

6. National Conference on Geodesy – Science & Technology

The first National Conference on Geodesy (GeodCon-26) served as a landmark event for India’s scientific community, emphasizing that high-precision mapping and Earth-measurement science are the "invisible pillars" of a modern economy. The conference highlighted how the National Geospatial Policy 2022 is transforming India from a data-consumer to a global geospatial leader.

1. Background

To understand the policy, it is essential to define the two core scientific domains it governs-

Geodesy- The branch of mathematics and earth sciences that deals with the scientific measurement and representation of the Earth’s geometric shape, its orientation in space, and its gravity field. It explains how the Earth changes over time (crustal motion, tides, and polar motion).

Geospatial Technology- An umbrella term for various high-tech tools used to collect, analyse, and visualize data linked to specific geographic locations.

GIS (Geographic Information Systems)- Software for mapping and analysing data.

- 1. Remote Sensing- Collecting information via satellites or aircraft.
- 2. GNSS/GPS- Satellite-based positioning (e.g., India’s Navi).
- 3. LiDAR- Laser-based light detection and ranging for high-resolution 3D mapping.

2. National Geospatial Policy (NGP) 2022- The Framework

The NGP 2022 was introduced to democratize geospatial data, which was previously restricted due to security concerns.

Vision- To make India a global leader in the geospatial sector by 2030.

Liberalization- It removed the requirement for prior approvals, security clearances, and licenses for the collection and dissemination of geospatial data by Indian entities.

Data Access- Promoted the creation of a National Geospatial Data Infrastructure (NGDI) to ensure seamless data sharing across government and private sectors.

3. Strategic Significance of Geospatial Technology

Geospatial data acts as an "enabling layer" across multiple sectors of national importance-

Governance & Urban Planning-

- 1. SVAMITVA Scheme- Uses drones and GIS to provide "Records of Rights" to village household owners.
- 2. Smart Cities- Enables precise infrastructure mapping, utility management, and digital twinning of cities.

National Security-

- 1. NavIC- Provides independent satellite navigation for defense and civilian use.
- 2. Guidance Systems- Essential for missile trajectories, border surveillance, and drone operations.

Economic Growth-

- 1. Logistics- Optimizes supply chains and delivery routes for startups.
- 2. Precision Agriculture- Helps farmers monitor soil moisture and crop health via satellite imagery.

Disaster Resilience-

- 1. Tectonic Monitoring- Tracks crustal deformation to predict earthquake risks.
- 2. Climate Change- Monitors sea-level rise and models cyclone paths with high accuracy.

4. Key Government Initiatives (2025-2026)

The government has launched several operational missions to implement the 2022 Policy effectively.

Initiative	Core Objective
National Geospatial Mission (NGM)	Development of foundational geospatial infrastructure and national datasets.
CORS Network	A network of Continuously Operating Reference Stations providing centimetre-level positioning accuracy across India.

Operation Drona Giri	A pilot initiative to demonstrate real-world geospatial applications in disaster management and planning.
BISAG-N	Provides specialized GIS solutions and satellite applications for state and central governance.
NavIC Expansion	Ensuring India remains independent of foreign GPS systems for critical infrastructure.

5. Challenges and The Way Forward

GeodCon-26 identified specific hurdles that India must overcome to maintain its "Sovereign Geospatial Status"-

Key Challenges

Capacity Building- There is a significant shortage of specialized "Geodesists" and scholars capable of handling niche techniques like gravimetry and VLBI (Very Long Baseline Interferometry).

Sovereign Data Frames- Currently, much of the world relies on international reference frames. India needs its own independent Geodetic Reference Frame and Gravity Models to ensure defense projects aren't vulnerable to foreign coordinate shifts.

Data Volume- The sheer scale of high-resolution 3D data requires massive storage and processing power.

Future Strategy

Integration of GeoAI- Utilizing Artificial Intelligence to automate the processing of massive geodetic datasets for real-time decision-making.

Private Sector Synergy- Encouraging private firms to move beyond simple mapping into high-end geodetic hardware manufacturing.

Youth Engagement- Launching specialized fellowship programs to attract "young scholars" into the field of Geodesy.

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