

# LRGS Overview

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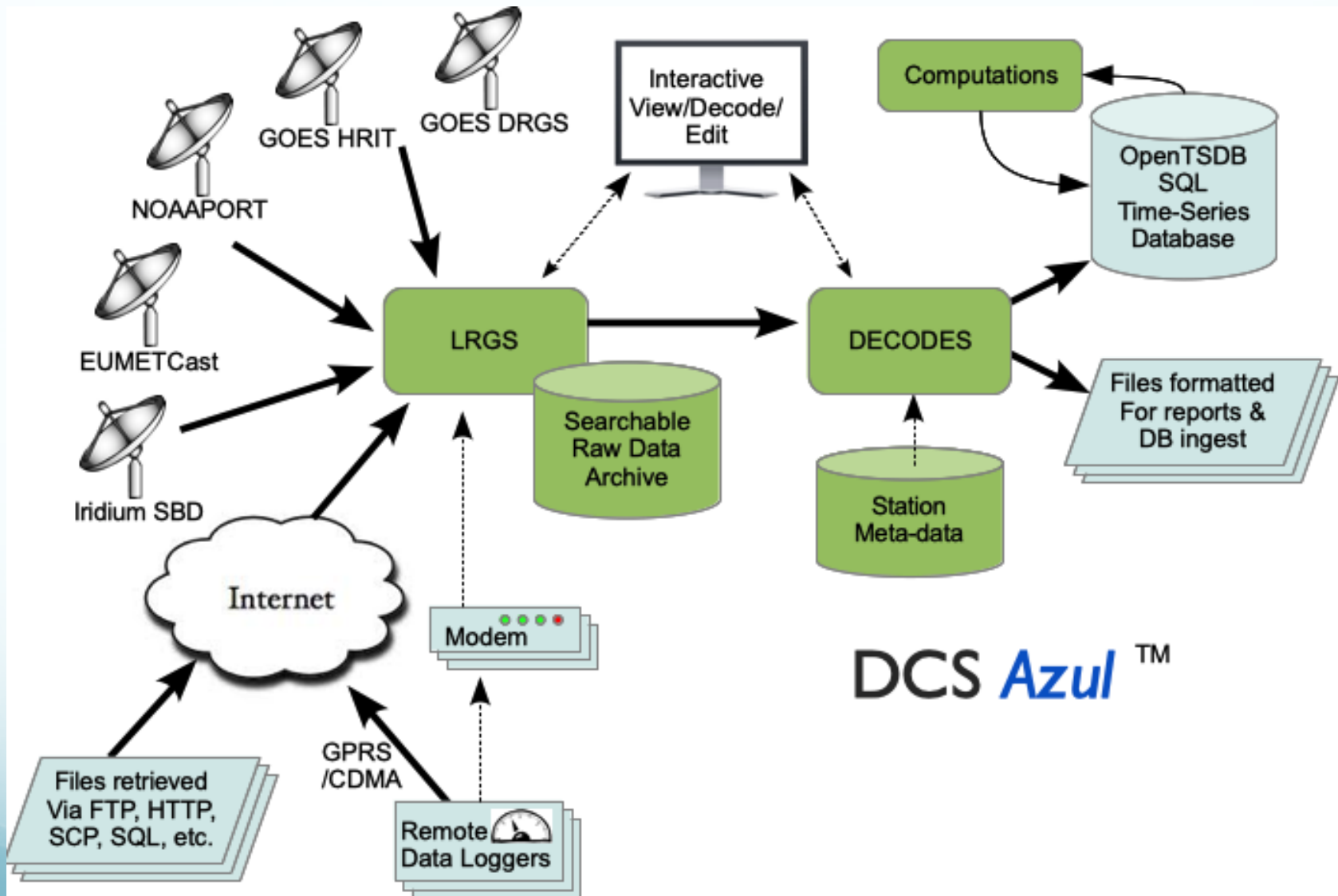
# Agenda

- What is LRGS?
- Monitoring an LRGS
- Data Acquisition for ...
  - GOES
  - Iridium
  - Data Logger Polling
- Data Retrieval Tools
  - Message Browser
  - Command-Line 'getDcpMessages'
  - DECODES
- DCP Monitor

# What is LRGS?

(Local Readout Ground Station)  
(Lancaster Royal Grammar School)  
(Linear Regression by Gibbs Sampling)  
(Lakes Region Girls Softball)  
(Long-term Research Grant Scheme)

# LRGS



# Monitoring LRGS via Web

https://dcs1.noaa.gov/Account/Login

NOAA HOME WEATHER OCEANS FISHERIES CHARTING SATELLITES CLIMATE RESEARCH COASTS CAREERS

**NOAA** GOES DATA COLLECTION SYSTEM  
OFFICE OF SATELLITE AND PRODUCT OPERATIONS

>> Operational Notices  
12/14/2017 17:39 UTC

>> Help Desk  
24/7 Operations

>> System Information

>> Program Information

>> DADDS File Downloads  
03/16/2018 14:00 UTC  
pdts\_compressed.txt  
chans\_by\_baud.txt

>> Wallops Webservers  
dcs1.noaa.gov  
dcs2.noaa.gov

>> NSOF Webservers  
dcs3.noaa.gov  
dcs4.noaa.gov

>> **LRGS Status**

DCS Administration and Data Distribution  
NOAA's System for Managing and Providing Access to Data from GOES DC

**DADDS DCS1**  
User Login

Email

Password

**SIGN IN**

- Need a Login? Click
- Forgotten Password
- DCS Field Test? Click
- Need Help? Click
- 24/7 Technical Support
- DCS Operations

**Submit an Application for GOES DCS SYSTEM**

**Notice to Users**

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

# LRGS Summary Status

## LRGS Summary Status

UTC: March 16, 2018 14:25:25 (Day 075)

<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.wcda.noaa.gov">cdadata.wcda.noaa.gov</a>	03/16 14:25:23	OK	DRGS:Active	99.55%	99.55%	15403	102	9.1
<a href="http://cdabackup.wcda.noaa.gov">cdabackup.wcda.noaa.gov</a>	03/16 14:25:00	OK	DRGS:Active	99.56%	99.56%	15156	35	9.1
<a href="http://cdadrot.wcda.noaa.gov">cdadrot.wcda.noaa.gov</a>	03/16 14:25:18	OK	DOMSAT:Active	99.61%	99.61%	15291	11	9.1
<a href="http://nlrgs1.noaa.gov">nlrgs1.noaa.gov</a>	03/16 14:18:22	OK	DRGS:Active	99.55%	99.55%	11229	6	9.1
<a href="http://nlrgs2.noaa.gov">nlrgs2.noaa.gov</a>	03/16 14:23:28	OK	DRGS:Active	99.57%	99.57%	14379	5	9.1
<a href="http://lrgseddn1.cr.usgs.gov">lrgseddn1.cr.usgs.gov</a>	03/16 14:25:25	OK	DDS:Active	99.55%	99.55%	15378	59	9.1
<a href="http://lrgseddn2.cr.usgs.gov">lrgseddn2.cr.usgs.gov</a>	03/16 14:25:21	OK	DDS:Active	99.56%	99.56%	15551	30	9.1
<a href="http://lrgseddn3.cr.usgs.gov">lrgseddn3.cr.usgs.gov</a>	03/16 14:25:18	OK	DDS:Active	99.55%	99.55%	15344	25	9.1

# LRGS Status Detail

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

UTC: March 16, 2018 14:27:55 (Day 075)

(Time reported by LRGS)

System Status: Running

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

## Archive Statistics

Messages In Storage: **24956965**

Oldest Msg Time: **02/13 23:59:52**

Next Idx #: **493676**

## Hourly Data Collection Statistics

<i>Hour:</i>	<i>7-8</i>	<i>8-9</i>	<i>9-10</i>	<i>10-11</i>	<i>11-12</i>	<i>12-13</i>	<i>13-14</i>	<i>14-15</i>
GOES DRGS (Good/ParErr):	<b>68741 / 316</b>	<b>68612 / 322</b>	<b>68756 / 272</b>	<b>68524 / 296</b>	<b>68438 / 304</b>	<b>68915 / 318</b>	<b>68757 / 282</b>	<b>34313 / 150</b>
DDS Recv (Good/ParErr):	<b>33869 / 165</b>	<b>33789 / 167</b>	<b>33867 / 151</b>	<b>33735 / 151</b>	<b>33728 / 164</b>	<b>33941 / 173</b>	<b>33867 / 152</b>	<b>16847 / 78</b>
Archived (Good/ParErr):	<b>33852 / 164</b>	<b>33798 / 162</b>	<b>33855 / 147</b>	<b>33756 / 145</b>	<b>33712 / 160</b>	<b>33945 / 171</b>	<b>33874 / 149</b>	<b>16842 / 74</b>

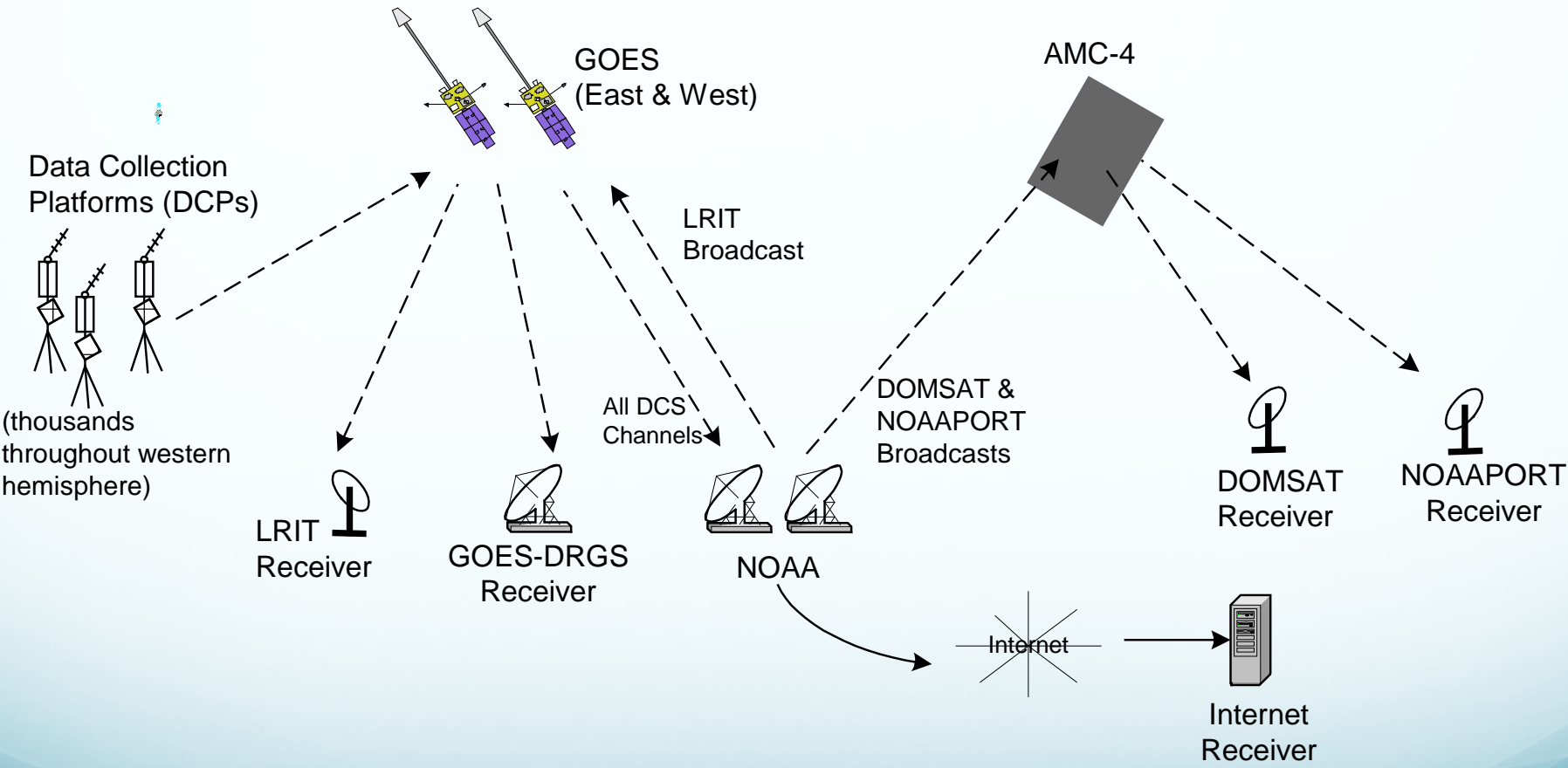
## Downlink Statistics

<i>Downlink Name</i>	<i>Last Msg Rcv Time</i>	<i>Last Seq Num</i>	<i>Link Status</i>	<i>Link Params</i>
DRGS:Microcom-DRGS-BE	03/16 14:27:55	64351	Connected	
DRGS:Microcom-DRGS-PE	03/16 14:27:55	64353	Connected	
DRGS:Microcom-DRGS-BW	03/16 14:27:55	54820	Connected	
DRGS:Microcom-DRGS-PW	03/16 14:27:55	54820	Connected	
DDS:EDDN	03/16 14:27:55	-1	Real-Time	Primary
DDS:CDA-BACKUP	(none)	-1	Ready	Primary
DDS:NLRGS1	(none)	-1	Disconnected	Primary

## Client Statistics

<i>Slot</i>	<i>Host Name</i>	<i>User</i>	<i>Msg Count</i>	<i>Last Activity Time</i>	<i>Last Msg Time</i>	<i>Status</i>
0	-	mtwatr	1	03/16 14:27:54	03/16 14:11:05	running
1	-	mtwatr	0	03/16 14:27:55	03/14 15:04:05	running

# Data Acquisition for GOES

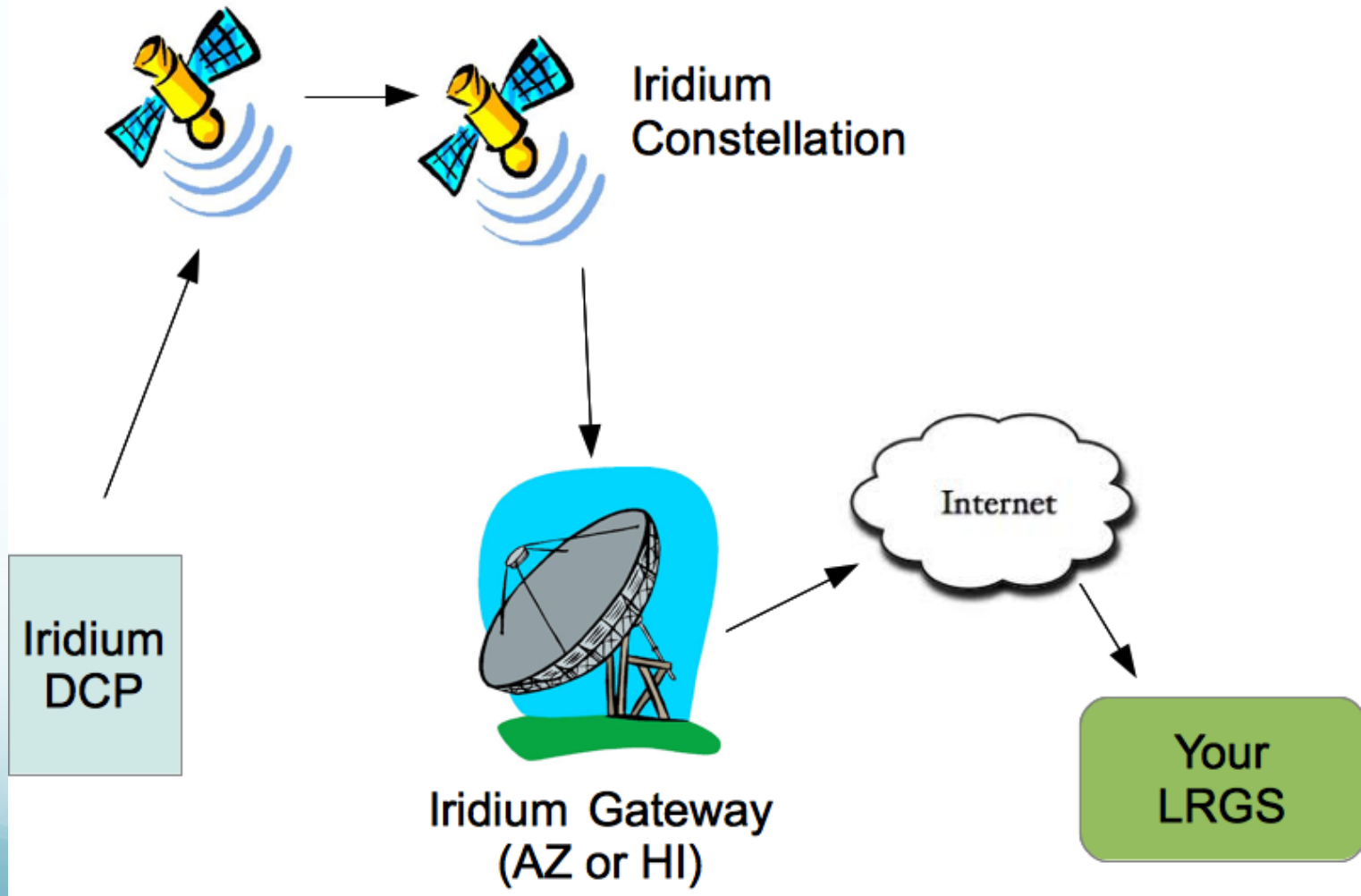




# LRGS for GOES DCPs

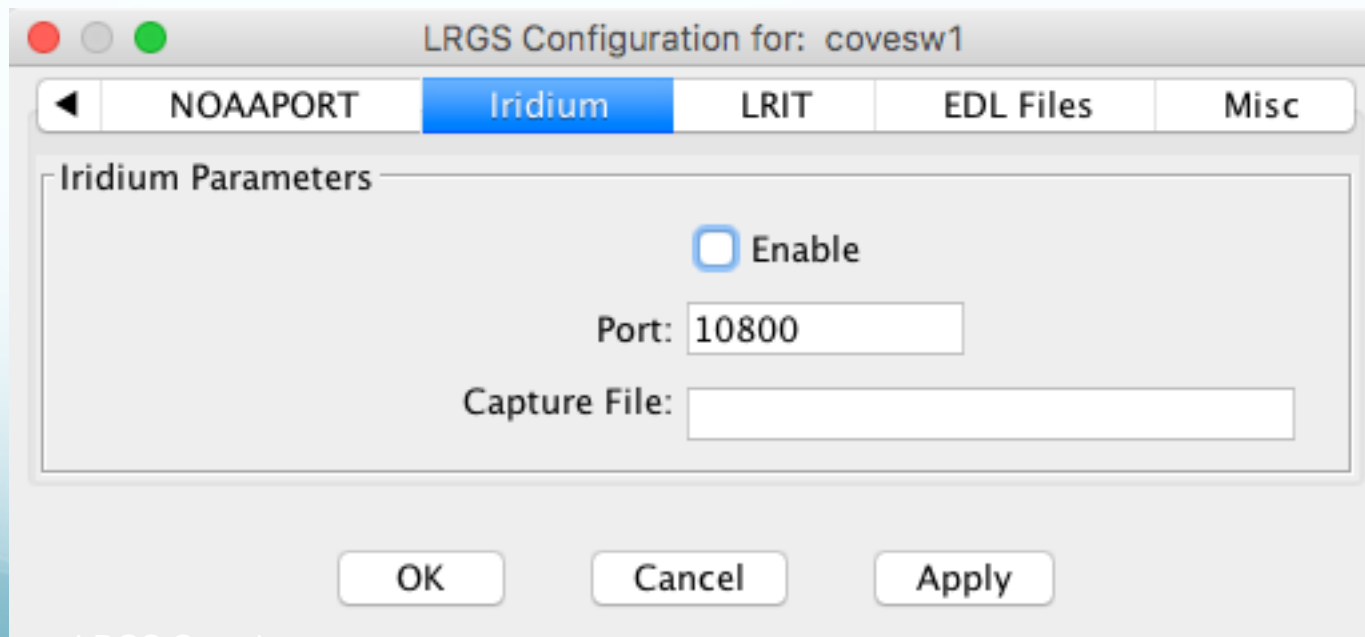
- Receives GOES Data from ...
  - Network link to another LRGS (aka network backup)
  - DRGS/DAMS-NT
  - HRIT (DAMS-NT or File interface)
    - *Supports new HRIT Formats!*
  - NOAAPORT
  - DOMSAT (RIP)
- Configuration Panel for each of the above
- Stores the First/Best copy of each message
  - *No need to specify priorities.*

# Data Acquisition for Iridium



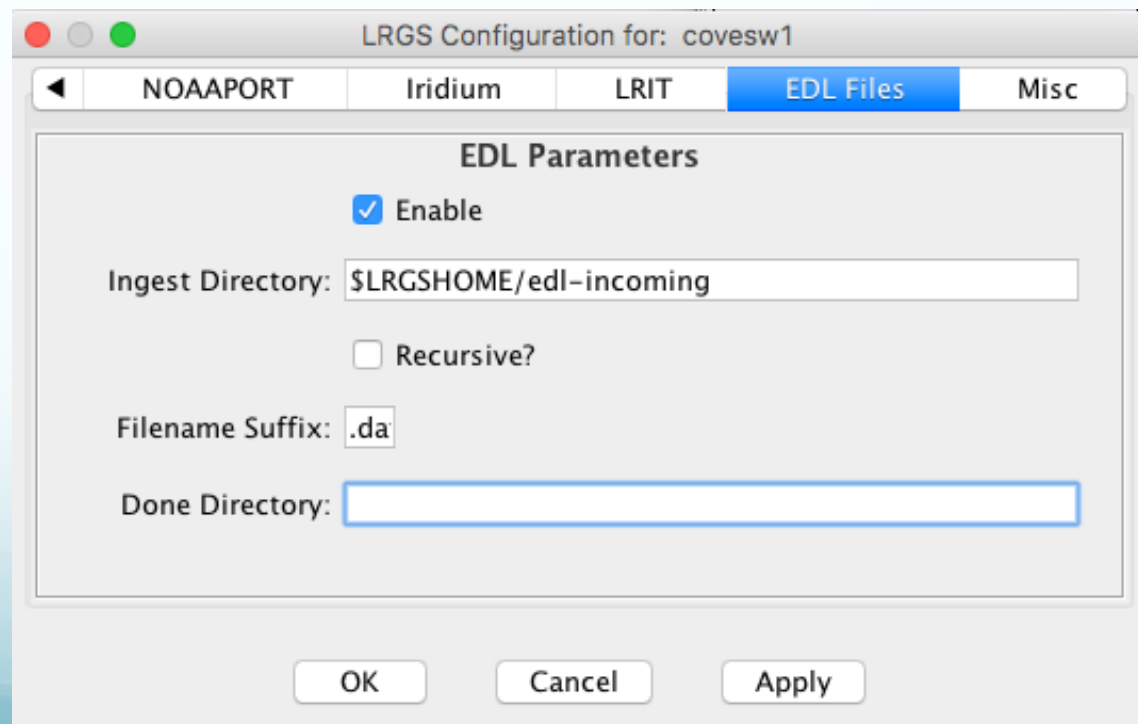
# LRGS Iridium Config

- Port: (default=10800) LRGS opens listening socket on that port for incoming connections from Iridium Gateway
- Capture File: Raw data from each iridium session stored here – for debugging/troubleshooting only.



# Data Acquisition for Data Logger Polling

- Monitor a hot directory for incoming EDL (Electronic Data Logger) files.
  - Files must have EDL-style header containing
- Used by Polled-Logger (network, cellular, modem) interface
- Files are ingested into LRGS archive and then distributed to clients.



# Required EDL Header

- LRGS needs to know how to index an EDL message by unique station identifier and time.

- Example:

```
//STATION RMTH  
//SOURCE pakbus  
//DEVICE END TIME 171102 041919 +0000  
//POLL START 171102 041919 +0000  
//POLL STOP 171102 041932 +0000
```

- The header *must* contain:
  - STATION – Unique Identifier – serves same purpose as DCP Address or IMEI
  - Some time stamp to serve as message transmit time

# Rtstat Screen Showing EDL Files Coming In

## Archive Statistics

Messages In Storage: **107775653**

Oldest Msg Time: **07/11 23:58:00**

Next Idx #: **564972**

## Hourly Data Collection Statistics

<i>Hour:</i>	<i>7-8</i>	<i>8-9</i>	<i>9-10</i>	<i>10-11</i>	<i>11-12</i>	<i>12-13</i>	<i>13-14</i>	<i>14-15</i>
DOMSAT (Good/ParErr):	<b>33380 / 185</b>	<b>33314 / 205</b>	<b>33529 / 176</b>	<b>33442 / 159</b>	<b>33394 / 167</b>	<b>33517 / 183</b>	<b>33374 / 314</b>	<b>15726 / 102</b>
DOMSAT Dropped:	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>
DDS Recv (Good/ParErr):	<b>33364 / 220</b>	<b>33289 / 241</b>	<b>33520 / 203</b>	<b>33437 / 178</b>	<b>33397 / 181</b>	<b>33513 / 203</b>	<b>33389 / 363</b>	<b>15696 / 121</b>
LRIT (Good/ParErr):	<b>34375 / 190</b>	<b>34345 / 209</b>	<b>35538 / 186</b>	<b>34462 / 164</b>	<b>34314 / 170</b>	<b>33583 / 182</b>	<b>35221 / 334</b>	<b>15624 / 100</b>
EDL Ingest:	<b>181</b>	<b>186</b>	<b>190</b>	<b>184</b>	<b>185</b>	<b>190</b>	<b>191</b>	<b>195</b>
Archived (Good/ParErr):	<b>33625 / 204</b>	<b>33562 / 233</b>	<b>33780 / 207</b>	<b>33679 / 189</b>	<b>33643 / 181</b>	<b>33771 / 205</b>	<b>33638 / 374</b>	<b>15911 / 122</b>

## Downlink Statistics

<i>Downlink Name</i>	<i>Last Msg Rcv Time</i>	<i>Last Seq Num</i>	<i>Link Status</i>	<i>Link Params</i>
DomsatRecv	11/08 14:26:26	5209	Active	
LRIT:142.94.146.240	11/08 14:26:22	87493	Connected	
EDL-Input	11/08 14:17:35	102707	Enabled	
DDS:CDADATA	11/08 14:26:21	-1	Real-Time	Primary
DDS:EDDN1	11/05 17:13:03	-1	Ready	Primary
DDS:OpenDCSU	(none)	-1	Unused	Primary
DDS:EDDN2	(none)	-1	Ready	Primary
DDS:CDABACKUP	(none)	-1	Ready	Primary

# Why put EDL Messages in LRGs?

- Centralize polling (and other methods for collection) in one place.
- Distribute EDL Messages throughout your LRGs network
- Distribute EDL Messages to other agencies
- Automatic short term backup, just like GOES DCP messages
  - 120 days is typical

# Data Retrieval Tools

Download available from NOAA  
All 100% Java (Runs on any OS)





# Search Criteria Editor

Search Criteria Editor

File

Date/Time

Since:

Until:  Stop after current data is retrieved.

Apply To:   Ascending time order (may slow retrievals)

Platform Selection

Type	Value
Platform Name	ALOI4
Platform Name	Arkadelphia
Platform Name	BFD
Platform Name	BMD
Platform Name	BMD-tailwater
Platform Name	CRAI4
Platform Name	Gathright-Adits
Platform Name	Gathright-Dam
Platform Name	GBYT2
Platform Name	Hanover
Platform Name	Moomaw
Platform Name	MROI4
Platform Name	OKVI4
Platform Name	ROWI4

Buttons: Enter Platform ID, Select Platform, Select from PDT, Add Network List, Add GOES Channel, Edit, Remove, Clear

Platform/Message Types

- GOES Self Timed
- GOES Random
- Quality Notifications
- GOES Spacecraft:
- Iridium
- Network/Modem DCP
- Parity:

Buttons: Clear All, Select All

# Command-Line getDcpMessages

- Useful for automating retrievals in a script.

```
mmaloney-mbp:CWMS30 mmaloney$ bin/getDcpMessages -h lrgseddn3.cr.usgs.gov -u covesw -f MessageBrowser.sc -n
CE1842E018075174514G51-2NN073EXE00023 BST@TpAkx@Td@TjAkx@T|
CE1842E018075164514G50-2NN073EXE00023 BST@TtAkW@T}@TpAkx@Td
CE25F47818075174337G43-0NN161EXE00227":LL 13 #30 582.05 582.02 582.04 582.04 :RF 13 #30 0.46 0.46 0.46 0.46 :BV
 13 #30 14.2 14.2 14.2 14.2 :G3 13 #30 5.06 5.06 5.06 5.06 :G4 13 #30 1.31 1.31 1.31 1.31 :G6 13 #30 0.00 0.00
0.00 0.00 :G2 13 #30 0.00 0.00 0.00 0.00
CE25F47818075164337G43+0NN161EXE00227":LL 13 #30 582.04 582.04 582.04 582.06 :RF 13 #30 0.46 0.46 0.46 0.46 :BV
 13 #30 14.2 14.2 14.2 14.2 :G3 13 #30 5.06 5.06 5.06 5.06 :G4 13 #30 1.31 1.31 1.31 1.31 :G6 13 #30 0.00 0.00
0.00 0.00 :G2 13 #30 0.00 0.00 0.00 0.00
CE2DD63218075170623G47+0NN049EXE00078 BST@H~@Ed@Hu@H~@Ed@Hu@H}@Ed@Hu@H}@Ed@Ht@H}@Ed@Ht@H}@Ed@Ht@H}@Ed@Ht@H}@Ed@
Htj
```

# DECODES

- Capabilities:
  - Receive data from:
    - LRGS, files, web scrape, logger-polling, sockets, FTP, SCP
  - DECODE any (?) DCP using GOES:
    - ASCII, Pseudo-Binary (several flavors), pure binary
  - Convert data to wide variety of formats:
    - SHEF, CSV, XML, JSON, ZRXP, many more
  - Send data directly to Time Series Databases:
    - Currently CWMS and HDB
  - Write output data to:
    - Files, Directories, Sockets, Pipes
  - Extensible
  - 100% Java – Runs on any modern OS

# DCP Monitor Web App

- Available at [www.covesw.com](http://www.covesw.com)
  - Select group and # days backlog.
  - Contact info@covesw to have your DCPs added as a group.

**Cove Software DCP Monitor**

gth

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GOES List

---

GOES Channel

---

Polled DCP

---

Iridium

Show current day plus  days in the past.

# DCP Monitor Web App

- Initial screen shows a whole day's messages for a selected group of DCPs.
  - Underscore = good message, other chars = failure codes

GOESList-oriole x +

www.covesw.com/dcpmon/dcpmon-top.jsf

MVR-RIVERGAGES-DAS for 14 March 2018

DCP address	DCP name	Agency	First xmit time	Failure codes by hour of transmission																							
				0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
<a href="#">Channel 29</a>																											
16F8178C	<a href="#">SIRI2</a>	MVR	00:03:40	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
<a href="#">Channel 35</a>																											
DE255304	<a href="#">FLN14</a>	MVR	00:14:00	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
DE25856C	<a href="#">CRWI4</a>	MVR	00:14:30	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
DF0047FE	<a href="#">MGOI4</a>	MVR	00:20:40	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
<a href="#">Channel 38</a>																											
553250E2	<a href="#">LANM5</a>	MVR	00:39:10	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
55326578	<a href="#">DOBM5</a>	MVR	00:39:20	_V	_V	_V	_V	_V	_V	_V	_V	_V	_V	_V	_V	_V	_V	_V	_V	_V	_V	_V	_V	_V	_V	_V	_V
5532760E	<a href="#">TRCM5</a>	MVR	00:39:30	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
<a href="#">Channel 49</a>																											
CE7644BA	<a href="#">HUSM5</a>	MVR	00:00:00	_W	_W	_W	_W	_W	_W	_W	_W	_W	_W	_W	_W	_W	_W	_W	_W	_W	_W	_W	_W	_W	_W	_W	_W
CE88B242	<a href="#">CDLI2</a>	MVR	00:00:20	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
CE637FAC	<a href="#">CRVI4</a>	MVR	00:01:00	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
CE628DD2	<a href="#">CTWI4</a>	MVR	00:01:20	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
CE628300	<a href="#">MROI4</a>	MVR	00:02:00	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
CE632102	<a href="#">BPLI4</a>	MVR	00:02:20	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
CE7CA61A	<a href="#">TAMI4</a>	MVR	00:02:40	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
CE632FD0	<a href="#">MIWI4</a>	MVR	00:03:00	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
CE631498	<a href="#">ALO14</a>	MVR	00:03:20	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
CE63093C	<a href="#">CID14</a>	MVR	00:03:40	_V	_V	_V	_V	_V	_V	_V	_V	_V	_V	_V	_V	_V	_V	_V	_V	_V	_V	_V	_V	_V	_V	_V	_V
CE6307EE	<a href="#">CNE14</a>	MVR	00:04:00	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
CE6344E4	<a href="#">WAPI4</a>	MVR	00:04:20	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_

# Possible Failure Codes

## Failure code legend

_ or G	Good DCP Message
?	DCP Message with Parity Error
A	DCP message contained a correctable address error
B	DCP message contained a bad (unknown) address
D	DCP message was duplicated (i.e. received on multiple channels)
I	DCP message had an invalid address
M	The DCP message for the referenced platform was missing (not received in its proper time slice)
N	The referenced platform has a non-complete entry in the DAPS Platform Description Table (PDT)
Q	DCP message had bad quality measurements
T	DCP message was received outside its proper time slice (early/late)
U	DCP message was unexpected
W	DCP message was received on the wrong channel
C	Excessive carrier before start of message
S	Low signal strength
F	Excessive frequency offset
X	Bad modulation index
V	Low battery voltage



# DCP Monitor Web App

- Click DCP Name to view list of msgs for day:

## GREI2

DCP Address: CE752652  
First transmit window: 00:54:20  
Self-timed channel: 49  
Transmission interval: 01:00:00  
Transmission window: 10  
Baud rate: 300

GOES channel	Date	Transmit start	Transmit end	Window start	Window end	Failure code	Signal strength	Message length	Frequency offset	Modulation index	DRGS code	Battery voltage
49	03/14/2018	<a href="#">00:54:27.8</a>	<a href="#">00:54:30.0</a>	00:54:20	00:54:30	GT	45	91	0	N	UB	12.2
49	03/14/2018	<a href="#">01:54:27.8</a>	<a href="#">01:54:30.0</a>	01:54:20	01:54:30	GT	46	91	0	N	UP	12.2
49	03/14/2018	<a href="#">02:54:27.8</a>	<a href="#">02:54:30.0</a>	02:54:20	02:54:30	GT	45	91	0	N	UP	12.2
49	03/14/2018	<a href="#">03:54:27.8</a>	<a href="#">03:54:30.0</a>	03:54:20	03:54:30	GT	45	91	0	N	UP	12.2
49	03/14/2018	<a href="#">04:54:27.8</a>	<a href="#">04:54:30.0</a>	04:54:20	04:54:30	GT	45	91	0	N	UB	12.2
49	03/14/2018	<a href="#">05:54:27.8</a>	<a href="#">05:54:30.0</a>	05:54:20	05:54:30	GT	45	91	0	N	UB	12.2
49	03/14/2018	<a href="#">06:54:27.8</a>	<a href="#">06:54:30.0</a>	06:54:20	06:54:30	GT	46	91	0	N	UP	12.2
49	03/14/2018	<a href="#">07:54:27.8</a>	<a href="#">07:54:30.0</a>	07:54:20	07:54:30	GT	45	91	0	N	UP	12.2
49	03/14/2018	<a href="#">08:54:27.8</a>	<a href="#">08:54:30.0</a>	08:54:20	08:54:30	GT	45	91	0	N	UB	11.9
49	03/14/2018	<a href="#">09:54:27.8</a>	<a href="#">09:54:30.0</a>	09:54:20	09:54:30	GT	46	91	0	N	UP	11.9
49	03/14/2018	<a href="#">10:54:27.8</a>	<a href="#">10:54:30.0</a>	10:54:20	10:54:30	GT	45	91	0	N	UP	11.9
49	03/14/2018	<a href="#">11:54:27.8</a>	<a href="#">11:54:30.0</a>	11:54:20	11:54:30	GT	45	91	0	N	UP	11.9
49	03/14/2018	<a href="#">12:54:27.8</a>	<a href="#">12:54:30.0</a>	12:54:20	12:54:30	GT	45	91	0	N	UP	11.9
49	03/14/2018	<a href="#">13:54:27.8</a>	<a href="#">13:54:30.0</a>	13:54:20	13:54:30	GT	45	91	0	N	UP	14.1
49	03/14/2018	<a href="#">14:54:27.8</a>	<a href="#">14:54:30.0</a>	14:54:20	14:54:30	GT	45	91	0	N	UP	13.4
49	03/14/2018	<a href="#">15:54:27.8</a>	<a href="#">15:54:30.0</a>	15:54:20	15:54:30	GT	45	91	-1	N	UP	13.7
49	03/14/2018	<a href="#">16:54:27.8</a>	<a href="#">16:54:30.0</a>	16:54:20	16:54:30	GT	45	91	-1	N	UP	13.7
49	03/14/2018	<a href="#">17:54:27.8</a>	<a href="#">17:54:30.0</a>	17:54:20	17:54:30	GT	45	91	-1	N	UP	13.7



# DCP Monitor Web App

- Click Start Time to view Raw & Decoded Message

## GREI2 - 03/14/2018 09:54:27.8 (UTC) Salt Creek near Greenview, IL (USGS)

### Message Parameters:

DCP Address: CE752652	Quality Codes: GT
Signal Strength: 46 dBm	Frequency Offset: 0 (* 50 Hz)
GOES Channel: 49E	Message Length: 54 (bytes)
DRGS code: UP	Battery: 11.9 (volts)
Carrier Start (UTC): 09:54:27.8	Carrier Stop (UTC): 09:54:30.0

### Raw Data:

```
CE75265218073095428G46-0NN049EUP00054 BCT@D^@D_@D^@D_@D_@D^@D^@D^A~gA~gA~gA~gA~gA~gA~ge
```

### Decoded Data:

UTC	HG HG ft	PC PC in	VB VB V
03/14/2018 08:00:00	2.88	81.03	
03/14/2018 08:15:00	2.88	81.03	
03/14/2018 08:30:00	2.88	81.03	
03/14/2018 08:45:00	2.87	81.03	
03/14/2018 09:00:00	2.87	81.03	11.873
03/14/2018 09:15:00	2.86	81.03	
03/14/2018 09:30:00	2.87	81.03	
03/14/2018 09:45:00	2.86	81.03	

# Thank You!

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