

## Geodetic Observatory TIGO in Concepción

*Hayo Hase, Armin Böer, Stefan Riepl, Sergio Sobarzo, Cristobal Jara, Roberto Aedo, Gonzalo Remedi, Marcus Moreno, Gonzalo Hermosilla*

### Abstract

During TIGO's third year of operation in Concepción, TIGO performed 96 24h VLBI-observations and is hence one of the most scheduled IVS-sites. The radiotelescope got a new antenna control unit. TIGO supported the operation at O'Higgins. Activities of the VLBI-group at TIGO during 2004 and an outlook for 2005 are given.

### 1. General Information

At the end of 2004 according to the bilateral agreement between Germany and Chile the initial period of 3 years of cooperation between

- Bundesamt für Kartographie und Geodäsie
- Universidad de Concepción
- Universidad del Bío Bío
- Universidad Católica de la Santísima Concepción
- Instituto Geográfico Militar

for the operation of the Geodetic Observatory TIGO in Concepción ended successfully. On March 10, 2004, the Directing Board of TIGO decided to renew the three years period of cooperation until the end of 2007. This will guarantee the continuation of the commitments of TIGO in the International Services throughout the period.

### 2. Component Description

The IVS-network station TIGOCONC is the VLBI-part of the Geodetic Observatory TIGO, which was designed to be a fundamental station for geodesy. Hence the VLBI-radiotelescope is collocated with an SLR-telescope (ILRS-site), a GPS/Glonass permanent receiver (IGS-site) and other instruments like water-vapour-radiometer, superconducting gravity meter, seismometer.

The atomic clock ensemble of TIGO consists of 2 hydrogen masers, 2 cesium clocks and 3 GPS-time receivers realizing the Chilean contribution to the Universal Time scale (Circular T, BIPM).

During September 2004 the radiotelescope operation at TIGO was paused for a replacement of the antenna control unit. The motivation for the ACU replacement was the fact that spare parts for the system designed 12 years ago became more and more difficult to get, as production lines of key components like microprocessors and motors had terminated. The replacement of the servo system included also the development of new control software. The replacement was executed successfully within only three weeks (to minimize downtime) by the contracted MAN Technology company, which was also responsible for the new design. The new design replaced seven former microprocessors by just one with better performance. Communications between host

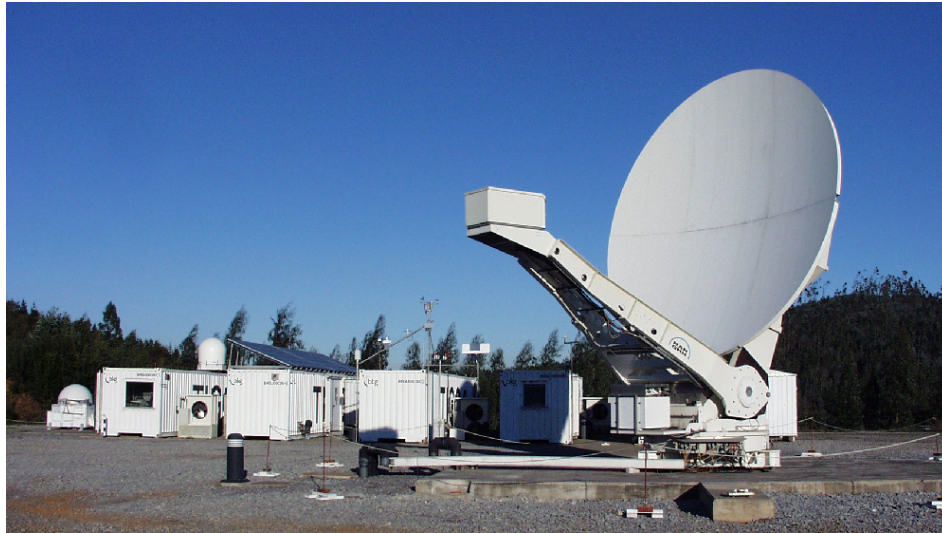


Figure 1. Geodetic Observatory TIGO: The VLBI-radiotelescope is the largest instrument of TIGO. Left in the back is the collocated SLR-telescope.

and remote computer are now realized by ethernet links, which permit higher data rates than the former serial connection. The new ACU is a digital system which permits profound diagnosis remotely and remote software updates via internet, while the radiotelescope is operating. The antenna controller time base is now derived from its own GPS receiver card replacing the time interface to the outside world in the former ACU. The new antenna controller routine for the Field System could be developed by TIGO staff prior to the replacement thanks to a simulator of the new ACU provided by MAN.

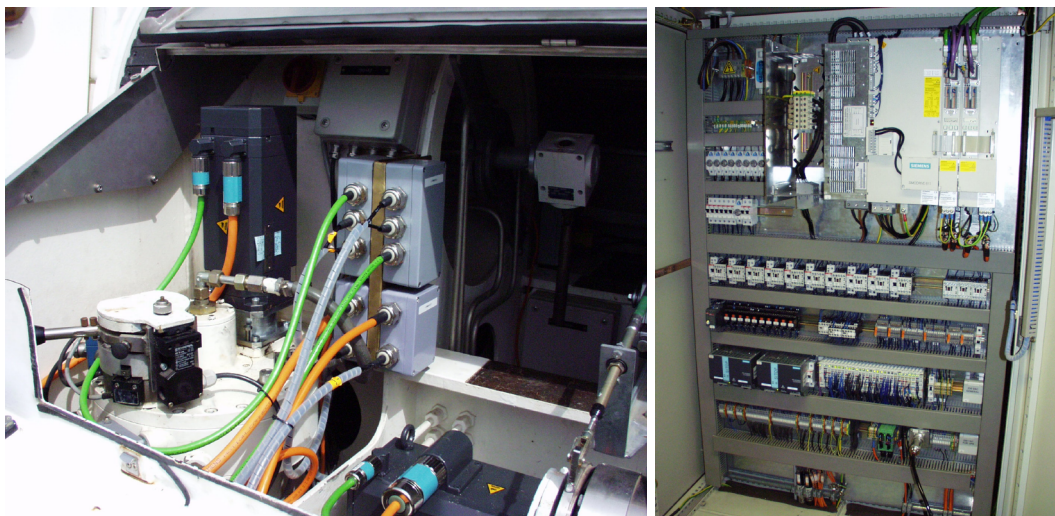


Figure 2. ACU replacement: New Siemens motors with new wiring had to be installed at the radiotelescope. The new switchboard cabinet shows its new Siemens servo and Beckhoff Profibus components.

### 3. Staff

In 2004 the TIGO VLBI group supported for first time the operation of the German Antarctic Receiving Facilities (GARS) at O'Higgins. After his training in VLBI operation at TIGO Cristobal Jara joined Christian Plötz from Wettzell in his campaign during October until December 2004.

The actual TIGO-VLBI group consists of the persons listed in Table 1.

Staff	Function	Email
Hayo Hase	head	hayo.hase@tigo.cl
Sergio Sobarzo	chief engineer	sergio.sobarzo@tigo.cl
Cristobal Jara	electronic engineer	cristobal.jara@tigo.cl
Roberto Aedo	electronic engineer	roberto.aedo@tigo.cl
Gonzalo Remedi	programmer	gonzalo.remedi@tigo.cl
Marcos Moreno (until Aug 04)	geologist	marcos.moreno@tigo.cl
Gonzalo Hermosilla (until Aug 04)	geologist	gonzalo.hermosilla@tigo.cl
Carlos Verdugo (since Jan 05)	mechanical engineer	carlos.verdugo@tigo.cl
any VLBI-operator	on duty	vlbi@tigo.cl
all VLBI-operators		vlbistaff@tigo.cl

Table 1. TIGO-VLBI support staff in 2004.

### 4. Current Status and Activities

During 2004 TIGO was scheduled for 97 VLBI-experiments (24h).

Name	# of exp.	ok	failed
R1xxx	42	42	-
T20xx	8	8	-
E30xx	11	11	-
R4xxx	26	25	1
RDVxx	3	3	-
OHIGxx	7	7	-
Total IVS	97	96	1

Table 2. TIGO's IVS observation statistic for 2004. In September 2004 TIGO was down for about 4 weeks due to ACU replacement.

In May 2004 Hayo Hase and Sergio Sobarzo presented together with Alan Whitney and David Lapsley the eVLBI subject at the national conference on communication networks for science, research and education. Previously TIGO conducted some data transmissions to Haystack and Bonn based on Mark 5 technology as feasibility study for future developments. It turned out that the infrastructure to and from Chile is worse than inside the country. This has to do with the long intercontinental distances.

TIGO is installing a regional GPS network. Since September 2004 the first GPS permanent

station at Punto Faro Hualpen in about 15km distance westwards from TIGO is operational. A monument in Dichato (about 45km north) was constructed and will be equipped with permanent GPS, sea level tide gauge and meteorological station in early 2005.

## 5. Future Plans

The VLBI-activities in 2005 will focus on

- execution of the IVS observation program for 2005,
- participation at the IVS-TOW meeting in May,
- investigations related to eVLBI,
- fund allocation for eVLBI to get more bandwidth,
- general radiotelescope maintenance,
- experimental satellite trackings,
- repetition of the local survey.