

### ISRO'S NEW X-RAY EYE IN THE SKY

#### Context

- As the world woke up to the first morning of 2024, ISRO's launch vehicle put into orbit a new X-ray payload (XPoSat, X-ray Polarimeter Satellite) for astronomical research.
- If all goes well, the instrument, **totally indigenous in design and fabrication**, will herald yet another milestone for Indian astronomers.

#### An Overview of XPoSat and POLIX

- **Milestone Launch of XPoSat**
  - ISRO's successful launch of the **X-ray Polarimeter Satellite (XPoSat)** signifies a groundbreaking achievement for Indian astronomers.
  - The launch vehicle placed XPoSat into orbit, **marking India's entry into advanced space-based X-ray observations**.
  - XPoSat, **designed for astronomical research**, carries the indigenous Indian X-ray Polarimeter instrument (POLIX) at its core.
- **RRI's 15-Year Endeavor - POLIX Development**
  - The Raman Research Institute (RRI) in Bangalore has been dedicated to the development of POLIX for the past 15 years.
  - **POLIX, entirely indigenous in design and fabrication**, showcases India's commitment to advancing space-based X-ray astronomy.
  - Despite its relatively modest size, **POLIX is a unique instrument**, focusing on studying the polarisation of X-rays in space.
- **POLIX's Unique Focus on X-ray Polarisation**
  - POLIX, measuring about half a meter in all dimensions and weighing nearly two hundred kilograms, is **dedicated to studying a specific property of X-rays — polarisation**.

- The instrument **aims to unravel the mysteries of celestial objects, such as stars with powerful magnetic fields, pulsars, and regions around black holes, by analysing the polarization of X-rays they emit.**
- X-ray polarisation **provides astronomers with valuable insights into the nature and characteristics of these cosmic phenomena.**

## Significance of ISRO's Milestone Mission

- The successful integration of POLIX into XPoSat **exemplifies India's technological prowess and scientific acumen in the field of space exploration.**
- The collaborative effort between ISRO, RRI, and the broader scientific community **underscores India's dedication to advancing knowledge and making significant strides** in space-based X-ray astronomy.
- With XPoSat and POLIX, **Indian astronomers are poised to make groundbreaking discoveries that contribute to a deeper understanding of the universe,** showcasing the country as a significant player in the realm of advanced astrophysical research.

## Conclusion

- The successful launch of XPoSat and the **deployment of POLIX represent a significant stride in India's pursuit of excellence in space-based X-ray astronomy.**
- The innovative design of POLIX, its ability to probe lower energy X-rays, and its collaborative role with NASA's instrument **position Indian astronomers at the forefront of unravelling the mysteries surrounding pulsars and black holes.**
- As XPoSat begins its cosmic scanning, the scientific community **eagerly awaits the invaluable insights it promises to provide.**

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## WHAT IS RADIOCARBON DATING?

The technique called radiocarbon dating brought the first verifiable way to do this to many fields of science, transforming them – and our world – to a significant degree.



## About Radiocarbon dating:

- It is a method by which the **age of an object** can be determined.

Radiocarbon dating refers to a method that does this using **radiocarbon**, a name for the **isotope carbon-14**.

- **How does Carbon-14 form?**

- It is created in the **earth's atmosphere** when **cosmic rays**– energetic streams of charged particles coming from sources in outer space – slam into the **atoms of the gases** and release neutrons.
- When these neutrons interact with the nitrogen-14 isotope, they can produce carbon-14.
- Since cosmic rays are ceaselessly passing through the earth's atmosphere, **carbon-14 is created constantly there**.
- It readily combines with atmospheric oxygen to form **radioactive carbon dioxide**.
- This compound then enters the bodies of plants (via photosynthesis), animals (when they consume plants), and other biomass through the carbon cycle.
- It is in **the form of carbon dioxide** and other carbon compounds, would have to be able to diffuse into the earth's various ecosystems such that the concentration of carbon-14 in the atmosphere was comparable to the concentration of carbon-14 in the planet's other biospheres.

## How does radiocarbon dating work?

- When an organic entity – like the human body – is 'alive', it constantly exchanges carbon with its surroundings by breathing, consuming food, defecating, shedding skin, etc.
- Through these activities, **carbon-14 is both lost from the body as well as replenished**, so its concentration in the body is nearly constant and in equilibrium with its surroundings.

- When this individual dies, the body no longer performs these activities and the concentration of carbon-14 in the body begins to dwindle through radioactive decay.
  - The more time passes, the more the amount of carbon-14 lost, and the less there will remain. This decay rate can be predicted from theory.
  - Radiocarbon dating dates an object by measuring the amount of carbon-14 left, which scientists and/or computers can use to calculate how long ago the body expired.
  - The modern radiocarbon dating setup is more sophisticated and one of the most sensitive dating setups uses **accelerator mass spectrometry (AMS)**, which can work with organic samples as little as 50 mg.
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## AADHAAR-BASED PAYMENT SYSTEM (ABPS) MANDATORY FOR NREGS WORKERS: GOVT MAY CONSIDER EXEMPTIONS ON CASE BASIS

### Why in News?

- With the ABPS now mandatory for National Rural Employment Guarantee Scheme (NREGS) workers' payments, the government announced that it may consider exemptions on a "case-by-case basis".
- The NREGS **provides a legal guarantee for 100 days of employment** in every financial year to adult members of any rural household willing to do public work-related unskilled manual work **at the statutory minimum wage**.

### Aadhar Enabled Payment System (AePS) and its Objectives:

- AePS is a **bank led model** which allows online interoperable financial inclusion transactions at PoS (MicroATM) through the Business correspondent of any bank using the Aadhaar authentication.
- The only inputs required for a customer to do a transaction under this scenario are -
  - Bank Name
  - Aadhaar Number
  - Biometrics captured during enrolment
- **Objectives of the AePS:**

- **To empower a bank customer to use Aadhaar** as his/her identity to access his/her respective Aadhaar enabled bank account.
- **To perform basic banking transactions** like cash deposit, cash withdrawal, intrabank or interbank fund transfer, balance enquiry and obtain a mini statement through a Business Correspondent
- To sub-serve the goal of Government of India and Reserve Bank of India (RBI) in furthering **Financial Inclusion**.
- **To sub-serve the goal of RBI in electronification of retail payments.**
- To enable banks to route the Aadhaar initiated interbank transactions through a central switching and clearing agency.
- **To facilitate disbursements** of Government entitlements like NREGA, Social Security pension, Handicapped Old Age Pension, etc.
- To facilitate interoperability across banks in a safe and secured manner.
- To build the foundation for a full range of Aadhaar enabled Banking services.

## ABPS for NREGS:

- Under Mahatma Gandhi NREGS, ABPS has been in use since **2017**. Under ABPS, workers' 12-digit Aadhaar numbers are linked with their job cards as well as the bank accounts of NREGS workers.
- After almost universal availability of Aadhaar numbers to every adult population, the Government of India decided to extend ABPS for beneficiaries under the scheme.
- The payment will land through ABPS only to the account associated with ABPS, which means that **it is a safer and faster way of payment transfer**.
- Out of the total 14.33 crore active beneficiaries, the Aadhaar has been seeded for 13.97 crore.
- Against these seeded Aadhaar, a total 13.34 crore Aadhaar have been authenticated and 81.89% of active workers are now eligible for ABPS.
- In the Month of July 2023, about 88.51% of the wage payment has been made through ABPS.

## AGREEMENT ON THE PROHIBITION OF ATTACK AGAINST NUCLEAR INSTALLATIONS AND FACILITIES

India and Pakistan exchanged the list of nuclear installations and facilities through diplomatic channels recently under the agreement on the Prohibition of Attack against Nuclear installations and facilities.



### About Agreement on the Prohibition of Attack against Nuclear Installations and Facilities:

- It was signed on December 31, 1988, by the then Pakistani Prime Minister Benazir Bhutto and Indian PM Rajiv Gandhi.
- The treaty came into force on January 27, 1991, and has two copies each in Urdu and Hindi.

### Need for the Agreement:

- In 1986, the Indian army carried out a massive exercise ‘Brasstacks’, raising fears of an attack on nuclear facilities.
- Since then, both countries have been negotiating to reach an understanding towards the control of nuclear weapons, which culminated in the treaty.
- Provisions:
  - The agreement mandates both countries to inform each other about any nuclear installations and facilities to be covered under the agreement on the first of January of every calendar year, providing a confidence-building security measure environment.
  - The term ‘nuclear installation or facility’ includes nuclear power and research reactors, fuel fabrication, uranium enrichment, iso-topes separation, and reprocessing facilities, as well as any other installations with fresh or irradiated nuclear fuel and materials in any form and establishments storing significant quantities of radioactive materials.

## EXERCISE DESERT CYCLONE

The Joint Military Exercise 'Desert Cyclone 2024' between India and UAE will be held from January 2 to January 15 in Rajasthan.



### About Exercise 'Desert Cyclone':

- It is the **inaugural edition of joint military exercise** "Desert Cyclone 2024" between India and the United Arab Emirates (UAE).
- The exercise aims to enhance **interoperability** by **learning & sharing best practices** in Urban Operations.
- This exercise is marking a significant milestone in the strategic partnership.

### Key facts about India and UAE relations

- India and the UAE established diplomatic relations in 1972 and UAE opened its Embassy in Delhi in 1972 whereas, India opened its Embassy in Abu Dhabi in 1973.
- The first-ever India-UAE Joint Air Forces exercise took place in September 2008 at the Al-Dhafra base in Abu Dhabi.
- India has also been a regular participant at the biennial International Defence Exhibition (IDEX) in Abu Dhabi.
- Earlier this year, two ships of the Indian Navy, INS Visakhapatnam, and INS Trikand participated in **bilateral exercise 'Zayed Talwar'** with the UAE to enhance interoperability and synergy between the two navies.

## WHY DID FIU IND ACT AGAINST VIRTUAL ASSET PROVIDERS?

- On December 28<sup>th</sup>, the Financial Intelligence Unit India (FIU IND) issued show cause notices to nine offshore Virtual Digital Asset Service Providers (VDA SPs).
- These VDA SPs include **Binance, Kucoin, Huobi, Bitfinex** and **MEXC Global**, among others.

- The Director FIU IND wrote to the Secretary, Ministry of Electronics and Information Technology to **block the URLs of the above-mentioned entities.**

## What is the Premise of the Noncompliance?

- In March 2023, VDA SPs in India were brought under anti-money laundering/counter financing of terrorism regulations.
- They were **mandated to comply with Prevention of Money Laundering Act (PMLA) 2002**, verify the identities of onboarded clients, and maintain records of their financial positions and potentially suspicious transactions.
- This obligation applies to all VDA SPs operating in India irrespective of physical presence.
- Currently, 31 VDA SPs have registered with FIU IND.

## How are other Countries Regulating Virtual Assets?

- In Dubai (UAE), they follow licensing framework. The mandatory licenses are comprehensively categorised based on the service that the entity wants to offer in the market.
  - For obtaining the mandatory license in the Emirate, it imposes an obligation to comply with AML-CFT laws relevant to “its VA activities, businesses or operations in any jurisdiction at all times”.
- In the European Union, the **Markets in Crypto-Assets Regulation (MiCA) endeavours to institute uniform EU market rules for crypto-assets.**
  - The regulation is premised around “transparency, disclosure, authorisation and supervision of transactions”.
  - It would provide measures to tackle market manipulation, prevent money laundering, terrorist financing and other criminal activities.
  - Service providers under this common law would require authorisation to operate in the region.



- Though entered into force in June 2023, the legislation is still in consultation stages. The final report is expected in June 2024.
  - Across the Atlantic, **the U.S. does not have a thorough nationwide regulatory framework at present.**
    - Some digital assets and related activities are covered under certain existing regulations, such as the Bank Secrecy Act and the Anti-Money Laundering Act of 2020.
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## WHAT IS THE E-SCR PORTAL?

The Supreme Court of India's monumental project of translating all of its 36,000 judgments into Scheduled Languages achieved unprecedented speed in 2023, with the E-SCR portal starting with just 2,238 translated judgements as of January and ending the year with over 31,000 rulings translated.



### About e-SCR portal:

- It is an initiative to provide the **digital version of the apex court's judgements** in the manner as they are reported in the official law report.
  - The Supreme Court has developed a search engine with the help of **the National Informatics Centre.**
  - It is comprising elastic search technique in the database of e-SCR and the search facility in e-SCR provides for free text search, search within search, case type and case year search, judge search, year and volume search and bench strength search options.
  - It will provide free access to its about 34,000 judgements to lawyers, law students and the common public.
  - These verdicts will be available on the apex court website, its mobile app and on the judgment portal of the **National Judicial Data Grid (NJDG).**
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