

Gilmore Creek Geophysical Observatory

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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 and building, 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 80's for the Alaskan mobile VLBI campaign and used as the base station for those geodetic measurements. 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). Data acquisition is by the VLBA terminal and a Mark 5A, VLBA and S2 recording system with the Mark IV. The X/S band microwave receiver uses a cryogenic low noise front end. VLBI Field System version 9.5.7 is used to control the VLBA rack. GCGO has a Hydrogen Maser NR 5 time standard with a HP Cesium for the telescope computer. A CNS timing GPS receiver is used to provide the GPS offset measurements. The JPL GPS scintillation project is observed using an Ashtech GPS receiver. The Institut Geographique National in France operates a DORIS beacon located near the NOAA VHF transmitter building. 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
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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, GHz
T_{sys}	62 K
$SEFD(CASA)$	650 Jy
G/T	35.3 dB/K
X-band	8.1 – 8.9, GHz
T_{sys}	58 K
$SEFD(CASA)$	550 Jy
G/T	44.5 dB/K

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

GCGO is co-located with the NOAA Fairbanks command and data acquisition facility. The NOAA Manager is Lance Seman. The site is operated by Space Mark International. Roger Kermes is project Manager. Technical staff members include R. Morgain, retired in July, Dave Eubanks transferred back to NOAA in the fall and Carol Homchick who assumed all duties of operating and maintaining the GCGO with help from local staff T. Knuutila, Z. Padilla, and Rich Strand, as well as Ed Himwich by e-mail, telephone and station visits. The telescope's hydraulic system is maintained by M. Meindl, A. Sanders and F. Holan. Day-by-day scheduling is done by Cindy Thomas (NVI, Inc.) and VLBI technical directives/contract modifications by Steve Bailey (NASA/GSFC).



Figure 2. Carol Homchick, SMI with Rich Strand, NVI. Final GCGO staff photo.

4. Status of Gilmore Creek Geophysical Observatory

In 2005 GCGO was scheduled for over 100 sessions and the CONT05 campaign. Normal observatory problems continued into 2005. Some sessions were lost due to telescope hydraulic failures. Dewar failures and lost tracks in the Mark 5A system also caused problems. Maser problems were solved and receiver communications were corrected but caused data quality loss. TDPS and DAT rack power supplies also caused data loss during the year. These failures and others were compounded with a new station staff. Rich Strand with help from Dave Eubanks and Carol Homchick repaired the Mark 5A, receiver communications, dewar replacement and cooling along with station equipment maintenance to conduct the necessary CONT05 reliability tests to successfully observe that campaign. Carol received additional support from Brian Corey, Ed Himwich, Irv Diegel, among others at Haystack, GSFC and Honeywell.

5. Outlook

GCGO suspended VLBI operations at the end of 2005. We hope to restart operations with a VLBI2010 system, when it becomes available.