Versatile Scientific Interface and VLBI Standard Interface handle G-bps data

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International VLBI service under the IAG endorsed VLBI Standard Interface hardware (VSI-H) in August 2000. VSI enable to transmit Gbps data under heterogeneous instrument which utilizes multi national scientific observation system deployed in the world wide VLBI network. NASA, MIT-Haustack, Canadian SGL and CRL thechnically contributed to establish the VSI standard. CRL group completed the first Gbps VSI instruments in December 2000 and it proved the Gbps data transfer performance. The VSI standard come into wide use will increase instruments performance and reduce their cost. Any scientific instruments which need Gbps data speed and precise epoch control can use the VSI.

1.Introduction

Data rate of scientific instruments are increasing to acquire high-speed and high quality data. VLBI(Very Long Baseline Interferometry) is one of the most aggressive field to use the high speed data more than 100 Mbps.

The high speed data increase the VLBI sensitivity and measurement accuracy by receiving wide band-width from radio stars. Although they recently reached Gbps rate, there had been no compatibility in multi-national environment. International VLBI Service (IVS) endorsed "VLBI Standard Interface - Hardware (VSI-H)", in August 2000. The IVS is belong to International Association of Geodesy (IAG). NASA, MIT-Haysatck, Canadian-SGL groups and CRL contributed to establish the technical foundation of VSI-H.

It is expected to have flexible collaboration between the countries to
transfer data between observational instruments.

2.Introduction of VSI-H and implementation of CRL

VSI-H abstracted G-bps data input and output. It assumes virtual module DIM (Data Input Module) and DOM (Data Output Module). DIM and DOM are record, playback or transmit data transparently. Usually DIM and DOM give a generic name to DTS (Data Transmission System) and they are magnetic recorders, optical data network or any other method. VSI-H defined 32 parallel data stream, clock, 1-pps, UTC and auxiliary information lines by LVDS (Low Voltage Differential) technology. It also define the DIM/DOM control sequence both in RS232 and ether-net. These software protocol VSI-S (Software) are under discussion. Any user who use these VSI-H direction will be able to connect the heterogeneous system with minimum effort. CRL have achieved the Gbps VLBI first since 1998 and we adapted the Gbps AD sampler and recorders to the VSI-H in December 2000. As the first result we confirmed data transmission by the VSI-H.

3.Future work for other scientific field

Since there is no other prominent interfaces provides both high speed data transmission and functions of precise epoch control, any scientist who interested in the VSI are free to use the specification in their system. CRL also promote the VSI to spread them as "Versatile Scientific Interface". Currently the favorite DTS to the VLBI is magnetic recorders to accept G-bps data. In future, we plan to adapt VSI to optical fiber network and shared computation resources. The research will be enabled by researchers from various scientific field. We will carry out joint project with other groups.