

Start of Semi-Regular Geodetic VLBI Experiments in VERA

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<http://veraserver.mtk.nao.ac.jp/index-J.htm>

VERA (VLBI Exploration of Radio Astrometry) is a new VLBI array dedicated to phase-referencing astrometry. This observation system aims the measure of a separation angle between distant QSO and radio-object in our Galaxy with 10 micro arc-seconds level accuracy to establish the 3-D structure and dynamics of Milky Way. To the astrometrical measurement by such high accuracy, it is demanded to decide the position of antennas in the reference frame with high accuracy (2mm accuracy in the baseline of 2000km). The geodetic VLBI observations are concluded as one of the important sessions in VERA to satisfy this demand.

The outlines of VERA geodetic observation system are expressed as follows. Four antennas that compose the VERA array are located in Mizusawa, Iriki, Ogasawara and Ishigaki respectively. The size of parabolic dish is 20m in diameter. Two frequency bands, S band (2210-2360MHz) and X band (8200-8600MHz), are used. A special note of characteristic is a high sensitivity observation by the use of VERA giga-bit recording system. An increase in the number of observations and the improvement of accuracy are expected by adopting this system.

First geodetic VLBI experiment was carried out in November 2004. The number of scan is about 330 in each baseline. Observation data is cross-correlated by the Mitaka FX Correlator. The geodetic analysis was performed for the cross-correlated data. In the execution of analysis, at first, precise theoretical delays were calculated by CALC3 developed at National Astronomical Observatory Mizusawa. Then, geodetic parameters are estimated by MSOLV also developed at Mizusawa. As a result of the analysis, the positions of VERA Stations are estimated. The formal errors are about 3-4mm for the horizontal components and 11mm for the vertical component. Afterwards, we are continuing experiment and geodetic-analysis by the pace once every two weeks.

In the future, we aim at the reduction of the load to regular observations, improvement of observation efficiency, update of analysis system and the geophysical model and improvement of reliability of analytical result.