

Quasar VLBI network

Stations report for the TOG meeting

2018 March 19-20, Shanghai, China

Period 2017/10 – 2018/03

General Information *(no changes)*

Quasar VLBI network includes three stations: Badary, Svetloe and Zelenchukskaya. All stations are equipped with a 32-m fully steerable radiotelescopes RT-32 marked as Bd, Sv and Zc respectively. Stations Zelenchukskaya and Badary are also equipped with a 13-m VGOS radiotelescopes marked as Zv and Bv. At present both new RT-13 are in test operation. In April 2017 construction of the third VGOS RT-13 radiotelescope began in the Svetloe observatory.

During the reporting period in all Quasar stations the standard maintenance work with antennas, servo, receivers and cryogenic systems were carried out. Technical improvements and problems are presented below by topics.

EVN session 3 in 2017/10/19-11/09

Quasar participated in 26 experiments (Bd-26, Sv-26, Zc-26) at L, C and S/X-bands. All experiments were successful. Few 1-2 hours pauses during EVN experiments was planned because of priority IAA intensive experiments Ru-I (EA058B at Zc; EG078F at ZcBd; ES083 at SvZc).

EVN session 1 in 2018/02/22-03/15

Quasar participated in 17/20 (on this moment) experiments (Bd-17, Sv-16, Zc-17) at L, C and K-bands. Experiments were mostly successful. Few losses were due to problems with antenna (N18K1 at Bd), L-band receiver (EG100A and EP106A at Sv), Mark5B+ synchronization (EM131C at Sv). Few 1-2 hours pauses during EVN experiments was planned because of priority IAA intensive experiments Ru-I (N18L1 at Zc; EG100A at ZcBd).

Out of Session experiments

Quasar supported four out-of session experiment – GG083A (+SvBd), GG083B (+SvZcBd), GG083C (+ZcBd), GG083D (+SvZc). Experiment GG083A was canceled in Zc due to elevation drive fail.

Additionally the Quasar stations participated international projects:

- RadioAstron, about ninety 1-h experiments, +SvZcBd;
- IVS regular and CONT 2017, November 27 – Desember 12, fifteen 24-h experiments, +ZcBd;
- VLBI astrometry of ecliptic plane calibrator sources, three 24-h experiments, CVN+SvZcBd;
- GNSS-VLBI observations, one experiment OSZ1, HhOn8+ScZc.

Receivers

All RT-32 Quasar radio telescopes are equipped with two channel RCP/LCP receivers in the next bands: L, C, S/X and K.

At **Zc** the new C-band two-channel receiver was installed in October.

At **Sv** the L-band receiver was replaced on a new one during 5-7 February. C-band LCP-channel cryogenic system was replaced in March 7, after its fail.

Backends *(no changes)*

From 2012 February the IAA data acquisition systems R1002M is fully functional at all Quasar stations and using in all VLBI observations, including IVS, EVN, RadioAstron and domestic programs.

Recording system *(no changes)*

The Mark5B+ is the data recording system at all Quasar stations. At May 2014 Mark5B+ software was upgraded to SDK 9.3.

H-masers *(no changes)*

Since July 2011 the new Active Hydrogen Masers VCH-1003M were put into operation in all stations of the Quasar network. The H-maser VCH-1003M is a modern, high-performance maser with low phase noise option. It uses the latest technologies, including Stand-alone Auto Cavity Tuning (no external reference required), remote IP control, monitoring and self-diagnostics.

Another two Active Hydrogen Masers VCH-1005 (old models) are in reserve in Sv and Zc.

Disks *(no changes)*

Quasar VLBI network as a single EVN unit provides 160 TB (8TB×20) for the EVN disk pool. No new disk packs for reporting period.

Field System *(no changes)*

BdSvZc: FS 9.10.4.

Continuous calibration

Not implemented in R1002M.

e-VLBI

At Bd and Zc was made a preparation for the Quasar network integration in EVN eVLBI. The 10Gbps NIC network adapter was installed on Mark5B+. Test of the network performance shows 1.53 and 1.75 Gbps to JIVE.

Beam maps

Beam maps of Bd was measured for X-band, elevations 44, 53 and 62 degrees – sent to A. Keimpema.

At Sv in December we made a number of experiments on beam maps measurements for L, C and X bands. Processing are close to finish.

Personnel *(updated)*

VLBI director	Alexander Ipatov	ipatov@iaaras.ru
VLBI friend/scheduler	Mikhail Kharinov	kharinov@iaaras.ru
Technical friend	Andrey Mikhailov	agm@iaaras.ru
PC member	Alexey Melnikov	aem@iaaras.ru
Disk module shipments	Svetlana Akkuzina	sveta24@inbox.ru

M.A. Kharinov (2018/03/13)