

Sejong Space Geodetic Observation Center

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Abstract This report provides an overview of the main activities and progress of the Sejong VLBI (Very Long Baseline Interferometry) system from 2023 to 2024. The system is part of the Space Geodetic Observation Center, managed by the National Geographic Information Institute (NGII). The Sejong Observatory supports international VLBI programs and focuses on observations, system maintenance, and future improvements to ensure stable operations and better observation performance.



Fig. 1 Overview of the Sejong Geodetic Observation Center

1 General Information

The Sejong VLBI Observatory is part of the Space Geodetic Observation Center, located in Sejong City, Republic of Korea. Sejong City, established about a decade ago as an administrative hub, is home to several government agencies. The observatory, operated by the National Geographic Information Institute (NGII) under the Ministry of Land, Infrastructure, and Transport (MOLIT), was founded in 2012. It features a 22-meter Cassegrain radio telescope and supports observations in multiple frequency bands, including 2/8 GHz (S/X band), 22 GHz (K band), and 43 GHz (Q band). NGII oversees staffing, budgeting, and infrastructure development for the observatory. This report provides an overview of the technical specifications, operational status, and future plans of the Sejong VLBI Observatory.

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2 Staff

The operational staff of the Sejong VLBI Observatory is listed in Table 1. The team consists of four members. Sang-oh Yi leads the observatory and oversees all operations. Dan-Bee Hong is responsible for VLBI correlation and baseline analysis. Sanghyuk Yang manages VLBI system maintenance and monitors equipment performance. Sangwon Lee conducts VLBI observations and handles data transmission. The team works closely with external experts and enhances its capabilities through regular training.

Table 1 Staff and responsibilities

Name	Role	Responsibility
Sang-oh Yi	Head	Operations and research
Dan-Bee Hong	Researcher	Correlation and analysis
Sanghyuk Yang	Engineer	Equipment maintenance
Sangwon Lee	VLBI observation	VLBI observation and data transmission

3 Current Status and Activities

3.1 Overview

The Sejong VLBI system supports the International VLBI Service (IVS) and the East Asia VLBI Network (EAVN). It is controlled using NASA's Field System (FS9), and data is stored on two Mark 6B and K5 recorders. The system has a total storage capacity of approximately 500 TB, with 66 TB allocated for observation data and 450 TB for DiFX correlation analysis. Data transmission is carried out via a 10-Gbps fiber optic network provided by the Korea Institute of Science and Technology Information (KISTI) and National Information Society Agency.

3.2 IVS Observations

During 2023 and 2024 the Sejong Observatory participated in several IVS sessions with results summarized in Table 2.

Table 2 Summary of participation in IVS sessions (2023–2024).

Year	R1	T2	AOV	APSG	Total
2023	40	7	6	2	55
2024	39	6	4	2	51

3.3 Maintenance Activities

To ensure operational reliability the following maintenance tasks were performed in 2023 and 2024. Below is a selection of maintenance efforts.

- Troubleshooting of the ACU status monitoring system;
- Fabrication and installation of a new radio calibration chopper;
- Replacement of the isolator and cooling head power cable inside the cryogenic chamber;
- Replacement of faulty hard drives in the K5 recorder and reinstallation of the operating system;

- Replacement of the hydrogen maser cooler and constant temperature humidity controller;
- Replacement of the hydrogen maser monitoring program PC;
- Fabrication and installation of a filter to remove 2 GHz band RFI.

4 Future Plans

4.1 Antenna Drive System Replacement

A full replacement of the antenna servo system is in progress from 2024 and is expected to be completed by the end of 2025. To improve stability and address issues with the existing drive system including the Antenna Control Unit (ACU), Drive Control Unit (DCU), and Power Distribution Unit (PDU), complete replacement will be done. As part of the upgrade, the antenna's slew speed will be reduced from $5^\circ/s$ to $3^\circ/s$, while acceleration will be increased from $1^\circ/s^2$ to $3^\circ/s^2$. This adjustment will shorten the time required for the antenna to move between observation targets.

4.2 VLBI Observation Program Development

A new system is being developed to replace FS9, aiming to improve the stability and scalability of the Sejong VLBI system. The development is expected to be completed in 2025, with full-scale implementation scheduled to begin in 2026.

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