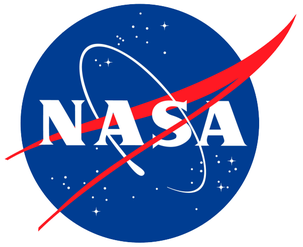
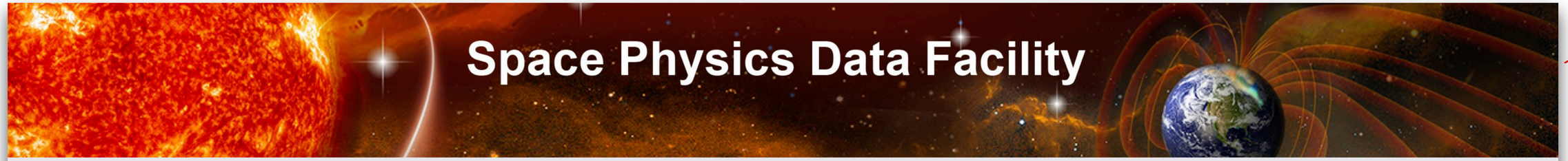


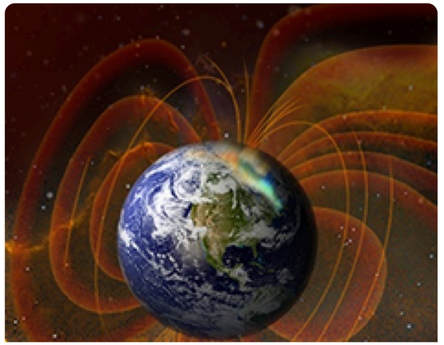
Software and Services at the Space Physics Data Facility (SPDF)

July 8, 2026

Eric Grimes on behalf of the SPDF team (NASA-SPDF-Support@nasa.onmicrosoft.com)



SPDF Archive



Access to the Space Physics Data Facility (SPDF) public archive by directory, with additional access methods(including web services).

CDAWeb

NASA's Space Physics Data Facility (SPDF)

Heliophysics studies the nature and dynamic interactions of the Sun, the heliosphere, and the plasma environments of the planets and interstellar space. The Heliophysics Digital Resource Library (HDRL) archives and serves the heliophysics data, as a project in the Heliophysics Science Division (HSD) at NASA's Goddard Space Flight Center. **Space Physics Data Facility (SPDF)** is the active and permanent archive for the space physics data, while solar data is archived at Solar Data Analysis Center (SDAC), as components of the HDRL, per NASA's Heliophysics Science Data Management Policy. Visit NASA Heliophysics Data for more information, policy, and document templates.

SPDF provides multi-project, cross-disciplinary access to data to enable correlative and collaborative research across discipline and mission boundaries with present and past missions. Many datasets from current missions are updated regularly (even daily), including reprocessed data for older time periods, and SPDF only preserves the latest version. SPDF maintains the CDAWeb data explorer and browsing system, the SSCweb database of spacecraft orbits, the OMNIWeb cross-normalized database, and the Common Data Format (CDF) self-describing science data format and associated software.

News & Announcements

Space Physics Data Facility

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- Linking Missions and Services
- CDAWeb (data browser)
- CDAWeb Inside IDL
- OMNIWeb Plus (now including COHOWeb, ATMOWeb, FTP Browser, HelioWeb and CGM)
- SSCWeb (orbit search)
- 4D Orbit Viewer
- Plot Walk for pre-generated plots
- CDAWeb Audification
- Direct HTTPS file access
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archive by directory, wit
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CDAWeb

& Announcements

Linking SPDF Services with Missions

Click an SPDF service name to check mark (✔) the spacecraft whose data are available.
Click a spacecraft name to check mark (✔) the SPDF services with its data.
See Info for New Users for more information about these data services.

GO =Go to Service's Home Page ⓘ=Show Source Info *= Orbit/Trajectory Data Only

DATA SERVICES:

- **CDAWeb** GO

  High-resolution, current space physics data with graphics and listings from many missions.

- **OMNIWeb Plus** GO

  Hourly-averaged solar wind magnetic field and plasma, etc.

- **Plot Walk** GO

  Browse pregenerated data and orbit plots

- **SPDF FTPS Site** GO

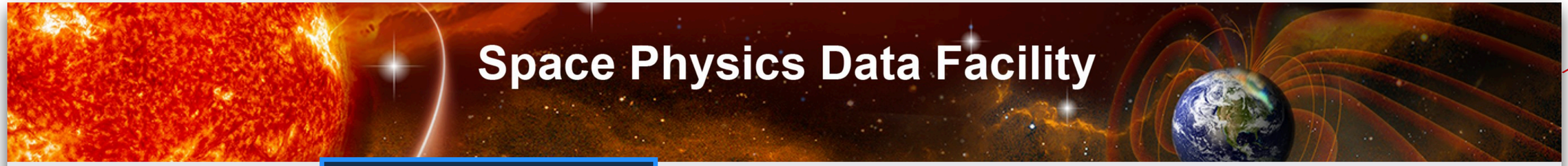
  Read FTP to FTPS information.

SOURCE SPACECRAFT:

- ✔ ACE
- Active*
- Aditya-L1*
- ✔ Aerocube
- Aeros
- ✔ AIM
- Akebono*
- ✔ Alouette (1,2)
- AMPTE
- APEX-MAIN*
- ✔ Apollo
- Aqua*
- Ariel-4*
- ✔ Arase (ERG)
- ARCAD
- ✔ ARTEMIS (1,2)
- Artemis2-Orion
- ASTRID II*
- AE
- Aura*
- ✔ DE
- ✔ ELFIN
- ✔ Endurance
- ✔ Equator-S
- ESCAPADE
- Explorer
- EZIE (A, B, C)
- ✔ FAST
- FIREBIRD*
- ✔ Formosat
- Freja*
- ✔ Galileo*
- Gateway*
- GCOM W1*
- ✔ Genesis
- ✔ Geotail
- ✔ Giotto*
- GOCE*
- ✔ GOES(1-2, 5-19)
- ✔ GOLD
- ✔ GPS
- JUICE*
- ✔ Juno
- Jupiter*
- Kepler*
- KPLO* (Danuri)
- Lagrange Point 1* (L1)
- Landsat*
- ✔ LANL
- LRO*
- LUNA
- Magsat
- ✔ MAP
- Mariner 10
- Mars
- ✔ MAVEN
- ✔ MESSENGER
- ✔ MGS
- Microlab 1*
- Mir*
- ✔ MMS (1-4)
- Reimei
- ✔ Rosetta*
- RHESSI
- ✔ SAMPEX
- ✔ Sakigake*
- San Marco
- Saturn*
- SCATHA*
- SDO*
- SET-1/DSX*
- SMILE*
- ✔ SNOE
- ✔ SOHO
- ✔ SOLAR-1
- ✔ Solar Orbiter
- SORCE*
- Spartan-A
- Spitzer*
- SPORT*
- Sputnik 1*
- ✔ STEREO (A, B)

OTHER DATA SOURCES:

- ✔ Planet & Comet Positions
- ✔ Ground-based
- Activity Indices



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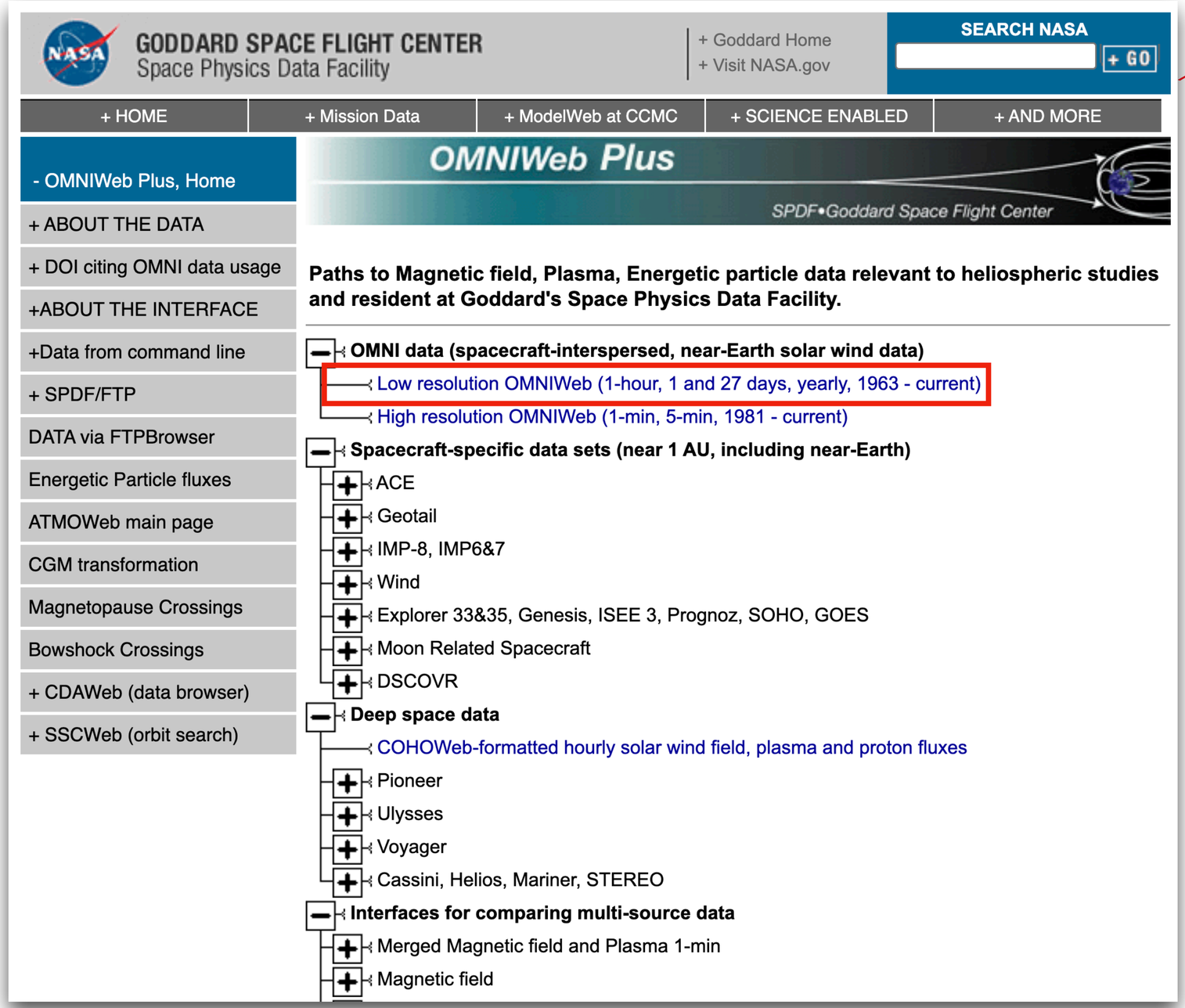
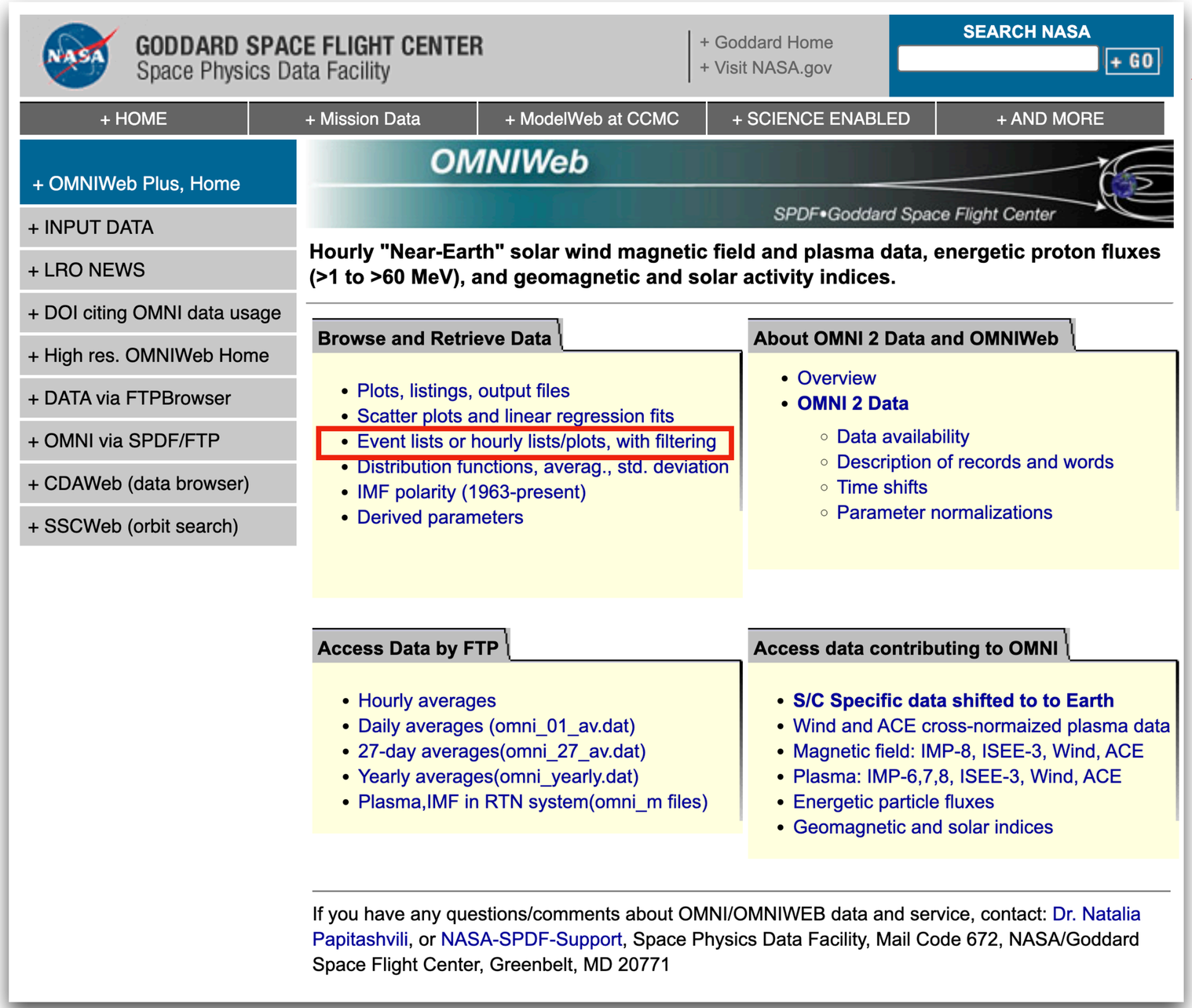
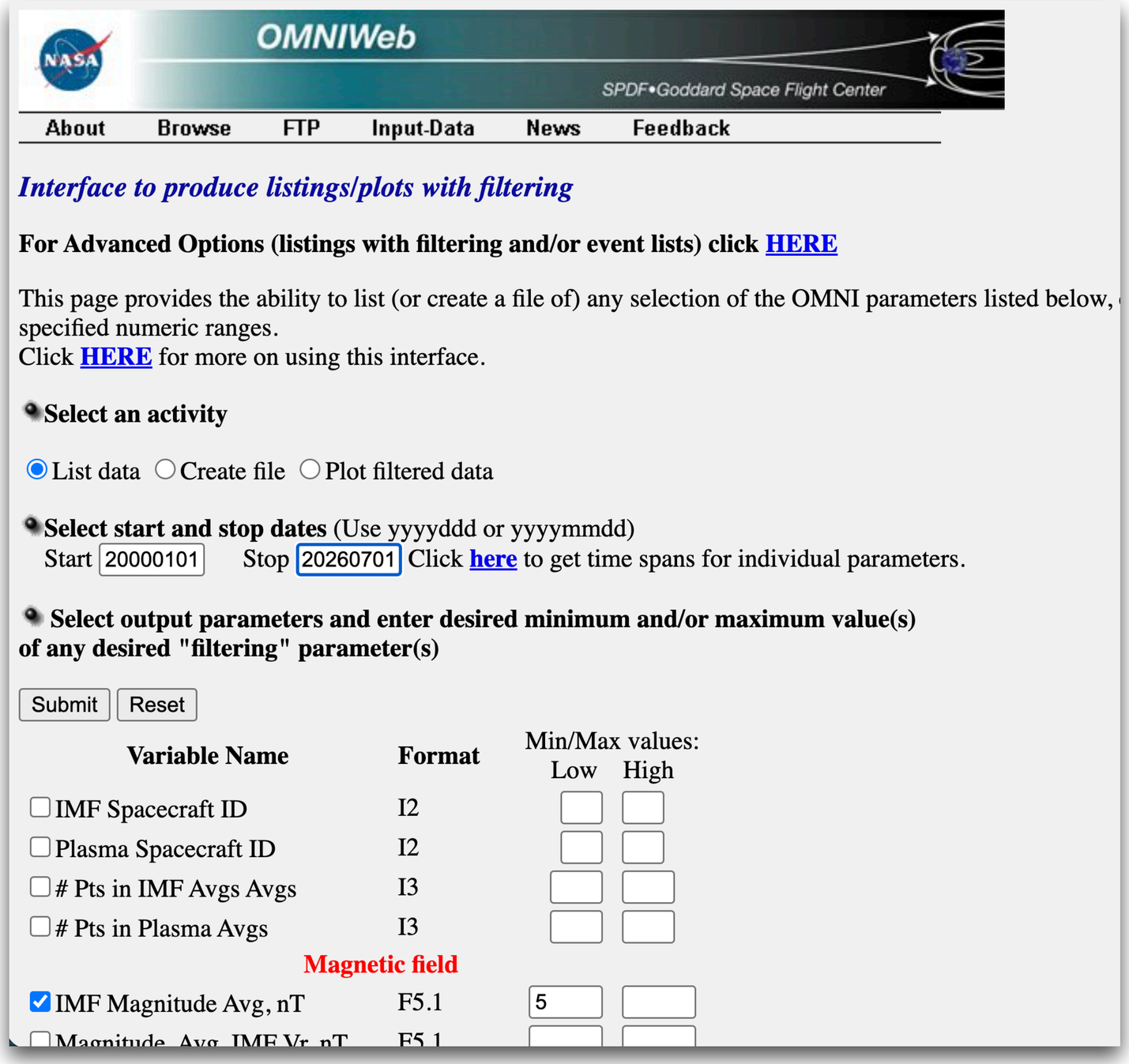
- Allows listing, plotting solar wind data that has been time shifted to the magnetopause



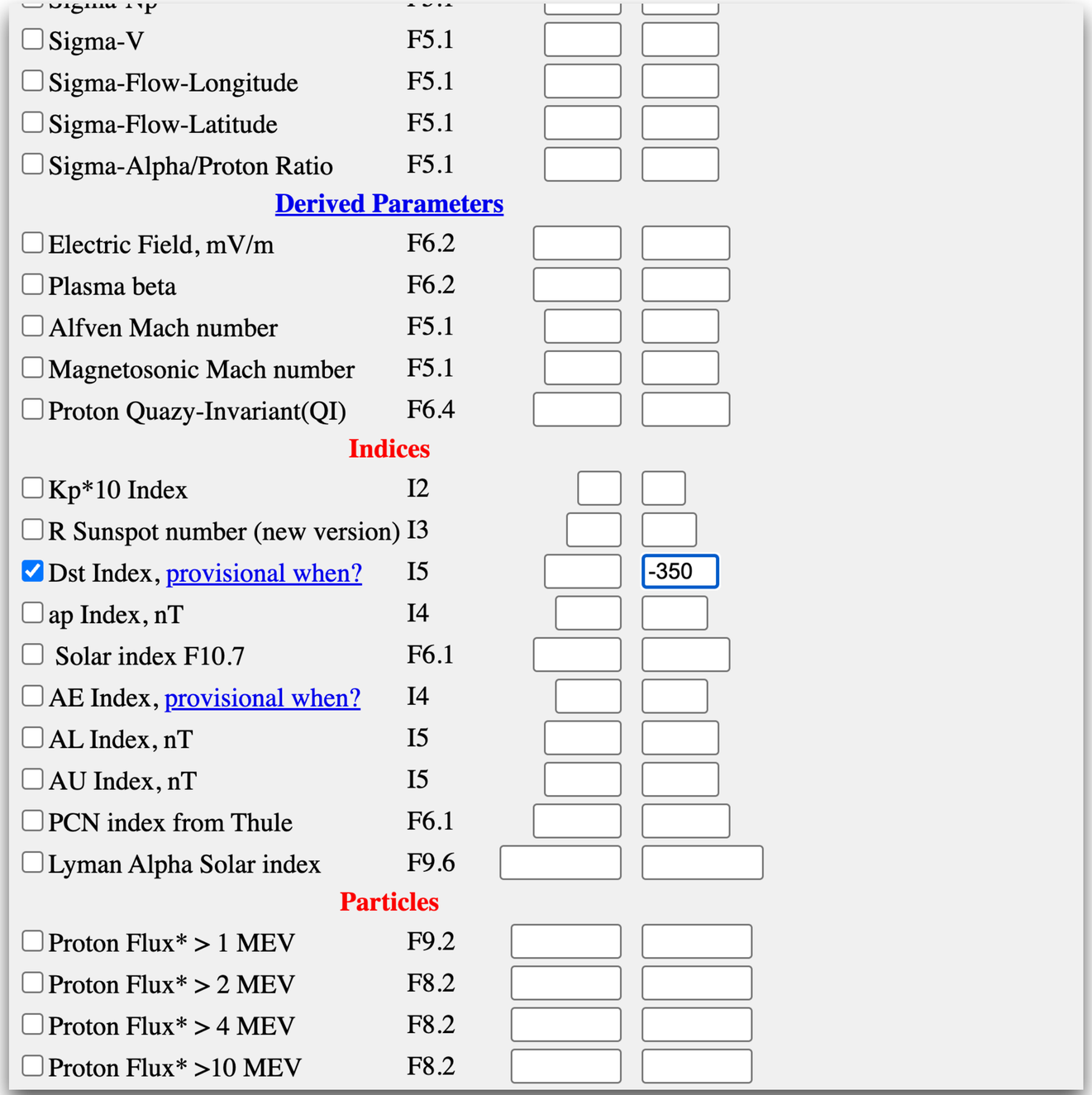
- A lot of features, but we're going to use it to find some large geomagnetic storms



- We’re setting the start and stop dates to from Jan 2000 through July 2026
- Note that you can filter the variables by min/max value for that variable



- We used the default parameters, but also selected Dst and set the max value to -350 nT (so the output should be limited to very large storms)



- The first 3 parameters are the default selections, and the 4th is Dst (which we're using to limit)
- We can see the large May 2024 storm

Listing for omni2 data from 20000101 to 20260701
Number of Records=11
Constraints on parameter values:
Scalar B, nT (5, 99999999)
SW Proton Density, N/cm^3 (0., 20)
Dst-index, nT (-99999, -350)

```
#N Parameters:
 1 Scalar B, nT
 2 BZ, nT (GSM)
 3 SW Proton Density, N/cm^3
 4 Dst-index, nT

YEAR DOY HR    1     2     3     4
2001  90  7  43.1 -36.3  13.1  -351
2001  90  8  37.6  19.4  17.5  -387
2003 324 18  40.4 -37.5  18.7  -396
2003 324 20  26.5 -17.2  16.7  -422
2003 324 21  25.5 -17.8  14.9  -422
2003 324 22  24.7 -14.8   9.5  -405
2004 313  5  29.3 -28.0   6.6  -368
2004 313  6  25.5 -23.5   5.5  -374
2024 132  3  34.7 -22.8  17.5  -395
2024 132  4  39.6 -18.9   8.4  -389
2024 132  5  38.5   5.9  19.9  -358
```

If you have any questions about OMNIWeb Plus Interface,contact:
Dr. Natalia Papitashvili, Code 672, Greenbelt, MD 20771.

Last Update: July 07, 2026, NEP.

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SSC Database Contents

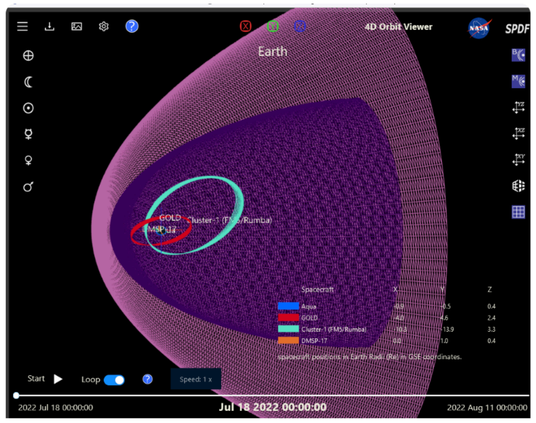
SSCWEB Spacecraft Availability & Time Ranges

Satellite	res(sec)	Time Range (yyyy doy hr)	pred/def
ace	720	[1997 237 17.80000, 2024 56 17.40000]	definitive
		(2024 56 17.40000, 2024 78 23.80000]	predictive
active	60	[1989 272 0.00000, 1991 277 8.00000]	definitive
aec	60	[1973 351 8.01667, 1978 344 0.00000]	definitive
aed	60	[1975 290 0.00000, 1976 60 0.00000]	definitive
aee	60	[1975 324 21.06667, 1981 161 0.00000]	definitive
aerocube6a	60	[2014 180 0.00000, 2024 56 11.56667]	definitive
		(2024 56 11.56667, 2024 77 0.00000]	predictive
aerocube6b	60	[2014 180 0.00000, 2024 57 1.33333]	definitive
		(2024 57 1.33333, 2024 78 0.00000]	predictive
aim	60	[2007 115 0.00000, 2017 5 0.00000)	predictive
		[2017 5 0.00000, 2024 56 20.26667]	definitive
		(2024 56 20.26667, 2024 77 0.00000]	predictive

Spacecraft Availability & Time Ranges

Data Provenance

4-D Orbit Viewer



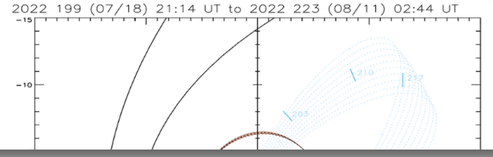
4D Orbit Viewer provides an interactive 4-D animation of spacecraft orbits over time.

Locator Listing

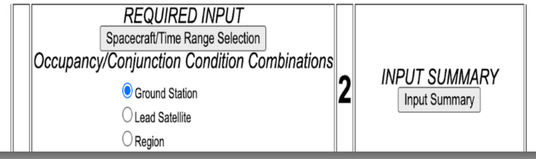
Time	Sat.	GSE (RE)			Magnetic	Spacecraft
yyyy ddd hh:mm:ss		X	Y	Z	FldStrth	Region
2023 220 00:00:00	goes17	1.76	6.22	1.38	103.09	D_Msphere
2023 220 00:01:00	goes17	1.74	6.23	1.39	103.01	D_Msphere
2023 220 00:02:00	goes17	1.71	6.23	1.40	102.92	D_Msphere
2023 220 00:03:00	goes17	1.68	6.24	1.41	102.83	D_Msphere
2023 220 00:04:00	goes17	1.66	6.24	1.42	102.75	D_Msphere
2023 220 00:05:00	goes17	1.63	6.25	1.43	102.66	D_Msphere
2023 220 00:06:00	goes17	1.60	6.25	1.44	102.58	D_Msphere
2023 220 00:07:00	goes17	1.58	6.25	1.45	102.49	D_Msphere
2023 220 00:08:00	goes17	1.55	6.26	1.45	102.40	D_Msphere
2023 220 00:09:00	goes17	1.52	6.26	1.46	102.32	D_Msphere

Locator provides a table of spacecraft coordinate locations in various coordinate systems with other location-related information. (THEMIS Saved Examples)

2-D Locator Graphics



Conjunction Query



Coordinate Converter

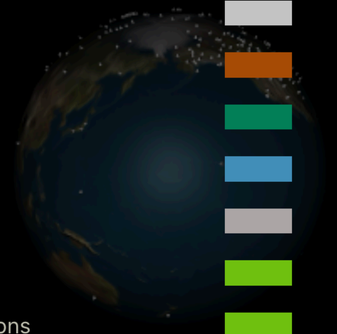
Select Spacecraft

4D Orbit Viewer
v0-2025.10.06.1331

SPDF

all | available | selected

Select	Name	Color	Shape
☐	Landsat8		cone
☐	Landsat9		cone
☐	Mars		sphere
☐	Mercury		sphere
☐	MetOp-B (MetOp-1)		sphere
☑	MMS 1		sphere
☑	MMS 2		sphere
☑	MMS 3		cone
☑	MMS 4		sphere
☐	Moon		sphere
☐	Neptune		cone
☐	New Horizons		cone
☐	NOAA-20		cone
☐	NOAA-21		cone
☐	Oersted		cylinder
☐	Pluto		cone
☐	Psyche		cone



Display Orbits

Select Start Date/Time

4D Orbit Viewer
v0-2025.10.06.1331

SPDF

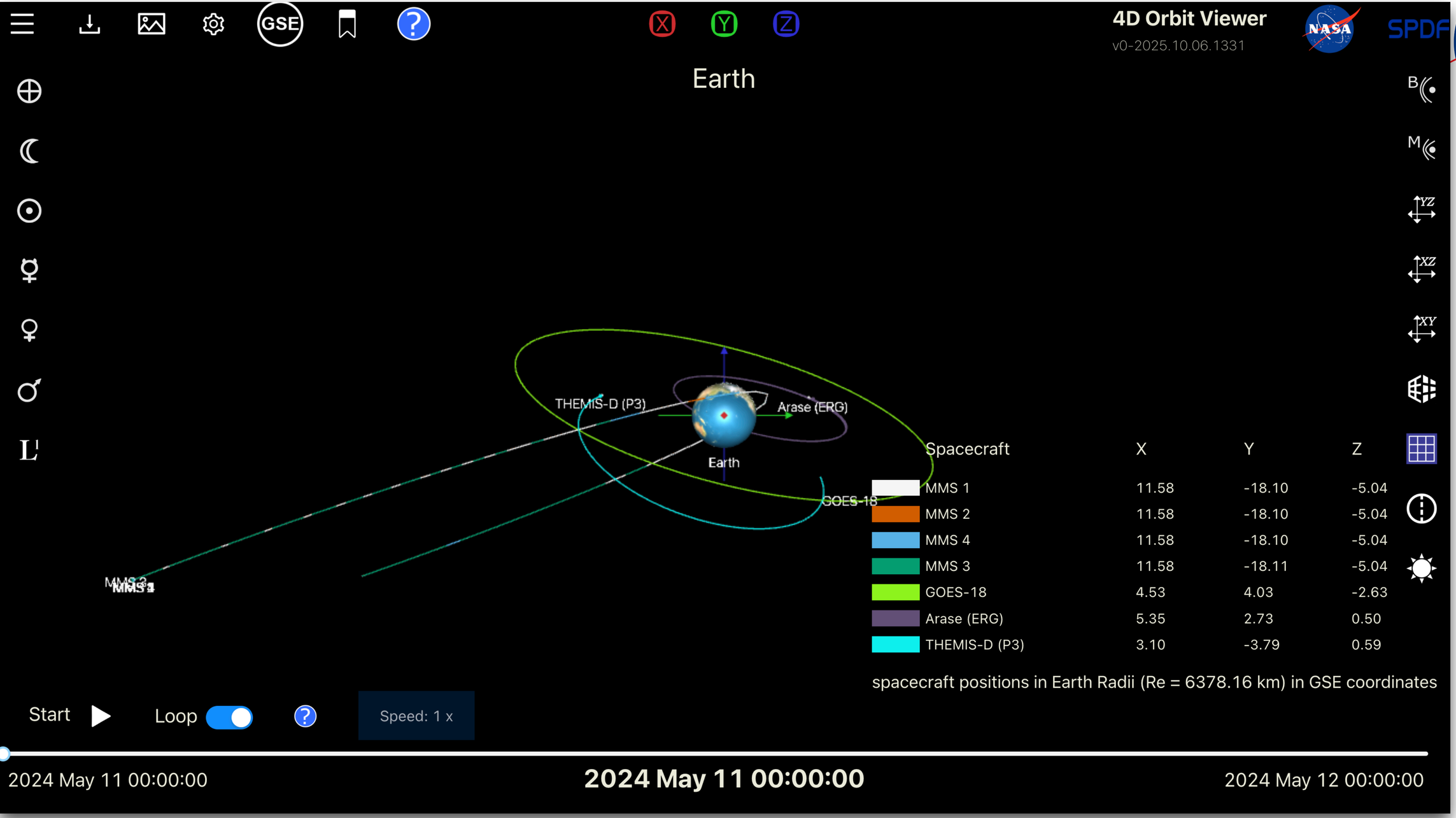
May 2024

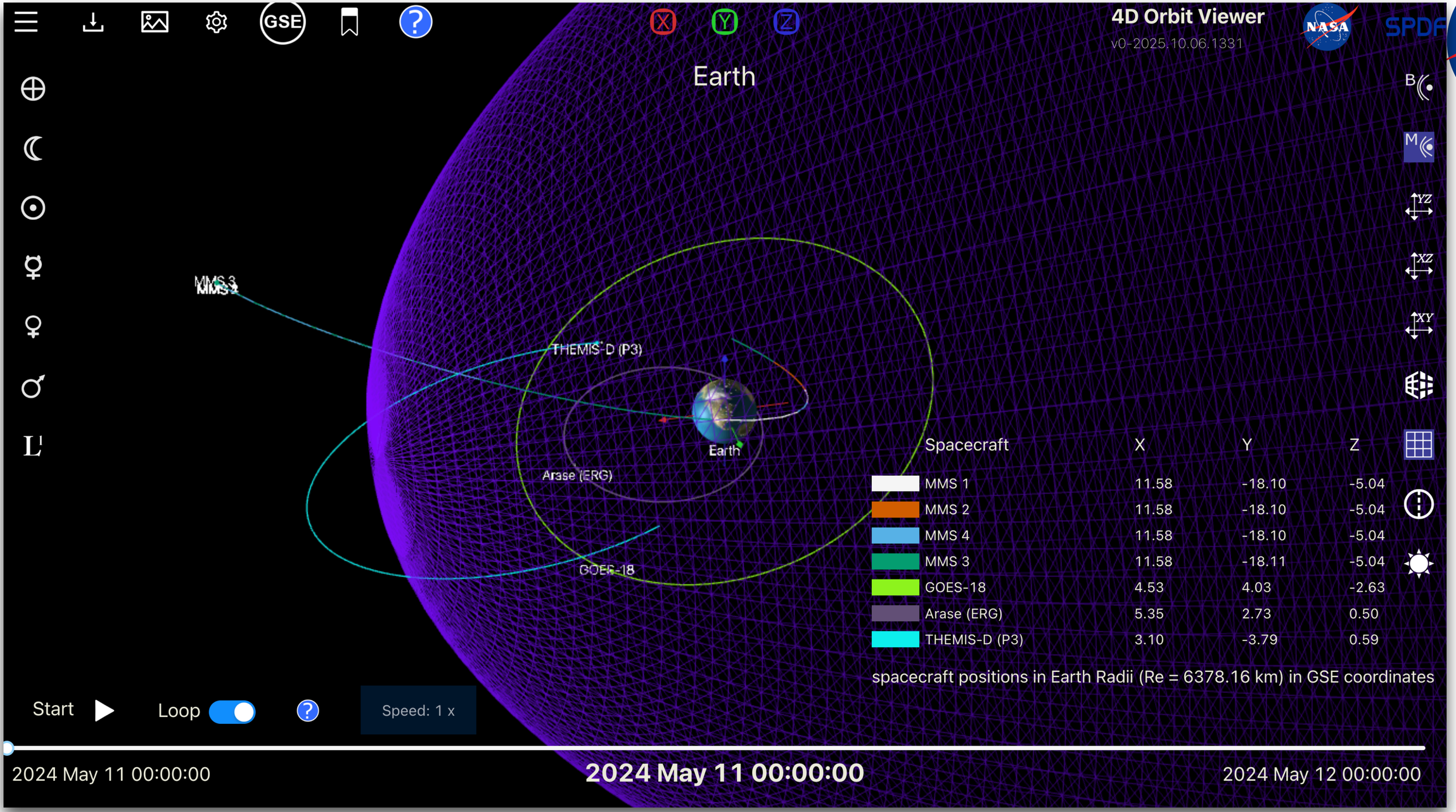
Sun	Mon	Tue	Wed	Thu	Fri	Sat
119	120	121	122	123	124	125
126	127	128	129	130	131	132
133	134	135	136	137	138	139
140	141	142	143	144	145	146
147	148	149	150	151	152	153
154	155	156	157	158	159	160

00 : 00 : 00

Date View

Display Orbits


GSE
X
Y
Z
4D Orbit Viewer
v0-2025.10.06.1331
SPDF
Earth
B
M
YZ
XZ
XY
THEMIS-D (P3)
Arase (ERG)
Earth
GOES-18
MMS 2
MMS 1
Spacecraft X Y Z
MMS 1 11.58 -18.10 -5.04
MMS 2 11.58 -18.10 -5.04
MMS 4 11.58 -18.10 -5.04
MMS 3 11.58 -18.11 -5.04
GOES-18 4.53 4.03 -2.63
Arase (ERG) 5.35 2.73 0.50
THEMIS-D (P3) 3.10 -3.79 0.59
spacecraft positions in Earth Radii (Re = 6378.16 km) in GSE coordinates
Start
Loop
Speed: 1 x
2024 May 11 00:00:00
2024 May 11 00:00:00
2024 May 12 00:00:00


GSE
X
Y
Z
4D Orbit Viewer
v0-2025.10.06.1331
NASA
SPDF
Earth
B
M
YZ
XZ
XY
MMS 3
MMS 2
THEMIS-D (P3)
Earth
Arase (ERG)
GOES-18
Spacecraft X Y Z
MMS 1 11.58 -18.10 -5.04
MMS 2 11.58 -18.10 -5.04
MMS 4 11.58 -18.10 -5.04
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Start
Loop
Speed: 1 x
2024 May 11 00:00:00
2024 May 11 00:00:00
2024 May 12 00:00:00

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Plot Walk

User Guide

Mission:

Orbits

Plot type:

Geospace S/C Orbits at 30 Re

Time range:

8 hours

Date:

2024-05-11

Time:

10:07

Links:

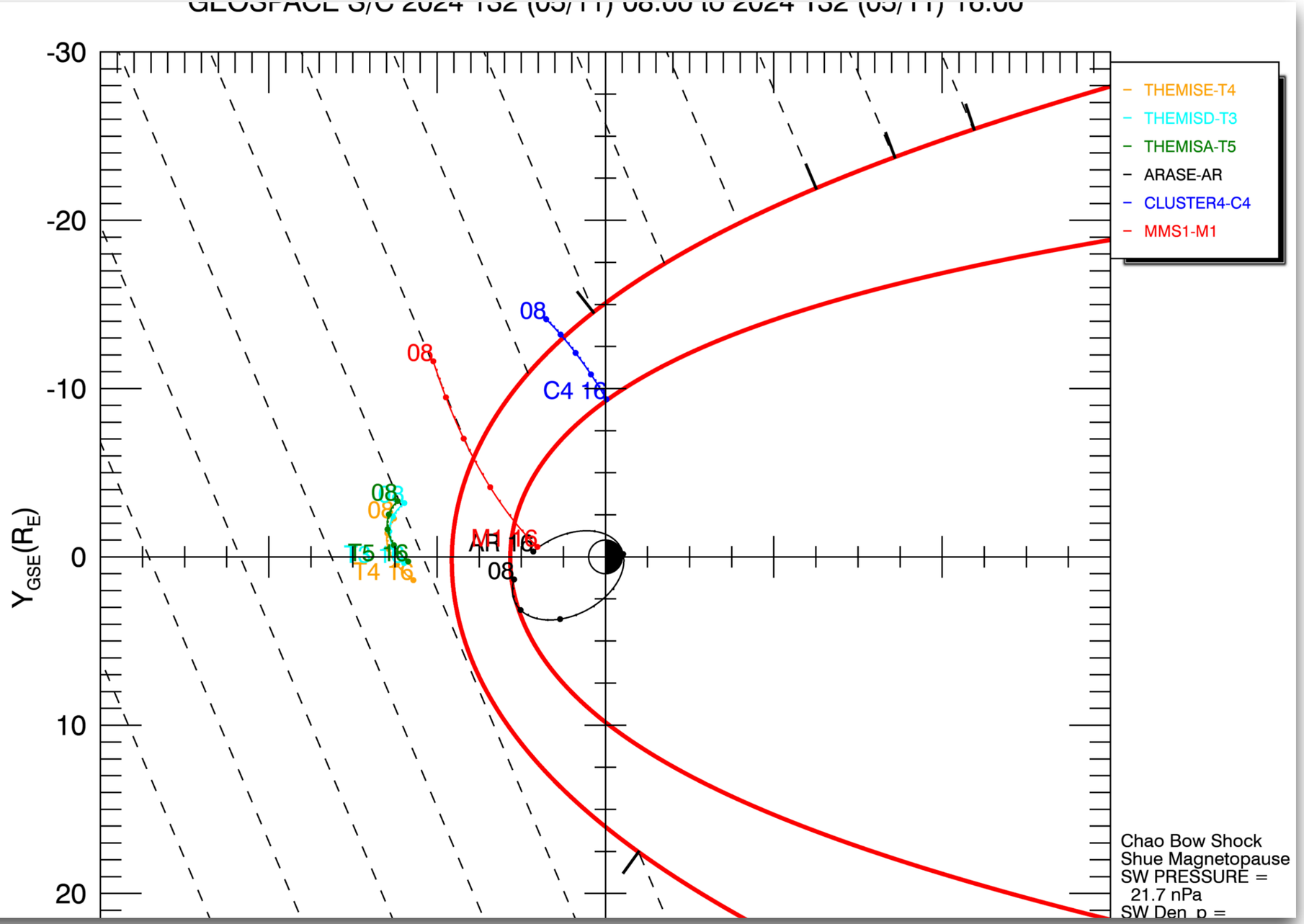
README

Image

PDF

Postscript

4D orbit viewer



Plot Walk

User Guide

Mission:

MMS

Probe:

1

Plot type:

Multi-Instrument Summary

Time range:

1 day

Date:

2024-05-11

Time:

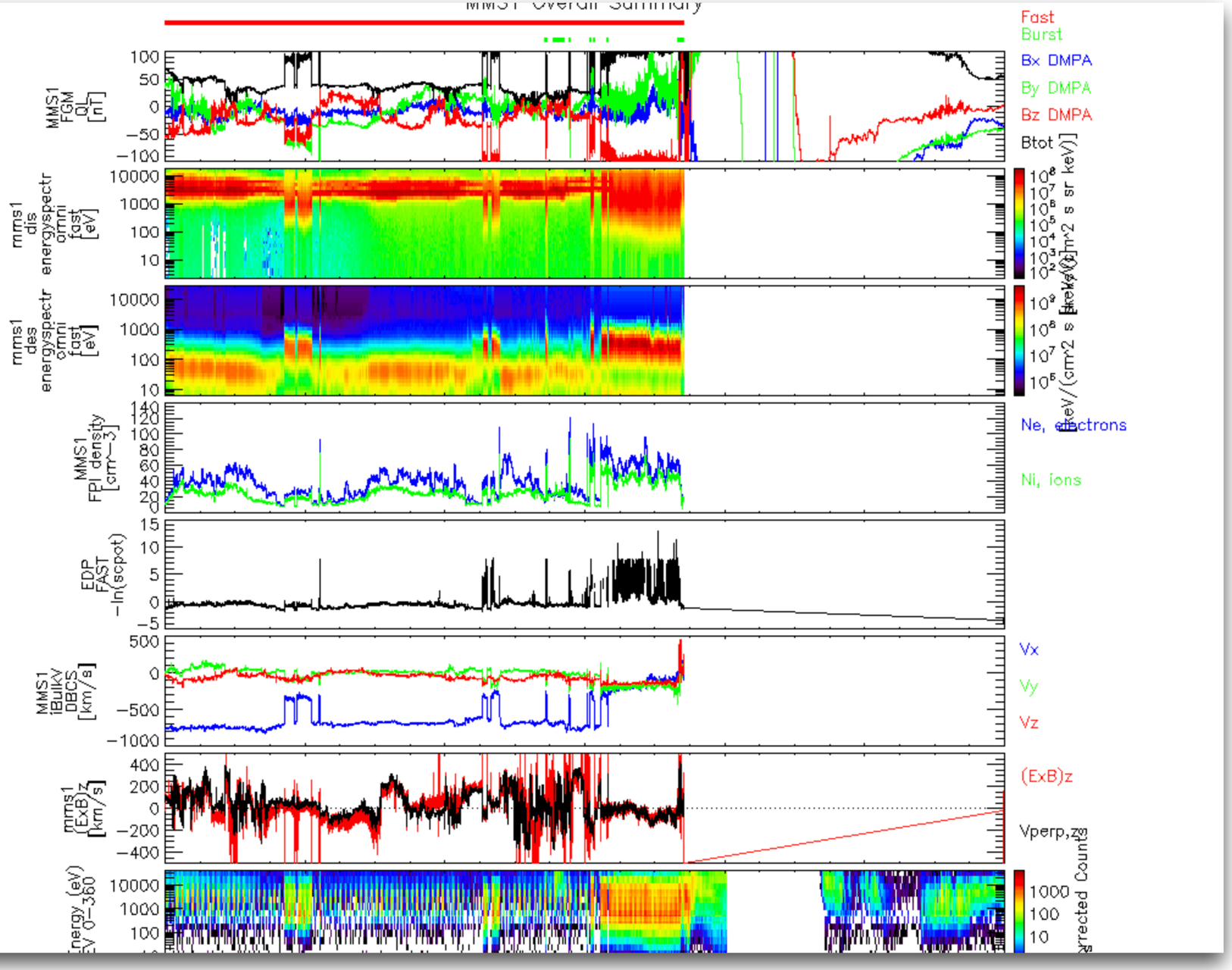
10:07

Links:

Image

4D orbit viewer

The inventory of MMS plots



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nd the Common Data Format (CDF) self-describing science data format and associated

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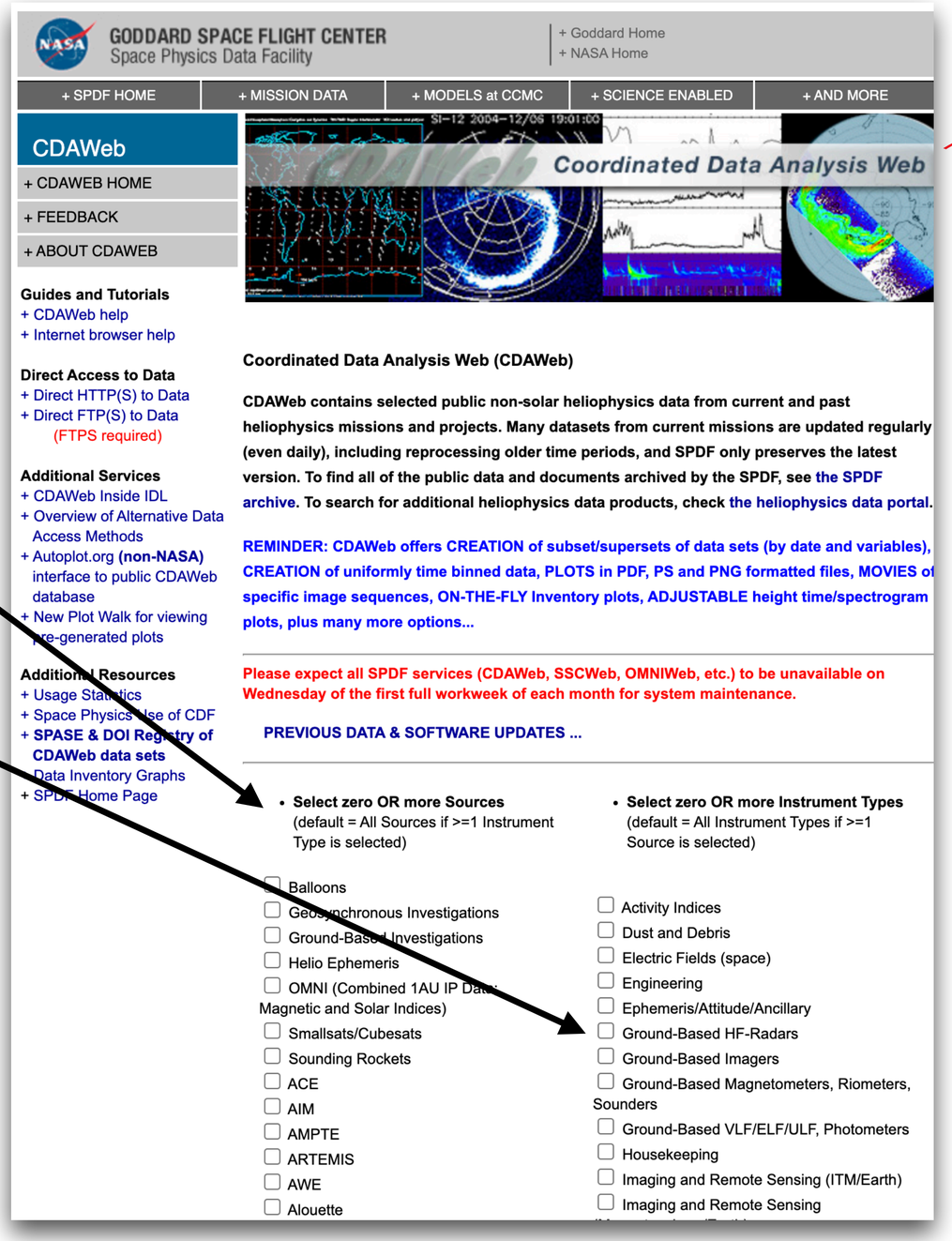
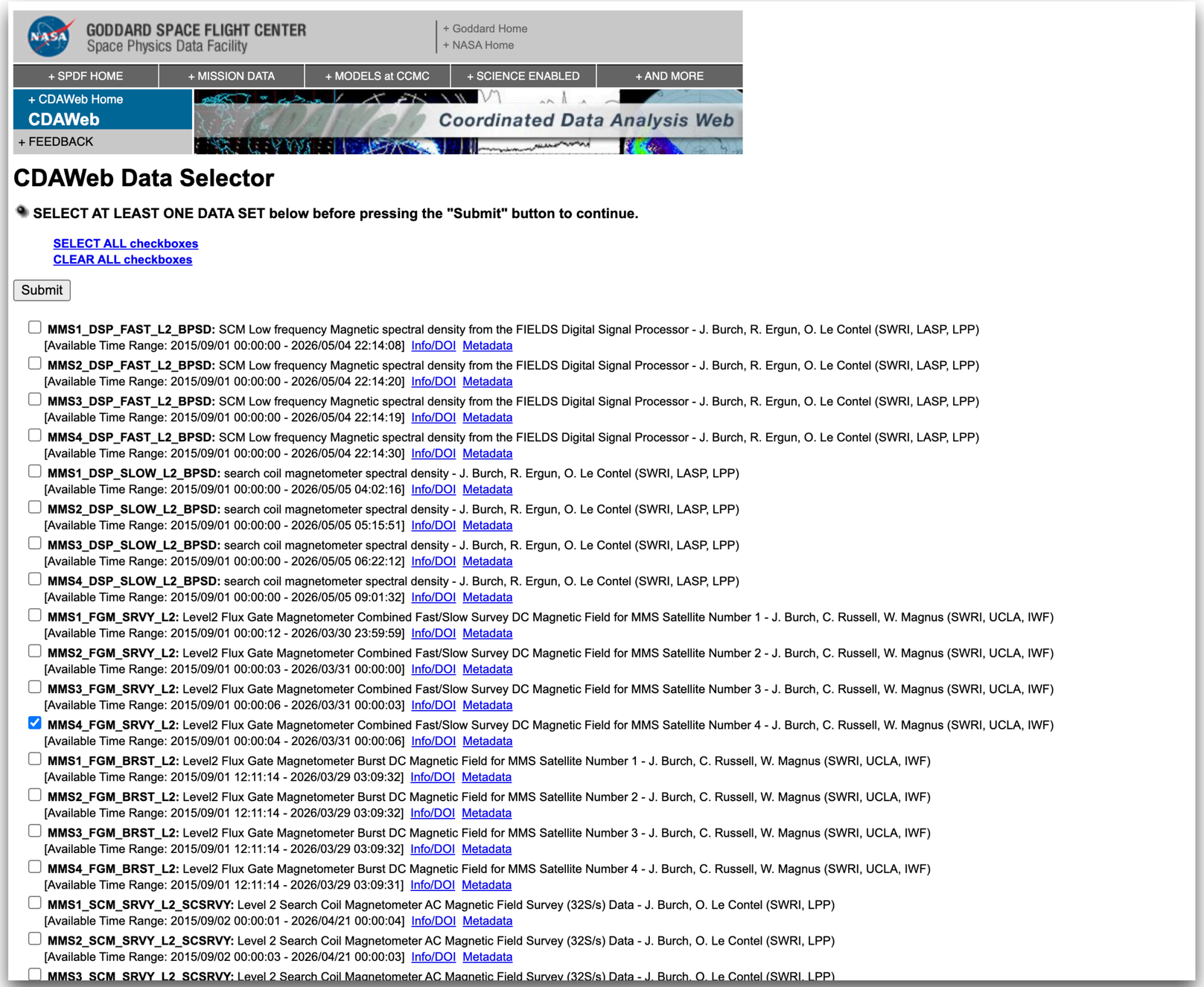
- We can search the CDAWeb datasets by selecting the “source” and/or “instrument type”



- For the following example, we selected MMS and THEMIS magnetic fields data

- Note that you can click on the links in the dataset list for information on the dataset and examples of accessing the data from IDL and Python



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+ FEEDBACK

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CDAWeb Data Selector

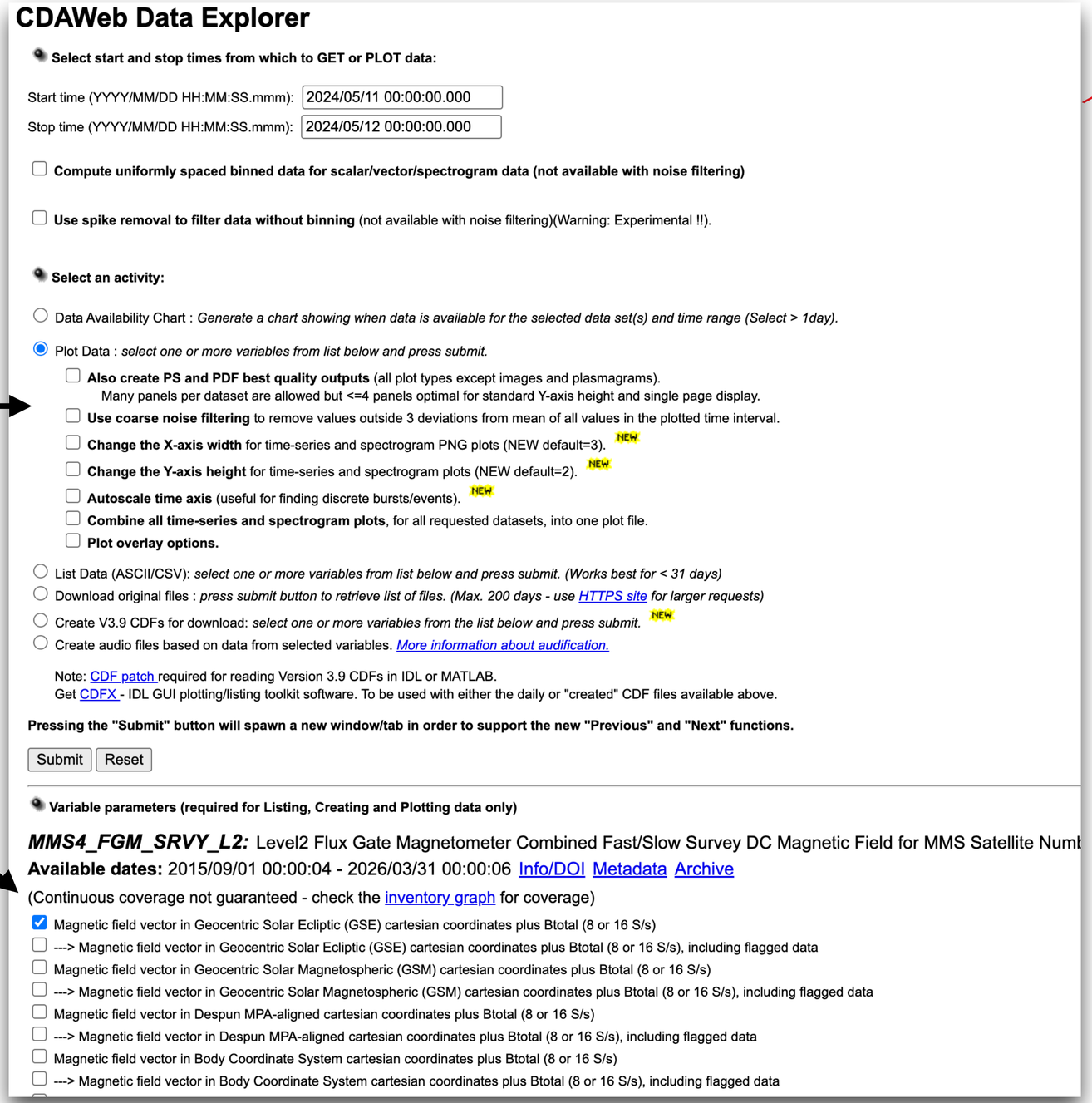
SELECT AT LEAST ONE DATA SET below before pressing the "Submit" button to continue.

SELECT ALL checkboxes
CLEAR ALL checkboxes

Submit

- [ ] **MMS1_DSP_FAST_L2_BPSD:** SCM Low frequency Magnetic spectral density from the FIELDS Digital Signal Processor - J. Burch, R. Ergun, O. Le Contel (SWRI, LASP, LPP)
  [Available Time Range: 2015/09/01 00:00:00 - 2026/05/04 22:14:08] Info/DOI Metadata
- [ ] **MMS2_DSP_FAST_L2_BPSD:** SCM Low frequency Magnetic spectral density from the FIELDS Digital Signal Processor - J. Burch, R. Ergun, O. Le Contel (SWRI, LASP, LPP)
  [Available Time Range: 2015/09/01 00:00:00 - 2026/05/04 22:14:20] Info/DOI Metadata
- [ ] **MMS3_DSP_FAST_L2_BPSD:** SCM Low frequency Magnetic spectral density from the FIELDS Digital Signal Processor - J. Burch, R. Ergun, O. Le Contel (SWRI, LASP, LPP)
  [Available Time Range: 2015/09/01 00:00:00 - 2026/05/04 22:14:19] Info/DOI Metadata
- [ ] **MMS4_DSP_FAST_L2_BPSD:** SCM Low frequency Magnetic spectral density from the FIELDS Digital Signal Processor - J. Burch, R. Ergun, O. Le Contel (SWRI, LASP, LPP)
  [Available Time Range: 2015/09/01 00:00:00 - 2026/05/04 22:14:30] Info/DOI Metadata
- [ ] **MMS1_DSP_SLOW_L2_BPSD:** search coil magnetometer spectral density - J. Burch, R. Ergun, O. Le Contel (SWRI, LASP, LPP)
  [Available Time Range: 2015/09/01 00:00:00 - 2026/05/05 04:02:16] Info/DOI Metadata
- [ ] **MMS2_DSP_SLOW_L2_BPSD:** search coil magnetometer spectral density - J. Burch, R. Ergun, O. Le Contel (SWRI, LASP, LPP)
  [Available Time Range: 2015/09/01 00:00:00 - 2026/05/05 05:15:51] Info/DOI Metadata
- [ ] **MMS3_DSP_SLOW_L2_BPSD:** search coil magnetometer spectral density - J. Burch, R. Ergun, O. Le Contel (SWRI, LASP, LPP)
  [Available Time Range: 2015/09/01 00:00:00 - 2026/05/05 06:22:12] Info/DOI Metadata
- [ ] **MMS4_DSP_SLOW_L2_BPSD:** search coil magnetometer spectral density - J. Burch, R. Ergun, O. Le Contel (SWRI, LASP, LPP)
  [Available Time Range: 2015/09/01 00:00:00 - 2026/05/05 09:01:32] Info/DOI Metadata
- [ ] **MMS1_FGM_SRVY_L2:** Level2 Flux Gate Magnetometer Combined Fast/Slow Survey DC Magnetic Field for MMS Satellite Number 1 - J. Burch, C. Russell, W. Magnus (SWRI, UCLA, IWF)
  [Available Time Range: 2015/09/01 00:00:12 - 2026/03/30 23:59:59] Info/DOI Metadata
- [ ] **MMS2_FGM_SRVY_L2:** Level2 Flux Gate Magnetometer Combined Fast/Slow Survey DC Magnetic Field for MMS Satellite Number 2 - J. Burch, C. Russell, W. Magnus (SWRI, UCLA, IWF)
  [Available Time Range: 2015/09/01 00:00:03 - 2026/03/31 00:00:00] Info/DOI Metadata
- [ ] **MMS3_FGM_SRVY_L2:** Level2 Flux Gate Magnetometer Combined Fast/Slow Survey DC Magnetic Field for MMS Satellite Number 3 - J. Burch, C. Russell, W. Magnus (SWRI, UCLA, IWF)
  [Available Time Range: 2015/09/01 00:00:06 - 2026/03/31 00:00:03] Info/DOI Metadata
- [x] **MMS4_FGM_SRVY_L2:** Level2 Flux Gate Magnetometer Combined Fast/Slow Survey DC Magnetic Field for MMS Satellite Number 4 - J. Burch, C. Russell, W. Magnus (SWRI, UCLA, IWF)
  [Available Time Range: 2015/09/01 00:00:04 - 2026/03/31 00:00:06] Info/DOI Metadata
- [ ] **MMS1_FGM_BRST_L2:** Level2 Flux Gate Magnetometer Burst DC Magnetic Field for MMS Satellite Number 1 - J. Burch, C. Russell, W. Magnus (SWRI, UCLA, IWF)
  [Available Time Range: 2015/09/01 12:11:14 - 2026/03/29 03:09:32] Info/DOI Metadata
- [ ] **MMS2_FGM_BRST_L2:** Level2 Flux Gate Magnetometer Burst DC Magnetic Field for MMS Satellite Number 2 - J. Burch, C. Russell, W. Magnus (SWRI, UCLA, IWF)
  [Available Time Range: 2015/09/01 12:11:14 - 2026/03/29 03:09:32] Info/DOI Metadata
- [ ] **MMS3_FGM_BRST_L2:** Level2 Flux Gate Magnetometer Burst DC Magnetic Field for MMS Satellite Number 3 - J. Burch, C. Russell, W. Magnus (SWRI, UCLA, IWF)
  [Available Time Range: 2015/09/01 12:11:14 - 2026/03/29 03:09:32] Info/DOI Metadata
- [ ] **MMS4_FGM_BRST_L2:** Level2 Flux Gate Magnetometer Burst DC Magnetic Field for MMS Satellite Number 4 - J. Burch, C. Russell, W. Magnus (SWRI, UCLA, IWF)
  [Available Time Range: 2015/09/01 12:11:14 - 2026/03/29 03:09:31] Info/DOI Metadata
- [ ] **MMS1_SCM_SRVY_L2_SCSRVY:** Level 2 Search Coil Magnetometer AC Magnetic Field Survey (32S/s) Data - J. Burch, O. Le Contel (SWRI, LPP)
  [Available Time Range: 2015/09/02 00:00:01 - 2026/04/21 00:00:04] Info/DOI Metadata
- [ ] **MMS2_SCM_SRVY_L2_SCSRVY:** Level 2 Search Coil Magnetometer AC Magnetic Field Survey (32S/s) Data - J. Burch, O. Le Contel (SWRI, LPP)
  [Available Time Range: 2015/09/02 00:00:03 - 2026/04/21 00:00:03] Info/DOI Metadata
- [ ] **MMS3_SCM_SRVY_L2_SCSRVY:** Level 2 Search Coil Magnetometer AC Magnetic Field Survey (32S/s) Data - J. Burch, O. Le Contel (SWRI, LPP)

- We can list data, plot data, download the original files, create v3.9 CDF files and create audio files from the selected variables



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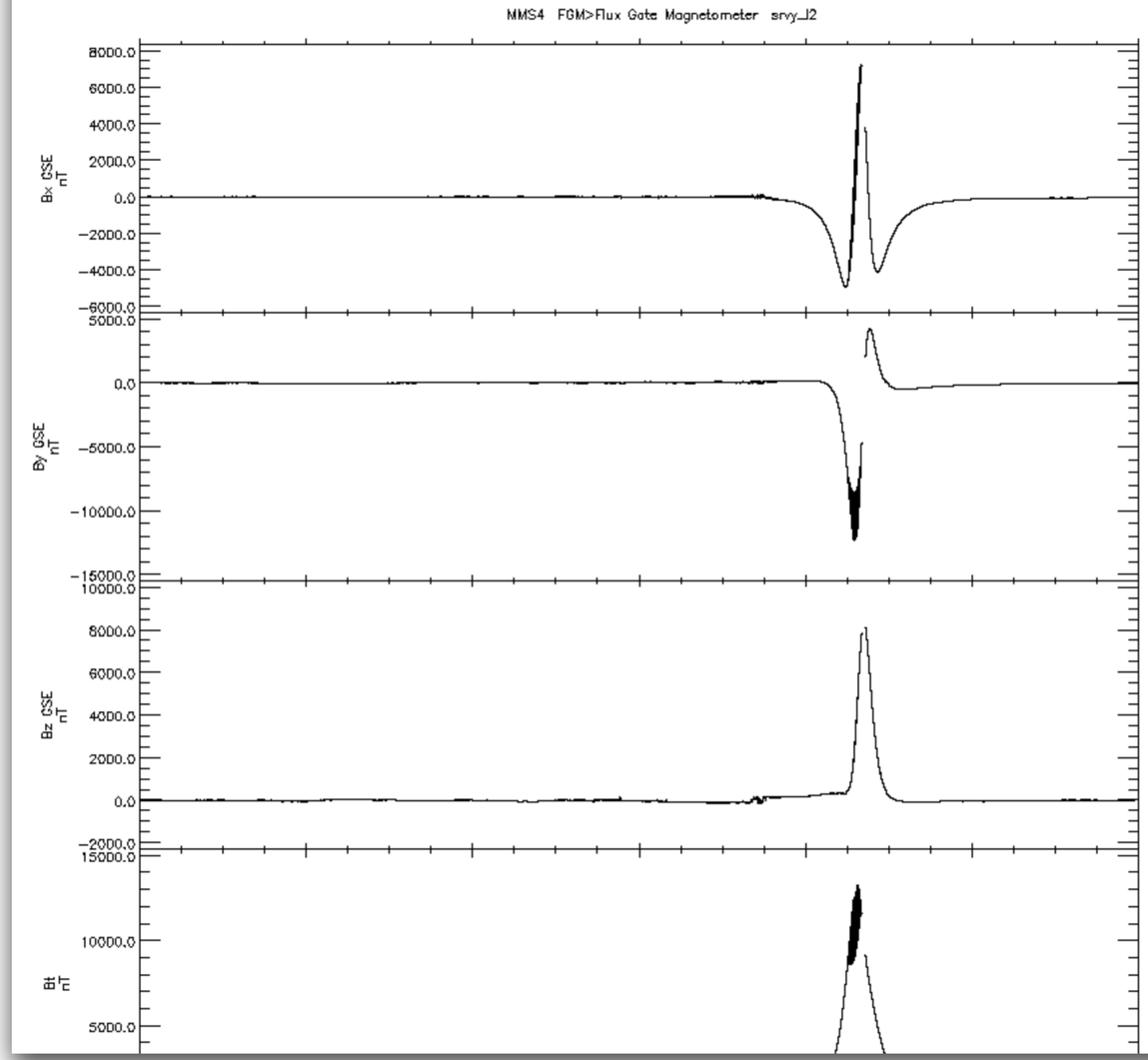
Coordinated Data Analysis Web

MMS4_FGM_SRVY_L2



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- Linking Missions and Services
- CDAWeb (data browser)
- CDAWeb Inside IDL
- OMNIWeb Plus (now including COHOWeb, ATMOWeb, FTP Browser, HelioWeb and CGM)
- SSCWeb (orbit search)
- 4D Orbit Viewer
- Plot Walk for pre-generated plots
- CDAWeb Audification
- Direct HTTPS file access
- Alternative Data Access

SPDF Archive

Access to the Space Phys
Data Facility (SPDF) publ
archive by directory, wit
additional access methods(including web services).

s Space Physics Data Facility (SPDF)

cs studies the nature and dynamic interactions of the Sun, the heliosphere, and the
vironments of the planets and interstellar space. The Heliophysics Digital Resource Library
hives and serves the heliophysics data, as a project in the Heliophysics Science Division
SA's Goddard Space Flight Center. **Space Physics Data Facility (SPDF)** is the active and
archive for the space physics data, while solar data is archived at Solar Data Analysis
AC), as components of the HDRL, per NASA's Heliophysics Science Data Management
NASA Heliophysics Data for more information, policy, and document templates.

des multi-project, cross-disciplinary access to data to enable correlative and collaborative
ross discipline and mission boundaries with present and past missions. Many datasets
nt missions are updated regularly (even daily), including reprocessed data for older time
d SPDF only preserves the latest version. SPDF maintains the CDAWeb data explorer and
ystem, the SSCweb database of spacecraft orbits, the OMNIWeb cross-normalized
nd the Common Data Format (CDF) self-describing science data format and associated

CDAWeb

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Index of /pub/data

Name	Last modified	Size
Parent Directory		-
000_readme.txt	2023-08-11 14:47	3.7K
1963-038C/	2014-08-08 11:05	-
aaa_balloons/	2021-01-13 15:36	-
aaa_groundbased/	2023-04-05 16:15	-
aaa_planetary/	2026-02-05 11:48	-
aaa_smallsats_cubesats/	2026-02-24 14:35	-
aaa_sounding_rockets/	2023-03-10 14:33	-
aaa_special-purpose-datasets/	2024-05-07 13:18	-
ace/	2025-02-10 00:48	-
ae/	2013-03-04 14:58	-
aeros/	2013-12-03 08:51	-
aim/	2021-01-29 14:58	-
alouette/	2015-06-19 10:41	-
ampte/	2009-02-12 11:33	-
apollo/	2021-09-24 21:21	-
arase/	2019-05-07 13:35	-
arcad/	2023-08-14 11:44	-
ariel/	2014-05-28 15:36	-
ats/	2012-09-26 14:20	-
aureol/	2017-05-11 14:34	-
awe/	2025-07-09 15:12	-
azur/	2014-08-07 15:25	-
balloons/	2021-01-13 15:36	-
barrel/	2020-12-15 22:08	-
bepicolombo/	2025-02-10 00:48	-
canopus/	2012-10-01 18:08	-
cassini/	2025-02-10 00:48	-
cdaw9/	2012-10-01 01:03	-
cluster/	2024-06-12 19:42	-
cnofs/	2013-02-13 16:37	-

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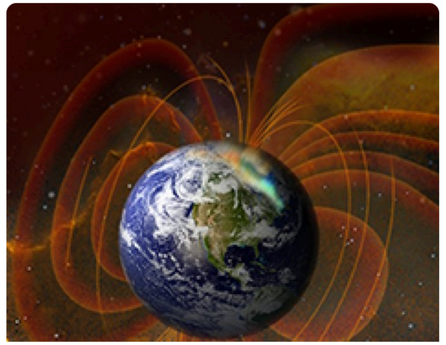
- CDF (Common Data Format)
- ISTP Metadata Guidelines
- CDF/netCDF/FITS/HDF/XML/A… Format Translations
- ISTP Metadata Editor
- MakeCDF
- CDAWlib (IDL)
- CDFX (IDL)
- CDAWeb Web Service API
- SSCWeb Web Service API
- Heliophysics Data Portal Web Service API

NASA's Sp… Facility (SPDF)

Heliophysics stu… …teractions of the Sun, the heliosphere, and the plasma environm… …tellar space. The Heliophysics Digital Resource Library (HDRL) archives … …ta, as a project in the Heliophysics Science Division (HSD) at NASA's … **…pace Physics Data Facility (SPDF)** is the active and permanent archi… …while solar data is archived at Solar Data Analysis Center (SDAC), as… …r NASA's Heliophysics Science Data Management Policy. Visit NASA… …formation, policy, and document templates.

SPDF provides m… …access to data to enable correlative and collaborative research across … …ries with present and past missions. Many datasets from current mis… …en daily), including reprocessed data for older time periods, and SPD… …sion. SPDF maintains the CDAWeb data explorer and browsing syste… …ecraft orbits, the OMNIWeb cross-normalized database, and th… …self-describing science data format and associated software.

SPDF Archive

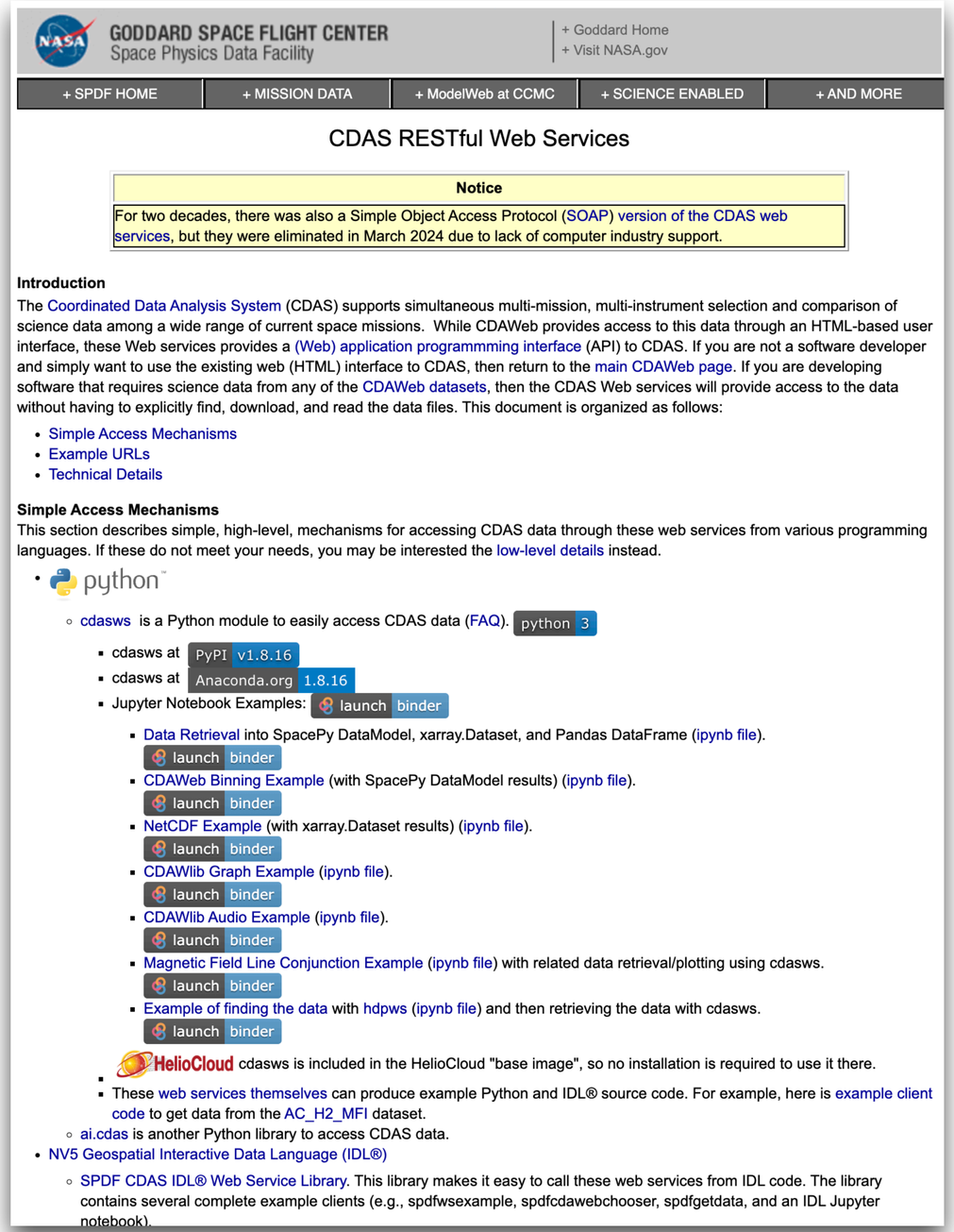


Access to the Space Physics Data Facility (SPDF) public archive by directory, with additional access methods(including web services).

CDAWeb

News & Announcements

- We have a lot of examples of using Python (and IDL) to access the data
- Note that the cdasws package is included in HelioCloud by default



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CDAS RESTful Web Services

Notice

For two decades, there was also a Simple Object Access Protocol (SOAP) version of the CDAS web services, but they were eliminated in March 2024 due to lack of computer industry support.

Introduction

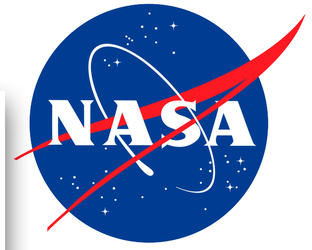
The Coordinated Data Analysis System (CDAS) supports simultaneous multi-mission, multi-instrument selection and comparison of science data among a wide range of current space missions. While CDAWeb provides access to this data through an HTML-based user interface, these Web services provides a (Web) application programmming interface (API) to CDAS. If you are not a software developer and simply want to use the existing web (HTML) interface to CDAS, then return to the main CDAWeb page. If you are developing software that requires science data from any of the CDAWeb datasets, then the CDAS Web services will provide access to the data without having to explicitly find, download, and read the data files. This document is organized as follows:

- Simple Access Mechanisms
- Example URLs
- Technical Details

Simple Access Mechanisms

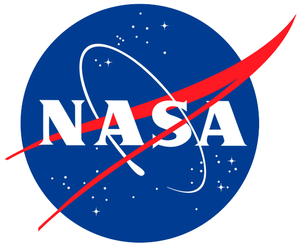
This section describes simple, high-level, mechanisms for accessing CDAS data through these web services from various programming languages. If these do not meet your needs, you may be interested the low-level details instead.

- python
  - cdasws is a Python module to easily access CDAS data (FAQ). python 3
    - cdasws at PyPI v1.8.16
    - cdasws at Anaconda.org 1.8.16
    - Jupyter Notebook Examples: launch binder
      - Data Retrieval into SpacePy DataModel, xarray.Dataset, and Pandas DataFrame (ipynb file). launch binder
      - CDAWeb Binning Example (with SpacePy DataModel results) (ipynb file). launch binder
      - NetCDF Example (with xarray.Dataset results) (ipynb file). launch binder
      - CDAWlib Graph Example (ipynb file). launch binder
      - CDAWlib Audio Example (ipynb file). launch binder
      - Magnetic Field Line Conjunction Example (ipynb file) with related data retrieval/plotting using cdasws. launch binder
      - Example of finding the data with hdpws (ipynb file) and then retrieving the data with cdasws. launch binder
    - HelioCloud cdasws is included in the HelioCloud "base image", so no installation is required to use it there.
    - These web services themselves can produce example Python and IDL® source code. For example, here is example client code to get data from the AC_H2_MFI dataset.
  - ai.cdas is another Python library to access CDAS data.
- NV5 Geospatial Interactive Data Language (IDL®)
  - SPDF CDAS IDL® Web Service Library. This library makes it easy to call these web services from IDL code. The library contains several complete example clients (e.g., spdfwsexample, spdfcdawebchooser, spdfgetdata, and an IDL Jupyter notebook).



- sscws Package API
  - Getting started with the `sscws` client library.
  - sscws at the PyPI respository.
  - sscws at the Anaconda.org 2.4.4
  - Jupyter Notebook Examples: launch binder
    - Simple Location Example (ipynb file). launch binder
    - Complex Location Example (ipynb file) requesting many values including magnetic field line tracing. This example also demonstrates how to diagnose a problem with an invalid request. launch binder
    - Radial Conjunction With Ground Location (ipynb file). launch binder
    - Magnetic Field Line Conjunction Example (ipynb file) with related data retrieval/plotting using cdasws. launch binder
  - PyScript example of using sscws in a web page.
  - These web services themselves can produce example client Python and IDL® source code. For example, here is example client code to get International Space Station (ISS) orbit information.

- NV5 Interactive Data Language (IDL®)
  - SPDF SSC IDL® Web Services Library. This library makes it easy to call these web services from IDL® code. The library contains several complete example clients (e.g., spdfsscwsexample) and an IDL® Jupyter notebook).
- Unix Shell Script
  - Shell Script Examples. These examples should run on most Unix-like (e.g., macOS, Linux, Solaris, Windows Subsystem for Linux, etc.) platforms that have `curl`, `xsltproc` and `xmllint`. To install the prerequisite software on debian/ubuntu based Linux distributions, do



Thank you!

If you have questions, comments, feature requests, etc. please don’t hesitate to contact us!
NASA-SPDF-Support@nasa.onmicrosoft.com