This Talk

So we have all these awesome spacecrafts, but how can we parse it in a meaningful way?

Give some centralized locations for Heliospheric and Solar Data

Talk about the king of Solar data analysis: SolarSoft (SSW)
Direct from the Mission Team

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Virtual Observatories

- But what if you want more context?
- Virtual Observatories / Data centers!

- NASA language:
  - “Information from a single spacecraft vantage point is being replaced by multispacecraft distributed observatory methods”
  - “The VO program is designed to develop an integrated approach to scientific research and analysis”
  - i.e. Data Assimilation
Virtual Heliospheric Observatory

- Centralized data distribution center for in-situ data

vho.nasa.gov
Virtual Heliospheric Observatory

- Many diff types of queries, can span many instruments
Virtual Heliospheric Observatory

- Can download data or even plot directly
Virtual Solar Observatory

- Centralized data distribution center Solar data
  sdac.virtualsolar.org

- **Time**
  Search by time interval.
  Derive time intervals from event catalogs

- **Observable**
  Search based on physical observables

- **Instrument / Source / Provider**
  Search based on instruments or data archives
  - Compact listing
  - Instrument / Source (not provider dependent)
  - Instrument Only (not source or provider dependent)

- **Spectral Range**
  Search based on a spectral range

- **Nicknames**
  Search based on common terms used to describe data products
Virtual Solar Observatory

- Centralized data distribution center Solar data
  sdac.virtualsolar.org

- Huge number of instruments (too many to list)

- Includes ground based obs as well

- Interface is a bit clunky, but can help finding multiple datasets
More Context: Models at the CCMC

- Community repository for validated heliospheric models
- MHD models, B extrapolations
- Runs on Request
- Lets you ask what 3D magnetic, velocity, thermodynamic structures might look like for any time in the past 2 decades

http://ccmc.gsfc.nasa.gov/
Data Analysis
SolarSoft (SSW)

- Huge Repository of general IDL tools and mission specific data analysis routines and calibration files.

- Primary Goal: “Provide a large reuse software library”
  - save everyone time and effort!

- Website: [http://www.lmsal.com/solarsoft](http://www.lmsal.com/solarsoft)

- (or just google ‘solarsoft lmsal’)
SolarSoft (SSW)

- Time series analysis, time conversions
- Spectral fitting
- Image and Image cube (movies) display, wavelets
- IDL data manipulation (structure, string, array, math)
- File I/O
- Solar utilities: limb fitting, grid overlay, coordinate transformations…
- Provide access to supporting ancillary data bases
- Provide integrated access to other IDL packages
SolarSoft (SSW)

- Caveat, SSW website / main documentation is pretty ‘dated’
- But SSW is constantly being contributed to/updated
  - Individual package documentation (+file headers) is usually good
- Once you manage to install it, very easy to keep up to date
- If it is at all relevant to what you do, It is well worth the initial effort!
SSW: Packages

- Software suites for a number of observatories (SDO, SOHO, HINODE, STEREO, GOES, YOHKOH, TRACE, + other optical and radio observatories

- Also has virtual observatory packages
  - This includes a VSO interface → can script data acquisition in IDL!

- Many other special use packages:
SSW: GEN

- Standard tools with SSW (ssw/gen/idl)
- Great resource for IDL code to use
SSW: FESTIVAL

- SSW package for studying multiple imaging datasets in unison with a variety of analysis tools

SOHO EIT + LASCO

STEREO EUVI + COR1&2 + HI1&2
SSW: CHIANTI

- Comprehensive spectral analysis suite (next talk)
Other: Helioviewer.org

- NASA/ESA project that uses VSO API and makes nice web and java interface for viewing data.
- Will load calibrated images in real time!
- Intended eventually for SDO scale data, so check back!