

SCHED2010 (FWF P21049)

In 2003, the International Very Long Baseline Interferometry (VLBI) Service for Geodesy and Astrometry (IVS) tasked a Working Group (WG3) to begin a process of modernization with the major goal of bridging the gap from the current 5 to 7 mm level of accuracy for VLBI position determination to the new sub 1 mm requirement, nearly one order of magnitude improvement. Based on the final report of WG3 the IVS established the VLBI2010 Committee (V2C) as a permanent body which is supposed to design hardware, software and observing strategies of the next generation VLBI system. As a contribution to V2C, various simulations have been carried out at the Institute of Geodesy and Geophysics (IGG), Vienna. A Monte Carlo Simulator and a corresponding VLBI simulation software VV-SIM were developed to get as realistic answers as possible about the quality of a scheduled VLBI session. These simulations showed that more intensive investigations on scheduling the VLBI observation sessions have to be done to improve the future VLBI system in terms of important criteria such as accuracy, temporal resolution, real time capability, and reliability. In the project proposed here different VLBI scheduling strategies and algorithms will be carefully investigated, the resulting schedules will be thoroughly evaluated and a new scheduling software "SCHED2010" will be generated to exploit the full power of the future VLBI2010 system and to derive the best possible geodetic parameters.

In VLBI each antenna observes only one radio source at a particular time and the number of observations and the accuracy of the estimated parameters are directly related to the sequence of the observed sources. Scheduling considerations which will be investigated and implemented in SCHED2010 refer either to the selection of the radio sources or to the specifications of the antennas. The new scheduling software will be mainly based on criteria related to the radio sources such as uniform sky coverage, different source effective flux densities (SEFD), and the use of source structure maps. Various other aspects are focused on the antennas, such as optimizing the schedule for fast moving antennas, combine existing and new antennas to a sound network, and make use of multiple antennas at one site. Also economical and ecological considerations are added to the investigations for SCHED2010 such as antenna maintenance and electric power saving. SCHED2010 will be directly linked to the existing simulation tools at IGG. Dynamical change of the schedule depending on the status of the antennas, radio sources, and record media will be considered for the final implementation of SCHED2010 within the operational tasks of the IVS. It is envisaged to link the new scheduling software to the existing VLBI system and to apply it for operational purposes.