

The Virtual Solar Observatory: Still a Small Box

J.B. Gurman, G. Dimitoglou, J. Hourclé

NASA Goddard Space Flight Center, Solar Physics Branch

R.S. Bogart, K.Q. Tian

Stanford University, Center for Space Science and Astrophysics

F. Hill, I. Suárez-Sola, S. Wampler

National Solar Observatory

P. Martens, K. Yoshimura

Montana State University, Department of Physics

A.R. Davey

The Southwest Research Institute

....impossible without the
cooperation of:

T. Darnell, *HAO (MLSO)*

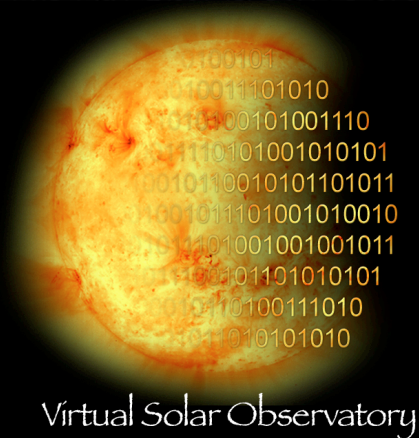
S. Freeland, *LMSAL*

Dale Gary, *NJIT*

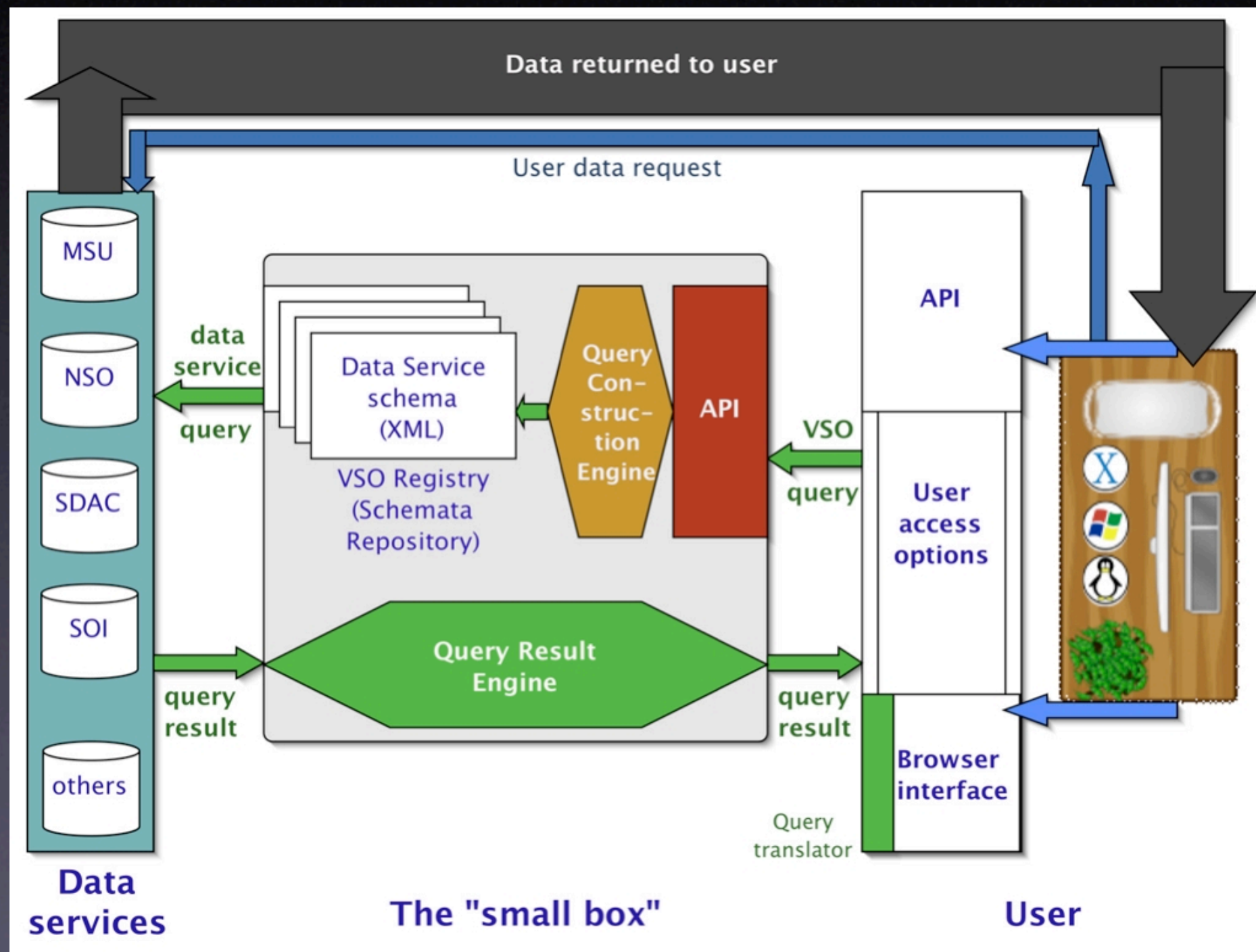
K. Reardon, *Oss. Astrophys. di Arcetri*

K. Tolbert, R. Schwartz, *NASA GSFC*

D. Wilkinson, *NOAA SEC*



How small is that box?

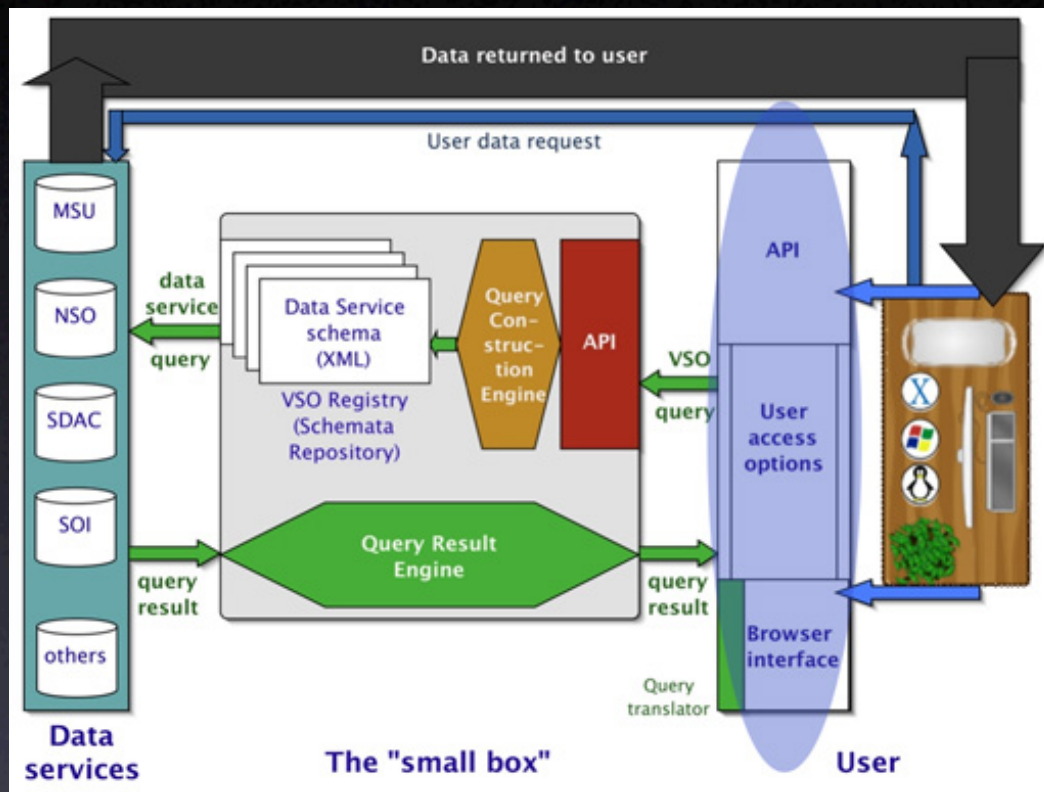


Design remains the same as design published in 2002/12, 1.0 release in 2003/12, but....



Virtual Solar Observatory

Richer in features



- Browser query interface offers multiple search methods, including combinations
- GUI/shopping cart allows sorting by columns, viewing of thumbnails (where available)



VSO Time / Instrument

Version 1.1

Start Date/Time: 2005 ▾ Apr ▾ 13 ▾ / 22 ▾ : 00 ▾

End Date/Time: 2005 ▾ Apr ▾ 14 ▾ / 01 ▾ : 59 ▾

Search

Clear

Provider : Source : Instrument Drilldown

Select a name to expand the list

☐ HANET (H-alpha Network, Big Bear Lake)?

☐ HAO (High Altitude Observatory, NCAR)?

☐ LSSP (Laboratory for Space and Solar Physics,
NASA/Goddard)?

☐ RHESSI (Reuven Ramaty High Energy Solar
Spectroscopic Imager)?

☐ MSU (Montana State University)?

☐ NGDC (National Geophysical Data Center, NOAA)?

☐ GOES-12 (Geosynchronous Operational Environmental
Satellite - 12)?

☐ NSO (National Solar Observatory)?

☐ OBSPM (Departement d'Astronomie Solaire de
l'Observatoire de Paris)?

☐ OVRO (Owens Valley Radio Observatory)?

☐ SDAC (Solar Data Analysis Center, NASA/Goddard)?

☐ SOHO (Solar and Heliospheric Observatory)?

☐ TRACE (Transition Region And Coronal Explorer)?

☐ SHA (Stanford Helioseismology Archive, Stanford U.)?

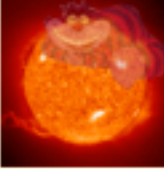
Search and selection

- Search by data source and facility/instrument

VSO Time / Observable Search Form

http://vso.nascom.nasa.g Google

Apple News science SOHO NASA SDAC senior review

 VSO Time / Observable Search Form
Version 1.0 

Start Date/Time: 2005 Apr 13 / 21 : 00

End Date/Time: 2005 Apr 14 / 00 : 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

Search Clear


Search and selection

- or by physical observable

VSO Time / Spec

<http://sdac2.nascom.nasa.gov/cgi->

Apple News (250) science SOHO NASA estate SDA

 VSO Time / Spec
Version

Start Date/Time: 2005 Apr 22 / 22 : 00

End Date/Time: 2005 Apr 23 / 01 : 59

Spectral Range

☐ soft X-rays [1 - 100 Å]
☐ extreme UV [100 - 1000 Å]
☐ ultraviolet [900 - 3800 Å]
☐ visible [3500 - 10000 Å]
☐ radio [0.3 - 30 GHz]
☐ **OR** select spectral range:

min

max

unit


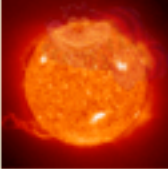
Search and selection

- or by wavelength/frequency

VSO Time / Nickname Search Form

http://vso.nascom.nasa.gov

Apple News science SOHO NASA SDAC senior review

 VSO Time / Nickname Search Form
Version 1.0 

Start Date/Time: 2005 Apr 13 / 22 : 00

End Date/Time: 2005 Apr 14 / 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

Search and selection

- or by “nicknames,” commonly used names for specific data types



Search and selection

- or by combinations of search methods
- here, provider and wavelength range

VSO Time / Provider / Spectrum Search Form

http://vso.nascom.nasa.gov Google

Apple News science SOHO NASA SDAC senior review

 VSO Time / Provider / Spectrum Search Form
Version 1.0 

Start Date/Time: 2005 Apr 13 / 22 : 00

End Date/Time: 2005 Apr 14 / 01 : 59

Provider : Source : Instrument Drilldown

Select a name to expand the list

- ☐ HANET (H-alpha Network (Big Bear Lake))
- ☐ HAO (High Altitude Observatory (NCAR))
- ☐ MSU (Montana State University)
- ☐ NSO (National Solar Observatory)
- ☐ OBSPM (Departement d'Astronomie Solaire de l'Observatoire de Paris)
- ☐ OVRO (Owens Valley Radio Observatory)
- ☐ SDAC (Solar Data Analysis Center (NASA))
- ☐ SHA (Stanford Helioseismology Archive)

Spectral Range

- ☐ soft X-rays [0.1 - 20 keV]
- ☐ extreme UV [50 - 500 Å]
- ☐ ultraviolet [800 - 3500 Å]
- ☐ visible [3000 - 9000 Å]
- ☐ OR select wavelength range:


min

max

VSO Time / Nickname Search

http://vso.nascom.nasa.gov/cgi-bin/search?time=

Apple News science SOHO NASA SDAC senior review estate

 VSO Time / Nickname Search
Version 1.0

Start Date/Time: 2005 Feb 05 / 13 : 00

End Date/Time: 2005 Feb 05 / 13 : 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


A sample search experience

- Look for EUV images in a certain time range

Loading "VSO search engine"

http://vso.nascom.nasa.gov/cgi-bin/vsoui.pl

Apple News science SOHO NASA SDAC senior review estate Mac resources



VSO at vso.nascom.nasa.gov is searching for solar data that meet the following criteria:

Time

- Start 5 Feb 2005 13:00:00
- End 5 Feb 2005 13:59:00

Wave

- Wave Unit Angstrom
- Wave Minimum 100
- Wave Maximum 2000

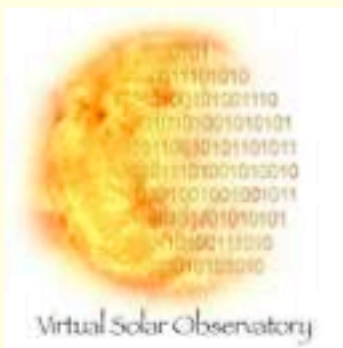
Physical Observable

- intensity

1101001010010

A sample search experience

- While search is progressing, most browsers will display time range, other search parameters
- Note how nickname “EUV image” translates to a certain wavelength range and a physical observable



VSO Search Results

[New Search](#)

10 Records Found

SDAC

10 Returned

Select Check Criteria

Check/Uncheck ...

☐ All Above this box

☐ All Below this box

☒ Just this box

--- --

Check All

Uncheck All

Go To Request Data

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"/> Instrument	<input type="checkbox"/> Extent
<input type="checkbox"/>		2005.02.05 12:45:57	2005.02.05 13:15:31	346.22 Å	631.33 Å	N/A	intensity	SOHO	CDS	N/A
<input type="checkbox"/>	IMG Link	2005.02.05 13:00:14	2005.02.05 13:00:26	171.00 Å	171.00 Å	N/A	intensity	SOHO	EIT	N/A
<input type="checkbox"/>	IMG Link	2005.02.05 13:06:09	2005.02.05 13:08:11	284.00 Å	284.00 Å	N/A	intensity	SOHO	EIT	N/A
<input type="checkbox"/>	IMG Link	2005.02.05 13:13:50	2005.02.05 13:14:02	195.00 Å	195.00 Å	N/A	intensity	SOHO	EIT	N/A
<input type="checkbox"/>		2005.02.05 13:15:38	2005.02.05 13:45:11	346.22 Å	631.33 Å	N/A	intensity	SOHO	CDS	N/A
<input type="checkbox"/>	IMG Link	2005.02.05 13:19:42	2005.02.05 13:20:14	304.00 Å	304.00 Å	N/A	intensity	SOHO	EIT	N/A
<input type="checkbox"/>	IMG Link	2005.02.05 13:26:01	2005.02.05 13:26:13	195.00 Å	195.00 Å	N/A	intensity	SOHO	EIT	N/A
<input type="checkbox"/>	IMG Link	2005.02.05 13:36:16	2005.02.05 13:36:28	195.00 Å	195.00 Å	N/A	intensity	SOHO	EIT	N/A
<input type="checkbox"/>		2005.02.05 13:45:18	2005.02.05 14:14:51	346.22 Å	631.33 Å	N/A	intensity	SOHO	CDS	N/A
<input type="checkbox"/>	IMG Link	2005.02.05 13:48:10	2005.02.05 13:48:22	195.00 Å	195.00 Å	N/A	intensity	SOHO	EIT	N/A

[Comments? Help us improve VSO](#)

Note “thumbnail” image options

results



VSO Search Results

Show Search Params :: [show]

total entries: 14

<< prev - 1 - next >>

Sort Only | Rearrange only | Sort & Rearrange ?

Views: Basic | Thumbs | Links | Long ?

Search VSO Help or enter
Cart Id:

Go

[VSO Glossary](#)

Query Menu [hide]

[New Search](#) ?

[Edit Search](#) ?

Search Status [show]

Rows Returned [hide]

SDAC

- 14 Records Found
- 14 Returned

SDAC_2

- 0 Records Found
- 0 Returned

Add/Remove Columns
[show]

CheckBox Tools

Select ... ?

- ☐ All Above this box
- ☐ All Below this box
- ☒ Just this box

Select All

Clear

Request Data

Add to Shopping Cart

Export to Text

Movie Player

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Thumbnail	Time Start	Time End	Min Spectral Range	Max Spectral Range	Wave Type	Observable	Source	Instrument	Extent	
<input type="checkbox"/>	2005.02.04 23:59:02	2005.02.05 23:59:01	N/A	N/A	N/A	intensity	SOHO	VIRGO	N/A	
<input type="checkbox"/>	2005.02.04 23:59:02	2005.02.05 23:59:01	N/A	N/A	N/A	intensity	SOHO	VIRGO	N/A	
<input type="checkbox"/>	2005.02.04 23:59:02	2005.02.05 23:59:01	N/A	N/A	N/A	intensity	SOHO	VIRGO	N/A	
<input type="checkbox"/>	2005.02.05 00:01:57	2005.02.06 00:01:56	N/A	N/A	N/A	intensity	SOHO	VIRGO	N/A	
<input type="checkbox"/>	2005.02.05 12:45:57	2005.02.05 13:15:31	346.22 Å	631.33 Å	N/A	intensity	SOHO	CDS	N/A	
<input type="checkbox"/> IMG Link	2005.02.05 13:00:14	2005.02.05 13:00:26	171.00 Å	171.00 Å	N/A	intensity	SOHO	EIT	N/A	
<input type="checkbox"/> IMG Link	2005.02.05 13:06:09	2005.02.05 13:08:11	284.00 Å	284.00 Å	N/A	intensity	SOHO	EIT	N/A	
<input type="checkbox"/> IMG Link	2005.02.05 13:13:50	2005.02.05 13:14:02	195.00 Å	195.00 Å	N/A	intensity	SOHO	EIT	N/A	
<input type="checkbox"/>	2005.02.05 13:15:38	2005.02.05 13:45:11	346.22 Å	631.33 Å	N/A	intensity	SOHO	CDS	N/A	
<input type="checkbox"/> IMG Link	2005.02.05 13:19:42	2005.02.05 13:20:14	304.00 Å	304.00 Å	N/A	intensity	SOHO	EIT	N/A	
<input type="checkbox"/> IMG Link	2005.02.05 13:26:01	2005.02.05 13:26:13	195.00 Å	195.00 Å	N/A	intensity	SOHO	EIT	N/A	
<input type="checkbox"/> IMG Link	2005.02.05 13:36:16	2005.02.05 13:36:28	195.00 Å	195.00 Å	N/A	intensity	SOHO	EIT	N/A	
<input type="checkbox"/>	2005.02.05 13:45:18	2005.02.05 14:14:51	346.22 Å	631.33 Å	N/A	intensity	SOHO	CDS	N/A	
<input type="checkbox"/> IMG Link	2005.02.05 13:48:10	2005.02.05 13:48:22	195.00 Å	195.00 Å	N/A	intensity	SOHO	EIT	N/A	

[Comments?](#) [Help us improve VSO](#) ?

[VSO](#) @ [Home](#) [NSO](#) [Stanford](#)

Thursday, 19 May 2005 about 4:03 PM MST

thumbnails view

10 Records Found

SDAC

10 Returned

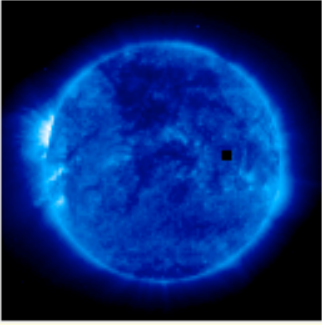
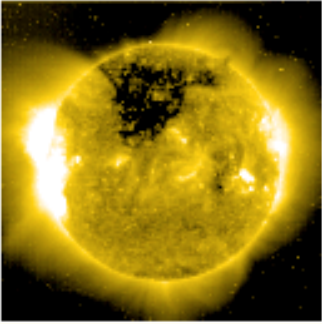
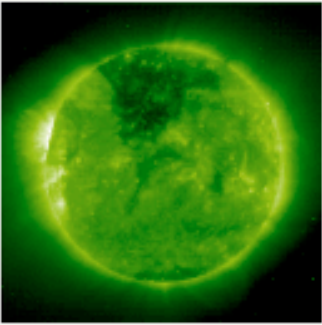
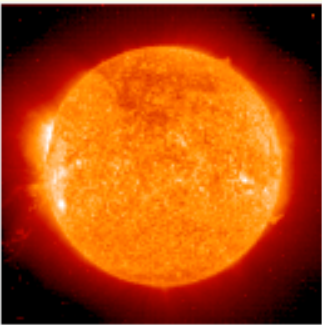
**Sort Only | Rearrange only |
Sort & Rearrange**Views: **Basic** | Thumbs | Links | Long**Select Check Criteria**
Check/Uncheck ...☐ All Above this box☐ All Below this box☒ Just this box

--- ---

Check All

Uncheck All

Go To Request Data

<input type="checkbox"/> Thumbnail	<input type="checkbox"/> Time Start	<input type="checkbox"/> Time End	<input checked="" 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"/> Instrument	<input type="checkbox"/> Extent
<input type="checkbox"/>	2005.02.05 12:45:57	2005.02.05 13:15:31	346.22 Å	631.33 Å	N/A	intensity	SOHO	CDS	N/A
<input type="checkbox"/> 	2005.02.05 13:00:14	2005.02.05 13:00:26	171.00 Å	171.00 Å	N/A	intensity	SOHO	EIT	N/A
<input type="checkbox"/> 	2005.02.05 13:06:09	2005.02.05 13:08:11	284.00 Å	284.00 Å	N/A	intensity	SOHO	EIT	N/A
<input type="checkbox"/> 	2005.02.05 13:13:50	2005.02.05 13:14:02	195.00 Å	195.00 Å	N/A	intensity	SOHO	EIT	N/A
<input type="checkbox"/>	2005.02.05 13:15:38	2005.02.05 13:45:11	346.22 Å	631.33 Å	N/A	intensity	SOHO	CDS	N/A
<input type="checkbox"/> 	2005.02.05 13:19:42	2005.02.05 13:20:14	304.00 Å	304.00 Å	N/A	intensity	SOHO	EIT	N/A
<input type="checkbox"/>									

sort options

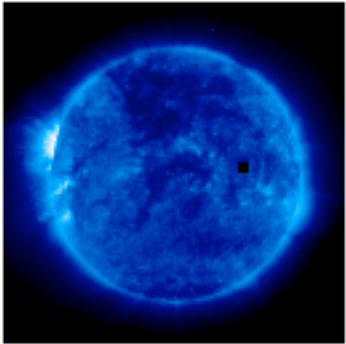
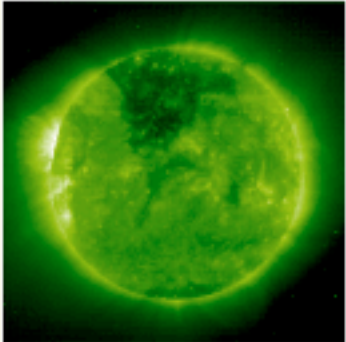
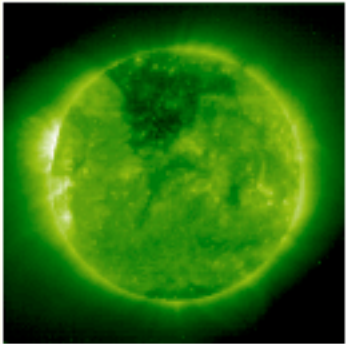
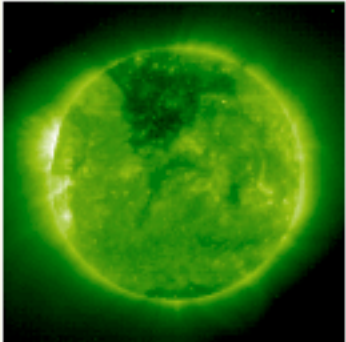
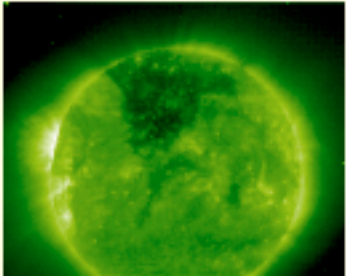
10 Records Found

SDAC

10 Returned

[Sort Only](#) | [Rearrange only](#) |
[Sort & Rearrange](#)Views: [Basic](#) | [Th](#)Select Check Criteria
Check/Uncheck ...☐ All Above this box☐ All Below this box☒ Just this box

--- ---

<input type="checkbox"/>	<input type="checkbox"/> Min WaveLength	<input type="checkbox"/> Thumbnail	<input type="checkbox"/> Time Start	<input type="checkbox"/> Time End	<input type="checkbox"/> Max WaveLength	<input type="checkbox"/> Wave Type
<input type="checkbox"/>	171.00 Å		2005.02.05 13:00:14	2005.02.05 13:00:26	171.00 Å	N/A
<input type="checkbox"/>	195.00 Å		2005.02.05 13:13:50	2005.02.05 13:14:02	195.00 Å	N/A
<input type="checkbox"/>	195.00 Å		2005.02.05 13:26:01	2005.02.05 13:26:13	195.00 Å	N/A
<input type="checkbox"/>	195.00 Å		2005.02.05 13:36:16	2005.02.05 13:36:28	195.00 Å	N/A
<input type="checkbox"/>	195.00 Å		2005.02.05 13:48:10	2005.02.05 13:48:22	195.00 Å	N/A

*A sample
search
experience*

Hits now sorted
by ascending
wavelength

10 Records Found

SDAC

10 Returned

Sort Only | Rearrange only |
Sort & Rearrange

Views: Basic

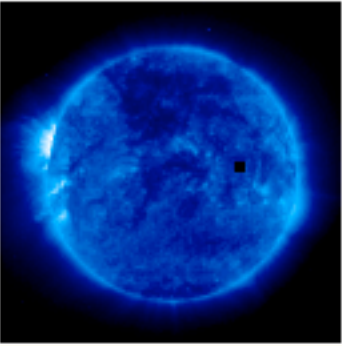
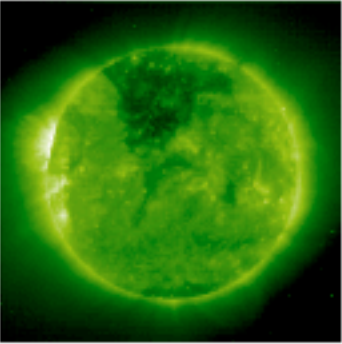
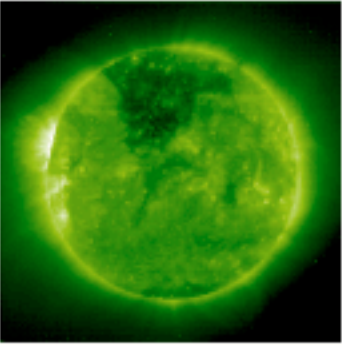
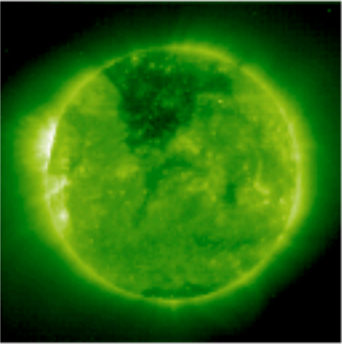
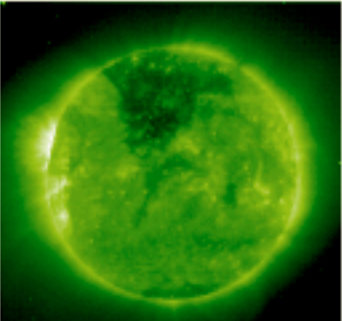
Select Check Criteria
Check/Uncheck ...☐ All Above this box☒ All Below this box☐ Just this box

--- --

Check All

Uncheck All

Go To Request Data

	<input type="checkbox"/> Min WaveLength	<input type="checkbox"/> Thumbnail	<input type="checkbox"/> Time Start	<input type="checkbox"/> Time End	<input type="checkbox"/> Max WaveLength
<input type="checkbox"/>	171.00 Å		2005.02.05 13:00:14	2005.02.05 13:00:26	171.00 Å
<input checked="" type="checkbox"/>	195.00 Å		2005.02.05 13:13:50	2005.02.05 13:14:02	195.00 Å
<input checked="" type="checkbox"/>	195.00 Å		2005.02.05 13:26:01	2005.02.05 13:26:13	195.00 Å
<input checked="" type="checkbox"/>	195.00 Å		2005.02.05 13:36:16	2005.02.05 13:36:28	195.00 Å
<input checked="" type="checkbox"/>	195.00 Å		2005.02.05 13:48:10	2005.02.05 13:48:22	195.00 Å

A sample search experience

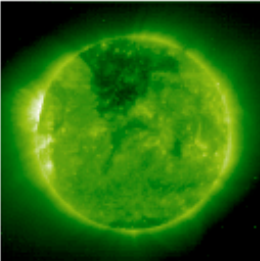
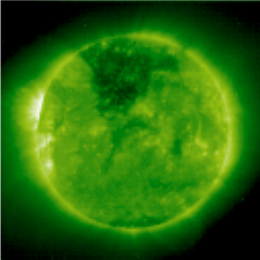
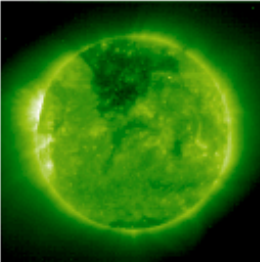
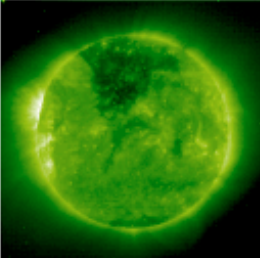
Selection via check
boxes and/or
“above/below”
controls

CART ID: VSO-55AIf2j-3078

[New Search](#) | [Click & Bookmark](#) | [Email This Cart](#)

[Sort Only](#) | [Rearrange only](#) |
[Sort & Rearrange](#)

Views: [Basic](#) | [Thumbs](#) | [Links](#) | [Long](#)

<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"/> Instrument	<input type="checkbox"/> Extent
	2005.02.05 13:13:50	2005.02.05 13:14:02	195.00 Å	195.00 Å	N/A	intensity	SOHO	EIT	N/A
	2005.02.05 13:26:01	2005.02.05 13:26:13	195.00 Å	195.00 Å	N/A	intensity	SOHO	EIT	N/A
	2005.02.05 13:36:16	2005.02.05 13:36:28	195.00 Å	195.00 Å	N/A	intensity	SOHO	EIT	N/A
	2005.02.05 13:48:10	2005.02.05 13:48:22	195.00 Å	195.00 Å	N/A	intensity	SOHO	EIT	N/A

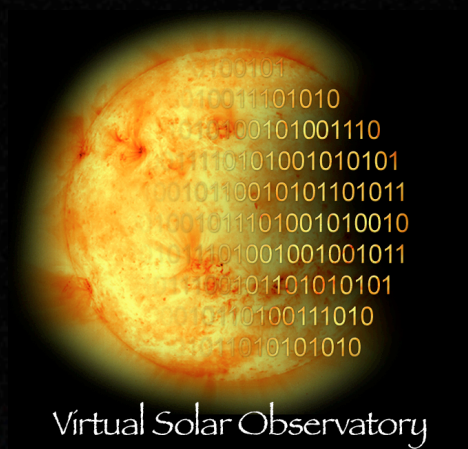
Session 1 of 1

[Proceed to Request Data](#)

A sample
search
experience

Shopping cart
trope

Unique cart ID
for future
reference (e.g.
in publications)



A sample search experience

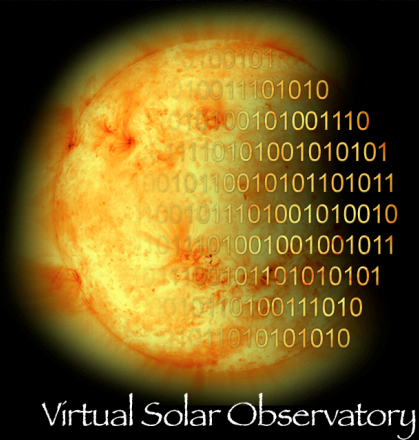
CART ID: VSO-NSOQA-050519-161418
Request Status

Session 1 : 19-May-2005 23:03:06 UTC

Provider	Time	State	Comments
SDAC	19-May-2005 23:14:27 UTC	DONE	http://sohodata.nascom.nasa.gov/archive/4/private/data/processed/eit/lz/2005/02/efz20050205.130014 http://sohodata.nascom.nasa.gov/archive/4/private/data/processed/eit/lz/2005/02/efz20050205.131350 http://sohodata.nascom.nasa.gov/archive/4/private/data/processed/eit/lz/2005/02/efz20050205.132601 http://sohodata.nascom.nasa.gov/archive/4/private/data/processed/eit/lz/2005/02/efz20050205.133616 http://sohodata.nascom.nasa.gov/archive/4/private/data/processed/eit/lz/2005/02/efz20050205.134810

Delivery method determined by data provider(s):

- tarball (requires e-mail address)
- individual links (as here)



Web browser is not the only possible interface

VSO also offers an Application Programming Interface (API)

Can be accessed from software as well

Example: senior undergraduate wrote Java-based client based on existing documentation

myVSO

myVSO Query Data Analysis

Virtual Solar Observatory

myVSO SEARCH TERMS

- ☒ Time
- ☐ Observable
- ☐ Instrument/Provider
- ☐ Spectral Range
- ☐ Nickname

GENERATE myVSO SEARCH FORM

myVSO TIME/OBSERVABLE SEARCH FORM

Start Time... Year: 2005 Month: 01 Day: 01 Hour: 00 Minute: 00

Stop Time... Year: 2005 Month: 01 Day: 01 Hour: 03 Minute: 00

☒ LOS_velocity
☐ vector_velocity
☐ LOS_magnetic_field
☐ vector_magnetic_field
☐ intensity
☐ equivalent_width
☐ wave_power
☐ wave_phase

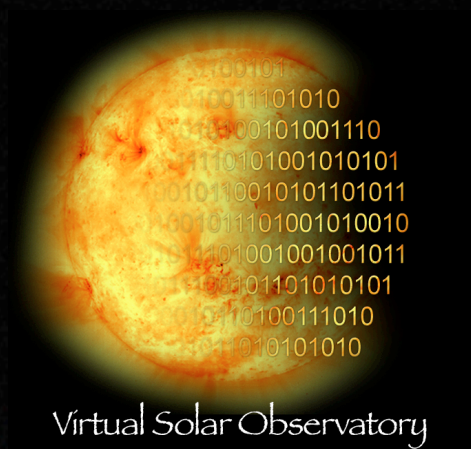
☐ oscillation_mode_parameters
☐ polarization_vector
☐ number_density
☐ particle_flux
☐ particle_velocity
☐ thermal_velocity
☐ composition

SEARCH CLEAR

myVSO RESULTS

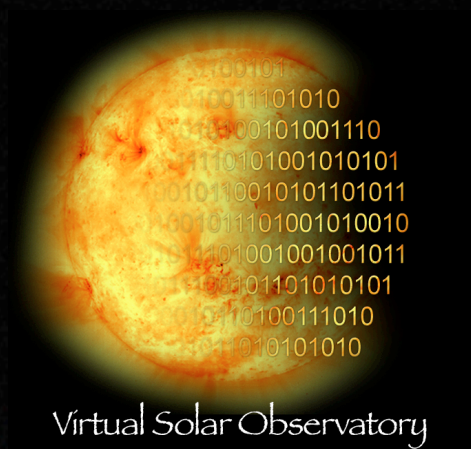
Start Time / Stop Time / Min Wavelength / Max Wavelength / Wave Type / Observable / Source / Instrument / Extent
<input type="checkbox"/> 2005.01.01 00:07:00 2005.01.01 00:59:00 6768 6768 line LOS_velocity SOHO MDI FULLDISK
<input type="checkbox"/> 2005.01.01 01:00:00 2005.01.01 01:59:00 6768 6768 line LOS_velocity SOHO MDI FULLDISK
<input type="checkbox"/> 2005.01.01 02:00:00 2005.01.01 02:59:00 6768 6768 line LOS_velocity SOHO MDI FULLDISK
<input type="checkbox"/> 2005.01.01 03:00:00 2005.01.01 03:59:00 6768 6768 line LOS_velocity SOHO MDI FULLDISK
<input type="checkbox"/> 2005.01.01 00:21:00 2005.01.01 00:59:00 6768 6768 line LOS_velocity SOHO MDI FULLDISK

myVSO DOWNLOADS

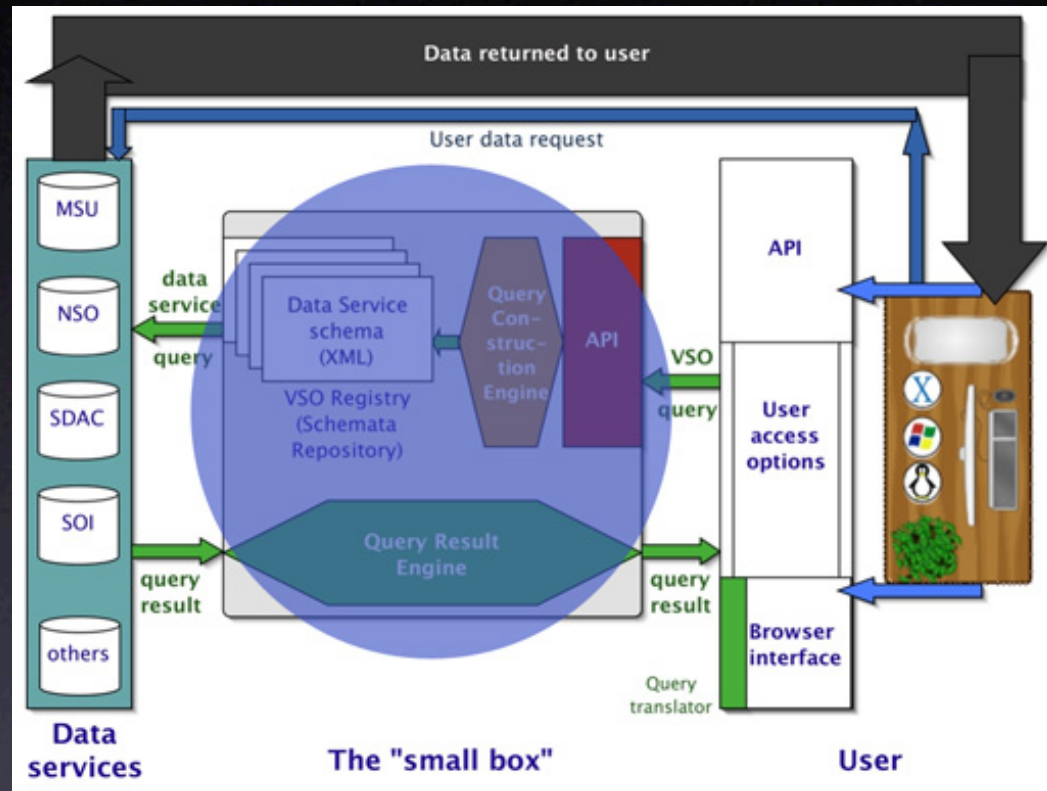


Latest features

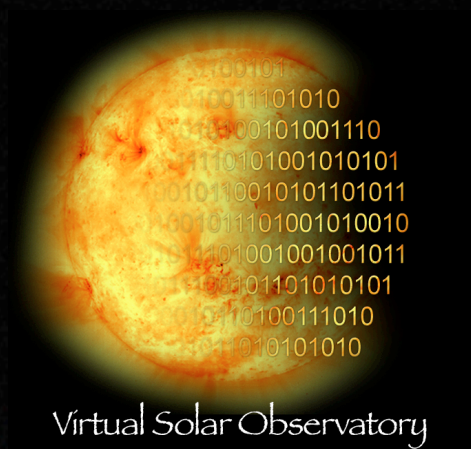
- Catalog/event list search (metadata as data)
 - Joined queries with “normal” data
- Web Services Description Language (WSDL) for other service providers (EGSO, CoSEC)



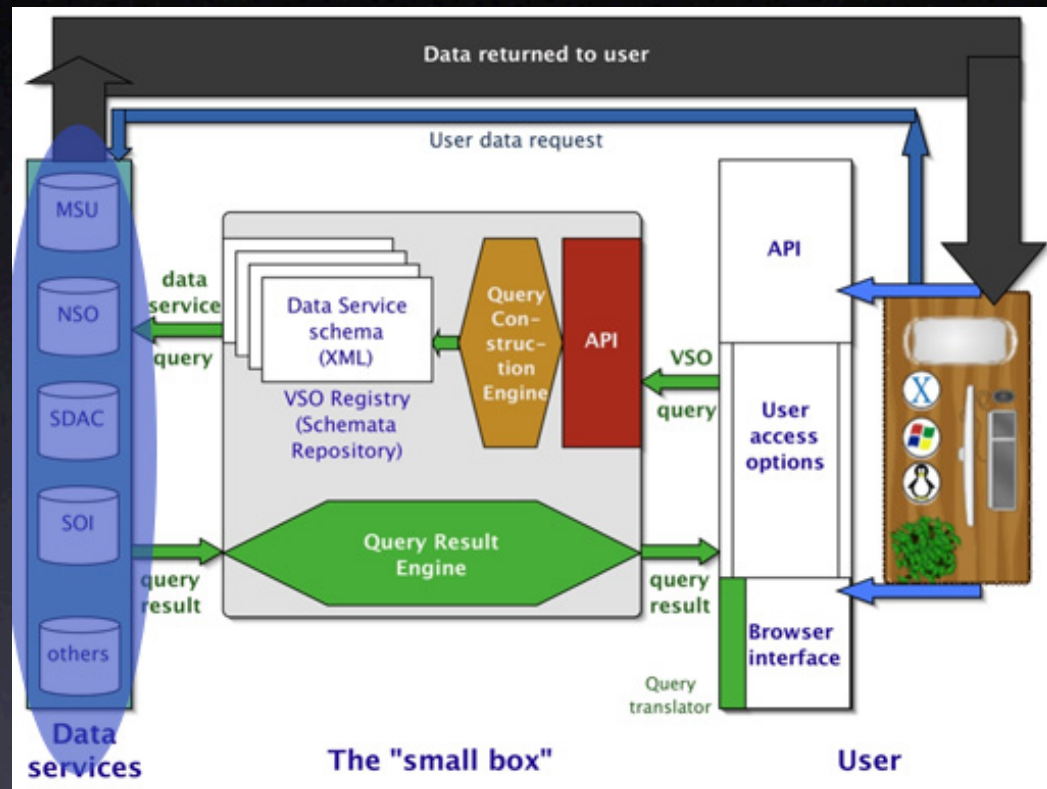
Internals changes



- Please see poster SH51B-05 (Bogart, Tian *et al.*) for changes in:
 - data model
 - performance
 - and much more on UI changes

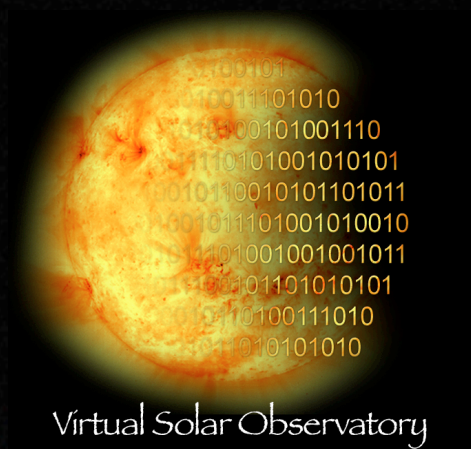


Additional data services



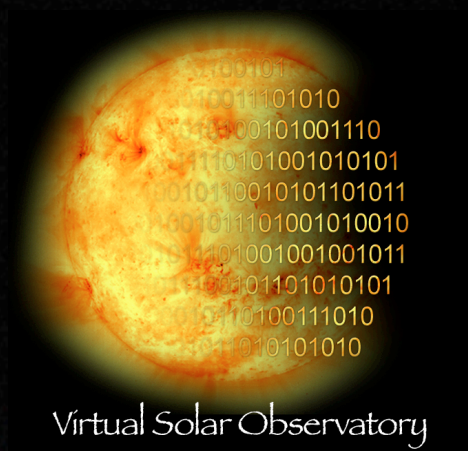
Already added:
HANET
Meudon
OVRO

- TRACE
 - by image (rather than hourly, compressed file)
 - a *lot* of images
- RHESSI
- GOES SXI
- *Yohkoh* Legacy



The “to do” list

- Work with new missions
 - STEREO imaging instruments access at STEREO Science Center will use VSO as search engine
 - SDO instruments
 - Solar-B
- Allow selection by all detector heads/telescopes, filter wheel positions, &c.
 - e.g. LASCO C2, clear; Yohkoh SXT, GOES SXI filters
- And more (user comments)....



How generic can we be?

- Could the internals of the VSO be used by VO's in other disciplines currently planned or under development?