

Station Report of the 20m Radiotelescope at Wettzell

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Abstract

In 2001 the 20m Radiotelescope in Wettzell continued its VLBI observations of geodetic and astrometric observing sessions in the frame of the IVS. A lot of technical improvements and upgrades have been performed during regular service and maintenance. A repetition of the local survey, as done in 2000, has been performed in 2001 in order to control the ties of the reference point of the VLBI telescope to the other geodetic systems.

1. Participation in the Observing Programs

Since 1983 the Radiotelescope Wettzell has contributed to geodetic and astrometric observing programs. Extended time series exist for the station position and velocity. In 2001 the 20m Radiotelescope participated in more than 300 experiments as summarized in table 1. The amount

Table 1. Summary of observation activities.

90	POLARIS/IRIS-A/NEOS-A+B/CORE
12	IRIS-S
200	DUT1 Intensive
3	EUROPE
6	RDV
3	Astronomy

of observations increased, compared to the year 2000, due to the fact that the Mk IV correlator became operational, which allows intensified CORE-activities. In the first half year of 2001 CORE-3 was performed every fortnight instead of once per month. In the second half of the year CORE-3 was carried out once per week. The observations for IRIS-S, in which the 20m radiotelescope participated since its very beginning in 1986, ended at the end of 2001. The daily INTENSIVE sessions, aiming at the determination of DUT1, observed since 1983 up to 1995 on the baseline Wettzell-Westford, continued on the baseline Wettzell-GreenBank and nowadays Wettzell-Kokee Park, have been reduced to 4 days (Mon, Wed, Thu and Fri) per week only.

Due to consequent maintenance the system failures have been minimized; nevertheless some components failed and resulted in loss of observations. There are still unexplained problems in the Antenna Control Unit (ACU) requiring occasionally a reset and thus causing loss of some scans. But as a whole, the 20m radiotelescope performed all sessions as scheduled.

2. Technical Improvements and Activities

The staff of the 20m radiotelescope Wettzell worked not only in the main field on operating and improving their own VLBI system, but supported also related fields such as

- the survey control of the Fundamental Station,

- upgrading the TIGO 6m telescope before shipping to its designed location Concepcion,
- upgrading the data acquisition system of the O'Higgins 9m telescope.

The main technical extension at the 20m radiotelescope in Wettzell was the integration of a K4 recording system at the end of the year 2001, which is planned for carrying out Intensive type observations with Tsukuba to derive DUT1. The K4 consists of

- SONY - VLBI INPUT INTERFACE UNIT, type DCF 2100 and
- SONY - DIGITAL INSTRUMENTATION RECORDER, type DIR 1000.

These devices replace a K4 recording system which has been used in Wettzell for one year, on loan from Communication Research Laboratory (CRL). In parallel the field system(FS) version 9.5.3 was installed, which allows us to run both, Mk-IV and K4 data acquisition systems, thanks to Ed Himwich! This implementation will allow smooth operation of Mk-IV and K4.

Two Mk-IV Formatters, one a spare for Wettzell and one a spare for TIGO, were upgraded to firmware-version 4.1.

The second Honeywell tape recorder, for which the MK-IV upgrade kit was delivered early in summer from Haystack to Wettzell, was implemented and finally tested for operations. The two available tape recorders together with the FS version 9.5.3 in Wettzell will allow recording of the follow on CORE sessions and the INTENSIVE sessions on separate tape units. In the past unfortunately INTENSIVE sessions often were merged into a 24h session, which required tape changes and caused timegaps. The observing effort and the observing time lost for switching can be kept as short as possible.

At the end of the year one of the two azimuth drive motors failed and had to be replaced. The motor was worn out completely after more than 63000 hours of operation. Repair was not possible.

Tom Clark's Totally Accurate Clock (TAC) has been integrated into the VLBI timing system. This enables the determination of the time difference between TAC and formatter clock to an accuracy of 0.1 microsecond, which is very helpful for faster correlation of data.

The local survey network, established for the determination of local ties and for detection of local deformations has been controlled with emphasis to the surrounding of the antenna. It has been extended to integrate the newly installed Lasergyroscope "G", which is developed for monitoring variations in earth rotation.

During the planned Antarctica field campaign in January and February 2001 two staff members from Wettzell visited the O'Higgins station for technical improvements and supported the observations. The upgrade from Mk-III to Mk-IV has been carried out at the 9m telescope of O'Higgins with support from Michael Wunderlich from Max Planck Institute for Radioastronomy, Bonn. In addition a reliable meteorological data recording system comparable to the Wettzell recording device has been installed.

The Transportable Integrated Geodetic Observatory (TIGO) was located in Wettzell up to the end of 2001. A lot of improvements were performed on the receiver; especially the performance of the S-band could be improved. The Peltier cooling unit, which never worked properly, was completely redesigned and a totally new unit was built finally. Unfortunately a fire in the VLBI operation container occurred due to lightning, which caused damage and required a complete replacement of defective cables. Finally, for transportation to Concepcion/Chile the staff supported disassembling the 6m offset antenna, packing and storing all VLBI devices into the containers.

As far as TIGO was included in the observation program in 2001 care has been taken of the helium cooling, the worn out coldheads/adsorbers were replaced and during running of the VLBI measurements the staff of the 20m telescope kept an eye on the automatically operating TIGO telescope.



Figure 1. 20m Radiotelescope, in front of the artificial hill covering the underground laboratory of the Ringlaser.