

#### **4. GLONASS Evaluation (John Manning, Australia, Larry Hothem, USA)**

##### ***Key 1998-9 activities:***

##### **Participation in IGEX-98 Experiment**

See following "Site Information Form for the GPS/GLONASS Campaign IGEX98.'  
A station called CRAR, located at McMurdo Station, was occupied from 16 DEC 1998 to 7 FEB 1999.

L1 /L2 observations were collected simultaneously for both GPS and GLONASS satellites continuously, except for very short breaks to upload new firmware.

The system used:

Receiver -	Model:	JPS Legacy/G
	Serial Number:	L00071 (Rec ID MT310943221)
	Firmware Version:	1.4 (21-JAN-1999)

Antenna -	Model-	JPS RegAnt Choke Ring
	Serial Number:	RA0044

No other receivers were deployed in Antarctica in support of IGEX-98.

##### **Workshop on IGEX-98 EXperiment**

The IGS in cooperation of the US Institute of Navigation, will conduct a workshop on IGEX-98 on 13 and 14 September 1999, in Nashville, TN. This workshop is scheduled in conjunction with the ION GPS99 International Conference and Symposia.

Topics to be covered during the 2-day Workshop include summary of international sites occupied, equipment used, data quality, solutions for orbits, and analysis of results.

##### **Other GLONASS observations**

Starting in the 1996-7 field seasons, in support of the airborne SOAR project to navigate within 15 meters of preplanned grid track, an Ashtech GG24 GPS/GLONASS L1 receiver was used. GLONASS observations were used solely to navigate the aircraft to take advantage of greater accuracy since the GLONASS signals are not affected by SA.

Prepared by: L. Hothem, USGS, Reston, VA

CRAR Site Information Form  
GPS/GLONASS Campaign IGEX98

0. Form

Prepared by (full name) Larry D. Hothem  
Date Prepared 08-FEB-1999  
Report Type UPDATE and TERMINATE OBSERVATIONS  
Prepared Using WP Editor

1. Site Identification of the GPS/GLONASS Monument

Site Name Crary Science and Engineering Center  
Four Character ID CRAR  
Monument Inscription none  
IERS DOMES Number 66001MOO4  
CDP Number (XXXX)  
Monument Description STEEL PLATE ON MAST  
Date Installed 16-DEC-1998 01:08 UT  
Geologic Characteristic VOLCANIC FLOWS and WELDED TEPHRA  
Bedrock Type VOLCANIC  
Bedrock Condition POLYGONAL CRACK PATTERN  
Fracture Spacing over 200 cm  
Notes Ross Island and vicinity consists of volcanic rock. It is not clear whether frost action actively exploits the cracks.  
Additional Information The tectonic structure of the area is unclear. Mount Erebus, an active volcano, is located about 38km north of station CRAR.

2. Site Location Information

City or Town McMurdo Station  
State or Province Ross Island  
Country Antarctica  
Tectonic Plate Antarctic  
Approximate Position  
X coordinate (m) -1310643.79 (m)  
Y coordinate (m) 310590.23 (m)  
Z coordinate (m) -6213367.72 (m)  
Latitude (deg) 77.848042 S  
Longitude (deg) 166.668242 E  
Ellipsoid Height (m) -19.94 (m)  
Geoid undulation (m) -53.38 (m)  
Elevation (m) (1) (33.44) (m)  
Additional Information Geoid Model: EGM96  
(1) Elevation computed  
Datum: ITRF94  
Updated position in ITRF96 system relative to IGS station MCM4 is pending.

3. Receiver Information

3.1 Receiver Type JPS Legacy/G  
Satellite System GPS+GLONASS  
Serial Number L00071 (Rec ID MT310943221)  
Firmware Version 1.4 (21-JAN-1999)  
Date Installed 16-DEC-1998, 01:08 UT  
Date Removed 7-FEB-1999, 24:00 UT  
Additional Information New Firmware V1.4 (dated 21-JAN-1999)  
installed 28-JAN-1999, 01:04 UT, replacing  
firmware V1.3 (dated 10-JAN-1999)

4. Antenna Information

4.1 Antenna Type JPS RegAnt Choke Ring  
Serial Number PA0044  
Antenna Height (m) 0.090 (m)  
Antenna Reference Point ARP  
Degree Offset from North 0  
Antenna Radome Type Antenna inside waterproof enclosure  
Date Installed 16-DEC-1998, 01:08 UT  
Date Removed 7-FEB-1999, 24:00 UT  
Additional Information Model for antenna entered in initial  
logs was incorrect. Rather than  
GalAnt model, it is a RegAnt Choke  
Ring. Verification pending on type  
of choke ring, i.e. whether it is a  
RegAnt-1 (single-depth choke ring)  
or a RegAnt-2 (dual-depth choke  
ring).

Independent calibration pending  
(see Item 11)

5. Local Site Ties

5.1 Monument Name MCM4  
Site Ref CDP Number 4025  
Site Ref Domes Number 66001MOO3  
Differential Components from GPS/GLONASS Marker to Site Reference (ITRS)  
dx (m) -1059.47 (m)  
dy (m) 224.89 (m)  
dz (m) 112.60 (m)  
Accuracy (mm) 50 (mm)  
Date Measured NOV-1997  
Additional Information Pending is updated tie data.

6. Frequency Standard

6.1 Standard Type INTERNAL  
Frequency QUARTZ  
Effective Dates 16-DEC-1998 - (07-FEB-1999)  
Notes (multiple lines)

7. Collocation Information

7.1 Instrumentation Type GPS  
Status PERMANENT  
Effective Dates 31-JAN-199S - present  
Notes IGS Station MCM4.  
Adjacent to station MCM4 is a dish antenna used primarily as downlink for RADARSAT data. With appropriate instrument upgrade, this antenna could be used for VLBI observations.

8. Meteorological Instrumentation

8.1 Humidity Sensor Model  
Manufacturer  
Data Frequency  
Accuracy (% rel h) (% rel h)  
Effective Dates (dd-MMM-yyyy - dd-MMM-yyyy)  
Notes Limited data may be available from McMurdo Meteorological Station

8.2 Pressure Sensor Model  
Manufacturer  
Data Frequency  
Accuracy (mbar) (mbar)  
Height Diff to Ant (m) (m)  
Effective Dates (dd-MMM-yyyy - dd-MMM-yyyy)  
Notes Limited data may be available from McMurdo Meteorological Station

8.3 Temperature Sensor Model  
Manufacturer  
Data Frequency  
Accuracy (deg C) (deg C)  
Effective Dates (dd-MMM-yyyy - dd-MMM-yyyy)  
Notes Limited data may be available from McMurdo Meteorological Station

8.4 Water Vapor Radiometer  
Manufacturer  
Distance to Antenna (m) (m)  
Elev Diff to Ant (m) (m)  
Effective Dates (dd-MMM-yyyy - dd-MMM-yyyy)  
Notes Limited data may be available from McMurdo Meteorological Station

8.5 Other Instrumentation (multiple lines)

9. On-Site, Point of Contact Agency Information

Agency US Geological Survey  
Mailing Address (multiple lines)  
Primary Contact  
Contact Name Larry D. Hothem  
Telephone (primary)  
Telephone (secondary)  
Fax  
E-mail HothemLa@mcmurdo.gov

Secondary Contact  
Contact Name  
Telephone (primary)  
Telephone (secondary)  
Fax  
E-mail  
Additional Information (multiple lines)

10. Responsible Agency (if different from 9.)

Agency US Geological Survey  
Mailing Address 521 National Center  
Reston, Virginia 20192 USA  
Primary Contact  
Contact Name L. Hothem  
Telephone (primary) 1-703-648-4663  
Telephone (secondary)  
Fax 1-703-648-4165  
E-mail Lhothem@usgs.gov  
Secondary Contact  
Contact Name J. Mullins  
Telephone (primary) 1-703-648-5144  
Telephone (secondary)  
Fax 1-703-648-4165  
E-mail jmullins@usgs.gov  
Additional Information (multiple lines)

11. More Information

URL for More Information

<http://unavco.ucar.edu/polar/coordinates/CRAR.html>

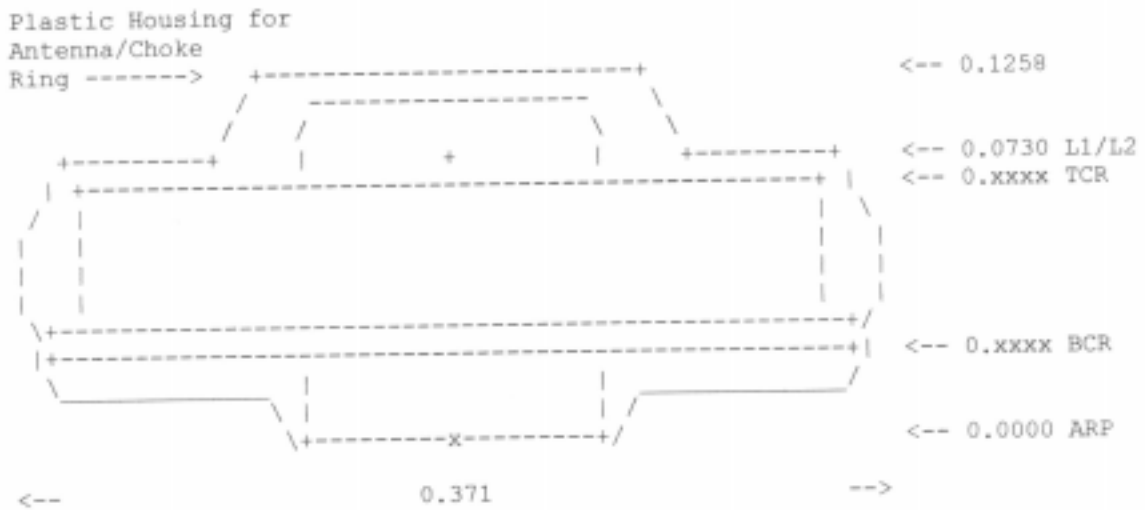
Hardcopy on File

Site Map	Y
Site Diagram	N
Horizon Mask	N
Monument Description	Fixed antenna mount on top of mast at Crary Center loading dock, Phase II
Site Pictures	Y

Additional Information

- (1) Pictures are available as digital images in JPG format.
- (2) JPS RegAnt model antenna is encased in a hard plastic shell as shown below. The distances are taken from JPS website: <http://www.javad.com/Products/Hardware/RegAnt.htm>
- (3) Pending in March-April 1999, are plans by Jerry Mader, NOAA/NGS/Geosciences, to conduct a calibration analysis.

Antenna Graphics with Dimensions (meters)



ARP: Antenna Reference Point

L1 : L1 Phase Center

TCR: Top of Choking

TGP: Top of Ground Plane

TPA: Top of Pre-amplifier

TOP: Top of Pole

THC: Top of Housing Case

L2 : L2 Phase Center

BCR: Bottom of Choking

BGP: Bottom of Ground Plane

BPA: Bottom of Pre-amplifier

BOP: Bottom of Pole

12. Local Events Possibly Affecting Computed Position

- |      |               |  |
|------|---------------|--|
| 12.1 | Date<br>Event | 12-JAN-1999 00:00:00 - 00:52:00 UT<br>Data gap while logging stopped<br>to reconfigure computer.                                   |
| 12.2 | Date<br>Event | 13-JAN-1999 00:00:00 - 00:28:00 UT<br>Data gap while logging stopped to make<br>adjustments to software configuration.             |
| 12.3 | Date<br>Event | 15-JAN-1999 00:02:00 - 07:29:00 UT<br>Data gap while updating firmware from<br>Ver. 0.0046 to Ver. 1.3 (10-JAN-1999)               |
| 12.4 | Date<br>Event | 23-JAN-1999 04:44:30 - 04:52:00 UT<br>Data gap occurred during testing of<br>software to automate daily handling of<br>data.       |
| 12.5 | Date<br>Event | 28-JAN-1999 01:04:30 - 01:14:00 UT<br>Data gap while updating firmware from<br>Ver. 1.3 (10-JAN-1999) to Ver. 1.4<br>(21-JAN-1999) |
| 12.6 | Date<br>Event | 7-FEB-1999 24:00:00 UT<br>Observations terminated and equipment<br>returned to manufacturer.                                       |