

Gilmore Creek Geophysical Observatory

Steve Caskey

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 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.

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| 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, <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 Roger Kermes acting as the Operations Manager and also as the Project Manager after the departure of Janine Jarvis. In May, technical staff member K. Eberhart was replaced with R. Morgan. S. Caskey also served on the GCGO technical staff during 2004 but is retiring in February, 2005. T. Knuutila, Z. Padilla, and others continue to assist the GCGO technical staff. 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 Bill Wildes (NASA/GSFC).

4. Status of Gilmore Creek Geophysical Observatory

In 2004 GCGO was scheduled for 100 sessions. In March, two were missed, due to an X encoder replacement and the repair of a crack in the X-axis structure. In May and June, six were missed due to an antenna TDPS failure. In addition, in July the BBC failed, and some observations were impacted. The BBC was repaired in August.

Starting in June, GCGO experienced a DEWAR warming problem, until a new coldhead was installed in December. Meanwhile, observations continued with the warm DEWAR. In October, we started troubleshooting an apparent MASER problem. In November, the last two LMR400 IF lines from the receiver failed, so we switched to backup RG-214 lines until two new LMR400 lines could be installed in December.

In November, we installed a new Ashtech GPS receiver and computer for the Rogue JPL system. In December, we installed the Mark IV(Formatter)/Mark5A(HD) system, the S2 DAR/RT system and a new antenna for the Rogue JPL system.

Visitors in 2004 included Clyde Cox (Honeywell, for Mark IV/Mark 5A and S2 installation), Irv Diegel (Honeywell, for MASER maintenance), Ed Himwich (NVI, Inc., for software upgrades) and Bill Wildes (NASA/GSFC, for contract purposes).

5. Outlook

Steve will retire on February 23, 2005. Thanks to all in the VLBI community for the 20+ years.