharat, Dt. 16 Jan 2025,

URL: <https://www.etvbharat.com/en!/bharat/indian-army-adds-black-hornet-nano-drone-to-fleet-for-enhanced-surveillance-and-infiltration-prevention-along-pakistan-border-enn25011606902>

The Indian Army fleet now has a small drone smaller than a bird known as the Black Hornet Nano. The drone was displayed at the 9th Veterans Day event in the Tanda Artillery Division at Akhnoor

of Jammu. The drone will help the Indian Army foil the infiltration bids and will keep a close eye on the enemy, especially in border areas along with Pakistan.

The Black Hornet Nano drone looks like a small child toy laced with two cameras. This nano drone has become the cynosure of all eyes. Weighing a few grams and smaller than a palm, the Indian Army's Black Hornet Nano Drone will search terrorists by entering their burrows.

The Black Hornet Nano drone is notably compact, with dimensions of 16 cm in length and 2.5 cm in width, making it one of the smallest drones in military use. Weighing just 18 grams with its battery, it provides soldiers with a lightweight surveillance tool that can be carried with ease.

This drone is designed for troops providing immediate situational awareness, its small size and silence make it nearly undetectable, the drone can be attacked with a small box along with a soldier's utility belt for launching.

The Black Hornet has recently been included in its fleet by the Indian Army in Jammu and Kashmir. The Black Hornet, equipped with two cameras, without making any sound can reach hidden militants during any encounter without making any sound. The Indian Army is using this drone to know the positions of militants.

Black Hornet has expertise in building intervention, and without making any sound, this drone conveys the position of militants hiding in any building to the army.

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ISRO's SpaDeX opens new frontiers for Indian Defence

Source: The Tribune, Dt. 16 Jan 2025,

URL: <https://www.tribuneindia.com/news/top-headlines/isros-spadex-opens-new-frontiers-for-indian-defense/>

Indian Space Research Organisation's (ISRO) success in docking two orbiting satellites in space, besides being a huge milestone in the country's space exploration endeavours, will also give a fillip to the Indian military's own fledgling space-based programmes.

Even before IRSO's maiden Space Docking Experiment (SpaDeX) took off, the Indian Air Force had projected a requirement for "Autonomous Docking Operations for On-Orbit Maintenance and Refuelling (OOMR)," required for refuelling, maintaining and upgrading assets already in space.

The Indian Armed Forces primarily rely on satellites for strategic reconnaissance and, besides several existing satellites, had long-term plans for putting into orbit a vast constellation of satellites for surveillance and communications.

Use of satellites received an impetus after the 1999 Kargil conflict when the lack of indigenous capability was severely felt and India was saddled with outdated imagery of the war zone provided by certain foreign countries.

Terming it to be a historic moment, ISRO announced on January 16 that its Space Docking Experiment (SpaDeX) has been successfully completed, making India the fourth country after Russia, United States and China to develop this capability.

“Manoeuvre from 15-metre to 3-meter hold point completed. Docking initiated with precision, leading to successful spacecraft capture. Retraction completed smoothly, followed by rigidisation for stability,” ISRO said on its official X handle.

“Post docking, control of two satellites as a single object is successful. Undocking and power transfer checks to follow in coming days,” the post added.

SpaDeX was launched onboard the Polar Satellite Launch Vehicle (PSLV) from Sriharikota, off the coast of Odisha, in the evening of December 30, 2024 and the original schedule was to mate the two satellites, ‘SDX01 Chaser’ and ‘SDX02 Target’ on January 7.

The docking was postponed several times over technical issues such as requirement for additional simulations and greater drift of the satellites than expected during orbital manoeuvres, prompting ISRO to proceed cautiously. On January 12, after reducing the inter-satellite distance in phases, the spacecrafts were brought as close as 3-meters apart and scientists studied the data generated for taking the last step.

A top ISRO scientist had earlier told The Tribune that a key spin off of the space docking technology would be extending the operational life of existing satellites. Space assets like geostationary satellites are very expensive but have a life of 8 - 10 years when propulsion units run out of fuel even though other onboard systems and sensors are fully functional. Space docking technology would enable replacing propulsion units repeatedly, allowing satellites to remain effective for many more years.

In November 2024, the IAF had projected a requirement through the Ministry of Defence’s Innovations for Defence Excellence (iDEX) scheme that ropes in the industry for meeting the Armed Forces’ requirements, for space docking technology.

“This project is about refuelling, maintenance and upgrading operations of a spacecraft, while in orbit, which entails the development of technologies for precise rendezvous, proximity and docking with the spacecraft and subsequent refuelling, maintenance and upgrading spacecraft operations,” the iDEX document stated.

“The expectation from the challenge is to design and develop technologies for docking operations with friendly/ cooperative spacecraft that need to be serviced, refuelled, or maintained. The technologies for precise guidance during all phases of operation – proximity, terminal guidance and docking and subsequent docking methodologies are envisioned to be designed and developed in this challenge,” the document added.

As of 2024, India operates nine satellites for defence purposes. Among them, two GSAT-7 and GSAT-7A are dedicated military satellites, while the rest like HySIS, CartoSat, EMISAT, RISAT and EOS, are dual purpose satellites. Six more satellites that will have military applications planned for launch soon.

After the retirement of the Soviet-era MiG-25R tri-sonic high-altitude reconnaissance aircraft that the IAF operated from 1981 to 2006, India depends upon satellites for strategic reconnaissance and imagery. The satellites are supplemented at the tactical level by unmanned aerial vehicles and fighter aircraft equipped with externally mounted camera pods.

In India, the Defence Space Agency (DSA), a tri-services agency under the Integrated Defence Staff headquartered at Bengaluru, is responsible for operating satellites and conducting space-warfare, including research, threat assessment, anti-satellite programmes and doctrinal aspects.

India's foray into using outer space for military purposes began with the 'Space Based Surveillance Phase – I' project, which was approved by the Vajpeyee government in 2001. As a part of this, four satellites — Cartosat-2A, Cartosat-2B, EROS-B and RISAT-2 — were launched. Space Based Surveillance Phase – II was approved in 2013, which saw six satellites — Cartosat-2C, Cartosat-2D, Cartosat-3A, Cartosat-3B, Microsat-TD, RISAT-2A — being put in space, according to reports.

In October 2024, the Cabinet Committee on Security approved a proposal for the development, construction and launch of at least 52 satellites as a part of Space Based Surveillance Phase – III for round the clock, all weather reconnaissance and surveillance from space across land and sea domains, as well as enhance secure communications capability.

The project estimated to be worth Rs 26,968 crore will be supervised by the National Security Council Secretariat along with the DSA. ISRO will construct 21 satellites while the remaining 31 will be built by the private sector.

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India, China and the Malacca Strait game

Source: The Tribune, Dt. 17 Jan 2025,

URL: <https://www.tribuneindia.com/news/comment/india-china-and-the-malacca-strait-game/>

From the 48th floor sea-facing room at Oakwood Hotel in Sri Racha, Thailand, overlooking the Gulf of Thailand, I see an oil refinery being built by some 200 Indian employees of the multinational, Petrofac. Unlike in the adjoining dispute-ridden, China-claimed South China Sea, the Thai Gulf is tranquil. The growth of China, the world's second biggest economy, depends on an uninterrupted supply of energy, which suffers from a Malacca dilemma.

During his marathon briefing on Monday, eve of Army Day, Chief of Army Staff, Gen Upendra Dwivedi said the LAC was sensitive but stable (earlier it was unpredictable). China calls the shots there; India reacts. Time it turned the tables elsewhere: possibly the Malacca Strait in the Indian Ocean where India has the upper hand for now.

Along the narrow neck of southern Myanmar and Thailand, connecting the Malaysia peninsula to the Asian mainland, is the Isthmus of Kra, called Devil's Neck, like our own Chicken's Neck in the Siliguri corridor which is being hedged under the Kaladan Multi-Modal project through Sittwe port in Myanmar.

Across Kra, Thailand, prodded by China, had sought to make a canal; now a 90-km land bridge is to join the Andaman Sea in the Indian Ocean with the Gulf of Thailand in the South China Sea/Pacific Ocean to bypass the Malacca Strait.

An alternative passage avoiding the Malacca Strait will inflict severe strategic and economic loss on Malacca's custodians — Singapore, Indonesia and Malaysia — and alter maritime dynamics in the Indo-Pacific: depriving India of a strategic choke point in the Indian Ocean to offset its diminished deterrence against China along the LAC.

China's Malacca dilemma is the stuff of legend. At a Chinese Communist Party meeting in 2003, the then President Hu Jintao mentioned the lack of alternative routes and vulnerability of the Malacca Strait to naval blockade. As much as 90 per cent of China's trade is by sea, including 80 per cent of oil and 60 per cent of gas. The Strait of Malacca is 80 km long, 65-to-150 km wide and 2.8 km at its narrowest point.

From Malacca town, I could see the other side. Around 250 ships use it daily; it is congested with cargo ships and will reach its capacity by 2030. A closure of Malacca by accident or design will cost \$85 million a week. During the Gulf War, Indian warships escorted US shipping through the Malacca Strait.

China has weighed its Malacca diversion options: alternative routes, a new passage and enhancement of deterrence to use the existing route. Alternative routes are available further south of the Malacca Strait through Sunda, Lombok and the Macassar Strait. These are shallow for submarines and involve two-to-three days of additional sailing (1500 nm), incurring added cost, which a Thai estimate puts at an astounding \$200 billion a year.

The Maritime Silk and Belt and Road initiatives launched in 2013 were designed to protect China's land routes and sea lanes of communication for energy. Three land corridors were envisaged: the \$65-billion China-Pakistan Economic Corridor (CPEC) from Gwadar to Xinjiang; the China-Nepal Economic Corridor (CNEC), which is at the design stage, and the \$7-billion partly developed China-Myanmar Economic Corridor (CMEC) from Kyaukphyu to Kunming, containing road, rail and oil and gas pipelines with SEZs.

China is acquiring military bases and access to ports and airfields to dominate the Indian Ocean Region — the Djibouti military base, Gwadar (Pakistan), Hambantota (99-year lease in Sri Lanka), Kyaukphyu and Coco island (Myanmar) and Ream (Cambodia) in the Gulf of Thailand. Negotiations are on with Madagascar, Comoros, the Seychelles and Mauritius for use of/access to military facilities.

India, too, is creating strategic assets in Mauritius, the Seychelles and Myanmar, coupled with bilateral and multilateral partnerships in the Indo-Pacific. China is a loner.

In November 2023, the then Thai Prime Minister Srettha Thavisin presented the design to bypass the Malacca Strait and ports in Singapore and Malaysia, with a land bridge from Ranong and Chumphon, both deep sea container ports in the Andaman Sea and the Gulf of Thailand. In September 2024, Transport Minister Suriya Jungreangkit said the South-Eastern Corridor connecting Bimstec and Asean countries with the Indo-Pacific would come into effect in September 2025, the construction would commence in 2026 and the project completed in 2030. In

August 2024, PM Paetongtarn Shinawatra confirmed that Thailand would seek Chinese investment for the \$27-35-billion project.

For enhancing deterrence in the Indian Ocean, Beijing had shifted the military focus from the PLA to the PLA Navy (PLAN). It is now the fastest growing naval armada in the world, transforming from a brown-water navy to a blue-water one, crossing the First Island Chain and implementing the Two-Oceans Strategy — the Indian and Pacific Oceans. By 2035, it will be a 390-ship navy with seven aircraft carriers, frontline warships and submarines, hugely surpassing the US navy.

In the event of a blockade of the Malacca Strait by the US and/or India, which is an act of war, China may not attempt to break the blockade as it has three months of strategic oil reserves, with plans to make it last for 18 months and replenishing from Uzbekistan and Russia.

Any blockade of the Malacca Strait could result in the Chinese invasion of Taiwan. The reverse is also possible: a blockade of Taiwan by China could lead to the closure of the Malacca Strait. Further, a blockade or invasion of Taiwan independent of action against Malacca will also harm India's economy.

In such contingencies, as per the India-US cooperative deterrence — the Indo-Pacific Strategy — New Delhi should align its maritime domain expertise and naval capability in the Indian Ocean while the US focus should be in the Pacific Ocean. As PLAN's blue-water proficiency would take a decade to manifest, India should exploit more imaginatively China's Malacca dilemma to alter the adverse balance along the LAC. Or, will the Kra land bridge become China's hedge?

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Pakistan Eclipses Indian Navy In AIP-Submarine Tech! Set To Widen The Gap With Chinese Hangor-Class Subs

Source: The EurAsian Times, Dt. 17 Jan 2025,

URL: <https://www.eurasiantimes.com/chinese-built-aip-equipped-submarine-pakistan/>

The Indian Navy doesn't operate a single AIP-equipped submarine yet. Meanwhile, the Pakistan Navy's all three French Agosta-90B (PNS Khalid, Saad, and Hamza) are powered by AIPs. As per the current progress, the Hangor submarines are expected to join the Pakistan Navy by the late 2020s and early 2030s. Upon completion, the submarines will join the Pakistan Navy's fleet, taking the strength of its AIP-equipped boats to 11.

Despite being cash-strapped, Pakistan is matching the prowess of the Indian Navy ship by ship. As the only Indian Navy-operated port in the country is coming to life and set to become the largest naval base east of the Suez Canal, Pakistan has also accelerated its efforts to have one of Asia's largest naval fleets by enlarging its surface fleet to 50 warships along with a subsurface fleet of 11 submarines. Of the 50 surface ships the Pakistan Navy aspires to operate, 20 are expected to be "major surface vessels" like frigates and corvettes.

Admiral Naveed Ashraf, Chief of the Naval Staff of the Pakistan Navy, told Chinese state media that the construction of four of these submarines is progressing as per the timeline. Admiral Ashraf said that the Hangor-class submarines will significantly enhance Pakistan's naval capabilities with their improved stealth, maneuverability, and firepower, allowing our Navy to execute a wide range of operations effectively.

"The project is proceeding as per the timeline. We expect that these submarines will join the Pakistan Navy fleet very soon," Ashraf said. In December 2021, the fifth Hangor-class conventional submarine, also the first one to be built in Pakistan, had the steel cutting ceremony. With it, Pakistan will gain invaluable experience in building the world's top-class modern submarine.

The Hangor submarines are S-26 variants based on the Chinese Yuan class submarines but developed for exports. Several design changes were made to the standard-grade S-26. The Hangor class submarine is larger, with a displacement of 2,800 tons compared to the S26's 2,550 tons. But it has a slightly shorter hull (76 m to the S26's 77.7 m). Both have the same payload capacity of six torpedo tubes and a Stirling-based AIP system.

Earlier, the S-26 submarines were powered by the German MTU 12V 396 SE84 diesel engine, but the German government reportedly withheld export licenses for the powerplant. Later, the Pakistan Navy decided to go with the Chinese CHD-620 diesel engine, delaying the program.

These submarines are equipped with advanced sensors and modern armaments, which slightly tilts the tactical power balance in favor of Pakistan. These diesel attack submarines align with the Pakistan Navy's offensive sea denial strategy, which prioritizes using submarines and missile-carrying maritime patrol aircraft in naval warfare.

AIP-powered conventional diesel-electric submarines (SSK) are midway between nuclear-powered boats and non-AIP SSKs. It allows an SSK to remain submerged for 10 to 14 days without needing to surface to charge its batteries, which might get it detected. Other SSKs can stay underwater for roughly 48 hours. The fuel-cell-based AIP is unique, as it generates its hydrogen requirement on board. An AIP enhances a submarine's underwater endurance between battery charges by three to four times, thus reducing its vulnerability to detection.

Indian Submarine Fleets' Slow Progress Towards AIP

With the induction of INS Vaghsheer, the Indian submarine fleet currently has 17 conventional submarines. The Scorpene Class submarine will be retrofitted with an indigenous AIP system when the first submarine in the class, INS Kalvari, undergoes major refit. Retrofitting the operational submarine would require cutting it into halves and inserting a new AIP section, increasing its length and weight. French shipbuilder Naval Group will assist in the complex procedure.

After this, the technology will undergo further testing before being fitted into the remaining Scorpene-class submarines. Experts have pointed out that upgrading a weapons platform with new technology will reduce operational readiness, as the repairs will take at least a year. Apart from the six recently built submarines, the rest are over 30 years old and approaching their decommissioning date. India's aging Shishumar (HDW) class and Sindughosh (Kilo) class submarines are facing spare parts issues because of Russia's Ukraine war.

The Indian Navy is also scouting for a foreign vendor to build AIP-equipped submarines under Project-75I. It has already done field evaluations of the system offered by Germany and Spain. However, it is yet to be finalized who gets the contract. Considering it took 11 years for the first Scorpene class submarine to enter the Indian Navy's fleet after signing the deal, the subs to be built under Project 75I are at least a decade away from entering operation.

Pakistan-China Cooperation

Pushed by China, Pakistan has woken up to the importance of the Western Indian Ocean and, hence, the push for the navy's modernization. Apart from the Hangor class submarine, Admiral Khalid talked about four Type 054A/P frigates built by China and how they have bolstered the country's warfighting capabilities.

"The induction of Type 054 A/P frigates in the Pakistan Navy Fleet has bolstered our warfighting capabilities and enhanced operational flexibility, and these ships will remain the mainstay of the Pakistan Navy Fleet in coming years."

The last two of the frigates were delivered in May 2023. The Type 054A/P is one of the latest multi-role frigates of Chinese origin, equipped with state-of-the-art weapons and sensors that include CM-302 surface-to-surface missiles and LY-80 surface-to-air missiles, as well as an Advanced Anti-Submarine Warfare suite and Combat Management System, enabling ships of this class to operate under multi-threat scenarios. The Pakistan Navy has been the first customer of these frigates.

The Pakistan Navy Chief said that Type 054 A/P ships are equipped to operate under multi-threat scenarios and have been fully integrated into Pakistan Navy operations. The F-22P guided missile frigate, built by China and rechristened as PNS Zulfikar by the Pakistan Navy, conducted Operation Himalayan Spirit in the North Arabian Sea in October 2024. The Pakistan Navy seized 1.3 tons of narcotics during the operation.

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Science & Technology News

ISRO successfully docks two satellites in space, India fourth country to achieve feat after US, Russia, China

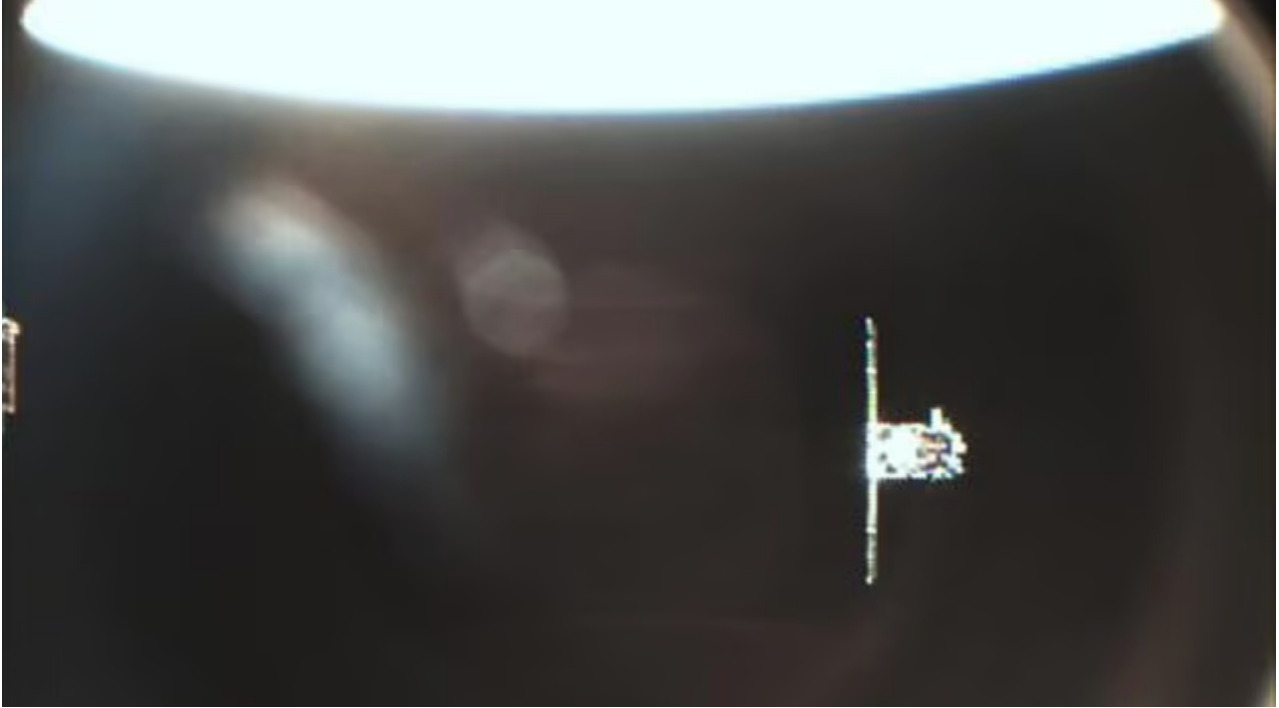
Source: The Indian Express, Dt. 17 Jan 2025,

URL: <https://indianexpress.com/article/india/isro-docks-spadex-two-satellites-9781414/>

The Indian Space Research Organisation (ISRO) on Thursday morning docked two satellites in space, demonstrating a capability that is critical to executing the more ambitious future missions like the building of a permanent space station or landing humans on the Moon.

With the successful docking of the two satellites — Chaser and Target — as part of the Space Docking Experiment (SpaDeX), India has become the fourth country after the US, Russia and China to accomplish the feat.

Calling it a “historic moment”, ISRO said on X: “Post docking, control of two satellites as a single object is successful. Undocking and power transfer checks to follow in coming days.”



The SpaDeX satellites when holding position at 15m.

Docking refers to joining together two or more fast-moving objects in space. Most larger space assets, particularly those that involve two-way journeys, from and to Earth, are made of several parts that are taken one at a time and integrated in space.

Space facilities like the International Space Station, as big as a typical six-bedroom house in the United States, cannot be launched into space at one go. Similarly, spacecraft taking humans to the Moon are composed of multiple components. A part of the spacecraft has to detach and land on the Moon, and then re-integrate on the return journey.

Satellites in space move at very high speeds, thousands of kilometres per hour. For docking to happen, they have to move at exactly the same speed, so that relative to each other, they are almost stationary. Docking, thus, is an extremely complicated process requiring very high precision manoeuvres. The smallest of errors can lead to complete destruction of the satellites.

This extremely delicate manoeuvre had to be put off at least twice in the last few days because the two spacecraft, which had been launched into space on December 30 last year, were not able to achieve ideal conditions for docking.

“Congratulations to our scientists at @isro and the entire space fraternity for the successful demonstration of space docking of satellites,” Prime Minister Narendra Modi said in a post on X.

“SpaDeX has accomplished the unbelievable ... and it is all (using the) indigenous Bharatiya Docking System. This paves the way for smooth conduct of ambitious future missions including the Bharatiya Antriksha Station, Chandrayaan 4 and Gaganyaan,” Union Science Minister Dr Jitendra Singh said.

The SpaDeX mission consisted of two relatively small spacecraft, called Target and Chaser, each weighing about 220 kg, that were launched together into space. They were injected with slightly different force to allow them to attain a separation of about 20 km, while keeping them in the same orbit around Earth, about 470 km from the surface.

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Cabinet okays ISRO’s third launch pad at Sriharikota on day of historic SpaDex docking success

Source: The Indian Express, Dt. 17 Jan 2025,

URL: <https://indianexpress.com/article/india/isro-cabinet-third-launch-pad-sriharikota-9782299/>

The Union Cabinet approved the setting up of a third launch pad at the country’s only spaceport in Sriharikota on Thursday, a day when the Indian Space Research Organisation (Isro) completed its historic docking experiment.

The new launch pad will be required for the space agency to become future ready to use the heavier Next Generation Launch Vehicle (NGLV) that it is currently developing. It will also be essential for India’s plan of setting up the Bharatiya Antariksh Station by 2035 and sending a human to moon by 2040.

The third launch pad will be built with a configuration support of NGLV launches and the current vehicle with the heaviest capacity, LVM3, both of which use semi-cryogenic engines. The third launch pad is expected to be built in four years at a cost of Rs 3,984.86 crore. The cost will cover the setting up of the launch pad and all associated facilities such as vehicle assembly, satellite preparation, and fuelling.

At present, the spaceport in Sriharikota has two launch pads. The first launch pad was set up 30 years ago and is designed to support the launch of smaller vehicles such as PSLV and SSLV.

The second launch pad was set up 20 years ago, primarily for the launch of heavier vehicles such as GSLV and LVM3, but can also be used as a standby for the workhorse PSLV.

The new launch pad will also act as a backup for the second launch pad and can be used for the launch of heavier rockets. It will also help in increasing the frequency of launches from India, allowing the space agency to undertake more commercial as well as scientific missions.

Importantly, the second launch pad is also getting human rated for the Gaganyaan missions.

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ISRO's SpaDeX op success stepping stone for India's ambitious space missions: PM Modi

Source: The Times of India, Dt. 17 Jan 2025,

URL: <https://timesofindia.indiatimes.com/india/isros-spadex-op-success-stepping-stone-for-indias-ambitious-space-missions-pm-modi/articleshow/117312695.cms>

The successful docking of two Isro spacecraft in space on Thursday has paved the way for future space and outer space missions as India desperately needs a permanent station in space for parking its spacecraft before pursuing a long space journey.

The docking mission is a very challenging task as it involves reducing the inter-spacecraft distance between two fast-moving satellites till they unite.

Though Chaser and Target satellites have been moving at a speed of 28,800 kmph or 10 times the speed of a bullet in space, they appear to be stationary due to zero relative velocity. Chaser then approached Target with progressively reduced inter-satellite distances of 5 km, 1.5 km, 500 m, 225 m, 15 m and 3 m, ultimately leading to the docking.

Only three countries — the US, Russia and China — have mastered this technology until now. India has now entered this elite club, becoming the fourth country to achieve this remarkable feat.

Isro scientists started work on the space docking experiment (SpaDeX) in 2016 with preliminary studies and hastened the work on the technology when PM Narendra Modi in 2023 had set deadlines for the indigenous space station by 2035 and manned mission to the Moon by 2040. On Thursday, the scientists were overjoyed when Chaser and Target, both weighing 220kg, docked in space after initial hiccups.

Lauding Isro scientists, the PM said the SpaDeX mission is a “significant stepping stone for India's ambitious space missions in the years to come”.

“Congratulations to our scientists at @isro and the entire space fraternity for the successful demonstration of space docking of satellites,” he said on X. President Droupadi Murmu also congratulated Isro for the mission.

Space minister Jitendra Singh underscored that SpaDeX establishes India as a global leader in space docking technology. He also highlighted a significant collaboration between the Department of Biotechnology and Isro to explore the application of biology in space.

Singh also highlighted the significance of the indigenous ‘Bharatiya Docking System’ used for the docking experiment and emphasised that this milestone paved way for smooth conduct of ambitious future missions, including Bharatiya Antriksha Station, Chandrayaan-4 and Gaganyaan.”

PM Sh@narendramodi's continuous patronage keeps the spirits soaring...,” he posted on X.

Isro veteran Nambi Narayanan said, “It is something we all have been dreaming of for years. In every future mission, we will need to do docking for outer space missions. We have to perfect it. We have to be a master of the technology. It appears that we have become one since we achieved it gradually.” Former Isro scientist and Chandrayaan-1 project director Mylswamy Annadurai said

besides playing a vital role in future missions, the docking technology could play a crucial role in managing space debris.

The primary objective of the SpaDeX mission is to develop and demonstrate the technology needed for rendezvous docking and undocking of two small spacecraft in a low-earth circular orbit. The objectives also include demonstration of the transfer of electric power between the docked spacecraft, which is essential for future applications such as in-space robotics, composite spacecraft control and payload operations after undocking.

The Indian industry is also upbeat about the mission's success. "It truly opens doors to many possibilities, from furtherance of our space programs to establishment of our own space station in future. It also brings endless opportunities much closer, especially when our private space industry is moving forward and growing rapidly," says Lt Gen AK Bhatt, director general, Indian Space Association (ISpA).

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ISRO's SpaDex mission advances lunar exploration, sample return missions and other objectives: ATL

Source: The Hindu, Dt. 16 Jan 2025,

URL: <https://www.thehindu.com/sci-tech/science/isros-spadex-mission-advances-lunar-exploration-sample-return-missions-and-other-objectives-atl/article69104069.ece>

Hyderabad-based Anant Technologies has been partnering with ISRO for several years including in the successful docking mission. ATL's chairman and managing director P. Subba Rao at the assembly of PSLV C60 which carried two satellites as part of the agency's SpaDex mission.

Anant Technologies Limited (ATL), a leading player in India's space industry functioning from Hyderabad, said that the successful precision docking mission by Indian Space Research Organisation (ISRO) reinforces the agency's unwavering commitment to push the boundaries of space exploration and technological innovation.

"The successful docking highlights India's growing capabilities in advanced space operations and showcases the dedication and expertise of ISRO's scientists and engineers. We are proud to have played a crucial role in the SpaDeX mission," said chairman and managing director P. Subba Rao through a press release issued on Thursday (January 16, 2025).

The firm had delivered critical components, including Rendezvous Processing Units (RPU) and DC-DC converters for SDX01 and SDX02 for satellite sub-systems. For satellite integration, it undertook the Assembly, Integration, and Testing (AIT) of the satellites at its world-class private-sector satellite manufacturing facilities.

ATL also took up AIT of various PSLV-C60 subassemblies and had supplied 29 key subsystems, including Data Acquisition Units, Transmitters, Power Modules, NAVIC processor and control modules.

“ISRO’s success inspires all of us in the space ecosystem to continue striving for excellence and innovation. SpaDeX underscores its unwavering dedication to innovation and self-reliance in space technology, positioning India among the elite nations mastering complex orbital operations. This mission advances key objectives such as lunar exploration, sample return missions, and establishing the Bharatiya Antariksh Station (BAS),”he said.

ATL has been collaborating with ISRO for over three decades contributing to success of 102 satellites and 82 launch vehicles by playing a key role in making satellite systems, launch vehicle components, and mission-critical technologies. While it is headquartered in Hyderabad, it operates advanced facilities in Thiruvananthapuram for the fabrication, assembly, and testing of launch vehicle subsystems and satellites, the release added.

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Indian quantum physicist wins prestigious Gates-Cambridge Impact Prize

Source: The Hindu, Dt. 16 Jan 2025,

URL: <https://timesofindia.indiatimes.com/science/indian-quantum-physicist-wins-prestigious-gates-cambridge-impact-prize/articleshow/117304524.cms>

Professor Urbasi Sinha of the Raman Research Institute (RRI) in Bengaluru has been awarded the Gates-Cambridge Impact Prize 2025, recognising her pioneering contributions to quantum computing and technology. Sinha, who heads the Quantum Information and Computing (QuIC) lab at RRI, is among eight winners chosen to mark the 25th anniversary of the Gates-Cambridge scholarship programme.

“Her lab was instrumental in developing India's early capabilities in heralded and entangled photon sources, crucial components in quantum communication and computin,” RRI said.

"I have seen how the scholarship has evolved over the 25 years and am thrilled to celebrate its anniversary. It is very humbling, but also makes me believe in the impact I can have in the next 25 years,” Sinha said.

The award recognizes her vision in advancing quantum computing solutions for global challenges. Sinha currently plays a key role in India's National Quantum Mission and helped establish the Open Quantum Institute at CERN in 2024.

She also holds the Canada Excellence Research Chair in Photonic Quantum Science and Technologies at the University of Calgary. Founded by Nobel laureate Sir CV Raman in 1948, RRI is a leading research institution in India focusing on frontier areas of physics, including quantum technologies, astronomy, and theoretical physics.

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