

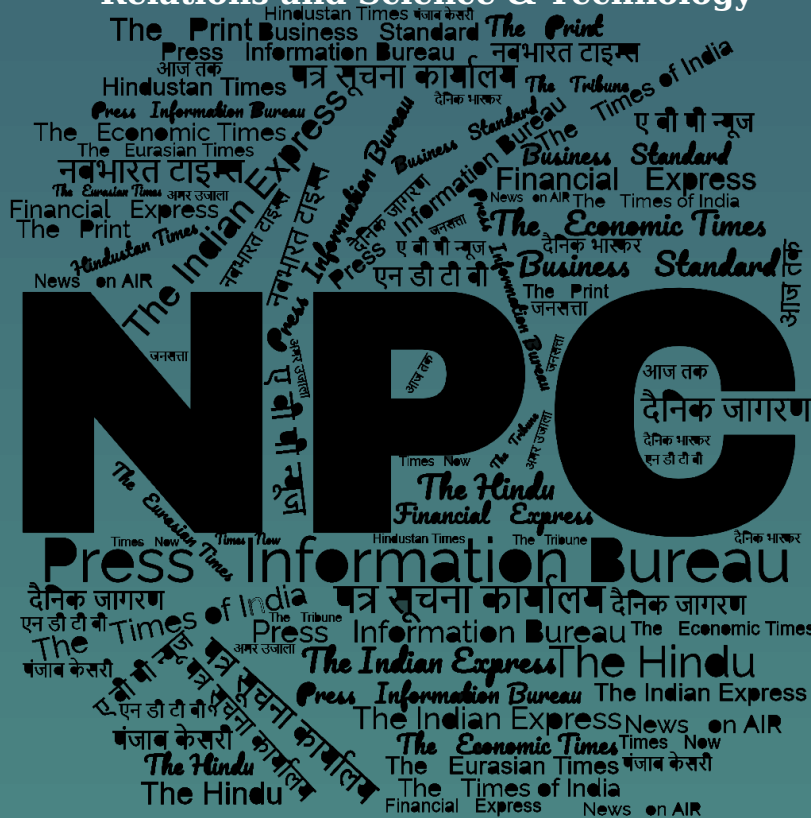
दिसंबर
Dec
2023

खंड/Vol. : 48 अंक/Issue : 242
27/12/2023

समाचार पत्रों से चयित अंश Newspapers Clippings

डीआरडीओ समुदाय को डीआरडीओ प्रौद्योगिकियों, रक्षा प्रौद्योगिकियों, रक्षा नीतियों, अंतर्राष्ट्रीय संबंधों और विज्ञान एवं प्रौद्योगिकी की नूतन जानकारी से अवगत कराने हेतु दैनिक सेवा

A Daily service to keep DRDO Fraternity abreast with DRDO Technologies, Defence Technologies, Defence Policies, International Relations and Science & Technology



रक्षा विज्ञान पुस्तकालय
Defence Science Library
रक्षा वैज्ञानिक सूचना एवं प्रलेखन केंद्र
Defence Scientific Information & Documentation Centre
मेटकॉफ हाउस, दिल्ली - 110 054
Metcalf House, Delhi - 110 054

CONTENTS

S. No.	TITLE		Page No.
Defence News			1-11
Defence Strategic: National/International			1-11
1.	Raksha Mantri Commissions Stealth Guided Missile Destroyer INS Imphal in Mumbai; Terms it as a Symbol of 'Aatmanirbharta' in Defence	<i>Press Information Bureau</i>	1
2.	INS Imphal: Navy Commissions Indigenous Stealth-guided Missile Destroyer in Mumbai	<i>The Times of India</i>	3
3.	"India's Growing Economic, Strategic Power has Filled some Forces with Jealousy, Hatred": Rajnath Singh	<i>ANI</i>	4
4.	Army to Launch Offensive against Terror Hideouts after Poonch Attack: Sources	<i>India Today</i>	6
5.	Defence Minister Rajnath Singh to Visit Rajouri on December 27	<i>The Hindu</i>	7
6.	'India-Russia Ties the only Constant in World Politics', Says EAM Jaishankar	<i>Hindustan Times</i>	7
7.	Houthi Attacks: India not Joining Operation Prosperity Guardian in Red Sea as of now	<i>The Week</i>	8
8.	India's Defence and Aerospace Sector Leapfrog Jump in 2023	<i>Businessworld</i>	10
Science & Technology News			11-16
9.	New Non-invasive Formaldehyde Sensor can Detect Adulterated Fish at Room Temperature	<i>Press Information Bureau</i>	11
10.	Ionospheric Secrets Traced in the White Continent can Help Satellite-based Navigation	<i>Press Information Bureau</i>	12
11.	Experimental GenAI Models should not be Open to Public: Government to Tech Firms	<i>Financial Express</i>	13
12.	Aditya L1 Mission: What will Happen after Spacecraft Reaches Destination on January 6?	<i>Mint</i>	14
13.	ISRO to Launch PSLV-C58 with XPoSAT on January 1, Study Black Holes, Neutron Stars	<i>India Today</i>	16



Press Information Bureau
Government of India

Ministry of Defence

Tue, 26 Dec 2023

Raksha Mantri Commissions Stealth Guided Missile Destroyer INS Imphal in Mumbai; Terms it as a Symbol of 'Aatmanirbharta' in Defence

With 75% indigenous content, enhanced stealth features & state-of-the-art equipment, the ship to further strengthen India's maritime power & safeguard national interests

INS Imphal to bolster our principle of 'Jalmev Yasya, Balmev Tasya' (One Who Controls the Sea is All Powerful) in Indo-Pacific region: Shri Rajnath Singh

"India's growing power has filled some forces with jealousy & hatred; Perpetrators of attacks on Merchant Vessels 'Chem Pluto' & 'Sai Baba' will soon be brought to justice"

"India plays the role of Net Security Provider in Indian Ocean Region; Together with friendly countries, we will keep the sea lanes secure to ensure that maritime trade touches greater heights"

INS Imphal, a Project 15B stealth guided missile destroyer, was commissioned into the Indian Navy in the presence of Raksha Mantri Shri Rajnath Singh at an impressive ceremony held at the Naval Dockyard, Mumbai on December 26, 2023. The event marks the formal induction of the third of four indigenous 'Visakhapatnam' class destroyers, being designed by the Indian Navy's Warship Design Bureau and constructed by Mazagon Dock Shipbuilders Limited (MDL), Mumbai.

Speaking on the occasion, the Raksha Mantri described INS Imphal as a shining example of 'Aatmanirbharta' in defence and a reflection of the commitment of Indian Navy, MDL & all other stakeholders towards national security. "INS Imphal is a symbol of India's growing maritime power and it will strengthen it further. It will bolster our principle of 'Jalmev Yasya, Balmev Tasya' (One Who Controls the Sea is All Powerful) in the Indo-Pacific region," he said.

The ship measures 163m in length, 17m in breadth with a displacement of 7,400 tonnes and is amongst the most potent warships built in India. It is propelled by four powerful Gas Turbines, in a Combined Gas & Gas configuration, and is capable of speeds in excess of 30 knots.

The Raksha Mantri defined INS IMPHAL as a conglomeration of different strengths of the nation. "Brahmos Aerospace installed Brahmos missile on the ship. Torpedo tube launchers are of Larsen & Toubro (L&T). Rapid Gun Mount has been installed by Bharat Heavy Electricals Limited (BHEL), and Medium Range missiles by Bharat Electronics Limited (BEL). In addition, many

start-ups and MSMEs are involved in its construction. Just like many elements have given a concrete form to INS IMPHAL, people from all walks of life should work together for us to become 'Viksit Bharat'. Every citizen is a carrier of India's security and progress. Whenever one works, the betterment of the nation must be kept in mind," he said.

Shri Rajnath Singh reiterated the Government's resolve to lay equal emphasis on the modernisation of all the three Services to safeguard national interests, stating that earlier governments focussed only on protecting the country from land-based threats. He pointed out that with the Himalayas in the north and the hostile behavior of Pakistan in the west, most of India's goods trade comes through sea, which makes it an island country from 'trade' perspective. He stressed on the need to continuously develop the Navy's capabilities as global trade is of great importance to India to secure its national interests.

The Raksha Mantri also referred to the recent suspected drone attack on Merchant Vessel (MV) Chem Pluto in the Arabian Sea and the attack on 'MV Sai Baba' in the Red Sea. He stated that India's growing economic and strategic power has filled some forces with jealousy and hatred. He added that the Government of India has taken the attacks very seriously and the Navy has increased its surveillance. He assured that the perpetrators of these attacks will soon be brought to justice and strict action will be taken against them.

"India plays the role of a Net Security Provider in the entire Indian Ocean Region. We will ensure that maritime trade in this region touches greater heights. For this, together with our friendly countries, we will keep the sea lanes secure. We have full confidence in the ability and strength of our Navy," said Shri Rajnath Singh.

In his address, Chief of the Naval Staff Admiral R Hari Kumar stated that INS Imphal possesses the distinction of being a shining symbol of Indian Navy's unflinching commitment towards achieving the vision of self-reliance in defence. He also termed it a testament to 'Ek Bharat Shreshtha Bharat' vision of the Government. He added that the ship will not only tackle physical threats that emanate from the seas, but will also demonstrate the strength of an integrated country. "INS Imphal will deter the various designs that try to harm national unity. It will breath fire upon the enemy and demonstrate unflinching resolve in the face of adversity," he said.

The Chief of the Naval Staff exuded confidence that the fourth Project 15B stealth guided missile destroyer 'Surat' will be commissioned in 2024. Prior to the commissioning of INS Imphal, two destroyers of the same class INS Visakhapatnam and INS Mormugao were commissioned into the Navy in 2021 & 2022 respectively.

Admiral R Hari Kumar pointed out that to counter piracy & drone attacks on merchant shipping, the Indian Navy has deployed four destroyers of Project 15B & 15A class deployed. He added that the P8I Aircraft, Dorniers, Sea Guardians, Helicopters & Coast Guard Ships have all been deployed jointly to counter these threats.

The Chief of the Naval Staff added that the Navy aims to induct at least one Agniveer from each district, each block and each village of the country. "The strategy is to attract youth - both men and women - from every corner of the country, up-skill them when in Service, certify their abilities through education institutions, inculcate a spirit of nationalism and ensure that they re-join the civil sector as invaluable assets. The vision is to percolate such a nationalistic workforce across the length and breadth of the country," he said.

INS Imphal has the unique distinction of being the first warship to be named after a city in the North-east, underscoring the importance and contribution of the region and Manipur to the Nation & the Indian Navy. Its keel was laid on May 19, 2017 and the ship was launched on April 20, 2019. The ship sailed for her maiden sea sortie on April 28, 2023, and underwent comprehensive trials in harbour & at sea, with its delivery on October 20, 2023 marking a record time frame of less than

six months. The time taken to build INS Imphal and undergo trials has been the shortest for any indigenous destroyer. The ship successfully completed the first-ever test-firing of extended range Brahmos missile prior to its commissioning, making it 'weapon-ready'.

Maharashtra Chief Minister Shri Eknath Shinde, Flag Officer Commanding-in-Chief, Western Naval Command Vice Admiral Dinesh K Tripathi and Director (Finance) with Additional Charge of Chairman & Managing Director, MDL Shri Sanjeev Singhal were among those who attended the commissioning ceremony.

The ship has a total complement of about 315 personnel, and is commanded by Captain KK Choudhury, a Gunnery and Missiles specialist. It will augment the Navy's mobility, reach and flexibility in safeguarding the nation's maritime security and interests.

INS Imphal has enhanced stealth features resulting in a reduced Radar Cross Section, achieved through efficient shaping of hull, full beam superstructure design, plated masts and use of radar transparent material on exposed decks. It is armed with sophisticated state-of-the-art weapons and sensors, including Surface-to-Surface Missiles, Surface-to-Air Missiles, Anti-Submarine Warfare (ASW) rocket launchers & Torpedo launchers, ASW helicopters, radars, sonar and Electronic Warfare systems. The ship is equipped to fight under Nuclear, Biological and Chemical warfare conditions.

A unique feature of this ship is the high level of indigenisation of about 75%, highlighting Prime Minister Shri Narendra Modi-led Government's efforts towards 'Aatmanirbhar Bharat'. The indigenous equipment/systems include Combat Management System, Rocket Launcher, Torpedo Launcher, Integrated Platform Management System, Automated Power Management System, Foldable Hangar Doors, Helo Traversing system, Close-in Weapon System, and the Bow-mounted SONAR.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1990408>

THE TIMES OF INDIA

Tue, 26 Dec 2023

INS Imphal: Navy Commissions Indigenous Stealth-guided Missile Destroyer in Mumbai

Indian Navy on Tuesday commissioned its latest stealth-guided missile destroyer 'INS Imphal' at Naval Dockyard in Mumbai.

The largest and most advanced destroyer to ever be named after a city in the northeastern state of Manipur, its commissioning has added muscle to India's naval fleet.

"INS Imphal will not only tackle physical threats that emanate at or from the seas, but also, through the demonstrated strength of an integrated Bharat, she will deter nefarious designs, trying to subvert our national unity," Navy chief Admiral R Hari Kumar said during the commissioning event. Defence minister Rajnath Singh and Maharashtra chief minister Eknath Shinde were present at the Naval Dockyard for the event that marked the formal induction into the Navy of the third of four 'Visakhapatnam' class destroyers.

Speaking after the commissioning of INS Imphal, Rajnath said India has intensified patrolling of the seas after the recent attacks on merchant navy ships. "The Indian government has taken the drone attack on MV Chem Pluto and attack on MV Saibaba in the Red Sea seriously. We will find

those who executed the recent attacks on merchant navy ships even from the depths of the seas and take strict action against them," he said.

MV Chem Pluto with 21 Indian crew members, was struck by a drone about 217 nautical miles from Porbandar on Saturday following which both the Indian Navy and the Indian Coast Guard deployed a number of assets to provide assistance to the ship. In another such incident, a Gabon-flagged commercial crude oil tanker, with 25 Indian crew members, also came under a drone attack in the Red Sea.

Imphal was delivered to the Indian Navy on October 20 after completing a rigorous and comprehensive trial programme both in the harbour and at sea. The ship's keel was laid on May 19, 2017, and the ship was launched into water on April 20, 2019.

Measuring 163 metres in length, displacing 7,400 tonnes and with 75% indigenous content, Imphal can rightfully be regarded as one of the most potent warships to have been constructed in India.

A testament to India's growing shipbuilding prowess in pursuit of the national vision of 'Aatmanirbhar Bharat'. The warship is a true harbinger of a developed India, in tune with the national vision for 'Amrit Kaal'. The ship boasts a high indigenous content including medium range surface-to-air missiles, BrahMos surface-to-surface missiles, indigenous torpedo tube launchers, anti-submarine indigenous rocket launchers and 76mm super rapid gun mount.

— rajnathsingh (@rajnathsingh)

INS Imphal is fitted with a modern surveillance radar which provides target data to the gunnery weapon systems of the ship. The ship's Anti-Submarine Warfare capabilities are provided by the indigenously developed Rocket Launchers, Torpedo Launchers and ASW helicopters. The ship is equipped to fight under Nuclear, Biological and Chemical (NBC) warfare conditions and has a high degree of automation and stealth features further enhancing her combat capability and survivability.

A state-of-the-art warship, Imphal is designed by the Indian Navy's Warship Design Bureau and built by M/s MDL, with significant contributions from the public and private sectors, including MSMEs, and the Defence Research and Development Organisation (DRDO).

<https://timesofindia.indiatimes.com/india/ins-imphal-commissioning-indian-navy-indigenous-stealth-guided-missile-destroyer-rajnath-singh/articleshowprint/106280890.cms>



Tue, 26 Dec 2023

"India's Growing Economic, Strategic Power has Filled some Forces with Jealousy, Hatred": Rajnath Singh

After the INS Imphal, a Project 15B stealth-guided missile destroyer was commissioned into the Indian Navy, Union Defence Minister Rajnath Singh on Tuesday said that the INS Imphal is a shining example of 'Aatmanirbharta' in defence and a reflection of the commitment of the Indian Navy, MDL and all other stakeholders towards national security. He also stated that India's growing economic and strategic power has filled some forces with jealousy and hatred.

Speaking on the occasion, Defence Minister Rajnath Singh said, "INS Imphal is a symbol of India's growing maritime power and it will strengthen it further. It will bolster our principle of 'Jalmev Yasya, Balmev Tasya' (One Who Controls the Sea is All Powerful) in the Indo-Pacific region."

According to the Defence Ministry, the ship measures 163m in length and 17m in breadth, with a displacement of 7,400 tonnes and is among the most potent warships built in India. It is propelled by four powerful gas turbines, in a combined gas and gas configuration, and is capable of speeds in excess of 30 knots.

The Defence Minister defined INS Imphal as a conglomeration of different strengths of the nation. "Brahmos Aerospace installed Brahmos missile on the ship.

Rajnath Singh reiterated the government's resolve to lay equal emphasis on the modernisation of all three services to safeguard national interests, stating that earlier governments focussed only on protecting the country from land-based threats.

He pointed out that with the Himalayas in the north and the hostile behaviour of Pakistan in the west, most of India's goods trade comes through the sea, which makes it an island country from a 'trade' perspective. He stressed the need to continuously develop the Navy's capabilities, as global trade is of great importance to India to secure its national interests.

The Defence Minister also referred to the recent suspected drone attack on Merchant Vessel (MV) Chem Pluto in the Arabian Sea and the attack on 'MV Sai Baba' in the Red Sea.

He added that the Government of India has taken the attacks very seriously and the Navy has increased its surveillance. He assured that the perpetrators of these attacks will soon be brought to justice and strict action will be taken against them.

"India plays the role of a net security provider in the entire Indian Ocean Region. We will ensure that maritime trade in this region touches greater heights. For this, together with our friendly countries, we will keep the sea lanes secure. We have full confidence in the ability and strength of our Navy," Rajnath Singh said.

On the occasion, Chief of the Naval Staff Admiral R Hari Kumar stated that INS Imphal possesses the distinction of being a shining symbol of the Indian Navy's unflinching commitment towards achieving the vision of self-reliance in defence.

He also termed it a testament to the 'Ek Bharat Shreshtha Bharat' vision of the government. He added that the ship will not only tackle physical threats that emanate from the seas but will also demonstrate the strength of an integrated country. "INS Imphal will deter the various designs that try to harm national unity. It will breathe fire upon the enemy and demonstrate unflinching resolve in the face of adversity," he said.

The Chief of the Naval Staff exuded confidence that the fourth Project 15B stealth-guided missile destroyer 'Surat' will be commissioned in 2024. Prior to the commissioning of INS Imphal, two destroyers of the same class INS Visakhapatnam and INS Mormugao were commissioned into the Navy in 2021 and 2022 respectively.

Admiral R Hari Kumar pointed out that to counter piracy and drone attacks on merchant shipping, the Indian Navy has deployed four destroyers from Project 15B and 15A class. He added that the P8I Aircraft, Dorniers, Sea Guardians, Helicopters and Coast Guard Ships have all been deployed jointly to counter these threats.

Defence Ministry said that INS Imphal has the unique distinction of being the first warship to be named after a city in the northeast, underscoring the importance and contribution of the region and Manipur to the Nation and the Indian Navy.

Its keel was laid on May 19, 2017, and the ship was launched on April 20, 2019. The ship sailed for her maiden sea sortie on April 28, 2023, and underwent comprehensive trials in the harbour and at sea, with its delivery on October 20, 2023, marking a record time frame of less than six months.

The time taken to build INS Imphal and undergo trials has been the shortest for any indigenous destroyer. The ship successfully completed the first-ever test-firing of an extended-range Brahmos missile prior to its commissioning, making it 'weapon-ready', the ministry said.

<https://www.aninews.in/news/national/general-news/indias-growing-economic-strategic-power-has-filled-some-forces-with-jealousy-hatred-rajnath-singh20231226155250/>



Tue, 26 Dec 2023

Army to Launch Offensive against Terror Hideouts after Poonch Attack: Sources

Army chief General Manoj Pande has instructed local commanders in the Rajouri-Poonch sector to launch an offensive on terrorists hiding in the area and dismantle the natural caves that have become terror hideouts, sources told India Today TV. This comes amid the ongoing anti-terror operation in the sector in response to the targeted attack that killed four soldiers last week.

Aerial surveillance and combing operations in Rajouri-Poonch, especially in the forest belt of Dera Ki Gali and Bafliyaz, entered Day 7 on Tuesday. Mobile internet services remained shut for the fourth day in a row.

Meanwhile, sources said Defence Minister Rajnath Singh will visit the Rajouri-Poonch sector on Wednesday and interact with on-duty soldiers in the area.

The Defence Minister will also chair a security review meeting at the White Knight Corps Headquarters in Jammu. He is also expected to hold talks with Lieutenant Governor of Jammu and Kashmir, Manoj Sinha.

General Manoj Pande chaired an important security review meeting at White Knight Corps Headquarters in Jammu's Nagrota on Monday and visited the disturbed areas.

A Brigadier-level officer was taken off duty and moved out of Jammu and Kashmir's Poonch as the Army launched an internal inquiry into the three civilian deaths reported in Poonch, hours after the terrorist attack on army vehicles in Poonch that killed four soldiers, sources said on Monday.

The Army is taking disciplinary action against some officers and rejigging the postings of others in the wake of the civilian deaths in the region amid allegations of custodial torture by the families of the deceased.

The People's Anti-Fascist Front (PAFF), reportedly linked to Jaish-e-Mohammed, has claimed responsibility for the attack on jawans last week.

The terrorists shared pictures from the attack site on social media, which showed sophisticated US-made M4 carbine assault rifles.

<https://www.indiatoday.in/amp/india/story/jammu-and-kashmir-rajouri-poonch-attack-search-ops-terrorist-army-chief-cave-hideout-visit-defence-rajnath-singh-2480463-2023-12-26>

Tue, 26 Dec 2023

Defence Minister Rajnath Singh to Visit Rajouri on December 27

Defence Minister Rajnath Singh has said he will visit Jammu and Rajouri on Wednesday. "Tomorrow, 27th December, I shall be in Jammu and Rajouri," Mr. Singh said in a post on X on Tuesday.

The Minister's visit comes following the death of four army personnel, two of them captain, during an encounter between security forces and terrorists in Jammu and Kashmir's Rajouri district last week. Three more soldiers were injured in the same encounter.

Tomorrow, 27th December, I shall be in Jammu and Rajouri.

— Rajnath Singh (@rajnathsingh) December 26, 2023

According to the defence sources, more troops are being moved to the sector to strengthen the counter-terror grid.

<https://www.thehindu.com/news/national/defence-minister-rajnath-singh-to-visit-rajouri-on-december-27-2023/article67677897.ece>

Wed, 27 Dec 2023

‘India-Russia Ties the only Constant in World Politics’, Says EAM Jaishankar

External Affairs Minister S Jaishankar on Tuesday said that while there have been ups and downs in relationships between all countries, the only constant in global politics has been the ties between India and Russia.

He also emphasised that in the fields of defence, space and nuclear energy, countries only cooperate with those with whom they have a "high degree" of trust.

The EAM was interacting with the Indian community at an event in Moscow on Tuesday.

Addressing the event, Jaishankar said, "Relationship between India and Russia, in many ways is exceptional...if one looks at last 60, 70, 80 years of politics among the major countries. They have had their relationships, but all these relationships have their ups and downs...Russia and China, Russia and USA, Russia and Europe, India and China, India and USA. You would see over time, there are good periods, there are difficulties, stresses and very good memories and great achievements".

He also confirmed that he will be holding a meeting with his Russian counterpart Sergei Lavrov on Wednesday during his five-day visit to the country.

Taking to X (formerly Twitter), Jaishankar said that during his interaction, he urged the Indian community to contribute in deepening the mutually beneficial cooperation between the two countries.

"Interacted with the Indian community in Moscow. Appreciated their contribution to building a strong and steady collaboration between India and Russia. The Special and Privileged Strategic Partnership reflects experiences and sentiments of last 75 years. Urged the community to contribute to deepening of mutually beneficial cooperation. Their role in promoting close ties between our civil societies is invaluable. An #AtmanirbharBharat will deepen ties with Russia in a multipolar world," Jaishankar posted on X.

During his address, the EAM further noted that over the last 70-80 years, both India and Russia have transformed a lot and a lot has also changed in world politics, but the relationship between New Delhi and Moscow has remained constant.

"To me, what is exceptional about India-Russia relationships. From the early 50s, for 70-80 odd years. There have been big changes in this period. The Soviet Union became the Russian Federation, big changes have happened in world politics, Russia has transformed, and India has grown. But, if there is one constant in world politics, it has actually been the relationship between India and Russia," he said.

Jaishankar said that the cooperation between India and Russia in various fields also shows the quality of the relationship between the two countries.

"Russia is a special partner in a few areas -- defence, nuclear energy...Today, in my presence and that of Deputy Prime Minister Denis Manturov, we signed some important agreements pertaining to future units of the Kudankulam Nuclear Project. Typically, defence, nuclear and space, are collaborations you only do with countries with whom you have a high degree of trust. So, it's not just we do the cooperation is reflective of the quality of the relationship," he added.

The EAM acknowledged that India got a "very strong cooperation from Russia during its G20 presidency and affirmed New Delhi's commitment to support Moscow's presidency of BRICS grouping next year.

Jaishankar arrived in Russia on Monday for his four-day visit and said that he looked forward to his engagements.

<https://www.hindustantimes.com/india-news/indiarussia-ties-the-only-constant-in-world-politics-says-eam-jaishankar-101703614878217.html>



Tue, 26 Dec 2023

Houthi Attacks: India not Joining Operation Prosperity Guardian in Red Sea as of now

Just 217 nautical miles off Gujarat's Porbandar coast is uncomfortably close to India's Exclusive Economic Zone's territorial limit of 200 nautical miles. Yet it was here that a suspected drone hit the MV Chem Pluto, a Liberian flagged, Japanese-owned, and Netherlands-operated chemical tanker on December 23.

The ship was carrying 21 Indians and one Vietnamese crew.

And then on December 24, a Gabon-flagged tanker MV Sai Baba with Indian crew on board that was heading to India also reported a drone attack in the Red Sea area. Asked if India was planning to join Operation Prosperity Guardian, a top Navy official told THE WEEK: "At the moment, there is no reason to involve ourselves in the Operation as our interests are being protected. But of

course, if we find that they are being threatened at any point of time, we are ever-ready to do the needful.”

A multinational security initiative to thwart Houthi attacks in the crucial Red Sea route, Operation Prosperity Guardian was announced by US Defence Secretary Lloyd Austin on December 19. Besides the US, it includes the UK, Bahrain, Canada, France, Italy, Netherlands, Norway, Seychelles, and Spain and a few other countries. The navies of these countries will conduct joint patrols in the region to provide an umbrella of protection to merchant vessels.

On Tuesday, speaking at the commissioning of the INS Imphal in Mumbai, Defence Minister Rajnath Singh said: “India’s growing power has filled some forces with jealousy and hatred... Perpetrators of attacks on merchant vessels Chem Pluto and Sai Baba will soon be brought to justice.”

Speaking at the same event, Navy Chief Admiral R. Hari Kumar said: “Even as we speak, we have four destroyers of Project 15B & 15A class deployed to counter piracy and drone attacks on merchant shipping. Also the P8I Aircraft, Dorniers, Sea Guardians, Helicopters and Coast Guard Ships all deployed jointly to counter these threats.”

INS Imphal is the first warship to have successfully undertaken test firing of the BrahMos surface-to-surface missile. Third in a row, the fourth destroyer is slated for commissioning in 2024 after the INS Visakhapatnam in 2021, and the INS Mormugao in 2022.

In the Arabian Sea, it is the trio of guided missile destroyers—INS Mormugao, INS Kochi and INS Kolkata—that are maintaining a deterrent presence in various areas in the region.

Meanwhile, an Indian Coast Guard Ship (ICGS), Vikram, escorted the Chem Pluto towards Mumbai, where it arrived on Monday.

A Navy statement had said: “Analysis of the area of attack and debris found on the ship points towards a drone attack. However, further forensic and technical analysis will be required to establish the vector of attack, including type and amount of explosive used. A joint investigation by various agencies has commenced on completion of the analysis by the Navy’s Explosive Ordnance Team.”

While investigations are ongoing, it is interesting that Iran’s Islamic Revolutionary Guards Corps (IRGC) has recently introduced a new force multiplier—drone carrier—to conduct combat operations in the Arabian Sea area.

These forward base ships and sustainment vessels would be used to project force in the waters far and near including the Persian Gulf and Sea of Oman.

These ships carrying drones, fighter aircraft, helicopters, and missile launchers include the ‘Shahid Roudaki’ commissioned in November 2020, the ‘Shahid Soleimani’ in September 2022, and the ‘Shahid Mahdavi’ in March 2023.

In addition, the IRGC Navy is also building a fourth forward base ship—‘Shahid Bahman Bagheri’—that many have specifically described as a ‘drone carrier’.

Iran has also helped the Houthis in producing the ‘Shahed-136’ drone, which has an operational range of more than 2,000 km.

<https://www.theweek.in/news/india/2023/12/26/india-not-joining-operation-prosperity-guardian-in-red-sea-as-of-now.html>

India's Defence and Aerospace Sector Leapfrog Jump in 2023

The Indian Aerospace and Defence (A&D) sector is expected to reach USD 70 billion by 2030. The new growth standard is due to technological collaboration, an emphasis on manufacturing, and the government's strong push to develop an Aerospace and Defence ecosystem in India.

Today, India is gradually becoming a manufacturing hotspot to manufacture aerospace-related parts and assemblies that are used in numerous commercial and defence aircraft and helicopters.

India has allotted USD 72.6 billion to the Defence Research Development Organisation (DRDO). As an area in which India invests heavily, the Union Budget for Fiscal Year 2023-24 includes a 13.1 per cent rise in defence research and development (R&D) spending. With increased defence spending, the South Asian country to invest in additional military equipment and other capabilities to become self-sufficient in crucial defence technology and systems.

India is also investing money to try to speed technological development, such as India's first indigenous aircraft carrier, the INS Vikrant (IAC-1). The need to upgrade the country's aged military gear to offer appropriate security against possible hostile acts by changing global combat circumstances is driving this investment.

The allocation for defence in India's Union Budget 2023 has been increased by 12.5 per cent over last year to Rs 5.94 lakh crore for 2023-24 from Rs 5.25 lakh crore. The government has budgeted Rs 1.62 lakh crore as capital outlay for the procurement of new military equipment, representing a 7 per cent increase over the current fiscal's capital budget of Rs 1.52 lakh crore.

Many massive military projects are currently in the works, including the acquisition of fifth-generation Advanced Medium Combat Aircraft (AMCA), Twin Engine Deck-Based Fighter (TEDBF), Tejas MK2 and a vital design and development programme for an aero engine. The Indian Navy's purchase plans include 27 fighter jets for the INS Vikrant, an indigenously manufactured aircraft carrier.

Changing India's Defence Landscape

Today, India accounts for 3.7 per cent of global military spending, placing it third in the world after the United States and China. It also has the world's second-largest military force, with 14 lakh active personnel and 13 lakh reserve personnel spread among the Indian Army, Navy, and Air Force. Defence spending accounts for almost 2.4 per cent of GDP.

India's military manufacturing sector is developing, with established and new firms of varying sizes preparing to exploit lucrative opportunities in the defence and aerospace industries that they have been anticipating for years.

Simultaneously, the government is taking aggressive steps to enhance domestic purchases. The MoD previously produced three positive indigenisation lists, totalling 310 goods that must be sourced domestically and have at least 50 per cent domestic content.

CEO and Co-founder of Posspole, Kiran Rudrappa said that India's defence startups have made significant contributions to the country's quest for self-reliance in defence manufacturing under the "Atmanirbhar Bharat" programme in 2023. These startups are increasingly successful, engaging in the development of advanced technologies such as unmanned aerial vehicles, surveillance, inspection, intelligence and cybersecurity systems, Rudrappa added.

India's Emerging Drone Industry

With roughly USD 50 million in investments, the current fiscal year is shaping up to be the strongest year yet for India's fledgling drone industry.

Drone start-ups received USD 49.7 million in funding across 20 rounds in FY 2022-23, compared to USD 25 million in funding across 23 rounds in FY 2021-22. According to Tracxn Technologies data, the number for FY 2020-21 was USD 11.2 million spread across 20 rounds. Thus, investments in the segment have registered 300 per cent growth in the last three fiscals.

CEO of Skye Air, Ankit Kumar said that the industry witnessed an unprecedented surge in the adoption of drone technology across various industries in India this year. This significant trend aligns seamlessly with the dynamic demands of the Indian market, setting the stage for an even more promising future, Kumar added.

<https://www.businessworld.in/article/India-s-Defence-And-Aerospace-Sector-Leapfrog-Jump-In-2023/26-12-2023-503577/>

Science & Technology News



Press Information Bureau
Government of India

Ministry of Science & Technology

Tue, 26 Dec 2023

New Non-invasive Formaldehyde Sensor can Detect Adulterated Fish at Room Temperature

A new low-cost sensor made of metal oxide nanoparticles–reduced graphene oxide composite can detect formalin adulteration in fishes at room temperature in a non-invasive way. The sensor shows long-term stability with a low detection limit.

Food adulteration is the practice of adding illegal or harmful substances to food to make it appear more appealing or to increase its shelf life. Formaldehyde is a colourless, pungent gas that is used in a variety of industrial processes, including as a preservative in some foods, commonly in fish in developing countries. However, the use of formaldehyde in food is illegal in many countries, as it is a known carcinogen.

Commercial formalin sensors for fish are primarily electrochemical-based or colorimetric-based. Electrochemical sensors are extensively used but are expensive. On the other hand, calorimetric sensors are less expensive. But both methods are invasive in nature. Moreover, low-level detection and selective detection are two major issues with these sensors. The development of 2D materials-based gas sensors has created a new avenue of effective detection of toxic vapors at room temperature. These sensors have the potential to detect the formalin evaporated from adulterated food products.

Nanomaterials and Nanoelectronics Laboratory, headed by Dr. Hemen Kr. Kalita, Assistant Professor, Department of Physics, Guwahati University, Assam has developed a cost-effective

formalin sensor using tin oxide-reduced graphene oxide composite that can effectively detect the presence of formalin in adulterated fishes.

Graphene oxide (GO), the oxidized form of graphene, exhibits high solution processability and ease of chemical modification with other materials such as metals, metal oxides, or polymers. However, the low electrical conductivity of GO posed a challenge and the scientists overcome this by developing the tin oxide-reduced graphene oxide composite (rGO- SnO₂).

While reduced graphene oxide (rGO) has been used to detect various toxic gases and VOCs, tin oxide (SnO₂) has been extensively investigated for formaldehyde detection in pristine form and by incorporating it with various compounds, including graphene, due to its high stability and high sensitivity toward low concentrations of formaldehyde.

The researchers synthesized graphene oxide (GO) through process called wet chemical approach and tin oxide-reduced graphene oxide composite (rGO- SnO₂) was synthesized by hydrothermal route followed by calcination of the obtained product. They found that the sensor made of tin oxide decorated reduced graphene oxide effectively sensed formaldehyde vapor at room temperature.

The sensor has been tested for adulterated fish at lab scale as well on fish available in the fish markets of the Guwahati region. The research for this supported by DST-PURSE (Promotion of University Research and Scientific Excellence) was published in the journal ACS Appl. Nano Mater. It was observed that the sensor could detect the presence of formalin in many fish sample units that are imported from regions outside the state of Assam. The crucial importance of this work is the non-invasive detection of formalin.

The designing of the prototype is in process in the lab which may be regarded as a breakthrough in the field of food adulteration. The prototype of this sensor will open new avenues for the development of affordable formalin sensor devices.

Link to the article: <https://pubs.acs.org/doi/abs/10.1021/acsnm.3c01183>

<https://pib.gov.in/PressReleasePage.aspx?PRID=1990560>



Press Information Bureau
Government of India

Ministry of Science & Technology

Tue, 26 Dec 2023

Ionospheric Secrets Traced in the White Continent can Help Satellite-based Navigation

The cold dark winters and the bright sunny summer of Antarctica holds a secret in the ionosphere that scientists have traced recently. The day-night ionospheric density varied regardless of 24 hours of sunlight in summer and complete darkness in winter.

Decade-long ionospheric observations at Bharati station, Antarctica, found a substantial seasonal variation with maximum total electron count (TEC) in equinoctial months followed by the summer and winter. Such long-term studies can help understand effects of ionosphere on satellite-based navigation and communication systems and to mitigate them.

The ionosphere is a part of Earth's upper atmosphere, which is partially ionized extending from 100-1000km. The ionosphere at polar regions is highly dynamic and acts as a major energy sink for

space weather events, and related processes in magnetosphere-ionosphere systems as the magnetic field lines are vertical in this region. The ionospheric observations in Antarctica are few compared to Arctic region due to geographic limitations and limited number of stations.

A team of scientists from the Indian Institute of Geomagnetism (IIG), an autonomous body of the Department of Science and Technology (DST) have examined the long-term seasonal ionospheric observations at Indian Antarctica station Bharati between 2010 and 2022 and also with solar activity following Sun's 11-year cycle.

It was observed that though there was no sunlight incidence throughout the day in winter months (polar nights) at Bharati station; a diurnal pattern was observed with peak ionospheric density near local noon. The day-night ionospheric density variations were observed regardless of 24 hours of sunlight in summer and complete darkness in winter. The scientists attributed the peak ionization to particle precipitation and transportation of convectional plasma from high latitudes. Also, the maximum ionospheric density in the summer months where 24 hours sunlight is present (polar days), was about twice more than that of polar nights at the Bharati region.

The study was published in the Journal of Polar Science. This kind of long-term studies will help us understand effects of ionosphere on satellite-based navigation and communication systems and to mitigate them.

Publication link: <https://doi.org/10.1016/j.polar.2023.101001>

<https://pib.gov.in/PressReleasePage.aspx?PRID=1990494>



Tue, 26 Dec 2023

Experimental GenAI Models should not be Open to Public: Government to Tech Firms

Generative AI platforms like Open AI, Google Bard and others have been advised by the government not to release to the public any experimental variants, just by putting a disclaimer. Tech firms not heeding the advise would not be eligible for legal protection under safe harbour clause in case of any user harm, sources said.

Currently, generative AI platforms put disclaimers stating they are experimental in nature and can make mistakes.

For instance, Google's Bard has put a disclaimer that "Bard is an experiment, and it will make mistakes. Even though it's getting better every day, Bard can provide inaccurate information, or it can even make offensive statements".

Similarly, ChatGPT's disclaimer reads, "it can make mistakes. Consider checking important information".

Officials said that instead of releasing experimental stuff to the public with disclaimers, these platforms should first run experiments on certain specific users in a sandbox kind of an environment, which will be approved by some government agency or regulator.

The advisory has been issued to the companies as several cases of either bias in content or user harm have been flagged by users recently. The ministry of electronics and IT is working on an omnibus Digital India Act to address such emerging issues, but has said in the interim the

Information Technology Act and other similar laws will apply in all cases of user harm, which includes deepfakes.

Recently, Google's generative AI platform Bard caught the attention of the government, when a user flagged a screenshot, in which Bard refused to summarise an article by a right wing online media on the ground that it spreads false information and is biased.

Post this instance, the government came up with an advisory that any instances of bias in the content generated through algorithms, search engines or AI models of platforms like Google Bard, ChatGPT, and others will not be entitled to protection under the safe harbour clause of Section 79 of the Information Technology Rules.

Companies like Google are in favour of a risk-based approach instead of uniform rules for all AI applications. "I think, fundamentally, you have to ask yourself, what kind of bias you are concerned about? There are already laws in place that say certain types of biases are not allowed. So that is why we are pushing for a risk-based approach, proportionate to a particular use case," Pandu Nayak, vice president of Search at Google, told FE in a recent interaction.

A flexible framework can address diverse landscape of AI technologies without hindering innovation. For example, according to Nayak, risks from using AI in agriculture are very different from what one might find in other areas.

At the Global Partnership on Artificial Intelligence (GPAI) summit, which concluded on December 14 in the Capital, the 29-member countries including India, UK, Japan, France, among others, affirmed their commitment to work towards advance, safe, secure, and trustworthy artificial intelligence (AI), while also looking at relevant regulations, policies, standards, and other initiatives. As per the next steps, over the next few months the countries will work together to lay out some broad principles on AI, including what guardrails should be put in place.

<https://www.financialexpress.com/business/digital-transformation-experimental-gen-ai-models-should-not-be-open-to-public-government-to-tech-firms-3347360/>



Tue, 26 Dec 2023

Aditya L1 Mission: What will Happen after Spacecraft Reaches Destination on January 6?

Aditya L1 spacecraft is set to reach its cosmic destination, Lagrange Point 1 (L1), on January 6, 2024. Indian Space Research Organisation (ISRO) Chairman S Somanath said recently, "Aditya L1 will enter L1 point on January 6. That is what is expected...exact time will be announced at the appropriate time."

Somanath said when the Aditya-L1 spacecraft reaches the L1 point, "we have to fire the engine once again so that it does not go further."

"It will go to that (L1 between Sun and Earth) point, and once it reaches that point, it will rotate around it and will be trapped at L1," the ISRO chief was quoted by news agency PTI as saying.

Even the ISRO mentions on its website that upon arrival at the L1 point, a manoeuvre would bind Aditya-L1 to an orbit around L1 — a balanced gravitational location between the Earth and the Sun.

"The spacecraft is planned to be placed in a halo orbit around the Lagrangian point 1 (L1) of the Sun-Earth system, which is about 1.5 million km from the Earth," the ISRO said.

According to the ISRO, Aditya-L1 will stay approximately 1.5 million km away from the Earth, directed towards the Sun, which is about 1 per cent of the Earth-Sun distance.

"The strategic placement at the L1 Lagrange point ensures that Aditya-L1 can maintain a constant, uninterrupted view of the Sun," the ISRO said.

Aditya-L1 has already performed a "Trans-Lagrangian1 insertion manoeuvre", which marked the beginning of its 110-day trajectory to the destination around the L1 Lagrange point.

What follows next?

"Once it is successfully placed on L1 point, it will be there for the next five years, gathering all the data which are very important not for India alone but for the entire world," Somanath said.

The Sun is a giant sphere of gas and Aditya-L1 would study the outer atmosphere of the Sun. "Aditya-L1 will neither land on the Sun nor approach the Sun any closer," the Indian space agency added. The ISRO chief said that the data will be very useful to understand the dynamics of the Sun and how it affects our lives.

"The satellite (Aditya L1) (will) spend its whole mission life orbiting around L1 in an irregularly shaped orbit in a plane roughly perpendicular to the line joining the Earth and the Sun," the ISRO said.

About Aditya-L1 and its mission goals

Aditya-L1 is a "satellite dedicated to the comprehensive study of the Sun". The Polar Satellite Launch Vehicle (PSLV-C57) successfully launched the Aditya-L1 spacecraft on September 2, 2023. It is the first space-based observatory class Indian solar mission to study the Sun.

The spacecraft carries seven payloads to observe the photosphere, chromosphere, and the outermost layers of the Sun (the corona) using electromagnetic and particle detectors.

"Using the special vantage point of L1, four payloads would directly view the Sun and the remaining three payloads would carry out in-situ studies of particles and fields at the Lagrange point L1," the ISRO said.

The Aditya L1 payloads are expected to provide the "most crucial information" to understand the problems of coronal heating, Coronal Mass Ejection, pre-flare and flare activities, and their characteristics, dynamics of space weather, the study of the propagation of particles, and fields in the interplanetary medium.

The role of seven payloads

1. Visible Emission Line Coronagraph (VELC): It is the prime payload designed as a reflective coronagraph with a multi-slit spectrograph,
2. Solar Low Energy X-ray Spectrometer (SoLEXS): It is designed to measure the solar soft X-ray flux to study solar flares.
3. Plasma Analyser Package for Aditya (PAPA): It is designed to understand solar winds and their composition and, carry out mass analysis of solar wind ions.
4. High Energy L1 Orbiting X-ray Spectrometer (HEL1OS): It is designed to study solar flares in the high-energy X-rays.
5. Solar Ultra-violet Imaging Telescope (SUIT): It is a UV telescope to image the solar disk in the near ultra-violet wavelength range.
6. Aditya Solar wind Particle EXperiment (ASPEX): This payload comprises two subsystems - SWIS and STEPS.

> Solar Wind Ion Spectrometer is a low-energy spectrometer designed to measure the proton and alpha particles of the solar wind

> Suprathermal and Energetic Particle Spectrometer is a high-energy spectrometer designed to measure high-energy ions of the solar wind

7. Magnetometer (MAG): It will measure the low-intensity interplanetary magnetic field in space. It has two sets of Magnetic Sensors.

<https://www.livemint.com/science/news/aditya-11-sun-mission-isro-what-will-happen-after-spacecraft-reaches-destination-january-6-somanath-11703608623187.html>



Tue, 26 Dec 2023

ISRO to Launch PSLV-C58 with XPoSAT on January 1, Study Black Holes, Neutron Stars

India is poised to ring in 2024 with a roaring launch of the Polar Satellite Launch Vehicle carrying the country's first X-Ray Polarimeter Satellite (XPoSat) on January 1, 2024.

The Indian Space Research Organisation (Isro) has announced that the XPoSat mission will lift off at 9:10 am using a Polar Satellite Launch Vehicle (PSLV), marking a significant milestone in India's space exploration journey.

The XPoSat mission is designed to investigate the polarisation of intense X-ray sources, a scientific endeavour that will place India at the forefront of space-based polarimetry.

This mission is not only India's first dedicated polarimetry mission but also the world's second, following Nasa's Imaging X-ray Polarimetry Explorer (IXPE) launched in 2021.

XPoSat aims to study the 50 brightest known sources in the universe, including pulsars, black hole X-ray binaries, active galactic nuclei, neutron stars, and non-thermal supernova remnants. The satellite will be placed in a circular low Earth orbit of 500–700 km, with a mission lifespan of at least five years.

The primary payload, POLIX (Polarimeter Instrument in X-rays), will measure the degree and angle of polarization in the medium X-ray energy range of 8-30 keV photons of astronomical origin. Complementing POLIX, the XSPECT (X-ray Spectroscopy and Timing) payload will provide spectroscopic information in the energy range of 0.8-15 keV.

Developed by the Raman Research Institute (RRI) in collaboration with U R Rao Satellite Centre (URSC), these instruments are expected to offer new insights into the physics of celestial objects. By measuring the polarisation of X-rays, scientists can infer critical information about the geometry and emission mechanisms of these distant sources. The XPoSat mission is anticipated to break new ground in our understanding of the universe. It will add two crucial dimensions—degree and angle of polarization—to the existing spectroscopic and timing data, potentially resolving ambiguities in current theoretical models of astronomical emissions.

<https://www.indiatoday.in/science/story/isro-to-launch-xposat-mission-aboard-pslv-c58-on-january-1-2480685-2023-12-26>

© The news items are selected by Defence Science Library, DESIDOC from Print Newspapers and Authentic Online News Resources (mainly on DRDO, Defence and S&T)