

Geodetic VLBI Test Observations with Multi-Channel Giga-bit VLBI System

Yasuhiro Koyama[1]; Tetsuro Kondo[2]; Moritaka Kimura[3]; Hiroshi Takeuchi[4]

[1] NICT/KSRC; [2] KSRC,NICT; [3] NICT; [4] NICT Kashima Space Research Center

<http://www.nict.go.jp/ka/radioastro/>

As a technology development center of the International VLBI Service for Geodesy and Astrometry, National Institute of Information and Communications Technology has been developing next generation VLBI systems. Two major purposes of the current developments are to improve the sensitivity of the VLBI observations by increasing the data rate by using high speed A/D samplers and high speed digital data recorder, and to minimize the latency to obtain results after global VLBI session by transferring observed data over the high speed digital network, i.e. e-VLBI. Initially, we have developed the single channel 1 Gbps sampler unit (ADS1000) and the 1 Gbps magnetic tape recorder systems (GBR1000 and GBR2000-VSI) and these systems have been used for various test geodetic VLBI observations. From these test observations, we have succeeded to demonstrate precise geodetic VLBI measurements with small-to-medium size VLBI stations with improved sensitivity of the Giga-bit VLBI system. On the other hand, the single channel system is not always superior to the multi-channel system since bandwidth synthesis technique can not be used to improve time delay observables. Because of this reason, we have developed multi-channel Giga-bit sampler unit ADS2000. The unit is capable to sample 16 channel signals simultaneously at the data rate up to 64 Msps per channel and 2 bits quantization. The ADS2000 unit has a standard interface VSI-H (VLBI Standard Interface - Hardware specifications). Therefore, the digitized data sampled with the ADS2000 unit can be recorded either with the Giga-bit magnetic recorder GBR2000-VSI or by the K5/VSI system which can record data through VSI-H directly on a PC system. Currently, we are performing fundamental measurements using these systems and we are planning to perform test geodetic VLBI observations by using a baseline between Kashima 11-m station and Koganei 11-m station. In this report, we will introduce the multi-channel Giga-bit VLBI system and will report about the results obtained from the test geodetic VLBI observations.