

## **e-VLBI activity in NICT**

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### **Extended Abstract:** (Submission for workshop Software)

Very Long Baseline Interferometry (VLBI) is a space geodetic technique that can measure the baseline vector between radio telescopes within a few millimetres accuracy. This technique is contributing to the realization of an International terrestrial reference frame (ITRF) and is also used to realize the international celestial reference frame (ICRF). Furthermore VLBI is the unique technique which can measure UT1-UTC by observation of extra galactic radio sources.

Owing to rapid progress of computer and high speed network technology, near real-time data processing of intercontinental VLBI observation has become reality by transferring the huge amount of VLBI data (256Mbps/station, totally a few Tera Bytes/station/day). Additionally the speed of software correlation processing using a small cluster of PCs is approaching the same data rate at with observation are made.

Essentially advantages of e-VLBI are two points: (1) rapid turn around and (2) flexibility of data handling and processing. There are several applications that need rapid output of VLBI products.

E.g., spacecraft navigation by VLBI is one field that needs rapid turn around after the observation has finished. It is known that joint use of VLBI and range and range rate (R&RR) observation of spacecrafts enhances the orbit determination precision. NICT and the Japanese space agency (JAXA) are collaborating in order to utilize VLBI for spacecraft navigation. UT1-UTC is a unique product obtained by VLBI. And thus, improvement of product latency from of intercontinental VLBI observation is beneficial for more accurate and rapid prediction of earth orientation parameter (EOP) and for real-time applications. Actually e-VLBI is used in routine VLBI observation at several places. VLBI data observed by Japanese stations Tsukuba, and Kashima in IVS session have been routinely transferred to Haystack observatory for correlation processing. European VLBI network (EVN) has accepted a proposal of e-VLBI observation. The German VLBI station Wettzell and the Japanese Tsukuba VLBI station is routinely doing UT1-UTC observation using data transfer over the network.

National Institute of Information and Communications Technology (NICT) has been contributing to the VLBI community by the development of e-VLBI technology. NICT is developing high-speed bandwidth-guaranteed optical networks and their control systems, which are experimentally used for stable VLBI data transfer. Additionally, our software correlator is used in EVN, and VLBI institutes in many countries (UK, Austria, Australia, Netherlands, China, and Russia). Furthermore our K5 disk-based VLBI system is used at most of VLBI stations in Japan.

This paper reports about the e-VLBI activity in NICT and will present the current status and the impact of IT on e-VLBI as a VLBI application.