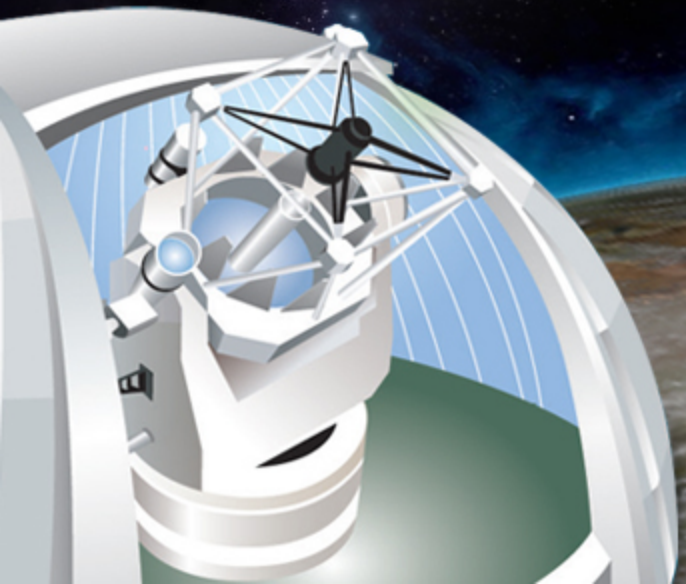
KASI 한국천문연구원
Korea Astronomy & Space Science Institute

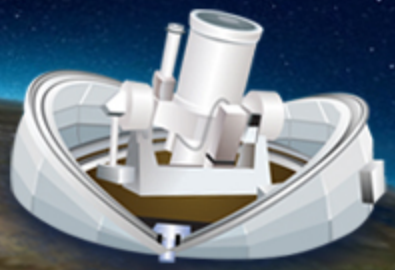
Report on Sejong Station

2011. 12. 07

National Geographic Information Institute (NGII)

Korea Astronomy & Space Science Institute(KASI)





AIGO
Accurate Ranging system for Geodetic Observation

KASI KIMM KAERI SaTReC

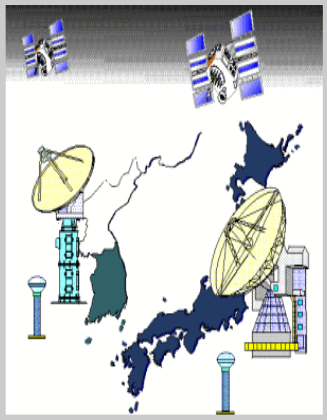
The status of Korea VLBI for Geodesy

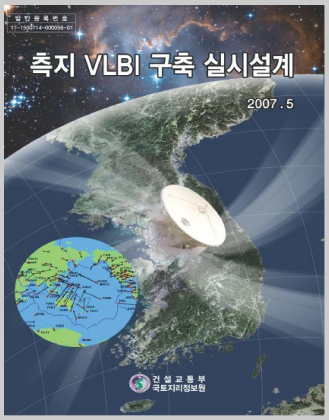
Bird's-eye view

The status of Korea VLBI for Geodesy

Overview

1995 → 2007 → 2008 → 2010 → 2011

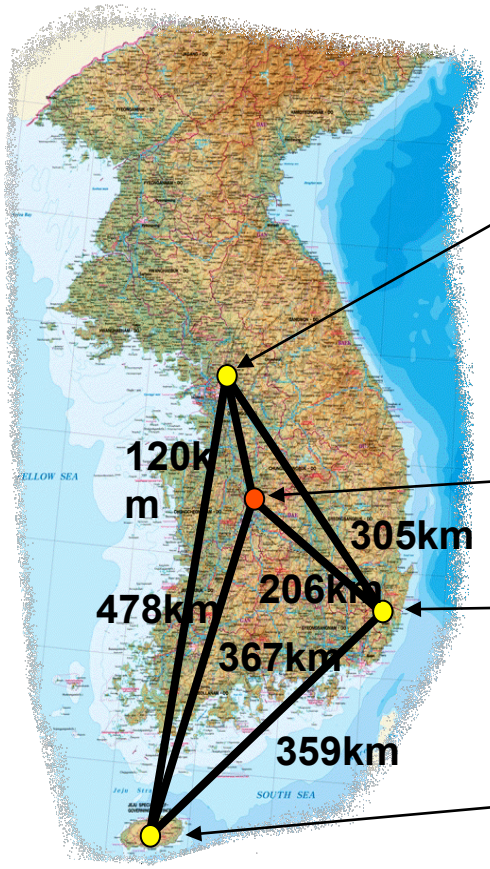




First geodetic VLBI obs. Korea - Japan	Conceptual design of KVG was fixed	Antenna site was fixed	KVG system production, Building & Road constructions were started	KVG project will be finished

The status of Korea VLBI for Geodesy

Antenna site

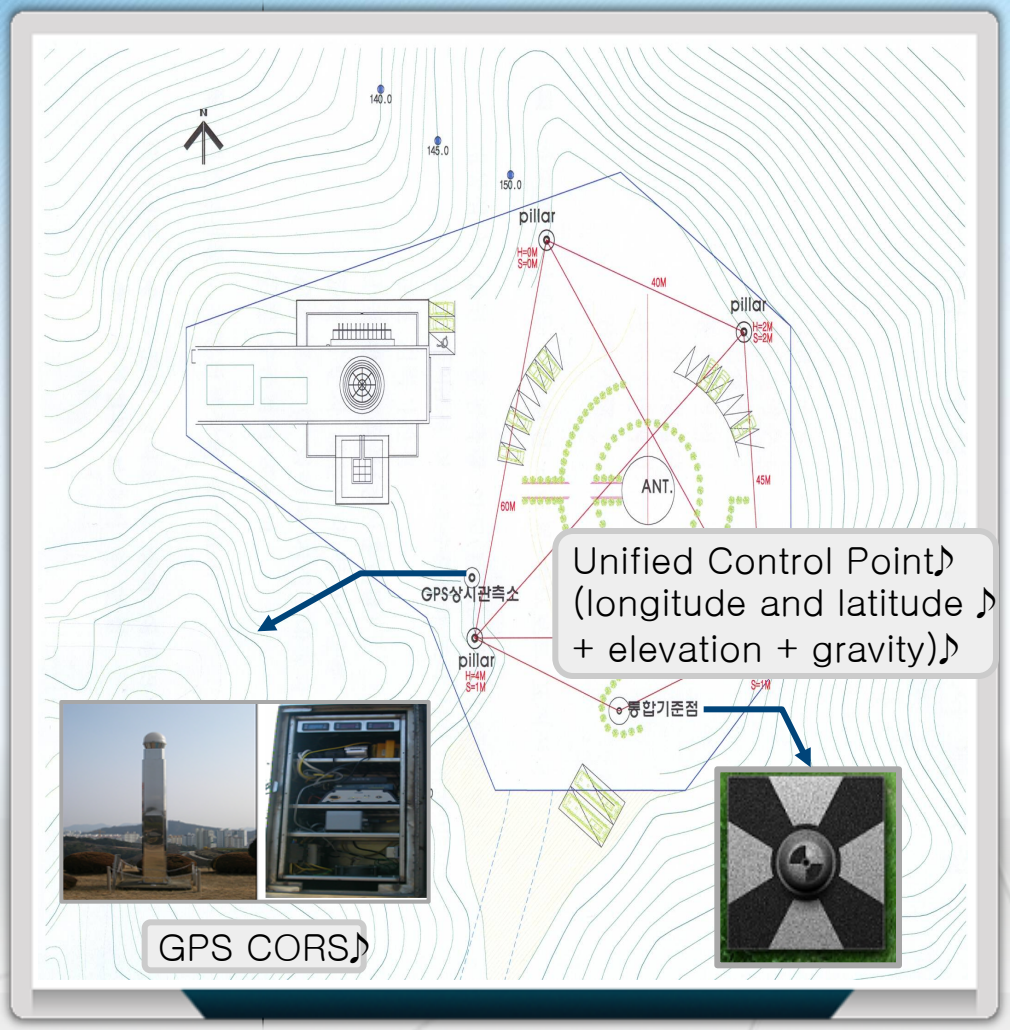


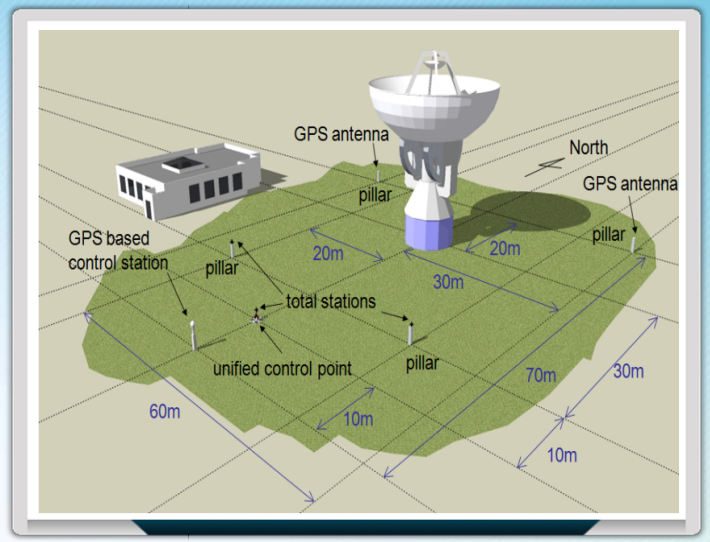
The status of Korea VLBI for Geodesy

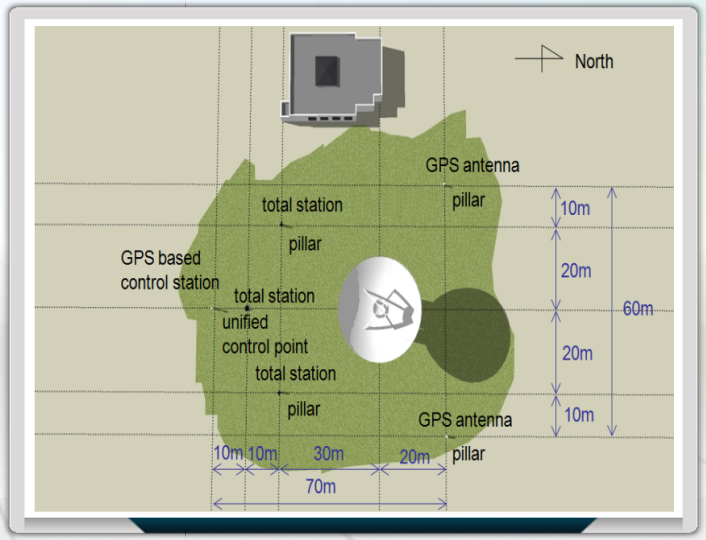
Antenna site

The status of Korea VLBI for Geodesy

Observatory Layout



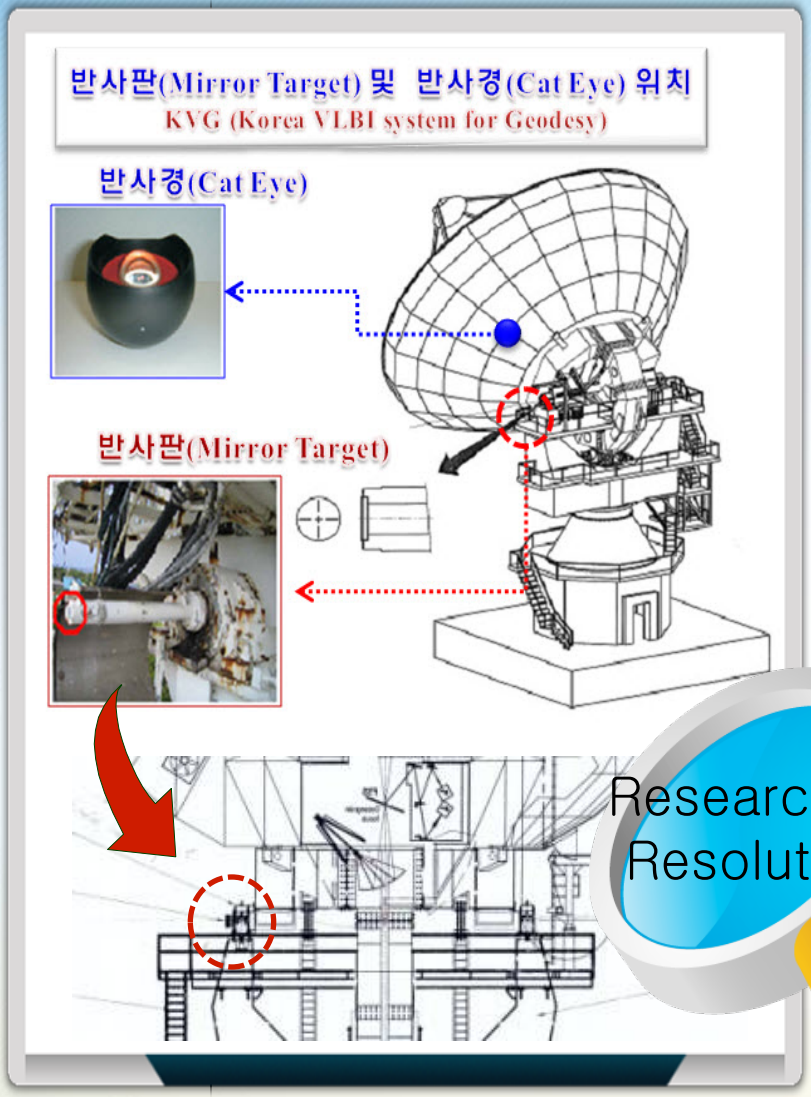




The status of Korea VLBI for Geodesy

The status of Korea VLBI for Geodesy

Co-location



Research & Resolution♪

Relationship with VLBI results and national network

1) Determination of VLBI Antenna Reference Point

2) Implementation of local tie with ARP, Pillar, UCP, CORS

3) Connection with CORS network and UCP & Triangulation point network

The status of Korea VLBI for Geodesy

Deformation Check

Photogrammetry

Terrestrial Lidar

Consideration & Application♪

The status of Korea VLBI for Geodesy

Future Plan

The second half of 2011

2011.09 contact with IVS
2011.11 researcher recruitment
2011.12 finish building & road construction
finish system production & antenna installation

The first half of 2012

2012.01~ system testing
2012.04 opening ceremony
2012.06 1st co-location survey

The second half of 2012

2012.07~ international & domestic observation
2012.09 2st co-location survey

After 2013

2013.01~ international & domestic observation
preparation VLBI 2010

Overview of ARGO Program

- **ARGO** (**A**ccurate **R**anging system for **G**eodetic **O**bservation)

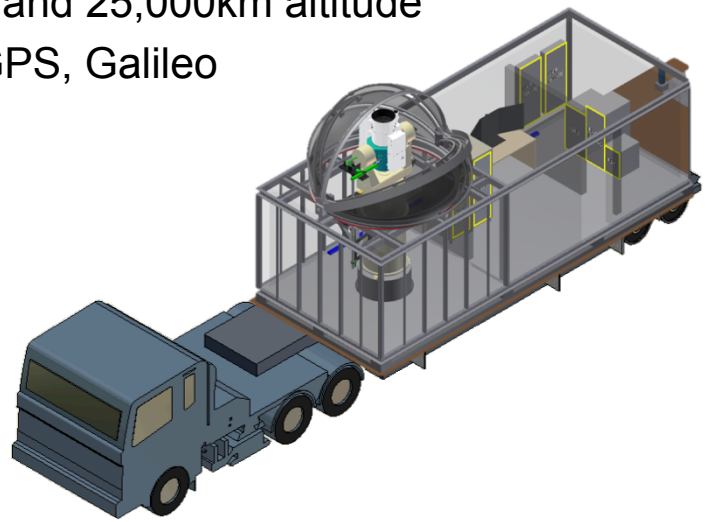
- **Development Phase**
  - 2008 - 2014 (7years)

- **Final Goal**
  - One mobile system(40cm/10cm) : ARGO-M
  - One fixed system(1m) : ARGO-F
- **Objectives**
  - Space geodesy research and GEOSS/GGOS contribution by laser ranging for satellites with LRA
  - Precise obit determination(POD) through laser ranging measurement with mm level accuracy
  - Contribution to international SLR societies and ILRS network participation

- **Development Strategies**
  - **KASI and other governmental institutes in developing the ARGO-M system**
    - KIMM (Korean Institute of Machinery & Materials) : Tracking Mount
    - KRISS (Korea Research Institute of Standards and Science) : Telescope Mirrors
  - **(Semi) Turnkey based system with SLR/LLR capability for ARGO-F**
  - Cooperates with foreign institutes in China, Austria, Swiss and other countries

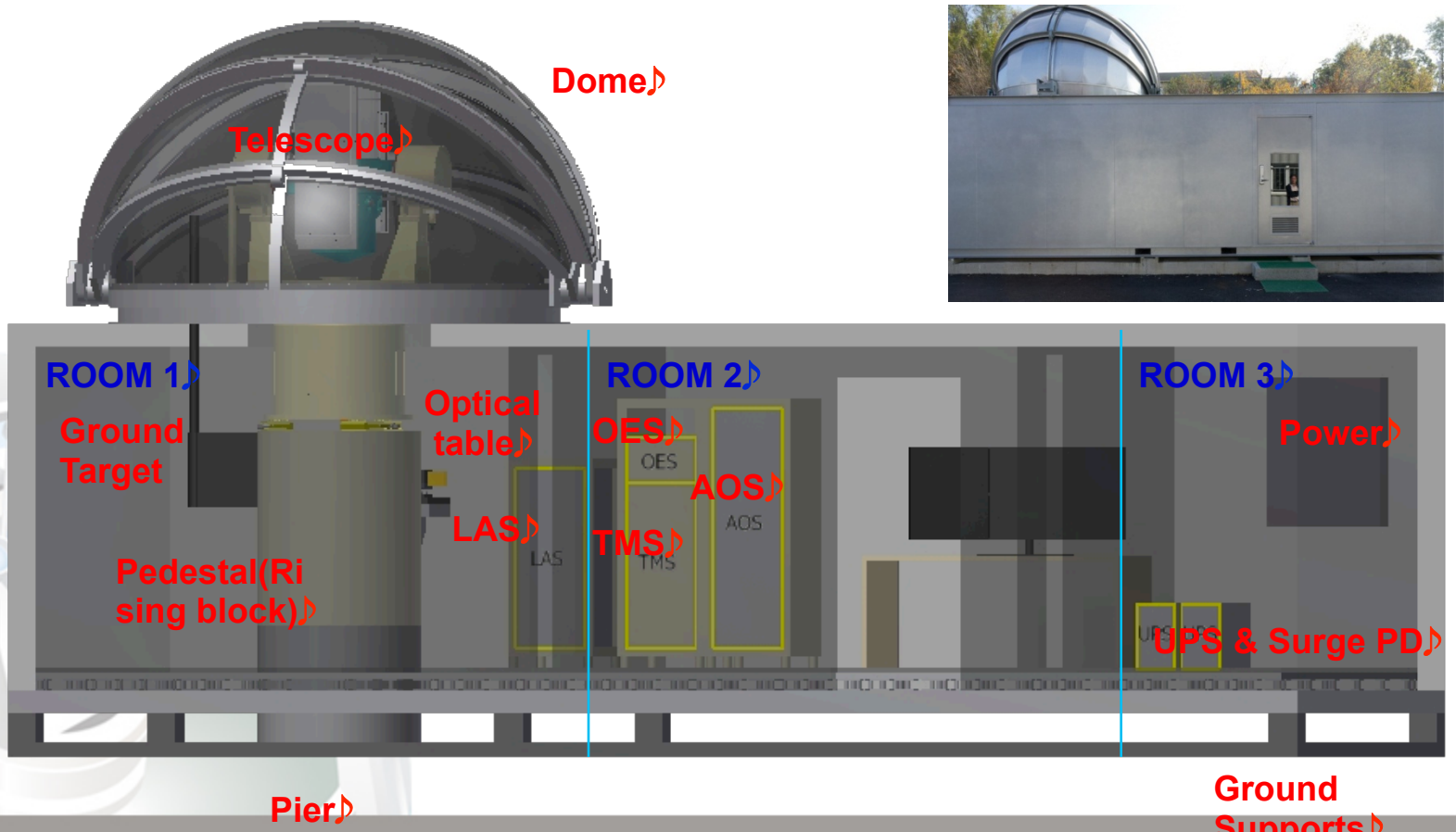
Major Characteristics of ARGO-M

- **ARGO-M Structure (6 subsystems)**
  - **OPS**(OPtics System), **TMS**(Tracking Mount System), **OES**(Opto-Electronic System), **CDS**(Container-Dome System), **LAS**(Laser System), **AOS**(ARGO-M Operation System)
- **Tracking Capability**
  - Capable of tracking satellites between 300km and 25,000km altitude
    - STSAT-2(300x1,500km), KOMPSAT-5, GPS, Galileo
  - KHz laser ranging
  - Daylight and night tracking
- **Ranging Accuracy**
  - Lageos : 10mm(SS), 5mm(NP)
  - Ground Target : 3mm(SS), 1mm(NP)
- **Operational Functions**
  - Can be controlled from the remote site
  - Automated scheduling, planning and orbit prediction capability
  - Automatic ranging based on schedule and aircraft detection(using radar)
  - Automated diagnostic warning to monitoring system
- **Etc**
  - Container and central locking dome (move by using a trailer)



ARGO-M System Integration

- **ARGO-M Structure**
  - Room1(Laser room) : TMS, LAS, optical table, ground target
  - Room2(Operation room) : OES, TMS, AOS devices
  - Room3(Accessory room) : Power distribution panel, UPS, Surge protection devices



ARGO-M System Integration

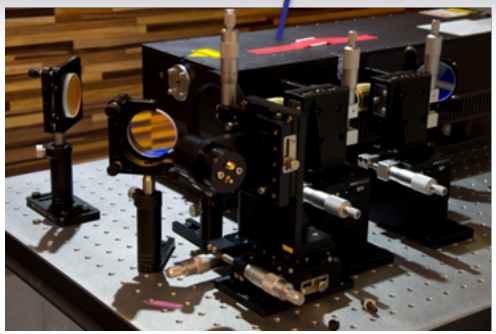

PDU♪


Event Timer♪


XLi♪
C-SPAD♪


SPD♪


FPGA Board♪


Laser head


Pedestal♪


Dome & Container♪


Telescope Tracking Mount♪


AOS♪

Laser contro

Laser chiller

Milestone of ARGO-M Program

- **ARGO-M Design Review**
  - System Requirement Review : 2008.09
  - System Design Review : 2009.05
  - Preliminary Design Review : 2009.12
  - Critical Design Review : 2011.03
- **ARGO-M System Integration**
  - Container for ARGO-M site installation : 2011.08.05
  - Dome installation : 2011.09.22
  - Telescope, tracking mount installation : 2011.10.05

  ~Present
  - Tracking mount, dome, laser interface
  - Alignment Telescope, coudé light path
- **ARGO-M System Test Operation**
  - test operation and solving problems (~ 2012.07)
  - Relocate ARGO-M system to formal site (~ late 2012, under the selection of a site)
  - Official Operation for ILRS Societies (late 2012 ~)