VOSED: a VO tool to build and analyze SEDs

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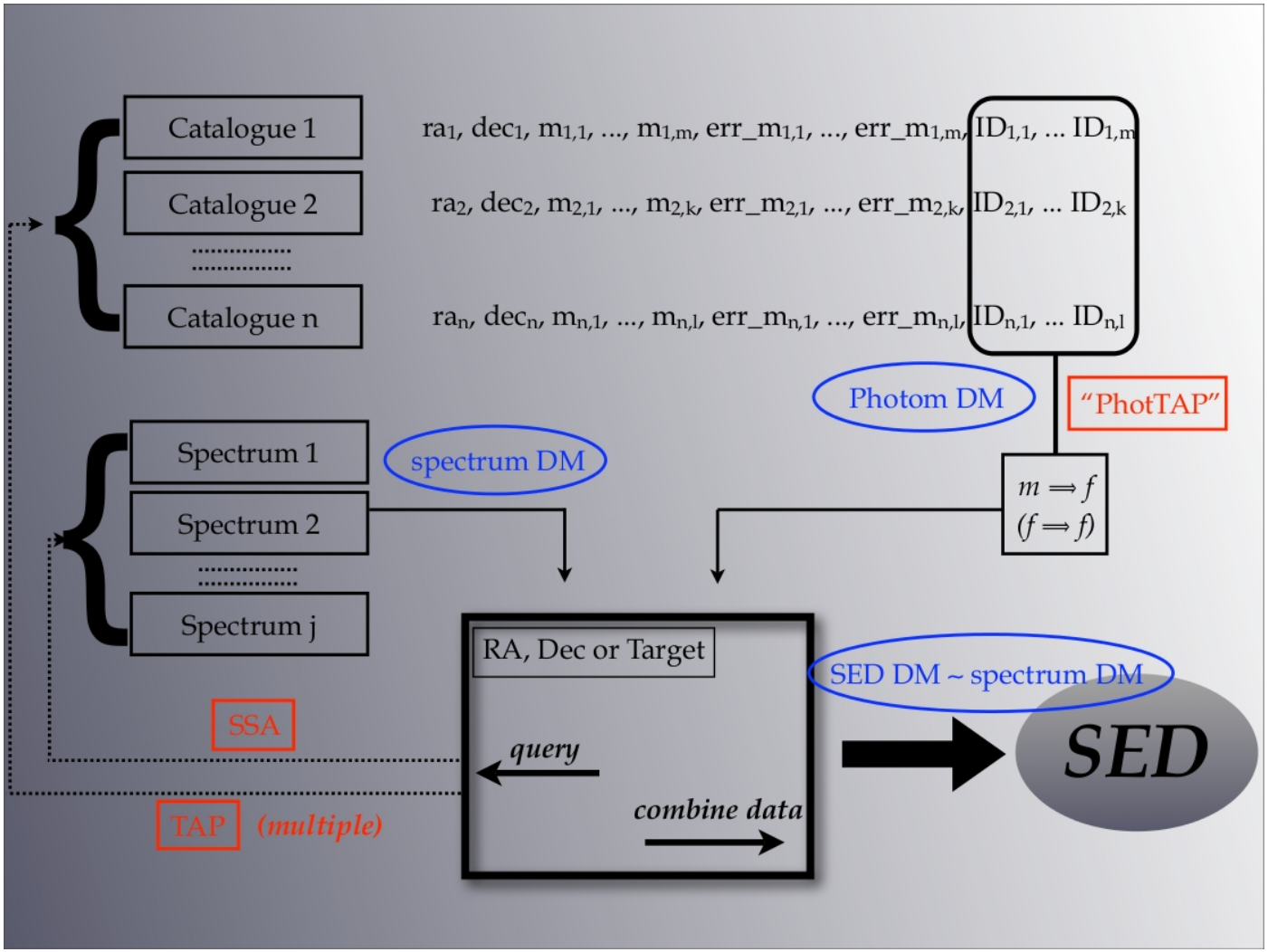
VOSED

Following Paolo's talk...



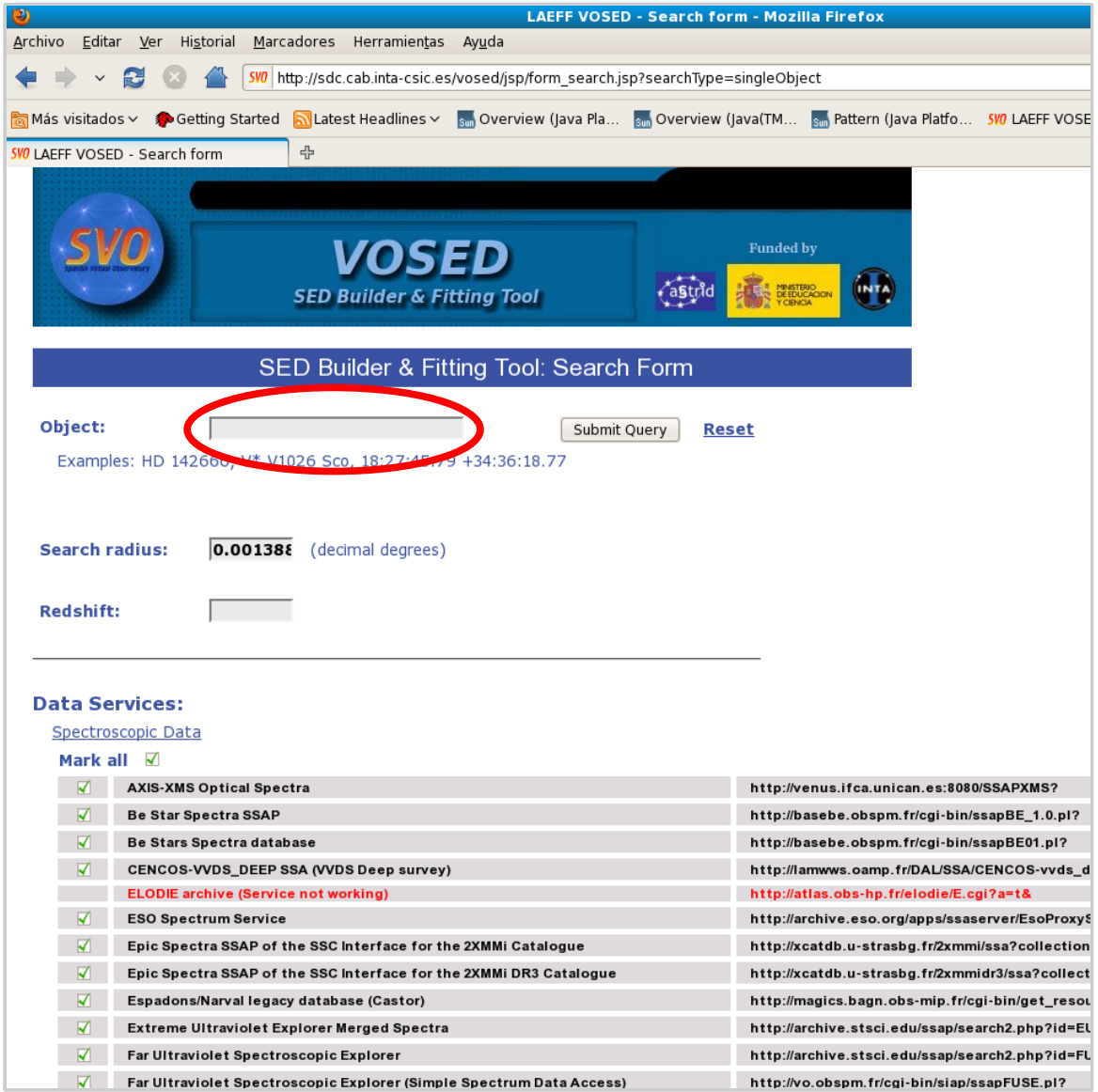
VOSED

Evanthia's wish list at EURO-VO Tech Forum:

- VOTable with different segments
- “Build a SED of my favorite object from this and that data set (spectra and catalogues)
- Give me back the SEDof all objects in a given region of the sky combining all the available data sets.

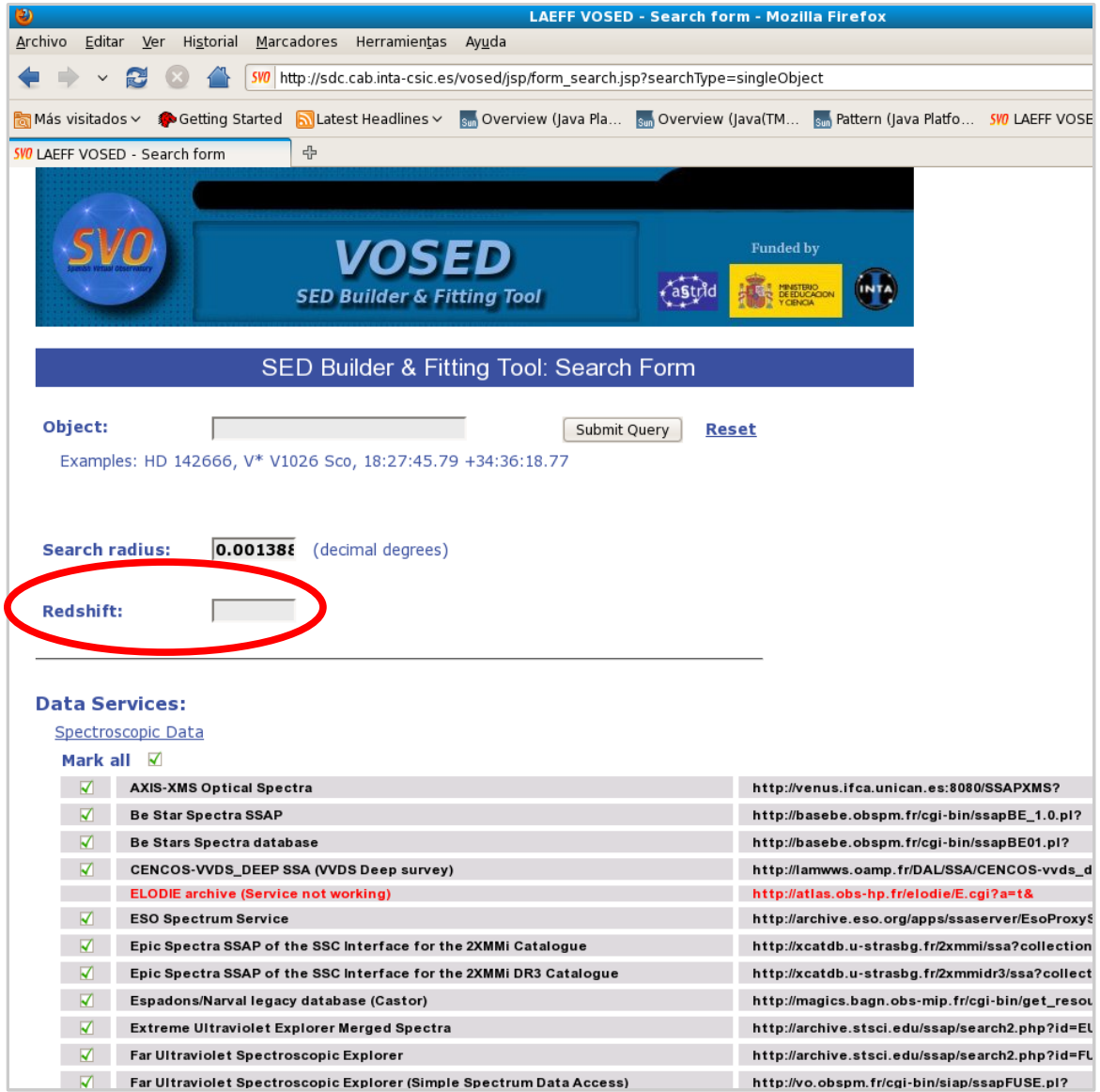
Input form

1. Enter target



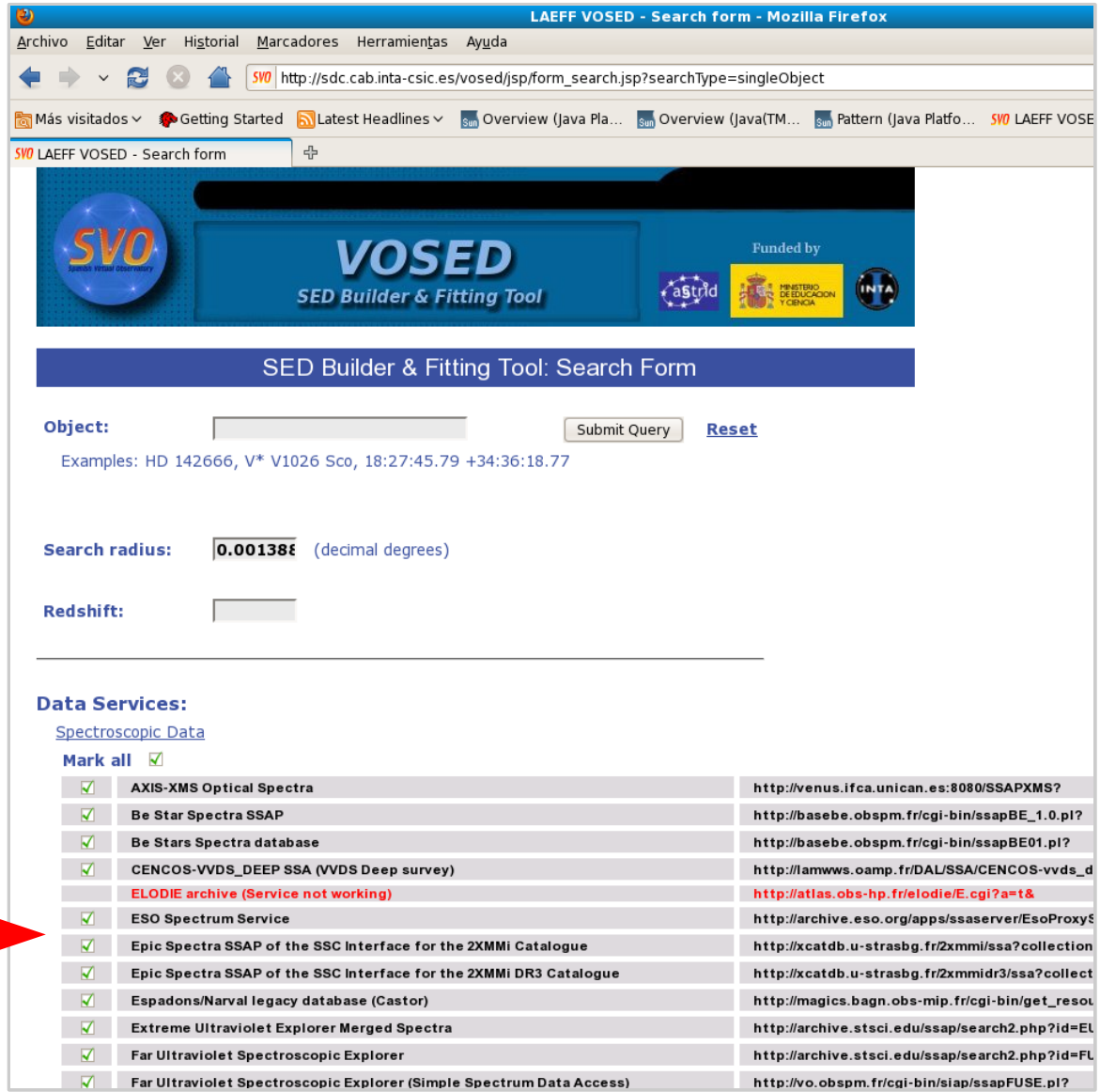
Input form

1. Enter target
2. Redshift as input parameter (for extragalactic objects)



Input form

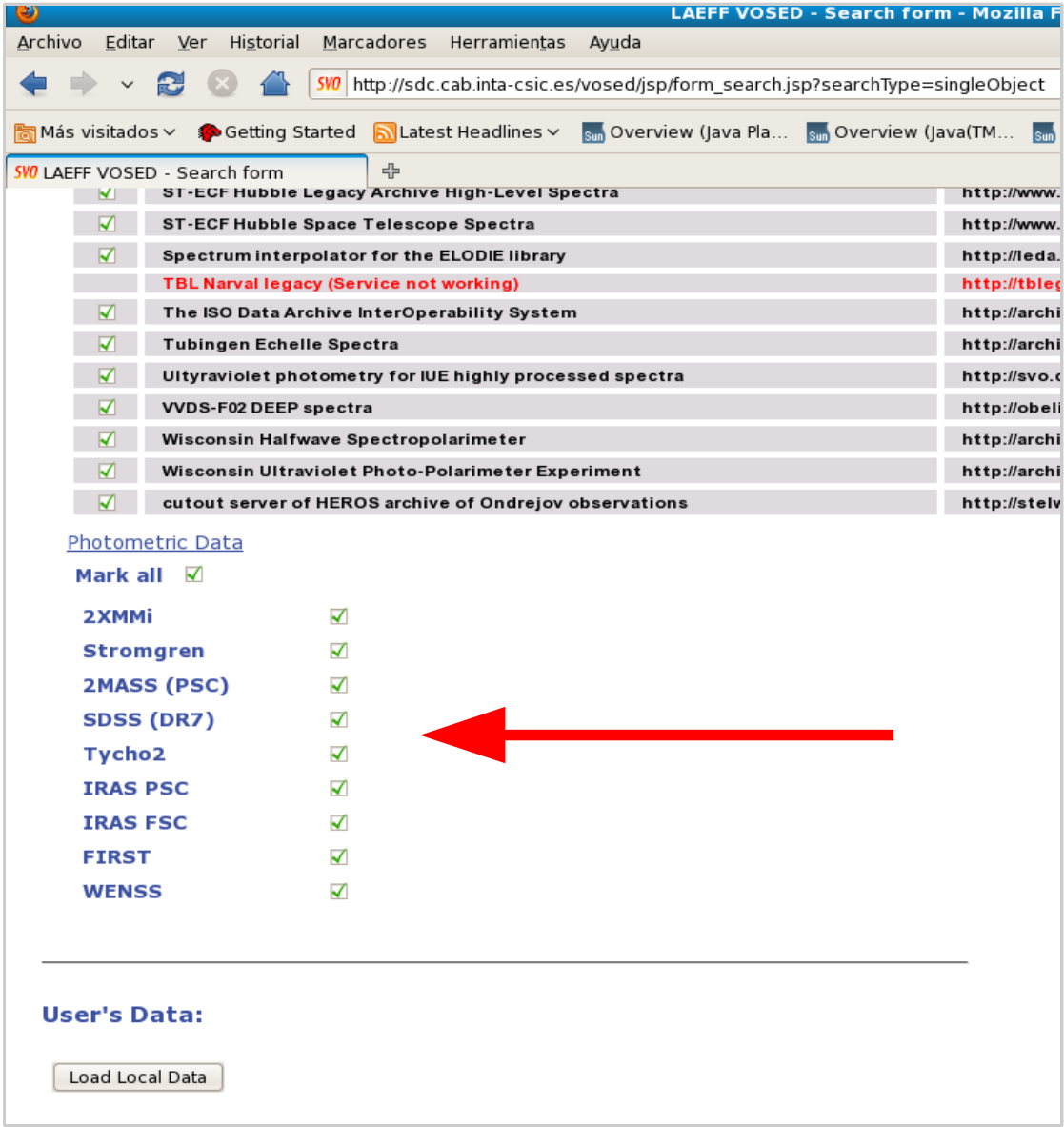
1. Enter target
2. Redshift as input parameter.
3. Select SSAP services
   - Services are discovered using the VO registry
   - Services not working are ignored.



Input form

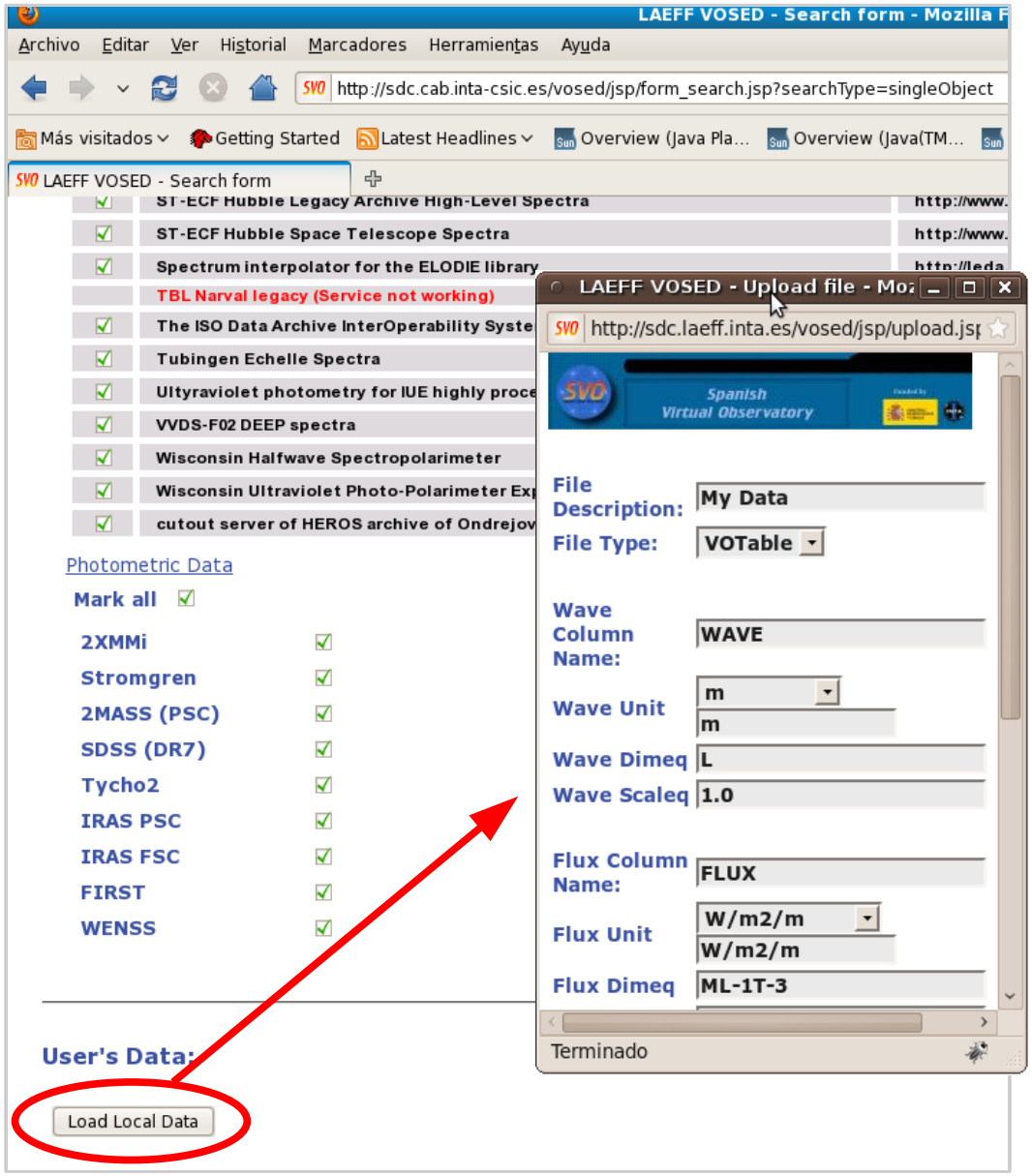
1. Enter target
2. Redshift as input parameter.
3. Select SSAP services
4. Select photometric services
   - Most demanded
   - Accurate calibration
   - Wide range of the spectrum

(a standard photometry access would be very usefull)



Input form

1. Enter target
2. Redshift as input parameter.
3. Select SSAP services
4. Select photometric services
5. User's data may be loaded



Results

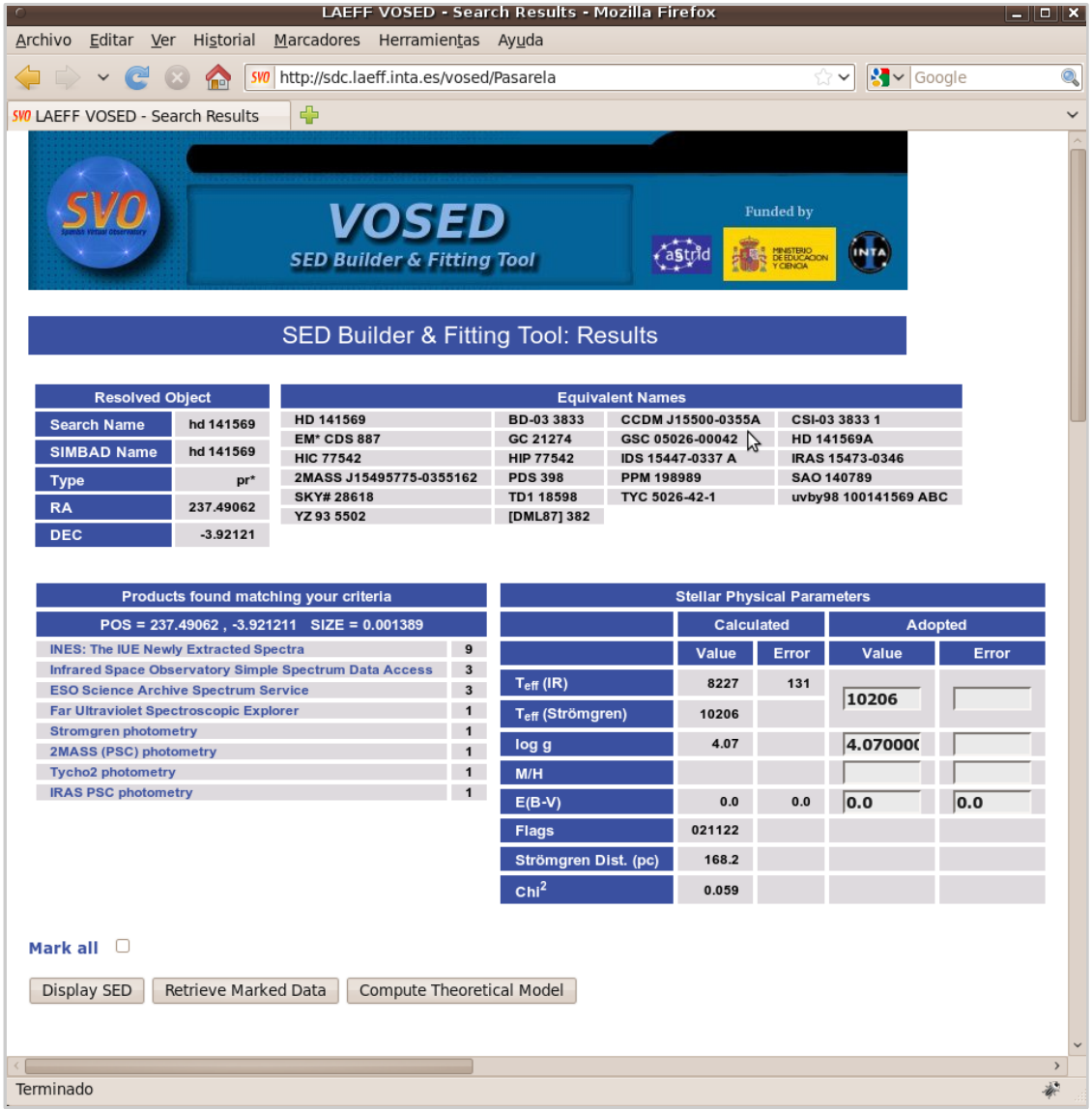
The results include:

1. Basic object info

2. Equivalent names

3. Service results summary.

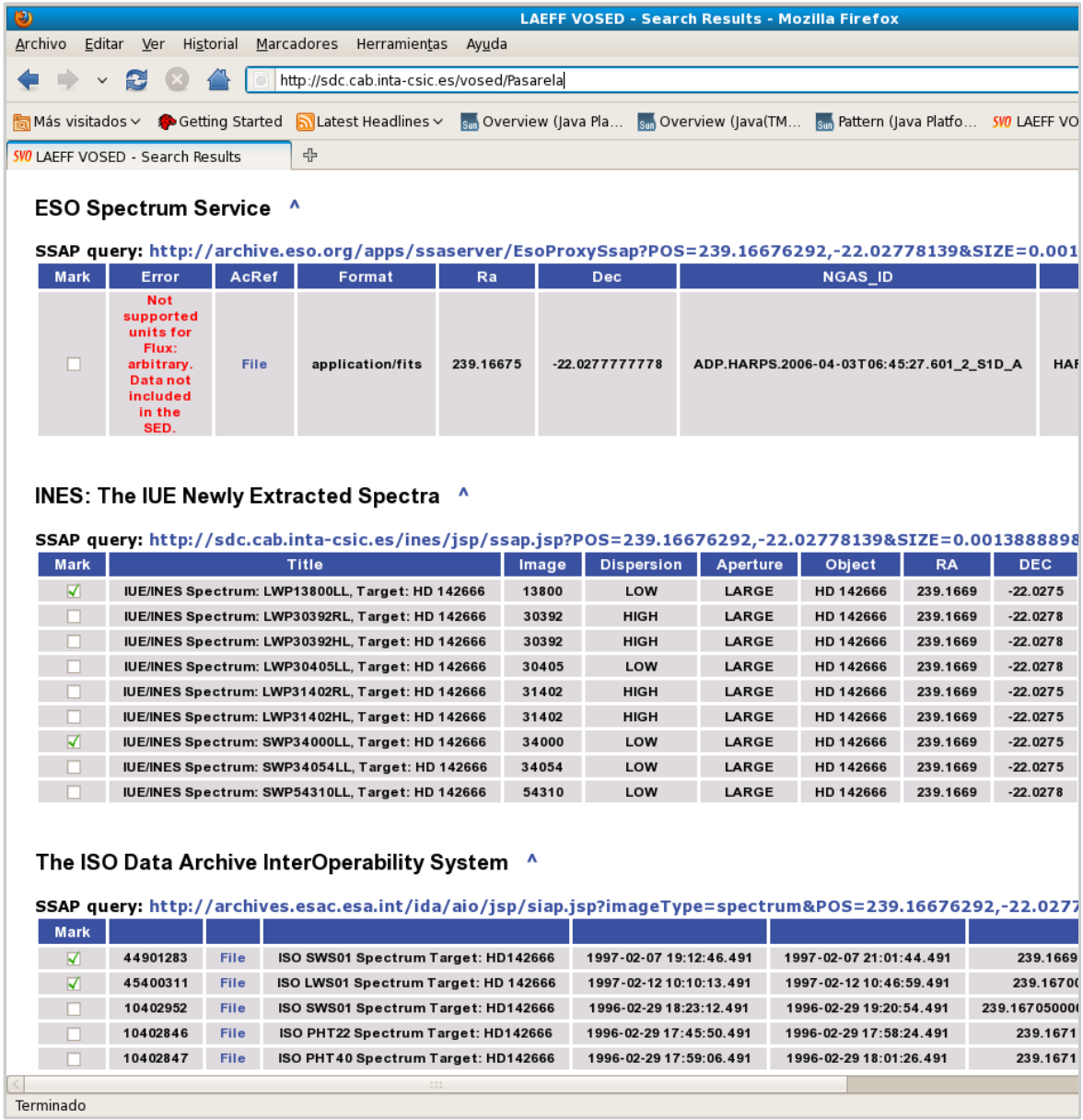
4. Computed stellar physical parameters
(only if 2MASS and/or Strömgren photometry is available)



Results

The results include:

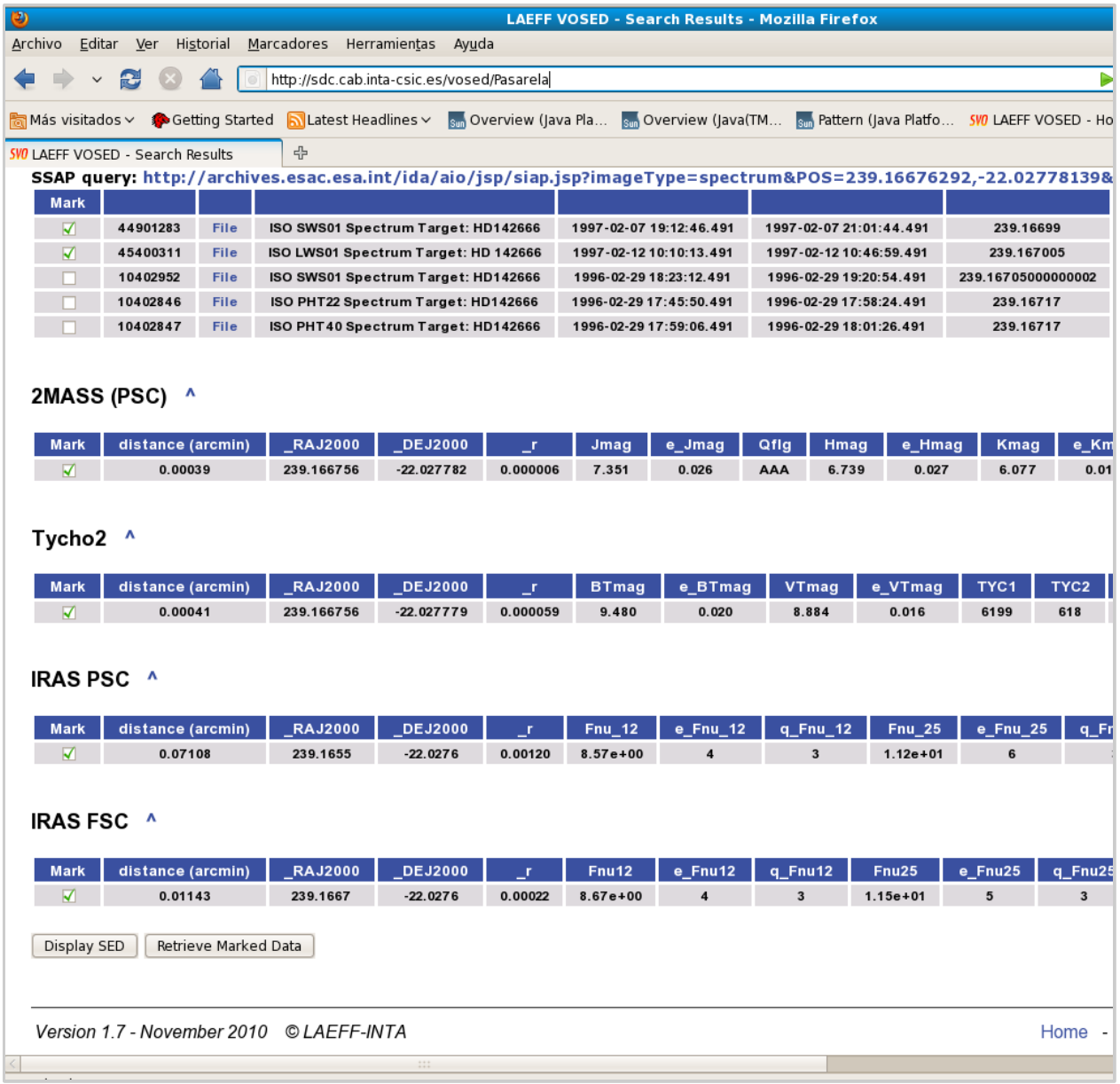
1. Basic object info
2. Equivalent names
3. Service results summary.
4. Computed stellar physical parameters
5. VO resources details.



Results

The results include:

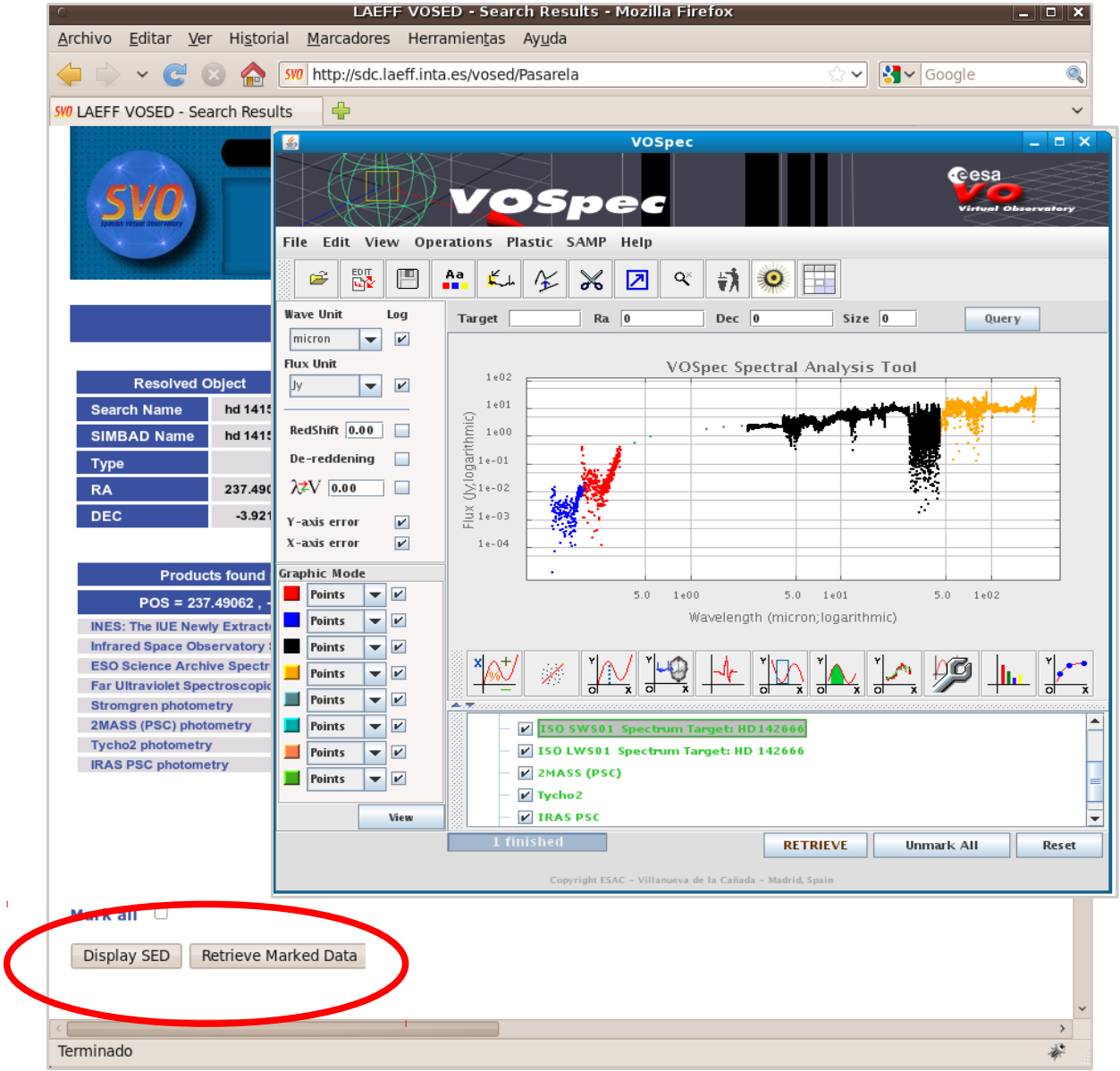
1. Basic object info
2. Equivalent names
3. Service results summary.
4. Computed stellar physical parameters
5. VO resources details.
6. Found photometry.



Results

The data may be:

1. Open with VOSpec

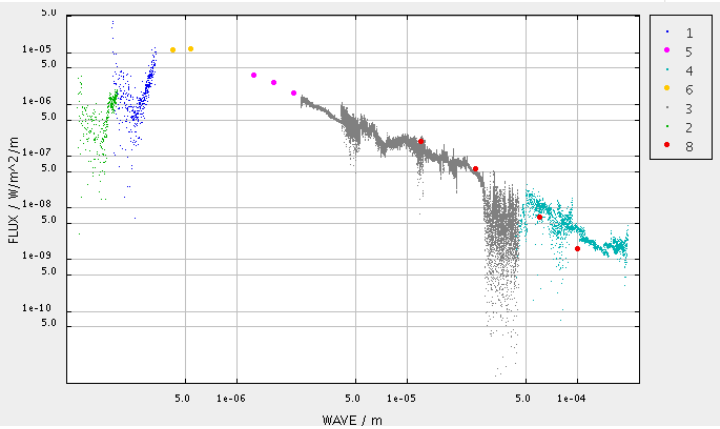


Results

The data may be:

1. Open in VOSpec
2. Downloaded
   - The origin of each point of the SED is identified.

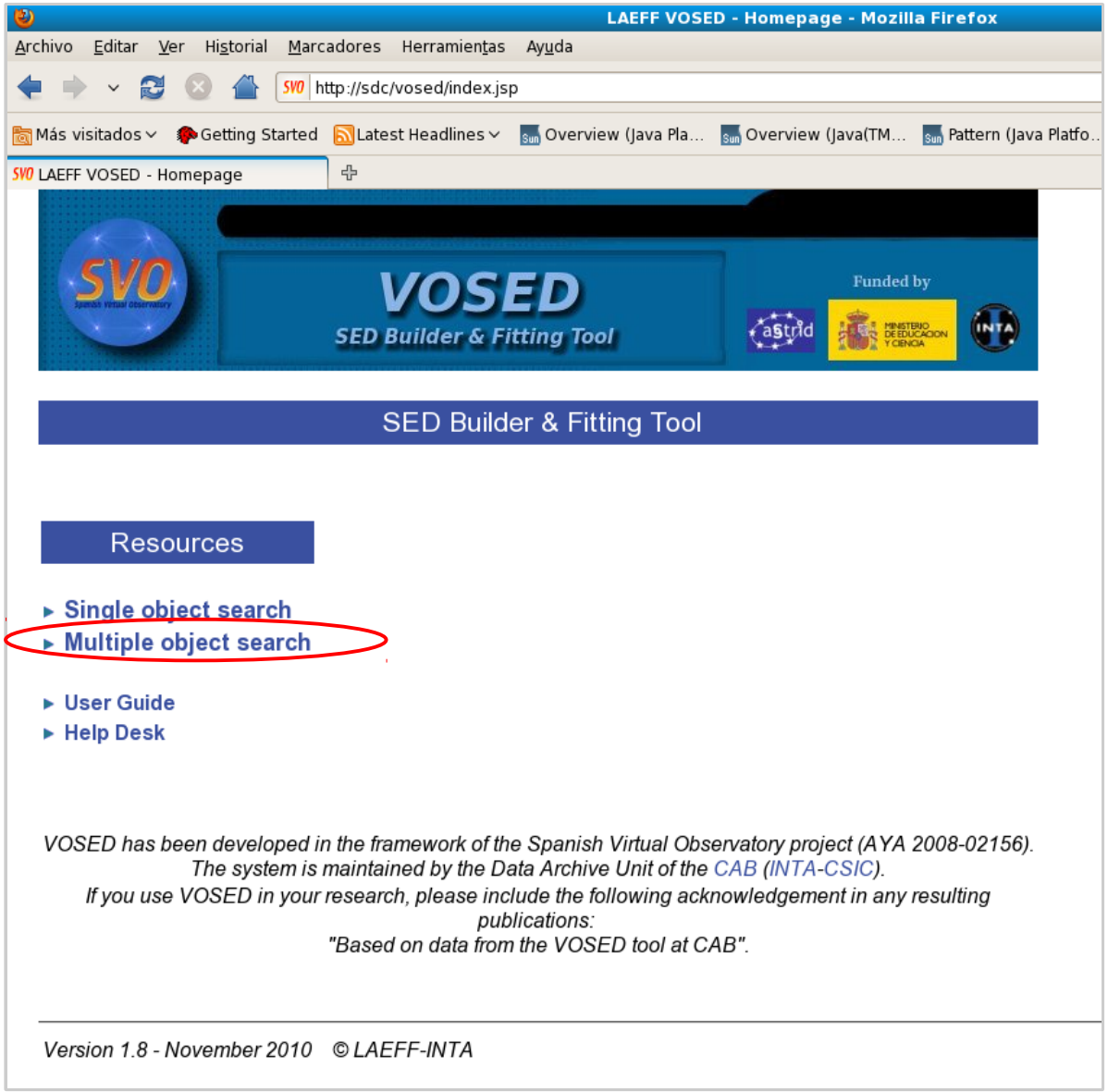
Info to add: aperture, bandpass, observing date




```
<VOTABLE version="1.1" xmlns="http://www.ivoa.net/xml/VOTable/v1.1" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.ivoa.net/xml/VOTable/v1.1 http://www.ivoa.net/xml/VOTable/v1.1"
xmlns:sed="http://www.ivoa.net/xml/SedModel/v1.0"> <DESCRIPTION>Spanish Virtual Observatory</DESCRIPTION>
<RESOURCE>
        <TABLE>
        <GROUP name="1">
                <PARAM name="SourceServiceName" value="INES: The IUE Newly Extracted Spectra" datatype="char"
arraysize="*"/>
                <PARAM name="SourceTitle" value="IUE/INES Spectrum: LWP13800LL, Target: HD 142666" datatype="char"
arraysize="*"/>
                <PARAM name="SourceDataLink"
value="http://sdc.cab.inta-csic.es:80/cgi-ines/SingleDownload?filename=LWP13800LL.FITS" datatype="char"
arraysize="*"/>
                <PARAM name="SourceId" value="1" datatype="int"/>
        </GROUP>
        <GROUP name="2">
                <PARAM name="SourceServiceName" value="2MASS (PSC)" datatype="char" arraysize="*"/>
                <PARAM name="SourceTitle" value="2MASS (PSC)" datatype="char" arraysize="*"/>
                <PARAM name="SourceDataLink"
value="http://vizier.u-strasbg.fr/viz-bin/votable/-A?-source=II/246/&amp;-out.add=_RAJ2000,_DEJ2000&amp;-ou
t.max=99&amp;-order=I&amp;-c.eq=J2000&amp;-oc.form=dec&amp;-c.u=deg&amp;-c.geom=r&amp;-out.add=_r&amp;-sort
=_r&amp;-out=Jmag&amp;-out=e_Jmag&amp;-out=Qflg&amp;-out=Hmag&amp;-out=e_Hmag&amp;-out=Qflg&amp;-out=Kmag&a
mp;-out=e_Kmag&amp;-out=Qflg&amp;RA=239.16676292&amp;DEC=-22.02778139&amp;SR=0.001388889" datatype="char"
arraysize="*"/>
                <PARAM name="SourceId" value="2" datatype="int"/>
        </GROUP>

                <FIELD unit="m" datatype="float" name="WAVE0" />
                <FIELD unit="m" datatype="float" name="WAVE" />
                <FIELD unit="W/m^2/m" datatype="float" name="FLUX" />
                <FIELD unit="W/m^2/m" datatype="float" name="E_FLUX" />
                <FIELD unit="" datatype="char" arraysize="*" name="Q_FLAG" />
                <FIELD unit="" datatype="int" name="SOURCE" />
                <DATA>
                        <TABLEDATA>
                <TR>
                        <TD>1.8514329833984375E-7</TD><TD>1.8514329833984375E-7</TD><TD>1.9915280091275384E-6</TD><TD>4.706
218596252365E-6</TD><TD></TD><TD>1</TD>
                </TR>
                <TR>
                        <TD>1.854102294921875E-7</TD><TD>1.854102294921875E-7</TD><TD>7.316962790868131E-6</TD><TD>4.540319
1297789525E-6</TD><TD></TD><TD>1</TD>
                </TR>
```

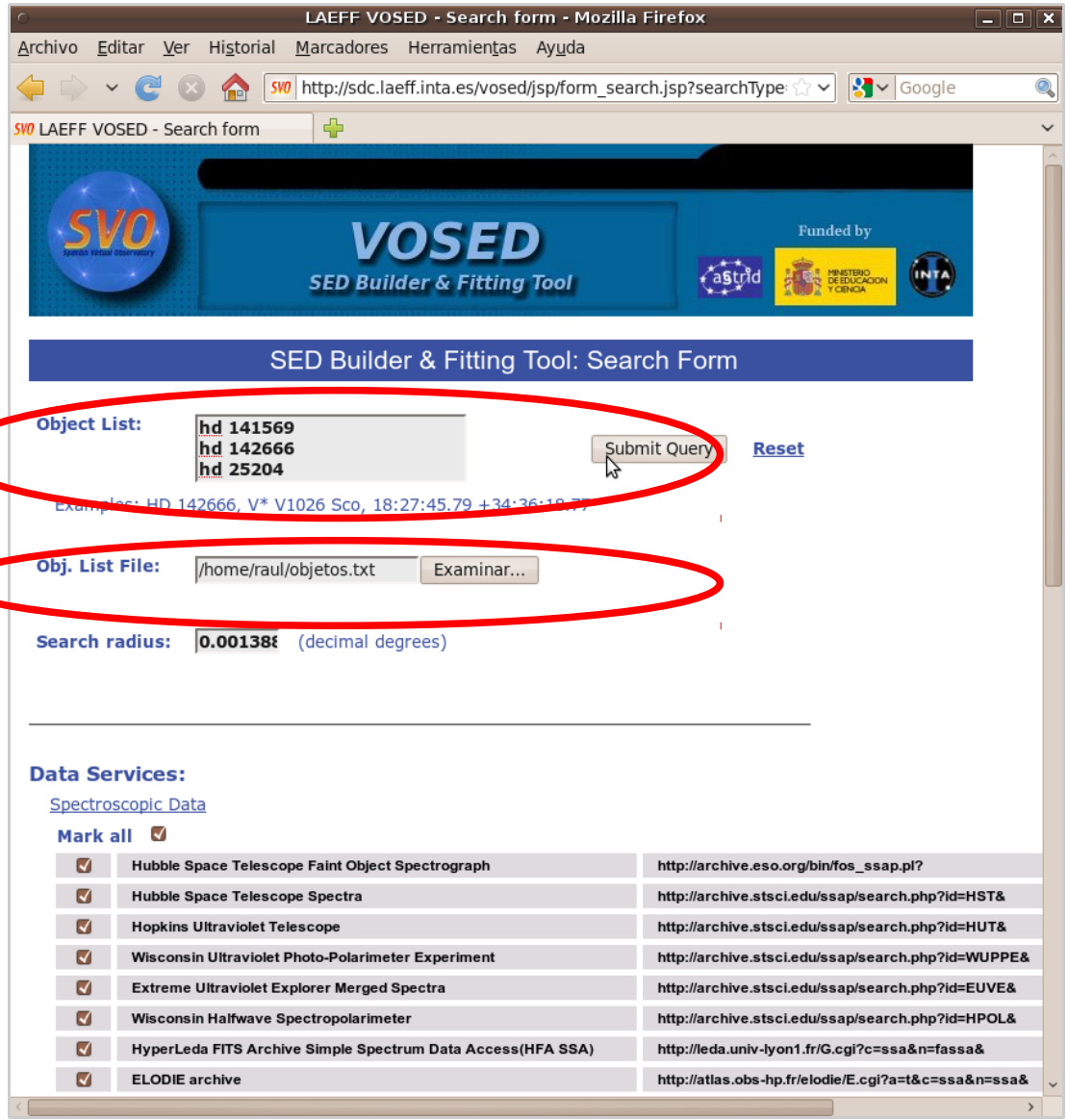
Multiple object mode



Multiple object

A multiple object query may be performed:

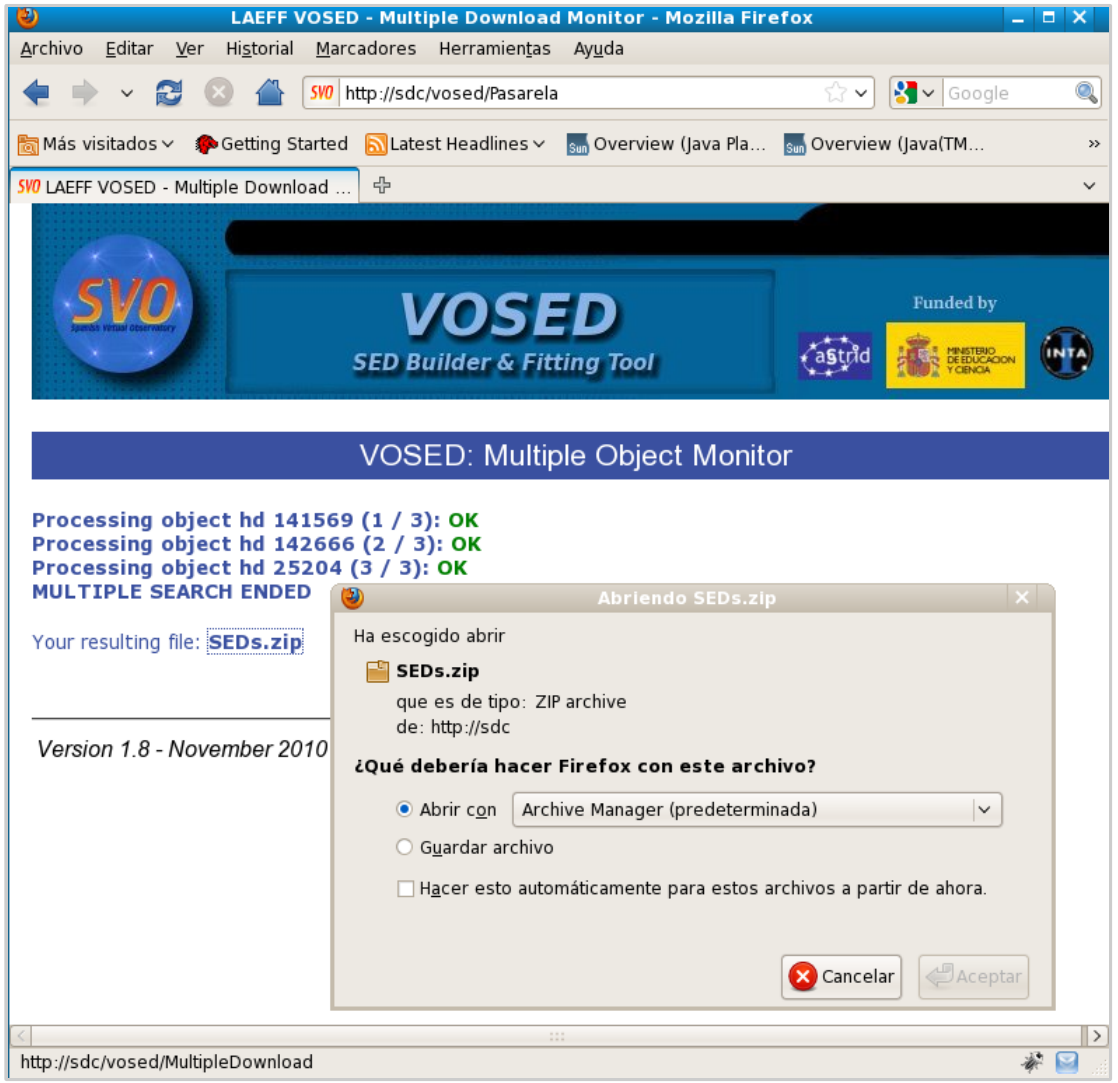
- Typing the object names or coordinates
- Loading a text file where you can specify:
  - Object names or coordinates
  - Redshift of each of them.



Multiple object

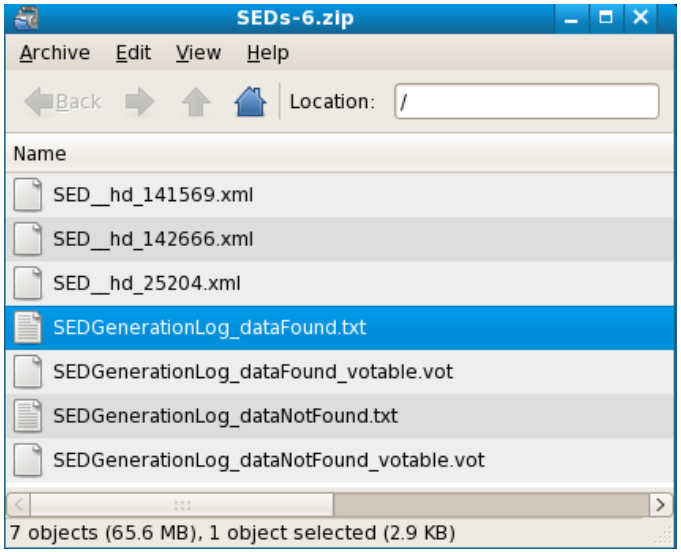
The process is monitored in real time.

A ZIP file is generated containing the SEDs.



Multiple object

Generation logs are also provided in ASCII and VOTable formats.



Object	Redshift	Serv. Type	Data Found	Instrument	Wav. range (m)	Serv. name	Error
hd 141569		SSAP	0 OK, 1 failed	UVES	n/a	ESO Spectrum Service	Warning: Spectral and Flux axes not identified
hd 141569		SSAP	9 OK, 0 failed	LWP, SWP	115.05811E-9 - 334.99749E-9	INES: The IUE Newly Extracted Spectra	
hd 141569		SSAP	3 OK, 0 failed		2.381422E-6 - 196.8293E-6	The ISO Data Archive InterOperability System	
hd 141569		PHOT	1 OK, 0 failed		345.056E-9 - 547.803E-9	Stromgren	
hd 141569		PHOT	1 OK, 0 failed		1.2518E-6 - 2.1539E-6	2MASS (PSC)	
hd 141569		PHOT	1 OK, 0 failed		420.44E-9 - 532.185E-9	Tycho2	
hd 141569		PHOT	1 OK, 0 failed		12E-6 - 100E-6	IRAS PSC	
hd 142666		SSAP	0 OK, 1 failed		n/a	ESO Spectrum Service	Not supported units for Flux: arbitrary
hd 142666		SSAP	9 OK, 0 failed	LWP, SWP	115.05811E-9 - 334.99917E-9	INES: The IUE Newly Extracted Spectra	
hd 142666		SSAP	5 OK, 0 failed		2.3803439E-6 - 200E-6	The ISO Data Archive InterOperability System	
hd 142666		PHOT	1 OK, 0 failed		1.2518E-6 - 2.1539E-6	2MASS (PSC)	
hd 142666		PHOT	1 OK, 0 failed		420.44E-9 - 532.185E-9	Tycho2	
hd 142666		PHOT	1 OK, 0 failed		12E-6 - 100E-6	IRAS PSC	
hd 142666		PHOT	1 OK, 0 failed		12E-6 - 100E-6	IRAS FSC	
hd 25204		SSAP	22 OK, 0 failed	LWR, SWP	115.00778E-9 - 335.0113E-9	INES: The IUE Newly Extracted Spectra	
hd 25204		PHOT	1 OK, 0 failed		1.2518E-6 - 2.1539E-6	2MASS (PSC)	
hd 25204		PHOT	1 OK, 0 failed		420.44E-9 - 532.185E-9	Tycho2	
hd 25204		PHOT	1 OK, 0 failed		12E-6 - 100E-6	IRAS PSC	

Multiple object

Successfully used in two Euro-VO Research Initiative projects:

- A common scale fo the spectroscopic metallicity determination of field and open cluster stars (P.I. U. Heiter):
  - SED's building of approx. 5300 objects
- Spectral Energy Distribution of 2XMM-selected AGNs (P.I. R. Gil-Merino)
  - Approx. 3000 objects.

Problems found

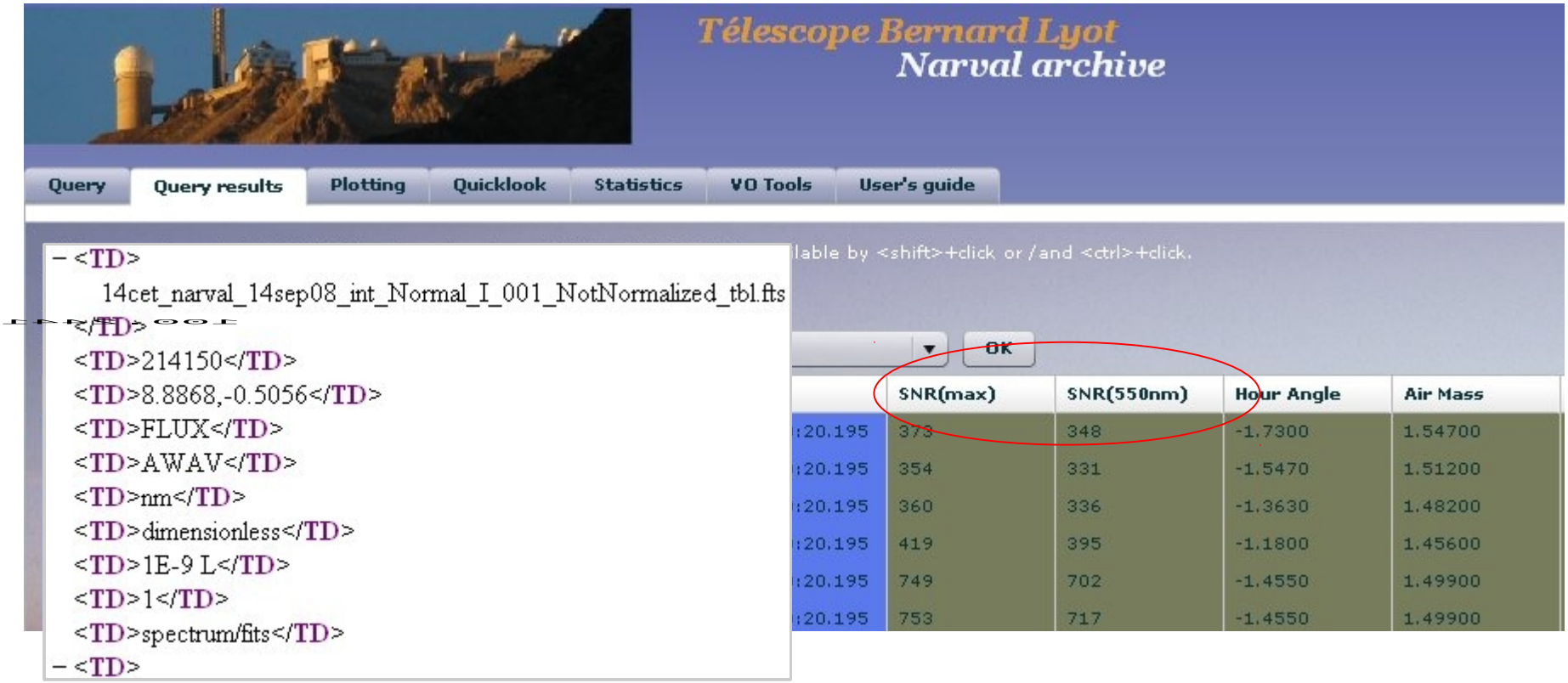
Table Browser for 1: SEDGenerationLog_dataFound_votable.vot

	Object	Data Found	Serv. name	Error	Query URL
22	hd 25204	Service error	Espadons/Narval legacy database (Castor)	Error parsing VOTable.	http://magics.bagn.obs-mip.fr/cgi-bin/get_resources?...
23	hd 25204	Service error	GIRAFFE archive of reduced spectra	UNKNOWN ERROR	UNKNOWN
24	hd 25204	Service error	High Energy Stereoscopic System	SQLSTATE[08006] [7] FATAL: no pg_hba.conf ent...	http://voparis-srv.obspm.fr/srv/ssa-hess_spectrum.p...
25	hd 25204	22 OK, 0 failed	INES: The IUE Newly Extracted Spectra		http://sdc.cab.inta-csic.es/ines/jsp/ssap.jsp?POS=60...
1	hd 142666	0 OK, 1 failed	ESO Spectrum Service	Not supported units for Flux: arbitrary	http://archive.eso.org/apps/ssaserver/EsoProxySsap?...
2	hd 142666	1 OK, 0 failed	Far Ultraviolet Spectroscopic Explorer		http://archive.stsci.edu/ssap/search2.php?id=FUSE&P...
3	hd 142666	0 OK, 1 failed	Far Ultraviolet Spectroscopic Explorer (Simple Spe...	Warning: Spectral and Flux axes not identified by ...	http://vo.obspm.fr/cgi-bin/siap/ssapFUSE.pl?POS=23...
4	hd 142666	Service error	GIRAFFE archive of reduced spectra	UNKNOWN ERROR	UNKNOWN
5	hd 142666	Service error	High Energy Stereoscopic System	SQLSTATE[08006] [7] FATAL: no pg_hba.conf ent...	http://voparis-srv.obspm.fr/srv/ssa-hess_spectrum.p...
6	hd 142666	9 OK, 0 failed	INES: The IUE Newly Extracted Spectra		http://sdc.cab.inta-csic.es/ines/jsp/ssap.jsp?POS=23...
7	hd 142666	5 OK, 0 failed	International Ultraviolet Explorer		http://archive.stsci.edu/ssap/search2.php?id=IUE&PO...
8	hd 142666	Service error	SSA Service for Optical Spectroscopy in the CDF-S	Invalid RA value: RA = 239.16676292.	http://www.g-vo.org/ssampe_102/SSA?archiveid=CDF...
9	hd 142666	Service error	SSA Service for zCOSMOS Bright Spectroscopic Ob...	Invalid RA value: RA = 239.16676292.	http://www.g-vo.org/ssampe_102/SSA?archiveid=ZCO...
10	hd 142666	5 OK, 0 failed	The ISO Data Archive InterOperability System		http://archives.esac.esa.int/ida/aio/jsp/siap.jsp?imag...
11	hd 141569	0 OK, 1 failed	ESO Spectrum Service	Warning: Spectral and Flux axes not identified by ...	http://archive.eso.org/apps/ssaserver/EsoProxySsap?...
12	hd 141569	1 OK, 0 failed	Far Ultraviolet Spectroscopic Explorer		http://archive.stsci.edu/ssap/search2.php?id=FUSE&P...
13	hd 141569	0 OK, 1 failed	Far Ultraviolet Spectroscopic Explorer (Simple Spe...	Warning: Spectral and Flux axes not identified by ...	http://vo.obspm.fr/cgi-bin/siap/ssapFUSE.pl?POS=23...
14	hd 141569	Service error	GIRAFFE archive of reduced spectra	UNKNOWN ERROR	UNKNOWN
15	hd 141569	Service error	High Energy Stereoscopic System	SQLSTATE[08006] [7] FATAL: no pg_hba.conf ent...	http://voparis-srv.obspm.fr/srv/ssa-hess_spectrum.p...
16	hd 141569	9 OK, 0 failed	INES: The IUE Newly Extracted Spectra		http://sdc.cab.inta-csic.es/ines/jsp/ssap.jsp?POS=23...
17	hd 141569	3 OK, 0 failed	International Ultraviolet Explorer		http://archive.stsci.edu/ssap/search2.php?id=IUE&PO...
18	hd 141569	Service error	SSA Service for Optical Spectroscopy in the CDF-S	Invalid RA value: RA = 237.49062042.	http://www.g-vo.org/ssampe_102/SSA?archiveid=CDF...
19	hd 141569	Service error	SSA Service for zCOSMOS Bright Spectroscopic Ob...	Invalid RA value: RA = 237.49062042.	http://www.g-vo.org/ssampe_102/SSA?archiveid=ZCO...
20	hd 141569	0 OK, 1 failed	ST-ECF Hubble Space Telescope Spectra	No units found for Wavelength.	http://www.stecf.org/hst-vo/hst_ssa?POS=237.49062...
21	hd 141569	3 OK, 0 failed	The ISO Data Archive InterOperability System		http://archives.esac.esa.int/ida/aio/jsp/siap.jsp?imag...

- Data services issues:
  - Services down
  - Services not complying standards.

Problems found

On Data Providers: Key Information (S/N, resolution, aperture) available in Native Data but missing in the VOTable



Problems found

Table Parameters for 1: hpolret_15-mon_19910206_hw_vo.fits

Name	Value	Description
EXPOSURE	0.089	[sec] exposure duration
TSTART	48293.09	[days] MJD exposure start time
TSTOP	48293.09000103	
TMID	48293.09000052	
SPECSDIM	10-10 L	
SPCOMID	5514.0	
SPCOBWID	4608.0	
FLUXSDIM	10+7 ML-1T-3	
SNR_MEAN	168.507	
FLUXAVG	6.76222E-11	
SPCO_RES	25.0	

Table Parameters for 1: hpolret_15-mon_19910206_hw_vo.

Name	Value
REDSHIFT	unknown
TITLE	hpolret_15-mon_19910206_hw, 15-Mon
RA_TARG	100.2441666603
DEC_TARG	9.8955555556
SPCO_UCD	em.wl
FLUX_UCD	phot.fluxDens;em.wl
1S2_1	SPCO
1CYTP2	WAVE-TAB
1S3_1	SPCO
1CYTP3	WAVE-TAB
1S4_1	SPCO
APERTURE	12.0,12.

```
<TD>MAST.HPOL</TD>
<TD>100.24416666</TD>
<TD>9.89556</TD>
– <TD>
    http://archive.stsci.edu/pub/vospectra/hpol/hpolret_15-mon_19910206_hw_vo.fits
  </TD>
<TD>15-Mon</TD>
<TD>764</TD>
<TD>48293.090</TD>
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<TD/>
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<TD>hpolret_15-mon_19910206_hw_vo.fits</TD>
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<TD>7818.000</TD>
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<TD>L ML-1T-3 ML-1T-3</TD>
<TD>1E-10 1E+7 1E+7</TD>
<TD>ANGSTROM ERG/CM2/S/A PERCENT PERCENT</TD>
<TD>15-Mon</TD>
```
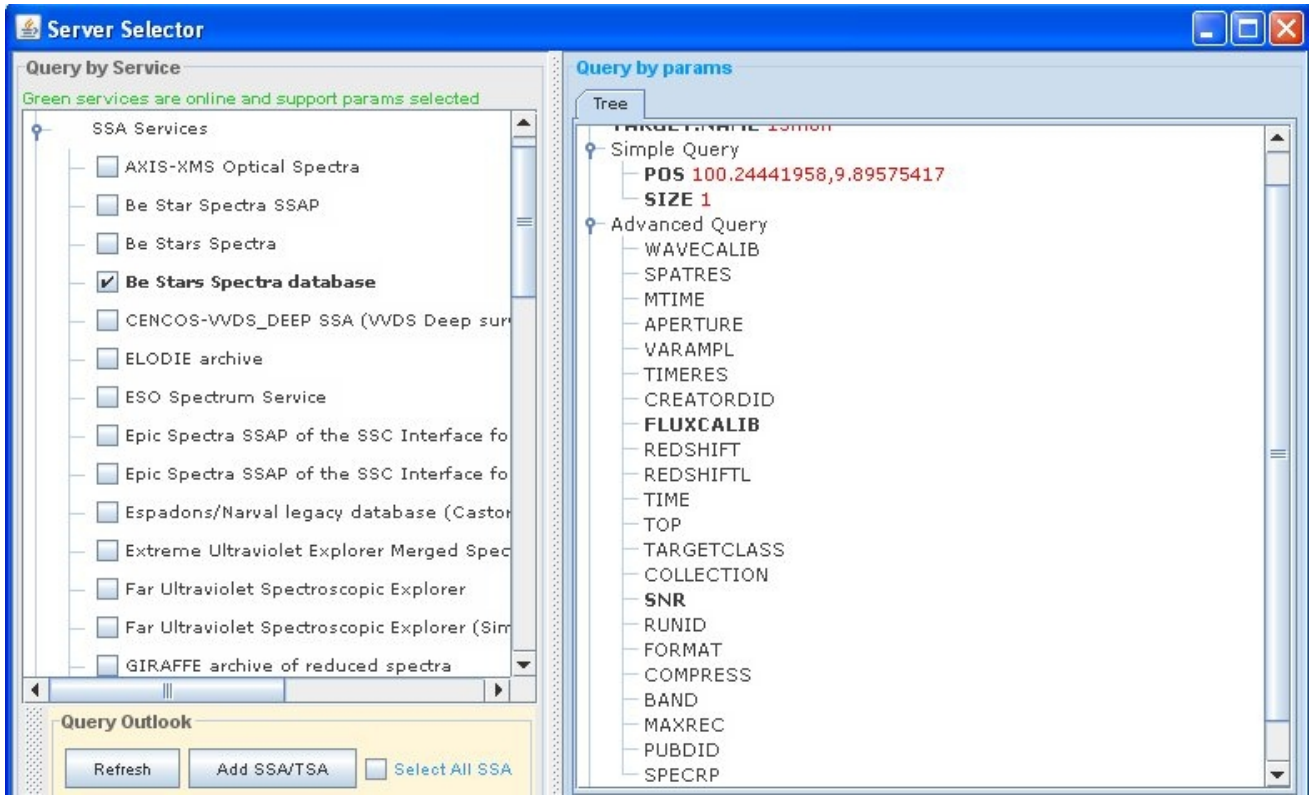

On tools side

- Use these parameters to filter the query
  - 15 Mon → 854 spectra in the Be star spectra SSAP.



Conclusions

- New data models and improvement of protocols are needed BUT...
- Lot of work may be done today just using what we already have IF...
- We use it in an adequate way.

Thanks