

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

### **1. Government forms panel to promote scientific mining of critical minerals ( April 19, 2024 )**

A **seven-member panel** has been set up by the government under the leadership of **NITI Aayog member Vijay Kumar Saraswat** to promote scientific mining of critical minerals.

#### **An Overview of the News**

- The panel's primary goal is **to propose legislative measures for the cost-effective and scientific extraction of critical minerals such as copper, gold, and diamond.**
- These minerals are often found in deeply embedded deposits, requiring underground mining for extraction.
- Strategies will be devised by the panel to raise awareness among states about the implications of mining reforms.
- In **2023, the Geological Survey of India (GSI)** discovered approximately 5.9 million tonnes of lithium deposits in the Salal-Haimana area of Jammu & Kashmir, crucial for electric vehicle manufacturing.

#### **About Critical Minerals**

- Critical minerals are vital for both economic development and national security.
- India's government has identified a list of **30 critical minerals.**
- These minerals include Antimony, Beryllium, Bismuth, Cobalt, Copper, Gallium, Germanium, Graphite, Hafnium, Indium, Lithium, Molybdenum, Niobium, Nickel, platinum group elements (PGE), Phosphorous, Potash, Rare Earth Elements (REE), Rhenium, Silicon, Strontium, Tantalum, Tellurium, Tin, Titanium, Tungsten, Vanadium, Zirconium, Selenium, and Cadmium.

### **2. New Endangered Balsam Species Discovered in Kerala's Agasthyamala Biosphere Reserve ( April 18, 2024 )**

A new species of the genus *Impatiens* (family Balsaminaceae), named "*Impatiens neo-uncinata*," was discovered in the Agasthyamala biosphere reserve, Thiruvananthapuram district, Kerala, during a floristic survey.

#### **An Overview of the News**

- The discovery was documented in the scientific journal *Phytotaxa*.
- "*Impatiens neo-uncinata*" shares morphological similarities with *Impatiens uncinata* but varies in flower size, basal and distal lobes, dorsal petal, and pollen.
- It features snowy white flowers with red stripes and relatively large blooms.

- The new species has only been observed in a single locality at elevations ranging from 1,000 to 1,250 meters and is classified as Endangered according to IUCN criteria.
- The genus *Impatiens* encompasses over 1000 species found in tropical and sub-tropical regions.

**About Kerala**

- Kerala, situated on India's Malabar Coast, boasts nearly 600km of Arabian Sea coastline.
- Famous for its palm-fringed beaches and intricate network of backwaters.

Capital - Thiruvananthapuram

Chief Minister - Pinarayi Vijayan

Districts - 14

Demonyms - Keralite, Malayali

**3. Successful MPATGM Warhead Flight Trials Conducted by Indian Army and DRDO ( April 16, 2024 )**

The Indian Army and DRDO recently conducted successful warhead flight trials of the Man Portable Anti-tank Guided Missile (MPATGM) Weapon System on April 13, 2024, at the Pokhran Field Firing Range in Rajasthan.

**An Overview of the News**

- Components of the MPATGM Weapon system include the MPATGM itself, Launcher, Target Acquisition System (TAS), and Fire Control Unit (FCU).
- MPATGM was developed domestically by DRDO in collaboration with VEM Technologies Private Limited, based in Hyderabad, Telangana.
- The trials aimed at meeting the operational requirements specified in the General Staff Qualitative Requirements (Infantry, Indian Army), covering the complete operational envelope.
- Successful penetration trials of the Tandem Warhead System of MPATGM were also conducted during these trials.

**Key Features of MPATGM:**

- The missile is approximately 1.3 meters long with a diameter of around 0.12 meters.
- It has a strike range of 2.5 kilometers and weighs about 14.5 kilograms.
- Equipped with a modern Infrared Imaging Seeker and advanced avionics.

**Manufacturing Location:**

- Bharat Dynamics Limited (BDL) in Bhanoor, Telangana, is designated for its manufacturing.

**About DRDO**

- It serves as the Research and Development (R&D) arm of the Ministry of Defence (MoD).
- Chairman - Dr. Samir Venkatpati Kamat
- HQ - New Delhi, Delhi
- Founded - 1958

**4. Israel's C-Dome Defense System Successfully Deployed in Eilat for First Time ( April 15, 2024 )**

Israel has introduced its maritime defense system, known as the C-Dome, for the first time in Eilat, Israel's southernmost city.

**An Overview of the News**

- The C-Dome is essentially a naval adaptation of the Iron Dome, a renowned air defense system designed to safeguard against rocket and missile threats.
- Notably, on April 8, 2024, the Israel Defence Forces (IDF) effectively intercepted a suspicious airborne target breaching Israeli airspace using the C-Dome defense mechanism.
- The C-Dome Defense System is a product of Rafael Advanced Defense Systems, a state-owned Israeli defense corporation.

**About IDF:**

- The Israel Defense Forces (IDF), also known as Tzahal in Hebrew, serves as the national military of the State of Israel.
- Comprising three main service branches, namely the Israeli Ground Forces, the Israeli Air Force, and the Israeli Navy, it covers various aspects of defense.
- As the singular military arm of Israel's security infrastructure, the IDF holds exclusive responsibility for national defense.

**5. Roscosmos Launches 1st Angara-A5 Rocket from Vostochny Cosmodrome ( April 15, 2024 )**

Angara-A5 successfully launched on April 11, 2024, from Vostochny Cosmodrome, replacing Proton M as Russia's heavy-lift rocket.

**An Overview of the News**

- The rocket attained speeds exceeding 25,000 km/hr and placed a test payload into low orbit.
- The launch coincided with Russia's Cosmonaut Day on April 12, commemorating Yuri Gagarin's historic spaceflight in 1961.
- It will replace Russia's heavy-lift rocket Proton-M, which has served in this role since the mid-1960s.

**Angara-A5:**

- The Angara-A5 stands 54.5 meters tall and comprises three stages, with a hefty weight of approximately 773 tonnes.
- It boasts a payload capacity of up to 24.5 tonnes to lower orbit.
- Notably, the rocket employs a more environmentally friendly fuel combination of oxygen and kerosene, departing from the toxic heptyl used in previous models.
- The Angara series, developed by the Khrunichev State Research and Production Space Centre, derives its name from the Angara River, originating from Lake Baikal in Siberia.

**Project Angara Origins:**

- Conceptualized in 1991 following the dissolution of the Soviet Union, Project Angara aimed to diminish Russia's reliance on the Baikonur Cosmodrome, leased from Kazakhstan until 2050.

**About Roscosmos:**

- Headed by Director-General Yuri Ivanovich Borisov, Roscosmos operates from its headquarters in Moscow, Russia.
- Established in 1992, the agency has been instrumental in advancing Russia's space exploration endeavors.

**6. SpaceX Launches Bandwagon-1: First Rideshare Mission to Low-Earth Orbit ( April 9, 2024 )**

On April 7, 2024, Space Exploration Technologies Corporation (SpaceX) conducted the launch of Bandwagon-1.

**An Overview of the News**

- This marks the first rideshare mission to low-Earth orbit, facilitated by a Falcon 9 rocket.
- The launch took place from the National Aeronautics and Space Administration (NASA) Kennedy Space Center in Florida, United States of America (USA).

**Key Satellites Carried:**

- Bandwagon-1 carries a total of 11 satellites, each serving various purposes and organizations.
- Notable satellites include KOREA's 425Sat, HawkEye 360's Clusters 8 & 9, Tyvak International's CENTAURI-6, IQPS's QPS-Synthetic Aperture Radar (SAR)-7 TSUKUYOMI-II, Capella Space's Capella-14, and Tata Advanced Systems Limited's TSAT-1A.

**Significance of the Launch:**

- The inclusion of a '425 Project' satellite for the military of South Korea stands out as a significant aspect of this mission.
- This satellite is likely the largest among the 11 satellites carried by Bandwagon-1.
- It's noteworthy that the first 425 Project satellite, an optical/infrared spacecraft, was launched previously in December 2023 with a Falcon 9 rocket.

**7. Romania unveils world's most powerful laser ( April 6, 2024 )**

Developed by a research center in Romania as part of the EU Infrastructure Extreme Light Infrastructure (ELI) project.

**An Overview of the News**

- Operated by French company Thales, this laser claims to have revolutionary potential in a variety of fields, from healthcare to space exploration.
- At the core of this groundbreaking laser technology lies chirped-pulse amplification (CPA), a method developed by Mourou and Strickland.
- CPA facilitates the amplification of laser power while ensuring safe intensity levels by stretching and compressing the ultra-short laser pulse.
- This innovative technology achieves unprecedented levels of intensity, opening the door to myriad applications such as corrective eye surgery and advanced precision instruments in industrial operations.

**Nobel Prize Winner Contribution:**

- Gerard Mourou and Donna Strickland were awarded the Nobel Prize in Physics in 2018 for their pioneering work in laser technology.
- His inventions have led to revolutionary advancements by enabling precision instruments and applications.

**Possible Applications:**

- Nuclear waste treatment: Laser technology can reduce the radioactivity period of nuclear waste, increasing the safety and manageability of disposal.
- Space debris removal: Laser technology can be deployed to clear space debris, reducing the risk of collisions with satellites and spacecraft.

- Medical Advances: The precision of lasers promises breakthroughs in medical treatments, including targeted cancer treatments and advanced surgical techniques.

**Involvement of the ELI Project and Thales Group:**

- Part of the European Union Infrastructure Extreme Light Infrastructure (ELI) project, which aims to push laser technology boundaries.
- Operated by Thales Group, a leading global provider of aerospace, defense and security solutions, headquartered in France.

**8. Stargate, a \$100 billion AI supercomputer ( April 5, 2024 )**

Microsoft and OpenAI have announced the introduction of 'Stargate,' a cutting-edge AI supercomputer with a price tag of \$100 billion.

**An Overview of the News:****Project Collaboration and Financing:**

- The project might cost up to \$100 billion to complete.
- OpenAI will support AI research and development, and Microsoft will collaborate to finance the project.

**Timeline for Project Completion:**

- By 2028, the project is expected to be finished.
- Over the next six years, Stargate is expected to become the largest supercomputer ever constructed.

**Investing Priority:**

- The purchase of AI processors will account for a sizeable amount of the project's expenditure.

**Key Facts about Supercomputers in India and Globally:**

- The Airawat supercomputer is the fastest supercomputer in India.
- PARAM 8000, the first supercomputer built in the country
- PARAM Shivay, the first supercomputer in India.
- China is the nation with the most supercomputers, followed by the USA and Japan.
- World's fastest supercomputer: Frontier
- Vijay Pandurang Bhatkar is the father of the Indian supercomputer.

**9. President dedicates CAR-T cell therapy at IIT Bombay to the nation ( April 4, 2024 )**

President Draupadi Murmu dedicated CAR-T cell therapy at IIT Bombay to the nation.

**An Overview of the News**

- CAR-T cell therapy, used in treating cancer patients, has been developed by IIT Bombay-incubated company ImmunoAdoptive Cell Therapy (ImmunoACT) in India.
- This therapy is the result of a collaborative effort between IIT Bombay and Tata Memorial Center (TMC).
- It has been designed and developed at IIT Bombay, with integrated process development and manufacturing conducted at ImmunoACT.
- Clinical investigations and translational studies were conducted by teams at TMH.
- It is expected that the CAR-T cell therapy product has the potential to save many lives at a much lower cost than similar products available outside India.

**CAR T-cell therapy:**

- It is a treatment method where a patient's T cells, a type of immune system cell, are modified in a laboratory setting to target cancer cells.
- T cells are extracted from the patient's blood, and in the lab, a gene for a specific receptor called a chimeric antigen receptor (CAR) is introduced into these T cells.
- The CAR enables the modified T cells to bind to a particular protein found on the patient's cancer cells.
- Following this modification, large quantities of CAR T cells are cultured in the laboratory and subsequently administered to the patient through infusion.
- This therapy is primarily employed in treating certain types of blood cancers, and ongoing research is exploring its potential for treating other forms of cancer.
- CAR T-cell therapy is also referred to as chimeric antigen receptor T-cell therapy.

**10. Successful flight test of Agni-Prime missile ( April 4, 2024 )**

Agni-Prime missile successfully flight tested in Odisha.

**An Overview of the News**

- The test was conducted jointly by the Strategic Force Command (SFC) and Defense Research and Development Organization (DRDO) from Dr APJ Abdul Kalam Island.
- The Defense Ministry said that the Agni-Prime missile met all the test objectives, demonstrating its reliable performance.

**Introduction of Agni-P (Agni-Prime):**

- Agni-P, also known as Agni-Prime, is a medium-range ballistic missile under development by India's Defence Research and Development Organisation (DRDO).
- It is the sixth missile in the Agni series and is designed to be a two-stage, surface-to-surface, canister-launched, and road-mobile system.

**Purpose and Deployment:**

- Agni-P is intended to be deployed within the Strategic Forces Command for operational use.
- Its development aims to enhance India's ballistic missile capabilities, particularly in the medium-range segment.

**Key Features and Upgrades:**

- The missile incorporates significant upgrades compared to its predecessors.
- These upgrades include advancements in the composite motor casing, navigation systems, and guidance systems.

**Maneuverable Reentry Vehicle (MaRV):**

- Agni-P is equipped with a maneuverable reentry vehicle (MaRV), enhancing its effectiveness in penetrating enemy defenses and accurately hitting targets.

**Solid-Fueled Design:**

- Agni-P utilizes solid fuel propulsion, ensuring reliability, mobility, and ease of deployment.

**Canister Launch Capability:**

- Its canister-launch system adds to its mobility and readiness, allowing for rapid deployment and launch from various platforms.

**Strategic Significance:**

- The development and deployment of Agni-P mark a significant advancement in India's strategic missile program.
- It strengthens India's deterrence capability and provides a credible response to evolving security challenges in the region.