



University of Wisconsin SSEC

Datacenter

Satellite Data Services

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Satellite Data Services Program Manager



WISCONSIN
UNIVERSITY OF WISCONSIN-MADISON

McIDAS User's Group Meeting May 22-24, 2018



SSEC Satellite Data Services Update



- SDS Status
- SDS Projects



SSEC SDS



Staffed M-F , 7:30 AM - 11:00 pm Central time.

- 2 FTE ~100% time
 - Computer Operator (1st shift)
 - Computer Operator (1st shift)
- 5 FTE ~portions of their time
 - Program Manager
 - System Programmer
 - DataBase/Web Programmer
 - Research Specialist (PM assistant)
 - Antenna/Communication technician
- 4 Student QC assistants/programmers (2nd shift)



SSEC SDS



Staffed M-F , 7:30 AM - 11:00 pm Central time.

- Ops, QC, Programing
 - Rosie Spangler, Douglas Ratcliff
- QC, Ops, Inventory/Archive, Contracts
 - Nancy Troxel-Hoehn
- Programmer, UI, DataBase
 - Clayton Suplinski
- Programing, Product Generation, AMQP
 - Rick Kohrs
- System Programing, Ingestors
 - Dan Forrest
- Antennas
 - Istvan Bocsi



Data Center Facilities

- Over 2100 ft.
- The Data Center's disk storage exceeds 12-18 PBs.
- The entire room is on four 72 KW UPSs, of which, about 200+ KW are in use. Non UPS power usage is ~17 KW. An additional 72 KW UPS for a smaller 5th floor computer room
- Cooling provided by campus chilled water and outside air in the winter. Racks are cooled by 16 in row APC coolers.
- Gigabit and 10 Gigabit network (also 100 MB admin network, 40 Gigabit InfiniBand).



Antennas @ SSEC

- C-Band

- 11 meter heated (87° West - SES-2, POES Wallops Relay, MSG)
- 6.3 meter heated (101° West - SES-1, POES Fairbanks Relay)
- 4.5 meter (101° West - SES-1, Noaaport)
- 3.7 meter GEONETcast (58° West INTELSAT 21)

- L-Band

- 7.3 meter (75° West -GOES-East Primary/GOES-16)
- 7.3 meter (89.5° West -GOES-West Primary/GOES-17)
- 4.6 meter (135° West -GOES-West Primary)
- 4.5 meter (135° West -GOES-East auto tracking)

- X-Band

- 4.4 meter (Tracking - EOS)

- X/L Band

- 2.4 meter (Tracking - Suomi NPP, EOS, Metop A&B, NOAA-18, 19 and FY3)



UW SSEC SDS

Antennas Remotely Managed

- X/L Band

- Honolulu Community College
- Atlantic Oceanographic & Met Lab , Miami, FL
- University of Puerto Rico
- Guam

All are 2.4 m used for Tracking – Aqua, Terra, Suomi NPP, EOS, Metop A&B, NOAA-18, 19, NOAA-20 and FY3

- Supports

- NOAA NWS NCEP
- Eumetcast
- GTS



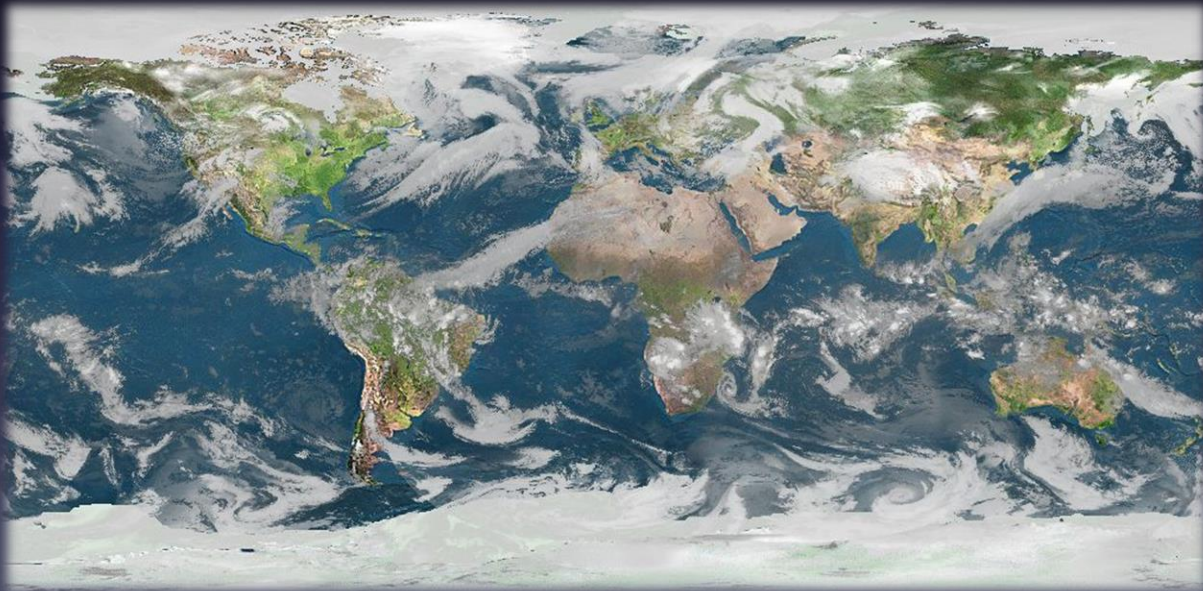
Data Distribution

- Realtime
 - McIDAS ADDE (Abstract Data Distribution Environment)
 - ftp
 - http
 - Ldm
 - Direct access via mount
 - WMS (Web map service)
- Archive
 - ADDE
 - Direct Access (in-house only)
 - WMS (experimental)
 - McFETCH
 - THREDDS



Real-time Data

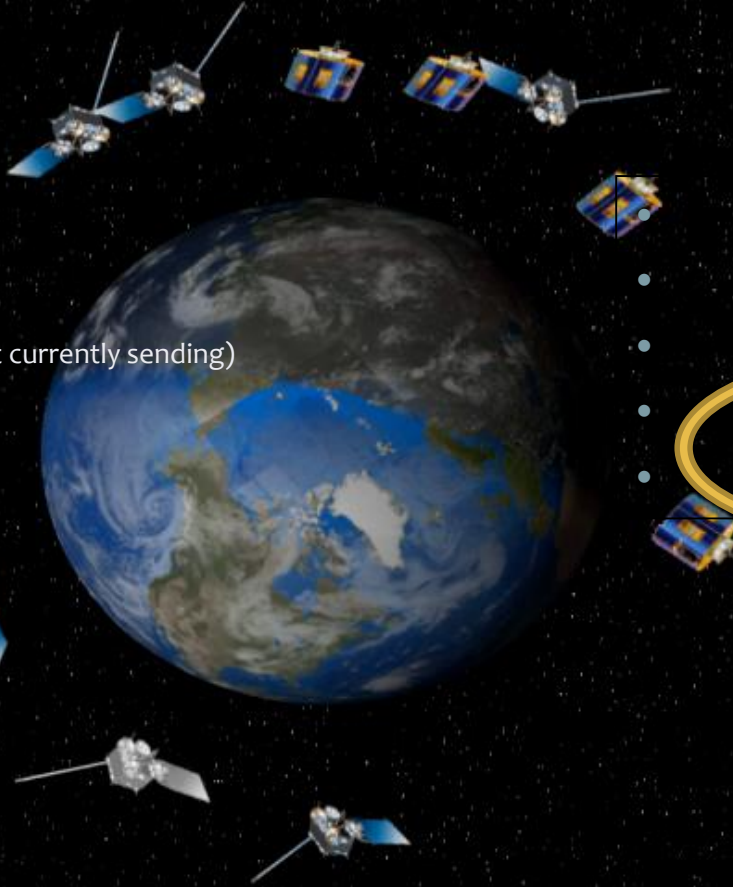
The SSEC Data Center receives data from 9-12 different geostationary satellites and 12 different polar orbiting satellites. Most data are available in near real-time via ADDE. Other methods of data access are available upon request.



Geostationary Satellites received

- GOES-16 -East (75.2° W)
- GOES-15 -west(135° W)
- GOES-14 -Test (105° W) (not currently sending)
- GOES-17 -Test (89.5° W)
- Meteosat-11 (0° E)
- Meteosat-8 (near 41.5° E)
- COMS (128° E)

- FY-2E (86° E)
- FY-2G (105° E)
- Himawari-8 (140° E)
- Kalpana(74° E)
- INSAT-3D(83° E)



Geostationary Satellites Received at UW SSEC in 2016



	Sub-Point	Reception Method	Source	Latency	Daily Volume
GOES-16	75.2° West	L-Band	DB	<10 seconds	130-400 GB
GOES-14	105° West	L-Band	DB	<2 minutes	23 GB
GOES-15	135° West	L-Band	DB	<2 minutes	23 GB
GOES-17	89.5° West	L-Band	DB	<10 seconds via DB	130-400 GB
Meteosat-11	0° East	C-Band Relay	DB Relay	<15 minutes	24 GB
Meteosat-8	41.5° East	Network Relay	NOAA STAR	~30 minutes	24 GB
Himawari-8	140° East	Network Relay	NOAA STAR	~ 10 minutes	300 GB
Himawari-8	140° East	Himawari Cast Network Relay	Hawaii NWS	~ 10 minutes	62 GB
Kalpana	74° East	Network Relay	ISRO	45-120 minutes	1.4 GB
Insat-3D	83° East	Network Relay	ISRO	45-180 min	19 GB
FY2E	86° East	Network Relay	ABOM	15-30 minutes	4.7 GB
FY2G	105° East	Network Relay	ABOM	15-30 minutes	4.7 GB
COMS	128° East	Network Relay	KMA	9-24 minutes	11 GB



Polar Satellites received

- NOAA-15

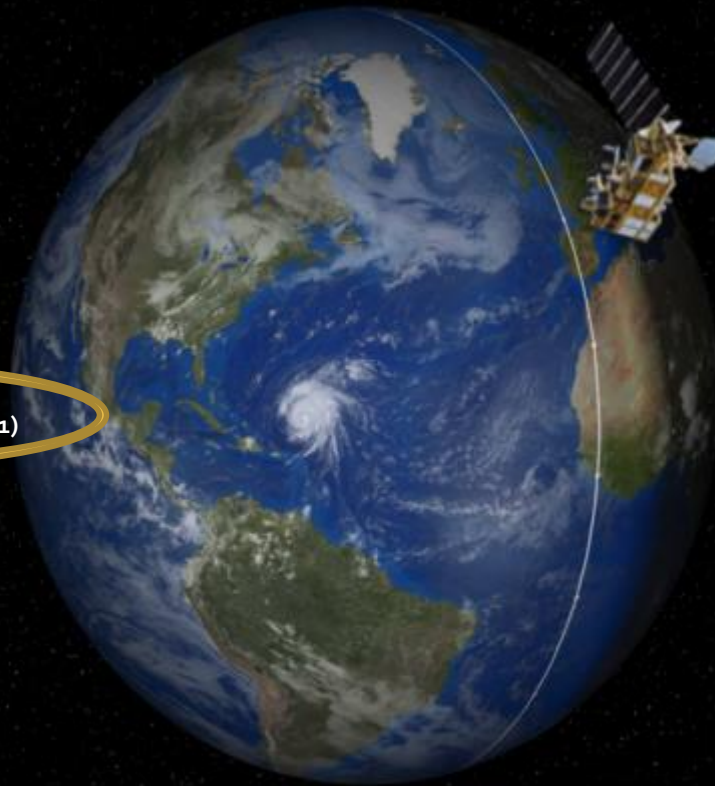
- NOAA-18

- NOAA-19

- NOAA-20 (JPSS-1)

- METOP-A

- METOP-B



- Aqua

- Terra

- Suomi-NPP

- Landsat-8 (RE only)

- FY-3B

- FY-3C

- GCOM-W1



Polar Satellites Received at UW SSEC in 2018

	Reception Method	Domain	ADDE Latency	Instruments	Access
NOAA-15	C-Band relay, NOAA-STAR	DB CONUS Global	DB <1 minutes after pass	AVHRR, AMSU, DCS->level-1	ADDE
				All other instruments Level-0	NA
NOAA-18	DB L-Band, C-Band relay, NOAA STAR	DB CONUS Global	DB <1 minutes after pass	AVHRR->level-1	ADDE
				All other instruments Level-0	NA
NOAA-19	DB L-Band, C-Band relay, NOAA STAR	DB CONUS Global	DB <1 minutes after pass	AVHRR->level-1	ADDE
				All other instruments Level-0	NA
NOAA-20	DB XL-Band, NOAA STAR, CLASS	DB CONUS Global	DB <1 minutes after pass	VIIRS>level-1	ADDE
				VIIRS,ATMS, CrIS	DB ftp (sips)
Metop-A	DB L-Band, NOAA STAR Relay	DB CONUS Global	CONUS <15 minutes after pass	AVHRR ->level-1	ADDE
				AVHRR, IASI	DB ftp (sips)
Metop-B	DB L-Band, NOAA STAR Relay	DB CONUS Global	CONUS <15 minutes after pass	AVHRR ->level-1	ADDE
				AVHRR,IASI	DB ftp (sips)
Suomi-NPP	DB X/L Band, NOAA STAR, CLASS	DB CONUS Global	CONUS <15 minutes after pass	VIIRS	ADDE
				VIIRS,ATMS, CrIS	DB ftp (sips)
Aqua	DB X-Band, NASA Relay	DB CONUS Global	DB <15 minutes after pass	AIRS, MODIS -> Level-1	ADDE
				AIRS, MODIS	DB ftp (sips)
Terra	DB X-Band, NASA Relay	DB CONUS Global	DB <15 minutes after pass	MODIS -> Level-1	ADDE
				MODIS	DB ftp (sips)
Landsat-8	Network Relay (USGS)	CONUS	<24 hours	Level-1	ADDE , WMS
Shizuku GCOM-W1	DB X-Band	CONUS	DB <1 min after pass	Level-0	SSEC ftp
FY-3B/C	DB X/L Band	CONUS	DB <1 min after pass	Level-0	SSEC ftp

Non-Satellite data

- NOAAport
 - Text/Point
 - Model Grids
 - Radar



Archive Data

As of May 2018, over 1,400 TBs online.

Grows approximately about ~350+ TB/year

US Geostationary Satellites

- GOES-8 through GOES-17 (**1994-Present**) (East, West , South America and test)
- GOES-1 through GOES-7 (**1978-1996**)
- SMS-1&2 (1978-1981)



Archive Data

International Geostationary Satellites

- *GMS/MTSAT (1998-2015)*
- *Meteosat/Meteosat IODC (1998-Present)*
- *Meteosat-1 FGGE (1978-1979)*
- *FY2 (2004-Present)*
- *Kalpana (2005-2017)*
- *Insat-3D (June 2014-2017)*
- *COMS (June 2012 – Present)*
- *Himawari-8 (March 2015 – Present)*



Archive Data



NOAAPORT/Conventional Data

- Model Output *(1996-Present)**
- In situ Point Observations *(1976-Present)*



Other SDS Projects



McFETCH Satellite Data Server

Dave Parker, Dave Santek, Bill Bellon, Clayton
Suplinski, Rick Kohrs, Jerry Robaidek



McFETCH Satellite Data Server

Multi-format client-agnostic File Extraction
Through Contextual HTTP

- Allows access to ADDE archive servers
- Heavily dependent on McIDAS-X
- Outputs all formats McIDAS-X can plus others



McFETCH Satellite Data Server

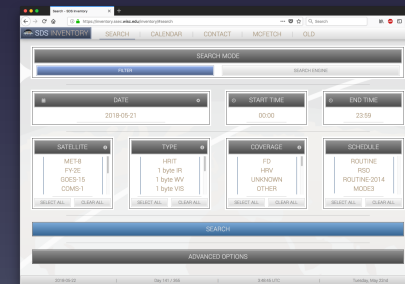
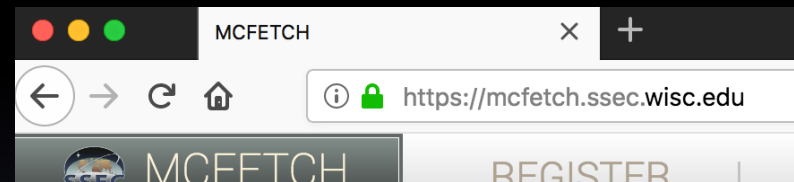
- Output formats:

AREA	Flat Binary
NetCDF	Gif
Geotiff	JPEG
Flat text	PNG



McFETCH Satellite Data Server

- Access via HTTPS
- Any client that can request a URL, can access, subset, and remap satellite data from an ADDE server
- Integrated with inventory

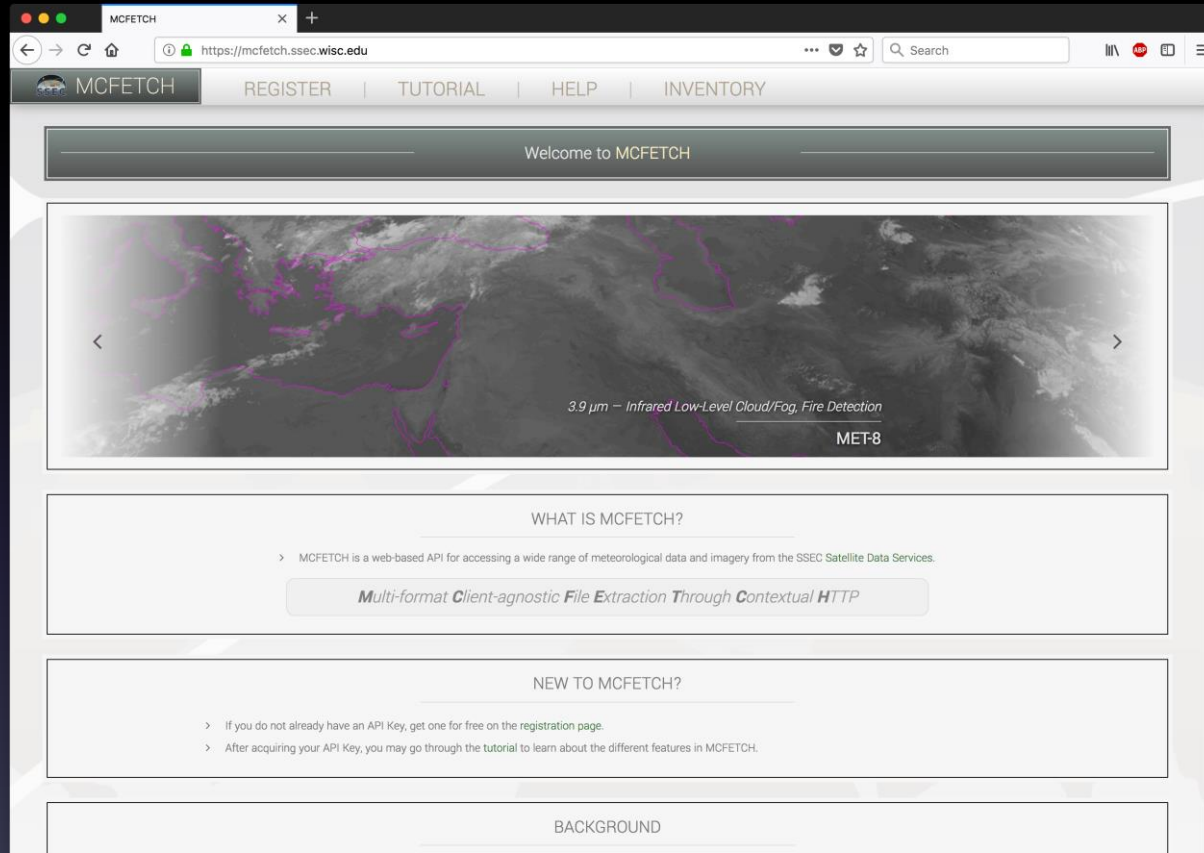


McFETCH Satellite Data Server

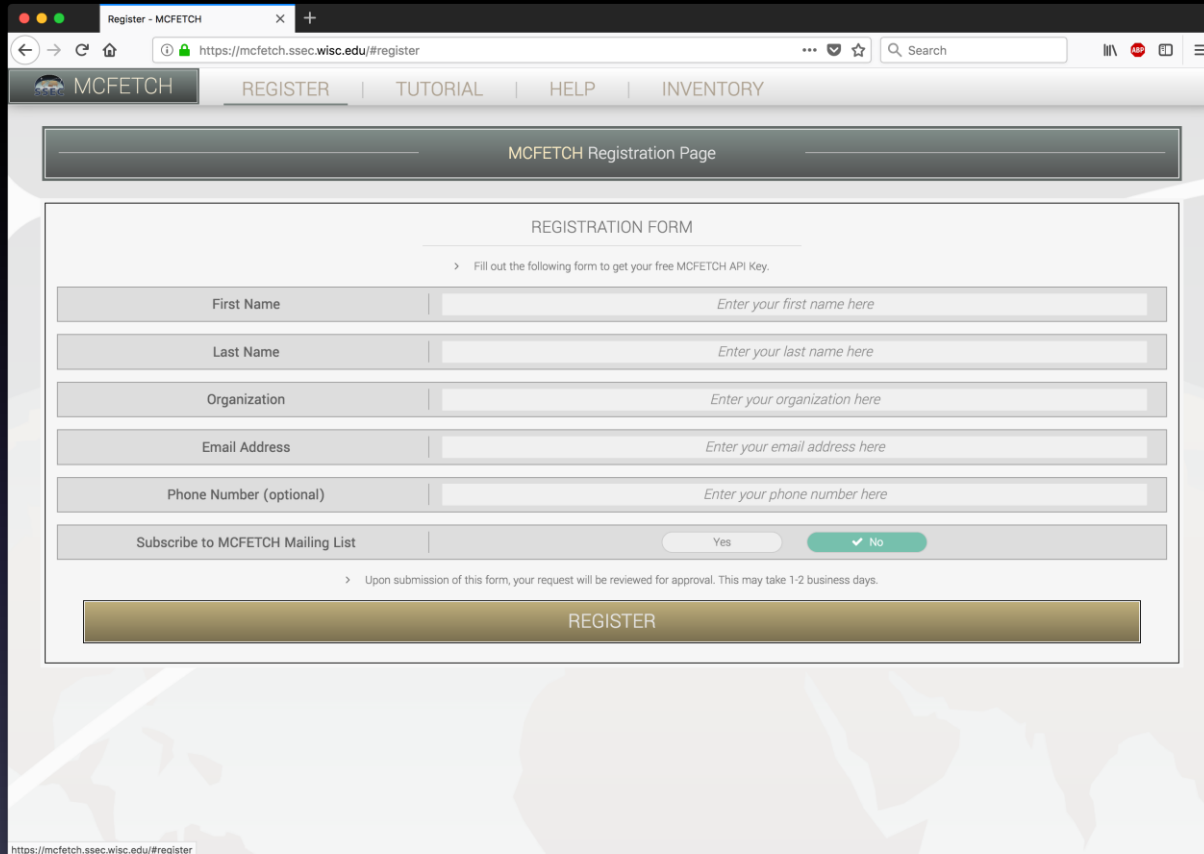
- Must register for a unique data key
- 1 GB daily limit
- 1000 transaction per day daily limit
- Data must be 180 days or older (30 Days or older for Unidata Community)



McFETCH Satellite Data Server



McFETCH Satellite Data Server



The screenshot shows a web browser window with the title "Register - MCFETCH". The address bar displays "https://mcfetch.ssec.wisc.edu/#register". The navigation bar includes "MCFETCH" and links for "REGISTER", "TUTORIAL", "HELP", and "INVENTORY". The main content area is titled "MCFETCH Registration Page" and contains a "REGISTRATION FORM".

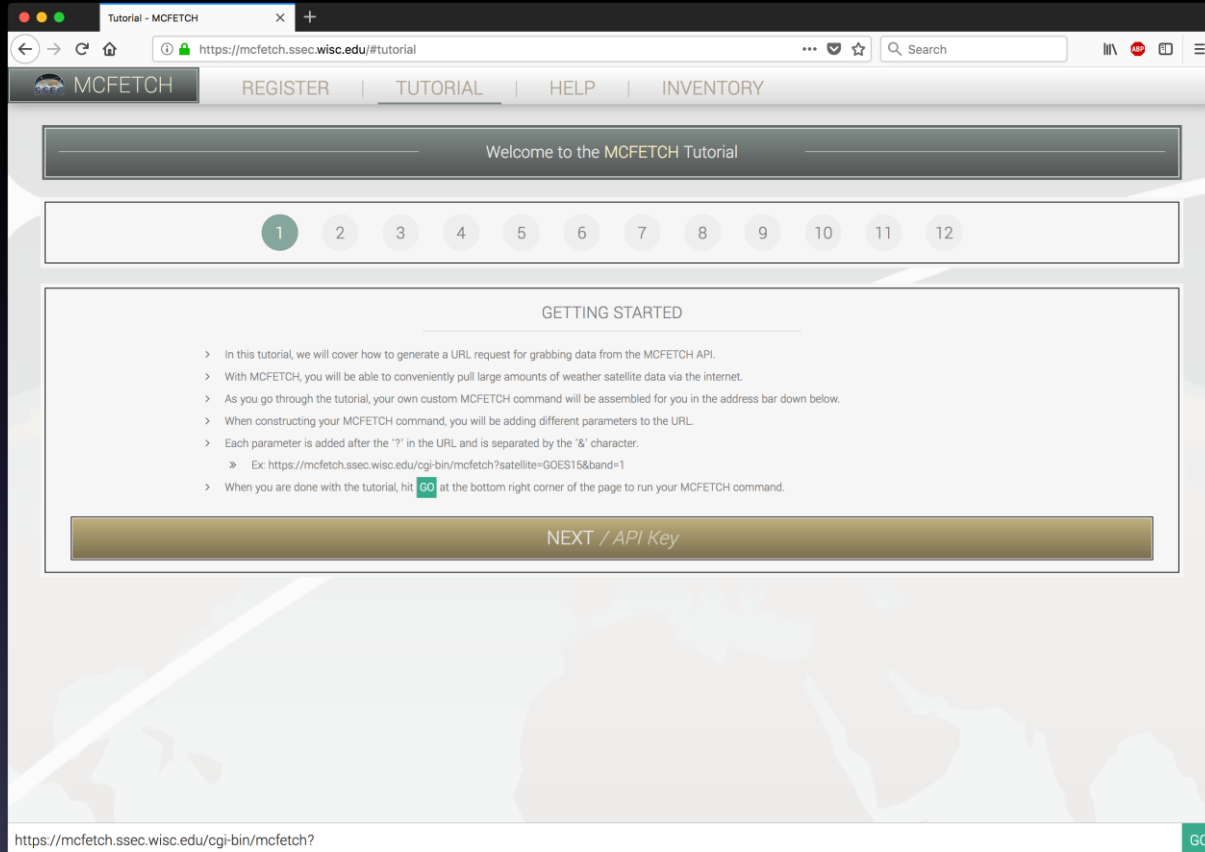
Fill out the following form to get your free MCFETCH API Key.

First Name	<input type="text"/>	Enter your first name here
Last Name	<input type="text"/>	Enter your last name here
Organization	<input type="text"/>	Enter your organization here
Email Address	<input type="text"/>	Enter your email address here
Phone Number (optional)	<input type="text"/>	Enter your phone number here
Subscribe to MCFETCH Mailing List	<input type="radio"/> Yes <input checked="" type="radio"/> No	

Upon submission of this form, your request will be reviewed for approval. This may take 1-2 business days.



McFETCH Satellite Data Server



The screenshot shows a web browser window with the title "Tutorial - MCFETCH". The address bar displays the URL <https://mcfetch.ssec.wisc.edu/#tutorial>. The page features a navigation bar with links: MCFETCH, REGISTER, TUTORIAL (active), HELP, and INVENTORY. Below the navigation bar is a welcome message: "Welcome to the MCFETCH Tutorial". A progress indicator shows 12 steps, with step 1 highlighted. The main content area is titled "GETTING STARTED" and contains a list of instructions:

- > In this tutorial, we will cover how to generate a URL request for grabbing data from the MCFETCH API.
- > With MCFETCH, you will be able to conveniently pull large amounts of weather satellite data via the internet.
- > As you go through the tutorial, your own custom MCFETCH command will be assembled for you in the address bar down below.
- > When constructing your MCFETCH command, you will be adding different parameters to the URL.
- > Each parameter is added after the "?" in the URL and is separated by the "&" character.
 - > Ex: <https://mcfetch.ssec.wisc.edu/cgi-bin/mcfetch?satellite=GOES15&band=1>
- > When you are done with the tutorial, hit [GO](#) at the bottom right corner of the page to run your MCFETCH command.

At the bottom of the content area is a button labeled "NEXT / API Key". The footer of the page shows the URL <https://mcfetch.ssec.wisc.edu/cgi-bin/mcfetch?> and a green "GO" button.



McFETCH Satellite Data Server

Search - SDS Inventory

https://inventory.ssec.wisc.edu/inventory/#search

SDS INVENTORY | SEARCH | CALENDAR | CONTACT | MCFETCH | OLD

SEARCH MODE

FILTER SEARCH ENGINE

DATE: 2018-05-21

START TIME: 00:00

END TIME: 23:59

SATELLITE: MET-8, FY-2E, GOES-15, COMS-1

TYPE: HRIT, 1 byte IR, 1 byte WV, 1 byte VIS

COVERAGE: FD, HRV, UNKNOWN, OTHER

SCHEDULE: ROUTINE, RSO, ROUTINE-2014, MODE3

SEARCH

ADVANCED OPTIONS

2018-05-22 | Day 141 / 365 | 3:48:45 UTC | Tuesday, May 22nd



McFETCH Satellite Data Server

Search - SDS Inventory

https://inventory.ssec.wisc.edu/inventory/#search&start_time:2017-05-21 00:00;end_time:2017-05-21 00:00

SDS INVENTORY | SEARCH | CALENDAR | CONTACT | MCFETCH | OLD

May 21, 2017 / 141

38 times | 38 files | 1 satellite

0.23° S, 74.55° W East-USA

GOES-13 38 TIMES, 38 FILES

TOGGLE COLUMNS | SCRIPTS FOR DOWNLOADING DATA

EXPORT AS CSV | EXPORT AS JSON

2016-10-14 00:01:00 - 2018-01-08 15:32:00 | G-13 Sndr stopped producing useful data on November 15, 2015 & should be considered permanently failed. No further recovery attempts are planned.

TIME	IMAGETIME	SUB_LAT	SUB_LON	COVERAGE	TYPE	SCHEDULE	BANDS
01:00	2017-05-21 01:00:18	-0.25	74.55	CONUS	Imager	ROUTINE	1 2 3 4 6
01:30	2017-05-21 01:30:17	-0.26	74.55	CONUS	Imager	ROUTINE	1 2 3 4 6
02:00	2017-05-21 02:00:19	-0.25	74.55	CONUS	Imager	ROUTINE	1 2 3 4 6
02:30	2017-05-21 02:30:18	-0.24	74.55	CONUS	Imager	ROUTINE	1 2 3 4 6
03:00	2017-05-21 03:30:19	-0.21	74.57	CONUS	Imager	ROUTINE	1 2 3 4 6
04:00	2017-05-21 04:00:18	-0.2	74.57	CONUS	Imager	ROUTINE	1 2 3 4 6
04:30	2017-05-21 04:30:19	-0.17	74.58	CONUS	Imager	ROUTINE	1 2 3 4 6
05:00	2017-05-21 05:00:19	-0.15	74.59	CONUS	Imager	ROUTINE	1 2 3 4 6
05:30	2017-05-21 05:30:17	-0.12	74.6	CONUS	Imager	ROUTINE	1 2 3 4 6
06:30	2017-05-21 06:30:18	-0.05	74.61	CONUS	Imager	ROUTINE	1 2 3 4 6
07:00	2017-05-21 07:00:17	-0.02	74.62	CONUS	Imager	ROUTINE	1 2 3 4 6
07:30	2017-05-21 07:30:18	0.01	74.63	CONUS	Imager	ROUTINE	1 2 3 4 6
08:00	2017-05-21 08:00:18	0.04	74.64	CONUS	Imager	ROUTINE	1 2 3 4 6
08:30	2017-05-21 08:30:17	0.08	74.64	CONUS	Imager	ROUTINE	1 2 3 4 6
09:30	2017-05-21 09:30:17	0.14	74.66	CONUS	Imager	ROUTINE	1 2 3 4 6
10:00	2017-05-21 10:00:17	0.16	74.66	CONUS	Imager	ROUTINE	1 2 3 4 6
10:30	2017-05-21 10:30:18	0.19	74.67	CONUS	Imager	ROUTINE	1 2 3 4 6
11:00	2017-05-21 11:00:17	0.21	74.67	CONUS	Imager	ROUTINE	1 2 3 4 6
11:30	2017-05-21 11:30:18	0.23	74.67	CONUS	Imager	ROUTINE	1 2 3 4 6
12:30	2017-05-21 12:30:17	0.25	74.67	CONUS	Imager	ROUTINE	1 2 3 4 6
13:00	2017-05-21 13:00:18	0.25	74.67	CONUS	Imager	ROUTINE	1 2 3 4 6
13:30	2017-05-21 13:30:18	0.25	74.67	CONUS	Imager	ROUTINE	1 2 3 4 6
14:00	2017-05-21 14:00:17	0.25	74.66	CONUS	Imager	ROUTINE	1 2 3 4 6
14:30	2017-05-21 14:30:18	0.24	74.66	CONUS	Imager	ROUTINE	1 2 3 4 6
16:00	2017-05-21 16:00:18	0.2	74.64	CONUS	Imager	ROUTINE	1 2 3 4 6

2018-05-22 | Day 141 / 365 | 3:53:24 UTC | Tuesday, May 22nd



McFETCH Satellite Data Server

Search - SDS Inventory

https://inventory.ssec.wisc.edu/inventory/#search&start_time:2017-05-21 00:00;end_time:2017-05-21 00:00

SDS INVENTORY | SEARCH | CALENDAR | CONTACT | MCFETCH | OLD

DOWNLOAD / GOES-13

BANDS *

1
2
3
4
6

LATITUDE
45

LONGITUDE
92

API KEY
2346432224

SIZE HORIZONTAL
1400

SIZE VERTICAL
1000

FORMAT
GIF

CUSTOM PARAMETERS
MAP=YES

SCRIPT FORMAT
WGET

DOWNLOAD SCRIPT

14:00 2017-05-21 14:00:17 0.25 74.66 CONUS Imager ROUTINE 1 2 3 4 6
14:30 2017-05-21 14:30:18 0.24 74.66 CONUS Imager ROUTINE 1 2 3 4 6
16:00 2017-05-21 16:00:18 0.2 74.64 CONUS Imager ROUTINE 1 2 3 4 6

2018-05-22 | Day 141 / 365 | 3:54:02 UTC | Tuesday, May 22nd



```

# robo — robo@cmcfetch1:war/www/cgi-bin — vi G0E513.d20170521010018.d20170521233018.sh — 197.90.1
# /Users/robo — robo@cmcfetch1:war/www/cgi-bin — vi G0E513.d20170521010018.d20170521233018.sh

# /bin/bash

#####
# Title      G0E513.d0170521010018.d0170521233018.sh
# Description This script will download the specified G0E5-13 data from
#             the MCFETCH API.
# Author     SSC Satellite Data Services
# Date       2014-05-22 03:53 UTC
# Usage      bash G0E513.d0170521010018.d0170521233018.sh
# Notes      Run this script from the directory in which you want the data.
#             This script may be executed in parallel on other PCs.
#             On Linux and Mac machines.
#             Downloaded data will be saved in the current directory.
#             cdwd as G0E513.d0170521010018.d0170521233018.sh
#
# For obtaining a free MCFETCH API key, please refer to the following link:
# https://fetch.ssc.wisc.edu/register
#
# Search URL:
# https://inventory.ssc.wisc.edu/Inventory?search&start_ttime=2017-05-23Z0000&end_ttime=2017-05-23Z0003:59;satellite=G0E5-13;type=Image;coverage=CONUS;
#
# DISCLAIMER: BY USING THIS SCRIPT, YOU WILL BE MAKING DATA REQUESTS TO THE
# MCFETCH SERVER THAT MAY IMPACT THE DATA QUOTA OF YOUR ACCOUNT. IF YOU EXCEED
# THIS QUOTA, YOUR ACCOUNT MAY BECOME LIMITED IN TERMS OF DATA REQUESTS AND
# YOU MAY LOSE THE ABILITY TO DOWNLOAD DATA FROM THIS SERVER.
#
# THIS SOFTWARE IS PROVIDED BY THE AUTHOR "AS IS" AND ANY EXPRESS OR IMPLIED
# WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF
# MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO
# EVENT SHALL THE AUTHOR BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL,
# SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO,
# PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS,
# OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND IN ANY THEORY OF LIABILITY,
# WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
# OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF
# ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
#####

KEY="ZM4643224"

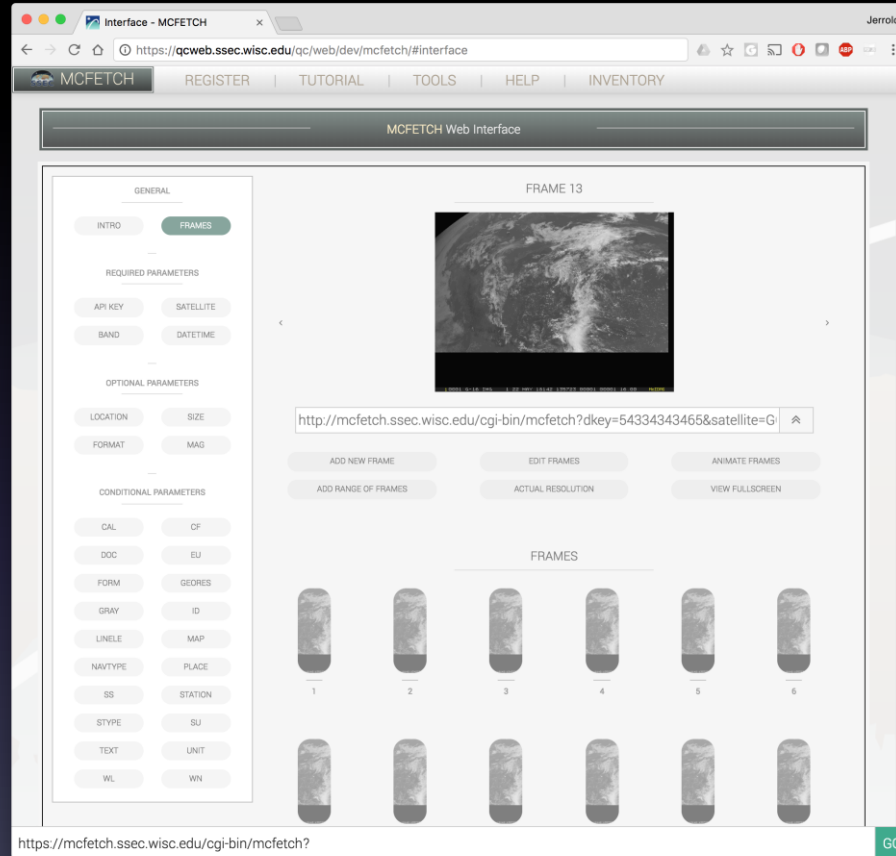
HTTP="http://fetch.ssc.wisc.edu/cgi-bin/mcfetch?key=${KEY}&satellite=G0E513&output=CFR1&lat=45-9&lon=1000-14000000-915"

#####

[[OADS45-
date=20170521&time=01:30:18&coverage=CONUS&band=4"
date=20170521&time=01:30:17&coverage=CONUS&band=4"
date=20170521&time=01:30:16&coverage=CONUS&band=4"
date=20170521&time=01:30:15&coverage=CONUS&band=4"
date=20170521&time=01:30:14&coverage=CONUS&band=4"
date=20170521&time=01:30:13&coverage=CONUS&band=4"
date=20170521&time=01:30:12&coverage=CONUS&band=4"
date=20170521&time=01:30:11&coverage=CONUS&band=4"
date=20170521&time=01:30:10&coverage=CONUS&band=4"
date=20170521&time=01:30:09&coverage=CONUS&band=4"
date=20170521&time=01:30:08&coverage=CONUS&band=4"
date=20170521&time=01:30:07&coverage=CONUS&band=4"
date=20170521&time=01:30:06&coverage=CONUS&band=4"
date=20170521&time=01:30:05&coverage=CONUS&band=4"
date=20170521&time=01:30:04&coverage=CONUS&band=4"
date=20170521&time=01:30:03&coverage=CONUS&band=4"
date=20170521&time=01:30:02&coverage=CONUS&band=4"
date=20170521&time=01:30:01&coverage=CONUS&band=4"
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date=20170521&time=01:29:54&coverage=CONUS&band=4"
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date=20170521&time=01:29:49&coverage=CONUS&band=4"
date=20170521&time=01:29:48&coverage=CONUS&band=4"
date=20170521&time=01:29:47&coverage=CONUS&band=4"
date=20170521&time=01:29:46&coverage=CONUS&band=4"
date=20170521&time=01:29:45&coverage=CONUS&band=4"
date=20170521&time=01:29:44&coverage=CONUS&band=4"
date=20170521&time=01:29:43&coverage=CONUS&band=4"
date=20170521&time=01:29:42&coverage=CONUS&band=4"
date=20170521&time=01:29:41&coverage=CONUS&band=4"
date=20170521&time=01:29:40&coverage=CONUS&band=4"
date=20170521&time=01:29:39&coverage=CONUS&band=4"
date=20170521&time=01:29:38&coverage=CONUS&band=4"
date=20170521&time=01:29:37&coverage=CONUS&band=4"
date=20170521&time=01:29:36&coverage=CONUS&band=4"
date=20170521&time=01:29:35&coverage=CONUS&band=4"
date=20170521&time=01:29:34&coverage=CONUS&band=4"
date=20170521&time=01:29:33&coverage=CONUS&band=4"
date=20170521&time=01:29:32&coverage=CONUS&band=4"
date=20170521&time=01:29:31&coverage=CONUS&band=4"
date=20170521&time=01:29:30&coverage=CONUS&band=4"
date=20170521&time=01:29:29&coverage=CONUS&band=4"
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date=20170521&time=01:29:27&coverage=CONUS&band=4"
date=20170521&time=01:29:26&coverage=CONUS&band=4"
date=20170521&time=01:29:25&coverage=CONUS&band=4"
date=20170521&time=01:29:24&coverage=CONUS&band=4"
date=20170521&time=01:29:23&coverage=CONUS&band=4"
date=20170521&time=01:29:22&coverage=CONUS&band=4"
date=20170521&time=01:29:21&coverage=CONUS&band=4"
date=20170521&time=01:29:20&coverage=CONUS&band=4"
date=20170521&time=01:29:19&coverage=CONUS&band=4"
date=20170521&time=01:29:18&coverage=CONUS&band=4"
date=20170521&time=01:29:17&coverage=CONUS&band=4"
date=20170521&time=01:29:16&coverage=CONUS&band=4"
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date=20170521&time=01:29:08&coverage=CONUS&band=4"
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date=20170521&time=01:29:06&coverage=CONUS&band=4"
date=20170521&time=01:29:05&coverage=CONUS&band=4"
date=20170521&time=01:29:04&coverage=CONUS&band=4"
date=20170521&time=01:29:03&coverage=CONUS&band=4"
date=20170521&time=01:29:02&coverage=CONUS&band=4"
date=20170521&time=01:29:01&coverage=CONUS&band=4"
date=20170521&time=01:28:59&coverage=CONUS&band=4"
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date=20170521&time=01:28:48&coverage=CONUS&band=4"
date=20170521&time=01:28:47&coverage=CONUS&band=4"
date=20170521&time=01:28:46&coverage=CONUS&band=4"
date=20170521&time=01:28:45&coverage=CONUS&band=4"
date=20170521&time=01:28:44&coverage=CONUS&band=4"
date=20170521&time=01:28:43&coverage=CONUS&band=4"
```



McFETCH Web Interface



McFETCH Users

As of May 21, 2018

- 276 Users
- 29 users in last 30 days
- 52,750 transactions in last 30 days



McFETCH Satellite Data Server

Upcoming updates (summer 2018)

- Improved performance for archive requests
- Original “archived” format data output



McFETCH Satellite Data Server

To get a data access key:

Go to <https://mcfetch.ssec.wisc.edu>



McIDAS in Python

- Uses code developed by Kevin Hallock and Jon Beavers
- New McIDAS scripts in Python
- Available in McIDAS 2017.1 XRD



AMQP

RabbitMQ

- AMQP -> Advanced Message Queuing Protocol
- RabbitMQ
- amqpfind
- Himawari
- GOES-16/17
- Expand to other GEOs and Polar



GRB Fanout server

Developed by Dan Forrest



GRB Fanout Server

The Problem:

- Quorum Demodulator
 - Single UDP stream
 - Multicast broadcast
- Multiple Ingestors needed GRB stream
- Not all Co-located
- Multicast through router data loss
- Development planned in 2015

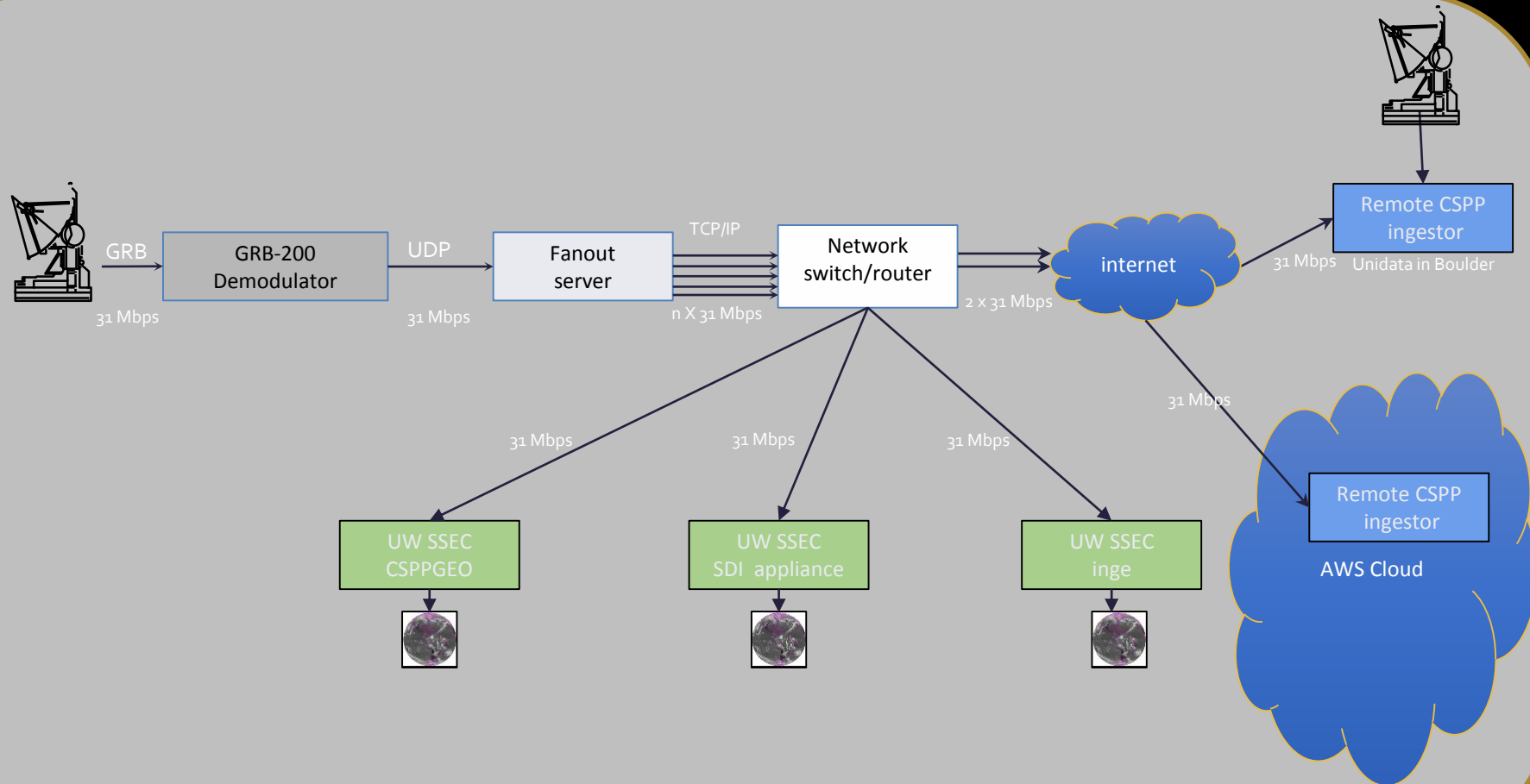


Quorum GRB-200 Demodulator

Only SDS/Datacenter funds were used for this.



GRB Fanout Server



Fanout server hardware specs

- Dell PE R430
- Single Intel Xeon 2.4GHz 6 core processor
- 8GB RAM
- 2TB disk (2 x 200GB & 1 x 1.6TB)
- \$3,600 USD



GRB Fanout Server

- Compatible with CSPP-GEO, SDI GRB Appliance
- Still in “ALPHA”
- Need additional resources to move to mature distribution



GRB Fanout switching

- Sometimes you need to switch to a different fanout server due to:
 - Swapping Antennas
 - Swapping demodulators
 - Antenna down time (planned or unplanned)
 - Local RFI (E.g. Solar RFI)



GRB Mixer

Developed by Dan Forrest

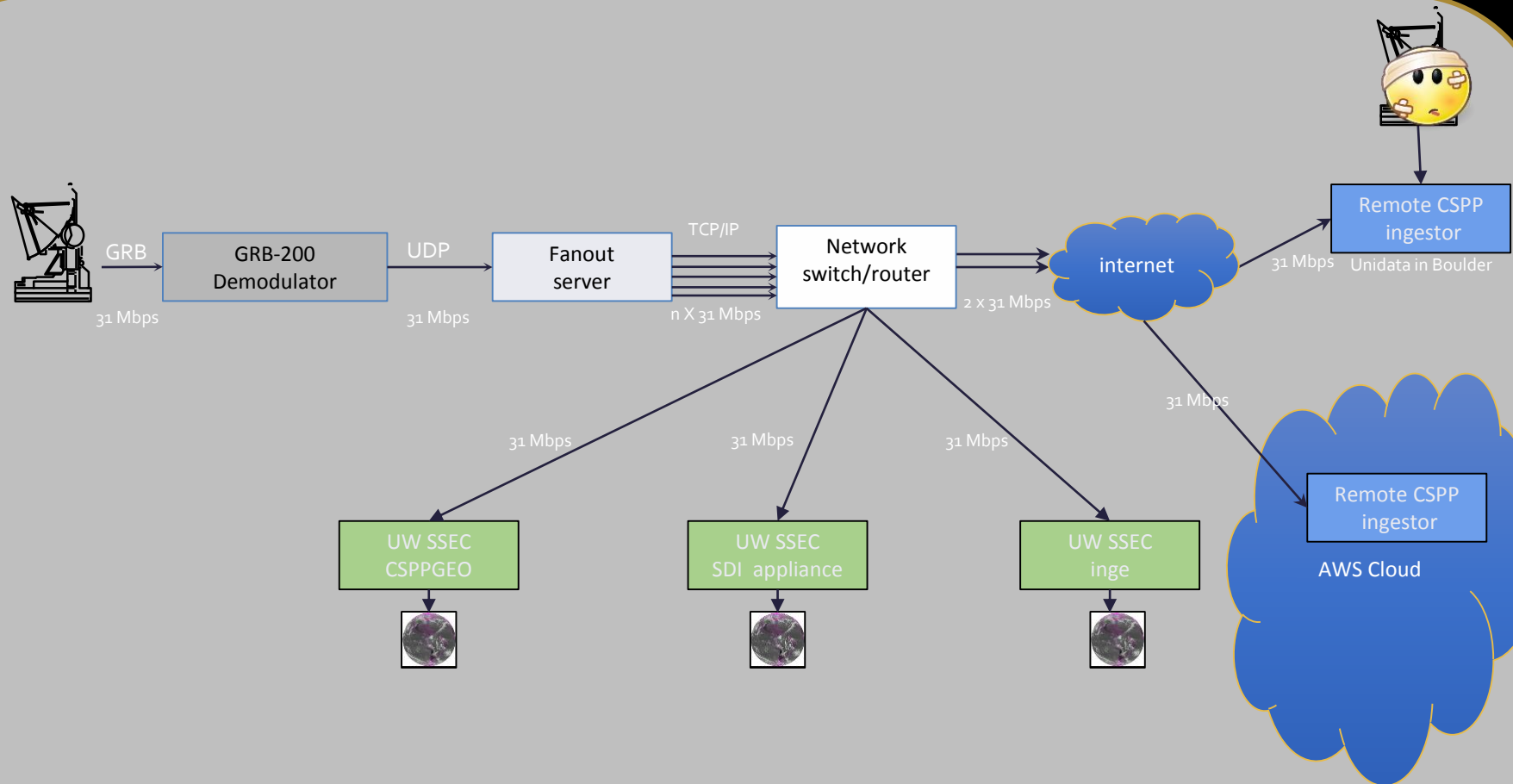


GRB Mixer

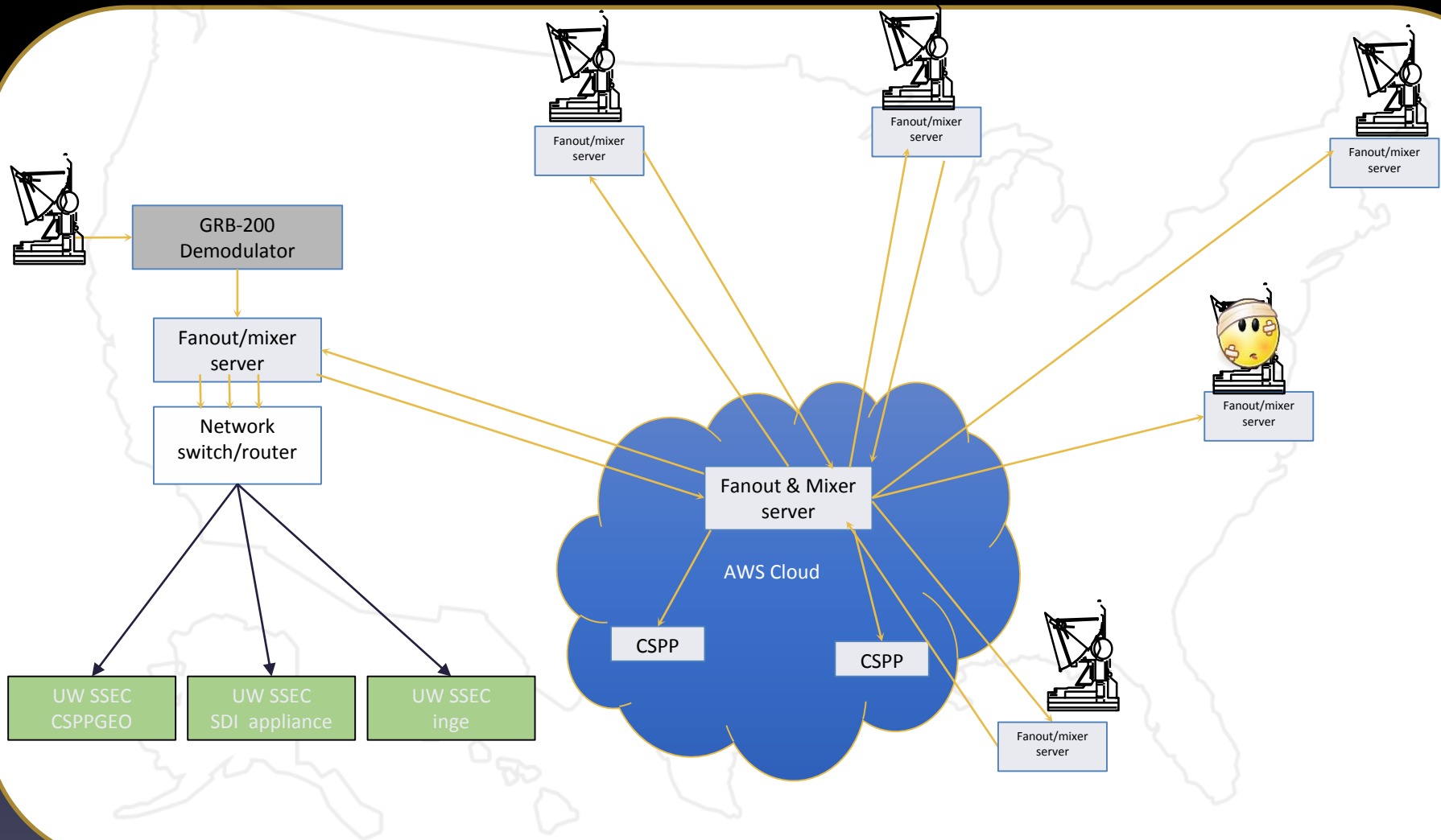
- Allows mixing of 1 or more fanout feeds
automatically
- Mix feeds at the “CADU” level
- Great solution for local Radio Frequency
Interference mitigation



GRB Fanout Server with Mixer



Fanout and Mixer in the Cloud



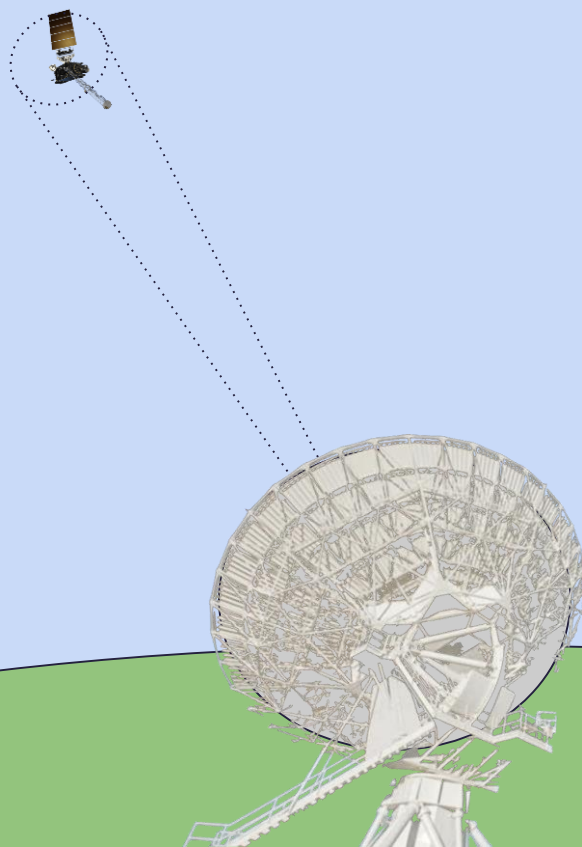
GRB Mixer

Great for RFI!

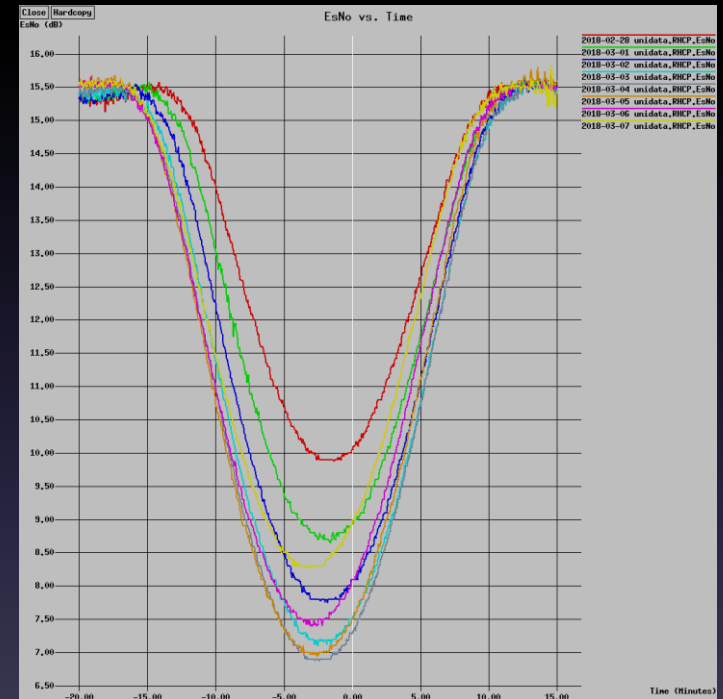
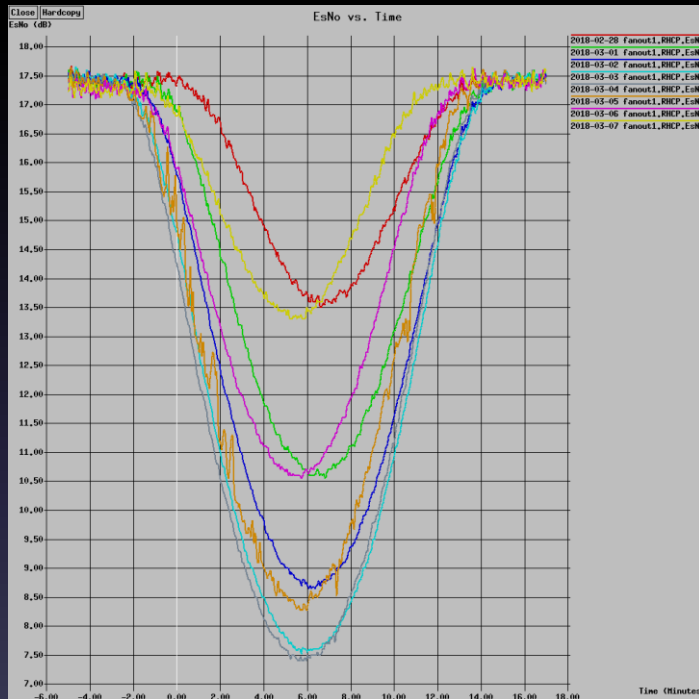
Some RFI Sources

- Solar (annually near equinox)
- Local terrestrial ... Powerlines, stray RF
- Lightning





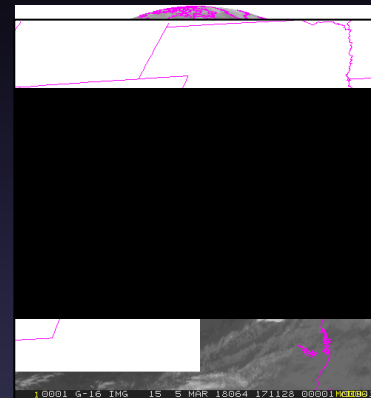
Solar RFI Graphs



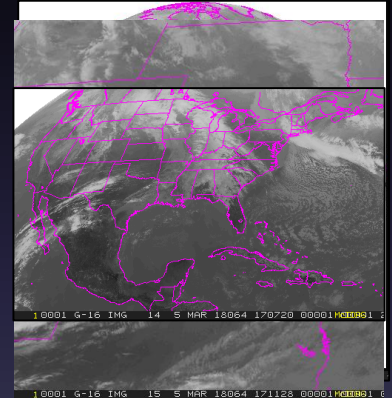
Solar RFI at PDA ground station

March 5, 2018

- 03/05/2018 17:06:38 - 17:15:57 UTC
- Affected 7 Meso-scale sectors
 - 5 entire images lost
 - 2 partial images
- Affected 1 Full Disk
 - 8 Channels partial loss
 - 8 channels No loss
- Affected 1 CONUS (all 16 channels lost)



PDA



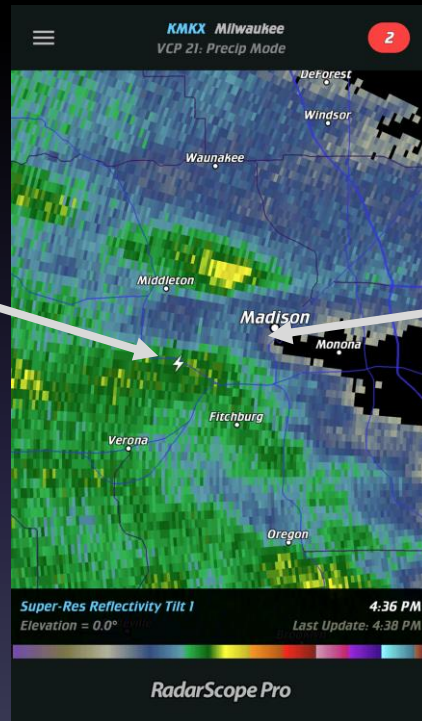
SSEC





RFI due to Lightning

Lightning
Flash
4.3 Miles
away

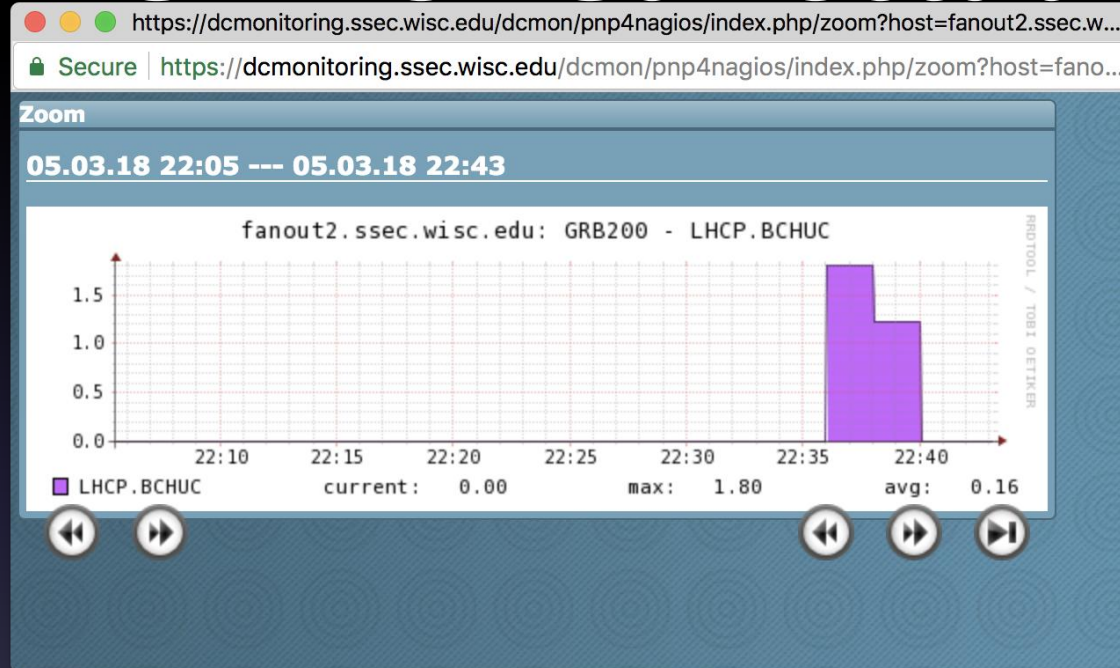


SSEC
Antenna
Location

Lightning Flash occurred
at 22:36:36Z on March 5,
2018



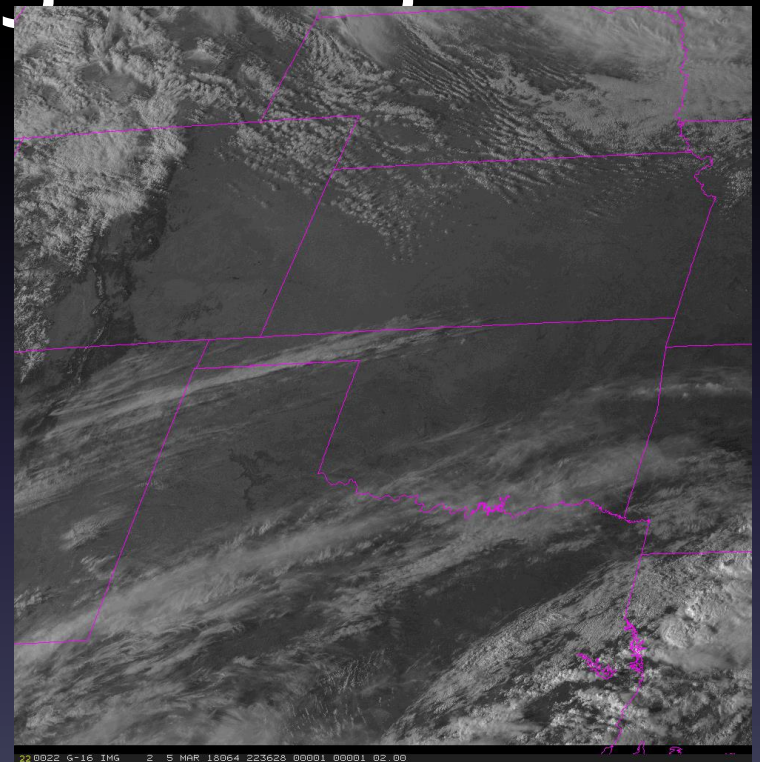
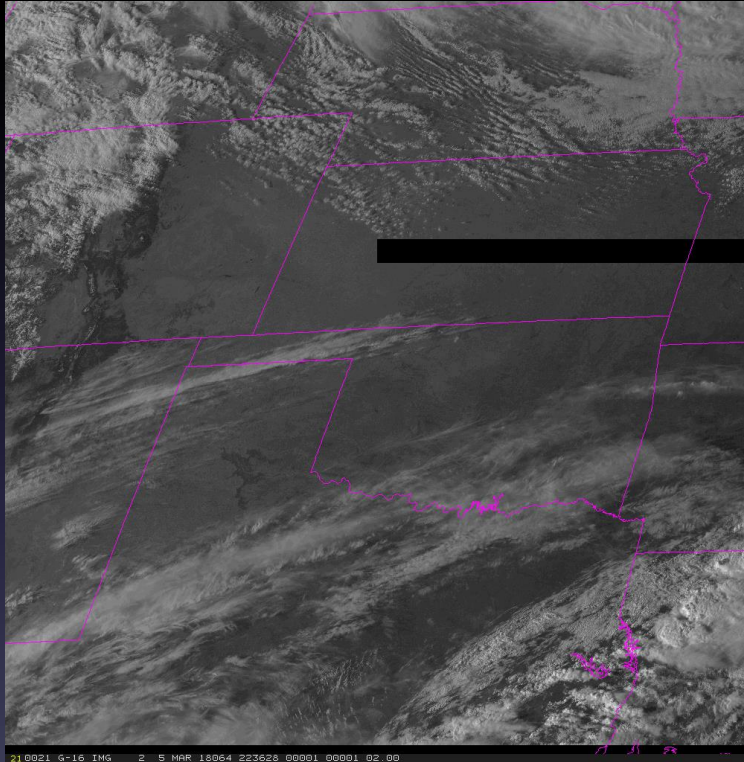
BCH* UnCorrectable



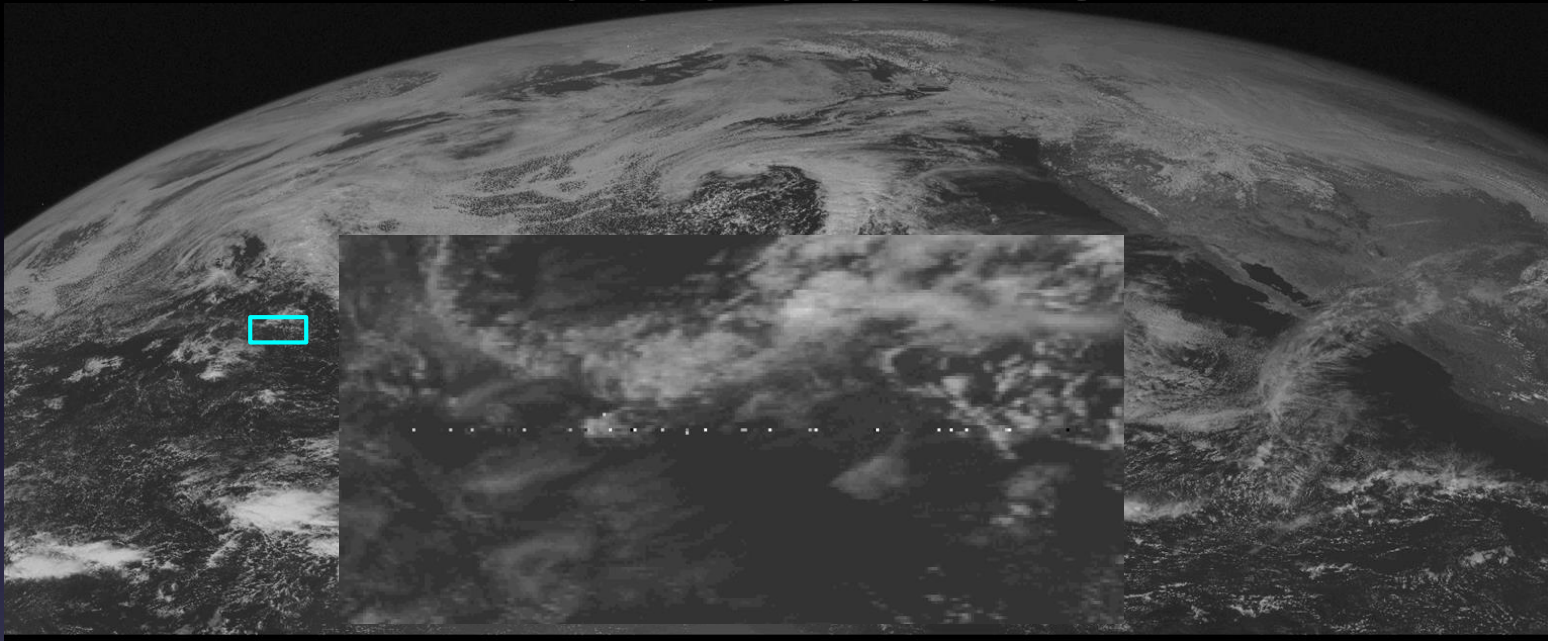
*Bose–Chaudhuri–Hocquenghem



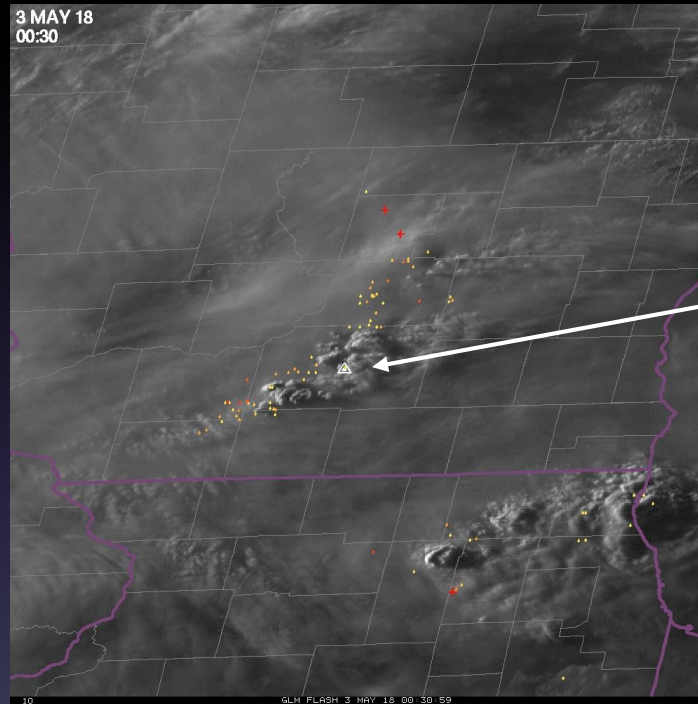
RFI Due to Lightning



What about GVAR?



RFI due to Lightning (May 3, 2018 00:37 UTC)

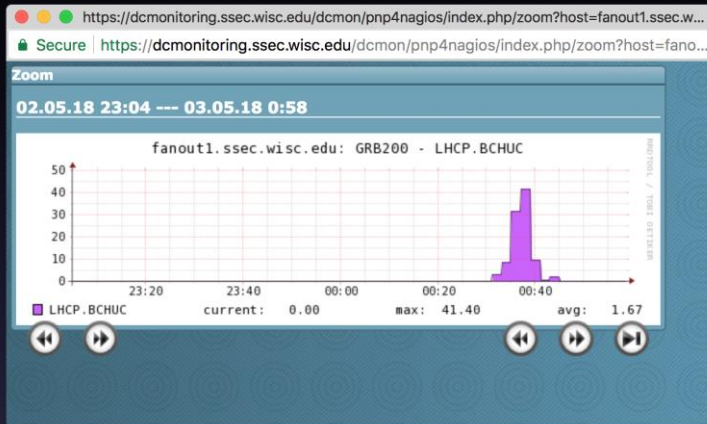


SSEC
Antenna
Location

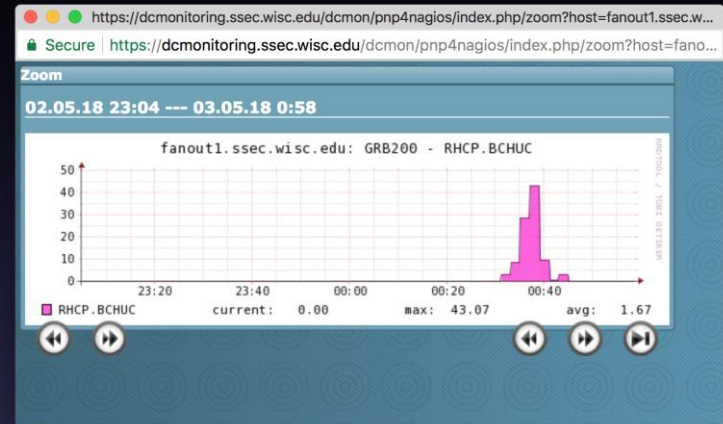
Lightning event at 00:35 -
00:40Z on May 3, 2018



BCH* UnCorrectable



Left Hand Circular Polarized
(LHCP)



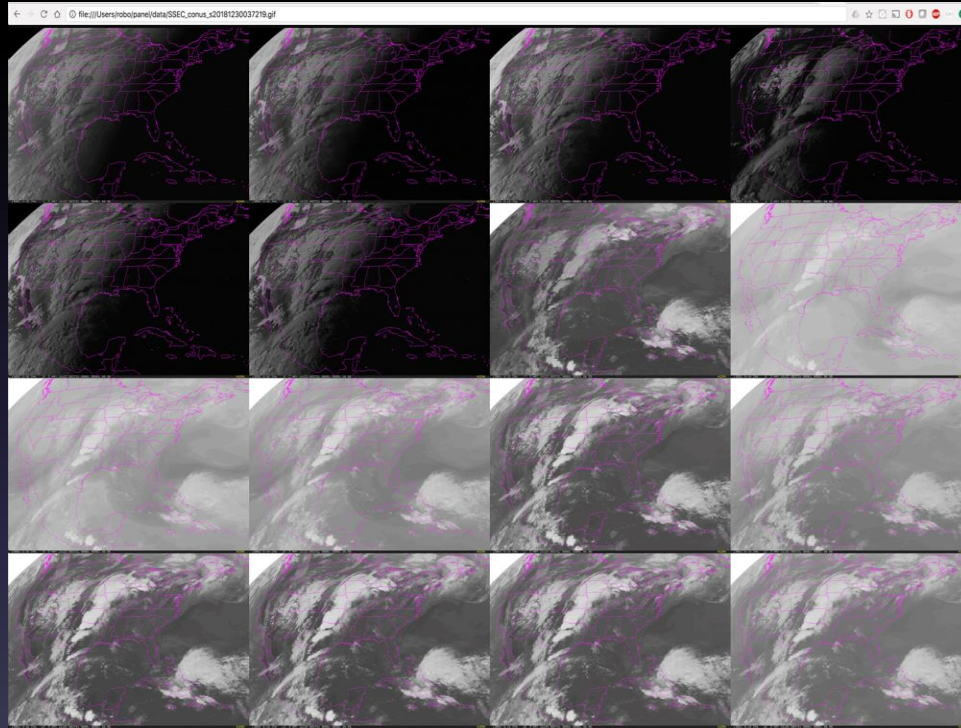
Right Hand Circular Polarized
(RHCP)

*Bose–Chaudhuri–Hocquenghem



RFI Due to Lightning

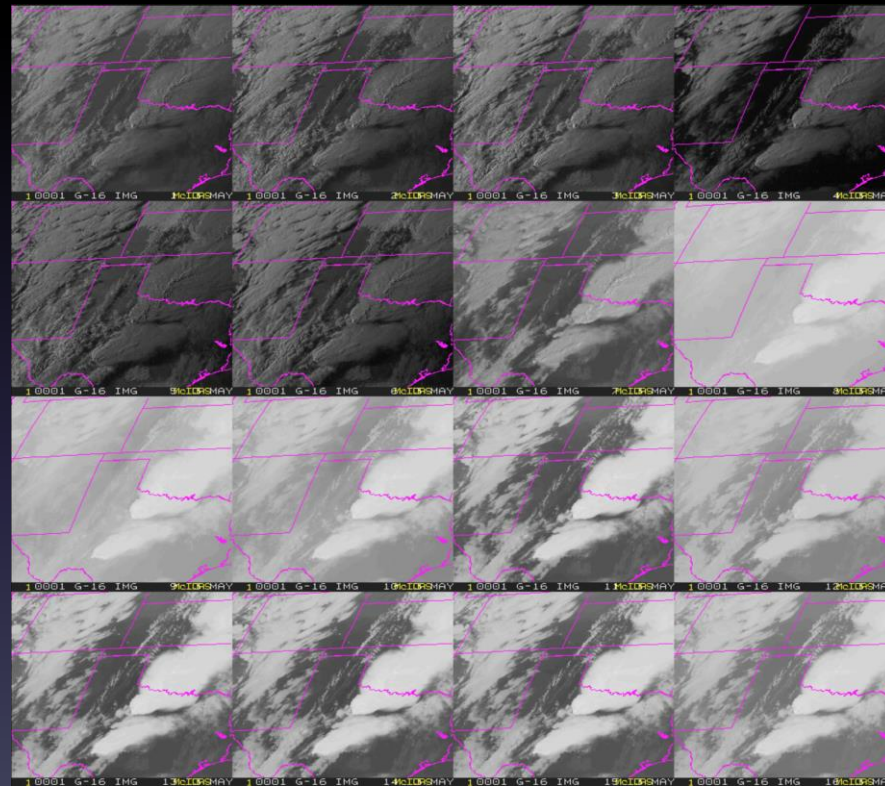
CONUS
May 3, 2018
00:37:22 UTC



2 Antennas through Mixer

RFI Due to Lightning

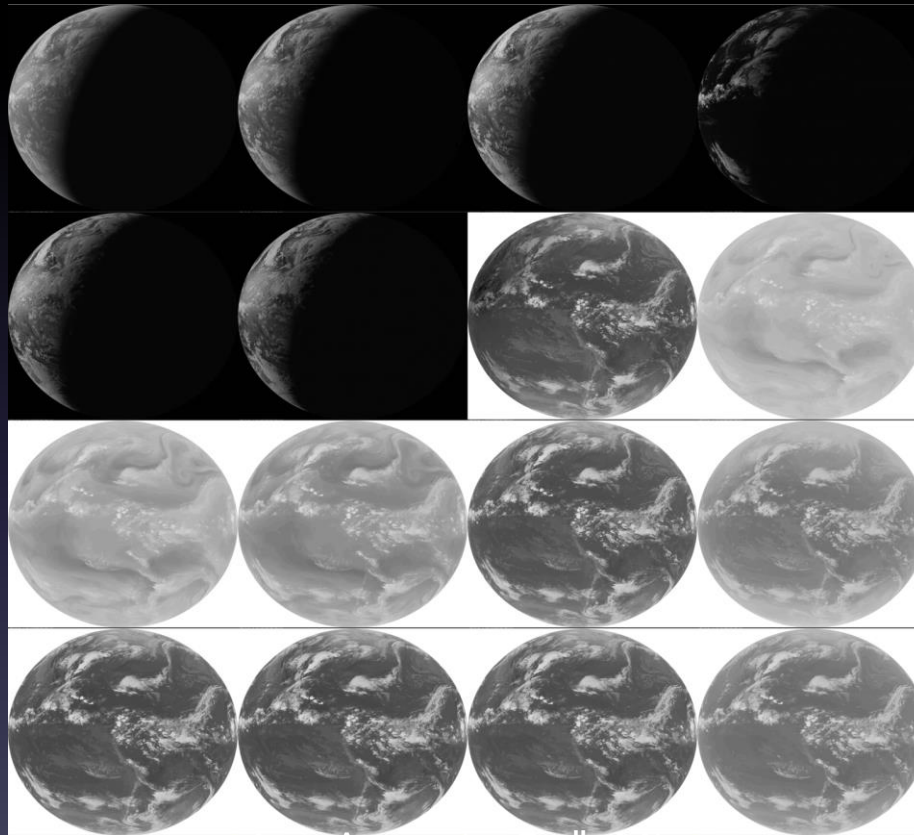
Meso 1
May 3, 2018
00:38:30 UTC



2 Ante Antenna Only Mixer

RFI Due to Lightning

Full Disk
May 3, 2018
00:30:41 UTC



2 Antenna Only Mixer

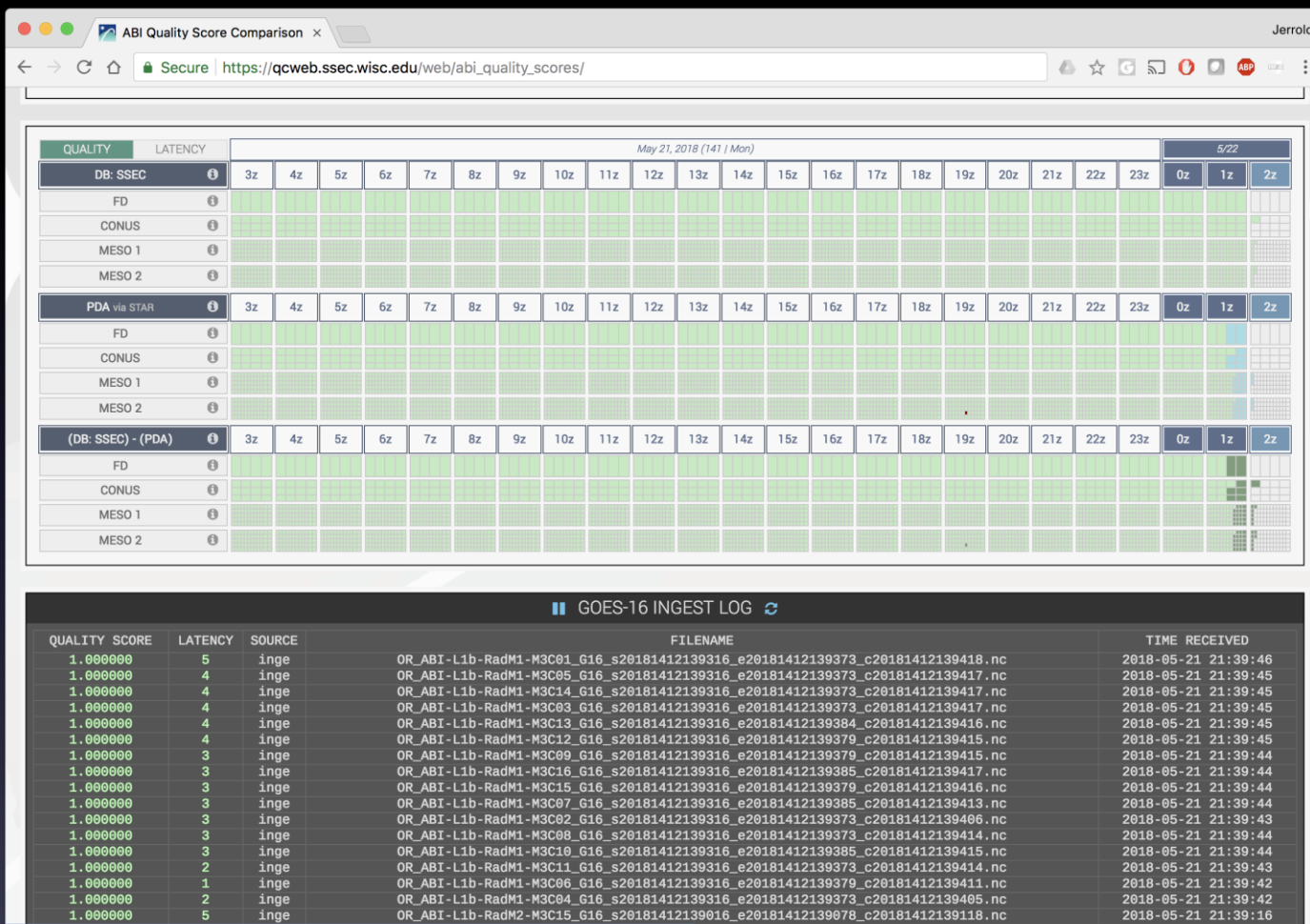


GRB Mixer

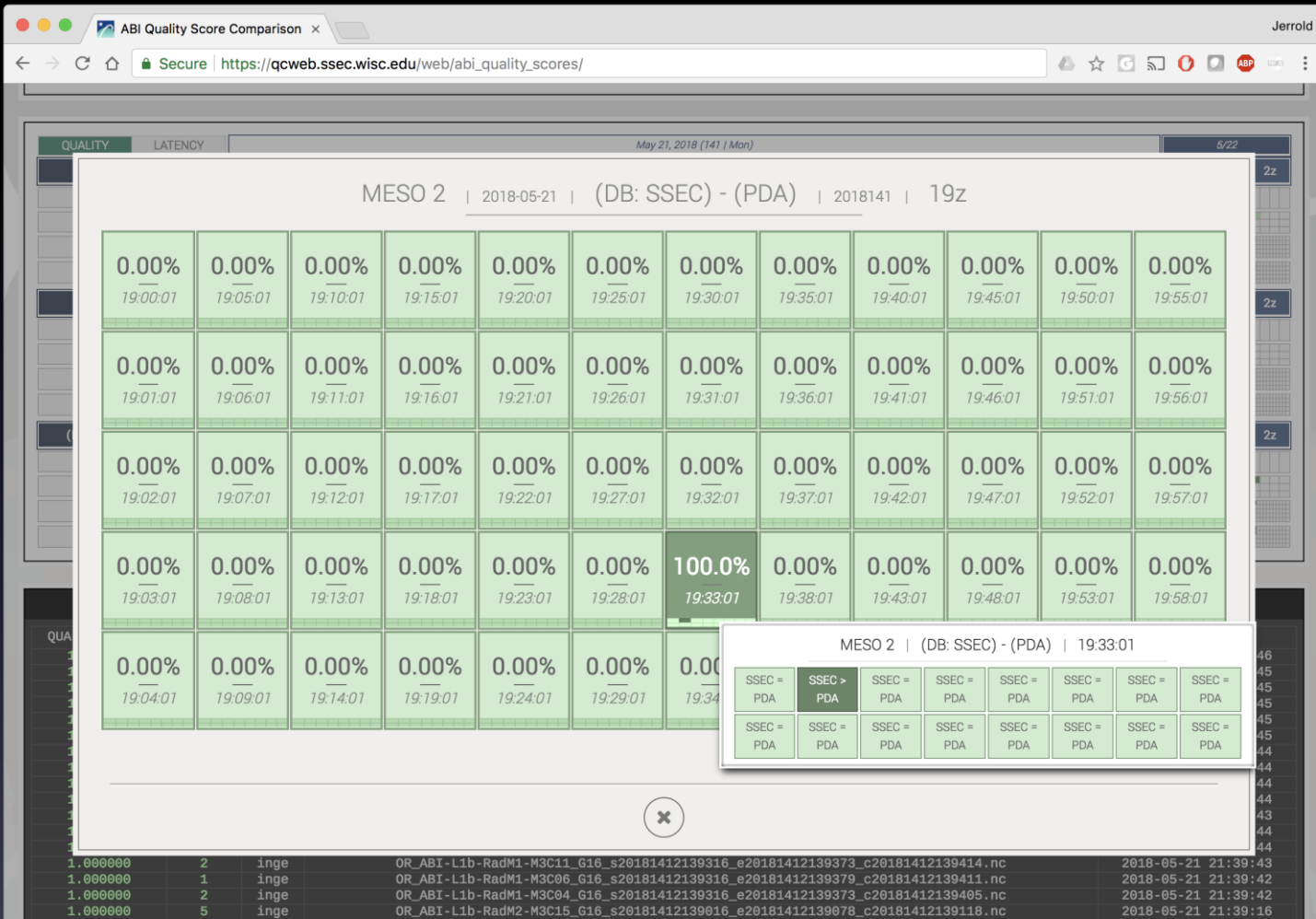
- Compatible with CSPP-GEO, SDI GRB Appliance
- Still in “ALPHA”
- Need additional resources to move to mature distribution



ABI Monitor



ABI Monitor



ABI Monitor


ABI Quality Score Comparison x

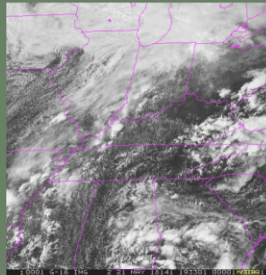
Secure https://qcweb.ssec.wisc.edu/web/abi_quality_scores/

May 21, 2018 (141 | Mon) 5/22

MESO 2 | 2018-05-21 | (DB: SSEC) - (PDA) | 2018141 | 19:33:01

Channel 2 | Mode 3 | 100.0% | 2018-05-21 19:33:01 UTC





PDA via STAR - 0.00% SSEC - 100.0%

Error: No matching filename OR_ABI-L1b-RadM2-M3C02_G16_s20181411933015_e20181411933073_c20181411933107.nc

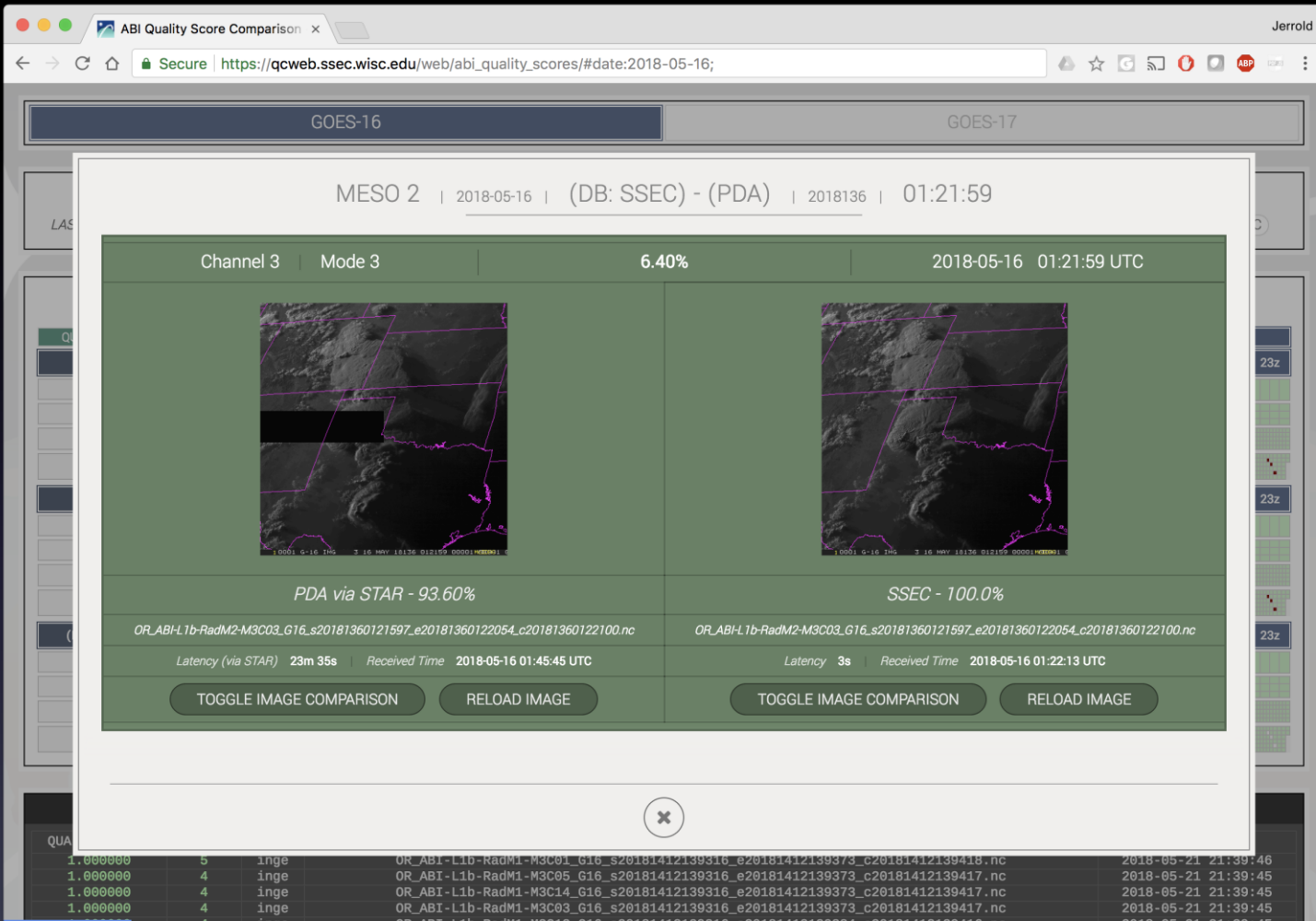
Error: Could not get latency statistics Latency 3s | Received Time 2018-05-21 19:33:13 UTC

TOGGLE IMAGE COMPARISON RELOAD IMAGE TOGGLE IMAGE COMPARISON RELOAD IMAGE

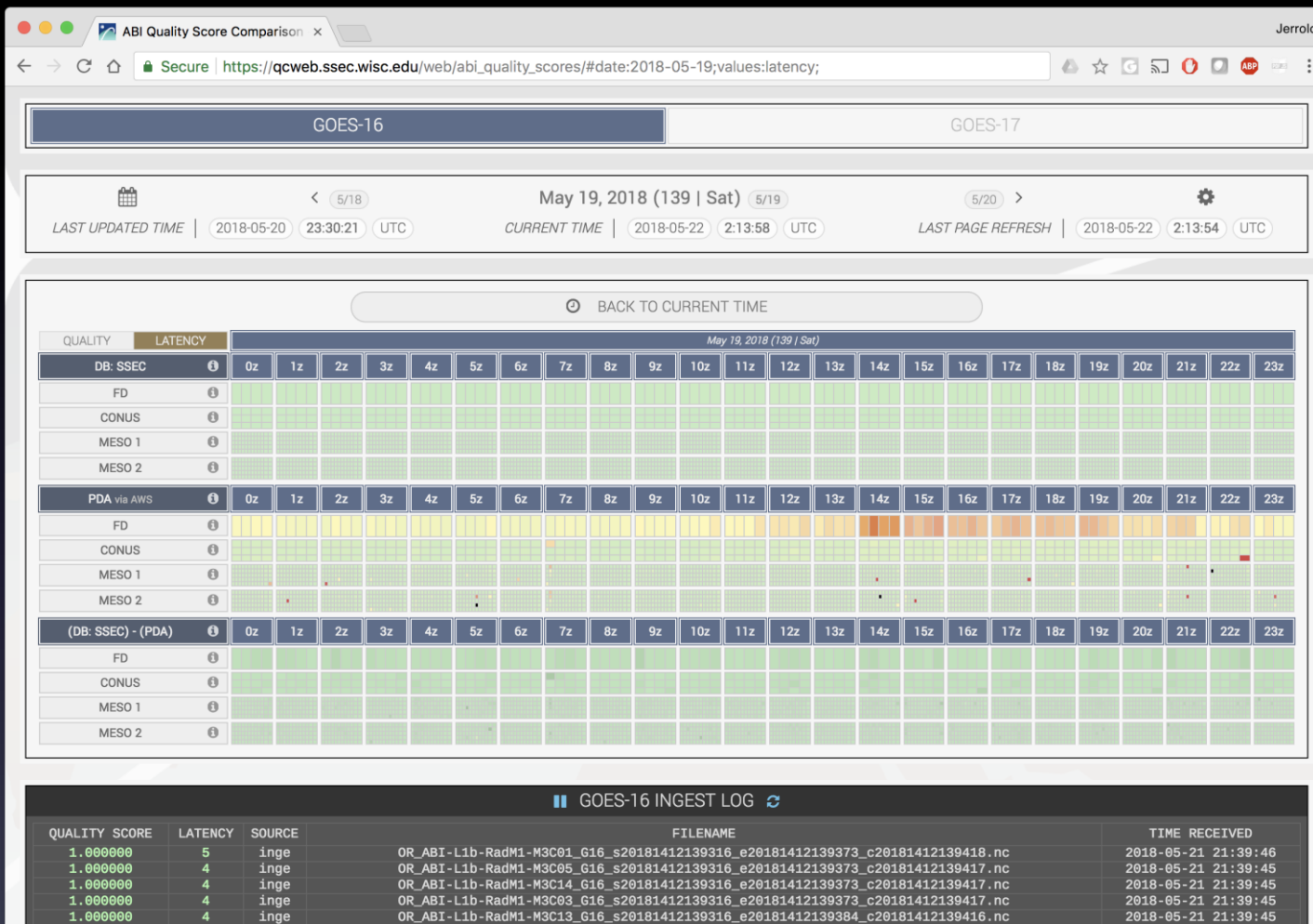
1.000000 2 inge OR_ABI-L1b-RadM1-M3C11_G16_s20181412139316_e20181412139373_c20181412139414.nc 2018-05-21 21:39:43
1.000000 1 inge OR_ABI-L1b-RadM1-M3C06_G16_s20181412139316_e20181412139379_c20181412139411.nc 2018-05-21 21:39:42
1.000000 2 inge OR_ABI-L1b-RadM1-M3C04_G16_s20181412139316_e20181412139373_c20181412139405.nc 2018-05-21 21:39:42
1.000000 5 inge OR_ABI-L1b-RadM2-M3C15_G16_s20181412139016_e20181412139078_c20181412139118.nc 2018-05-21 21:39:16



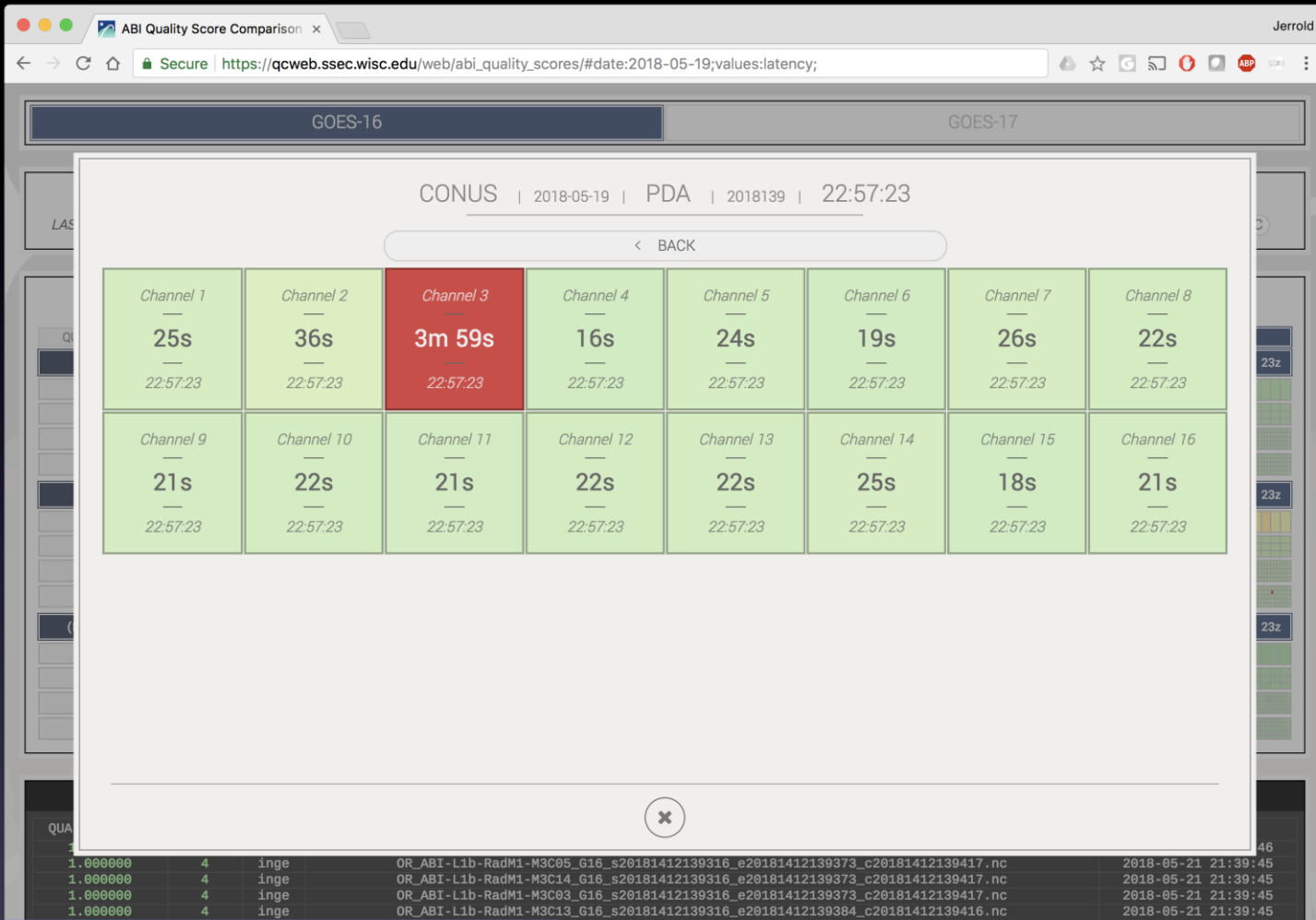
ABI Monitor



ABI Monitor



ABI Monitor



ABI Monitor

Statistics

- January 1 through May 13, 2018.

ABI Aggregate Stats

GOES-16

GOES-17

Start Time | 01/01/2018

End Time | 05/13/2018

GET QUALITY STATS

GET LATENCY STATS

ALL

Source	Average Quality Score		Images Received		CSV File
DB: SSEC	99.99%		432103 (99.99%)		CSV FILE
PDA	97.77%		422542 (97.78%)		CSV FILE

Source	Quality = 100%	90% <= Quality < 100%	80% <= Quality < 90%	70% <= Quality < 80%	Quality < 70%
DB: SSEC	432074	12	9	3	11
PDA	421614	741	30	3	9651

SSEC QUALITY > PDA QUALITY	SSEC QUALITY = PDA QUALITY	PDA QUALITY > SSEC QUALITY
10507	422676	24



ABI Monitor

Statistics

- March 4 through May 13, 2018.

ABI Aggregate Stats

GOES-16

GOES-17

Start Time

03/04/2018

End Time

05/13/2018

GET QUALITY STATS

GET LATENCY STATS

ALL

Source	Average Quality Score	Images Received	CSV File
DB: SSEC	99.99%	230834 (99.99%)	CSV FILE
PDA	99.36%	229385 (99.37%)	CSV FILE

Source	Quality = 100%	90% <= Quality < 100%	80% <= Quality < 90%	70% <= Quality < 80%	Quality < 70%
DB: SSEC	230822	4	2	1	10
PDA		257	4	37	1487

SSEC QUALITY > PDA QUALITY	SSEC QUALITY = PDA QUALITY	PDA QUALITY > SSEC QUALITY
1797	229811	10

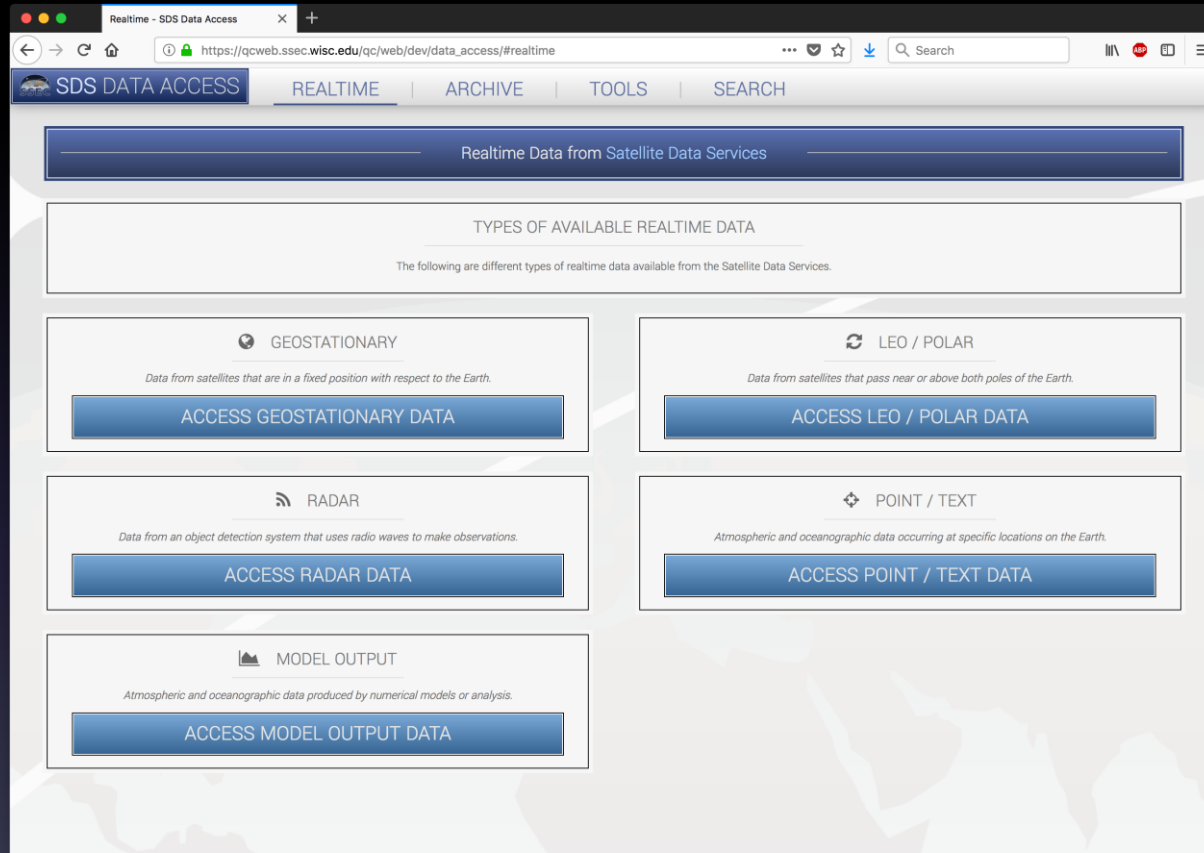


ABI Monitor

- Uses McFETCH
- Generic image QC code
- All GEOs planned to be added to a QC monitor



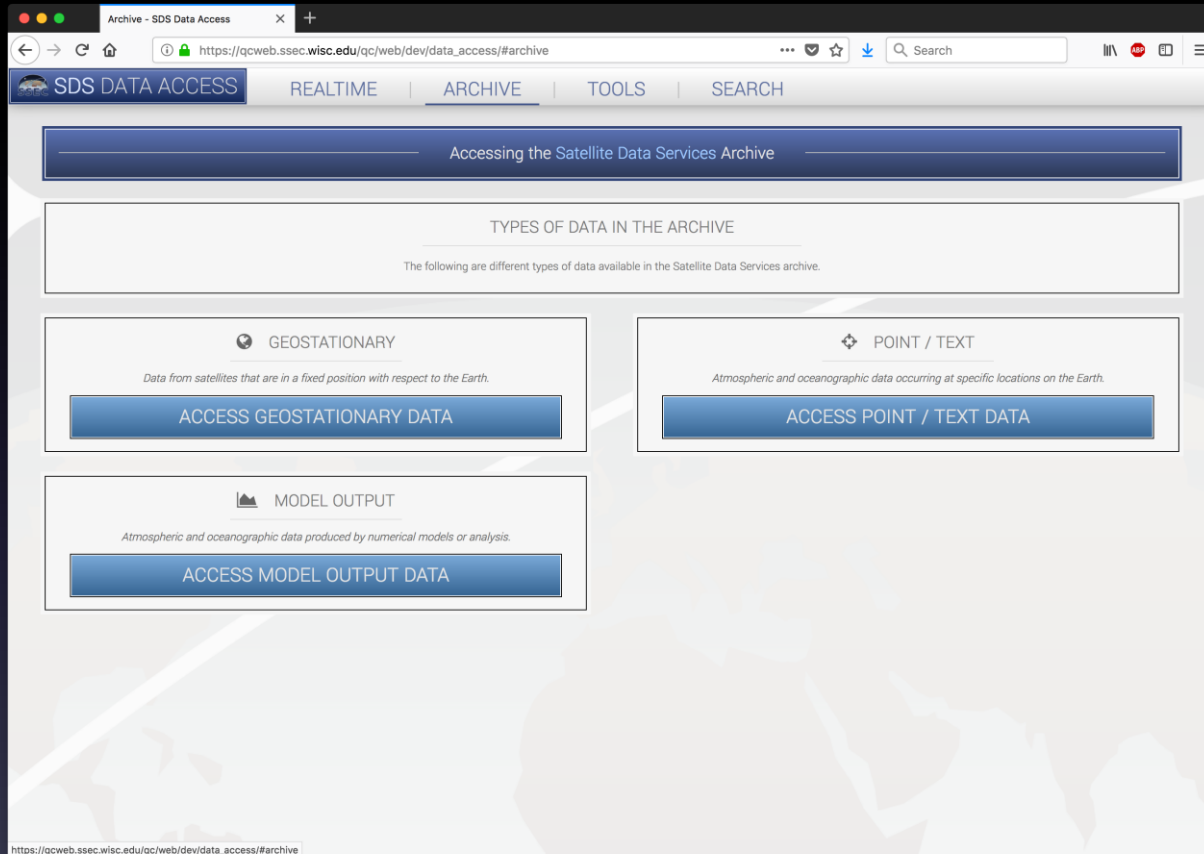
Data Access Page



Real-time Data



Data Access Page



Archive Data



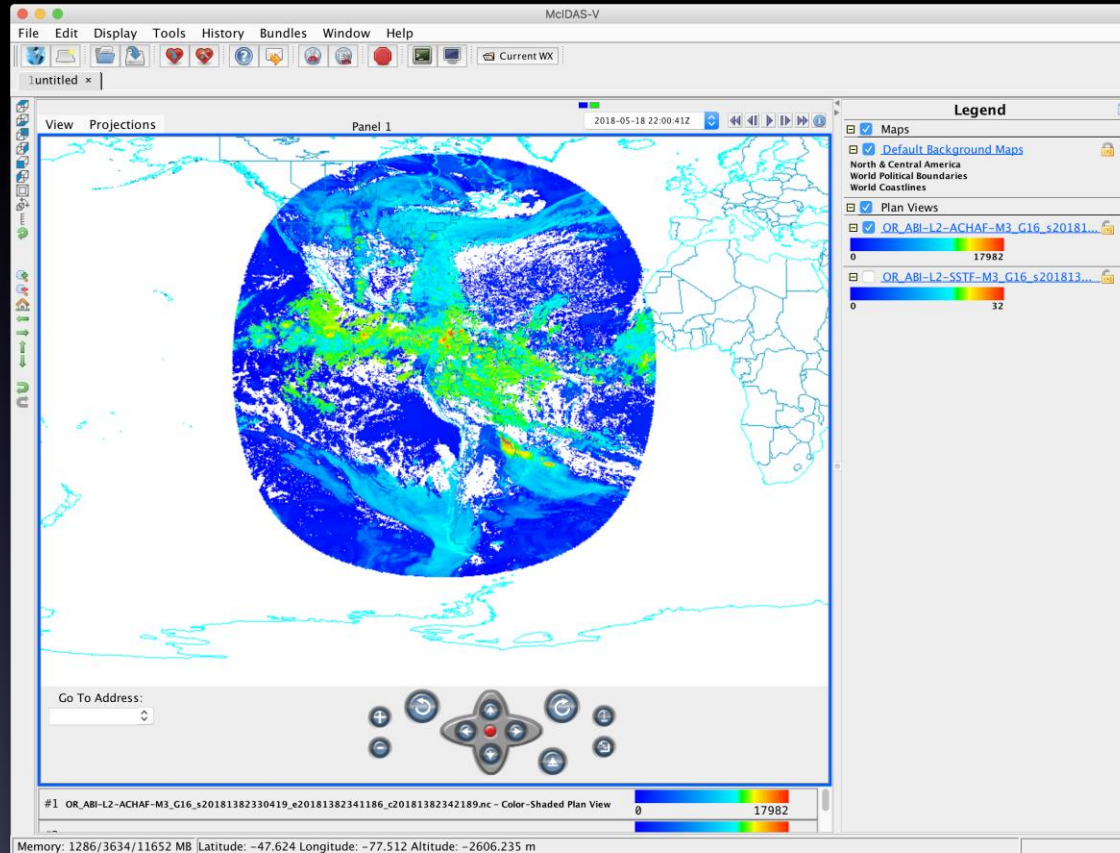
GEONETcast



- Used to monitor polar data uplinks



GEONETcast



Cloud initiatives

- McIDAS client container
- McIDAS ADDE server container
- Fanout server container



Questions?