

ISRO has achieved a breakthrough in Semicryogenic Engine development

The first successful hot test of the Engine Power Head Test Article (PHTA) was conducted at ISRO Propulsion Complex, Mahendragiri (Tamil Nadu).

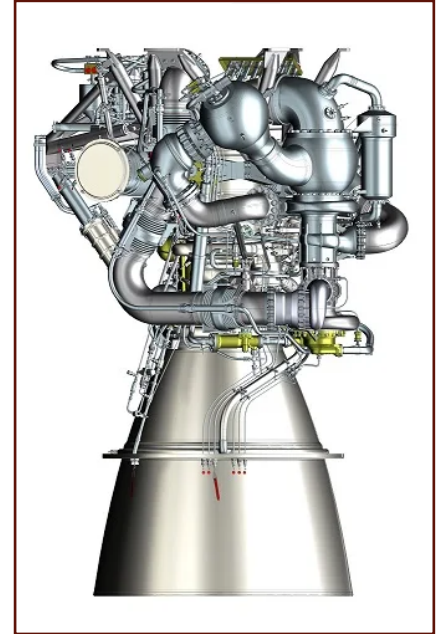
- It will power the **Semicryogenic booster stage** of the Launch Vehicle Mark-3 (LVM3).
 - ⊕ **LVM3** is a **three-stage** launch vehicle consisting of two solid strap-on motors (S200), one liquid core stage (L110), and a high-thrust cryogenic upper stage (C25).

About the Test

- **The stage (SC120)** powered by the **2,000 kN (kilonewton)** semi-cryogenic engine (SE2000) will replace the present **core liquid stage (L110)** of **LVM3** for payload enhancement and power the booster stages of future launch vehicles.
- **Non-toxic and non-hazardous propellants** (Liquid Oxygen and Kerosene) are employed in semi-cryogenic propulsion.
- **A semi-cryogenic propulsion system** and updated cryogenic stage in the LVM3 vehicle enhances its payload capability from **4 tonne to 5 tonne** in Geosynchronous Transfer Orbits (GTO).

What is a Semicryogenic Engine?

- **ISRO is developing a 2000 kN** thrust semi-cryogenic engine working on an **LOX (Liquid Oxygen) Kerosene propellant** combination for enhancing the **payload capability of LVM3** and for future launch vehicles.
- **Liquid Propulsion Systems Centre (LPSC)** is the lead centre for the development of semi-cryogenic propulsion systems with the support of other launch vehicle centres of ISRO.



Maharashtra Sets Up Dedicated Cell for Mercy Petitions

Maharashtra has established a dedicated cell under the Additional Secretary (Home) to expedite processing of mercy petitions for death row convicts.

- This decision follows **Supreme Court directive (2024)** mandating all **States & UTs** to create dedicated units within their **Home/Prison Departments** for efficient handling of mercy petitions.

Mercy Petition

- Mercy petition to the President or Governor is last constitutional resort a convict can take when he is sentenced by court of law.
- Mercy pleas and pardons are **discretionary** acts of grace, not legal rights.
- Mercy is exercised through **clemency power**, which is also known as the pardoning power.

Pardoning Power

- **President's Pardoning Power (Article 72)**
 - ⊕ **Pardon:** Complete absolution from punishment.
 - ⊕ **Respite:** Lesser punishment due to special circumstances like disability or pregnancy.
 - ⊕ **Reprieve:** Temporary stay of execution, allowing time for appeal.
 - ⊕ **Remit:** Reduces duration of sentence while keeping its nature the same.
 - ⊕ **Commute:** Replace the punishment with a lesser form, e.g., death to life imprisonment.
- **President's power extends to** court-martial cases, offenses under Union law, death sentence cases etc.
- **Governor's Pardoning Power (Article 161):** Governor too has pardoning powers, but these do not extend to death sentences and court Martials.
- **President & Governor do not act independently** but on government advice (**Maru Ram case, 1980**).



UNESCO released 'Education and Nutrition: Learn to Eat Well' Report

The report provides **interconnectedness between Education and Nutrition**. It was published to coincide with the **Nutrition for Growth summit** hosted by France.

Complementarity between Nutrition and Education according to report

- **Nutrition affects Education and learning.** E.g. Integrated Child Development Scheme results in a 9% increase in completion of secondary school and 11% increase in completion of university.
- **School Meals impact enrolment, attendance and learning:** E.g. In the Indian state of Maharashtra, consumption of bio-fortified pearl millet improved attention and memory among adolescents.
- **Nutrition impact Gender Equality and Justice:** In India, PM-POSHAN resulted in positive enrolment impacts on girls and other disadvantaged groups.
- **Education affects nutrition:** Through intergenerational and individual choices. E.g. Educated mothers' choices and individual status affect health and nutrition.

Recommendations:

- **Transform nutrition education:** Including food education in school curricula from early childhood to adult education.
- **Place schools at the centre of efforts:** Apply a whole-school approach that combines school meal provision, nutrition education, physical activity and extracurricular initiatives.
- **Build professional capacity through education and training:** Bridging gaps in knowledge and skills at all levels.
- **Monitor the relationship between education and nutrition:** Strengthen tracking of school meals and related health and nutrition programmes.



Centre Government Extended AFSPA in certain areas of Manipur, Nagaland, and Arunachal Pradesh

The **Armed Forces (Special Powers) Act (AFSPA)** has been extended for six months to **address insurgency and maintain order amid ethnic violence**.

About AFSPA

- It gives armed forces **power to maintain public order in "disturbed areas"**.
- Disturbed area can be declared under **Section 3 of AFSPA** when a part or whole State/ Union Territory (UT) is in such a condition that the **use of armed forces in aid of civil power is necessary**.
 - ⊕ **The Central Government or Governor of State or administrator of UT** can declare the whole or part of State/UT as a disturbed area.
- **Special power provided to armed forces**
 - ⊕ **Use of force, including lethal force,** against individuals violating the law.
 - ⊕ **Arrest and search without a warrant.**
 - ⊕ **Immunity from prosecution** without prior Central government approval.



Concerns related to AFSPA

- ⊕ **Human rights violations:** Human rights organizations and local groups have criticized AFSPA for alleged excesses by security forces.
- ⊕ **Failure of Governance:** AFSPA is often seen as a temporary solution to deeper political failures.
- ⊕ **Public distrust:** Lack of transparency in military actions leads to anti-Army sentiment.

Justice Jeevan Reddy Committee about AFSPA

- Repeal of the Armed Forces (Special Powers) Act (AFSPA).
- **Amend the Unlawful Activities (Prevention) Act, 1967 (UAPA)** to include provisions of AFSPA specifically for the Northeast states.

U.S. Firm Gets Clearance to Build N-Reactors in India

The U.S. has approved **Holtec International**, a U.S.-based company, to design & construct nuclear reactors in India under restrictive US regulation called '10CFR810'.

- It permits Holtec to transfer unclassified **Small Modular Reactor (SMR)** technology to 3 Indian private entities. The approval is valid for **10 years** & will be reevaluated every 5 years.
- The use of technology and information is subject to 'peaceful nuclear activities' under **International Atomic Energy Agency safeguards** & not for any military purpose.

Significance

- Advancement of India-US 123 Agreement (2008):** 123 Agreement is about cooperation for peaceful uses of nuclear energy.
- Boosting Private Sector Participation:** Encourages private entities to develop SMRs, expanding India's nuclear capabilities.
- Enhancing India's Nuclear Expertise:** Supports localization of **SMR manufacturing** and strengthens India's role in the **global SMR market**.

Challenges for Private Sector Participation in Nuclear Sector

- Civil Liability for Nuclear Damage Act, 2010:** It has deterred foreign players from investing in the nuclear sector.
- Atomic Energy Act 1962: Restricts nuclear power generation to state-owned entities** and does not allow private companies to operate nuclear power plants as independent operators.

Small Modular Reactor (SMR)

- They are advanced nuclear reactors that have a power capacity of up to 300 MW(e) per unit.
- Advantages:**
 - Reduced Fuel Requirements:** SMR-based power plants need refueling every 3 to 7 years, unlike conventional plants, which require it every 1 to 2 years.
 - Adaptability:** SMRs are adaptable and can be scaled up/down to supply more or less power.
 - Safety Features:** Extensive use of passive safety features in SMR designs.

Smart Cities Mission (SCM) deadline ended on March 31, 2025

As per the Smart Cities Mission dashboard, the cities have completed **7,491 projects** with **567 projects** still ongoing till Feb, 2025.

About Smart Cities Mission (2015)

- Aim:** To improve the quality of life in 100 cities by providing efficient services, robust infrastructure, and sustainable solutions.
- Type:** Centrally Sponsored Scheme.
- Implementing is carried out primarily through **two approaches:**
 - Area-Based Development (ABD) approach:** Each of the 100 cities has selected a defined area for targeted interventions. These ABD areas are being developed as replicable models for other parts of the city.
 - Pan-City Projects:** Which are technology-driven solutions.
- Other key dimensions :** Creating a Special Purpose Vehicle (SPV) structure for program implementation, promoting multiple sources of funding for projects, fostering competitive federalism, and engaging citizens.

Other key initiatives and milestones achieved by SCM

- Integrated Command and Control Centres (ICCC):** All 100 Smart Cities have operational ICCCs, which utilize data for making informed decisions.
- Public Safety and Security:** Over 84,000 CCTV surveillance cameras have been installed in 100 Smart Cities, aiding in crime monitoring.
- Water Supply:** More than 17,026 kilometers of the water supply system are being monitored through Supervisory Control and Data Acquisition, reducing non-revenue water and leakages.
- Solid Waste Management:** Over 66 cities are managing solid waste with increased technology use, improving route management, efficiency of collection, and daily management.

Also In News



Soil liquefaction

India's National Centre for Seismology says soil liquefaction caused severe damage in Myanmar.

About Soil Liquefaction

- It is a phenomenon where a **block of soil behaves as a liquid** instead of a solid.
- Liquefaction takes place when loosely packed, water-logged sediments at or near the ground surface **lose their strength in response to strong ground shaking**.
- Liquefaction occurring beneath buildings and other structures can cause **major damage during earthquakes**.



Asbestos

Govt bans use of asbestos in KVVs, Navodaya Vidyalayas.

About Asbestos

- Asbestos is a **naturally occurring mineral**. Its fibers are resistant to heat and corrosion.
- Useful** as insulation and automotive parts, construction materials, and floor and roof tiles etc.
- Health Effects:** Cancer, Asbestosis, banned in over 65 countries.
- Major Areas:** Russia, Brazil, Kazakhstan and China.



Andes Mountains

Shrinking Andean glaciers threaten the water supply in South America as per study.

About Andes Mountains

- **Type:** **Fold Mountains**, formed due to the subduction of the **oceanic Nazca Plate beneath the South American continental plate**.
- **Length:** About 4,500 miles long and spans **seven South American countries** Venezuela, Colombia, Ecuador, Peru, Bolivia, Chile and Argentina.
- **Highest peak:** **Cerro Aconcagua** (6960 meters).
- **Volcanoes:** **Ojos del Salado** (Dormant), **Cotapaxi Volcano** (Active).
- **UNESCO World Heritage site:** **Machu Picchu**.
- **Altiplano plateau**, World's second-highest after the Tibetan plateau.



Pelagic birds

Breeding colonies of Pelagic birds were recorded on **sandbars of Adam's Bridge**.

- Adam's bridge connects Rameswaram, India to Mannar island of Sri Lanka.

About Pelagic birds

- They **spend a large portion** of their lives on the open ocean.
- They can be found **thousands of miles offshore**, but can get blown on to land during high winds and storms.
- **Examples:** Brown noddy, Bridled Tern, Saunder's Tern, Little Tern, etc.
- **Key Features:**
 - ⊕ **Greatly in size and excellent swimmers.**
 - ⊕ **They have exceptionally long thin wings** that allow them to fly for long periods without rest.
 - ⊕ **They have a special salt gland** that extracts salt from the seawater.
- **Threats:** Oil spills, climate change, plastic pollution etc.



Future Circular Collider

The **Future Circular Collider project** raises concerns about monopolizing funding and restricts alternative research directions.

About Future Circular Collider

- It is an ambitious proposed successor to the Large Hadron Collider (LHC) at CERN.
 - ⊕ **European Organization for Nuclear Research (CERN)** is one of the world's leading scientific institutions, dedicated to understanding fundamental nature of the universe.
- **Scientific Objectives**
 - ⊕ **Unanswered Questions from the LHC:** e.g. what role did the Higgs boson plays in the Big Bang?
 - ⊕ **Exploring Beyond the Standard Model:** The LHC has not yet detected new elementary particles beyond the Higgs boson



INIOCHOS-25

Indian Air Force to Participate in Multinational Air Exercise in Greece. **About INIOCHOS-25**

- It is an **annual multinational air exercise** hosted by Greece's Hellenic Air Force.
- It serves as a platform for air forces to hone their skills, exchange tactical knowledge, and strengthen military ties.



India's Traditional New Year Festivals

Various traditional New Year festivals are being celebrated across different parts of India.

Chaitra Suktadi

- Marks the **beginning of the Hindu New Year**, based on the **lunar calendar**.
- The **Vikram Samvat calendar** used in North India also begins from Chaitra Suktadi.

Ugadi

- Celebrated in Andhra Pradesh, Telangana, and Karnataka as the **Telugu New Year**.
- The word "**Yugadi**" comes from "Yug" (age) and "Adi" (beginning).

Gudi Padwa

- Primarily observed in Maharashtra, Goa etc.

Cheti Chand

- **Marks the beginning of the New Year** for Sindhi community.
- It, also known as **Jhulelal Jayanti**, is a religious festival celebrated by Sindhi

Sajibu Cheiraoba

- **Sajibu Nongma Panba Cheiraoba** marks the **Meitei New Year**, celebrated in Manipur.
- Falling on the **first lunar day of the Sajibu month (March/April)**.



Sarhul Festival

Sarhul Festival is being celebrated in Jharkhand and the larger Chhotanagpur region.

About Sarhul Festival

- It is celebrated by **Oraon, Munda and Ho** tribes, of Jharkhand region.
- Sarhul, literally "worship of the Sal tree" marks the beginning of **New Year**.
 - ⊕ They are seen as abode of **Sarna Maa**, the deity protecting village from inclement natural forces.
- It is rooted in **nature worship** and celebrates the symbolic union of Sun & Earth.
- **Celebrated every year** in 1st month of Hindu calendar, on the third day of the moon or the fortnight of 'Chaitra'.
- It marks the advent of the **spring season or "Phaagun"**.

Place in news



Tonga (Capital: Nuku'alofa)

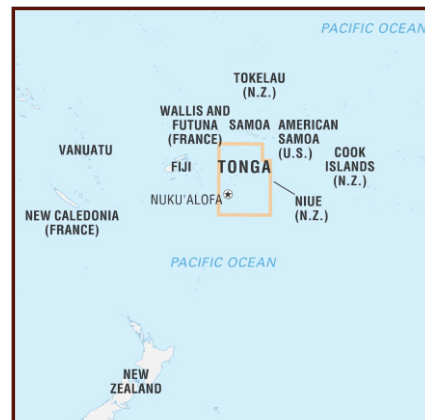
A powerful 7.1 magnitude earthquake struck near Tonga.

Political Features

- **Location:** Southwestern Pacific Ocean.
- It consists of some **170 islands** divided into 3 main island groups: Tongatapu in the south, Ha'apai in the centre, and Vava'u in the north.
- Tonga is a member of the **Commonwealth** and **United Nations**.

Geographical features

- **Highest Peak:** Kao Island in the Ha'apai Group.
- **Climate:** Semitropical climate except in the northernmost islands, where truly tropical conditions prevail.
- **There are no rivers in Tonga.**



AHMEDABAD



BENGALURU



BHOPAL



CHANDIGARH



DELHI



GUWAHATI



HYDERABAD



JAIPUR



JODHPUR



LUCKNOW



PRAYAGRAJ



PUNE



RANCHI