

Gilmore Creek Geophysical Observatory

Rich Strand

Abstract

The following report provides a general technical description and operational overview of the Gilmore Creek Geophysical Observatory located near Fairbanks, Alaska.



Figure 1. Gilmore Creek Geophysical Observatory's telescope, Fairbanks, Alaska.

1. GCGO at Fairbanks

Gilmore Creek Geophysical Observatory (GCGO) is located 22 km northeast of Fairbanks, Alaska. The observatory is co-located with the NOAA weather satellite command and data acquisition station. The station sits on an 8,500 acre reservation that is mostly undeveloped wilderness. Ten antennas are in operation. GCGO was instrumented by NASA's Crustal Dynamics Project in the mid 1980s for the Alaskan mobile VLBI campaign and used as the base station for those geodetic measurements [1]. The GCGO is part of the NASA Space Geodesy program in cooperation with the U.S. Naval Observatory.

2. Technical Parameters of GCGO

The 26 meter telescope, monument number 4047, X-East Y-North, latitude N 64° 58' 43.81288" and longitude E 147° 29' 42.18552" height 306.418 meters is hydraulic-operated and controlled

by a Modcomp computer system (see table 2). The DAT rack is a VLBA terminal and recorder (thin tape). The X/S band microwave receiver has a cryogenic low noise front end. VLBI Field System version 9.5.7 is used with a PC. Hydrogen Maser NR 5 is the time standard with an HP Cesium for the telescope computer. A CNS (TAC) receiver is monitored by the TAC32 software for GPS offset measurements. The JPL GPS scintillation project is observed using an Ashtech and 8100 Rogue GPS receiver. The Institut Geographique National in France operates a DORIS beacon located near the NOAA VHF transmitter building. Nortel Data Network Systems operates the PRARE (Precise Range and Range Rate Equipment) for the German Space Agency. CLS from France operates the ARGOS and ARGOS-NEXT beacon. The ARGOS-NEXT platform is located next to the NOAA 26 meter antenna.

Table 1. Address of GCGO near Fairbanks.

Gilmore Creek Geophysical Observatory
 NOAA/NESDIS FCDAS
 1300 Eisele Road
 Fairbanks, AK 99712
<http://www.fcdas.noaa.gov>

Table 2. Technical parameters of the GCGO radio telescope for geodetic VLBI.

Parameter	GCGO
owner and operating agency	NOAA/NASA
year of construction	1962
receiving feed	primary focus
diameter of main reflector	26 meters
focal length	10.9728 meters
surface accuracy of reflector	889 mm rms
X Y mount	1 degree per second
S-band	2.2 – 2.4, <i>GHz</i>
T_{sys}	62 <i>K</i>
$SEFD(CASA)$	650 <i>Jy</i>
G/T	35.3 <i>dB/K</i>
X-band	8.1 – 8.9, <i>GHz</i>
T_{sys}	58 <i>K</i>
$SEFD(CASA)$	550 <i>Jy</i>
G/T	44.5 <i>dB/K</i>

3. Staff of the Gilmore Creek Facility, Fairbanks, Alaska

GCGO is co-located with the NOAA data acquisition facility. The NOAA Manager is Jim Budd. The site is operated by the Lockheed Technology Services Group with Janine Jarvis as Lockheed Project Manager and Roger Kermes, Lockheed Operational Manager. R. Strand and S. Caskey

are assigned to GCGO technical staff with T. Knuutila, Z. Padilla, and others assisting. The telescope's hydraulic system is maintained by M. Meindl, A. Sanders and F. Holan. Day by day scheduling is done by NVI, Cindy Thomas and VLBI technical directives/contract modifications by NASA/GSFC, Bill Wildes.

4. Status of Gilmore Creek Geophysical Observatory

GCGO was scheduled 119 sessions with one session lost due to a failure with the machinery that moves the telescope. GCGO observed several sessions warm which degraded the data as we had some problems with a dewar in the receiver during the summer. The dewar that was replaced at the end of February during standard preventative maintenance started to fail in June and was replaced in July. The maser failed November 6th and a power supply was replaced by directions from Honeywell's Diegel and Rhine. The PRARE stopped tracking due to a failed motor driver board and was repaired by local staff. The observatory participated in several fringe tests as well as the gravity sessions with Jupiter. GCGO was scheduled for CONT02 in October and we observed for 17 days. A magnitude 7.9 earthquake struck near the observatory November 3rd and GCGO was tagged along with the R4045 session later that week. Visitors included Bill Wildes/GSFC NASA, Ed Himwich/NVI, and John LaBrecque/NASA headquarters.

Table 3. VLBI observing at Gilmore Creek in 2002	
Year 2002 Experiments assigned to GCGO -	119
Observations scheduled -	41546
Observations recorded -	40480
Efficiency -	97.43%



Figure 2. GCGO telescope hydraulics team with VLBI observers

5. Outlook

GCGO will be observing ten sessions per month average with 121 scheduled for year 2003. A Mark 5A installation is expected mid summer.

References

- [1] C.Ma,J.Sauber,L.Bell,T.Clark,D.Gordon,W.Himwich, and J.Ryan, Measurement of Horizontal Motion in Alaska Using VLBI 1990, In:Journal of Geophysical Research, vol 95, No.B13, Pg 21991-22011, December 10,1990