NICT Data Center Biennial Report for 2017–2018

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Abstract The Data Center at the National Institute of Information and Communications Technology (NICT) archives and releases the databases and analysis results processed at NICT. Regular VLBI sessions of the Key Stone Project VLBI Network were the primary objective of the Data Center. These regular sessions continued until the end of November 2001. In addition to the Key Stone Project VLBI sessions, NICT has been conducting geodetic VLBI sessions for various purposes, and these data are also archived by the Data Center.

1 General Information

The IVS Data Center at National Institute of Information and Communications Technology (NICT) archives and releases the databases and analysis results processed at NICT. Major parts of the data are from the Key Stone Project (KSP) VLBI sessions [1], but other regional and international VLBI sessions conducted by NICT are also archived. Since routine observations of the KSP network terminated at the end of November 2001, there have been no additional data from the KSP regular sessions since 2002. Table 1 lists the Web server locations maintained by the NICT Data Center.

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2 Activities during the Past Years

2.1 KSP VLBI Sessions

The KSP sessions had been performed with four VLBI Stations at Kashima, Koganei, Miura, and Tateyama. After regular tape-based routine observing since 1995, 24-hour real-time VLBI using a high-speed ATM (Asynchronous Transfer Mode) network became the standard operation mode of the KSP project [2, 3]. After May 1999, the ATM network line to the Miura station became unavailable. Thereafter, the daily real-time VLBI sessions were performed with the three other stations. Once every six days (every third session), the observed data were recorded with the K4 data recorders at three stations, and the Miura station participated in the sessions with the tape-based VLBI technique. In this case, the observed data at the three stations other than the Miura station were processed in real-time, and the analysis results were released promptly after the observations. A day later, the observed tapes were transported from the Kashima, Miura, and Tateyama stations to the correlation center at Koganei for tape-based correlation processing with all six baselines. Once the tape-based correlation processing was completed, the data set produced with the real-time VLBI data processing was replaced by the new data set.

In July 2000, an unusual site motion of the Tateyama station was detected from the KSP VLBI data series, and the frequency of the sessions was increased from every other day to daily on July 22. The daily sessions were continued until November 11, 2000, and the site motions of the Tateyama and Miura stations were monitored in detail. During the period,

Table 1 URLs of the Web server systems. Note that there have been minor changes to the URLs.

Service	URL
KSP Web pages	`http://ksp.nict.go.jp/`
Database files	`http://www2.nict.go.jp/sts/stmg/www3/database/`
e-VLBI UT1 Exp.	`http://www2.nict.go.jp/sts/stmg/research/e-VLBI/UT1/`

it was found that the Tateyama station moved about 5 cm in the northeast direction. The Miura station also moved about 3 cm to the north. The unusual site motions of these two stations gradually settled, and the current site velocities seem to be almost the same as those before June 2000. By investigating the time series of the site positions, the unusual site motion started sometime between the end of June 2000 and the beginning of July 2000. At the same time, volcanic and seismic activities near the Miyakejima and Kozushima Islands began. These activities were finally found to be the cause of the regional crustal deformation in the area.

2.2 UT1 e-VLBI Sessions

In the period from 2007 to 2008, experimental e-VLBI sessions for rapid UT1 determination were conducted in collaboration with the VLBI stations at NICT, GSI, Onsala Space Observatory, and Metsähovi. The observed VLBI data were transferred to Kashima (NICT) or Tsukuba (GSI) via a high-speed Internet network. Then correlation and bandwidth synthesis were performed successively to obtain quick estimates of UT1–UTC. The data of these experiments were saved in Mk3 database format and are available from the NICT data center.

3 Current Status

The VLBI project mission of our group is the development of a broadband system and its application to frequency transfer. Two sets of small-diameter VLBI stations are placed at NICT Headquarters in Tokyo and the National Metrology Institute of Japan (NMIJ) in Tsukuba, respectively. The receiver system of the Kashima 34-m VLBI station was upgraded to enable broadband observations. We conducted domestic broadband VLBI experiments [4] for the evaluation of the system until March 2018. The broadband VLBI data were stored in MK3 database format and analyzed by Calc/Solve developed by NASA/GSFC. The small VLBI station at NMIJ was moved to Italy in 2018 for an intercontinental atomic clock comparison using broadband VLBI. These experiments will be continued until the transportable VLBI station will be returned to Japan in 2020.

References

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