

Station report to the EVN TOG meeting .  
Irbene station, Ventspils.

### **Receivers**

Currently Irbene RT-32 can operate in four bands:

- 327 MHz (92 cm) (prime focus with offset);
- 1.6 GHz (18 cm) (secondary focus);
- 5 GHz (6 cm) (secondary focus);
- 12 GHz (2.3 cm) (secondary focus);

92cm and 5 GHz provide dual circular polarization; 18cm receiver currently provides only one circular polarization, 12 GHz one linear polarization. All receivers work on ambient temperature and not cooled. Ongoing work for install and connect cryogenic equipment for 5 GHz receiver.

### **Data acquisition systems:**

In 2012 a new DBBC was obtained in Irbene. DBBC work within six months revealed what 2 core boards from 4 are not stable and introduce problems to DBBC work. We decided to remove faulty boards. Currently DBBC work with 2 IF channels. This is completely enough for our current needs.

For data recording IRBENE use Mark5b (with Red hat linux) and connected to DBBC via one VSI interface.

Additionally Irbene for data acquisition use TN-16 data recorder, it record one channel data with bandwidth up to 8 MHz in NRTV format to PC.

### **Antenna control system:**

For antenna control we use adapted Field System, which able to control movement and Mark5b, but no DBBC control implemented.

### **Time and frequency synchronization:**

Hydrogen Maser “Quartz” CH-75A (5 MHz and 1 PPS)

Symmetricon X-GPS receiver for 1 PPS signal to maser.

Receivers LO heterodynes synchronized directly with Hydrogen maser 5 MHz signal. For heterodynes we use R&S signal generators. DBBC receive 10 MHz synchronization from R&S generator which in turn synchronized with maser. All PC's (DBBC, MARK5b, FS, telescope control computers) obtain NTP time from local time server, integrated into GPS receiver.

### **VLBI observations**

After long time Irbene finally got fringes in the Fringe test experiment on the 12 of April in International Cosmonautics day together with Onsala and Torun. Fringes obtained at 5GHz dual pol in the both baselines Irbene – Torun; Irbene – Onsala, in to modes:

- 2 channels 8 MHz; 2 bit 64 Mbps;
- 16 channels 8 MHz; 2 bit 512 Mbps.

[http://www.evlbi.org/tog/ftp\\_fringes/FR012A/](http://www.evlbi.org/tog/ftp_fringes/FR012A/)

[http://www.evlbi.org/tog/ftp\\_fringes/FR012B/](http://www.evlbi.org/tog/ftp_fringes/FR012B/)

Fringe test reveal same problems:

- 1 second difference in Mark5 data;
- Same phase drift in the signal;
- LCP and RCP channel order different compare to Onsala; Torun.

Last April for Irbene brings good results in two more VLBI experiments:

On the 9 of April we got first light in the NAVSTAR GPS and GLONASS satellite VLBI observation at 18cm. Together with NIRFI two antennas in Nizhnij Novgorod, Russia.

In the 19 – 20 of April was successful space debris VLBI-location experiment with Evpatorija RT-70 planet locator and receiving stations: Irbene; Urumqi; Simeiz; Medicina). Preliminary results show what Irbene successfully detected all 8 from 8 space debris objects. Experiment was at 5GHz and for data acquisition we are use same configuration as for EVN fringe tests, additionally for data recording used TN-16 recorder.

On the 31 May – 1 June Irbene take part in the two 6 cm observation sessions : N12C2 and EY018B. Ftp fringe tests from N12C2 show no good results: some small evidence for fringes only: [http://www.evlbi.org/tog/ftp\\_fringes/N12C2/](http://www.evlbi.org/tog/ftp_fringes/N12C2/)

In June Irbene participate in the N12L2 tests. Our new L-band receiver and antenna dedicated for the navigation satellites but it works also in VLBI band. We decide try this antenna in EVN session. Unfortunately at this point the sensitivity of the antenna is not enough for faint objects and we don't expect results from this observation but this was good opportunity to test our systems together with EVN.

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