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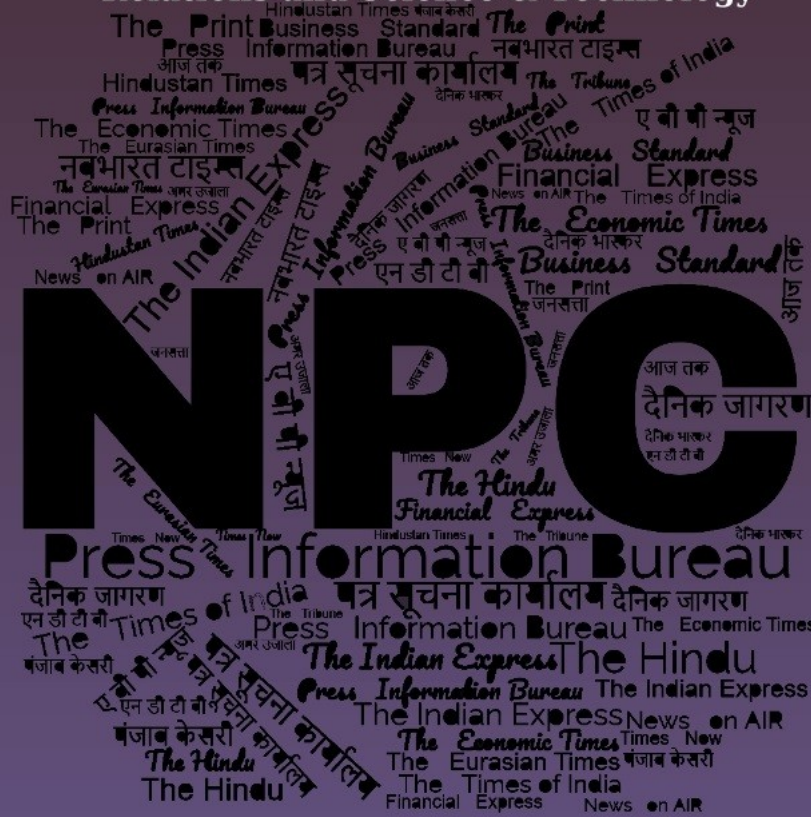
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Sat, 27 July 2024

अमेरिकी **FIM-92 Stingers** लगेगा बच्चा, **DRDO** बना रहा कंधे से दागने वाली सबसे खतरनाक मिसाइल, घबराएगा चीन-PAK

DRDO कंधे से दागी जाने वाली एयर डिफेंस (AD) मिसाइल विकसित कर रहा है, जो कई मायनों में अमेरिका के FIM-92 Stinger से भी ज्यादा खतरनाक होगी। संसद में एक प्रश्न के लिखित जवाब में रक्षा राज्य मंत्री संजय सेठ ने कहा, कि DRDO की कंधे से दागी जाने वाली एडी मिसाइल इसकी VSHORADS (Very Short Range Air Defence Missile System) मिसाइल का छोटा वेरिएंट होगी।

उन्होंने कहा, "VSHORADS की टेक्नोलॉजी और कुछ सब-सिस्टम का इस्तेमाल कंधे से दागी जाने वाली स्वदेशी एयर डिफेंस मिसाइल के विकास के लिए किया जा सकता है।"

आपको बता दें, कि VSHORADS चौथी पीढ़ी की मानव-पोर्टेबल मिसाइल प्रणाली है, जिसके लिए टाइपड लांचर की जरूरत होती है। स्टिंगर तीसरी पीढ़ी की मानव-पोर्टेबल कंधे से दागी जाने वाली मिसाइल है। (स्टिंगर ब्लॉक 2 मिसाइल कथित तौर पर चौथी पीढ़ी की है।)

मिसाइल जेनरेशन

तीसरी पीढ़ी के MANPADS मिसाइल, अपने टारगेट की इमेज बनाने के लिए रोसेट स्कैनिंग IR डिटेक्टरों का इस्तेमाल करते हैं, जबकि चौथी पीढ़ी के MANPADS टारगेट की IR छवि बनाने के लिए इमेजिंग इन्फ्रारेड सेंसर का इस्तेमाल करते हैं, जिससे इनकी सटीकता और भी ज्यादा बढ़ जाती है।

DRDO VSHORADS मिसाइल का एक छोटा और हल्का वेरिएंट विकसित करने का इरादा रखता है, जिसे कंधे से लॉन्च किया जा सकता है। और यही वजह है, कि VSHORADS मिसाइल में अमेरिकी स्टिंगर मिसाइल की तुलना में बेहतर सीकर, लंबी दूरी और बेहतर गतिशीलता है।

इसलिए, VSHORADS का कंधे से फायर किया जाने वाला वेरिएंट, स्टिंगर से बेहतर प्रदर्शन करेगा क्योंकि इसमें बेसलाइन वेरिएंट जैसी ही टेक्नोलॉजी शामिल की गई हैं।

बेहतर सीकर

DRDO के VSHORADS की इफेक्टिव रेंज 6 किलोमीटर है और इसमें इमेजिंग इन्फ्रारेड (IIR) होमिंग सिस्टम है। IIR सीकर, अमेरिकी स्टिंगर मिसाइल पर लगे तीसरी पीढ़ी के IR सीकर की तुलना में ज्यादा एडवांस और सक्षम है। एक IR सीकर किसी ऊष्मा स्रोत का पता लगाने और उसे ट्रैक करने के अलावा उसकी तस्वीर भी बना सकता है। यह IR जैमिंग और स्पूफिंग के प्रति काफी लचीला होता है, जो लक्ष्य की तरफ से, मान लीजिए किसी फाइटर जेट या हेलीकॉप्टर के डिफेंसिव सूट या खुद लक्ष्य की तरफ से रिलीज किए गये IR फ्लैयर्स के बीच आसानी से भेदभाव कर सकता है और उस हिसाब से टारगेट को मार सकता है। ये सिस्टम दुश्मन के किसी प्रॉक्सी टारगेट को पहचान लेता है और दुश्मन के झांसे में नहीं फंसता है। सबसे महत्वपूर्ण बात यह है कि IIR अपने लक्ष्य की पहचान सकता है और

बेहतर मारक क्षमता हासिल करने के लिए लक्ष्य-विशिष्ट खोज एल्गोरिदम का उपयोग कर सकता है। गतिशीलता

अमेरिकी स्टिंगर मिसाइल को एक ऐसी मिसाइल होने की अच्छी-खासी प्रतिष्ठा प्राप्त है, जिससे बच पाना मुश्किल है। यह एरोडायनामिक कंट्रोल सरफेस और थ्रस्ट वेक्टरिंग के संयोजन का उपयोग करके उड़ान में मजबूती से पैंतरेबाजी करता है, जिससे लक्ष्य का बच निकलना बहुत मुश्किल हो जाता है। लेकिन भारतीय VSHORADS स्टिंगर की तुलना में कहीं ज्यादा खतरनाक है। यह भी एरोडायनामिक सरफेस और थ्रस्ट वेक्टरिंग का इस्तेमाल करता है, जिसे एक छोटे आकार के रिपक्शन कंट्रोल सिस्टम (RCS) का उपयोग करके लागू किया जाता है। अपने दोहरे पल्स सॉलिड प्रोपेलेंट रॉकेट मोटर के साथ, VSHORADS, अमेरिकी स्टिंगर मिसाइल से काफी बेहतर प्रदर्शन करने की क्षमता रखता है। यह थ्रस्ट वैरिएशन के जरिए अपनी पैंतरेबाजी क्षमता को लगातार बदलता रहता है और जब इसकी सबसे ज्यादा जरूरत होती है, उस वक्त ये थ्रस्ट को बढ़ाता है। बर्निंग एरिया, नोजल, रॉकेट मोटर चैंबर, प्रोपेलेंट टाइप और कई प्रोपेलेंट ब्लॉक को टेलर करके थ्रस्ट वैरिएशन हासिल किया जाता है। जाहिर है, लॉन्च के बाद, प्रोपेलेंट को ज्यादा स्पीड से बाहर निकालने की क्षमता देकर एक हाई प्रोपेलेंट हासिल किया जा सकता है और ये खासियत भारतीय VSHORADS मिसाइल में है। लेकिन, अमेरिकी स्टिंगर मिसाइल में डबल पल्स रॉकेट मोटर की सुविधा नहीं है। यह प्रपल्शन के लिए सिंगल-स्टेज सॉलिड रॉकेट मोटर का इस्तेमाल करता है, जो उड़ान के दौरान मिसाइल को उसकी मैक्सिमम स्पीड तक बढ़ाता है। गतिशीलता के लिए, स्टिंगर खास तौर से एयरडायनेमिक कंट्रोल सरफेस और थ्रस्ट वेक्टरिंग पर निर्भर करता है।

डायमेंशनल चैलेंज

VSHORADS मिसाइल 2 मीटर लंबी, 0.09 मीटर व्यास वाली और 21 किलोग्राम वजन की है, जबकि अमेरिकी स्टिंगर 1.52 मीटर लंबी, 0.07 मीटर व्यास और 10.1 किलोग्राम वजन की है। यानि, भारतीय VSHORADS मिसाइल, स्टिंगर की तुलना में काफी बड़ी और काफी ज्यादा भारी है, यही वजह है कि इसे लॉन्च करने के लिए टाइपॉड की जरूरत होगी। मिसाइल के आकार और वजन को कम करने का एक प्रभावी तरीका ये है, कि इसमें छोटे रॉकेट मोटर्स का इस्तेमाल करना होगा, लेकिन ऐसा करने से इसकी रेंज कम हो जाएगी। फिलहाल इसकी रेंज 6 किलोमीटर है, जो खासतौर पर पहाड़ी क्षेत्र में युद्ध के लिए डिजाइन किया गया है। और अगर इसे कंधे के दागे जानी वाली मिसाइल बनाया जाता है, तो फिर इसकी रेंज स्टिंगर मिसाइल जितनी ही हो जाएगी। DRDO सिर्फ छोटे रॉकेट मोटर्स का उपयोग करके स्टिंगर जैसे डायमेंशन और वजन वाले मिसाइल का निर्माण करे में सक्षम नहीं है। इसे मिसाइल एयरफ्रेम के लिए हल्के वजन वाली सामग्री और इलेक्ट्रॉनिक्स का उपयोग करने की भी जरूरत होगी। लेकिन, कंधे से दागे जाने वाले MANPAD के साथ भी DRDO जो कारनामा कर दिया है, वो रोमांचक है, क्योंकि ये काफी मुश्किल काम है और इसमें काफी टेक्नोलॉजिकल मुश्किलें आती हैं।

<https://hindi.oneindia.com/news/international/indias-drdo-develops-advanced-shoulder-fired-missile-surpassing-american-fim-92-stingers-1063497.html>



Fri, 26 July 2024

THAAD's Analog, S-400's Partner, DRDO's AD-1 Missile Interceptor Puts India In The Elite League

DRDO's development of the AD-1 interceptor will facilitate the fielding of a credible BMD (Ballistic Missile Defence) system and the deployment of a very capable IADS (Integrated Air Defence System).

The AD-1 missile is a component of the DRDO's BMD Phase-2 system. DRDO has already completed the development of BMD Phase-1, which provides defense against missiles with less than 2,000 km range, such as Pakistan's Ghauri and Shaheen missiles and China's solid-fuel Dongfeng-21 (NATO designation: CSS-5).

The Phase 2 system will provide defense against ballistic missiles with ranges of up to 5,000 km. The Phase 2 system requires longer-range radars (Detection range of 1,500 km as opposed to 600 km for Phase 1 radars) and new hypersonic interceptor missiles flying at Mach 6-7 (As opposed to Mach 4-5 for Phase 1 missiles) with agility and the capability to discriminate against ballistic missile defense countermeasures.

Flight Tests

The second flight test of the BMD Phase-2 AD-1 interceptor on July 24 appears to have focused primarily on validating radar tracking, missile guidance, and the communication layer of BMD Phase-2. The press release announcing the tests states that the test “fully met all the trial objectives validating complete network centric warfare weapon system consisting of Long Range Sensors, low latency communication system and MCC (Missile Control Centre) and Advance Interceptor missiles.”

Unlike the interceptor’s maiden test in November 2022, the second test also included the launch of a target missile. The maiden test validated the basic functionality of the system elements (radar, launcher, MCC) while deployed in their operational geographical locations.

Swordfish Radar

BMD Phase 2 uses the indigenously developed Swordfish Long Range Tracking Radar (LRTR) for target tracking. The L-band AESA radar is a derivative of the Israeli EL/M-2080 Green Pine long-range radar used while developing BMD Phase-I. The detection range for the latest variant of the Swordfish is reported to be 1500 km.

The press release’s reference to the validation of a low-latency communication layer during the test is significant. Low-latency communication, likely using an LEO (Low Earth Orbit, 200-600 km) satellite, facilitates more accurate guidance through tighter trajectory control. The use of communication satellites placed in GEO (35,786 km) orbits leads to higher latency.

AD-1 Interceptor

The AD-1 is a long-range interceptor missile designed for low exo-atmospheric and endo-atmospheric conditions. It is claimed to have a large kill altitude bracket, likely centered at 100 km. It is capable of intercepting long-range ballistic missiles and aircraft. The missile is propelled by a two-stage solid motor and equipped with an indigenously developed advanced control system, navigation, and guidance algorithm to precisely guide it to the target.

The missile notably features fins on both stages. Not much else is known about the AD-1 interceptor. A long-range interceptor missile should be capable of rapid acceleration and very high speeds. It needs a powerful rocket motor to contend with atmospheric drag. Because of the shorter engagement window, it needs to be capable of rapid maneuvering at high speeds (High g loads).

THAAD Analog

In many ways, AD-1 is analogous to the US THAAD (Terminal High Altitude Area Defence) system interceptor missile, which is designed to engage target missiles at higher altitudes within the atmosphere during their terminal phase descent. THAAD can intercept ballistic missiles over 200 km away and track targets at ranges in excess of 1,000 km. However, unlike the AD-1, the THAAD interceptor is a single-stage missile.

A two-stage interceptor has several advantages over a single-stage interceptor, such as extended range, higher speed, better maneuverability, and greater altitude reach. The THAAD interceptor uses a hit-to-kill warhead and an IR seeker.

An IR seeker can better discriminate warheads from decoys and other objects. Its high-resolution tracking capabilities facilitate more precise homing. Hit-to-kill interception requires precise guidance and control to achieve successful intercepts.

Long-Range Interceptor For Aerodynamic Targets?

It is conceivable that a variant of the AD-1 interceptor would be adapted for use with an IADS like the S-400. In this case, the interceptor would need to feature an active radar-homing seeker. Unlike an IR seeker, a radar seeker is not affected by weather or other atmospheric conditions. The S-400 uses the two-stage 40N6 interceptor, which has a range of 400 km and a target engagement altitude of up to 185 km. India is working on its own S-400 class air defense system, known as “Project Kusha.”

On October 3, 2023, speaking at the annual press conference to commemorate Air Force Day (October 8), Indian Air Force (IAF) Chief of Air Staff (CAS), Air Chief Marshal VR Chaudhari, announced that India would be developing its own long-range air defense system under Project Kusha.

Conclusion

The Ballistic Missile Defence test on July 24 proved the efficacy of the DRDO-developed Swordfish long-range tracking radar, low-latency communication layer, and MCC guidance capability. The DRDO press release does not specify if an interception took place or was even planned. Clearly, BMD Phase-2 is a work in progress, and its operational deployment is likely a decade away.

<https://www.eurasiantimes.com/thaads-analog-s-400s-partner-drds/>

Defence News

Defence Strategic: National/International

THE ECONOMIC TIMES

Mon, 29 July 2024

Japan, US, Australia, India at Tokyo talks on maritime and cyber security amid China concerns

Top diplomats from Japan, the U.S., Australia and India met Monday to discuss security concerns and joint support to reinforce maritime safety and cybersecurity in the Indo-Pacific region amid growing tensions with China.

At the meeting hosted in Tokyo by Japanese Foreign Minister Yoko Kamikawa, U.S. Secretary of State Antony Blinken, Australian Foreign Minister Penny Wong and Indian External Affairs

Minister Subrahmayam Jaishankar were expected to share strong opposition to Beijing's escalating assertiveness in the South China Sea.

China has triggered growing tension with many Asia-Pacific nations with its sweeping claims over the South China Sea and its crucial maritime trade routes. It also claims self-governing Taiwan as its territory, to be annexed by force if necessary. China's military expansion has been criticized for lack of transparency.

At what are known as the Quad talks, the four ministers were expected to discuss cooperation to counter cyber attacks, deal with disinformation and ensure maritime security. They are also looking to support other countries in the region to bolster their abilities in those areas. Kamikawa said in her opening statement that maritime security in the region is increasingly unstable, so unity and cooperation is needed more than ever among the Quad countries in securing a rules-based free and open international order.

Without specifically naming China, Kamikawa said escalating tensions in "a certain region" and cyberattacks by "a certain country" can easily spill over to others in the region and increase their risks. "In order to have the prosperity in the region, we must ensure stability of the foundation in maritime, cyber and space domains," she said. "We Quad nations aim to protect the foundations of prosperity in the Indo-Pacific as we seek to achieve an international community of co-existence and coprosperity."

Australia's Wong said they are facing "the most confronting circumstances in our region in decades." She said the Quad nations are working to achieve a region that is governed by "accepted rules and norms where all of us can cooperate, can trade and thrive" and where "sovereignty is respected and competition is managed responsibly."

The talks were also expected to discuss Russia's war in Ukraine, conflict in the Middle East and other shared concerns. Blinken said those conflicts elsewhere in the world must be brought to an end, but he stressed the importance of events in the Indo-Pacific region. "We have not lost sight, indeed we are resolutely focused on this region that we share."

The talks came after Japan and the United States held their "2+2" security meeting Sunday, when they called China "the greatest strategic challenge." They agreed on further deepening military cooperation by making major upgrades to their command structures and bolstering Japanese production and repair of U.S.- licensed weapons.

<https://economictimes.indiatimes.com/news/defence/quad-foreign-ministers-meet-in-tokyo-for-talks-on-maritime-security-cyber/articleshow/112093678.cms>

THE ECONOMIC TIMES

Sun, 28 July 2024

US to provide consultancy to India to build advanced UAVs under USD 3 billion 31 Predator drones deal

As part of the USD 3.1 billion 31 MQ-9B Predator drone deal between India and the US, American side is proposing to provide consultancy to Indian entities for developing an indigenous advanced unmanned aerial vehicle.

India and the US have been holding discussions for the drone deal for the last few years, under which the three services will get the 31 drones, with the Navy getting 15 birds and the Air Force and Army and Air Force getting two each.

The American offer to provide consultancy to Indian entities for developing an advanced Indian drone as part of the project is expected to be taken up for discussion and clearance at the Defence Acquisition Council meeting scheduled to be held on Monday, defence sources told ANI.

This would be the first meeting of the DAC under Narendra Modi 3.0 and is expected to provide boost to the indigenization process in defence sector under Rajnath Singh.

Sources said that the consultancy is expected to cut down the time taken for development of a highly advanced drone by a significant margin. The MQ-9B drones are planned to be deployed at four places, including INS Rajaji near Chennai and Porbandar in Gujarat, by the Indian Navy, while the other two services will keep them jointly at two bases in Sarsawa and Gorakhpur in Uttar Pradesh at Air Force bases due to long runway requirements.

The American firm involved in the government-to-government deal is General Atomics, whose officials held discussions with Indian side in the last few weeks in this regard, the sources said. Sarsawa and Gorakhpur as bases will help in boosting military surveillance capabilities all along the Line of Actual Control with China, from Ladakh to Arunachal Pradesh.

The drone deal is being done at the tri-service level, with the Indian Navy leading the negotiations for it with the American side. The MQ-9B drones require a significant runway length for take off and landing which are available with the Indian Air Force.

As per the drone deal with the US, 31 MQ-9B drones are being acquired of which 15 would be for coverage of the maritime zone and would be deployed by the Indian Navy.

The IAF and the Army will have eight each of these highly capable long endurance drones and would be able to cover almost all the areas of interest along the LAC with support from other existing assets. The American side has given its letter of acceptance to the Indian side at a price tag of around USD 4 billion but India is not planning to take the entire package and the cost for it would be lower than that.

With a flight time of over 36 hours at heights over 40,000 feet, the drones can be armed with Hellfire air-to-ground missiles and smart bombs, this fightersized drone specializes in(intelligence, surveillance, and reconnaissance) missions.

The Predator drones are expected to significantly enhance India's ability to conduct unmanned surveillance and reconnaissance patrols, particularly in the Indian Ocean Region (IOR) and along its land borders with China and Pakistan.

MQ-9B has proven to be a critical asset in safeguarding India's security interests, as it was used to extensively to monitor anti-piracy operations from naval headquarters to get a clear picture of the actions taking place almost 3,000 km from Indian shores.

<https://economictimes.indiatimes.com/news/defence/us-to-provide-consultancy-to-india-to-build-advanced-uavs-under-usd-3-billion-31-predator-drone-deal/articleshow/112085928.cms>

Border Road Organisation Starts Phase 3 Of India, China Border Roads Project

The Border Road Organisation (BRO), along with the Central Public Works Department (CPWD) and the National Projects Construction Corporation (NPCC), has commenced the third phase of the India-China Border Roads project in eastern Ladakh.

This project aims to enhance the road network and facilitate the movement of security forces along the Line of Actual Control (LAC) between India and China. The ongoing Phase II of the project has already resulted in the construction of all-weather roads that have facilitated faster movement of security forces along the LAC.

The India-China Border Roads (ICBR) project is a response to Chinese infrastructure development along the borderlands with India. It involves the construction of a network of roads along the Line of Actual Control (LAC) between India and China.

The project is being implemented in multiple phases, with Phase I (ICBR-I) approved in 2005 and Phase II (ICBR-II) approved in 2020. The third phase (ICBR-III) is currently being considered, with a proposal to build 37 more roads along the India-China border.

The construction of these roads is crucial for enhancing connectivity and mobility in the border areas, as well as for strengthening India's infrastructure in response to Chinese developments on the other side of the border.

The completion of these roads will facilitate the movement of troops, equipment, and civilians, and contribute to the overall security and development of the region.

It is important to note that the construction of these roads has faced various challenges, including bureaucratic hurdles, delays in clearances, manpower shortages, and environmental factors. However, efforts are being made to expedite the work and overcome these obstacles.

The India-China border stretches for 3,488 kilometers across Ladakh, Arunachal Pradesh, Himachal Pradesh, Uttarakhand, and Sikkim. The construction of these border roads aims to enhance connectivity and infrastructure development in these regions.

Overall, the India-China Border Roads Project, led by the Border Road Organisation, is a significant initiative to improve road connectivity and security along the India-China border.

The ongoing Phase III of the project in eastern Ladakh is expected to further enhance the road network and facilitate the movement of security forces in the region.

<https://economictimes.indiatimes.com/news/defence/border-road-organisation-starts-phase-3-of-india-china-border-roads-project/articleshow/112088492.cms>

S-400 air defence system 'shot down' almost entire 'enemy' package in exercise; major success for IAF

The Sudarshan S-400 air defence missile system achieved a major success in a recent exercise where it 'shot down' 80 per cent of the 'enemy' fighter aircraft package while forcing others to retreat, aborting their missions.

The exercise was carried out by the Indian Air Force in a theatre where the force has deployed one of its squadrons of the long-range air defence missile system, defence sources told ANI. The exercise was conducted by the Indian Air Force to showcase full integration of air defence missile system into the force, they said.

During the exercise, real fighter aircraft were flying to test the capabilities of the S-400 weapon system, now called Sudarshan by the Indian Air Force after the mighty Sudarshan chakra of Lord Krishan.

The Sudarshan, 'locking on and targeting' in simulated action, could 'shoot down' 80 per cent of the 'enemy' offensive package. The other remaining aircraft aborted their mission which was to 'attack' their targets within Indian territory and were intercepted by the air defence system.

The Indian Air Force has now fully integrated the system, whose three squadrons have already been inducted and two more are expected to be supplied in 2026. The Indian side has requested that Russia expedite the delivery of the systems.

The Indian side, during a high-level visit to Russia, also requested the Russian side deliver the system. India and Russia signed an over Rs 35,000 crore deal for five squadrons of S400. The Indian Air Force, which recently received the indigenous MR-SAM and Akash missile systems as well as the Israeli Spyder quick reaction surface-to-air missile systems, believes the S-400 will be a game changer for it.

The Indian Defence Acquisition Council recently cleared the procurement of the Indian Long Range Surface Air Missile System under Project Kusha. The development came after the project was approved by the Cabinet Committee on Security.

The Indian Air Force, which recently received the indigenous MR-SAM and Akash missile systems as well as the Israeli Spyder quick reaction surface-to-air missile systems, believes the S-400 will be a game changer for it. The Indian Air Force has significantly improved its air defence capabilities in recent years.

Air defence systems have been deployed in a big way by the Chinese military across the Line of Actual Control, while India has also deployed its own systems in a big way there.

<https://economictimes.indiatimes.com/news/defence/s-400-air-defence-system-shot-down-almost-entire-enemy-package-in-exercise-major-success-for-iaf/articleshow/112060626.cms>

Defence building light tank for Army, first prototype realised: Govt on Proj 'Zorawar'

The defence ministry is working on developing a light tank for the Indian Army for deployment at high-altitude area of the country, with a prototype already built, the Parliament was informed on Friday. Minister of State for Defence Sanjay Seth gave the information in a written response to a query on project 'Zorawar'.

He was asked whether the government is working on time-bound project 'Zorawar' for the production of indigenous light tank and its induction into Army by 2027 at high-altitude border areas of the country.

"Yes, sir. DRDO, Ministry of Defence is working on development of light tank for the Indian Army for deployment at high altitude area of our country. First prototype of light tank has been realised," he said.

Seth was also asked whether any private players were roped into the project and, if so, the details of the cost of the project.

"Yes, sir. M/s Larsen & Toubro Ltd. Hazira, Surat is working as a lead system integrator of light tank and many MSMEs are working for development of subsystems of light tank. The sanctioned project cost is Rs 234.5 crores, which includes design and development cost and one prototype realisation cost," the minister said.

<https://economictimes.indiatimes.com/news/defence/defence-building-light-tank-for-army-first-prototype-realised-govt-on-proj-zorawar/articleshow/112047949.cms>

'S-400 shot down almost entire enemy pack in test'

Sudarshan S-400 air defence missile system achieved a major success in a recent exercise where it 'shot down' 80% 'enemy' fighter aircraft package while forcing others to retreat, aborting their missions. The exercise was carried out by the Indian Air Force (IAF) in a theatre where the force has deployed one of its squadrons of the long-range air defence missile system, said defence sources.

The exercise was conducted to showcase full integration of air defence missile system into the force, they said. During the exercise, real fighter aircraft were flying to test capabilities of S-400 weapon system, now called Sudarshan by the IAF after the mighty Sudarshan chakra of Lord Krishan. Sudarshan, 'locking on and targeting' in simulated action, could 'shoot down' 80% 'enemy' offensive package.

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<https://timesofindia.indiatimes.com/city/delhi/s-400-air-defence-system-successfully-intercepts-enemy-aircraft-in-recent-exercise/articleshow/112071804.cms>



Sun, 28 July 2024

Multilateral peacekeeping exercise begins in Mongolia

An Indian contingent is part of the 21st edition of Khaan Quest, a multinational peacekeeping exercise, which commenced in Mongolia on July 27 with an opening ceremony held at the Five Hills Training Area in the Mongolian capital of Ulaanbaatar. The Indian Army contingent includes 40 personnel from a Battalion of the Madras Regiment, along with others.

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The exercise has around 430 participants from 23 countries, including Australia, Canada, China, Japan, Türkiye, the United States, and the United Kingdom, among others.

“On 27 July, Ambassador Atul Malhari Gotsurve participated in the inaugural ceremony of the 21st multinational military Exercise Khaan Quest-2024. He welcomed Indian troops from Madras Regiment to Mongolia and conveyed his best wishes for the exercise,” the Indian Embassy in Mongolia said in a post on X.

Peacekeeping preparations

The Indian contingent departed on July 25 for the exercise, which is scheduled to run from July 27 to August 9. One woman officer and two women soldiers are also part of the contingent. “Aim of Exercise Khaan Quest is to prepare Indian armed forces for peacekeeping missions while operating in a multinational environment, thereby increasing interoperability and military readiness in peace support operations under Chapter VII of United Nations Charter. The exercise will focus on high degree of physical fitness, joint planning and joint tactical drills,” the Army said in a statement issued as the contingent departed.

Tactical drills to be practised during the exercise will include the establishment of static and mobile check points, cordon and search operations, patrolling, evacuation of civilians from hostile area, counter improvised explosive device drills, combat first aid, and casualty evacuation, the Army said.

The exercise started as a bilateral event between the U.S. and Mongolian armed forces in 2003 and graduated to a multinational peacekeeping exercise from 2006 onwards. The exercise will facilitate developing inter-operability, bonhomie and camaraderie between soldiers of the participating

countries and also sharing of their best practices in tactics, techniques and procedures for the conduct of joint operations, the statement added.

<https://www.thehindu.com/news/national/multilateral-peacekeeping-exercise-begins-in-mongolia/article68457201.ece>



Sat, 27 July 2024

US-India Defence Cooperation Act: A Strategic Shift in Bilateral Relations

With India's growing influence and Prime Minister Narendra Modi's recent re-election, the United States Congress has introduced a significant bill favoring India. Proposed by US Congressman Marco Rubio, the 'US-India Defence Cooperation Act' seeks to elevate India's status to that of America's close allies, including Japan, Israel, South Korea, and NATO members.

Elevating India's Strategic Status

Congressman Rubio's bill emphasizes the importance of recognizing India as a strategic ally. It states, "If Pakistan spreads terrorism against India, then security assistance to it should be stopped. Action should be taken against Pakistan." This reflects a shift in US policy, acknowledging India's pivotal role in regional stability and counter-terrorism efforts.

Strengthening Military and Diplomatic Ties

The bill proposes that the US should enhance its military cooperation with India, akin to its relationships with Japan, Israel, and South Korea. This includes increasing military aid and sharing critical defence technology. Rubio highlighted the necessity of this partnership to counter China's growing influence in the Indo-Pacific region.

He stated, "Communist China is trying to increase its dominance in the Indo-Pacific region. China also keeps violating the sovereignty of our regional allies. In such a situation, America should help its allies like India to deal with China."

Addressing Pakistan's Proxy War

A significant aspect of the bill is its focus on Pakistan. It demands that if Pakistan continues its proxy war against India, the US should halt its economic aid and take action against it. This stance underscores the US's commitment to supporting India's security and curbing terrorism in the region.

Exemption for India in Defence Purchases from Russia

One of the notable provisions of the bill is the call for exemptions for India from sanctions under the Countering America's Adversaries Through Sanctions Act (CAATSA). The bill argues that since the Indian military is heavily reliant on Russian defence equipment, it should receive some leeway in continuing these purchases. This exemption would help India maintain its defence capabilities without facing US sanctions.

Historical Context and India's Stance on NATO Plus

The concept of granting India a 'NATO Plus' status has been discussed before. Last year, the US Parliament's Select Committee recommended India's inclusion in NATO Plus, a security system that brings together NATO and five alliance nations (Australia, New Zealand, Japan, Israel, and South Korea) to enhance global defence cooperation. However, India's Foreign Minister, S Jaishankar, made it clear that India is not keen on joining NATO Plus. India's strategy has always been to remain non-aligned and not part of any power blocs.

The Nature of NATO Plus

NATO, established in 1949, is a defence alliance comprising 32 countries, including the US, UK, Canada, and France. The NATO Plus framework aims to bolster defence cooperation among its members. Although there is international support for India's inclusion, India maintains its stance of strategic autonomy, avoiding binding military alliances that might compromise its independent decision-making.

US Perspective on India's Defence Dependency on Russia

President Joe Biden had previously remarked on India's defence dependency on Russia, particularly during the Ukraine conflict. Biden suggested that India's stance on Russia is influenced by its reliance on Russian military supplies. The proposed bill by Rubio, however, seeks to navigate this dependency by advocating for technology transfers and exemptions for India.

Enhancing US-India Partnership

Rubio's Act aims to strengthen the US-India partnership across multiple dimensions, including defence, civil space, technology, medicine, and economic investments.

It proposes that the US should support India in its efforts to secure its land and maritime borders, particularly against Chinese aggression. The Act also calls for a comprehensive review of US aid to Pakistan, ensuring that it does not support terrorism against India.

India's Growing Defence Imports from the US

In the past decade, India has significantly bolstered its defence capabilities through substantial imports of American platforms, totaling nearly USD 25 billion. This growing defence trade underscores the deepening strategic ties between the two nations and India's increasing reliance on advanced American military technology.

Bottomline

The 'US-India Defence Cooperation Act' marks a significant development in US-India relations. By proposing to treat India as a strategic ally on par with Japan, Israel, South Korea, and NATO members, the bill underscores the importance of India in the global geopolitical landscape.

It also highlights the need for a robust partnership to counter common threats, particularly from China and Pakistan.

As the bill progresses through the US Congress, it could herald a new era of defence and strategic cooperation between the two largest democracies in the world.

<https://www.financialexpress.com/business/defence-us-india-defence-cooperation-act-a-strategic-shift-in-bilateral-relations-3566384/>

Agnipath Scheme: Revolutionising Military Recruitment and Human Resource Management

As India modernises its armed forces, human resource management (HRM) reforms are crucial to developing a young, agile, and technologically proficient armed force. The Agnipath Scheme, introduced in June 2022, is a cornerstone of these reforms, aimed at transforming the Indian military's human resource landscape by recruiting and training young individuals, known as Agniveers.

Building a Modern Military: The Role of HRM

Effective HRM in the military is vital for maintaining a capable and modern armed force. Recruitment and training are essential for selecting and adequately preparing individuals to meet the demands of modern warfare. Performance management systems are implemented to appraise, reward, and recognise personnel effectively, ensuring that the military remains motivated and ready for action.

Workforce planning is another critical function that involves forecasting and managing human resource needs to maintain readiness. Developing fair and motivating compensation systems is also crucial for retaining talent and ensuring that the armed forces remain competitive and attractive to potential recruits. These functions collectively ensure that the military remains battle-ready and capable of adapting to evolving security threats.

Agnipath Scheme: Injecting Youthful Energy into the Armed Forces

Under this scheme, youth serve in the armed forces for four years, providing a steady influx of fresh talent. This initiative not only injects youthful energy into the armed forces but also ensures that the military remains financially sustainable.

Strength in Numbers: Recruitment and Expansion

In its initial phase, the Army inducted 40,000 Agniveers, with the Navy and Air Force recruiting 2,700 and 3,000, respectively. With a projected intake cap of 1.75 lakh recruits until 2026, the scheme is set to significantly increase the number of young soldiers. By 2030-32, Agniveers are expected to make up half of the Army's personnel, reflecting the scheme's strategic importance in enhancing the military's youthful profile. This expansion is crucial for maintaining a robust, dynamic defence force that meets contemporary security challenges.

Adapting to the Future: Evolving the Agnipath Scheme

To enhance its appeal, the Agnipath Scheme underwent several revisions in 2023. The upper age limit was increased to 23 years, and eligibility was expanded to include pre-skilled youth and ITI/polytechnic graduates. Additionally, provisions were introduced to attract skilled candidates by offering incentives. Future changes may include increasing the retention rate of Agniveers for regular troops and extending their tenure from four to eight years. These adjustments aim to make the scheme more attractive and effective in retaining talent, ensuring that the armed forces benefit from the skills and experience of Agniveers for a longer period.

Dispelling Misconceptions: Addressing Criticisms with Clarity

While innovative, the Agnipath Scheme has faced criticism. Concerns include the potential erosion of military ethos and fighting spirit, risks associated with a large number of trained but short-tenure soldiers re-entering civilian life, and the perception that Agniveers are a “lesser” cadre of soldiers performing similar tasks as regular soldiers but with fewer benefits. However, reports from various units and formations indicate that Agniveers excel in their duties, with some even outperforming the regular soldiers. This performance underscores the effectiveness of the Agnipath Scheme in maintaining high standards of professionalism and capability within the armed forces.

Pioneering Equality: Gender Inclusivity in the Armed Forces

Gender inclusivity is a critical aspect of military HRM reforms. Historically, women have had limited representation in the military. However, the government has taken decisive steps to increase female participation, such as inducting women into the Corps of Military Police in 2021. The goal is to recruit 1,700 women in a phased manner, promoting diversity and inclusivity within the armed forces. This initiative aims to create a more balanced and representative military capable of leveraging the strengths and perspectives of both men and women.

The Agnipath Scheme is pivotal to India’s ongoing military HRM reforms. By focusing on youthful recruitment and gender inclusivity, the scheme aims to build a modern, agile, and efficient military force. Continuous improvements and adaptations are essential to address criticisms and ensure the long-term success of India’s military modernisation efforts. In a significant milestone for gender equality in the Indian Army, approximately 200 women have joined the ranks of the Agniveers, a bold new recruitment initiative.

Among these trailblazers, around 100 have already been dispatched to their units, performing admirably alongside their male counterparts. Lieutenant General Channira Bansi Ponnappa, the Army’s Adjutant General, announced this historic development, highlighting the inclusion of female police personnel among the recruits. This progress underscores the commitment to fostering a more inclusive and equitable environment in the armed forces. Highly placed military officials have reiterated that, in the HRM domain, the Agniveer (Agnipath) scheme has been a path-breaking manpower intake and management methodology, ensuring a youthful profile and technologically adept soldiers, representing a “rightsizing” approach.

<https://www.financialexpress.com/business/defence-agnipath-scheme-revolutionising-military-recruitment-and-human-resource-management-3566909/>

THE ECONOMIC TIMES

Sun, 28 July 2024

Amid rising attacks, experts call for reassessment of counter-terror ops in Jammu

With an uptick in terrorist activities in the otherwise peaceful Jammu region, security experts have suggested a comprehensive reassessment of the existing counterterrorism strategies employed by security forces. Retired Lieutenant General D S Hooda, former General Officer Commanding-in-Chief of the Udhampur-based Northern Command, emphasised the urgent need for a proactive approach to counter the evolving terrorist tactics.

Former Deputy Chief of Army Staff (Strategy) Lt Gen Paramjit Singh Sangha expressed confidence the security forces will learn from their recent mistakes and improve counterinsurgency efforts.

The Jammu region has witnessed a series of violent incidents over the past few weeks. A recent ambush claimed the lives of nine army personnel, including a captain, in the remote forest areas of Machedi in Kathua. The perpetrators still at large.

On June 9, nine passengers, including seven pilgrims returning from the Shiv Khori temple in Reasi district, were killed in a terrorist attack. Police have arrested several suspects linked to the attack, however the main assailants remain unidentified.

"Over time, we have observed a shift in tactics, with terrorists increasingly adopting ambush and 'shoot and scoot' strategies," Lt Gen (Retd) Hooda told PTI over the phone, underlining the need for security forces to reevaluate their strategies to understand and rectify potential shortcomings.

Distinguishing between the operational environments of Jammu and the Valley, Lt Gen (Retired) Hooda noted that while terrorists in Kashmir are often contained within localised areas, those in Jammu are strategically positioned in challenging terrains, complicating military responses. "In some areas, troops may have to trek for eight to 10 hours to reach a specific location," he explained.

Lt Gen (Retired) Hooda suggested a prolonged period of relative peace in the Jammu region may have contributed to lapses in vigilance, and cautioned against complacency within the security establishment. Echoing similar sentiments, former Deputy Chief of Army Staff (Strategy) Lt Gen (Retd) Paramjit Singh Sangha expressed confidence in the security forces' capacity to learn from the recent setbacks and improve counter-insurgency efforts.

"We need to learn honest and correct lessons and ensure that mistakes are not repeated," he told PTI over the phone, emphasising the importance of patience and adherence to proven military tactics.

"Unlike conventional warfare, there are no deadlines." He pointed out that traditional intelligence-gathering methods may be less effective in this context, indicating a need for a re-evaluation of tactics and procedures. "The Northern Command is undoubtedly taking these incidents seriously and implementing corrective measures," he affirmed, expressing trust in their response to the ongoing threat.

After a decisive campaign against terrorism in 2005, which largely cleared Jammu of militant activities, the region has seen a resurgence of violence, particularly in the twin border districts of Rajouri and Poonch, where over 70 individuals, including 52 security personnel, have been killed in terror-related incidents since 2021.

Gen (Retd) Hooda advocated for the revival of Village Defence Committees and the recruitment of more Special Police Officers from local communities to enhance counter-terrorism efforts.

"The locals have traditionally been the eyes and ears of the Army in this region," he noted, underscoring their pivotal role in intelligence gathering. While acknowledging that some individuals within communities may harbour extremist sentiments, Gen (Retd) Hooda warned that fostering suspicion towards local populations near the Line of Control could be counterproductive.

Lt Gen (Retd) Sangha also highlighted the historical contributions of local communities, particularly the Gujjar and Bakarwal tribes, in maintaining peace in the region, cautioning against actions that could alienate these groups.

He dismissed suggestions that local support for terror groups exists, positing instead that the attackers likely rely on pre-established networks rather than random local assistance. "These terrorists probably have a pre-selected support network, not random locals," he explained, suggesting that the attacks were deliberate and executed by a small number of individuals with robust communication links to handlers across the Line of Control.

Discussing longterm solutions, Gen (Retd) Hooda recalled discussions during his tenure about implementing smart fencing along the borders. He criticised the current fencing system, which deteriorates during the rainy season, compromising security.

"Instead of waiting for a perfect solution, we need to put up a fence that offers better protection than what we currently have," he said. Concerns were also raised regarding the detection of tunnels used by terrorists to infiltrate into the Indian territory, with experts calling for prioritising solutions to this growing challenge.

As Jammu faces a new wave of violence, experts believe that the call for a strategic reassessment underscores the urgency of addressing the shifting dynamics of terrorism in the region.

<https://economictimes.indiatimes.com/news/defence/amid-rising-attacks-experts-call-for-reassessment-of-counter-terror-ops-in-jammu/articleshow/112079818.cms>

THE ECONOMIC TIMES

Sun, 28 July 2024

Russian President Vladimir Putin greets INS Tabar on Russia's Navy Day

Russian President Vladimir Putin greeted Indian Navy personnel onboard Indian Naval Ship (INS) Tabar, which is participating in Russia's Navy Day celebrations, Russia-based RT reported.

Putin reviewed the Main Naval Parade on the Neva River in St Petersburg. At the start of the event, he congratulated the sailors of the Russian Navy, TASS reported. The tradition to hold the Main Naval Parade in St Petersburg is "to honour glorious victories of the Navy that made a substantial contribution to defending the Fatherland" emerged in 2017.

This year, Russia's Main Naval Parade on the Neva River involves 20 surface ships and gunboats, four sailing vessels and a submarine, according to TASS report.

The Russian combat ships that participated in the Main Naval Parade on the Neva River also included the the Project 22800 Karakurt-class missile corvette Odintsovo, the Project 20380 missile corvette Boiky, Project 12700 coastal minesweeper Alexander Obukhov, the Project 21631 missile corvettes Grad, Naro-Fominsk, Grad Sviyazhsk and Serpukhov, the Project 23550 icebreaking patrol ship Ivan Papanin and the Project 636.3 Varshavyanka-class large diesel-electric submarine Mozhaisk, according to TASS report.

The foreign combat ships that were part of Russia's Main Naval Parade on the Neva River included the Indian Navy's frigate Tabar, the Algerian Navy's training ship Soummam and the Chinese guided missile destroyer Jiaozuo.

Nearly 2,500 troops marched in foot columns on Senate Square in St Petersburg to conclude Russia's Main Naval Parade. Earlier in the day, INS Tabar arrived at St Petersburg to participate in Russian Navy Day celebrations. The Indian Navy spokesperson said that the visit of INS Tabar to

Russia strengthens cooperation between two nations, underpinned by interoperability between the navies and is aligned to Government of India's policy of Vasudhaiva Kutumbakam.

In a post on X, Indian Navy spokesperson stated, "#INSTabar, arrived at St Petersburg, Russia to a warm welcome ceremony by the #RuFN. The ship's visit to Russia incl participation in 328th #RussianNavyDay celebration, professional interactions & conduct of PASSEX b/n both navies."

"This visit further strengthens #maritime cooperation b/n the two nations, underpinned by the #interoperability b/n the navies & is aligned to GoI's policy of #VasudhaivaKutumbakam," it added.

INS Tabar, is a stealth frigate built for the Indian Navy in Russia. The ship is equipped with a versatile range of weapons and sensors and is among the earliest stealth frigates of the Indian Navy, according to ministry of defence press release. The ship is part of the Indian Navy's Western Fleet, which is based in Mumbai under the Western Naval Command.

<https://economictimes.indiatimes.com/news/defence/russian-president-vladimir-putin-greets-ins-tabar-on-russias-navy-day/articleshow/112084602.cms>

नवभारत टाइम्स

Sun, 28 July 2024

भारत को अपना Su-75 चेकमेट लड़ाकू विमान बेचना चाहता है रूस, लेकिन भारतीय वायु सेना हट रही पीछे, जानें वजह

रूस अपने पुराने मिग-29 लड़ाकू विमानों के बेड़े की जगह भारत को अपने Su-75 चेकमेट लाइट टैक्टिकल फाइटर बेचना चाह रहा है, लेकिन मॉस्को के लगातार प्रयासों के बावजूद भारतीय वायु सेना ने इस प्रस्ताव पर सकारात्मक प्रतिक्रिया नहीं दी है। भारत की हिचकिचाहट का मुख्य कारण Su-75 को लेकर अनिश्चितता है। अभी तक इस हल्के लड़ाकू विमान ने अभी तक अपनी पहली उड़ान नहीं भरी है। रूस ने 2021 में पहली बार चेकमेट मॉडल का प्रदर्शन किया था। उस समय भारत को एक संभावित ग्राहक के रूप में स्थापित किया था। हालांकि, उस समय तक लड़ाकू विमान केवल एक मॉक-अप के रूप में ही मौजूद था और इसका कोई वास्तविक प्रोटोटाइप नहीं था।

विमान की पहली उड़ान अभी तक तय नहीं

डिफेंस मीडिया आउटलेट IDRW की रिपोर्ट के अनुसार, 2023 में निर्धारित इस विमान की उड़ान को कई बार स्थगित किया जा चुका है और अब कम से कम 2026-2027 तक इसकी उम्मीद नहीं है। इस बीच 2024 की शुरुआत में भारत ने एडवांस्ड मीडियम कॉम्बैट एयरक्राफ्ट कार्यक्रम के तहत अपनी 5 वीं पीढ़ी की लड़ाकू परियोजना को मंजूरी दे दी। इस महत्वाकांक्षी परियोजना का लक्ष्य 2028 या 2029 तक पहले पांच प्रोटोटाइप का निर्माण करना है। हालांकि, इनका समय पर तैयार होना एक प्रश्न बना हुआ है, लेकिन यह साफ दिखाता है कि भारत रूसी विमान परियोजनाओं से दूरी बनाने का इरादा रखता है।

रूसी विमानों से दूरी बना रहा भारत

भारत का उद्देश्य लड़ाकू विमानों में रूस निर्भरता की जगह खुद से निर्माण करके आत्मनिर्भर बनना है। यहां ध्यान रखना जरूरी है कि रूस को Su-57 पर पांचवीं पीढ़ी के लड़ाकू विमान की परियोजना पर भारत के साथ सहयोग करना था, लेकिन भारत 2018 में इससे पीछे हट गया था। इस बीच रूस ने Su-75 हल्के लड़ाकू विमान पर काम शुरू किया। इसके लिए रूस भारत को खरीदार के रूप में सुरक्षित करना चाहता है। दरअसल, नए विमान को विकसित करना एक महंगा उपक्रम है, ऐसे में ग्राहक पहले से तय हो तो इस बोझ को कम कर सकते हैं।

सेंटर फॉर सिक्योरिटी पॉलिसी की एक विश्लेषक माया कार्लिन ने बिजनेस इनसाइडर के लिए एक लेख में रूस के Su-75 चेकमेट को एक 'लंगड़ाता हुआ कार्यक्रम' बताया था। इसके पहले साल 2022 में Su-75 चेकमेट की पहली उड़ान

दिखाने के लिए तय समय से पहले ही संयुक्त अरब अमीरात ने अपनी भागीदारी को निलंबित कर दिया था। इसके बाद रूस के पास इस विमान के विकास के लिए फंडिंग का महत्वपूर्ण स्रोत हाथ से छूट गया था।

<https://navbharattimes.indiatimes.com/world/rest-of-europe/russia-wants-su-75-checkmate-sell-to-india-but-indian-air-force-not-respond-to-proposal-as-no-prototype-till-now/articleshow/112076708.cms>



Mon, 29 July 2024

Impossible For China To Dominate — U.S. Tightens Screws In Indo-Pacific To Check PLA, Fortify Allies & Military Bases

As China increases its belligerence around Taiwan and continues to threaten Japan to reinforce its claims of some of the islands, the U.S. Military has started increasing its presence in the region. The U.S. Air Force (USAF) recently moved F-22 Raptors, the formidable fifth-generation fighters, to the Kadena airbase in Japan, not too far from the Chinese mainland.

The U.S. is working closely with regional allies South Korea and Japan to boost military capabilities. More importantly, pro-US President Ferdinand Marcos, Jr. led the Philippine government in working closely with the U.S. to create many new military bases. It is time to examine these and see how they impact the power balance.

U.S. Indo-Pacific Command

The U.S. Indo-Pacific Command (USINDOPACOM) is the oldest and largest unified combatant command of the U.S. armed forces and is responsible for the entire Indo-Pacific region.

The 375,000 service personnel are expected to secure more than 260 million sq. km, or roughly 52 percent of the Earth's surface, stretching from the West Coast of the United States to the East Coast maritime borderline waters of India and from the Arctic to the Antarctic. The Indo-Pacific Command consists of the component commands of the U.S. Army, Marines, Navy, and Air Force. It also includes U.S. Forces in Japan and Korea.

There is a standing joint task force, massive elements for Special Operations and Joint Intelligence Operations, and a Center for Excellence in Disaster Management and Humanitarian Assistance. The Nimitz-MacArthur Pacific Command Center, located on Camp H. M. Smith in Hawaii, serves as the headquarters for the Indo-Pacific Command. The U.S. Pacific Fleet has close to 200 ships. It has two aircraft groups and can muster up to five carrier groups.

The US Marines have two Expeditionary Forces with 86,000 personnel and 640 aircraft. The US Pacific Air Forces have 420 aircraft. The U.S. Army Pacific has 106,000 personnel plus 300 aircraft and five watercraft. There are nearly 1,200 Special Operations personnel.

U.S. Assets In Alaska

The U.S. has significant radars, long-range missile sites, and airbases in Alaska, all of which will support combat operations in the northwest Pacific. Some of these extend into the 1900-kilometer-long Aleutian Islands chain, not far from the Eastern Russian Komandor Islands, which, too, are part of the same island chain.

Naval Base Guam

Guam is 2,751 km east-south-east of Taiwan. Part of Joint Region Marianas, the U.S. Navy (USN) Strategic Base Guam has the very large Apra Harbour that is part of the Orote Peninsula. The harbor can accommodate USN supercarriers like the USS Nimitz (CVN-68). In 2009, it was combined with Andersen Air Force Base to form Joint Region Marianas, a Navy-controlled joint base.

There is a ship repair facility. The Naval Base is also home to a submarine squadron, a Coast Guard Sector, and a Naval Special Warfare Unit. It is the home base to dozens of Pacific Command, Pacific Fleet, Seventh Fleet, and Seabee units. Guam maintains the Seventh Fleet's submarines and supports the Naval Support Facility at Diego Garcia.

Earlier called Naval Operating Base and later nicknamed The Pacific Supermarket, the base has seen large expansion over the years. The 7th Fleet's Navy Expeditionary Forces Command Pacific is also headquartered here. The base also has naval munitions storage and maintenance facilities.

Andersen Airbase Guam

The USAF Andersen Air Force Base is part of the 36th Wing under the Pacific Air Forces Eleventh Air Force. Established in 1944 after the Liberation of Guam as North Field, it is named for Brigadier General James Roy Andersen (1904–1945).

The airbase was extensively used during the last year of WW II to launch B-29 Superfortress bombing missions against Japan. The Wing today provides support to deployed air and space forces of the USAF and other friendly foreign air forces. The naval and Air bases are about 48 km apart at opposite ends of the Island. The airbase was used to launch many missions during the Korean and Vietnam wars.

It is the most important U.S. air base west of Hawaii. It is one of the four Air Force Bomber Forward Operating Locations and the only base in the Western Pacific that can permanently service U.S. heavy strategic bombers, including B-1B, B-2, and B-52 bombers. Andersen is one of two critical bases in the Asia-Pacific region, the other being Diego Garcia in the Indian Ocean.

The base was also one of the few places in the world where the NASA Space Shuttle was permitted to land, serving as an Augmented Emergency Landing Site for the Shuttle orbiter. B-2s and B-52 aircraft squadrons have taken turns in order to provide a continuous bomber presence at the base. In 2017, North Korea threatened to strike the Island. The U.S. moved nearly a million munitions within a month to counter such an eventuality.

Since 2019, the main operational and flying units on the base included the 36th Wing (PACAF), elements of the 624th Regional Support Group, the 734th Air Mobility Support Squadron, 69th Reconnaissance Group, flying the Northrop Grumman RQ-4 Global Hawk, and a Helicopter Sea Combat Squadron of USN flying the Sikorsky MH-60S. There is Task Force Talon, a U.S. Army, E Battery, Air Defense Artillery Regiment THAAD, and support elements.

The USAF no longer permanently bases strategic bombers outside the continental United States. B-1B Lancer, B-2A Spirit, and B-52G Stratofortress aircraft deployed to Guam on a rotational basis. The United States Space Force has the 21st Space Operations Squadron. The USAF proposes upgrading Guam to host a dozen Singaporean F-15s for training. Many U.S. fighters come to Guam for major exercises such as "Cope North."

U.S. Military Bases in Japan

The United States Forces Japan (USFJ) has been active since 1957. It forms a subordinate unified combatant command under USINDOPACOM with nearly 50,000 personnel, with headquarters at

Yokota Air Base near Tokyo. The USFJ is meant to defend Japan as per the security treaties between the United States and Japan.

The United States Seventh Fleet is based in Yokosuka, Kanagawa Prefecture. The III Marine Expeditionary Force is based in Okinawa. A significant number of USAF fighters are stationed at Misawa and Kadena airbases. Japan compensates 75 percent of U.S. basing costs. Okinawa makes up only 0.6 percent of Japan's land area, but 62 percent of United States bases in Japan (exclusive use only) are on Okinawa.

On Okinawa, U.S. military installations occupy about 10.4 percent of the total useable land. Approximately 74.7 percent of all the U.S. military facilities in Japan are located on the Island of Okinawa.

The USAF calls the Kadena airbase, home of the 18th Wing, its "Keystone of the Pacific." U.S. aircraft in Japan are being continuously upgraded. Forty-eight fifth-generation F-35A fighters are gradually replacing the 36 F-16s at Misawa Air Base in northern Japan, and 36 brand-new F-15EX jets deploy to Kadena Air Base on the southern Island of Okinawa, replacing 48 older F-15C/D. The F-22s have been operating from Kadena.

The U.S. government employs over 8,000 local workers, yet there are often protests against the U.S. base on Okinawa Island, and a certain amount of relocation to Guam or other friendly counties has been going on. Similar protests are going on against Marine Corps facilities at Futenma. The issues include jet-sound noise, marine life issues, and water contamination.

The U.S. also operates C-130s, KC-135 tankers, and P-8A maritime surveillance aircraft. Significant numbers of CV-22 Osprey aircraft are deployed at its Yokota Air Base. There are various other helicopters. The U.S. military has major facilities at Misawa, Yokota, Kadena, Futenma, Itami, and Tachikawa airbases. There are also many military communications stations spread across Japan.

There is an auxiliary airfield air cargo terminal at Hakata-ku, Fukuoka. There are also Ammunition Storage Areas near Kadena, Hiroshima, and many other places. Major naval ports are at Yokosuka, Atsuagi, and Sasebo (Nagasaki). Yokohama, Naha, and many other places have port dock facilities. There are many POL Depots. There are armament training ranges. There is a major Marine Corps air station at Iwakuni, Yamaguchi, and Ginowan, Okinawa. There are also joint-use military facilities with Japanese forces.

Japanese Self-Defense Forces have 250,000 Personnel, 150 ships, about 300 maritime aircraft, 750 Air Force aircraft (350 fighters, including F-35, F-15J, F-2A/B), 20 AEW&C & 10 FRA, 20 active air bases, and ten naval aviation bases. They plan to expand further.

United States Forces Korea (USFK)

The USFK has been in position since July 1957. Today, the numbers are around 28,000 personnel (20,000 Army, 300 Naval at Busan Naval Base, 100 each of Marines and Special Forces, and 8,000 USAF HQ at Osan Airbase). It has been at an all-time low since the peak of 326,863 US personnel in 1953. They are a subordinate unified command under USINDOPACOM. Their Headquarters is at Camp Humphreys, Pyeongtaek, South Korea.

The Major USFK elements include the U.S. Eighth Army, U.S. Seventh Air Force, U.S. Naval Forces Korea, U.S. Marine Forces Korea, and U.S. Special Operations Command Korea (SOCKOR). Their mission is to support the local United Nations Command (UNC). The U.S. Space Forces are collocated with the USAF at Osan.

While USFK is a separate organization from UNC and ROK/US Combined Forces Command (CFC), its mission is to coordinately support both UNC and CFC. U.S. forces have been in South Korea since the July 1953 armistice. North Korea had repeatedly violated the armistice over the years. After North Korea went nuclear and with its aggressive missile program, it has been engaged in intimidating test firing of its missiles over South Korea and Japan.

The 18th Fighter-Bomber Wing (F-15C/D, KC-135R, E-3B/C, HH-60) and 51st Fighter-Interceptor Wings (A-10s and F-16C/D) are at Osan. The South Korean Armed Forces have 555,000 active personnel, 150 ships, about 70 maritime aircraft, and 19 Submarines. They also have 740 Air Force aircraft (F-35, F-15, F-16, F-50, F-5, F-4), 8 AEW&C/ FRA aircraft, ten active air bases, and 9 naval bases.

U.S. Bases In Philippines

United States military bases were established in the Philippines on the basis of a treaty signed after the conclusion of World War II and the recognition of Philippine independence by the U.S. The 21 years of Marcos dictatorship (1965-1986) allowed the U.S. to continue with some additional provisions.

But after him, the resurgence of Filipino nationalism was against U.S. bases. Despite the U.S. agreeing to pay compensation of \$900 million in 1983 for the next five years, the bases had already become a political liability for the Aquino government. The bases established under the original treaty were discontinued in 1991 and 1992 after the Senate of the Philippines narrowly rejected a new treaty that would have allowed some of the bases to continue for another ten years.

In July 1991, the U.S. and Philippine negotiators drafted a new agreement titled the Treaty of Friendship, Peace, and Cooperation between the two countries, proposing the clean-up and turnover of Clark to the Philippine government in 1992 and extending the lease of Subic Bay Naval Base by the U.S. for ten years. The eruption of Mount Pinatubo in June 1991 also influenced the United States' decision to abandon the nearby Clark Air Base, which was heavily damaged by ash emissions and lahar flows.

In November 1991, the U.S. government formally turned Clark over to the Philippine government, which transformed the airfield into Clark International Airport. The Subic Bay Naval base was deactivated in 1992. The Philippines–United States Visiting Forces Agreement came into effect in May 1999 and the Enhanced Defense Cooperation Agreement came into effect in April 2014 for ten years.

This allowed U.S. forces and contractors to operate out of “agreed locations.” In April 2015, the United States government asked for access to eight bases in the Philippines, including the formerly American Subic Bay Naval Base and Clark Air Base, as well as locations in Luzon, Cebu, and Palawan. Finally, the Philippines agreed on 5 locations for military bases. These included, Antonio Bautista Air Base (Palawan), Basa Air Base (Pampanga), Benito Ebuen Air Base (Cebu), Fort Magsaysay (Nueva Ecija), Lumbia Airport (Cagayan de Oro).

In February 2023, four additional locations of military bases were designated under the EDCA. These were Balabac Island (Palawan), Camp Melchor Dela Cruz (Gamu, Isabela), Lal-lo Airport (Lal-lo, Cagayan), and Naval Base Camilo Osias (Santa Ana, Cagayan). However, the governors of Isabela and Cagayan, which together host three of the bases, expressed dismay at the agreement, stating they had not been consulted on the sites and did not want their provinces to pay too much for the infrastructure improvements or become potential targets of Chinese nuclear attack.

Conclusion

There is a sizeable U.S. presence in the three important countries, Japan, South Korea, and the Philippines that face the East and South China Seas (SCS). Japan and South Korea have sizeable forces, and their defense expenditures are going up, which will increase their capabilities. The Philippines was most affected by Chinese aggressive designs in the SCS. In fact, they had to go to the International Court of Arbitration.

The United States Taiwan Defense Command (USTDC) was a sub-unified command of the United States Armed Forces operating in Taiwan from December 1954 to April 1979. At its peak in 1971, it had 8,565 military personnel on the Island. The Mutual Defense Treaty between the United States and Taiwan was a defense pact effective from 1955 to 1980. It was intended to defend the Island of Taiwan from invasion by China.

Some of its content was carried over to the Taiwan Relations Act of 1979. Since the formal U.S. recognition of China in 1979, the Act has defined the officially substantial but non-diplomatic relations between the U.S. and Taiwan. The Taiwan Policy Act of 2022 promotes Taiwan's security, ensures regional stability, and deters China's aggression against Taiwan. It also threatens severe sanctions for hostile action against Taiwan.

The Taiwan Policy Act of 2022 creates a new initiative to bolster Taiwan's defense capabilities, providing almost \$4.5 billion in security assistance over the next four years and designating Taiwan as a "Major Non-NATO Ally." Nowadays, there are around 100 US military advisers in Taiwan at any given time. Since the formation of QUAD, there have been increased military exercises in the Indo-Pacific region. With more NATO members getting involved in the region, the military strength against China is becoming significant.

<https://www.eurasiantimes.com/impossible-for-china-to-dominate-u-s-tightens-screws-in-indo-pacific-to-check-pla-fortify-allies-military-bases/>



Sat, 27 July 2024

Chinese Spy Ship Reaches Bay Of Bengal; Likely To Snoop At Indian Navy's Sub-Surface Missile Firing

Chinese spy ship Xiang Yang Hong 03 has reached India's strategic backyard to map the Bay of Bengal next to the scheduled Indian Navy's surface firing exercise. After the Sri Lankan government denied docking permission, the vessel has been going to the Maldives to replenish fuel, food, water, and personnel rotation. At the beginning of 2024, the ship was scheduled to make a port call in Sri Lanka, but the island nation banned Chinese vessels from docking for a year.

Now, the role is being played by the Maldives, located at the crossroads of trade routes in the Indian Ocean, which has recently been fostering closer ties with Beijing. Open-Source Intelligence (OSINT) has indicated that China's ocean research vessel Xiang Yang Hong 03 is "currently moving into the Bay of Bengal, operating just 120 nautical miles from a scheduled Indian Naval Subsurface firing exercise in the region.

OSINT expert Damien Symon's assessment indicates that the ship, managed by China's Third Institute of Oceanography, is just 380 nautical miles from Chennai in India. While China maintains that its activities in India's strategic waters are benign, India is wary of them, and rightly so. The

strategic community believes that despite being managed by the Third Institute of Oceanography, the ship has links to the People's Liberation Army (PLA).

The presence of the vessel in the vicinity as the Indian Navy conducts sub-surface firing can yield dual-purpose data with clear military ramifications. The survey vessel can get data on seabed mapping, recording hydrological data to understand the profile of the undersea environment, subsea cable intelligence gathering, recording telemetry data of missile firings, and so on. The research that the vessel is conducting in the region would help it to undertake a military mission in the Indian Ocean.

While seismic data is critical in assessing geological conditions, the presence of hydrocarbons, water, and seabed conditions also affect the ability to detect submarines. Research vessels involved in scientific research can also use their instruments for naval reconnaissance, gathering intelligence on foreign military facilities and vessels operating in the vicinity.

Xiang Yang Hong 03 had left China in January 2024 and since has been conducting explorations in the region, while docking at Maldives. Chinese Foreign Ministry spokesperson Wang Wenbin recently said that the Xiang Yang Hong 3's mission was scientific ocean exploration. "China's scientific research activities in relevant waters are for peaceful purposes and aimed at contributing to humanity's scientific understanding of the ocean. The activities are in strict compliance with the terms of the United Nations Convention on the Law of the Sea," Wang said on February 7 during the regular press briefing.

Exponential Growth Of Chinese Spy Ships

The exponential growth in the number of warships in the Chinese Navy has sent many big powers in the world into a tizzy. But the growing survey ship fleet also gives a peek into the PLA Navy's future capabilities and plans. Survey vessels are designed to examine subsea structures by sending sound waves into the ocean and collecting samples underwater. According to the International Maritime Organization's database, 64 registered Chinese survey vessels were built in or after 1990, surpassing 44 in the US and 23 in Japan.

The survey activities of ships flagged to other nations can usually be distinguished by the vessel's operator. In the United States, for example, military surveys are done by the US Navy, marine scientific research is conducted by universities or civilian organizations like the National Oceanic and Atmospheric Administration, and commercial surveys are conducted by private companies.

However, there are no such distinctions among China's state-owned fleet, making it impossible to confidently identify the purpose of most surveys. China's civil-military convergence makes it likely that data obtained by Chinese survey vessels is shared among scientific, military, and commercial entities.

Think tank Centre for Strategic and International Studies has said: "To survey the Earth's oceans, China has developed the world's largest fleet of civilian research vessels. While these ships support scientific and commercial objectives, they are also being used to advance Beijing's strategic ambitions."

Its report 'Hidden Reach' concluded after assessing the activities of Chinese survey vessels since 2020 that "Of the 64 active vessels, over 80 percent have demonstrated suspect behavior or possess organizational links suggesting their involvement in advancing Beijing's geopolitical agenda."

China's surveying operations have been heavily concentrated along its maritime periphery in the South China Sea and the western Pacific Ocean. But it has also set its sights on the Indian Ocean, an emerging arena of competition between Beijing and New Delhi.

Suspicious Activities Of Chinese Research Vessels

The behavior of Chinese research vessels that raise suspicion are repeated instances of “spoofing” (providing falsified identification information) or “going dark” (turning off automatic identification system signals for extended periods). Data from Windward indicates the Chinese spy vessel resorts to these methods frequently especially near foreign military facilities.

Some Chinese survey ships have conducted survey operations within the exclusive economic zones (EEZs) of other countries without prior permission, which is prohibited under international law. These activities have sparked diplomatic spats, including a 2019 confrontation between an Indian warship and a Chinese research vessel operating unauthorized in India’s EEZ.

Harvesting Ocean Data For Submarine Ops

Knowing the underwater domain is critical for Chinese submarine operations in the Indian Ocean. Chinese submarines could be called on to support a wide range of missions, ranging from intelligence collection to nuclear deterrence patrols. Expanding its submarine operations in the region would require overcoming certain geographical hurdles, foremost being the key chokepoints between the South China Sea and the Indian Ocean.

The US Department of Defense assesses that China has likely considered 18 countries as potential hosts for an additional overseas military facility. Of these, 11 ring the Indian Ocean. Chinese survey vessels have become common in India’s sphere of influence. Reports indicate that the Chinese have been particularly interested in the Ninetyeast Ridge, a mid-ocean ridge on the Indian Ocean floor. The ridge divides the Indian Ocean into the West and East Indian Ocean.

Naval experts have contended that this range is important for submarine operations. The data will aid Chinese submarines in increasing their activity in the Indian Ocean. In August 2019, the Chinese survey vessel Shi Yan 1 came 460 km east of the Indian island Port Blair in the Bay of Bengal and was forced to move out by the Indian Navy’s warships.

In December 2019, another of its survey vessels, Xiang Yang Hong 06, reportedly deployed at least 12 underwater gliders in the Indian Ocean. These long-endurance unmanned underwater vehicles (UUVs) traveled around 12,000 km at a depth of 6.5 km from the ocean surface to gather data on currents and water properties.

<https://www.eurasiantimes.com/chinese-spy-ship-reaches-bay-of-bengal/>



Sat, 27 July 2024

Strengthening US Security: The Introduction of the Mako Hypersonic Missile

In response to recent intrusions by China and Russia in Alaska, the United States has decided to bolster its defence capabilities by equipping its fighter aircraft with a new hypersonic missile named ‘Mako’. This decision, made in the lead-up to the presidential election, has sparked discussions worldwide, particularly in Russia and China. The Mako missile promises to enhance America’s security in conflict zones, rendering its defences nearly impregnable.

The Mako Hypersonic Missile

The Mako missile, developed by Lockheed Martin, is a multi-mission weapon designed for diverse attack scenarios, including surface, sea, air, and air defence systems. This advanced missile will be installed in all American fighter jets, such as the F-15, F-16, F-18, F-22, and F-35, as well as in bombers and surveillance aircraft. Its capabilities have been rigorously tested across various platforms, ensuring its readiness for deployment.

Lockheed Martin introduced the Mako missile to the world, naming it after the Mako shark, renowned for being the fastest-swimming fish in the ocean. The missile's design and functionality reflect the agility and speed of its namesake, making it a formidable addition to the US military arsenal.

Enhancing Military Capabilities

The US Navy, Navy SEAL commandos, and the US Air Force are set to install the Mako missile in all their military aircraft. The missile's versatility allows it to be used in any mission and launched from any aircraft, providing a significant tactical advantage. Its ability to attack various targets, from sea and air to complex air defence systems, makes it a vital tool for modern warfare.

The Mako missile can be installed in fourth, fifth, and sixth-generation stealth fighter aircraft, enhancing the combat capabilities of the US military. This air-launched missile can be fired from any aircraft, ensuring flexibility and rapid deployment in various combat scenarios. Similar to the Tomahawk missile, the Mako hypersonic missile is expected to significantly boost the strength of the US Army, Air Force, and Navy.

The Russian Kinjal Hypersonic Missile

The development of the Mako missile comes in response to Russia's deployment of the 'Kinjal' (or Kinzhal and KH-47M2) hypersonic missile. Russia has utilized the Kinjal missile in the ongoing conflict with Ukraine, launching it from MiG-31 aircraft. The Kinjal missile has demonstrated its effectiveness in combat, highlighting the strategic advantage hypersonic weapons can provide.

Russia's Kinjal missile travels at speeds exceeding Mach 10, making it difficult for existing defence systems to intercept. Its ability to carry both conventional and nuclear warheads further enhances its strategic value. The missile's deployment in Ukraine has underscored the need for the US to develop comparable hypersonic capabilities to maintain a balance of power.

Strategic Implications

The introduction of the Mako missile is a significant step for the US in maintaining its military superiority. Hypersonic weapons, capable of traveling at speeds greater than five times the speed of sound, present a formidable challenge for defence systems. Their speed, maneuverability, and ability to carry various payloads make them critical assets in modern warfare.

The deployment of the Mako missile will likely influence global military strategies, prompting other nations to accelerate their hypersonic weapon development programs. As hypersonic technology continues to evolve, the strategic landscape will shift, with countries striving to develop advanced systems to counter potential threats.

Bottomline

As hypersonic weapons become more integral to military strategies, the development and deployment of the Mako missile underscore the importance of maintaining technological superiority in an ever-evolving global security environment.

<https://www.financialexpress.com/business/defence-strengthening-us-security-the-introduction-of-the-mako-hypersonic-missile-3566391/>



Press Information Bureau
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Ministry of Science & Technology

Fri, 26 July 2024

Polyatomic ion shows new way of CCU under ambient conditions

Researchers have found a new way to utilise carbon dioxide CO₂ in ambient reaction conditions, unlike formerly reported harsh thermal conditions. Using CO₂ they have converted amines to N-formamides useful for synthesizing heterocycles, pharmaceuticals, and bio-active compounds, through a green approach.

Carbon capture and utilisation is becoming more and more important as a solution for the rising greenhouse gases in the atmosphere. Polyoxometalates (POM), a class of synthesised nanomaterials, consisting three or more transition metal linked together by shared oxygen atoms, are promising candidates for improving photocatalytic conversion of CO₂ which is the most significant greenhouse gas.

They offer high-efficiency catalytic sites and exhibit extraordinary thermal stability, redox ability, and semiconductor-like properties. Utilizing POMs as photocatalysts offer several advantages. Their light absorption properties can be finely tuned by incorporating different transition metals. The secret that makes them candidates for photocatalytic conversion are their properties of quick and reversible multielectron transfer. However, earlier most photocatalytic conversions have been carried out under extreme conditions and scientists are on the look out for solutions to carry out such conversions under normal conditions.

Researchers at Institute of Nano Science and Technology (INST) Mohali, an institute of Department of Science and Technology have explored two novel Keggin POM-based solids--- (C₅H₇N₂)₅[CoW₁₂O₄₀] (PS-96) and (C₅H₇N₂)₅[CuW₁₂O₄₀] (PS-97), [C₅H₇N₂ = 4-aminopyridine] out of which the latter was found to be active for efficient and photocatalytic N-formylation of various substituted anilines and morpholine with CO₂ using phenyl silane as a reducing agent, which operates under ambient conditions. They found that the band gap of the catalyst was ultra-low at 1.43 eV. This property specifically urged them to check the photocatalytic activity of POMs in the visible region.

Working in collaboration Dr. Suman Lata Jain, IIP Dehradun, INST researchers (Dr. Monika Singh, Parul Sood and others) found that in the N-formylation reaction, POMs can convert CO₂ and amines into formamide derivatives by activating the CO₂ molecule and promoting its reaction with the amine substrate. POMs exhibiting photocatalytic activity can initiate and accelerate chemical reactions under light irradiation. This property is particularly beneficial in the context of CO₂ utilization.

Using POMs as photocatalysts aligns with green chemistry principles by reducing the need for stoichiometric reagents and minimizing waste while utilizing CO₂ (a greenhouse gas) as a reactant.

This contributes to more sustainable chemical processes. Moreover, POMs as photocatalysts are easily available and are cost-effective materials.

This research published in *Journal of Material Chemistry A* (<https://doi.org/10.1039/D4TA02432J>) opens the path for research investigating POM-based hybrid solids in photocatalytic N-formylation of amines using CO₂.

<https://pib.gov.in/PressReleasePage.aspx?PRID=2037629>

ThePrint

Fri, 26 July 2024

Scientists discover ‘dark oxygen’ produced on deep-ocean floor where the Sun don’t shine

The discovery of dark oxygen produced by “rocks” at the bottom of the ocean where the Sun doesn’t shine has scientists reassessing the origin of life.

Much of the oxygen that supports life on Earth is produced from sunlight by photosynthetic organisms such as plants and algae. It is generally understood that this is how life began.

Now, that understanding has been challenged by new evidence that oxygen can also be produced by electrolysis on the floor of the ocean, 4,000 metres below the surface, according to a study published Monday in the peer-reviewed journal *Nature Geoscience*.

A team of scientists led by Andrew Sweetman of the Scottish Association for Marine Science (SAMS) made the discovery on the seabed of the Clarion-Clipperton Zone of the Pacific Ocean. Specifically, they measured the electric voltage in mineral masses (called polymetallic nodules) on the seabed and found that it was high enough to split seawater into oxygen and hydrogen.

Oxygen produced in the absence of sunlight is called “dark oxygen”.

The concept of “dark oxygen” itself is not new, for there has been evidence of bacteria (*Candidatus Methylophilum oxyfera*) producing oxygen in the absence of photosynthesis, according to a 2012 study published in the journal *Frontiers*.

However, this is the first time that scientists have found evidence of oxygen being produced at the seafloor.

According to the researchers, the discovery calls into question how life on Earth began.

“While the presence of some microbial metabolisms that perform oxygen production without light has been known for a while, they are not usually thought to be very active on a global scale, and the phenomenon of dark oxygen production in the deep sea has not been presumed; in fact, its detection runs counter to the long-standing conventional wisdom that any oxygen that does make it to the deep sea ultimately comes from the atmosphere and photosynthesis. That doesn’t seem to be the case anymore,” Jeffrey Marlow, a biologist at Boston University and one of the authors of the study, told ThePrint over email.

Nodules rich in metals, have high electric charge

The team that made the discovery was sampling the seabed for the possible impact of deep-sea mining of polymetallic nodules.

While no such mining has been approved yet, the potential is being explored; these polymetallic nodules contain metals such as manganese, nickel and cobalt, which go into making lithium-ion batteries. The nodules also contain rare-earth metals.

The team found nodules to be carrying a very high electric charge. They measured the voltage, or the difference of charge between various points, and found it high enough to enable the splitting of seawater into hydrogen and oxygen by seawater electrolysis.

“When measuring the voltages on the nodule, the values were much higher than a regular rock from the street and calculations showed the measured values and the environmental conditions combined would be able to produce the observed oxygen. So yes, if the voltages reach the minimum threshold, they will always split water, unless there are additional processes we are currently unaware of,” Danielle S.W. de Jonge, a PhD student at SAMS and one of the study authors, told ThePrint.

The study, however, acknowledges that questions remain about the potential mechanism behind the electrolysis and the source of the energy driving the process.

Mining may affect seafloor ecosystems

The scientists said the dark oxygen could support seafloor ecosystems, which may be impacted if mining does take place.

Although deep-sea mining has not yet been formally approved by the International Seabed Authority, Marlow said some test mining has begun.

In the Clarion-Clipperton Zone where the new study was carried out, 19 licences (each covering 75,000 square kilometres) have been granted for initial studies on mining.

“This means that 1.4 million square kilometres are under consideration for large-scale mining, which by my quick calculations, is about one third the size of India! So yes, the potential impact would be substantial because it could occur over a very large area,” Marlow told ThePrint.

<https://theprint.in/science/scientists-discover-dark-oxygen-produced-on-deep-ocean-floor-where-the-sun-dont-shine/2192813/>

THE ECONOMIC TIMES

Sat, 27 July 2024

Gaganyaan mission update: One ISRO astronaut to undertake space travel to ISS post-August, says Minister Jitendra Singh

An astronaut named Gaganyaatri from ISRO will embark on a journey to the International Space Station (ISS), space minister Jitendra Singh told Lok Sabha, giving an update on an Indian astronaut going to space in the coming weeks.

In a written reply to the Lower House of Parliament, the minister said the Indian space agency is "pursuing an Isro-Nasa joint mission to ISS wherein one Gaganyatri from Isro will undertake space travel to ISS. This is a collaborative effort of Isro, Nasa and Nasa-identified private entity, i.e. Axiom Space. Recently, Isro has signed a space flight agreement with Axiom Space for this joint mission to the ISS."

The reply came on the Lok Sabha query of Trinamool Congress MLA Saugata Roy about the "Axiom-4 Mission", astronauts and the Gaganyaan mission.

Nasa said the space agency and Axiom Space have signed an order for the fourth private astronaut mission to the ISS, "targeted to launch no earlier than August 2024 from the agency's Kennedy Space Center in Florida". The Gaganyatri for the ISS mission will be one of the four IAF pilots being trained for the Gaganyaan mission.

The Astronaut Selection Board constituted by Isro had earlier selected four astronauts from a group of IAF test pilots. All four astronauts had undergone training on a spaceflight basic module in Russia during the pandemic. Currently, Indian astronauts are undergoing training at Isro's Astronauts Training Facility in Bengaluru for the Gaganyaan mission, the minister informed. On the Gaganyaan training, Singh said, "Two out of three semesters of the (Gaganyatri) training programme were completed. Independent training simulator and static mockup simulators (have been) realised."

On the vehicle that will put astronauts in space, Jitendra Singh said "solid and liquid propulsion stages of human-rated launch vehicle are ready for flight integration. C32 cryogenic stage is nearing completion. Crew module and service module structure realisation has been completed and flight integration activities are in progress."

The Gaganyaan project is Isro's big-ticket mission that envisages a demonstration of human spaceflight capability by launching a crew of three members into an orbit of 400 km for a three-day mission and bringing them safely back to the Earth by landing in Indian waters. The mission is expected to be launched in 2025.

<https://economictimes.indiatimes.com/news/science/gaganyaan-mission-update-one-isro-astronaut-to-undertake-space-travel-to-iss-post-august-says-minister-jitendra-singh/articleshow/112061053.cms>

THE ECONOMIC TIMES

Fri, 26 July 2024

International astronomers including IIT Kanpur professor discover 'super-Jupiter' exoplanet orbiting a Sun-like star

An international team of astronomers, including Dr. Prashant Pathak from IIT-Kanpur, has discovered a giant exoplanet orbiting a nearby star similar to our Sun, a TOI report stated. The exoplanet, named Epsilon Indi Ab (Eps Ind Ab), is classified as a 'superJupiter' due to its mass, which is at least six times greater than that of Jupiter. This is the first mature exoplanet discovered using direct imaging, according to a statement from IIT-Kanpur on Thursday. The details of the discovery were published in the journal Nature.

DirectImaging Technique

The discovery was made using the James Webb Space Telescope's (JWST) MidInfraRed Instrument (MIRI). The planet orbits the K5V-type star Epsilon Indi A, located 12 light-years from Earth. The exoplanet has a temperature of about -1°C (30°F) and orbits its star at a distance 28 times greater than the Earth-Sun distance. "Previous studies had correctly identified a planet in this system but underestimated its mass and orbital separation," said Elisabeth Matthews from the Max Planck

Institute for Astronomy and lead author of the research. With the help of the JWST, the team was able to accurately determine these properties.

Significance of the Discovery

"This discovery is a major milestone in exoplanet research and sets the stage for future discoveries," said Manindra Agrawal, director of IIT-Kanpur. Dr. Prashant Pathak emphasized the importance of this discovery, highlighting its unusual atmospheric composition with a high metal content and a different carbon-to-oxygen ratio. He noted, "This opens up fascinating questions about its formation and evolution."

Methodology and Future Research

The team decided to use a direct imaging approach due to the planet's long orbital period of around 200 years. They used JWST's MIRI camera equipped with a coronagraph to block starlight, enabling the detection of faint signals around bright objects. Dr. Pathak explained, "Previous attempts to study the planet were not successful as the planet's orbital period is around 200 years and the data from short-term observations was not sufficient to accurately determine the planet's properties."

Thomas Henning, Emeritus Director at MPIA and co-PI of the MIRI instrument, stated, "Our next goal is to obtain spectra for a detailed fingerprint of the planet's climatology and chemical composition. In the long run, we hope to also observe other nearby planetary systems to hunt for cold gas giants."

<https://economictimes.indiatimes.com/news/science/international-astronomers-including-iit-kanpur-professor-discover-super-jupiter-exoplanet-orbiting-a-sun-like-star/articleshow/112041856.cms>



Mon, 29 July 2024

Europe's JUICE probe set for close encounter with Earth before journey to Jupiter

European Space Agency's Jupiter Icy Moons Explorer (JUICE) is gearing up for a pivotal maneuver in its mission to the gas giant. Scheduled to fly past Earth on August 20, 2024, the spacecraft will come within 4,200 miles (6,800 kilometers) of our planet, providing a rare opportunity to catch a fleeting glimpse of it. Launched in April 2023, JUICE is Europe's first mission to Jupiter, tasked with studying the planet and its largest moons: Ganymede, Callisto, and Europa.

These moons are believed to have subsurface oceans beneath their icy crusts, making them key targets in the quest to understand more about potential extraterrestrial life.

When and how can you spot JUICE?

The close flyby of Earth will occur at 5:57 p.m. Eastern Time (21:57 GMT) on August 20. This will assist in adjusting the spacecraft's trajectory through a gravity-assisted maneuver.

This flyby, along with a planned future flyby of Venus and two additional passes by Earth, is essential for setting JUICE on its course to reach Jupiter in 2031.

The European Space Agency (ESA) has advised that powerful binoculars or a telescope will offer the best chance to view the spacecraft.

Why is the flyby significant?

The flyby will serve as a crucial test for JUICE's instruments. Notably, the RIME (Radar for Icy Moon Exploration) antenna, which faced deployment issues and electronic noise problems, will be activated for a performance check.

Engineers will have an eight-minute window on August 19 to assess RIME's functionality and potentially adjust its operations.

"These maneuvers are akin to navigating a narrow corridor at high speed," said Ignacio Tanco, the mission's operations manager. He emphasized the precision required for successful execution, given the narrow margin for error.

Ground stations worldwide will be in constant communication with JUICE starting August 17, monitoring the spacecraft's progress and making necessary adjustments.

JUICE to also fly past moon:

Before reaching Earth, JUICE will first glide past the Earth's moon on August 19. The spacecraft will then approach Earth, with the closest view over Southeast Asia and the Pacific Ocean. When the probe will be behind the moon, brief communication gaps are expected— such as a half-hour break on August 19—these are accounted for in the mission's planning. JUICE's journey to Jupiter, which would have otherwise required 132,000 pounds (60,000 kilograms) of propellant, benefits from the gravity assists provided by the moon and Earth flybys.

This efficient use of fuel allows the spacecraft to carry only 8,000 pounds (3,650 kilograms) of propellant, with a reserve of 800 pounds (363 kilograms) used for trajectory adjustments. As JUICE approaches Earth, its onboard cameras will capture images of our planet and the moon, which will be shared on social media.

<https://indianexpress.com/article/technology/science/europe-juice-probe-set-close-encounter-earth-before-jupiter-9481517/>



Sat, 27 July 2024

India's first fully robotic telescope captures 'building-sized' asteroid zipping past Earth

India's first fully robotic GROWTH-India telescope in Ladakh captured images of a massive asteroid as it made a close pass by Earth on July 25 (Thursday). Classified as a Near Earth Asteroid, '2011 MW1' zoomed past our planet at a breathtaking speed of 28,946 kilometers per hour, coming as close as ten times the distance to the Moon. The images were captured by the country's first fully robotic optical research telescope located at the Indian Astronomical Observatory in Hanle, Ladakh.

Astrophysicist Varun Bhalerao, associated with IIT Bombay's STAR lab, shared an image of the asteroid on social media, showcasing its rapid movement that made stars in the background look like flecks.

Despite being classified as an Apollo-class asteroid because its orbit intersects with Earth's path, it does not qualify as a 'Potentially Hazardous Asteroid'. GROWTH-India's primary mission is to observe celestial phenomena, including Near Earth Asteroids, which may pose potential threats to Earth.

Asteroids, remnants from the early solar system, offer valuable scientific insights into the conditions that existed billions of years ago.

https://indianexpress.com/article/technology/science/india-telescope-captures-building-sized-asteroid-zipping-past-earth-9478028/#google_vignette

