

At the beginning of 2006, a new 4-board correlator MicroPARSEc (Figure 2) was completed. It consists of 4 MicroPARSEc units, one S2-PT, a special commutation device, and one personal computer. This correlator can process up to 8 frequency channels on 1 base. It takes 144 hours to process a three-station, 24-hour session of the Quasar VLBI network using this correlator.

In March 2006 this correlator became the main correlator of the IAA Correlator Center.

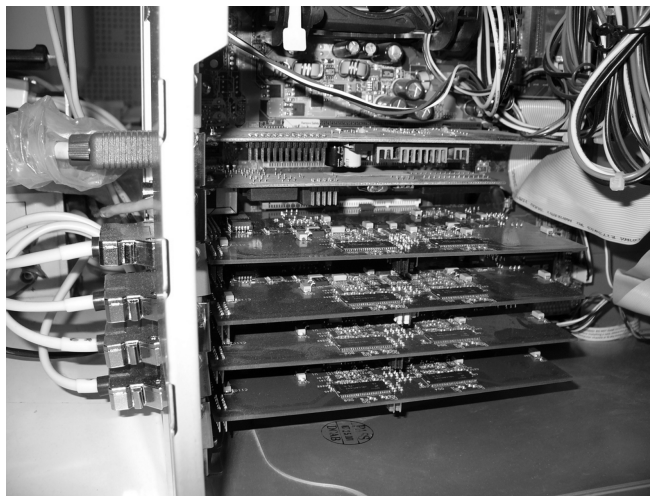


Figure 2. 4-board MicroPARSEc correlator.

At present, we are completing a 12-board MicroPARSEc correlator (Figure 3). It consists of 12 MicroPARSEc units placed into a special industrial computer, two S2-PTs and a special commutation device. This correlator can process up to 24 frequency channels simultaneously, i.e. 3 bases with 8 frequency channels each, so it will take 48 hours to process a standard Quasar VLBI session.

In December 2006, we started testing the 12-board MicroPARSEc correlator, and we are planning to put it into use in March 2007.

The postprocessing software was also modified to obtain high accuracy group delays and to prepare the IAA Correlator Center to process geodetic observations.

At present, the MicroPARSEc correlator is equipped with only S2-PT devices. In spite of the MicroPARSEc capabilities, we are currently limited by S2-PT characteristic allowing only observations of 2 MHz bandwidth with 1-bit sampling. We are planning to use Mark 5B terminals in the future.

3. Experiments Done

At the end of 2005, the first EOP determination experiments were performed on the three-station Russian national VLBI network Quasar. The data were processed with the single board MicroPARSEc correlator in January-February 2006.

Due to the configuration of Badary station equipment at that time the observations were only performed on X-band with 4 frequency channels. The ionospheric delays were calculated using GPS TEC (total electron content) maps, then NGS files were produced. The first national VLBI EOP were obtained in the IAA Data Analysis Center.

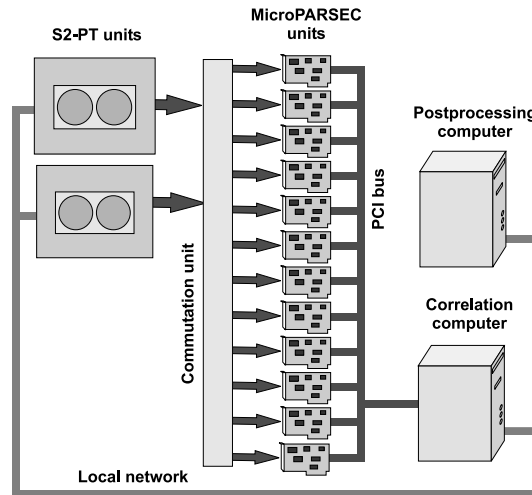


Figure 3. 12-board MicroPARSEC correlator.

In August 2006, the regular national VLBI observations on the Quasar VLBI network with full set of 14 frequency channels were started by the IAA RAS, which included three observational programs:

- EOP determination program, which lasts 24 hours using 3 stations and is run twice a month.
- UT1-UTC determination program, which lasts 8 hours using 2 stations and is run twice a month.
- Time synchronization program, which lasts 8 hours using 2 stations and is run twice a month.

All observational data were processed using the 4-board MicroPARSEC correlator.

The accuracies of the calculated group delays and ionospheric delays are within 50-100 picoseconds.

The accuracies of the EOP parameters calculated by the IAA Data Analysis Center are within about 1 mas for pole coordinates and 50 microseconds for UT1-UTC.

The scheduling of the Quasar observation series was done by the IAA RAS using the SKED software (Linux version).

4. Staff

- Andrey Bogdanov — software developer, correlator operator
- Alexey Melnikov — software developer, correlator operator
- Violet Shantyr — software developer, post processing
- Igor Surkis — leading investigator, system integrator, software developer
- Vladimir Zimovsky — hardware developer, system integrator, correlator operator

5. Conclusion

Russian regular geodynamic observations with the Quasar VLBI network have started. The data obtained have been processed using MicroPARSESEC correlator at the IAA Correlator Center. The new 12-board MicroPARSESEC correlator of higher efficiency is about to be implemented.