

दिसंबर
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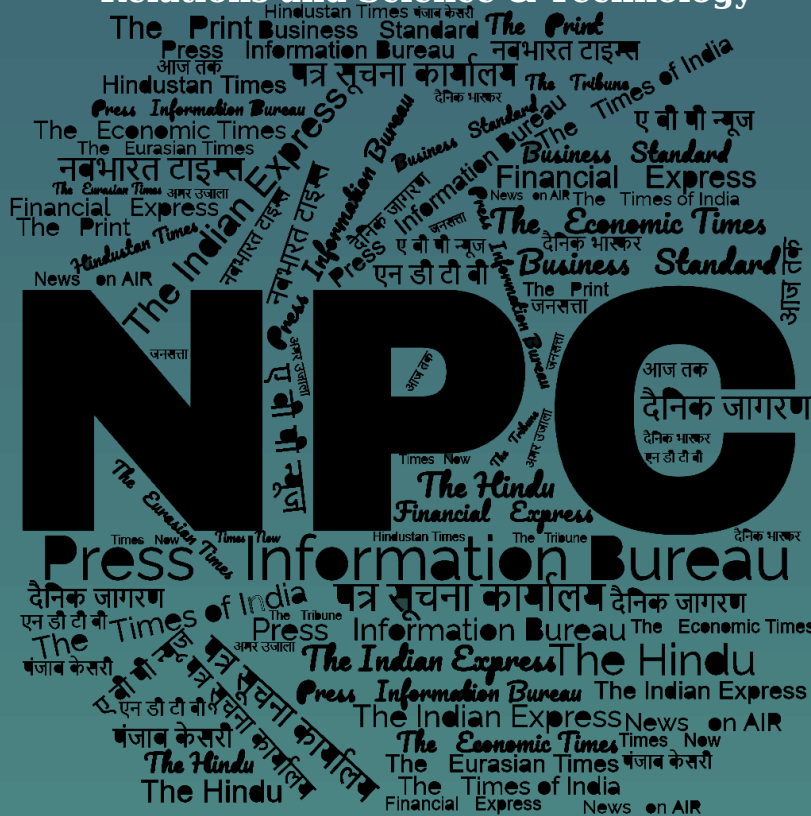
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THE TIMES OF INDIA

Thu, 14 Dec 2023

Arihant's N-Capable Missile 'Ready to Roll'

India tested its nuclear capable K-4 submarine-launched ballistic missile (SLBM), designed to have a strike range of 3,500 km, for the second time in six days on Friday. The missile test, as the one conducted on January 19, was undertaken from an undersea platform in the shape of a submersible pontoon off the coast of Andhra Pradesh.

The solid-fuelled K-4 missile is being developed by DRDO to arm the country's nuclear-powered submarines in the shape of INS Arihant and its under-development sister vessels. INS Arihant, which became fully operational in November 2018 to complete India's nuclear triad, is currently armed with the much shorter K-15 missiles with a 750 km range.

"The K-4 is now virtually ready for its serial production to kick-off. The two tests have demonstrated its capability to emerge straight from underwater and undertake its parabolic trajectory," said a source.

India has the land-based Agni missiles, with the over 5,000-km Agni-V inter-continental ballistic missile now in the process of being inducted, and fighter jets jury-rigged to deliver nuclear weapons. But INS Arihant gives the country's deterrence posture much more credibility because nuclear-powered submarines armed with nuclear-tipped missiles are considered the most secure, survivable and potent platforms for retaliatory strikes.

Once the K-4 missiles are inducted, they will help India narrow the gap with countries like the US, Russia and China, which have over 5,000-km range SLBMs. The K-4 missiles are to be followed by the K-5 and K-6 missiles in the 5,000-6,000 km range class.

The 6,000-tonne INS Arihant, which is propelled by an 83 MW pressurised light-water reactor at its core, in turn, is to be followed by INS Arighat, which was launched in 2017. The next generation of nuclear submarines, currently called S-4 and S-4*, will be much larger in size.

<https://timesofindia.indiatimes.com/india/india-successfully-test-fires-k-4-submarine-launched-missile/articleshow/73589861.cms>



Press Information Bureau
Government of India

Ministry of Defence

Thu, 14 Dec 2023

DGQA Organises West Zone Defence Industry Meet on 'Quality Equipment in Time' in Vadodara

A West Zone Defence Industry Meet on the theme 'Quality Equipment in Time' was organised by the Directorate General of Quality Assurance (DGQA) under the aegis of Department of Defence Production, Ministry of Defence on Dec 14, 2023 in Vadodara. In the meet, a series of new initiatives of the Ministry of Defence to streamline the Defence production and Quality Assurance processes were explained to the various stakeholders, in keeping with the Government of India's vision of 'Ease of Doing Business' and 'Make in India' in the Defence manufacturing sector. Additional Secretary (Defence Production) Sh. T Natarajan, addressed the defence industry meet, which was presided over by Director General, DGQA Lt Gen RS Reen.

Shri T Natarajan in his address said that reforms like 'Green Channel' and 'Self Certification' schemes have offered greater autonomy to Defence manufacturers. "Additionally, 'Remote QA Inspection', Defence Export Promotion Scheme and Defence Testing and Infrastructure Scheme, are aimed to catalyse the indigenous production. These schemes will enable expeditious delivery of critical defence equipment by the Indian Defence manufacturers," he added.

On the occasion, the Green Channel certification was awarded to L&T, Mumbai. Representatives of the Defence Industries, and senior officers of the Naval QA organisation and Indian Army at Vadodara participated in the event. A compendium of Technical papers on QA was also released during the meet.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1986173>



Press Information Bureau
Government of India

Ministry of Defence

Thu, 14 Dec 2023

INS Kadmatt Arrived at Manila, Philippines

As part of the ongoing Long Range Op Deployment, INS Kadmatt arrived at Manila, Philippines on 12 Dec 2023. The visit is aimed at bolstering maritime cooperation between India and Philippines.

A Wide range of engagements between personnel of both the Navies planned during the Port Call. These include professional interactions, Subject Matter Expert Exchange and cross deck visits, aimed at enhancing cooperation and exchanging best practices. Visits by school children and community outreach/ social impact activities are also planned during the visit.

Post departure from Manila, a Maritime Partnership Exercise is scheduled in the South China Sea between INS Kadmatt and BRP Ramon Alcaraz, an off-shore patrol vessel of the Philippine Navy.

INS Kadmatt is an indigenously designed and built Anti-Submarine Warfare Corvette, equipped with state-of-the-art anti submarine weapon suite.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1986090>



Press Information Bureau
Government of India

Ministry of Defence

Thu, 14 Dec 2023

Commissioning of Indian Naval Ship Tarmugli

Indian Navy commissioned INS Tarmugli, a Fast Attack Craft, at an impressive ceremony held at Naval Dockyard Visakhapatnam under the aegis of the Eastern Naval Command on 14 Dec 23. Vice Admiral Sandeep Naithani, Chief of Materiel was the Chief Guest for the Ceremony.

The ship is a Trinkat Class FAC which was gifted to the Maldivian Naval Defence Forces (MNDF) in 2006 by the Govt of India. The ship was returned to the Indian Navy in May this year, which also provided an in-service Waterjet Fast Attack Craft, to MNDF as the new MCGS Huravee. Post extensive restoration work by the Naval Dockyard, Visakhapatnam the FAC has been reincarnated in its present avatar.

<https://www.pib.gov.in/PressReleasePage.aspx?PRID=1985936>

The warship is fitted with MTU engines, the latest communication equipment, a 30 mm gun and an advanced Radar system and will be extensively used for coastal surveillance and protection of our ODAs in the KG Basin area along the East Coast of India.

INS Tarmugli is being commanded by Cdr Satpal Singh Sangwan and would operate under the Naval Officer-in-Charge (Andhra Pradesh). The 46 metre ship, named after a picturesque island in the Andaman group, displaces 320-tonne and can achieve speeds in excess of 30 knots.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1986363>



Thu, 14 Dec 2023

INS Tarmugli: A Historic Induction into the Indian Navy's Fleet of Power and Precision

INS Tarmugli, a Water Jet Fast Attack Craft, was ceremoniously inducted into the Indian Navy under the aegis of the Eastern Naval Command, at Naval Dockyard, Visakhapatnam.

Boasting a remarkable history, this vessel began its service as INS Tillanchang, a Trinkat Class ship, operating actively until 2006. As part of India's diplomatic outreach in the Indian Ocean Region (IOR), the ship was gifted to the Maldives National Defence Force (MNDF) and assumed the name MCGS Huravee.

From April 16, 2006, until its decommissioning in May 2023, MCGS Huravee served under the MNDF flag. Upon its return to the Indian Navy, the ship underwent an extensive six-month refurbishment and upgrade at Naval Dockyard, Visakhapatnam.

Today, with the distinguished title of INS Tarmugli, it was officially recommissioned in the presence of VAdm Sandeep Naithani, Chief of Materiel.

The vessel's incorporation marks a significant advancement in Naval shoreline operations, owing to its Water Jet Fast Attack Craft capabilities, which promise exceptional agility and speed.

The warship is fitted with MTU engines, the latest communication equipment, a 30 mm gun and an advanced Radar system and will be extensively used for coastal surveillance and protection of ODAs (Offshore Development Area) in the KG Basin area along the East Coast of India.

INS Tarmugli is being commanded by Cdr Satpal Singh Sangwan and would operate under the Naval Officer-in-Charge (Andhra Pradesh). The 46-metre ship, named after a picturesque island in the Andaman group, displaces 320-tonne and can achieve speeds in excess of 30 knots.

Tailored for tasks such as intercepting swift surface vessels, executing Anti-Smuggling operations, ensuring Fishery Protection, and conducting Search & Rescue Operations, INS Tarmugli stands as a testament to the Indian Navy's commitment to maritime security and operational excellence. The commissioning ceremony stands as a symbol of national pride and maritime strength.

<https://www.financialexpress.com/business/defence-its-tarmugli-a-historic-induction-into-the-indian-navys-fleet-of-power-and-precision-3338929/>



Fri, 15 Dec 2023

Need to be Network-centric; All IAF Personnel soon to have 5G Phones, Says Chief of Air Staff

Stressing on the need for the Indian Air Force to be completely network-centric, Chief of Air Staff, Air Chief Marshal VR Chaudhari, said on Thursday that soon all the Air Force personnel will carry a 5G-enabled mobile phone. He said that towards interoperability of networks, the IAF's air defence networks are being integrated with the Army and the Navy.

The Air Chief was delivering the General BC Joshi Memorial Lecture on the topic 'Transformation of IAF into Contemporary and Future Ready Aerospace Force.' The lecture is organised by the Department of Defence and Strategic Studies of the Savitribai Phule Pune University. The Air Chief highlighted the vision of IAF as per the latest edition of its doctrine "to be an agile and adaptive Air Force that provides decisive aerospace power in furtherance of our national interests". To be able to do so, the CAS brought out that the IAF needs to 'see first and see the farthest, reach first and reach the fastest and hit first and hit the hardest'.

"A very important area is the critical information infrastructure. We are firmly of the opinion that if we are to be a force to reckon with, we need to be completely network-centric. And to do so, we need to have really robust networks — with embedded fifth generation technologies and adequate

security features and redundancies. We have our terrestrial network called the Air Force Net. We have upgraded it to a software defined network. We have procured 5G handsets for all our personnel of the IAF. And by April, all personnel of the entire Indian Air Force, will hopefully carry a 5G enabled mobile phone on the Air Force Net,” the Air Chief said.

The network centric operations denote the use of information technology and computer networking tools to form networks of various force elements in an operation or conflict scenario.

Speaking about the shortening of the OODA (Observe, Orient, Decide and Act) loop to have an upper edge over the adversary, Air Chief Marshal Chaudhari said, “We have embarked on a journey to get software defined radios, newer data links, space-based communication and surveillance systems. We are focusing on 5th Generation technologies, all through the indigenous route.” The chief said that the Air Force was also looking at teaming the fighters with unmanned combat aerial vehicle (UCAVs) which is called Manned-Unmanned Teaming (MUM-T).

Further speaking about the network operations, he said, “To be able to reach a time and space in years ahead, where we can be truly network centric, we need to focus on three areas — ground network, airborne network and space network. We established a countrywide network back in 2004 which rides on multiple fibre optic cables and has a lot of redundancies. Thus, our ground network is very well established and all our applications are on it, particularly the air defence. We are now progressing to the airborne network through which we will minimise the sensor to shooter time. The space network will be over-encompassing all these networks. So the integration of this is a work in progress. We have taken major steps in this direction. And in a few years, we will be truly network centric in our operations. In our operations networks, 5th Generation technologies would mean we have predictive network analysis in all our security operations centres. Integration and interoperability of networks will be key as the future of any conflict will be multi-domain. It would require interoperability with not just two other services but also other agencies within the country. Our air defence networks are being integrated with the Army and the Navy. Other communication networks will be integrated in due course of time. The day is not far when all of us will be on the same platforms when it comes to communications.”

<https://indianexpress.com/article/cities/pune/need-to-reform-rebuild-war-fighting-machinery-to-make-them-ready-for-future-battlespace-iaf-chief-9068855/>



Fri, 15 Dec 2023

Air Chief Articulates Strategic Vision of Agile and Adaptive Air Force

Air Chief Marshal VR Chaudhari, on Thursday, articulated the vision of the Indian Air Force (IAF) as laid down in the latest edition of IAF’s doctrine (2023) viz; “To be an agile and adaptive Air Force that provides decisive aerospace power in furtherance of our national interests”.

The Air Chief delivered the General BC Joshi memorial lecture at Savitribai Phule University (SPPU) in Pune where he spoke on “Transformation of IAF into a Contemporary and Future Ready Aerospace Force”.

To be able to do so, the CAS brought out that the IAF needs to ‘See first and see the farthest, reach first and reach the fastest, hit first and hit the hardest’. He also brought out IAF’s contribution to

nation-building highlighting the sterling role played by IAF towards humanitarian assistance and disaster relief during natural calamities and evacuation of Indian diaspora from conflict zones.

The focal point of his strategic vision integrates cutting-edge technologies to bolster IAF's operational capabilities. The air chief highlighted the importance of acquiring state-of-the-art equipment and platforms to ensure air superiority in the region including airborne and unmanned platforms, sensors, communication, and electronic warfare systems.

<https://www.hindustantimes.com/cities/pune-news/air-chief-articulates-strategic-vision-of-agile-and-adaptive-air-force-101702577778874.html>



Thu, 14 Dec 2023

Millet March Symposium: Nourishing our Nation's Defenders with Healthy Grains

Marking the 'International Year of Millets – 2023, the Indian Army organized a symposium titled "Millet March: Boosting Our Defenders with Millets" at the Manekshaw Centre in Delhi Cantt on December 14, 2023. Lieutenant General MV Suchindra Kumar, Vice Chief of the Army Staff, led the proceedings, underscoring the potential of "Shree Annas" to revolutionize our food practices, safeguard the environment, and support farming communities. The symposium, facilitated by Headquarters Delhi Area, aimed to raise awareness about the advantages of millets.

Attended by representatives from all three services, including S Vijayarani from the Food Safety and Standards Authority of India (FSSAI), and officials from the Defence Food Research Laboratory (DFRL) and Agricultural & Processed Food Products Export Development Authority, the event shed light on the historical significance of millets in soldiers' diets. Although millets were part of troop rations until the early 1970s, their use declined with the increased availability of rice and wheat.

The reintroduction of millets into the Army's diet is anticipated to boost production and market demand. Notably gluten-free and healthier, millets contribute to improved fitness levels for all ranks and align with the government's initiatives. India now leads global millet production, with over US\$100 million in millet product exports, dispelling the notion that millets are solely 'Poor Man's Food.'

The DFRL has played a crucial role in tailoring millet products for a seamless "Farm to Kitchen" and "Kitchen to Fork" experience.

The symposium highlighted the benefits of including millets in daily diets and showcased the Army's efforts in promoting millets through recipes, cooking competitions, and emphasizing their health advantages. The event concluded with a display of millet-based foods and snacks, specially curated by the Army Services Corps.

<https://www.financialexpress.com/business/defence-millet-march-symposium-nourishing-our-nations-defenders-with-healthy-grains-3339021/>

Thu, 14 Dec 2023

Indian Coast Guard's Fleet to be Twice the Size of Pakistani Navy with 200 Ships and 100 Aircraft

The Indian Coast Guard (ICG) is set to strengthen its maritime capabilities along the Western Seaboard by significantly increasing its assets, as disclosed by Director General Rakesh Pal. Presently equipped with 157 ships and about 78 aircraft, the ICG plans to raise these numbers to 200 ships and 100 aircraft by the end of 2025 or early 2026, pending the finalisation of a deal with Mazagon Dock within the next month.

Expansion Plans For Enhanced Maritime Vigilance

"To overcome all the challenges, the Indian Coast Guard is adding many ships and aircraft to its fleet. With the current ship count of 157 and about 78 aircraft, the number will likely increase to 200 ships and 100 aircraft by the end of 2025 or early 2026, after we sign a deal with the Mazagon Dock within the next one month," DG Pal said.

The Director General further underlined the strategic importance of this augmentation, especially given the context of security challenges in the region.

Strategic Alignment And Regional Comparison

Notably, according to the Global Fire Power Ranking, India's primary naval rival in the western seaboard, Pakistan, possesses a total of 114 assets. The ICG's expansion intent also aligns with the Defence Minister's broader vision to facilitate the transition of the Indian Navy into a blue water navy capable of operating on a larger scale beyond India's coastlines.

Concurrently, the ICG hosted the 15th Capacity Building Senior Officers' Meeting (CBSOM-2023) in Gujarat, on December 12. This meeting, held from December 11 to 15, 2023, aimed at strengthening international and regional cooperation to combat maritime piracy. It, as per the Defence Ministry, served as a platform to assess the current status of maritime piracy and armed robbery in Asia, facilitating the exchange of experiences and the formulation of collaborative strategies among participating nations.

Director General Rakesh Pal, serving as the designated Indian Governor to the Regional Cooperation Agreement on Combating Piracy and Armed Robbery against Ships in Asia (ReCAAP), inaugurated the four-day meeting. The event witnessed the participation of 19 international delegates from 15 countries, alongside representatives from the Indian Navy, major ports, State Maritime Boards, Directorate General of Shipping, and other maritime organisations.

ReCAAP Agreement And ICG'S Contribution

According to MoD, ReCAAP stands as a regional government-to-government agreement aimed at intensifying cooperation to curb piracy. India's ratification of the ReCAAP agreement in 2006 led to its entry into force, now boasting 21 contracting parties. The ICG shoulders the responsibility of sharing piracy-related information with member countries and the ReCAAP Information Sharing Centre in Singapore. Furthermore, as per available data, the ICG has successfully co-hosted Capacity Building workshops with ReCAAP ISC in India in 2011, 2017, and 2019.

These concerted efforts underscore India's commitment to fortifying maritime security in the region while encouraging international collaboration to address the complex challenges posed by piracy and armed robbery at sea. As the ICG continues its trajectory towards strengthening its fleet, these

strategic endeavours highlight India's stance in ensuring maritime safety and security both on its eastern as well as western flanks.

<https://www.indiandefensenews.in/2023/12/indian-coast-guards-fleet-to-be-twice.html>

THE TIMES OF INDIA

Fri, 15 Dec 2023

Maldives Cancels Hydrology Agreement with Indian Navy Inked During PM Modi's 2019 Visit

After having asked India to withdraw its military personnel from the Maldives, President Mohamed Muizzu has decided to pull out from a 2019 agreement for cooperation in the field of hydrology between the Indian Navy and Maldives National Defence Force. Male Thursday notified India about its decision to annul the agreement which was signed during PM Narendra Modi's visit to the country in June 2019.

The agreement allowed the Indian Navy to carry out extensive hydrographic surveys in the Maldives to help improve navigation safety, economic development, security and defence cooperation, environmental protection, coastal zone management and scientific research. The navy had so far carried out 3 such surveys under the agreement that Muizzu's predecessor Ibrahim Solih signed with India. "In the future, hydrography works will be carried out under 100 percent Maldivian management, and with only Maldivians privy to the information," said a senior official of the president's office, adding that the government will review "secret agreements" signed by the previous administration that endangered Maldives' independence and sovereignty.

The new government under Muizzu, which took over last month and is seen widely as pro-China, had said earlier it will review some of the agreements that the previous government had signed with India, while also calling for efforts to expedite work on Indian economic projects like the flagship \$ 500 million Greater Male Connectivity Project.

Muizzu has also remained intent on driving out Indian military personnel who are involved in operating and maintaining the 2 naval choppers and a Dornier aircraft India had gifted to Male, even though Indian government sources claim that in the meeting he had with Modi in Dubai on the margins of COP28, the president acknowledged the utility of Indian "platforms" involved in humanitarian assistance and disaster relief activities.

According to Indian authorities, discussions are still on to keep these Indian assets operational and that the core group that the 2 leaders agreed to form to enhance bilateral ties will work to find a "workable solution". After he returned to Male though, Muizzu said India had agreed to pull out its soldiers.

The Maldives had recently also not participated in a meeting of the NSA-level Colombo Security Conclave in which it is a member-state along with India, Sri Lanka and Mauritius. Sources in Male, however, said it was only an "administrative issue" and that Maldives remained a part of the Conclave. The decision to cancel the hydrology agreement with India is likely to further fuel fears of a China-tilt in the Maldives' foreign policy under Muizzu even though officials in Male strongly deny any such bias.

<https://timesofindia.indiatimes.com/india/maldives-cancels-hydrology-agreement-with-indian-navy/articleshow/106001489.cms>

Thu, 14 Dec 2023

Iranian Defence Minister Warns against Proposed US Backed Red Sea Force

Iran's Defence Minister Mohammad Reza Ashtiani warned that a proposed US backed multinational task force to protect shipping in the Red Sea would face "extraordinary problems", official Iranian media reported on Thursday.

Ashtiani's comments came after the United States said last week it was in talks with other countries to set up a task force following a spate of attacks by the Iran-backed Houthis in Yemen on ships in the Red Sea.

"If they make such an irrational move, they will be faced with extraordinary problems," Ashtiani told the official Iranian Student News Agency (ISNA) in comments it published on Thursday.

"Nobody can make a move in a region where we have predominance," he said, referring to the Red Sea.

Ashtiani did not specify what measures Iran was prepared to take in response to the setting up of a US backed Red Sea task force.

US National Security Advisor Jake Sullivan told reporters last week that Washington was in talks with "other countries" over forming a "maritime task force to ensure safe passage of ships in the Red Sea," but did not give further details.

Yemen's Houthis, which are aligned with Iran, have waded into the Israel-Hamas conflict by attacking vessels in vital shipping lanes and firing drones and missiles at Israel more than 1,000 miles from their seat of power in the Yemeni capital of Sanaa.

American and French navies have strengthened their presence in the Red Sea to protect vessels from the risk of seizure or attack by the Houthis.

<https://www.deccanherald.com/world/iranian-defence-minister-warns-against-proposed-us-backed-red-sea-force-2810850>



Thu, 14 Dec 2023

Britain, Japan and Italy Sign Advanced Fighter Jet Programme Treaty

Britain, Japan and Italy have signed an international treaty to establish a programme aimed at developing an advanced fighter jet, the defence ministers of the three allies announced on Thursday.

The agreement, which Reuters reported this month, comes a year after the three countries established their first major defence industry collaboration by merging the separate next-generation fighter efforts of London and Tokyo.

The parliaments of each country must ratify the agreement, which aims to see the combat aircraft in flight by 2035. The joint development phase of the programme will begin in 2025.

Both the joint government headquarters of the Global Combat Air Programme (GCAP) and its industry counterpart will be based in Britain. The government organisation's first chief executive will come from Japan, while the first leader of the business organisation will be from Italy, according to the announcement.

"No nation can do this alone to this level of expertise combined with our skills and our equipment, with our design and ability on production lines," British defence minister Grant Shapps said.

Flanked by Shapps and Italian Defence Minister Guido Crosetto in Tokyo, Japan's defence minister, Minoru Kihara said: "As we face the most complex security environment since World War Two... securing aerial superiority continues to be a crucial challenge that we must achieve."

Kihara did not say who would head the company, but said that he would ensure "the best person for the job" is selected.

Italy, Britain and Japan will all have equal 33% stakes in the project, the Italian Defence Ministry said in a statement.

"Months of negotiations have allowed for a balanced compromise," it said.

In the past months, Italy had dismissed as "speculative" reports that Japan and Britain would dominate the alliance.

The supersonic stealth jet will feature a radar that can provide 10,000 times more data than current systems, the British government has said.

Britain's BAE Systems (BAES.L), Italy's Leonardo (LDOF.MI), European missile maker MBDA and engine maker Rolls-Royce (RR.L) are involved in the project.

Reuters has reported that Japan's Mitsubishi Heavy Industries (7011.T), Japanese avionics manufacturer Mitsubishi Electric Corp (6503.T), and engine makers IHI Corp (7013.T) and Avio Aero are also involved.

<https://www.reuters.com/world/britain-japan-italy-sign-advanced-fighter-jet-programme-treaty-2023-12-14/>



Thu, 14 Dec 2023

ADF Focuses on 'Drone Racing' to Accelerate Technology Developments

The Australian Defence Force (ADF) is increasingly engaging in "drone racing" events to enhance their understanding of new technologies related to unmanned aerial vehicles (UAVs) and support associated research and development (R&D).

In an interview with Janes in late November, Royal Australian Air Force's (RAAF's) Wing Commander Keirin Joyce said a major outcome of increasing involvement in drone racing for the ADF has been "informal modernisation".

All three services under the ADF have established drone racing teams. Their involvement in drone racing events supports informal modernisation in three ways.

First, drone racing events provide “good market intelligence” to the ADF about available component technologies and how these can influence the design of UAVs, Wg Cdr Joyce said.

“We recognised six years ago that in many regards in the UAV technology sector, the commercial technology providers were moving at a much faster pace than military, especially at the lower cost end,” he added.

Wg Cdr Joyce said the drone racing events provide an opportunity for the ADF to assess cheap components, motors, electronic speed controllers, datalinks, and radios, among other technologies.

Second, drone racing events give the ADF access to a “community of people that have a grounded understanding of flight control code”, Wg Cdr Joyce added.

<https://www.janes.com/defence-news/news-detail/adf-focuses-on-drone-racing-to-accelerate-technology-developments>

Science & Technology News

 **The Indian EXPRESS**

Fri, 15 Dec 2023

ISRO to Launch Chandrayaan-4 to Bring Back Samples from Moon in 4 Yrs: Somanath

The Indian Space Research Organisation (ISRO) has planned to launch Chandrayaan-4 to bring back samples from the Moon in four years, said its chairperson S Somanath while elaborating on the space agency’s Vision 2047.

The first module of the Bharatiya Antariksh Station — India’s planned space station — that will be capable of conducting experiments with the help of robots will be launched by 2028.

Prime Minister Narendra Modi had previously called on the space agency to set up a space station by 2035 and send a man to the Moon by 2040.

While these missions may seem far off, an experiment crucial for sustained human spaceflight will be “launched in the next three to four months,” said Somanath during a lecture at Rashtrapati Bhavan Thursday.

The SPADEX experiment will demonstrate autonomous docking capability. Docking is a process where two spacecrafts are aligned in a precise orbit and joined together.

Explaining the mission, Somanath said: “Two satellites that are connected to each other will be launched, they will separate out, travel for a few kilometres, and then come back and connect.”

While India successfully developed the lander and rover on-board Chandrayaan-2 and Chandrayaan-3 missions after Russia backed out, Somanath said that for a sample-return mission “we need much more technology than what we have developed for the landing.”

He said work was on to develop technologies such as robotic arm to collect samples, mechanisms for docking in the Moon orbit and Earth orbit, transfer of samples, re-entry into the atmosphere without burning up — this will also be demonstrated by the Gaganyaan mission that will send astronauts to low Earth orbit and bring them back to Earth.

And while the ISRO recently demonstrated a trajectory to bring back a spacecraft from the Moon to Earth orbit using left-over fuel in the propulsion module, for a sample return mission the ascender module will have to collect the samples, come back to an orbit around the moon, and dock with another craft and transfer the sample, before it starts its journey back to Earth.

In Earth orbit, the spacecraft will have to dock with another module that will bring it to Earth. Just as with the Gaganyaan mission, the spacecraft with Moon samples will splashdown with the help of parachutes in the sea.

Somanath said that for sustained presence of Indians in space, ISRO is also working on developing an inflatable habitat module where the astronauts will be able to walk around and conduct experiments.

ISRO is also working on technologies such as satellites that will be able to re-fuel other satellites in space and ISRO Servicer Module that will be able to use robotic arms for maintenance of the modules and even replace modules when needed.

While the first module in 2028 can be launched with the existing rockets, he said, for building the entire space station a heavier launch vehicle will be needed. Somanath said ISRO was working on designing the Next Generation Launch Vehicle (NGVL) that will have a capacity to carry 16 to 25 T to low Earth orbit.

More importantly, ISRO is in discussion with NASA and the European Space Agency to build a common interface between the Indian space station and that of these countries. This interface will make joint work possible, said Somanath, indicating the possibility of collaborating with these countries for the space station. The current International Space Station has been built in collaboration with several countries and is likely to be de-orbited in 2030. The common interface will also allow the Indian module to go and dock with the ISS, he said.

<https://indianexpress.com/article/india/isro-to-launch-chandrayaan-4-to-bring-back-samples-from-moon-in-4-yrs-somanath-9068930/>

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