National Geographic Information Institute
Ministry of Land, Infrastructure and Transport

The Introduction of Korean Spatial data Policy and National Geographic Information Institute

L E E W O N K U K
Planning and Policy Department

Contents

Chapter 01.

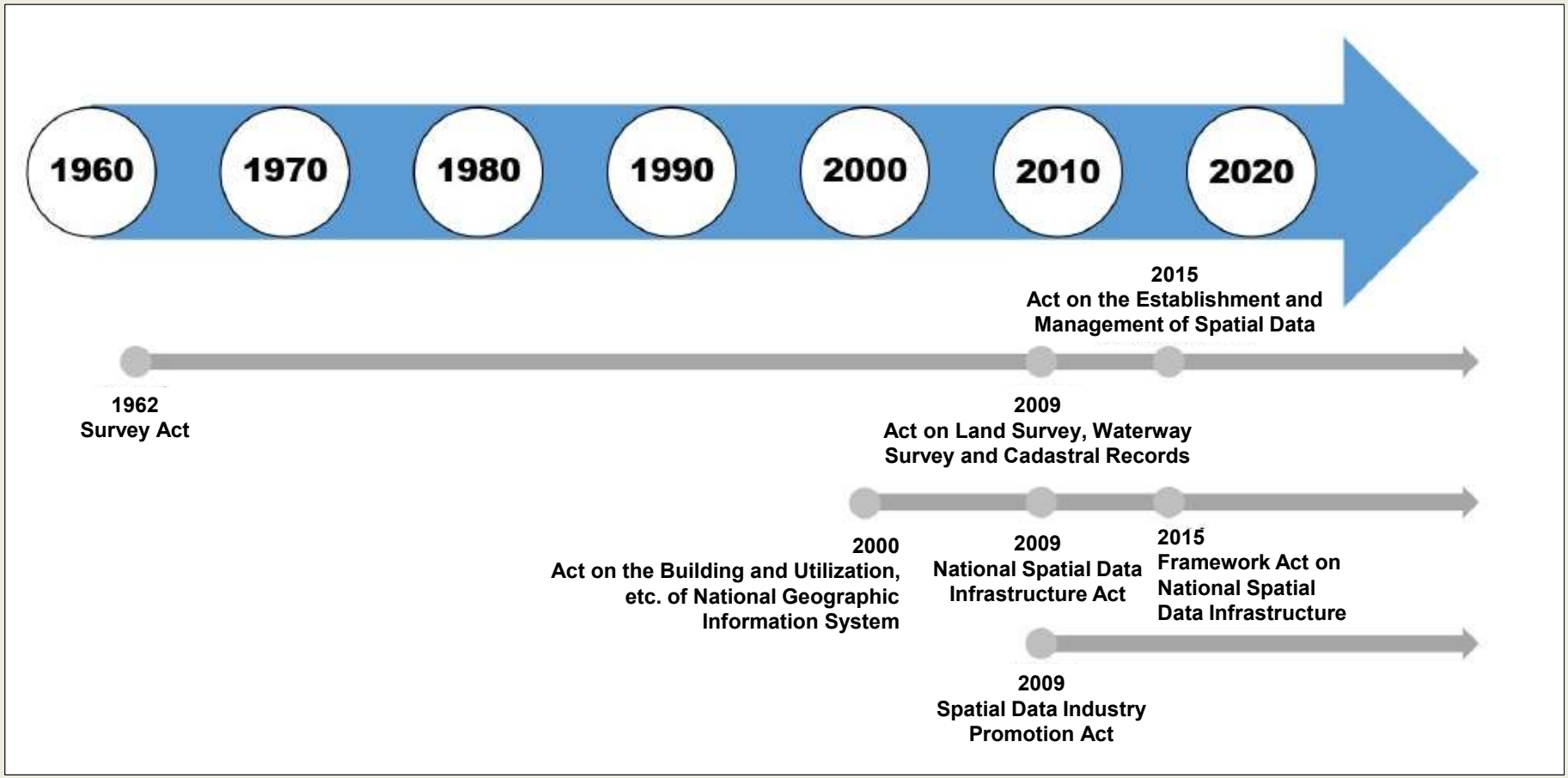
THREE SPATIAL DATA ACTS

01 Introduction

On April 29, 2014, three amended acts passed the National Assembly plenary session which include contents about generating synergy through a convergence of related areas(survey, cadastral, etc) and promoting the industrial development to foster the spatial data industry as a core industry of Creative economy

- **Framework Act on National Spatial Data Infrastructure**
- **Act on the Establishment and Management of Spatial Data**
- **Spatial Data Industry Promotion Act**

02 Legislation progress of the three acts



03 Purposes of the three acts

Act	Purpose
Framework Act on National Spatial Data Infrastructure	To provide for matters relating to the efficient construction of the national spatial data system and the integrated utilization and management thereof, thereby contributing to the development of the national economy through the rational use of the national territory and natural resources
Act on the Establishment and Management of Spatial Data	To contribute to the efficient management of national land, safe marine transportation, and the protection of ownership of citizens, by prescribing matters concerning the standards and procedures for surveying and waterway survey as well as the preparation, management, etc. of cadastral records and comprehensive real estate records
Spatial Data Industry Promotion Act	To contribute to developing the national economy and improving the quality of citizens' life by strengthening the competitiveness of the spatial data industry and promoting the development thereof

Chapter 02.

FRAMEWORK ACT AND UTILIZATION ACT

01 Mid-Long term basic plans(5years)

Framework Act on National Spatial Data Infrastructure (Article 6)

- ✓ **Basic Plan for National Spatial Data Policy**
- ✓ (Term/Period) 6th / 2018~2022

Act on the Establishment and Management of Spatial Data (Article 5)

- ✓ **Basic Plan for National Survey**
- ✓ (Term/Period) 2nd / 2021~2025

Spatial Data Industry Promotion Act (Article 4)

- ✓ **Master Plan for Promotion of the Spatial Data Industry**
- ✓ (Term/Period) 3rd / 2021~2025

02 The 6th basic plan for national spatial data policy

Ministry of Land, Infrastructure and Transport (2018)

Vision	Realization of Smart Korea by spatial data convergence Renaissance

Objectives	[Data Utilization] Produce and open convenient spatial data for all people [Nurturing new industry] Create decent jobs via open-spatial data convergence ecosystem [National management innovation] Smart management by spatial data convergence policy

Strategies & Tasks	Strategy	Task
	[1. Foundation] Produce spatial data that create values	① Innovate spatial data production system ② Prepare production base for high-quality spatial data ③ Increase accuracy and credibility of cadastral information
	[2. Convergence] Activate spatial data platform to share innovations	① Full open the consumer-oriented spatial data ② Increase efficiency of sharing & managing ways of spatial data through two-way communication ③ Lead innovation of public policy by utilizing spatial data
	[3. Growth] Foster spatial data industry focusing jobs	① Strengthen human resources and job matching ② Foster spatial data industry by Supporting startups ③ Support 4th industrial revolution era and technical development ④ Support spatial data companies to expand to overseas
	[4.Cooperation] Construct policy environment that enables participation & coexisting	① Improve and arrange the spatial data infrastructure ② Build cooperative spatial data governance

03 The 2nd basic plan for the national survey policy (2021~2025)

Ministry of Land, Infrastructure and Transport (2021)

Vision	Realization of safe and convenient land management through smartification of survey

Objectives	Qualitative and quantitative growth of survey through innovating survey data and service				
	Technology	Data		Standard	Industry
	Increase localization of survey HW·SW 20% → 60%	Decuple the accuracy of real-time kinematic ±1m → ±10cm	Advancement of 3D data (topography) 40%→100% (buildings) 1%→20% (roads) 5%→30%	Increase the national standard 1 → 13	Increase the sales of the survey industry 4→8 (trillion won)

Strategies & Tasks	strategies	tasks
	1. Strengthen high-definition location data service	① Establish national geodetic datum system using VLBI technology ② Advance the national geodetic datum ③ Expand real time location data service
	2. Establish high-quality survey data	① Innovate the national geodetic datum data ② Establish survey data for the next generation to realize the digital twin ③ Localize automatized survey data production system and core technologies
	3. Expand ways to convergence survey data	① Establish a national quality standard for converging survey data ② Strengthen customizing service of high-quality survey data ③ Build a support system for converging survey data
	4. Improve the survey system and foster new industry	① Improve the outcome management system for survey data ② Activate industrial ecosystem to develop the survey industry ③ Expand overseas activities and strengthening the global capacity

04 The 3rd master plan for promotion of the spatial data industry(2021~2025)

Ministry of Land, Infrastructure and Transport (2021)

Vision	Nurturing the spatial data industry as the core foundation industry of the digital economy

Objectives

▪ Spatial data industry sales: 9 billion won(2019) → 13 billion won(2025)
① **(support startups)** 15 → **more than 40(Annually)**
② **(Reflect appropriate price)** improve **more than 20%** of the current state
③ **(Expand overseas project)** 130billion(2016~2020) → above **300billion**(2021~2025)

▪ National competitiveness in spatial data area No.13(2019) → No .7(2025)
① **(Technical level compare to the biggest technological powerhouse)** 81%(2019) → **90%(2025)**
② **(Training spatial data convergence human resource)** 800 → **2,000(Annually)**
③ **(Foster representative corporations)** companies with sales above 40 billion 1.1%(2019) → **4%(2025)**

Strategies & Tasks

Strategy	Tasks
1. Strengthen the industrial competitiveness through company oriented support	① Excavate and support startups ② Co-prosperity of Large and small companies ③ Improve the business price and prepare the supervision method ④ Support overseas expansions
2. Advance the system of spatial data distribution & utilization	① Support and distribute the customized data ② Generate satellite data convergence service ③ Develop and apply data standard ④ Improve the distribution channel by deregulation
3. Develop the core future technology and training convergence human resource	① Develop new technology in the area of digital twin ② Strengthen the R&D system and diffuse its outcome ③ Training human resources for the new industry ④ Support jobs by job matching

Chapter 03.

INTRODUCTION TO NATIONAL GEOGRAPHIC INFORMATION INSTITUTE

01 Overview
History of NGII

Mission

Establishment of national geodetic datum and geospatial data

Vision

Realization of smart geospatial convenience for the people anytime, anywhere

History

Beginning stage ~1973

- 62.01.01 Establishment of Act on Land Survey (Law No. 938)

Growth stage 1974~1994

- 74.04.01 Start Mapping of 1/5K Topographic map

Expansion stage 1995~2011

- 95.01.01 Start Mapping of 1/1K Topographic map
- 95.05.01 Establishment of the basic plan for NGIS

Innovation stage 2012~

- 19.11 Establishment of the Space Geodetic VLBI Observation Center

1958.04
Founded under the Ministry of Defense (Geographical Institution)

1974.11.
Founded under the Ministry of Construction (National Geographic Institute)

2001.01.01
Nominated as Executive agency

2003.07
Name changes (NGII)

2004.11
Opening of Map Museum

2012.03
Opening of the Space Geodetic VLBI Center

2019.11
Opening National Land Satellite Center

2021.03
Launch of national land satellite

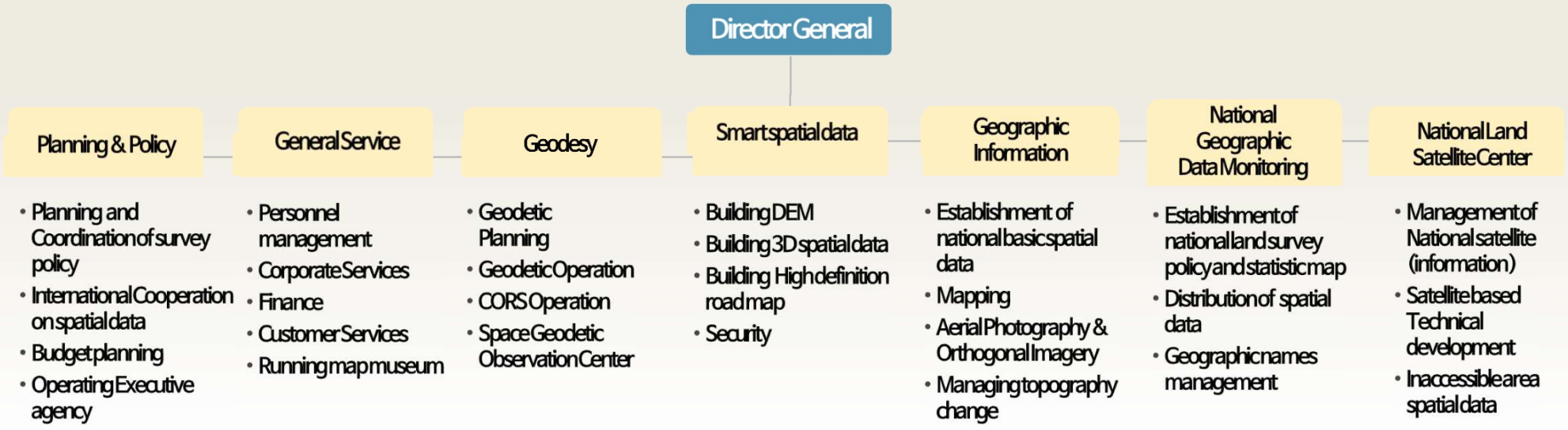
01 Overview

Main tasks and organization of NGII

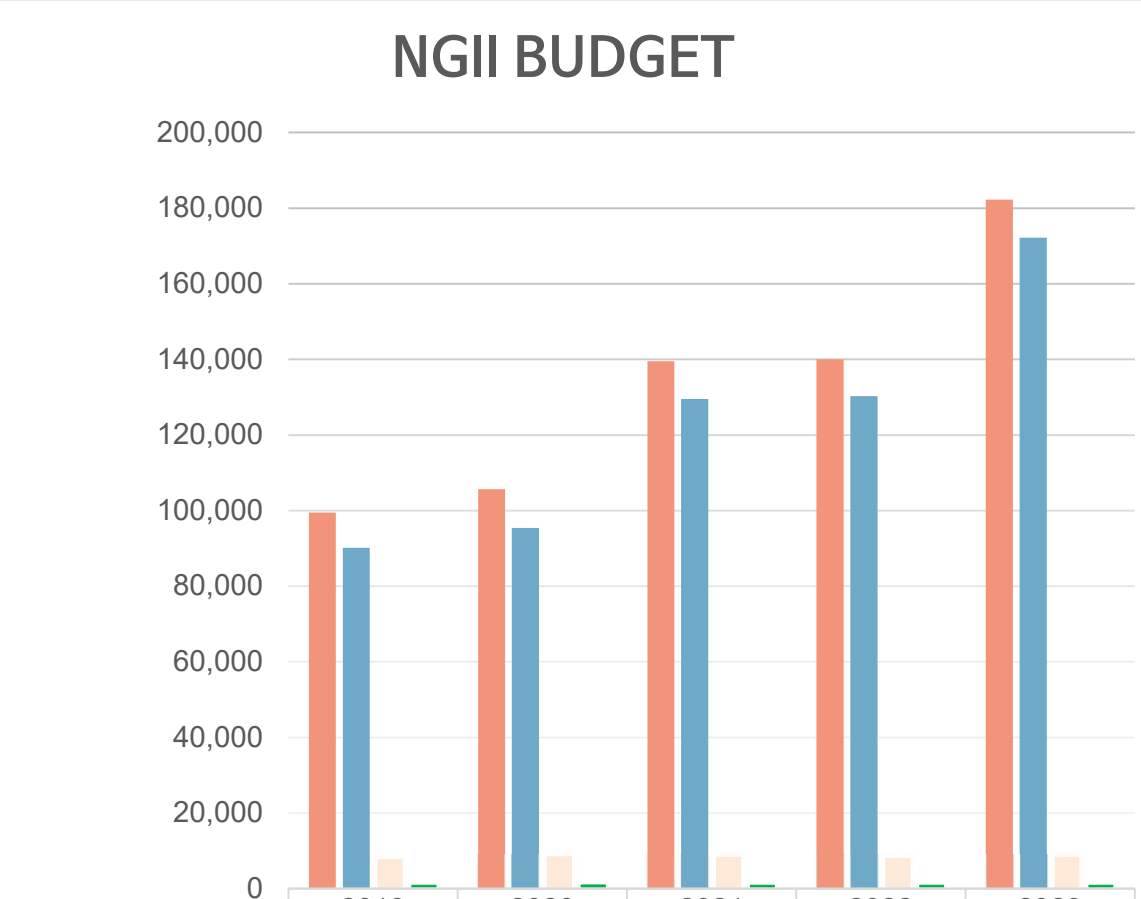
Main Tasks

- Establishment of National Geodetic Datum
- Construction and management of national Imagery data
- Construction of national spatial data database
- National land survey and Management of Geographical Names
- International Cooperation

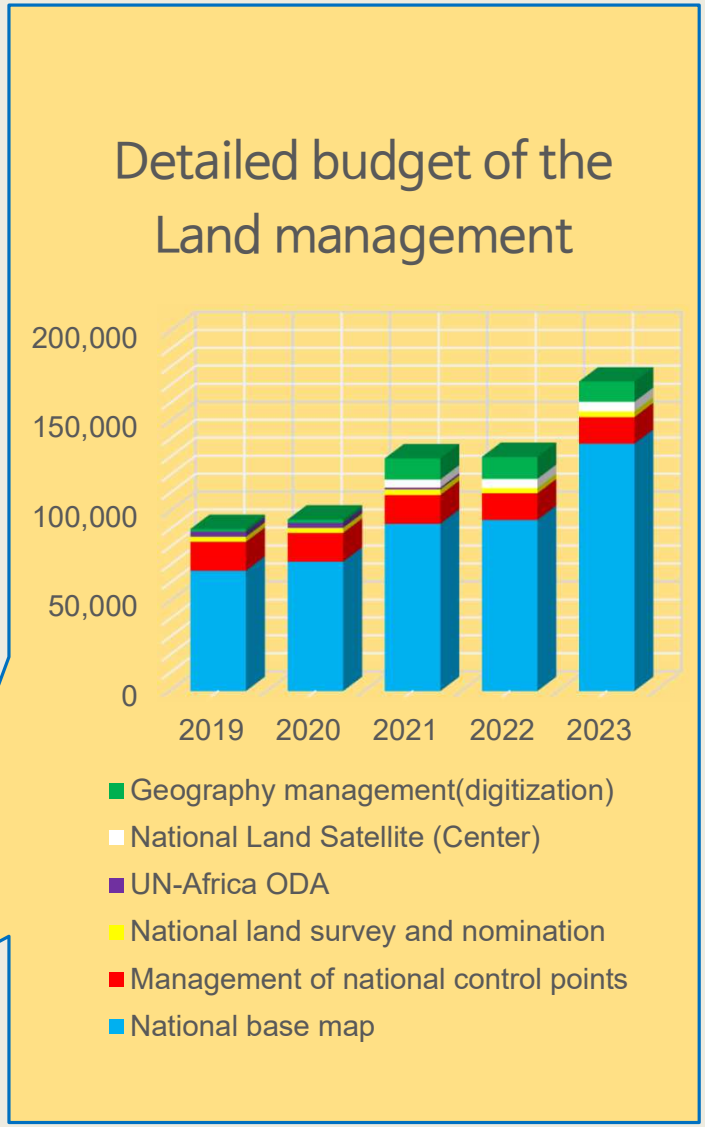
Organization : 6 Divisions, 1 Center (131 Staffs)



01 Overview
Budget of NGII



	2019	2020	2021	2022	2023
Sum	99,514	105,621	139,530	140,042	182,248
Land management	90,174	95,419	129,502	130,301	172,211
labor costs	8,060	8,844	8,730	8,443	8,718
Basic expenditure	1,280	1,358	1,298	1,298	1,319



01 Overview

Scenery of NGII

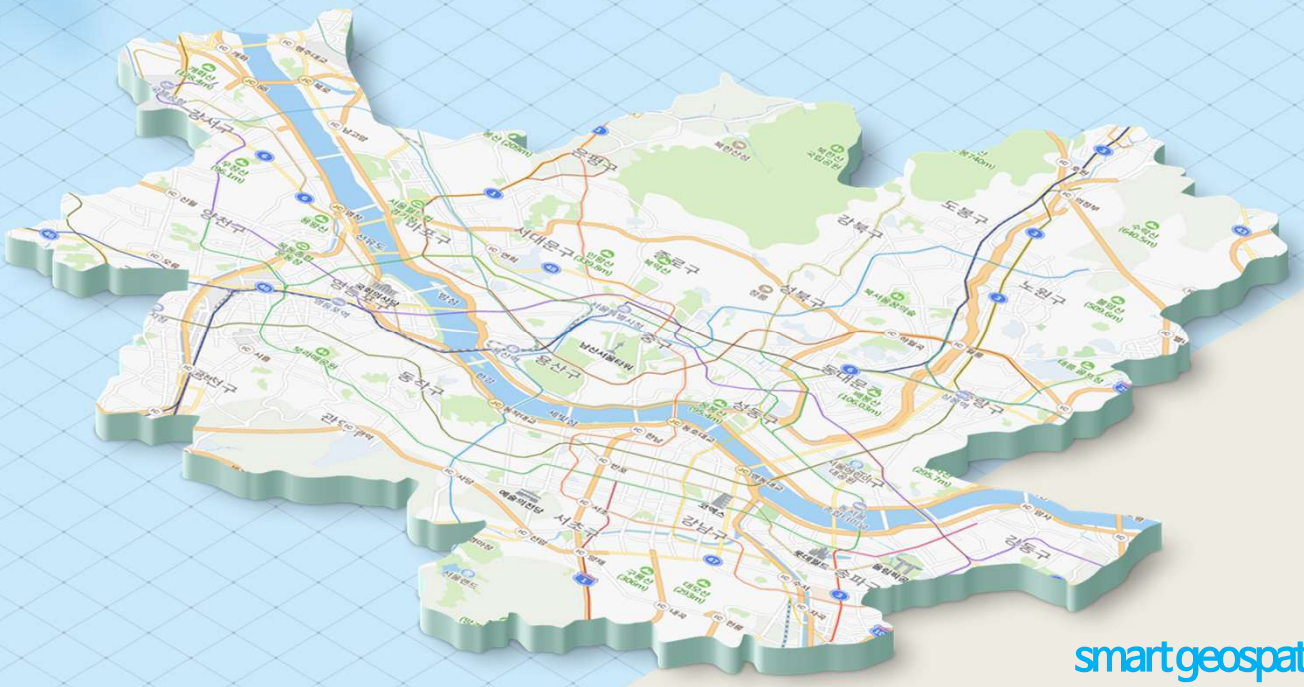
Main building

Map museum

VLBI Center

National Land Satellite Center

Main Tasks of NGII



Realization of
smart geospatial convenience (Smart Land)
for people anytime, anywhere

02 Main tasks of NGII

The national geodetic Datum (1/2)

Horizontal Datum

Standard Datum of Geographic Coordinates of South Korea (Suwon City)

Latitude : North 37o 16' 33.3659"

Longitude : East 127o 03' 14.8913"

Space Geodetic Observation Center (VLBI Center) (Sejong City)

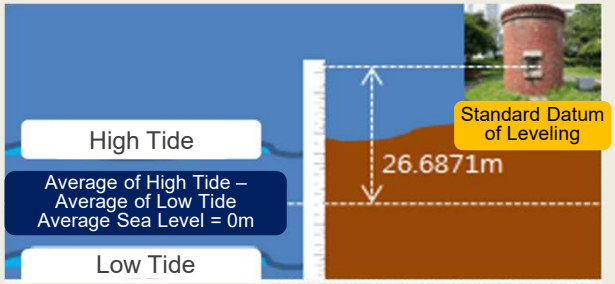
Standard datum of geographic coordinate is…

Reference point for all locations in South Korea / Starting point of latitude and longitude survey

Vertical Datum

Inha Technical College (Incheon)

Standard datum of leveling created based on an average sea level of Incheon (Height 26.6871m)



Types of Horizontal Location Measurement Standard Points

Space Geodetic Control Point

Satellite Control Point (GPS Permanent Station)

Benchmark

Integrated Control Point

Triangulation Point

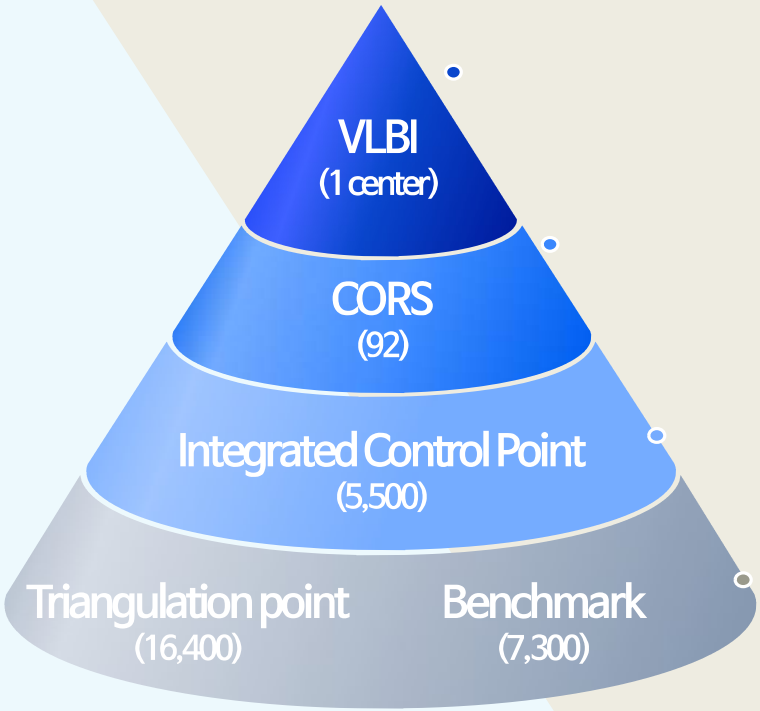
02 Main tasks of NGII

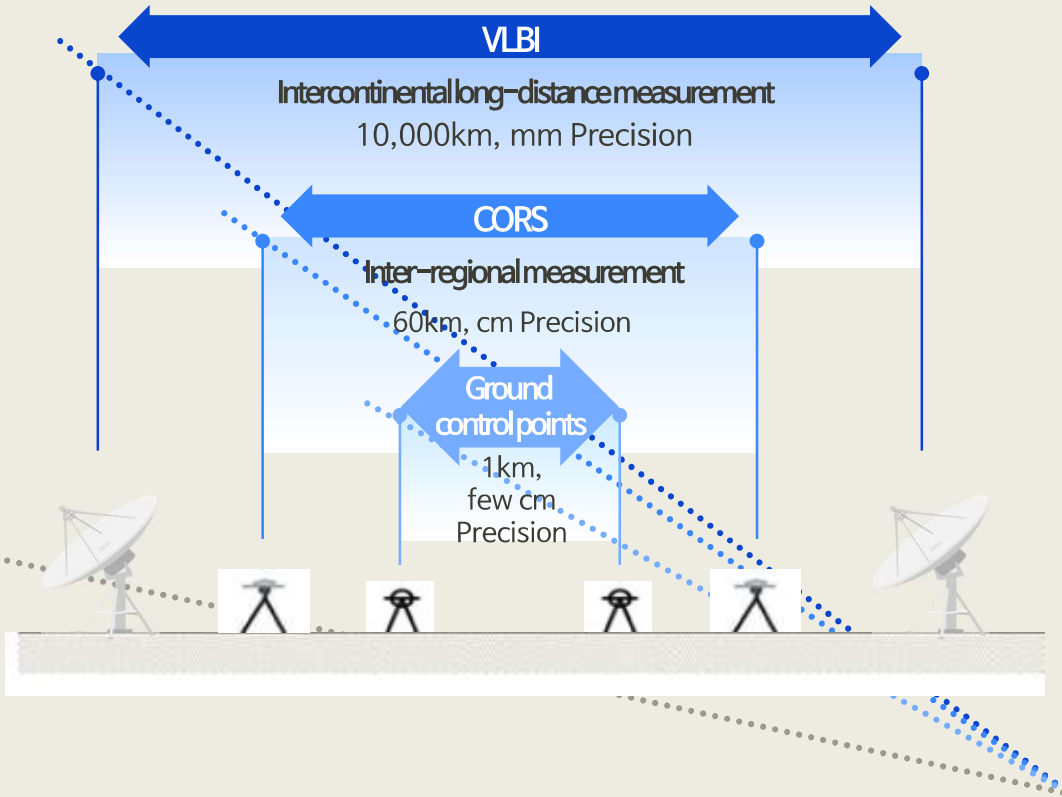
The national geodetic datum (National control points, 2/2)

Establish national datum standards (horizontal, vertical) through the latest geodetic technology, and provide the datum standard by building the survey infrastructure nationwide

Establishment of a precise national datum standard system

Sales of spatial data industry (2019)
1.5918 trillion won

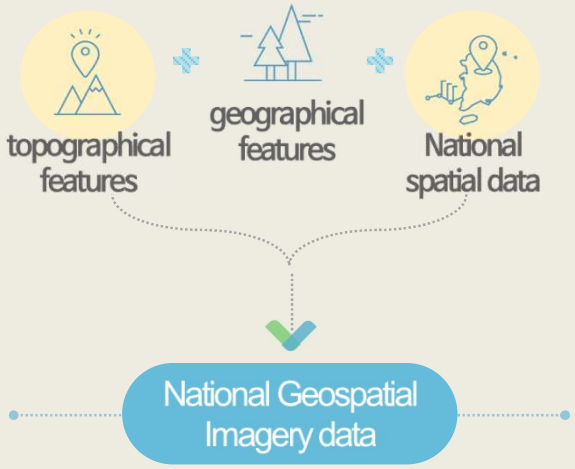




02 Main tasks of NGII

Imagery data for national land (1/2)

Producing and managing the national geospatial imagery

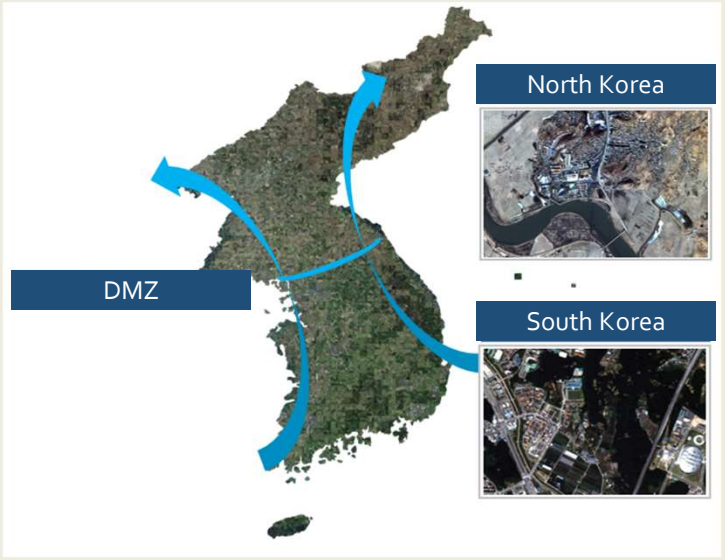


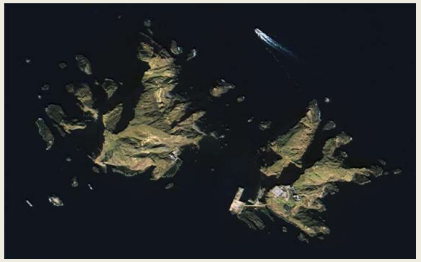
The national geospatial imagery information system is essential for mapping

National Geographic Information Institute is recording the changes of national landscape through photography

① Operating satellite and Creating high-definition satellite image

- Provide high-resolution satellite images that can be used immediately for mapping and etc. by processing the original satellite images



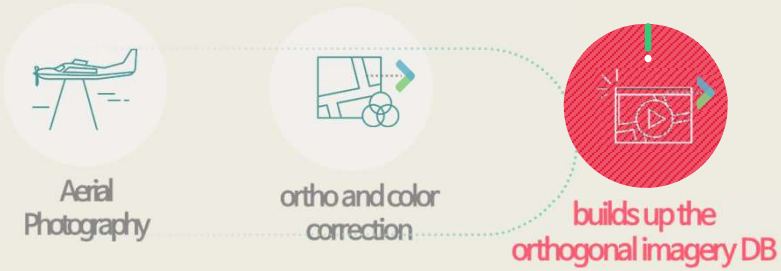


02 Main tasks of NGII

Imagery data for national land (2/2)

② Aerial photography and Orthogonal Imagery DB

- NGII carries out the aerial survey to build up the whole aerial photography DB of 12 and 25cm resolution



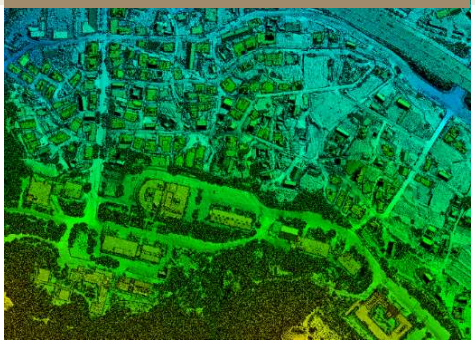
Aerial Photography

Orthogonal Imagery DB

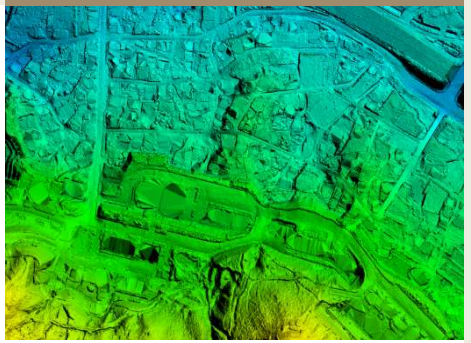
③ Creating 3D spatial data

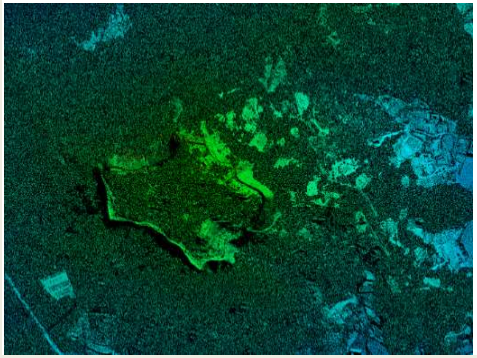
- As the core infra of Digital twin(one of 10 major tasks of the Korean New Deal), creating 3D spatial data identical to the real world on 2D maps by utilizing 3D DEM and building information

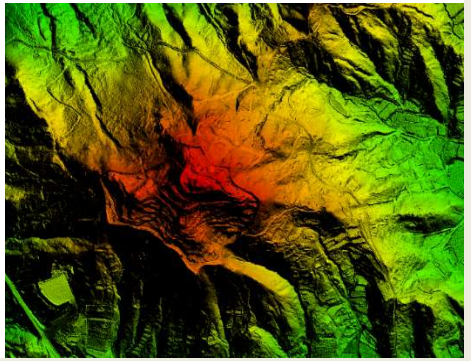
DSM



DEM







02 Main tasks of NGII

National base map

- Produce 1:1000 digital topographic map for managing underground facilities in downtown area
- Produce 1:5000 scale base maps used for national land planning, large-scale SOC construction, and navigation
- Produce small scale maps such as a complete map of Korea

Large-scale Digital Topographic Map (1:1,000)

Digital topographic maps for urban areas are produced through matching funds (50:50) with local governments

- Produce maps for 82 cities spanning approx. 10000㎢ and suburb areas spanning 50㎢
- Produce large-scale maps customized for local governments by using local administrative information

National Base Map (1:5,000)

The National base map is updating annually

- Revise the national base map nationwide (approx.100000㎢)
- Important detected changes such as core buildings are updated within 1~6months in order of priority
- Undetected objects are updated within a year via aerial photograph and POI

02 Main tasks of NGII

High definition road map

Accuracy 25cm level of map expressing 3D- regulatory lines (lanes, boundary lines, etc.), road facilities (tunnels, bridges, etc.), and sign facilities (traffic safety signs, signal flags, etc.) for recognizing automobile location, routing, and road information

Backgrounds

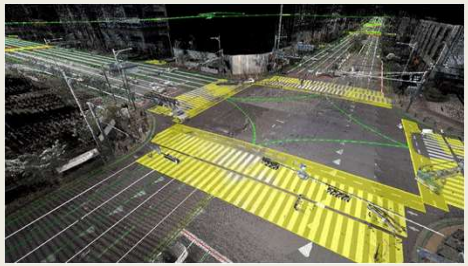
Support plan for autonomous car commercialization
(May, 2015, The 3rd ministerial meeting for regulatory reform)

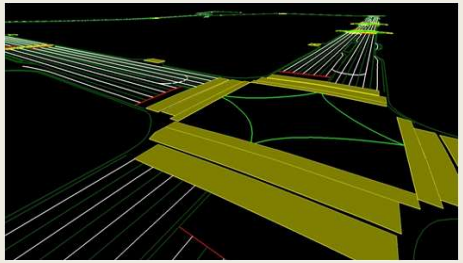
- Produce precise digital topographic maps including all lanes nationwide
  - Construct 4,300km of motorways by 2020

Development strategy for future car industry
(October, 2019, national vision proclamation ceremony for future vehicle)

- Construct nationwide 3D road maps to recognize the topographical features
  -expressways(2019)→national roads in major cities(2024)→110,000km of national road(2030)

Relation between autonomous driving and high definition roadmap


Point cloud data


Vector data

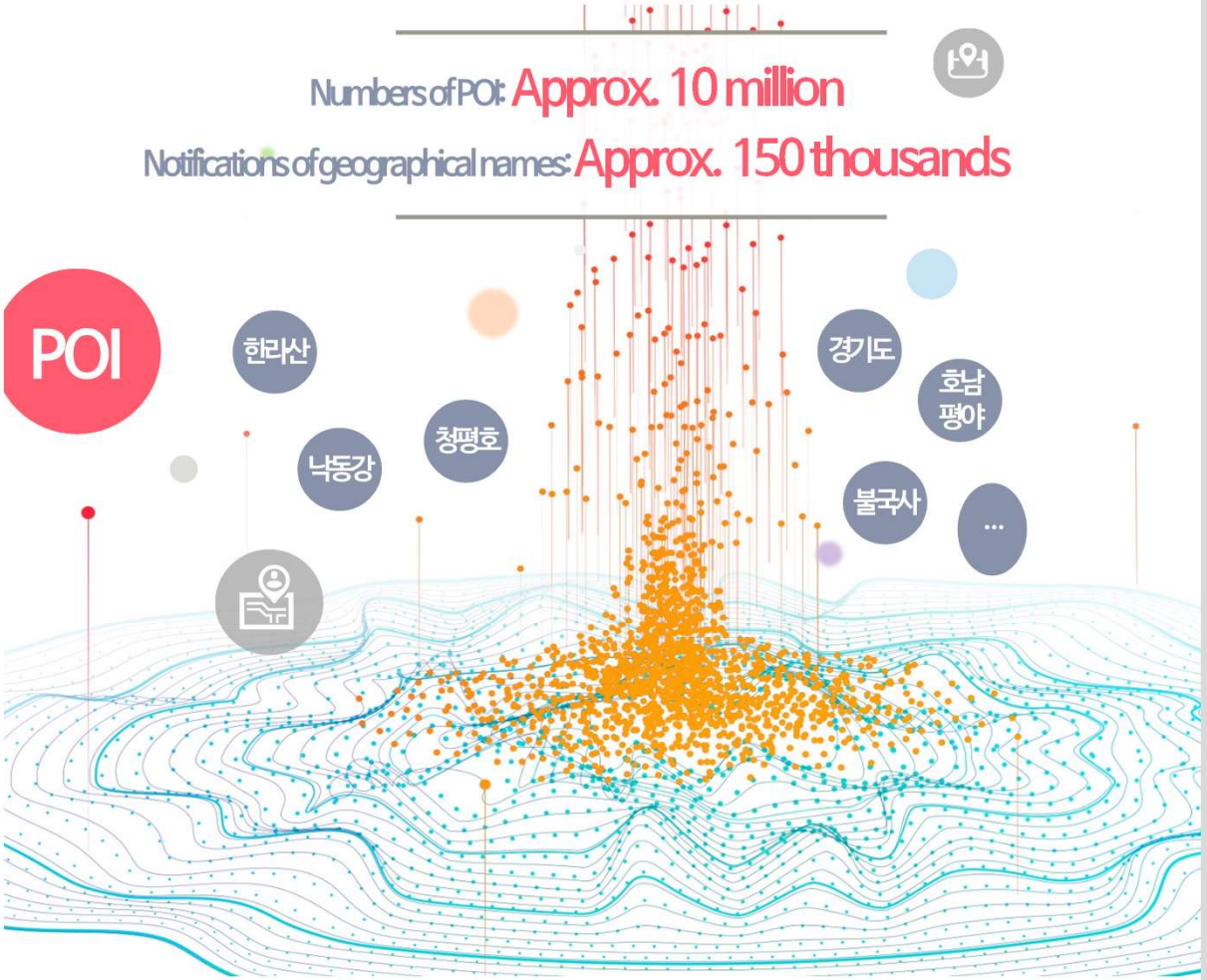
Progress

- ✓ After pilot construction(2015~2016), about 6,700km of national expressways and C-ITS demonstration districts are completed in 2017-2020.
- ✓ The general national highway will be expanded from 2021 and Approx. 15,000 km of it will be constructed by 2022.
- ✓ Approx. 2,357km of 4(or more)-lane local roads will be constructed by 2025 across the country.

02 Main tasks of NGII

National land survey & Geographical names management

- Database POI, coordinate, address, and mutual information and utilize them in browsing
- Change North Korean/Japanese style name to Korean name through Korean Committee on Geographical Names



연합뉴스

15 January, 2019

Korean Committee on Geographical Names confirmed 'Angel large bridge'

Jeollanam-do Sinan-gun joined "Korean Committee on Geographical Names" and held the 5th Korean Committee on Geographical Names on 11th of december, last year. Sinana-gun announced that they determined the name of a marine bridge that connect Aphae and Amtae as "Angel large bridge (Cheonsa Dae-kyo) on 17th of December. Thereby, "Sinan-gun Committee on Geographical Names" also confirmed the name of "Angel large bridge (Cheonsa Dae-kyo)" on 27th September, last year

02 Main tasks of NGII
Operating the National Land Satellite (Center)

National Land Satellite Center

✓ Opening the National Land Satellite Center in NGII (November 2019)

- (**Function**) Systematically collect, produce, process, manage, and provide the information acquired from the satellite and support land use & management tasks
- (**Current state**) Construction expenses: 360 million won,
  Period: 2018 ~ 2019 (Integrated management center, office, data processing room, etc.)

Opening ceremony of the National land satellite center (1 November, 2019)

National Land Satellite

✓ (**Background**) Precise land satellite-2 is developed to support land use, resource management, and utilization of national spatial data for social issues and the public sector.

✓ (**Project period**) 2015.3~2022.4 (No.1 was launched on 22, March 2021 & No.2 will be launched in the second half of 2022)

✓ (**Project budget**) Approx. 243.4billion won (Ministry of Land, Infrastructure, and Transport: 80.5 billion, Ministry of Science and ICT: 162.9 billion)

✓ (**Satellite feature**) 500kg-level Satellite-2 (Resolution: Black & White 0.5m)

Size / Weight	1.4×1.4×2.4m / 500kg
Mission Track / Life span	497.8km Solar Synchronous Orbit (polar orbit) / 4years
Resolution / Observation Width	Black & White 0.5m (1band), Color 2m (4bands) / 12km
Spectral resolutions	Black & White, Color: 450~900nm (Blue, Green, Red, near-infrared)
Observation area	Entire Korean Peninsula (Approx. 800km×1,000km), Polar regions, overseas area

02 Main tasks of NGII

Spatial data of NGII

- Building LOD2.5
- \+ Building LOD1
- \+ National Base Map
- \+ High Definition Road (Vector)
- \+ High Definition Road (Point Cloud)
- \+ Aerial Photography
- \+ Satellite Image
- \+ DEM
- \+ National Control Point

< Yeouido, Seoul >

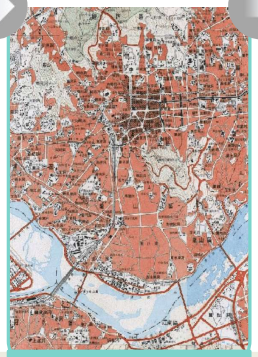
02 Main tasks of NGII

Map: Past(2D)→Present(3D)→Future(Digital Twin)

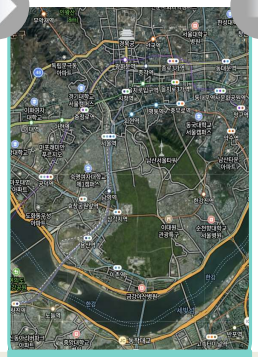
Development progress

Old Map

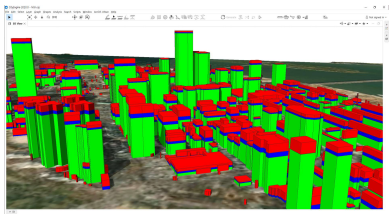
Paper Map



Digital Map



2.5D



Digital Twin

Purposes

Military, Administrative

Land Development / City Planning

Location Information / Navigation

Meeting the expectation of new industries such as Digital Twin

Abstract / Generalization

Reality

Thanks for listening

감사합니다