Geospatial Intelligence

Why in news?

In recent times, geospatial intelligence has shown enormous potential from disaster management and environmental monitoring to military applications.

What is GEOINT?

- **Geospatial intelligence** –It is the *collection and integration of data* from a network of technologies, including satellites, mobile sensors, ground-control stations and aerial images.
- The data is used to *produce real-time maps and simulations* to help identify when, where and to what extent a threat is likely to emerge.

- **Geospatial technology –** It is a term used to describe the range of modern tools contributing to the geographic mapping and analysis of the Earth and human societies.
- It can be used to create intelligent maps and models which help to collect geographically referenced data.

Status of Geospatial Technology in India

- India's geospatial economy is expected to cross Rs 63,000 crore by 2025 at a growth rate of 12.8%.
- There are around 250 Geospatial Start-ups in India.
- Ministry of Science and Technology have launched National Geospatial Policy, 2022, a citizen-centric policy that seeks to strengthen the Geospatial sector to support national development, economic prosperity and a thriving information economy.
- India have also unveiled a Geospatial Incubator.
- Second United Nations World Geospatial Information Congress (UN-WGIC) 2022 was organised in Hyderabad.
- A new geospatial data guideline was released in 2021.
- National organizations implementing GIS based projects are Survey of India, Geological Survey of India, National Atlas and Thematic Mapping Organization (NATMO), Indian Space Research Organisation (ISRO) and National Informatics Centre.

Why Geospatial technology is important for India?

- **Employment** – It is expected to provide employment to more than 10 lakh people mainly through Geospatial Start-ups.
- **Promote innovation** – Democratization of Indian geospatial ecosystem will spur domestic innovation.
- **Global competition** – It will enable Indian companies to compete in the global mapping ecosystem by leveraging modern geospatial technologies.
- **Self-reliance** – It helps in realising the dream of Atmanirbhar Bharat.
- **Backup Indian land reforms** – Rural Development Ministry has mapped over 45 lakh km of rural roads and have digitised water bodies, green areas, plots, and other structures essential for administrative purposes.

SVAMITVA (Survey of Villages and Mapping with Improvised Technology in Village Areas) is piloted by the Ministry of Panchayati Raj in 2020 to digitise land records.

What are the applications of Geospatial Intelligence?

- **Military applications** – Aids from regular surveillance to long-term situational awareness.
- Creates 3D models for all combat systems & operations and provide in-depth understanding positions of troops and equipment.
- Helps in maintaining decision superiority and sovereignty by analysing enemy vulnerability.
- Helps to plan future targeting action to minimise civilian damages.
    - *In Russian-Ukraine war*, a commercial satellite imagery company, was the 1st to report the 40-mile-long convoy of Russian ground forces heading toward Kyiv in 2022.
- **Disaster Management** – GEOINT contributes to emergency preparedness and response thus helping officials to distribute resources and personnel, as well as issue storm warnings and evacuation orders.
    - The *National Hurricane Centre* actively monitors the location, formation and trajectory of tropical cyclones.
- It provides valuable guidance for search-and-rescue and recovery efforts following a disaster.
    - During the *2023 earthquake in Turkey and Syria,* maps and aerial images quickly identified the extent of damage and helped first responders locate access points.
- **Environmental Monitoring** – It monitors temperature, precipitation, snowpack and polar ice thus helping to anticipate and prepare for potential disturbances.
    - For instance, understanding temperature profiles across time provides information on when, where and to what extent is the threat.
- **Logistics and global supply chains** – The global economy runs on GPS, which provides detailed information on the time, location and destination of ships and cargo which leads to more consistent and reliable operations.

The Global Positioning System (GPS) is a space-based radio-navigation system consisting of a constellation of satellites (currently 31) broadcasting navigation signals and a network of ground stations and satellite control stations used for monitoring and control.

- **Transportation** – It helps in the rollout of autonomous vehicles.
- Using high-resolution imagery, city planners and engineers are able to detect markings and features on the ground such as bicycle lanes and traffic direction.
- **Digital twins** – It is contributing to the development, implementation and evaluation of digital twins which replicate real systems in digital world in real-time.
- Digital twins have been highly effective in conflict settings by simulating weather and terrain to help militaries and peacekeepers develop and enact strategies.
- **Health Sector** – Geo-enabled technology can be used for establishing telemedicine facilities, analysing infrastructure availability, etc.
- During Covid-19 pandemic, *Arogya Setu app* helped in identifying containment zones, monitoring citizen movement, administrating vaccines and ensuring social distancing.

References

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