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Defence News

Defence Strategic: National/International

Aatmanirbharta in Defence: Project Sanction Order signed for Design & Development of 6MW Medium Speed Marine Diesel Engine worth Rs 270 crore

Source: Press Information Bureau, Dt. 02 Apr 2025,

URL: <https://pib.gov.in/PressReleasePage.aspx?PRID=2117773>

Project Sanction Order under Make-I category for the Design and Development of 6MW Medium Speed Marine Diesel Engine has been inked between Indian Navy and Kirloskar Oil Engines Limited. The signing took place in the presence of Secretary (Defence Production) Shri Sanjeev Kumar and Vice Chief of the Naval Staff Vice Admiral Krishna Swaminathan at South Block, New Delhi on April 02, 2025.



The prototype diesel engine with indigenous content of over 50% will be developed at a cost of Rs 270 crore with 70% funding from the Government of India. The order also includes development of detailed design for 3-10MW diesel engine. The developed engines will be used for Main Propulsion and Power Generation on ships of the Indian Navy and the Indian Coast Guard.

Most of the diesel engines of higher capacity were being imported from foreign Original Equipment Manufacturer (OEM) till date. This project will start the process in achieving self-reliance in marine engine development in the country.

It is a significant step in the ongoing efforts of the Government, led by Prime Minister Shri Narendra Modi, to indigenise critical technologies and achieve Aatmanirbharta in defence. It will further strengthen indigenous capabilities, save foreign exchange and reduce dependency on foreign OEMs. It will act as a catalyst for the development of defence industrial ecosystem in the country.

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Launching Of Fifth 25T Bollard Pull Tug Ojas (YARD 339)

Source: Press Information Bureau, Dt. 02 Apr 2025,

URL: <https://pib.gov.in/PressReleasePage.aspx?PRID=2117821>

Launching of fifth 25T Bollard Pull (BP) Tug Ojas was held on 31 Mar 25 at M/s TRSL, Kolkata in presence of Cmde Sanjay Kumar, President SSB, Kolkata as the Chief Guest. These Tugs are a part of the contract for construction of six (06) 25T BP Tugs concluded with M/s Titagarh Rail Systems Limited (TRSL), Kolkata on 12 Nov 21. The Tugs have been indigenously designed and built in accordance with relevant Naval Rules and Regulation of Indian Register of Shipping (IRS).

The Shipyard had successfully delivered four of these Tugs which are utilised by Indian Navy to provide assistance to Naval ships and submarines during berthing, un-berthing and manoeuvring in confined waters. The Tugs will also provide afloat firefighting support to ships alongside or at anchorage and will also have the capability to conduct limited Search and Rescue Operations. These Tugs are proud flag bearers of Make in India and Aatmanirbhar Bharat initiatives of Government of India.



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Indo - U.S Joint Hadr Amphibious Exercise- Tiger Triumph Opening Ceremony Joint Statement

Source: Press Information Bureau, Dt. 02 Apr 2025,

URL: <https://pib.gov.in/PressReleasePage.aspx?PRID=2117936>

The opening ceremony of the 4th edition of the bilateral joint Humanitarian Assistance and Disaster Relief (HADR) amphibious exercise between India and the U.S. - Tiger TRIUMPH 2025 was held onboard the Indian Navy's INS Jalashwa (L41) on 01 Apr 25. The exercise reflects the deepening convergence of U.S.-India strategic maritime interests and the countries' defense partnership. The present edition is aimed at further enhancement of interoperability and combined joint all-domain operations during large-scale HADR operations.

The harbour phase of the exercise is being conducted at Visakhapatnam from 01-07 Apr 25, and involves a planning process for the execution of various training events at sea, as well as further refinement of procedures established in previous iterations of Tiger TRIUMPH. In addition, the harbour phase will include training and Subject Matter Expert Exchange (SMEE) events on a range of professional subjects, such as special operations, emergency medical response procedures, and operations across the air, maritime, cyber and space domains. These exchanges will allow our forces to continue sharing Best Practices and building stronger bonds. Sports engagements and visits to sites of cultural importance will also be coordinated to nurture camaraderie and develop personal relationships.



During the sea phase, which will take place from 08-12 Apr 25, the bilateral forces will work together to train for maritime, amphibious and HADR operations through a Joint Combined Command and Control Center. This phase will conclude with establishment of a joint combined humanitarian relief and medical response camp following an amphibious landing at Kakinada. Participating units from the Indian Navy include Landing Platform Dock INS Jalashwa with integral landing crafts and helicopters, the Delhi-class guided-missile destroyer INS Mumbai (D62), Magar-class amphibious assault ship, Deepak-class fleet tanker INS Shakti (A57) and PBI Long-Range Maritime Reconnaissance Aircraft, MH60R Helicopters and Hawk Aircraft. The Indian Army will be represented by an Infantry Battalion group, including Mechanised Forces, and Special Operations Forces from all the three services will also participate in the exercise. Cyber and Space specialists will also participate in the exercise. The Indian Air Force will demonstrate the capability of C130, Mi-17 V5 and showcase the air portable BHISMA medical equipment. The participating U.S. Task Force would comprise a U.S. Navy Whidbey Island-class dock landing ship USS Comstock (LSD 45), with embarked U.S. Marines from the 11th Marine Expeditionary Unit and 1st Light Armored Reconnaissance battalion, as well as the Arleigh Burke-class guided-missile destroyer USS Ralph Johnson (DDG 114) and a Navy P8A Poseidon aircraft. The U.S. Space Force and Air Force are supporting the exercise with subject matter experts and a C-130J aircraft, respectively. The U.S. Army will be represented by a platoon, medical platoon, Civil-Military Operations Center and Multi-Domain Task Force Combined Information Effects Fusion Cell.

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India's sea borders, zones may expand with baseline update

Source: The Economic Times, Dt. 02 Apr 2025,

URL: <https://economictimes.indiatimes.com/news/defence/indias-sea-borders-zones-may-expand-with-baseline-update/articleshow/119915350.cms>

India's maritime territory and boundaries with the neighbouring nations could increase as the government is looking at adopting new international standards on how the baseline - exact coordinates of the seashore - are calculated.

Sources said the government is considering shifting to the World Geodetic System 1984 (WGS84) datum to define the exact coordinates of its shoreline, moving on from the antiquated Everest Ellipsoid system that is not recognised globally.

Moving to the new system would alter current baselines - straight lines that join the outermost points to the coast - and bring changes to the territorial waters and Exclusive Economic Zones (EEZ) . Limits of the territorial waters, the contiguous zone, the continental shelf, the exclusive economic zone and the maritime boundaries are measured seaward from the baseline.

This is likely to increase India's maritime borders by a few meters to a few hundred meters, which would impact territorial waters that extend 12 nautical miles into the sea and the EEZ that is till 200 nautical miles. For example, in the Sir Mouth area (part of Sir Creek), the Indian coast baseline would shift by about 57 meters in a northwesterly direction.

Sources said that the new system would lead to a new gazette notification of 133 geographic coordinates that are used to calculate the baseline. They added that the Ministry of External Affairs has been discussing revising the datum and aligning it with international standards.

They explained India's baseline could change especially towards the Bangladesh area. This would also lead to change in territorial waters. A similar though lesser impact may also be felt on the Pakistan side of the border. It may be noted that the 2014 Permanent Court of Arbitration tribunal that resolved the maritime boundary dispute between Bangladesh and India used the WGS84 datum.

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Bharat Forge says it exported 100 guns to Europe, other markets last year

Source: The Economic Times, Dt. 02 Apr 2025,

URL: <https://economictimes.indiatimes.com/news/defence/bharat-forge-says-it-exported-100-guns-to-europe-other-markets-last-year/articleshow/119915005.cms>

Bharat Forge Chairman Baba Kalyani on Wednesday said that the company has supplied 100 guns, including 18 Advanced Towed Artillery Guns (ATAGs), to several countries, including those in Europe. "We exported artillery guns to Europe even before supplying them to the Indian Army. As a matter of fact, last year, we supplied 100 guns to a European country, including 18 ATAGs, Kalyani said at a press conference at the company's headquarters here.

It is a great feeling that, after 75 years of independence, India is not only capable of manufacturing its own artillery guns but is also exporting them to European nations, he said, adding that the company sees immense opportunities worldwide.

"Our goal is to become the largest artillery producer in the world, hopefully by 2030. To achieve this, we are setting up a significant manufacturing capacity," he said.

Kalyani further said that the firm manufactures all types of artillery guns, including ultralight artillery guns (ULH). "Currently, we are developing artillery guns capable of firing on the move," he added.

He said many countries around the world are showing interest in our products and the company's exports will continue to grow.

"Last year, exports accounted for nearly 90 per cent of our sales. This year, we have planned for almost 80 per cent of our sales to come from exports. The global market is opening up for us, and we aspire to become a supplier to the US Army, the French Army, the British Army, and other global defense forces in the future," he said.

Today, he said, many countries are facing a significant shortage of defense hardware and manufacturing capacity. "While there is no doubt that they possess advanced technology -- perhaps even superior to ours -- the real challenge lies in production. The sheer volume of equipment consumed in the Ukraine war has created an urgent need for replenishment," he said.

Just to replace what has already been used, he said, these nations will require substantial manufacturing capabilities. "This presents a major opportunity for defense manufacturers like us to step in and bridge the gap."

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US sanctions target Iran's UAV, ballistic missile programs

Source: The Economic Times, Dt. 02 Apr 2025,

URL: <https://economictimes.indiatimes.com/news/defence/us-sanctions-target-irans-uav-ballistic-missile-programs/articleshow/119892939.cms>

The United States on Tuesday (local time) sanctioned six entities and two individuals based in Iran, the UAE, and China that have been involved in the procurement of key components on behalf of entities connected to Iran's UAV and ballistic missile programs.

The US State Department said in a statement that "today's action is a part of President Trump's maximum pressure campaign on the Iranian regime to disrupt efforts by the US-sanctioned Iran-based Qods Aviation Industries to procure equipment for Iran's military-industrial complex and UAV program."

"The United States will use all available means to expose and disrupt Iran's growing UAV and missile development programs and weapons proliferation, which destabilize the Middle East and beyond," the statement added.

Further, the State Department said that they will "continue to act" against the complex schemes Iran uses in third countries to conceal its acquisition and its transfers of sensitive technology.

According to the US State Department, Iran uses this technology and the proceeds from arms sales to bolster its military industrial base to build missiles and UAVs, which are used against fellow countries, as well as exported to Russia, terrorist proxy groups around the Middle East, and to other actors of concern.

The Department of Treasury's action was taken pursuant to Executive Order 13382, which targets proliferators of weapons of mass destruction and their supporters.

On Monday, the US imposed visa restrictions on Chinese officials responsible for limiting the access of US officials to Tibetan areas.

This move is in response to the Chinese Communist Party's (CCP) long-standing refusal to allow US diplomats, journalists, and international observers into Tibet while Chinese officials enjoy unrestricted access to the United States.

"Today, I am taking steps to impose additional visa restrictions on Chinese officials determined to be substantially involved in the formulation or execution of policies related to access for foreigners to Tibetan Areas, pursuant to the Reciprocal Access to Tibet Act of 2018," US Secretary of State Marco Rubio said in a statement."

For far too long, the Chinese Communist Party (CCP) has refused to afford US diplomats, journalists, and other international observers access to the Tibet Autonomous Region (TAR) and

other Tibetan areas of China, while China's diplomats and journalists enjoy broad access in the United States. US diplomats are also unable to provide services to US citizens traveling in Tibet," he added.

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Indian MoD negotiates electric light tactical vehicle deal

Source: Janes, Dt. 02 Apr 2025,

URL: <https://www.janes.com/osint-insights/defence-news/defence/indian-mod-negotiates-electric-light-tactical-vehicle-deal>

The Indian Ministry of Defence (MoD) is negotiating a contract with Bangalore-based electric vehicle (EV) manufacturer Pravaig for an undisclosed number of military electric vehicles known as Veer.

The procurement will support the Indian Army's requirement for light tactical vehicles with electric propulsion systems.

A Pravaig spokesperson told Janes on 25 March that negotiations for the contract is on its "last leg". "We're in talks with two states to set up a dedicated facility that can roll out high volumes every month," the spokesperson added.

According to the spokesperson, Veer EV has undergone modifications to suit the operational needs of the Indian Army and began military trials in June 2024. "It has been approved [by the Indian Army] with just a few minor recommendations," the spokesperson said.

The final closed-body hybrid variant of the EV meant for the Indian Army is under development, and Pravaig expects this to be completed by mid-2025, the spokesperson added. The hybrid variant of the Veer EV features an additional petrol range extender along with the electric battery. The production will start once the contract is signed.

According to a post on Pravaig's official social media, Veer EV won the Prime Minister's Award for Innovation for Defence Excellence (iDEX) on 11 March.

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See India as strategic partner, very open-minded about defence ties, says German Ambassador

Source: The Print, Dt. 02 Apr 2025,

URL: <https://theprint.in/world/see-india-as-strategic-partner-very-open-minded-about-defence-ties-says-german-ambassador/2575598/>

The incoming German government will look at boosting its defence cooperation with India, German Ambassador to India Philipp Ackermann has told ThePrint. His comments come amidst a huge churn in Europe, especially in Germany, which has vowed to increase spending on defence as the Russia-Ukraine war rages on.

“The German government supports and encourages the Indian private sector to reach out. We are very, very open-minded, extremely proactive when it comes to defence cooperation, and that’s not only defence production, but also common exercises like the frigates coming to India. We are looking forward to more exchanges with the armed forces as well,” he said, speaking on the sidelines of the Franco-German Prize for Human Rights and the Rule of Law ceremony for 2024 Tuesday at the French Embassy.

Asked about the possibility of more Memoranda of Understanding (MOUs) being signed in this sector, Ackermann expressed optimism, despite the transitional phase in Germany’s government. He noted that the new government had yet to make clear statements on this issue, but he believed the overall approach towards defence collaboration would be smoother as Germany continues to pursue a proactive stance.

He pointed to the proposed submarine deal with India’s Navy, as part of which the German company Thyssenkrupp Marine Systems (TKMS) has cleared the technical evaluations to build six advanced conventional submarines for the Indian Navy with stealth technology.

The ambassador made it clear that such initiatives, while led by private businesses, are encouraged and backed by the German government. “It’s a whole package. We see India as a strategic partner, more and more. So there’s a chance for more joint military exercises, clearly in this,” he added.

Ackermann stressed that this is part of a broader strategy where India is increasingly seen as a strategic partner. He noted the potential for more joint military exercises in the future, highlighting the deepening defence relationship between the two countries. “We have come a long way in the past two years. We haven’t seen a complete change of policy,” he said.

Growing India-Germany defence relations

In a significant departure from its traditionally cautious stance, this renewed emphasis on defence ties comes as both nations look to strengthen their strategic partnership in the face of evolving geopolitical dynamics.

Germany has historically lacked strong defence ties with India, but with increasing concerns over China’s influence in the Indo-Pacific and Russia’s ongoing war in Ukraine, Germany is exploring new avenues for collaboration, including defence technology, joint military drills, and co-production agreements.

Germany had last year lifted restrictions on the sale of small arms, thereby allowing the Indian military and its state police forces to buy them off the shelf. Germany’s erstwhile Christian Democratic Union government, led by Angela Merkel, prevented the sale of small arms to police forces in states they perceived had a ‘bad human rights record’.

Germany has also eased its export licensing rules.

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Yunus Invites China To Build Airbase In Bangladesh's Lalmonirhat District, Pakistani Firm To Work As Subcontractor: Sources

Source: The EurAsian Times,

Dt. 03 Apr 2025,

URL: <https://www.eurasiantimes.com/oped-yunus-invites-china-to-build-airbase/>

During his recent China trip, Muhammad Yunus, head of the interim government in Bangladesh, sparked controversy by stating that Bangladesh remains the “only guardian” of the ocean [Indian Ocean] as the seven northeastern states of India are “landlocked.”

In a viral video, Yunus suggests that China establish a base in Bangladesh, indirectly challenging India's strategic position.

“The seven states of India, in the eastern part of India – called the seven sister states are completely landlocked. They have no way to reach the ocean. We (Bangladesh) are the only guardians of the ocean for the entire region (northeast India),” Yunus said.

He further remarked, “This opens up a huge possibility for China – this could become an extension of the Chinese economy. Build things, market them, take them back to China, or export to the rest of the world.”

Sanjeev Sanyal, a member of Prime Minister Narendra Modi's Economic Advisory Council, took to the social media platform X to express concern over Yunus's comments.

“Interesting that Yunus is making a public appeal to the Chinese on the basis that 7 states in India are land-locked. China is welcome to invest in Bangladesh, but what exactly is the significance of 7 Indian states being landlocked?” he questioned.

During his discussions with Chinese President Xi Jinping, Yunus secured Chinese assistance in modernizing Bangladesh's Mongla Port, a project worth US\$400 million.

Additionally, China pledged US\$350 million to expand the China Economic and Industrial Zone in Chattogram, with another US\$150 million allocated for technical assistance.

Yunus also sought China's long-term support in river water management, urging Beijing to provide a 50-year assistance package. “China is the master of water management,” Yunus stated, expressing Dhaka's interest in learning from Chinese expertise.

A key point of discussion was the Teesta River, which Bangladesh jointly shares with India. While Sheikh Hasina's government had earlier sought New Delhi's cooperation, Yunus's administration now appears to be shifting its reliance towards Beijing. A Memorandum of Understanding (MoU) has reportedly been requested for Chinese assistance in the Teesta Barrage project.

Furthermore, an agreement was signed for the Exchange of Hydrological Information on the Yarlung Zangbo-Jamuna River, which flows from Tibet to India before entering Bangladesh.

Meanwhile, according to a credible source, China is also willing to build an airbase in Bangladesh's Lalmonirhat district. Discussions on this matter also took place during the trip.

The source further said that if all goes well, the process of building the airbase could begin by October this year, and a Pakistani company would work as the subcontractor for the airbase project.

EurAsian Times cannot verify the assertions of the Guest Author.

In another development, Pakistani Foreign Minister Ishaq Dar will visit Bangladesh from April 24, while Foreign Secretary Amna Baloch is scheduled to visit the country from April 17. The visits are part of efforts to “boost bilateral ties” between Islamabad and Dhaka following the ouster of the Awami League government last year.

Diplomatic relations between Bangladesh and Pakistan worsened during Sheikh Hasina’s 15-year rule. Pakistani foreign minister Hina Rabbani Khar last visited Bangladesh for 12 hours in 2012.

Ahead of these high-level visits, Imran Ahmed Siddiqui, the Pakistan foreign ministry’s additional secretary (Asia and Pacific affairs), visited Bangladesh in March to discuss preparations.

A senior official of Bangladesh’s Foreign Ministry told a Dhaka daily that a Foreign Secretary-level meeting between Bangladesh and Pakistan will take place in Dhaka on 17 April. Bangladesh’s Foreign Secretary, Jashim Uddin, and Pakistan’s Foreign Secretary, Amna Baloch, will lead their respective delegations. Following this, Foreign Affairs Adviser Touhid Hossain will hold a bilateral meeting with Pakistani Foreign Minister Ishaq Dar.

According to Foreign Ministry officials, the meeting will focus on key areas such as trade and investment, air connectivity, defense cooperation, agricultural collaboration, and cultural exchange programs.

On the topic of direct flights between Bangladesh and Pakistan, a Foreign Ministry official noted that direct cargo shipping has already begun between the two nations, visa restrictions have been eased, and trade and commerce are also showing signs of expansion.

Additionally, ‘Fly Jinnah,’ a Pakistani low-cost airline, is awaiting final approval to begin passenger flights to Bangladesh. Bangladesh has already granted Fly Jinnah permission, and Pakistan’s aviation authority is currently working on finalizing its General Sales Agent (GSA) approval.

Although Bangladesh maintains that any progress in bilateral relations must address long-standing unresolved issues, including Pakistan’s unconditional apology for the 1971 war crimes, compensation for war damages, repatriation of over eight hundred thousand stranded Pakistanis, Bangladesh’s rightful share of pre-1971 assets, repayment of foreign aid during the 1970 cyclone in undivided Pakistan, Islamabad is unwilling to accept any of these pre-conditions.

According to the Ministry of Foreign Affairs, although Bangladesh is not interested in advancing ties with Pakistan unless these unresolved historical issues are addressed – particularly an official apology for the 1971 genocide committed by the Pakistani military, there is growing pressure from some of the “extremely influential figures” in the Yunus regime as well as some top-army officials are exerting pressure on the ministry to “move ahead” with deepening relations with Pakistan “without any pre-condition.”

The source further said Islamabad is pressing Dhaka to “give up” the idea of repatriating over eight lakh stranded Pakistanis by “integrating them” through granting Bangladeshi citizenship.

Following the Coup on August 5 last year, Muhammad Yunus and Pakistan’s Prime Minister Shehbaz Sharif spoke on the phone and met twice – once in New York and again in Egypt. Meanwhile, Shehbaz Sharif has invited Yunus to visit Pakistan “at a convenient time.” Sources in Dhaka said this visit may take place sometime in June.

Muhammad Yunus’s remark stating that Bangladesh remains the “only guardian” of the ocean [Indian Ocean] as the seven northeastern states of India are “landlocked” and his growing tendency to deepen relations with China and Pakistan exposes signs of his anti-India and anti-Trump agendas.

Meanwhile, with Yunus’s advancement of agendas of deepening relations with China and Pakistan and his ongoing activities of pushing terrorism inside northeastern states in India, The New York Times, in a recent article, has expressed deep concern at Dhaka’s “brewing shift toward religious conservatism” that has emerged from the political vacuum.

The article stated, “In the political vacuum that has emerged after the overthrow of Bangladesh’s authoritarian leader [Sheikh Hasina], religious fundamentalists in one town declared that young women could no longer play soccer. In another, they forced the police to free a man who had harassed a woman for not covering her hair in public, then draped him in garlands of flowers.”

The New York Times article portrays only a fraction of the total scenarios in Bangladesh. Currently, the country under the direct patronage of Muhammad Yunus has fallen into the grips of Islamists and jihadists comprising Al Qaeda, Islamic State (ISIS), Hizb Ut Tahrir, Hefazat-e-Islam, Hamas, and others.

Since August 5, 2024, the process of radicalization of Bangladesh has been alarmingly advancing, where Bangladesh Armed Forces, which plays an important role in the UN Peace Mission, has been surprisingly playing the role of a silent spectator – if not an abettor.

Unless immediate steps are taken by the international community, especially the Trump administration, to save Bangladesh by slapping sanctions targeting Yunus, members of the advisory council of his illegal regime, and his cronies, pretty soon Bangladesh will become a hotbed of terrorism.

At the same time, because of the growing role of the Pakistani ISI in the country, it will also become an epicenter of transnational drug trafficking.

At the same time, religious minorities, including Hindus, Christians, and Ahmadiyyas, shall continue to face unimaginable torture and intimidation, thus finally forcing them to flee to neighboring India or elsewhere.

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Science & Technology News

Chandrayaan's ChaSTE scores a first after taking moon's temperature

Source: The Hindu, Dt. 03 Apr 2025,

URL: <https://www.thehindu.com/sci-tech/science/chandrayaan-3-chaste-instrument-first-successful-thermal-probe-celestial-body/article69403476.ece>

As the Vikram lander of Chandrayaan-3 touched down on the moon on August 23, 2023, a thermal probe tucked snugly in its panels, slowly worked itself free and stretched its arms. Its motors started to whirl, sending the little probe into the soil. Once the probe reached its intended depth, it clicked in place with a latch.

This is Chandra's Surface Thermophysical Experiment (ChaSTE) — the first instrument to measure temperatures in situ near the moon's south pole. Scientists used this data to report that water ice is more prevalent on the moon than expected. ChaSTE also became the first mission to successfully penetrate the soil of a celestial body to deploy a thermal probe after two previous missions had fallen short.

The ChaSTE probe features 10 temperature sensors spaced about 1 cm apart along its length, near the nose-tip. It uses a rotation-based deployment mechanism. When its motor rotates, ChaSTE's probe needle pushes down until its tip touches the moon's surface. By monitoring the temperature from the sensor at the end of the probe, scientists can identify if it has touched the surface. As the probe continues to pierce, the soil offers more and more resistance. This requires the motor to exert greater force. That is how scientists confirm how far the probe has descended.

ChaSTE tunnelled into the soil to a final depth of 10 cm, then collected measurements throughout the Chandrayaan-3 mission, until September 2, 2023. In November 12, 2014, the European Space Agency's Philae lander, hitchhiking on the Rosetta spacecraft, landed on comet 67P/Churyumov-Gerasimenko. But it bounced — twice. Its Multi-Purpose Sensors for Surface and Subsurface Science (MUPUS) instrument onboard was designed to measure temperature by digging into the terrain. However, scientists couldn't deploy it due to the awkward landing position Philae found itself in on that desolate icy rock, 500 million km away.

The German-Polish team behind MUPUS got another chance when NASA's InSight robotic spacecraft landed on Mars on November 26, 2018. It carried a temperature-sensing instrument called the Heat Flow and Physical Properties Package (HP3). It consisted of a self-hammering nail, nicknamed "The Mole", designed to penetrate 5 m below Mars's surface.

But the friction between the probe and the sand was too low for the mole to hammer itself down more than a few centimetres. After more than a year's action-packed struggle, the 35-cm Mole had finally descended fully into the Martian sand. But scientists couldn't get any temperature data. This was because HP3's temperature sensors were not on the mole. They were attached to a tether that was supposed to trail The Mole as it burrowed through the sand.

“While both the instruments [MUPUS and HP3] used a hammering device, the ChaSTE probe was pushed into the soil by a rotating device,” Durga Prasad K., principal investigator of ChaSTE from the Physical Research Laboratory, Ahmedabad, said. It was the secret sauce that made all the difference. Unnati Ashar is a freelance science journalist.

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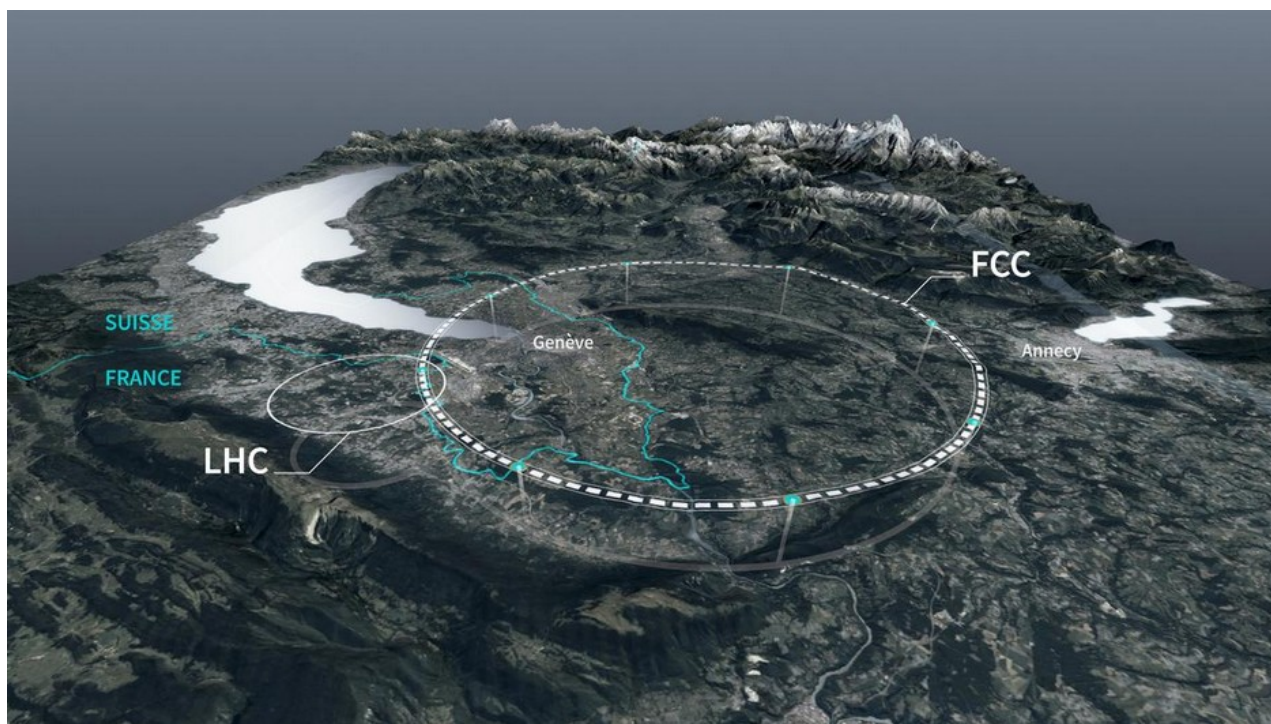
Scientists release plans for an even bigger atom smasher to address the mysteries of physics

Source: The Hindu, Dt. 02 Apr 2025,

URL: <https://www.thehindu.com/sci-tech/science/scientists-release-plans-for-an-even-bigger-atom-smasher-to-address-the-mysteries-of-physics/article69402698.ece>

Top minds at the world’s largest atom smasher have released a blueprint for a much bigger successor that could vastly improve research into the remaining enigmas of physics.

The plans for the Future Circular Collider – a nearly 91 km (56.5-mile) loop along the French-Swiss border and below Lake Geneva – published late Monday (March 31, 2025) put the finishing details on a project roughly a decade in the making at CERN, the European Organization for Nuclear Research.



A handout made available by the European Organization for Nuclear Research (CERN) on April 19, 2023, shows the tunnels of the Future Circular Collider (FCC) and the current Large Hadron Collider (LHC) in Geneva.

The FCC would carry out high-precision experiments in the mid-2040s to study “known physics” in greater detail, then enter a second phase – planned for 2070 – that would conduct high-energy

collisions of protons and heavy ions that would “open the door to the unknown,” said Giorgio Chiarelli, a research director at Italy’s National Institute of Nuclear Physics.

“History of physics tells that when there is more data, the human ingenuity is able to extract more information than originally expected,” Mr. Chiarelli, who was not involved in the plans, said in an e-mail.

For roughly a decade, top minds at CERN have been making plans for a successor to the Large Hadron Collider, a network of magnets that accelerate particles through a 27 km (17-mile) underground tunnel and slam them together at velocities approaching the speed of light.

The blueprint lays out the proposed path, environmental impact, scientific ambitions and project cost. Independent experts will take a look before CERN’s two dozen member countries – all European except for Israel – decide in 2028 whether to go forward, starting in the mid-2040s at a cost of some 14 billion Swiss francs (about \$16 billion).

CERN officials tout the promise of scientific discoveries that could drive innovation in fields like cryogenics, superconducting magnets and vacuum technologies that could benefit humankind.

Outside experts point to the promise of learning more about the Higgs boson, the elusive particle that has been controversially dubbed “the God particle,” which helped explain how matter formed after the Big Bang.

Work at the Large Hadron Collider confirmed in 2013 the existence of the Higgs boson, the central piece in a puzzle known as the standard model that helps explain some fundamental forces in the universe.

CERN Director-General Fabiola Gianotti said the future collider “could become the most extraordinary instrument ever built by humanity to study the constituents and the laws of nature at the most fundamental levels in two ways,” by improving study of the Higgs boson and paving the way to “explore the energy frontier,” and by looking for new physics that explain the structure and evolution of the universe.

One unknown is whether the Trump administration, which has been cutting foreign aid and spending in academia and research, will continue to support CERN a year after the Biden administration pledged U.S. support for the study and collaboration on the FCC’s construction and “physics exploitation” if it’s approved.

“The United States is home to 2,000 users of CERN, making them the single largest national contingent among the 17,000 people working there, including outside experts abroad and staff on site,” Mr. Gianotti said.

While an observer state and not a member, the U.S. doesn’t pay into the CERN regular budget but has contributed to specific projects. Most of the CERN regular budget comes from Europe.

Costas Fountas, the CERN Council president, said he had spoken with some U.S. National Science Foundation and Department of Energy staff who relayed the message that so far “they’re ‘under the radar of the cuts of the Trump administration’. That’s their words.”

CERN scientists, engineers and partners behind the plans considered at least 100 scenarios for the new collider before coming up with the proposed 91 km circumference at an average depth of 200 meters (656 feet). The tunnel would be about 5 meters (16 feet) in diameter, CERN said.

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