

# WP7 – JRA2

## Data Access and Data Models

## WP7 Objectives

*Taking into account requirements from the scientific users and the data centres, participate in the IVOA Working Groups for the definition of the IVOA standards and protocols for data access, data description and query language, beyond the present initial versions (“simple” protocols). Input will be given to the Data Access Layer, Data Models and VO Query Language IVOA Working Groups.*

# WP7 Description of Work

*[...] Perform R&D studies for Data Access, Data Model and VObs Query Language protocols and standards in the context of the IVOA working groups.*

- Studying the DAL, DM, VOQL standards. Assessing possible technologies to implement these standards*
- Participation to the IVOA WGs discussions, mail forum, teleconferences*
- Participation to writing the standards specifications document of these DAL, DM, VOQL*
- Participation to the IVOA Technical forum to present the findings and implementations of these DAL, DM, VOQL standards*
- Writing prototype implementation these DAL, DM, VOQL standards onto real data holdings from European Data Centres*
- If applicable, publish these implementations into the Euro-VO Registry of VObs resources Coordinate with EuroVO-AIDA Service Activities for these (prototype) implementations of these DAL, DM, VOQL standards to be consumed by VObs tools[...]*

## WP7 milestones & deliverables

- Common milestones to all JRAs
  - Technology Forums
  - IVOA Interoperability meetings
- Deliveries to be done **AFTER** the IVOA interop

|      |  |                       |                                      |
|------|--|-----------------------|--------------------------------------|
| D7.1 | WP7-JRA2 intermediate report and associated prototypes | ESA<br><b>Pending</b> | April 2009<br><b>few inputs !</b>    |
| D7.2 | WP7-JRA2 final report and associated prototypes        | ESA                   | April 2010<br><b>-&gt; June 2010</b> |

- Work to continue through cycle 2

# Roadmap

- 11 tasks identified
- Leader from each of the partners chosen for each of the tasks
- Leading only means coordinating the efforts of the “task force”; no other implications
- Real work has to be done within the group
- Creation of specific mailman distribution lists per task
  - ESO volunteered to hold the lists
- All discussions will be archived
- Suggestion that task leaders celebrate teleconfs regularly
- Information to be passed to WP7 Lead

## WP7 Identified Tasks/Leads

- WP7\_T1\_AsynchDAL UEDIN (Guy Rixon)
- WP7\_T2\_SEDLibrary ESO (ESO)
- WP7\_T3\_FootprintDAL CNRS (Francois Bonnarel)
- WP7\_T4\_GenericDS CNRS + ESA (Jesus Salgado)
- WP7\_T5\_AssocSAP ESA (Jesus Salgado) + CNRS
- WP7\_T6\_PhotometryDM ESA (Jesus Salgado)
- WP7\_T7\_RadioCubes UEDIN (Anita Richards)
- WP7\_T8\_ADQLLibrary ESA (Aurelien Stebe)
- WP7\_T9\_SourceCat ESA (Inaki ortiz)
- WP7\_T10\_ObsProvDM CNRS (Mireille Louys)
- WP7\_T11\_Units UEDIN (Anita Richards)

# T1: Asynch DAL

- Integration of asynchronous queries into the new generation DAL protocols (e.g. TAP, SIAPv2)
  
- No work reported on this

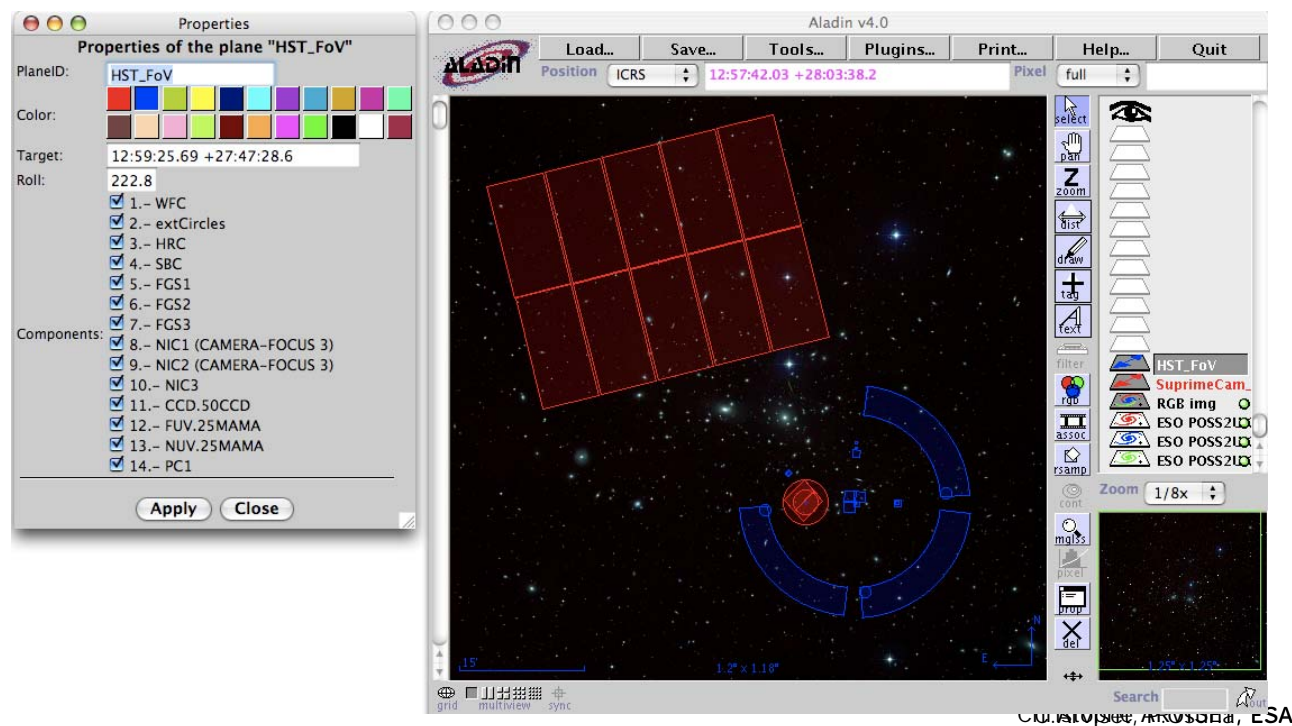
## T2: SED Library

- At ESO a first effort is based on the "natural" native FITS format most of the ground based observatories are using world-wide.
- A library is being developed to convert the ground based typical spectral format (1D image) into the SpectrumDM suggested FITS format.
- A CGI script to test the library is already available, and will be soon made available through the ESO SSA operational service.
- Later on, based on this concrete experience, the library will be made available to other Data Centres.



# T3: Footprints and DAL

- WP7\_T3\_FootprintDAL
  - Integration of Footprint services in the current and future SIAP and SSAP protocols including development of Server/client prototypes as a proof of concept



# T4: Generic Dataset

- discussions had on QUERY parameters, access to cubes, with cutouts and transformations (including resampling) output parameters with their utypes, etc , inclusion of DAL associations and extensions.
- The Generic dataset access protocol will include a common profile to encapsulate the existing IVOA simple access protocols and provide advanced capabilities such as ADQL queries, descriptions of metadata according to the full Observation datamodel, and access modes to heterogeneous complex data
- A version of the SIA2 preliminary draft interface is in preparation for end of June. A version of SIA2 working draft is planned to be circulated for August the 3rd. Then the generic Dataset protocol will be designed following the vision developed in "DAL architecture document" ([http://www.ivoa.net/internal/IVOA/SiaInterface/DAL2\\_Architecture.pdf](http://www.ivoa.net/internal/IVOA/SiaInterface/DAL2_Architecture.pdf)) and formalized in a new document.

## T5: Associations in S\*AP

- Absence of clear use cases identified in IVOA
- Thus defining use cases therefore to give as input:
  - *Complex data* ( multi-images, MOS, Echelle, ...)
  - *Complex metadata* (Photometry, Provenance, characterization level 3 (FOVs) and 4 (variability maps))
  - *Echelle spectra*:
    - It could be described either by association of multiple 1-D spectra or use a multi-segment spectral representation. It this enough?

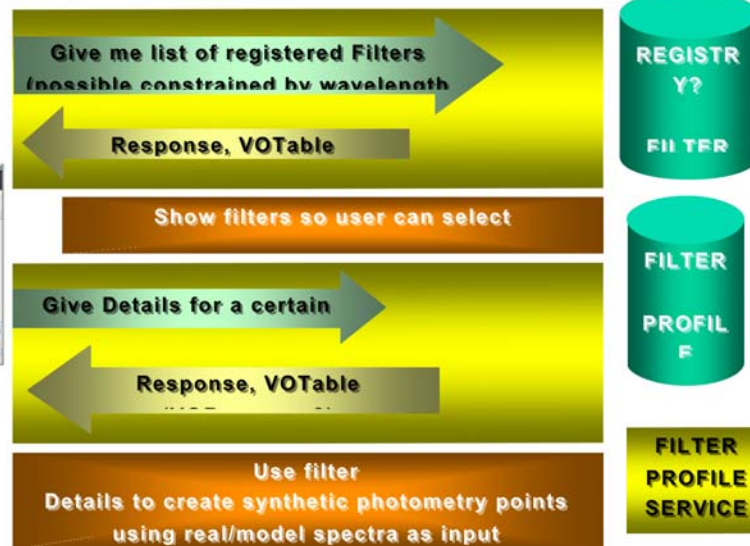
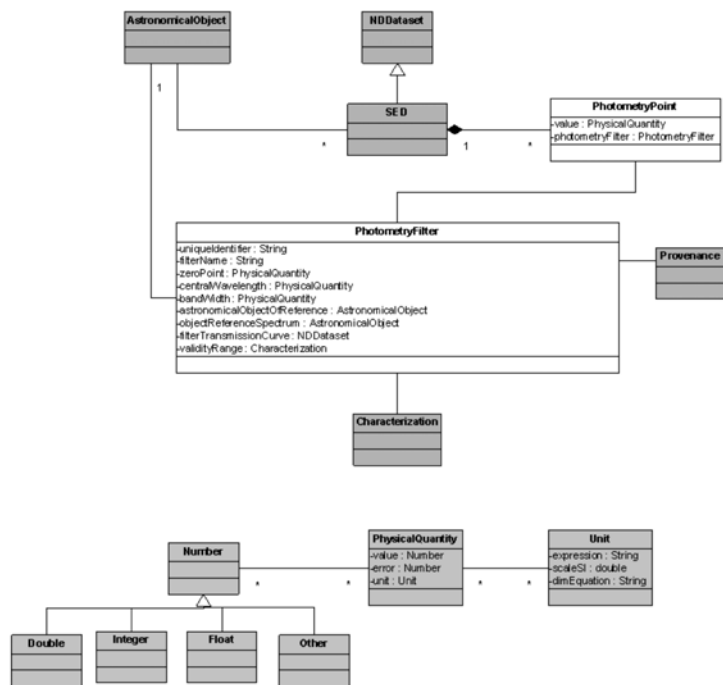
## T5: Associations in S\*AP (II)

- *Transmission curves/response matrixes linked in the SSAP response to SED.*
- *Images and sub-images: In SIAP, one image per observation + images for different energy bands or instrument. Example XMM images.*
- *Multi-position query*
- *Confidence Maps (McMahon)*

# T6: Photometry DM

- Meeting held between SVO/ESAVO members
- Preliminary Photometry UML Data model produced. Task distribution working list created and model distributed to it
- Science use cases distributed to the list
- Plan of activities developed and distributed
  - Distribution of preliminary Photometry UML for discussion (done)
  - Distribution of science use cases (done)
  - Agreement on DM
  - Creation of Profile Filter Service and interaction with VO applications (ongoing)
  - Creation of Photometry data services and interaction with VO applications
- Model presented during AIDA meeting (March 2009)
- Discussions held during the meeting and changes implemented in the model

# T6: Photometry DM (II)



## T7: Radio Cubes

- Produced a Note on polarization, also for presentation at the Interop:

<http://www.ivoa.net/internal/IVOA/NotesOnPolarization/Note-Polarization-0.1-20090522.pdf>

- Summarizing briefly the requirements of data providers such as ALMA, e-MERLIN, HI single dish mosaics
- Investigating compatible formats in other wavebands, e.g. some ESO optical or IR data (SINFONI) may be in the form of suitable cubes
- Drawing up priorities for data retrieval standards- Commenting on related aspects of SIAPv2

## T8: ADQL Library

- Facilitate update of ADQL by data centre by developing Java libraries
- ADQL2XML, ADQL2SQL, SQL2ADQL
- No work on this in cycle 1



# ADQL v2.0 became IVO Recommendation in October 2008

IVO Recommendation

International Virtual Observatory Alliance

IVO Documents



IVOA Astronomical Data Query Language  
Version 2.00

IVOA Recommendation 30 October 2008

**Interest/Working Group:**

<http://www.ivoa.net/twiki/bin/view/IVOA/IvoaVOQL>

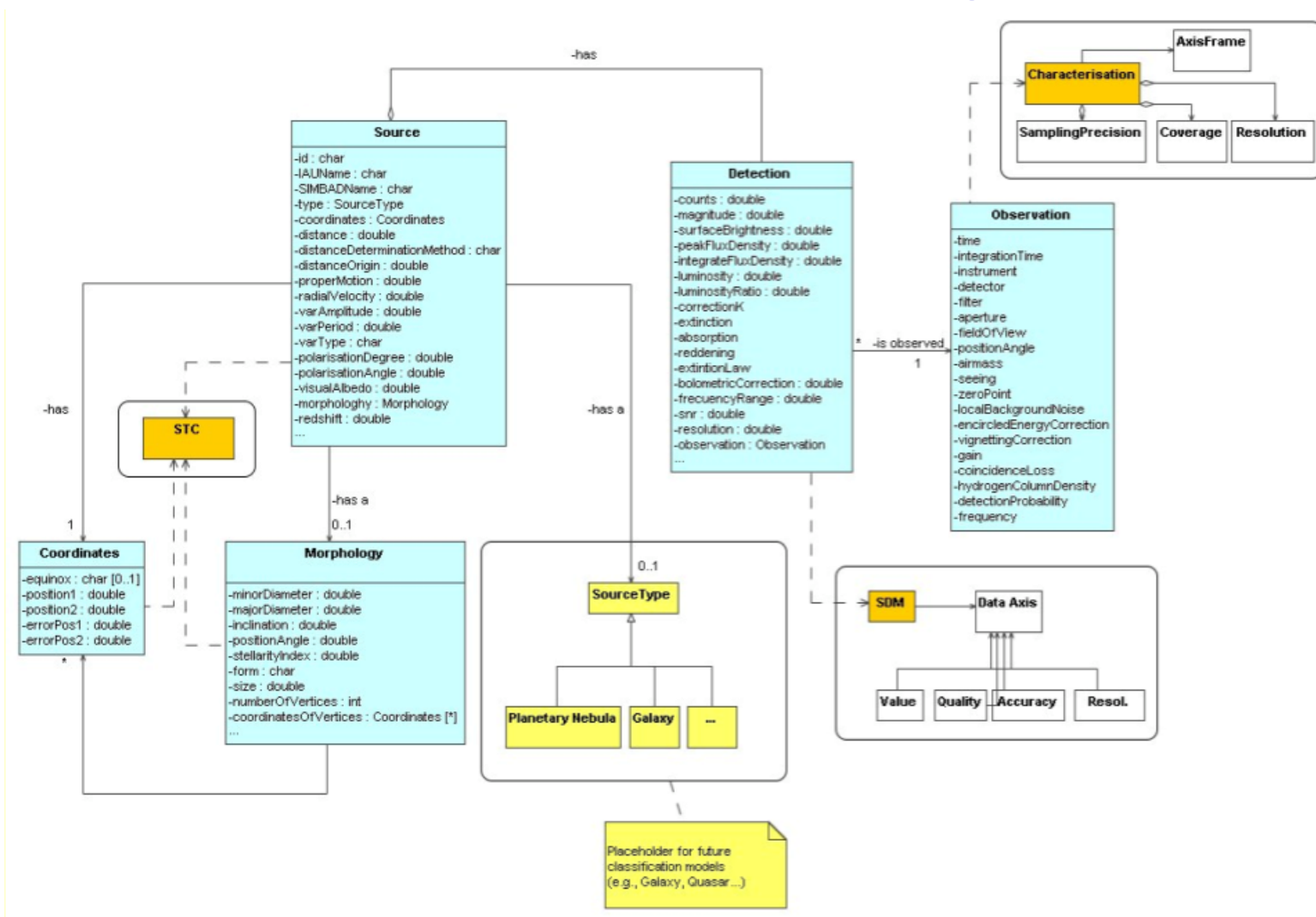
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**Editor(s):**

Pedro Osuna and Iñaki Ortiz

# T9: Source Catalogue



## T9: Source Catalogue (II)

- A TAP-like service registered e.g. at:  
<http://<service.url>/tap/sync?REQUEST=doQuery&LANG=ADQL&QUERY=<adql.query>>

- Would accept an ADQL query like:

```
select "scdm:Source.id" from scdm
  where
    CONTAINS (
      POINT('FK5 J2000.0 GEOCENTER' , 202.468, 47.195),
      CIRCLE('FK5 J2000.0 GEOCENTER' ,
        'scdm:Source.Coordinates.Center.ra' ,
        'scdm:Source.Coordinates.Center.dec" ,
        0.0167))=1
```

- Which would translate to the individual DBs in, for instance (2MASS and 2XMM examples):

```
select II/264.2MASS from II/264
  where
    CONTAINS (
      POINT('FK5 J2000.0 GEOCENTER' ,
        202.468, 47.195),
      CIRCLE('FK5 J2000.0 GEOCENTER' ,
        II/264.RAJ2000, II/264.DEJ2000,
        0.0167))=1
```

```
select IX/39.Source from IX/39
  where
    CONTAINS (
      POINT('FK5 J2000.0 GEOCENTER' ,
        202.468, 47.195),
      CIRCLE('FK5 J2000.0 GEOCENTER' ,
        IX/39.RAJ2000, IX/39.DEJ2000, 0.0167))=1
```

# T10:ObsProvDM : Provenance

- « Provenance » of an observation or a dataset in IVOA vocabulary and standards maybe different than in other contexts
- It is part of a more general description of the dataset metadata which is called the « Observation data model »
- It is not dealing with the curator or data provider which are described elsewhere in the standard
- It is dealing with the description of the history of the data
- An observational dataset is the result of an instrumental and software process
- We need to give simple enumeration of these steps with links to additional non standardized documentation and metadata

# T10: ObsProvDM : Provenance (II)

- « Provenance » has three main classes
  - « Processing » (calibration, mosaicking ...)
  - « Observation Configuration » made of « Observation elements » (telescope, camera)
  - « Ambient conditions » (like temperature)
- Priority use cases:
  - describing Filter transmission curve
  - access to Progenitors of the Mosaic dataset...
- Special discussions at IVOA level since Strasbourg Interop
  - May raise its priority and allocated resources !

# T10:ObsProvDM Provenance (III)

**Mosaic Processing stage**

**Algorithm**

**associated data**

**data access**

**metadata access**

| type         | format     | acref  | observationMet...                               |
|--------------|------------|--|---|
| 1 proGenitor | image/fits | http://project.org/dstale/xposure/exposure1.fits | http://project.org/dstale/xposure/exposure1.xml |
| 2 proGenitor | image/fits | http://project.org/dstale/xposure/exposure2.fits | http://project.org/dstale/xposure/exposure2.xml |
| 3 proGenitor | image/fits | http://project.org/dstale/xposure/exposure3.fits | http://project.org/dstale/xposure/exposure3.xml |
| 4 proGenitor | image/fits | http://project.org/dstale/xposure/exposure4.fits | http://project.org/dstale/xposure/exposure4.xml |

| type          | format     | acref   |
|---------------|------------|---|
| confidenceMap | image/fits | http://project.org/dstale/xposure/frisimage_confidence.fits |

# T11: Units

- VO Units draft written. Proposed to IVOA. Discussions ongoing  
<http://www.ivoa.net/forum/dm/att-1495/WD-VOUnits-20090519.pdf>

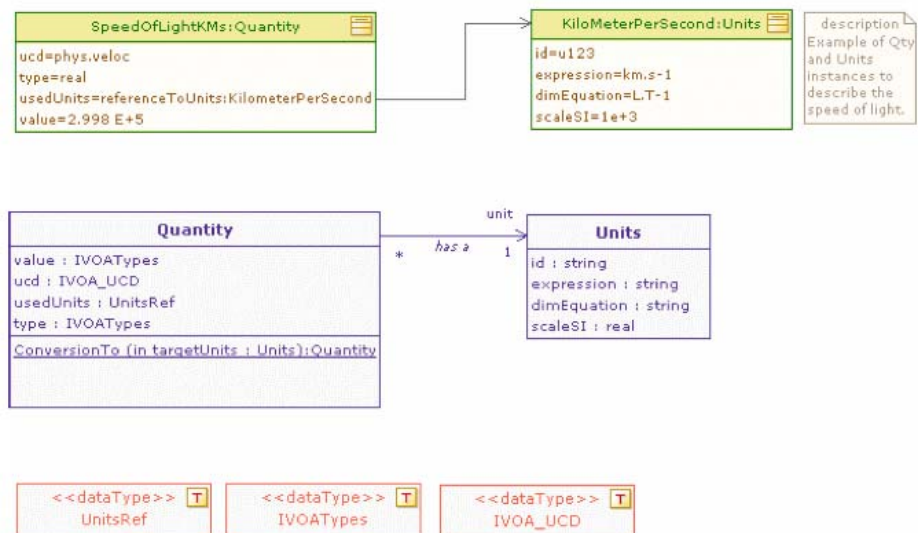


Figure 2: UML model for units. Bottom: Simple types defined by the model and used for class attributes. Middle: This simple class diagram illustrates how the Quantity Class might use the Units Class to represent which unit string is used to code the value attribute. Top: As an example, a specific Quantity, SpeedOfLight, is represented by a Quantity instance object and uses the KilometerPerSecond object, an instance of the Units Class. Such a Units instance could be used by many Quantity objects.



# Other Main Highlights from IVOA meetings

## WP7 related activities

- Progress on DAL
  - SLAP Simple Line Access Protocol (with SSLDM) going to RFC in July
  - TAP (Table Access Protocol) going to RFC in July
  - SIAP 2
- Progress on DM
  - SSLDM Simple Spectra Lines DM (with SLAP) going to RFC in July
  - UTYPES
  - Characterization
- Strong Euro-VO involvement on these activities



# Meetings

- 1<sup>st</sup> AIDA Technical Forum, Strasbourg, France, March 2008
  - <http://wiki.eurovotech.org/twiki/bin/view/VOTech/StageSevenPlanningMeetings>
  - In cooperation with VOTECH
- IVOA Interoperability Meeting, Trieste, Italy, May 2008
  - <http://www.ivoa.net/cgi-bin/twiki/bin/view/IVOA/InterOpMay2008>
- 2<sup>nd</sup> AIDA Technical Forum, Cambridge, UK, September 2008
  - <http://wiki.eurovotech.org/twiki/bin/view/VOTech/StageEightPlanningMeetings>
  - In cooperation with VOTECH
- IVOA Interoperability Meeting, Baltimore, USA, October 2008
  - <http://www.ivoa.net/cgi-bin/twiki/bin/view/IVOA/InterOpOct2008>
- 3<sup>rd</sup> AIDA Technical Forum, Strasbourg, France, March 2009
  - <http://cds.u-strasbg.fr/twikiAIDA/bin/view/EuroVOAIDA/ThirdTechnologyForum>
- IVOA Interoperability Meeting, Strasbourg, France, May 2009
  - <http://www.ivoa.net/cgi-bin/twiki/bin/view/IVOA/InterOpMay2009>