# Status of the Visibility Service and Observation Locator protocols

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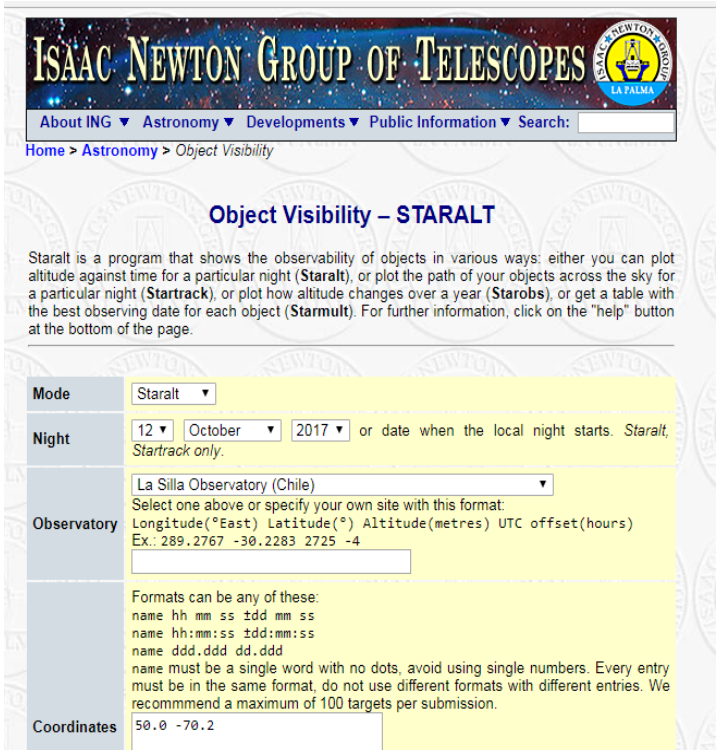
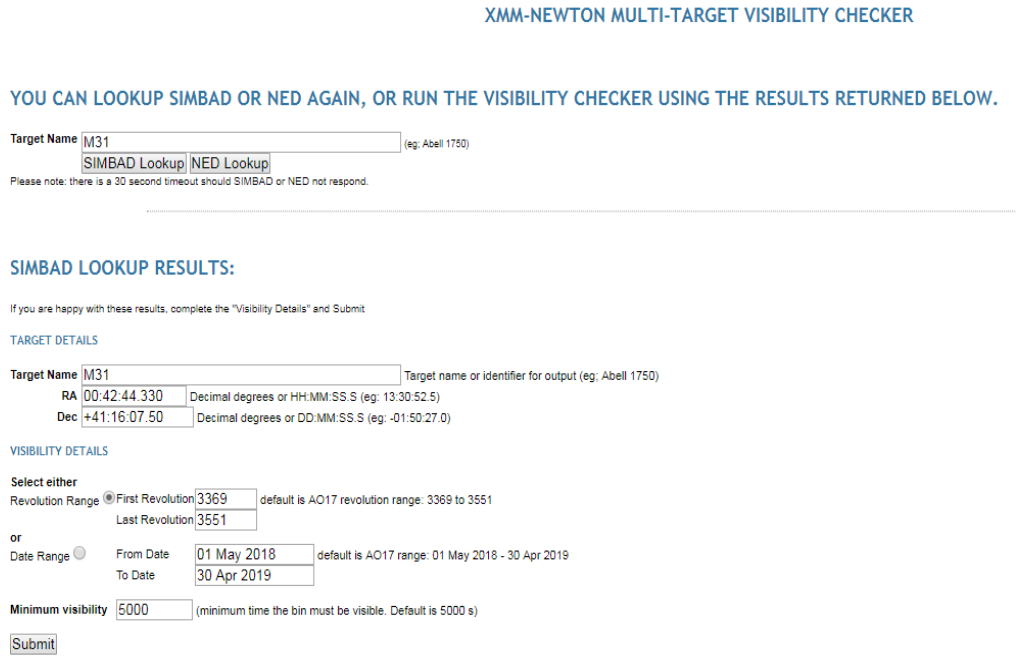
*3 ATG for ESA*
*4 ESA*

# Visibility Service – reasons for

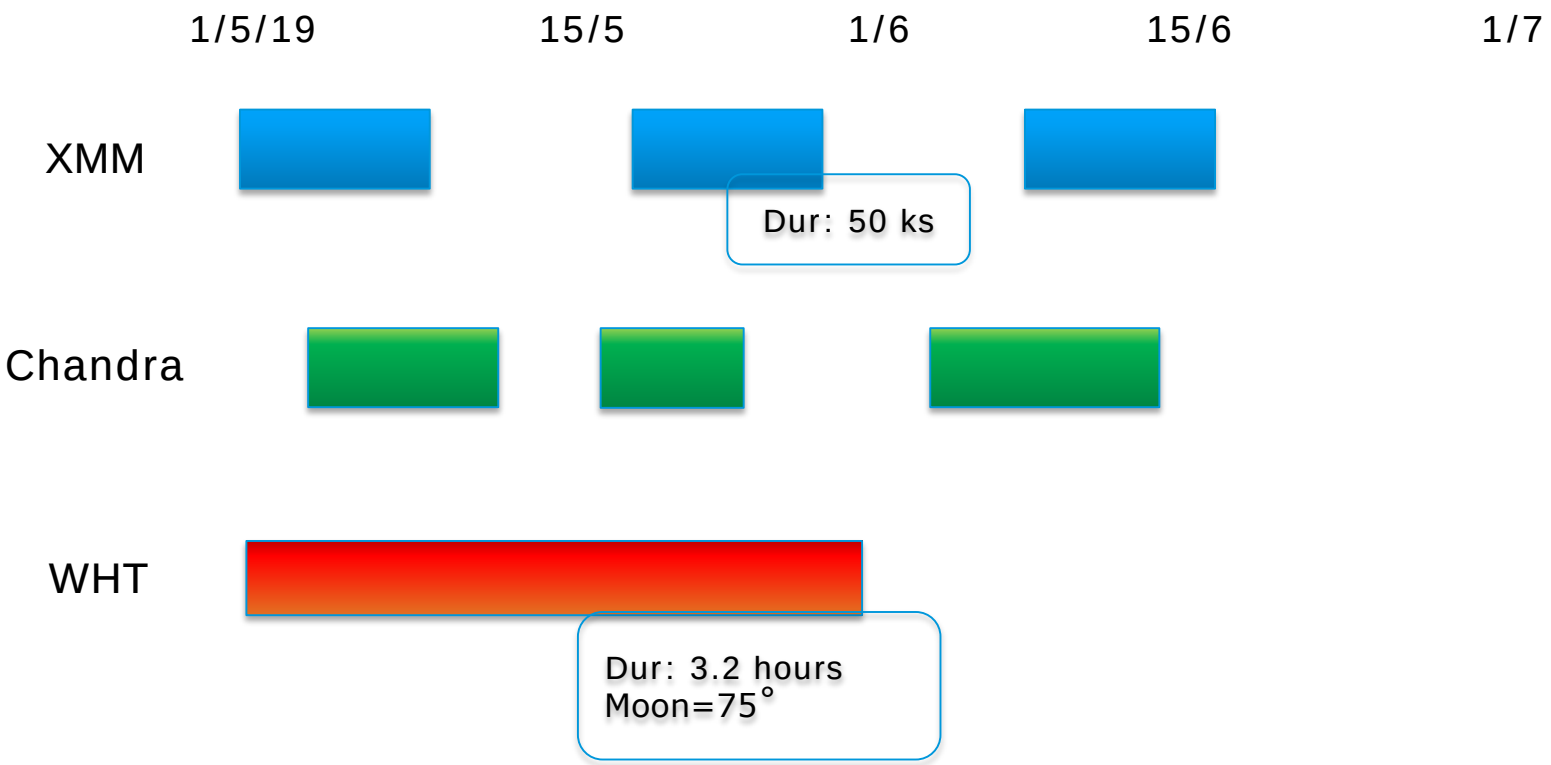



Astronomer: interested in seeing which facilities are available to observe a particular object and when

Planner: to see when a coordinated observation may be possible

# Visibility Service – ideal client



# Contact with community Meeting

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

1. Note updated from v0.2 to ObjVisSAP v0.5 WD

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

Properties:

1. S*AP protocol
2. Based on “parameter=value”

**Input**:

s_ra, s_dec (mandatory)

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

min_vis (optional)

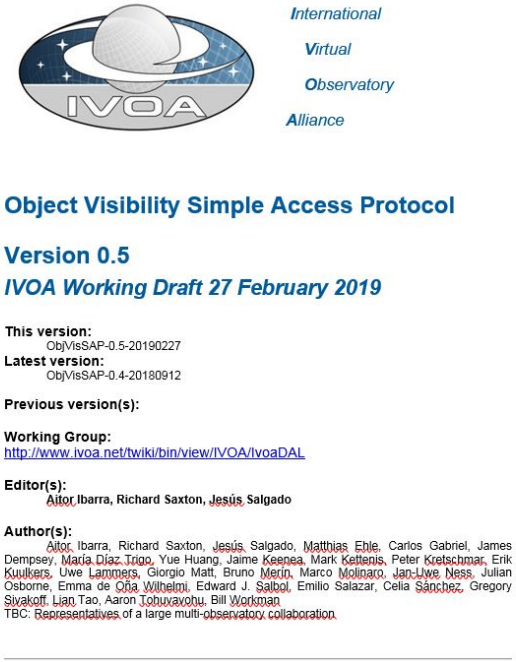
**Output**:

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)



International Virtual Observatory Alliance

**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:**
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TBC: Representatives of a large multi-observatory collaboration

# Visibility Service – status

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

# Visibility Service – gaia server

curl -X GET "https://gaia.esac.esa.int/val_gost/ObjVisSAP/gaiaobjvisap?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 start visibility period (Barycentric MJD in TCB).</DESCRIPTION>
.....
<DATA>
<TABLEDATA>
 <TR>
  <TD>61297.866025687195</TD>          - Validity date (expected next update)
  <TD>58647.80895925872</TD>           - Start time (MJD)
  <TD>2019-06-13T19:29:03.237</TD>     - Start time in Gaia time format
  <TD>58647.88297099387</TD>           - End time (MJD)
  <TD>2019-06-13T21:15:37.425</TD>     - End time in Gaia time format
  <TD>4.5</TD>                         - Duration (s)
 </TR>
.....
```

# Observation Log Service – reasons for

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.*

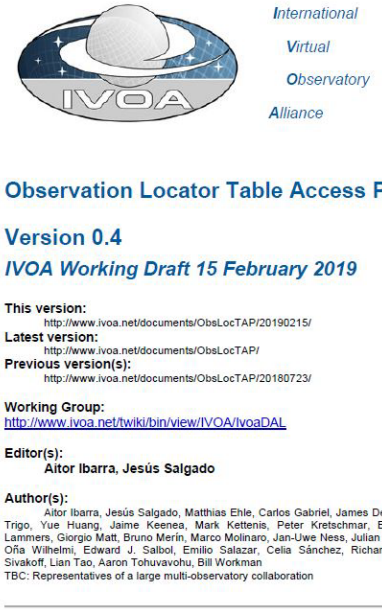
# ObsLocTAP: Observation Locator Table Access Protocol

1. 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



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**Observation Locator Table Access Protocol**

**Version 0.4**

***IVOA Working Draft 15 February 2019***

**This version:**
http://www.ivoa.net/documents/ObsLocTAP/20190215/
**Latest version:**
http://www.ivoa.net/documents/ObsLocTAP/
**Previous version(s):**
http://www.ivoa.net/documents/ObsLocTAP/20180723/

**Working Group:**
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TBC: Representatives of a large multi-observatory collaboration

# Observation Log Service – status

Last presented version : 0.2

Currently version : 0.4

Changes from 0.2 -> 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

# Observation Log Service – obs type

### *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)

# Service Implementations

Chandra – visibility and Observation Log (see next talk)

Gaia – visibility

Integral – visibility / ObsLocTAP

XMM - internal visibility & ObsLocTap

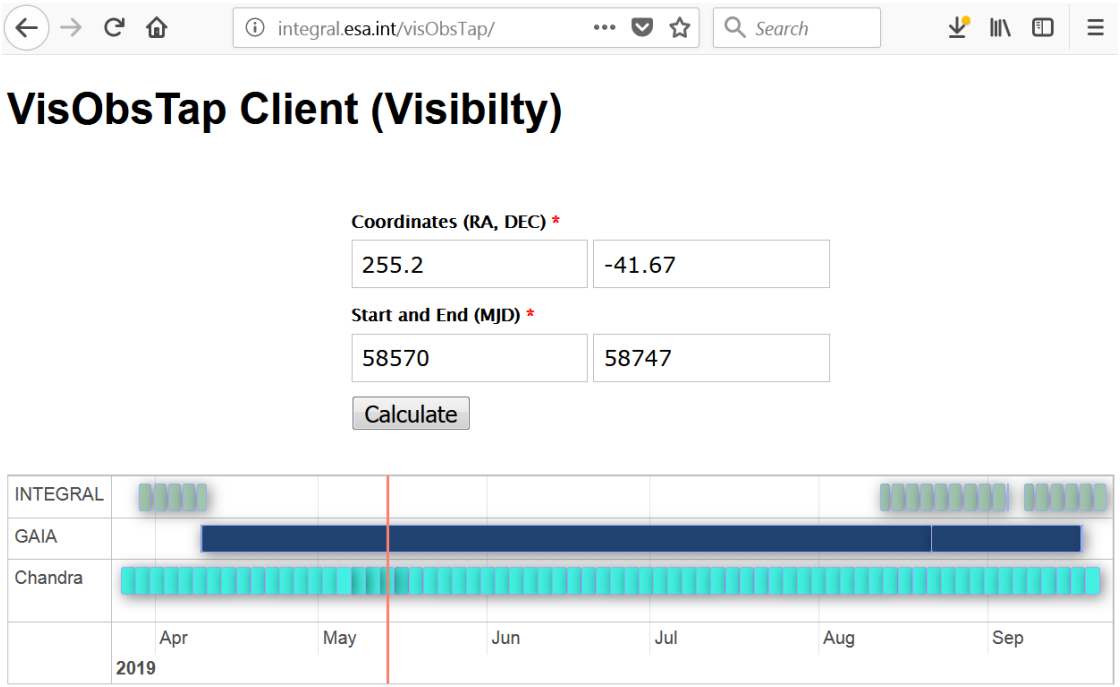
# Trial client for ObjVisSAP service

Javascript client

integral.esa.int/visObsTap

Using the live Chandra, INTEGRAL, Gaia servers.

Can be used for validating servers.



# Roadmap

1. Support current draft service implementations and open up for external testing
2. 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

# Roadmap - tentative dates

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!