GEOSA
الهيئة العامة للمساحة والمعلومات الجيومكانية
General Authority for Survey and Geospatial Information

National Geospatial Governance KSA

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General Authority for Survey and Geospatial Information

1	About the General Authority for Survey and Geospatial Information (GEOSA)
2	National Geospatial Data Governance
3	National Geospatial Data Policies
4	National Geospatial Data Standards
5	Guide to Establish and Operate Geo-Information Unit in Government Agencies

GEOSA
الهيئة العامة للمساحة والمعلومات الجيومكانية
General Authority for Survey and Geospatial Information

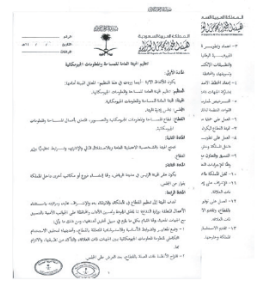
About the General Authority for Survey and Geospatial Information

Roles & Responsibilities

The Authority aims to regulate, develop, supervise, and monitor the Sector in the Kingdom, in a manner that achieves quality, enhances performance, and maintains security, in coordination with relevant agencies.

Cabinet Resolution No. (90)

Responsibilities

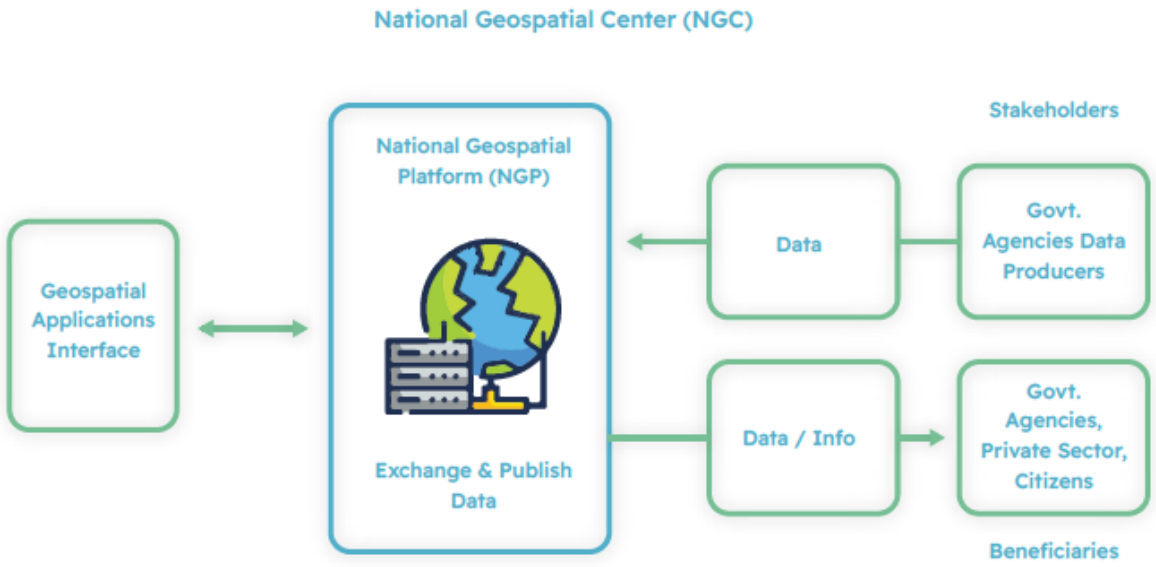


Responsibilities

- Propose and Enact Laws
- Develop and Approve National Geospatial Infrastructure
- Establish & Maintain Rules, Standards
- Develop and Implement Strategic Plans
- Protect Stakeholder Interests
- License Sector Activities
- Represent Kingdom in its field of specialty
- Attract investment & growth in the Sector
- Cooperate with International Agencies, .Organizations, etc
- Provide geospatial consultancy services
- Supervise publications of Atlases
- Provide specialized consultancy & support for borders
- Build National Capacities

National Geospatial Center

A unified national reference for the governance of geospatial data, setting standards and controls to achieve the integrated use of the national geospatial information system, and organizing a mechanism for collecting, sharing, saving, updating, maintaining and disseminating geospatial data through a national geospatial platform according to easy, secure, upgradable and growing preservation and publishing principles.



National Geospatial Center

Geospatial Data Management

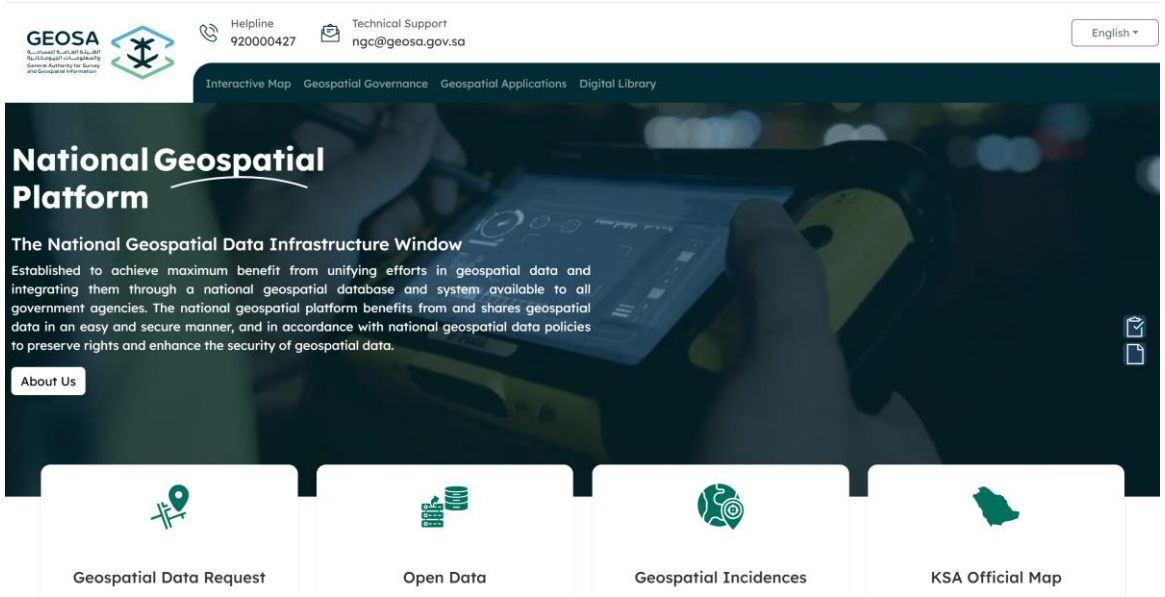
Geospatial Data Governance

National Geospatial Platform

National Geospatial Security

Geospatial Intelligence

National Geospatial Platform



Vector Base map

Interactive Map

National Data Model
15 Foundation Themes

Geospatial Data Dictionary

1.6K+
Data Requests

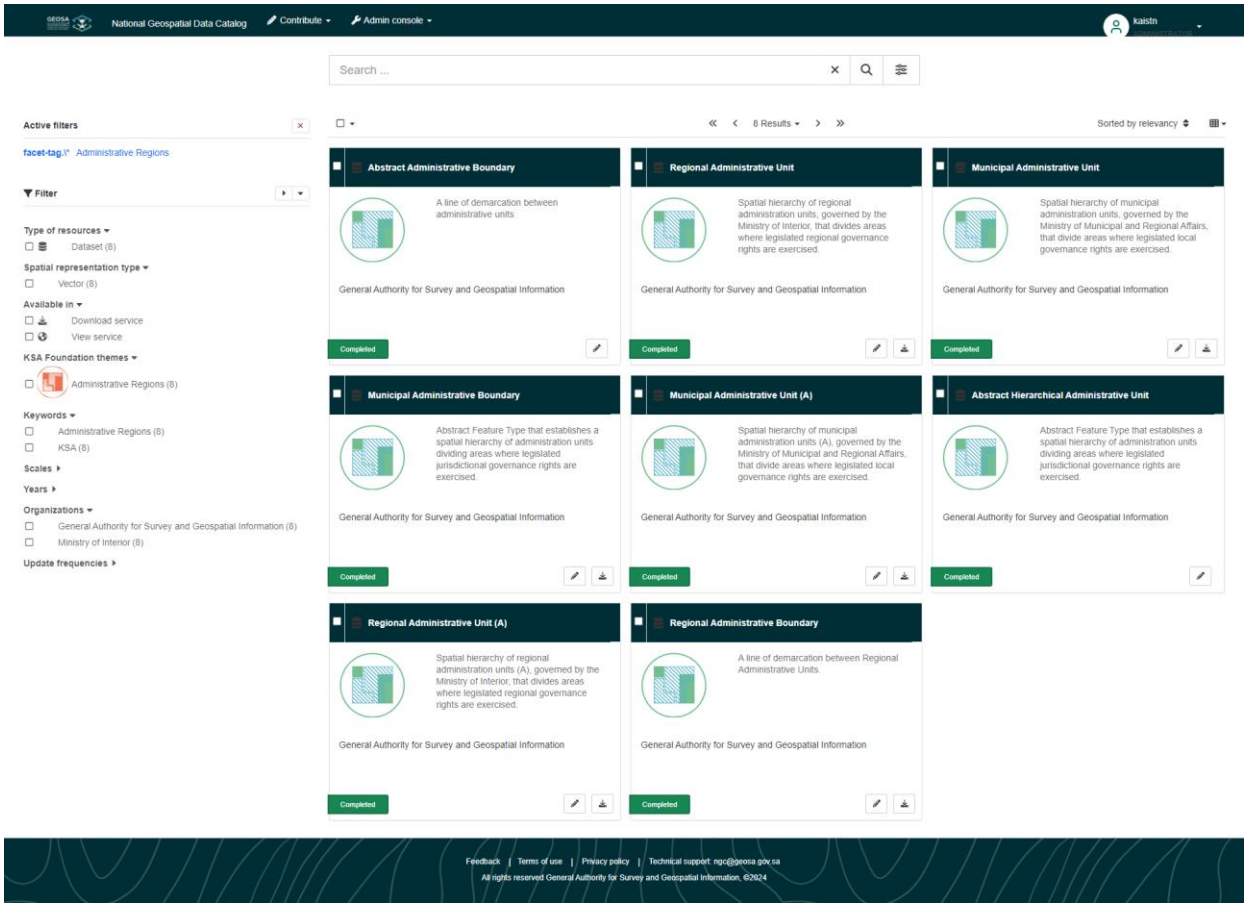
85+
Government sector (Entities)

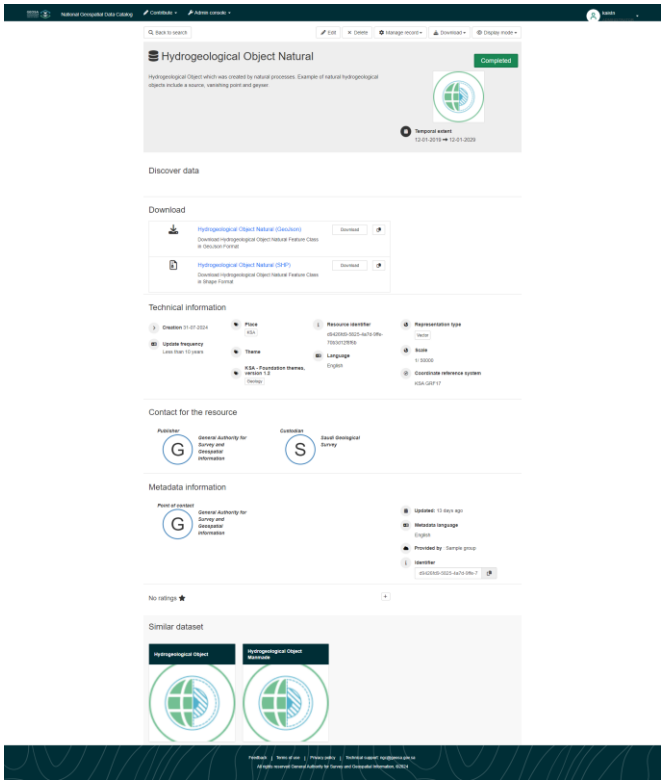
55+
Privat sector (Entities)

20+
Academic sector (Entities)

450+
Web Services

National Geospatial Data Catalog





National Geospatial Data Governance

National Geospatial Data Governance

Creating and managing a comprehensive geospatial data governance that aligns with the requirements of users. This involves collaborating and coordinating with data producers to prepare data for publication, distribution, and exchange in adherence to national policies, standards, and industry best practices. **The goal is to ensure that all stakeholders, including decision makers and beneficiaries, can effectively utilize the data.**

Adopting global best practices in geospatial information

National Geospatial Data Governance – Best Practices

UN-GGIM
UNITED NATIONS INITIATIVE ON GLOBAL GEOSPATIAL INFORMATION MANAGEMENT

ANZLIC
the Spatial Information Council

INSPIRE - Infrastructure for Spatial Information in Europe

ANNEX 1(9)

- Addresses
- Hydrography
- Coordinate reference system
- Cadastral Parcels
- Transport Networks
- Geographical names
- Geographical grid systems
- Administrative units
- Protected sites

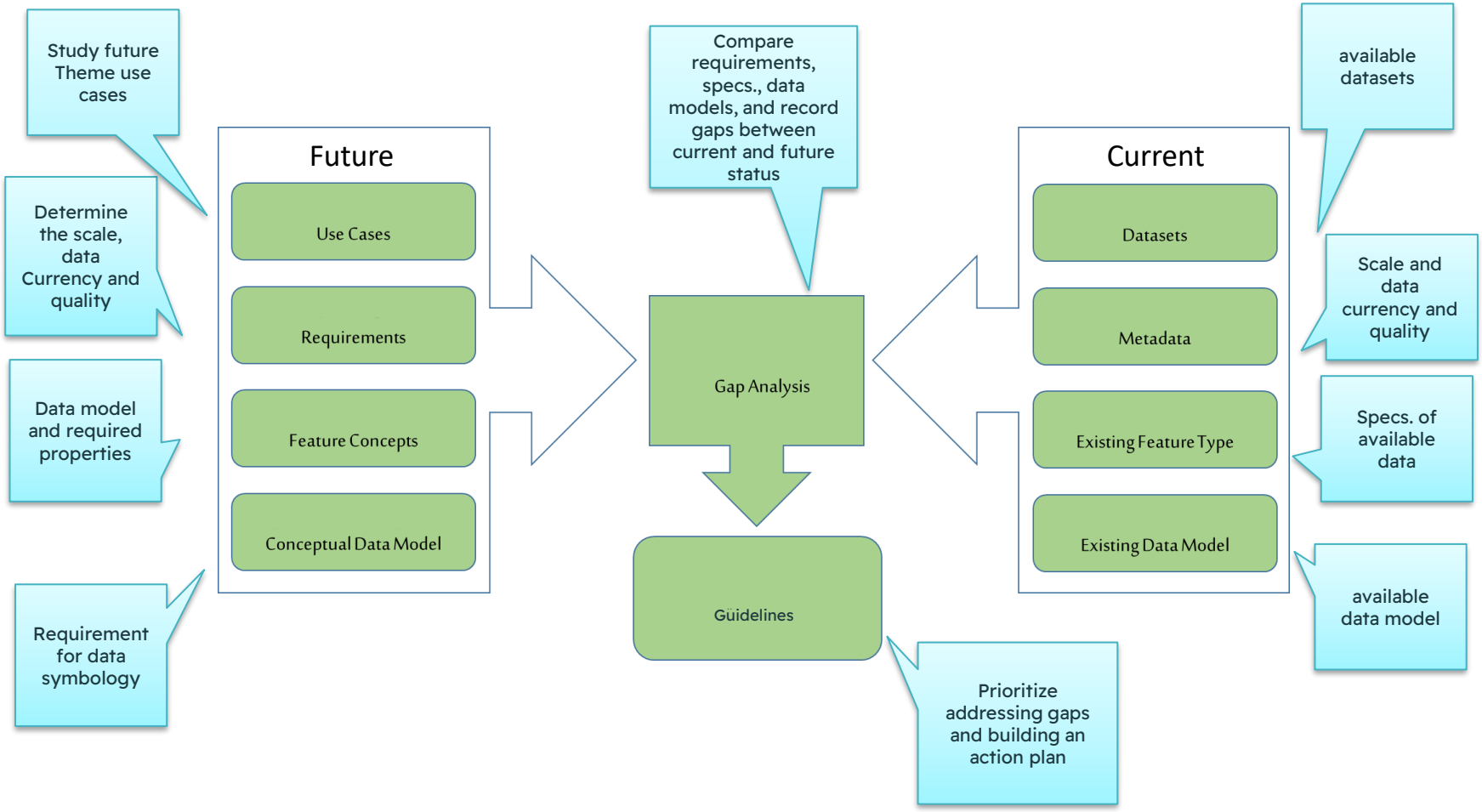
ANNEX 2 (4)

- Elevation
- Geology
- Land cover
- Orthoimagery

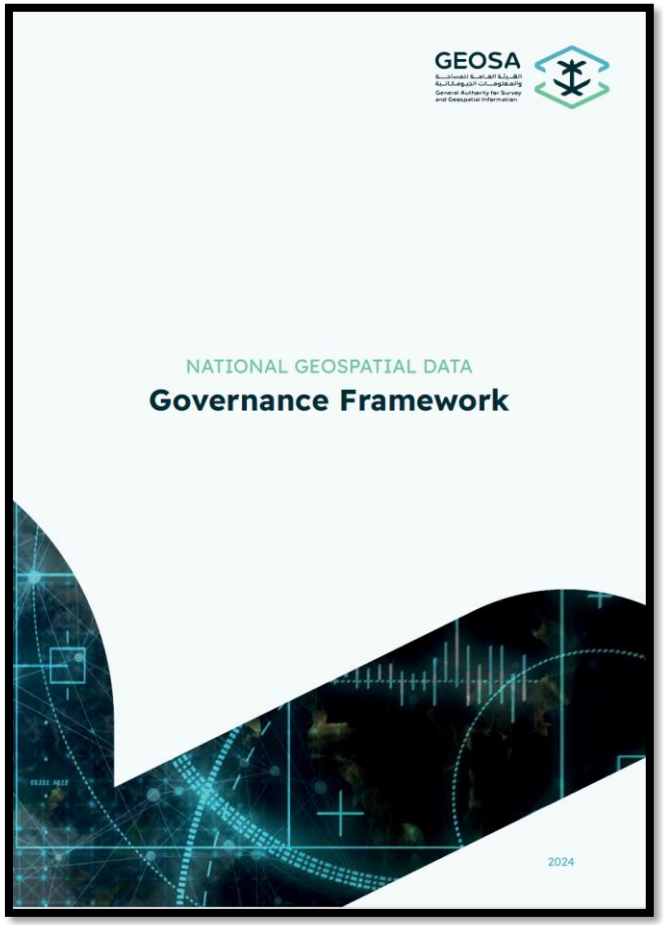
ANNEX 3 (21)

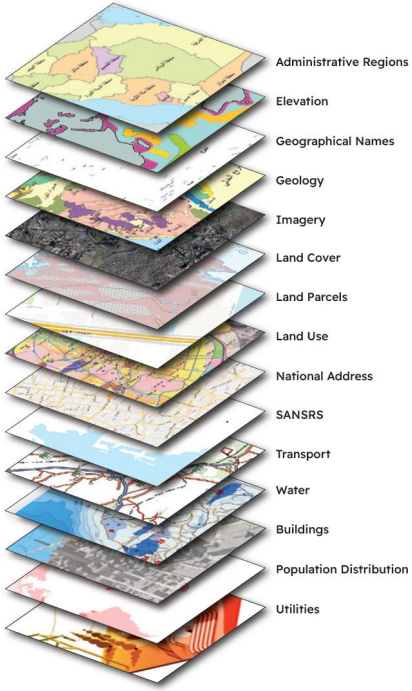
- Agricultural & aquaculture facilities
- Environmental monitoring Facilities
- Natural risk zones
- Species distribution
- Utility & governmental services
- Land use
- Production & industrial facilities
- Atmospheric conditions
- Human health and safety
- Population distribution & demography
- Utility & governmental services
- Energy Resources
- Mineral Resources
- Soil
- Buildings
- Meteorological geographical features
- Sea regions
- Area management/ restriction/regulation zones & reporting units
- Habitats & biotopes
- Oceanographic geographical features
- Statistical units

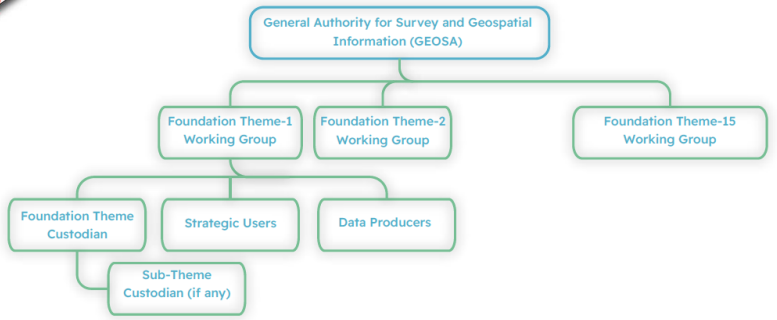
National Geospatial Data Governance - Methodology



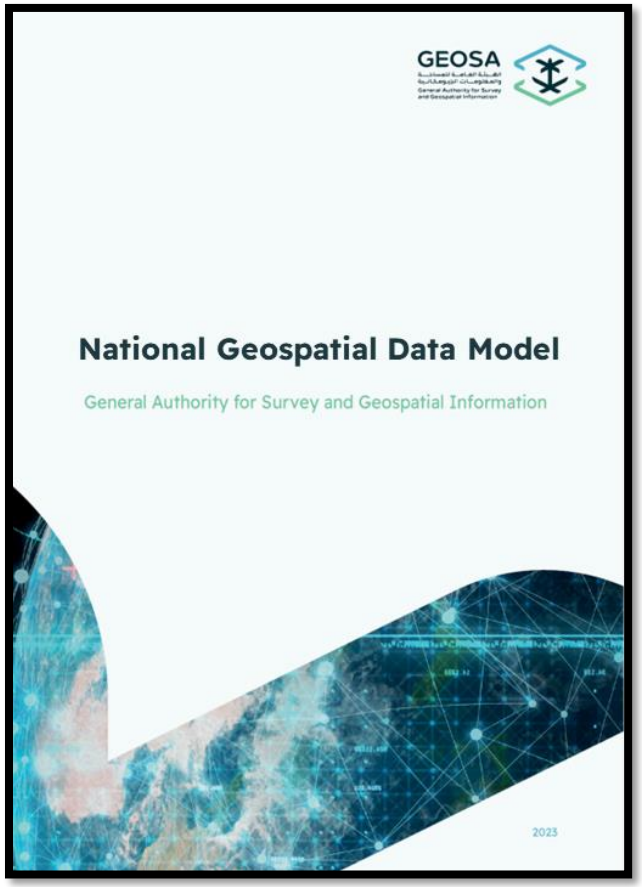
National Geospatial Data Governance – Governance Framework

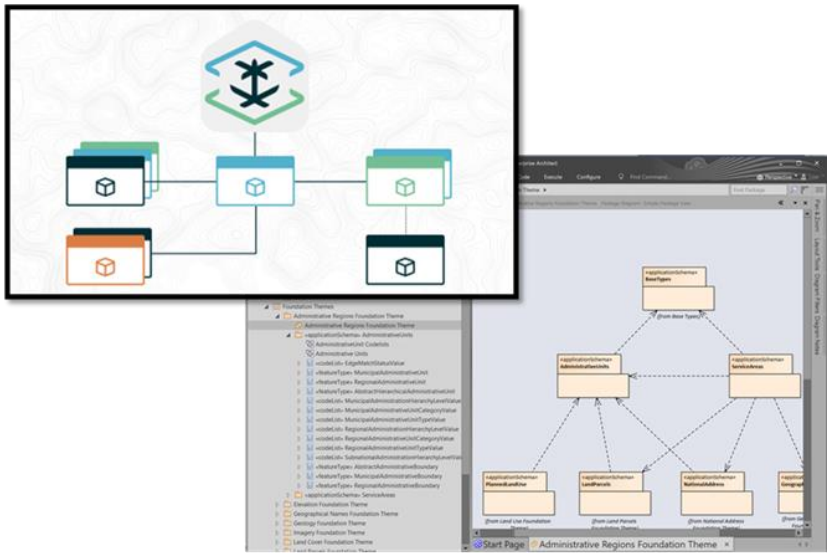






National Geospatial Data Governance – National Geospatial Data Model





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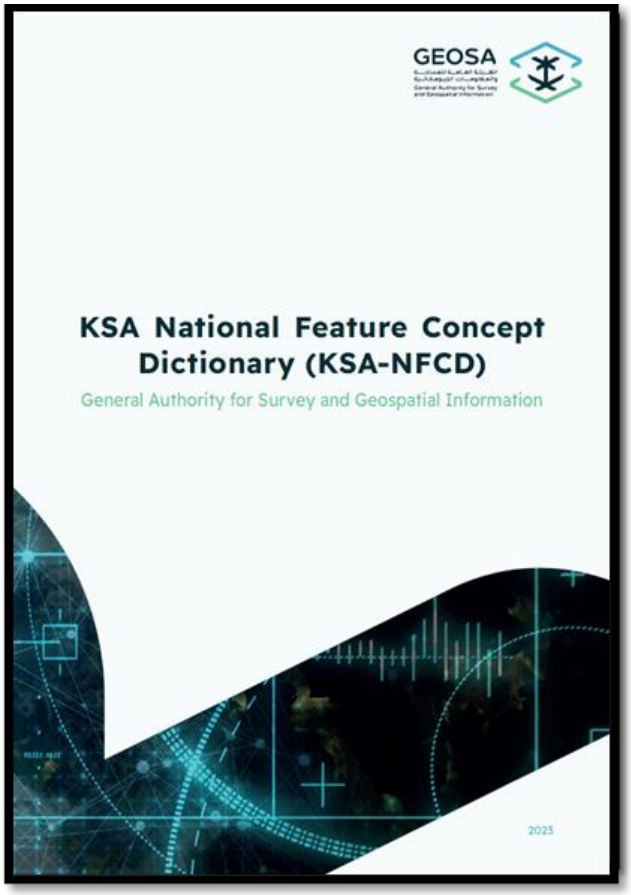
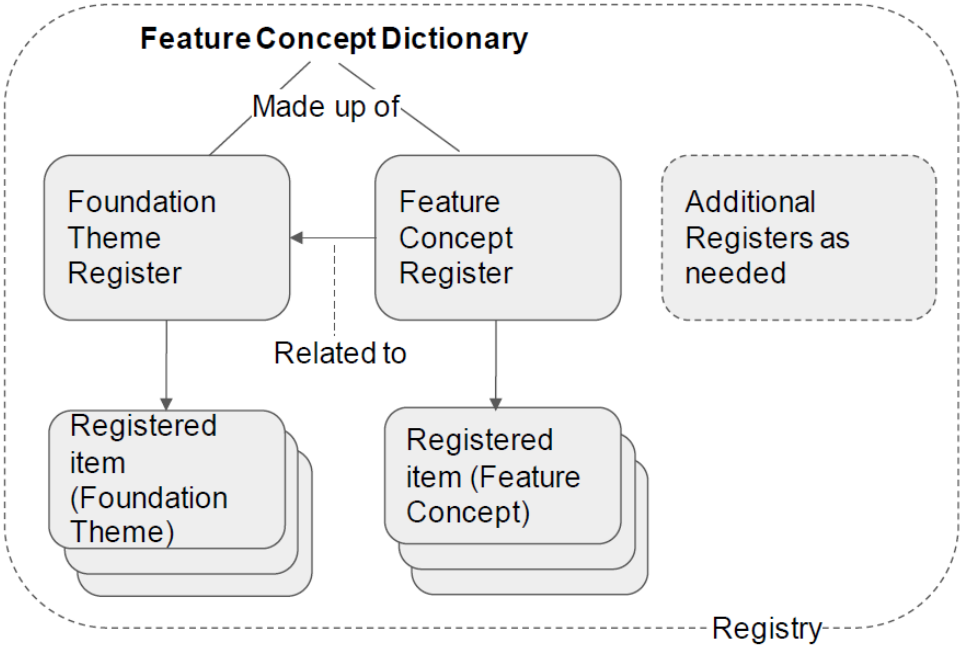
National Geospatial Data Governance





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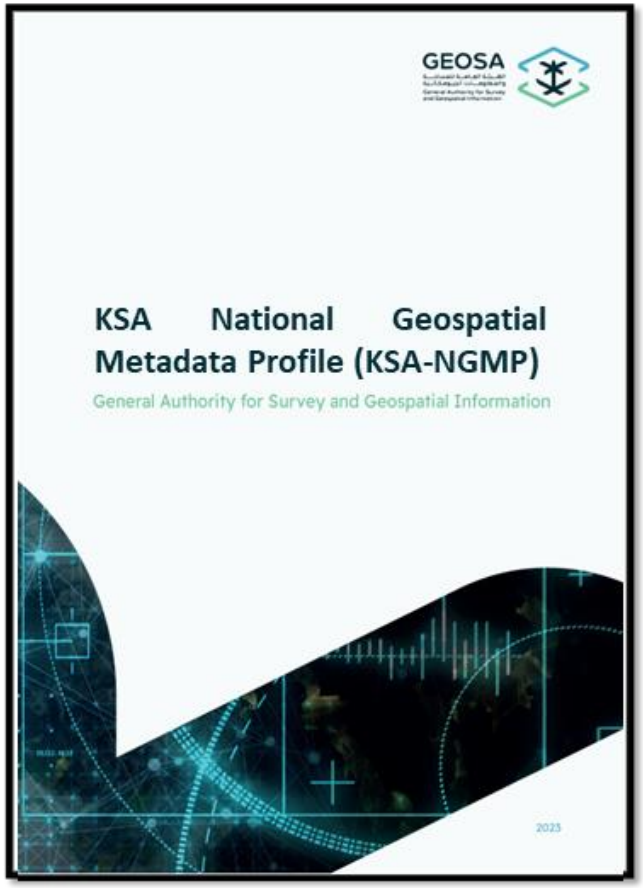
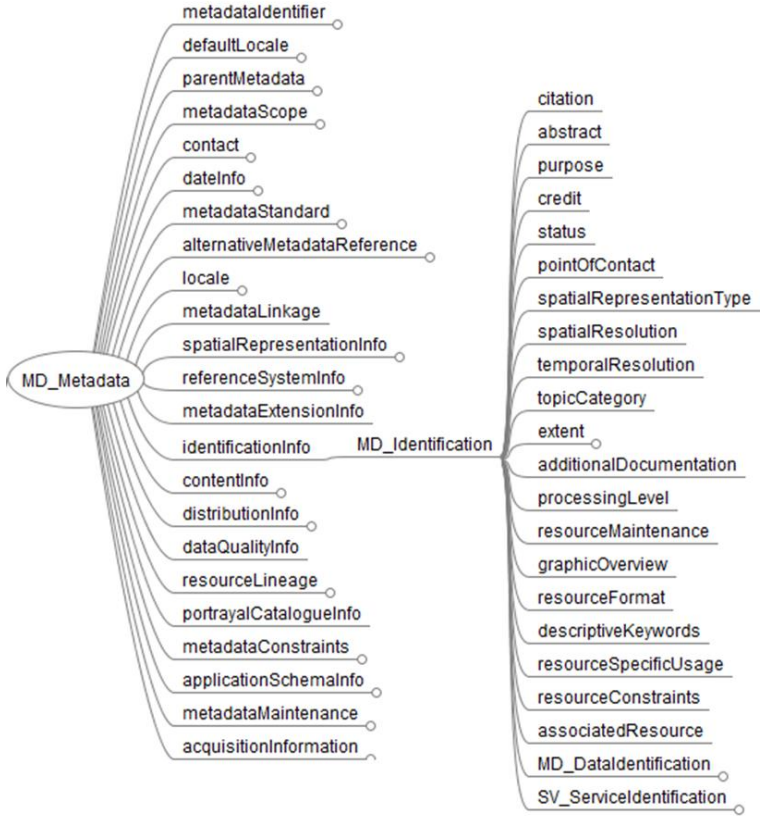
National Geospatial Data Governance





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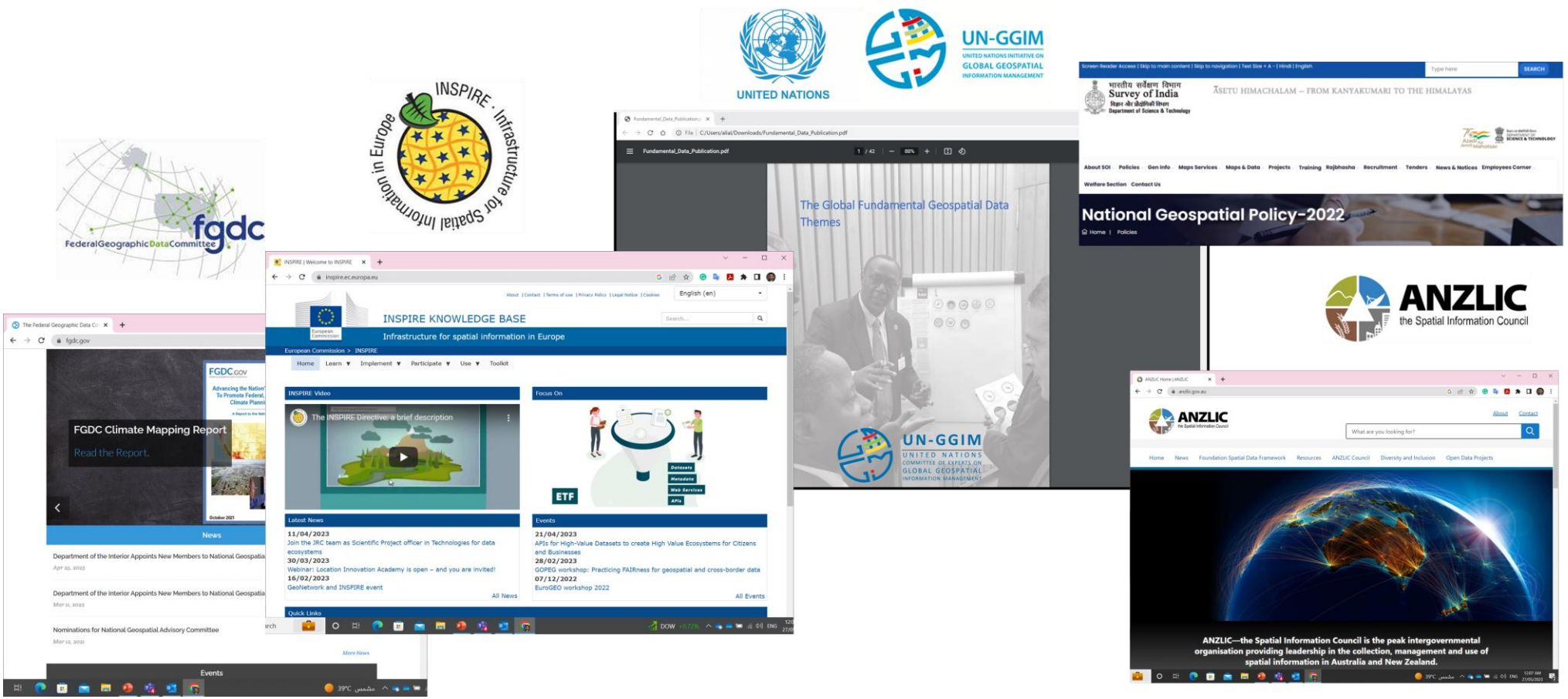
National Geospatial Data Policies

National Geospatial Data Policies – Introduction



National Geospatial Data Policies – Introduction

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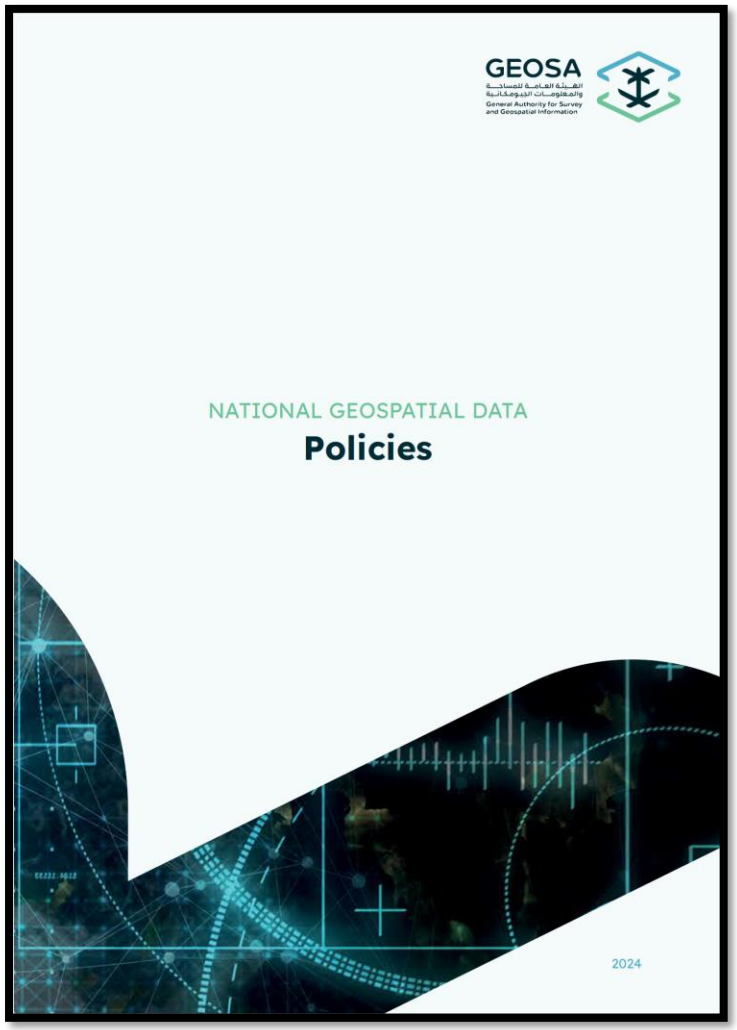
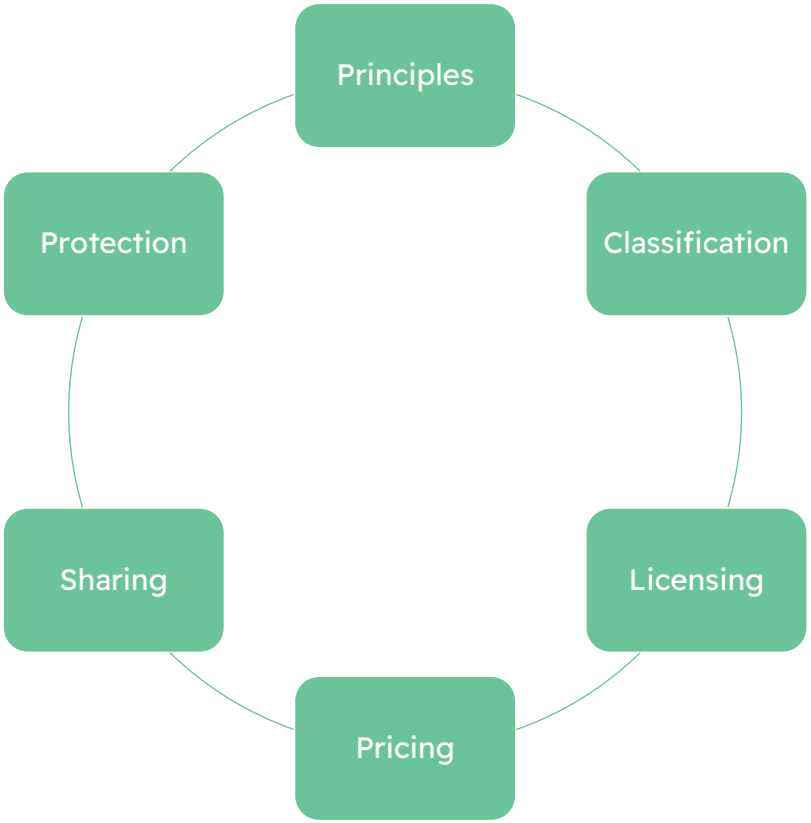
ISO/TC 211

IHO International Hydrographic Organization

National Geospatial Data Policies – Introduction





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National Geospatial Data Policies – Principles

Supervision of the National Regulator

Single accountable entity

Collect ones, use many times

Ownership by the government

GEOSA coordinates

GEOSA handles licenses

Private sector enablement

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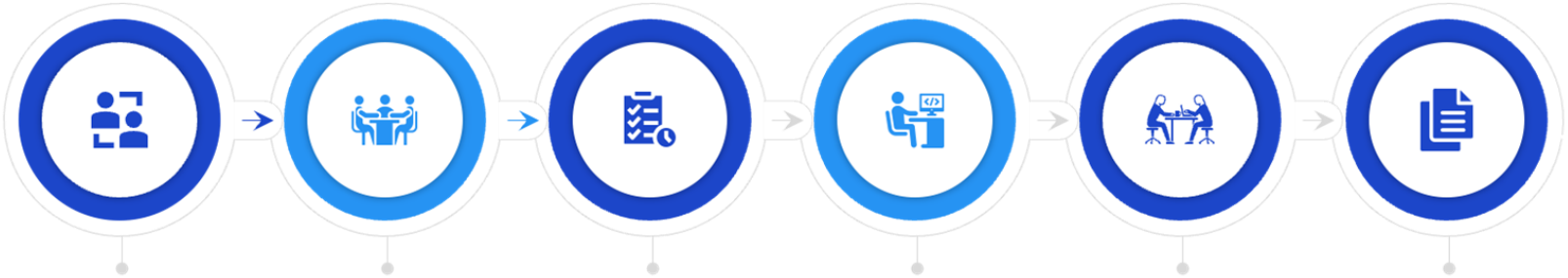
National Geospatial Data Policies – Principles



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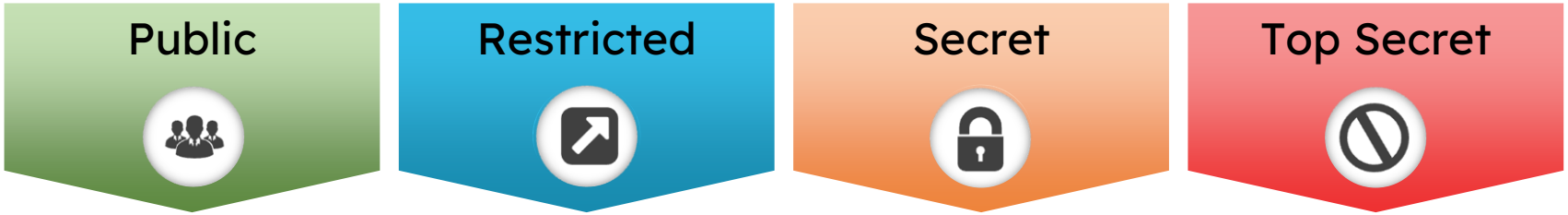
National Geospatial Data Policies – Classification



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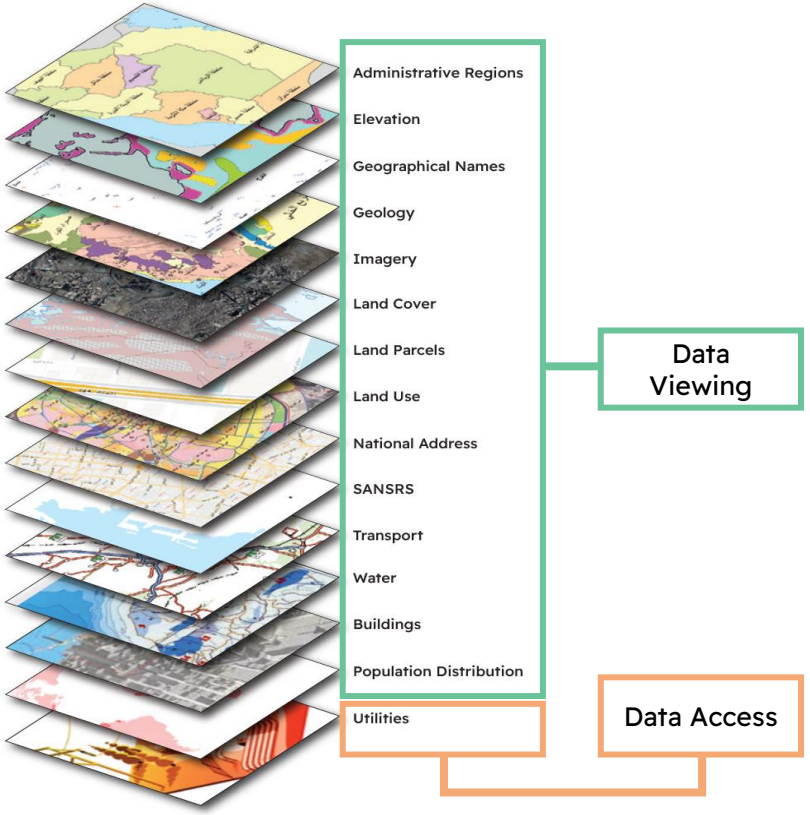
National Geospatial Data Policies – Licensing

Derivative Data/App. Production

Data Access

Data Viewing



The minimum Licensing for the Foundation geospatial data is set, however different licensees can be granted based on the required use case.

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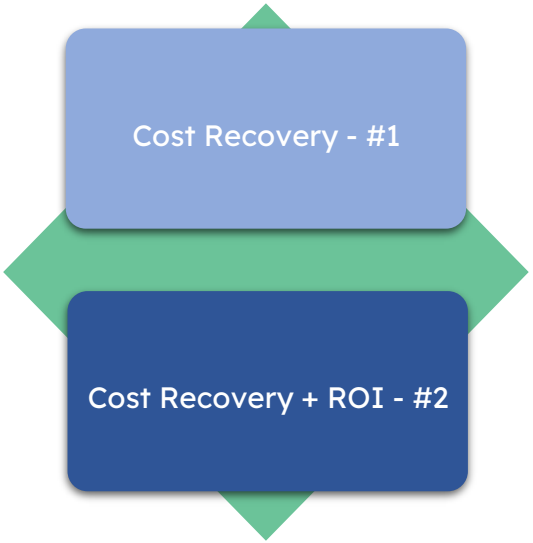
National Geospatial Data Policies – Pricing

Pricing Models



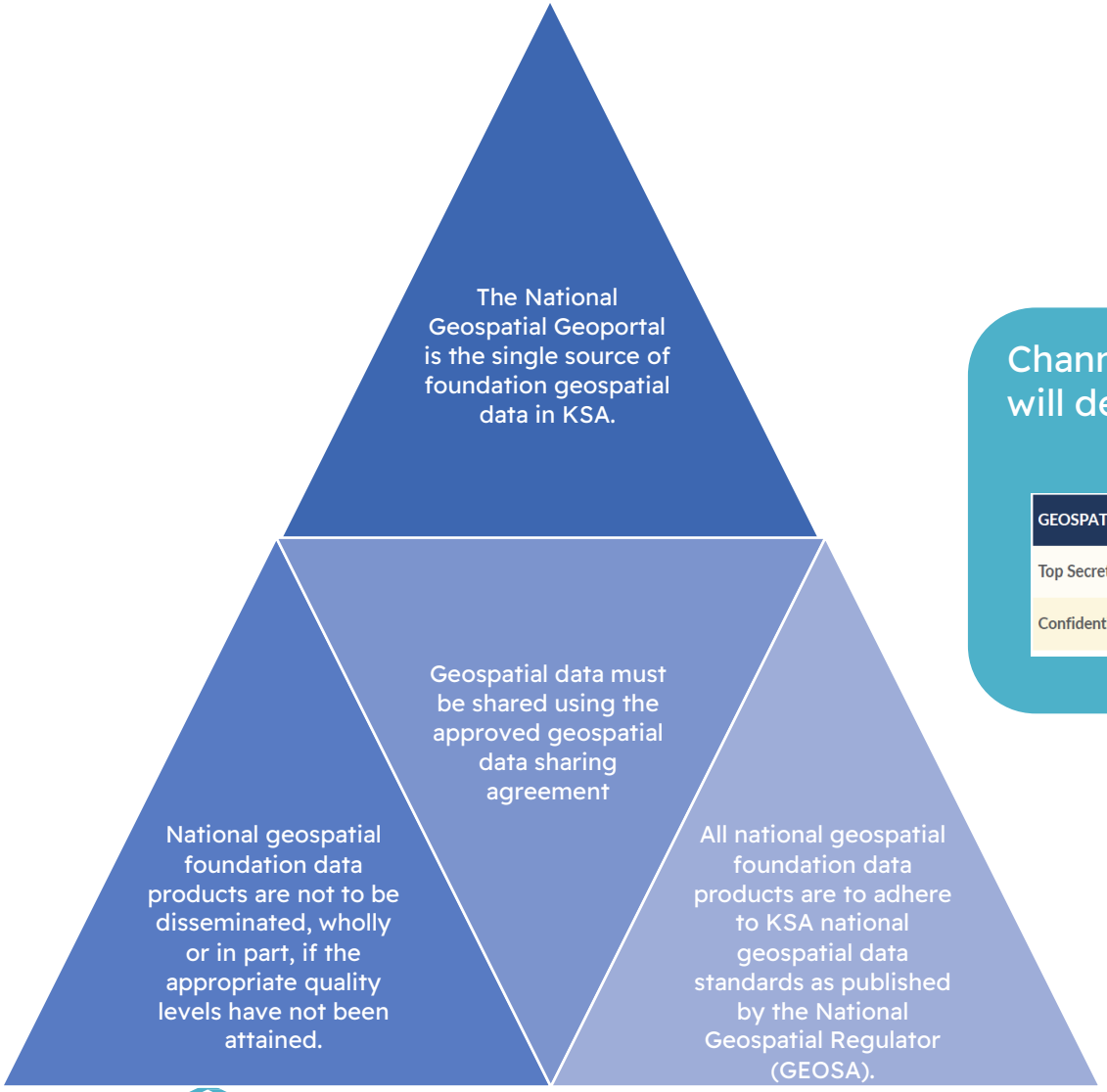
Government to Government

DATA TYPE	GEOSPATIAL DATA	GEOSPATIAL PRODUCTS
Open Geospatial Data	Free	Cost Recovery (Model#1)
Classified Geospatial Data (Confidential and higher)	Free	Cost Recovery (Model#1)

Government to Business/Individuals

DATA TYPE	GEOSPATIAL DATA	GEOSPATIAL PRODUCTS
Open Geospatial Data	Free	Cost Recovery (Model#1)
Classified Geospatial Data (Confidential and higher)	Cost Recovery (Model#1)	Cost Recovery + ROI (Model#2)

National Geospatial Data Policies – Sharing



Channels for dissemination of a specific dataset will depend on the data classification as follows:

GEOSPATIAL DATA CLASSIFICATION	SHARING CHANNEL
Top Secret and **Secret**	Government Secure Network (GSN)
Confidential and **Public**	Geospatial Web Applications / Geospatial Web Services:

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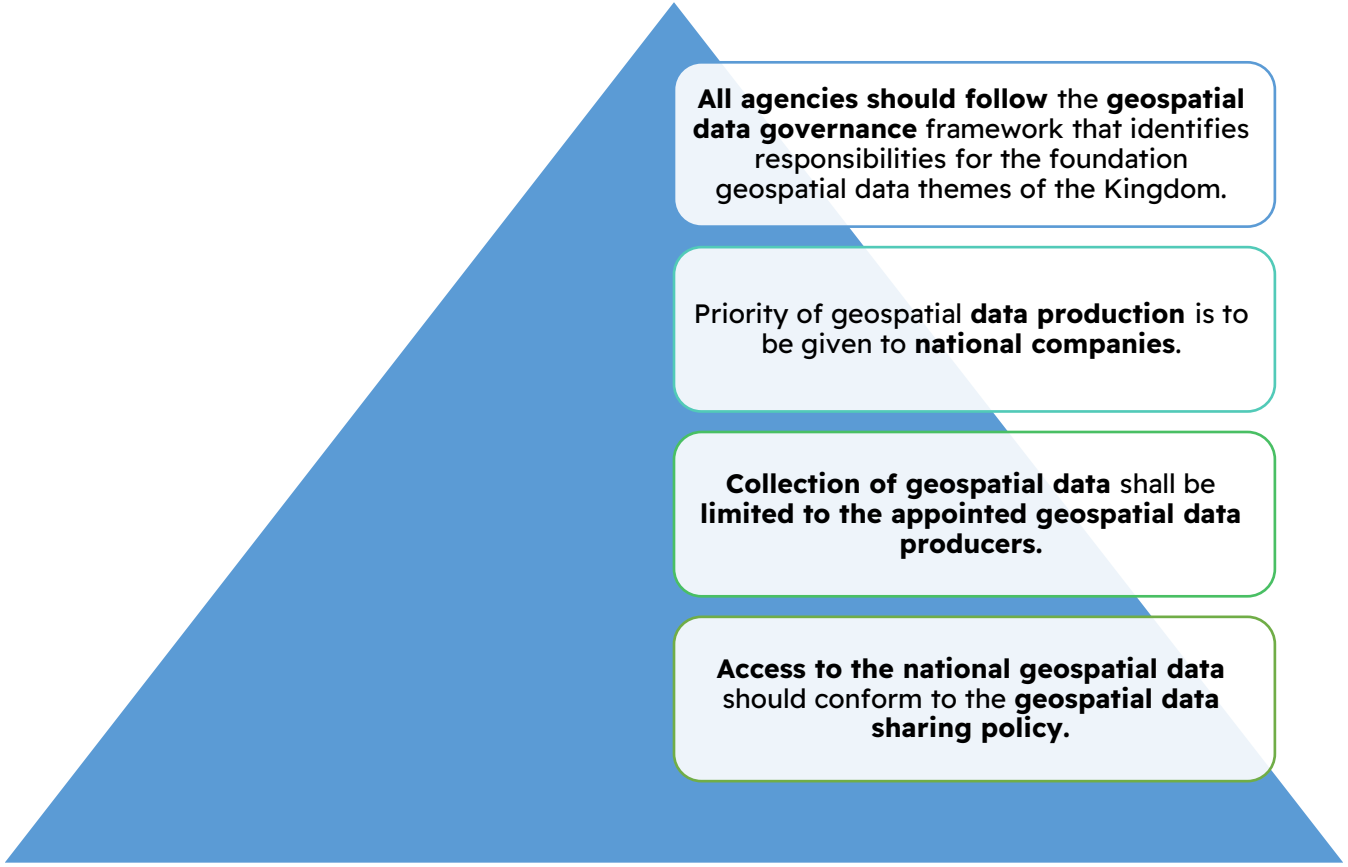
National Geospatial Data Policies – Protection



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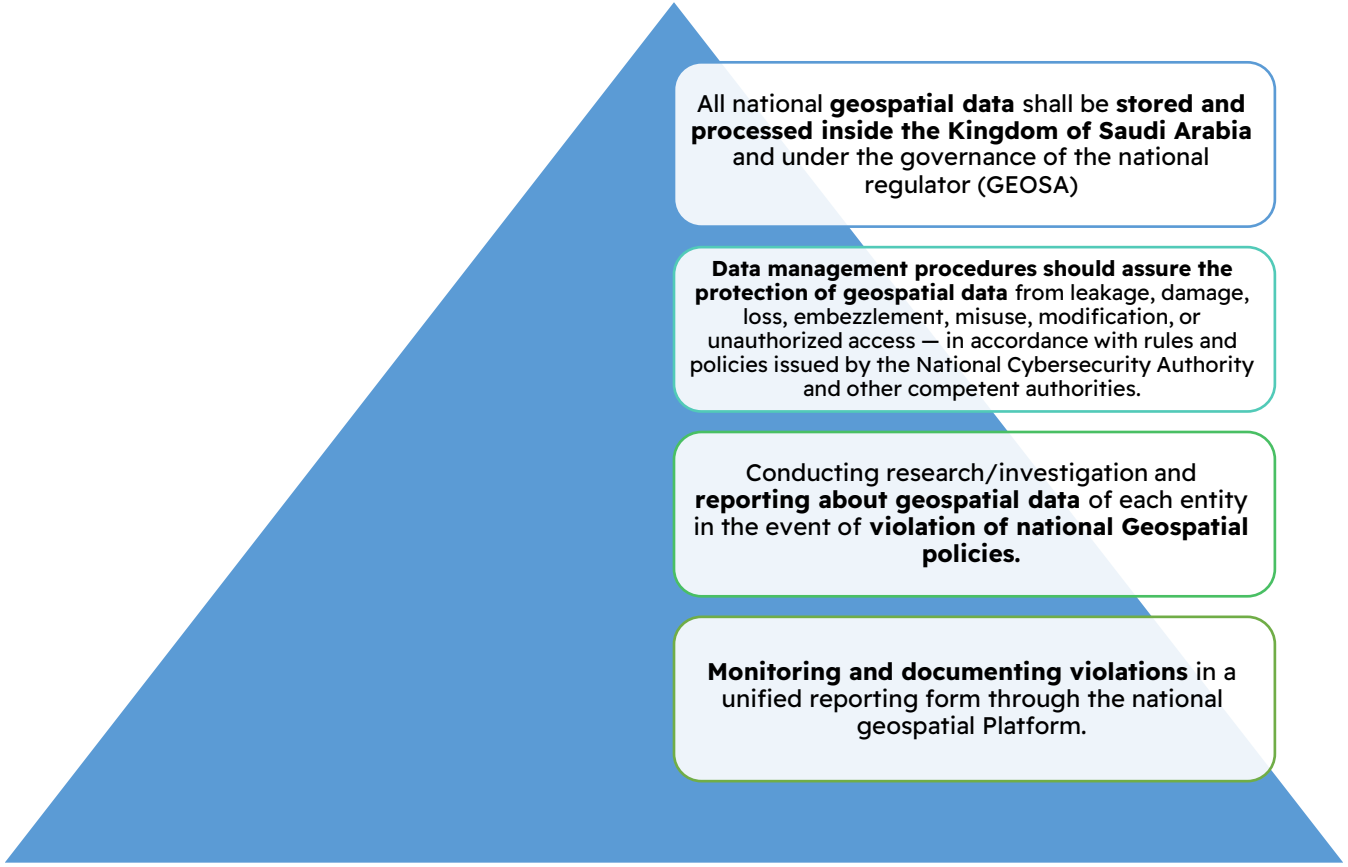
National Geospatial Data Policies – Protection



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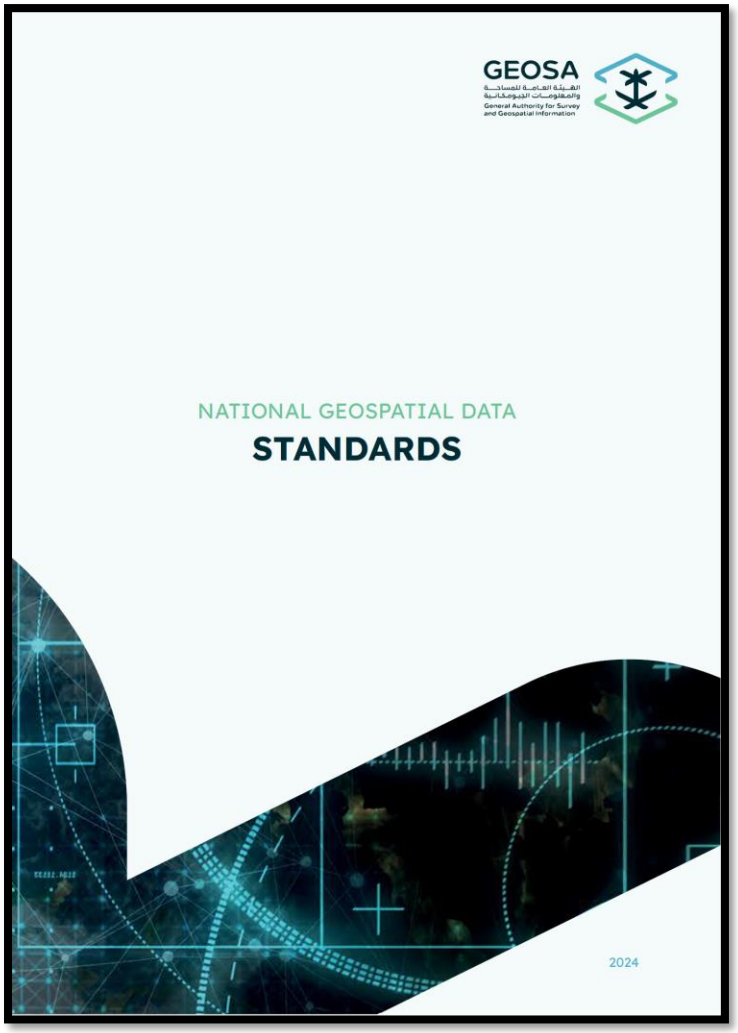
National Geospatial Data Standards

National Geospatial Data Standards – Introduction



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National Geospatial Data Standards – Data Quality

Data quality elements based on ISO 19157 standard

Temporal Quality | Logical Consistency | Thematic Quality | Positional Accuracy | Completeness

EXAMPLE

Foundation Theme	
National Address	
Geospatial Data Quality Requirements:	
Completeness	All national address data must be at least 95% complete.
Positional Accuracy	The spatial accuracy should not exceed 3 meters.
Thematic Accuracy	The thematic Accuracy must be geographically precise, correctly assigned to appropriate locations, and compliant with standardized address formats or conventions. For example, linking address with accurate geographical features such as a building, house, or parcel of land within the locality.
Logical Consistency	• Address components must match reality; for example, street names should match the actual streets, and building numbers should follow a standardized format. • Check valid address ranges - if there are numbered buildings from 1 to 100 on the street, there should be no missing addresses or duplicate numbers within this range.
Temporal Quality	• Date acquisition data. • Timely updates to ensure the addition of new addresses. • The dataset may include historical addresses to provide a comprehensive record of address changes over time. • The timeframe for updating the data is daily

EXAMPLE

Foundation theme	
Land Parcels	
Geospatial Data Quality Requirements:	
Completeness	Land parcels and their components should be at least 85% complete.
Positional Accuracy	Urban areas: minimum 25 cm Rural/agricultural areas: minimum 1.5 meters
Thematic Accuracy	Attribute values associated with each land parcel, such as parcel size, location coordinates, ownership details, zoning information, and any other relevant attributes, are accurately represented and reflect the actual characteristics of the corresponding land parcels.
Logical Consistency	• Check duplication of land parcel features. • Check for invalid placement of land parcel features within a defined tolerance • Check for invalid overlaps of land parcel features.
Temporal Quality	• Dates of data acquisition of land parcels. • Types of updates. • Validity period for the data. • The timeframe for updating the data does not exceed one month

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National Geospatial Data Standards – Data Quality Evaluation

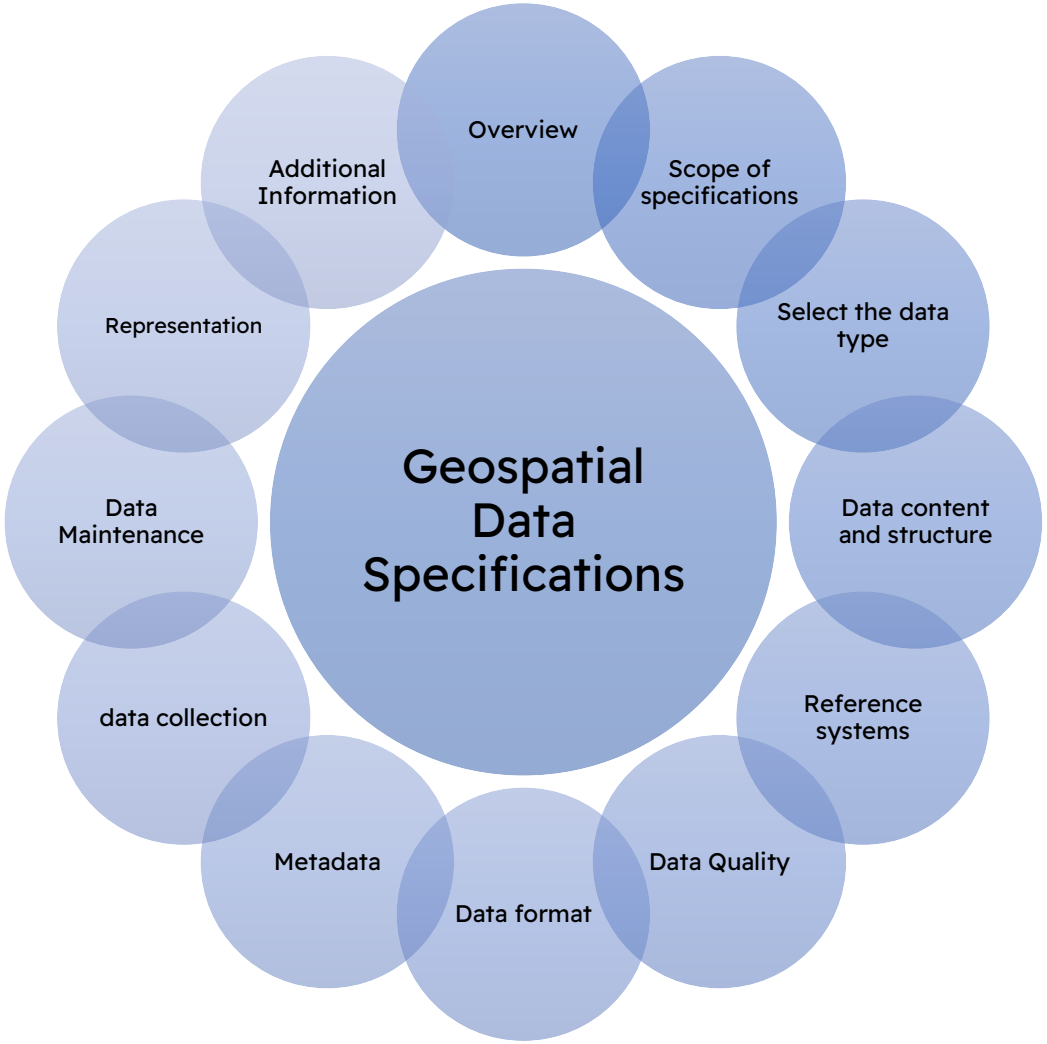
The elements of data quality assessment are based on the ISO 19157 standard, and the following requirements must be met in order to assess the quality of geospatial data:

- **Reliability:** Credibility of the data quality test result.
- **Representation:** The degree of accuracy of the representation of the geospatial data sample.
- **Homogeneity:** Consistency of data quality test results.

Indirect evaluation

Direct Evaluation

National Geospatial Data Standards – Data Specifications



An accurate technical detailed description of the dataset or dataset series as well as the information generated and provided by the geospatial data producer.

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National Geospatial Data Standards – Quality Management

Determine the required quality of data for a specific purpose and context to ensure that quality standards are met, as well as evaluate, document and disseminate quality-related information.

1. Stage Specifications
2. Quality Assessment Outputs
3. Data Quality Integration

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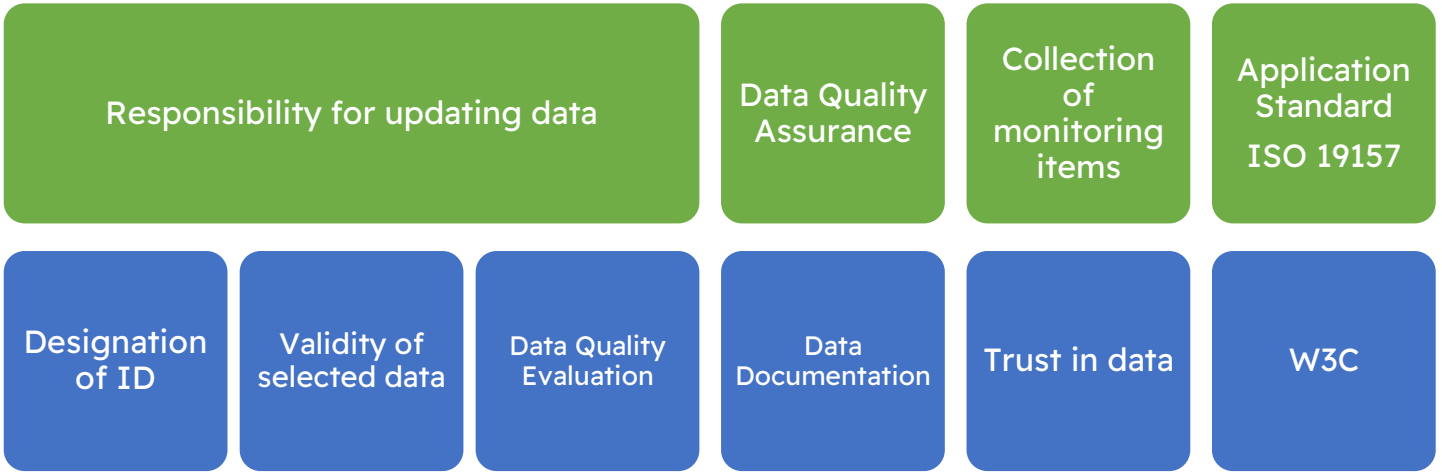
National Geospatial Data Standards – Data Collection and Documentation

Geospatial data must be collected according to clear procedures and high transparency, to achieve the necessary reliability of geospatial data.



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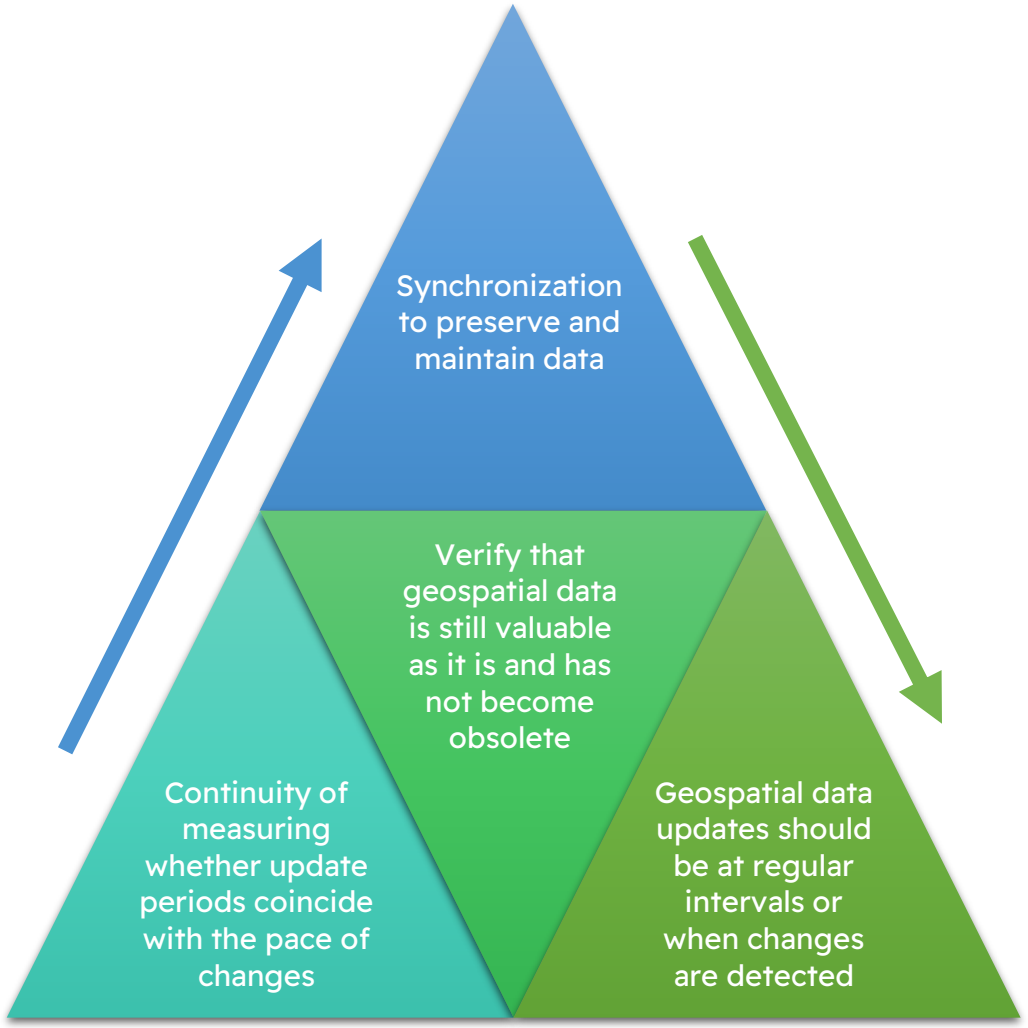
National Geospatial Data Standards – Maintenance and Update



To maintain, maintain and update geospatial data, plans must be developed to ensure the maintenance and updating of geospatial data, including procedures, specifications and funding for the maintenance of the produced data, and the following basic principles must be followed for the maintenance and updating of geospatial data:

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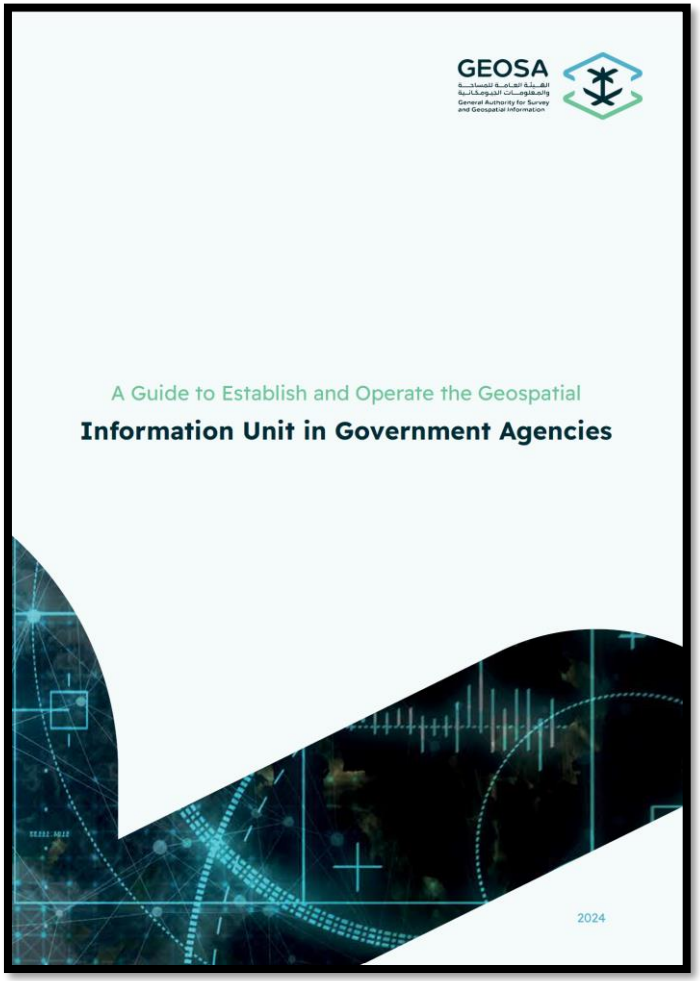
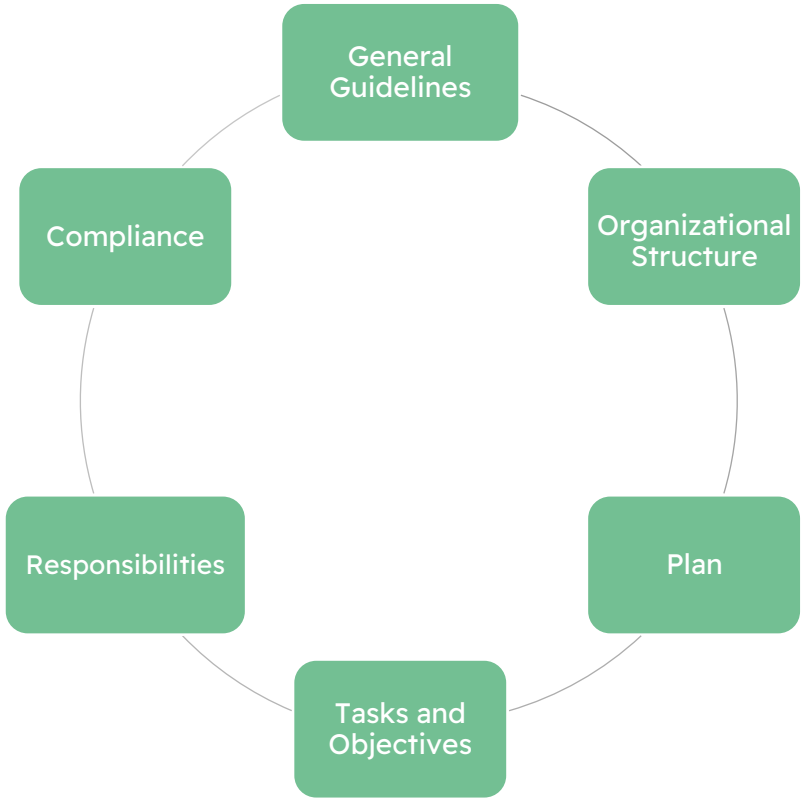
Guide to Establish and Operate Information Unit in Government Agencies

A Guide to Establish and Operate Information Unit in Government Agencies





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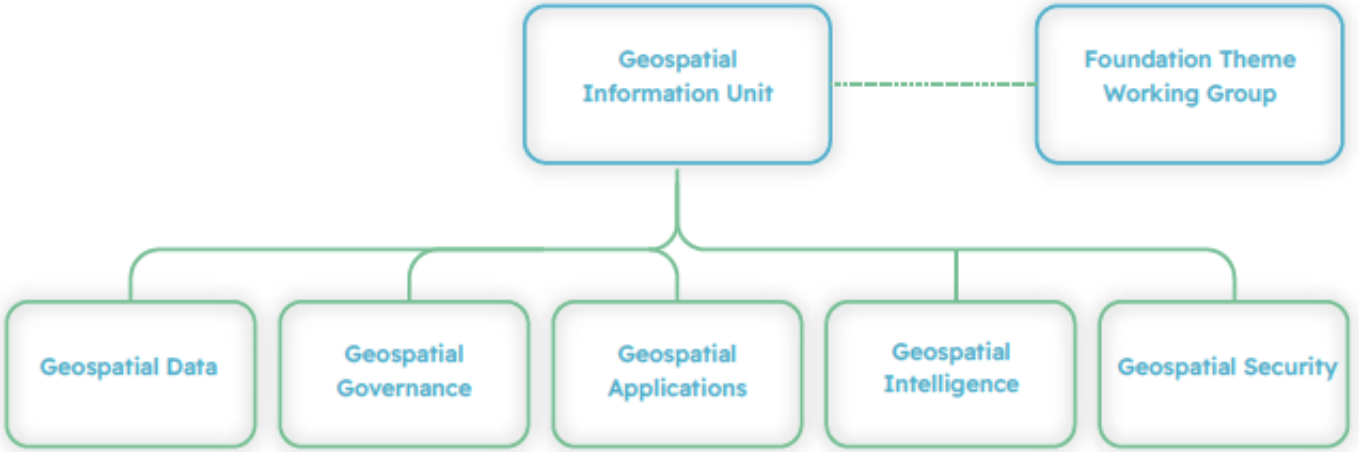
Organizational Structure of the Geospatial Information Unit

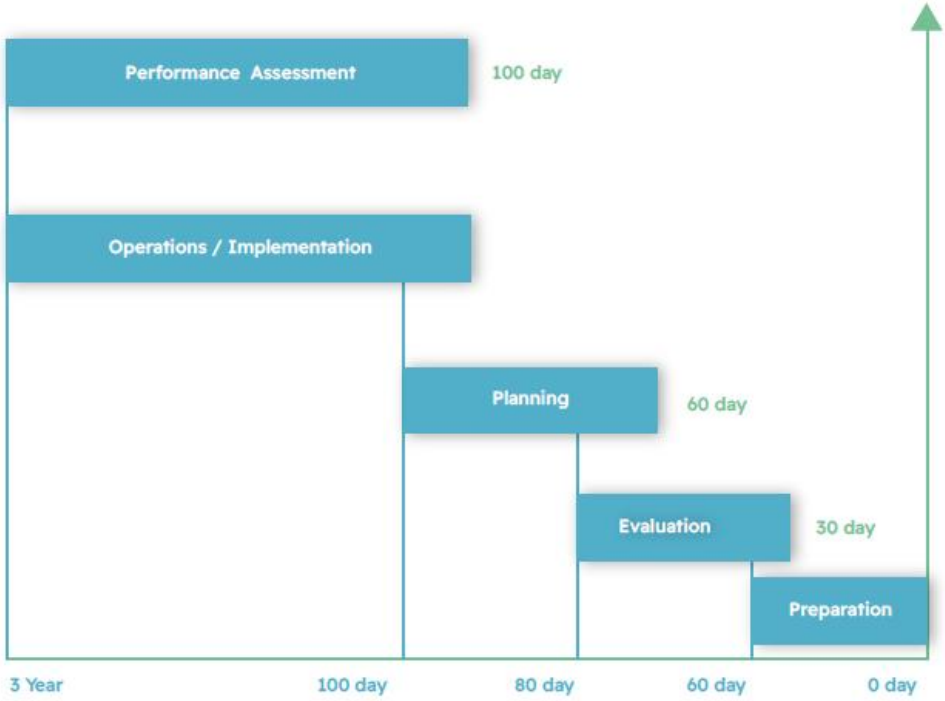


Tasks (example)

Role	Geospatial Information Unit				
	Geospatial Data	Geospatial Governance	Geospatial Applications	Geospatial Intelligence	Geospatial Security
Custodian	- Ensuring data quality according to national geospatial standards - Ensuring the interoperability of geospatial data with the national geospatial infrastructure at the National Geospatial Center - Make sure the foundation theme / layer (and sub-theme) data is collected and maintained. - Ensuring access to the foundation geospatial layer's data. - Maintaining and operating geospatial data - Ensuring that the data is available and processed in a format that is compatible with the national geospatial standards and policies.	- Developing the work plan for operationalizing the Geospatial Information Unit - Ensuring that creation of the Foundation Theme Working Group (FTWG) and specify Operational procedures. - Work with members of the FTWGs to write a strategic work plan. - Participate effectively in the coordination process between FTWGs. - Ensuring commitment to the national geospatial data governance framework - Ensuring the commitment of the FTWG members to the roles entrusted to them - Ensuring adherence to national geospatial policies and standards - Measurement the level of achievement in implementing of the work plan for the Geospatial Information Unit.	- Geospatial applications development - Development of digital geospatial services - Integration with the National Geospatial Platform - Dissemination and exchange of Geospatial data - Creating Geospatial databases - Maintaining and operating geospatial databases - maintaining and operating Geospatial applications - application integration Geospatial with other applications - building tools to measure user experience of the application Geospatial - Providing and following up on licenses for geospatial applications	- Geospatial data analysis - Support decision making - Developing smart geospatial tools - Integration with geospatial big data and Internet of Things - Engineering and building applications for smart devices - engineering and building smart software - Preparing and updating the road map for implementing a geospatial rapid response program.	- Geospatial data analysis - Support decision making - Developing smart geospatial tools - Integration with geospatial big data and Internet of Things - Engineering and building applications for smart devices - engineering and building smart software - Preparing and updating the road map for implementing a geospatial rapid response program.

A Guide to Establish and Operate Information Unit in Government Agencies

The guide contains five basic stages for the development of the geospatial information unit in government agencies through which it aims to work gradually, where the unit will initially be established (or re-established) in the first three stages (within 100 days), after that the activation phase of that unit will begin, which may take from one to three years, depending on the size of the entity and the role entrusted to it.



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Responsibilities (example)

Role	Main Tasks and Responsibilities	Qualifications
Supervisor of the Geospatial Information Unit	– Follow-up on the application of the national geospatial data model for the collection of relevant national geospatial data, its exchange, sharing, archiving, update, maintenance and dissemination through the national geospatial platform (NGP). – Supervise the processes of collecting, reviewing, classifying, organizing and saving all national geospatial data in case the entity's role is geospatial data producer – Follow-up on periodic assessments on geospatial data quality to ensure commitment to approved standards, policies and regulations. – Supervise the management of national geospatial databases to ensure easy retrieval of geospatial information, its update, and managing the way geospatial information is organized and improving it. – Follow-up on the application of mechanisms, policies and service level agreements for geospatial data to determine the geospatial data that is shared and displayed on the NGP and supports the processes of requesting, exchanging and sharing geospatial data and information interactively among different parties (public / private and local / international). – Supervise the processes of applying standards, rules and regulations, specifications and guidance approved by GEOSA. – Follow-up the processes of implementing policies for data classification, management, and updating them on a regular basis, keeping pace with local and global changes and in accordance with international best practices. – Implementing the governance of the national foundation geospatial layers (Foundation Themes) with the participation of all concerned stakeholders. – Adopting emerging technologies and projects in the field of geospatial artificial intelligence (GeoAI). – Adopting all types of geospatial data analysis processes (geospatial, census, Spatial analysis, image analysis, network analysis, land surface analysis, temporal analysis spatially) using a variety of tools and techniques to use in making better informed decisions. – Ensuring keeping pace with modern technologies and leading practices in providing artificial intelligence and similar technologies in the Sector in general and GEOSA in particular. – Leading the implementation of procedures and policies and legislation to maintain the confidentiality and security of geospatial information and follow up on implementation. This is to identify illegal activities and prohibit them or reduce their impact. – Supervising the preparation and development of effective monitoring plans and following up on the implementation of procedures and Security controls to protect geospatial data from various threats, tampering, or access Unauthorized – Follow up on geospatial security audits and prepare reports, conducting periodic studies on the threats and risks that threaten geospatial security and submitting them to the relevant management to take the necessary decisions – Monitor, analyze and evaluate all activities and operations of systems, applications, networks and locations Work with the entity, identify and classify any geospatial exposures, and provide recommendations and instructions for processing those exposures with the aim of reducing the possibility of exploiting those exposures in any way or manner that negatively affects national security – Ensuring attendance at awareness programs and training courses provided by GEOSA on national geospatial security.	– Bachelor's degree in information systems, or information technology, or survey engineering, or any other related discipline – Professional certification in the relevant field is an advantage. – 15+ years of experience in the field of geospatial data or any related field, including the last 4 years in a leadership position – Knowledge in geospatial systems, pertinent technologies, policies, standards and regulations – Proficiency in Arabic and English

Compliance

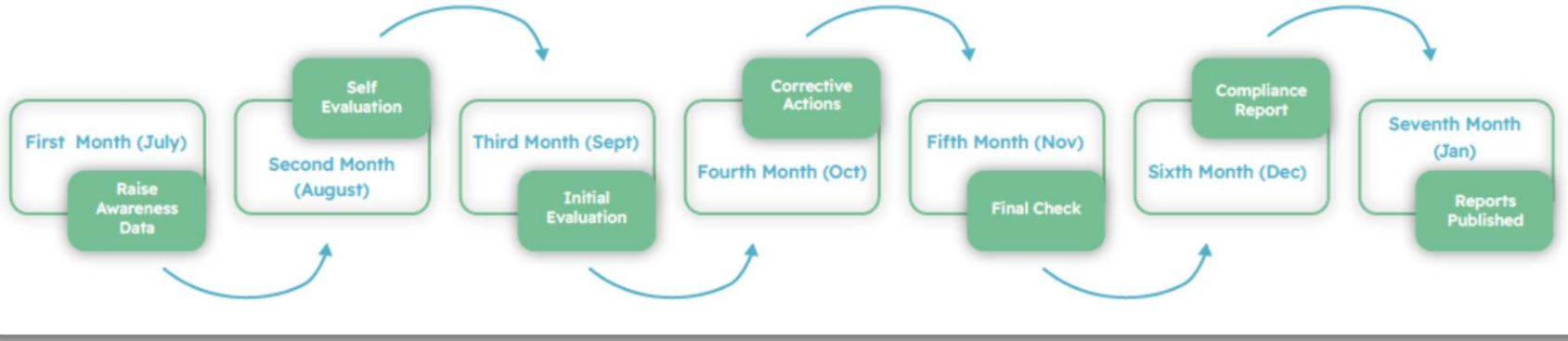
Raising the levels of compliance of entities with the controls and conditions issued by the Authority regarding the establishment and operation of the Geospatial Information Unit in government agencies

Compliance Mechanism	Compliance Matrix	Compliance Standards	Compliance Cycle
	1: **General** Compliance Matrix 2: Compliance matrix as a foundation theme **custodian** 3: Compliance matrix as a geospatial data **producer** 4: Compliance Matrix as a Geospatial Data **User** 5: Compliance matrix as a **security entity**	**Quantitative Measures** **Qualitative Measures**	**Annual Compliance Cycle**

Compliance

Raising the levels of compliance of entities with the controls and conditions issued by the Authority regarding the establishment and operation of the Geospatial Information Unit in government agencies

Compliance Mechanism | **Compliance Matrix** | **Compliance Standards** | **Compliance Cycle**



GEOSA
الهيئة العامة للمساحة والمعلومات الجيومكانية
General Authority for Survey and Geospatial Information

Thank You