

# Data Center at Communications Research Laboratory

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## Abstract

The Data Center at Communications Research Laboratory archives and releases the databases and analysis results processed at the Correlation Center and the Analysis Center at Communications Research Laboratory. Regular VLBI sessions with the Key Stone Project VLBI Network were the primary objects of the Data Center. These regular sessions continued until the end of November 2001. In addition to the Key Stone Project VLBI sessions, Communications Research Laboratory has been conducting geodetic VLBI sessions for various purposes and these data are also archived and released by the Data Center.

## 1. Introduction

The IVS Data Center at the Communications Research Laboratory (CRL) archives and releases the databases and analysis results processed by the Correlation Center and Analysis Center at CRL. Major parts of the data are from the Key Stone Project (KSP) VLBI sessions [1] but other regional and international VLBI sessions conducted by CRL are also archived and released. Since routine observations of the KSP network terminated in the end of November 2001, there were no additional data for the KSP regular sessions since 2002. In 2003, three geodetic VLBI sessions were carried out and processed. The analysis results in the SINEX (Solution Independent Exchange) file format and other form of data formats are available from the WWW and FTP servers. Database files generated with the Mark-III database file format are available upon request and will be sent to the users in DDS tape cartridges. Database files of non-KSP sessions, i.e. other domestic and international geodetic VLBI sessions, are also available from the FTP server. Table 1 shows the list of WWW and FTP server systems maintained by the Data Center at CRL.

Table 1. URL of the WWW and FTP server systems.

Service	URL
KSP WWW pages	<a href="http://ksp.crl.go.jp/">http://ksp.crl.go.jp/</a>
IVS WWW mirror pages	<a href="http://ivs.crl.go.jp/mirror/">http://ivs.crl.go.jp/mirror/</a>
FTP	<a href="ftp://ftp.crl.go.jp/pub/dk/ivs/">ftp://ftp.crl.go.jp/pub/dk/ivs/</a>

The maintenance of these server machines has been moved from the VLBI research group of the CRL to the common division for the institutional network service of the laboratory in 2001 to improve the network security of these systems.

## 2. Data Products

### 2.1. KSP VLBI sessions

The KSP VLBI sessions were performed with four KSP IVS Network Stations at Kashima, Koganei, Miura, and Tateyama on a daily or bi-daily (once every two days) basis until May

1999. The duration of each session was about 23.5 hours. Within the period, daily observations were performed from March 1 until April 1, 1999 to obtain continuous VLBI data series for various investigations such as studies about the atmospheric delay models and for the improvements of the data analysis technique. The high-speed ATM (Asynchronous Transfer Mode) network line to the Miura station became unavailable in May 1999 and the real-time VLBI observations with the Miura station became impossible. After this time, the real-time VLBI sessions were performed with three stations at Kashima, Koganei, and Tateyama. Once every six days (every third session), the observed data were recorded to 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 three stations except for the Miura station were processed in real-time and the analysis results were released promptly after the observations completed. A day later, the observed tapes were transported from Kashima, Miura, and Tateyama stations to Koganei station for tape-base correlation processing of the full six baselines. After the tape-base correlation processing completed, the data set produced with the real-time VLBI data processing was replaced by the new data set.

In July 2000, unusual site motion of the Tateyama station was detected from the KSP VLBI data series, and the frequency of the sessions was increased from bi-daily to daily since July 22, 2000. The daily sessions were continued until November 11, 2000, and the site motion of the Tateyama and Miura stations were monitored in detail. During the period, it was found that Tateyama station moved about 5 cm to the northeast direction. 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 seems to be almost same as the site velocities before June 2000. By investigating the time series of the site positions, the unusual site motion started from 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 are believed to have caused the regional crustal deformation near the area, and the unusual site motions at Tateyama and Miura are explained by the event.

## 2.2. Other VLBI sessions

In addition to the KSP regular VLBI sessions, domestic and international geodetic VLBI sessions have been conducted by CRL in cooperation with Geographical Survey Institute (GSI) and other organizations. These sessions are listed in Table 2. The observed tapes of these sessions were correlated by using the K-4 correlator and the software correlation programs (K-5 correlator) at CRL either at Koganei or at Kashima.

In 2003, two e-VLBI sessions (evlbi4 and tsev6) were performed for two hours each with Kashima 34m and Westford stations with cooperation with Haystack Observatory. The purpose of these experiments were to demonstrate rapid turnaround processing of the international VLBI observations by using e-VLBI technique. Especially, we have demonstrated that the UT1-UTC can be estimated within one day from the observations from the session tsev6 performed on June 27, 2003 [2]. Two K5 test session, i.e. U03031 and JD0306, were performed to evaluate the performance of the newly developed K5 VLBI system and Gigabit VLBI system. In the U03031 session, the K5 VLBI system and the Gigabit VLBI system were used in parallel with the K4 VLBI system at Kashima 11-m and Koganei 11-m stations. On the other hand, the JD0306 is one of the routine domestic VLBI sessions coordinated by the Geographical Survey Institute. Kashima 11-m,

Table 2. Geodetic VLBI sessions conducted by CRL

Year	exp. names	sessions
1999	K4 Tie	K4TIE1, K4TIE2
2000	Japan Tie	JPNTI2, JPNTI3, JPNTI4, JPNTI5, JPNTI6
	GIFT	GIFT01, GIFT02
2001	Japan Tie	JPNTI7
	HOKT	HOKT01
2002	HOKT	HOKT02
	CUTE	CUTE01, CUTE02, CUTE03
	Usuda	USUDA1
2003	CUTE	CUTE04
	K5 Test	U03031, JD0306
	e-VLBI	evlbi4, tsev6
	Nozomi	34 sessions
	Hayabusa	10 sessions

Tomakomai 11-m, Gifu 11-m, and Yamaguchi 32-m stations participated in the JD0306 session in addition to the regular GSI VLBI sites at Tsukuba 32-m, Chichijima 11-m, and Aira 11-m. K5 VLBI system was used at five stations and Gigabit VLBI system was used at two stations. Results from different VLBI systems were compared and it was confirmed that the K5 VLBI system and Gigabit VLBI system have expected performance [3].

Figure 1 show the number of geodetic VLBI sessions and number of valid observed delays used in the data analysis for each year.

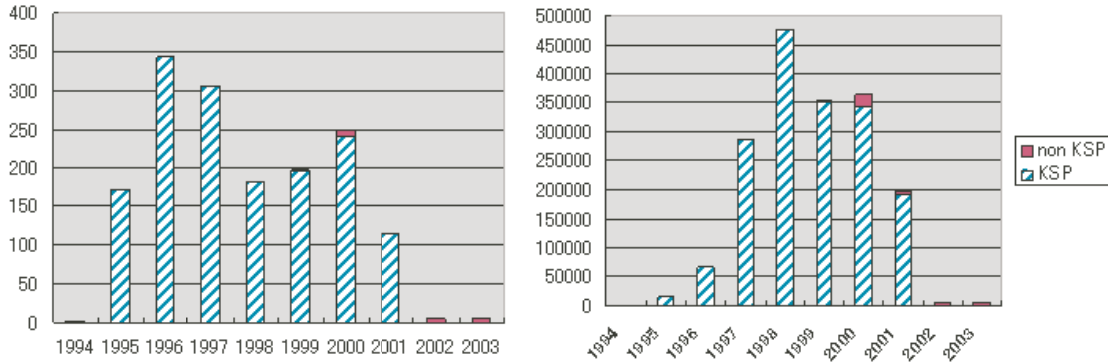


Figure 1. Number of sessions (left) and observed delays (right) used in the data analysis for each year up to the year 2003.

### 3. Future Plans

Although the regular VLBI sessions with the KSP VLBI network finished in 2001, the IVS Data Center at CRL will continue its service and will archive and release the analysis results accumulated by the Correlation Center and Analysis Center at CRL. In addition, a number of VLBI sessions are planned to be conducted in the year 2004 and these data will be archived and released to the public users.

In April 2004, Communications Research Laboratory will be integrated with the Telecommunications Advanced Organization of Japan (TAO) and the new institute will be established. The name of the institute will be National Institute of Information and Communications Technology and the VLBI activities in the CRL will be continued under the new institute.

### References

- [1] Special issue for the Key Stone Project, J. Commun. Res. Lab., Vol. 46, No. 1, March 1999
- [2] Yasuhiro Koyama, Tetsuro Kondo, Hiro Osaki, Alan R. Whitney and Kevin A. Dudevoir, Rapid Turn Around EOP Measurements by VLBI over the Internet, Proceedings of the XXIII General Assembly of the International Union of Geodesy and Geophysics (June 30-July 11, 2003, Sapporo, Japan) (in press)
- [3] Koyama, Y., T. Kondo, H. Osaki, K. Takashima, K. Sorai, H. Takaba, and K. Fujisawa, IVS CRL TDC News, No. 23, Nov. 2003, pp. 26-30