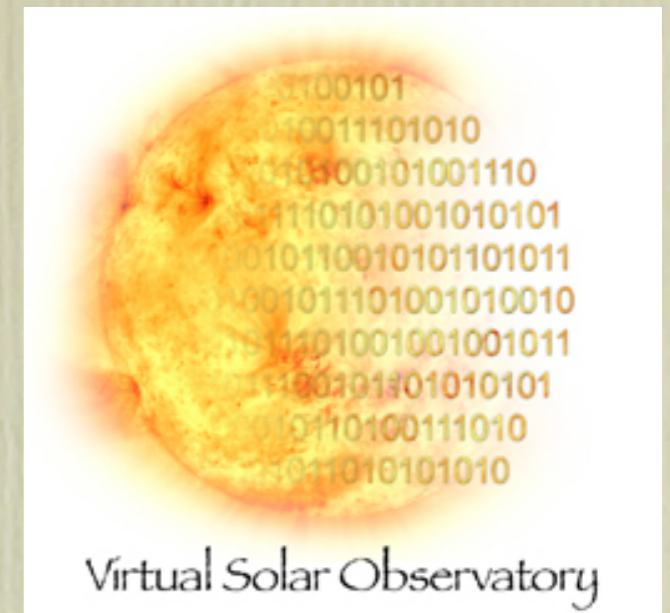




STEREO and the VSO



J.B. Gurman, G. Dimitoglou, J. Hourclé
NASA Goddard Space Flight Center, Solar Physics Branch

R.S. Bogart, K. Tian
Stanford University

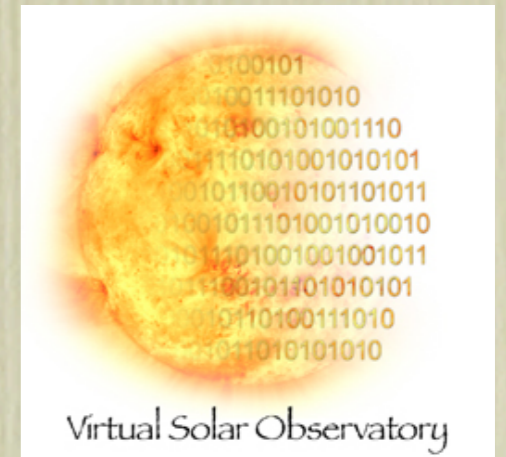
F. Hill, I. Suárez-Solá, S. Wampler
National Solar Observatory

P. Martens, S. Yoshimura
Montana State University

A. Davey
Southwest Research Inst. (Boulder)



What's all this VSO stuff, anyway?



- VSO history
- VSO design
- VSO status
- VSO and STEREO
 - SSC data service
 - relationship to other discipline virtual observatories (“VxO’s”)
- So what and who cares?



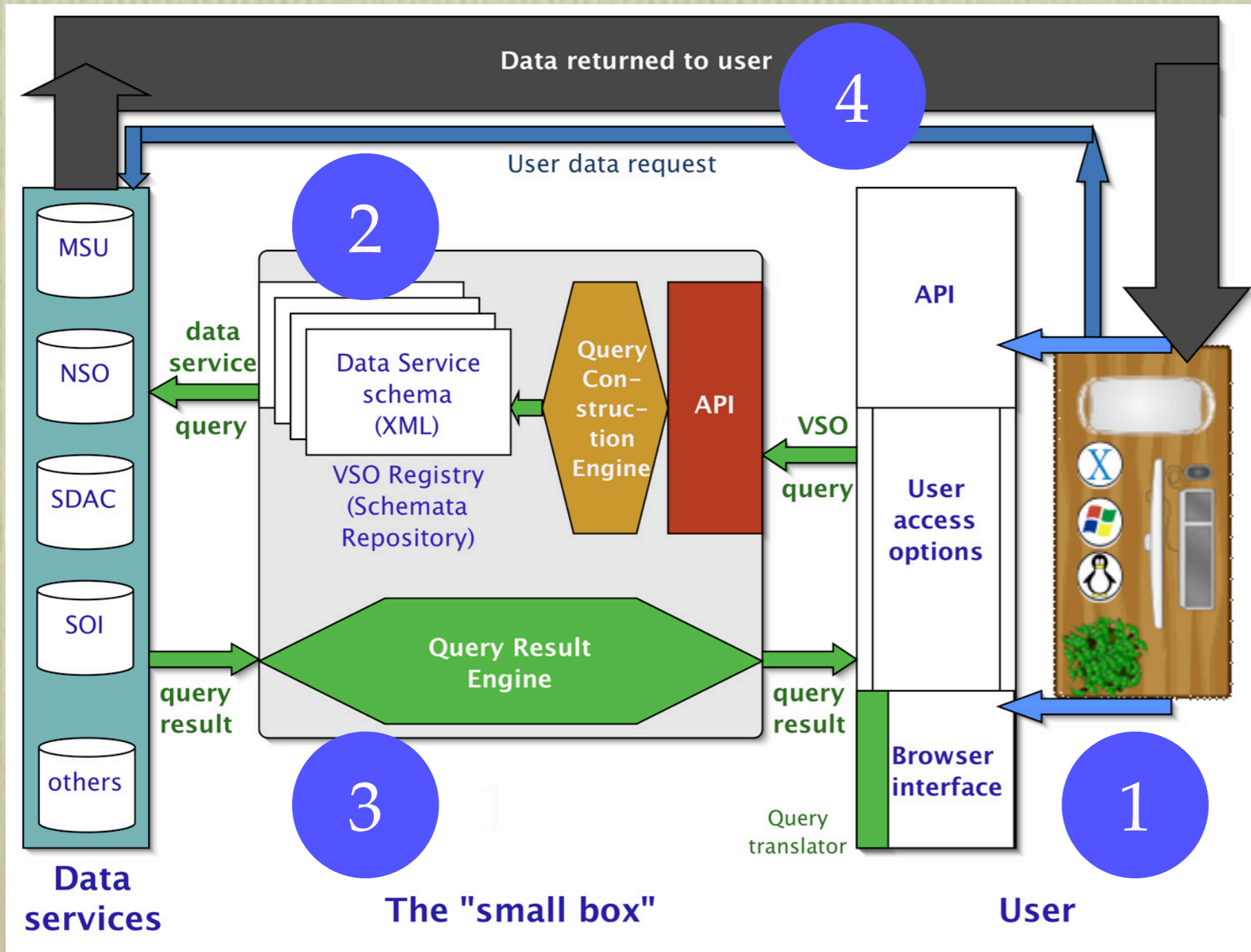
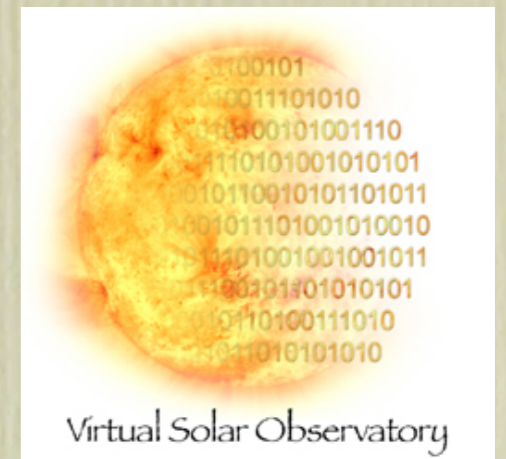
History



- Motivated by “nighttime” astronomy virtual observatory (VO) organizational efforts in mid-1990’s
- “Whole Sun Catalog” (European-US) effort unfunded
- “Birds of a Feather” (BoF) session at 2000 Solar Physics Division meeting
- NSF IR, NASA LWS proposals - shot down
- 2001 Senior Review
- Study (1 year), followed by two years of development (2003 June - 2005 May)
- Consortium of “the willing” (National Solar Observatory, Stanford, Montana State, Solar Data Analysis Center)



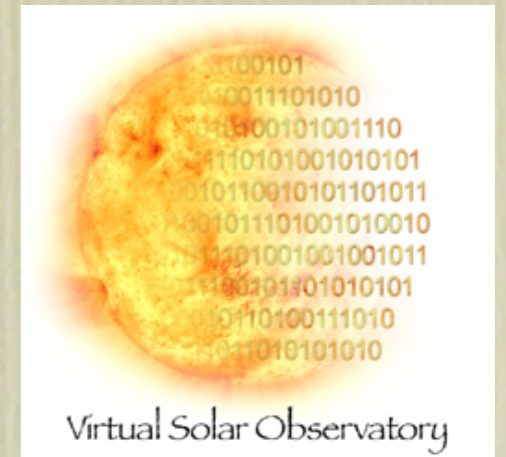
So what does the VSO do?



1. Access through a browser or an API
2. "Small box" uses registry of XML data service schema to construct appropriate queries for each relevant data service
3. API or browser can refine queries
4. Final data transfer is direct to requestor (no middleman)



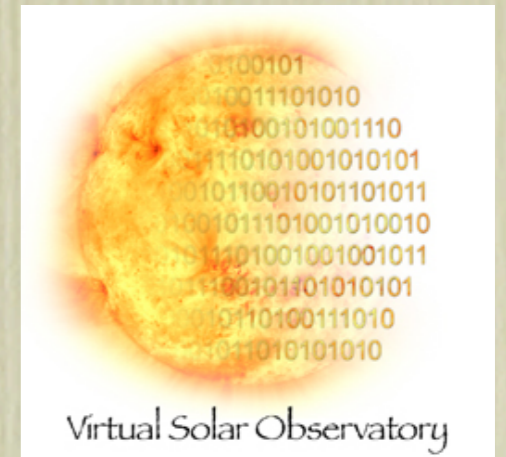
VSO status (I)



- First beta release at 2003 Fall AGU
- Version 0.5 beta released at 2004 Spring AAS/SPD meeting
- Version 1.0 released this week at 2004 Fall AGU
 - Variety of user interfaces, API
 - Faster search engine
 - Thumbnail images for some data
 - “Nickname” as well as physical observable-, instrument-oriented searches



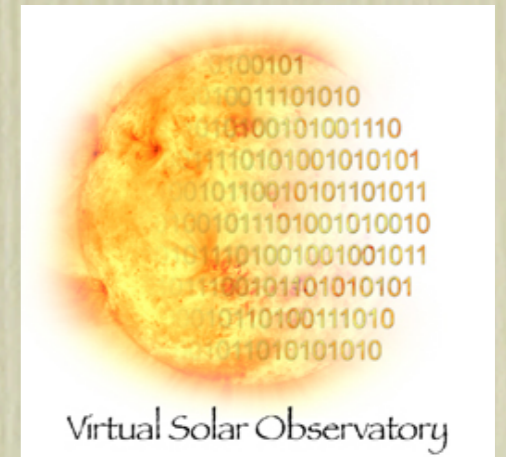
VSO status (II)



- Current data services: Stanford (MDI, MWO), MSU, NSO Digital Library, OVRO, H alpha network (HANET), Meudon, HAO MLSO (coronagraph, prominence monitors), SDAC (*SOHO*)
- Metadata providers: flare and CME lists
- Working on adding new data services:
 - TRACE (on a per-image basis)
 - RHESSI
- Will include SDO



VSO and STEREO



- The VSO is one of the ways we plan to offer access to STEREO data at the SSC
 - Poster last Tuesday: Hourclé *et al.*, “STEREO in the Virtual Solar Observatory Context” (SH21B-0413)
 - Interactive or API
- The VSO is also capable of acting as a data service (through its API) for other VxO’s, *e.g.* the VHO, VSPO, or CoSEC (N. Hurlburt and colleagues at Lockheed)
- Similarly, the VSO is capable of accessing other VxO’s as data services



VSO Time / Provider Search Form

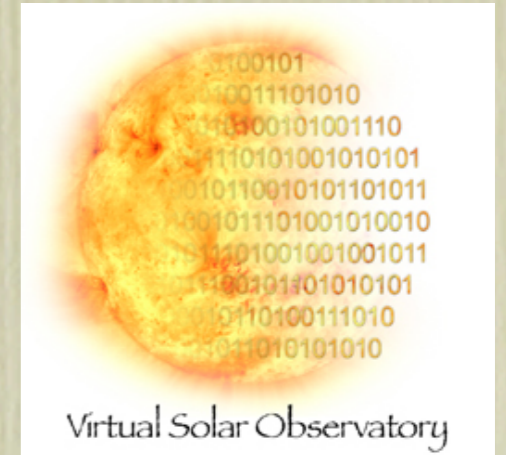
http://vso1.nascom.nasa.gov/vso/agu/stereo_select_mockup.html

Start Date/Time: 2006 Oct 30 / 00 : 00
End Date/Time: 2006 Oct 30 / 23 : 59

Provider : Source : Instrument Drilldown

Select a name to expand the list

- HANET
- HAO
- MSU
- NSO
- OBSPM
- OVRO
- SSC
 - STEREO-A
 - IMPACT 2006.???.? →
 - PLASTIC 2006.???.? →
 - SECCHI
 - COR1 2006.???.? →
 - COR2 2006.???.? →
 - EUVI 2006.???.? →
 - HI1 2006.???.? →
 - HI2 2006.???.? →
 - SWAVES 2006.???.? →
 - STEREO-B
 - IMPACT 2006.???.? →
 - PLASTIC 2006.???.? →
 - SECCHI
 - SWAVES 2006.???.? →
- SDAC
 - SOHO
 - CDS 1996.01.19 →



- Possible to search on multiple spacecraft/instruments/data services




-or search by physical observable

VSO Time / Observable Search Form

http://vso1.nascom.nasa.gov/cgi-bin/search?time=1&observab

Apple News science NASA SOHO SDAC senior review Mac resources stor

 VSO Time / Observable Search Form
Version 1.0

Start Date/Time: 2004 Nov 12 / 22 : 00

End Date/Time: 2004 Nov 13 / 01 : 59

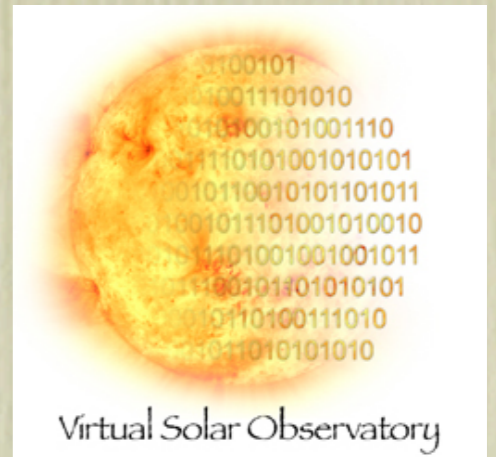
Physical Observable

- LOS_velocity
- vector_velocity
- LOS_magnetic_field
- vector_magnetic_field
- intensity
- equivalent_width
- wave_power
- wave_phase
- oscillation_mode_parameters
- polarization_vector
- number_density
- particle_flux
- particle_velocity
- thermal_velocity
- composition

Notes

- Observable classification is tentative, as some data services have not registered full information
- Time ranges of instrumentation provide the minimum and maximum ranges of data known to be available. The VSO is still receiving new information, but some archives may be a week or more behind the present c

VSO @ Home | NSO | Stanford






- or by “nickname”

VSO Time / Nickname Search Form

http://vso1.nascom.nasa.gov/cgi-bin/search?time=1&nickname

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 VSO Time / Nickname Search Form
Version 1.0

Start Date/Time: 2004 Nov 12 / 22 : 00

End Date/Time: 2004 Nov 13 / 01 : 59

Nickname

Dopplergram

- Full-disk dopplergram
- K-7699 dopplergram
- Na-D dopplergram
- Ni-6768 dopplergram

Image

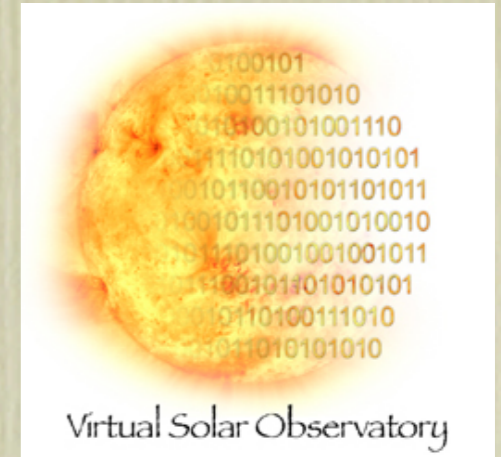
- 10.7cm image
- Ca-K image
- EUV image
- H-alpha image
- Hard X-ray image
- He 10830 image
- Na-D image
- Soft X-ray image
- UV image
- White-light image

Magnetogram

- Full-disk magnetogram
- LOS magnetogram
- Vector magnetogram

Spectrum

- EUV Spectrum
- IR Spectrum
- UV Spectrum
- Visible Spectrum





- and can use thumbnail images to help downselect from the search results

VSO Search Results

http://vso.stanford.edu/cgi-bin/VSO/vsoui.pl

Apple News science NASA SOHO SDAC senior review Mac resources stores VSO IFMP mishegas schools

VSO Search Results

Virtual Solar Observatory

150 Records Found
SDAC 125 Returned

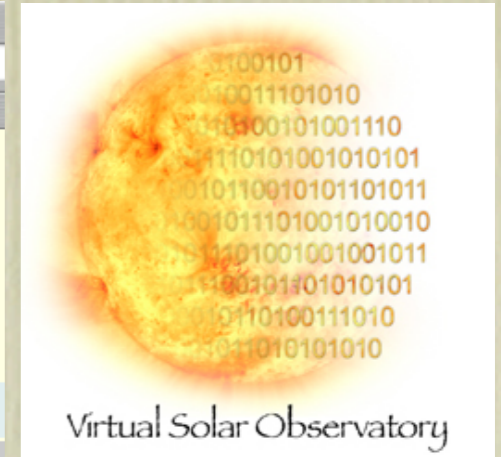
25 Records Found
SHA 25 Returned

Select Check Criteria
Check/Uncheck ...
 All Above this box
 All Below this box
 Just this box
 --- ---

Sort Only | Rearrange only | Sort & Rearrange

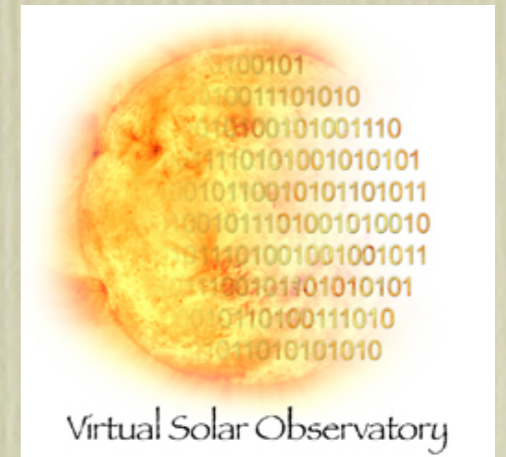
Views: Basic | Thumbs | Links | Long

<input type="checkbox"/>	<input type="checkbox"/> Thumbnail	<input type="checkbox"/> Time Start	<input type="checkbox"/> Time End	<input type="checkbox"/> Min WaveLength	<input type="checkbox"/> Max WaveLength	<input type="checkbox"/> Wave Type	<input type="checkbox"/> Observable	<input type="checkbox"/> Source	<input type="checkbox"/> Instrume
<input type="checkbox"/>		2004.10.12 00:03:30	2004.10.12 22:24:30	6768 Å	6768 Å	N/A	LOS_magnetic_field	SOHO	MDI
<input type="checkbox"/>		2004.10.12 17:54:45	2004.10.12 21:08:34	151.42 Å	784.42 Å	N/A	intensity	SOHO	CDS
<input type="checkbox"/>		2004.10.12 19:00:16	2004.10.12 19:00:28	171.00 Å	171.00 Å	N/A	intensity	SOHO	EIT
<input type="checkbox"/>		2004.10.12 19:00:30	2004.10.12 19:59:30	6768 Å	6768 Å	N/A	LOS_magnetic_field	SOHO	MDI
<input type="checkbox"/>		2004.10.12 19:06:10	2004.10.12 19:08:13	284.00 Å	284.00 Å	N/A	intensity	SOHO	EIT
<input type="checkbox"/>		2004.10.12 19:12:30	2004.10.12 19:12:30	6768 Å	6768 Å	N/A	LOS_magnetic_field	SOHO	MDI
<input type="checkbox"/>		2004.10.12 19:13:51	2004.10.12 19:14:03	195.00 Å	195.00 Å	N/A	intensity	SOHO	EIT
<input type="checkbox"/>		2004.10.12 19:19:43	2004.10.12 19:20:16	304.00 Å	304.00 Å	N/A	intensity	SOHO	EIT





So what and who cares?



- Whether directly or through another VxO, probably the easiest way for non-solar physicists to get solar data
 - nicknames
- Increase the uptake of STEREO data, simply by making it easier to access
 - Good for science
 - Good for STEREO in Senior Reviews
- Should enable science that would otherwise be too tedious for even a graduate student