

# Geodetic Observatory O'Higgins – BKG's IVS Network Station in Antarctica in 2001

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## Abstract

The German Antarctic Receiving Station O'Higgins (GARS) has been in operation for VLBI for about 10 years. During the year 2001 only one observing period was organised; the VLBI system was upgraded from MK III to a MK IV system including thin tape drive. Problems occurred with the antenna pointing, which leads to detailed planning of the maintenance and repair of the antenna drives beginning in 2002. The report gives an overview on the observations, technical improvements, the technical staff, collocated geodetic equipment and future plans.

## 1. Observation Campaign at O'Higgins in 2001

The VLBI system at German Antarctic Receiving Station (GARS) O'Higgins has been in operation for about 10 years. Altogether 58 VLBI experiments were carried out over the years. In 2001 only one observation campaign could be organised in January-February for participation in VLBI observing programs. Three 24-hour VLBI experiments were observed:

- the two special IVS CORE O'Higgins (COHIG 14 and COHIG15) and
- the IRIS South IS159 experiments.

During the campaign the antenna system required more and more manual interactions due to severe problems in the antenna servo system. Some investigations were done with the antenna in order to clarify the technical problems, to overcome the failures and finally to gain knowledge for detailed planning of the maintenance and repair of the whole antenna in the next campaign. In addition to the technical problems some logistical inconveniences (transportation, etc.) came up, which forced cancellation of the planned campaign in October, November 2001. The time was intensively used to clarify with the manufacturer the servo problems and to obtain technical information for solving the problem. The repair and maintenance was shifted to the first campaign in 2002.

## 2. New Technical Components for VLBI Equipment at O'Higgins in 2001

A major task in the year 2001 was the upgrade of the VLBI data acquisition from MKIII to MKIV and the related thin tape recorder upgrade. In addition the field system was changed to Linux 9.14.17 Version.

For the MkIV upgrade a new wired data acquisition rack (DAR) was prepared with support from Haystack Observatory. It was shipped to O'Higgins and expected to be in time at the station for the planned operations. After a delay of some days the new MkIV formatter and MkIV decoder, and the existing power supplies and baseband converter were plugged into the rack at the station in O'Higgins (Figures 1, 2 and 3) and the old rack could be replaced.

The upgrade of the thin tape recorder was done with strong support from Michael Wunderlich from the Max Planck Institute for Radioastronomy / Bonn also in January-February 2001. Due to the delay in shipping the required material to O'Higgins the upgrade took much more time than



Figure 1. Old MkIII formatter and data analysis board



Figure 2. DAR after the finish of MkIV upgrade



Figure 3. Installation of the thin tape equipment

planned. A real test of the upgraded data acquisition system was finally the successful observation of the three planned observation sessions, as mentioned before.

In addition to the MKIV implementations the installation of the new Field System version on a 667 MHz Pentium III PC was carried out right before the start of the observation campaign in February 2001.

Finally, the stay at O'Higgins station of the DLR and BKG staff was used for the integration of a local computer network LAN and the Internet access via Chilean Telecom ENTEL and ChileSat.

The technical parameters of the VLBI system and their changes over the years are summarised in [AR99] and in the Network Station Configuration File.

### 3. Technical Staff Responsible for Working at O'Higgins Station

The Table 1 lists the staff that is working during VLBI campaigns in Antarctica and is preparing the VLBI bursts for O'Higgins. Due to a reorganisation of BKG's structure the O'Higgins tasks are shifted to the responsibility of the Fundamental Station Wettzell.

Depending on technical requirements or problems at O'Higgins the specialists from Wettzell (Walter Schwarz, Gerhard Kronschnabl) will support the field campaigns temporarily.

### 4. Current Status of the Collocated Geodetic Equipment

To the VLBI system two GPS receivers, a PRARE system, a tide gauge sensor and meteorological sensors were collocated. The IGS GPS Station O'Higgins (Turbo Rogue) delivered data continuously over the year. In addition an Ashtech Z18 GPS receiver was installed for observing GPS and GLONASS data synchronously. In case of a failure of the Turbo Rogues the Ashtech receiver can be used as a backup. Also the PRARE equipment for ERS2 provided stable results. It



Figure 4. Participants of GARS 2001 campaign (colleagues from BKG and DLR) in front of the 9m antenna

is one of the few existing observing stations worldwide. The data recording of a tide gauge sensor started in 1999. The system collected data without interruptions until November 2001. The cable connection was destroyed by ice. In February 2002 a new system will be installed. The O'Higgins Station will become a member of GPS Tide Gauge Benchmark Monitoring Pilot Project (TIGA - PP).

## 5. Future Plans

With the dedication of TIGO to Concepcion in Chile in 2001 the need for O'Higgins as a reference station increased. It is planned to keep O'Higgins as an IVS Network Station for some more years, depending on the technical status and on the collaboration with the involved agencies in Germany and Chile.

In 2002 the antenna servo will be upgraded and repaired, a new weather station will be installed and the LAN system will be improved. The local terrestrial network survey (pillars and reference points of additional geodetic systems) will be repeated including the control of the antenna reference point. Due to local construction work for a building needed by the Chilean military agency hosting our station, the monument of the IGS Turbo Rogue has to be shifted to another location, some meters apart from the current monument.

More campaigns at O'Higgins are in preparation for 10/2002 and 01/02 2003.

Table 1. Staff working in O'Higgins VLBI project

Name	Background	Dedication	Agency / e-mail
<b>general</b>			ohiggins@leipzig.ifag.de <a href="http://www.leipzig.ifag.de/vlbi/ohiggins">http://www.leipzig.ifag.de/vlbi/ohiggins</a>
Christian Plötz	electronics engineer	60%	TU Munich ploetz@wettzell.ifag.de
Reiner Wojdziak	computer science	60%	BKG rw@leipzig.ifag.de
<b>in 2001</b>			
Walter Schwarz	electronics engineer		BKG schwarz@wettzell.ifag.de
Gerhard Kronschnabl	electronics engineer		BKG kronschnabl@wettzell.ifag.de
Michael Wunderlich	electronics engineer		MPiFR mwunderlich@mpifr-bonn.mpg.de

## References

- [AR99] Reinhold, A.: German Antarctic Receiving Station O'Higgins, IVS Annual Report 1999, edited by N.R.Vandenberg, Greenbelt USA, 1999