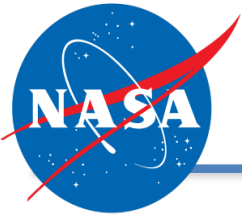


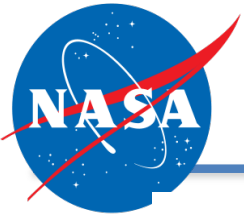
# HEASARC

## CALET archive status

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HEASARC Project Scientist  
(NASA/GSFC)

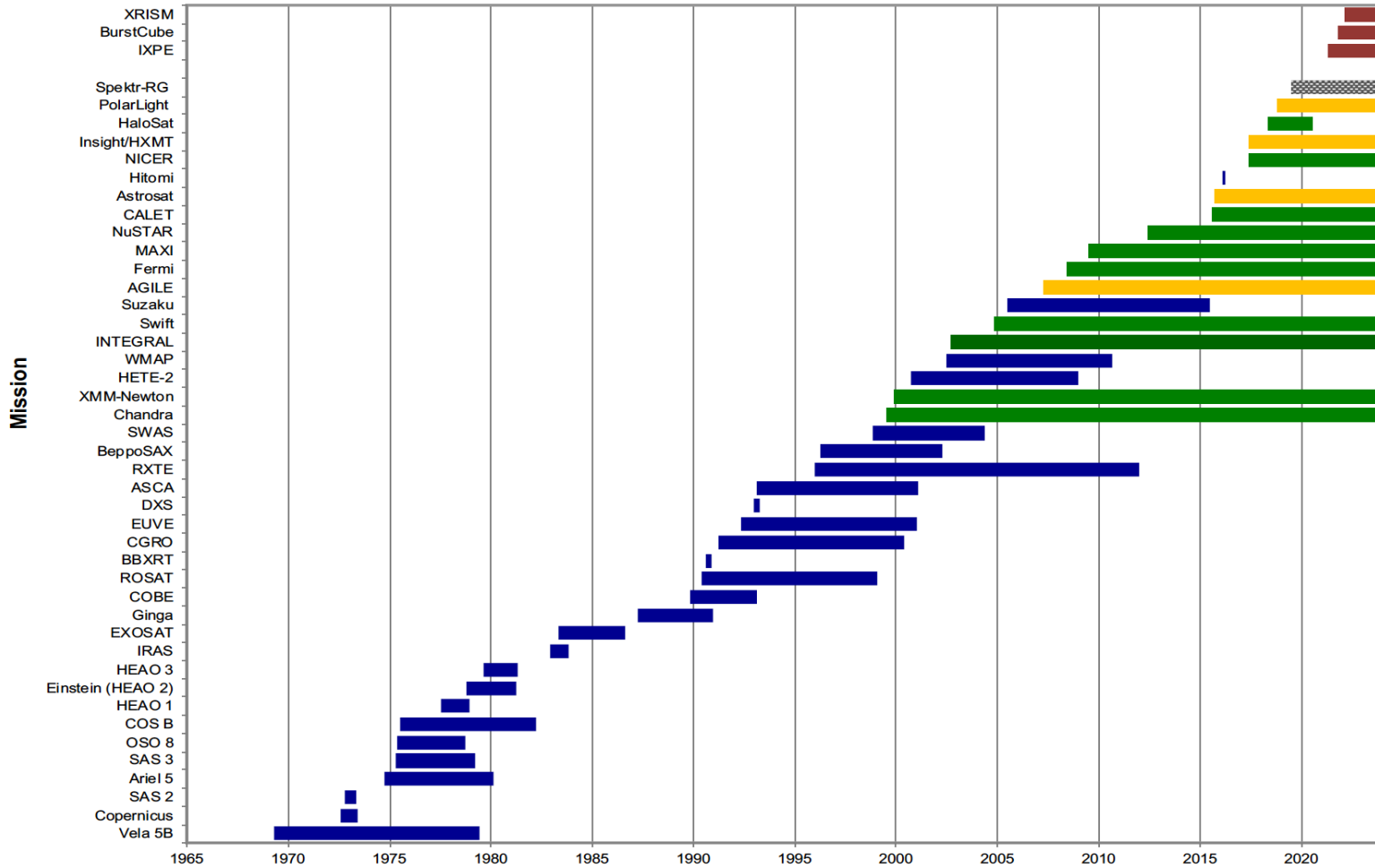


- HEASARC is the NASA High Energy Astrophysics Science Archive
- Established in 1991 at NASA/GSFC with the following charter :
  - Maintain and disseminate data previous and past high energy astrophysics missions (from 2008 also cosmic microwave background data)
  - Provide software and data analysis support for these datasets
  - Maintain and provide the necessary scientific and technical expertise for the processing and interpretation of the data holding
  - Develop and maintain multi-mission approach analysis and support tools
  - Provide catalogs of observations and ancillary data for the data holdings
  - Coordinate data, software and media standards with other astrophysics sites
- HEASARC developed standards for data, software, calibration data and a common data access
  - Data are archived in FITS (mandate from NASA)
    - Standard FITS layouts to accommodate different data type and standard keywords
  - Software was designed as open source. Uses common libraries for reading/writing data, for user interface and access to the calibration data
    - The HEASoft package includes: multi-mission software for analysis , tools to manipulate FITS files as well as mission specific software
  - Calibration data are stored in the calibration database
    - => *These standards are in use in all high energy missions*
  - Data access is via a multi-mission Web interface to browse metadata linked to data products or https-ftp protocols

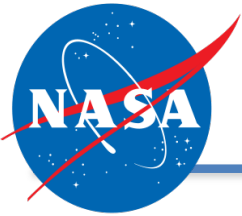


# HEASARC Data Holding

HEASARC



- Major space astrophysics missions since 1969. Year
- Data before 1991 were reformatted in FITS by the HEASARC.
- Data Host or will be at the HESARC **Blue:** past mission **Green:** operating missions **Red:** future missions
- **Yellow:** Not host at the HEASARC



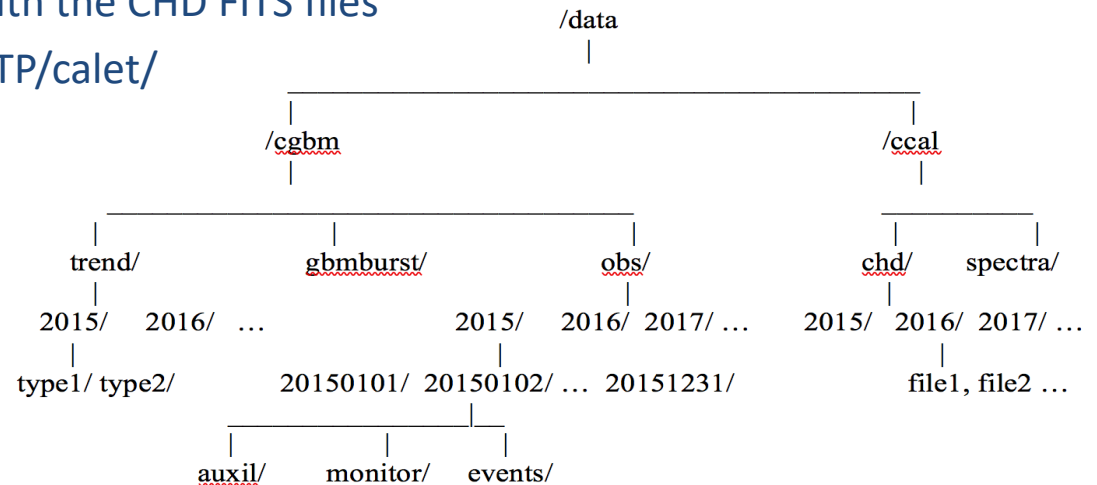
# CALET archive (1)

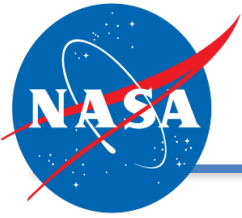
HEASARC

- Discussions on the CALET archive at the HEASARC started in March 2018
  - HEASARC was identified as the US archive in the LOA between JAXA and NASA
  - DARTS and HEASARC collaborate on the CALET archive
- Data to archive include the CGBM data, Space weather data from the CHD and the cosmic-ray spectra from the Calorimeter
  - HEASARC started discussion with the CGBM team to define the archive structure, filename convention, data format and the calibration data
  - After the first release of the CHD data in ASCII, HEASARC wrote a converter to translate data in FITS.
- The CALET data will/are available from the HEASARC archive with the following archive structure.

- Currently routinely populated with the CHD FITS files

<https://heasarc.gsfc.nasa.gov/FTP/calet/>





# CALET archive access



- Data will/are accessible via the web Browse interface or https access
- HEASARC generates the metadata necessary to the Browser
- W3Browse allows to query more than one mission and table simultaneously

Archive
HEASARC Browse

[Tip Archive](#)
[Hera](#)
[HELP](#)

Other Browse interfaces:  
[Notification Service](#) | [Batch](#) | [Correlation](#) | [Index of all tables](#)

Query File And Session Uploads

Start Search   Reset   Detailed Mission/Catalog Search

**1. Do you want to search around a position ... ?**  
 (If you want to search on parameters other than object name or coordinates, select "Detailed Mission/Catalog Search".)

**Object Name or Coordinates:**

e.g. Cyg X-1 or 12 00 00, 4 12 6 or  
 Cyg X-2; 12.235, 15.345 (Note use of  
 semi-colons (;) to separate multiple  
 object names or coordinate pairs)

**Coordinate System:** J2000

**Search Radius:** Default   arcmin

Default uses the optimum radius for each catalog searched.

**and/or**   [Select Local File:](#)      no file selected

File should contain objects and/or coordinate pairs  
 one per line or separated by semi-colons.

**... and/or search by date?**

**Observation Dates:**    YYYY-MM-DD hh:mm:ss or MJD: DDDDD.ddd

Not all tables have observation dates. For those that do, the time portion of the date is optional. Separate multiple dates/ranges with semicolons (;). Range operator is '..'. (e.g. 1992-12-31; 48980.5; 1995-01-15 12:00:00; 1997-03-20 .. 2000-10-18)

**2. What missions and catalogs do you want to search?** (Bold text indicates mission is active)

**Most Requested Missions**

**Chandra** [CXC, CSC]

NICER

Suzaku

Fermi

NuSTAR [CalTech]

Swift

Hitomi

ROSAT

WMAP

MAXI [JAXA]

RXTE

XMM-Newton [XSA]

Other X-Ray and EUV Missions

Ariel V

Copernicus

Ginga

SAS 3

ASCA

Einstein

HEAO 1

Uhuru

BBXRT/Astro-1

EUVE [MAST]

Kvant

Vela 5B

BeppoSAX

EXOSAT

OSO8

Other Gamma-Ray Missions

AGILE [ASDC]

CALET [JAXA]

CGRO

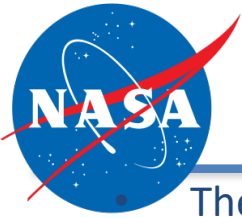
COS B

## Browse access

- <https://heasarc.gsfc.nasa.gov/cgi-bin/W3Browse/w3browse.pl>

## Http access

- <https://heasarc.gsfc.nasa.gov/FTP/calet/>

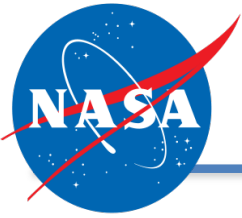


# CGBM data

HEASARC

The CGBM archive includes two data sets:

- 1<sup>st</sup> data data set
  - TH Monitoring data : 4 energy sampled data every 0.125 sec in low gain and high gain
  - PH Monitoring data : low gain 102 chan spectra & high gain 410 chan spectra sampled every 4 sec
  - Event data in low and high gain when a trigger occurs (~1500000 events collected 100 sec before the event and ~512 sec after the events.
  - Images from the ASC
- 2<sup>nd</sup> data set
  - High level products from the GRBs and other events
- Calibration data to be stored in CALDB
  - Channel boundaries and responses
- Plan to delivery :
  - The 1st data set is underway.
    - The TH and PH data will be delivered first (within Feb 2020), follow by the EVENT data
    - CALDB populated with the Channel boundaries files
    - HEASARC will generate metadata to allow access via the Web Browser
  - 2<sup>nd</sup> data set
    - Plan still under discussion
- HEASARC do not plan to archive the web software interface now available at DARTS
  - However the data format of the CGBM data is similar to other data from different mission to allow usage of the existing software and/or scripting existing routine to reproduce the web interface capability



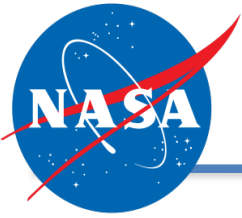
# Calorimeter data



- The Calorimeter archive includes:
  - Space weather data from the CHD
    - The original files (version 1.0 were delivered to DARTS is ASCII
    - HEASARC wrote a converter to translate the data in FITS and uncover few anomalies
    - The converter is now running at DARTS on version 1.2 and HEASARC rsyn the archive routinely
      - Data are verified before made public for transmission problem and/or anomaly in the FITS file
    - Data files can be plot and viewed with standard ftools (e,g, lcurve , fplot or fdump)
    - When data are at the HEASARC , metadata are generated and ingested in the database to allow data selection via the Browser

<a href="#">View</a>	<a href="#">Sort</a>	<a href="#">Parameter (Unit)</a>	<a href="#">Query Terms</a>	<a href="#">Min Value</a>	<a href="#">Max Value</a>	<a href="#">Value Type</a>
<input type="checkbox"/> All						
<input checked="" type="checkbox"/>	<input type="radio"/>	<a href="#">obsid</a>		20151013	20200130	string
<input checked="" type="checkbox"/>	<input type="radio"/>	<a href="#">time</a>		2015-10-13 00:00:27	2020-01-30 00:03:49	date
<input checked="" type="checkbox"/>	<input type="radio"/>	<a href="#">end_time</a>		2015-10-14 00:00:26	2020-01-30 15:03:47	date
<input type="checkbox"/>	<input type="radio"/>	<a href="#">exposure (s)</a>		0.00000	86400.50450	float
<input type="checkbox"/>	<input type="radio"/>	<a href="#">processing_date</a>		2019-12-19 09:12:48	2020-01-31 04:16:06	date
<input type="checkbox"/>	<input type="radio"/>	<a href="#">processing_version</a>		v3	v3	string
<input checked="" type="checkbox"/>	<input type="radio"/>	<a href="#">rate_mean (ct/s)</a>		0.00	23839.67	float
<input checked="" type="checkbox"/>	<input type="radio"/>	<a href="#">rate_min (ct/s)</a>		0.00	410.95	float
<input checked="" type="checkbox"/>	<input type="radio"/>	<a href="#">rate_max (ct/s)</a>		0.00	1017947.44	float

- Spectra
  - The ascii file were delivered at DARTS
  - Need to work out a suitable FITS format and translate them in FITS



# Conclusions and Future

HEASARC

- Currently HEASARC hosts and gives access to the CHD space weather data
- Future :
  - a) Waiting for the first delivery of the CGBM and made them public
  - b) Create metadata for the CGBM
  - c) Made public CALDB for the CGBM
  - d) Ingest the CGBM EVENTS
  - e) Derive a format for the Calorimeter spectra
  - f) Finalize the plan for the CGBM products and responses (and ingest when ready)
  - g) Create dedicated web pages for CALET similarly to all other missions