

e-VLBI applications of Chinese VLBI Network

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Recently the stations and the data processing center of the Chinese VLBI Network (CVN) were updated to achieve new e-VLBI capabilities. The new terminals like CDAS and MK5B+ were mounted at four station of CVN, the correlator was upgraded for e-VLBI applications. CVN adopts the strategy of “one network, two purposes” for deep-space and scientific applications.

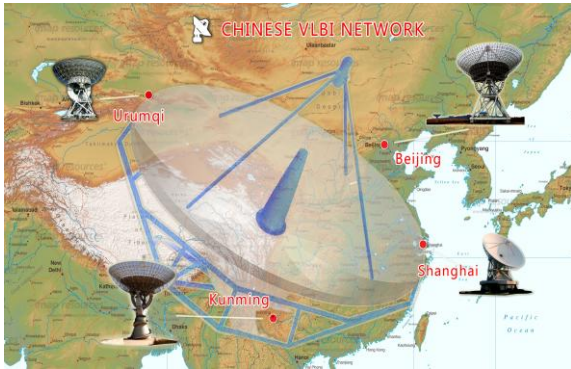


Figure 1. Map of CVN

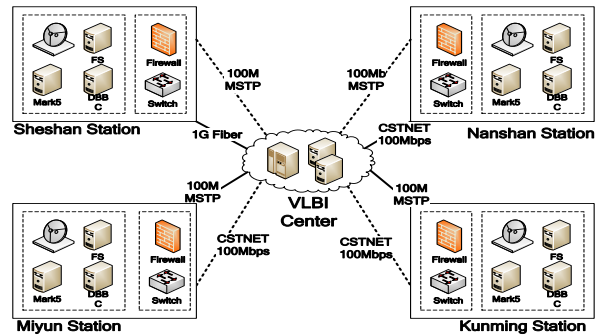


Figure 2. e-VLBI network of CVN

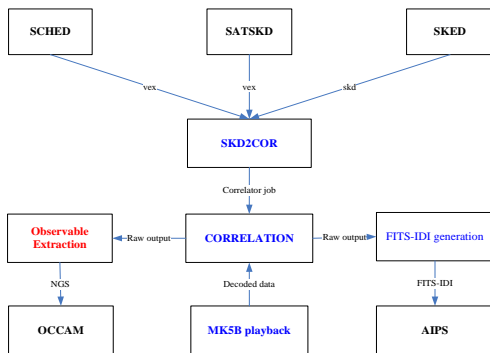


Figure 3. Correlator structure

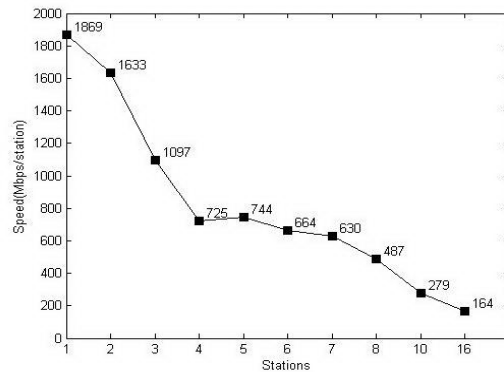


Figure 4. Speed of the CVN software correlator

- RAPID UT1 MEASUREMENT EXPERIMENT

On Feb. 23, 2011, a two hours rapid Δ UT1 measurement observation was conducted on the Shanghai-Urumqi baseline. Limited by the budget, the data rate was only 64Mbps; and data were transferred from the two stations to the data center over the TCP/IP protocol. One hour later, Δ UT1 was achieved (-175.200 ± 0.225 ms). One week later, IERS result (-175.252 ± 0.007 ms) was download. The difference is about 50 μ s. This experiment demonstrates the rapid Δ UT1 measurement ability of CVN.

- APPLICATIONS IN CHANG'E MISSION

The medium-range and long-range plan for the Chinese lunar exploration consists of three phases: orbiting the Moon, landing and sample returning. From 2007 to 2010, two lunar orbiters (CE-1, CE-2) have been sent to the Moon. CVN has taken import roles in both missions. During the critical flying mission, CVN worked in the near real time mode with e-VLBI and the total data latency of CVN data center was less than 5 minutes. In the future lunar explorations, especially in the Rendezvous and Docking (RVD) procedure, the high real-time VLBI is welcome. So we are trying to shorten the VLBI processing latency from 5 minutes to less than 1 minute.

- FUTURE

Now the network speed of Shanghai Sheshan station for EVN real time session is up to 512Mbps. The e-VLBI demonstration on CNGI (Chinese Next Generation Internet) is underway. The e-VLBI network condition will improve in the near future.

- ACKNOWLEDGMENT

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