



The VLBI2010 Global Observing System (VGOS)

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Over the past several years the International VLBI Service for Geodesy and Astrometry (IVS) has been engaged in an effort to modernize all aspects of geodetic VLBI from observing systems and processes to correlation and analysis. The goals of the next generation system are to achieve: 1-mm position accuracy on global scales, continuous measurements of time series of station positions and Earth orientation parameters, and turnaround time to initial geodetic results of less than 24 hours. Strategies for achieving these goals include an increase in the number of observations per day, careful attention to reducing systematic errors, automation of operations and analysis, and increased use of eVLBI, a process whereby data are transmitted from antennas to the correlator electronically.

The new VLBI2010 technology involves a complete reworking of the legacy S/X-band systems including the introduction of very fast slewing antennas, broadband observing systems, and a software correlator. Although development continues, the system is at a level of maturity where preliminary geodetic results are being produced on the 600-km baseline between the 12-m radio telescope at the Goddard Geophysical and Astronomical Observatory (GGAO) near Greenbelt, MD and the 18-m radio telescope at Haystack Observatory, MA. Starting in January 2013, a series of IVS Research and Development (R&D) sessions will be carried out where the GGAO and Westford broadband systems co-observe with several IVS radio telescopes using legacy S/X systems. At the same time, a network of next generation stations is emerging which has been named the VLBI2010 Global Observing System (VGOS). In addition to the GGAO 12-m antenna, new fast antennas have been built or are under construction in Australia (Hobart, Yarragadee, Katherine), New Zealand (Warkworth), Germany (Wettzell), Spain/Portugal (Yebes, Canary Islands, Azores), Japan (Tsukuba), and USA (Arecibo). Others have been funded but are not yet under construction.

It is widely recognized that VLBI plays an essential role in defining the scale and orientation of global terrestrial reference frames. However, the realization of this role requires that VLBI measurements be tightly coupled to those of the other space geodetic techniques. Work continues at Matera, Wettzell, and GGAO to improve the integration of VLBI with the other techniques in anticipation of the multi-technique sites that will form the core of the Global Geodetic Observing System (GGOS).