

New broad band observing system using the new digital back-end (OCTAVE-DAS) and correlator system for VERA, JVN and EAVN

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The new VLBI observing system (OCTAVE-DAS) have been developed for KaVA and EAVN based on the VSI-H and VDIF specifications at NAOJ. It consists of 1) a high speed 1-20 Gbps 3-10 bit RF(-30 GHz) direct ADC with DBBC functions, 2) media converter between one 10 GigE port and four 2 Gbps input and output ports conformable to VSI-H, 3) new VLBI recorders have functions of both recording and playing at a maximum rate of 32 Gbps and 4) Gbit real-time correlator and software correlator system using GPGPU technology. These OCTAVE-DAS are connected via 10 GigE network with VDIF and VSI specifications. Along with these systems, RF/IF switches and IF converters were developed and installed at all VERA stations. As a result, VERA is now capable of new modes of observations such as simultaneous K/Q band receiving with dual polarization using K-band RF direct A/D. This is towards future EAVN upgrade plans. These components have been used for VERA, JVN and EAVN.

We have been conducting scientific test observations with ultra-wideband dual-polarization and a measurement of annual parallax of Sgr A*. We first detected fringes of dual polarization of simultaneous K/Q band observations using the RF K-band direct A/D technique on the Mizusawa and Iriki baseline. We will report on current status and results of scientific broad-band(>8 Gbps) and dual-polarization VLBI test observations using the OCTAVE-DAS.

The below figures show the OCTAD and OCTADISK2 in the OCTAVE-DAS system and their associated RF/IF switches



Figure 1. RF Direct sampler OCTAD manufactured by Elecs industry.

Figure 2. PETA data recorder OCTADISK2 manufactured by Elecs industry.

Figure 3. RF/IF switch manufactured by NAOJ.

References

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