

NEWS TODAY

Indian Space Research Organization (ISRO) has successfully undocked the SpaDeX satellite

This follows successful docking of two satellites - **SDX01 (Chaser)** and **SDX02 (Target)** which was achieved in January 2025.

➤ This made India **the fourth nation**, after United States, Russia, and China, to demonstrate in-space docking technology.

About SpaDeX Mission

- SpaDeX is a technology demonstrator mission designed to develop and showcase in-space **docking, rendezvous, and undocking capabilities** using two small satellites- **SDX01 (Chaser)** and **SDX02 (Target)**.
- These satellites were launched **aboard PSLV-C60**.
- SpaDeX spacecraft were **designed and realized by UR Rao Satellite Centre (URSC), Bengaluru** with the support of other ISRO centers (VSSC, LPSC, SAC, IISU, and LEOS).
 - ⊕ Established in 1976, URSC is **lead centre of ISRO** responsible for design, development, assembly & integration of communication, navigation, remote sensing, **scientific and small satellite missions**.





Technological Innovations in SpaDeX

- **Docking Mechanism:** A low-impact, androgynous docking system for **smooth connection between the spacecraft**.
- **Inter-Satellite Communication Link (ISL):** Enables **real-time data transfer** between spacecraft.
- **GNSS-Based Relative Orbit Determination:** Ensures **precise navigation and control** during docking.
- **Power Transfer Technology:** Demonstrates **energy transfer** between docked satellites.
- **Autonomous Rendezvous and Docking Algorithms:** Used for precise maneuvering of satellites in orbit.

Post-Docking Applications

- After docking and undocking, satellites will continue independent payload operations. These include:
 - ⊕ **High-Resolution Imaging (SDX01):** Capturing images for Earth observation.
 - ⊕ **Multi-Spectral Payload (SDX02):** Monitoring natural resources and vegetation.
 - ⊕ **Radiation Monitoring (SDX02):** Studying space radiation for future human missions.

Significance of Mission

 <p>Enabling Future Space Missions Supports deep-space missions like lunar sample return and interplanetary exploration</p>	 <p>Developing Bharatiya Antariksh Station Aids in the creation of India's planned space station</p>
 <p>Supporting Crewed Lunar Missions Essential for future human spaceflight under Gaganyaan and beyond</p>	 <p>Advancing In-Space Servicing & Robotics Demonstrates power transfer and robotic servicing for satellite maintenance</p>

India launches first exploration license (EL) auction for critical minerals under EL regime

Exploration Licenses were introduced after **enactment of MMDR Amendment Act, 2023** to allow **private participation in reconnaissance** and prospecting for 29 critical and deep-seated minerals.

- The auction will focus on **13 Exploration License blocks**, covering critical minerals such as **Rare Earth Elements, Zinc, Copper, and Diamond**.
- Auction is aimed at accelerating mineral discovery, **attracting investment, reducing imports, and supporting clean energy and industry**.

About Critical Minerals

- Those minerals which are essential for **economic development and national security**, the lack of availability of these minerals may lead to **supply chain vulnerability and disruption**.
- **Mines and Minerals (Development and Regulation) Act (1957)** empowers central government for auction of mining lease and composite license for Critical Minerals.




Applications:

- ⊕ **Clean technologies:** Like Cobalt use in Electric Vehicle, Batteries, corrosion resistant alloys, etc.
- ⊕ **Information and communications:** Like Gallium use in Semiconductors, Integrated Circuits, and LEDs.
- ⊕ **Advanced manufacturing:** Like Hafnium use in Super alloy, Catalyst precursor, etc.

Concerns Associated with Critical Minerals Mining

- Mining can severely **pollute and deplete water resources** if not properly managed.
 - ⊕ **16% of critical mineral mines, deposits and districts** are located in highly water-stressed areas.
- **High exploration costs** and limited investment.
- **Geopolitical issues** such as mining industry in Chile and Peru are facing risks emerging from political instability in regions.

STEPS TAKEN FOR MINING CRITICAL MINERALS

 <p>MMDR Amendment Act, 2023 Delisted six minerals, including Lithium and Niobium, from list of atomic minerals, allowing private sector participation</p>	 <p>National Critical Mineral Mission Announced in Budget 2024-25, aims to promote domestic firms to secure foreign critical mineral assets and boost trade</p>	 <p>National Mineral Exploration Trust (NMET) Introduced a reimbursement scheme covering up to 50% of eligible exploration expenses</p>
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CAR T-cell therapy works for 73% Indian patients in clinical trials: Lancet report

These results come from the Phase I and II trials of therapy, where researchers assess its safety and effectiveness against a given condition.

Key findings of Report

- **Lower costs:** Cost is 1/20th of similar global therapies.
- **Side Effects & Risks:** Most common side effects reported by study were anemia in 61% participants, low platelet count in 65% patients, low count of white blood cells etc.

About CAR (Chimeric Antigen Receptor) T-Cell Therapy

➤ It **modifies immune cells, specifically T-cells**, by turning them into potent cancer fighters known as CAR-T cells.

⊖ T-cells are **special cells (types of white blood cells)** whose primary function is cytotoxic, meaning killing other cells.

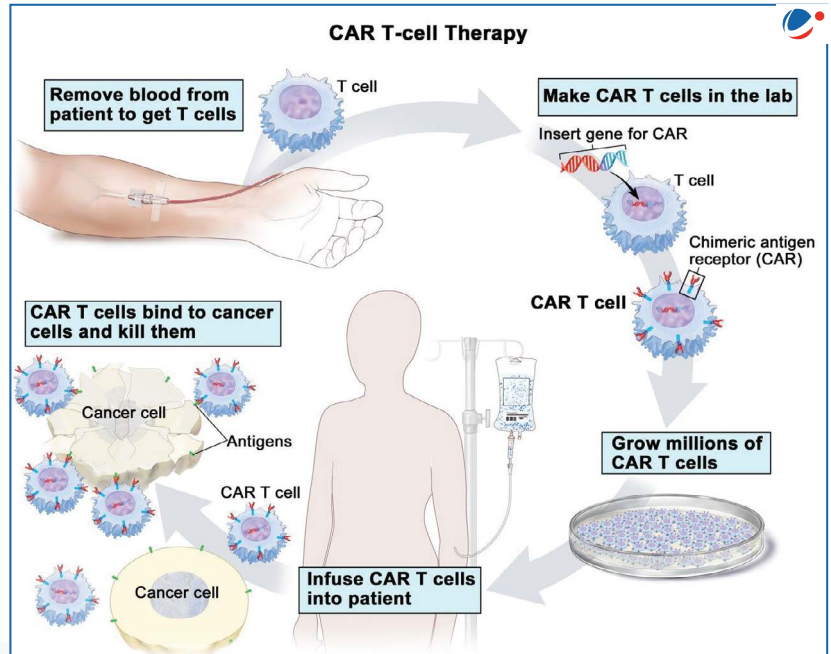
➤ This treatment is **designed for specific types of blood cancer** and is given to patients whose cancer has either relapsed or not responded to first-line treatment.

Benefits of CAR T-Cell therapy

- **Short treatment duration:** Unlike aggressive chemotherapy or stem cell transplants, it allows for a faster recovery.
- **A "Living Drug" with Sustained Benefits:** CAR T-cells persist in the body, offering long-term protection against cancer relapse.

Challenges







- **Cytokine Release Syndrome:** Over activation of immune cells leads to high fever, organ failure etc.
- **Neurotoxicity:** Ranges from confusion and seizures to cerebral edema and coma.
- **Antigen Escape:** Tumors develop resistance by losing antigen targeted by CAR-T cells.



Six properties added to India's Tentative List by UNESCO World Heritage Centre

Before a site can be inscribed in the UNESCO World Heritage List, it must first be included in a country's Tentative List.

Six Sites in India's Tentative List

 Kanger Valley National Park	<ul style="list-style-type: none"> • Location: Bastar District, Chhattisgarh. • Draws its name from Kanger River. • Karst topography with Limestone Caves and Tirathgarh Waterfalls.
 Mudumal Megalithic Menhirs	<ul style="list-style-type: none"> • Megalithic astronomical observatory site located near the banks of Krishna River, Telangana. • A menhir is a man-made standing or an upright stone, which is usually tapered at the top. • Estimated to be 3,500 to 4,000 years old.
 Ashokan Edict Sites along the Mauryan Routes	<ul style="list-style-type: none"> • These include Major Rock Edicts, Minor Rock Edicts, Pillar Edicts, and Other Edicts and Cave Inscriptions. • These were inscribed by Maurya Emperor Ashoka during the 3rd century BCE.
 Chausath Yogini Temples	<ul style="list-style-type: none"> • Locations: Madhya Pradesh, Uttar Pradesh, Tamil Nadu and Odisha. • Have 64 images of Yoginis and are associated with tantric worship. • Most Chausath Yogini temples are circular in plan except for the Khajuraho, Badoh and Rikhiyan, which are rectangular.
 Gupta Temples in North India	<ul style="list-style-type: none"> • Combines elements of Nagara and Dravida architectural styles and of Buddhist and Hindu styles. • Temples had a basic square plan and flat roof with a circumambulatory path and a low height Shikhara. • Made of sun-dried bricks and terracotta, with some made in sandstone.
 The Palace-Fortresses of the Bundelas	<ul style="list-style-type: none"> • Six forts including Garhkundar Fort, Raja Mahal, Jahangir Mahal, Datia Palace, Jhansi Fort and Dhubela Palace. • Blend of Rajput and Mughal architectural styles.

Standing Committee on Water Resources tabled Fourth Report on Demand for Grants (2025-26) of Ministry of Jal Shakti

The report highlighted key government initiatives in water sector, challenges faced by them and recommendations to make them effective.

Key Highlights of Report

- **Poor Fund Utilization:** Only 60% of budget allocated for 2024-25 was used till end of three quarters.
- **Challenges in Water Sector:** Multiplication in magnitude of reduction of per capital availability of water, deterioration in quality, overexploitation of ground water resources and relatively lower efficiency of the facilities for water utilization.
 - ⊕ **Recommendation:** These challenges necessitate revision of National Water Policy and its implementation.
- **Namami Gange Mission-II:** Constitute a committee comprising MPs/MLAs from districts for better formulation, implementation and monitoring of work.
- **Dam Safety:** Implementation of Dam Safety Act is affected due to personnel shortage in State Committees on Dam Safety (SCDSs) and State Dam Safety Organizations (SDSOs).
 - ⊕ **Recommendation:** Include a local public representative in bodies/organizations under National Dam Safety Authority (NDSA).
- **Rainwater Harvesting:** No dedicated financial support to States/UTs from National Water Mission (NWM).
- **Flood Management and Border Areas Programme (FMBAP):** Underutilization of allocated fund hampers implementation and cross-border river issue resulting in recurring floods.
 - ⊕ **Recommendation:** Ministry of Jal Shakti and Ministry of External Affairs should undertake the Cross-Border Flooding Management as an independent initiative.

PM Surya Ghar: Muft Bijli Yojana (PMSGMBY) crosses milestone of 10 lakh installations

Launched in 2024, PMSGMBY, under Ministry of New and Renewable Energy (MNRE), is the world's largest domestic rooftop solar initiative.

- Under PMSGMBY, Government has disbursed Rs. 4,770 crore in subsidies to 6.13 lakh beneficiaries.
- Chandigarh and Daman & Diu have achieved 100% of their rooftop solar targets for government buildings.
- Gujarat is top performing state in solar rooftop installations followed by Kerala and Uttar Pradesh.

About PMSGMBY

- **Objective:** Installing Rooftop Solar (RTS) & providing free electricity for up to 300 monthly units for 1 Crore households.
- **Duration:** Till FY 2026-27.
- **Eligibility:** Only Residential Consumers or Residential Welfare Societies (RWAs).
 - ⊕ Residential Households get a subsidy of Rs. 30,000 per kW up to 2 kW, Rs. 18,000 per kW for additional capacity up to 3 kW, and Rs. 78,000 total subsidy for >3 kW.
 - ⊕ RWAs get a subsidy of Rs. 18,000 per kW for common facilities.
- **Financing:** Collateral-free loans up to ₹2 lakh at a 6.75% subsidised interest rate through 12 Public Sector Banks.
- **Creation of Model Solar Village:** One Model Solar Village per district selected to demonstrate solar energy adoption.
 - ⊕ To qualify, a village must be a revenue village with 5,000+ population (2,000+ in special category states).

Impact of PMSGMBY

- **Expansion of Renewable Energy:** Expected to add 30 GW of solar capacity through residential rooftop installations by 2027.
- **Government Saving:** Projected to save the government ₹75,000 crore annually on electricity costs.
- **Environmental Benefits:** Each solar installation offsets carbon emissions equivalent to planting 100 trees.
- **Employment:** Projected to create 17 lakh direct jobs.

Also In News



Pobitora Wildlife Sanctuary

Drying of Tamulidoba Beel in Pobitora Wildlife Sanctuary is a Growing Concern.

About Pobitora wildlife sanctuary

- **Location and Landscape:** In the flood plains of River Brahmaputra in the district of Morigaon, Assam.
 - ⊕ It consists of Rajamayong Reserve Forest and Pobitora Reserve Forest.
- **Highest Rhino Density:** It holds the highest density of Greater One-Horned Rhinoceros in the country.
- **Flora and Fauna:** Grasslands of Pobitora offer sightings of the Greater One Horned Rhinoceros, Wild Water Buffalo, Monitor Lizard, Wild Boar, etc.
- It was declared as a wildlife sanctuary in 1987.



Reinsurance

Valueatics Re has become the first private firm to receive IRDAI's nod to commence reinsurance business in India.

- Currently, public sector General Insurance Corporation (GIC Re) is the only reinsurance company operating in India.

About Reinsurance

- Reinsurance is a risk management practice where insurance companies transfer a portion of their risk to another insurance company (reinsurer) to protect themselves from large financial losses.
- **Regulator:** Insurance Regulatory and Development Authority of India (IRDAI).
- **Laws:** Governed under the Insurance Act, 1938 and IRDAI (Re-Insurance) Regulations, 2018.



Balochistan

Balochistan, Pakistan's largest province, has recently been the epicenter of escalating violence.

About Balochistan

- **Strategic Location:** Lies at the mouth of **Strait of Hormuz** and borders **Iran (West), Afghanistan (North), and Arabian Sea (South)**.
- **Gwadar Port**, a deep-sea port, key to **China-Pakistan Economic Corridor (CPEC)** also lies in this region.
- **Natural Resources:** Rich in **natural gas, coal, copper, and gold**.
- **Cultural Heritage:** **Mehrgarh** (One of the world's oldest known settlements), **Makran Coast Petroglyphs** etc.



PM-YUVA 3.0

Ministry Of Education Launches PM Scheme For Mentoring Young Authors (PM-YUVA 3.0).

About PM-YUVA 3.0

- **Aim:** Aims to train young authors below 30 years of age to promote reading, writing, and book culture.
- **Selection and Training Process:** 50 authors will be selected through an All India Contest.
- **Implementation:** National Book Trust, India is an implementing agency ensuring structured mentorship.
- **Significance:** Strengthens Ek Bharat Shreshtha Bharat by promoting cultural and literary exchange.



Saffron

Foundation stone laid for campus of **North East Centre for Technology Application and Reach (NECTAR)** in Shillong (Meghalaya), which will promote Saffron cultivation in the North East.

- NECTAR is an **autonomous body** under the **Department of Science and Technology**.

About Saffron

- It is a **spice** that comes from the stigmas of purple flowers of the plant **Crocus sativus**.
- It is known as **Red Gold** as its **stigmas** are typically of orange-red colour due to content of crocetin.
- **Cultivation:** **Primarily in Jammu and Kashmir (GI tagged saffron), Himachal Pradesh and Karnataka**.
- **Mission Saffron** initiative has expanded saffron cultivation across Sikkim, Arunachal Pradesh, and Meghalaya.



Houthi rebels

Recently, the US launched surprise airstrikes against Yemen based Houthi rebels.

About Houthi rebels

- Houthis are an **armed political and religious group**, formerly known as **Ansar Allah**.
- Follow **Zaidi Islam**, a branch of Shia Islam.
- They are part of Iran-led "**Axis of Resistance**" - an anti-Israel and anti-Western alliance of regional militias including Hamas and Hezbollah.
- A civil war erupted in Yemen in late **2014** when the Houthis seized Yemen's Capital **Sanaa**.



Bongosagar 2025

India-Bangladesh Naval Exercise Bongo Sagar 2025 and Coordinated Patrol was conducted in the Bay of Bengal.

- The exercise saw **participation of INS Ranvir** from the Indian Navy.
- The first edition of Bongosagar was held in **2019**.

Other bilateral exercise Between India and Bangladesh:

- **Exercise Sampriti:** Annual joint military exercise
- Focuses on **counterterrorism, disaster response, and military cooperation**.



Supersolid

Recently, scientists turned light into a 'supersolid' for the 1st time ever.

- Until now, supersolidity had **only been observed in Bose-Einstein condensates (BECs)**.
- BEC is a state of matter formed when a **group of bosons is cooled to near absolute zero**, causing them to occupy the same quantum state.

About Supersolid

- It is a rare state of matter that **exhibits both solid-like structure and frictionless flow**.
- Supersolids are defined by quantum mechanics where **particles condense into an orderly, crystalline solid but also move like a liquid that has no viscosity**.
- Viscosity refers to a **substance's internal friction**, governing how smoothly it flows.
- Supersolids require **extremely low temperatures** to form – usually very close to absolute zero.
- **Uses:** Quantum computing, superconductors, frictionless lubricants, etc.

Place in News



Syria (Capital: Damascus)

Alawites minorities came under attack during conflict in Syria.

Political Features

- Lies in **West Asia**.
- **Bordering Countries:** **Turkey (North), Iraq (East), Jordan (South), Israel and Lebanon (West)**.
- **Bordering Water Bodies:** **Mediterranean Sea (West)**.

Geographical Features

- **Major Physical Regions:** **Syrian Desert, Euphrates River Valley, and Anti-Lebanon Mountains** (mark Syria's border with Lebanon).
- **Major Rivers:** **Euphrates, Orontes, Tigris**.
- **Highest Point:** **Mount Hermon**.
- **Major Conflict Cities:** **Aleppo, Homs, Idlib, Golan Heights** (Disputed territory with Israel) etc.

