# NOAA/NESDIS Antenna and RF Systems Capabilities Handbook

## March 2008

## Revision 1

Prepared by:

U.S. Department of Commerce
National Oceanic and Atmospheric Administration (NOAA)
National Environmental Satellite, Data, and Information Service (NESDIS)

NOAA/NESDIS
OSD Series
X028

NOAA/OSD3-2001-0043R1UD0
March 17, 2008
DCN 1

# NOAA/NESDIS
# Antenna and RF Systems
# Capabilities Handbook

## Revision 1

## March 2008

***Prepared by:***

**U.S. Department of Commerce**
**National Oceanic and Atmospheric Administration (NOAA)**
**National Environmental Satellite, Data, and Information Service (NESDIS)**

# Approval Page
# (eApproval by eMail)

| Document Numbers: | |
|---|---|
| **NOAA/NESDIS** | **NOAA/OSD3-2001-0043R1UD0** |
| **OSD Series** | **March 17, 2008** |
| **X028** | **DCN 1** |

Document Title Block:

## NOAA/NESDIS
## Antenna and RF Systems
## Capabilities Handbook
## Revision 1

| **PROGRAM**: All | **DOCUMENT RELEASE DATE**: March 17, 2008 |
|---|---|
| **APPROVALS** | |
| GROUP: Office of Systems Development<br><br>Approved by email on March 24, 2008<br><br>NAME: Charles Bryant, Ground Systems Division Chief (acting) | GROUP: OSO / Support Branch<br><br>Approved by email on March 18, 2008<br><br>NAME: William Carter, Hardware Manager |
| GROUP: Wallops CDA Station (WCDAS)<br><br>Approved by email on March 18, 2008<br><br>NAME: Doug Crawford, WCDAS Station Manager | GROUP: Fairbanks CDA Station (FCDAS)<br><br>Approved by email on April 4, 2008<br><br>NAME: Lance Seman, FCDAS Station Manager |
| GROUP: OSD Ground Systems Division<br><br>Approved by email on March 24, 2008<br><br>NAME: Warren F. Dorsey, Ground Systems Division Project Manager | |
| CMO Release Approval:<br><br>Approved by email on March 20, 2008<br><br>NAME: Stephen P. Adamson, CSC, CMO Manager | |

# Version Description Record

DOCUMENT TITLE:
***NOAA/NESDIS Antenna and RF Systems Capabilities Handbook; Revision 1***

| DOCUMENT CHANGE HISTORY | | | |
|---|---|---|---|
| DCN No. | Revision | Date | Description of Change |
| *-* | *001* | *September 1, 1992* | |
| *-* | *Revision 1** | *January 13, 1994* | |
| *-* | *Revision 2** | *July 12, 2001* | |
| 0 | R0UD0 | August 10, 2001 | Initial Release<br>DocCCR-MULTI-HW-2001-0001 |
| 1 | R1UD0 | March 17, 2008 | Revision 1<br>DocCCR-MULTI-HW-2008-0002<br>DocCCR-MULTI-HW-2008-0003<br>DocCCR-MULTI-HW-2008-0004<br><br>The document has been revised to reflect site changes at the NSOF, WCDAS, FCDAS, Boulder, Asheville, and Barrow. |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

*Note: *All versions prior to the August 10, 2001, NOAA/NESDIS baseline were published and controlled by Honeywell Technology Solutions, Inc.*

# Preface

This document comprises the initial National Oceanic and Atmospheric Administration (NOAA) National Environmental Satellite, Data, and Information Service (NESDIS) Revision 1 publication of the *NOAA/NESDIS Antenna and RF Systems Capabilities Handbook* (document number NOAA-GOES/OSD3-2001-0043R1UD0; March 17, 2008, issue).

This document was prepared by Honeywell Technology Solutions Inc., 7000 Columbia Gateway Drive, Columbia, Maryland 21046-5555 based upon data collected in the prior issuance of the document in combination with new data collected for this document especially with regard to the rather new NOAA Operational Satellite Facility (NSOF) in Suitland, Maryland, the National Climatic Data Center (NCDC), Asheville, North Carolina, the Space Environment Center (SEC), Boulder, Colorado, and the Satellite Station in Barrow, Alaska. The data contained herein came from the record documents for each antenna system at each facility. Some of the data was derived where empirical data was absent. Most of the photos were taken by the Honeywell staff.

Any future updates and revisions to this document will be produced and controlled by NOAA/NESDIS.

The publication of this baseline document closes the following Document Configuration Change Requests:

- DocCCR-MULTI-HW-2008-0002
- DocCCR-MULTI-HW-2008-0003
- DocCCR-MULTI-HW-2008-0004

# Table of Contents

**Section 1.0 NOAA/NESDIS Antenna and RF Systems ..... 1-1**
1.1 General Description ..... 1-1

**Section 2.0 Wallops Command and Data Acquisition Station Antenna System ..... 2-1**
2.1 General Description ..... 2-1
2.2 26 Meter Antenna System ..... 2-4
2.3 14.2 Meter Antenna System ..... 2-7
2.4 13 Meter A Antenna System ..... 2-11
2.5 13 Meter B Antenna System ..... 2-15
2.6 18 Meter (GOES-A) Antenna System ..... 2-19
2.7 18 Meter (GOES-B) Antenna System ..... 2-22
2.8 16.4 Meter (HR-1) Antenna System ..... 2-25
2.9 16.4 Meter (HR-2) Antenna System ..... 2-28
2.10 13 Meter (GOES-C) Antenna System ..... 2-31
2.11 8 Meter Antenna System ..... 2-34
2.12 7.2 Meter Antenna System ..... 2-36
2.13 5 Meter Antenna System ..... 2-38
2.14 1.2 Meter Antenna System ..... 2-39
2.15 UHF HELIX Antenna Systems ..... 2-42

**Section 3.0 Fairbanks Command and Data Acquisition Station (FCDAS) Antenna Systems ..... 3-1**
3.1 General Description ..... 3-1
3.2 26 Meter Antenna System ..... 3-4
3.3 13 Meter '1/A' Antenna System ..... 3-7
3.4 13 Meter '2/B' Antenna System ..... 3-11
3.5 13 Meter '3/C' Antenna System ..... 3-14
3.6 21 Meter GOES Antenna System ..... 3-17
3.7 SAR Antenna System ..... 3-18

**Section 4.0 NOAA Satellite Operations Facility (NSOF) ..... 4-1**
4.1 General Description ..... 4-1
4.2 9.1 Meter #1 Antenna System ..... 4-3
4.3 9.1 Meter #2 Antenna System ..... 4-6
4.4 9.1 Meter #3 Antenna System ..... 4-8
4.5 9.1 Meter #4 Antenna System ..... 4-10

**Section 5.0 Goddard Space Flight Center Wallops Backup (WBU) Site ..... 5-1**
5.1 General Description ..... 5-1
5.2 16.4 Meter (HR-3) Antenna System ..... 5-3

**Section 6.0 National Climatic Data Center (NCDC) Facility in Asheville, North Carolina ..6-1**
6.1 General Description ..... 6-1
6.2 3.8 Meter Antenna System ..... 6-2

6.3 1.8 Meter Antenna System ..... 6-4

**Section 7.0 Space Environmental Center (SEC) at Boulder, Colorado ..... 7-1**
7.1 General Description ..... 7-1
7.2 6.1 Meter Antenna System ..... 7-2
7.3 5 Meter Antenna System ..... 7-4

**Section 8.0 Satellite Station in Barrow, Alaska ..... 8-1**
8.1 General Description ..... 8-1

**Section 9.0 Archived Antennas ..... 9-1**
9.1 Legacy NOAA Satellite Antenna Systems ..... 9-1
9.1.1 General Description ..... 9-1
9.2 7 Meter Antenna System ..... 9-2
9.3 4 Meter Antenna System (for Historical Purposes only) ..... 9-4
9.4 SATAN Antenna System ..... 9-7
9.5 Polar VHF AUX Antenna System ..... 9-9
9.6 26 Meter (VLBI) Antenna System ..... 9-11
9.7 12 Meter Antenna System ..... 9-14
9.8 6 Meter Antenna System ..... 9-17
9.9 4 Meter Antenna System ..... 9-19
9.10 SATAN Antenna System ..... 9-23
9.11 Satellite Command Antenna on a Medium Pedestal (SCAMP) Antenna System .. 9-26
9.12 VHF Array Antenna System ..... 9-29
9.13 Suitland Satellite Operations & Control Center at Federal Building 4 ..... 9-31
9.14 7.4 Meter (East) Antenna System ..... 9-32
9.15 7.4 Meter (West) Antenna System ..... 9-35
9.16 4.8 Meter (West) Antenna System ..... 9-37
9.17 4.8 Meter (East) Antenna System ..... 9-39
9.18 5 Meter Mesh Antenna System ..... 9-40

**Section 10.0 Coordinate System Overlays ..... 10-1**

# List of Figures

Figure 2-1. Wallops Command & Data Acquisition Station (South View) ..... 2-1
Figure 2-2. Wallops Command and Data Acquisition Station (Aerial View) ..... 2-2
Figure 2-3. Wallops 26 Meter Antenna ..... 2-3
Figure 2-4. Wallops 26 Meter Antenna System Horizon Profile ..... 2-4
Figure 2-5. Wallops 14.2 Meter Antenna ..... 2-6
Figure 2-6. Wallops 14.2 Meter Antenna Horizon Profile ..... 2-7
Figure 2-7. Wallops 13 Meter A Antenna ..... 2-10
Figure 2-8. Wallops 13 Meter A Antenna Horizon Profile ..... 2-11
Figure 2-9. Wallops 13 Meter B Antenna ..... 2-14
Figure 2-10. Wallops 13 Meter B Antenna Horizon Profile ..... 2-15
Figure 2-11. Wallops 18 Meter (GOES-A) Antenna ..... 2-18
Figure 2-12. Wallops 18 Meter (GOES-A) Antenna Horizon Profile ..... 2-19
Figure 2-13. Wallops 18 Meter (GOES-B) Antenna ..... 2-21
Figure 2-14. Wallops 18 Meter (GOES-B) Antenna Horizon Profile ..... 2-22
Figure 2-15. Wallops 16.4 Meter (HR-1) Antenna ..... 2-24
Figure 2-16. Wallops 16.4 Meter (HR-1) Antenna Horizon Profile ..... 2-25
Figure 2-17. Wallops 16.4 Meter (HR-2) Antenna ..... 2-27
Figure 2-18. Wallops 16.4 Meter (HR-2) Antenna Horizon Profile ..... 2-28
Figure 2-19. Wallops 13 Meter (GOES-C) Antenna ..... 2-30
Figure 2-20. Wallops 13 Meter (GOES-C) Antenna Horizon Profile ..... 2-31
Figure 2-21. Wallops 8 Meter Antenna ..... 2-33
Figure 2-22. Wallops 7.2 Meter Antenna ..... 2-35
Figure 2-23. Wallops 5 Meter Antenna ..... 2-37
Figure 2-24. Wallops 1.2 Meter Antennas ..... 2-39
Figure 2-25. Wallops UHF HELIX Antenna ..... 2-41
Figure 3-1. Fairbanks Command and Data Acquisition Station (Southwest View) ..... 3-1
Figure 3-2. Fairbanks Command and Data Acquisition Station (Northwest View) ..... 3-2
Figure 3-3. Fairbanks CDA Station (West View) ..... 3-2
Figure 3-4. Fairbanks 26 Meter Antenna ..... 3-3
Figure 3-5. Fairbanks 26 Meter Antenna Horizon Profile ..... 3-4
Figure 3-6. Fairbanks 13 Meter ‘1/A’ Antenna ..... 3-6
Figure 3-7. Fairbanks 13 Meter ‘1/A’ Antenna Horizon Profile ..... 3-7
Figure 3-8. Fairbanks 13 Meter ‘2/B’ Antenna ..... 3-10
Figure 3-9. Fairbanks 13 Meter ‘2/B’ Antenna Horizon Profile ..... 3-11
Figure 3-10. Fairbanks 13 Meter ‘3/C’ Antenna ..... 3-13
Figure 3-11. Fairbanks 13 Meter ‘3/C’ Antenna Horizon Profile ..... 3-14
Figure 3-12. Fairbanks 21 Meter Antenna ..... 3-16
Figure 3-13. Fairbanks SAR 1 Antenna ..... 3-18
Figure 3-14. Fairbanks SAR 2 Antenna ..... 3-19
Figure 4-1. NOAA Satellite Operations Facility (NSOF) ..... 4-1
Figure 4-2. NSOF 9.1 Meter 1 Antenna ..... 4-2
Figure 4-3. NSOF 9.1 Meter 2 Antenna ..... 4-5
Figure 4-4. NSOF 9.1 Meter 3 Antenna ..... 4-7

Figure 4-5. NSOF 9.1 Meter 4 Antenna ..... 4-9
Figure 5-1. Wallops Backup Facility in Greenbelt, Maryland ..... 5-1
Figure 5-2. GSFC 16.4 Meter (HR-3) Antenna ..... 5-2
Figure 5-3. GSFC 16.4 Meter (HR-3) Antenna Horizon Profile ..... 5-3
Figure 6-1. National Climatic Data Center in Asheville, North Carolina ..... 6-1
Figure 6-2. NCDC 3.8 Meter Antenna ..... 6-2
Figure 6-3. NCDC 1.8 Meter Antenna ..... 6-4
Figure 7-1. David Skaggs Research Center in Boulder, Colorado ..... 7-1
Figure 7-2. DSRC 6.1 Meter Antenna ..... 7-2
Figure 7-3. Table Mountain Site ..... 7-4
Figure 7-4. Table Mountain 5 Meter Antenna ..... 7-5
Figure 8-1. Barrow, Alaska Site ..... 8-1
Figure 8-2. Barrow, Alaska 4 Meter Antenna Radome ..... 8-2
Figure 8-3. Barrow, Alaska 4 Meter Antenna ..... 8-3
Figure 8-4. Barrow, Alaska 3 Meter Antenna Radome ..... 8-5
Figure 9-1. Wallops 7 Meter Antenna ..... 9-1
Figure 9-2. Wallops 4 Meter Antenna ..... 9-3
Figure 9-3. Wallops 4 Meter Antenna Horizon Profile ..... 9-4
Figure 9-4. Wallops SATAN Command Antenna ..... 9-6
Figure 9-5. Wallops SATAN Antenna Horizon Profile ..... 9-7
Figure 9-6. Wallops Polar AUX VHF Antenna ..... 9-9
Figure 9-7. Fairbanks 26 Meter (VLBI) Antenna ..... 9-10
Figure 9-8. Fairbanks 26 Meter (VLBI) Antenna Horizon Profile ..... 9-11
Figure 9-9. Fairbanks 12 Meter Antenna ..... 9-13
Figure 9-10. Fairbanks 12 Meter Antenna Horizon Profile ..... 9-14
Figure 9-11. Fairbanks 6 Meter Antenna ..... 9-16
Figure 9-12. Fairbanks 6 Meter Antenna Horizon Profile ..... 9-17
Figure 9-13. Fairbanks 4 Meter Antenna ..... 9-19
Figure 9-14. Fairbanks 4 Meter Antenna Horizon Profile ..... 9-20
Figure 9-15. Fairbanks SATAN Antenna ..... 9-22
Figure 9-16. Fairbanks SATAN Antenna Horizon Profile ..... 9-23
Figure 9-17. Fairbanks SCAMP Antenna ..... 9-25
Figure 9-18. Fairbanks SCAMP Antenna Horizon Profile ..... 9-26
Figure 9-19. Fairbanks VHF ARRAY Antenna ..... 9-28
Figure 9-20. Fairbanks VHF Antenna Horizon Profile ..... 9-29
Figure 9-21. NOAA Satellite Operations and Control Center ..... 9-31
Figure 9-22. Suitland 7.4 Meter (East) Antenna ..... 9-32
Figure 9-23. Suitland 7.4 Meter (West) Antenna ..... 9-34
Figure 9-24. Suitland 4.8 Meter (West) Antenna ..... 9-36
Figure 9-25. Suitland 4.8 Meter (East) Antenna ..... 9-38
Figure 9-26. Table Mountain 5 Meter Mesh Antenna ..... 9-40
Figure 10-1. X-Y Coordinate Map ..... 10-1
Figure 10-2. X'Y' Coordinate Map ..... 10-3
Figure 10-3. Az El Coordinate Map ..... 10-5

# List of Tables

Table 1-1. NOAA NESDIS Antenna & RF Systems Capability Chart for Wallops ..... 1-3
Table 1-2. NOAA NESDIS Antenna & RF Systems Capability Chart for Fairbanks and Barrow ....1-6
Table 1-3. NOAA NESDIS Antenna & RF Systems Capability Chart for Suitland, Greenbelt, Asheville and Boulder ..... 1-8
Table 2-1. Wallops 26 Meter Antenna System ..... 2-5
Table 2-2. Wallops 14.2 Meter Antenna System ..... 2-8
Table 2-3. Wallops 13 Meter A Antenna System ..... 2-12
Table 2-4. Wallops 13 Meter B Antenna System ..... 2-16
Table 2-5. Wallops 18 Meter (GOES-A) Antenna System ..... 2-20
Table 2-6. Wallops 18 Meter (GOES-B) Antenna System ..... 2-23
Table 2-7. Wallops 16.4 Meter (HR-1) Antenna System ..... 2-26
Table 2-8. Wallops 16.4 Meter (HR-2) Antenna System ..... 2-29
Table 2-9. Wallops 13 Meter (GOES-C) Antenna System ..... 2-32
Table 2-10. Wallops 8 Meter Antenna System ..... 2-34
Table 2-11. Wallops 7.2 Meter Antenna System ..... 2-36
Table 2-12. Wallops 5 Meter Antenna System ..... 2-38
Table 2-13. Wallops 1.2 Meter Antenna System ..... 2-40
Table 2-14. Wallops UHF HELIX (A) Antenna System ..... 2-42
Table 2-15. Wallops UHF HELIX (B) Antenna System ..... 2-43
Table 2-16. Wallops UHF HELIX (C) Antenna System ..... 2-44
Table 2-17. Wallops Recent Depot Level Maintenance Chart ..... 2-45
Table 3-1. Fairbanks 26 Meter Antenna System ..... 3-5
Table 3-2. Fairbanks 13 Meter ‘1/A’ Antenna System ..... 3-8
Table 3-3. Fairbanks 13 Meter ‘2/B’ Antenna System ..... 3-12
Table 3-4. Fairbanks 13 Meter ‘3/C’ Antenna System ..... 3-15
Table 3-5. Fairbanks 21 Meter Antenna System ..... 3-17
Table 3-6. Fairbanks Recent Depot Level Maintenance Chart ..... 3-21
Table 4-1. NSOF 9.1 Meter 1 Antenna System ..... 4-4
Table 4-2. NSOF 9.1 Meter 2 Antenna System ..... 4-6
Table 4-3. NSOF 9.1 Meter 3 Antenna System ..... 4-8
Table 4-4. NSOF 9.1 Meter 4 Antenna System ..... 4-10
Table 4-5. Suitland Recent Depot Level Maintenance Chart ..... 4-11
Table 5-1. GSFC 16.4 Meter (HR-3) Antenna System ..... 5-4
Table 5-2. GSFC Recent Depot Level Maintenance Chart ..... 5-5
Table 6-1. NCDC 3.8 Meter Antenna System ..... 6-3
Table 6-2. NCDC 1.8 Meter Antenna System ..... 6-4
Table 6-3. NCDC Recent Depot Level Maintenance Chart ..... 6-5
Table 7-1. DSRC 6.1 Meter Antenna System ..... 7-3
Table 7-2. Table Mountain 5 Meter Antenna System ..... 7-6
Table 7-3. DSRC/Table Mountain Recent Depot Level Maintenance Chart ..... 7-7
Table 8-1. Barrow, Alaska 4 Meter Antenna System ..... 8-4
Table 8-2. Barrow, Alaska 3 Meter Antenna System ..... 8-6
Table 9-1. Wallops 7 Meter Antenna System ..... 9-2

Table 9-2. Wallops 4 Meter Antenna System ..... 9-5
Table 9-3. Wallops SATAN Antenna System ..... 9-8
Table 9-4. Wallops Polar VHF AUX Antenna System ..... 9-9
Table 9-5. Fairbanks 26 Meter (VLBI) Antenna System ..... 9-12
Table 9-6. Fairbanks 12 Meter Antenna System ..... 9-15
Table 9-7. Fairbanks 6 Meter Antenna System ..... 9-18
Table 9-8. Fairbanks 4 Meter Antenna System ..... 9-21
Table 9-9. Fairbanks SATAN Antenna System ..... 9-24
Table 9-10. Fairbanks SCAMP Antenna System ..... 9-27
Table 9-11. Fairbanks VHF Array Antenna System ..... 9-30
Table 9-12. Suitland 7.4 Meter (East) Antenna System ..... 9-33
Table 9-13. Suitland 7.4 Meter (West) Antenna System ..... 9-35
Table 9-14. Suitland 4.8 Meter (West) Antenna System ..... 9-37
Table 9-15. Suitland 4.8 Meter (East) Antenna System ..... 9-39

# Section 1.0 NOAA/NESDIS Antenna and RF Systems

## 1.1 General Description

The National Oceanic and Atmospheric Administration (NOAA) National Environmental Satellite Data and Information Service (NESDIS) operates and maintains the nations meteorological satellite data acquisition and command facilities at Wallops Island, Virginia, and Fairbanks, Alaska, and a NOAA Satellite Operations Facility (NSOF) at Suitland, Maryland.

This publication not only describes the capabilities of the antenna systems located at these and other NOAA/NESDIS facilities but also serves as a summary of NOAA/NESDIS' antenna systems infrastructure. Table 1-1 provides an overview of the salient characteristics of these antenna systems. Section Two describes the antenna systems at the Wallops Command and Data Acquisition Station (WCDAS) located in Wallops Virginia. Section Three describes the antenna systems located at the Fairbanks Command and Data Acquisition Station (FCDAS) in Fairbanks, Alaska. Section Four describes the 9.1M GOES Variable Antenna Receive (GVAR) systems at the new NOAA Satellite Operations Facility at the Suitland, Maryland and Section Five describes the 16.4M antenna system at the Wallops Backup (WBU) site at the Goddard Space Flight Center, Greenbelt, Maryland. Also included herein are three other NOAA/NESDIS sites. They are located in Asheville, North Carolina, Boulder Colorado and Barrow, Alaska. These antenna systems are described in Sections 6, 7, and 8 respectively. Section Nine describes the NESDIS antennas that were formally used to support the NOAA/NESDIS GOES/POES missions but have been removed from mission support and/or operational service. These are shown in black and white and are provided for legacy/historical purposes only.

Beyond the new NSOF facility and the addition of the North Carolina, Colorado, and Barrow, Alaska sites, this publication attempts to capture some of the history and Depot Level Maintenance (DLM) data for each antenna system. The Wallops DLM chart is given in Table 2-17, the Fairbanks www. chart is given in Table 3-6, the Suitland DLM chart is given in Table 4-5, the Goddard Space Flight Center (GSFC) DLM chart is given in Table 5-2, the National Climatic Data Center (NCDC) DLM chart is given in Table 6-3, and the David Skaggs Research Center (DSRC) / Table Mountain DLM chart is given in Table 7-3. This was done for record keeping and future maintenance planning purposes.

The information presented herein is in tabular form. The data is a compilation of measured, estimated, calculated, and equipment manufacturer specifications. The data is believed to be accurate at the time of publication. The information is provided in loose-leaf format to allow periodic updates that are undertaken at five to seven year intervals.

The geodetic coordinates for the antenna reference points are referenced to the World Geodetic System 84 (WGS 84) datum on the Geodetic Reference System 80 (GRS 80) ellipsoid. The reference point of the antenna is the intersection of the horizontal and vertical axes of rotation. The height coordinate is the distance in meters above/below the reference ellipsoid, which approximates the shape of the earth. The elevation is the distance above the geoid or Mean Sea Level. The geoid is the equipotential gravity surface at mean sea level representing the irregular earth surface.

This page intentionally left blank.

***Table 1-1. NOAA NESDIS Antenna & RF Systems Capability Chart for Wallops***

| | | LOCATION | | | | | | | | ANTENNA | | | RECEIVE SYSTEM | | | | | | TRANSMIT SYSTEM | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE | ANTENNA | LATITUDE | | | LONGITUDE (E) | | | ELEV (M) | HEIGHT (M) | MOUNT | TYPE | FEED | FREQ (MHz) | POLARITY | GAIN (dBi) | 3 dB BW (DEG) | TSYS (DEG K) | G/T (dB) | FREQ (MHz) | POLARITY | GAIN (dBi) | 3 dB BW (DEG) | POWER (KW) | EIRP (dBm) |
| | | DEG | MIN | SEC | DEG | MIN | SEC | | | | | | | | | | | | | | | | | |
| WALLOPS | 26 METER | 37 | 56 | 48.080 | 284 | 32 | 28.691 | 23.4 | -15.0 | XY | PARABOLIC | PRIME | 136-138 | LINX/LINY | 27.4 | 6.7 | | | N/A | | | | | |
| | | | | | | | | | | | | | 1670-1710 | RCP/LCP | 43.8/43.6 | 0.5 | 343.7/362.7 | 18.4/18/0 | | | | | | |
| | | | | | | | | | | | | | 2200-2290 | RCP/LCP | 48.7/48.9 | 0.3 | 289.8/323.4 | 24.0/23.8 | | | | | | |
| WALLOPS | 14.2 METER | 37 | 56 | 48.390 | 284 | 32 | 23.773 | 12.6 | -25.8 | XY | PARABOLIC | PRIME | 136-138 | LINX/LINY | 22.4 | 11.2 | | | N/A | | | | | |
| | | | | | | | | | | | | | 1544.5 | RCP/LCP | 43.5 | 1.0 | 301.0 | 18.7 | | | | | | |
| | | | | | | | | | | | | | 1670-1710 | RCP/LCP | 44.3/43.9 | 0.9 | 144.5/142.2 | 22.7/22.4 | | | | | | |
| | | | | | | | | | | | | CASS | 7600-8500 | RCP/LCP | 58.5 | 0.195 | 190.5 | 35.7 | | | | | | |
| | | | | | | | | | | | | PRIME | 2200-2300 | RCP/LCP | 46.5/46.7 | 0.7 | 157.0/173.0 | 24.5/24.3 | 2025-2035 | RCP | 46.8 | 0.76 | 1 | 106.8 |
| WALLOPS | 13 METER A | 37 | 56 | 50.041 | 284 | 32 | 9.938 | 18.0 | -20.4 | AZ/EL | PARABOLIC | PRIME | 1670-1710 | RCP/LCP | 43.1 | 0.9 | 190.0 | 20.3 | 1750-1850 | RCP/LCP | 43.1 | 0.87 | 0.3 | 97.9 |
| | | | | | | | | | | | | | 2200-2400 | RCP/LCP | 44.0 | 0.7 | 110.0 | 23.5 | 2025-2120 | RCP/LCP | 44.4 | 0.77 | 0.3 | 99.2 |
| | | | | | | | | | | | | CASS | 7250-8500 | RCP/LCP | 55.0 | 0.2 | 70.0 | 36.4 | N/A | | | | | |
| WALLOPS | 13 METER B | 37 | 56 | 50.809 | 284 | 32 | 17.040 | 16.3 | -22.1 | AZ/EL | PARABOLIC | PRIME | 1670-1710 | RCP/LCP | 43.1 | 0.9 | 190.0 | 20.3 | 1750-1850 | RCP/LCP | 43.1 | 0.87 | 0.3 | 97.9 |
| | | | | | | | | | | | | | 2200-2400 | RCP/LCP | 44.0 | 0.7 | 110.0 | 23.5 | 2025-2120 | RCP/LCP | 44.4 | 0.77 | 0.3 | 99.2 |
| | | | | | | | | | | | | CASS | 7250-8500 | RCP/LCP | 55.0 | 0.2 | 70.0 | 36.4 | N/A | | | | | |
| WALLOPS | 18 METER A | 37 | 56 | 45.158 | 284 | 32 | 22.404 | 20.4 | -18.0 | AZ/EL | PARABOLIC | CASS. | 1670-1710 | ROTATABLE LINEAR | 46.8 | 0.7 | 81.3 | 27.7 | 2025-2035 | ROTATABLE LINEAR | 47.6 | 0.59 | 1 | 107.6 |
| | | | | | | | | | | | | | 2200-2290 | ROTATABLE LINEAR | 49.0 | 0.5 | 242.0 | 24.0 | | | | | | |
| WALLOPS | 18 METER B | 37 | 56 | 47.439 | 284 | 32 | 16.568 | 21.5 | -16.9 | AZ/EL | PARABOLIC | CASS. | 1670-1710 | ROTATABLE LINEAR | 46.5 | 0.7 | 90.8 | 26.9 | 2025-2035 | ROTATABLE LINEAR | 48.6 | 0.59 | 1 | 107.6 |
| | | | | | | | | | | | | | 2200-2290 | ROTATABLE LINEAR | 49.0 | 0.5 | 275.0 | 24.0 | | | | | | |
| WALLOPS | 16.4 METER HR1 | 37 | 56 | 43.797 | 284 | 32 | 19.912 | 19.9 | -18.5 | AZ/EL | PARABOLIC | CASS. | 1670-1710 | ROTATABLE LINEAR | 48.4 | 0.7 | 100.9 | 28.3 | 2025-2035 | ROTATABLE LINEAR | 49.6 | 0.55 | 1 | 109.6 |
| | | | | | | | | | | | | | 2200-2290 | ROTATABLE LINEAR | 50.0 | 0.5 | 97.7 | 30.1 | | | | | | |
| WALLOPS | 16.4 METER HR2 | 37 | 56 | 43.533 | 284 | 32 | 16.476 | 20.0 | -17.4 | AZ/EL | PARABOLIC | CASS. | 1670-1710 | ROTATABLE LINEAR | 48.4 | 0.7 | 100.9 | 28.3 | 2025-2035 | ROTATABLE LINEAR | 49.6 | 0.55 | 1 | 109.6 |
| | | | | | | | | | | | | | 2200-2290 | ROTATABLE LINEAR | 50.0 | 0.5 | 97.7 | 30.1 | | | | | | |
| WALLOPS | 13 METER C | 37 | 56 | 47.146 | 284 | 32 | 21.957 | 12.0 | -26.4 | AZ/EL | PARABOLIC | CASS. | 1670-1710 | ROTATABLE LINEAR | 44.4 | 0.9 | 99.0 | 24.4 | 2025-2035 | ROTATABLE LINEAR | 44.6 | 0.77 | 1 | 105 |
| | | | | | | | | | | | | | 2200-2290 | ROTATABLE LINEAR | | 0.7 | | 25.2 | | | | | | |
| WALLOPS | 8 METER | 37 | 56 | 44.800 | 284 | 32 | 18.350 | 9.2 | -29.2 | AZ/EL | PARABOLIC | CASS. | 1665-1700 | ROTATABLE LINEAR | 40.3 | 1.5 | 223.8 | 16.8 | 2025-2035 | ROTATABLE LINEAR | 42 | 1.25 | 2 | 102 |
| WALLOPS | HELIX A (EAST) | 37 | 56 | 44.000 | 284 | 32 | 22.000 | 10.0 | -28.4 | AZ/EL | HELIX | | 468.825 | RCP | 13 | 35 | 1500 | -26 | 401.7-402.0985 | RCP | 12.2 | 45 | 0.1 | 52.2 |
| WALLOPS | HELIX B (SPARE) | 37 | 56 | 44.000 | 284 | 32 | 22.000 | 10.0 | -28.4 | AZ/EL | HELIX | | 468.8125 | RCP | 13 | 35 | 1500 | -26 | 401.7-402.0985 | RCP | 12.2 | 45 | 0.1 | 52.2 |
| WALLOPS | HELIX C (WEST) | 37 | 56 | 44.000 | 284 | 32 | 22.000 | 10.0 | -28.4 | AZ/EL | HELIX | | 468.8375 | RCP | 13 | 35 | 1500 | -26 | 401.7-402.0985 | RCP | 12.2 | 45 | 0.1 | 52.2 |
| WALLOPS | 5 METER | 37 | 56 | 44.124 | 284 | 32 | 24.335 | 12.9 | -25.5 | AZ/EL | PARABOLIC | PRIME | 1668.5-1713.5 | LINEAR | 36.3 | 2.6 | 190.2 | 13.5 | N/A | | | | | |
| WALLOPS | 7.2 METER | 37 | 56 | 43.0 | 284 | 32 | 26.0 | 7.31 | | AZ/EL | PARABOLIC | PRIME | 1670-1710 | LINEAR | 39.1 | 1.75 | 162.2 | 17.0 | N/A | | | | | |
| WALLOPS | 1.2 METER 1 | 37 | 56 | 44.0 | 284 | 32 | 24.0 | 5.79 | | HR/DEC | PARABOLIC | PRIME | 1680-1710 | LINEAR | 24 | 10.3 | 190.5 | 1.2 | N/A | | | | | |
| WALLOPS | 1.2 METER 2 | 37 | 56 | 44.0 | 284 | 32 | 24.0 | 5.79 | | HR/DEC | PARABOLIC | PRIME | 1680-1710 | LINEAR | 24 | 10.3 | 190.5 | 1.2 | N/A | | | | | |
| WALLOPS | 1.2 METER 3 | 37 | 56 | 44.0 | 284 | 32 | 24.0 | 5.79 | | HR/DEC | PARABOLIC | PRIME | 1680-1710 | LINEAR | 24 | 10.3 | 190.5 | 1.2 | N/A | | | | | |
| WALLOPS | 1.2 METER 4 | 37 | 56 | 44.0 | 284 | 32 | 24.0 | 5.79 | | HR/DEC | PARABOLIC | PRIME | 1680-1710 | LINEAR | 24 | 10.3 | 190.5 | 1.2 | N/A | | | | | |
| WALLOPS | 7 METER | 37 | 56 | 43.993 | 284 | 32 | 20.037 | 13.2 | -25.2 | HA/DEC | PARABOLIC | PRIME | SYSTEM RECENTLY REMOVED | | | | | | | | | | | |
| WALLOPS | 4 METER | 37 | 56 | 44.813 | 284 | 32 | 19.577 | 14.8 | -23.6 | AZ/EL | PARABOLIC | PRIME | SYSTEM RECENTLY REMOVED | | | | | | | | | | | |
| WALLOPS | SATAN CMD | 37 | 56 | 46.751 | 284 | 32 | 24.447 | 16.9 | -21.5 | XY | DISC-ON-ROD | | N/A | | | | | | 148-154 | LINX/LINY/RCP/LCP | 19 | 12 | 3.5 | 84 |
| WALLOPS | POLAR AUX VHF | 37 | 56 | 48.0 | 284 | 32 | 27.0 | 10.6 | | AZ/EL | YAGI | | N/A | | | | | | 148 | RCP | 13.5 | 30 | 2.5 | 77.5 |

| |
|---|
| POLAR ANTENNA |
| GOES ANTENNA |
| REMOVED/INACTIVE |

***Table 1-2. NOAA NESDIS Antenna & RF Systems Capability Chart for Fairbanks and Barrow***

| | | LOCATION | | | | | | | | ANTENNA | | | RECEIVE SYSTEM | | | | | | TRANSMIT SYSTEM | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE | ANTENNA | LATITUDE | | | LONGITUDE (E) | | | ELEV (FT) | HEIGHT (FT) | MOUNT | TYPE | FEED | FREQ (MHz) | POLARITY | GAIN (dBi) | 3 dB BW (DEG) | TSYS (DEG K) | G/T (dB) | FREQ (MHz) | POLARITY | GAIN (dBi) | 3 dB BW (DEG) | POWER (KW) | EIRP (dBm) |
| | | DEG | MIN | SEC | DEG | MIN | SEC | | | | | | | | | | | | | | | | | |
| FAIRBANKS | 26 METER | 64 | 58 | 36.176 | 212 | 28 | 56.803 | 304.4 | 316.1 | XY | PARABOLIC | PRIME | 136-138 | LINX/LINY | 27.4 | 6.7 | | | N/A | | | | | |
| | | | | | | | | | | | | | 1670-1710 | RCP/LCP | 48.7 | 0.54 | 275.4 | 24.3 | | | | | | |
| | | | | | | | | | | | | | 2200-2300 | RCP/LCP | 51.8 | 0.34 | 257 | 27.7 | | | | | | |
| FAIRBANKS | 26 METER VLBI | 64 | 58 | 42.279 | 212 | 30 | 9.040 | 320.0 | 331.7 | XY | PARABOLIC | PRIME | 2100-2300 | RCP | 52.1 | 0.34 | 65 | 34 | N/A | | | | | |
| | | | | | | | | | | | | | 8200-8800 | RCP | 63.4 | 0.08 | 60 | 45.6 | | | | | | |
| FAIRBANKS | 13 METER '1A' | 64 | 58 | 26.400 | 212 | 29 | 24.396 | 367 | 378.7 | AZ/EL | PARABOLIC | PRIME | 1670-1710 | RCP/LCP | 43.1 | 0.8 | 190 | 19.8 | 1750-1850 | RCP/LCP | 41.4 | 0.87 | 0.3 | 96.2 |
| | | | | | | | | | | | | PRIME | 2200-2400 | RCP/LCP | 44.0 | 0.6 | 110 | 23.5 | 2025-2120 | RCP/LCP | 43.5 | 0.77 | 0.3 | 98.3 |
| | | | | | | | | | | | | CASS. | 7250-8500 | RCP/LCP | 58.0 | 0.18 | 70 | 37.8 | N/A | | | | | |
| FAIRBANKS | 13 METER '2B' | 64 | 58 | 25.716 | 212 | 29 | 39.3 | 385 | 396.7 | AZ/EL | PARABOLIC | PRIME | 1670-1710 | RCP/LCP | 42.0 | 0.8 | 190 | 19.2 | 1750-1850 | RCP/LCP | 41.7 | 0.7 | 0.3 | 96.5 |
| | | | | | | | | | | | | PRIME | 2200-2400 | RCP/LCP | 44.0 | 0.6 | 110 | 23.6 | 2025-2120 | RCP/LCP | 42.7 | 0.7 | 0.3 | 97.7 |
| | | | | | | | | | | | | CASS. | 7250-8500 | RCP/LCP | 55.0 | 0.18 | 70 | 36.5 | N/A | | | | | |
| FAIRBANKS | 13 METER 3C' | 64 | 58 | 24.492 | 212 | 29 | 53.412 | 404 | 415.7 | AZ/EL | PARABOLIC | PRIME | 1670-1710 | RCP/LCP | 43.1 | 0.8 | 190 | 19.6 | 1750-1850 | RCP/LCP | 41.8 | 0.87 | 0.3 | 96.7 |
| | | | | | | | | | | | | PRIME | 2200-2400 | RCP/LCP | 44.0 | 0.6 | 110 | 23.4 | 2025-2120 | RCP/LCP | 43 | 0.77 | 0.3 | 97.7 |
| | | | | | | | | | | | | CASS. | 7250-8500 | RCP/LCP | 58.0 | 0.18 | 70 | 36.4 | N/A | | | | | |
| FAIRBANKS | 21 METER | 64 | 58 | 21.9 | 212 | 29 | 56.040 | 435.6 | | AZ/EL | PARABOLIC | CASS. | 1670-1710 | ROTATABLE LINEAR | 50.58 | 0.48 | 41.1 | 30.75 | 2025-2035 | ROTATABLE LINEAR | 53.12 | 0.34 | 1 | 113.1 |
| | | | | | | | | | | | | | 2200-2300 | ROTATABLE LINEAR | 53.12 | 0.34 | 48.95 | 32.93 | | | | | | |
| FAIRBANKS | SAR 1 | 64 | 58 | 25.59 | 212 | 28 | 58.22 | 444.1 | | | | | | | | | | | N/A | | | | | |
| FAIRBANKS | SAR 2 | 64 | 58 | 25.18 | 212 | 28 | 56.07 | 444.7 | | | | | | | | | | | N/A | | | | | |
| FAIRBANKS | 12 METER | 64 | 58 | 35.391 | 212 | 28 | 45.222 | 295.5 | 307.2 | XY | PARABOLIC | PRIME | 136-138 | LINX/LINY | 16 | 13 | | | N/A | | | | | |
| | | | | | | | | | | | | | 1670-1710 | RCP/LCP | 43.7 | 1 | 813 | 14.6 | | | | | | |
| | | | | | | | | | | | | | 2200-2300 | RCP/LCP | 46 | 0.8 | 426.6 | 19.7 | | | | | | |
| FAIRBANKS | 6 METER | 64 | 58 | 20.312 | 212 | 28 | 56.804 | 327.5 | 339.2 | XY | PARABOLIC | PRIME | SYSTEM RECENTLY REMOVED | | | | | | | | | | | |
| FAIRBANKS | 4 METER | 64 | 58 | 23.834 | 212 | 28 | 59.067 | 340.7 | 352.4 | AZ/EL | PARABOLIC | PRIME | SYSTEM RECENTLY REMOVED | | | | | | | | | | | |
| FAIRBANKS | SATAN CMD | 64 | 58 | 19.644 | 212 | 29 | 1.441 | 330.0 | 341.7 | XY | DISC-ON-ROD | | N/A | | | | | | 148-154 | RCP | 19 | 12 | 3.5 | 84.4 |
| FAIRBANKS | SCAMP CMD | 64 | 58 | 22.281 | 212 | 28 | 55.139 | 330.5 | 342.2 | XY | YAGI | | N/A | | | | | | 148-154 | RCP | 17 | 20 | 3.5 | 82.4 |
| FAIRBANKS | VHF ARRAY | 64 | 58 | 23.834 | 212 | 28 | 59.067 | 340.7 | 352.4 | AZ/EL | YAGI | | 136-138 | RCP/LCP | 20 | 16 | 1109 | -10.4 | 148.46-148.66 | RCP | | | | |
| BARROW | 3 METER | 71 | 19 | 24 | 203 | 23 | 22.0 | 2.1 | 4.8* | AZ/EL | PARABOLIC | PRIME | 1668-1725 | | 32 | | | | | | | | | |
| BARROW | 4 METER | 71 | 19 | 25 | 203 | 23 | 20.85 | 2.1 | 14.8* | AZ/EL | PARABOLIC | PRIME | N/A | | | | | | 2024-2110 | RCP | 34 | 3 | .3 | 88.8 |

*Estimate based on site photos

| |
|---|
| POLAR ANTENNA |
| GOES ANTENNA |
| REMOVED/INACTIVE |

This page intentionally left blank.

***Table 1-3. NOAA NESDIS Antenna & RF Systems Capability Chart for Suitland, Greenbelt, Asheville and Boulder***

| | | LOCATION | | | | | | | | ANTENNA | | | RECEIVE SYSTEM | | | | | | TRANSMIT SYSTEM | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE | ANTENNA | LATITUDE | | | LONGITUDE (E) | | | ELEV (M) | HEIGHT (M) | MOUNT | TYPE | FEED | FREQ (MHz) | POLARITY | GAIN (dBi) | 3 dB BW (DEG) | TSYS (DEG K) | G/T (dB) | FREQ (MHz) | POLARITY | GAIN (dBi) | 3 dB BW (DEG) | POWER (KW) | EIRP (dBm) |
| | | DEG | MIN | SEC | DEG | MIN | SEC | | | | | | | | | | | | | | | | | |
| SUITLAND | 9.1 METER 1 | 38 | 51 | 7.7 | 283 | 3 | 46.900 | 86.8 | | AZ/EL | PARABOLIC | PRIME | 1670-1710 | ROTATABLE LINEAR | 42.1 | 1.18 | 181.85 | 19.5 | N/A | | | | | |
| | | | | | | | | | | | | CASS. | 8000-8500 | ROTATABLE LINEAR | 55.7 | 0.27 | 138.64 | 34.3 | | | | | | |
| SUITLAND | 9.1 METER 2 | 38 | 51 | 7.7 | 283 | 3 | 46.900 | 86.8 | | AZ/EL | PARABOLIC | PRIME | 1670-1710 | ROTATABLE LINEAR | 42 | 1.19 | 169.26 | 19.7 | N/A | | | | | |
| | | | | | | | | | | | | CASS. | 8000-8500 | ROTATABLE LINEAR | 55.6 | 0.27 | 128.66 | 34.5 | | | | | | |
| SUITLAND | 9.1 METER 3 | 38 | 51 | 7.7 | 283 | 3 | 46.900 | 86.8 | | AZ/EL | PARABOLIC | PRIME | 1670-1710 | ROTATABLE LINEAR | 41.6 | 1.25 | 182.4 | 19.1 | N/A | | | | | |
| | | | | | | | | | | | | CASS. | 8000-8500 | ROTATABLE LINEAR | 55.2 | 0.28 | 142.09 | 33.7 | | | | | | |
| SUITLAND | 9.1 METER 4 | 38 | 51 | 7.7 | 283 | 3 | 46.900 | 86.8 | | AZ/EL | PARABOLIC | PRIME | 1670-1710 | ROTATABLE LINEAR | 41.5 | 1.25 | 160.42 | 19.5 | N/A | | | | | |
| | | | | | | | | | | | | CASS. | 8000-8500 | ROTATABLE LINEAR | 55.5 | 0.28 | 130.4 | 34.4 | | | | | | |
| SUITLAND | 7.4 METER EAST | 38 | 50 | 58.494 | 283 | 4 | 10.890 | 103.7 | 71.2 | HA/DEC | PARABOLIC | PRIME | 1670-1710 | ROTATABLE LINEAR | 39 | 1.6 | 186.2 | 16.3 | N/A | | | | | |
| SUITLAND | 7.4 METER WEST | 38 | 50 | 59.361 | 283 | 4 | 8.064 | 103.7 | 71.2 | HA/DEC | PARABOLIC | PRIME | 1670-1710 | ROTATABLE LINEAR | 39 | 1.6 | 199.5 | 16 | N/A | | | | | |
| SUITLAND | 4.8 METER WEST | 38 | 51 | 0.416 | 283 | 4 | 8.458 | 101.7 | 69.2 | HA/DEC | PARABOLIC | PRIME | 1670-1710 | ROTATABLE LINEAR | 36 | 2.6 | 93 | 15.5 | N/A | | | | | |
| SUITLAND | 4.8 METER EAST | 38 | 50 | 59.151 | 283 | 4 | 9.317 | 105.8 | 73.3 | HA/DEC | PARABOLIC | PRIME | 1670-1710 | ROTATABLE LINEAR | 36 | 2.6 | 93 | 15.5 | N/A | | | | | |
| GSFC (WBU) | 16.4 METER HR3 | 39 | 00 | 2.170 | 283 | 9 | 30.822 | 62.78 | 30.42 | AZ/EL | PARABOLIC | CASS. | 1670-1710 | ROTATABLE LINEAR | 48.8 | 0.67 | 100.9 | 28.3 | 2025-2035 | ROTATABLE LINEAR | 49.6 | 0.55 | 1 | 109.6 |
| | | | | | | | | | | | | | 2200-2290 | ROTATABLE LINEAR | 50.0 | 0.53 | 97.7 | 30.1 | | | | | | |
| ASHEVILLE | 3.8 METER | 35 | 35 | 37.95 | 278 | 27 | 32.650 | | | AZ/EL | PARABOLIC | PRIME | | ROTATABLE LINEAR | | | | | N/A | | | | | |
| ASHEVILLE | 1.8 METER | 35 | 35 | 37.95 | 278 | 27 | 32.650 | | | AZ/EL | PARABOLIC | PRIME | 10950-12750 | HORIZONTAL | 45.5 | 0.9 | | | N/A | | | | | |
| BOULDER (DSRC) | 6.1 METER | 39 | 59 | 26.27 | 254 | 44 | 9.76 | 1669.9 | | AZ/EL | PARABOLIC | CASS. | 1670-1710 | ROTATABLE LINEAR | 37.6 | 2.1 | 96 | 16 | N/A | | | | | |
| | | | | | | | | | | | | | 2200-2300 | RCP | | | | | N/A | | | | | |
| BOULDER (DSRC) | 6.1 METER | 39 | 59 | 26.30 | 254 | 44 | 9.14 | 1670.6 | | AZ/EL | PARABOLIC | CASS. | 1670-1710 | ROTATABLE LINEAR | 37.6 | 2.1 | 96 | 16 | N/A | | | | | |
| | | | | | | | | | | | | | 2200-2300 | RCP | | | | | N/A | | | | | |
| BOULDER (DSRC) | 6.1 METER | 39 | 59 | 26.28 | 254 | 44 | 8.33 | 1671.5 | | AZ/EL | PARABOLIC | CASS. | 1670-1710 | ROTATABLE LINEAR | 37.6 | 2.1 | 96 | 16 | N/A | | | | | |
| | | | | | | | | | | | | | 2200-2300 | RCP | | | | | N/A | | | | | |
| BOULDER | 5 METER | 40 | 7 | 51.69 | 254 | 45 | 33.4 | 1690.1 | | AZ/EL | PARABOLIC | PRIME | 1670-1710 | ROTATABLE LINEAR | | | | | N/A | | | | | |
| BOULDER | 5 METER | 40 | 7 | 51.69 | 254 | 45 | 32.8 | 1690.1 | | AZ/EL | PARABOLIC | PRIME | 1670-1710 | ROTATABLE LINEAR | | | | | N/A | | | | | |
| BOULDER | 5 METER | 40 | 7 | 51.69 | 254 | 45 | 32.1 | 1690.7 | | HA/DEC | PARABOLIC | PRIME | 1670-1710 | ROTATABLE LINEAR | | | | | N/A | | | | | |

| |
|---|
| POLAR ANTENNA |
| GOES ANTENNA |
| REMOVED/INACTIVE |

This page intentionally left blank.

# Section 2.0 Wallops Command and Data Acquisition Station Antenna System

## 2.1 General Description

WCDAS provides data acquisition, command, control, and reprocessing of NOAA's Geostationary Operational Environmental Satellite (GOES) and NOAA's Polar-orbiting Operational Environmental Satellite (POES) systems as well as other scientific missions as tasked. The station also provides support to the National Aeronautics and Space Administration (NASA) by acquiring and forwarding spacecraft data to the NASA Wallops Facility over fiber optic tie lines between the stations. These tie lines also allow the NOAA to use the antenna systems at the NASA facility when required.

***Figure 2-1. Wallops Command & Data Acquisition Station (South View)***

Figure 2-2 shows an aerial view of WCDAS.

***Figure 2-2. Wallops Command and Data Acquisition Station (Aerial View)***

***Figure 2-3. Wallops 26 Meter Antenna***

## 2.2 26 Meter Antenna System

The 26 meter antenna system depicted in Figure 2-3 is a Rohr parabolic antenna with a prime focus feed system on a fully steerable X/Y mount. The primary function of the system is to receive data from the Low Earth Orbiting (LEO) and POES spacecraft. The 26 meter antenna is also capable of supporting the GOES, Advanced Composite Explorer (ACE), and other LEO spacecraft missions as required. The system can and has been used to acquire tracking data from GOES. This time-tagged axis position data is then forwarded to the GOES navigation office and is used to update orbital parameters. The 26 meter system can track non-NOAA satellites and forward the data to the nearby NASA facility as required.

The multi-frequency feed is designed to operate in several frequency bands. All received signals are converted from the respective frequency band to an Intermediate Frequency (IF) between 400 MHz and 500 MHz. The data is then demodulated by Diversity Combined Receivers (DCR) or equivalent. This IF can also be converted to the nominal GOES 70 MHz frequency band via a 450/70 MHz up converter with cabling to route the signals to the GOES floor as required.

The antenna is positioned using electric drive motors mounted on each axis. The control signals and steering voltages are generated at the Antenna Control Console (ACC). The ACC is capable of Two line Element (TLE) Program track and limited Automated Gain Control (AGC) signal track. The antenna also can be driven manually. Figure 2-4 provides a horizon profile of terrain masking to aid in identifying signal blockage constraints. Table 2-1 describes the capabilities of this system.

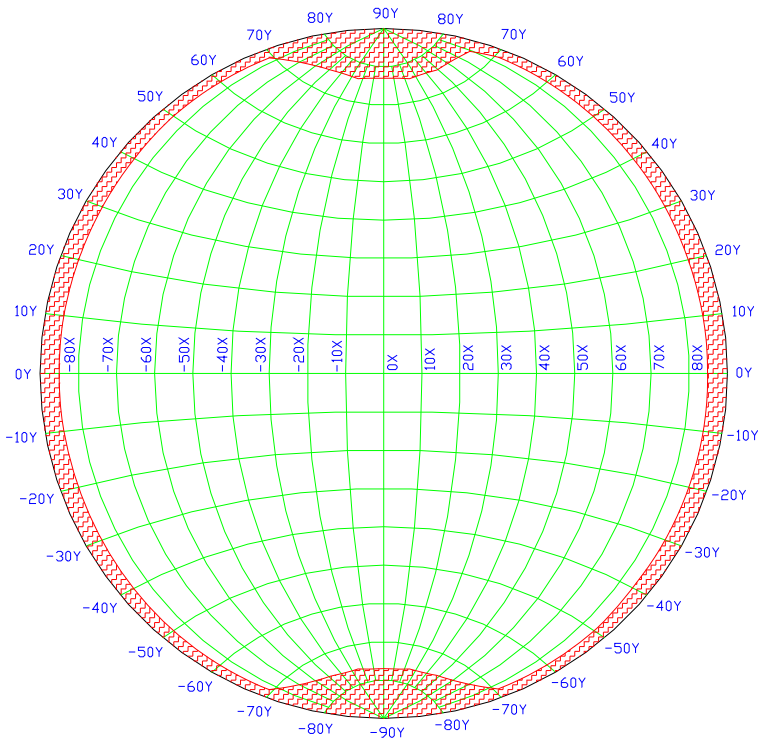


***Figure 2-4. Wallops 26 Meter Antenna System Horizon Profile***

***Table 2-1. Wallops 26 Meter Antenna System***

| | |
|---|---|
| Location (WGS 84)<br><br>North Latitude<br>East Longitude<br>Height | <br><br>37° 56' 48.080"<br>284° 32' 28.691"<br>-15 Meters |
| Mount Type | XY (+X East, +Y North) |
| Control Modes | Manual - Antenna position determined by operator input from remote control located in control room.<br>NORAD Track (TLE) - Computer positions antenna based on prepared acquisition data sets.<br>Slave - Antenna positioned to angles of other site antenna or computer using site synchro slave bus. |
| Antenna Type | Prime Focus Parabolic |
| Reflector Diameter | 26 Meters |
| Receive Frequencies | 136-138 MHz<br>1670-1710 MHz<br>2200-2300 MHz |
| Polarity<br>36-138 MHz<br><br>1670-1710 MHz<br><br><br>2200-2300 MHz | <br>Linear X / Linear Y<br><br>Right-hand Circular Polarization (RCP) / Left-hand Circular Polarization (LCP) (optimally combined in DCR)<br><br>RCP / LCP (optimally combined in DCR) |
| Receive Gain<br>136-138 MHz<br>1670-1710 MHz<br>2200-2300 MHz | <br>27 dBi<br>43.7 dBi<br>48.8 dBi |
| System Temperature<br>136-138 MHz<br>1670-1710 MHz<br>2200-2300 MHz | <br><br>200° Kelvin<br>170° Kelvin |
| Gain/Temperature (G/T)<br>136-138 MHz<br>1670-1710 MHz<br>2200-2300 MHz Control Modes | <br><br>20.7 dB DERIVED<br>26.5 dB DERIVED |
| Receive 3 dB Beam width<br>136-138 MHz<br>1670-1710 MHz<br>2200-2300 MHz | <br>6.7°<br>0.54°<br>0.34° |

***Figure 2-5. Wallops 14.2 Meter Antenna***

## 2.3 14.2 Meter Antenna System

The 14.2 meter antenna system, like the 26 meter system, is a TIW prime focus parabolic antenna on a fully steerable X/Y mount. The 14.2 meter antenna was recently upgraded to support X-band via a sub-reflector. The X- and Y-axis drive systems consist of dual, opposed torque drives, each drive consisting of a DC servo motor and gear reducer with a pinion on the reducer output shaft. This system is designed to perform the same functions as the 26 meter system described in Section 2.2. In addition to the 26 meter system capabilities, the 14.2 meter antenna can also be used to transmit commands to the spacecraft in the S-Band frequency range. The 14.2 meter antenna is capable of supporting the GOES, ACE, and other LEO spacecraft missions as required. It also is capable of receiving the 1544 MHz signal from the Search and Rescue Satellite (SARSAT) on the NOAA spacecraft. Figure 2-6 provides the terrain masking profile. System capabilities are outlined in Table 2-2.

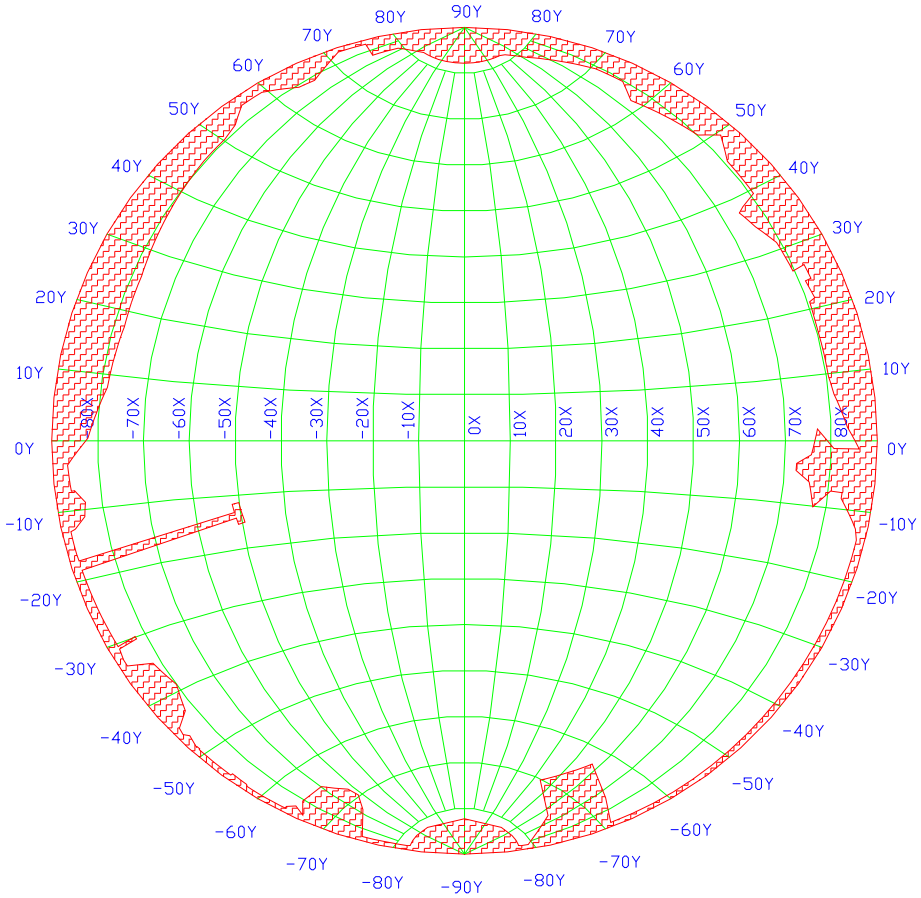


***Figure 2-6. Wallops 14.2 Meter Antenna Horizon Profile***

***Table 2-2. Wallops 14.2 Meter Antenna System***

| | |
|---|---|
| Location (WGS 84)<br><br>North Latitude<br>East Longitude<br>Height | <br><br>37° 56' 48.390"<br>284° 32' 23.773"<br>-25.8 Meters |
| Mount Type | XY (+X East, +Y North) |
| Control Modes | Manual -Antenna position determined by operator input from remote control located in control room.<br><br>Auto-track - Position error signals from receiver determine antenna position.<br><br>Program - Computer positions antenna based on processed acquisition data.<br><br>Slave - Antenna positioned to angles of other site antenna or computer using site synchro slave bus. |
| Antenna Type | Prime Focus Parabolic / CASS 'X' |
| Reflector Diameter | 14.2 Meters |
| Receive Frequencies | 136 - 138 MHz<br>1544.5 MHz<br>1670-1710 MHz<br>2200-2300 MHz<br>7600-8500 MHz |
| Polarity<br><br>136-138 MHz<br><br>1544.5 MHz<br><br>1670-1710 MHz<br><br>2200-2300 MHz | <br><br>Linear X / Linear Y<br><br>RCP / LCP (optimally combined DCR)<br><br>RCP / LCP (optimally combined DCR)<br><br>RCP / LCP (optimally combined DCR) |

***Table 2-2. Wallops 14.2 Meter Antenna System (Continued)***

| | |
|---|---|
| Receive Gain<br>136-138 MHz<br>1544.5 MHz<br>1670-1710 MHz<br>2200-2300 MHz<br>7600-8500 MHz | <br>22.4 dBi<br>43.5 dBi<br>44.1 dBi<br>46.6 dBi<br>55.0 dBi DERIVED |
| System Temperature<br>136-138 MHz<br>1544.5 MHz<br>1670-1710 MHz<br>2200-2300 MHz<br>7600-8500 MHz | <br><br>301° Kelvin<br>143° Kelvin DERIVED<br>165° Kelvin<br>70° Kelvin DERIVED |
| Gain/Temperature (G/T)<br>136-138 MHz<br>1544.5 MHz<br>1670-1710 MHz<br>2200-2300 MHz Control Modes<br>7600-8500 MHz | <br><br>18.7 dB<br>22.5 dB DERIVED<br>24.4 dB<br>36.5 dB DERIVED |
| Receive 3 dB Beam width<br>136-138 MHz<br>1544.5 MHz<br>1670-1710 MHz<br>2200-2300 MHz<br>7600-8500 MHz | <br>11.23°<br>1.0°<br>0.91°<br>0.68°<br>0.185°DERIVED |
| Transmit Frequency | 2020-2035 MHz |
| Transmit Polarity | Right -hand Circular |
| Transmit Gain | 46.8 dBi |
| Transmit 3 dB Beam width | 0.76° |
| Transmit Power | 1000W |
| Effective Isotropic Radiated Power (EIRP) | 106.8 dBm |

***Figure 2-7. Wallops 13 Meter A Antenna***

## 2.4 13 Meter A Antenna System

The 13 meter A antenna system depicted in Figure 2-7 is a DATRON parabolic antenna with a prime focus feed system for L-Band and S-Band but utilizes a sub-reflector for the X-Band feed. The 13 meter antenna system consists of a three-axis pedestal, elevation over azimuth, with two 13.6 horsepower motors in each axis. The 7 degree tilted third axis provides the hemispheric coverage required to maintain constant signal acquisition during overhead passes without exceeding the velocity constraints of the pedestal. This remote sensing satellite system provides tracking, command, and receiving mission telemetry data from the NOAA low earth orbit (LEO) satellites - NOAA POES, United States Air Force (USAF) Defense Meteorological Satellite Program (DMSP) and others. The basic system hardware and software is configured to support NOAA/USAF L-Band and S-Band satellites and with options, X-Band remote sensing satellites. The 13 meter antenna can command spacecraft in both the S-Band and L-Band frequency range. Figure 2-8 provides the terrain masking profile. System capabilities are outlined in Table 2-3.

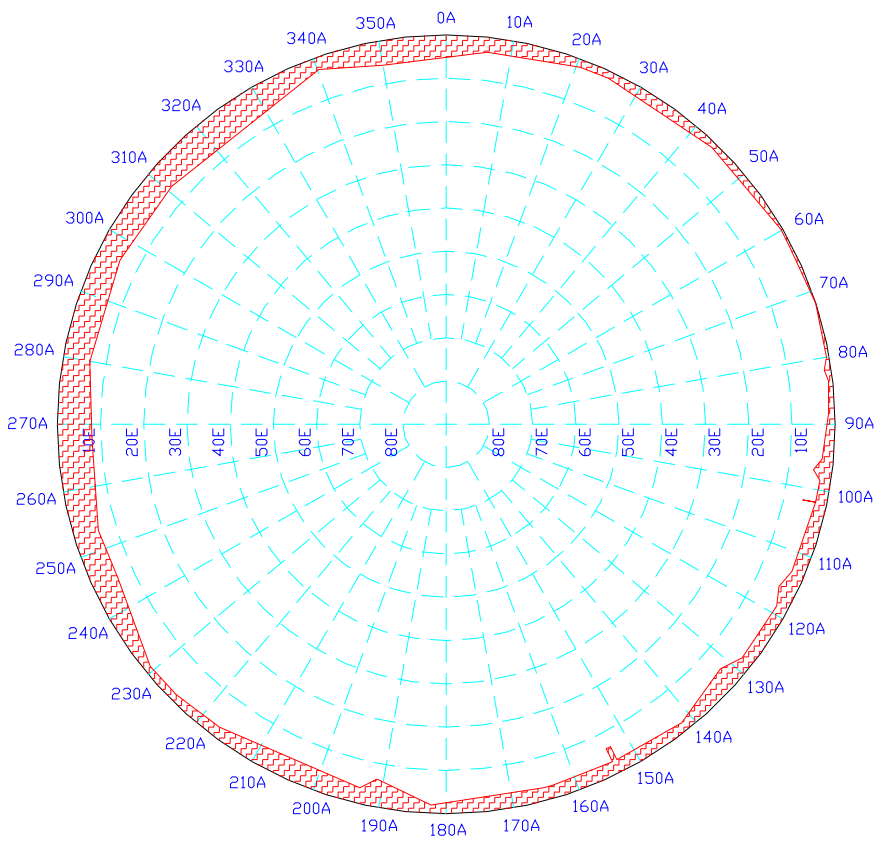


***Figure 2-8. Wallops 13 Meter A Antenna Horizon Profile***

***Table 2-3. Wallops 13 Meter A Antenna System***

| | |
|---|---|
| Location (WGS 84)<br>North Latitude<br>East Longitude<br>Height | <br>37° 56' 50.041"<br>284° 32' 09.938"<br>-20.4 Meters |
| Mount Type | Azimuth/Elevation (AZ/EL) |
| Control Modes | Manual -Antenna position determined by operator input from remote control located in control room.<br><br>Auto-track - Position error signals from receiver determine antenna position.<br><br>Program - Computer positions antenna based on processed acquisition data.<br><br>Slave - Antenna positioned to angles of other site antenna or computer using site synchro slave bus. |
| Antenna Type | Prime Focus Parabolic / CASS 'X' |
| Reflector Diameter | 13 Meters |
| Receive Frequencies | 1670-1710 MHz<br>2200-2400 MHz<br>7250-8500 MHz |
| Polarity<br><br>1670-1710 MHz<br><br>2200-2400 MHz<br><br>7250-8500 MHz | <br><br>RCP / LCP (optimally combined in Multi-Function Receiver)<br><br>RCP / LCP (optimally combined in Multi-Function Receiver)<br><br>RCP / LCP (optimally combined in Multi-Function Receiver) |

***Table 2-3. Wallops 13 Meter A Antenna System (Continued)***

| | |
|---|---|
| Receive Gain<br>1670-1710 MHz<br>2200-2400 MHz<br>7250-8500 MHz | <br>43.1 dBi<br>44.0 dBi<br>55.0 dBi |
| System Temperature<br>1670-1710 MHz<br>2200-2400 MHz<br>7250-8500 MHz | <br>190° Kelvin<br>110° Kelvin<br>70° Kelvin |
| Gain/Temperature (G/T)<br>1670-1710 MHz<br>2200-2400 MHz<br>7250-8500 MHz | <br>20.3 dB<br>23.5 dB<br>36.4 dB |
| Receive 3 dB Beamwidth<br>1670-1710 MHz<br>2200-2400 MHz<br>7250-8500 MHz | <br>0.91°<br>0.69°<br>0.19° |
| Transmit Frequency | 1750-1850 MHz<br>2025-2120 MHz |
| Transmit Polarity | Right-hand Circular or Left-hand Circular |
| Transmit Gain<br>1750-1850 MHz<br>2025-2120 MHz | <br>43.14 dBi<br>44.41 dBi |
| Transmit 3 dB Beam width<br>1750-1850 MHz<br>2025-2120 MHz | <br>0.87°<br>0.77° |
| Transmit Power | 300 W |
| Effective Isotropic Radiated Power (EIRP) | 97.91 dBm |

***Figure 2-9. Wallops 13 Meter B Antenna***

## 2.5 13 Meter B Antenna System

The 13 meter B antenna system shown in Figure 2-9 is a DATRON parabolic antenna with a prime focus feed system for L-Band and S-Band, but utilizes a sub-reflector for the X-Band feed. The 13 meter antenna system consists of a three-axis pedestal, elevation over azimuth, with two 13.6 horsepower motors in each axis. The 7 degree tilted third axis provides the hemispheric coverage required to maintain constant signal acquisition during overhead passes without exceeding the velocity constraints of the pedestal. This remote sensing satellite system provides tracking, command, and receiving mission telemetry data from the NOAA low earth orbit (LEO) satellites - NOAA POES, USAF DMSP and others. The basic system hardware and software is configured to support NOAA/USAF L-Band and S-Band satellites and with options, X-Band remote sensing satellites. The 13 meter antenna can command spacecraft in both the S-Band and L-Band frequency range. Figure 2-10 provides the terrain masking profile. System capabilities are outlined in Table 2-4.

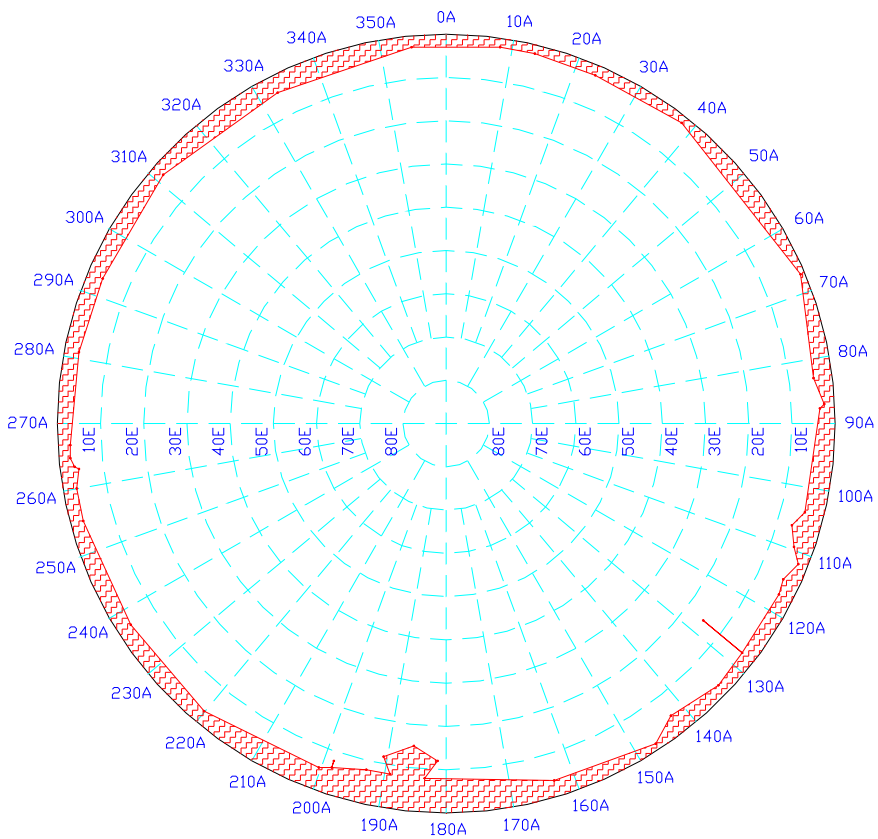


***Figure 2-10. Wallops 13 Meter B Antenna Horizon Profile***

***Table 2-4. Wallops 13 Meter B Antenna System***

| | |
|---|---|
| Location (WGS 84)<br><br>North Latitude<br>East Longitude<br>Height | <br><br>37° 56' 50.809"<br>284° 32' 17.040"<br>-22.14 Meters |
| Mount Type | Azimuth/Elevation (AZ/EL) |
| Control Modes | Manual -Antenna position determined by operator input from remote control located in control room.<br><br>Autotrack - Position error signals from receiver determine antenna position.<br><br>Program - Computer positions antenna based on processed acquisition data.<br><br>Slave - Antenna positioned to angles of other site antenna or computer using site synchro slave bus. |
| Antenna Type | Prime Focus Parabolic / CASS 'X' |
| Reflector Diameter | 13 Meters |
| Receive Frequencies | 1670-1710 MHz<br>2200-2400 MHz<br>7250-8500 MHz |
| Polarity<br><br>1670-1710 MHz<br><br>2200-2400 MHz<br><br>7250-8500 MHz | <br><br>Right-hand Circular (RCP) / Left-hand Circular (LCP) (optimally combined in Microdyne Receiver)<br><br>Right-hand Circular (RCP) / Left-hand Circular (LCP) (optimally combined in Microdyne Receiver)<br><br>Right-hand Circular (RCP) / Left-hand Circular (LCP) (optimally combined in Microdyne Receiver) |

***Table 2-4. Wallops 13 Meter B Antenna System (Continued)***

| | |
|---|---|
| Receive Gain<br>1670-1710 MHz<br>2200-2400 MHz<br>7250-8500 MHz | <br>43.1 dBi<br>44.0 dBi<br>55.0 dBi |
| System Temperature<br>1670-1710 MHz<br>2200-2400 MHz<br>7250-8500 MHz | <br>190° Kelvin<br>110° Kelvin<br>70° Kelvin |
| Gain/Temperature (G/T)<br>1670-1710 MHz<br>2200-2400 MHz<br>7250-8500 MHz | <br>20.3 dB<br>23.5 dB<br>36.4 dB |
| Receive 3 dB Beam width<br>1670-1710 MHz<br>2200-2400 MHz<br>7250-8500 MHz | <br>0.91°<br>0.69°<br>0.19° |
| Transmit Frequency | 1750-1850 MHz<br>2025-2120 MHz |
| Transmit Polarity | Right-hand Circular or Left-hand Circular |
| Transmit Gain<br>1750-1850 MHz<br>2025-2120 MHz | <br>43.14 dBi<br>44.41 dBi |
| Transmit 3 dB Beam width<br>1750-1850 MHz<br>2025-2120 MHz | <br>0.87°<br>0.77° |
| Transmit Power | 300 W |
| Effective Isotropic Radiated Power (EIRP) | 97.91 dBm |

***Figure 2-11. Wallops 18 Meter (GOES-A) Antenna***

## 2.6 18 Meter (GOES-A) Antenna System

The 18 meter (GOES-A) system is a Radiation Systems, Inc. parabolic antenna with a cassegrain feed system on a steerable Azimuth/Elevation mount. It is designed to support geostationary orbiting satellites. The system receives data from GOES in the 1670 MHz to 1710 MHz and 2200 MHz to 2290 MHz frequency bands. Signals received are down converted to the required IF range and demodulated, pre-processed, distributed, and recorded by equipment in the GOES operations area. S-band transmitters are used to transmit commands and range tones to the spacecraft. These transmitters are also used to transmit preprocessed spacecraft data to the NSOF via spacecraft transponders. Figure 2-12 provides a terrain masking profile and Table 2-5 describes the antenna system.

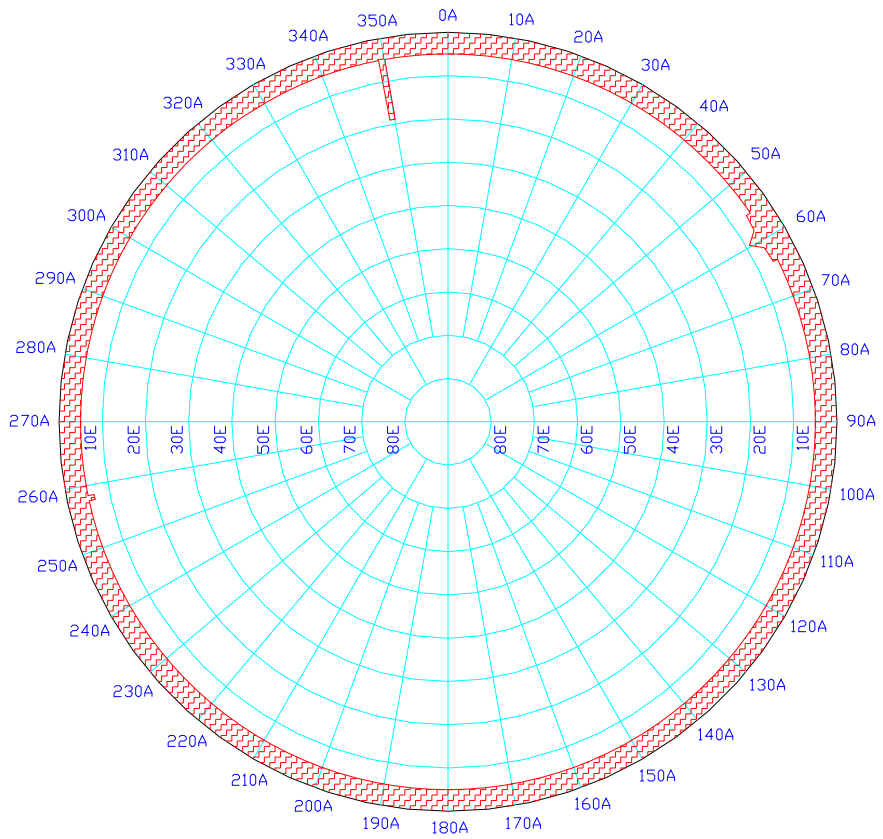


***Figure 2-12. Wallops 18 Meter (GOES-A) Antenna Horizon Profile***

***Table 2-5. Wallops 18 Meter (GOES-A) Antenna System***

| | |
|---|---|
| Location (WGS 84)<br>North Latitude<br>East Longitude<br>Height | <br>37° 56' 45.158"<br>284° 32' 22.404"<br>-18 Meters |
| Mount Type | Azimuth/Elevation (AZ/EL) |
| Control Modes | Manual Position / Manual Rate Track<br>Stow/Maintenance/Axis and Stop - Antenna position determined by operator input from remote control located in control room.<br><br>Monopulse, StepTrack, Optrack, NORAD TLE, Table/Preset Position, Star, Sun Track<br>via Antenna Control Unit(s) |
| Antenna Type | Cassegrain Focus Parabolic |
| Reflector Diameter | 18 Meter |
| Receive Frequencies | 1670-1710 MHz<br>2200-2290 MHz |
| Polarity | Linear (All Transmit and Receive systems share a common feed which is rotate able through 360 degree from remote control located in the control room) |
| Receive Gain<br>1670-1710 MHz<br>2200-2290 MHz | <br>46.8 dBi |
| System Temperature<br>1670-1710 MHz<br>2200-2290 MHz | <br>81.3°Kelvin |
| Gain/Temperature (G/T)<br>1670-1710 MHz<br><br>2200-2290 MHz | <br>27.7 dB (Best measured performance)<br>26.0 dB (Guaranteed)<br>24.0 dB |
| Receive 3 dB Beam width<br>1670-1710 MHz<br>2200-2290 MHz | <br>0.67°<br>0.49° |
| Transmit Frequency | 2025 MHz - 2035 MHz |
| Transmit Gain | 47.6 dBi |
| Transmit 3 dB Beam width | 0.59° |
| Transmit Power | 1000W |
| Effective Isotropic Radiated Power (EIRP) | 107.6 dBm |

***Figure 2-13. Wallops 18 Meter (GOES-B) Antenna***

## 2.7 18 Meter (GOES-B) Antenna System

The 18 meter (GOES-B) system shown in Figure 2-13 is a Radiation Systems Inc. parabolic antenna with a cassegrain feed system on a steerable Azimuth/Elevation mount. It is designed to support geostationary orbiting satellites. The system receives data from GOES in the 1670 MHz to 1710 MHz and 2200 MHz to 2290 MHz frequency bands. Signals received are down-converted to the required IF range and demodulated, pre-processed, distributed, and recorded by equipment in the GOES operations area. S-band transmitters are used to transmit commands and range tones to the spacecraft. These transmitters are also used to transmit preprocessed spacecraft data to the NSOF via spacecraft transponders. Figure 2-14 provides a terrain masking profile. System capabilities are outlined in Table 2-6.

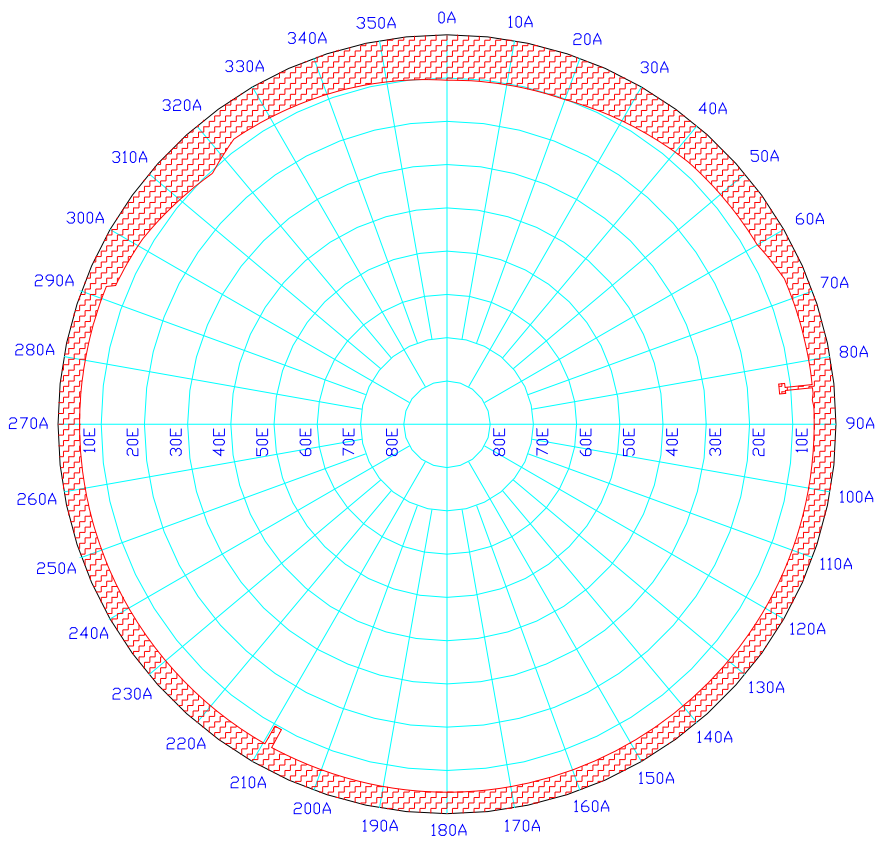


***Figure 2-14. Wallops 18 Meter (GOES-B) Antenna Horizon Profile***

***Table 2-6. Wallops 18 Meter (GOES-B) Antenna System***

| | |
|---|---|
| Location (WGS 84)<br>North Latitude<br>East Longitude<br>Height | <br>37° 56' 47.439"<br>284° 32' 16.568"<br>-16.9 Meters |
| Mount Type | Azimuth/Elevation (AZ/EL) |
| Control Modes | Manual Position / Manual Rate Track<br>Stow/Maintenance/Axis and Stop - Antenna position determined by operator input from remote control located in control room.<br><br>Monopulse, StepTrack, Optrack, NORAD TLE, Table/Preset Position, Star, Sun Track<br>via Antenna Control Unit(s) |
| Antenna Type | Cassegrain Focus Parabolic |
| Reflector Diameter | 18 Meter |
| Receive Frequencies | 1670-1710 MHz<br>2200-2290 MHz |
| Polarity | Linear (All Transmit and Receive systems share a common feed which is rotate able through 360° from remote control located in control room) |
| Receive Gain<br>1670-1710 MHz<br>2200-2290 MHz | <br>46.5 dBi |
| System Temperature<br>1670-1710 MHz<br>2200-2290 MHz | <br>90.8° Kelvin |
| Gain/Temperature (G/T)<br>1670-1710 MHz<br><br>2200-2290 MHz | <br>26.9 dB (Best measured performance)<br>26.0 dB (Guaranteed)<br>24.0 dB |
| Receive 3 dB Beam width<br>1670-1710 MHz<br>2200-2290 MHz | <br>0.67°<br>0.49° |
| Transmit Frequency | 2025 MHz - 2035MHz |
| Transmit Gain | 48.6 dBi |
| Transmit 3 dB Beam width | 0.59° |
| Transmit Power | 1000W |
| Effective Isotropic Radiated Power (EIRP) | 107.6 dBm |

***Figure 2-15. Wallops 16.4 Meter (HR-1) Antenna***

## 2.8 16.4 Meter (HR-1) Antenna System

The 16.4 Meter hurricane-rated antenna (HR-1) shown in Figure 2-15 is a Vertex/RSI parabolic antenna with a cassegrain feed system on a steerable Azimuth/Elevation mount. It is used to support the geostationary orbiting satellites. The system receives spacecraft image data from GOES in the 1670 MHz to1710 MHz and 2200 MHz to 2290 MHz frequency bands. Signals received are down-converted to the 70 MHz IF range and demodulated, pre-processed, distributed, and recorded by equipment in the GOES operations area. S-Band transmitters are used to transmit command and range tones to the spacecraft from 2025 MHz – 2035 MHz. These transmitters are also used to transmit pre-processed spacecraft data to the NSOF via spacecraft transponders. Figure 2-16 provides a terrain masking profile. The antenna system parameters are described in Table 2-7.

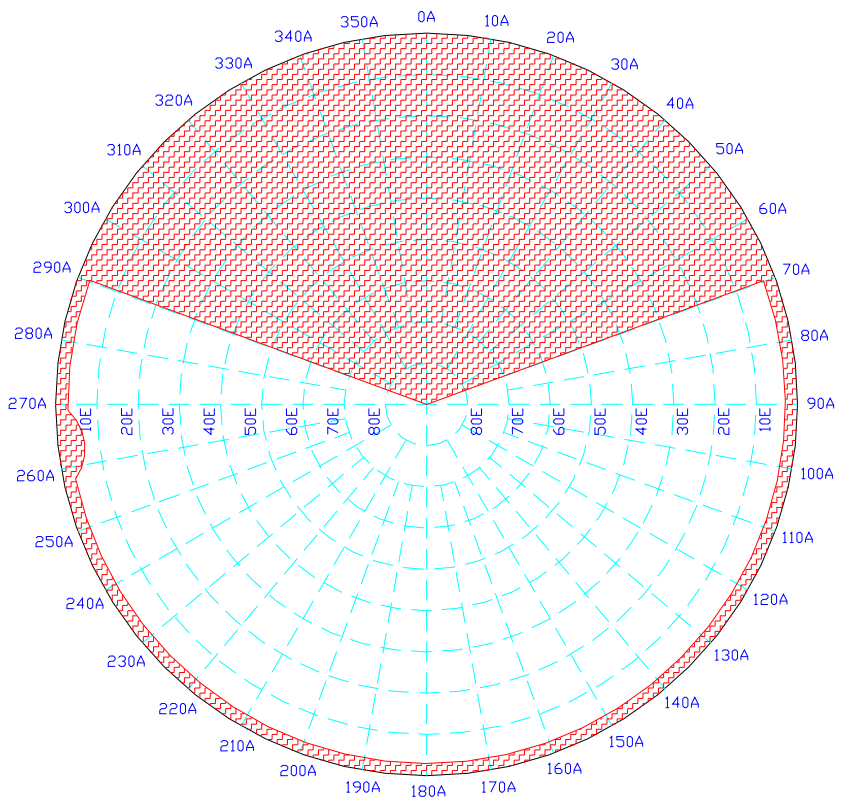


***Figure 2-16. Wallops 16.4 Meter (HR-1) Antenna Horizon Profile***

***Table 2-7. Wallops 16.4 Meter (HR-1) Antenna System***

| | |
|---|---|
| Location (WGS 84)<br>North Latitude<br>East Longitude<br>Height | <br>37° 56' 43.797"<br>284° 32' 19.912"<br>-18.51 Meters |
| Mount Type | Azimuth/Elevation (AZ/EL) |
| Control Modes | Manual Position / Manual Rate Track<br>Stow/Maintenance/Axis and Stop - Antenna position determined by operator input from remote control located in control room.<br><br>Monopulse, StepTrack, Optrack, NORAD TLE, Table/Preset Position, Star, Sun Track<br>via Antenna Control Unit(s) |
| Antenna Type | Cassegrain Focus Parabolic |
| Reflector Diameter | 16.4 Meter |
| Receive Frequencies | 1670-1710 MHz<br>2200-2290 MHz |
| Polarity | Linear (All Transmit and Receive systems share a common feed which is rotate able through 360° from remote control located in control room) |
| Receive Gain<br>1670-1710 MHz<br>2200-2290 MHz | <br>48.4 dBi<br>50.0 dBi |
| System Temperature<br>1670-1710 MHz<br>2200-2290 MHz | <br>100.9° Kelvin<br>97.7° Kelvin |
| Gain/Temperature (G/T)<br>1670-1710 MHz<br><br>2200-2290 MHz | <br>28.3 dB (Best measured performance)<br>26.0 dB (Guaranteed)<br>30.1 dB |
| Receive 3 dB Beam width<br>1670-1710 MHz<br>2200-2290 MHz | <br>0.67°<br>0.53° |
| Transmit Frequency | 2025-2035 MHz |
| Transmit Gain | 49.6 dBi |
| Transmit 3 dB Beam width | 0.55° |
| Transmit Power | 1000W |
| Effective Isotropic Radiated Power (EIRP) | 109.6 dBm |

***Figure 2-17. Wallops 16.4 Meter (HR-2) Antenna***

## 2.9 16.4 Meter (HR-2) Antenna System

The 16.4 Meter hurricane-rated (HR)-2 antenna shown in Figure 2-17 is functionally identical to the 16.4 Meter (HR-1) antenna. The 16.4 Meter hurricane-rated antenna (HR-2) is a Vertex/RSI parabolic antenna with a cassegrain feed system on a steerable Azimuth/Elevation mount. It is used to support the geostationary orbiting satellites. The system receives spacecraft image data from GOES in the 1670 MHz to1710 MHz and 2200 MHz to 2290 MHz frequency bands. Signals received are down-converted to the 70 MHz IF range and demodulated, pre-processed, distributed, and recorded by equipment in the GOES operations area. S-Band transmitters are used to transmit command and range tones to the spacecraft from 2025 MHz – 2035 MHz. These transmitters are also used to transmit pre-processed spacecraft data to the NSOF via spacecraft transponders. Figure 2-18 provides a terrain masking profile. The antenna system parameters are described in Table 2-8.

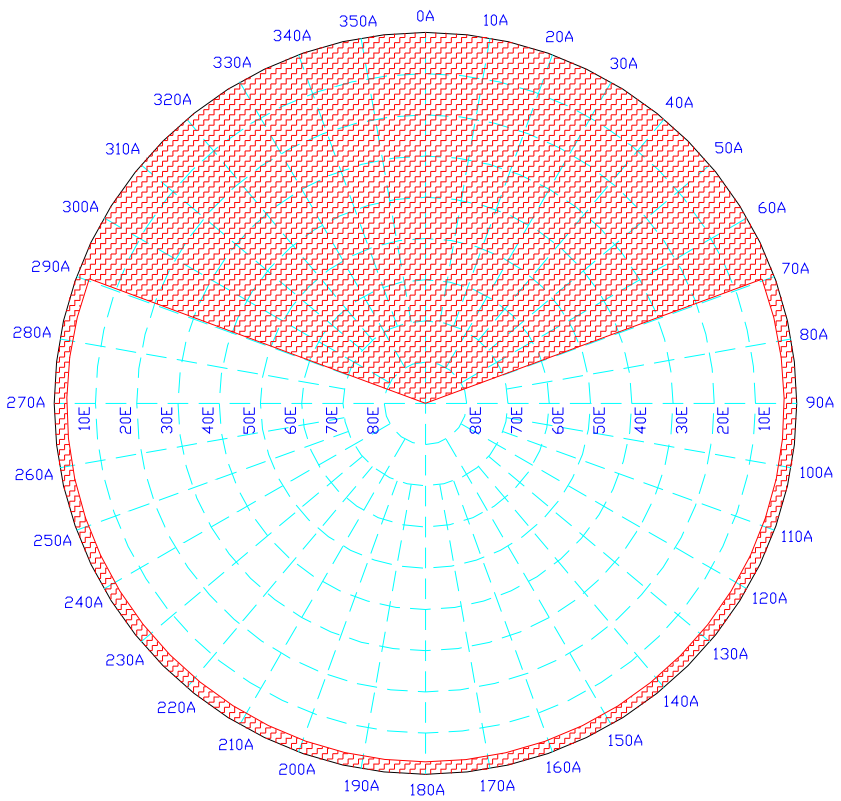


***Figure 2-18. Wallops 16.4 Meter (HR-2) Antenna Horizon Profile***

***Table 2-8. Wallops 16.4 Meter (HR-2) Antenna System***

| | |
|---|---|
| Location (WGS 84)<br><br>North Latitude<br>East Longitude<br>Height | <br><br>37° 56' 43.533"<br>284° 32' 16.476"<br>-17.43 Meters |
| Mount Type | Azimuth/Elevation (AZ/EL) |
| Control Modes | Manual Position / Manual Rate Track<br>Stow/Maintenance/Axis and Stop - Antenna position determined by operator input from remote control located in control room.<br><br>Monopulse, StepTrack, Optrack, NORAD TLE, Table/Preset Position, Star, Sun Track<br>via Antenna Control Unit(s) |
| Antenna Type | Cassegrain Focus Parabolic |
| Reflector Diameter | 16.4 Meter |
| Receive Frequencies | 1670-1710 MHz<br>2200-2290 MHz |
| Polarity | Linear (All Transmit and Receive systems share a common feed which is rotate able through 360° from remote control located in control room) |
| Receive Gain<br>1670-1710 MHz<br>2200-2290 MHz | <br>48.4 dBi<br>50.0 dBi |
| System Temperature<br>1670-1710 MHz<br>2200-2290 MHz | <br>100.9° Kelvin<br>97.7° Kelvin |
| Gain/Temperature (G/T)<br>1670-1710 MHz<br><br>2200-2290 MHz | <br>28.3 dB (Best measured performance)<br>26.0 dB (Guaranteed)<br>30.1 dB |
| Receive 3 dB Beam width<br>1670-1710 MHz<br>2200-2290 MHz | <br>0.67°<br>0.53° |
| Transmit Frequency | 2025-2035 MHz |
| Transmit Gain | 49.6 dBi |
| Transmit 3 dB Beam width | 0.55° |
| Transmit Power | 1000W |
| Effective Isotropic Radiated Power (EIRP) | 109.6 dBm |

***Figure 2-19. Wallops 13 Meter (GOES-C) Antenna***

## 2.10 13 Meter (GOES-C) Antenna System

The 13 meter (GOES-C) system shown in Figure 2-19 is designed to perform the same functions as the 18 meter antenna system described in Section 2.9. It is primarily used as a full GOES support back-up antenna. Paragraph 2-9 describes the systems in general. Figure 2-20 provides a terrain masking profile. The 13 meter system is a an azimuth sector antenna in that to achieve the full 180 degree azimuth travel the antenna must be manually moved to one of three overlapping sectors at the antenna pedestal. The antenna system parameters are described in Table 2-9.

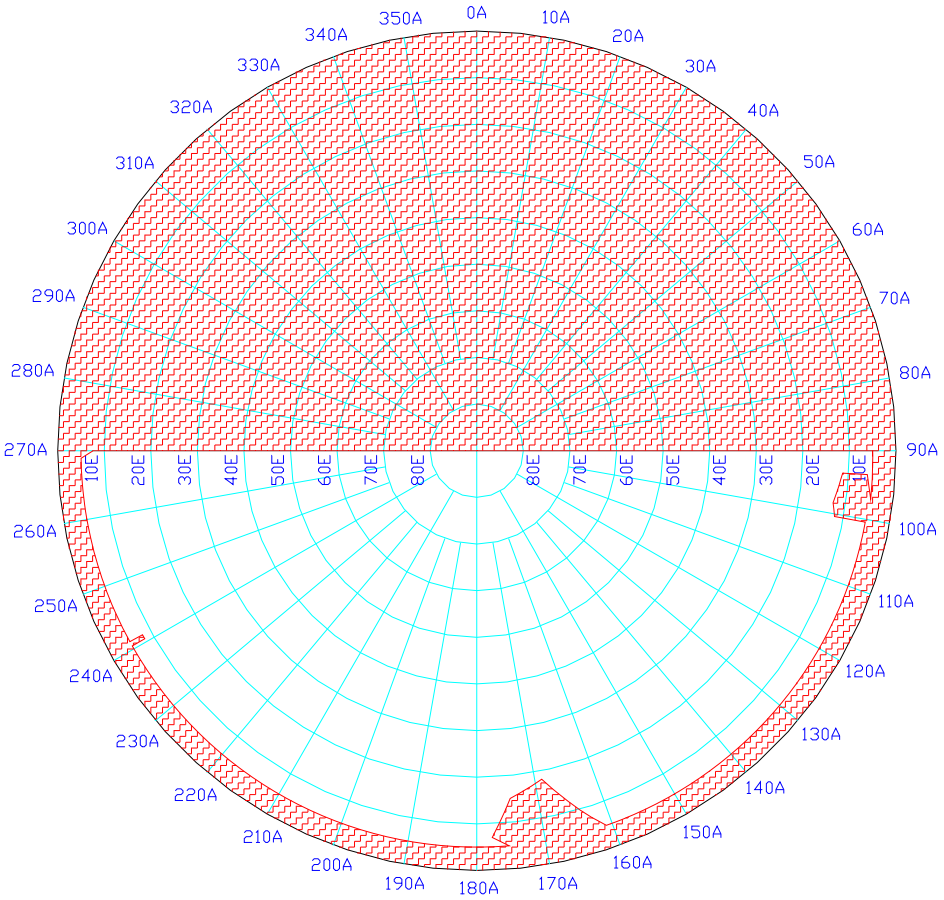


***Figure 2-20. Wallops 13 Meter (GOES-C) Antenna Horizon Profile***

***Table 2-9. Wallops 13 Meter (GOES-C) Antenna System***

| | |
|---|---|
| Location (WGS 84)<br>North Latitude<br>East Longitude<br>Height | <br>37° 56' 47.146"<br>284° 32' 21.957"<br>-26.4 Meters |
| Mount Type | Azimuth/Elevation (AZ/EL) |
| Control Modes | Manual Position / Manual Rate Track<br>Stow/Maintenance/Axis and Stop - Antenna position determined by operator input from remote control located in control room.<br><br>Monopulse, StepTrack, Optrack, NORAD TLE, Table/Preset Position, Star, Sun Track<br>via Antenna Control Unit(s). |
| Antenna Type | Cassegrain Focus Parabolic |
| Reflector Diameter | 13 Meters |
| Receive Frequencies | 1670-1710 MHz<br>2200-2290 MHz |
| Polarity | Linear (All Transmit and Receive systems share a common feed which is rotate able through 360° from remote control located in control room) |
| Receive Gain<br>1670-1710 MHz<br>2200-2290 MHz | <br>44.4 dBi |
| System Temperature<br>1670-1710 MHz<br>2200-2290 MHz | <br>99° Kelvin |
| Gain/Temperature (G/T)<br>1670-1710 MHz<br>2200-2290 MHz | <br>24.4 dB<br>25.2 dB |
| Receive 3 dB Beam width<br>1670-1710 MHz<br>2200-2290 MHz | <br>0.87°<br>0.70° |
| Transmit Frequency | 2025-2035 MHz |
| Transmit Gain | 44.6 dBi |
| Transmit 3 dB Beam width | 0.77° |
| Transmit Power (Max) | 1000W |
| Effective Isotropic Radiated Power (EIRP) | 105 dBm |

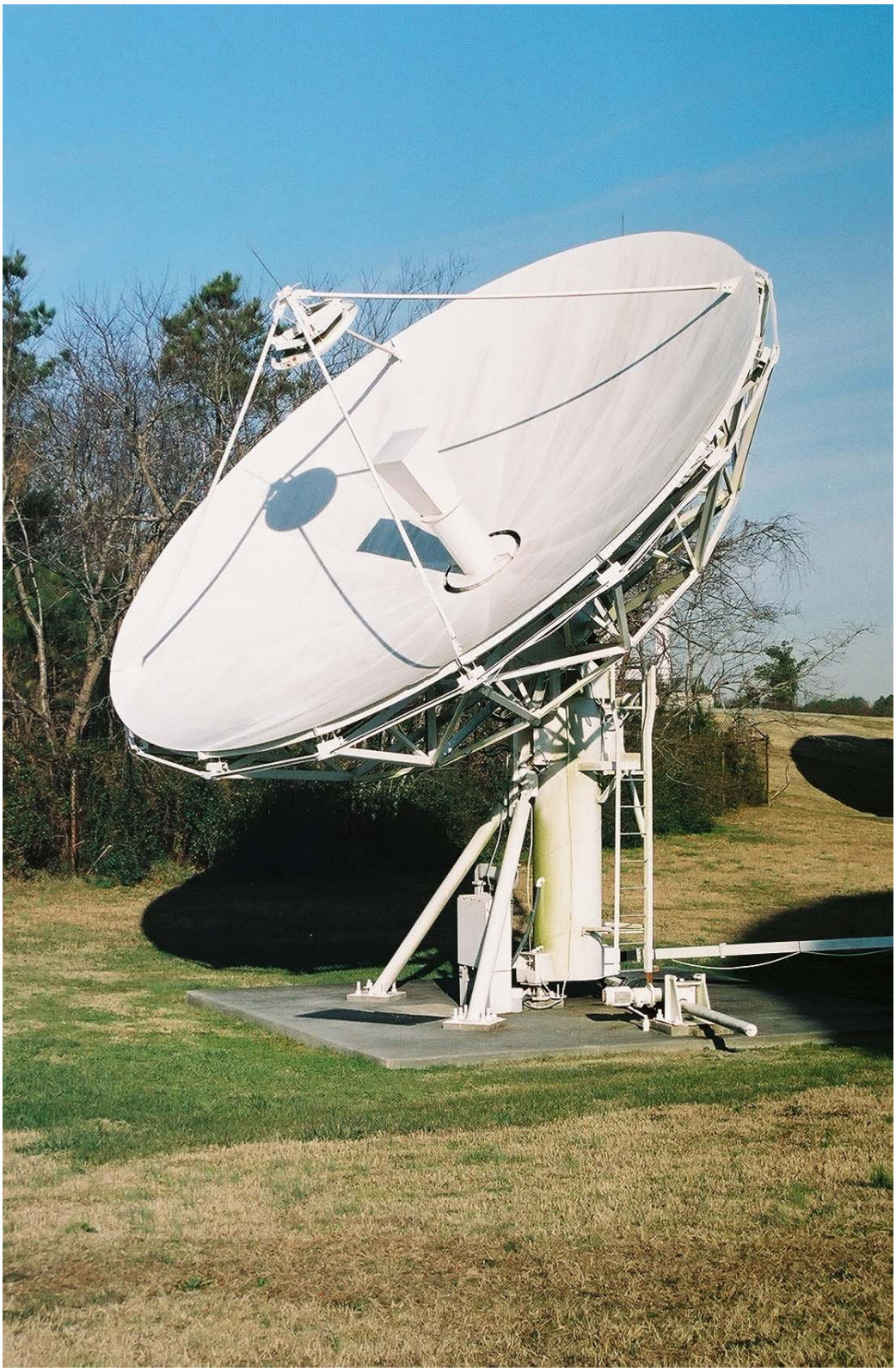

***Figure 2-21. Wallops 8 Meter Antenna***

## 2.11 8 Meter Antenna System

The 8 meter antenna system shown in Figure 2-21 is an 8 meter parabolic reflector with a cassegrain focus feed on a steerable AZ/EL mount. The system provides limited back-up to the 18 meter and 13 meter antenna systems described elsewhere in this publication. The system supports the GOES receive and transmit frequencies. The antenna is primarily used for secondary mission support (Emergency Management Weather Information Network (EMWIN) / Low-Rate Information Transmission (LRIT)) or for satellite Telemetry and Command (T&C) in a storage configuration. The antenna is electrically movable via operator control. Table 2-10 summarizes the 8 meter antenna system capabilities.

***Table 2-10. Wallops 8 Meter Antenna System***

| | |
|---|---|
| Location (WGS 84)<br>North Latitude<br>East Longitude<br>Height | <br>37° 56' 44.800"<br>284° 32' 18.350"<br>-29.2 Meters |
| Mount Type | Azimuth/Elevation (AZ/EL) |
| Control Modes | Manual -Antenna position determined by operator input from remote control located in control room. |
| Antenna Type | Cassegrain Focus Parabolic |
| Reflector Diameter | 8 Meters |
| Receive Frequencies | 1665-1700 MHz |
| Polarity | Linear (All Transmit and Receive Systems share a common feed which is rotate able through 360° from remote control located in control room) |
| Receive Gain | 40.3 dBi |
| System Temperature | 223.8° Kelvin |
| Gain/Temperature (G/T) | 16.8 dB |
| Receive 3 dB Beamwidth | 1.5° |
| Transmit Frequency | 2030 MHz |
| Transmit Gain | 42 dBi |
| Transmit 3 dB Beamwidth | 1.25° |
| Transmitter Power (Max) | 2000W |
| Effective Isotropic Radiated Power(EIRP) | 105 dBm |

***Figure 2-22. Wallops 7.2 Meter Antenna***

## 2.12 7.2 Meter Antenna System

The 7.2 meter antenna system shown in Figure 2-22 was installed in 2002. It is a Vertex/RSI Az-El sectorized mount antenna with linear polarized receive feed only. While purchased to support Meteosat MSG data, it is capable of full GOES secondary mission receive support. Table 2-11 summarizes the 7.2 Meter Antenna system capabilities.

***Table 2-11. Wallops 7.2 Meter Antenna System***

| | |
|---|---|
| Location (WGS 84)<br>North Latitude<br>East Longitude<br>Height | <br>37° 56' 43.000"<br>284° 32' 26.000"<br>7.31 Meters |
| Mount Type | Azimuth/Elevation (AZ/EL) |
| Control Modes | Manual Position / Manual Rate Track<br>Stow/Maintenance/Axis and Stop - Antenna position determined by operator input from remote control located in control room.<br><br>Monopulse, StepTrack, Optrack, NORAD TLE, Table/Preset Position, Star, Sun Track via Antenna Control Unit(s) |
| Antenna Type | Cassegrain Focus Parabolic |
| Receive Frequency | 1670 MHz- 1710 MHz |
| Polarity | Linear |
| Receive Gain<br>1670-1710 MHz | <br>39.1 dBi |
| System Temperature<br>1670-1710 MHz | <br>162.2° Kelvin |
| Gain/Temperature (G/T)<br>1670-1710 MHz | <br>17.0 dB |
| Receive 3 dB Beam width<br>1670-1710 MHz | <br>1.75° |

***Figure 2-23. Wallops 5 Meter Antenna***

## 2.13 5 Meter Antenna System

The 5 meter antenna system shown in Figure 2-23 is a 5 meter parabolic antenna with a L-Band feed mounted at prime focus. Currently the 5 meter is used to support Meteosat at 1676 MHz. It can only be positioned manually. Table 2-12 highlights the 5 Meter antenna system capabilities.

***Table 2-12. Wallops 5 Meter Antenna System***

| | |
|---|---|
| Location (WGS 84)<br>North Latitude<br>East Longitude<br>Height | <br>37° 56' 44.124"<br>284° 32' 28.335"<br>-25.5 Meters |
| Mount Type | Azimuth/Elevation (AZ/EL) |
| Control Modes | Manual -Antenna positioned using manual hand cranks on mount. |
| Antenna Type | Prime Focus Parabolic |
| Receive Frequency | 1670 MHz- 1710 MHz |
| Polarity | Linear |
| Receive Gain<br>1670-1710 MHz | <br>36.3 dBi |
| System Temperature<br>1670-1710 MHz | <br>190.2° Kelvin |
| Gain/Temperature (G/T)<br>1670-1710 MHz | <br>13.5 dB |
| Receive 3 dB Beam width<br>1670-1710 MHz | <br>2.6° |

***Figure 2-24. Wallops 1.2 Meter Antennas***

## 2.14 1.2 Meter Antenna System

The 1.2 meter antenna systems shown in Figure 2-24 were installed in 2006. While there are currently four antennas on the concrete pad, the pad can support a total of six small aperture antennas. These antennas are used to provide data quality monitoring of the GOES East and West spacecraft LRIT and EMWIN missions. Table 2-13 describes the 1.2 Meter antenna system capabilities.

***Table 2-13. Wallops 1.2 Meter Antenna System***

| | |
|---|---|
| Location (WGS 84)<br>North Latitude<br>East Longitude<br>Height | <br>37° 56' 44.000"<br>284° 32' 24.335"<br>5.79 Meters |
| Mount Type | Azimuth/Elevation (AZ/EL) |
| Control Modes | Manual -Antenna positioned using manual hand cranks on mount. |
| Antenna Type | Prime Focus Parabolic |
| Receive Frequency | 1670 MHz- 1710 MHz |
| Polarity | Linear |
| Receive Gain<br>1670-1710 MHz | <br>24.00 dBi |
| System Temperature<br>1670-1710 MHz | <br>190.5°Kelvin |
| Gain/Temperature (G/T)<br>1670-1710 MHz | <br>1.2 dB |
| Receive 3 dB Beam width<br>1670-1710 MHz | <br>10.37° |

***Figure 2-25. Wallops UHF HELIX Antenna***

## 2.15 UHF HELIX Antenna Systems

The UHF HELIX antennas are on steerable AZ/EL mounts. These antennas are used to calibrate the Data Collection Platforms (DCP) on the GOES. They can also be used to transmit test signals to the SARSAT platforms on the spacecraft. Three UHF HELIX antennas are located at the station. Table 2-14 through Table 2-16 describe these systems.

***Table 2-14. Wallops UHF HELIX (A) Antenna System***

| | |
|---|---|
| Location (WGS 84)<br>North Latitude<br>East Longitude<br>Height | <br>37° 56' 44"<br>284° 32' 22"<br>-28.4 Meters |
| Mount Type | Azimuth/Elevation (AZ/EL) |
| Control Modes | Manual -Antenna position determined by operator input from remote control located in control room. |
| Antenna Type | 3 Turn Helix |
| Receive Frequencies | 468.125MHz, 468.825 MHz, 468.8375 MHz |
| Polarity | RCP |
| Receive Gain | 13 dBi |
| System Temperature | 1500° Kelvin |
| Gain/Temperature (G/T) | -26 dB |
| Receive 3 dB Beam width | 35° |
| Transmitter Frequency Range | 401.7 MHz - 402.1 MHz |
| Transmit Gain | 12.2 dBi |
| Transmit 3 dB Beam width | 45° |
| Transmitter Power (Max) | 100 W |
| Effective Isotropic Radiated Power(EIRP) | 62.2 dBm |

***Table 2-15. Wallops UHF HELIX (B) Antenna System***

| | |
|---|---|
| Location (WGS 84)<br><br>North Latitude<br>East Longitude<br>Height | <br><br>37° 56' 44"<br>284° 32' 22"<br>-28.4 Meters |
| Mount Type | Azimuth/Elevation (AZ/EL) |
| Control Modes | Manual -Antenna position determined by operator input from remote control located in control room. |
| Antenna Type | 3 Turn Helix |
| Receive Frequencies | 468.125MHz, 468.825 MHz, 468.8375 MHz |
| Polarity | RCP |
| Receive Gain | 13 dBi |
| System Temperature | 1500° Kelvin |
| Gain/Temperature (G/T) | -26 dB |
| Receive 3 dB Beamwidth | 35° |
| Transmitter Frequency Range | 401.7 MHz - 402.1 MHz |
| Transmit Gain | 12.2 dBi |
| Transmit 3 dB Beamwidth | 45° |
| Transmitter Power (Max) | 100 W |
| Effective Isotropic Radiated Power(EIRP) | 62.2 dBm |

***Table 2-16. Wallops UHF HELIX (C) Antenna System***

| | |
|---|---|
| Location (WGS 84)<br><br>North Latitude<br>East Longitude<br>Height | <br><br>37° 56' 44"<br>284° 32' 22"<br>-28.4 Meters |
| Mount Type | Azimuth/Elevation (AZ/EL) |
| Control Modes | Manual -Antenna position determined by operator input from remote control located in control room. |
| Antenna Type | 3 Turn Helix |
| Receive Frequencies | 468.125MHz, 468.825 MHz, 468.8375 MHz |
| Polarity | RCP |
| Receive Gain | 13 dBi |
| System Temperature | 1500° Kelvin |
| Gain/Temperature (G/T) | -26 dB |
| Receive 3 dB Beam width | 35° |
| Transmitter Frequency Range | 401.7 MHz - 402.1 MHz |
| Transmit Gain | 12.2 dBi |
| Transmit 3 dB Beam width | 45° |
| Transmitter Power (Max) | 100 W |
| Effective Isotropic Radiated Power(EIRP) | 62.2 dBm |

***Table 2-17. Wallops Recent Depot Level Maintenance Chart***

| Maintenance Performed Since Last Inspection | 26M | 14.2M | 13M-A | 13M-B | SATAN | VHF Aux | 18M-A | 18M-B | 16.4M-A | 16.4M-B | 13M-C | 8M | 7.2M | 5M | 1.2 M (4) | Helix (3) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Installation Date | 1965 | 1990 | 2000 | 2000 | 1988 | 1968 | 1973 | 1973 | 2002 | 2002 | 1979 | 1984 | 2002 | 1982 | 2006 | 1976 |
| | POES | | | | | | GOES | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| Spares for Legacy System | | | | | Array & Gimbal/ 2006 | | | | | | | | | | | |
| Antenna Assessment/Condition Survey | | | | | 2003 | | 2000 | 2000 | | | 2003 | | | | | |
| Control Cabling | | | | | | | | | | | | | | | | |
| Antenna Grounding System | | | | | | | | | | | | | | | | |
| RF Antenna Cabling | 2004 | 2007 | | | | | | | | | | | | | | |
| Antenna Shelter | | | | | | | | | | | | | | | | |
| RF Equipment Upgrades | | X-Band | X-Band | X-Band | | | | | | | | | | | | |
| Equipment Shelters | | | | | | | | | | | | 2007 | | | | |
| Fiber Optic Upgrades | 2004 | 2007 | | | | | | | | | | | | | | |
| Hydraulic Upgrades | | | | | | | | | | | | | | | | |
| Structural Upgrades | | | | | | | | | | | | | | | | |
| Servo Drive Upgrades | 2003 | 2006 | | | | | | | | | 2006 | | | 1993 | | |
| Gear Box Upgrades | | | 2006 | 2006 | | | 2007 Pintle Rod | 2007 Pintle Rod | 2006/AZ | | | | | | | |
| Feed System Upgrades | | | 2007 Diplexers | 2007 Diplexers | | | | | | | | | | | | |
| Solid State Transmitter System | | 2006 | | | | | 2006 | 2006 | 2007 | 2007 | | | | | | |
| Electric Drive/Servo Upgrade | 2004 | 2006 | Brushless Motor 2007 | Brushless Motor 2007 | | | | | | | | | | | | |
| Corrosion Control DLM | 2006 | 2006 | | | | | 2007/ Pedestal | 2007/ Pedestal | | | 2001/ Reflector | 2001/ Pedestal | | 2007 | | |

This page intentionally left blank.

# Section 3.0 Fairbanks Command and Data Acquisition Station (FCDAS) Antenna Systems

## 3.1 General Description

The Fairbanks Command and Data Acquisition Station (FCDAS) is NOAA's primary command and data acquisition facility for its Polar-orbiting Operational Environmental Satellites, Defense Meteorological Satellite Program (DMSP) satellites, and provides backup support to the Geostationary Operational Environmental Satellite (GOES) West satellite. The Station characteristics of having high northern latitude and easily accessible remote location all combine to set the FCDAS aside as a premier data acquisition site for current and future satellite missions. The FCDAS satellite ground systems have been experiencing a continuous technology infusion since the installation of three 13-meter antenna systems during the summer of 1998. These new state of the art autonomous systems enable the FCDAS to meet the unique mission requirements of modern spacecraft. Coupled with this new technology, the existing operational infrastructure provides the station with backup generators and UPS conditioned power which provides exceptional site reliability. In addition, the availability of large capacity fiber optic service enables the FCDAS to transfer high data rate payload data anywhere in the world, with a higher reliability rate and lower cost than traditional commercial satellite services.

***Figure 3-1. Fairbanks Command and Data Acquisition Station (Southwest View)***

***Figure 3-2. Fairbanks Command and Data Acquisition Station (Northwest View)***

***Figure 3-3. Fairbanks CDA Station (West View)***

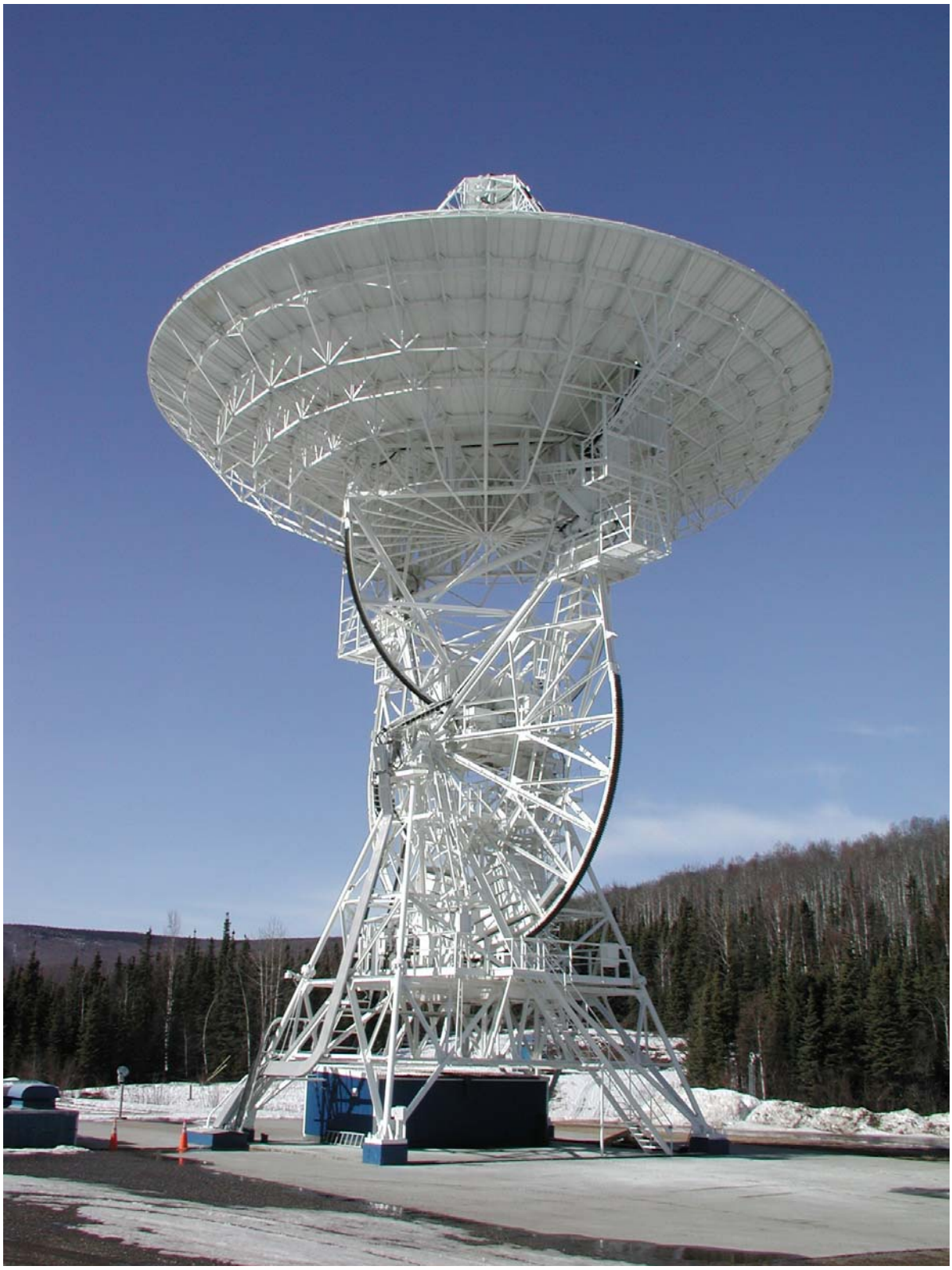

***Figure 3-4. Fairbanks 26 Meter Antenna***

## 3.2 26 Meter Antenna System

The 26 meter Blau Knox parabolic antenna shown in Figure 3-4 uses a prime focus multi-frequency feed. The antenna is mounted on a fully steerable X/Y positioning system. The primary function of the system is to receive data from the polar-orbiting satellites. The feed is designed to operate at several frequency bands. All received signals are converted from the received frequency to an IF of 70 MHz to be demodulated by DCRs or equivalent. The antenna is positioned using electric drive systems mounted on each axis. Control signals and steering voltages are generated by the Antenna Control Console (ACC) located in the stations' operations room. The system can be driven manually, from the computer, or from NORAD Track Two line element data sets. Figure 3-5 provides a terrain masking profile and Table 3-1 describes the capabilities of this system.

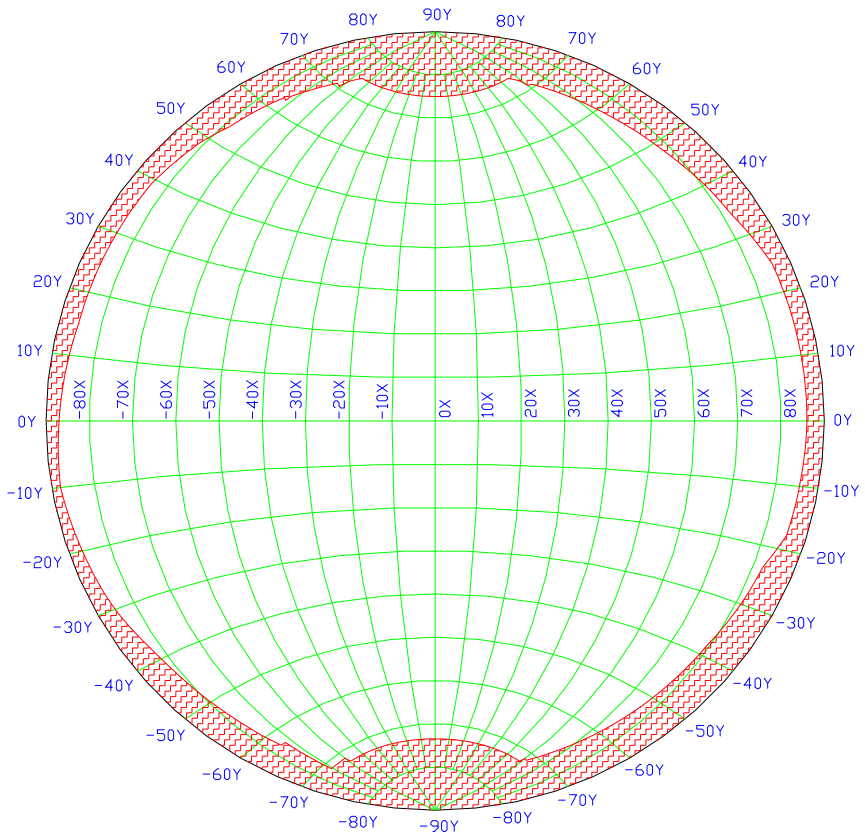


***Figure 3-5. Fairbanks 26 Meter Antenna Horizon Profile***

***Table 3-1. Fairbanks 26 Meter Antenna System***

| | |
|---|---|
| Location (WGS 84)<br>North Latitude<br>East Longitude<br>Height | <br>64° 58' 36.176"<br>212° 28' 56.803"<br>316.1 Meters |
| Mount Type | X-Y (+X East, +Y North) |
| Control Modes | Manual - Antenna position determined by operator input from remote control located in control room.<br>NORAD Track (Two Line Element) - Computer positions antenna based on prepared acquisition data sets.<br>Slave - Antenna positioned to angles of other site antenna or computer using site synchro slave bus. |
| Antenna Type | Prime Focus Parabolic |
| Reflector Diameter | 26 Meters |
| Receive Frequencies | 136-138 MHz<br>1670-1710 MHz<br>2200-2300 MHz |
| Polarity<br>136-138 MHz<br>1670-1710 MHz<br>2200-2300 MHz | <br>Linear X / Linear Y<br>RCP / LCP (optimally combined DCR or equivalent)<br>RCP / LCP (optimally combined DCR or equivalent) |
| Receive Gain<br>136-138 MHz<br>1670-1710 MHz<br>2200-2300 MHz | <br>27.4 dBi<br>48.7 dBi<br>51.8 dBi |
| System Temperature<br>136-138 MHz<br>1670-1710 MHz<br>2200-2300 MHz | <br><br>275.4° Kelvin<br>257.0° Kelvin |
| Gain/Temperature (G/T)<br>136-138 MHz<br>1670-1710 MHz<br>2200-2300 MHz Control Modes | <br><br>24.3 dB<br>27.7 dB |
| Receive 3 dB Beam width<br>136-138 MHz<br>1670-1710 MHz<br>2200-2300 MHz | <br>6.7°<br>0.54°<br>0.34° |

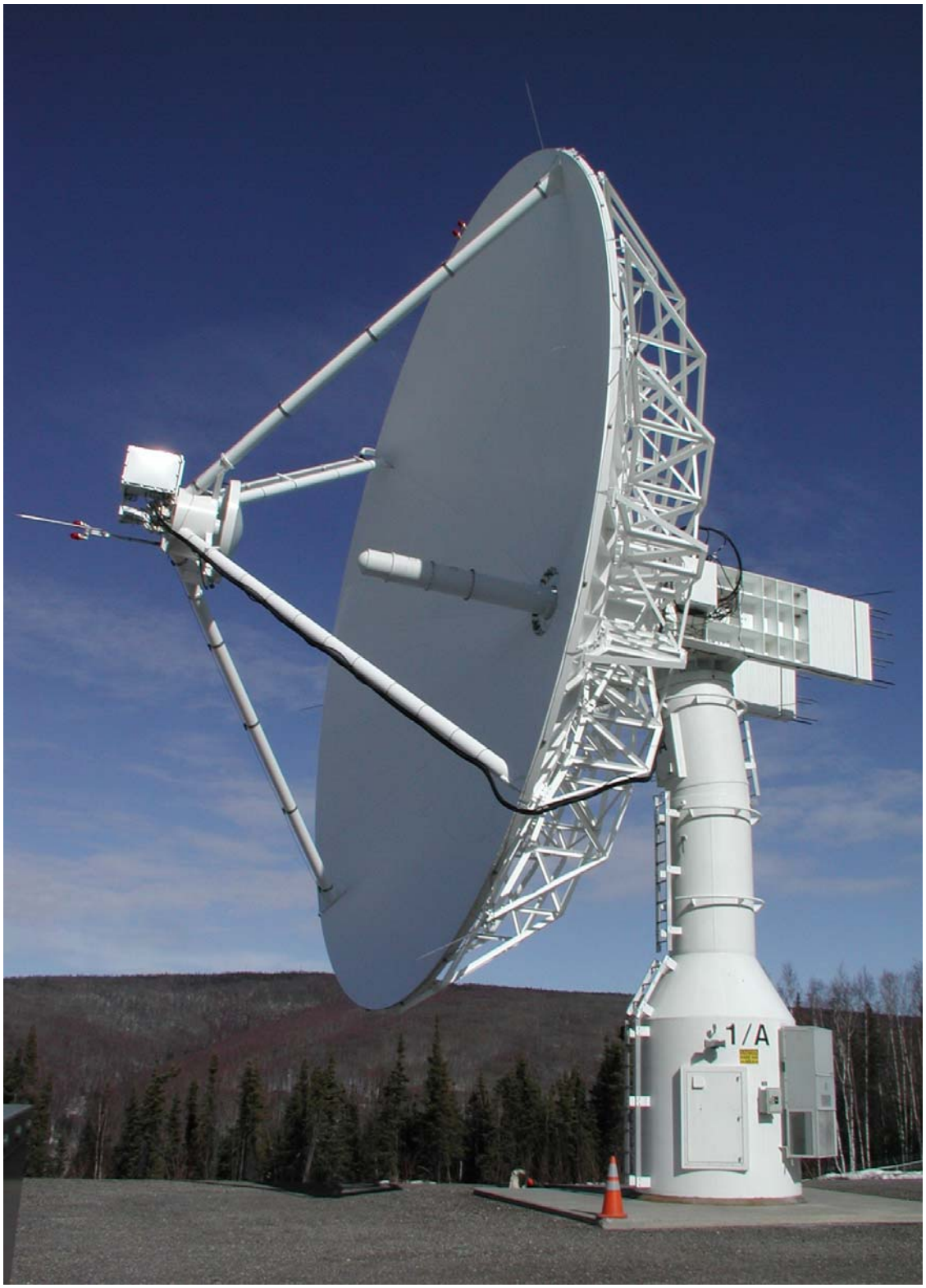


***Figure 3-6. Fairbanks 13 Meter '1/A' Antenna***

## 3.3 13 Meter '1/A' Antenna System

The 13 meter '1/A' DATRON antenna system shown in Figure 3-6 is a parabolic antenna with a prime focus feed system for L-Band and S-Band, but it utilizes a sub-reflector for the X-Band feed. The 13 meter antenna system consists of a three-axis pedestal, elevation over azimuth, with two 13.6 horsepower motors in each axis. The 7 degree tilted third axis moves between 0 or 180 degrees but does not provide active tracking. This remote sensing satellite system provides tracking, command, and receiving mission telemetry data from the NOAA and DMSP low earth orbit (LEO) satellites. The basic system hardware and software is configured to support NOAA and USAF DMSP S-Band and L-Band satellites and X-Band remote sensing satellites with a maximum bit rate of 400 Mbps. The 13 meter antenna can command spacecraft in both the S-Band and L-Band frequency range while simultaneously receiving L, S, and X-band data. Figure 3-7 provides a terrain masking profile. System capabilities are outlined in Table 3-2.

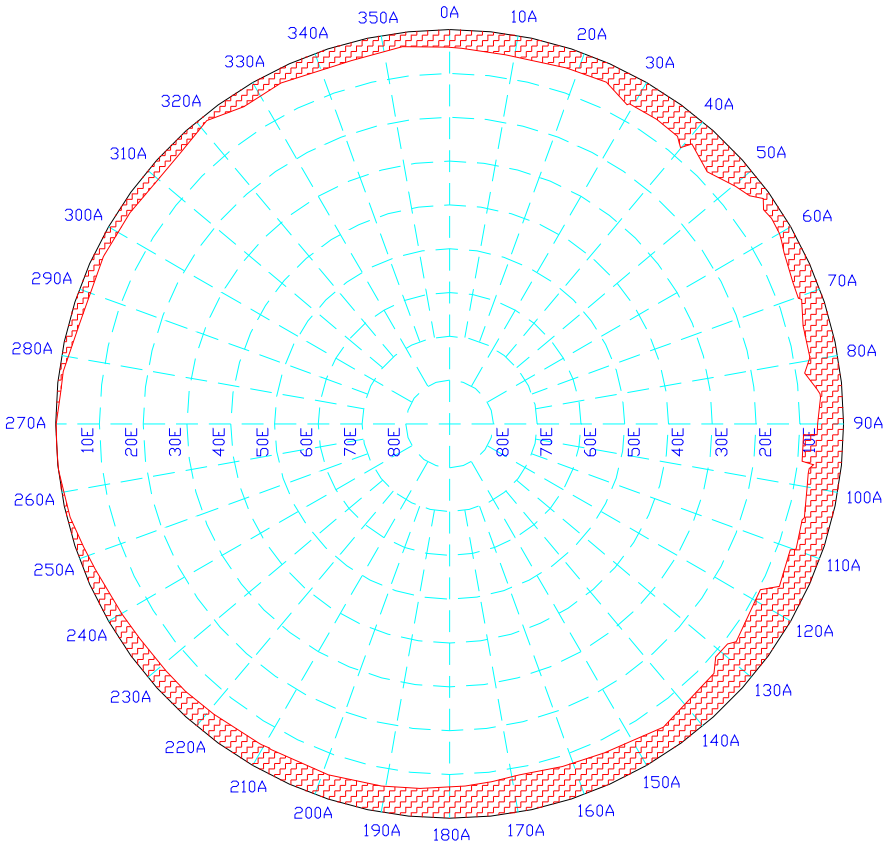


***Figure 3-7. Fairbanks 13 Meter '1/A' Antenna Horizon Profile***

***Table 3-2. Fairbanks 13 Meter '1/A' Antenna System***

| | |
|---|---|
| Location (WGS 84)<br>North Latitude<br>East Longitude<br>Height | <br>64° 58' 26.400"<br>212° 29' 24.396"<br>367 Meters |
| Mount Type | Azimuth/Elevation (AZ/EL) |
| Control Modes | Manual -Antenna position determined by operator input from remote control located in control room.<br><br>Autotrack - Position error signals from receiver determine antenna position.<br><br>Program - Computer positions antenna based on processed acquisition data.<br><br>Slave - Antenna positioned to angles of other site antenna or computer using site synchro slave bus. |
| Antenna Type | Prime Focus Parabolic / CASS 'X' |
| Reflector Diameter | 13 Meters |
| Receive Frequencies | 1670-1710 MHz<br>2200-2400 MHz<br>7250-8500 MHz |
| Polarity<br>1670-1710 MHz<br><br>2200-2400 MHz<br><br>7250-8500 MHz | <br>RCP / LCP (optimally combined in Microdyne Receiver)<br><br>RCP / LCP (optimally combined in Microdyne Receiver)<br><br>RCP / LCP (optimally combined in Microdyne Receiver) |

***Table 3-2. Fairbanks 13 Meter '1/A' Antenna System (Continued)***

| | |
|---|---|
| Receive Gain<br>1670-1710 MHz<br>2200-2400 MHz<br>7250-8500 MHz | <br>43.1 dBi<br>44.0 dBi<br>58.0 dBi |
| System Temperature<br>1670-1710 MHz<br>2200-2400 MHz<br>7250-8500 MHz | <br>190° Kelvin<br>110° Kelvin<br>70° Kelvin |
| Gain/Temperature (G/T)<br>1670-1710 MHz<br>2200-2400 MHz<br>7250-8500 MHz | <br>19.8 dB<br>23.5 dB<br>37.8 dB |
| Receive 3 dB Beam width<br>1670-1710 MHz<br>2200-2400 MHz<br>7250-8500 MHz | <br>0.8°<br>0.6°<br>0.18° |
| Transmit Frequency | 1750-1850 MHz<br>2025-2120 MHz |
| Transmit Polarity | Right -hand Circular or Left-hand Circular |
| Transmit Gain<br>1750-1850 MHz<br>2025-2120 MHz | <br>41.4 dBi<br>43.5 dBi |
| Transmit 3 dB Beam width<br>1750-1850 MHz<br>2025-2120 MHz | <br>0.87°<br>0.77° |
| Transmit Power<br>1750-1850 MHz /2025-2120 MHz | <br>300 W |
| Effective Isotropic Radiated Power (EIRP)<br>1750-1850 MHz<br>2025-2120 MHz | <br>97.9 dBm<br>98.5 dBm |

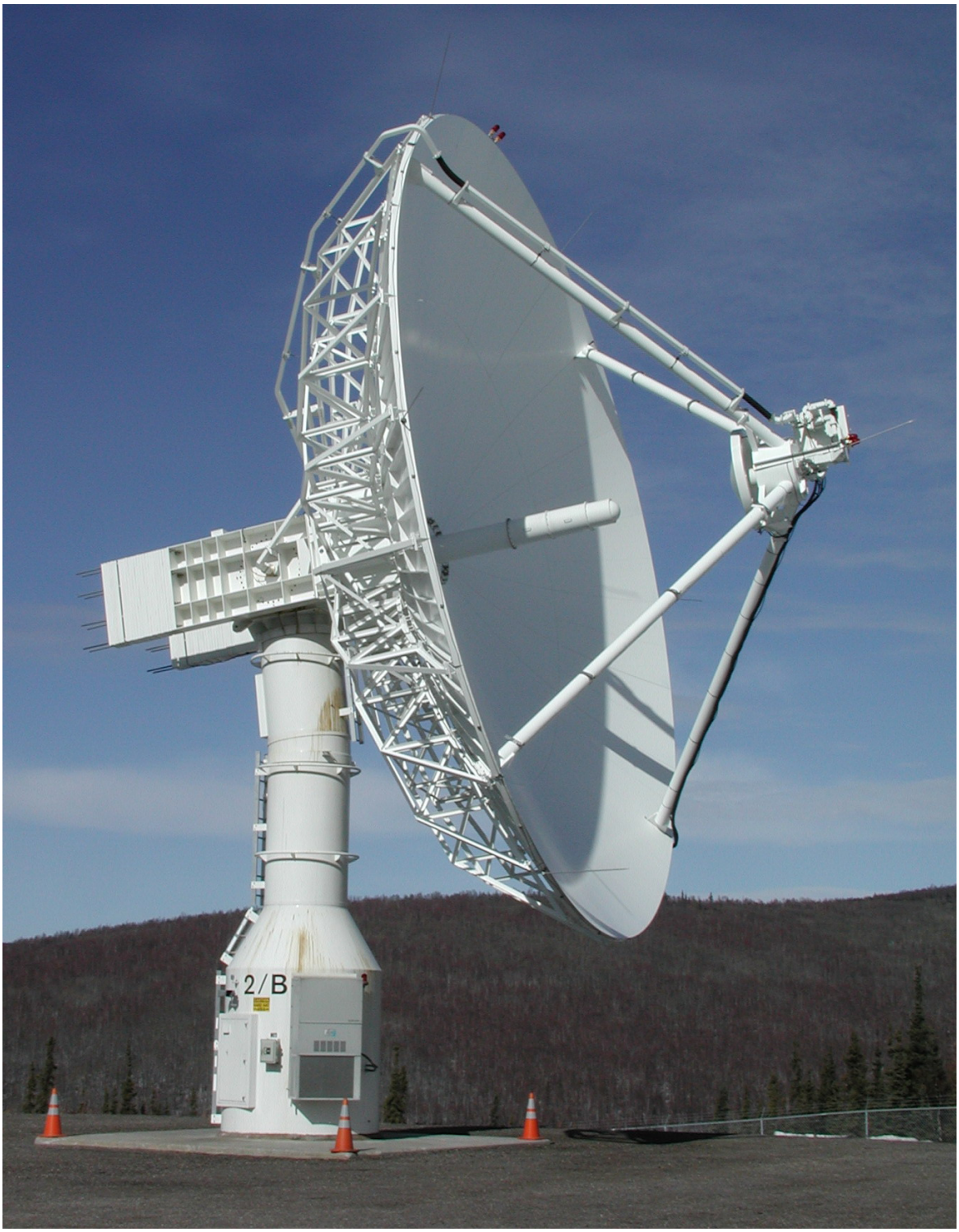


***Figure 3-8. Fairbanks 13 Meter '2/B' Antenna***

## 3.4 13 Meter '2/B' Antenna System

The 13 meter '2/B' DATRON antenna system shown in Figure 3-8 is a parabolic antenna with a prime focus feed system for L-Band and S-Band, but it utilizes a sub-reflector for the X-Band feed. The 13 meter antenna system consists of a three-axis pedestal, elevation over azimuth, with two 13.6 horsepower motors in each axis. The 7 degree tilted third axis moves between 0 or 180 degrees but does not provide active tracking. This remote sensing satellite system provides tracking, command, and receiving mission telemetry data from the NOAA and DMSP low earth orbit (LEO) satellites. The basic system hardware and software is configured to support NOAA and USAF DMSP S-Band and L-Band satellites and X-Band remote sensing satellites with a maximum bit rate of 400 Mbps. The 13 meter antenna can command spacecraft in both the S-Band and L-Band frequency range while simultaneously receiving L, S, and X-band data. Figure 3-9 provides a terrain masking profile. System capabilities are outlined in Table 3-3.

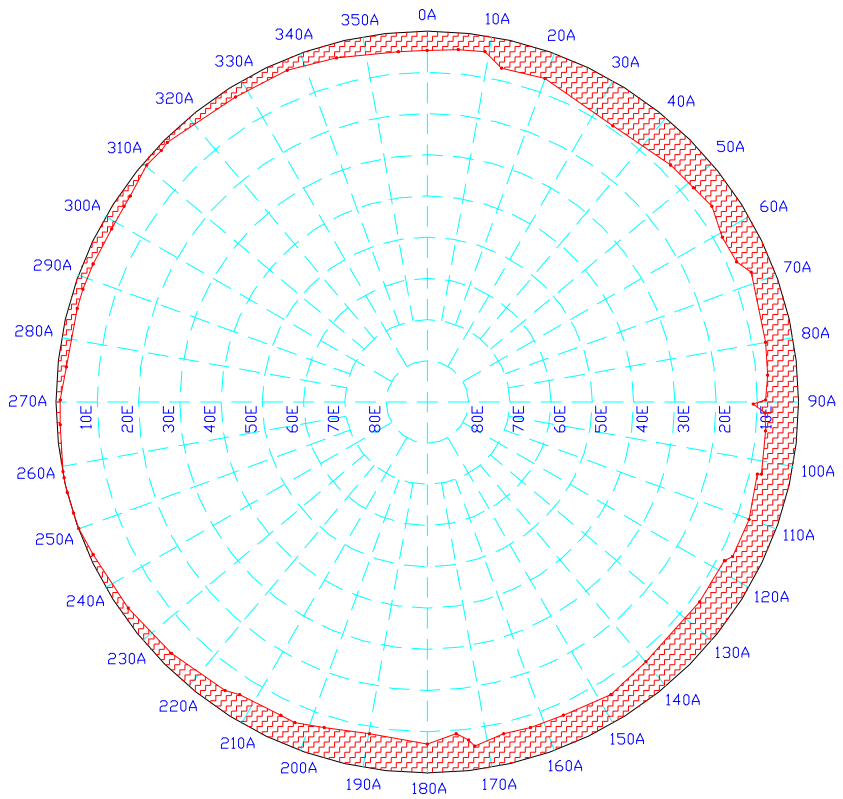


***Figure 3-9. Fairbanks 13 Meter '2/B' Antenna Horizon Profile***

***Table 3-3. Fairbanks 13 Meter '2/B' Antenna System***

| | |
|---|---|
| Location (WGS 84)<br>North Latitude<br>East Longitude<br>Height | <br>64° 58' 25.716"<br>212° 29' 39.300"<br>385 Meters |
| Mount Type | Azimuth/Elevation (AZ/EL) |
| Control Modes | Manual -Antenna position determined by operator input from remote control located in control room.<br><br>Autotrack - Position error signals from receiver determine antenna position.<br><br>Program - Computer positions antenna based on processed acquisition data.<br><br>Slave - Antenna positioned to angles of other site antenna or computer using site synchro slave bus. |
| Antenna Type | Prime Focus Parabolic / CASS 'X' |
| Reflector Diameter | 13 Meters |
| Receive Frequencies | 1670-1710 MHz<br>2200-2400 MHz<br>7250-8500 MHz |
| Polarity<br>1670-1710 MHz<br><br>2200-2400 MHz<br><br>7250-8500 MHz | <br>RCP / LCP (optimally combined in Microdyne Receiver)<br><br>RCP / LCP (optimally combined in Microdyne Receiver)<br><br>RCP / LCP (optimally combined in Microdyne Receiver) |
| Receive Gain<br>1670-1710 MHz<br>2200-2400 MHz<br>7250-8500 MHz | <br>42.0 dBi<br>44.0 dBi<br>55.0 dBi |
| System Temperature<br>1670-1710 MHz<br>2200-2400 MHz<br>7250-8500 MHz | <br>190° Kelvin<br>110° Kelvin<br>70° Kelvin |
| Gain/Temperature (G/T)<br>1670-1710 MHz<br>2200-2400 MHz<br>7250-8500 MHz | <br>19.2 dB<br>23.6 dB<br>36.5 dB |
| Receive 3 dB Beam width<br>1670-1710 MHz<br>2200-2400 MHz<br>7250-8500 MHz | <br>0.8°<br>0.6°<br>0.18° |
| Transmit Frequency | 1750-1850 MHz<br>2025-2120 MHz |
| Transmit Polarity | Right -hand Circular or Left-hand Circular |
| Transmit Gain<br>1750-1850 MHz<br>2025-2120 MHz | <br>41.7 dBi<br>42.7 dBi |
| Transmit 3 dB Beam width<br>1750-1850 MHz<br>2025-2120 MHz | <br>0.7°<br>0.7° |
| Transmit Power<br>1750-1850 MHz/2025-2120 MHz | <br>300 W |
| Effective Isotropic Radiated Power (EIRP)<br>1750-1850 MHz<br>2025-2120 MHz | <br>96.5 dBm<br>97.7 dBm |

***Figure 3-10. Fairbanks 13 Meter '3/C' Antenna***

## 3.5 13 Meter '3/C' Antenna System

The 13 meter '3/C' DATRON antenna system shown in Figure 3-10 is a parabolic antenna with a prime focus feed system for L-Band and S-Band, but it utilizes a sub-reflector for the X-Band feed. The 13 meter antenna system consists of a three-axis pedestal, elevation over azimuth, with two 13.6 horsepower motors in each axis. The 7 degree tilted third axis moves between 0 or 180 degrees but does not provide active tracking. This remote sensing satellite system provides tracking, command, and receiving mission telemetry data from the NOAA and DMSP low earth orbit (LEO) satellites. The basic system hardware and software is configured to support NOAA and USAF DMSP S-Band and L-Band satellites and X-Band remote sensing satellites with a maximum bit rate of 400 Mbps. The 13 meter antenna can command spacecraft in both the S-Band and L-Band frequency range while simultaneously receiving L, S, and X-band data. Figure 3-11 provides a terrain masking profile. System capabilities are outlined in Table 3-4.

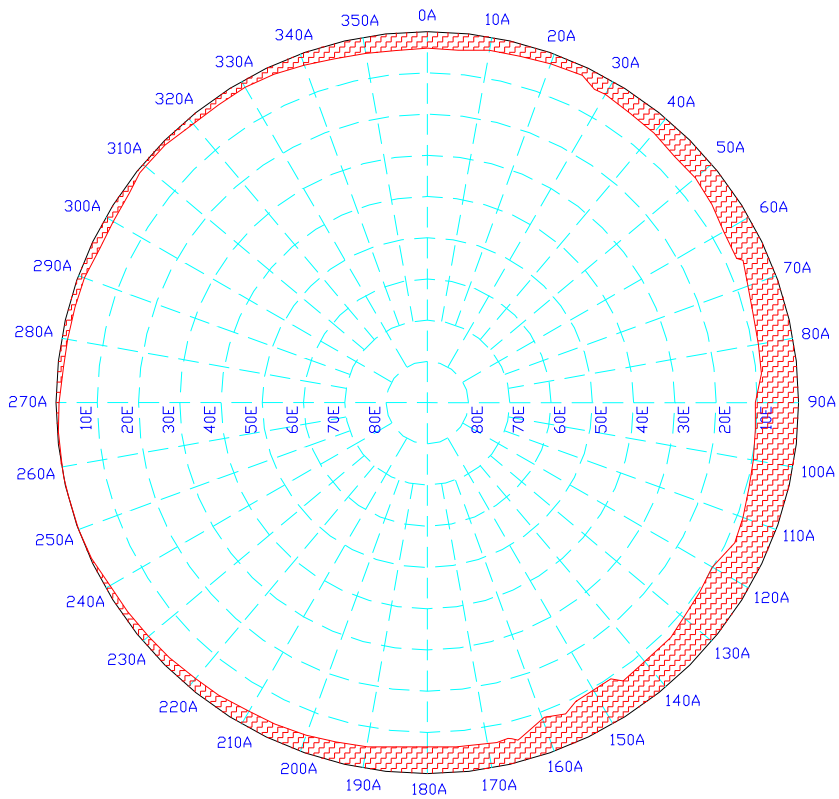


***Figure 3-11. Fairbanks 13 Meter '3/C' Antenna Horizon Profile***

***Table 3-4. Fairbanks 13 Meter '3/C' Antenna System***

| | |
|---|---|
| Location (WGS 84)<br>North Latitude<br>East Longitude<br>Height | <br>64° 58' 25.716"<br>212° 29' 39.300"<br>385 Meters |
| Mount Type | Azimuth/Elevation (AZ/EL) |
| Control Modes | Manual -Antenna position determined by operator input from remote control located in control room.<br><br>Autotrack - Position error signals from receiver determine antenna position.<br><br>Program - Computer positions antenna based on processed acquisition data.<br><br>Slave - Antenna positioned to angles of other site antenna or computer using site synchro slave bus. |
| Antenna Type | Prime Focus Parabolic / CASS 'X' |
| Reflector Diameter | 13 Meters |
| Receive Frequencies | 1670-1710 MHz<br>2200-2400 MHz<br>7250-8500 MHz |
| Polarity<br>1670-1710 MHz<br><br>2200-2400 MHz<br><br>7250-8500 MHz | <br>RCP / LCP (optimally combined in Microdyne Receiver)<br><br>RCP / LCP (optimally combined in Microdyne Receiver)<br><br>RCP / LCP (optimally combined in Microdyne Receiver) |
| Receive Gain<br>1670-1710 MHz<br>2200-2400 MHz<br>7250-8500 MHz | <br>43.1 dBi<br>44.0 dBi<br>58.0 dBi |
| System Temperature<br>1670-1710 MHz<br>2200-2400 MHz<br>7250-8500 MHz | <br>190° Kelvin<br>110° Kelvin<br>70° Kelvin |
| Gain/Temperature (G/T)<br>1670-1710 MHz<br>2200-2400 MHz<br>7250-8500 MHz | <br>19.6 dB<br>23.4 dB<br>36.4 dB |
| Receive 3 dB Beam width<br>1670-1710 MHz<br>2200-2400 MHz<br>7250-8500 MHz | <br>0.8°<br>0.6°<br>0.18° |
| Transmit Frequency | 1750-1850 MHz<br>2025-2120 MHz |
| Transmit Polarity | Right-hand Circular or Left-hand Circular |
| Transmit Gain<br>1750-1850 MHz<br>2025-2120 MHz | <br>41.8 dBi<br>43.0 dBi |
| Transmit 3 dB Beam width<br>1750-1850 MHz<br>2025-2120 MHz | <br>0.7°<br>0.7° |
| Transmit Power<br>1750-1850 MHz/2025-2120 MHz | <br>300 W |
| Effective Isotropic Radiated Power (EIRP)<br>1750-1850 MHz<br>2025-2120 MHz | <br>96.7 dBm<br>97.7 dBm |

***Figure 3-12. Fairbanks 21 Meter Antenna***

## 3.6 21 Meter GOES Antenna System

The 21 meter VERTEX/RSI antenna system, while initially purchased to support Japan with the GOES 9 spacecraft, is now used by NOAA for GOES West back-up support. Aside from its size and the steel cylindrical riser, the antenna is equivalent in all facets to the HR systems at the WCDAS and WBU. Figure 3-13 provides a terrain masking profile. The capabilities of the system are described in Table 3-5.

***Table 3-5. Fairbanks 21 Meter Antenna System***

| | |
|---|---|
| Location (WGS 84)<br>North Latitude<br>East Longitude<br>Height | <br>64° 58' 21.9"<br>212° 29' 56.04"<br>435.6 Meters |
| Mount Type | Azimuth/Elevation (AZ/EL) |
| Control Modes | Manual -Antenna position determined by operator input from remote control located in control room.<br><br>Program - Computer positions antenna based on processed acquisition data. |
| Antenna Type | Cassegrain Focus Parabolic |
| Receive Frequencies | 1670-1710 MHz<br>2200-2300 MHz |
| Polarity<br>1670-1710 MHz<br>2200-2300 MHz | <br>Rotatable Linear<br>Rotatable Linear |
| Receive Gain<br>1670-1710 MHz<br>2200-2300 MHz | <br>50.58 dBi<br>53.12 dBi |
| System Temperature<br>1670-1710 MHz<br>2200-2300 MHz | <br>96.16° Kelvin<br>104.47° Kelvin |
| Gain/Temperature (G/T)<br>1670-1710 MHz<br>2200-2300 MHz | <br>30.75 dB<br>32.93 dB |
| Receive 3 dB Beam width<br>1670-1710 MHz<br>2200-2300 MHz | <br>0.48°<br>0.34° |
| Transmit Frequency | 2025-2035 MHz |
| Transmit Gain | 52.2 dBi |
| Transmit 3 dB Beam width | 0.37° |
| Transmit Power | 1000 W |
| Effective Isotropic Radiated Power (EIRP) | 112.2 dBm |

***Figure 3-13. Fairbanks SAR 1 Antenna***

## 3.7 SAR Antenna System

The SAR antenna systems shown in Figure 3-13 and Figure 3-14 are satellite-receiving units that receive emergency beacon distress alerts. Fairbanks has two SAR antenna systems. These Cospas-Sarsat ground stations are called Local User Terminals (LUTs). AK 1 and AK 2. These LUTs track low earth orbiting satellites and are thus called LEO LUTs. LEOLUTs are designed to track the

Russian Nadhezda and the NOAA POES with France and Canadian Search and Rescue (SAR) instruments as they pass across the sky and receive the distress signals relayed by them. Once the signal is received, processed, and located by the LUT it is transmitted to the United States Mission Control Center (USMCC) in Suitland, MD. The LUTs are fully automated and completely unmanned at all times. There are similar NESDIS SAR antenna systems in Florida, California, Hawaii, Maryland, and Guam.

***Figure 3-14. Fairbanks SAR 2 Antenna***

This page intentionally left blank.

***Table 3-6. Fairbanks Recent Depot Level Maintenance Chart***

| Maintenance Performed Since Last Inspection | 26M | 13M-A | 13M-B | 13M-C | SATAN | SCAMP | VHF RECEIVE | 21M |
|---|---|---|---|---|---|---|---|---|
| Antenna Installation Date | | 1999 | 1999 | 1999 | | | 2000 | 2002/2003 |
| | POES | | | | | | | GOES |
| | | | | | | | | |
| Spares for Legacy System | | | | | Satan spares acquire from Hawaii/2004 | | | |
| Antenna Assessment / Condition Survey | | | | | | | | |
| Electric Power Cabling | 1993 | | | | | | | |
| Control Cabling | 1993 | | | | | | | |
| Antenna Grounding System | 1998 | | | | | | | |
| RF Antenna Cabling | 1993 | | | | | | | |
| Antenna Shelter | | Door Latches 2002 | Door Latches 2002 | Door Latches 2002 | | | | |
| RF Equipment Upgrades | | | | | | | | |
| Equipment Shelters | | | | | | | | |
| Fiber Optic Upgrades | | | | | | | | |
| Hydraulic Upgrades | Hydraulics Removed 2003 | | | | Actuators, Pumps, Stow Pins/2003 | | | |
| Structural Upgrades | Counterweights 2003 | | | | | | | |
| Servo Drive Upgrades | | Brushless Motor Upgrade 2007 | Brushless Motor Upgrade 2007 | Brushless Motor Upgrade 2007 | | | | |
| Gear Box Upgrades | | Elev/2005 Az/3rd Axis in 2006 | Elev-2005 Az/3rd Axis 2006 | Elev/2005 Az/3rd Axis in 2006 | | | | |
| Brake System Upgrades | 2003 | 2007 | 2007 | 2007 | | | | |
| Feed System Upgrades | 1991 | | | | | | | |
| Solid State Transmitter | | | | | | | | 2006 |
| Electric Drive Motor Upgrade | Electric Drives 2003 | 2007 | 2007 | 2007 | | | | |
| Corrosion Control DLM | 2004 | | | | | | | |

This page intentionally left blank.

# Section 4.0 NOAA Satellite Operations Facility (NSOF)

## 4.1 General Description

The NOAA Satellite Operations Facility (NSOF) shown in Figure 4-1 controls the operations of the POES and GOES systems along with control and monitoring of the DMSP and SARSAT programs. The NSOF coordinates all satellite operations, prepares spacecraft schedules, generates spacecraft commands, processes satellite data, and disseminates products. This section gives an overview of the antennas located at NSOF in Suitland, Maryland.

***Figure 4-1. NOAA Satellite Operations Facility (NSOF)***

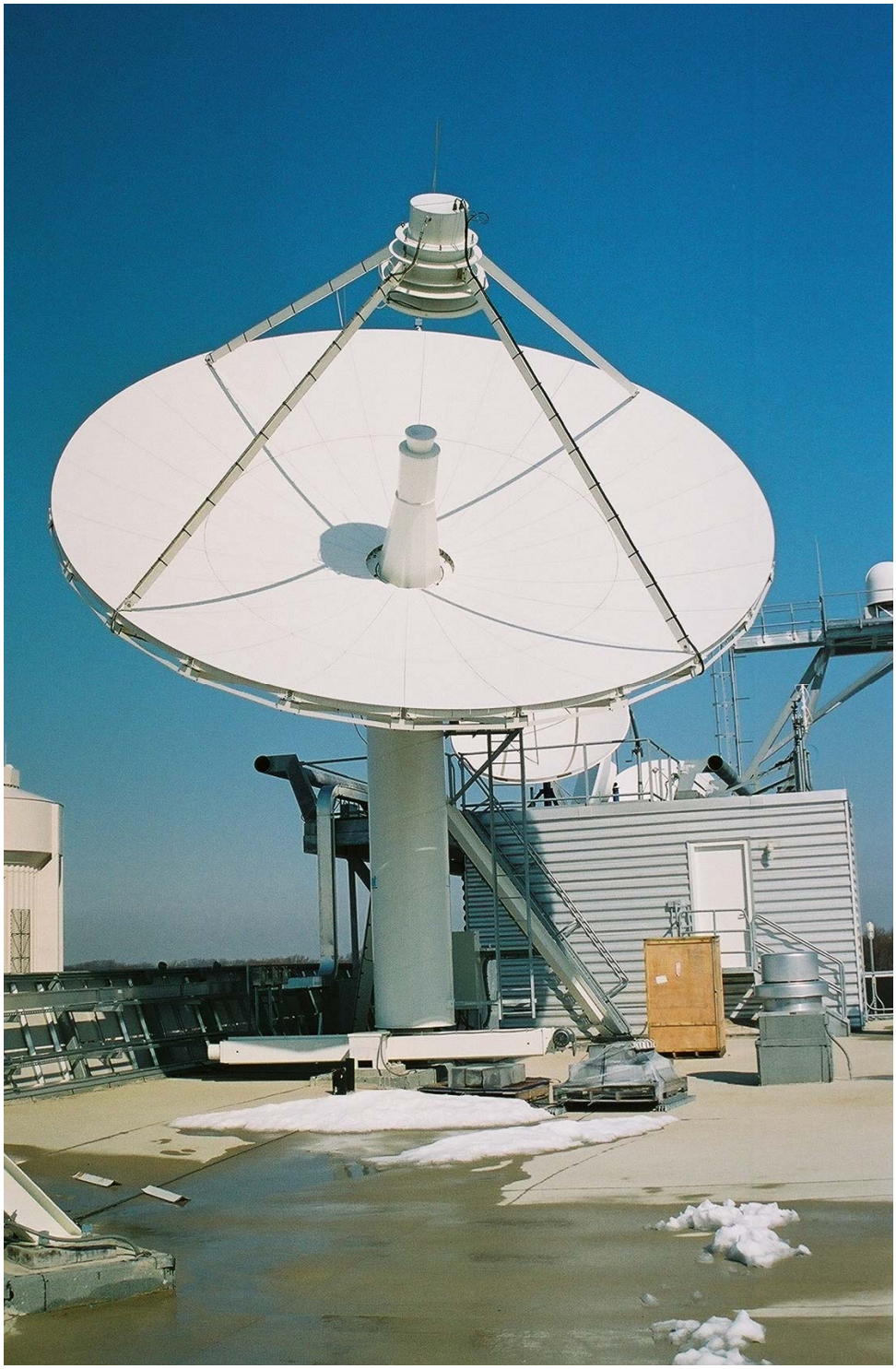

***Figure 4-2. NSOF 9.1 Meter 1 Antenna***

## 4.2 9.1 Meter #1 Antenna System

The 9.1 Meter #1 antenna system shown in Figure 4-2 consists of a ViaSat 11 Meter pedestal mated to its 9.14 meter diameter reflector with a dichroic sub-reflector, L-Band prime focus feed, and X-Band Cassegrain feed. This antenna system supports all GOES mission requirements except primary sensing data at L-Band. This antenna has an X-Band feed and LNAs to support future GOES-R requirements. The 9.14 Meter antenna can receive GOES telemetry, Multi-use Data Link Receive System and Server (MRS&S), Data Collection Platform Reply (DCPR), and GVAR broadcast data. Antenna positioning is controlled through the 8662 antenna controller on the roof in conjunction with its respective controller in the operations room. The operations room 8860 control unit is interfaced to a central antenna systems PC. The antenna controller provides for manual, auto-step (AGC track), adapt (database) track, and NORAD TLE or program track. The central antenna control sub-system can run a pre-programmed set of diagnostics and via its interconnected Labview signal analyzer take spectrum snaps that can be retained for future systems analysis. The 9.14 meter dual-shaped antenna provides:

- Prime-focus L-Band feed with dual receive channels
- Cassegrain X-Band feed with single receive channel.
- Linear Polarization capability for both X- and L-band signals with independent motorized polarization rotation.

The capabilities of the system are described in Table 4-1.

***Table 4-1. NSOF 9.1 Meter 1 Antenna System***

| | |
|---|---|
| Location (WGS 84)<br>North Latitude<br>West Longitude<br>Height | <br>38° 51' 07.7"<br>07.6° 56' 13.1"<br>71.2 Meters |
| Mount Type | Azimuth/Elevation (AZ/EL) |
| Control Modes | Manual, Auto-step (AGC track), Adapt-track (database), and NORAD TLE (program track). |
| Antenna Type<br>L-Band<br>X-Band | <br>Prime Focus Parabolic<br>Cassegrain |
| Reflector Diameter | 9.1 Meter |
| Receive Frequencies<br>L-Band<br>X-Band | <br>1670-1710 MHz<br>8.2-8.8 GHz (Feed terminated) |
| Polarity | Linear (Feed is rotate able through 360° from remote control located in control room.) |
| Receive Gain<br>L-Band<br>X-Band | <br>42.1dBi<br>55.7 dBi |
| System Temperature<br>L-Band<br>X-Band | <br>181.85° Kelvin<br>138.64° Kelvin |
| Gain/Temperature (G/T)<br>L-Band<br>X-Band | <br>19.5 dB<br>34.3 dBi |
| Receive 3 dB Beam width<br>L-Band<br>X-Band | <br>1.18°<br>0.27° |

***Figure 4-3. NSOF 9.1 Meter 2 Antenna***

## 4.3 9.1 Meter #2 Antenna System

The 9.1 meter #2 antenna system shown in Figure 4-3 is identical to the system described in Section 4.2. This antenna could be positioned to support any of the geosynchronous spacecraft. Table 4-2 describes system parameters.

***Table 4-2. NSOF 9.1 Meter 2 Antenna System***

| | |
|---|---|
| Location (WGS 84)<br>North Latitude<br>West Longitude<br>Height | <br>38° 51' 07.7"<br>07.6° 56' 13.1"<br>71.2 Meters |
| Mount Type | Azimuth/Elevation (AZ/EL) |
| Control Modes | Manual, Auto-step (AGC track), Adapt-track (database), and NORAD TLE (program track). |
| Antenna Type<br>L-Band<br>X-Band | <br>Prime Focus Parabolic<br>Cassegrain |
| Reflector Diameter | 9.1 Meter |
| Receive Frequencies<br>L-Band<br>X-Band | <br>1670-1710 MHz<br>8.2-8.8 GHz (Feed terminated) |
| Polarity | Linear (Feed is rotate able through 360° from remote control located in control room.) |
| Receive Gain<br>L-Band<br>X-Band | <br>42.0 dBi<br>55.6 dBi |
| System Temperature<br>L-Band<br>X-Band | <br>169.26° Kelvin<br>128.66° Kelvin |
| Gain/Temperature (G/T)<br>L-Band<br>X-Band | <br>19.7 dB<br>34.5 dBi |
| Receive 3 dB Beam width<br>L-Band<br>X-Band | <br>1.19°<br>0.27° |

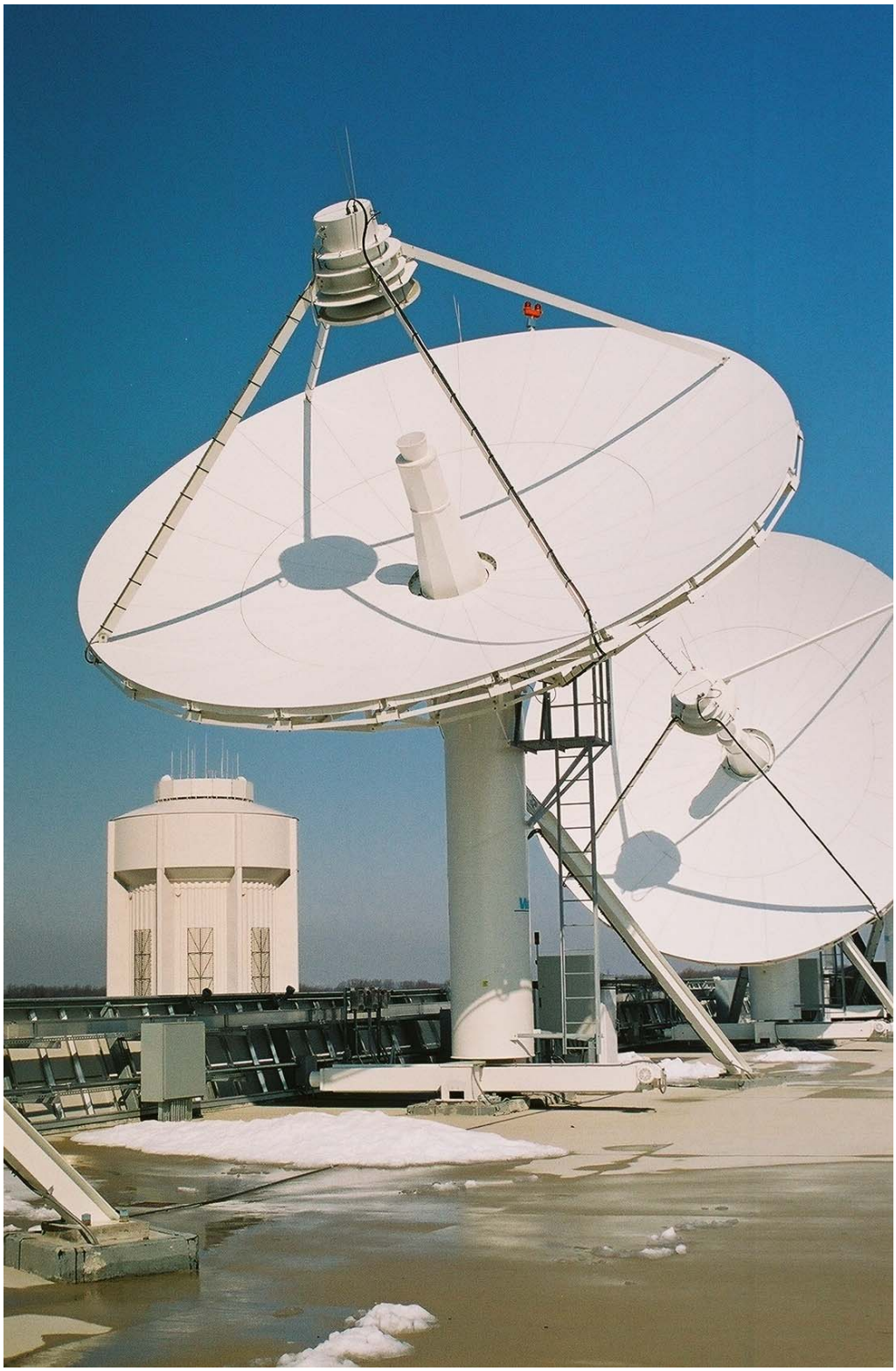

***Figure 4-4. NSOF 9.1 Meter 3 Antenna***

## 4.4 9.1 Meter #3 Antenna System

The 9.1 meter #3 antenna system shown in Figure 4-4 is identical to the system described in Section 4.2. This antenna could be positioned to support any of the geosynchronous spacecrafts. Table 4-3 summarizes its system performance parameters.

***Table 4-3. NSOF 9.1 Meter 3 Antenna System***

| | |
|---|---|
| Location (WGS 84)<br>North Latitude<br>West Longitude<br>Height | <br>38° 51' 07.7"<br>07.6° 56' 13.1"<br>71.2 Meters |
| Mount Type | Azimuth/Elevation (AZ/EL) |
| Control Modes | Manual, Auto-step (AGC track), Adapt-track (database), and NORAD TLE (program track). |
| Antenna Type<br>L-Band<br>X-Band | <br>Prime Focus Parabolic<br>Cassegrain 'X' |
| Reflector Diameter | 9.1 Meter |
| Receive Frequencies<br>L-Band<br>X-Band | <br>1670-1710 MHz<br>8.2-8.8 GHz (Feed terminated) |
| Polarity | Linear (Feed is rotate able through 360° from remote control located in control room.) |
| Receive Gain<br>L-Band<br>X-Band | <br>41.6 dBi<br>55.2 dBi |
| System Temperature<br>L-Band<br>X-Band | <br>182.4 ° Kelvin<br>142.09° Kelvin |
| Gain/Temperature (G/T)<br>L-Band<br>X-Band | <br>19.1 dB<br>33.7 dBi |
| Receive 3 dB Beam width<br>L-Band<br>X-Band | <br>1.25°<br>0.28° |

***Figure 4-5. NSOF 9.1 Meter 4 Antenna***

## 4.5 9.1 Meter #4 Antenna System

The 9.1 meter #4 antenna system shown in Figure 4-5 is identical to the system described in Section 4.2. This antenna could be positioned to support any of the geosynchronous spacecraft. Table 4-4 describes system parameters.

***Table 4-4. NSOF 9.1 Meter 4 Antenna System***

| | |
|---|---|
| Location (WGS 84)<br>North Latitude<br>West Longitude<br>Height | <br>38° 51' 07.7"<br>07.6° 56' 13.1"<br>71.2 Meters |
| Mount Type | Azimuth/Elevation (AZ/EL) |
| Control Modes | Manual, Auto-step (AGC track), Adapt-track (database), and NORAD TLE (program track). |
| Antenna Type<br>L-Band<br>X-Band | <br>Prime Focus Parabolic<br>Cassegrain 'X' |
| Reflector Diameter | 9.1 Meter |
| Receive Frequencies<br>L-Band<br>X-Band | <br>1670-1710 MHz<br>8.2-8.8 GHz (Feed terminated) |
| Polarity | Linear (Feed is rotate able through 360° from remote control located in control room.) |
| Receive Gain<br>L-Band<br>X-Band | <br>41.5 dBi<br>55.5 dBi |
| System Temperature<br>L-Band<br>X-Band | <br>160.42° Kelvin<br>130.4 ° Kelvin |
| Gain/Temperature (G/T)<br>L-Band<br>X-Band | <br>19.5 dB<br>34.4 dBi |
| Receive 3 dB Beam width<br>L-Band<br>X-Band | <br>1.25°<br>0.28° |

***Table 4-5. Suitland Recent Depot Level Maintenance Chart***

| Maintenance Performed Since Last Inspection | 9.1M-1 | 9.1M-2 | 9.1M-3 | 9.1M-4 |
|---|---|---|---|---|
| Antenna Installation Date | 2005 | 2005 | 2005 | 2005 |
| | GOES | | | |
| | | | | |
| Antenna Assessment/Condition Survey | | | | |
| Electric Power Cabling | | | | |
| Control Cabling | | | | |
| Antenna Grounding System | | | | |
| RF Antenna Cabling | | | | |
| Antenna Shelter | | | | |
| RF Equipment Upgrades | | | | |
| Equipment Shelters | | | | |
| Fiber Optic Upgrades | | | | |
| Hydraulic Upgrades | | | | |
| Structural Upgrades | | | | |
| Servo Drive Upgrades | | | | |
| Gear Box Upgrades | | | | |
| Feed System Upgrades | | | | |
| Solid State Amplifiers | | | | |
| Electric Drive Motor Upgrade | 2007 AZ | 2007 AZ | | |
| Corrosion Control DLM | | | | |

This page is intentionally left blank.

# Section 5.0 Goddard Space Flight Center Wallops Backup (WBU) Site

## 5.1 General Description

The WBU site shown in Figure 5-1 is located at Goddard Space Flight Center (GSFC) Building 25 in Greenbelt, Maryland. This site provides a single string continuous GOES satellite systems backup in the event of a prime site anomaly at the WCDAS. A backup team from the Wallops CDA station is prepared to travel to the backup site in any emergency. The backup site crew can coordinate all satellite operations, prepare spacecraft schedules, generate spacecraft commands, process satellite data, and disseminate products. This section provides an overview of the antenna located at the building 25 facility.

***Figure 5-1. Wallops Backup Facility in Greenbelt, Maryland***

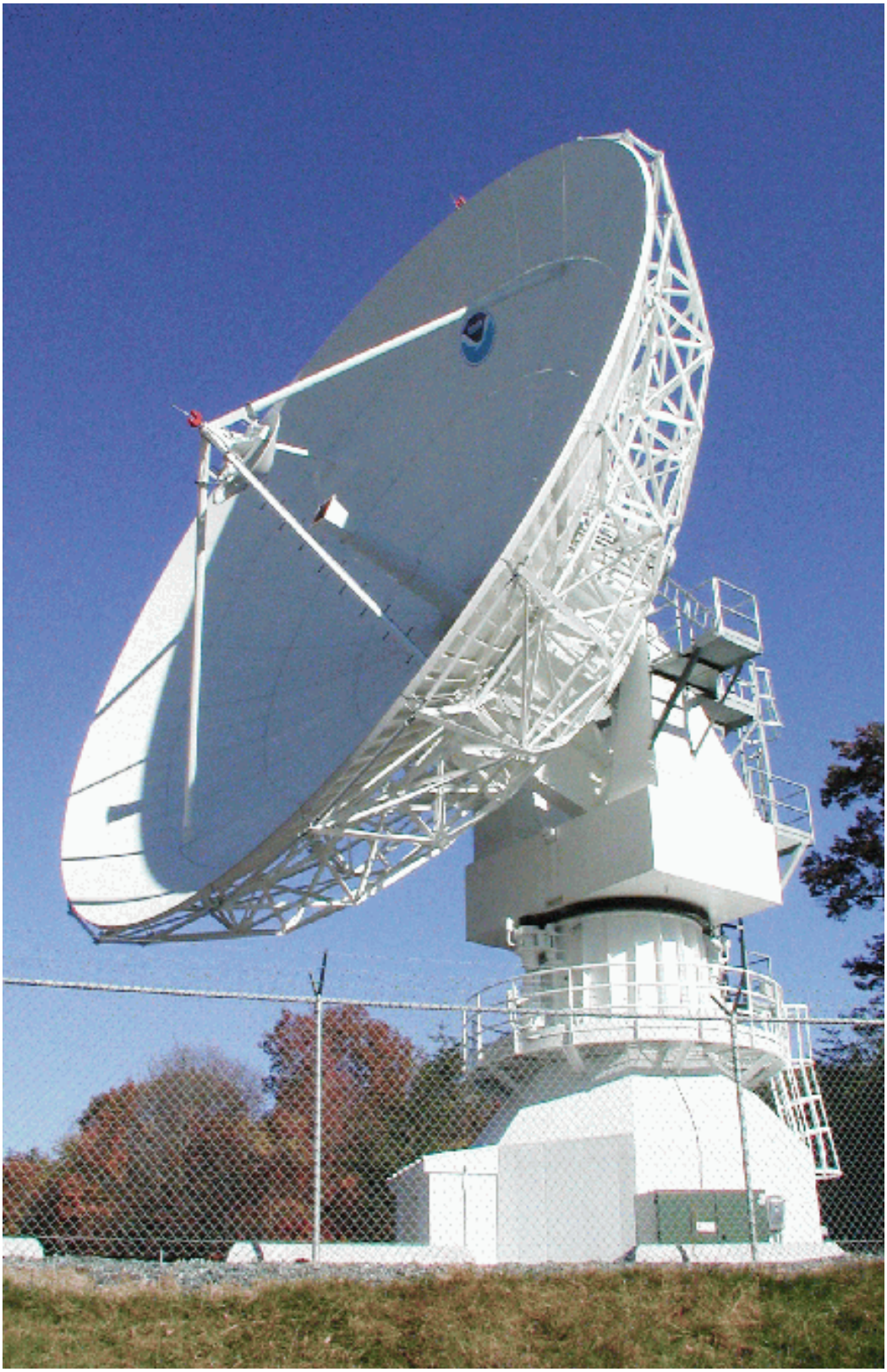

***Figure 5-2. GSFC 16.4 Meter (HR-3) Antenna***

## 5.2 16.4 Meter (HR-3) Antenna System

The 16.4 Meter hurricane-rated antenna (HR-3) is used as an emergency back-up for the GOES antennas at the WCDAS. It is functionally identical to the 16.4 Meter antennas at the Wallops station except that it has a single receive string. The position of the antenna is manually controlled from an operations room in building 25. Figure 5-3 provides a terrain masking profile. The antenna system parameters are described in Table 5-1.

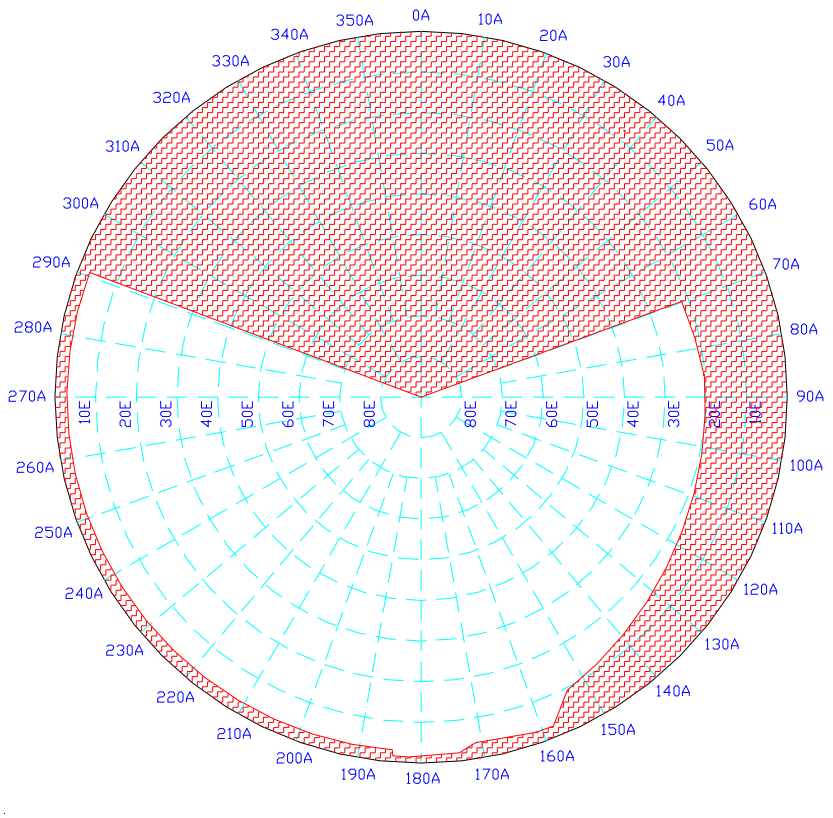


***Figure 5-3. GSFC 16.4 Meter (HR-3) Antenna Horizon Profile***

***Table 5-1. GSFC 16.4 Meter (HR-3) Antenna System***

| | |
|---|---|
| Location (WGS 84)<br>North Latitude<br>East Longitude<br>Height | <br>39° 00' 02.170"<br>283° 09' 30.822"<br>30.42 Meters |
| Mount Type | Azimuth/Elevation (AZ/EL) |
| Control Modes | Optrack -Antenna positioned by combination of continuous tracking data and ephemeris model predicts built via step track mode.<br><br>Manual -Antenna position determined by operator input from remote control located in control room.<br><br>Preset Position -Locates the antenna to a position defined by 40 selectable stored AZ/EL positions. |
| Antenna Type | Cassegrain Focus Parabolic |
| Reflector Diameter | 16.4 Meter |
| Receive Frequencies | 1670-1710 MHz<br>2200-2290 MHz |
| Polarity | Linear (All Transmit and Receive systems share a common feed which is rotate able through 360° from a remote control located in the control room) |
| Receive Gain<br>1670-1710 MHz<br>2200-2290 MHz | <br>48.4 dBi<br>50.0 dBi |
| System Temperature<br>1670-1710 MHz<br>2200-2290 MHz | <br>100.9° Kelvin<br>97.7° Kelvin |
| Gain/Temperature G/T)<br>1670-1710 MHz<br><br>2200-2290 MHz | <br>28.3 dB (Best measured performance)<br>26.0 dB (Guaranteed)<br>30.1 dB |
| Receive 3 dB Beam width<br>1670-1710 MHz<br>2200-2290 MHz | <br>0.67°<br>0.53° |
| Transmit Frequency | 2025-2035 MHz |
| Transmit Gain | 49.6 dBi |
| Transmit 3 dB Beam width | 0.55° |
| Transmit Power | 1000 W |
| Effective Isotropic Radiated Power (EIRP) | 109.6 dBm |

***Table 5-2. GSFC Recent Depot Level Maintenance Chart***

| | |
|---|---|
| Maintenance Performed Since Last Inspection | 16.4M |
| Antenna Installation Date | 2000 |
| | GOES |
| | |
| Antenna Assessment/Condition Survey | |
| Electric Power Cabling | |
| Control Cabling | |
| Antenna Grounding System | |
| RF Antenna Cabling | |
| Antenna Shelter | |
| RF Equipment Upgrades | |
| Equipment Shelters | |
| Fiber Optic Upgrades | |
| Hydraulic Upgrades | |
| Structural Upgrades | |
| Servo Drive Upgrades | |
| Gear Box Replacement/Upgrades | Elevation Box/ 2007 |
| Feed System Upgrades | Dehydrator/ 2005 |
| Solid State Amplifiers | Accepted Dec.2006 |
| Electric Drive Motor Upgrade | |
| Corrosion Control DLM | |

This page intentionally left blank.

# Section 6.0 National Climatic Data Center (NCDC) Facility in Asheville, North Carolina

## 6.1 General Description

The World Data Center (WDC) for Meteorology, Asheville is maintained by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA) and is collocated and operated by the National Climatic Data Center (NCDC). The NCDC acquires, catalogues, and archives data and makes them available to requesters in the international scientific community. This section provides an overview of the antennas located at the NCDC facility.

***Figure 6-1. National Climatic Data Center in Asheville, North Carolina***

***Figure 6-2. NCDC 3.8 Meter Antenna***

## 6.2 3.8 Meter Antenna System

The 3.8 Meter antenna depicted in Figure 6-2 is a Comtech receive-only dish that is used to support the receipt of GOES spacecraft data from the National Weather Service (NWS) NOAA port service. The system is maintained by the NWS. The position of the antenna is manually controlled from the operations room. The antenna system parameters are described in Table 6-1.

***Table 6-1. NCDC 3.8 Meter Antenna System***

| | |
|---|---|
| Location (WGS 84) | |
| North Latitude | 35° 35' 37.95" |
| East Longitude | 278° 27' 32.65" |
| Height | Meters |
| Mount Type | Azimuth/Elevation (AZ/EL) |
| Control Modes | Manual |
| Antenna Type | Prime Focus Parabolic |
| Reflector Diameter | 3.8 Meter |
| Receive Frequencies | |
| L-Band | 1670-1710 MHz |
| S-Band | 2200-2300 MHz |

***Figure 6-3. NCDC 1.8 Meter Antenna***

## 6.3 1.8 Meter Antenna System

The 1.8 Meter antenna shown in Figure 6-3 is a Prodelin Model 1183. It is used to receive the Ku-band Domestic Communications Satellite (DOMSAT) data from the GOES Data Collection system. It is a Local Readout Ground System (LRGS) that was purchased from and is maintained by ILEX Engineering. The antenna is positioned manually on the roof. The antenna system parameters are described in Table 6-2.

***Table 6-2. NCDC 1.8 Meter Antenna System***

| | |
|---|---|
| Location (WGS 84)<br>North Latitude<br>East Longitude<br>Height | <br>35° 35' 37.95"<br>278° 27' 32.65"<br>Meters |
| Mount Type | Azimuth/Elevation (AZ/EL) |
| Control Modes | Manual |
| Antenna Type | Prime Focus Parabolic Offset |
| Reflector Diameter | 1.8 Meter |
| Receive Frequencies<br>Ku-Band | <br>10.95-12.75 GHz |
| Polarity | Horizontal |
| Receive Gain | 45.5 dBi |
| Receive 3 dB Beam width | 0.9° |

***Table 6-3. NCDC Recent Depot Level Maintenance Chart***

| | | |
|---|---|---|
| Maintenance Performed Since Last Inspection | 4M | 1.8M |
| Antenna Installation Date | | |
| | GOES | |
| | | |
| Antenna Assessment / Condition Survey | | |
| Electric Power Cabling | | |
| Control Cabling | | |
| Antenna Grounding System | | |
| RF Antenna Cabling | | |
| Antenna Shelter | | |
| RF Equipment Upgrades | | |
| Equipment Shelters | | |
| Fiber Optic Upgrades | | |
| Hydraulic Upgrades | | |
| Structural Upgrades | | |
| Servo Drive Upgrades | | |
| Gear Box Upgrades | | |
| Feed System Upgrades | | |
| Solid State Amplifiers | | |
| Electric Drive Motor Upgrade | | |
| Corrosion Control DLM | | |

This page intentionally left blank.

# Section 7.0 Space Environmental Center (SEC) at Boulder, Colorado

## 7.1 General Description

The Space Environment Center continually monitors and forecasts Earth's space environment; provides accurate, reliable, and useful solar-terrestrial information; conducts and leads research and development programs to understand the environment and to improve services; advises policy makers and planners; plays a leadership role in the space weather community; and fosters a space weather services industry. The Space Environment Center is the Nation's official source of space weather alerts and warnings.

The Space Environment Center is one of nine National Centers for Environmental Prediction and provides real-time monitoring and forecasting of solar and geophysical events, conducts research in solar-terrestrial physics, and develops techniques for forecasting solar and geophysical disturbances. The SEC Forecast Center is jointly operated by NOAA and the U.S. Air Force and is the national and world warning center for disturbances that can affect people and equipment working in the space environment.

The Space Environment Center supports the NOAA GOES spacecraft using any of the three 6.1 Meter antenna systems at the David Skaggs Research Center (see Figure 7-1) or the two 5 Meter antenna systems at the Table Mountain site located 8 miles north of Boulder.

***Figure 7-1. David Skaggs Research Center in Boulder, Colorado***

## 7.2 6.1 Meter Antenna System

The David Skaggs Research Center Observatory has three Vertex/RSI 6.1 Meter antennas (see Figure 7-2). These are the SEC primary antennas used to receive telemetry from the GOES satellite and NASA's ACE satellite. The antennas are manually configured as needed for the desired satellite's signal. Received data is processed at SEC. Data and products are made available to SEC's Space Weather Forecast Center, various partners, and general users. The antenna system parameters are described in Table 7-1.

***Figure 7-2. DSRC 6.1 Meter Antenna***

.

***Table 7-1. DSRC 6.1 Meter Antenna System***

| | |
|---|---|
| Location (WGS 84)<br>North Latitude<br>East Longitude<br>Height | <br>39° 59' 26.27"<br>255° 45' 9.11"<br>5481 Meters |
| Mount Type | Azimuth/Elevation (AZ/EL) |
| Control Modes | Manual |
| Antenna Type | Cassegrain Focus Parabolic |
| Reflector Diameter | 6.1 Meter |
| Receive Frequencies<br>L-Band<br>S-Band | <br>1670-1710 MHz<br>2200-2300 MHz |
| Polarity | Linear (Feed is rotate able through 360° from remote control located in control room.) |

## 7.3 5 Meter Antenna System

Table Mountain, which is located about 8 miles north of Boulder, also has three antennas. They are approximately 5 meters (see Figure 7-3 and Figure 7-4). However, only two of these are currently being used. Presently there are no plans to repair the third antenna known as the screen dish (see archived antenna section). The two other antennas are currently undergoing modifications to provide remote control and automatic tracking. In the past these antennas have been used to receive backup data and meet additional GOES Command and Data Acquisition (CDA) / Pulse Code Modulation (PCM) telemetry required by SEC. Feed modifications are under way to allow these antennas to acquire telemetry for NASA satellites ACE (2278.35 MHz) and STEREO (8445 MHz). The two operational antenna system parameters are described in Table 7-2.

***Figure 7-3. Table Mountain Site***

***Figure 7-4. Table Mountain 5 Meter Antenna***

***Table 7-2. Table Mountain 5 Meter Antenna System***

| | |
|---|---|
| Location (WGS 84)<br>North Latitude<br>East Longitude<br>Height | <br>40° 7' 51.69"<br>255° 46' 32.70"<br>5545 Meters |
| Mount Type | Azimuth/Elevation (AZ/EL) |
| Control Modes | Manual |
| Antenna Type | Prime Focus Parabolic |
| Reflector Diameter | 5 Meter |
| Receive Frequencies<br>L-Band | <br>1670-1710 MHz |
| Polarity | Linear (Feed is rotate able through 360° from remote control located in control room.) |

***Table 7-3. DSRC/Table Mountain Recent Depot Level Maintenance Chart***

| Maintenance Performed Since Last Inspection | 6.1M-1 | 6.1M-2 | 6.1M-3 | 5M-1 | 5M-2 |
|---|---|---|---|---|---|
| Antenna Installation Date | 1998 | 1998 | 1998 | | |
| | GOES | | | | |
| | | | | | |
| Antenna Assessment / Condition Survey | | | | | |
| Electric Power Cabling | | | | | |
| Control Cabling | | | | | |
| Antenna Grounding System | | | | | |
| RF Antenna Cabling | | | | | |
| Antenna Shelter | | | | | |
| RF Equipment Upgrades | | | | | |
| Equipment Shelters | | | | | |
| Fiber Optic Upgrades | | | | | |
| Hydraulic Upgrades | | | | | |
| Structural Upgrades | | | | | |
| Servo Drive Upgrades | | | | | |
| Gear Box Upgrades | | | | | |
| Feed System Upgrades | | | | | |
| Solid State Amplifiers | | | | | |
| Electric Drive Motor Upgrade | | | | | |
| Corrosion Control DLM | | | | | |

This page intentionally left blank.

# Section 8.0 Satellite Station in Barrow, Alaska

## 8.1 General Description

The Satellite tracking station in Barrow, Alaska (see Figure 8-1) consists of a 4 Meter Radiation Systems, Inc. (RSI) command-only antenna and a 3 Meter receive-only antenna that track LEO/POES satellites and relay data back to Fairbanks via a T1 link on a DOMSAT satellite. It was originally designed as a prototype system to demonstrate that an antenna in this region can support at elevations of less than one degree.

The Barrow RSI 4 Meter command antenna is shown in Figure 8-2 and Figure 8-3 with its respective technical characteristics provided in Table 8-1. The Barrow Sea Space 3 Meter receive antenna is shown in Figure 8-4 with its respective technical characteristics provided in Table 8-2.

***Figure 8-1. Barrow, Alaska Site***

***Figure 8-2. Barrow, Alaska 4 Meter Antenna Radome***

***Figure 8-3. Barrow, Alaska 4 Meter Antenna***

***Table 8-1. Barrow, Alaska 4 Meter Antenna System***

| | |
|---|---|
| Location (WGS 84)<br>North Latitude<br>East Longitude<br>Height | <br>71° 19' 25.0"<br>203° 23' 20.85"<br>14.8 Meters |
| Mount Type | Azimuth/Elevation (AZ/EL) |
| Control Modes | Manual -Antenna position determined by operator input from remote control located in control room.<br><br>Slave - Antenna positioned to angles of other site antenna or computer using site synchro slave bus. |
| Antenna Type | Prime Focus Parabolic |
| Reflector Diameter | 4 Meter |
| Transmit Frequency | 2025-2120 MHz |
| Polarity | RCP |
| Transmit Gain | 34 dBi |
| Transmit 3 dB Beamwidth | 3.0° |
| Transmitter Power (Max) | 300 W |
| Effective Isotropic Radiated Power (EIRP) | 88.8 dBm |

***Figure 8-4. Barrow, Alaska 3 Meter Antenna Radome***

***Table 8-2. Barrow, Alaska 3 Meter Antenna System***

| | |
|---|---|
| Location (WGS 84) | |
| North Latitude | 71° 19' 24.0" |
| East Longitude | 203° 23' 22.0" |
| Height | 4.8 Meters |
| Mount Type | Azimuth/Elevation (AZ/EL) |
| Control Modes | Manual -Antenna position determined by operator input from remote control located in control room. |
| Antenna Type | Prime Focus Parabolic |
| Reflector Diameter | 3 Meters |
| Transmit Frequencies | 1668-1725 MHz |
| Polarity | RCP |
| Receive Gain | 32 dBi |

# Section 9.0 Archived Antennas

## 9.1 Legacy NOAA Satellite Antenna Systems

### 9.1.1 General Description

This section contains legacy antenna systems that have been removed from service but are included herein for historical purposes. While some of the antenna systems have been dismantled and removed from service, others have been moved to different locations and continue to support other NOAA/NESDIS mission requirements.

***Figure 9-1. Wallops 7 Meter Antenna***

## 9.2 7 Meter Antenna System

The 7 meter antenna system shown in Figure 9-1 was completely removed from the Wallops facility in 1999 to allow for the construction of the new 16.4 meter HR antennas. It is being listed for historical purposes only. The 7 meter antenna system was a parabolic reflector with a prime focus feed on a steerable Hour-Angle/Declination (HA/DEC) mount. The system provided limited back-up to the 18 meter and 13 meter antenna systems described elsewhere in this publication. The system was limited to receive and transmit in the frequency ranges used by the GOES. Table 9-1 details the 7 meter antenna system capabilities.

***Table 9-1. Wallops 7 Meter Antenna System***

| | |
|---|---|
| Location (WGS 84)<br><br>North Latitude<br>East Longitude<br>Height | <br><br>37° 56' 43.993"<br>284° 32' 20.037"<br>-25.2 Meters |
| Mount Type | Hour Angle / Declination (HA/DEC) |
| Control Modes | Manual -Antenna position determined by operator input from remote control located in control room. |
| Antenna Type | Prime Focus Parabolic |
| Reflector Diameter | 7 Meters |
| Receive Frequencies | 1665-1700 MHz |
| Polarity | Horizontal / Vertical |
| Receive Gain | 39 dBi |
| System Temperature | 173.8° Kelvin |
| Gain/Temperature (G/T) | 16.6 dB |
| Receive 3 dB Beam width | 1.6° |
| Transmit Frequency | 2030 MHz |
| Transmit Gain | 41.7 dBi |
| Transmit 3 dB Beam width | 1.44° |
| Transmitter Power (Max) | 2000W |
| Effective Isotropic Radiated Power(EIRP) | 104.7 dBm |

***Figure 9-2. Wallops 4 Meter Antenna***

## 9.3 4 Meter Antenna System (for Historical Purposes only)

The 4 meter antenna system shown in Figure 9-2 is a parabolic antenna with a prime focus feed on an AZ/EL mount. The primary mission of this antenna system is as a back-up transmit/command antenna for the present generation of POES. In an emergency it could provide limited command support for the GOES. The 4 meter system is designed for spacecraft command in the 2024 MHz to 2110 MHz frequency range. This system is normally used in conjunction with the 26 meter receive antenna system, but can also be used with the 14.2 meter system. This antenna relies upon a receive antenna or its associated computer system for antenna positioning via an X/Y to AZ/EL converter and the site synchro bus.

This antenna is presently being used in Barrow, AK. Figure 9-3 provides the terrain masking profile. Table 9-2 describes system capabilities.

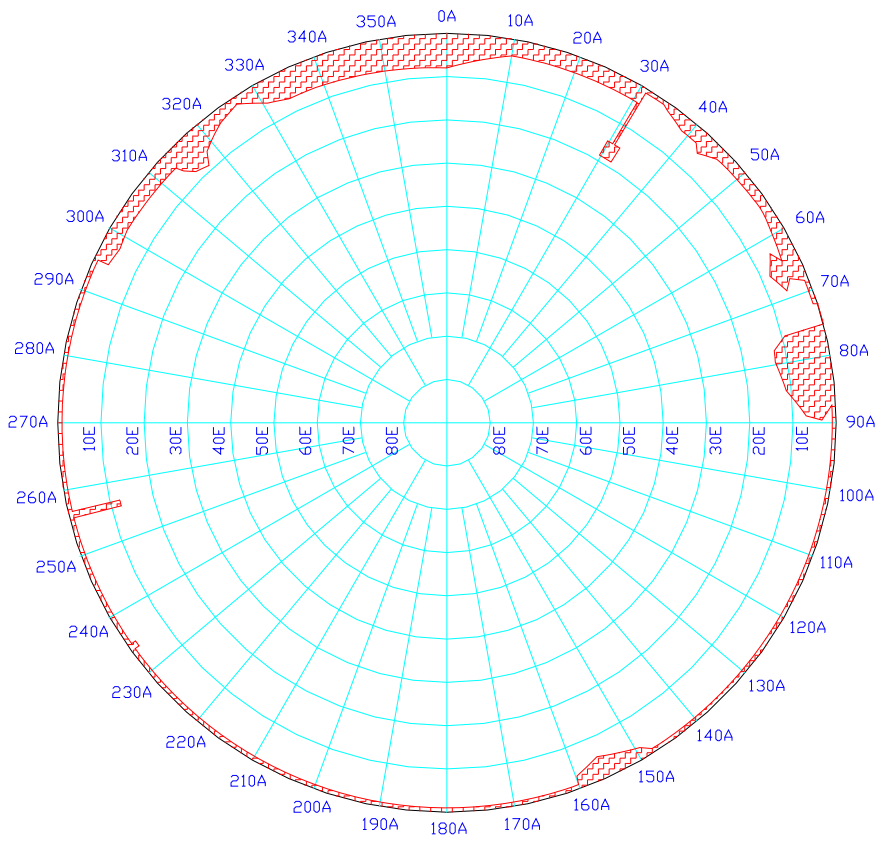


***Figure 9-3. Wallops 4 Meter Antenna Horizon Profile***

***Table 9-2. Wallops 4 Meter Antenna System***

| | |
|---|---|
| Receive Gain<br>1670-1710 MHz<br>2200-2400 MHz<br>7250-8500 MHz | <br>43.1 dBi<br>44.0 dBi<br>55.0 dBi |
| System Temperature<br>1670-1710 MHz<br>2200-2400 MHz<br>7250-8500 MHz | <br>190°Kelvin<br>110° Kelvin<br>70° Kelvin |
| Gain/Temperature (G/T)<br>1670-1710 MHz<br>2200-2400 MHz<br>7250-8500 MHz | <br>20.3 dB<br>23.5 dB<br>36.4 dB |
| Receive 3 dB Beam width<br>1670-1710 MHz<br>2200-2400 MHz<br>7250-8500 MHz | <br>0.91°<br>0.69°<br>0.19° |
| Transmit Frequency | 1750-1850 MHz<br>2025-2120 MHz |
| Transmit Polarity | Right-hand Circular or Left-hand Circular |
| Transmit Gain<br><br>1750-1850 MHz<br>2025-2120 MHz | <br><br>43.14 dBi<br>44.41 dBi |
| Transmit 3 dB Beam width<br>1750-1850 MHz<br>2025-2120 MHz | <br>0.87°<br>0.77° |
| Transmit Power | 2000 W |
| Effective Isotropic Radiated Power (EIRP) | 104.1 dBm |

***Figure 9-4. Wallops SATAN Command Antenna***

## 9.4 SATAN Antenna System

The SATAN antenna system shown in Figure 9-4 is a nine Disc-on-Rod broadband array on a fully steerable X/Y mount. The pedestal assembly is a servo-controlled, hydraulically powered gimbal. It is designed to command spacecraft in the 148 MHz to 154 MHz frequency range. This system is used in conjunction with the 26 meter or 14.2 meter antenna systems to transmit commands to the earlier generation of POES. The 26 meter, 14.2 meter or associated tracking computer is used to position the SATAN antenna via the site synchro bus. Figure 9-5 provides a terrain masking profile. Table 9-3 describes system capabilities.

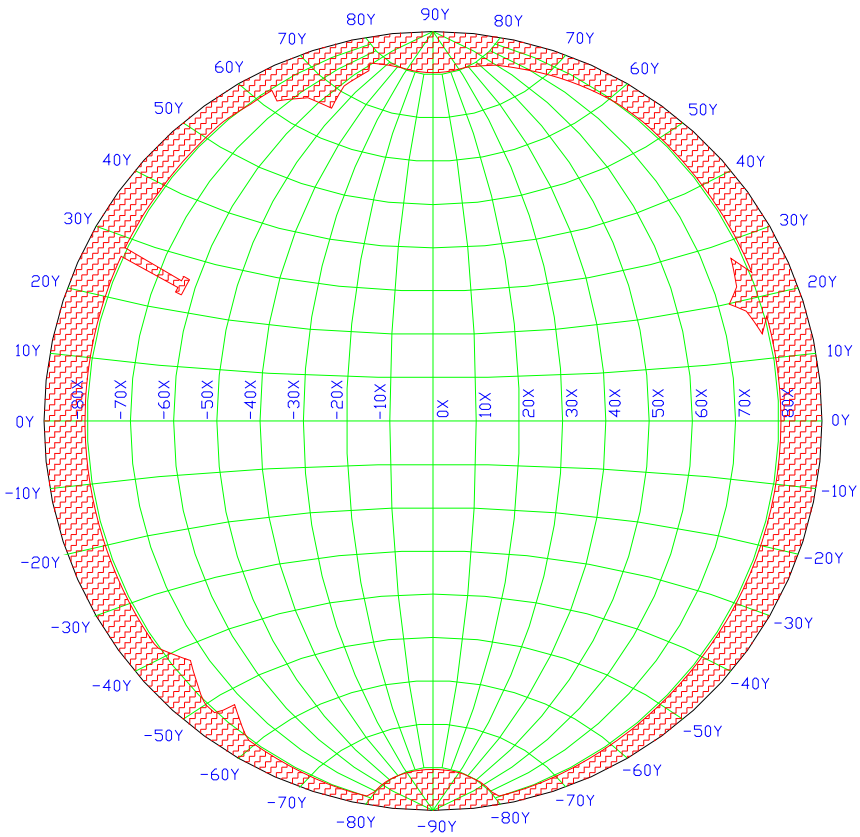


***Figure 9-5. Wallops SATAN Antenna Horizon Profile***

***Table 9-3. Wallops SATAN Antenna System***

| | |
|---|---|
| Location (WGS 84)<br>North Latitude<br>East Longitude<br>Height | <br>37° 56' 46.751"<br>284° 32' 24.447"<br>-21.5 Meters |
| Mount Type | XY (+X East, +Y North) |
| Control Modes | Manual -Antenna position determined by operator input from remote control located in control room.<br><br>Slave - Antenna positioned to angles of other site antenna or computer using site synchro slave bus. |
| Antenna Type | Nine Disc-on-Rod Array |
| Transmit Frequency | 148-154 MHz |
| Polarity | Remotely switch-able from:<br>Right-hand Circular (RCP)<br>Left-hand Circular (LCP)<br>Linear Parallel to X-AXIS (LIN X)<br>Linear Parallel to Y-AXIS (LIN Y) |
| Transmit Gain | 19 dBi |
| Transmit 3 dB Beam width | 12.0° |
| Transmit Power (Max) | 3500W |
| Effective Isotropic Radiated Power (EIRP) | 84.4 dBm |

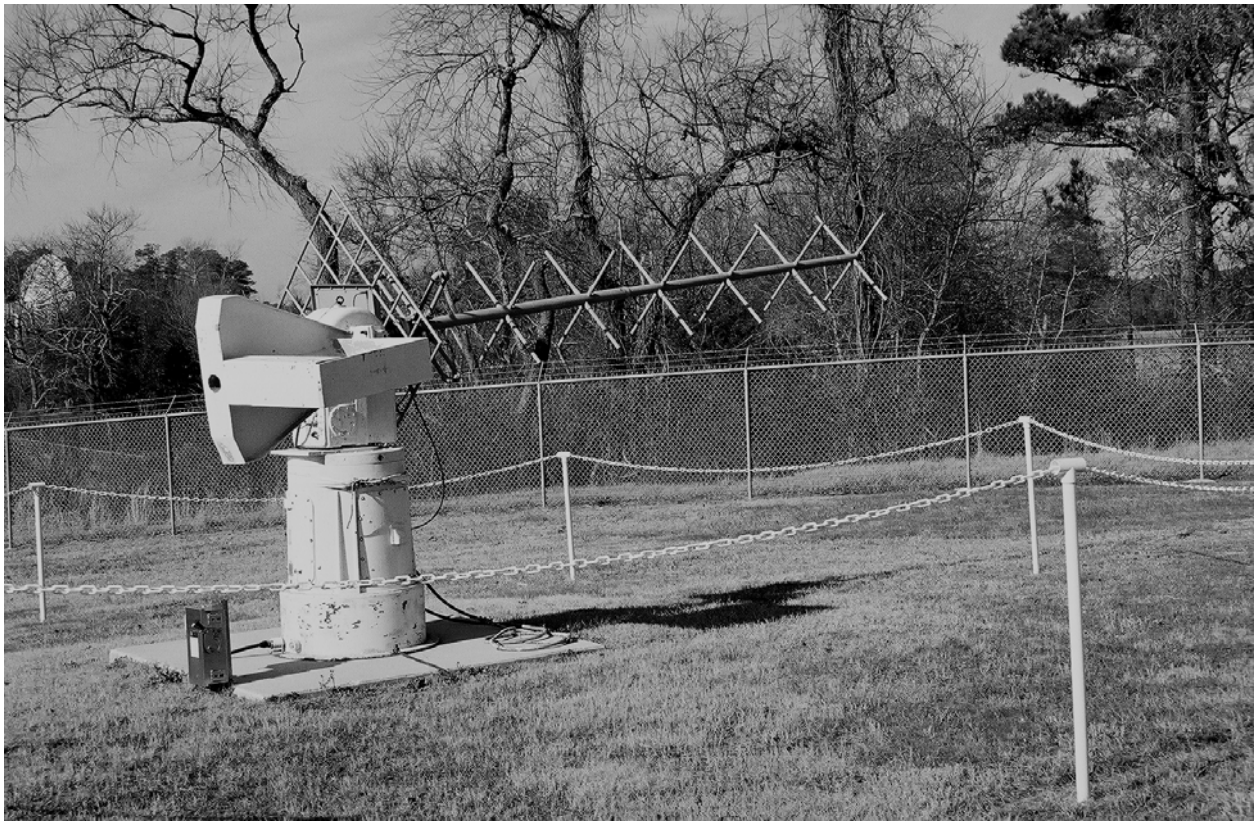

***Figure 9-6. Wallops Polar AUX VHF Antenna***

## 9.5 Polar VHF AUX Antenna System

The POLAR AUX VHF antenna system shown in Figure 9-6 is a low gain YAGI antenna on an AZ/EL mount. This antenna is used as a back-up to the SATAN antenna. It can only be positioned manually. Table 9-4 provides an overview of system capabilities. The antenna was physically relocated from the east side of the 26 Meter antenna to the west side of the 26 Meter antenna since the last revision of this handbook.

***Table 9-4. Wallops Polar VHF AUX Antenna System***

| | |
|---|---|
| Location (WGS 84)<br>North Latitude<br>East Longitude<br>Height | <br>37° 56' 48.000"<br>284° 32' 27.000"<br>10.77 Meters |
| Mount Type | Azimuth/Elevation (AZ/EL) |
| Control Modes | Manual -Antenna position determined by operator input from remote control located in control room. |
| Antenna Type | YAGI |
| Transmit Frequency | 148 MHz |
| Polarit | RCP |
| Transmit Gain | 13.5 dBi |
| Transmit 3 dB Beam width | 30.0° |
| Transmit Power (Max) | 2500W |
| Effective Isotropic Radiated Power (EIRP) | 77.5 dBm |

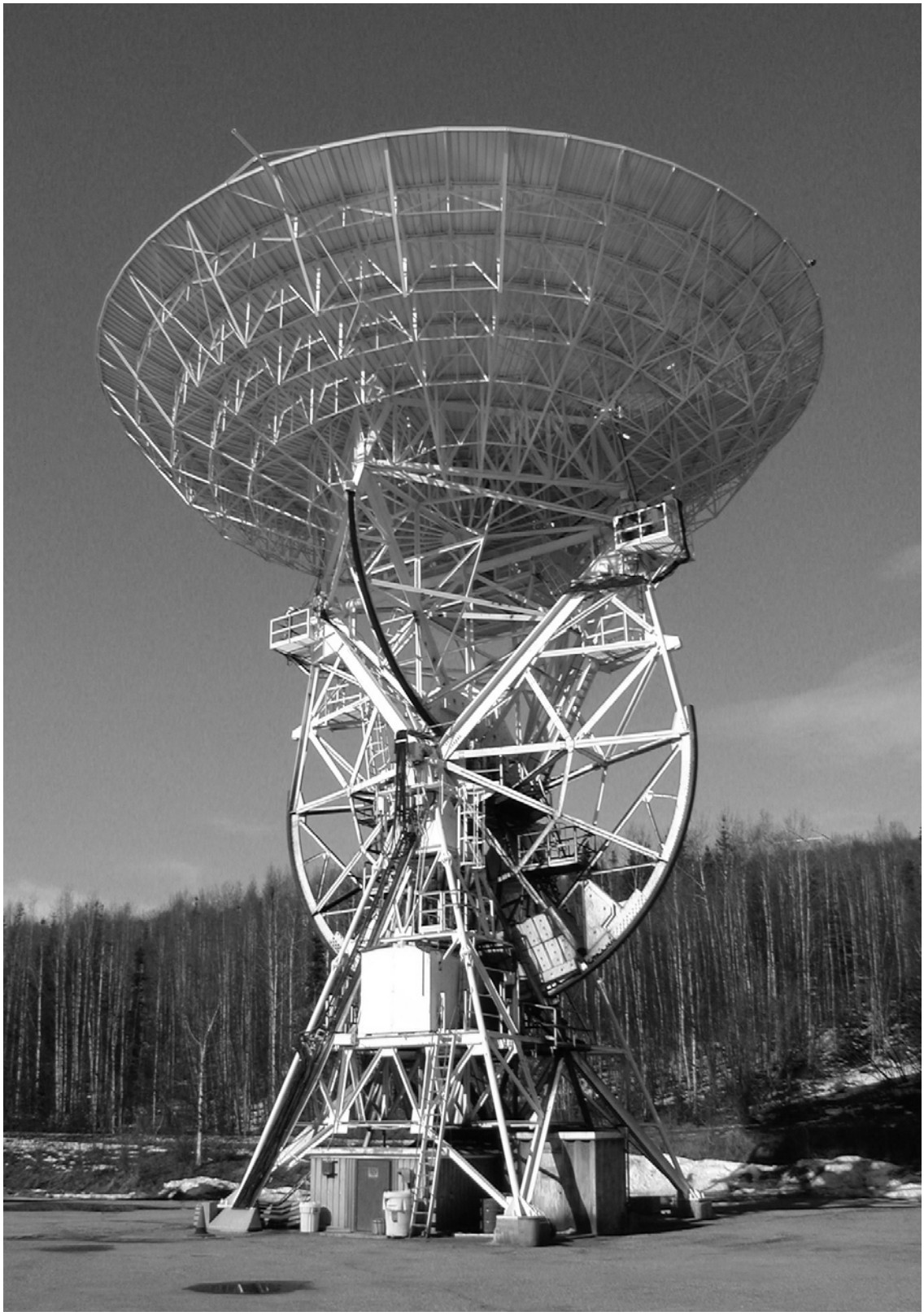

***Figure 9-7. Fairbanks 26 Meter (VLBI) Antenna***

## 9.6 26 Meter (VLBI) Antenna System

The 26 meter Rohr (VLBI) antenna system shown in Figure 9-7 is one element of a world-wide network of VLBI antennas. The NASA Dynamics of the Solid Earth (DOSE) Project operates the network in cooperation with the NOAA National Geodetic Survey (NGS), other U.S. government agencies and foreign government agencies. The antenna is a prime focus parabolic antenna on a fully steerable X/Y mount. The control signals and steering voltages are generated by the Antenna Control Console / Tracking Data Processing System (ACC/TDPS). The system can be driven manually, from the site synchro bus, or from the computer. Figure 9-8 provides a terrain masking profile. Table 9-5 describes the capabilities of this system.

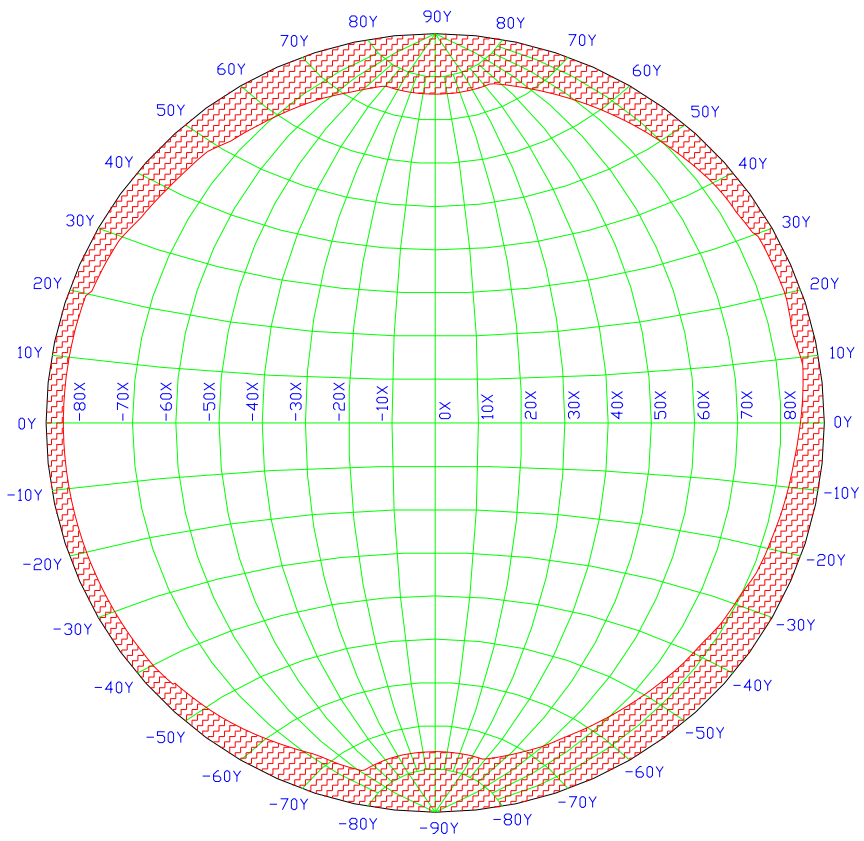


***Figure 9-8. Fairbanks 26 Meter (VLBI) Antenna Horizon Profile***

***Table 9-5. Fairbanks 26 Meter (VLBI) Antenna System***

| | |
|---|---|
| Location (WGS 84)<br>North Latitude<br>East Longitude<br>Height | <br>64° 58' 42.279"<br>212° 30' 9.040"<br>331.7 Meters |
| Mount Type | XY (+X east, +Y north) |
| Control Modes | Manual -Antenna position determined by operator input from remote control located in control room.<br><br>Program - Computer positions antenna based on processed acquisition data.<br><br>Slave - Antenna positioned to angles of other site antenna or computer using site synchro slave bus. |
| Antenna Type | Prime Focus Feed |
| Reflector Diameter | 26 Meters |
| Receive Frequencies | 2210-2450 MHz<br>8180-8980 MHz |
| Polarity | RCP |
| Receive Gain<br>2210-2450 MHz<br>8180-8980 MHz | <br>52.1 dBi<br>63.4 dBi |
| System Temperature<br>2210-2450 MHz<br>8180-8980 MHz | <br>65° Kelvin<br>60° Kelvin |
| Gain/Temperature (G/T)<br>2210-2450 MHz<br>8180-8980 MHz | <br>34.0 dB<br>45.6 dB |
| Receive 3 dB Beam width<br>2210-2450 MHz<br>8180-8980 MHz | <br>0.34°<br>0.08° |

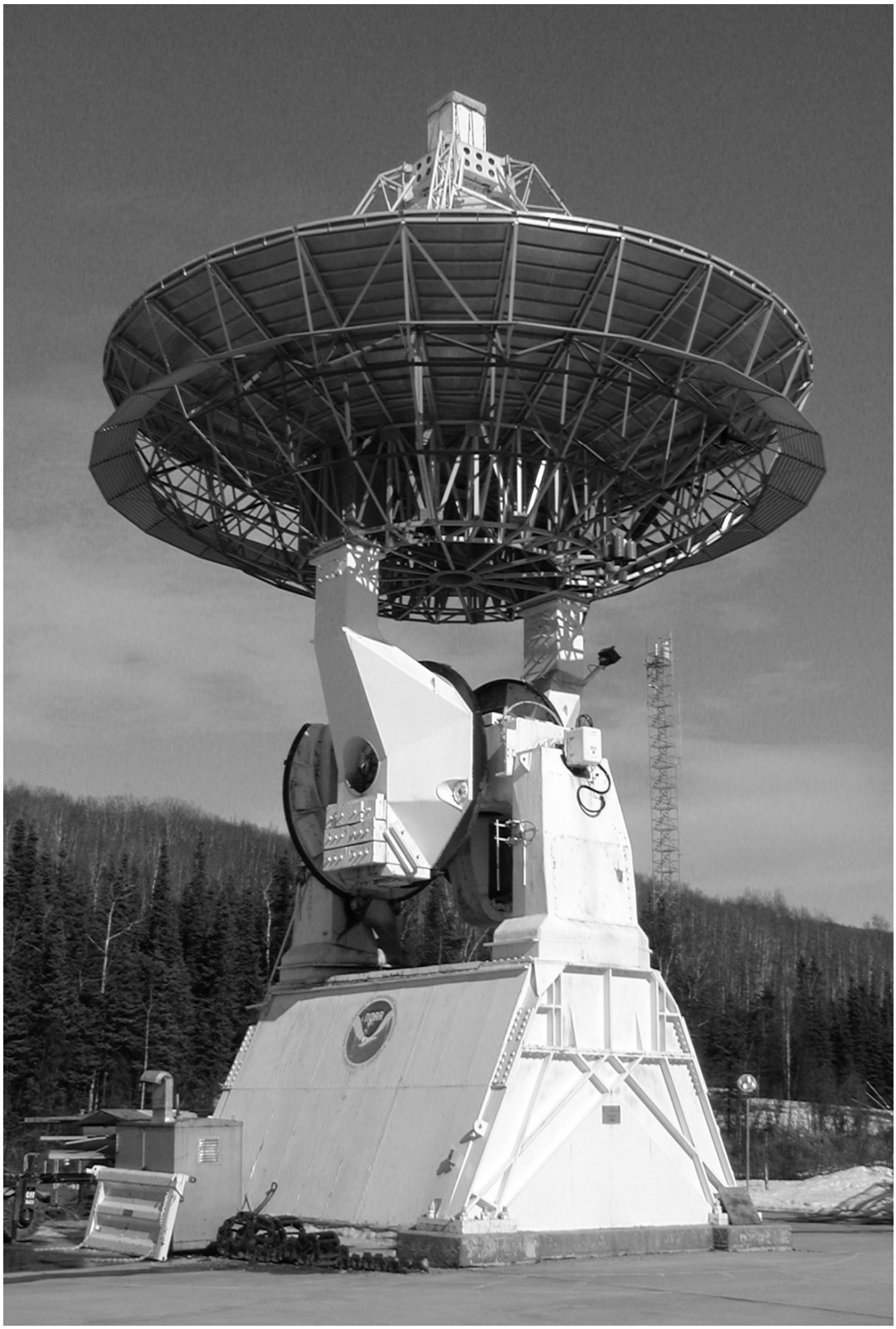

***Figure 9-9. Fairbanks 12 Meter Antenna***

## 9.7 12 Meter Antenna System

The 12 meter antenna depicted in Figure 9-9, although still in place, was de-activated as an operational system in 2000. The 12 meter antenna system was a prime focus parabolic antenna on a fully steerable hydraulic X/Y mount. The primary function of the system was to receive data from the polar orbiting satellites. The system was also used to provide launch and early orbit telemetry, angle, range, and range rate data for other spacecraft. The feed was designed to operate at several frequency bands. All received signals were converted from the received frequency to an IF between 400 MHz and 500 MHz to be demodulated by Multi-Function Receivers (MFR). The antenna was positioned using hydraulic systems mounted on each axis. Control signals and steering voltages were generated by the Antenna Control Console (ACC) / Tracking Data Processing System (TDPS). The system could be driven manually, from the computer, or from error voltages generated by the MFR. Range and range rate data could not be provided from the 12 meter system. Figure 9-10 provides a terrain masking profile. Table 9-6 describes the capabilities of this system.

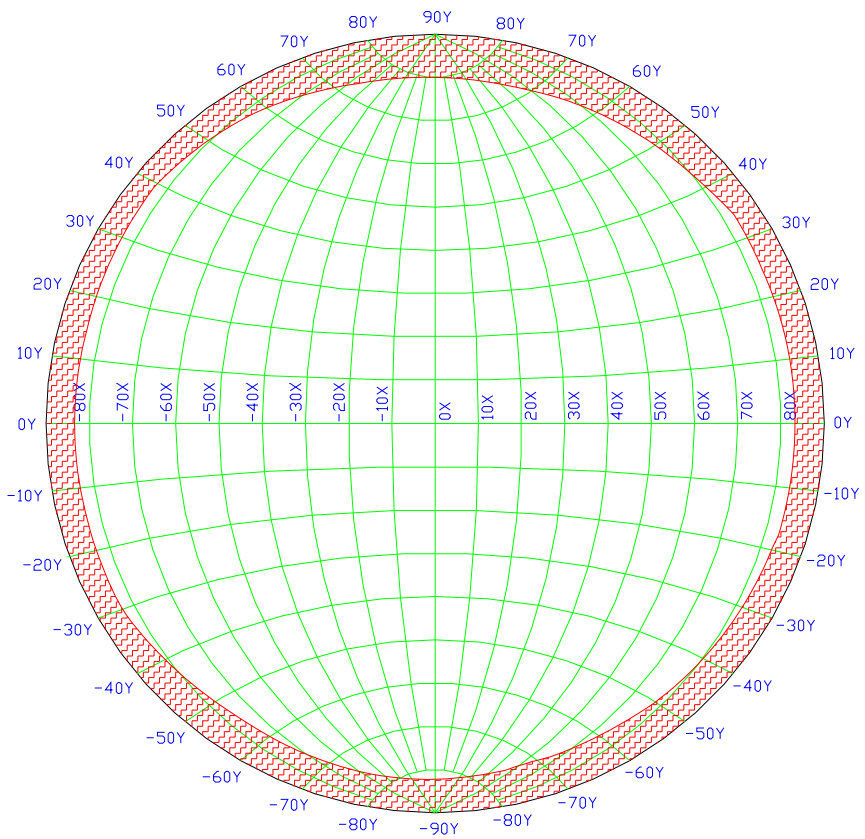


***Figure 9-10. Fairbanks 12 Meter Antenna Horizon Profile***

***Table 9-6. Fairbanks 12 Meter Antenna System***

| | |
|---|---|
| Location (WGS 84)<br>North Latitude<br>East Longitude<br>Height | <br>64° 58' 35.391"<br>212° 28' 45.222"<br>307.2 Meters |
| Mount Type | X-Y (+X East, +Y North) |
| Control Modes | Manual -Antenna position determined by operator input from remote control located in control room.<br><br>Autotrack - Position error signals from receiver determine antenna position.<br><br>Program - Computer positions antenna based on processed acquisition data.<br><br>Slave - Antenna positioned to angles of other site antenna or computer using site synchro slave bus. |
| Antenna Type | Prime Focus Parabolic |
| Reflector Diameter | 12 Meters |
| Receive Frequencies | 136-138 MHz<br>1670-1710 MHz<br>2200-2300 MHz |
| Polarity<br><br>136-138 MHz<br><br>1670-1710 MHz<br><br>2200-2300 MHz | <br><br>Linear X / Linear Y (optimally combined in Multi-Function Receiver)<br><br>RCP / LCP (optimally combined in Multi-Function Receiver)<br><br>RCP / LCP (optimally combined in Multi-Function Receiver) |
| Receive Gain<br>136-138 MHz<br>1670-1710 MHz<br>2200-2300 MHz | <br>16.0 dBi<br>43.7 dBi<br>46.0 dBi |
| System Temperature<br>136-138 MHz<br>1670-1710 MHz<br>2200-2300 MHz | <br><br>813° Kelvin<br>427° Kelvin |
| Gain/Temperature (G/T)<br>136-138 MHz<br>1670-1710 MHz<br>2200-2300 MHz Control Modes | <br><br>14.6 dBi<br>19.7 dBi |
| Receive 3 dB Beam width<br>136-138 MHz<br>1670-1710 MHz<br>2200-2300 MHz | <br>13.0°<br>1.0°<br>0.8° |

***Figure 9-11. Fairbanks 6 Meter Antenna***

## 9.8 6 Meter Antenna System

The 6 meter antenna shown in Figure 9-11 is no longer an operational system. The pedestal is still in place, but the antenna and feed system have been removed. The 6 meter antenna system was a prime focus parabolic antenna on a fully steerable X/Y mount. It was capable of transmitting signals in the 2025 MHz to 2120 MHz frequency band. The system can receive signals from 2200 MHz to 2300 MHz. The system was used to transmit commands to the latest generation of POES spacecraft. The 6 meter system was also used to provide command, range, and range rate data for other users. The 6 meter antenna was positioned using synchro signals from either the 12 meter or 26 meter antennas or associated tracking computers. Figure 9-12 provides a terrain masking profile. Table 9-7 lists system parameters.

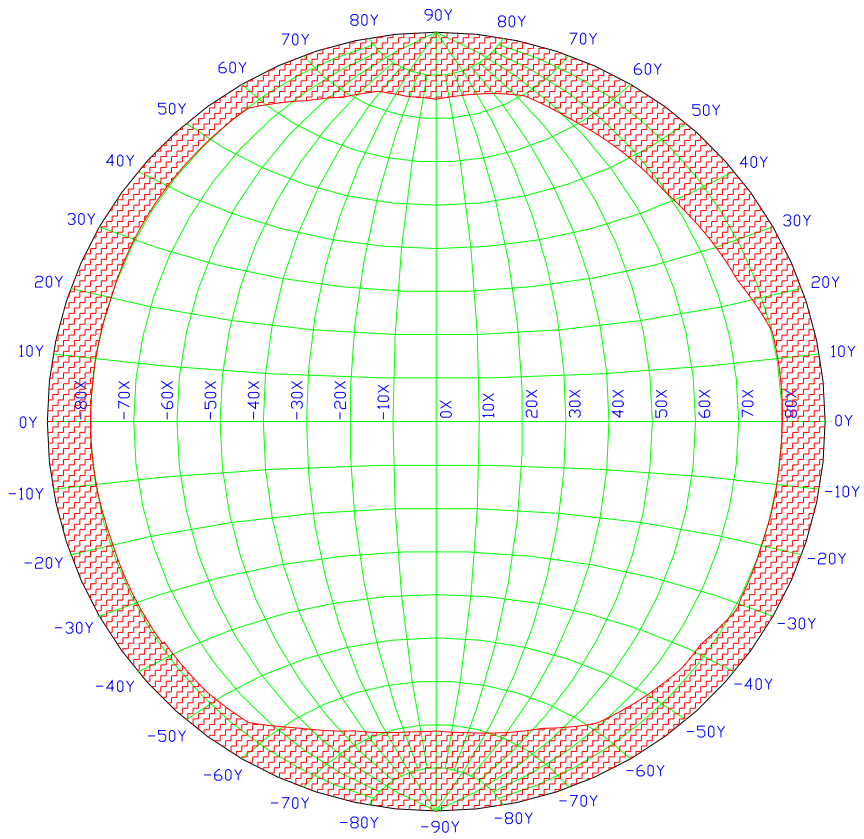


***Figure 9-12. Fairbanks 6 Meter Antenna Horizon Profile***

***Table 9-7. Fairbanks 6 Meter Antenna System***

| | |
|---|---|
| Location (WGS 84)<br>North Latitude<br>East Longitude<br>Height | <br>64° 58' 20.312"<br>212° 28' 56.804"<br>339.2 Meters |
| Mount Type | X-Y (+X East, +Y North) |
| Control Modes | Manual -Antenna position determined by operator input from remote control located in control room.<br><br>Slave - Antenna positioned to angles of other site antenna or computer using site synchro slave bus. |
| Antenna Type | Prime Focus Parabolic |
| Reflector Diameter | 6 Meters |
| Receive Frequencies | 2200-2300 MHz |
| Polarity | RCP / LCP<br>Note: Feed polarity change requires manual rotation at the feed. It is not practical to do this routinely. |
| Receive Gain | 39.0 dBi |
| System Temperature | 275° |
| Gain/Temperature (G/T) | 14.6 dB |
| Receive 3 dB Beamwidth | 1.7° |
| Transmit Frequency | 2025-2120 MHz |
| Transmit Gain | 39.0 dBi |
| Transmit 3 dB Beamwidth | 1.7° |
| Transmitter Power (Max) | 10,000 W |
| Effective Isotropic Radiated Power (EIRP) | 109 dBm |

***Figure 9-13. Fairbanks 4 Meter Antenna***

## 9.9 4 Meter Antenna System

While the 4 meter antenna system shown in Figure 9-13 is no longer operational, a VHF YAGI array was mounted on the 4 meter pedestal in 1999. The 4 meter antenna system was a parabolic antenna with a prime focus feed on an AZ/EL mount. It was capable of transmitting signals in the 2025 MHz to 2120 MHz frequency band. The system was used to transmit commands to the latest generation of POES spacecraft. The 4 meter antenna was positioned using synchro signals from either the 12 meter or 26 meter antennas or associated tracking computers. Figure 9-14 provides a terrain masking profile. The capabilities of the system are described in Table 9-8.

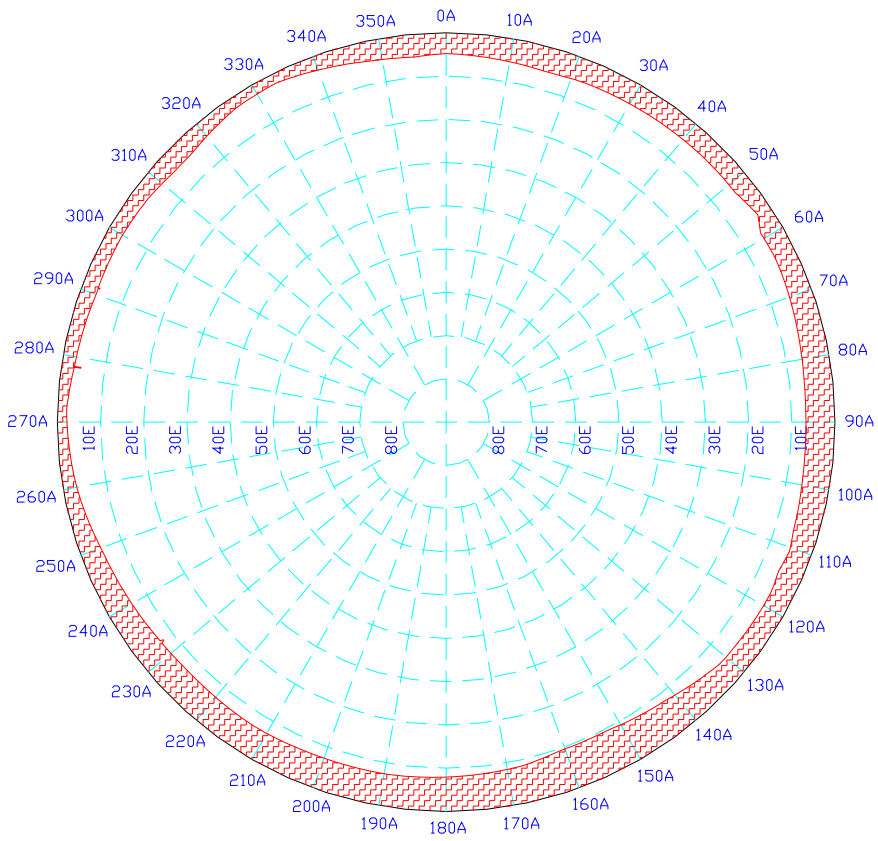


***Figure 9-14. Fairbanks 4 Meter Antenna Horizon Profile***

***Table 9-8. Fairbanks 4 Meter Antenna System***

| | |
|---|---|
| Location (WGS 84)<br>North Latitude<br>East Longitude<br>Height | <br>64° 58' 23.834"<br>212° 28' 59.067"<br>352.4 Meters |
| Mount Type | Azimuth/elevation (AZ/EL) |
| Control Modes | Manual -Antenna position determined by operator input from remote control located in control room.<br><br>Slave - Antenna positioned to angles of other site antenna or computer using site synchro slave bus. |
| Antenna Type | Prime Focus Parabolic |
| Reflector Diameter | 4 Meters |
| Transmit Frequencies | 2024-2110 MHz |
| Polarity | RCP |
| Transmit Gain | 34 dBi |
| Transmit 3 dB Beamwidth | 3.0° |
| Transmitter Power (Max) | 2 KW |
| Effective Isotropic Radiated Power (EIRP) | 97 dBm |

***Figure 9-15. Fairbanks SATAN Antenna***

## 9.10 SATAN Antenna System

The SATAN antenna system shown in Figure 9-15 is a nine Disc-on-Rod broadband high-power array on a fully steerable X/Y mount. The pedestal assembly is a servo-controlled, hydraulically powered gimbal. The SATAN antenna is capable of transmitting signals in the 148 MHz to 154 MHz frequency band. The system is used to transmit commands to the POES spacecraft. The SATAN antenna is positioned using synchro signals from either the 12 meter, 13 meter or 26 meter antennas or associated tracking computers. Figure 9-16 provides a terrain masking profile. The capabilities of the system are described in Table 9-9.

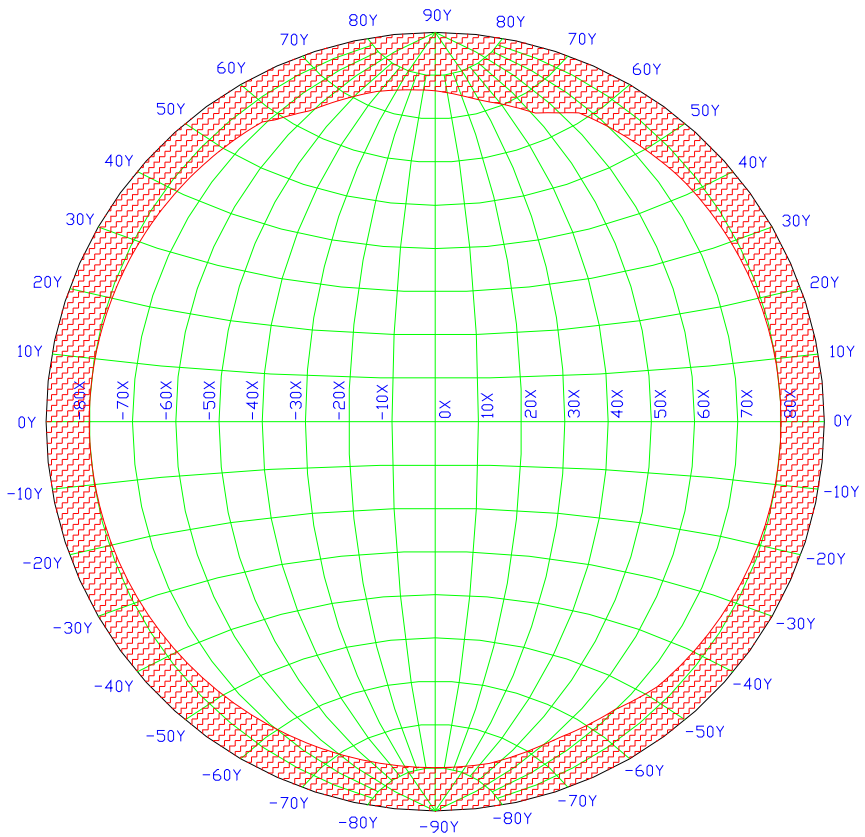


***Figure 9-16. Fairbanks SATAN Antenna Horizon Profile***

***Table 9-9. Fairbanks SATAN Antenna System***

| | |
|---|---|
| Location (WGS 84)<br><br>North Latitude<br>East Longitude<br>Height | <br><br>64° 58' 19.644"<br>212° 29' 14.411"<br>341.7 Meters |
| Mount Type | X-Y (+X East, +Y North) |
| Control Modes | Manual -Antenna position determined by operator input from remote control located in control room.<br><br>Slave - Antenna positioned to angles of other site antenna or computer using site synchro slave bus. |
| Antenna Type | Nine Disc-on-Rod Array |
| Transmit Frequencies | 148-154 MHz |
| Polarity | RCP |
| Transmit Gain | 19 dBi |
| Transmit 3 dB Beamwidth | 12.0° |
| Transmitter Power (Max) | 3500 W |
| Effective Isotropic Radiated Power (EIRP) | 84 dBm |

***Figure 9-17. Fairbanks SCAMP Antenna***

## 9.11 Satellite Command Antenna on a Medium Pedestal (SCAMP) Antenna System

The SCAMP antenna system shown in Figure 9-17 is a cross dipole array on a fully steerable X/Y mount. The SCAMP antenna pedestal subsystem is an electronically controlled two-axis gimbal mechanism. It is used as a back-up to the SATAN antenna system described in Section 9.10. Figure 9-18 provides a terrain masking profile. The capabilities of the system are described in Table 9-10.

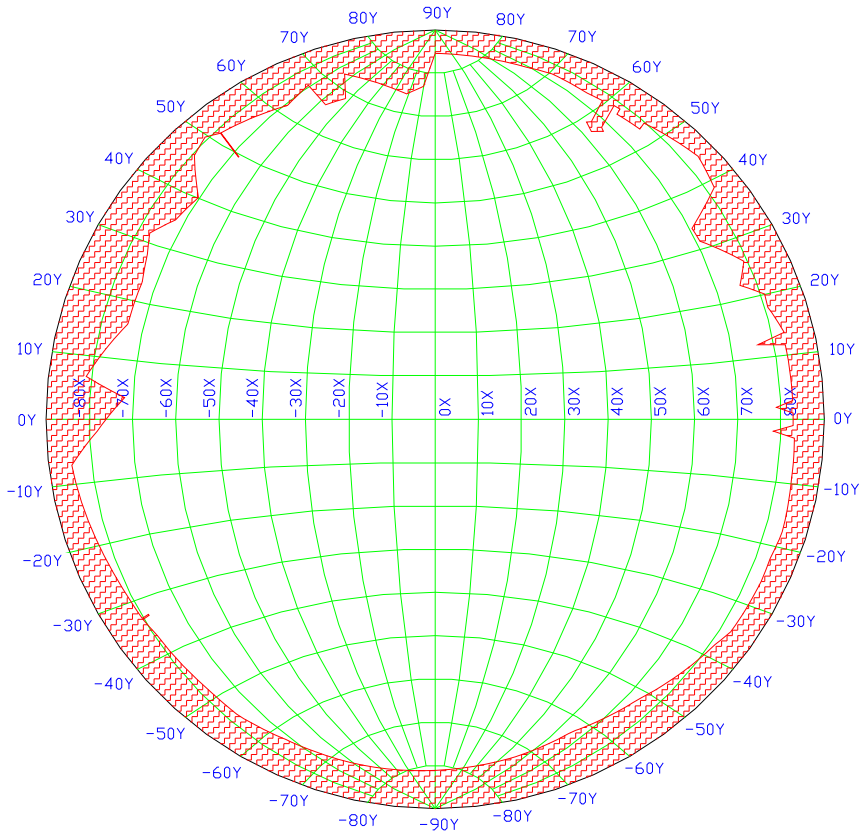


***Figure 9-18. Fairbanks SCAMP Antenna Horizon Profile***

***Table 9-10. Fairbanks SCAMP Antenna System***

| | |
|---|---|
| Location (WGS 84)<br><br>North Latitude<br>East Longitude<br>Height | <br><br>64° 58' 22.281"<br>212° 28' 55.139"<br>342.2 Meters |
| Mount Type | X-Y (+X East, +Y North) |
| Control Modes | Manual -Antenna position determined by operator input from remote control located in control room.<br><br>Slave - Antenna positioned to angles of other site antenna or computer using site synchro slave bus. |
| Antenna Type | YAGI Array |
| Transmit Frequencies | 148-154 MHz |
| Polarity | RCP |
| Transmit Gain | 17 dBi |
| Transmit 3 dB Beamwidth | 20.0° |
| Transmitter Power (Max) | 3500 W |
| Effective Isotropic Radiated Power (EIRP) | 82 dBm |

***Figure 9-19. Fairbanks VHF ARRAY Antenna***

## 9.12 VHF Array Antenna System

The VHF Array antenna system shown in Figure 9-19 is a cross dipole array on a fully steerable AZ/EL mount. The receive antenna is electronically positioned via a AZ/EL to X-Y converter connected to the site slaving system. It is the prime VHF receive antenna system. Figure 9-20 provides a terrain masking profile. The capabilities of the system are described in Table 9-11.

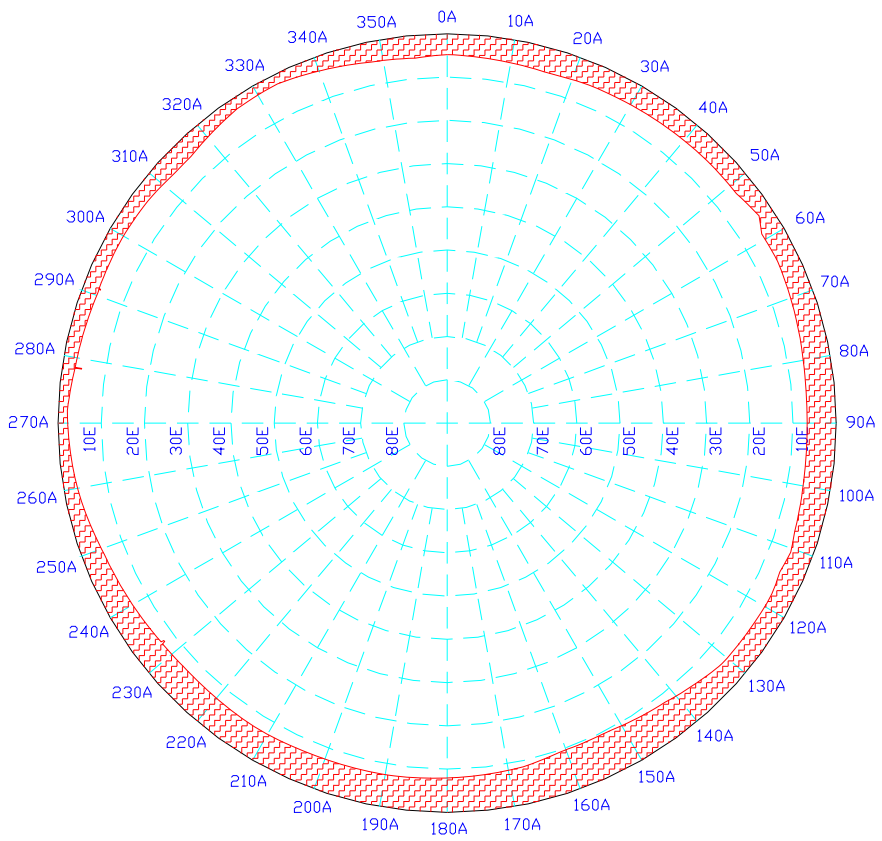


***Figure 9-20. Fairbanks VHF Antenna Horizon Profile***

***Table 9-11. Fairbanks VHF Array Antenna System***

| | |
|---|---|
| Location (WGS 84)<br>North Latitude<br>East Longitude<br>Height | <br>64° 58' 23.834"<br>212° 28' 59.067"<br>352.4 Meters |
| Mount Type | Azimuth/Elevation (AZ/EL) |
| Control Modes | Manual -Antenna position determined by operator input from remote control located in control room.<br><br>Slave - Antenna positioned to angles of other site antenna or computer using site synchro slave bus. |
| Antenna Type | YAGI Array |
| Receive Frequencies | 136-138 MHz |
| Polarity | RCP |
| Receive Gain | 20.0 dBi |
| System Temperature | 1109° Kelvin |
| Gain/Temperature (G/T) | -10.4 dB |
| Receive 3 dB Beam width | 16° |
| Transmit Frequencies | 148.46-148.66 MHz |
| Transmit Polarity | Right-hand Circular |
| Transmit Gain | Future Enhancement |
| Transmit 3 dB Beam width | Future Enhancement |
| Transmit Power | Future Enhancement |
| Transmit Isotropic Radiated Power (EIRP) | Future Enhancement |

## 9.13 Suitland Satellite Operations & Control Center at Federal Building 4

The Satellite Operations and Control Center (SOCC) previously controlled the operations of the POES and GOES systems. The SOCC coordinated all satellite operations, prepared spacecraft schedules, generated spacecraft commands, processed satellite data, and disseminated products. This section gives an overview of the antennas for the NOAA satellite operations facility that were located at Federal Office Building (FOB) 4 in Suitland, Maryland. The functions of the SOCC in FOB 4 were transferred to the new NSOF building in the fall of 2006.

***Figure 9-21. NOAA Satellite Operations and Control Center***

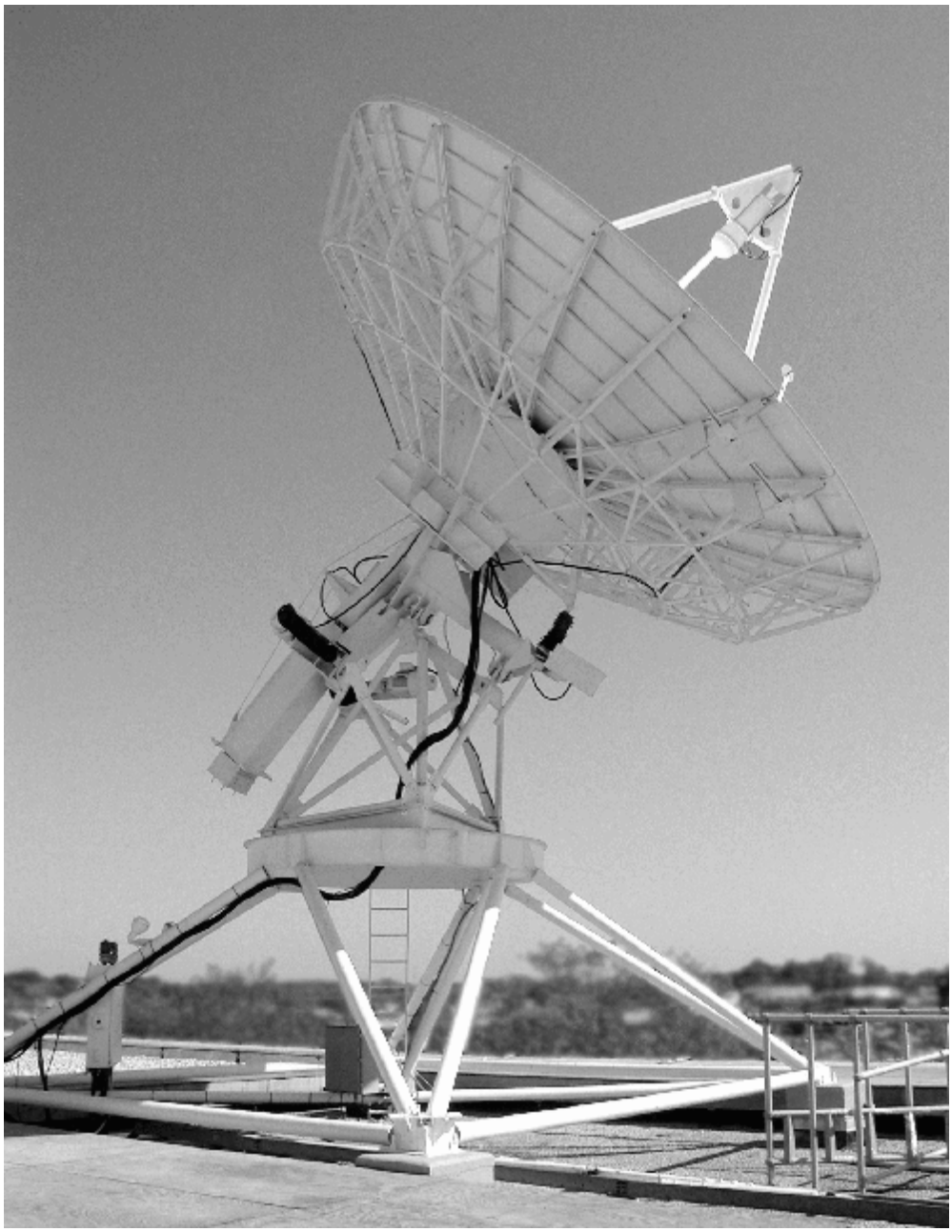

***Figure 9-22. Suitland 7.4 Meter (East) Antenna***

## 9.14 7.4 Meter (East) Antenna System

The 7.4 Meter (East) antenna shown in Figure 9-22 is used to receive spacecraft image data from GOES. It also receives pre-processed spacecraft data transmitted from the Wallops Station through the GOES. The prime focus parabolic antenna is on a steerable Hour Angle/Declination (HA/DEC) mount. The position of the antenna is manually controlled from the operations room. A stow bar assembly installed between the reflector and a supporting leg will help stabilize the reflector when

the antenna is subject to high winds and will also disable the motor drive. The antenna system parameters are described in Table 9-12.

***Table 9-12. Suitland 7.4 Meter (East) Antenna System***

| | |
|---|---|
| Location (WGS 84) | |
| North Latitude | 38° 50' 58.494" |
| East Longitude | 283° 04' 10.890" |
| Height | 71.2 Meters |
| Mount Type | Hour Angle / Declination (HA/DEC) |
| Control Modes | Manual |
| Antenna Type | Prime Focus Parabolic |
| Reflector Diameter | 7.4 Meter |
| Receive Frequencies | 1670-1710 MHz |
| Polarity | Linear (Feed is rotate able through 360° from remote control located in control room.) |
| Receive Gain | 39 dBi |
| System Temperature | 186.2° Kelvin |
| Gain/Temperature (G/T) | 16.3 Db |
| Receive 3 dB Beamwidth | 1.6° |

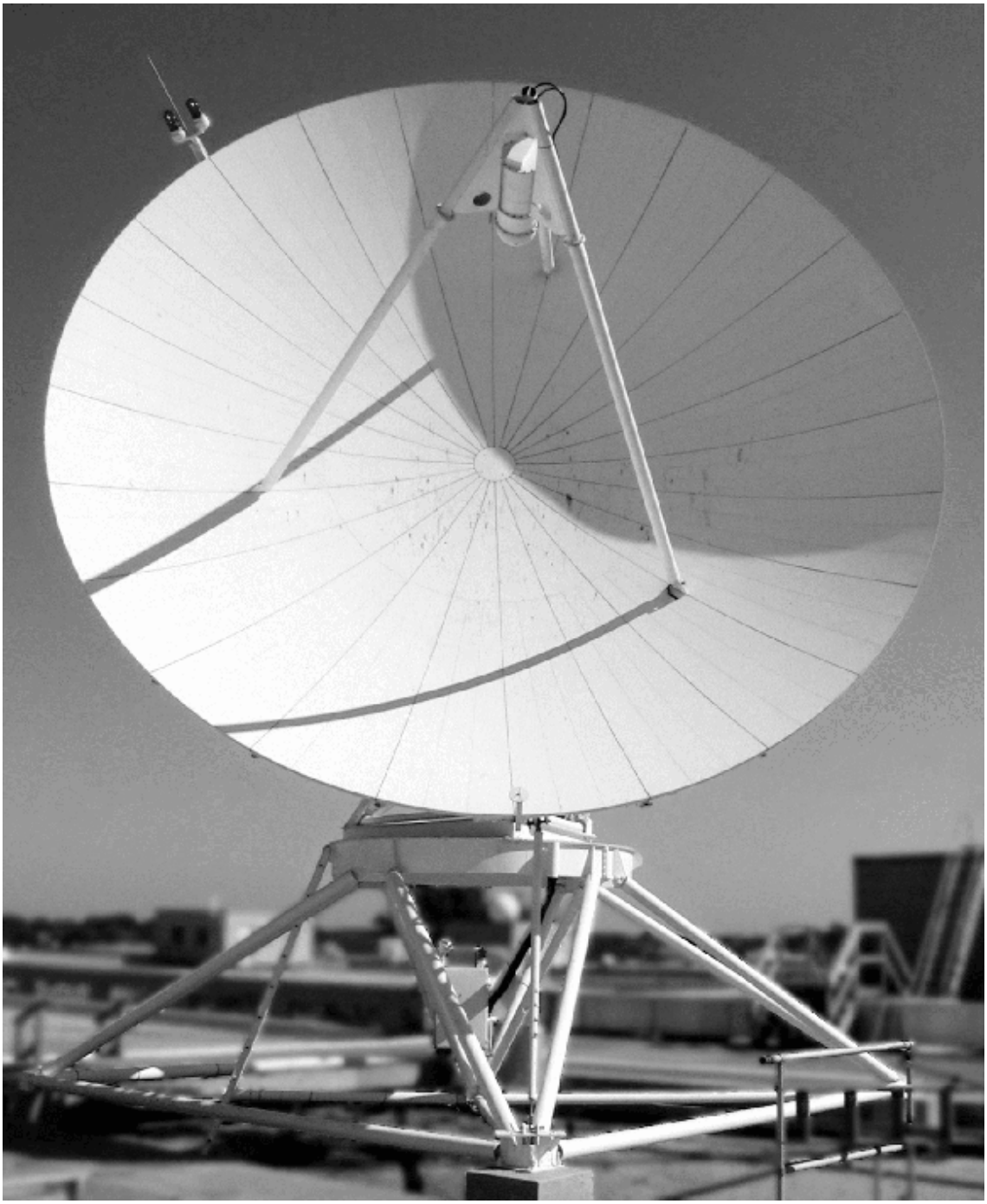

***Figure 9-23. Suitland 7.4 Meter (West) Antenna***

## 9.15 7.4 Meter (West) Antenna System

The 7.4 meter (West) antenna system shown in Figure 9-23 is identical to the system described in Section 9.2. This antenna normally supports the western satellite, but could be positioned to support any of the geosynchronous spacecrafts. Table 9-13 describes system parameters.

***Table 9-13. Suitland 7.4 Meter (West) Antenna System***

| | |
|---|---|
| Location (WGS 84) | |
| North Latitude | 38° 50' 59.361" |
| East Longitude | 283° 04' 8.064" |
| Height | 71.2 Meters |
| Mount Type | Hour Angle / Declination (HA/DEC) |
| Control Modes | Manual |
| Antenna Type | Prime Focus Parabolic |
| Reflector Diameter | 7.4 Meter |
| Receive Frequencies | 1670-1710 MHz |
| Polarity | Linear (Feed is rotate able through 360° from remote control located in control room.) |
| Receive Gain | 39 dBi |
| System Temperature | 199.5° Kelvin |
| Gain/Temperature (G/T) | 16.0 dB |
| Receive 3 dB Beam width | 1.6° |

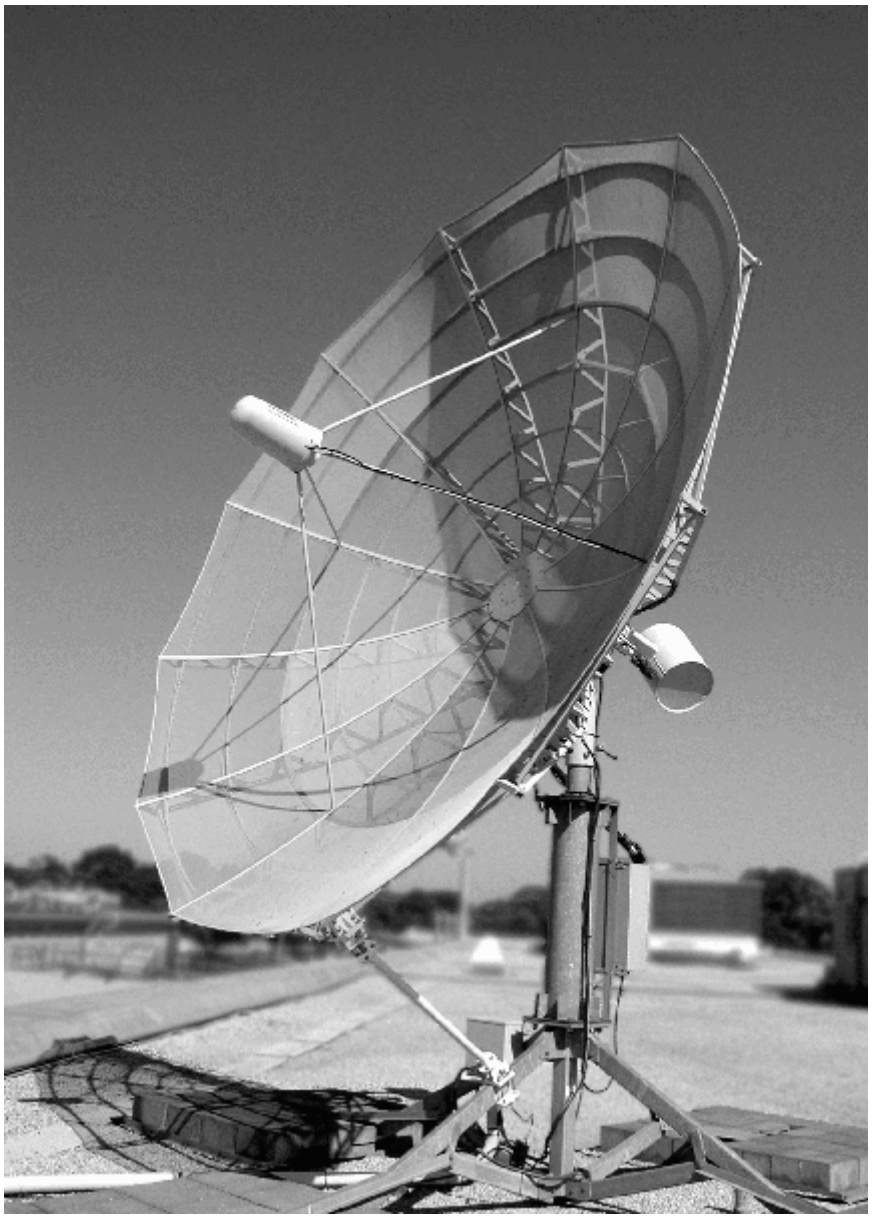

***Figure 9-24. Suitland 4.8 Meter (West) Antenna***

## 9.16 4.8 Meter (West) Antenna System

The 4.8 Meter (West) antenna shown in Figure 9-24 is used to receive spacecraft image data from GOES spacecraft. It also receives pre-processed spacecraft data transmitted from the Wallops Station through GOES. The prime focus parabolic antenna is on a steerable Hour Angle/Declination (HA/DEC) mount. The position of the antenna is manually controlled from the operations room. A stow bar assembly installed between the reflector and a supporting leg will help stabilize the reflector when the antenna is subject to high winds and will also disable the motor drive. This antenna is primarily a back-up for the 7 Meter west antenna, but could be positioned to support any of the geosynchronous spacecrafts. The antenna system parameters are described in Table 9-14.

***Table 9-14. Suitland 4.8 Meter (West) Antenna System***

| | |
|---|---|
| Location (WGS 84) | |
| North Latitude | 38° 51' 00.416" |
| East Longitude | 283° 04' 08.458" |
| Height | 69.2 Meters |
| Mount Type | Hour Angle / Declination (HA/DEC) |
| Control Modes | Manual |
| Antenna Type | Prime Focus Parabolic |
| Reflector Diameter | 4.8 Meter |
| Receive Frequencies | 1670-1710 MHz |
| Polarity | Linear (Feed is rotate able through 360° from remote control located in control room.) |
| Receive Gain | 36 dBi |
| System Temperature | 93° Kelvin |
| Gain/Temperature (G/T) | 15.5 dB |
| Receive 3 dB Beam width | 2.6° |

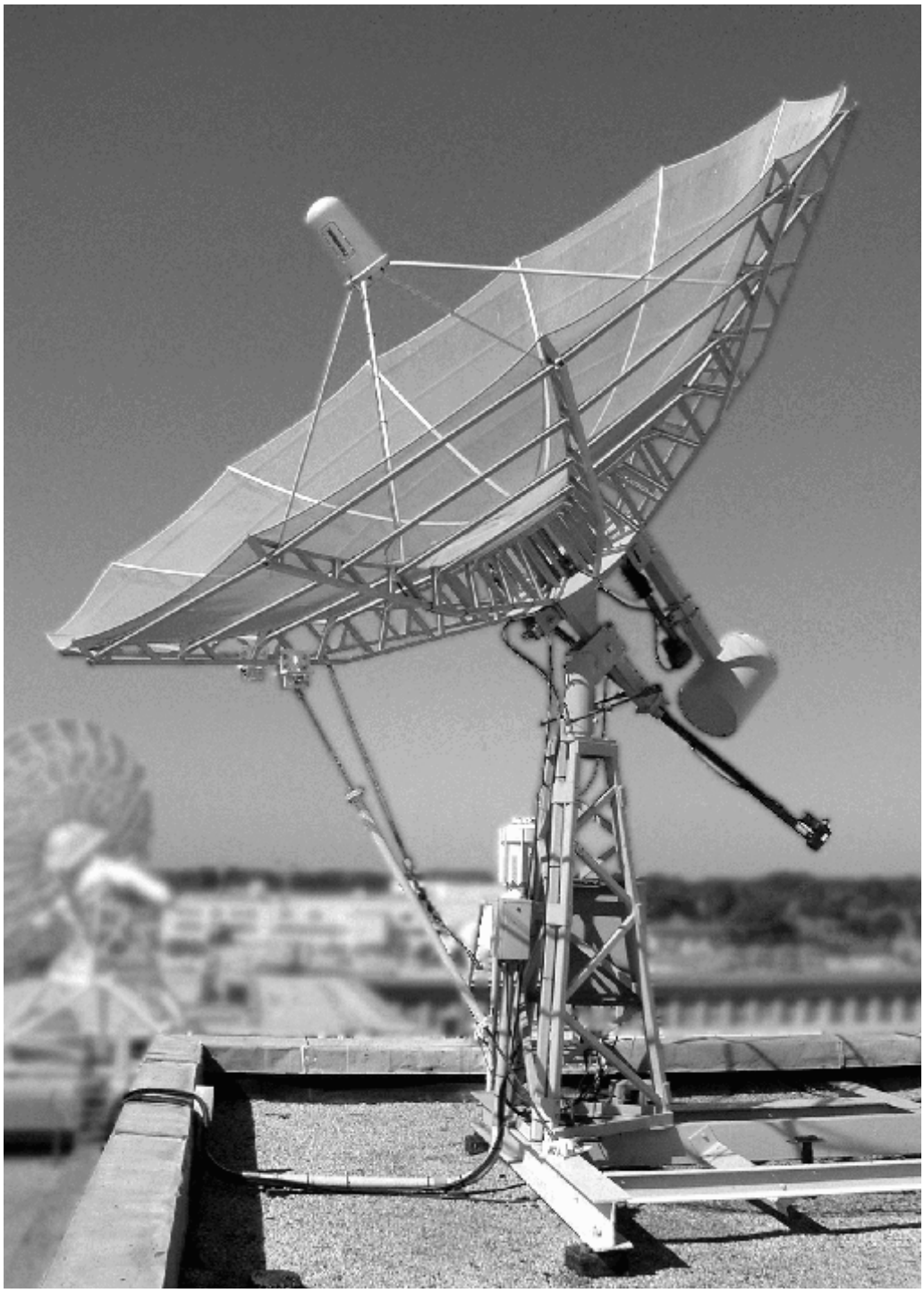

***Figure 9-25. Suitland 4.8 Meter (East) Antenna***

## 9.17 4.8 Meter (East) Antenna System

The 4.8 Meter (East) antenna shown in Figure 9-25 is identical to the system described in Section 9.3. This antenna is primarily a back-up to the 7 Meter east antenna but could be positioned to support any of the geosynchronous spacecrafts. Table 9-15 describes system parameters.

***Table 9-15. Suitland 4.8 Meter (East) Antenna System***

| | |
|---|---|
| Location (WGS 84) | |
| North Latitude | 38° 50' 59.151" |
| East Longitude | 283° 04' 09.317" |
| Height | 73.3 Meters |
| Mount Type | Hour Angle / Declination (HA/DEC) |
| Control Modes | Manual |
| Antenna Type | Prime Focus Parabolic |
| Reflector Diameter | 4.8 Meter |
| Receive Frequencies | 1670-1710 MHz |
| Polarity | Linear (Feed is rotate able through 360° from remote control located in control room.) |
| Receive Gain | 36 dBi |
| System Temperature | 93° Kelvin |
| Gain/Temperature (G/T) | 15.5 dB |
| Receive 3 dB Beam width | 2.6 ° |

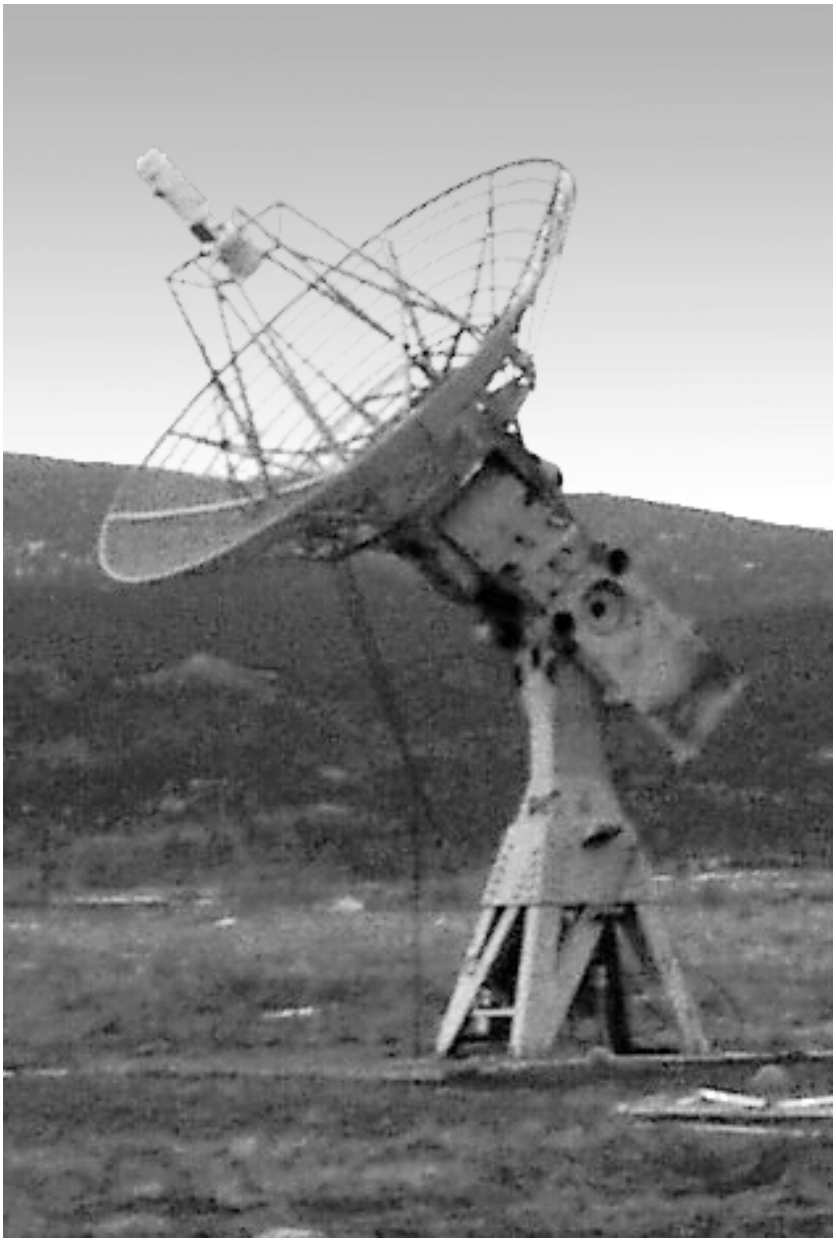

***Figure 9-26. Table Mountain 5 Meter Mesh Antenna***

## 9.18 5 Meter Mesh Antenna System

The 5 Meter mesh antenna at Table Mountain near Boulder, Colorado is an HA/Dec mount antenna that is no longer in service. This antenna was acquired from government surplus in the mid 1970s. Presently there are no plans to repair this antenna known as the screen dish.

# Section 10.0 Coordinate System Overlays

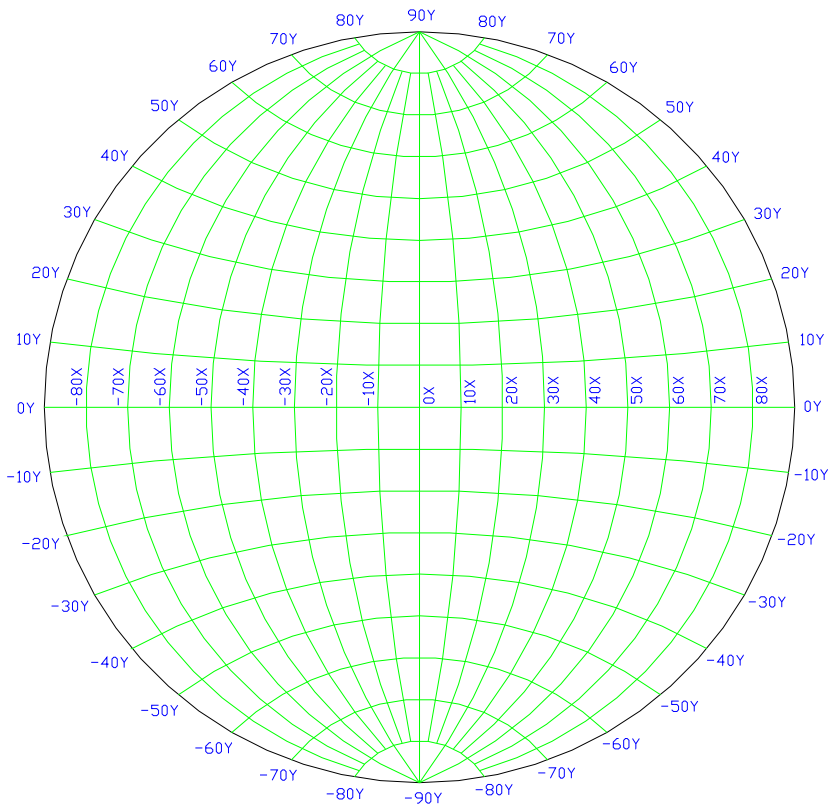


***Figure 10-1. X-Y Coordinate Map***

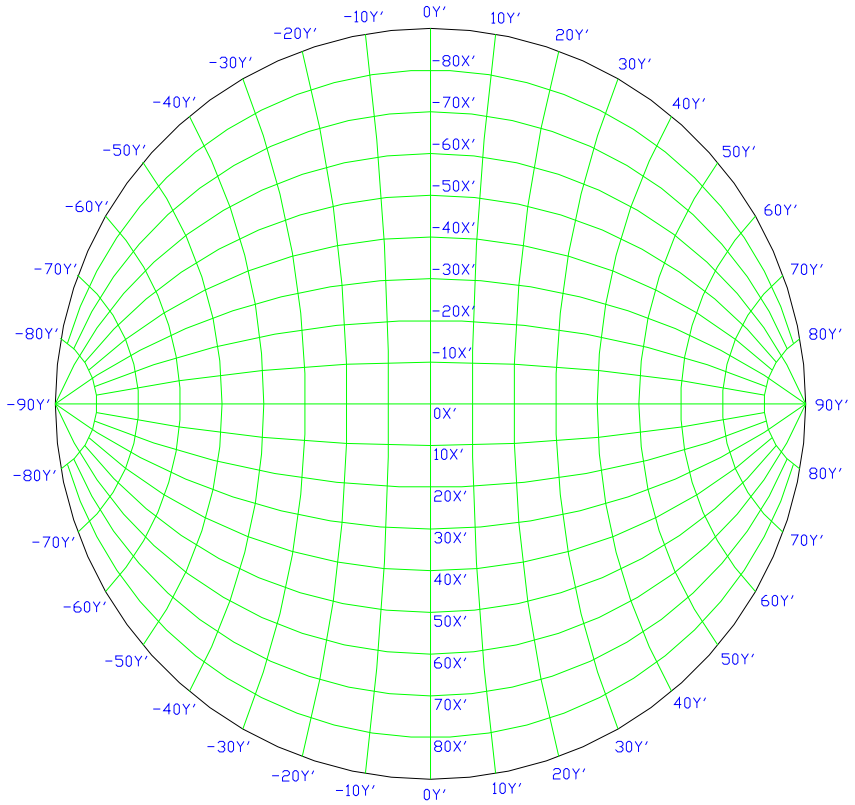


***Figure 10-2. X'Y' Coordinate Map***

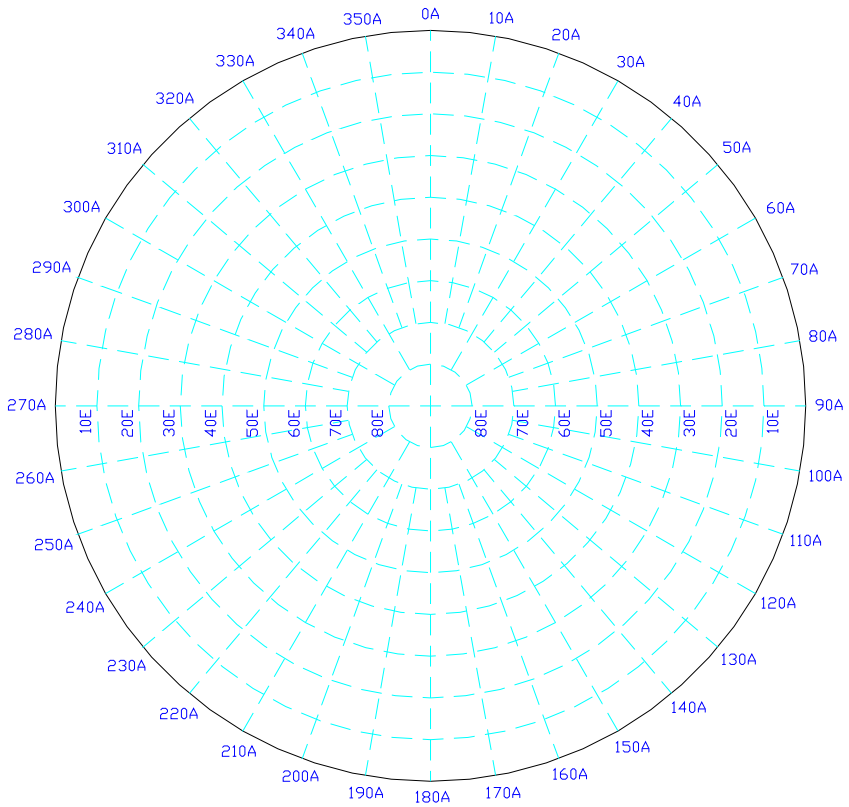


***Figure 10-3. Az El Coordinate Map***

# Appendix A. Acronyms

| Acronym | Definition |
|---|---|
| ACC | Antenna Control Console |
| ACE | Advanced Composite Explorer |
| AGC | Automatic Gain Control |
| CDA | Command and Data Acquisition |
| DCP | Data Collection Platform |
| DCPR | Data Collection Platform Reply |
| DCR | Diversity Combined Receiver |
| DMSP | Defense Meteorological Satellite Program |
| DOMSAT | Domestic Communications Satellite |
| DOSE | Dynamics of the Solid Earth |
| DSRC | David Skaggs Research Center |
| EMWIN | Emergency Management Weather Information Network |
| FCDAS | Fairbanks Command and Data Acquisition Station |
| FOB | Federal Office Building |
| GOES | Geostationary Operational Environmental Satellite |
| GSFC | Goddard Space Flight Center |
| GVAR | GOES Variable Antenna Receive |
| HA | Hour Angle |
| HR | Hurricane Rated |
| DEC | Declination |
| DLM | Depot Level Maintenance |
| IF | Intermediate Frequency |
| LEO | Low Earth Orbiting |
| LRGS | Local Readout Ground System |
| LRIT | Low-Rate Information Transmission |
| LUT | Local User Terminal |
| MRS&S | Multi-use Data Link Receive System and Server |
| NASA | National Aeronautics and Space Administration |
| NCDC | National Climatic Data Center |
| NESDIS | National Environmental Satellite Data and Information Service |
| NGS | National Geodetic Survey |
| NOAA | National Oceanic and Atmospheric Administration |
| NORAD | North American Air Defense Command |
| NSOF | NOAA Satellite Operations Facility |
| NWS | National Weather Service |
| PCM | Pulse Code Modulation |
| POES | Polar-orbiting Operational Environmental Satellite |
| RCP | Right-Hand Circular Polarization |
| RSI | Radiation Systems, Inc. |
| SARSAT | Search and Rescue Satellite |
| SCAMP | Satellite Command Antenna on a Medium Pedestal |

| | |
|---|---|
| SEC | Space Environmental Center |
| TDPS | Tracking Data Processing System |
| TIROS | Television and InfraRed Observation Satellite |
| TLE | Two Line Element |
| USAF | United States Air Force |
| USMCC | United States Mission Control Center |
| VLBI | Very Long Baseline Interferometer |
| WCDAS | Wallops Command and Data Acquisition Station |
| WBU | Wallops Backup |
| WDC | World Data Center |
| WGS | World Geodetic System |

# Document Distribution List

## Numerical Location Order

| DocID | Title | Version | Date |
|---|---|---|---|
| X028 | NOAA/NESDIS Antenna and RF Systems Capabilities Handbook | DCN 1 | March 17, 2008 |

| Loc # | Person | Location Title | Address | Email Address | Copies |
|---|---|---|---|---|---|
| 001 | Cauley, Verna {Key} | OSD Library | NSOF, Room 1005 | N/A | 1 |
| 001e | Cauley, Verna {Key} | OSD Library (eCopy) | NSOF, Room 1005 | N/A | 1 |
| 002 | James, Rick {Key} | OSO Library | NSOF, Room 1005 | N/A | 1 |
| 002e | James, Rick {Key} | OSO Library (eCopy) | NSOF, Room 1005 | N/A | 1 |
| 003 | Sheridan, Jim {Key} | WCDAS Library | WCDAS, Wallops, VA | N/A | 2 |
| 003e | Sheridan, Jim {Key} | WCDAS Library (eCopy) | WCDAS, Wallops, VA | N/A | 1 |
| 003n | Sheridan, Jim {Key} | WCDAS Library | WCDAS, Wallops, VA | Does not want eNotification | 1 |
| 004 | Seman, Lance {Key} | FCDAS Library | FCDAS, Fairbanks, AK | N/A | 1 |
| 004e | Seman, Lance {Key} | FCDAS Library (eCopy) | FCDAS, Fairbanks, AK | N/A | 1 |
| 005 | Araiza, Gabrielle {Key} | NASA/GSFC GOES Library | Bldg. 6, Room W237 | N/A | 1 |
| 005e | Araiza, Gabrielle {Key} | NASA/GSFC GOES Library (eCopy) | Bldg. 6, Room W237 | N/A | 1 |
| 008n | Mahmot, Ron | SOCC Manager | NSOF, Room 1508 | Ron.Mahmot@noaa.gov | 1 |
| 009n | Amburgey, Keith | OSO Deputy Director | NSOF, Room 1510 | Keith.Amburgey@noaa.gov | 1 |
| 010n | Bryant, Charles (Acting) | Ground Systems Division Chief | NSOF, Room 1210 | Charles.S.Bryant@noaa.gov | 1 |
| 017 | James, Rick {Key} | DMSP Operations Area | NSOF, Room 1532 | N/A | 1 |
| 026 | James, Rick {Key} | GOES Operations Area | NSOF, Room 1532 | N/A | 2 |
| 027n | McMath, Albert | SOCC Backup Ops at Wallops (GOES & POES) | WCDAS, Wallops, VA | albert.j.mcmath.jr@noaa.gov | 1 |
| 028n | Wheeler, Chris | GOES Engineering Team Lead | NSOF, Room 1583 | Chris.A.Wheeler@noaa.gov | 1 |
| 030n | c/o Chen, Sam | GOES Ground Systems Engineer, Acting | NSOF, Room 1589 | Sam.M.Chen@noaa.gov | 1 |
| 031n | Ludlum, Kevin | GOES Scheduling | NSOF, Room 1535 | Kevin.Ludlum@noaa.gov | 1 |
| 035 | James, Rick {Key} | POES Operations Area | NSOF, Room 1532 | N/A | 1 |
| 039n | Todirita, Nicolaie | POES Ground Systems Engineer | NSOF, Room 1584 | nicolaie.todirita@noaa.gov | 1 |
| 040n | Snell, Tom | POES Scheduling | NSOF, Room 1529 | tom.snell@noaa.gov | 1 |
| 046n | Hall, Mark | NOAA Copy | WDCAS, Wallops VA | mark.o.hall@noaa.gov | 1 |
| 053n | Carter, Bill | OSO Hardware Lead | NSOF, Room 1521 | William.Carter@noaa.gov | 1 |
| 054 | Sheridan, Jim {Key} | WCDAS Floor/GOES | WCDAS, Wallops, VA | N/A | 1 |
| 055n | Arnaud, Dan | Aerospace Copy | NSOF, Room 1221 | daniel.f.arnaud@aero.org | 1 |
| 056n | Harris, Stephen | ISI Library POC | Lanham, MD | sharris@integ.com | 1 |

| Loc # | Person | Location Title | Address | Email Address | Copies |
|---|---|---|---|---|---|
| 059n | Baker, Mike | Lead Programmer | NSOF, Room 1376 | Edward.M.Baker@noaa.gov | 1 |
| 063n | Robinson, Diane | GAS Software Team Lead (Acting) | NSOF, Room 1354 (GAS SW Team Lead's location) | Diane.Robinson@noaa.gov | 1 |
| 064n | McIntyre, Kathy | NOAA/GOES N Observatory Manager | GSFC, Code 424, Bldg. 6, Room W223 | Kathleen.H.McIntyre@nasa.gov | 1 |
| 065n | Clark, Johnny R. (Bob) | NOAA Copy | WCDAS, Wallops, VA | Johnny.R.Clark@noaa.gov | 1 |
| 067 | Davis, Gary | Director, Office of Systems Development | NSOF, Room 1212 | N/A | 1 |
| 067e | Davis, Gary | Director, Office of Systems Development (eCopy) | NSOF, Room 1212 | N/A | 1 |
| 069 | Dorsey, Warren | NOAA Copy | NSOF, Room 1140 | N/A | 1 |
| 069e | Dorsey, Warren | NOAA Copy (eCopy) | NSOF, Room 1140 | N/A | 1 |
| 069n | Dorsey, Warren | NOAA Copy | NSOF, Room 1140 | Warren.Dorsey@noaa.gov | 1 |
| 076n | McKenzie, Keith | GOES Project Manager | NSOF, Room 1143 | Keith.Mckenzie@noaa.gov | 1 |
| 078n | Mignogno, Mike | NOAA Copy | NSOF, Room 1213 | Mike.Mignogno@noaa.gov | 1 |
| 088n | Wade, Angelo | NOAA Copy | NSOF, Room 1157 | angelo.wade@noaa.gov | 1 |
| 093e | Wrublewski, Tom | NOAA Copy (eCopy) | GSFC, Code 480.0, Bldg. 6, Room W241 | N/A | 1 |
| 095n | Eng, Frank | NOAA/CSC Copy | NSOF, Room 1151 | Frank.Eng@noaa.gov | 1 |
| 098 | DCO Distribution {Key} | NOAA/OSD DCO Copy | NSOF, 1154B | N/A | 1 |
| 098e | DCO Distribution {Key} | NOAA/OSD DCO (eCopy) | NSOF, 1154B | N/A | 1 |
| 108e | James, Larry | NOAA Copy (eCopy) | NSOF, Room 1159 | N/A | 1 |
| 111 | Buhler, Yves | EUMETSAT Copy | EUMETSAT<br>attention: SES/Hhu<br>Am Kavalleriesand 31<br>64295 DARMSTADT<br>Germany | n/a | 1 |
| 111e | Buhler, Yves | EUMETSAT (eCopy) | EUMETSAT<br>attention: SES/Hhu<br>Am Kavalleriesand 31<br>64295 DARMSTADT<br>Germany | n/a | 1 |
| 112n | Nelson, Craig (Capt.) | NOAA/IPO | E/IP Centre Building, Suite 1450, Siver Spring, MD | Craig.Nelson@noaa.gov | 1 |
| 139n | Komajda, Ray | Noblis Copy | 3150 Fairview Park Drive Falls Church, VA 22042 | komajda@noblis.org | 1 |
| 140n | McClinton, Art | NOAA/Noblis - NOAA Liaison | NSOF, Room 1233 | Art.McClinton@noaa.gov | 1 |
| 141n | Hutchins, Joyce | Aerospace Copy | NSOF, Room 1215 | Joyce.Hutchins@noaa.gov | 1 |
| 149e | Rowe, Heidi | NOAA/CSC-BPX Copy (eCopy) | NSOF, Room 1137 | N/A | 1 |
| 153 | Settles, Michelle {Key} | EMOSS CM | NSOF, Room 1314 | N/A | 1 |

| Loc # | Person | Location Title | Address | Email Address | Copies |
|---|---|---|---|---|---|
| 153e | Settles, Michelle {Key} | EMOSS CM (eCopy) | NSOF, Room 1314 | N/A | 1 |
| 158 | c/o Rick James | NOAA/SOCC Shift Supervisor | NSOF, Room 1532 | N/A | 1 |
| 160n | Finson, Bob | DMSP Ground Systems Engineer | NSOF, Room 1585 | Bob.Finson@noaa.gov | 1 |
| 163n | Liang, Kirk | POES Project Manager | NSOF, Room 1163 | kirk.liang@noaa.gov | 1 |
| 166n | Silva, Jim | NOAA Copy | NSOF, Room 1223 | Jim.Silva@noaa.gov | 1 |
| 170n | Seman, Lance | Manager, FCDAS | FCDAS, Fairbanks, AK | Lance.Seman@noaa.gov | 1 |
| 174n | Street, Frank | Noblis Copy | 3150 Fairview Park Drive<br>Falls Church, VA 22042 | frank.street@noblis.org | 1 |
| 182n | Fitzmaurice, Michael | NOAA Copy | NSOF, Room 1429 | Mickey.Fitzmaurice@noaa.gov | 1 |
| 185 | Kirkner, Steve<br>(GOES-N Project) | GOES Project Manager | NASA/GSFC, Code 424<br>Bldg. 6, Room W232<br>Greenbelt, MD 20771 | N/A | 1 |
| 185e | Kirkner, Steve<br>(GOES-N Project) | GOES Project Manager<br>(eCopy) | NASA/GSFC, Code 424<br>Bldg. 6, Room W232<br>Greenbelt, MD 20771 | N/A | 1 |
| 191e | Douglas, Paul | GOES Engineer (EMOSS Contractor)<br>(eCopy) | NSOF, Room 1330 | N/A | 1 |
| 192n | Zeigler, Ian | EMOSS GOES Payload Engineer | NSOF, Room 1323 | ian.zeigler@noaa.gov | 1 |
| 199n | Linn, John | Noblis Copy | 3150 Fairview Park Drive<br>Falls Church, VA 22042 | John.Linn@noaa.gov | 1 |
| 206e | Apirian, Lloyd | NOAA Program Manager, Joint Spectrum Center (JSC) (eCopy) | IIT Research Institute/DSS<br>185 Admiral Cochrane Dr.<br>Annapolis, MD 21401-7396 | N/A | 1 |
| 230n | Loze, Bill | FCDAS | FCDAS, Fairbanks, AK | Bill.Loze@noaa.gov | 1 |
| 231n | Hyde, Mark | IPO/NPOESS | NSOF, Room 1549 | Mark.Hyde@noaa.gov | 1 |
| 232n | Irving, Antonio | SSD PIB Chief Copy | 5200 Auth Road<br>Camp Springs, MD 20746 | antonio.irving@noaa.gov | 1 |
| 234n | McGinnis, David | NOAA | Silver Spring, MD | Dave.Mcginnis@noaa.gov | 1 |
| 235n | Pereira, John | Manager, Requirements IPT | 1335 East West Highway,<br>Room 5124<br>Silver Spring, MD 20910 | John.Pereira@noaa.gov | 1 |
| 236n | Crawford, Doug | WCDAS Station Manager Copy | 35663 Chincoteague Rd.<br>Wallops, VA 23337 | van.d.crawford@noaa.gov | 1 |
| 237n | Heymann, Roger | NOAA/ODS1 | Floor 5<br>Building SSMC 1<br>1335 East West Highway<br>Silver Spring, MD 20910 | Roger.Heymann@noaa.gov | 1 |
| 239n | Mentzer, James | NOAA Copy | Silver Spring, MD 20910 | james.mentzer@noaa.gov | 1 |
| 240n | Williams, Howard | NOAA Copy | NSOF, Room 1405 | Howard.Williams@noaa.gov | 1 |
| 242n | Button, Tom | NOAA Copy | NSOF, Room 1421 | Tom.Button@noaa.gov | 1 |
| 243 | Jim Sheridan {Key} | WCDAS Floor Copy/Polar | WCDAS, Wallops VA | N/A | 1 |
| 244n | Lempicki, Beverly | | NSOF, Cube 1257 | Beverly.Lempicki@noaa.gov | 1 |

| Loc # | Person | Location Title | Address | Email Address | Copies |
|---|---|---|---|---|---|
| 245n | Johnson, Greg | NOAA Copy | WCDAS, Wallops, VA | Gregory.P.Johnson@noaa.gov | 1 |
| 246n | Whaley, Phil | NOAA Copy | WCDAS, Wallops, VA | Philip.L.Whaley@noaa.gov | 1 |
| 248n | Daniels, Bill | CSC Copy | NSOF, Room 1149 | Bill.Daniels@noaa.gov | 1 |
| 250n | Lyons, Ray | Noblis Copy | 5111 LEESBURG PIKE<br>FALLS CHURCH VA 22041<br>BLDG: RG2 | Ray.Lyons@noaa.gov | 1 |
| 252n | Woolner, Peter | Noblis Copy | 3150 Fairview Park Drive<br>Falls Church, VA 22042 | peter.woolner@noblis.org | 1 |
| 253n | c/o Howard Williams | RSIS Copy | NSOF, Room 1405 | Howard.Williams@noaa.gov | 1 |
| 254n | Crippen, Lawrence J. | Alion Copy | Annapolis, MD | lawrence.crippen@noaa.gov | 1 |
| 255n | Apirin, Lloyd | Alion Copy | Annapolis, MD | Lloyd.Apirian@noaa.gov | 1 |
| 258n | Tse, Ken | SGT Copy | NSOF, Room 1847 | | 1 |
| 259n | Blackwell, Chip | | WCDAS | freeman.b.blackwell@noaa.gov | 1 |
| 315n | Wernek, Bruce | SGT Copy | NSOF, Room 1371 | bwernek@sgt-inc.com | 1 |
| 335e | Documentation Mgmt Team<br>c/o Janice Carter<br>{Key} | NSOF Library - OSDPD/IPD/ESPC (eCopy) | NSOF Library, Room 1005 | N/A | 1 |
| 335n | Documentation Mgmt Team<br>c/o Janice Carter<br>{Key} | NSOF Library - OSDPD/IPD/ESPC | NSOF Library, Room 1005 | Janice.Carter@noaa.gov | 1 |
| 553 | DeFoor, Tom | NOAA Copy | 325 Broadway, Boulder, CO 80305 | | 1 |
| 553e | DeFoor, Tom | NOAA Copy (eCopy) | 325 Broadway, Boulder, CO 80305 | | 1 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Total eNotifications** | 58 | **Total CD Copies** | 18 | **Total Paper Copies** | 20 | **Total Copies** | 96 |