Korea Geodetic VLBI Station, SEJONG

Sangoh Yi,

2012.03.06

The 7th IVS-GM-Spain Madrid

Introduction

VLBI system

Fringe Test

Co-location Facilities

Join the IVS

Summary

Contents are…

- ‘Korea VLBI system for Geodesy’ (KVG) project has been completed
- NGII is ready to Join the IVS, “SEJONG” station

- Introduction
- VLBI system
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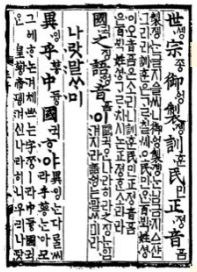
- Summary

SEJONG (http://en.wikipedia.org/wiki/Sejong_the_Great)



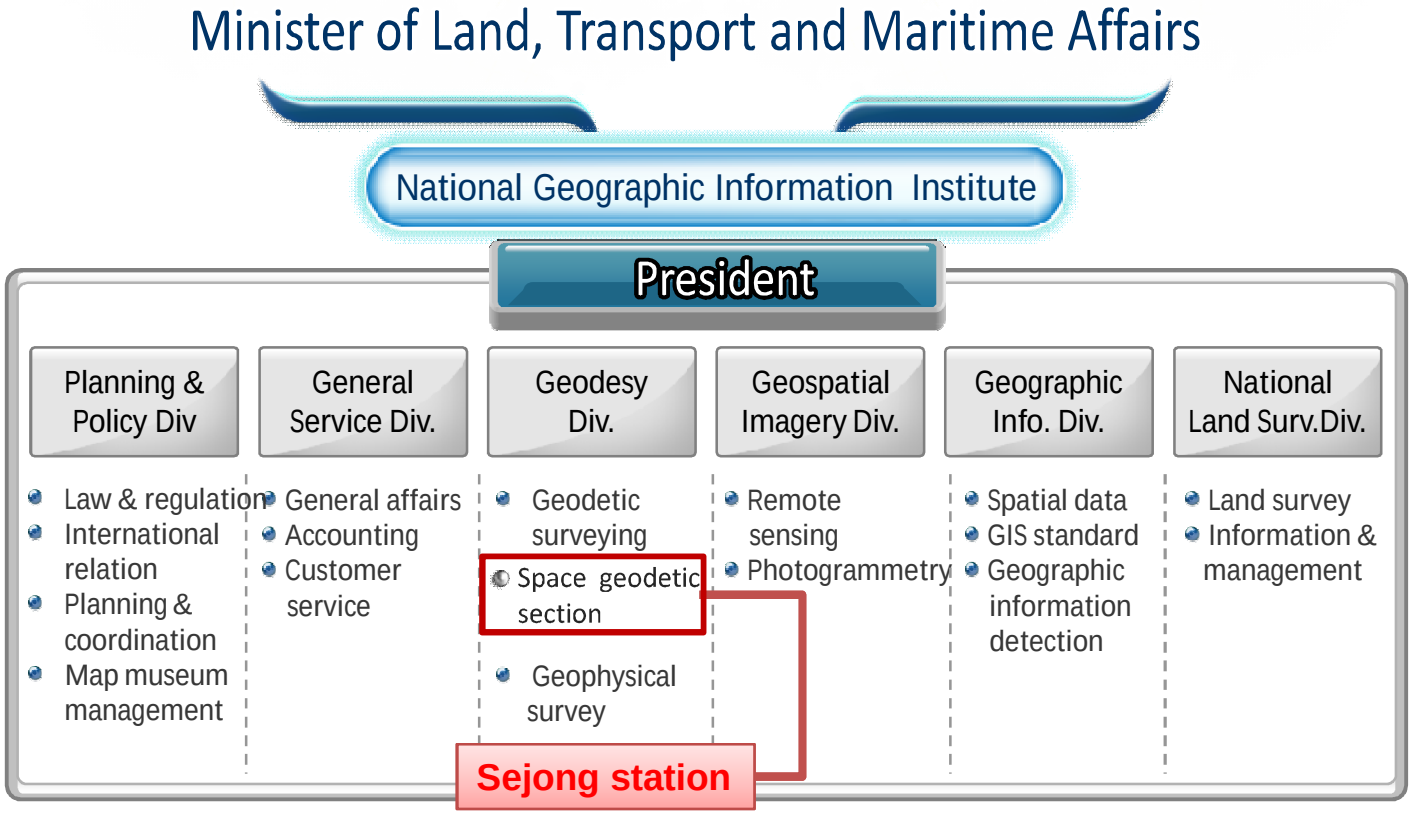
- Sejong the great (1397~1450) ,Fourth king of Joseon-dynasty
- Hangul, Celestial globe …
- A king revered by all of Korean

The King Sejong station (The antartic, KOPRI)

Sejong Special Autonomous City

Sejong VLBI station

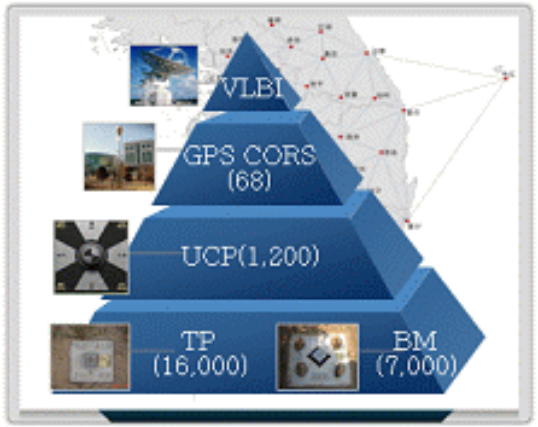
Organization of NGII



Main missions of NGII

- National Surveying Standard Set-up
- Spatial Info. Establishment & Reliability Improvement
- Surveying & Geographic Information Service
- Law & system improvement Pursuant to the times' change
- Technical Innovation & strengthen competitiveness

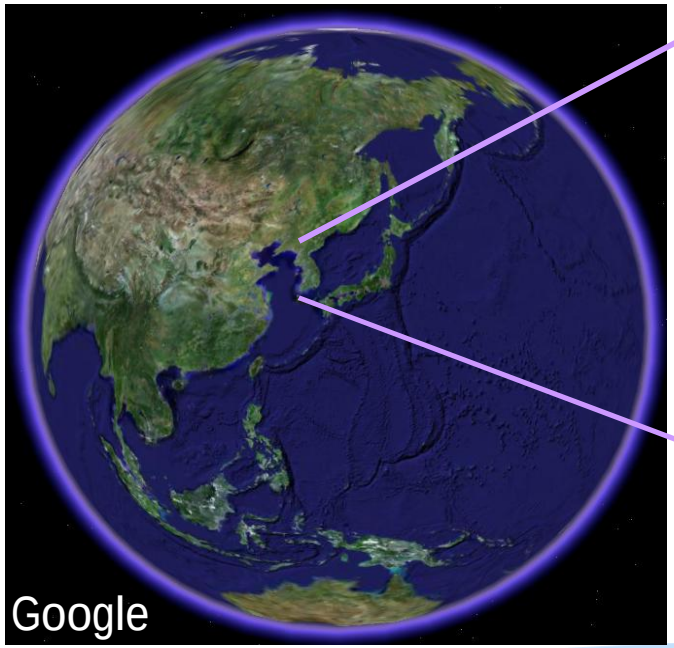
※ UCP(Unified Control Point) : longitude and latitude + elevation + gravity + imagery reference point

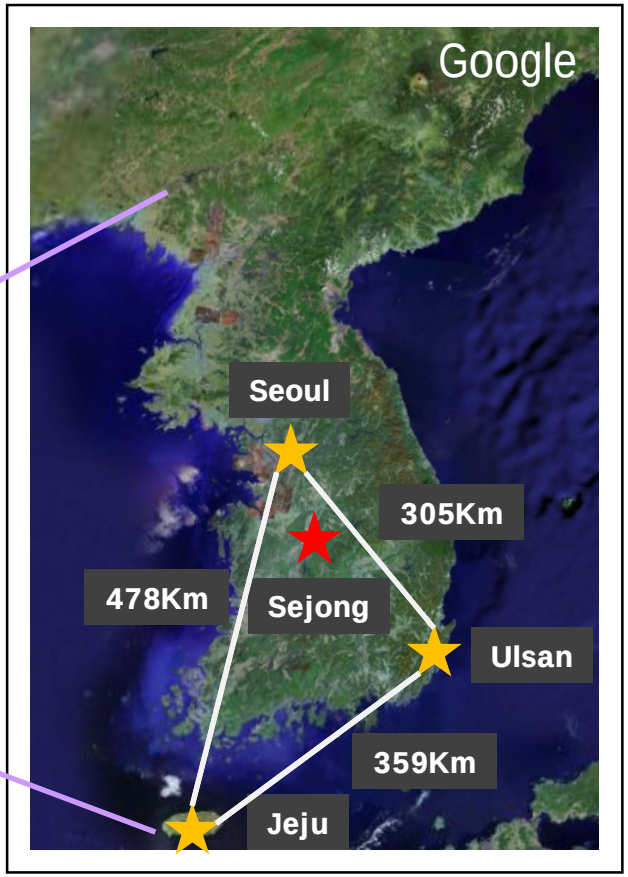


VLBI sites in Korea

Total 4 Stations

1: Sejong -> NGII
3: KVN -> KASI





★ Korea Geodetic VLBI, NGII
★ Korean VLBI Network

Geodetic VLBI in Korea

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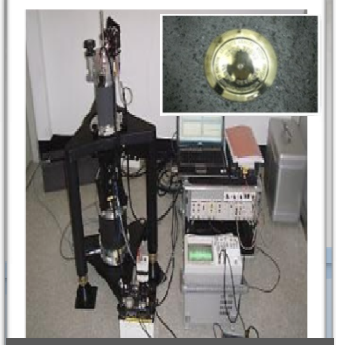
Sejong Station


22M, S/X,K,Q


Trimble, NetRS9


Gravimeter, FG5

Antenna

Antenna Size	22M (Cassegrain)
Receiving Frequency	2/8, 22 and 43 GHz **(Geodetic Purpose)**
Aperture Efficiency	~60%
Pointing Accuracy	0.0131˚ (RMS)
Reflector Surface Accuracy	86μm
Operation Range	AZ: +-270 ˚ EL: 0~90 ˚
Slew Speed	AZ & EL 5˚ /sec
Price	US$ 7M

- Manufactured by HighGain Antenna (www.highgain.co.kr)
- More information to Dr. Bae (msbae@highgain.co.kr)

Introduction

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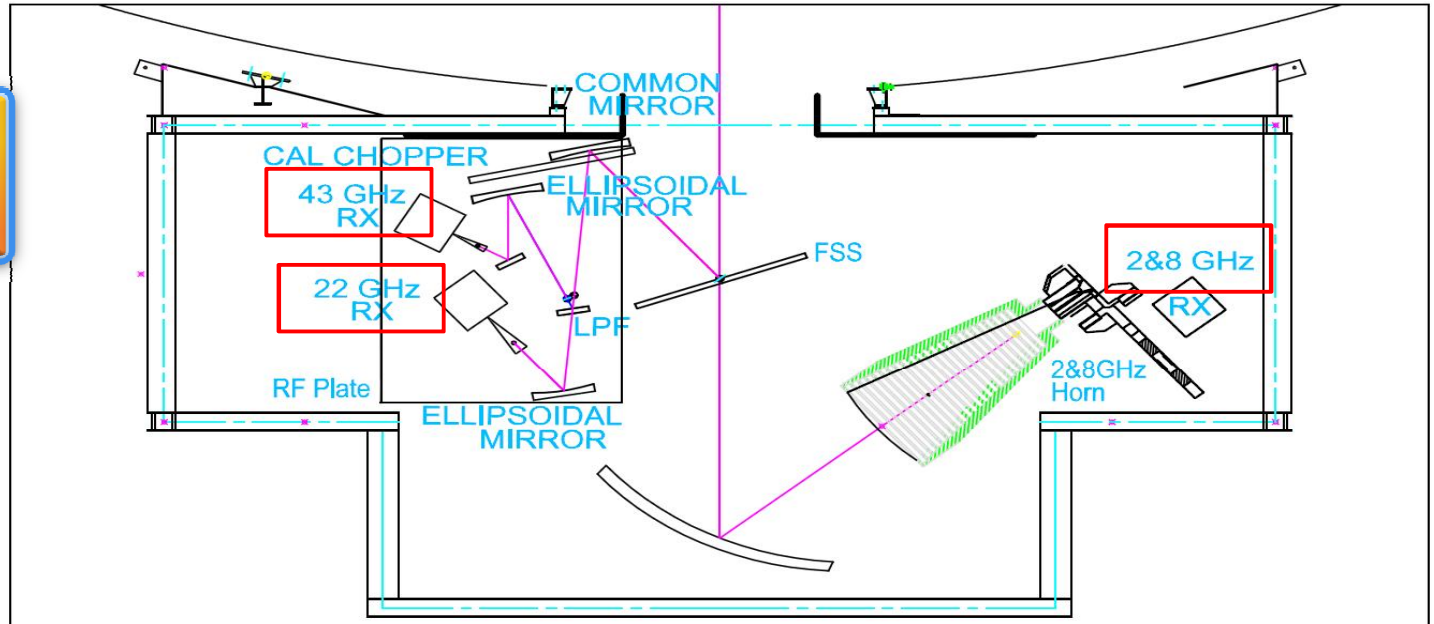
Fast, 5/sec

Large, 22M

Stable, Bed rock

Receiver






- Manufactured by GigaLane (www.gigalane.com)
- More information to Sungjin Kim (sjkim@gigalane.com)

Receiver

Bands	S band	X band	K band	Q band
Freq. [GHz]	2.1-2.4	8.0-9.0	21-23	42-44
Receiver Noise Temp.	<20 K	<30 K	<50 K	<80 K
Polarization	R, L	R, L	R, L	R, L
1st LO Freq.	None	None	13.5 GHz	33.9 GHz
1st IF Freq.	None	None	8 ~ 10 GHz	8 ~ 10 GHz
IF Pout/BW	-50dBm /500MHz	-50dBm /500MHz	-50dBm /500MHz	-50dBm /500MHz
Phase noise	-120dBc/Hz @1KHz			
Reference Freq.	100 MHz			

- Manufactured by GigaLane (www.gigalane.com)
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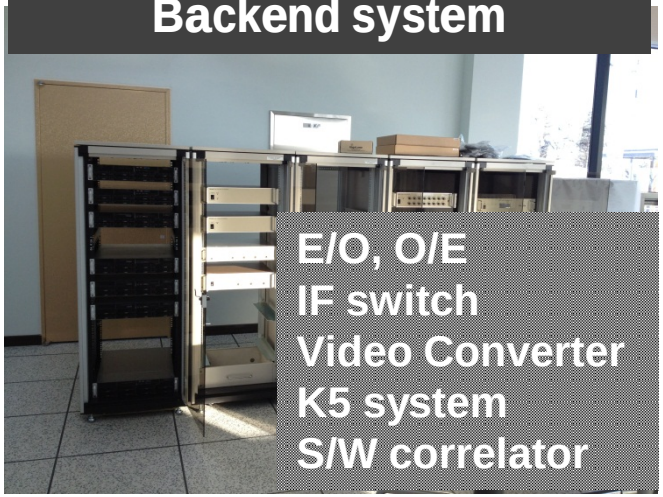
Backend

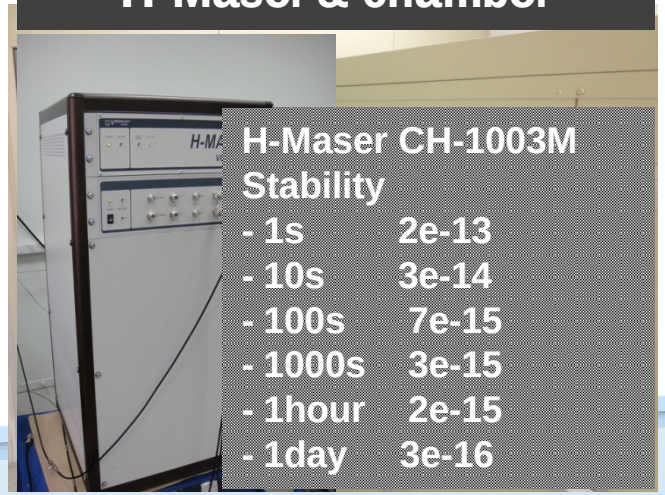
Backend system



E/O, O/E
IF switch
Video Converter
K5 system
S/W correlator

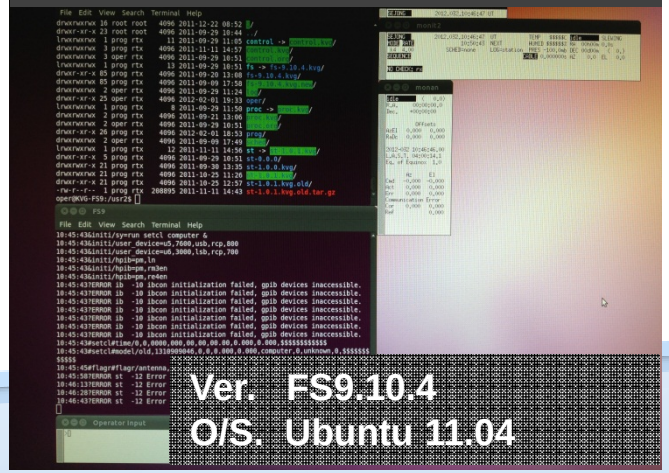
Observation room

H-Maser & chamber



H-Maser CH-1003M
Stability
- 1s 2e-13
- 10s 3e-14
- 100s 7e-15
- 1000s 3e-15
- 1hour 2e-15
- 1day 3e-16

FS9



Ver. FS9.10.4
O/S. Ubuntu 11.04

Fringe test information

Date	Feb 27th, 2012
Schedule file	F12058.skd
Station Info.	Sejong, Kashima11
Frequency	Sejong (RHCP) XL band: 8050-8550 MHz XH band: 8450-8950 MHz S band: 2100-2600MHz Kashima11 (RHCP) XH band: 8158-8600MHz S band: 2100-2600MHz
Data recorder	K5 system
Correlation S/W	ipvlbi20111020

Correlation results

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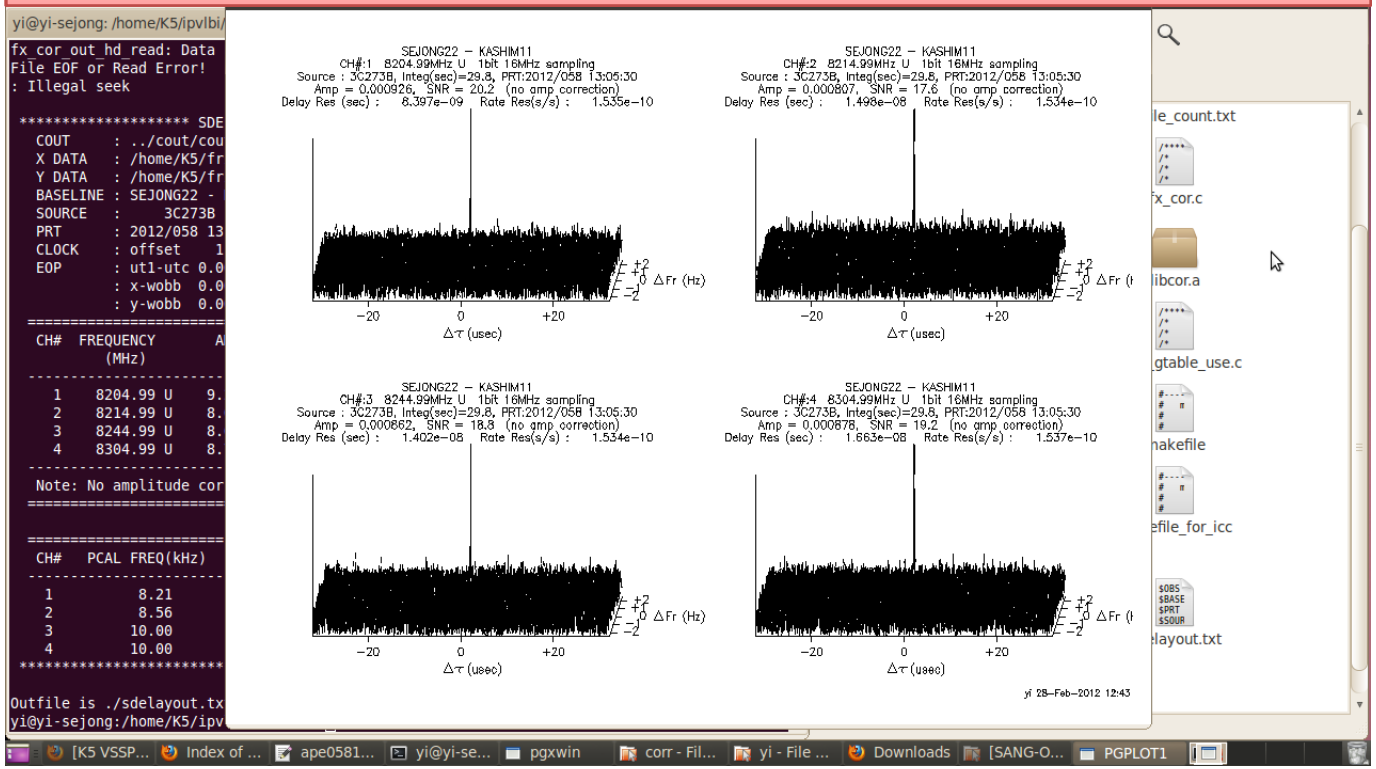
We got fringe!!



☞ **Acknowledgement**

Dr. T. Kondo, Dr. Sekido,
Mr. Tsutsumi, Mr. Hasegawa in NICT

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Correlation results

☞ Acknowledgement

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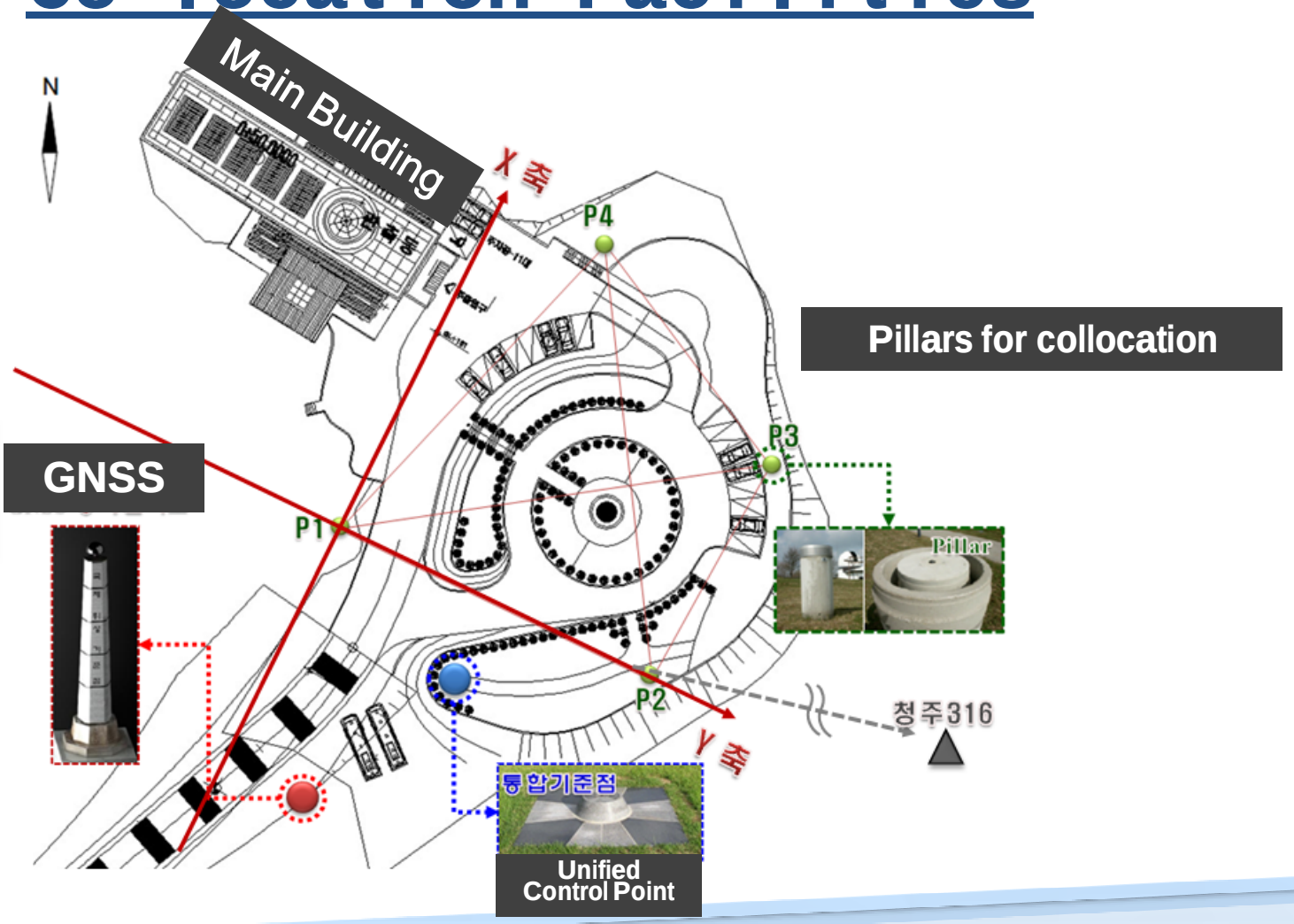
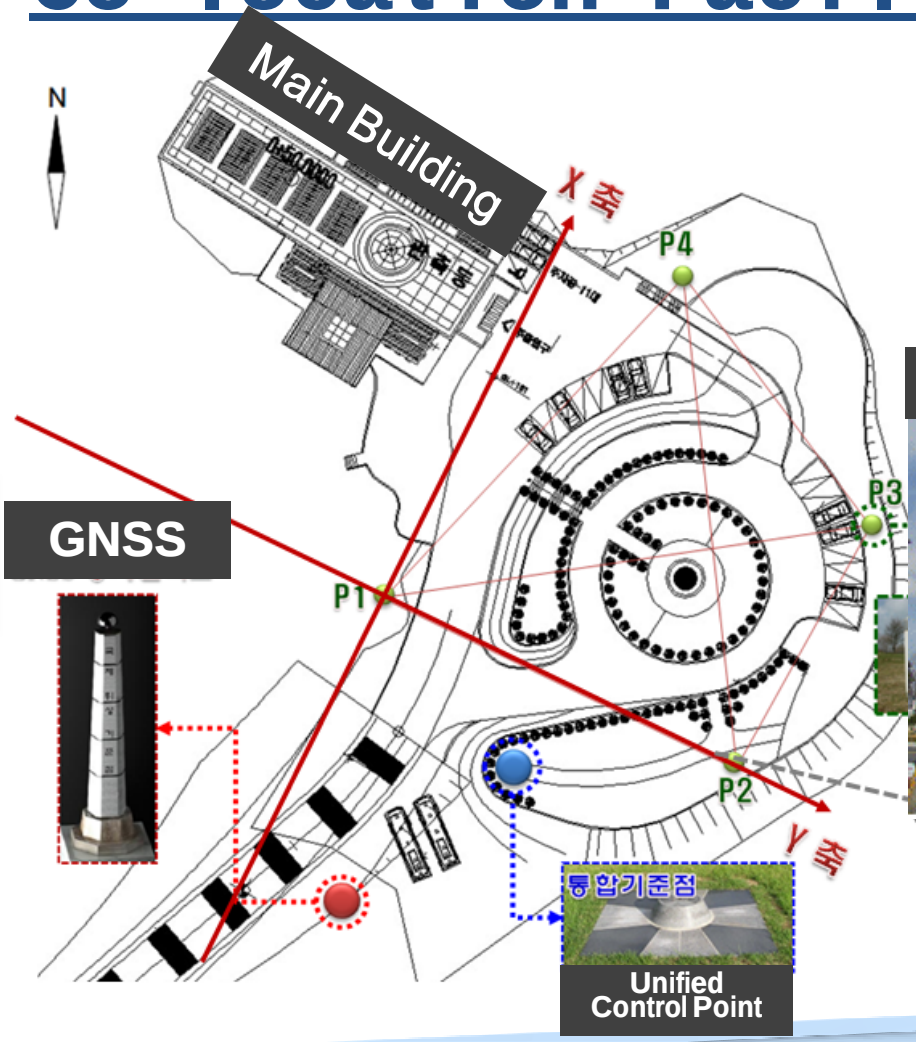
Co-location Facilities

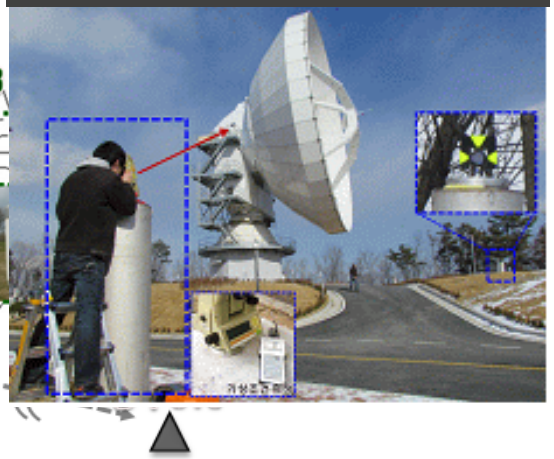


Poster "Local-tie survey at the Korea Geodetic VLBI station"

Co-location Facilities

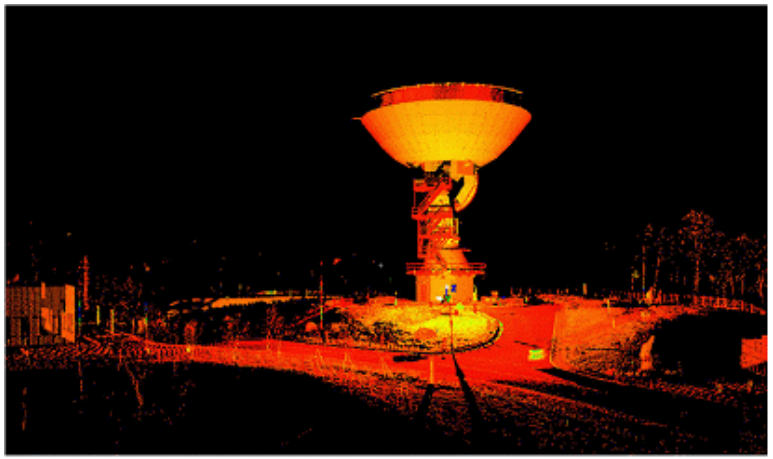


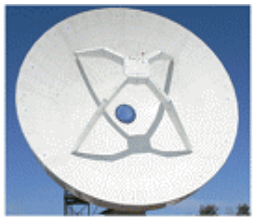
Pillars for collocation

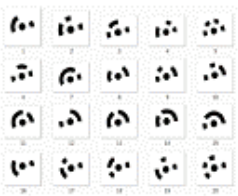


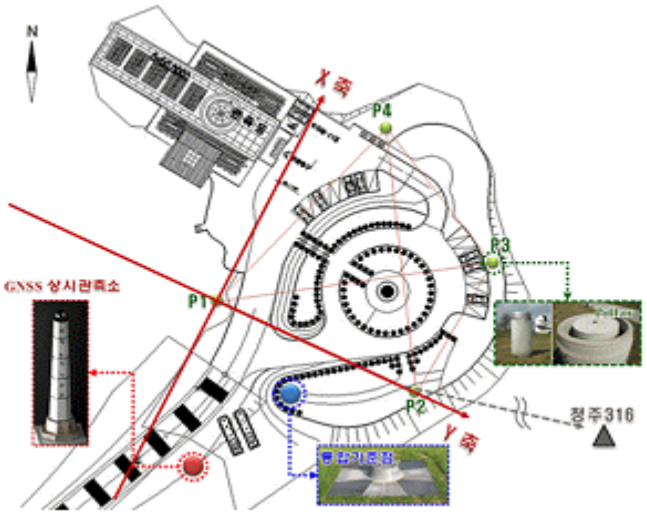
Poster "Local-tie survey at the Korea Geodetic VLBI station"

Various works for Co-location









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An application for IVS Network

Q. Please check co-located space geodetic techniques at your site:
SLR___GPS_✓_DORIS___PRARE___GLONASS___Gravimeter_✓_ Other_____

Q. Mark the observing networks and programs in which your station regularly participates:
R1_✓__ R4___ T2_✓__ EUROPE___ OHIG___ R&D___ RDV___ CRF____ APSG_✓__

Q. Percentage of time your station is dedicated to geodesy/astrometry 100/0

Q. Percentage of time for other observing time allocations (please list) 20?
Plan 1. Monitoring for diastrophism in local site
Plan 2. VLBI experiment observation for research purposes.

Q. Indicate the hardware and software configuration you use for data acquisition:
Rack: Mark IIIA___ VLBA___ VLBA-G___ Mark IV___ VLBA4___ K4__✓_

Q. Recorder: Mark 5A___ Mark 5B___ Mark 5B+___ Mark 5C___ K5_✓__

Q. FS Version__9.10.4____ H-maser type__VCH-1003M_____ Dish size____22m____

Q. Axis type: AZEL_✓__ HDEC___ XY___ Other (specify)_____

Q. Slew speeds: axis1___5°/sec____ axis2__5°/sec_____

Q. Limits: axis1___±270___ axis2___0~90°____

Q. SEFDs: X_Unsettled(Further notice)_ S_Unsettled (Further notice)___

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An app … S Network

Q. Please check (… her_____
SLR___GPS_✓

Q. Mark the obs(… egularly participates:
R1_✓__ R4__ … ____ APSG_✓__

Q. Percentage of … 100/0

Q. Percentage of … 20?
Plan 1. Monit(
Plan 2. VLBI e:

Q. Indicate the h … acquisition:
Rack: Mark III … _✓_

Q. Recorder: Ma … ___

Q. FS Version__9 … e____22m____

Q. Axis type: AZ

Q. Slew speeds:

Q. Limits: axis1_

Q. SEFDs: X_Uns

International VLBI Service for Geodesy and Astrometry (IVS)
Network Stations Proposal Form

Network Station Name	SEJONG station.
Parent/Funding organization	National Geographic Information Institute(NGII), Republic of Korea
Name of Administrative Contact	hee919@korea.kr
Name of Onsite Technical Contact Local Mailing Address for Station	sangoh.yi@korea.kr, stockoh11@korea.kr San 38, Nam-Myon, Yongi-Gun, Chungcheongnam-Do, South Korea
Onsite Phone +82312102654	Onsite Fax +82312102756
Onsite e-mail address	Unsettled (further notice)

Web access onsite? _✓_Yes ___No

Internet access onsite? _✓_Yes ___No

Please check co-located space geodetic techniques at your site:

SLR___GPS__✓__DORIS___PRARE___GLONASS___Gravimeter_✓_ Other_____

Mark the observing networks and programs in which your station regularly participates:
R1_✓__ R4___ T2_✓__ EUROPE___ OHIG___ R&D___ RDV___ CRF___ APSG_✓__ Other (specify)_____

Percentage of time your station is dedicated to geodesy/astrometry 100% / 0%

Percentage of time for other observing time allocations (please list) 20%
: Plan 1. Monitoring for diastrophism in local site.
: Plan 2. VLBI experiment observation for research purposes.

Indicate the hardware and software configuration you use for data acquisition:

Rack: Mark IIIA___ VLBA___ VLBA-G___ Mark IV___ VLBA4___ K4_✓_ Other (specify)_____

Recorder: Mark 5A___ Mark 5B___ Mark 5B+___ Mark 5C___ K5_✓_ Other (specify)_____

FS Version_9.10.4___ H-maser type_VCH-1003M___ Dish size___22m___

Axis type: AZEL_✓__ HDEC___ XY___ Other (specify)_____

Slew speeds: axis1__5 °/sec___ axis2__5 °/sec___

Limits: axis1__±270__ axis2__90 °___

SEFDs: X __Unsettled (further notice)__ S __Unsettled (further notice)__

What hardware/software/equipment upgrades are planned?

Please provide any other information that you feel will be helpful in demonstrating your station's capabilities to participate in the IVS.

This form should be signed by an official committing the organization to participate in the IVS as a Network Station, and agreeing to comply with IVS performance standards for data quality and operational reliability and to work closely with the IVS Network Coordinator.

For the organization: National Geographic Information Institute, South Korea.

Name: Leem, Seong-an Signature Date: 2012-03-09

Summary

- Korea Geodetic VLBI project has been completed
- Sejong station is for geodetic purpose only
- 22M dish, fast slew speed and stable site
- Successful first fringe detection
- A letter of application sent to the IVS board