Virtual Solar Observatory (VSO) status and plans

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Science constituency served

- Solar physicists
  - Not just US
  - Not just spacebased data users
- Other HPS researchers desiring access to solar data
  - Particularly heliospheric (SOHO, STEREO)
- Machines (via API)
- Not the general public
  - But possible to construct e.g. Java applet around API calls that could present data for the non-specialist
Who does what

- Distributed development
  - Small teams (~ 0.1 FTE scientist, 0.1 - 0.5 FTE technically competent person) at:
    - Stanford
    - Montana State
    - SwRI (Boulder)
    - National Solar Observatory
    - Goddard
  - “Management” (rope pushing) at Goddard
Data sets available

- **Current**
  - 25 unique sources (spacecraft, groundbased observatories) at 12 providers
    - > 50 individual instrument-provider combinations
  - 3 meta-metadata sets (event lists: CME’s, flares)

- **Planned**
  - New missions: STEREO, Solar-B, SDO
  - Additional groundbased data sets (e.g. DOT)
  - Additional event lists
Architecture

- The infamous “small box”
Still mostly thinking inside the small box

- Data query → meta data returned
- Allows for iterative searches
- Browser interface features
  - “Shopping cart” GUI
  - reorder columns, rows (Javascript)
  - thumbnails, images, animations
  - unique “cart ID” for reproducing searches
- Don’t yet have links to software
Proposed new work (senior review)

- **Develop the full potential of the VSO**
  - Provide the ability to join searches on multiple catalogs/event lists and data sources
  - Provide ability to search on spatial regions/coordinate ranges of interest as well as time, &c.
  - Improve robustness/availability of VSO server instances
    - software recognition of when specific servers are unavailable
    - hardware for redundancy, failover
- **Work with other VO's on building a heliophysics meta-VO**
- **Metadata translations**
- **API change control, backwards compatibility**
  - Community planning efforts (e.g. NASA Heliophysics)
  - Work toward making VSO compatible with semantic Web
  - Ontologies, Resource Description Framework (RDF)
  - Community efforts (e.g. AGU)
- **Graphic User Interface (GUI) improvements**
- **Connections to applications packages (e.g. CoSEC)**
- **Establish database of carts, publications, and other user annotations**
- **Enable Cart ID's for API calls (to allow citation, statistics)**
- **Management (project management, communications with larger community and NASA management)**
Technology

- Service-oriented architecture
  - SOAP, WSDL
  - Browser interface as well as API
  - Only provider buy-in necessary is either a SOAP server or a proxy service at one of the “founding” providers (e.g. for ASCII flat-directory catalogs when no SQL db exists)
  - Based on VSO-unique data model
    - Queries are based on time and {physical observable, instrument, source, provider, spectral range, nicknames (common terms)}
  - New version of GUI will use VOTables (speed improvement, delivery option)
History (past and future)

- Funded by SEC senior review, FY2001
  - Study (~ 1.3 year) produced strawman design, marketed at BoF sessions at AGU, SPD
- Development of initial capabilities: 2003/12 beta release, more consultation with community
- Additional functionalities, providers rolled out for AGU, AAS, SPD meetings since then (booth at 2005 Joint Assembly)
Uptake

- Lies, damn lies, statistics, VO statistics....
Methodology for user feedback

• VSO homepage solicits:
  ▶ Suggestions for new features
  ▶ Comments, criticisms, &c.
    - Go directly to ticketing system so s/w folks can deal with them

• Will continue to hold community (BoF) sessions

• Senior Review
  ▶ Most recent: 2006 May 2

• Distributed development