

Current Affairs search results for tag: science-and-technology

### **1. India successfully carries out trials of nuclear-capable "Agni-5 missile" ( Dec. 16, 2022 )**

"Agni-5 missile"

India on 15 December successfully carried out the **night trials** of the **Agni-5 nuclear-capable ballistic missile**. The test comes days after a clash between Indian and Chinese troops in Arunachal Pradesh's **Tawang district**.

#### **Important facts**

- Agni 5 missile capable of striking targets at ranges up to **5,000 kilometres** with a very high degree of accuracy.
- The test was conducted to validate new technologies and equipment on the missile, which is now lighter than before.
- Defense sources said the test proved the capability of extending the range of the Agni 5 missile if required.
- The trial was aimed at enhancing the range of the Agni-5 missile if required.

#### **About Agni 5 Missile**

- Agni-5 is an ingeniously built advanced surface-to-surface ballistic missile developed under the **Integrated Guided Missile Development Programme (IGMDP)**.
- It is a **fire-and-forget missile**, which cannot be stopped without an interceptor missile.
- The Integrated Guided Missile Development Programme (IGMDP) is the brain-child of **Dr A P J Abdul Kalam**, who aimed at making the country self-sufficient in the field of missile technology.
- The program had five missiles **P-A-T-N-A, Prithvi, Agni, Trishul, Nag, and Akash**.
- It was aimed at boosting India's nuclear deterrence against China, which has missiles such as the **Dongfeng-41**, which have a range between **12,000-15,000 km**.
- The Agni 1 to 4 missiles have ranges from **700 km to 3,500 km** and they have already been deployed.

#### **Agni Class of Missiles**

- **Agni 1** : Range of 700-800 km.
- **Agni 2**: Range more than 2000 km.
- **Agni 3**: Range of more than 2,500 Km
- **Agni 4**: Range is more than 3,500 km.

- **Agni-5:** The longest of the Agni series, an Inter-Continental Ballistic Missile (ICBM) with a range of over 5,000 km.
- **Agni-P (Prime):** It is a canisterised missile with a range capability between 1,000 and 2,000 km. It will replace the Agni I missile.

## **2. US announces historic nuclear fusion breakthrough ( Dec. 14, 2022 )**

US announces historic nuclear fusion breakthrough

US researchers announced a **historic nuclear fusion breakthrough** on December 13, marking a "**landmark achievement**" toward a source of unlimited, clean energy and an end to dependence on fossil fuels.

### **Important facts**

- This breakthrough in nuclear fusion could bring unlimited clean energy and could help in the fight against climate change.
- For the first time in history, American scientists have carried out a nuclear fusion reaction at the **National Ignition Facility at Lawrence Livermore National Laboratory in California, USA**, due to which pure energy (carbon free energy) was produced just like the Sun.
- According to scientists, if everything goes right, America's dependence on fossil energy like gas, petrol and diesel can be reduced.

### **What is Nuclear fusion?**

- Nuclear fusion is the process by which two light atomic nuclei combine to form a single heavier one while releasing massive amounts of energy.
- It is the process that powers the Sun and other stars. This light works by taking pairs of atoms and forcing them together and generates enormous amounts of energy.

## **3. UAE successfully launches first ever Arab-Built lunar spacecraft ( Dec. 12, 2022 )**

UAE successfully launches first ever Arab-Built lunar spacecraft

A **SpaceX Falcon 9 rocket** on 11 December carried into space the **first ever Arab-built lunar spacecraft**. It was launched from the **Cape Canaveral Space Force Station in Florida**.

### **Important facts**

- Named as **Rashid Rover** was built by **Dubai's Mohammed bin Rashid Space Centre (MBRSC)**, in the **United Arab Emirates (UAE)**, and is being delivered by the **HAKUTO-R** lander, engineered by Japanese lunar exploration company **ispace**.
- If the landing is successful, HAKUTO-R will also become the **first commercial spacecraft** ever to make a controlled landing on the moon.
- Rashid rover will provide 'novel and highly valued data, images, and insights,' as well as 'collect scientific data on matters relating to the origin of the solar system, our planet and life.'
- Its rover weighs just **22 pounds (10 kg)** and will work on the surface for about 10 days.

#### **4. Hot test of the scramjet engine was conducted successfully ( Dec. 12, 2022 )**

Hot test of the scramjet engine was conducted successfully

The **Indian Space Research Organisation (ISRO)** has successfully tested the **Hot Test of Scramjet Engine** at ISRO's Propulsion Research Complex at **Mahendragiri in Tirunelveli district of Tamil Nadu**.

##### **Important facts**

- The Hot Test System is a 100% production test used to check all operating parameters of the engine as they would function in real time.
- The test lasted for 11 seconds.
- With this test, the Indian space agency's effort to develop reliable next-generation airbreathing scramjet engines to launch satellites into predetermined orbit at low cost has crossed a significant milestone.

##### **About Scramjet Engine**

- The scramjet is a more advanced version of the **ramjet engine** and can operate efficiently at **hypersonic speeds**.
- India is the **fourth country** to demonstrate the flight testing of a Scramjet Engine.
- This allows for supersonic combustion by taking oxygen from the atmosphere during flight.
- It is then allowed to mix with the hydrogen already stored in the vehicle to trigger the oxygen combustion and propel the satellite to its designated orbit.

**5. DCGI allows the export of SII made Ebola vaccine for export to Uganda ( Dec. 8, 2022 )**

DCGI allows the export of SII made Ebola vaccine for export to Uganda

The [Drugs Controller General of India \(DCGI\)](#) on 8 December 2022 approved the export of India's first Ebola vaccine manufactured by **Serum Institute of India (SII)** to **Uganda**.

The vaccine has been developed by SII in collaboration with **Oxford University**, United Kingdom. This vaccine will be used for solidarity clinical trials in Uganda.

The [World Health Organisation \(WHO\)](#) has sought collaboration with manufacturers of Ebola vaccines for the prevention of the disease and has selected ChAdOx1 biEBOV as a potential vaccine for participation in a solidarity clinical trial in Uganda.

Oxford University signed an agreement with Serum Institute of India to manufacture ChAdOx1 biEBOV.

**Serum Institute of India** situated in Pune is the largest vaccine manufacturer in the world. SII makes vaccines for Covid-19, diphtheria, BCG, measles, rubella and others.

CEO of SII: **Adar Poonawala**

**Ebola Virus**

It was first reported in 1972 in South Sudan and in a village near **Ebola River in Democratic Republic of Congo**. Hence it is called the Ebola virus.

The virus can spread through direct contact with an infected animal (bat or nonhuman primate) or a sick or dead person infected with Ebola virus.

**6. ISRO and Social Alpha sign MoU to establish SpaceTech Innovation Platform ( Dec. 8, 2022 )**

ISRO and Social Alpha sign MoU to establish SpaceTech Innovation Platform

Indian Space Research Organisation (**ISRO**) and **Social Alpha** on 7 December signed an **MoU** to launch **SpaceTech Innovation Network (SpIN)**.

**Important facts**

- It is a one-of-its-kind public-private collaboration for start-ups and SMEs in the **space industry**.
- This is an important step towards providing further impetus to India's recent space reform policies.
- It will work towards identifying and unleashing the market potential of promising space technology innovators.
- SpIN has launched its **first innovation challenge** for developing solutions in areas of maritime and land transportation, urbanisation, mapping, and surveying.

**About SpaceTech Innovation Network (SpIN)**

- It will be **India's first dedicated platform** for innovation and venture development for the burgeoning space entrepreneurial ecosystem.
- It will primarily focus on facilitating space tech entrepreneurs in **three distinct innovation categories** -
  1. Geospatial Technologies and Downstream Applications
  2. Enabling Technologies for Space & Mobility
  3. Aerospace Materials, Sensors, and Avionics

**7. ISRO will develop "Spatial Data Infrastructure geoportal 'Geo-Ladakh' for Ladakh ( Dec. 8, 2022 )**

ISRO will develop "Spatial Data Infrastructure geoportal 'Geo-Ladakh'

The government of the Union Territory of Ladakh has approached the **Indian Institute of Remote Sensing (IIRS)**, a unit of the **Indian Space Research Organisation (ISRO)** for developing "Spatial Data Infrastructure geoportal '**Geo-Ladakh**' for UT-Ladakh.

**Important facts**

- The project encompasses spatial database generation (water resources, vegetation and energy potential) using remote sensing, geospatial techniques and the development of a **Geo-portal** for hosting this database.
- The project also aims towards training of UT-Ladakh officials on **Geospatial techniques and applications**.
- Portal provides geospatial data visualization and analytics for UT-Ladakh, consisting of Spatial viewer, **Carbon Neutrality, Geospatial utility mapping and Geo-Tourism**.
- A Memorandum of Understanding was also signed between IIRS (ISRO) and UT-Ladakh Administration on January 1, 2022, towards carrying out the above work.
- Currently, ISRO is setting up an **optical tele-scope** at **Hanle** for tracking spacecraft and space objects.

**8. Meghalaya Government launches 'Asia's first Drone delivery hub for easy access to healthcare' ( Dec. 7, 2022 )**

Meghalaya Government launches 'Asia's first Drone delivery hub

The **Meghalaya government** in partnership with Startup **TechEagle** has unveiled Asia's first drone delivery hub and network Meghalaya **Drone Delivery Network (MDDN)**, which is aimed at providing universal access to healthcare for the people in the state.

The **Meghalaya Drone Delivery Network (MDDN)** project is aimed at delivering vital supplies like drugs, diagnostic samples, vaccines, blood and blood components quickly and safely to different regions of the state using a dedicated drone delivery network.

The first official drone flight took off from Jengjal Sub Divisional Hospital on 5 December 2022, which acts as the hub, and delivered medicines to Padeloba primary health centre in less than 30 minutes, which would otherwise have taken 2.5 hours by road.

It expected that the Meghalaya Drone Delivery Network (MDDN) would bring universal access to healthcare for 2.7 million people of Meghalaya.

Now with the help of drones, it will be possible to overcome the problem of lack of visibility, high delivery costs, outdated technology and inaccessibility through roads and railway networks and deliver better healthcare facilities to people of Meghalaya.

### **State of Meghalaya**

It is also known as the **abode of clouds**. It is one of the 8 North Eastern states of India.

It became a state on 21 January 1972.

Governor: B.D.Mishra

Chief Minister: **Conrad Sangma**

Capital: Shillong

## **9. Delhi Police to design high-frequency radio system ( Dec. 7, 2022 )**

Delhi Police to design high-frequency radio system

**Delhi Police** is set to design, install and supply the '**Open Standard Digital Trunking Radio System' (OS-DTRS)** and will phase out the current tetra net wireless network services.

About **Rs 100 crore** will be spent on this project, for which tenders were issued on 2 December.

### **About OS-DTRS System**

- It will be a more efficient internal communication system, aimed at a **faster exchange of information and bigger networks**.
- This system provides multiple channels and common groups for policemen.
- It will also have a voice logger system, which can be used to describe a crime scene, interrogation details and evidence.
- The **project's master site** will be at the Delhi Police Head Quarters.

- Police are looking for private companies to run the system on **800 MHz frequency band** and microwave links.
- The master site will have OS-DTRS control and switching equipment, a network management system, 90 IP-based logger systems and a large LED display.
- Around **15,000 concurrent radio sets** will be made first and later expanded to 30,000 over time.
- This system will run for **at least 10 years** and will fix network problems faced by police personnel.

## **10. IIT Madras researchers develop technology to generate electricity from Sea Waves ( Dec. 7, 2022 )**

IIT Madras researchers develop technology to generate electricity from Sea Waves

**Indian Institute of Technology (IIT) Madras** Researchers have developed an '**Ocean Wave Energy Converter**' that can generate electricity from sea waves.

### **Important facts**

- The trials of this device were successfully completed during the second week of November 2022.
- The system, named '**Sindhuja-I**', was deployed by the researchers about six kilometres off the coast of **Tuticorin in Tamil Nadu**, where the sea depth is about 20 metres.
- Sindhuja-I can currently produce **100 watts of power**. It will generate **one megawatt** of power in the next three years.
- The research team plans to deploy a remote water desalination system and a surveillance camera at the location by December 2023.

### **What is Sindhuja-I system?**

- The system has been named '**Sindhuja-1**', which means '**originating from the ocean**'.
- The system consists of a floating buoy, a spar and an electrical module.
- As the wave moves up and down, the buoy moves up and down. In the current design, a balloon-like system called a '**buoy**' has a central hole that allows a long rod called a spar to pass through.
- The spar can be attached to the seabed, and passing waves will not affect it, while the buoy will move up and down and generate relative motion between them.
- Relative motion drives an electric generator to generate electricity. In the current design the spar floats and a mooring chain keeps the system in place.

