
Geodetic Activities of NGII

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CONTENTS

Chapter

|

▪ Introduction of the Dep. of Geodesy

Chapter

||

▪ Geodetic Infrastructure in Korea

Chapter

|||

▪ Research Activities

Chapter

I

Introduction of the Dep. of Geodesy

01 · Introduction

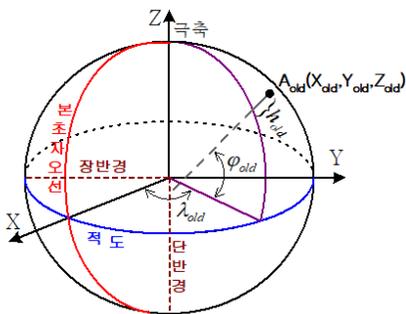
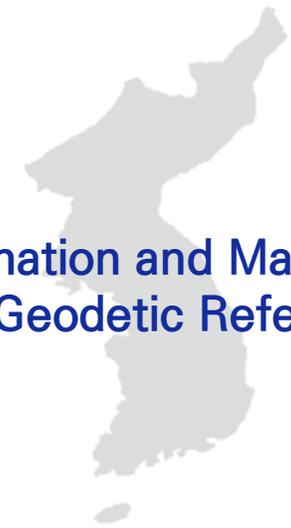
Department of Geodesy

▶ Organization: 3 divisions /16 Persons

▶ Main mission

- Determine and Maintain the National geodetic Reference System in Korea
- Operate and Control the VLBI(Very Long Baseline Interferometry) Center in Sejong
- Operate and Control the GNSS CORS(Continuous Operating Reference Stations)
- Maintain the National Control Points (Marker)

Determination and Management of National Geodetic Reference System



▶ Determine the National Geodetic Reference System

▶ VLBI Center

▶ GNSS CORS

▶ National Control Point

Chapter

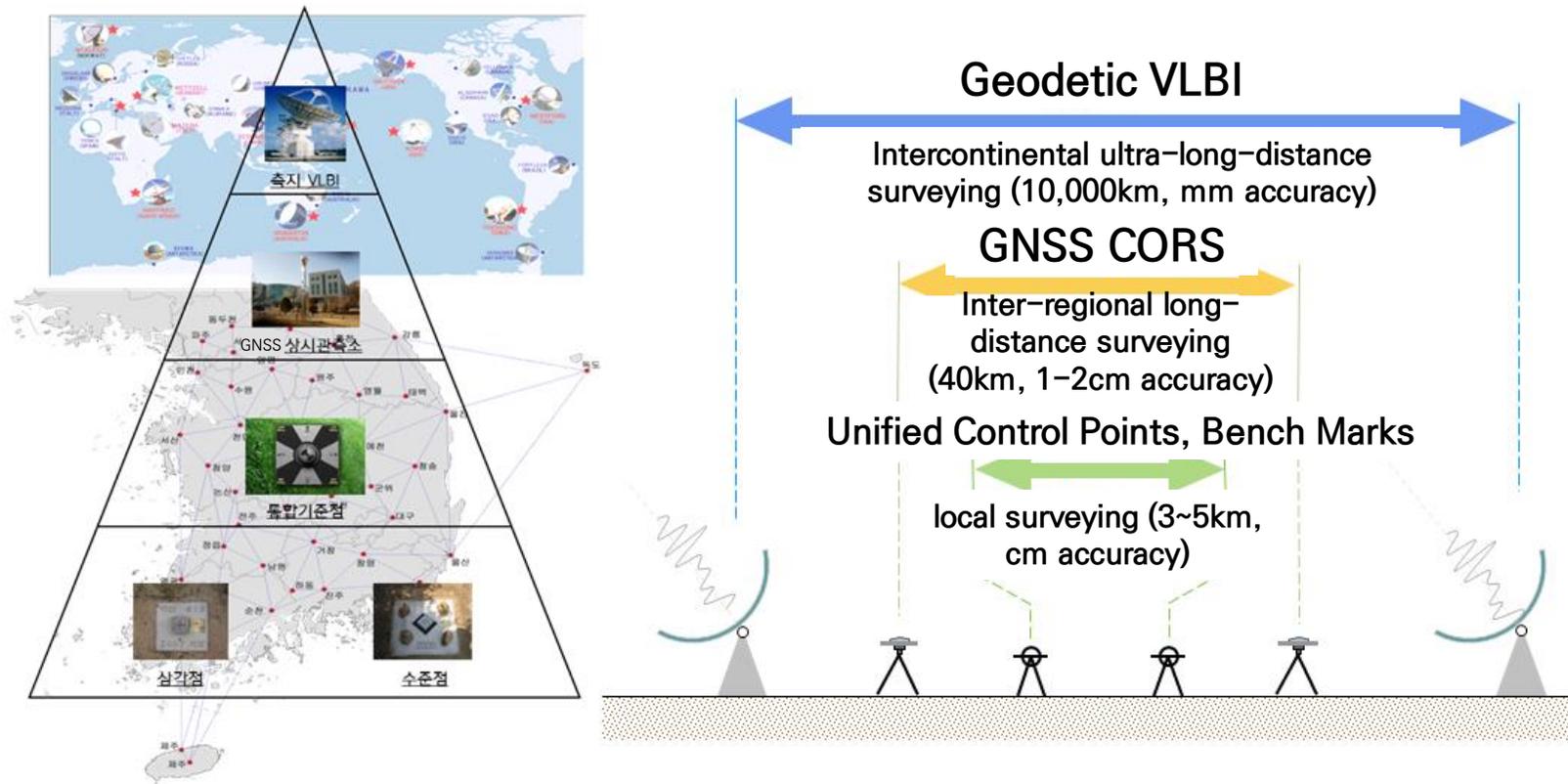


Geodetic Infrastructure in Korea

2 • National Control Point and Hierarchy I

Hierarchy of National Geodetic Infrastructure

- ▶ NGII operate the 1 Geodetic VLBI, 92 GNSS CORS, 5,586 Unified Control Points, 5,684 Bench Marks to manage the high precision national geodetic system over the entire country.



2 • National Control Point and Hierarchy II

VLBI for Space Geodesy

- ▶ VLBI is a space geodetic technique that measures determines the distances of thousands of kilometers among stations.
- ▶ Korean VLBI center participates in international joint observations with VLBI observation stations (16 countries) around the world to determine the precise positions of the VLBI stations and ensure the stable operability.

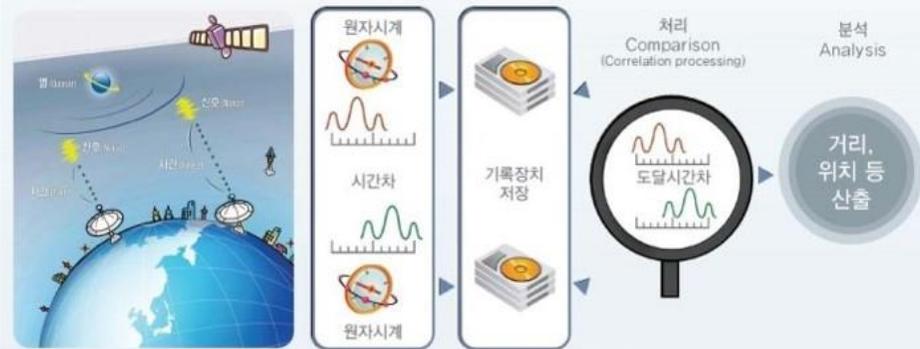
Panoramic view of the Space Geodetic Observation Center



Principles of Geodetic VLBI observation

원리

측지 VLBI(Very Long Baseline Interferometry, 초장기선전파간섭계)는 동일 우주신호를 지구상 여러 안테나에서 동시에 수신하며, 초정밀 원자시계를 이용하여 신호를 시각정보로 변환함으로써 관측국간 신호 도달시간 차를 이용하여 거리 및 위치 등을 산출

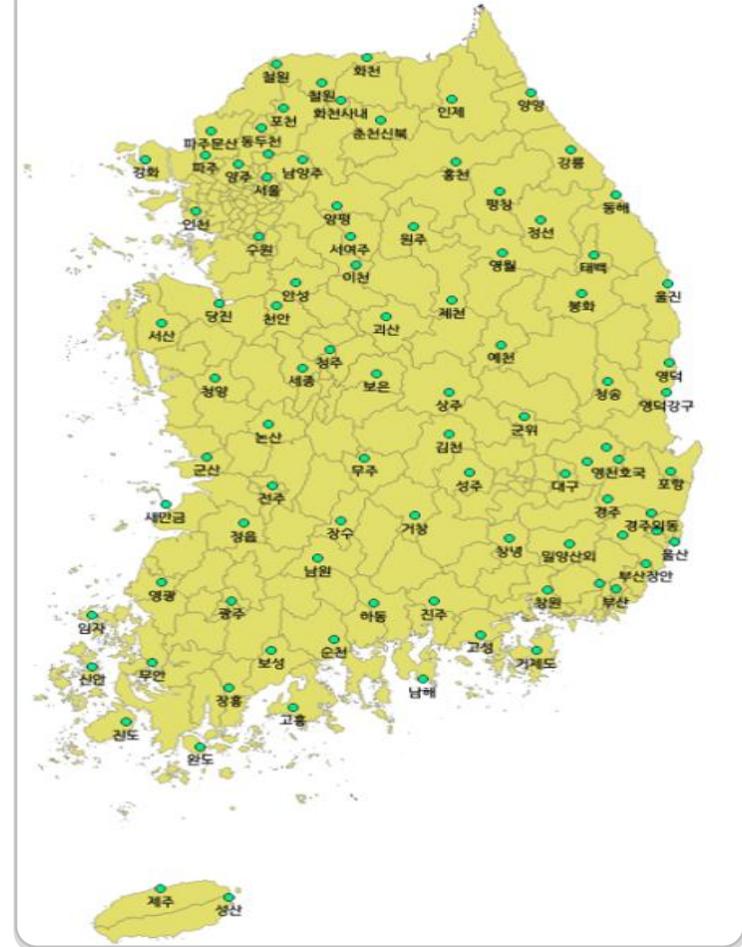


2 • National Control Point and Hierarchy III

GNSS CORS (92 stations , Nov. '23)

- ▶ 92 stations observe 365/24
- ▶ Measurements of GPS, GLONASS, Galileo, Beidou
- ▶ Baseline length about 40km

Layout of GNSS CORS

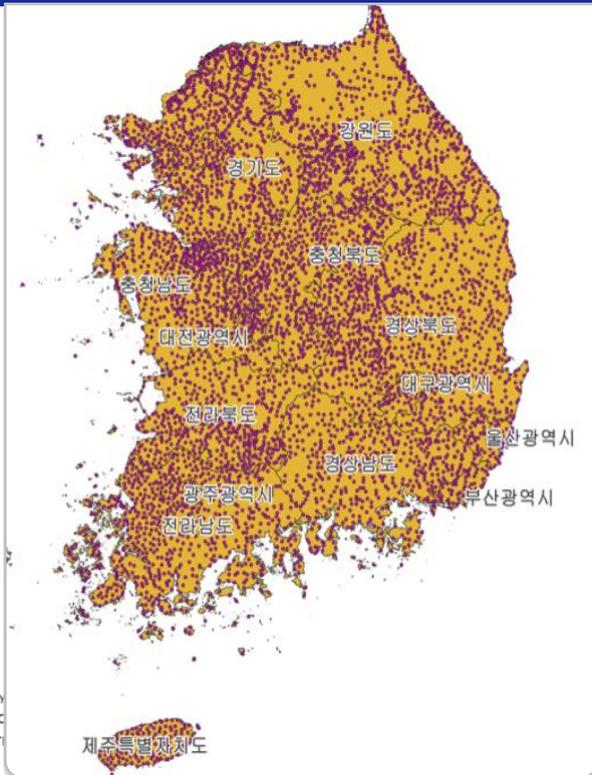


2 • National Control Point and Hierarchy IV

Unified Control Points (5,586 points, June. '23)

- ▶ Multi-functional national surveying reference points that measures the horizontal position, height, and gravity in Korean geodetic system.
- ▶ 5,586 points, 3~5km distance between points

Layout of Unified Control Point



Bench Marks (5,684 points, June. '23)

- ▶ Established by leveling and gravity surveying. The origin of the vertical control point is located at Incheon (west coast).
- ▶ 5,684 points, 2~4km distance between points

Layout of Bench Marks



Chapter



Research Activities

3 • Research Activities

Research activities on Geodesy (Jan. 2022~ May 2023)

Subject	Research Output
Upgrade of the crustal movement monitoring system	Calculates daily solution based on GNSS observation data from GNSS CORS and monitors the crustal movement
Network adjustment of the three dimensional control points	The coordinates of the unified control points are adjusted based on ITRF2015
Network adjustment of the vertical coordinates	Vertical coordinates are adjusted and the orthometric heights are introduced. Before, the normal orthometric height was used in vertical system.

3 • Research Activities

In progress research activities for Geodesy (Nov. 2023)

Subject	Objective
Preparation of the national coordinate update to ITRF2020	Precise determination of the VLBI antenna reference point IVP (InVariant Point) and pilot calculation of the CORS station in ITRF2020.
Improvement of the national geoid model	2 cm precision with 2km resolution
Pilot study on the detection of the crustal deformation using SAR	Locate the areas for the intensive maintenance of the control points

Thank you