

KSP-VLBI Correlation Center Report

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Abstract

Tape-based correlation system of KSP has been used for processing of geodetic VLBI experiments. Domestic VLBI experiments and Antarctica VLBI data were processed. Recently, spacecraft coordinate determination by VLBI became one of our important projects. For supporting it, station coordinates of USUDA 64m was measured by geodetic VLBI experiment under collaboration among ISAS, GSI and CRL. In the summer, some correlators and K4 data recorder were broken due to quite strong thunderstorm, which we never experienced before. Now the whole system is recovered and being operated normally.

1. Processed Data

The names of experiments processed by the KSP correlator are as follows:

HOKT series: VLBI experiments for coordinate determination of Tomakomai 11m diameter VLBI station, which was moved from Miura KSP station [1] after the KSP project. It is now operated by Hokkaido university.

CUTE series: A series of VLBI experiments for coordinate measurements of Tomakomai 11m and Gifu 11m station. The Gifu 11m VLBI antenna was moved from Tateyama KSP station after the close of KSP project. It is now operated by Gifu university. The experiments were performed by 11m antennas of Kashima, Koganei, Gifu, Tomakomai, which used to compose the KSP network.

JADE series: Gifu 11m VLBI station joined to geodetic VLBI experiments organized by Geographical Survey Institute (GSI). Half of the data were processed at GSI and other half were processed at CRL.

SYOWA series: National Institute of Polar Research (NIPR) and GSI has been organizing a series of VLBI experiments to measure the Antarctica plate motion. Hobart, HartRAO, and Japanese Syowa VLBI stations were joined. The data were originally recorded by S2 recorder and then copied to K4 tapes at Mitaka. One of the series of the experiment data were processed by KSP correlator.

USUDA geodetic experiment: VLBI experiment for station coordinates measurements of Usuda 64m deep space tracking station was performed. Geodetic VLBI experiment to determine the USUDA 64m station coordinates was not performed since late 1980s. Spacecraft navigation by VLBI is now one of our projects under collaboration with ISAS. For supporting that project, Usuda 64m station joined a geodetic VLBI experiment including Kashima 11m, Tsukuba 32m, Gifu 11m, and Tomakomai 11m. As the result of this experiment, the USUDA station coordinates were determined within 1 cm in horizontal and 4 cm in vertical components. The next experiment to confirm this result will be performed at the end of January 2003.

2. Thunderstorm and Typhoon-21

Kashima region sometimes suffers from strong thunderstorms in summer time. First of August in 2002 was a hot day all over the Kanto area and a strong thunderstorm was born and passed through Kashima region in the night. A thunderbolt struck a low frequency antenna tower beside the building of KSP correlation center. The damage caused by the thunderbolt was the worst in our experience. VLBI facilities (including Kashima 34m antenna, 11m antenna, correlation processors, and data recorders) were damaged by direct and induced high voltage from the thunderbolt. Our VLBI facility could not be used for a while due to the damage, however now they are recovered and being operated as usual.

Kashima region was attacked by an extremely strong typhoon (Typhoon-21) on 2nd of October. The wind of typhoon was strong enough to pull down steel towers, which are supporting high



Figure 1. High voltage electric power transmission towers were pulled down by strong wind of the typhoon. Photo were taken by R. Ichikawa at Itako.

voltage electric power transmission cables (Figure1). Two people were electrocuted by the high voltage electricity of the cable fallen down on the ground. Typhoon-21 damaged a wide area of Japan and then passed by.

3. Staff

- Tetsuro Kondo is responsible for overall operations and performance.
- Yasuhiro Koyama is in charge of correlation processing system.
- Mamoru Sekido is in charge of correlation processing system.
- Eiji Kawai is in charge of routine correlation processing operation.

References

- [1] Yasuhiro Koyama: Key Stone Project VLBI Stations, International VLBI Service for Geodesy and Astrometry 2001 Annual Report, edited by N. R. Vandenberg and K. D. Baver, NASA/TP-2002-210001, pp.84-87, 2002.