

# NOAA NESDIS GOES Data Collection System Spacecraft and Ground System Overview April 2023 TWG



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National Environmental Satellite, Data, and Information Service (NESDIS)



# GOES Spacecraft Constellation

- GOES-16: Prime East S/C @ 75.2° W Longitude
    - Replaced G13 18 Dec, 2017
  
  - GOES-18: Prime West S/C @ 137.0° W Longitude
    - Replaced G17 1 Jan, 2023
  
  - GOES-17: Storage @ 105° W Longitude
- 
- GOES-14: Storage @ 108.2° W Longitude
  
  - GOES-13: Transferred to USSF to support the GOES Indian Ocean (IO) mission
    - Became operational 9 Sep 2020, renamed EWS-G1 (Electro-optical Infrared Weather System Geostationary)
  
  - GOES-15: Currently drifting to Indian Ocean theater. Following arrival and checkout, it will become EWS-G2





# GOES U (19) Launch – Spring 2024

- NASA plans to launch GOES U, the fourth and final spacecraft in the GOES R series, in April 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.

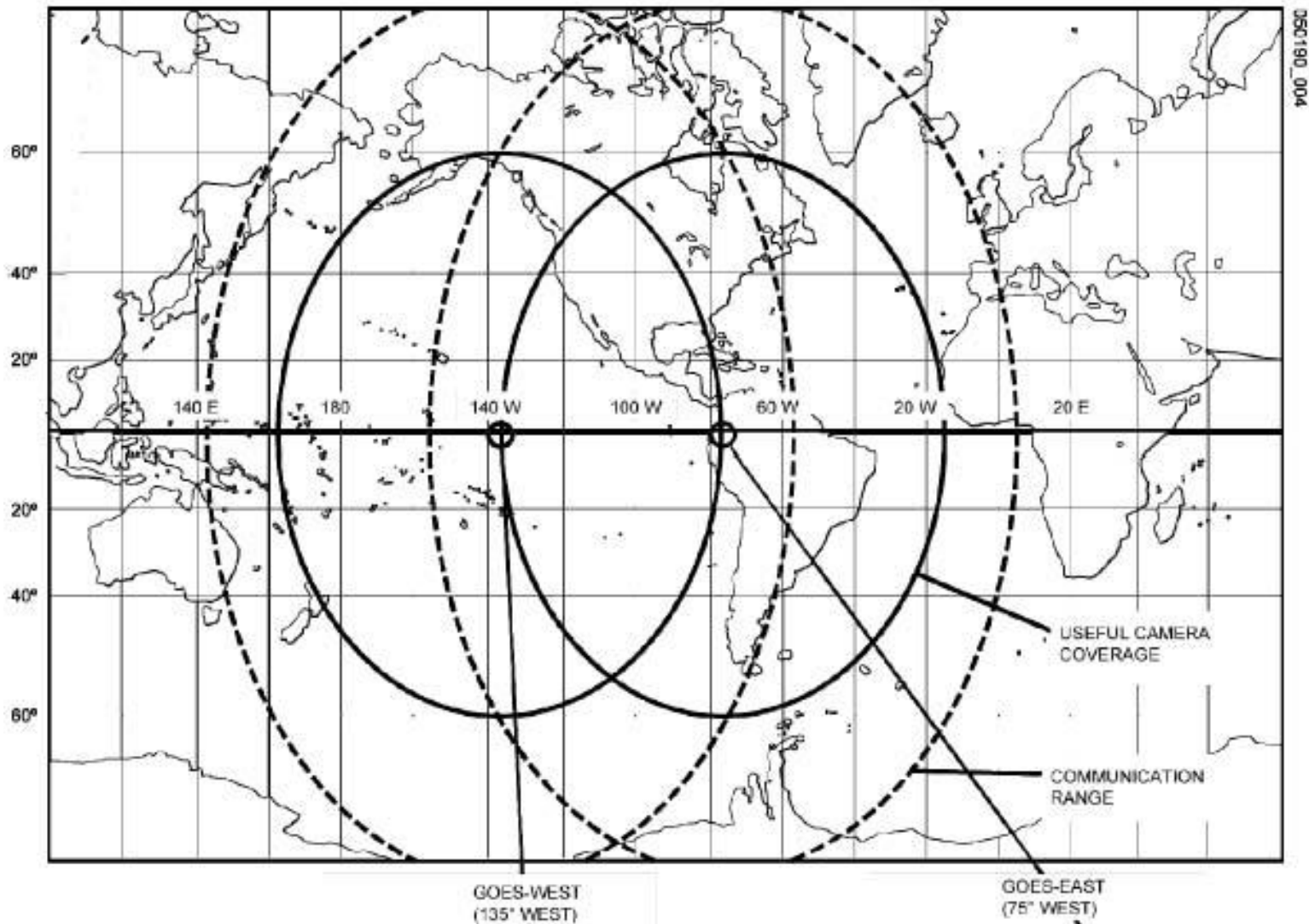


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# Current GOES Series Footprints



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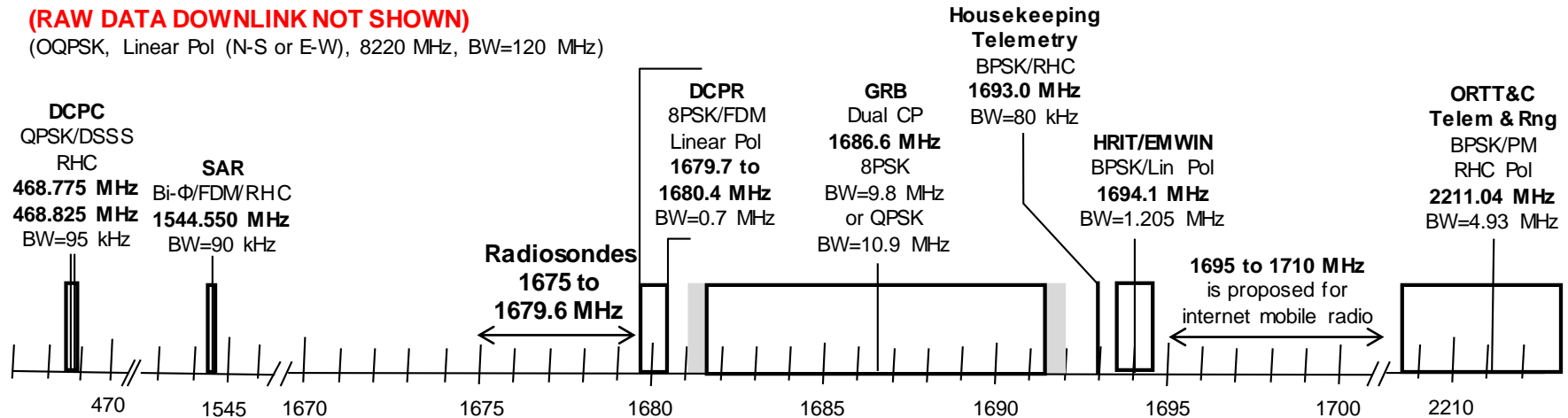


# GOES R Frequency Plan

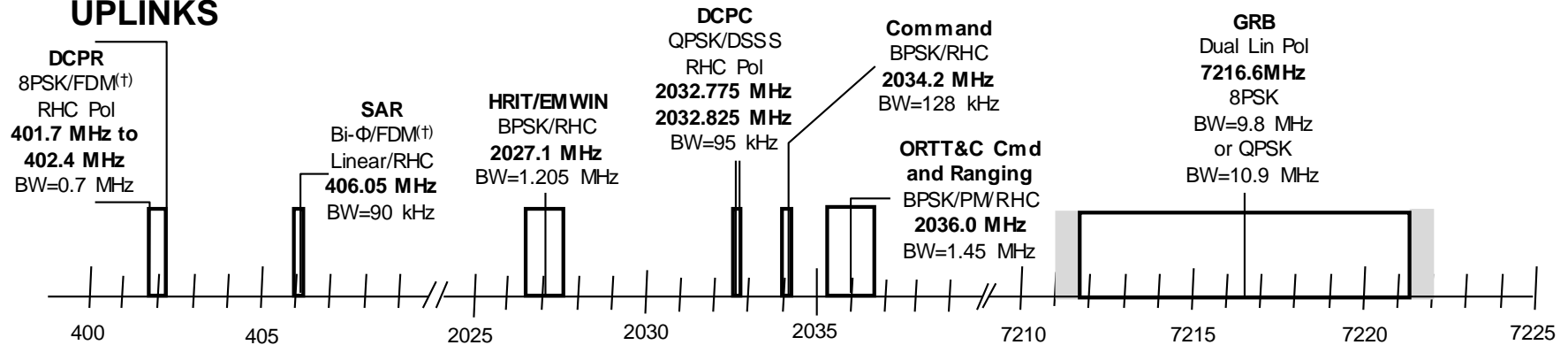
## DOWNLINKS

(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 Spring 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 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.



# 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



In Sept. 2022, NOAA replaced the existing omni-directional backup pilot uplink antenna 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 occurred in 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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# 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.



# 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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# DADDS Webservers <https://dcs1.noaa.gov/>

NOAA HOME WEATHER OCEANS FISHERIES CHARTING SATELLITES CLIMATE RESEARCH COASTS CAREERS

 **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](#)


**Next TWG/STIWG Will Take Place Virtually on May 5-6, 2020**

**Certification Standard 2 Transition Period Ends on May 31, 2026, In 2224 Days**

**GOES DCS 1200 bps CS2 Test Channel**

**Discontinuation of 100 BPS DCS Message Distribution**

**Submit an Application for a GOES DCS SUA**

 **Notice to Users**


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**\*\* WARNING \*\* WARNING \*\* WARNING \*\***

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# DADDS Webservers System Information

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 **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

**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 Webservers**  
dcs1.noaa.gov  
dcs2.noaa.gov

**NSOF Webservers**  
dcs1.noaa.gov  
dcs4.noaa.gov

**LRGS Status**

**LRGS Deadlines**  
Password Implementation:  
August 3, 2016  
SHA-256 Implementation:  
August 17, 2016

**Related Links**

**DCS 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 2009
- GOES DCS Certification Standard V4.0B/C/S1 (PDF) • Mar 2009
- 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

**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

**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) • Feb 2016
- 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

**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

**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 • April 2018
- Website Training Presentation • April 2019

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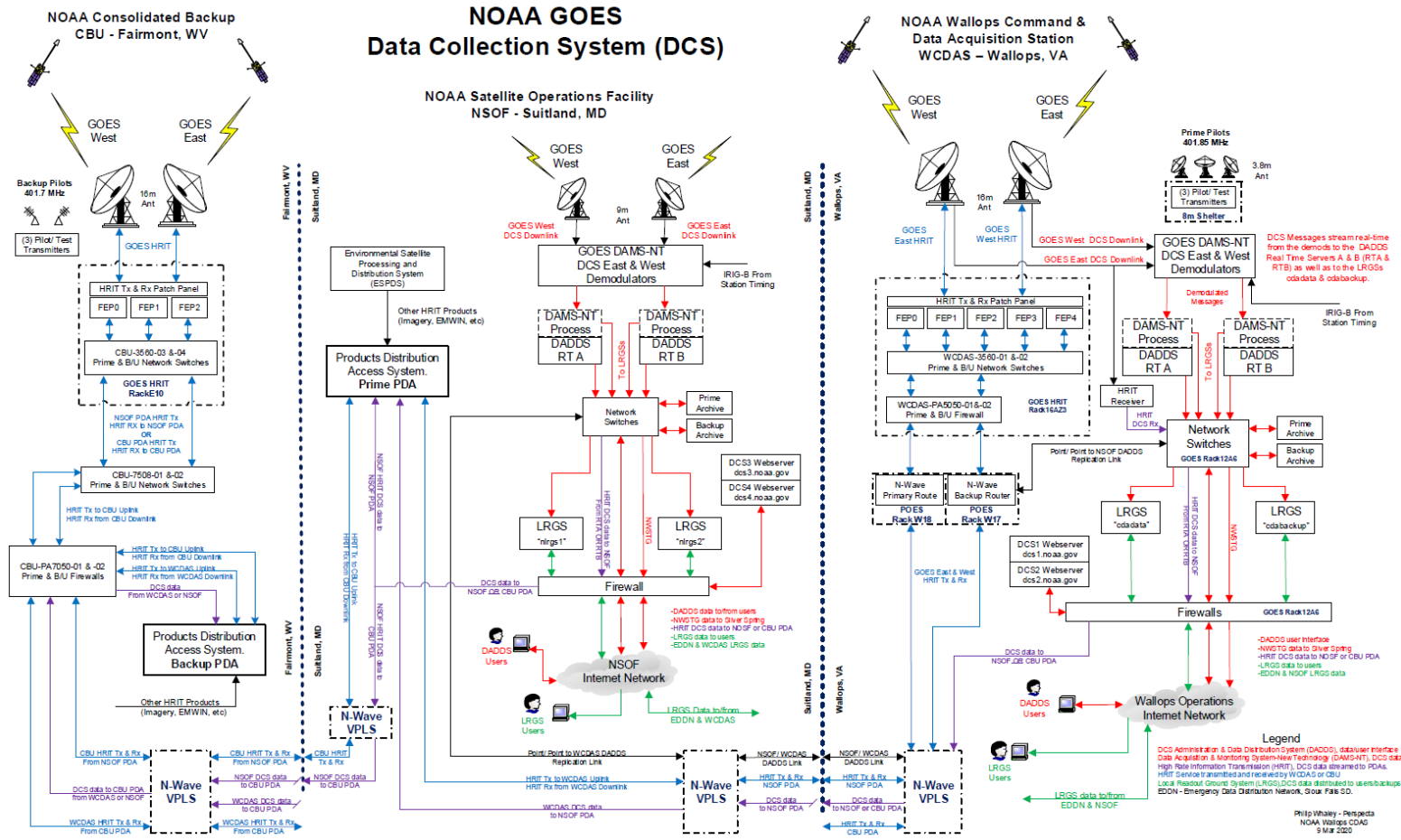


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# NOAA DCS System Diagram



# 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)
  - WCDAS Operations Supervisor
  - DCS Operations Team Lead
- Matthew Sullivan: 757-824-7360, [matt.g.sullivan@noaa.gov](mailto: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
- **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



**Thank you for your  
attention.**

**Questions?**



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