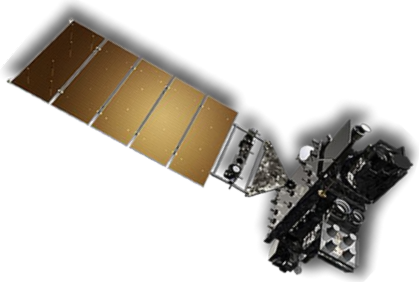
NOAA Wallops CDA Station
GOES Data Collection System

NOAA Satellite and Information Service
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-17: Prime West S/C @ 137.2° W Longitude
  - Replaced G15 15 Nov, 2018
- GOES-14: Storage @ 105° W Longitude
- GOES-13: Currently supporting GOES IO project
  - Will be renamed DOD-1 following acceptance by USAF
- GOES-15: Storage @ 128° W Longitude

GOES 17



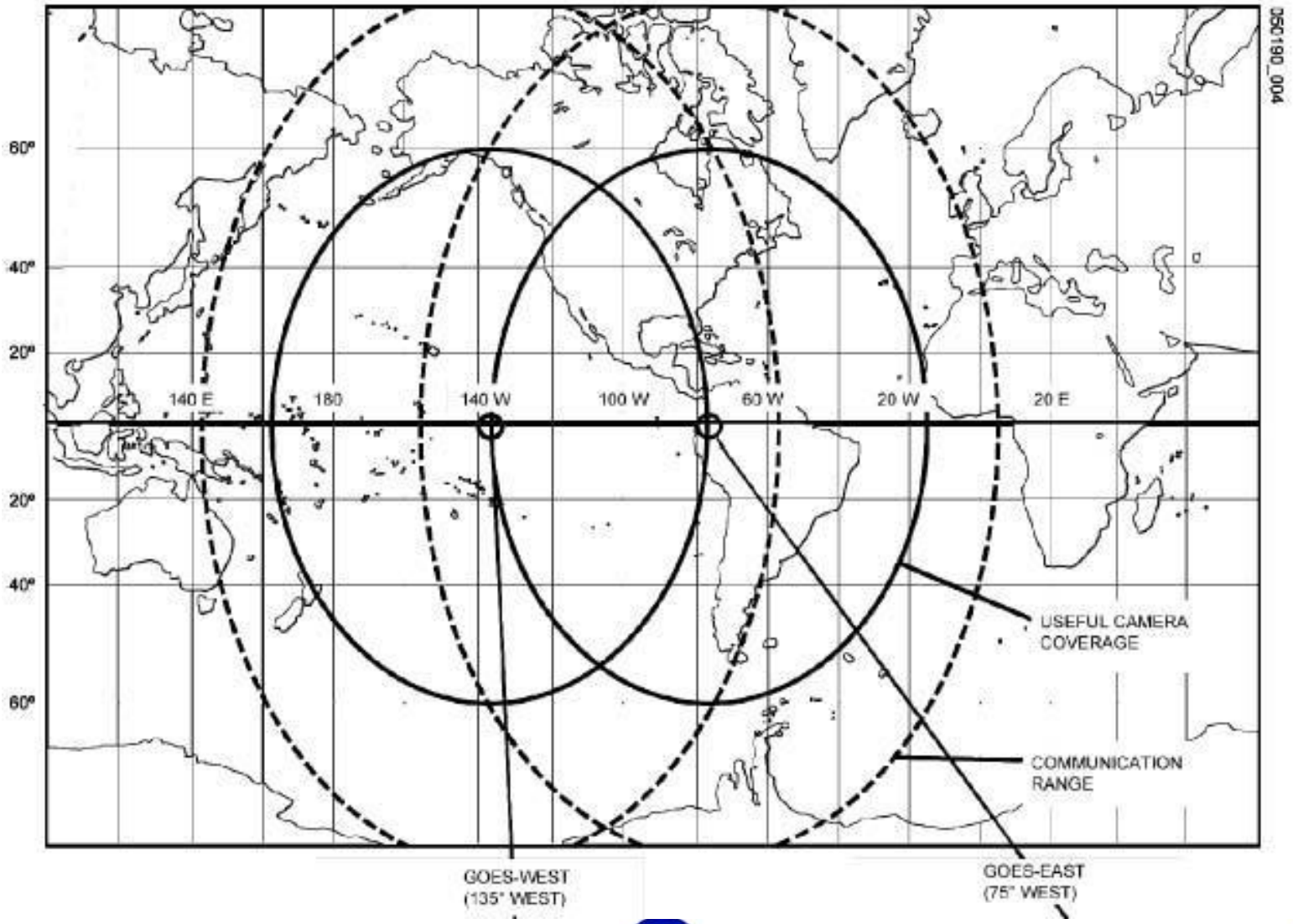
- NOAA's newest geostationary satellite series replaced GOES 15 at 137.2° West,15 Nov, 2018.

- **Reminder:** The GOES R satellite series frequency plan is different from the plan used by the GOES 13, 14 and 15 satellites. GOES DRGSs used to support the older GOES series satellites used DCS downlink in the frequency range of 1694.30 to 1694.70 MHz. The GOES R series satellites uses 1679.70 to 1680.10 MHz to support the DCS downlink.

- Note that the GOES 16 or 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**

GOES Footprints



NOAA Satellite and Information Service

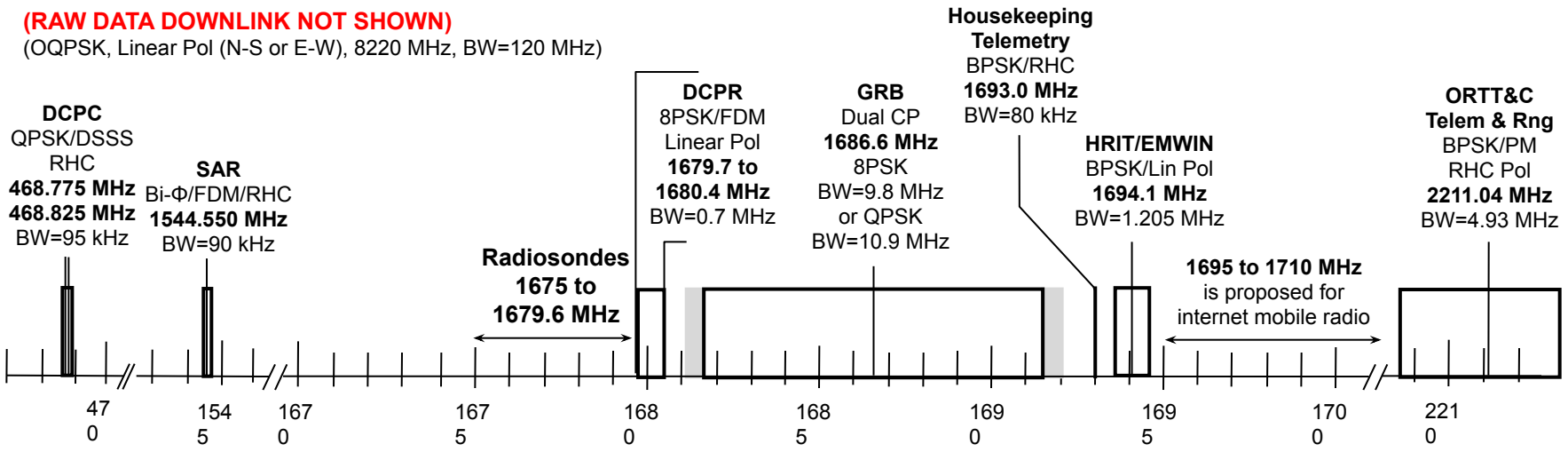
National Environmental Satellite, Data, and Information Service (NESDIS)

GOES R Frequency Plan

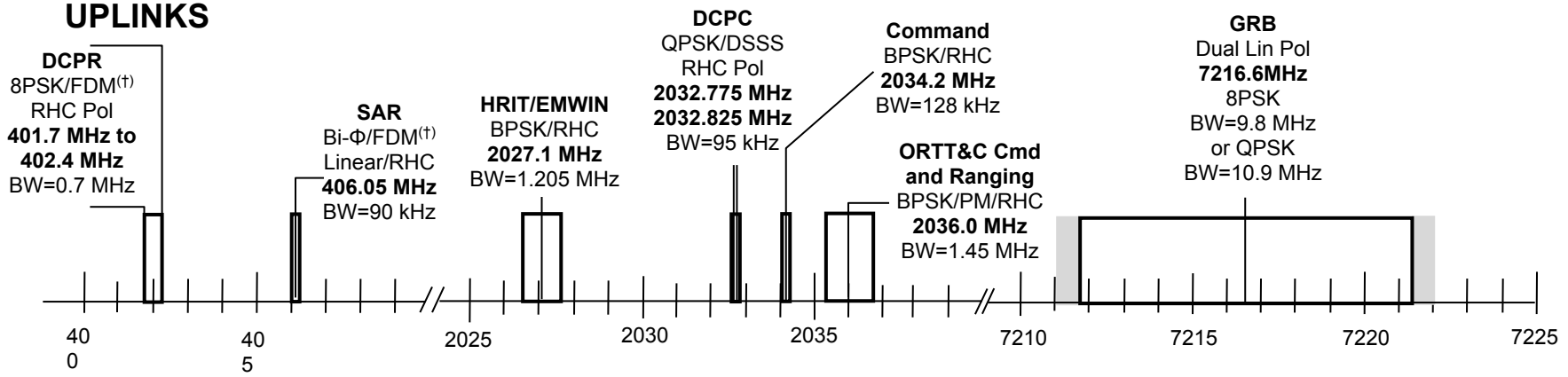
DOWNLINKS

(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

noblis

Wallops CDAS Backup Sites

- GOES Consolidated Backup (CBU)
  - Located in the I-79 Technology Park in Fairmont, WV
  - Provides full mission backup capability for GOES 13-17 **with the exception of a DCS receive ground system.**
  - Provides the Backup DCS Pilot at 401.7 MHz

- 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 2020 / early 2021 timeframe.

NOAA Command and Data Acquisition Station, Wallops VA

NOAA Satellite Operations Facility, Suitland Md

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

NOAA Consolidated Backup, Fairmont WV

NOAA GOES DCS Data Services

NOAA's Office of Satellite 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:

- **National Weather Service Telecommunication Gateway (NWSTG)**
  - WMO Header service from Wallops or NSOF DADDS
- **Local Readout Ground Station (LRGS)**
  - File sharing service from/with Wallops, EDDN & NSOF DAMS-NT
- **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 filter and export functionality

DCS National Weather Service Telecommunication Gateway (NWSTG)

- DCS messages processed are embedded with a WMO header and then sent to the NWSTG for distribution.
- WCDAS 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.
- Wallops DCS Operators are able to determine which site (WCDAS or NSOF) is actively providing message data based on operational needs.
- Data customers using the NWSTG are largely unknown.

NOAA LRGS Configuration

- NOAA Wallops CDAS hosts 2 LRGS,
  - 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

- NOAA Suitland NSOF hosts 2 LRGS,
  - 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

NOAA LRGS Support

- WCDAS Operations monitors and maintains NOAA LRGS Network
- The LRGSs can be monitored through "**LRGS Summary Status"** web page, available through the DADDS webservers 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
  - The EDDN LRGS servers are located at the USGS Earth Resources Observation and Science (EROS) facility located in Sioux Falls, SD.
  - https://eddn.usgs.gov/index.html

LRGS Summary Status

LRGS Summary Status

UTC: April 28, 2020 12:35:20 (Day 119)

Host Name	*Status Time*	*LRGS Status*	*Primary Downlink Status*	*Primary Quality Last Hour*	*Aggregate Quality Last Hour*	*Msgs This Hour*	*Num DDS Clients*	*Cove LRGS Version*
cdadata.wcda.noaa.gov	04/28 12:35:13	OK	DRGS:Active	99.58%	99.58%	22453	81	9.4
cdabackup.wcda.noaa.gov	04/28 12:35:02	OK	DRGS:Active	99.61%	99.61%	23995	51	9.4
nlrgs1.noaa.gov	04/28 12:35:16	OK	DRGS:Active	99.61%	99.61%	24142	16	9.4
nlrgs2.noaa.gov	04/28 12:35:16	OK	DRGS:Active	99.61%	99.61%	24141	14	9.4
lrgseddn1.cr.usgs.gov	04/28 12:34:51	OK	DDS:Active	99.58%	99.58%	22252	73	9.1
lrgseddn2.cr.usgs.gov	04/28 12:35:11	OK	DDS:Active	99.62%	99.62%	24105	35	9.2
lrgseddn3.cr.usgs.gov	04/28 12:35:11	OK	DDS:Active	99.58%	99.58%	22453	23	9.1

LRGS Monitor Page

LRGS: cdadata.wcda.noaa.gov

UTC: April 28, 2020 12:39:36 (Day 119)
(Time reported by LRGS)
System Status: Running
LRGS Version: 9.4.OpenDCS-6.7w RC02 (Mar 11, 2020)

Archive Statistics

Messages In Storage: 77869207 | Oldest Msg Time: 01/30 00:00:01 | Next Idx #: 461275

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):	36099 / 141	36121 / 139	36087 / 142	36074 / 128	36039 / 144	36100 / 146	35994 / 138	25158 / 97
DDS Recv (Good/ParErr):	36130 / 189	36148 / 171	36121 / 189	36098 / 158	36072 / 185	36121 / 179	36018 / 181	25175 / 118
DDS Recv:Secondary (Good/ParErr):	36052 / 178	36236 / 166	36128 / 184	36092 / 152	36059 / 181	36110 / 173	35912 / 172	25278 / 119
Archived (Good/ParErr):	36123 / 178	36154 / 163	36121 / 179	36094 / 149	36070 / 176	36130 / 169	36021 / 162	25178 / 112

Downlink Statistics

Downlink Name	Last Msg Rcv Time	Last Seq Num	Link Status	Link Params
DRGS:Microcom-DRGS-BE	04/19 13:17:08	1246	Connected	
DDS:NLRGS1	04/28 12:39:35	-1	Real-Time	Primary
DRGS:Microcom-DRGS-PE	04/28 12:39:36	66534	Connected	
DRGS:Microcom-DRGS-BW	04/22 15:23:07	63673	Connected	
DRGS:Microcom-DRGS-PW	04/28 12:39:36	37394	Connected	
DDS:EDDN1	04/28 12:39:35	-1	Real-Time	Secondary

Client Statistics

Slot	Host Name	User	Msg Count	Last Activity Time	Last Msg Time	Status
0	-	onthyd	22813	04/28 12:39:35	04/28 12:37:41	running
1	-	sutron	51281	04/28 12:38:40	04/28 12:39:12	running

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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 coverage extends well beyond the CONUS coverage offered by DOMSAT.
- 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://www.goes-r.gov/users/hrit.html

DADDS Webservers https://dcs1.noaa.gov/

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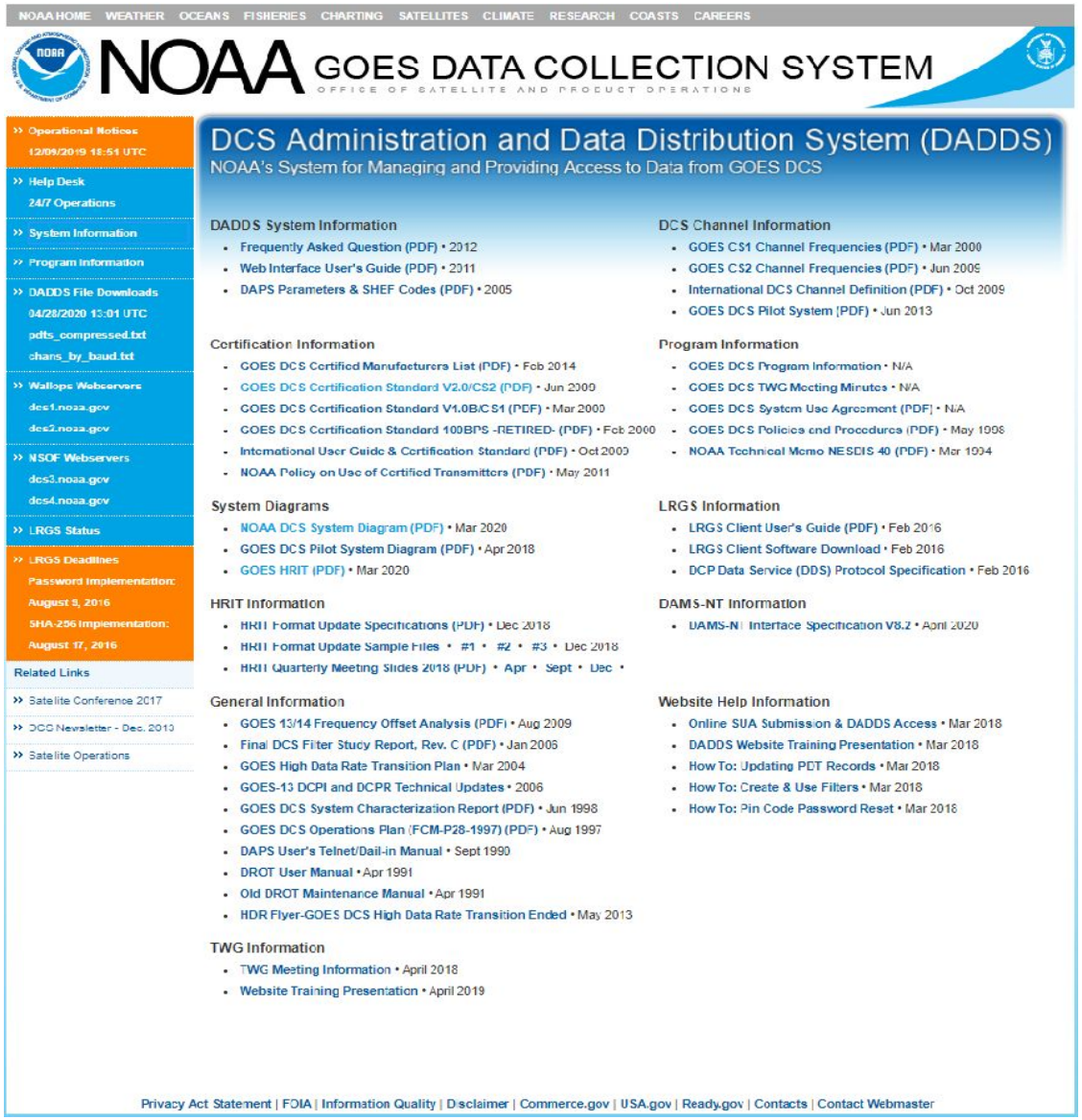
DADDS Webservers System Information



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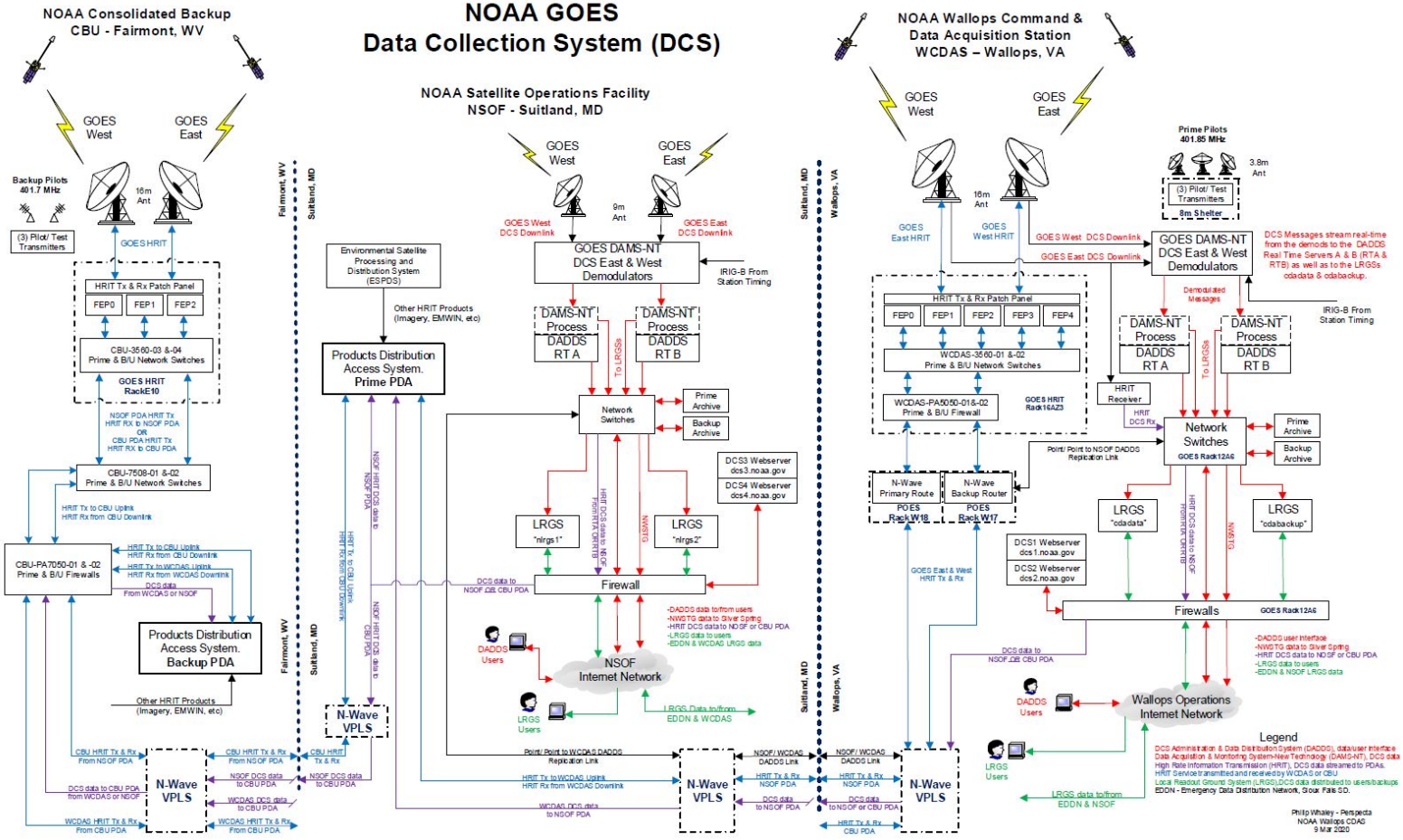
NOAA DCS System Diagram



NOAA Satellite and Information Service

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

NOAA Wallops CDAS
DCS Support Contacts

- Wallops Help Desk: 757-824-7450, wdcs@noaa.gov
  - 24/7 Technical Support for DCS, LRGS, DADDS, HRIT

- Travis Thornton: 757-824-7316, joseph.t.thornton@noaa.gov
  - WCDAS Operations Shift Supervisor
  - 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
- **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

DCP Test Channels

- GOES East
  - 300 bps
    - 195 for CS1 & CS2 (401.992000 MHz)
  - 1200 bps
    - 99A/197 for CS1 (401.995000 MHz)
    - 198 for CS2 (401.996500 MHz)

- GOES West
  - 300 bps
    - 196 for CS1 & CS2 (401.99350 MHz)
  - 1200 bps
    - 99A/197 for CS1 (401.995000 MHz)
    - 198 for CS2 (401.996500 MHz

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.

NETLISTS & FILTERS | DEFAULT FILTER

NETLISTS | FILTER | CLEAR | EXPORT | 100

	ADDRESS	GROUP	CHAN	BAUD	SIGNAL	NOISE	QUALITY	FREQ	CAR TIME	END TIME	TIME	ARM	SCID	TYPE	LEN	MESSAGE DATA
▸	45D657D6	WSCCAL	221	300	42.7	3.0	99.8	5.9	19/266 19:18:52.900	19/266 19:18:57.790	4.892	G	16	CS2	154	:HG 3 #5 936.644 936.646 936.654 936.650 936.638...
▸	3370B29A	NOANOS	209	300	44.3	1.9	100.0	-4.6	19/266 19:18:54.273	19/266 19:18:57.597	3.321	G	16	CS1	95	"P87707771AOO~]@@L0FLS1AK[@DAEEEG>AKO3@BBM@Z4DT5DV...
▸	3D299066	INAMEH	39	300	48.4	1.8	100.0	0.1	19/266 19:18:52.280	19/266 19:18:57.587	5.309	G	16	CS1	170	BB1C@CB@CB@CB@CB@CB@CB@CB@CB@CB@CB@CB@TZ@R\APWA...
▸	336496D2	NOANOS	159	300	43.2	1.8	100.0	1.8	19/266 19:18:54.293	19/266 19:18:57.487	3.196	G	16	CS2	89	"P90870961KYI@@@@L0FLSI@GN@G@ @GI3@ZEKAR4BK5B?6`|=...
▸	33406282	NOANOS	65	300	42.6	2.6	100.0	-0.5	19/266 19:18:54.287	19/266 19:18:57.483	3.198	G	16	CS1	91	"P84657051B\P@F@@L0FLS8AVL@P@#AVV3@DCD@G4CW5CB6`B<...
▸	15B5B528	MEXGAS	169	300	46.7	1.8	100.0	-1.5	19/266 19:18:48.127	19/266 19:18:57.407	9.283	G	16	CS1	319	2 18:20:00 65,47,9.0,16.0,31.2,40,880.9,0.00,#2...
▸	E14116F4	SARA14	37	300	37.0	3.5	98.8	5.0	19/266 19:18:53.870	19/266 19:18:57.387	3.515	G	16	CS2	101	BBST@PJM{N@LQ@PJ@OQM|T@LO@PG@OZM}E@LM@P\@N\M}V@LJ@...
▸	CAC12AFA	ONFIRE	91	300	36.5	5.0	89.4	25.1	19/266 19:18:53.253	19/266 19:18:57.363	4.112	G	16	CS1	125	" 013.5 088 010.6 018.1 029 000.00 //...
▾	CAC12AFA	ONFIRE	91	300	36.5	5.0	89.4	25.1	19/266 19:18:53.253	19/266 19:18:57.363	4.112	U	16	CS1	427	DADDS: PLATFORM [CAC12AFA] OWNER [ONFIRE] LOCATI...
	DADDS: PLATFORM [CAC12AFA] OWNER [ONFIRE] LOCATION [REPLCHAN37] DECLARED [19/266 19:19:02] PDT FIRST [00:18:00] PERIOD [01:00:00] WINDOW [00:10] PDT [19/266 19:18:00.000] TO [19/266 19:18:10.000] WIN [00:10.000] PRI CHAN [91-S] MSG [19/266 19:18:53.252] TO [19/266 19:18:57.364] LEN [00:04.112] REC CHAN [91] LATE BY [00:00:47.364] UNEXPECTED MESSAGE COMPLETELY OUTSIDE OF PDT WINDOW (LATE): NEAREST PDT SHOWN															
▸	47A3D0EA	QUEHYD	67	300	46.2	2.1	100.0	-0.5	19/266 19:18:48.367	19/266 19:18:57.193	8.828	G	16	CS1	302	"+13.6 +11.0 -13.4 0,19266,191700,294.999,294.997...
▸	CE711820	CESWL1	162	300	41.2	2.5	99.8	0.6	19/266 19:18:49.200	19/266 19:18:57.163	7.964	G	17	CS2	268	285.50 265.51 -99 17452 24.65 -0.03 -99.9 0...
▸	DD5B76CA	USGS01	164	300	39.4	2.8	100.0	-3.3	19/266 19:18:54.193	19/266 19:18:57.077	2.883	G	17	CS2	77	`BST@AI@LP@AU@K?@AU@KL@AZ@K[@AW@KF@AN@JY@AZ@JI@AP@...
▸	CE61748A	CELRP1	177	300	36.9	3.0	99.8	-0.8	19/266 19:18:50.277	19/266 19:18:57.010	6.733	G	16	CS2	221	BB1C@DY@DY@DY@DY@DY@DY@DY@DY@DY@DY@DY@DY@DY@...
▸	BA12C816	REMABR	21	300	40.2	2.1	99.8	-1.4	19/266 19:18:52.313	19/266 19:18:57.010	4.698	G	16	CS2	145	A916 2019-09-23 19 14.4 41 35.9 37.7 35.4 34 ...
▸	3541E3A0	HIGUOH	216	300	43.6	1.3	100.0	-0.2	19/266 19:18:50.297	19/266 19:18:56.857	6.559	G	17	CS2	215	":PRS 1 #1 4400 4412 4430 4398 4465 4588 4419 4668...
▸	56B06B00	CHLDOH	47	300	42.0	2.0	100.0	6.8	19/266 19:18:53.060	19/266 19:18:56.847	3.787	G	16	CS2	113	013.6 006.3 236.5 006.1 072.6 -00.3 014.2 000.0...
▸	15C46416	MEXNMS	141	300	49.3	1.8	100.0	22.3	19/266 19:18:47.360	19/266 19:18:56.760	9.400	G	16	CS1	323	2 18:20:00 56,64,9.0,15.7,34.2,45,959.2,0.00,96...
▸	CE772D74	CELRL1	25	300	38.8	2.8	99.8	0.4	19/266 19:18:53.290	19/266 19:18:56.757	3.467	G	16	CS1	101	BB1C@NP@NQ@NQ@NQ@NR@NR@NR@NS@NS@NS@NS@NS@NT@NT@NT@...
▸	16FDD552	USGS01	29	300	36.6	3.5	98.3	2.3	19/266 19:18:54.500	19/266 19:18:56.737	2.239	G	16	CS2	53	`BCT@ER@ER@ET@ES@ET@EV@EU@EV@CZ@CZ@CZ@CZ@CZ@CZ@...
▸	2442017A	TENNVA	79	300	41.1	3.1	99.5	-2.7	19/266 19:18:53.280	19/266 19:18:56.727	3.448	G	16	CS1	100	":PC 3 #15 1.38 1.38 1.38 1.38 1.38 1.38 1.38 1.38...

Thank you for your attention

Questions?