

# Onsala Station Report -- Jan to Sep 2014

## EVN Session 1/2014

This session in winter was significantly less affected by high winds. There was only one experiment EH028B in which Onsala 25m telescope had to be stowed for three hours due to strong winds. There was a minor loss (two hours) in ES072G because of an antenna communication problem.

There were many foggy days during the session. The amplitude calibration at 6.7 GHz and 8.4 GHz might be slightly affected.

There were some strong RFIs at  $\sim 1667$  MHz. Later after the session, these RFIs were tracked down. The basic stamps (controlling various electronics) picks up RFIs that's transmitted from an Ethernet switch in the receiver cabinet. After the switch was replaced the RFI went down significantly.

## EVN Session 2/2014

There were no observations of ES072H due to strong winds. The experiments GP051D and ES072K were not performed because the fuse associated with the Declination motor was blew out for a few times and there might be some unknown high-risk problems behind it.

Chopper wheel calibration is used at 22 GHz. The average opacity was  $\tau=0.33$  in N14K2,  $\tau=0.26$  in ES074A,  $\tau=0.49$  in ER035B. Note that the opacity correction ( $e^{\tau}$ ) was already applied into the Tsys data.

## Technical Development

A second DBBC2+MK5C backend has been built up. The old MK4 backend has been completely removed and is not available any more in the future. Now, there are two digital VLBI backends available (one is DBBC2+MK5B, the other is DBBC2+MK5C). With the new local IF distribution system, each backend can be automatically connected to either 25m or 20m radio telescopes. So, both telescopes can run different VLBI observations simultaneously. Moreover, the two backends can work together to support extremely wide band VLBI experiments in the near future. Further tests of the second backend will be organized during the EVN session 3/2014.

The old FS computer burned up due to water leakage during the time of radome replacement. Now, FS computer has been fixed. Furthermore, a new FS computer has arrived at Onsala.

The project of changing the radome of 20m radio telescope is ongoing. The old radome was from 1976. It is getting quite old (38 years) and not safe any more. Hopefully, the radome replacement will be finished by the end of September

2014. The new radome will help to improve the telescope sensitivity at high frequencies because of its better radio transparency.

A new IF system for the 20m antenna K, Ka, Q, and W band, transferred via analog fibers, with flexible 0-500 or 500-1000 MHz VLBI IF have been implemented since May 2014.

A total upgrade of the MASER reference frequency distribution is ongoing and will be ready for session 3/2014.

To reduce band pass ripple, the further optimization of K, Ka and Q band receivers is ongoing and expected to be ready for session 1/2015.

Further VLBI IF system upgrades will be implemented during 2014 to provide 4GHz bandwidth for K, and W band observations.

The hardware of the 80Hz radiometry system has been installed. Further tests will be arranged to verify its performance.

The new recording device Flexbuff has also been tested in 2014 summer. As far as the recording itself (MK5B or VDIF format), it worked quite stable. There were also fringes found not only in MK5B format but also in VDIF format. Flexbuff is also used to replace our old PC-EVN backend. The old PC-EVN system is not available any more.

A new 86 GHz receiver has been installed and displayed fringes during the GMVA session in 2014 May.

VLBI Group, Onsala Space Observatory