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Ultra-rapid earth rotation determination with VLBI during CONT11 and CONT14

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In 2007 the Geospatial Information Authority of Japan (GSI) and the Onsala Space Observatory (OSO) started a collaboration project aiming at determining the earth rotation angle, usually expressed as UT1-UTC, in near real-time. In the beginning of this project dedicated one hour long one-baseline experiments were observed periodically using the VLBI stations Onsala (Sweden) and Tsukuba (Japan). The strategy is that the observed VLBI data are sent in real-time via the international optical fibre backbone to the correlator at Tsukuba where the data are correlated with a software correlator and analyzed in near-real time with the c5++ VLBI data analysis software, thus producing UT1-UTC results with very low latency. The latency between the observation at the stations and the determination of UT1-UTC is on the order of a few minutes, thus we can talk about an ultra-rapid determination of UT1-UTC. An offline version of this strategy was adopted in 2009 for the regular VLBI intensive series INT-2, organized by the International VLBI Service for Geodesy and Astrometry (IVS), that involves Wettzell (Germany) and Tsukuba. Since March 2010 the INT-2 is using real-time e-transfer, too, and since June 2010 also automated analysis. Starting in 2009 the ultra-rapid approach was applied to regular 24 hour long IVS VLBI-sessions that involve Tsukuba and Onsala, so that ultra-rapid UT1-UTC results can be produced already during ongoing VLBI-sessions. This strategy was successfully operated during the 15 days long continuous VLBI campaigns CONT11 and CONT14. In this presentation we give an overview of the ultra-rapid concept, present the results derived during CONT11 and CONT14, and compare these ultra-rapid results to results derived from post-processing.

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