

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.

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. The GCGO telescope can be seen in Figure 1 as the last antenna on the right in the valley. 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.



Figure 1. NOAA/NASA Data Acquisition and Geophysical Observatory. Fairbanks, Alaska

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
--

2. Technical Parameters of GCGO

The 26 meter telescope 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



Figure 2. GCGO 26-meter radio telescope, Fairbanks, Alaska. Monument number 4047. X-East Y-North. Latitude N 64° 58' 43.81288" and Longitude E 147° 29' 42.18552" Height 306.418 meters

microwave receiver has a cryogenic low noise front end. VLBI Field System version 9.3.25 is used with a PC. Hydrogen Maser NR5 is the time standard with a HP Cesium for the telescope computer. A TAC receiver is used with a HP 5334 counter for GPS offset measurements. The station also runs NASA/JPL Rogue receiver 8100 running software v. 3.2.32.8. UCLA maintains the HIPAS system located in the GCGO and currently is operating an ionosonde. The Institut Geographique National in France operates the DORIS beacon that is located near the NOAA transmitter area.

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

GCGO is a major NOAA data collection facility and does not have a science staff. The NOAA Manager is Jim Budd. The site is operated by the Lockheed Technology Services Group with Doug Ooms as Lockheed Project Manager and Mike Simmons as Lockheed Operational Manager.

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>

R. Strand and S. Caskey are assigned to GCGO technical staff with T. Knuutila, Z. Padilla, H. Grotsema, and D. Eubanks assisting. The telescope hydraulic system is maintained by M. Meindl, A. Sanders and W. Powell.

4. Status of Gilmore Creek Geophysical Observatory

Gilmore Creek continues to observe in the CORE, NEOS, and RDV experiments. Yasuhiro Koyama arrived on site Jan/Mar to install the K4 DFC2100 for K4TIE observing. GCGO was used for Mars Pathfinder and USNO intensive as well as fringe sessions for equipment verification checks for other stations. The NASA/JPL Rogue receiver was replaced in June. It is now running Y2K compliant software. The Doris beacon was reprogrammed by station staff to continue support of precision satellite-based orbit determination. The VLBI receiver was pulled from the telescope several times this year for dewar repair. D. Rhine, Allied-Signal, arrived on site in September for maser preventive maintenance. PRARE satellite tracking instrument failed in June and has been shipped to Germany for repair. Field system software development continues by Ed Himwich, NVI, using the station's DAT racks for testing. The majority of Gilmore Creek's data loss has been due to telescope hydraulic failures.

Table 3. VLBI observing at Gilmore Creek between 03/01/98 and 03/01/99.

Experiments assigned to GCGO - 101
Observations scheduled - 27757
Observations recorded - 27078
Efficiency - 97.55%

5. Outlook

Increased observing in CORE program is scheduled. RFI studies are being completed due to full time operation of a gold mine near the station. Plans are being made to move this observatory to the NOAA operations building and installing a new 20 meter electric drive telescope.

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