One Nation One Time

For Prelims: CSIR- National Physical Laboratory, Indian Space Research Organisation, Indian Standard Time, Global Positioning System, Greenwich Mean Time, Atomic clocks, NavIC, Network Time Protocol

For Mains: Legal Metrology (IST) Rules, 2025, Role of Self-reliant Time Synchronization, Infrastructure and Digital Economy, **One Nation One Time**

Source: BS

Why in News?

The **Department of Consumer Affairs** in collaboration with the **Council of Scientific & Industrial Research** - **National Physical Laboratory (CSIR - NPL)** and the **Indian Space Research Organisation (ISRO)**, has drafted the **Legal Metrology (Indian Standard Time (IST)) Rules, 2025.**

- The rules aim to standardize and mandate **Indian Standard Time (IST)** adoption across all sectors, reinforcing the vision of **"One Nation, One Time."**

What are the Key Features of the Legal Metrology (IST) Rules, 2025

- **Mandatory Adoption of IST:** IST, as maintained by the **CSIR-NPL**, will be the **only legally recognized time standard in India**, reinforcing **"One Nation, One Time."**
  - The use of **foreign time references (such as Global Positioning System(GPS) time)** will be prohibited unless specifically approved by the government.
- **Synchronization of Critical Sectors:** All **government institutions, financial entities, telecom service providers, power grids, and digital infrastructure** must synchronize their systems with IST.
- **Regulatory Framework & Compliance:** Compliance will be **monitored through periodic audits**, and penalties will be imposed for non-adherence.
- **Special Provisions:** Scientific research, astronomy, and navigational applications may use alternative time references **with prior government approval**.
  - The rules provide **flexibility for strategic and national security applications**.

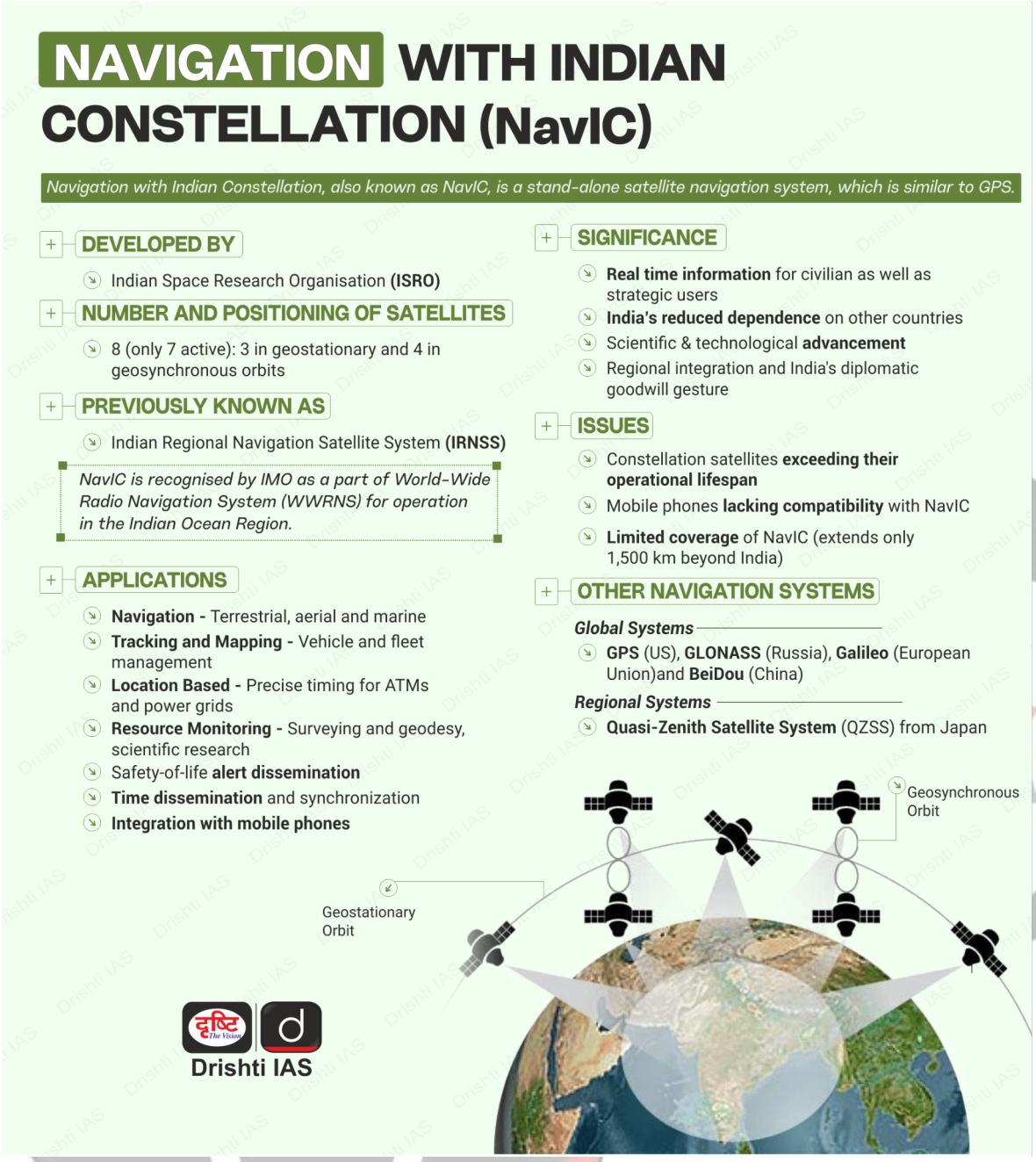
Indian Standard Time

- The IST is based on a **longitude** of **82.5°**, which passes through Mirzapur, Uttar Pradesh.
- It is 5 hours 30 minutes ahead of **Greenwich Mean Time (GMT)**, now called the **Universal Coordinated Time (UTC).**
  - IST was established in 1906, replacing three regional **time zones from the British era (Bombay, Calcutta, and Madras Time).**

What is One Nation, One Time?

- **About:** *'One Nation, One Time'* aims to establish a **unified and precise timekeeping framework** for all governmental, industrial, technological, and societal applications.
    - The government plans to set up **five Legal Metrology laboratories** across India to achieve microsecond-level accuracy in time dissemination.
- **Need for Self-reliant Timekeeping:** India's reliance on GPS satellites(controlled by the US) poses national security and **cybersecurity** risks. During the **Kargil War, 1999**, this dependence compromised India's ability to accurately target enemy positions.
    - A self-reliant system would reduce dependence and protect critical infrastructure.
- **Function:** The **NPL,** will utilize **atomic clocks** to provide accurate time, synchronized via **NavIC (Navigation with Indian Constellation)**.
    - The NPL's advanced atomic clocks, which **lose only one second over millions of years,** will serve as the reference for IST.
    - Synchronization protocols such as **Network Time Protocol (NTP)** and **Precision Time Protocol (PTP)** will be adopted by government institutions and public organizations.
- **Benefits:** Critical sectors like **5G**, **Artificial Intelligence**, **Internet of Things**, **navigation, and power grid synchronization** will operate with **higher precision**.
    - **Financial transactions** and regulatory compliance will become more **accurate and fraud-resistant**.
    - Digital devices and **communication networks will be synchronized**, improving operational efficiency and consumer services.
    - Strengthens India's digital infrastructure, making it an **attractive hub for global tech investments**.
        - Aligns with international best practices in **timekeeping, aviation, and telecommunication standards**.

//



CSIR- National Physical Laboratory

- **About:** The **NPL** is one of India’s earliest national laboratories. Its foundation stone was laid by **Jawaharlal Nehru in 1947**, and it was formally inaugurated by **Sardar Vallabhbhai Patel in 1950**.
- **Functions:** Responsible for realizing and maintaining physical measurement units based on the **International System (SI units)**, including **metre, kilogram, second, kelvin, ampere, and candela**,
    - NPL aids industries with precision measurements and certifies emission-monitoring instruments**.**
- **Key Contributions:** Develops advanced **atomic clocks** and maintains **Indian Standard Time (IST)** using **Cesium atomic clocks (work using Cesium atoms)** and **Hydrogen maser** (uses hydrogen atoms to serve precision frequency).
    - Provides **apex calibration services** and supports **National Accreditation Board for Testing and Calibration Laboratories (NABL).**

What are the Challenges in Implementing One Nation One Time?

- **Adoption by Telecom and ISPs:** **Internet Service Providers (ISPs)** and telecom operators rely on foreign time sources, mandating IST adoption requires tech upgrades, regulatory enforcement, and a centralized monitoring authority.
- **Global Integration:** Businesses engaged in international trade and financial markets require **synchronization with global time standards (UTC, GMT, etc.).**
    - Mechanisms for seamless transition and dual compliance need to be established.
- **Infrastructure Development:** Ensuring seamless time synchronization across the country, including regions with **limited connectivity**, integration with existing networks and systems in **underserved areas may face logistical and technical hurdles.**
- **Cybersecurity Concerns:** Time synchronization systems are potential targets for cyberattacks. Requires **secure encryption** and alternative time dissemination methods.

Way Forward

- **Cybersecurity Measures:** Implement robust encryption methods to protect time synchronization systems from cyberattacks.
    - Develop **backup systems** for time dissemination to ensure resilience against potential disruptions.
- **Monitoring Authority:** Establish a dedicated **Centralized Monitoring** authority to oversee the implementation and compliance of IST synchronization across all sectors.
- **Promoting Awareness:** Educate industries, financial institutions, and public services on **IST synchronization benefits**, while collaborating with global standardization bodies for seamless international integration.
- **Research and Development:** Invest in R&D to continuously improve **timekeeping technologies and protocols,** ensuring India remains at the forefront of precise timekeeping.

Drishti Mains Question:

Analyze how India's One Nation One Time synchronization system could enhance national security and defense preparedness.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims:

Q.1 Which one of the following countries has its own Satellite Navigation System? (2023)

a. Australia

b. Canada

c. Israel

d. Japan

Ans: d

- Navigation Systems Operational in the World:
    - GPS from the U.S.
    - GLONASS from Russia.
    - Galileo from the European Union

    - BeiDou from China.
    - NavIC from India
    - QZSS from Japan.
- **Hence, option D is correct.**

Q.2 With reference to the Indian Regional Navigation Satellite System (IRNSS), consider the following statements: (2018)

1. IRNSS has three satellites in geostationary and four satellites in geosynchronous orbits.
2. IRNSS covers the entire India and about 5500 sq. Km beyond its borders.
3. India will have its own satellite navigation system with full global coverage by the middle of 2019.

Which of the statements given above is/are correct?

(a) 1 only
(b) 1 and 2 only
(c) 2 and 3 only
(d) None

Ans: (a)

Mains:

Q. Why is the Indian Regional Navigational Satellite System (IRNSS) needed? How does it help in navigation? **(2018)**