

# 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). 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 <a href="http://www.fcdas.noaa.gov">http://www.fcdas.noaa.gov</a>
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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, <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 Fairbanks command and data acquisition facility. The NOAA Manager is Lance Seman. The site is operated by Space Mark International with Janine Jarvis as Project Manager and Roger Kermes as the Operations Manager. S. Caskey and K. Eberhart are assigned as 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**

In 2003 GCGO was scheduled with 105 sessions and missed three. In early 2003 GCGO observed several sessions warm due to problems with our helium lines. We also replaced our recorder's capstan motor in April, the Dewar in June, a servo valve on our antenna in September and the head in our recoder in October. Our visitors included Senator Ted Stevens, NASA Administrator Sean O'Keefe, Bill Wildes GSFC/NASA, and Ed Himwich/NVI.

### **5. Outlook**

A Mark 5 installation and Mark 4 formatter are expected early in 2004.