

# **Activities and Status of the Space Physics Data Facility (SPDF) Archive for the Past Year**

**Robert Candey, Lan Jian, and the Rest of the SPDF Team**

Fourth IHDEA Meeting

2022 Oct. 3 - 7

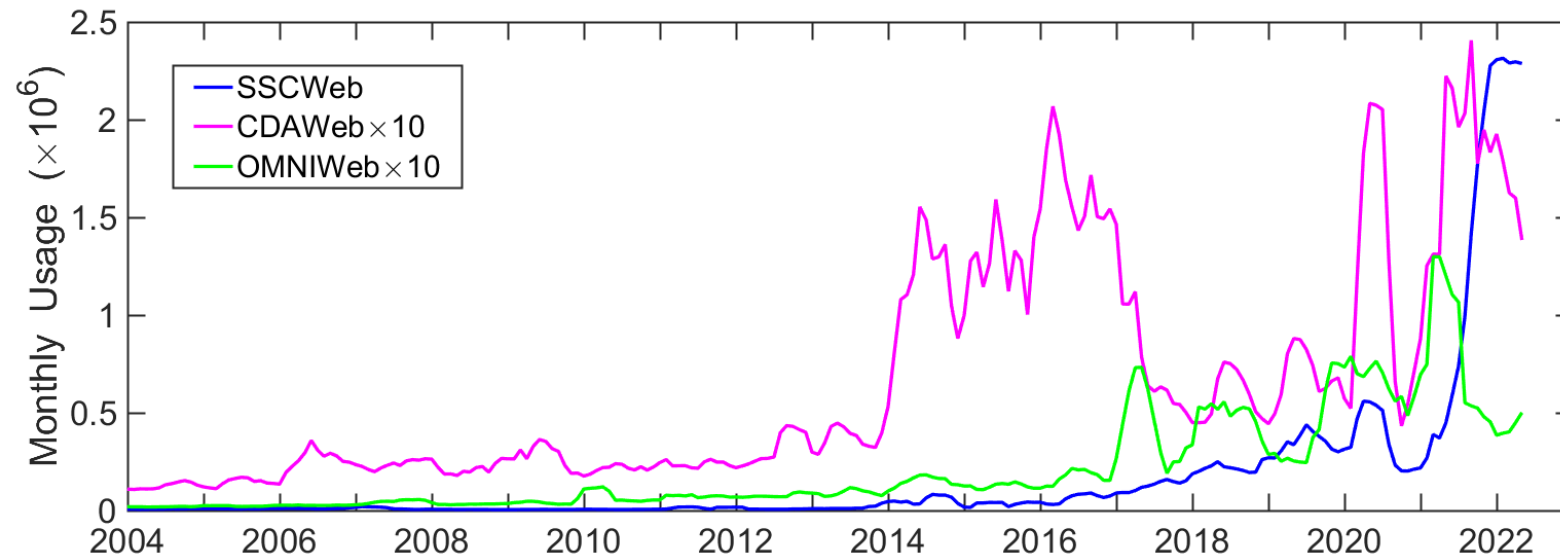
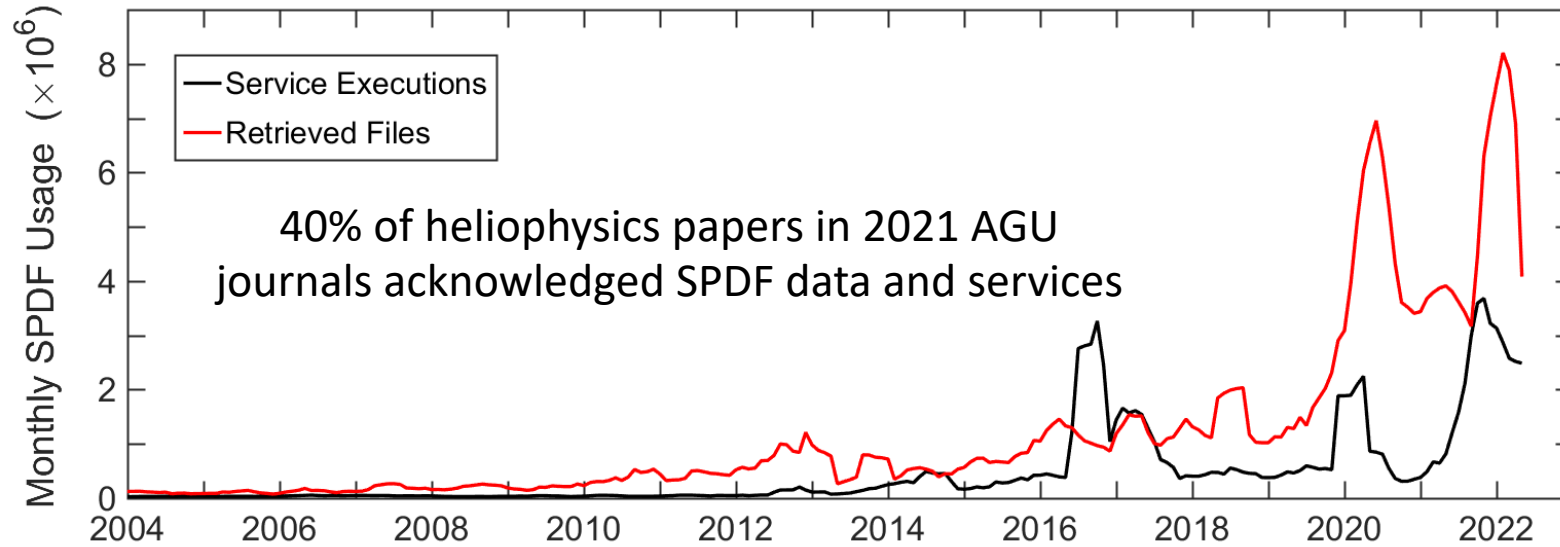
SPDF <<https://spdf.gsfc.nasa.gov>>

# SPDF Activities in the Past Year

- Added many new datasets from ICON, GOLD, Parker Solar Probe, IBEX, Solar Orbiter, MMS, and many other spacecraft, rocket, balloon, and ground instruments
- Completed development of CDFs for SOHO in-situ data, IBEX data, and Wind STICS
- Added GOES magnetometer (MAG) high-resolution data for GOES-08 to GOES-17 for 1995 to now, and ACE/ULEIS (AC\_H2\_ULE) version 04
- Now ingesting CDFs from the Cluster archive, starting with datasets identified as most important by Harri Laakso and Perri Makela (288 done, 12 in progress for first tier, out of 1960)
- Automated ingest pipeline for > 75 missions out of over 200 missions for a total of ~4,000 datasets using ~450 TB (ingest and usage logs: <https://cdaweb.gsfc.nasa.gov/publiclogs/> )
- Recent average monthly data ingestion rate: ~0.7 million files, ~14 TB data
- Continue population of OMNI, COHO, SSC databases
- CDAWeb plot and display improvements, waveforms, inventory plots, time slices, audification
- Adding SPASE Resource IDs and DOIs to CDAWeb metadata and displays

# SPDF Usage Statistics

More reports at [cdaweb.gsfc.nasa.gov/publiclogs/](http://cdaweb.gsfc.nasa.gov/publiclogs/)

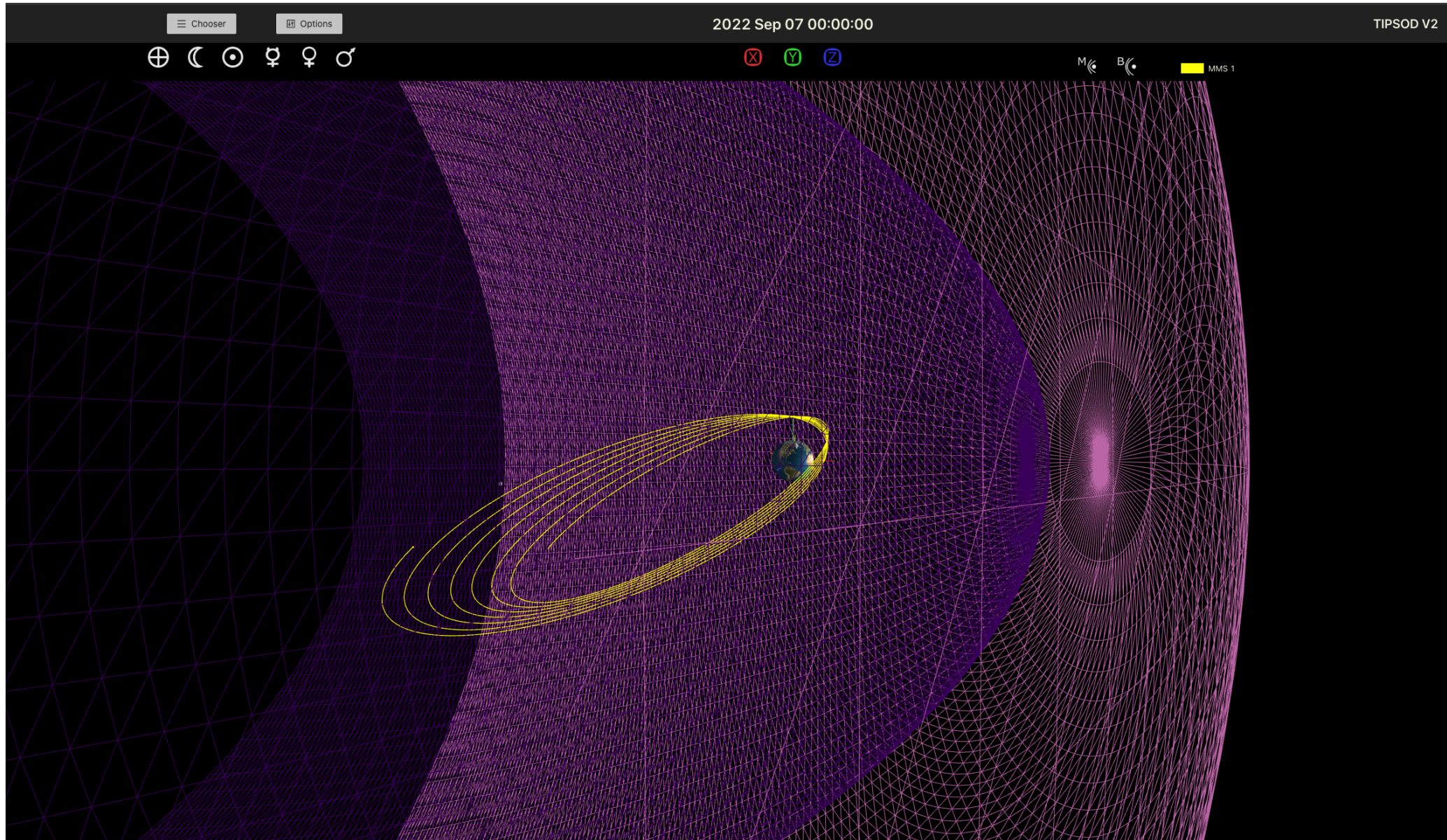


# Planned SPDF Activities

- We are about to start copying level 2 data into HelioCloud for use with cloud-based analysis tools
- Standardize ISTP/IACG Metadata Guidelines with version control, etc.
- New SKTeditor in Javascript or Python, including defining SPASE metadata at the same time as defining the internal metadata and structure of the CDF/netCDF dataset being created
- Working on web services for event lists for burst mode data and science events (CMEs, bow shock crossings, etc.) and use by SSCweb and CDAWeb to better serve intermittent/burst data (find next/previous burst)
- Developing Javascript alternative to the Java-based 4D Orbit Viewer
- HTML5/Javascript-based browser interface for CDAWeb/SSCweb, building on the above prototype 4D orbit viewer, expanded to add interactive data plotting and sonification tied to the orbit display, perhaps with data glyphs along the orbits as well (uses JSON output from SSCweb and CDAWeb web services)
- Jupyter notebooks showing web services
- Quick start guides, tutorials, improved documentation, web redesign



# Prototype 4D Orbit Viewer in Javascript



# SPDF Action Items from Previous IHDEA Meetings

1. Action on SPDF: to circulate on a regular basis, at least yearly, to IHDEA members the roadmap of CDF development
  - See next page for CDF status
2. Action on SPDF: ISTP rules to allow filenaming with start and end dates, in such a way that these filenames will not cause errors or warning by SKTeditor
  - Should be complete
3. Action on NASA and ESA/ESDC: to coordinate/facilitate the transfer of all science datasets of the Cluster mission from ESDC to SPDF
  - Nearly done with 300 datasets identified as most important, second tier next

# CDF Status and Recent Development

- CDF 3.8.1 released with Unicode UTF-8 encoding support
- Continued CDF support and general development, plus added features
- High-level functions to read variables or whole CDF into a map structure for IDL, Java, Perl and C#
- CDF-JSON converter
- Improved dynamic space management in core library, and improved compression logic to avoid using temporary files as much as possible
- Jeremy Faden is maintaining Nand Lal's pure Java CDF library

# ISTP Metadata Guidelines Development

- Converted web pages that have served as the text for the Guidelines to markdown and added to [https://github.com/IHDE-Alliance/ISTP\\_metadata](https://github.com/IHDE-Alliance/ISTP_metadata)
- Bobby is still editing the pages to add changes identified in the past few years
- Adding some global attributes and variable attributes to ISTP metadata standard, such as author list for DOIs, DOI, Variable\_display\_order, Variable\_display\_indent\_level, Associated\_parent\_variable, Dataset\_group, Mission\_parent) and from Cluster/Solar Orbiter: Representation, Tensor\_order, Coordinate\_systems, Rotation\_matrices, Unit\_quaternion
- We are looking for feedback on whether this is a suitable path forward, and for feedback on its layout and content
- The Earth science community uses the CF Conventions (originally Climate and Forecast) <https://cfconventions.org/>
- Future governance might be overseen by an international committee or fold into the SPASE effort