

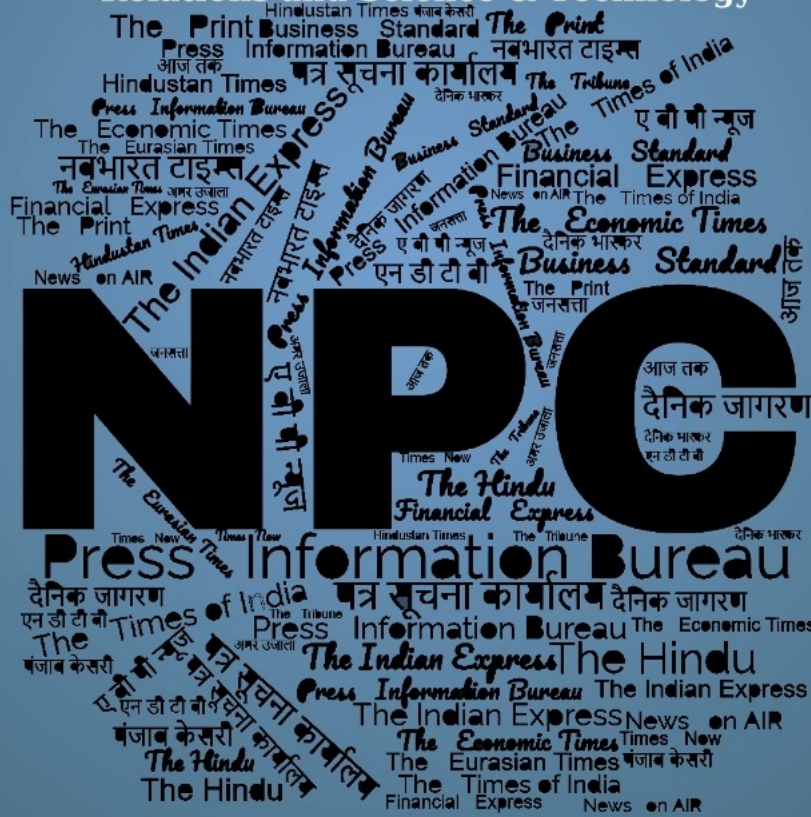
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समाचार पत्रों से चयित अंश Newspapers Clippings

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Defence News

Defence Strategic: National/International



**Press Information Bureau
Government of India**

Ministry of Defence

Sun, 02 Jun 2024

CDS Gen Anil Chauhan visits INS Chilka; Takes overview of the Agniveer Trainings

Chief of Defence Staff (CDS) Gen Anil Chauhan has visited INS Chilka, the premier ab-initio training establishment of Indian Navy. The CDS was briefed on the pivotal role played by INS Chilka in shaping future sea warriors of the Indian Navy. An overview of Agniveer training activities and analysis of the batches trained to date at Chilka was provided.

In his address to the Agniveers, the CDS brought out that the implementation of the 'Agnipath Scheme' has been one of the major reforms towards maintaining a youthful profile in the services and nation building by providing skilled, disciplined and motivated youth.

He exhorted the Agniveers to focus on training to become technologically proficient sea warriors. During the interaction, he took on various queries of the Agniveers.

To gain insight into Agniveer training in the Navy, CDS took a short tour of the training infrastructure. He complimented the training faculty for imparting high standards of training and shaping the next generation of sea warriors.

<https://pib.gov.in/PressReleasePage.aspx?PRID=2022546>



**Press Information Bureau
Government of India**

Ministry of Defence

Sat, 01 Jun 2024

Indian Naval Ship Shivalik Departs Singapore

Will participate in JIMEX 24 and RIMPAC 24

INS Shivalik, mission deployed to the South China Sea and Pacific Ocean, departed Singapore on 30 May 24 for onward passage to Yokosuka, Japan.

During the ship's OTR at Singapore, various activities were undertaken which included Call on with Base Commander, Changi Naval Base, Wreath Laying at Kranji War Memorial, Call on with High Commissioner of India to Singapore, IFC visit, Visit of around 80 school children onboard, Visit of Indian and Australian High Commissioner onboard and cross-deck visits to USS Mobile (LCS) reflecting maritime relations and shared values between the navies which is primarily under the ambit of Security and Growth for All in the Region (SAGAR).

INS Shivalik, upon departure from Singapore, is scheduled to participate in JIMEX 24 and RIMPAC 24. This deployment is aimed at enhancing the degree of interoperability with the JMSDF, US Navy and other partner navies participating in RIMPAC 24.

<https://pib.gov.in/PressReleasePage.aspx?PRID=2022438>

Business Standard

Mon, 3 Jun 2024

US, India in talks for \$3.99 billion MQ-9B drone deal

A team from the United States is currently in India for discussions on the acquisition of MQ-9B drones by the armed forces. The deal, estimated at \$3.99 billion, is yet to be finalised as talks on technology sharing continue.

Representatives from General Atomics have been in the national capital to negotiate the acquisition of 31 drones, with 15 designated for maritime roles, The Economic Times reported.

The US government approved the deal in February, increasing its estimated value from \$3 billion to \$3.99 billion. However, discussions on technology sharing have not yet been finalised.

The Indian armed forces have expressed concerns about recent reports of sophisticated drones being shot down by non-state actors in West Asia. Additionally, India is negotiating for a higher content of the MQ-9B drones to be manufactured locally to bolster efforts in developing indigenous combat drones.

General Atomics enhances India ties

Officials also noted that General Atomics has expressed willingness to manufacture components in India, currently valued at 8-9 per cent of the deal. Efforts are ongoing to increase this to 15-20 per cent.

General Atomics already has a tie up with Bharat Forge to produce UAV components and has committed to establishing a global maintenance hub for the MQ-9B drones in India. Unlike in previous agreements, where foreign companies had to invest 30 per cent of the contract value in the Indian defence and aerospace industry, offset rules have been waived for government-to-government deals.

Once operational, the MQ-9B drones will be stationed at three planned hubs in India. These include INS Rajali in Tamil Nadu, where two drones leased by the Navy are already operational. Additional hubs are expected to be established in North India and the North East.

https://www.business-standard.com/external-affairs-defence-security/news/us-india-in-talks-for-3-99-billion-mq-9b-drone-deal-details-here-124060300229_1.html

THE ECONOMIC TIMES

Sat, 01 Jun 2024

Very strong relations with India; co-producing armored vehicles: US Defence Secretary Lloyd Austin at Shangri La Dialogue

Lauding US-India ties at the Shangri La Dialogue in Singapore on Saturday, the United States Secretary of Defence, Lloyd Austin said that the relationship with India at present is better than it has ever been, adding that the two nations are co-producing armoured vehicles together. Speaking at Asia's premier security summit, Austin further said that it was years ago the notion came into existence to gain approval for India to build jet engines for fighter aircraft in India.

He said it is with India that the US has made progress in co-producing fighter jet engines and armoured vehicles.

"I think there is significant momentum. I think a good example is the relationship that we enjoy with India right now is as good as or better than our relationship has ever been. It's really strong," Austin said at the dialogue as he talked about the US-India bilateral relationship.

"You know, several years ago, we set out with a notion to gain approval for India to build jet engines for fighter aircraft in India. I served on the board of a company that makes jet engines for fighter aircraft. And I know how difficult this was going to be. And we were hopeful, but very sceptical that we could get this across the finish line. We did it. That's happening," he said, adding that the US is "co-producing armoured vehicles with India."

"Usage of new technology and training is for South East Asia," he said. The US Defence Secretary noted that the momentum in ties will keep continuing the way it is at present, and noted that the common values shared by the US and India are the anchors of the progress of the two nations. "So the anchors of our progress are sunk pretty deep throughout the region, and they're based on a common vision and common values. And so I believe that the momentum that we see is going to not only continue, but it's going to....that flywheel is going to pick up speed because this benefits us all," Austin underlined. "I do think that this will be lasting," he added.

Notably, the Shangri-La Dialogue is a "Track One" inter-governmental security conference held annually in Singapore by an independent think tank, the International Institute for Strategic Studies (IISS).

In April this year, the United States Secretary of Defence, Lloyd Austin said that the deal between the two nations to produce jet weapons in collaboration is revolutionary. Underscoring that India and the US are also co-producing an armoured vehicle, Austin said that such joint ventures will provide great capabilities. The landmark jet engine deal was revealed in June of last year, during Prime Minister Narendra Modi's historic official state visit to the US. To produce fighter jet engines for the Indian Air Force, General Electric and Hindustan Aeronautics signed a memorandum of understanding.

Earlier in 2023, US General Electric (US GE) announced that it had inked an agreement with Hindustan Aeronautics Limited (HAL), the government's aerospace and defence manufacturing firm, to jointly manufacture engines in India to power fighter jets for the Indian Air Force.

Moreover, the Biden Administration notified the US Congress in February this year, of its intent to sell nearly 4 billion dollars worth of arms, comprising mainly of the MQ 9 B Drones armed with Hellfire missiles.

The Defence Security Cooperation Agency, which is an agency within the US Department of Defence, said in a press release that the sale helps strengthen the US-Indian strategic relationship. It added that New Delhi continues to be an "important force for political stability, peace, and economic progress in the Indo-Pacific and South Asia region."

<https://economictimes.indiatimes.com/news/defence/very-strong-relations-with-india-co-producing-armored-vehicles-us-defence-secretary-lloyd-austin-at-shangri-la-dialogue/articleshow/110610628.cms>

Business Standard

Sun, 02 Jun 2024

Philippines to pursue 'robust collaboration' with India on defence front

Philippine President Ferdinand Marcos Jr has said that his government will pursue "more robust collaboration" with "friends" such as India as collaborative endeavours to build pillars that support the architecture of regional stability.

Under our Comprehensive Archipelagic Defence Concept, we shall develop our capacity to project our forces into areas where we must by constitutional duty and by legal right protect our interest and preserve our patrimony...And as we build our defence capabilities, so shall we continue to invest in diplomacy, Marcos said at the annual Shangri-La Dialogue on Friday night.

He said the Philippines would "also pursue more robust collaboration with friends such as South Korea, India, amongst others, collaborative endeavours among a few states that share specific interests built into pillars that support the architecture of regional stability. As we work to uphold the rule of law in international affairs, so shall we build our capabilities to protect our interest in our maritime domain and the global commons, the president said, underlining the increasing tension in the South China Sea and the vast Indo-Pacific region.

In April, the Philippines took delivery of India's BrahMos supersonic cruise missiles as part of a \$375 million deal signed by the two countries in 2022. BrahMos Aerospace Private Limited (BAPL), a joint venture company of India's Defence Research and Development Organisation (DRDO), signed a contract with the Philippines in January 2022 to supply Shore-Based Anti-Ship Missile System. Observers said such deals, and many more to be expected, put Manila-New Delhi in growing diplomatic and trade relations amidst China's aggressive activities in the region. Recently, an Indian naval ship paid a goodwill visit to the Philippines and there are multilateral cooperation agreements between India and the Association of Southeast Asian Nations (ASEAN), of which the Philippines is a leading member.

India-ASEAN regularly holds maritime exercises and naval ship visits are part of the total understanding to gain knowledge of each fellow member country's maritime capacities, the observers opined. Addressing the defence-security-focused three-day dialogue that kicked off on Thursday, Marcos underlined commitment to ASEAN centrality, saying it shall remain a core element of his country's foreign policy. Simultaneously, we shall strengthen our alliance with the United States and our strategic partnerships with Australia, Japan, Vietnam, Brunei and all the other ASEAN member states. In this spirit, we pursue trilateral collaboration with Indonesia and Malaysia in the Celebes Sea, he told international diplomats and delegates comprising defence experts at the event.

https://www.business-standard.com/external-affairs-defence-security/news/philippines-to-pursue-robust-collaboration-with-india-on-defence-front-124060100486_1.html

THEWEEK

Sun, 02 Jun 2024

How India operationalised its nuclear deterrent after Pokhran tests

- By Air Marshal Rajesh Kumar (Retd)

On May 18, 1974, India conducted a Peaceful Nuclear Explosion at Pokhran. Almost a quarter century later, it conducted five nuclear tests of advanced weapon designs, once again at the

Pokhran range, catapulting the country into the nuclear club with the ability to weaponise and maintain a nuclear arsenal.

The process of weaponisation and operationalisation was not smooth. Because of the need to maintain secrecy and also because of the long gap between the first and the second tests, the military was kept out of the loop for a long time. Even before the 1998 tests, General K. Sundarji (ret'd), former Army chief, had written that the “really big secret is that India has no coherent nuclear weapon policy and worse still, she does not have an institutionalised system for analysing and throwing up policy options in this regard”.

Despite the obvious disadvantage in keeping the programme outside the military, India had to move fast to operationalise its nuclear deterrent as pressure was building up from various quarters. Post the tests, India faced sanctions and there was pressure to roll back the nuclear programme and sign the CTBT (Comprehensive Nuclear-Test-Ban Treaty). The UN Security Council adopted Resolution 1172 condemning the tests. India stood firm and released its Draft Nuclear Doctrine (DND) in August 1999, showcasing itself as a responsible nuclear power.

The objective of putting the nuclear doctrine in the public domain was four fold. It signalled India's resolve to retain its nuclear weapons programme despite international condemnation of its tests. Second, it projected India as a 'responsible' nuclear state that had voluntarily placed its nuclear cards on the table. Third, as a political declaration of intent directed at potential adversaries, it established India's overall deterrence posture. Finally, it demonstrated to the public that the government is committed to safeguarding national security and is able to provide guidance to officials who would be expected to act in the event of a crisis. The draft doctrine was followed by a press note on the operationalisation of the nuclear doctrine issued on January 4, 2003, the same day India's Strategic Forces Command (SFC) was created.

India's nuclear doctrine rests on three major pillars—credible minimum deterrent, no first use and massive retaliation in case of attack by nuclear weapons. In order to have a credible nuclear deterrent, a force structure that can ensure a second strike capability needed to be developed. The task was not easy, but was taken up in earnest. The current force structure has evolved from the guidance in the draft doctrine which states that “India's nuclear forces will be effective, enduring, diverse, flexible and responsive to the requirements in accordance with the concept of minimum credible deterrence. These forces will be based on a triad of aircraft, mobile land-based missiles and sea-based assets in keeping with the objectives outlined above. Survivability of the forces will be enhanced by a combination of multiple redundant systems, mobility, dispersion and deception.”

As soon as the SFC was formed, a command and control structure was created along with the physical handing over of necessary assets. The first arm to operationalise was the air arm followed quickly by the land-based missile forces that began with the Prithvi II missiles followed by the Agni series. The sea-based deterrent was created with Dhanush missiles on surface platforms that were supplemented with the underwater arm led by INS Arihant. While operationalising its nuclear delivery vehicles and warheads, India has had to contend with an aggressive Pakistani nuclear doctrine. Pakistan claims that its nuclear weapons are solely aimed at India and has vigorously expanded its warhead count vis-à-vis India and has developed tactical nuclear weapons. It claims to have “full spectrum deterrence” and has ruled out 'no-first-use' policy.

There is also the expansion of China's nuclear arsenal, as Beijing is locked in a nuclear arms race with the US. These factors are putting pressure on India's desire to have an arsenal it describes as a minimum credible deterrent. While India has so far resisted the temptation to match Pakistan warhead for warhead, the expanding Chinese arsenal combined with the development and deployment of China's ballistic missile defence may force India to adjust the number of its warheads to retain an assured second strike capability.

The new technical developments in the last couple of years that have led to the canisterised Agni P and Agni V missiles are a step in the right direction. These missiles are more amenable to enhanced mobility and faster response times and are inherently more survivable. The launching of INS Arihant also strengthens the sea-based deterrent. India needs to quickly operationalise a longer-range sea-launched ballistic missile (SLBM) with multiple independently targetable reentry vehicle (MIRV) as well as develop an air-launched ballistic missile (ALBM) to further bolster its nuclear arsenal.

Following the Pokhran tests, India has operationalised a credible deterrent that the nation should be justifiably proud of. As newer threats and technologies abound among our adversaries, the ability to keep our nuclear deterrent relevant is well within the reach of our homegrown solutions.

<https://www.theweek.in/theweek/specials/2024/05/31/how-india-operationalised-it-s-nuclear-deterrent-after-pokhran-tests.html>

ThePrint

Sun, 02 Jun 2024

India cementing its position to become a formidable player in defense landscape

India is rapidly cementing its position as a formidable player in the global defence landscape. With the fourth largest defence budget in the world, India allocated USD 72.6 billion for the fiscal year 2023-24.

According to Invest India data, this investment supports the world's second-largest armed force, comprising 1.45 million active personnel.

In 2022-23, USD 19.7 billion was earmarked for capital expenditure, underscoring India's commitment to modernizing its military infrastructure.

The nation has set an export target of USD 5 billion by 2025, already achieving USD 1.9 billion in exports for 2023, marking a tenfold increase since 2016.

Currently, India exports defence equipment to 85 countries and contributes 3.7 per cent to the total global military expenditure.

The distribution of the defence budget reflects India's strategic priorities, 51 per cent is allocated to the Army, 23 per cent to the Air Force, 19 per cent to the Navy, 6 per cent to the Defence Research and Development Organisation (DRDO), and 1 per cent to the Ordnance Factory Board (OFB).

Over the next 5-7 years, the Indian government plans to invest USD 130 billion in fleet modernization across all armed services. This includes the acquisition of advanced technologies and systems to enhance the capabilities of the Indian military.

To foster innovation and self-reliance, the government has sanctioned USD 30 million to indigenize 164 technologies. This initiative involves 2002 experts and 5399 companies, ensuring that India remains at the cutting edge of defence technology.

The fifth Positive Indigenization list has been released, comprising highly complex systems, sensors, weapons, and ammunition. In total, 509 items across all five lists are earmarked for indigenization, promoting domestic manufacturing and reducing dependency on imports.

Under the Make in India initiative, there is a requirement for 114 multi-role fighter aircraft. This acquisition aims to bolster the Indian Air Force's operational readiness and enhance its aerial combat capabilities.

The Indian Army plans to procure 1,580 towed artillery guns, 814 mounted gun systems, and 100 tracked artillery guns. This acquisition will modernize the Army's artillery capabilities and ensure readiness for diverse combat scenarios.

The Indian Navy has issued a Request for Information (RFI) to procure 12 state-of-the-art Mine Counter measure vessels (MCMVs). These vessels are essential for ensuring maritime safety and protecting naval assets.

The Indian Army has a requirement for 1700 FRCVs to be fulfilled under the Strategic Partnership Model. This initiative will enhance the Army's ground combat capabilities and ensure operational superiority.

India has liberalized its Foreign Direct Investment (FDI) policy, allowing up to 74 per cent through the automatic route and up to 100 per cent through the government route for most aero-components. This policy aims to attract global investors and foster technology transfer.

This policy facilitates long-term strategic partnerships between the Indian private sector and global Original Equipment Manufacturers (OEMs). It seeks to establish domestic manufacturing infrastructure and supply chains through a transparent and competitive process.

DAP 2020 encourages FDI to establish manufacturing hubs for import substitution and exports while protecting domestic industry interests. The Offset policy under DAP 2020 has been revised to give OEMs more flexibility.

India is developing two defence industrial corridors in Tamil Nadu and Uttar Pradesh. These corridors are dedicated to defence manufacturing and aim to attract investment and foster innovation.

The government has reduced entry barriers for new entrants by scrapping the requirement for Industrial Licensing for most defence components. By October 2022, 595 industrial licenses were issued to 366 companies, of which 113 companies have commenced production.

iDEX aims to establish Defence Innovation Hubs across the country, fostering innovation and technology development in the aerospace and defence sectors. It supports startups, MSMEs, individual innovators, and academia with a budget of approximately USD 65 million.

Created to address investment queries, the Defence Investor Cell provides guidance on investment opportunities and regulatory requirements.

A web-based single window interface facilitates the issuance of export authorizations in a transparent and time-bound manner.

The Make in India Defence portal provides comprehensive information on policies, procedures, and promotional measures related to defence production.

Defence Production & Export Promotion Policy (DPEPP) 2020 aims to achieve a turnover of USD 25 billion, including USD 5 billion in aerospace and defence exports by 2025. The policy focuses on areas such as aero engines, MRO industry, and critical technologies.

The Ministry of Defence, led by the Defence Minister, is responsible for national defence and security. The Department of Defence Production (DDP), established in November 1962, develops infrastructure to produce weapons, systems, platforms, and equipment required for defence.

Prominent players in India's defence manufacturing sector include Hindustan Aeronautics Ltd., Bharat Electronics Limited, BEML Ltd., Mishra Dhatu Nigam Ltd. (MIDHANI), Mazagon Dock Shipbuilders Ltd., Goa Shipyard Ltd., Hindustan Shipyard Ltd., Bharat Dynamics Ltd., Garden Reach Shipbuilders and Engineers Ltd., and the Defence Research and Development Organisation (DRDO).

India's defence manufacturing sector is poised for unprecedented growth, driven by substantial budget allocations, robust policy support, and strategic initiatives aimed at fostering self-reliance and innovation.

With a clear roadmap, India is well on its way to becoming a global powerhouse in defence manufacturing.

<https://theprint.in/economy/india-cementing-its-position-to-become-a-formidable-player-in-defence-landscape/2112601/>

ThePrint

Fri, 31 May 2024

Meet the Chinese Army's newest recruit — a gun-toting 'robo-dog' with an automatic rifle on its back

In a joint military exercise with Cambodia, the Chinese Army debuted its newest recruit this week, a gun-toting robot dog, demonstrating the military's technological foray into replacing humans with machines in combat situations.

Two versions of the robot-dog were showcased — one that can fire at the enemy and a lighter dog that can be used in identifying targets. Both have a 4D wide-angle perception system, and just like real-life canines, can move forward and backward, jump, and lie down.

The dog ready for direct combat has an assault rifle attached to its top and weighs 50 kg. The other 15 kg robot is designed to replace human recruits in reconnaissance missions and can identify the enemy by providing real-time transmission of footage to military posts. It can even plan routes, avoid obstacles and approach targets.

The robot is controlled by a remote device used by soldiers as seen in a video released by the state-owned China Central television (CCTV). It operates on batteries and can be operational for up to four hours. The dogs are created by Chinese start-up Unitree Robotics.

The robot dog archetype was first developed by Boston Dynamics, a former Google subsidiary. Unitree, however, has denied supplying its products to the People's Liberation Army, said a Financial Times report — so it is still unknown how the Chinese army obtained these devices.

The robot dog was showcased as part of China's 15-day joint military exercise with Cambodia. The Golden Dragon 2024 exercise — held between 16 and 30 May — is taking place in Cambodia on both land and sea. It focusses on non-traditional security threats aimed at counter-terrorism, humanitarian relief, and anti-piracy operations, The Global Times reported.

Other “intelligent equipment” showcased at these drills included cargo drones, armed reconnaissance drones, which underscored the PLA's combat capabilities.

The China-Cambodia annual military exercise was first started in 2016. This year, the drill has seen the participation of 1,300 Cambodian and 760 Chinese troops.

China considers Cambodia an important ally and has invested in numerous infrastructure projects in the Southeast Asian country. More than 40 percent of Cambodia's 10 billion dollars foreign debt is owed to China. Further, China has also stationed two naval vessels at a new pier at the Ream naval base for over five months now. Its involvement in Cambodian ports can prove to be important for China's actions in the South China Sea.

Cambodia, which recently renamed a road in the country's capital after Chinese president Xi Jinping, is also known for its strategic positioning between China and the US. US defence secretary Lloyd Austin will be visiting Cambodia on 4 June, soon after the end of this military exercise.

<https://theprint.in/world/meet-the-chinese-armys-newest-recruit-a-gun-toting-robo-dog-with-an-automatic-rifle-on-its-back/2109869/>



Sat, 01 Jun 2024

Forging a unified path in space: BRICS space agencies convene in Moscow

In a recent meeting in Moscow, the heads of BRICS space agencies deliberated on a draft joint statement urging the global community to refrain from deploying weapons in space and to ensure the long-term sustainability of space activities. Additionally, they discussed their contributions to

the final declaration for the upcoming BRICS Summit in Kazan, scheduled for October 22-24, 2024.

Establishing the BRICS Space Council

The Russian delegation proposed the establishment of a BRICS Space Council, which garnered significant interest from the participating countries. Roscosmos Director General Yury Borisov suggested the creation of an international system to ensure the safety of space activities through an open information platform for data exchange and monitoring of near-Earth space.

Expanding Satellite Capabilities

In his welcome address, Borisov announced that BRICS countries now operate over 1,200 national satellites, thanks to new members joining the association. Sergey Ryabkov, Russia's BRICS Sherpa and Deputy Minister of Foreign Affairs, also attended the meeting.

The 'Milky Way' Project

Roscosmos unveiled plans for the 'Milky Way' civilian security system, an open platform based on Russia's automated warning system for dangerous situations in near-Earth space. This hub will provide data on space conditions and warnings about potential collisions, addressing the increasing number of satellites and space debris.

Data Exchange and Collaboration

BRICS countries aim to share data on natural space phenomena such as solar activity and asteroid trajectories. This system will be accessible to all, from amateur astronomers to professional space agencies. Borisov invited BRICS space agencies to join this platform and explore expanding its functionality to include remote sensing data and other space services.

Cooperation in Manned Space Exploration

Borisov proposed that BRICS partners collaborate on manned space missions, including building modules within the Russian Orbital Station for BRICS countries and creating a joint BRICS manned space program. This initiative would involve scientific research and training for BRICS cosmonauts.

Enhancing Remote Sensing Capabilities

He highlighted the collaboration among BRICS countries in expanding their remote sensing satellite constellations, noting that in 2023 they exchanged information covering over 27 million square kilometers of Earth's surface. Borisov suggested increasing the BRICS remote sensing constellation with new high-resolution satellites.

<https://www.financialexpress.com/business/defence-forging-a-unified-path-in-space-brics-space-agencies-convene-in-moscow-3509258/>

THE ECONOMIC TIMES

Sun, 02 Jun 2024

China makes historic landing on far side of the moon

China landed an uncrewed spacecraft on the far side of the moon on Sunday, a landmark mission which aims to retrieve rocks and soil from the lunar surface, China's space agency said.

The landing elevates China's space power status in a global rush to the moon, where countries, including the United States, are hoping to exploit lunar minerals to sustain long-term astronaut missions and moon bases. The Chang'e-6 craft successfully landed in the South Pole-Aitken Basin on the back of the moon at 6:23 a.m. Beijing time (2223 GMT), the China National Space Administration (CNSA) said in a statement on its website.

The Chang'e-6 mission is the first human sampling and return mission from the far side of the moon. It involves many engineering innovations, high risks and great difficulty," CNSA said. "The payloads carried by the Chang'e-6 lander will work as planned and carry out scientific exploration missions," CNSA said.

The successful mission is China's second on the far side of the moon, a region no country has landed on before. The back of the moon perpetually faces away from the Earth, making communications challenging.

The Chang'e-6 probe landed nearly a month after it was launched by a Chinese Long March-5 rocket from Wenchang Space Launch Center on the southern island of Hainan.

<https://economictimes.indiatimes.com/news/science/china-makes-historic-landing-on-far-side-of-the-moon/articleshow/110631441.cms>

THE ECONOMIC TIMES

Sun, 02 Jun 2024

Agnikul eyes to launch satellites by 2025: CEO Ravichandran

After the successful test-flight of Agnibaan SOrTeD, Chennai-based space start-up Agnikul Cosmos is hoping to start launching satellites early next year. In an interview with PTI, Agnikul co-founder and Chief Executive Officer Srinath Ravichandran said the 3D-printed semi-cryogenic engines and the rocket will offer quick turnaround for customers who will be able to have customised launch vehicles for their satellites.

"Nine to 12 months I would say. Probably by the end of this financial year or the early part of the next financial year is what we are targeting,"

Ravichandran said when asked about the commercial orbital launch of the Agnibaan rocket. The first test flight of Agnibaan SOrTeD (suborbital technology demonstrator) on May 30, which lasted for 66 seconds, came after four unsuccessful attempts.

"It was a big sense of relief. I think we got a lot of learning in differentiating between building a vehicle and launching a vehicle," said Ravichandran, whose idea to use 3D printing technology to build engines and rockets led to Agnikul Cosmos, a space sector start-up incubated at the IIT Madras Research Park in 2017.

The other co-founders were Moin SPM, an operations specialist and Satyanarayanan Chakravarthy, a professor at IIT Madras and Head of the National Centre for Combustion Research and Development. Women engineers Saraniya Periaswamy, the Vehicle Director for Agnibaan SOrTeD and Umamaheswari. K, the Project Director of the first Mission played a key role in the test flight.

Agnibaan SOrTeD was a vertical ascent flight unlike sounding rockets that are launched using guiding rails placed at a particular angle.

"Seven seconds after lift-off we checked the health of the vehicle and that is when the auto-pilot kicked in. Little bit into the flight, it started moving over the ocean and performed the pitch-over manoeuvre and then continued on its planned trajectory," Ravichandran said, sharing details of Agnibaan SOrTeD's maiden flight.

Once it reached about 60 seconds or so, we entered the wind biasing manoeuvre, where we solve the wind speed and actually fly into the wind so there is not much wind load on the vehicle," he said. After the wind-biasing manoeuvre, the rocket continued to fly till burnout and dropped back into the ocean.

"There was continuous radar tracking of the vehicle. All the devices and instruments enabling that also worked really well," Ravichandran said. The next steps for Agnikul is to master the technology of firing multiple engines together and carry out tests for stage separation. "We will have to figure out two things. Our orbital rocket has multiple engines fired together. So, that will have to be tested out on the ground. And the stage separation. SOrTeD was a single stage vehicle. The orbital vehicle will have two stages. So stage separation has to be tested," Ravichandran said.

"We are already in the middle of building rigs at our facility. We will take sixseven months to get that and from there we will be able to target the orbital mission in the next three months," he said.

According to Ravichandran, the demand for small satellites was high with as many as 30-35 tonnes of payloads put in low earth orbits every year. He said small satellites have a low life-span and the same need to be replenished for continued earth-imaging or communications applications.

The Agnibaan launch vehicle is designed to be compatible with the mobile launchpad called Dhanush and can be configured to accommodate payloads ranging from 30 kg to 300 kg, ensuring versatility across a wide range of mission requirements.

<https://economictimes.indiatimes.com/news/science/agnikul-eyes-to-launch-satellites-by-2025-ceo-ravichandran/articleshow/110637302.cms>

Several firsts to Agnibaan test flight, step closer to launch small satellites: IN-SPACe chief

Space start-up Agnikul Cosmos' test flight of home-built Agnibaan Sub-Orbital Technology Demonstrator (SOOrTeD) rocket achieved several firsts to its credit when it soared into the sky from the spaceport in Sriharikota on Thursday.

In an interaction with PTI, Pawan Goenka, Chairman, Indian National Space Promotion and Authorisation Centre (IN-SPACe), said the successful launch of Agnibaan was also a significant step for the private space sector in building capacity and capability for launching small satellites into orbit.

It was for the first time that a rocket was launched from a private launchpad, Agnikul's Dhanush, located within ISRO's Satish Dhawan Space Centre in Sriharikota, he said. The space regulator chief said it was for the first time in the world that a single-piece, 3D printed semi-cryogenic engine designed and developed by Agnikul was used to propel a launch vehicle.

He said it was also for the first time a semi-cryogenic engine was used to power a launch vehicle, a feat which even ISRO is yet to achieve. He also said the successful launch of Agnibaan brought India a step closer to having a significant capacity and capability to launch small satellites.

"We already have Skyroot that has done their sub-orbital launch in November 2022. We also have the small satellite launch vehicle from ISRO which will soon be owned by a private sector company," Goenka said.

Skyroot's sub-orbital test flight of Vikram-S rocket and Agnibaan SOOrTeD were precursors to the launch vehicles planned by the two start-ups. Goenka said small satellite launch vehicles have a shorter turnaround time enabling putting satellites into orbit at a short notice and at a fraction of the cost entailed in opting for heavier rockets that ferry multiple spacecraft in a single launch.

"You can book the whole vehicle and therefore you control your own destiny as a user. And it can be launched very quickly from the time that you put in the order," he said. "So, that is the advantage that you get from a small launch vehicle and that is the reason it will become preferable for small payloads," he added.

The decadal vision for the space sector in India, unveiled by IN-SPACe, aims to make the country a hub for launch of small satellites with three launch vehicles owned and operated by the private sector from a dedicated space port at Kulasekharipatanam in Tamil Nadu.

At present, the Indian space economy is valued at around USD 8 billion with a two per cent share in the global space economy with a potential to reach USD 44 billion by 2033. "We are aspiring to get to \$44 billion and in fact, a lot of work is happening on that front," Goenka said.

Recently, the government unveiled the Space Policy and liberalised the norms for foreign direct investment in the space sector, while IN-SPACe released the norms to implement the space policy.

<https://economictimes.indiatimes.com/news/science/several-firsts-to-agnibaan-test-flight-step-closer-to-launch-small-satellites-in-space-chief/articleshow/110570994.cms>

ThePrint

Fri, 31 May 2024

India to build new Antarctic research station, Maitri-II

To strengthen cooperation in the preservation and management of Antarctica, India has decided to set up an Antarctic research station named Maitri-II. This decision was taken during the 46th Antarctic Treaty Consultative Meeting (ATCM-46) held in Kochi, Kerala between May 20 and May 30, 2024, a PIB press release stated.

The ATCM-46 was held with an overarching theme of Vasudhaiva Kutumbakam, which means one Earth, one family, one future. The successful hosting of the 46th ATCM and 26th CEP in India underscores the collective resolve to safeguard Antarctica's unique ecosystems and promote global environmental sustainability.

Through dialogue, cooperation, and concerted action, Antarctica remains a beacon of peace, science, and environmental protection for generations to come. India will soon be submitting comprehensive environmental evaluations for establishing Maitri-II. The successful hosting of the 46th ATCM and 26th CEP in India underscores the collective resolve to safeguard Antarctica's unique ecosystems and promote global environmental sustainability.

<https://theprint.in/science/india-to-build-new-antarctic-research-station-maitri-ii/2110744/>

THE ECONOMIC TIMES

Fri, 31 May 2024

Now India can hope to have its own SpaceX and Blue Origin

Elon Musk's SpaceX and Jeff Bezos' Blue Origin dominate the space industry discourse in the world. From reusable rockets to space tourism, these companies are at the forefront of the global space industry. In India, the space industry has largely been confined to the public sector. But now that is all set to change.

Two recent events can make one believe that India too can hope to have its own SpaceX and Blue Origin in future. Two days after it was forced to call off the launch of its Agnibaan's "SubOrbital Technological Demonstrator or SOrTeD" mission, spacetech startup Agnikul Cosmos on Thursday carried out a successful mission. Agnikul's mission achieved three milestones: Demonstrating India's first launch from a private launchpad (Agnikul Launch Pad in Sriharikota named Dhanush);

showcasing the country's first semi-cryogenic engine-powered rocket launch; and utilising the first single-piece 3D-printed engine designed and built domestically to power a launch vehicle.

Last month, India's first military-grade spy satellite manufactured in the private sector, by Tata Advanced Systems Limited (TASL), was successfully deployed into space. A wholly owned subsidiary of Tata Sons, TASL is a significant player for aerospace and defence solutions in India. More and more private companies in India, from small startups to those owned by big conglomerates, are now zooming into the space business. The number of space start-ups has gone up from just 1 in 2014 to 189 in 2023, as per government data.

The investment in Indian space start-ups increased to \$124.7 million in 2023. The current size of the Indian space economy is estimated at \$8.4 billion (around 2-3% of global space economy) and it is expected to reach \$44 billion by 2033. The central role in this growth will be played by the private sector as the government has taken a number of steps to encourage participation of the private companies in the space sector. It is expected that the private sector will independently take up end-to-end solutions in satellite manufacturing, launch vehicle manufacturing, satellite services and manufacturing of ground systems.

Opening up space to the private sector

In May last year, a rocket developed after years of efforts by hundreds of Isro scientists was made available for private companies. The Indian National Space Promotion and Authorisation Centre (IN-SPACe) issued an expression of interest for transfer of technology of the small satellite launch vehicle (SSLV) to Indian private players.

Isro had flown the SSLV twice and the second mission was a success. It is a three-stage solid launch vehicle capable of carrying a payload of up to 500kg in a low-Earth orbit. Ever since opening of the space sector to private firms in 2020, the government has been intent upon sharing technology with them.

The transfer of the SSLV tech to the private sector will enable Indian companies to grab a significant share of the expanding global satellite launch market by offering services at a lower cost. In April last year, the Union Cabinet approved Indian Space Policy 2023 which aims to encourage private investment in the space sector. The policy authorises IN-SPACe, India's space regulator, to act as the single-window agency for clearance of space activities by government entities as well as nongovernment entities.

The government actually opened up the space sector to private entities three years ago, but it had played a limited role. The new policy allows the private sector in every stage of space programmes. "The single takeaway from the new policy is that nothing is off limits to the private sector. They can work on technologies, create infrastructure, develop launch vehicles, launch satellites with payloads for communication, navigation, earth observation (EO)... there is no constraint put on the private sector," IN-SPACe Chairman Pawan Goenka had told ET last year.

Since the space sector holds great strategic and security importance, any space activity must be authorised by IN-SPACe, whether it is government or private. While ensuring India's strategic or security interests are not compromised, it allows private entities across various categories and functions.

The new policy means approvals come easier, stakeholders are aligned with each other, and there are more private industry veterans in government helping the sector. Goenka himself is an auto-industry veteran, a former MD of Mahindra and Mahindra Limited and chairman of SsangYong Motor Company in Korea. Traditionally, big private companies such as Godrej & Boyce and Larsen & Toubro have been working with Isro. However, the new policy institutionalises the Isro-industry relationship.

Allowing FDI in space

The government gave another boost to the private sector by allowing foreign direct investment (FDI) in space in February this year. Allowing FDI in the space sector will help fuel the efforts of the startup ecosystem in launch vehicles, satellite manufacturing, and assembly segment. The move would help Indian companies integrate well into global space sector supply chains and enable innovation.

FDI in the space sector was earlier allowed up to 100 per cent in the area of satellite establishment and operations through government route only. The government changed the policy to allow up to 74 per cent FDI under automatic route in satellite-manufacturing and operation, satellite data products, and ground and user segments. Beyond this limit, government approval will be required in these areas for FDI. Up to 49 per cent FDI is allowed through the automatic route for launch vehicles and associated systems or subsystems, the creation of spaceports for launching and receiving spacecraft. Beyond 49 per cent, FDI in these activities would require government approval, it added.

Further, up to 100 per cent overseas investments are permitted under the automatic route for manufacturing of components and systems/sub-systems for satellites, ground, and user segments. Sreeram Ananthasayanam, Partner, Digital Govt and Space Tech Leader, Deloitte, had said that this amendment is also expected to give a fillip to the burgeoning downstream/user segment of the space sector value chain which leverages India's natural talent in IT/analytics and needs of the growing economy of our country.

"The policy will definitely help and further fuel the efforts of our nascent start-up ecosystem in launch vehicles, satellite manufacturing and assembly, and downstream application development," he said.

<https://economictimes.indiatimes.com/news/science/now-india-can-hope-to-have-its-own-spacex-and-blue-origin/articleshow/110570418.cms>

THE ECONOMIC TIMES

Fri, 31 May 2024

Lunar Timekeeping: How Nasa plans to synchronize moon missions

NASA and the European Space Agency (ESA) are collaborating to develop a standardized time system for the moon as part of the Artemis program, which aims to return humans to the lunar

surface. The initiative addresses the need for a unified timekeeping system to coordinate missions from different countries and private entities.

Importance of a Unified Lunar Time System

With many lunar missions planned, including those by China, India, and private companies, the absence of a standardized time zone on the moon poses logistical challenges. “A common lunar time system is essential for ensuring the successful operation and coordination of these missions,” said Pietro Giordano, ESA’s Galileo Timing and Geodetic Navigation System Manager.

Lunar Day-Night Cycle

The moon's day-night cycle, lasting about 29.5 Earth days, complicates timekeeping. Unlike Earth's 24-hour day, this prolonged cycle necessitates a different approach to maintaining a consistent time reference.

Lack of Natural Timekeeping Reference

Earth’s time zones are based on its rotation, divided into 24 hours. The moon lacks a similar natural reference point, requiring the creation of a new timekeeping system from scratch.

Coordinating International Missions

Achieving consensus on a standardized time zone that meets the needs of various international and private missions is challenging. Different missions may have varying requirements and preferences for timekeeping.

Technical Synchronization

Implementing precise navigation and communication systems to maintain accurate timekeeping across different lunar missions is complex. All equipment and systems must be compatible with the new time zone. Communication Delays The communication delay between Earth and the moon, about 1.28 seconds each way, must be considered to ensure accurate coordination and operation of missions.

Operational Practicalities

Adapting the new time zone for daily operations, including scheduling activities and coordinating with Earth-based teams, requires thorough planning and testing.

Data management

Converting data between Earth time and lunar time could pose challenges, requiring robust software and systems to handle time conversions seamlessly.

Potential Solutions

One proposed solution is to base the lunar time zone on Coordinated Universal Time (UTC), providing a consistent reference for all lunar activities. Another approach involves creating a new time scale specifically tailored to the moon's environment and operational requirements.

Future Steps

NASA and ESA are working on technologies to ensure accurate timekeeping and synchronization for lunar missions. These efforts are crucial for the success of the Artemis program and future lunar

exploration. “The synchronization of time will be vital for various aspects of lunar operations, including navigation, communication, and scientific experiments,” Giordano added.

The Artemis program, led by NASA, aims to land the first woman and the next man on the moon by 2024. Establishing a lunar time zone is a significant step towards fostering international collaboration and ensuring the success of multi-national lunar missions.

<https://economictimes.indiatimes.com/news/science/lunar-timekeeping-how-nasa-plans-to-synchronize-moon-missions/articleshow/110602137.cms>

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