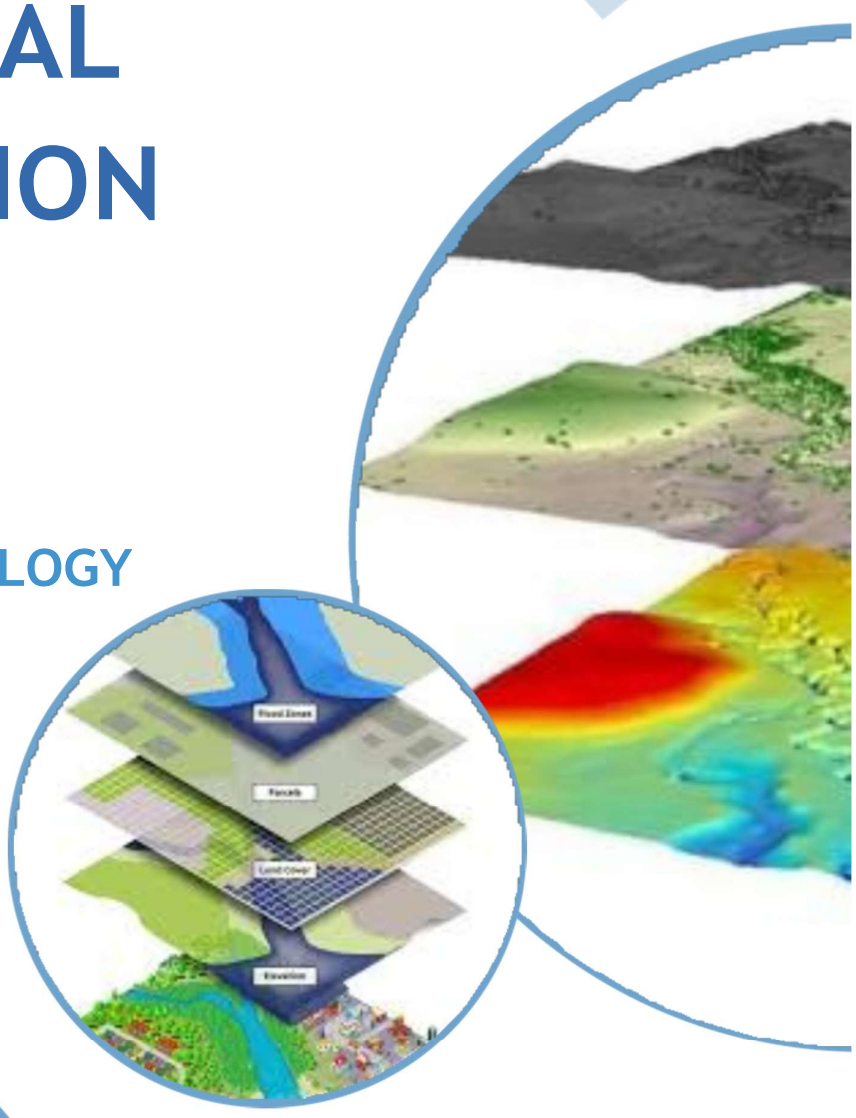
मानकः पथप्रदर्शकः

COMPENDIUM OF INDIAN STANDARDS ON

GEOSPATIAL INFORMATION



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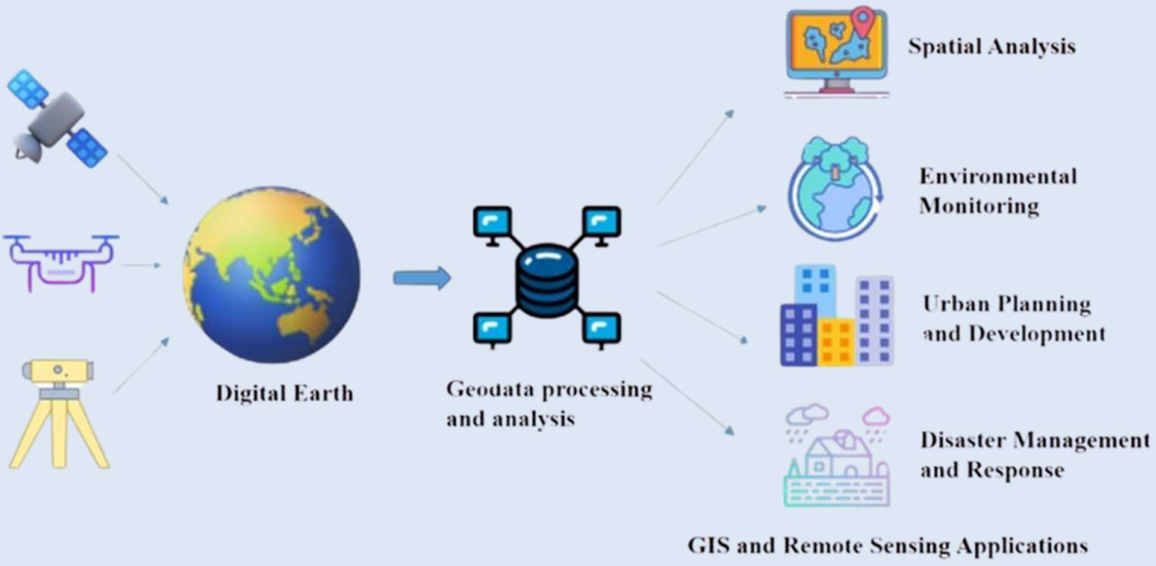
Introduction

Geospatial information refers to data that is associated with a specific location on the Earth's surface. It encompasses a wide range of information, including natural and built environments, infrastructure, demographics, land use, and various phenomena that can be mapped or modeled spatially.

The relevance and accessibility of geospatial information have grown with the development of key enabling technologies, namely Geographic Information Systems (GIS), Remote Sensing (RS), and the Global Positioning System (GPS). Today, it plays a critical role in a variety of sectors such as agriculture, urban planning, disaster management, environmental monitoring, transportation, defense, and public health. Governments, private enterprises, and research institutions increasingly rely on geospatial data for informed decision-making, efficient resource management, and policy formulation.

This compendium provides an overview of Indian Standards on geospatial information and highlights best practices, data governance frameworks, and international benchmarks.

By compiling relevant standards on geospatial information in a single document, this compendium serves as a ready reference for professionals involved with national mapping agencies, urban planners, disaster response teams, and others who rely on timely, accurate, and interoperable spatial data.



GEOSPATIAL INFORMATION :

Geospatial information forms the backbone of location-based understanding and decision-making. It integrates spatial data with descriptive attributes, enabling the visualization, analysis, and interpretation of real-world features in a geographic context. As data volumes grow and spatial technologies evolve, the importance of standardized approaches to manage and exchange geospatial information has become increasingly critical.

To support consistency, interoperability, and reliability across applications and sectors, geospatial standards provide structured guidelines for how this information is captured, described, processed, and shared. These standards ensure that diverse datasets can be effectively integrated and used in systems ranging from navigation apps to national policy frameworks.

The main categories under which Geospatial Standards can be categorized into are:

1. Geospatial Foundational Standards
2. Metadata and data quality standards
3. Schema and feature standards
4. Spatial Referencing Standards
5. Geospatial web and encoding standards
6. Data management and encoding standards
7. Application-Specific and Indian Contextual Standards

1. GEOSPATIAL FOUNDATIONAL STANDARDS :

Geospatial foundational standards provide the conceptual and structural basis for all other geospatial information standards. They define the overarching reference models, modeling languages, and terminologies used to describe, design, and implement geospatial systems and data. These foundational elements ensure consistency, clarity, and interoperability across diverse geospatial applications, making them essential for standards development, software design, and policy alignment. These standards are used by system architects, standards developers, geospatial software designers, data modelers, and academic researchers.

IS No.	Title	Brief
IS 17007:2018	Geographic information - Conceptual schema language:	This Standard provides rules and guidelines for the use of a conceptual schema language within the context of geographic information. The chosen conceptual schema language is the Unified Modeling Language (UML).

2. METADATA AND DATA QUALITY STANDARDS

Metadata and data quality standards provide the foundational framework for documenting and validating geospatial information. Metadata standards ensure that spatial datasets are described in a consistent and structured manner, enabling users to understand the content, origin, and usability of the data. Data quality standards, on the other hand, define the criteria for evaluating the accuracy, completeness, and consistency of geospatial data. Typical users of these standards includes Government agencies managing geospatial data repositories, Data providers and mapping organizations responsible for data production, GIS professionals who use and analyze spatial datasets, Academia and researchers working with spatial data in

scientific and policy studies, Private sector firms offering location-based services or spatial data products

IS No.	Title	Brief
IS 16439:2016	Metadata standard for geospatial information	This standard specifies metadata to provide a framework for documenting the spatial data and declare its content for the users.
IS 18565 (Part 1):2024	Data Quality Part 1 General requirements	This standard establishes the principles for describing the quality of geographic data.

3. SCHEMA AND FEATURE STANDARDS :

Schema standards define the logical structure of geospatial data—such as how geographic features and their attributes are modeled and described. These standards provide a common language for designing geospatial applications and ensure consistency in how spatial features are represented and exchanged. Primary users are data modelers, system architects, developers, and institutions creating geospatial applications or spatial databases.

IS No.	Title	Brief
IS 16970:2018	Geographic information - Rules for applications schema	This Standard defines rules for creating and documenting application schemas, including principles for the definition of features.

4. SPATIAL REFERENCING STANDARDS :

Referencing standards define coordinate systems and geodetic frameworks used to reference spatial data accurately on the Earth's surface. They ensure that spatial data from different sources aligns correctly in terms of position and scale. Users include surveyors, cartographers, GIS professionals, and anyone working with location-based measurements or mapping systems.

IS No.	Title	Brief
IS 13393:2024	Standard representation of geographic point location by coordinates (Second Revision)	This Standard specifies the representation of latitude and longitude and optionally height or depth.

5. GEOSPATIAL WEB AND ENCODING STANDARDS :

These standards define protocols and interfaces for accessing and sharing geospatial data over the web. They enable web-based services such as map visualization, data querying, and feature access through standardized APIs. This promotes real-time data use, integration into web applications, and broader accessibility. Users include web GIS developers, application service providers, public agencies, and private companies delivering geospatial services online.

IS No.	Title	Brief
IS 16626:2025	Geographic information - Geography markup language (GML)	The Geography Markup Language (GML) is an XML encoding in accordance with ISO 19118 for the transport and storage of geographic information modelled in accordance with the conceptual modelling framework used in the ISO 19100 series of International Standards and including both the spatial and non-spatial properties of geographic features.
IS 16699:2018	Geographic information - Web map server interface	This Standard specifies the behaviour of a service that produces spatially referenced maps dynamically from geographic information.
IS 16701:2021	Geographic information — Web Feature Service	This Standard specifies the behaviour of a web feature service that provides transactions on and access to geographic features in a manner independent of the underlying data store. It specifies discovery operations, query operations, locking operations, transaction operations and operations to manage stored parameterized query expressions.
IS 18620 (Part 1):2024	Geospatial API for features Part 1: Core	This Standard specifies the behaviour of Web APIs that provide access to features in a dataset in a manner independent of the underlying data store. This document defines discovery and query operations.

6. DATA MANAGEMENT AND ENCODING STANDARDS :

These standards govern how geospatial data is structured, stored, and encoded for efficient use and exchange. These standards ensure that geospatial datasets are machine-readable, interoperable, and compatible across platforms. These standards play a critical role in supporting location-based services (LBS) and facilitating seamless data sharing between platforms and applications.

IS No.	Title	Brief
IS 16967:2018	Geographic information - Location - Based services - Tracking and navigation	This Standard describes the data types, and operations associated with those types, for the implementation of tracking and navigation services. This Standard is designed to specify web services that can be made available to wireless devices through web-resident proxy applications, but is not restricted to that environment.
IS 16968:2018	Geographic information - Location - Based services - Multimodal routing and navigation	This Standard specifies the data types and their associated operations for the implementation of multimodal location-based services for routing and navigation. It is designed to specify web services that may be made available to wireless devices through web-resident proxy applications, but is not limited to that environment.
IS 16966:2018	Geographic Information — Location-Based Services — Reference Model	This Standard defines a reference model and a conceptual framework for location-based services (LBS), and describes the basic principles by which LBS applications may interoperate. This framework references or contains an ontology, a taxonomy, a set of design patterns and a core set of LBS service abstract specifications in UML.
IS 16554:2017	Data exchange standard for geospatial information	This standard specifies National Spatial Data Exchange (NSDE) format for catering the need of point, line and polygon topology and Digital Elevation Model (DEM) and coded raster data.

7. APPLICATION-SPECIFIC AND INDIAN CONTEXTUAL STANDARDS :

These standards cater to domain-specific needs and the Indian geospatial landscape. They address requirements unique to sectors such as land administration, transportation, and urban planning, and often align with national policies or infrastructure goals. Key users include Indian government departments, local authorities, planners, surveyors, and researchers working on national or regional geospatial initiatives.

IS No.	Title	Brief
IS 18594:2024	Land Administration Domain Model (LADM)	This Standard defines a reference Land Administration Domain Model (LADM) covering basic information-related components of land administration (including those over water and land, and elements above and below the surface of the earth).
IS 18008 (Part 1) : 2021	Smart Cities — GIS Part 1 Reference Architecture	This standard describes the Enterprise GIS reference architecture that comprises the functional architecture, technical reference model, and information reference model of the enterprise GIS. It also specifies the core capabilities and key design principles of the enterprise GIS.
IS 18008 (Part 2) : 2024	Smart Cities — GIS Part 2 Self-Assessment of GIS Reference Architecture	This standard (Part 2) provides guidelines for organizations for the self-assessment of their GIS implementations as per IS 18008 (Part 1).