

## IAA Correlator Center

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### Abstract

The activities of the 6-station IAA RAS correlator includes regular processing of domestic geodetic VLBI programs Ru-E and Ru-U. Since 2009, the Ru-U sessions have been transferred in e-VLBI mode for correlation at the IAA Correlator Center.

### 1. Introduction

The IAA Correlator Center is located and hosted by the Institute of Applied Astronomy in St.-Petersburg, Russia. The IAA Correlator Center is devoted to processing geodetic, astrometric, and astrophysical observations made with the Russian domestic VLBI network Quasar.

### 2. Summary of Activities

The IAA RAS correlator has the following features:

- 6-station and 15-baselines,
- maximal data range of 1 Gbps from each station,
- 1- or 2-bit quantized input VLBI signals,
- VSI-H input signals format,
- 16 frequency channels per baseline (240 frequency channels in total),
- maximal clock frequency of 32 MHz,
- Mark 5B playback terminals.

The correlator hardware is based on FPGA technology. Data processing and data transfer boards are placed in the Compact PCI 6U crates. All of the correlator hardware is mounted in four racks as shown in Figure 1.

The correlator equipment is connected through a local network and consists of crates, playback terminals, and a control personal computer. The correlator operates using GNU/Linux. Special software for controlling correlator works on crates and control computer and has a user-friendly GUI.

### 3. Experiments in 2010

In 2010 the IAA Correlator Center processed the domestic 2- and 3-station sessions and 4-station sessions with international participation. 22 Ru-E and 52 Ru-U domestic sessions were observed and processed.

The 24-hour 3-station Ru-E VLBI sessions are intended for EOP estimation. Signal sampling is 1-bit, frequency channel bandwidth is 16 MHz, and the total bit rate is 512 Mbps using standard wide geodetic frequency setup.



Figure 1. The 6-station IAA RAS correlator.

The 1-hour 2-station Ru-U VLBI sessions are intended for UT1-UTC estimation. Signal sampling is 1-bit, frequency channel bandwidth is 8 MHz, and the total bit rate is 256 Mbps using standard wide geodetic frequency setup. All of the 1-hour Ru-U sessions were processed in e-VLBI mode; about 40 GB of data from each station were transferred to the correlator. The first several scans of the Ru-E sessions were processed in e-VLBI mode for verification of station equipment. Several test VLBI experiments have been carried out with Shanghai Observatory in China.

#### 4. Staff

- Artemy Fateev — software developer;
- Voitsekh Ken — hardware developer;
- Alexey Melnikov — software developer, scheduler;
- Vladimir Mishin — software developer, post processing;
- Violet Shantyr — software developer, post processing;
- Igor Surkis — leading investigator, software developer;
- Vladimir Zimovsky — hardware developer.