

# ***Torun (Tr) Station Report***

(Sep 13<sup>th</sup>, 2016)

## **Brief Report of Recent EVN Session Problems**

Two EVN sessions have taken place since the previous report (Jan. 31, 2016).

### Feb/Mar session.

All of the 22 regular disk projects at L, C, and methanol bands were observed. Minor failures occurred during GF019A and GF019B resulting in one-hour and half-an-hour data loss, respectively. EA057B schedule ended half an hour earlier than expected due to the problems with the .vex file (“mode name too long”). In the case of EG078E, more than 8 hours of observations were lost because of our Mk5 power supply failure.

### May/Jun session.

All of the 27 regular disk projects at L, C, methanol, and K bands were observed. Unnoticed hang of antenna control system during EZ025 was the only one and serious failure (radio telescope was tracking only one and the same source from 00:51 until 6:35 UT).

Outside the regular EVN sessions Tr was scheduled in 13 Global RadioAstron (RA) experiments. Three of these projects (EB055 B, C, D) were not observed due to Mk5 power supply failure. Tr was requested in 173 short-duration (about one hour each) RA experiments. Ten of them were not observed for various reasons (conflicting higher priority projects, receiver failure, antenna servicing, staff shortage).

Tr successfully participated in all ToO and e-EVN experiments.

## **Changes/Upgrades Made to Software**

### ***Current software versions***

- Mark5A OS is Debian "Etch" version 4.0 with the package mark5a\_1.0.7-i386.deb
- Mark5A application code is Mark5A2007y.225d
- The StreamStor driver library version is 10.31 (SDK 9.2), with API version 11.25 and firmware version 13.05
- FS 9.10.4 version is used for Mark5A, and 9.11.07 for Mark5B/DBBC.
- [Mark5B](#) jive5ab version is 2.7.1-SDK9.2
- The software version of DBBC in the 'tunable' mode is 1.04.2. (During 2-Gbps tests:1.05E.)

## Remote time and frequency delivery to Tr

On 26 Nov. 2015, Tr was connected to the Polish fibre optic network distributing time and frequency (T&F) signals from UTC(PL) and UTC(AOS) laboratories. This paved the way for the investigation of alternative methods of T&F synchronization during VLBI sessions. Starting from the session of 12-13 January 2016., Tr has been using the remote T&F delivery on a regular basis. Apart from the higher reliability, the main advantage of this method is that, unlike the old H-maser at Tr, AOS T&F standard has a **zero drift**.

During the test hours of the e-VLBI session of 15-16 March 2016, we carried out yet another successful test using our fibre link. Instead of the signal transmitted from AOS H-maser, we used the signal generated by an experimental strontium atomic-lattice optical clock operated at National Laboratory for Atomic, Molecular, and Optical Physics in Toruń. Again, it turned out that it works equally well as a local H-maser. The strontium clock is two orders of magnitude more stable than a H-maser but to make this difference noticeable one has to use a standard of this kind at other stations. We plan to carry out a test in which one EVN baseline would have atomic (i.e. non-H-maser) clocks at both ends, one of which would be Tr.

Currently the GPS – remote clock time offset is  $-0.3 \mu\text{s}$  without drift.

*Paweł Wolak  
Andrzej Marecki*