IDHA Image archive model

Mireille Louys[1], François Bonnarel[2], François Ochsenbein[2], Pierre Fernique[2], Francoise Genova[2], Fionn Murtagh[3], Marc Wenger[2], and Pierre Didelon[4]

[1] Université Strasbourg I, LSIIT, UMR-CNRS 7005 - Bd S. Brandt - F-67400 Illkirch
[2] CDS, Observatoire de Strasbourg, UMR-CNRS 7550, 11, Rue de l'Université F-67000 Strasbourg, F
[3] Queen's University Belfast,IRL
[4] CEA, Saclay, France

The Image archive model described here has been developed within the scope of the IDHA (Images Distribuées Hétérogènes pour l'Astronomie) project. The IDHA project led by CDS, associates image processing scientists of LSIIT (Strasbourg), and astronomers of several French Institutes including TERAPIX from IAP, and Queen's University (Belfast). IDHA goal is to describe the information content of image archives and datasets. The metadata are designed as objects interacting with each other, using the standard UML notation. To describe the user logical approach to such image archives we studied different scenarii for the queries of images and their scientific interpretation. We emphazise the need for scalability in the metadata, from description of one single astronomical image to a complete information about an image collection such as a survey or a telescope archive.

The Class Diagram in fig 1 shows the objects and their relationship. The content of each class can be browsed at http://alinda.u-strasbg.fr/IDHA/lastmodel. The main classes of the model are **RawObservation** and **ProcessedObservation**. The **Processing** classes and **Reduction** classes contains mostly mission specific information about the reduction pipe-line and describe the processus leading from **RawObservations** to **ProcessedObservations**. At a lower level the **Observations** have links to their **AstrometricSolution** or **PhotometrySolution**, their **ObservingConditions**, and their related **StoredImages** in the database archive. The **View** class offers the user a representation of the region he requested and is created on the fly by the client application. At an upper level **Observations** belong to **ObservingProgram**. Selecting a subset of images according to spectral, positionnal or data quality criterion is supported by the **ObservingGroup** object. **Filter**, **Telescope**, **Instrument**, etc... describe in detail the various elements of this **ObservingConfiguration**.

The XML syntax which is hierarchical cannot support the graph structure of our model. But the choice of some user scenarii helps in defining subtrees in the graph. We start from a root node and explore the different connections avoiding backward links and circularity. For example the user scenario "getting a simple description of processed observations in a given cone, sorted out by spectral bands, in a given **ObservingProgram**", can be seen as a tree with

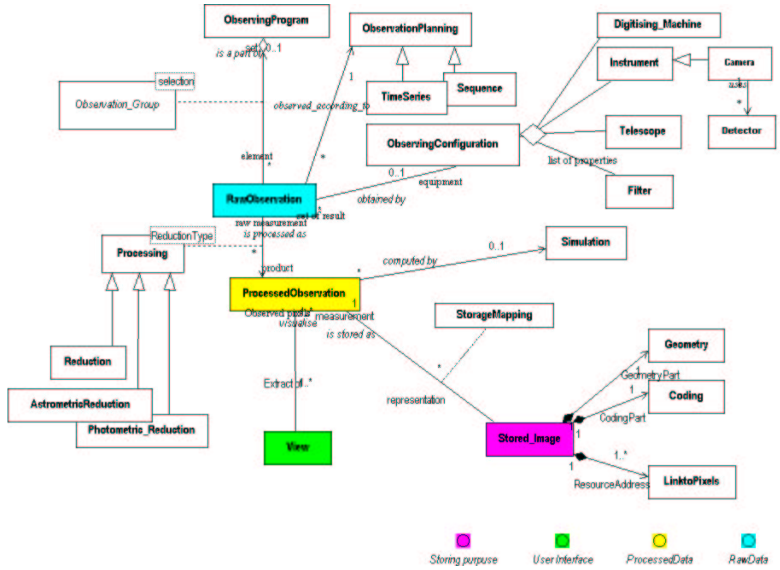

Fig. 1. UML description of basic objects and their connections

ObservingProgram at the root, followed by the various **ObservingGroups** corresponding to the selection properties and then by the list of **ProcessedObservations**. If we restrict to such subtrees, it is possible to offer partial XML views of the model that match the different granularity level of description needed. Each node (that is each class of the model) starting from the root can be described as a RESOURCE table element, with attributes arranged (stored) in a table and with its child nodes described recursively by including new adequate RESOURCE elements.

A parallel effort is underway at the Chandra data center (McDowell, 2002...) The goal is to modelize data for development of processing software. Close contacts have been maintained with this group in order to define common classes and attributes names (ie a commun understanding of the basic elements) as well as to express the specificities of Xray data versus optical data images.

The IDHA model is able to describe a large range of astronomical image archives. It's now time to use the model to generate XML VOTABLE metadata documents adapted to different user scenarii.

References

1. MacDowell J. 2002, this conference

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