

Status of the Visibility Service and Observation Locator protocols

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1 TPZ-VEGA for ESA 2 Quasar for ESA 3 ATG for ESA 4 ESA

Visibility Service – reasons for



XMM-NEWTON	MULTI-TARGET	VISIBILITY	CHECKER

About ING ▼ Astronomy ▼ Developments ▼ Public Information ▼ Search: Home > Astronomy > Object Visibility		SIMBAD Lookup NED Lookup (eg: Abell 1750) Please note: there is a 30 second timeout should SIMBAD or NED not respond. (eg: Abell 1750)		
	Object Visibility – STARALT			
altitude agains a particular nig	ogram that shows the observability of objects in various ways: either you can plot t time for a particular night (Staralt), or plot the path of your objects across the sky for ht (Startrack), or plot how altitude changes over a year (Starobs), or get a table with ving date for each object (Starmult). For further information, click on the "help" button of the page.	SIMBAD LOOKUP RESULTS: If you are happy with these results, complete the "Visibility Details" and Submit TARGET DETAILS		
5	AND AND AND AND			
Mode	Staralt	Target Name M31 Target name or identifier for output (eg; Abell 1750) RA 00:42:44.330 Decimal degrees or HH:MM:SS.S (eg: 13:30.52.5)		
Night	12 ▼ October ▼ 2017 ▼ or date when the local night starts. Staralt, Startrack only.	Dec +41:16:07.50 Decimal degrees or DD:MM:SS.S (eg: -01:50:27.0) VISIBILITY DETAILS		
Observatory	La Silla Observatory (Chile) Select one above or specify your own site with this format: Longitude(°East) Latitude(°) Altitude(metres) UTC offset(hours) Ex: 289.2767 -30.2283 2725 -4	Select either Revolution Range © First Revolution 3369 default is AO17 revolution range: 3369 to 3551 Last Revolution 3551 or Date Range © From Date 01 May 2018 To Date 01 May 2018 default is AO17 range: 01 May 2018 - 30 Apr 2019		
Condicato	Formats can be any of these: name hh mm ss tdd mm ss name hh mm iss tdd mm ss name ddd.ddd dd.ddd name must be a single word with no dots, avoid using single numbers. Every entry must be in the same format, do not use different formats with different entries. We recommend a maximum of 100 targets per submission.	To Date 30 Apr 2019 Minimum visibility 5000 (minimum time the bin must be visible. Default is 5000 s) Submit		

Astronomer: interested in seeing which facilities are available to observe a particular object and when

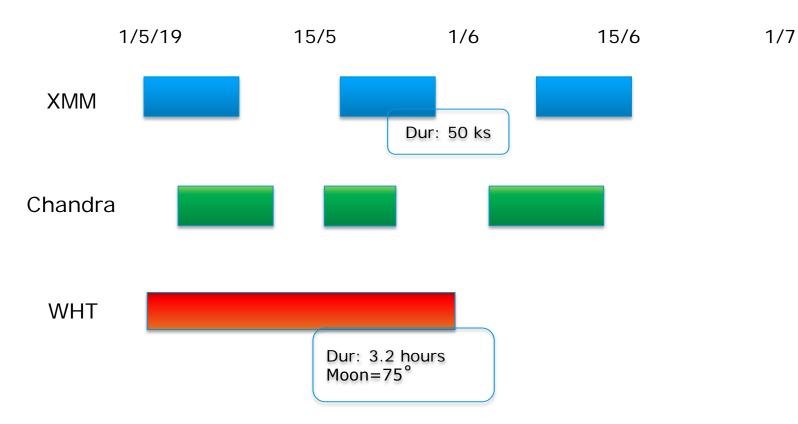
Planner: to see when a coordinated observation may be possible

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ESA UNCLASSIFIED - Releasable to the Public

Visibility Service – ideal client

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ObjVisSAP note v0.2 WD and ObsLocTAP v0.2 WD

Presented at a well attended multi-facility, multi-agency meeting at ESAC in September 2018.

Ariel, Gaia, eRosita, PLATO, Spitzer, XMM, Integral, Chandra, Swift, NuStar, HST, Einstein probe, IXPE, AstroSat, HXMT, MAXI, NICER, SoFIA, ALMA, SKA, LOFAR, REM, Gemini, LSST, GTC, TMT, GEM, CTA, Ligo-Virgo

Asterics, ePESSTO, HEASARC, SmartNET, OPTICON, ESO, ISDC

Object Visibility Simple Access Protocol



http://www.ivoa.net/documents/ObjVisSAP/

Properties:

- 1. S*AP protocol
- Based on "parameter=value" 2.

Input:

s_ra, s_dec (mandatory)

t_min (default to NOW), t_max (mandatory 4 server)

min_vis (optional)

Output:

t_validity (when vis info will be updated; mandatory)

- t_start, t_stop (vis windows; mandatory)
- t_visibility (visibility time in each window; mandatory)

moon_sep, elevation, energy range ... (optional)

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Object Visibility Simple Access Protocol

Version 0.5

IVOA Working Draft 27 February 2019

This version: ObjVisSAP-0.5-20190227 Latest version: ObjVisSAP-0.4-20180912

Previous version(s):

Working Group: http://www.ivoa.net/twiki/bin/view/IVOA/IvoaDAL

Editor(s):

Aitor Ibarra, Richard Saxton, Jesús Salgado

Author(s): Aitor, Ibarra, Richard Saxton, Jesús, Salgado, Matthias Eble, Carlos Gabriel, James Dempsey, María Díaz Trigo, Yue Huang, Jaime Keenea, Mark Kettenis, Peter Kretschmar, Erik Kuulkers, Uwe Lammers, Giorgio Matt, Bruno Merin, Marco Molinaro, Jan-Llwe Ness, Julian Osborne, Emma de Oña Wilhelmi, Edward J. Salbol, Emilio Salazar, Celia Sánchez, Gregory Siyakoff, Lian Tao, Aaron Tohuyayohu, Bill Workman BC: Representatives of a large multi-observatory collaboration

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Implementations by:

Chandra - see next talk Integral

Gaia

https://gaia.esac.esa.int/val_gost/ObjVisSAP/examples https://gaia.esac.esa.int/val_gost/ObjVisSAP/capabilities https://gaia.esac.esa.int/val_gost/ObjVisSAP/availability https://gaia.esac.esa.int/val_gost/ObjVisSAP/gaiaobjvisap

curl -X GET <u>"https://gaia.esac.esa.int/val_gost/ObjVisSAP/gaiaobjvisap?</u> <u>&s_ra=10.68470833&s_dec=41.26875&t_min=57388.0&t_max=57540.0"</u> -H "accept: application/x-votable+xml;charset=utf-8;serialization=TABLE"

Visibility Service – gaia server

```
curl -X GET <u>"https://gaia.esac.esa.int/val_gost/ObjVisSAP/gaiaobjvisap</u>
?s_ra=10.68470833&s_dec=41.26875&t_min=58613.0&t_max=59613.0" -H "accept:
application/x-votable+xml; charset=utf-8; serialization=TABLE"
<TABLE name="source_name_0" nrows="30">
<PARAM arraysize="*" datatype="char" name="QUERY_STATUS" value="">
<DESCRIPTION>OK</DESCRIPTION>
</PARAM>
<FIELD datatype="double" name="t_validity" ucd="time.validity" unit="d">
<DESCRIPTION>The date when the visibility calculations will change (MJD).</DESCRIPTION>
</FIELD>
</FIELD datatype="double" name="t_start" ucd="time.start" unit="d">
<DESCRIPTION>The date when the visibility calculations will change (MJD).</DESCRIPTION>
</FIELD>
</FIELD datatype="double" name="t_start" ucd="time.start" unit="d">
<DESCRIPTION>The start visibility period (Barycentric MJD in TCB).</DESCRIPTION>
```

<DATA>

<TABLEDATA>

<TR>

.

<TD>61297.866025687195</TD> <TD>58647.80895925872</TD> <TD>2019-06-13T19:29:03.237</TD> <TD>58647.88297099387</TD> <TD>2019-06-13T21:15:37.425</TD> <TD>2019-06-13T21:15:37.425</TD> <TD>4.5</TD>

- Validity date (expected next update)
- Start time (MJD)
- Start time in Gaia time format
- End time (MJD)
- End time in Gaia time format
- Duration (s)

Scientist: to see the observations that have already been made of a particular object and the observations which are planned and scheduled by various facilities.

This information may be used to propose further observations to fill gaps or to coordinate multi-wavelength campaigns.

Planner: to help a facility coordinate with existing planned observations of an object. To find times, in conjunction with the visibility server, when a coordinated observation may be possible between two facilities.

- **NuSTAR**: 30% of the observations are coordinated with other observatories.
- XMM-Newton: ~12% coordinated observations (NuSTAR, HST, Chandra, VLT, Swift).
- **INTEGRAL**: ~10% of the obs. are coordinated with other observatories.
- **Chandra** has expanded the time available via joint programs.

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ObsLocTAP: Observation Locator Table Access Protocol

 Initial note updated to create ObsLocTAP v0.4 WD

http://www.ivoa.net/documents/ObsLocTAP/

Properties:

- 1. TAP protocol Similar to ObsTAP
- 2. Data Model contains:
 - a. Observation Characterization
 - b. Axes:
 - Spatial Coverage
 - Spectral Coverage
 - Polarization
 - c. Observatory provenance



Observation Locator Table Access Protocol

Version 0.4

IVOA Working Draft 15 February 2019

This version:

http://www.ivoa.net/documenta/ObsLocTAP/20190215/ Latest version: http://www.ivoa.net/documents/ObsLocTAP/ Previous version[5]: http://www.ivoa.net/documents/ObsLocTAP/20180723/

Working Group: http://www.ivoa.net/twiki/bin/view/IVOA/IvoaDAL

Editor(s): Aitor Ibarra, Jesús Salgado

Author(s):

Alor Ibara, Jesús Salgado, Matthias Ehle, Carlos Gabriel, Janes Dempsey, Maria Diaz Trijo, Vite Huang, Jaime Keenea, Mark Ketnis, Peter Kretchmar, Erik Kullkers, Uwe Lammers, Giorgio Matt, Bruno Merin, Marco Molinaro, Jan-Uwe Ness, Julian Osborne, Emma de Ofia Wilhelmi, Edward J. Salbol, Emilio Salazar, Celia Sánchez, Richard Saxton, Gregory Sivakoft, Lian Tao, Aaron Tohuvavohu, Bill Workman TBC: Representatives of a large multi-observatory collaboration Last presented version : 0.2

Currently version : 0.4

Changes from $0.2 \rightarrow 0.4$ are:

1. Data model re-definition (introduction of ivoa: obsplan)

2. Adding better distinction between planned, Scheduled and performed observations

3. Correction of s_fov as a circle radius. Possible use of more complex footprints as objects to be defined

execution_status

Planned: a possible observation, usually coming from a certain proposal, has been identified. There is not yet an association to a certain time period when the observation can be executed.

Scheduled: mission planners have allocated a certain period when the observation can be executed.

Performed: the observation has been performed successfully. This is only at operational level as there is no guarantee of scientific results **Aborted**: the observation has not been correctly performed (or has been removed from the schedule).

t_planning

The date when this observation was planned (allowing queries on updated entries)

priority [0,1,2]

The priority of the observation (2 is highest and most difficult to move)



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Gaia – visibility
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- Integral visibility / ObsLocTAP
- XMM internal visibility & ObsLocTap

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integral.esa.int/visObsTap/

Javascript client

integral.esa.int/visObsTap

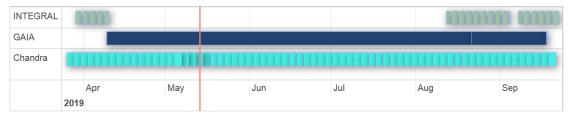
Using the live Chandra, INTEGRAL, Gaia servers.

Can be used for validating servers.



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Roadmap

- Support current draft service implementations and open up for external testing
- Support addition of more services particularly from ground-based observatories
- 3. IVOA technical assistance and frameworks support (in particular for TAP implementations) would be useful
- 4. Write a trial client for the visibility and for the observation servers (a client within ESASky planned for end of this year)
- 5. Update specs with feedback from the implementations
- 6. Add more use cases to spec
- 7. All feedback welcome happy to add interested parties to author list

- 1. Last WD versions (1.0) expected for end of September
 - WD versions distributed end of September for discussion at DAL level
- 2. Client implementation(s) after Summer (ESASky?, Python wrapper?)
 - Presentation of the implementations and final versions during the interop meeting in Groningen (October 2019)
 - PR versions for beginning of 2020
 - Recommendation for Spring interop in 2020 (?)

Conclusions

- 1. Significant continuing interest from the wide astronomical community
- 2. Initial community feedback has been incorporated into specs
- 3. Test server implementations and a client beginning to be developed for space missions
- 4. Feedback from scientific use to be fed back into specs
- 5. Aiming for full adoption by 1st half of 2020.



Thanks!