Institute of Applied Astronomy Technology Development Center

Leonid Fedotov, Alexander Ipatov, Nikolay Koltsov, Vyacheslav Mardyshkin, Andrey Mikhailov

Abstract

The domain of IAA TDC includes the development of software and hardware for Russian VLBI network QUASAR. This report describes IAA activities in this direction.

1. General

Technology Development Center is responsible for all parts of the Russian VLBI network and consists of separate laboratories developing hardware and software for this project. Now the 32 m radio telescope in Svetloe is participating in international VLBI network observations and in domestic radioastronomical and VLBI observations. Radio telescope in Zelenchukskaya is participating in domestic radioastronomical and VLBI observations. At Badary station radio telescope construction work and installation of hardware are finished. The first observations in the single dish mode were carried out.

2. Technical/Scientific

2.1. VLBI Data Acquisition and Recorder Equipment

The VLBI Data Acquisition and Recorder System (Figure 1) was mounted in Svetloe Radio Astronomical Observatory. This system consists of:

- IF switch, developed at IAA,
- Mark IV DAS, including 14 BBCs with up to 16 MHz bandwidth, Mark IV Formatter and Mark IV Decoder,
- Mark 5A recording terminal,
- S2 DAS, including 2 BBCs,
- S2-RT recording terminal,
- Clippers unit, developed at IAA.

The experts of IAA carried out the extensive work on upgrading the DAS to Mark IV level and put into operation the Mark IV Formatter together with the Mark 5A recorder.

Mark IV and Mark 5A are used for observations under the IVS R4, T2 and Euro programs. There is a possibility to make simultaneous records on both Mark 5A and old MarkIII recorder. S2 DAS and S2-RT are used for observations under IVS E3 program. S2-RT is applied for home observations Svetloe-Zelenchukskaya.

In Zelenchukskaya station we have 4-channels DAS, which is developed at IAA, and S2-RT recorder (Figure 2).

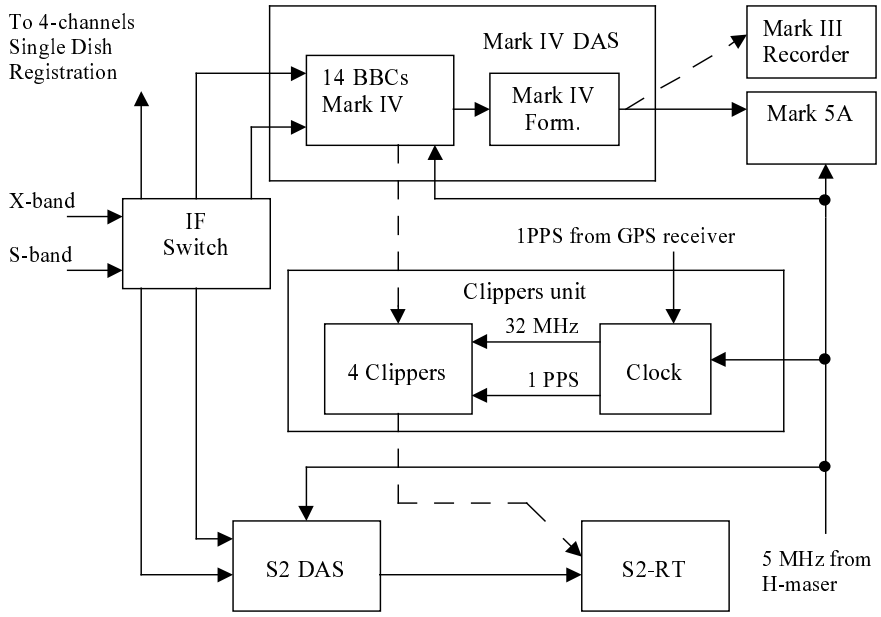

Figure 1. VLBI Data Acquisition and Recorder Equipment in Svetloe observatory

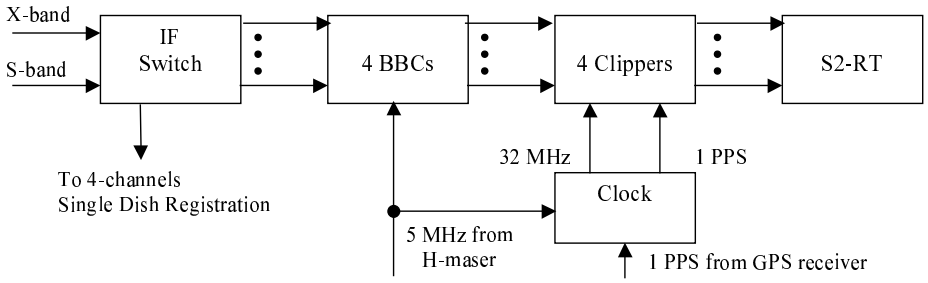

Figure 2. VLBI Data Acquisition and Recorder Equipment in Zelenchukskaya observatory

2.2. The Receivers

In the summer of 2004 in Badary station, west of Baikal lake, (Figure 3) the S/X two channel receivers and the coolers were installed (Figure 4). The results of the first sample observations carried out in December in single dish mode were optimistic.

New low noise front-end amplifiers have been prepared for mounting in Svetloe and Zelenchukskaya station to investigate the possibility of the radio telescope work in the 1.35 cm (22 GHz) waveband. The LNA noise temperature is equal 20 K.

The new control system for receivers has been elaborate. It is connected directly to FS computer. The one channel model was prepared and tested successfully at Svetloe station.

2.3. The Field System Computer

New Field System computers were installed at all three stations. The computers were assembled in Russia, the configuration is based on PentiumIV 2.8 GHz processor with 512 MB RAM and it is analog to the standard FS computer from SWT.

Figure 3. The new radio telescope in Badary

3. Technical Staff

For all the IAA address (8, Zhdanovskaya st., St. Petersburg, 197110, Institute of Applied Astronomy (IAA) RAS, Russia, Director Andrey Finkelstein, FAX +7-812-230-7413) is valid.

4. Outlook

In the new IVS year it is planned:

- to increase the number of clippers in clippers unit up to 14,
- to equip Zelenchukskaya observatory with the 14-channels VLBA4 DAS and Mark 5A recorder equipment,
- to equip Badary observatory with the multichannel DAS, which is developed at IAA, and with the S2-RT recorder,
- to carry out measurements of the radio telescope parameters in the S/X bands in Badary station,
- to rack-mount two new LNAs (1.35 and 13 cm), and to set up the new control receivers system in Svetloe station,
- to rack-mount three new LNAs (two for 1.35 and one for 3.5 cm) in Zelenchukskaya station,
- to carry out measurements of the radio telescope parameters in the S/X bands in Badary station.

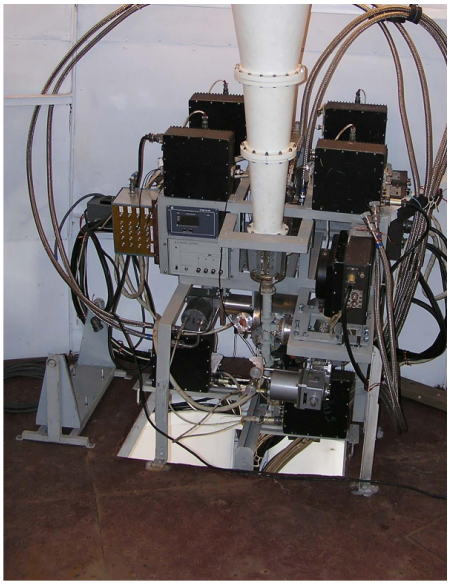

Figure 4. The S/X two channel receivers (left) and the coolers (right) installed at Badary radio telescope

Table 1. Technical Staff

Prof. Nikolay Koltsov	Main Scientific Researcher	VLBI and radiometric registration system	+7-812-235-3316	nec@ipa.rssi.ru
Dr. Sergey Smolentsev	Vice Director	Time keeping Frequency standard	+7-812-275-4415	smolen@ipa.rssi.ru
Dr. Alexander Salnikov	Chief the Laboratory Communication and Computer Systems	Network Communication Computers	+7-812-230-8361	ais@ipa.rssi.ru
Dr. Edward Korkin	Main Scientific Researcher	Dish metal constructions	+7-812-230-7415	korkin@ipa.rssi.ru
Dr. Irina Ipatova	Senior Scientific Researcher	Receivers Antenna performance	+7-812-230-6496	ipatova@ipa.rssi.ru
Dr. Vyacheslav Mardyshkin	Chief the Receivers Laboratory	Receivers Refrigerators Antenna performance	+7-812-230-6496	vvm@iaa.nw.ru
Mr. Andrey Mikhailov	Scientific Researcher	FS software Radio telescope control system	+7-812-230-6496	agm@ipa.nw.ru
Dr. Dmitry Ivanov	Chief the Laboratory Time and Frequency	Time keeping Frequency standart	+7-812-230-7416	labtf@ipa.rssi.ru
Dr. Leonid Fedotov	Chief the Laboratory Signals Conversion and Registration	VLBI DAS and registration system	+7-812-235-3316	flv@ipa.rssi.ru