

# **NOAA NESDIS**

## **GOES Data Collection System**

### **Spacecraft and Ground System Overview**

#### **April 2024 TWG**



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# GOES Spacecraft Constellation

## GOES R Series

- GOES-16: Prime East S/C @ 75.2° W Longitude
  - GOES-18: Prime West S/C @ 137.0° W Longitude
  - GOES-17: Storage @ 105° W Longitude
    - G17 DCPR downlink was temporarily activated on Feb 5 to mitigate RFI being experienced on G16
- 

## GOES N Series

- GOES-14: Storage @ 108.2° W Longitude
- GOES-15: EWS-G2 (Electro-optical Infrared Weather System Geostationary)
  - Replaced G13 (EWS-G1) on September 8, 2023 as the operational EWS satellite for the USSF in the Indian Ocean theater.



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# GOES U (19) Launch – Summer 2024

- NASA plans to launch GOES U, the fourth and final spacecraft in the GOES R series, on June 25, 2024 from the Kennedy Space Center.
- Following a successful launch, orbit-raising, and post-launch testing period, GOES U will be renamed GOES 19 and join NOAA's fleet of operational GOES satellites.
- The Geostationary Extended Observations (GEOXO) satellite series will replace the GOES series by the early 2030's.

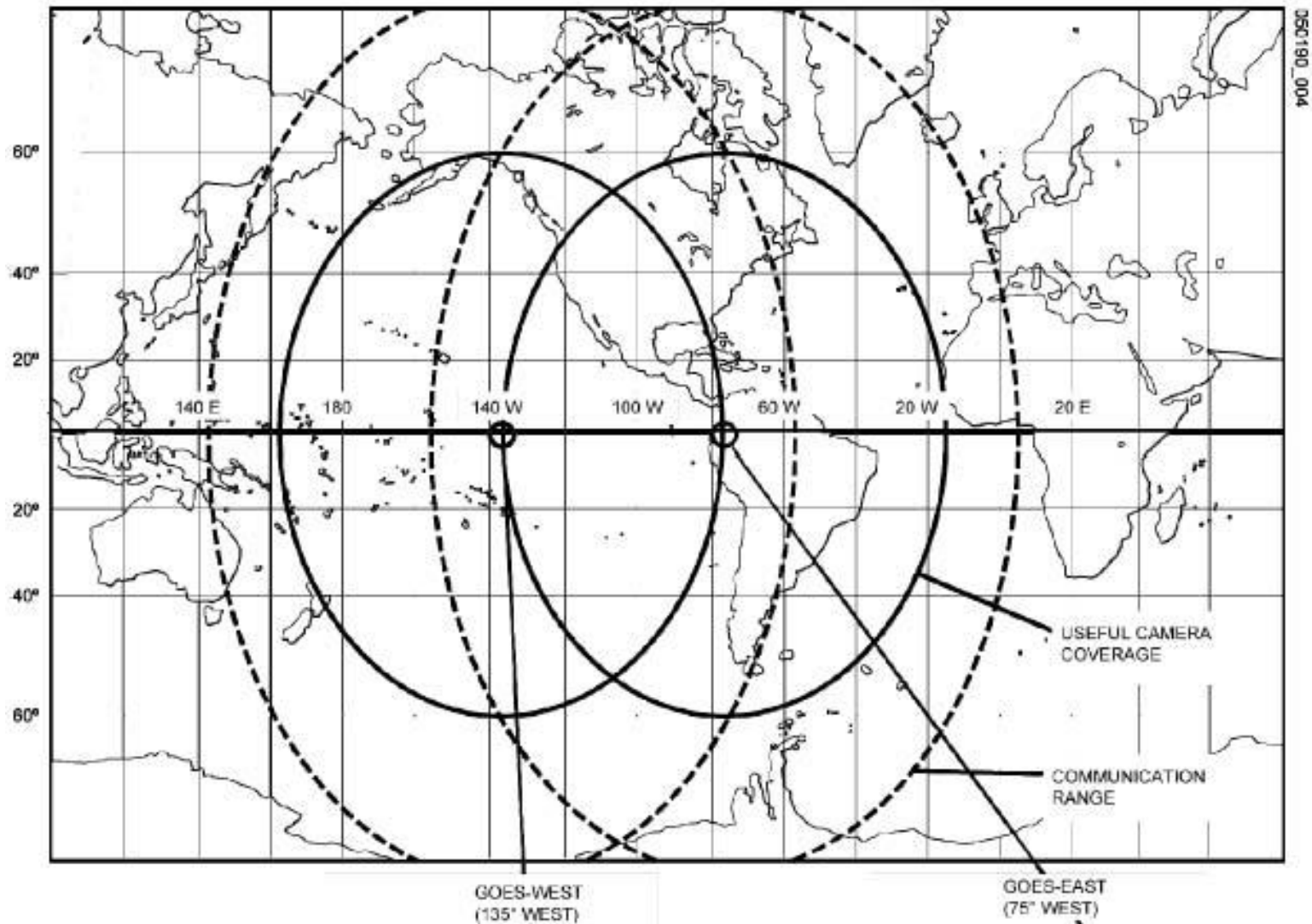


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# Current GOES Series Footprints



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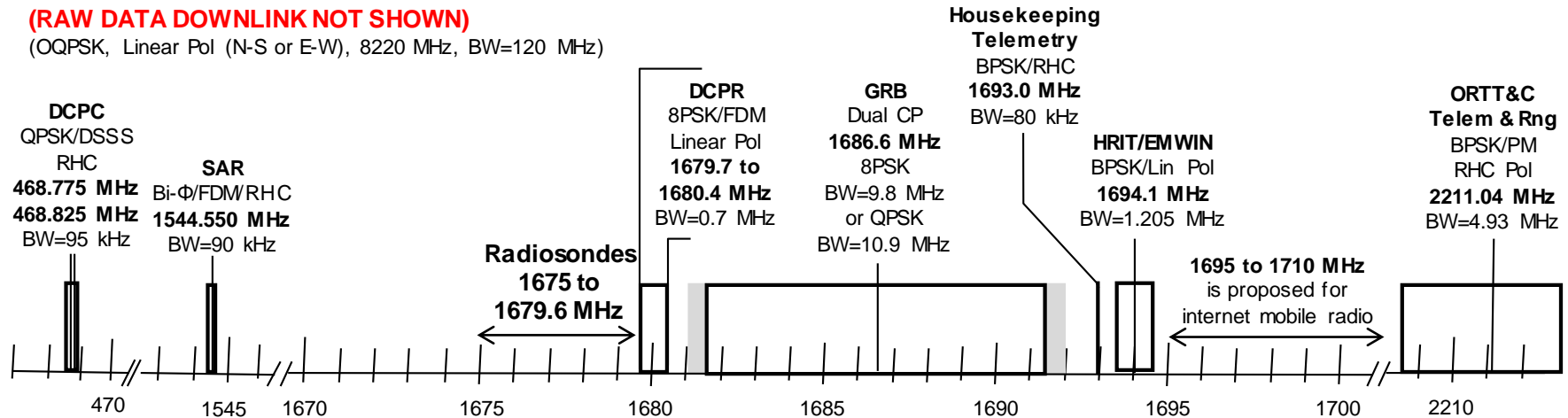
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# GOES R Frequency Plan

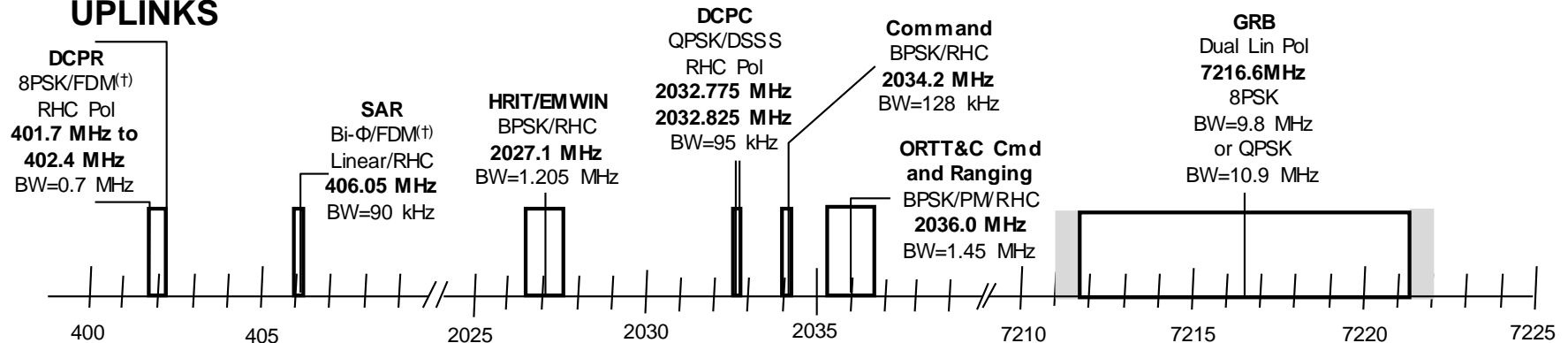
## DOWNLINKS

(RAW DATA DOWNLINK NOT SHOWN)

(QPSK, 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)**





# 16.4 meter 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) capable of supporting the GOES R series spacecraft.
- In addition to the primary HR antennas, WCDAS has the following legacy antennas capable of supporting the DCS:
  - HR1
  - HR2
  - 14.2 meter
  - 8 meter



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# WCDAS 3.8 meter Pilot Uplink Antennas



- GOES East – Primary Pilot (401.85 MHz)
- GOES West – Primary Pilot (401.85 MHz)
- GOES 17 – Primary Pilot (401.85 MHz) and Backup Pilot (401.7 MHz)



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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 DCS receive ground system.**
  - Provides the Backup DCS Pilot at 401.7 MHz
  - Installation of 3.8m Backup Pilot antennas completed in Sept 2022.
- 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 scheduled for 2024 following the GOES U launch.



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# 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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# CBU 3.8 meter Pilot Uplink Antennas



GOES East – Backup Pilot (401.7 MHz)

GOES West – Backup Pilot (401.7 MHz)



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# NOAA GOES DCS Data 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 distribution service from/with Wallops, EDDN & NSOF utilizing the OpenDCS software in a client-server model.
- **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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# DCS National Weather Service Telecommunication Gateway (NWSTG)

- DCS messages processed are embedded with a World Meteorological Organization (WMO) header and then sent to the NWSTG for distribution.
- WCDAS and NSOF systems are both providing DCS data to the Gateway. This enables the Gateway to select which stream to disseminate, with the default being Wallops is Prime.
- Data customers using the NWSTG are largely unknown.



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# Local Readout Ground System (LRGS)

- NOAA Wallops CDAS hosts 2 LRGS,
  - CDADATA:
    - LRGS Address ; [cdadata.wcda.noaa.gov](http://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](http://cdabackup.wcda.noaa.gov)
    - DRGS input from Wallops East & West DAMS NT demodulator applications, Primary & Backup
    - DDS Primary is CDADATA, DDS Backup is EDDN2
- NOAA Suitland NSOF hosts 2 LRGS,
  - NLRGS1:
    - LRGS Address ; [nlrgs1.noaa.gov](http://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](http://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



# High Rate Information Transmission (HRIT)

- HRIT is a GOES R series broadcast that provides the following services:
  - Reduced resolution Imagery Data
  - Emergency Managers Weather Information Network (EMWIN)
  - Data Collection System (DCS) messages
- GOES East & West DCS data is provided by the DADDs for inclusion in the GOES East and West HRIT broadcasts.
- GOES HRIT services can be supported by a 1m to 1.2m receive antenna system.
- For more information on the GOES HRIT system:
  - [https://noaasis.noaa.gov/GOES/HRIT/about\\_hrit.html](https://noaasis.noaa.gov/GOES/HRIT/about_hrit.html)
  - <https://www.goes-r.gov/users/hrit.html>



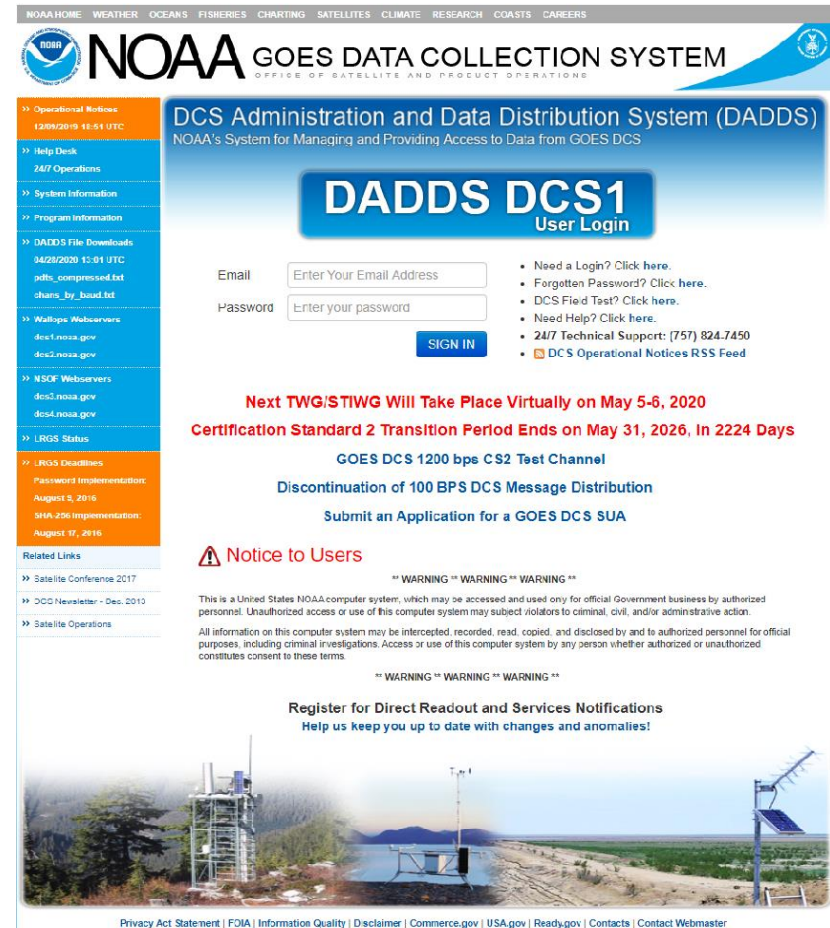
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# DCS Administration and Data Distribution System (DADDS)


- Web-based platform that provides DCS users and administrators the various administrative functions necessary to maintain a properly functioning DCS .
- Detailed system performance statistics used by DCS operators and program staff to troubleshoot anomalies and track system metrics.
- Field test capability to aid users in the installation and testing of DCPs.
- Message data export functionality
- Accessed via the following links:
  - <https://dcs1.noaa.gov/>
  - <https://dcs2.noaa.gov/>
  - <https://dcs3.noaa.gov/>
  - <https://dcs4.noaa.gov/>






# DADDS Webserver System Information

[NOAA HOME](#) [WEATHER](#) [OCEANS](#) [FISHERIES](#) [CHARTING](#) [SATELLITES](#) [CLIMATE](#) [RESEARCH](#) [COASTS](#) [CAREERS](#)

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OFFICE OF SATELLITE AND PRODUCT OPERATIONS



[» Operational Notices](#)  
12/09/2019 16:54 UTC

[» Help Desk](#)  
24/7 Operations

[» System Information](#)

[» Program Information](#)

[» DADDS File Downloads](#)  
04/28/2020 15:01 UTC  
pdfs\_compressed.txt  
chans\_by\_baud.txt

[» Walltops Webserver](#)  
dcs1.noaa.gov  
dcs2.noaa.gov

[» NSOF Webserver](#)  
dcs1.noaa.gov  
dcs4.noaa.gov

[» LRGS Status](#)

[» LRGS Deadlines](#)  
Password Implementation:  
August 3, 2016  
SHA-256 Implementation:  
August 17, 2016

[Related Links](#)

[» Satellite Conference 2017](#)

[» DCC Newsletter - Dec. 2013](#)

[» Satellite Operations](#)

## 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 2005
- [International DCS Channel Definition \(PDF\)](#) • Oct 2009
- [GOES DCS Pilot System \(PDF\)](#) • Jun 2013

### Certification Information

- [GOES DCS Certified Manufacturers List \(PDF\)](#) • Feb 2014
- [GOES DCS Certification Standard V2.0/CS2 \(PDF\)](#) • Jun 2000
- [GOES DCS Certification Standard V4.0B/C51 \(PDF\)](#) • Mar 2003
- [GOES DCS Certification Standard 100BPS - RETIRED \(PDF\)](#) • Feb 2000
- [International User Guide & Certification Standard \(PDF\)](#) • Oct 2003
- [NOAA Policy on Use of Certified Transmitters \(PDF\)](#) • May 2011

### System Diagrams

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

### 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 •

### General Information

- [GOES 13/14 Frequency Offset Analysis \(PDF\)](#) • Aug 2009
- [Final DCS Filter Study Report, Rev. C \(PDF\)](#) • Jan 2005
- [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

### TWG Information

- [TWG Meeting Information](#) • April 2018
- [Website Training Presentation](#) • April 2019

### Program Information

- [GOES DCS Program Information](#) • N/A
- [GOES DCS TWG Meeting Minutes](#) • N/A
- [GOES DCS System Use Agreement \(PDF\)](#) • N/A
- [GOES DCS Policies and Procedures \(PDF\)](#) • May 1998
- [NOAA Technical Memo NESDIS 40 \(PDF\)](#) • Mar 1994

### LRGS Information

- [LRGS Client User's Guide \(PDF\)](#) • Feb 2016
- [LRGS Client Software Download](#) • Feb 2016
- [DCP Data Service \(DDS\) Protocol Specification](#) • Feb 2016

### DAMS-NT Information

- [DAMS-NT Interface Specification V8.2](#) • April 2020

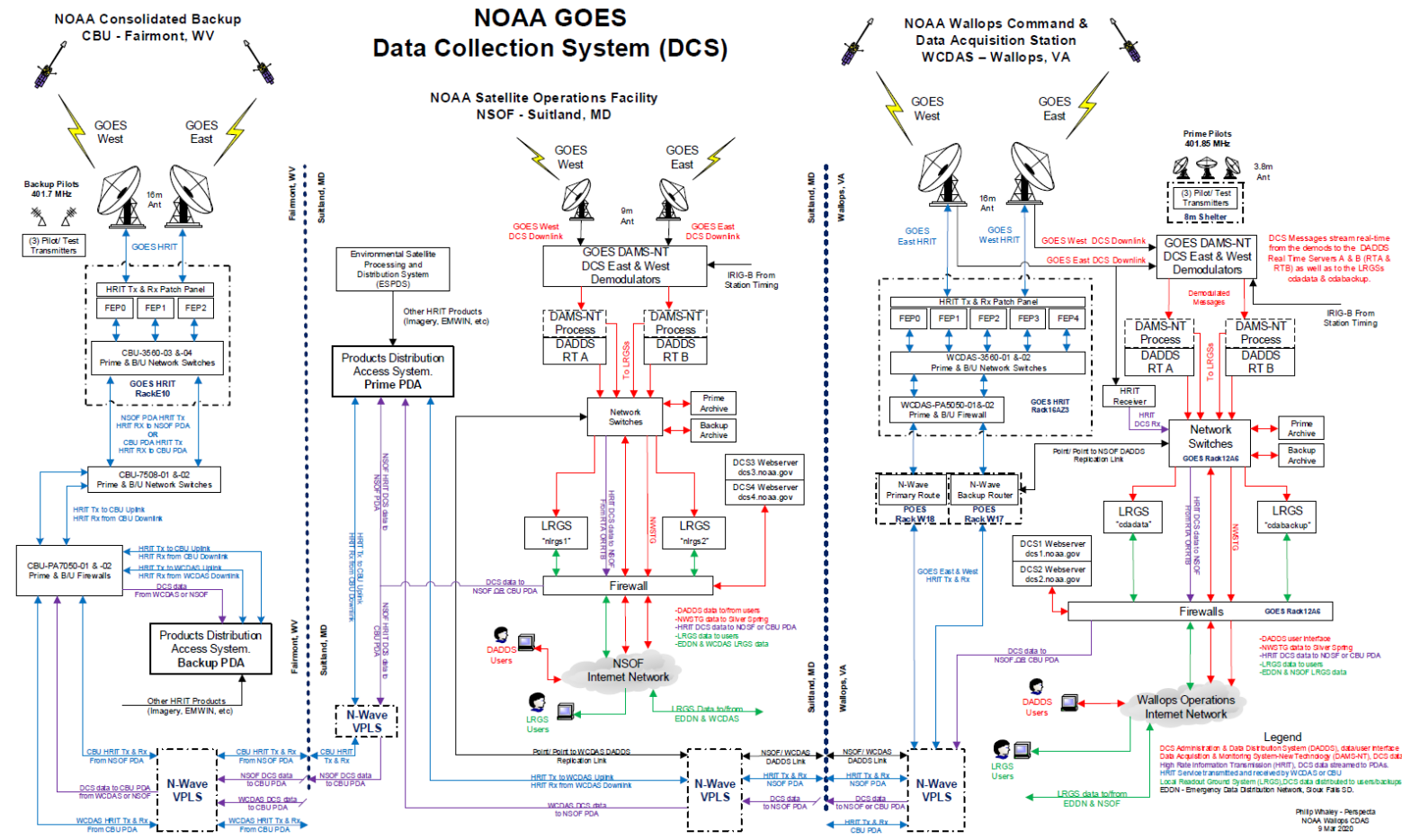
### Website Help Information

- [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

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# NOAA DCS System Diagram



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# NOAA Wallops CDAS DCS Support Contacts

- Wallops Help Desk: 757-824-7450, [wcdcs@noaa.gov](mailto:wcdcs@noaa.gov)
  - 24/7 Technical Support for DCS, LRGS, DADDS, HRIT
- Travis Thornton: 757-824-7316, [joseph.t.thornton@noaa.gov](mailto:joseph.t.thornton@noaa.gov)
  - DCS Operations Supervisor
- Matthew Sullivan: 757-824-7360, [matt.g.sullivan@noaa.gov](mailto:matt.g.sullivan@noaa.gov)
  - DCS Systems Engineer
- Christine Kuhner: 757-824-7450, [christine.j.kuhner@noaa.gov](mailto:christine.j.kuhner@noaa.gov)
  - DCS Team Lead



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# 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
- **GEOXO:** Geostationary Extended Operations
- **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
- **HRIT:** High Rate Information Transmission, GOES R Series (G16)
- **NWSTG:** National Weather Service Telecommunications Gateway



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**Thank you for your  
attention.**

**Questions?**



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