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VGOS observations with GGAO12M, Westford, and the new Kokee 12m antenna

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The GGAO 12m and Westford 18m antennas are instrumented with the broadband signal chain to provide VGOS capability. These antennas have been making VGOS geodetic observations for more than a year. Approximately seventeen one- to twenty-four-hour VGOS sessions were conducted in 2015 to develop and test many of the procedures needed for an operational program, including scheduling, unattended observing, correlation, and preliminary data analysis through geodetic estimation. Currently, after the creation of a schedule, the session can be run unattended following checkout of the antenna sensitivity and pointing. The Field System controls the Backend, including the four UpDownConverters (for band frequency selection), the four RDBE-G digital backends in polyphase filter bank (PFB) mode, and the Mark6 recorder. For correlation direct playback from the Mark6 is being tested. The broadband delay observable is derived by combining the four linear polarization cross-products in all four RF bands and simultaneously estimating the phase dispersion due primarily to the ionosphere. With some slight modifications of the database creation and editing programs it has been possible to do geodetic analysis of most of the sessions using nuSolve. Preliminary analysis of the first eleven sessions gives a weighted RMS deviation of 2 mm from the mean baseline length (600 km) for those one-hour sessions.

The Kokee 12m VGOS antenna, designed and manufactured by InterTronics Solutions, has been completed, and the broadband signal chain, built by Haystack, will be installed in early 2016. It is expected that Kokee12m will be added to the GGAO-Westford observations by February, and the procedures developed for the GGAO-Westford sessions will form the basis for observations with the three-station network.

Results for both the GGAO-Westford series and for observations with all three antennas will be reported.

Primary author: Dr NIELL, Arthur (MIT Haystack Observatory)

Presenter: Dr NIELL, Arthur (MIT Haystack Observatory)

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