

NOAA NESDIS

GOES Data Collection System

Spacecraft and Ground System Overview

AMS Collective Madison Meeting – Aug 6, 2022



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GOES Spacecraft Constellation

- GOES-16: Prime East S/C @ 75.2° W Longitude
 - Replaced G13 18 Dec, 2017
- GOES-17: Prime West S/C @ 137.3° W Longitude
 - Replaced G15 15 Nov, 2018
- GOES-14: Storage @ 105° W Longitude
- GOES-13: Transferred to USSF to support the GOES IO mission
 - Became operational 9 Sep 2020, renamed EWS-G1 (Electro-optical Infrared Weather System Geostationary)
- GOES-15: Storage @ 128° W Longitude



GOES 18 Launch and Post-launch Testing – Spring/Summer 2022

- NASA launched the third spacecraft in the GOES R series on March 1st, 2022 from Cape Canaveral Space Launch Complex 41 (SLC-41)
- Post-launch testing (PLT) is ongoing. In mid-July, GOES 18 was commanded to the GOES West co-location position of 137.0°W
- Current NESDIS operational plans involve replacing GOES 17 as the operational GOES West satellite in January 2023.

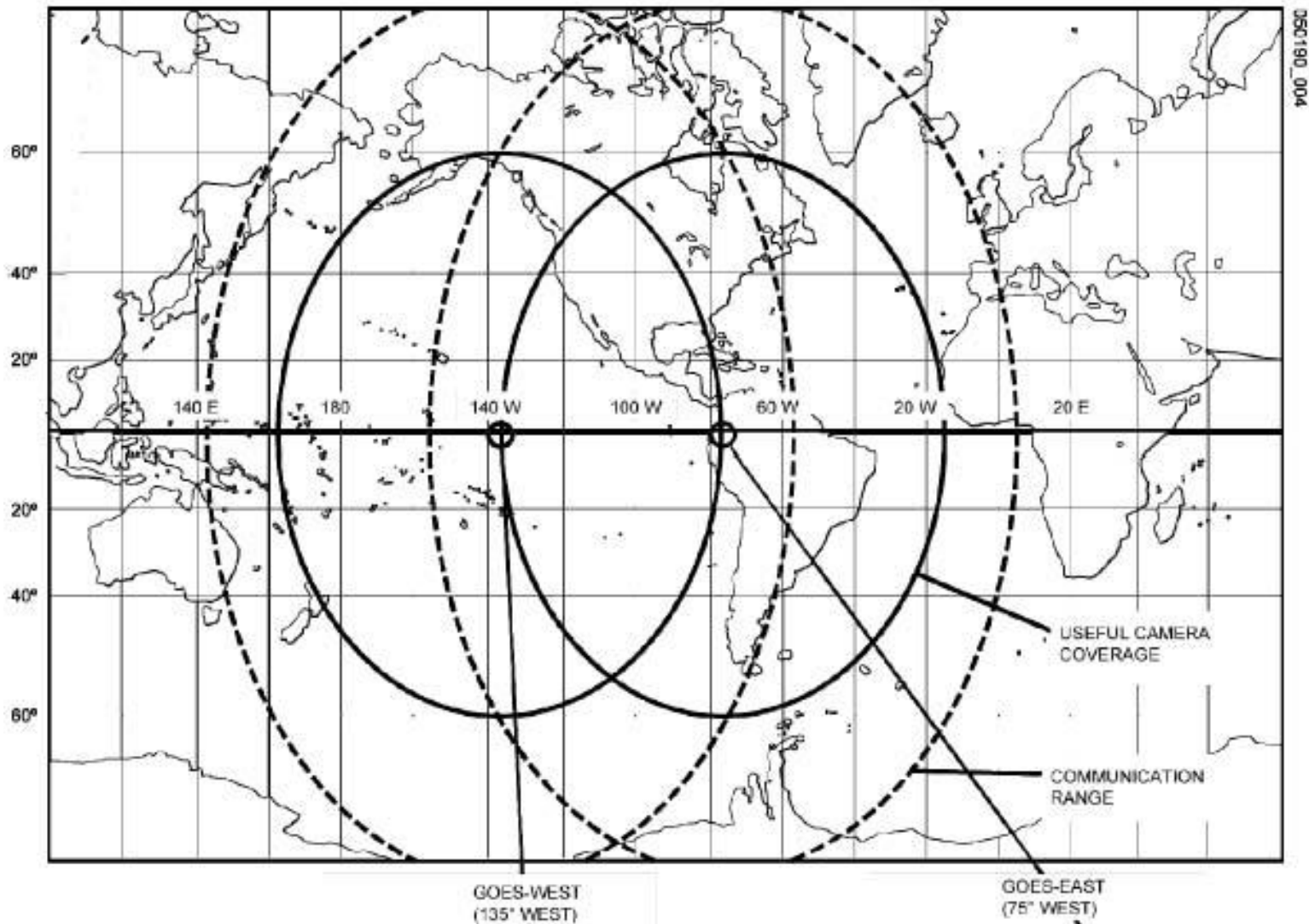


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Current GOES Series Footprints



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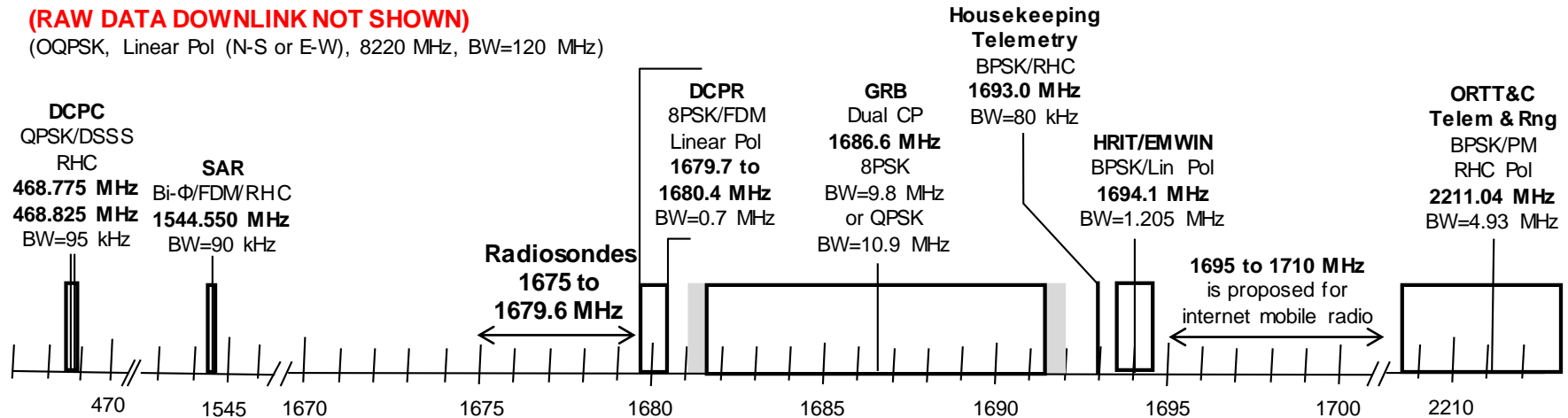


GOES R Frequency Plan

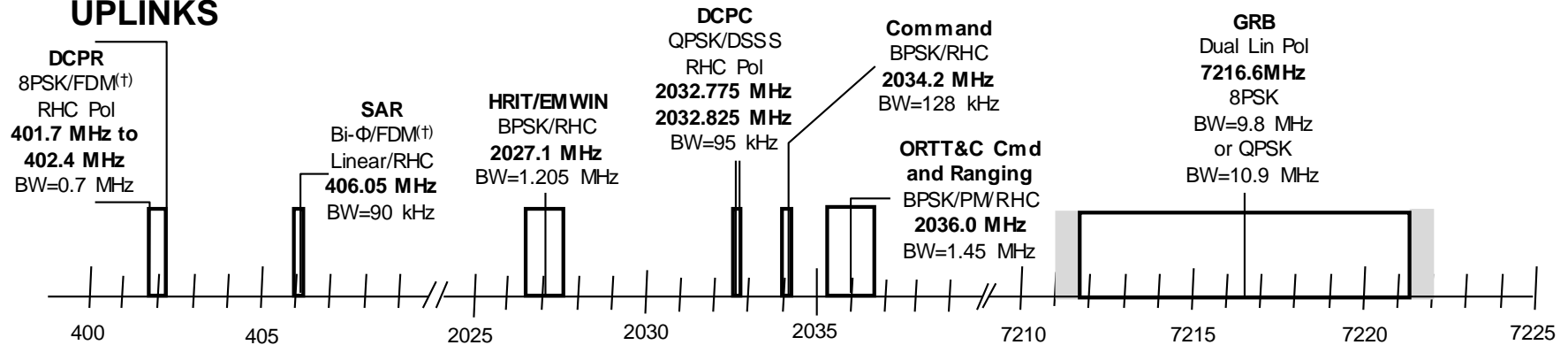
DOWNLINKS

(RAW DATA DOWNLINK NOT SHOWN)

(OQPSK, Linear Pol (N-S or E-W), 8220 MHz, BW=120 MHz)



UPLINKS



NOTES †: DCPR (8PSK) and SAR (Bi-Φ) are individual uplinks FDMed in the spacecraft transponder.

■: Indicates possible extra GRB bandwidth for QPSK modulation

Ground System Overview

NOAA Command and Data Acquisition Station, Wallops VA (WCDAS)



16.4m Hurricane Rated (HR) Parabolic Antenna

- Rx Capability
 - 1670-1695 MHz (L-band)
 - 2200-2240 MHz (S-band)
 - 8100-8350 MHz (X-band)
- Tx Capability
 - 2025-2050 MHz (S-band)
 - 7208-7225 MHz (X-band)
- There are currently three HR antennas at WCDAS (HR4, HR5, and HR6) and three at CBU (HR7, HR8, and HR9) capable of supporting the GOES R series spacecraft.
- Two legacy HR antennas at WCDAS (HR1 and HR2) are currently undergoing upgrades/enhancements to facilitate GOES R support. Upgrades currently scheduled for completion Winter 2023.



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DCS Primary Pilot Antennas – 401.85 MHz WCDAS



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NESDIS GOES Backup Sites

- GOES Consolidated Backup (CBU)
 - Located in the I-79 Technology Park in Fairmont, WV
 - Provides full mission backup capability for GOES 14-18 **with the exception of a DRGS.**
 - Provides the Backup DCS Pilot at 401.7 MHz
 - Installation of 3.8m Backup Pilot antennas in progress.
- NOAA Satellite Operation Facility (NSOF)
 - Located in Suitland, MD
 - Currently holds the backup DCS receive system, including DAMS-NT, DADDS, and LRGS.
 - Tentative plans to move all DCS backup ground equipment to CBU in late 2022.



NOAA Satellite Operations Facility, Suitland Md (NSOF)

- Four 9.1m parabolic antennas (N1, N2, N3 and N4) in support of the GOES R series spacecraft.
- Rx Capability
 - 1670-1710 MHz (L-band)
- L-band Rx-only capability provides limited support.



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NOAA Consolidated Backup (CBU), Fairmont WV



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Backup Pilot Antennas – 401.7 MHz CBU

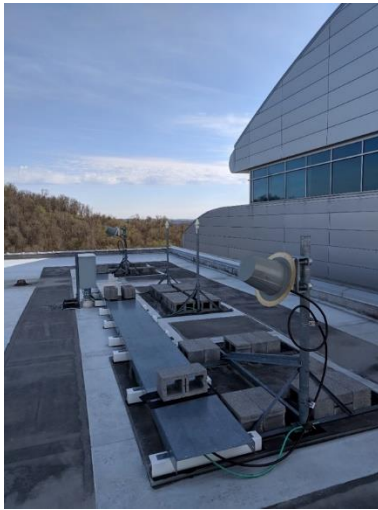


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CBU Backup Pilot Antenna Upgrade



NOAA seeks to replace the omni-directional backup pilot uplink antenna currently installed on the roof of CBU with two 3.8m parabolic antennas similar to the primary pilot uplink antennas at WCDAS.



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CBU Backup Pilot Antenna Upgrade cont.

- Parabolic antennas provide increased signal stability and enhance system redundancy.
- Antenna and shelter installation was completed in March 2022.
- Operational implementation of the new antennas scheduled for September 2022.
- No DCS message traffic interruption expected during antenna transition.



Red "X"s indicate planned location of new backup pilot antennas.



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GOES DCS Data Dissemination Services

NOAA/NESDIS provides both terrestrial and direct broadcast methods of GOES DCS message data dissemination from two facilities; the prime system is at the Wallops CDAS while the backup is at the NSOF. Wallops Operations monitors and controls both systems. The DCS supports the following dissemination services:

- **National Weather Service Telecommunication Gateway (NWSTG)**
 - WMO Header service from Wallops or NSOF DADDS
- **Local Readout Ground Station (LRGS)**
 - DCS message data sharing server system from/with Wallops, EDDN & NSOF DRGS. The LRGS utilizes OpenDCS, an open source software package.
- **High Rate Information Transmission (HRIT)**
 - GOES R Series link, DCS data from Wallops or NSOF DADDS
- **DCS Administration and Data Distribution System (DADDS)**
 - Supports message ingest, processing and distribution and provides system administration functionality.



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Local Readout Ground System (LRGS)

- NESDIS hosts 4 public facing LRGS servers, 2 at Wallops and 2 at NSOF.
 - CDADATA:
 - LRGS Address ; cdadata.wcda.noaa.gov
 - DRGS input from Wallops East & West DAMS NT demodulator applications, Primary & Backup
 - DDS Primary is NLRGS1, DDS Backup is EDDN1
 - CDABACKUP:
 - LRGS Address ; cdabackup.wcda.noaa.gov
 - DRGS input from Wallops East & West DAMS NT demodulator applications, Primary & Backup
 - DDS Primary is CDADATA, DDS Backup is EDDN2
 - NLRGS1:
 - LRGS Address ; nlrgs1.noaa.gov
 - DRGS input from NSOF East & West DAMS NT demodulator applications, Primary & Backup
 - DDS Receive Primary is NLRGS2, DDS Receive Backup is CDADATA
 - NLRGS2:
 - LRGS Address ; nlrgs2.noaa.gov
 - DRGS input from NSOF East & West DAMS NT demodulator applications, Primary & Backup
 - DDS Receive Primary is EDDN2, DDS Receive Backup is CDADATA
- Three additional public-facing servers are avail to LRGS users via the Emergency Data Distribution Network (EDDN) located at the USGS Earth Resources Observation and Science (EROS) facility in Sioux Falls, SD.



LRGS Server Status via DCS websites (dcs1.noaa.gov)

NOAA HOME WEATHER OCEANS FISHERIES CHARTING SATELLITES CLIMATE RESEARCH COASTS CAREERS NOAA

 **NOAA** GOES DATA COLLECTION SYSTEM
OFFICE OF SATELLITE AND PRODUCT OPERATIONS


DCS Administration and Data Distribution System (DADDS)
NOAA's System for Managing and Providing Access to Data from GOES DCS

DADDS DCS1
User Login

Email

Password


SIGN IN

- Need a Login? Click [here](#).
- Forgotten Password? Click [here](#).
- DCS Field Test? Click [here](#).
- Need Help? Click [here](#).
- **24/7 Technical Support: (757) 824-7450**
-  **DCS Operational Notices RSS Feed**

Certification Standard 2 Transition Period Ends May 31, 2026, in 1399 Days

GOES DCS 1200 bps CS2 Test Channel

Submit an Application for a GOES DCS SUA

 **Notice to Users**

This is a United States NOAA computer system, which may be accessed and used only for official Government business by authorized personnel. Unauthorized access or use of this computer system may subject violators to criminal, civil, and/or administrative action.

Operational Notices
07/05/2022 20:14 UTC

Help Desk
24/7 Operations

System Information

Program Information

DADDS File Downloads
08/01/2022 17:00 UTC
pdts_compressed.txt
chans_by_baud.txt

Wallops Webservers
dcs1.noaa.gov
dcs2.noaa.gov

NSOF Webservers
dcs3.noaa.gov
dcs4.noaa.gov

LRGS Status

LRGS Deadlines
Password Implementation:
August 9, 2016
SHA-256 Implementation:
August 17, 2016

Related Links



NESDIS LRGS Server Status Page



LRGS Summary Status

UTC: August 01, 2022 17:28:25 (Day 213)

<i>Host Name</i>	<i>Status Time</i>	<i>LRGS Status</i>	<i>Primary Downlink Status</i>	<i>Primary Quality Last Hour</i>	<i>Aggregate Quality Last Hour</i>	<i>Msgs This Hour</i>	<i>Num DDS Clients</i>	<i>Cove LRGS Version</i>
cdadata.wcda.noaa.gov	08/01 17:28:22	OK	DRGS:Active	96.95%	96.95%	20833	125	9.5
cdabackup.wcda.noaa.gov	08/01 17:28:06	OK	DRGS:Active	96.96%	96.96%	20986	71	9.5
nlrgs1.noaa.gov	08/01 17:28:23	OK	DRGS:Active	96.99%	96.99%	21169	25	9.5
nlrgs2.noaa.gov	08/01 17:27:55	OK	DRGS:Active	96.96%	96.96%	20853	20	9.5
lrgseddn1.cr.usgs.gov	08/01 17:28:03	OK	DDS:Active	96.95%	96.95%	20938	119	9.1
lrgseddn2.cr.usgs.gov	08/01 17:28:13	OK	DDS:Active	96.8%	96.8%	21066	98	9.1
lrgseddn3.cr.usgs.gov	08/01 17:28:10	OK	DDS:Active	96.97%	96.97%	21037	97	9.1



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NESDIS LRGS Server Status Page continued

LRGS: cdadata.wcda.noaa.gov

UTC: August 01, 2022 17:33:38 (Day 213)

(Time reported by LRGS)

System Status: Running

LRGS Version: 9.5.OpenDCS-6.8 RC10 (May 19, 2021)

Archive Statistics

Messages In Storage: **122466590**

Oldest Msg Time: **04/03 23:59:47**

Next Idx #: **771474**

Hourly Data Collection Statistics

Hour:	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18
GOES DRGS (Good/ParErr):	87606 / 5642	92920 / 764	90291 / 3106	91906 / 1730	90543 / 2713	90803 / 3812	89938 / 4073	53078 / 1971
DDS Recv (Good/ParErr):	41079 / 3626	42871 / 2268	42104 / 2131	42550 / 1218	42091 / 1772	42282 / 2674	42020 / 2703	24879 / 1037
DDS Recv:Secondary (Good/ParErr):	41088 / 3469	42873 / 2330	42124 / 1993	42544 / 1291	41847 / 1666	42390 / 2832	42030 / 2636	24875 / 996
Archived (Good/ParErr):	41069 / 2820	42845 / 1100	42079 / 1645	42543 / 970	42103 / 1430	42256 / 2029	41995 / 2080	24882 / 824

Downlink Statistics

Downlink Name	Last Msg Rcv Time	Last Seq Num	Link Status	Link Params
DRGS:Microcom-DRGS-BE	08/01 17:33:23	97508	Connected	
DDS:NLRGS1	08/01 17:33:22	-1	Real-Time	Primary
DRGS:Microcom-DRGS-PE	08/01 17:33:23	97652	Connected	
DRGS:Microcom-DRGS-BW	08/01 17:33:23	94947	Connected	
DRGS:Microcom-DRGS-PW	08/01 17:33:23	95238	Connected	
DDS:EDDN1	08/01 17:33:21	-1	Real-Time	Secondary

Client Statistics

Slot	Host Name	User	Msg Count	Last Activity Time	Last Msg Time	Status
0	-	enp	0	08/01 17:32:16	07/28 18:07:10	running
1	-	ostep	1981	08/01 17:33:32	08/01 17:33:20	running



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NESDIS LRGS Access

- In order to access GOES DCS message data via the NESDIS LRGS system, several requirements exist:

- Windows/Linux/Unix/MacOS-based computer
- Java Runtime Environment
- Internet connection
- LRGS/OpenDCS client software
- User Account provided by WCDAS DCS Operations staff

Operational Notices
07/05/2022 20:14 UTC

Help Desk
24/7 Operations

System Information

Program Information

DADD File Downloads
08/01/2022 17:00 UTC
pdts_compressed.txt
chans_by_baud.txt

Wallops Webservers
des1.noaa.gov
des2.noaa.gov

NSOF Webservers
des3.noaa.gov
des4.noaa.gov

LRGS Status

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Password Implementation:
August 9, 2016
SHA-256 Implementation:

DCS Administration and Data Distribution System
NOAA's System for Managing and Providing Access to Data from GOES DCS

DDCS DCS1
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Email

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Certification Standard 2 Transition Period Ends May 31, 2026

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NESDIS LRGS Access cont.

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DCS Administration and Data Distribution System (DADDS)

NOAA's System for Managing and Providing Access to Data from GOES DCS

DADDS System Information

- Frequently Asked Question (PDF) • 2012
- Web Interface User's Guide (PDF) • 2011
- DAPS Parameters & SHEF Codes (PDF) • 2005

DCS Channel Information

- GOES CS1 Channel Frequencies (PDF) • Mar 2000
- GOES CS2 Channel Frequencies (PDF) • Jun 2009
- International DCS Channel Definition (PDF) • Oct 2009
- GOES DCS Pilot System (PDF) • Jun 2013

Certification Information

- GOES DCS Certified Manufacturers List (PDF) • Sep 2020
- GOES DCS Certification Standard V2.0/CS2 (PDF) • Jun 2009
- GOES DCS Certification Standard V1.0B/CS1 (PDF) • Mar 2000
- GOES DCS Certification Standard 100BPS - RETIRED - (PDF) • Feb 2000
- International User Guide & Certification Standard (PDF) • Oct 2009
- NOAA Policy on Use of Certified Transmitters (PDF) • May 2011

Program Information

- GOES DCS Program Information
- GOES DCS TWG Meeting Minutes
- GOES DCS System Use Agreement (PDF)
- GOES DCS Policies and Procedures (PDF) • May 1998
- NOAA Technical Memo NESDIS 40 (PDF) • Mar 1994

System Diagrams

- NOAA DCS System Diagram (PDF) • Mar 2020
- GOES DCS Pilot System Diagram (PDF) • Apr 2018
- GOES HRIT (PDF) • Mar 2020

LRGS Information

- LRGS Client User's Guide (PDF) • May 2021
- LRGS Client Software Download • Feb 2016
- DCP Data Service (DDS) Protocol Specification • Feb 2016

HRIT Information

- HRIT Format Update Specifications (PDF) • Dec 2018
- HRIT Format Update Sample Files • #1 • #2 • #3 • Dec 2018
- HRIT Quarterly Meeting Slides 2018 (PDF) • Apr • Sept • Dec •

DAMS-NT Information

- DAMS-NT Interface Specification V8.2 • April 2020
- DAMS-NT East Sample Data • April 2020
- DAMS-NT West Sample Data • April 2020

General Information

- GOES DCS Random Reporting Channel User's Guide (PDF) • July 2021
- GOES 13/14 Frequency Offset Analysis (PDF) • Aug 2009
- Final DCS Filter Study Report, Rev. C (PDF) • Jan 2006
- GOES High Data Rate Transition Plan • Mar 2004
- GOES-13 DCPI and DCPR Technical Updates • 2006
- GOES DCS System Characterization Report (PDF) • Jun 1998
- GOES DCS Operations Plan (FCM-P28-1997) (PDF) • Aug 1997
- DAPS User's Telnet/Dail-in Manual • Sept 1990
- DROT User Manual • Apr 1991
- Old DROT Maintenance Manual • Apr 1991
- HDR Flyer-GOES DCS High Data Rate Transition Ended • May 2013

Website Help Information

- Online SUA Submission & DADDS Access • Mar 2018
- DADDS Website Training Presentation • Mar 2018
- How To: Updating PDT Records • Mar 2018
- How To: Create & Use Filters • Mar 2018
- How To: Pin Code Password Reset • Mar 2018

TWG Information

- TWG Meeting Information and Website Training

The LRGS client software, User's Guide, and the DDS protocol specification documentation are available from the System Information tab on any of the GOES DCS webpages

dcs1.noaa.gov
dcs2.noaa.gov
dcs3.noaa.gov
dcs4.noaa.gov



NESDIS LRGS Account Creation

- To register for an LRGS user account, please contact the WCDAS DCS Operations staff at 757-824-7450.
- Have the following information available:
 - Name
 - Email Address
 - Organization
 - Telephone Number
 - Preferred 6-character user name
- Note that the LRGS user account is different than a DADDS user account. The two are not interchangeable.
- DCS Operations staff will create the LRGS user account while on the phone.



NESDIS LRGS Account Creation cont.

- The initial user account password is generated by a GUI interface at WCDAS.
- DCS Operations staff will provide the newly generated password over the phone.
- This password may be changed after logging into the LRGS client software. Passwords must meet the NOAA CITR-021 password requirements as follows:
 - Passwords must contain at least 12 non-blank characters
 - Password must contain 3 of the following 4 character classes: upper case, lower case, digits, and special characters.
 - Passwords cannot contain the user name or any dictionary word or acronym that is 5 characters or longer.
 - When changing a password, you cannot reuse any of the last 8 passwords, or any password that was set in the past 2 years.



NOAA Wallops CDAS DCS Support Contacts

- Wallops Help Desk: 757-824-7450, wcdcs@noaa.gov
 - 24/7 Technical Support for DCS, LRGS, DADDS, HRIT
- Travis Thornton: 757-824-7316, joseph.t.thornton@noaa.gov
 - WCDAS Operations Manager, Acting
 - DCS Operations Team Lead
- Matthew Sullivan: 757-824-7360, matt.g.sullivan@noaa.gov
 - DCS RF Systems Specialist
 - WCDAS Frequency Spectrum Manager



Acronyms

- **NOAA:** National Oceanic and Atmospheric Administration
 - Office/Agency of the Department of Commerce.
- **NESDIS:** National Environmental Satellite, Data, and Information Service
 - Line office of NOAA
- **OSPO:** Office of Satellite and Product Operations
 - Suitland MD, Wallops VA, Fairbanks AK, College Park MD
- **NSOF:** NOAA Satellite Operations Facility, Suitland, MD
- **WCDAS:** Wallops Command and Data Acquisition Station, VA
- **GOES:** Geostationary Operational Environmental Satellite
- **CBU:** Consolidated Backup Facility, Fairmont, WV
- **DADDS:** Data Collection System (DCS) Administration & Data Distribution System
- **DRGS:** Direct Readout Ground System
- **LRGS:** Local Readout Ground System
- **DCP:** Data Collection Platform
- **DDS:** DCP Data Service
- **HRIT:** High Rate Information Transmission, GOES R Series (G16)
- **NWSTG:** National Weather Service Telecommunications Gateway



**Thank you for your
attention.**

Questions?



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