

# NOAA Wallops CDA Station GOES Data Collection System



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# GOES Spacecraft Constellation

- GOES-16: Prime East S/C @ 75.2° W Longitude
  - Replaced G13, 18 Dec, 2017
- GOES-15: Prime West S/C @ 135° W Longitude
- GOES-14: Storage @ 105° W Longitude
  - Currently supporting EMWIN & LRIT
- GOES-13: Storage @ 60° W Longitude
  - Arrived 31 Jan, 2018
- GOES-17: Parked @ 89.5° W Longitude for testing
  - Scheduled to replace G15 late 2018 @ 137° W



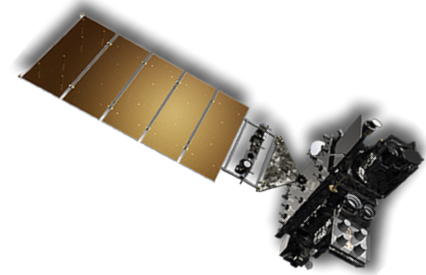
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# GOES 16



- NOAA's newest geostationary satellite series replaced GOES 13 at 75° West, 18 Dec, 2017.
- **Reminder:** The GOES R satellite series frequency plan is different from the plan currently in use by the GOES 14 and 15 satellites. GOES DRGSs supported the GOES East (GOES 13) DCS downlink in the frequency range of 1694.30 to 1694.70 MHz. The GOES R series satellites use 1679.70 to 1680.10 MHz to support the DCS downlink.
- Note that the GOES 16 frequency plan changes do NOT affect the Data Collection Platform (DCP) UHF-Band uplink transmissions, only the L-Band downlink to NOAA and the DRGSs.
- There are NO frequency changes in the DCS DOMSAT Ku-Band service.
- <http://www.goes-r.gov>



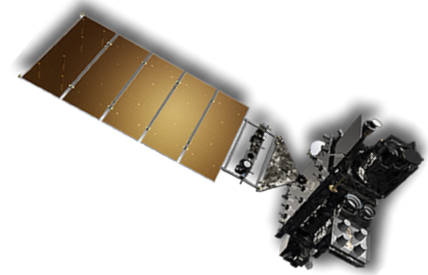
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# GOES 17



- NOAA's newest geostationary satellite, GOES S, was successfully launched 1 March. Orbit raising maneuvers are scheduled to bring the satellite into geostationary orbit at 89.5° West, around 18 March. Once in geostationary orbit, GOES 17 will undergo a period of checkout and validation, moving to the GOES West operational position in late 2018. (NOAA press release, 1 March: <https://www.nesdis.noaa.gov/GOES-R-Series-Satellites>).
- **Reminder:** The GOES R satellite series frequency plan is different from the plan currently in use by the GOES 14 and 15 satellites. GOES DRGSs currently support the GOES West (GOES 15) DCS downlink in the frequency range of 1694.30 to 1694.70 MHz. The GOES R series satellites will use 1679.70 to 1680.10 MHz to support the DCS downlink. GOES DCS users will need to modify their DRGSs to accommodate this change in downlink frequency, to be able to support GOES 17, later this year.
- Note that the GOES 17 frequency plan changes do NOT affect the Data Collection Platform (DCP) UHF-Band uplink transmissions, only the L-Band downlink to NOAA and the DRGSs.
- <http://www.goes-r.gov>

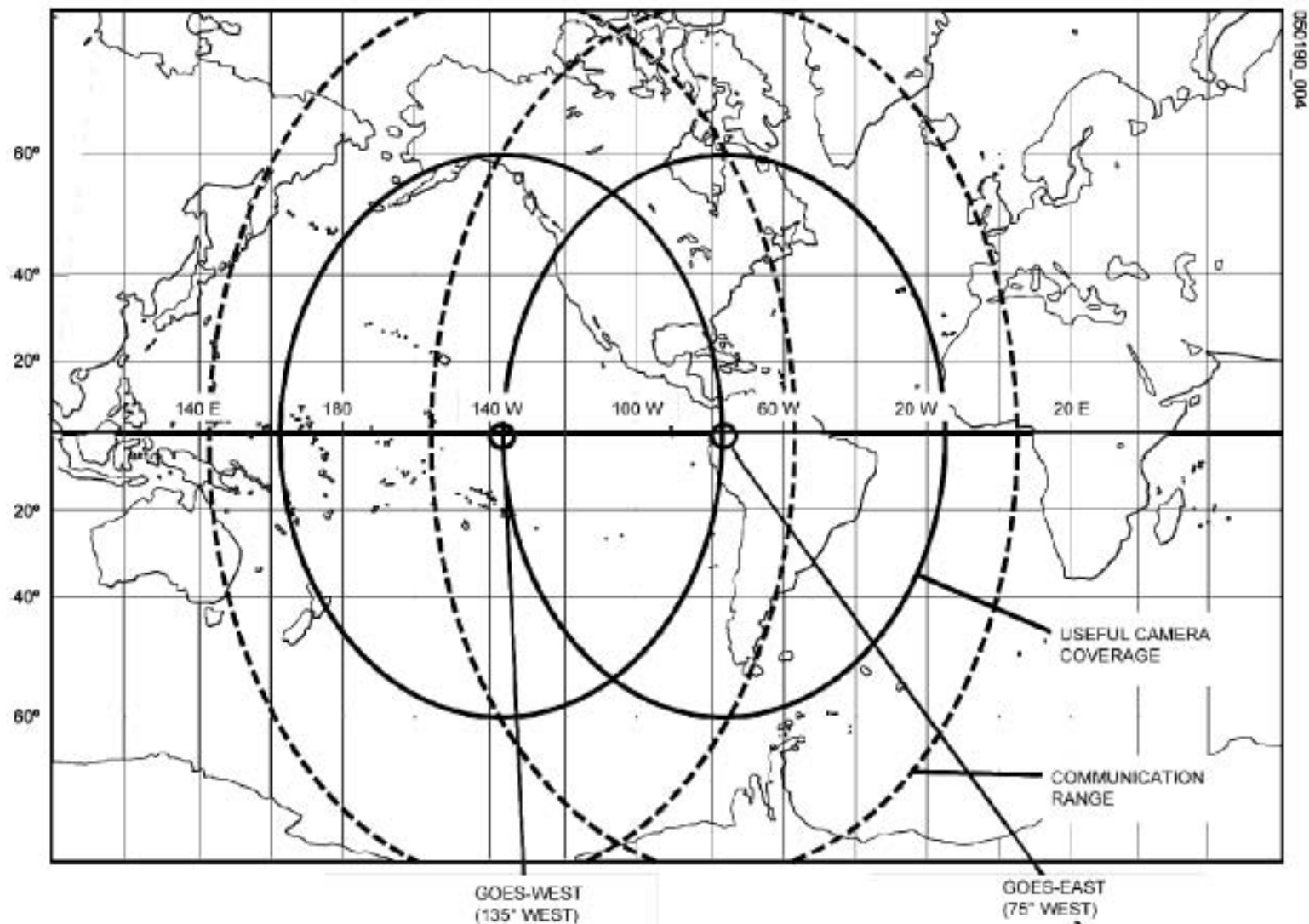


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# GOES Footprints



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# DCPR Changes for GOES-R

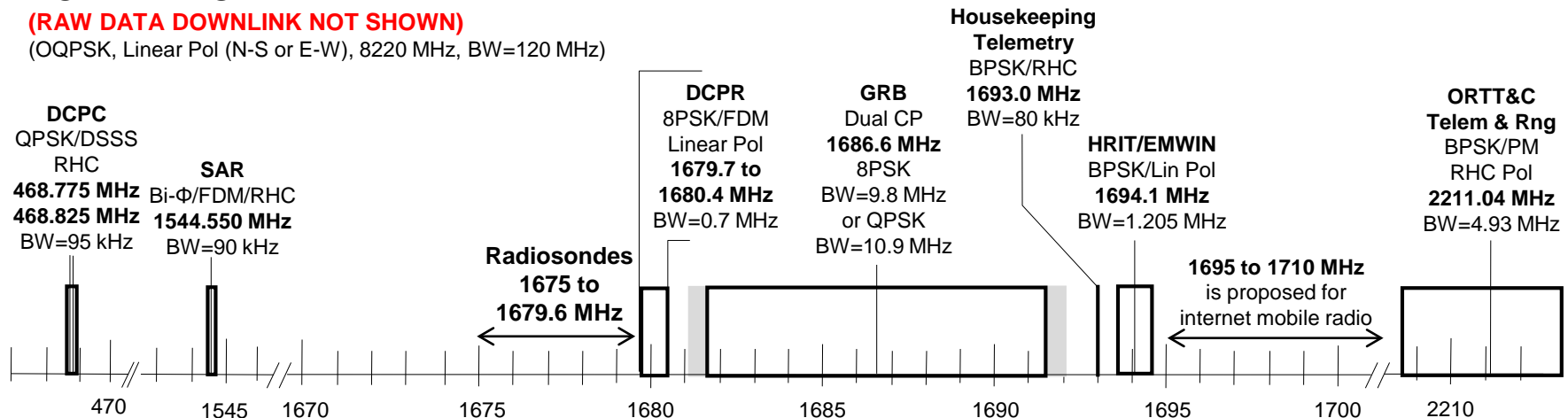
- On the GOES-N/O/P satellites the DCPR downlink band is 1694.3 – 1694.7 MHz
  - The uplink Pilot at 401.85 MHz is translated to 1694.45 MHz in the existing downlink
- For the GOES-R series satellites the DCPR downlink band will be 1679.7 – 1680.1 MHz
  - The uplink Pilot at 401.85 MHz will be translated to 1679.85 MHz in the new downlink
- No DCP uplink frequencies will change from the GOES-N to GOES-R satellites – only the downlinks

# GOES R Frequency Plan

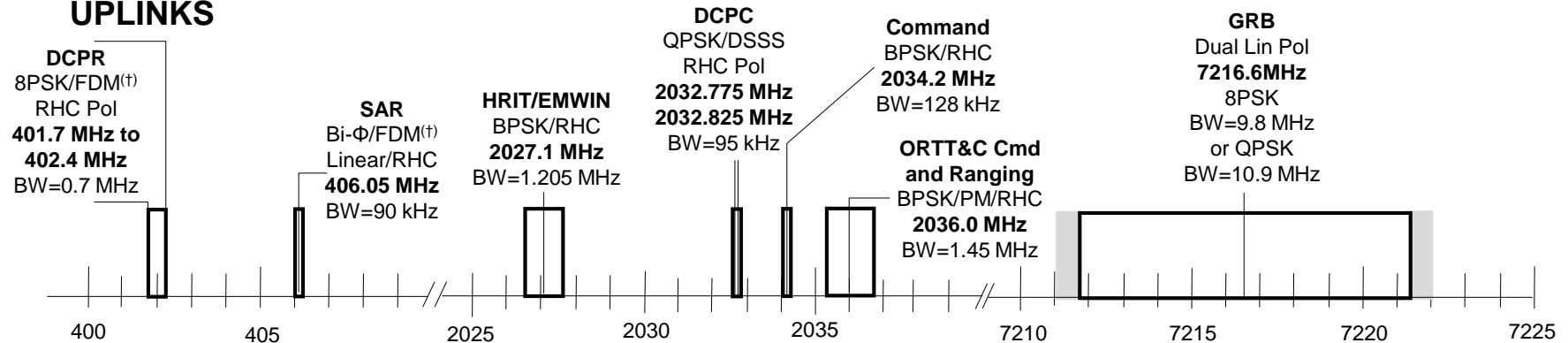
## DOWNLINKS

(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 FDM'ed in the spacecraft transponder.

■: Indicates possible extra GRB bandwidth for QPSK modulation

# Wallops CDAS Backups

- WBU, Goddard Space Flight Center, MD
  - GOES 13-15 series backup for GOES East
  - Secondary DCS Pilot 401.7MHz transmits 24/7
- Fairbanks CDAS
  - GOES 13-15 series backup for GOES West
- Backup DADDS at NSOF Suitland, MD
- CBU, Fairmont, WV
  - GOES R series backup for GOES East & West



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# NOAA GOES DCS Data Services

The OSPO provides GOES DCS ground system support at 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:

- **DOMSAT**
  - CONUS rebroadcast from Wallops or NSOF
- **NWSTG**
  - WMO Header service from Wallops or NSOF DADDS
- **LRGS**
  - File sharing service from/with Wallops, EDDN & NSOF DAMS-NT
- **LRIT**
  - GOES 13-15 link, DCS data from NSOF DADDS or Wallops LRGS
- **HRIT**
  - GOES R Series link, DCS data from Wallops or NSOF DADDS



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# NOAA DCS DOMSAT

- Wallops CDAS, VA is Prime and NSOF Suitland, MD is Backup
- Conus Coverage
- Annual cost for Wallops and NSOF backup site  $\approx$  \$15k
  - Funded by the OSPO
- Current Period of Performance: May 16, 2017 to May 15, 2018
- Current Satellite, SES-1
  - Circuit# 8819
  - Located at 101° W
  - Ku Transponder 16K
  - 12033.80 MHz (effective 11 April, 2017)
  - Horizontal Linear Polarization

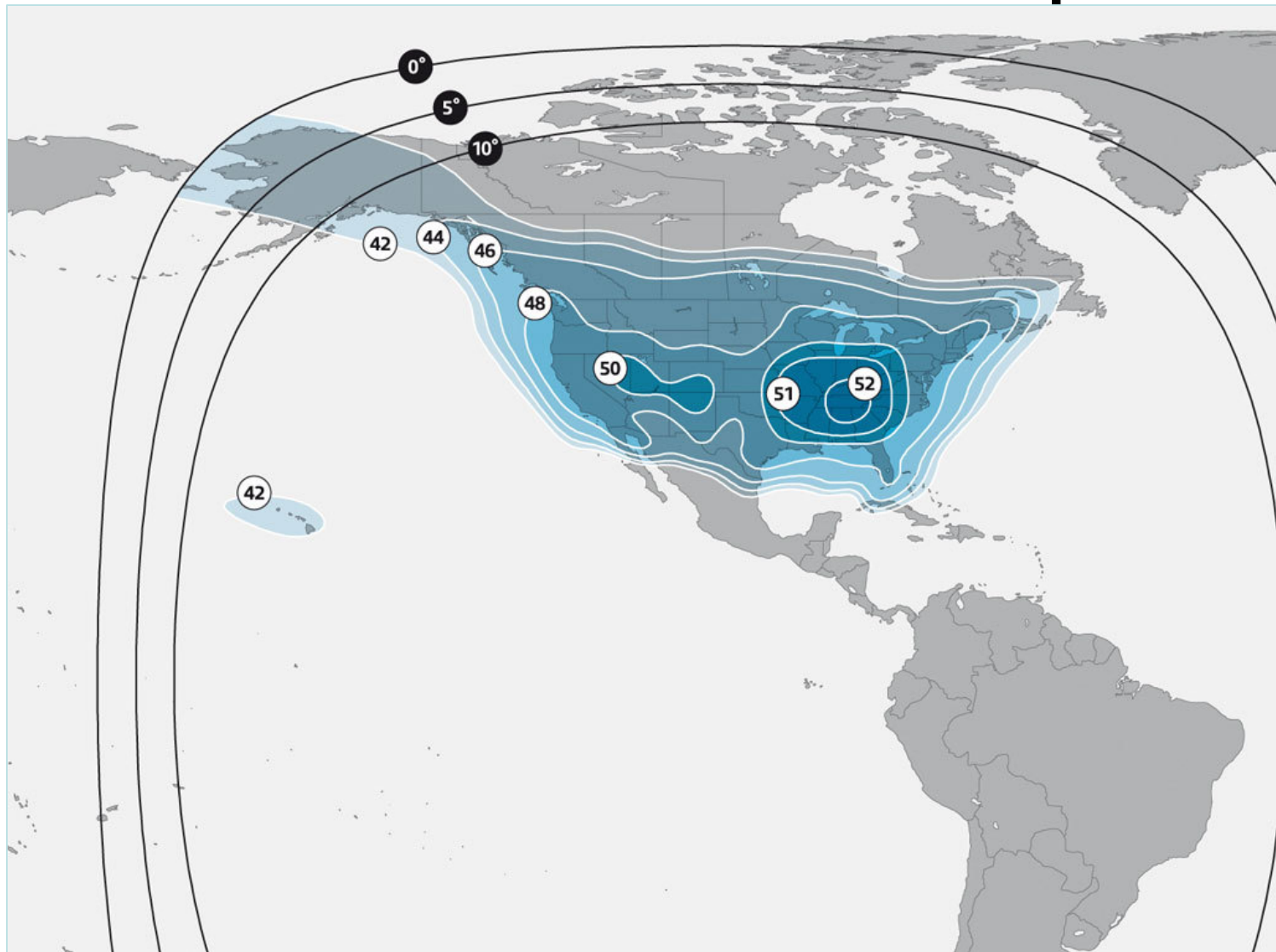


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# SES-1 Ku-Band Footprint



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# DCS National Weather Service Telecommunication Gateway (NWSTG)

- Approximately 86% of the DCS messages processed are embedded with a WMO header and then sent to the NWSTG for distribution
- Wallops and NSOF systems are both providing DCS data to the Gateway. This, in theory, enables the Gateway to select which stream to disseminate, with the default being Wallops is Prime.
- Recent changes to the Gateway have introduced delays in Wallops requests to have them select the desired data stream. NOAA is revisiting the original configuration that enabled Wallops to direct the desired site stream to the Gateway as opposed to requesting that they make configuration changes.
- Data customers using the NWSTG are largely unknown.



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# NOAA LRGS Configuration

- NOAA Wallops CDAS hosts 3 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 CDABACKUP, DDS Backup is EDDN1 then NLRGS1
  - 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 EDDN2, DDS Backup is EDDN 1 then NSOF LRGS 2
  - DROT:
    - LRGS Address ; [cdadrot.wcda.noaa.gov](http://cdadrot.wcda.noaa.gov)
    - DOMSAT receive input from the 1.8m antenna system, useful for DOMSAT troubleshooting
    - No Backup ingests so that DOMSAT data outages can be monitored
- 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 EDDN1, 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 CDABACKUP, DDS Receive Backup is EDDN2



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# NOAA LRGS Support

- The Wallops CDAS monitors and maintains NOAA LRGS Network
- The LRGSs can be monitored through “**LRGS Summary Status**” web page, available through the DADDs web servers 1-4:
  - <https://dcsX.noaa.gov> ► “LRGS Status” ► <https://dcsX.noaa.gov/lrgs/LrgsSummaryStatus.html>
- The Emergency Data Distribution Network’s (EDDN) 3 LRGSs can also be monitored through the **LRGS Summary Status**:
  - <https://eddn.usgs.gov/lrgs/LrgsSummaryStatus.html>
- CDADATA and CDABACKUP LRGSs provide GOES LRIT backup source.



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# LRGS Summary Status



## LRGS Summary Status

UTC: August 30, 2017 12:31:41 (Day 242)

<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>ILEX LRGS Version</i>
<a href="http://cdadata.wvda.noaa.gov">cdadata.wvda.noaa.gov</a>	08/30 12:31:25	OK	DRGS:Active	99.39%	99.39%	18933	76	9.1
<a href="http://cdabackup.wvda.noaa.gov">cdabackup.wvda.noaa.gov</a>	08/30 12:31:12	OK	DRGS:Active	99.4%	99.4%	18798	40	9.1
<a href="http://cdadrcr.wvda.noaa.gov">cdadrcr.wvda.noaa.gov</a>	08/30 12:31:15	OK	DOMSAT:Active	99.53%	99.53%	18725	12	9.1
<a href="http://nlrgs1.noaa.gov">nlrgs1.noaa.gov</a>	08/30 12:28:39	OK	DRGS:Active	99.33%	99.33%	17404	5	9.1
<a href="http://nlrgs2.noaa.gov">nlrgs2.noaa.gov</a>	08/30 12:29:53	OK	DRGS:Active	99.33%	99.33%	18177	5	9.1
<a href="http://lraseddn1.cr.usgs.gov">lraseddn1.cr.usgs.gov</a>	08/30 12:31:19	OK	DDS:Active	99.4%	99.4%	18866	97	9.1
<a href="http://lraseddn2.cr.usgs.gov">lraseddn2.cr.usgs.gov</a>	08/30 12:31:20	OK	DDS:Active	99.4%	99.4%	18922	31	9.1
<a href="http://lraseddn3.cr.usgs.gov">lraseddn3.cr.usgs.gov</a>	08/30 12:31:15	OK	DDS:Active	99.41%	99.41%	18810	72	9.1



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# LRGS Monitor Page

LRGS: **cdadata.wcda.noaa.gov**

UTC: August 30, 2017 12:33:27 (Day 242)

(Time reported by LRGS)

System Status: Running

LRGS Version: 9.1.OpenDCS-6.3w RC12 (May 22, 2017)

## Archive Statistics

Messages In Storage: **25223923**

Oldest Msg Time: **07/30 23:59:56**

Next Idx #: **435464**

## Hourly Data Collection Statistics

Hour:	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13
GOES DRGS (Good/ParErr):	<b>74039 / 396</b>	<b>73749 / 374</b>	<b>73254 / 368</b>	<b>73429 / 440</b>	<b>73624 / 362</b>	<b>73011 / 372</b>	<b>72778 / 400</b>	<b>43020 / 214</b>
DDS Recv (Good/ParErr):	<b>34596 / 227</b>	<b>34437 / 205</b>	<b>34272 / 203</b>	<b>34308 / 244</b>	<b>34426 / 193</b>	<b>34089 / 191</b>	<b>33921 / 230</b>	<b>20254 / 131</b>
Archived (Good/ParErr):	<b>34587 / 217</b>	<b>34473 / 197</b>	<b>34237 / 195</b>	<b>34314 / 239</b>	<b>34417 / 183</b>	<b>34126 / 181</b>	<b>34008 / 220</b>	<b>20203 / 121</b>

## Downlink Statistics

Downlink Name	Last Msg Rcv Time	Last Seq Num	Link Status	Link Params
DRGS:Microcom-DRGS-BE	08/30 12:33:27	27796	Connected	
DRGS:Microcom-DRGS-PE	08/30 12:33:27	27586	Connected	
DRGS:Microcom-DRGS-BW	08/30 12:33:27	20293	Connected	
DRGS:Microcom-DRGS-PW	08/30 12:33:27	20218	Connected	
DDS:EDDN	08/30 12:33:26	-1	Real-Time	Primary
DDS:CDA-BACKUP	08/29 06:06:33	-1	Ready	Primary
DDS:NLGRS1	(none)	-1	Disconnected	Primary

## Client Statistics

Slot	Host Name	User	Msg Count	Last Activity Time	Last Msg Time	Status
0	-	onthyd	3	08/30 12:33:27	08/30 12:27:31	running
1	-	mtwatr	1	08/30 12:33:14	08/30 12:27:49	running
2	-	cened1	0	08/30 12:33:04	08/30 12:29:22	running
3	-	ftsinc1	60	08/30 12:33:26	08/30 12:33:25	running
4	-	onthyd	13747	08/30 12:33:27	08/30 12:33:22	running
5	-	yukoaa	49	08/30 12:33:27	08/30 07:19:11	running



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# **Low Rate Information Transmission (LRIT) & High Rate Information Transmission (HRIT)**

- GOES East & West DCS data is provided by the DADDS for inclusion in the GOES West LRIT broadcast; Wallops LRGSs provide backup data sources.
- GOES East & West DCS data is provided by the DADDS for inclusion in the GOES East HRIT broadcast.
- GOES LRIT & HRIT coverage extends well beyond the CONUS coverage offered by DOMSAT.
- GOES LRIT and HRIT services can be supported by a 1m to 1.2m receive antenna system.

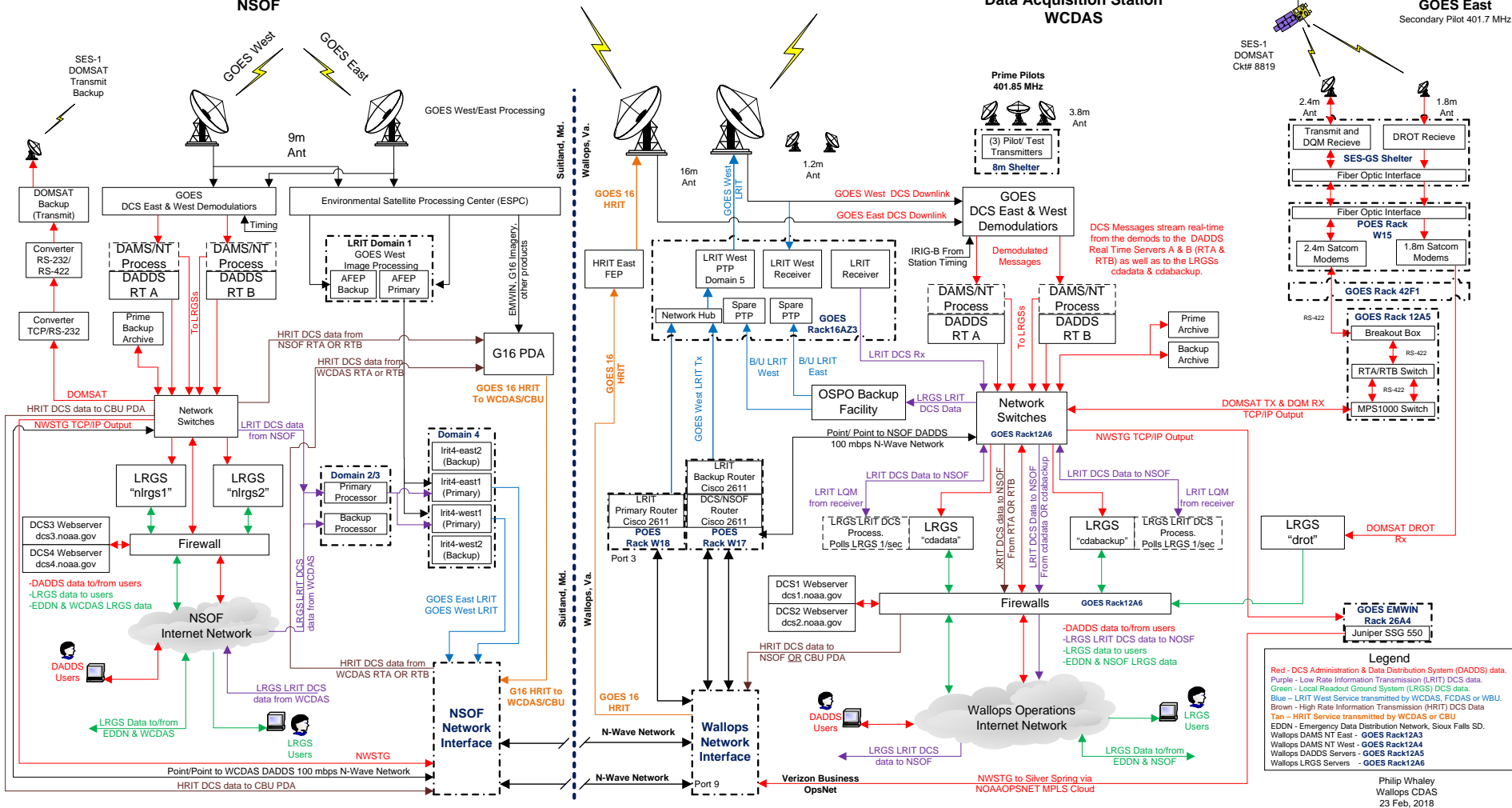
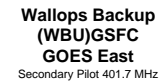


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## NOAA GOES DCS



# DADDs Webserver 1 - 4

>> Operational Notices
06/12/2017 15:58 UTC
>> Help Desk
24/7 Operations
>> System Information
>> Program Information
>> DADDs File Downloads
08/30/2017 11:30 UTC
pdts_compressed.txt
chans_by_baud.txt
>> Wallops Webserver
dc51.noaa.gov
dc52.noaa.gov
>> NSOF Webserver
dc53.noaa.gov
dc54.noaa.gov
>> LRGs Status
>> LRGs Deadlines
Password Implementation:
August 9, 2016
SHA-256 Implementation:
August 17, 2016


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Related Links

>> Satellite Conference 2015

>> DCS 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 DCS1

User Login

Email

Philip.I.Wholes@noaa.gov

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

Submit an Application for GOES DCS SUA

⚠ Notice to Users

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


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.

All information on this computer system may be intercepted, recorded, read, copied, and disclosed by and to authorized personnel for official purposes, including criminal investigations. Access or use of this computer system by any person whether authorized or unauthorized, constitutes consent to these terms.

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

Register for Direct Readout and Services Notifications


Help us keep you up to date with changes and anomalies!



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# DADDS Webserver System Information

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[» Operational Notices](#)  
06/12/2017 15:58 UTC

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[» DCS 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
- [NOAA DCS System \(PDF\)](#) - Aug 2013

### GOES DCS Channels

- [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 \(PDF\)](#) - Feb 2014
- [GOES DCS Certification Standards, Version 2.0/CS2 \(PDF\)](#) - Jun 2009
- [GOES DCS Certification Standards, Version 1.0B/CS1 \(PDF\)](#) - Mar 2000
- [International User Guide & Certification Standards \(PDF\)](#) - Oct 2009
- [GOES DCS Certification Standards, 100BPS-RETIRED- \(PDF\)](#) - Feb 2000
- [NOAA Policy on Use of Certified Transmitters \(PDF\)](#) - May 2011

### Program Information

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

### System Diagrams

- [NOAA DCS System \(PDF\)](#) - Nov 2015
- [GOES DCS Pilot System \(PDF\)](#) - Jan 2016

### LRGS Information

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

### General Information

- [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

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# NOAA Wallops CDAS Support Phone Numbers

- Wallops Help Desk: 757-824-7450 or 757-824-7451
  - 24/7 Technical Support for DCS, LRGS, LRIT, HRIT
- Travis Thornton: 757-824-7304
  - Operations Shift Supervisor and DCS Operations Lead
- Albert McMath: 757-824-7316
  - Wallops CDAS Operations Branch Chief
- Philip Whaley: 757-824-7316
  - Systems Engineering Branch support for GOES Systems
  - NOAA DCPRS Certification Official



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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
- **FCDAS:** Fairbanks Command and Data Acquisition Station, AK
- **WBU:** Wallops Backup, Goddard Space Flight Center, MD
- **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
- **LRIT:** Low Rate Information Transmission, GOES 13, 14 & 15 broadcast
- **HRIT:** High Rate Information Transmission, GOES R Series (G16)
- **NWSTG:** National Weather Service Telecommunications Gateway



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# NOAA Wallops CDA Station



# DCP Test Channels

- GOES East
  - 300bps
    - 195E for CS1 & CS2 (401.99200 MHz)
  - 1200bps
    - A99 for CS1, 497 for CS2 (401.99575 MHz)
      - Incompatible with CS2-needs to move
- GOES West
  - 300bps
    - 196W for CS1 & CS2 (401.99350 MHz)
  - 1200bps
    - A100 for CS1, 499 for CS2 (401.99875 MHz)



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# Abnormal Response Messages (ARM) Or Information Messages (IM)

- 'G' : Good Message - also transmitted with all messages except '?' and 'M'.
- '?' : Parity Error(s).
- 'A' : Correctable address
- 'N' : PDT Incomplete
- 'T' : Overlapping time error. A message was outside of, but overlapping its window.
- 'U' : Non-overlapping time error. Message completely out of its defined window.
- 'W' : Wrong channel
- 'M' : A self-timed message was not received at all, received on wrong channel, not completely inside a window or an overlapping window.
- 'B' : Non-correctable : Available on the DADDs Website message data. Messages with bad addresses are not disseminated.
- 'I' : Invalid address. Available on the DADDs Website message data. Messages invalid addresses are not disseminated.



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# DCS Message Statistics

**11083215414G48+2NN167EFF**

- **YYDDDDHHMMSS Time: YYDDDDHHMMSS (Frame Sync)**
- **T Type: G = Good ? = Parity Errors (ARM)**
- **SS Signal Strength: dBm EIRP (assumes 47 dBm Pilot)**
  - 25 to 56 dBm nominal demod reception thresholds
- **±X Frequency: Sign & Digit (±F times 50 Hz)**
- **M Modulation Index (Phase): Normal, High, Low**
- **D Data Quality (Phase): Normal, Fair, Poor**



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