Coordination Action for the integration of Solar System Infrastructures and Science

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Organisation of Vision for Solar System Science Workshop 3

Version 0.1

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Revision History

Version	Date	Released by	Detail
0.1	2013-04-30	Jean Aboudarham	Draft for internal CASSIS circulation

Table of Contents

1. Introduction

1.1 Scope of the Document

This document is produced in the context of the EU FP7 project CASSIS. It constitutes the deliverable report corresponding to the deliverable D4.3.3 (see DOW CASSIS (261618) 2012-07-12.pdf), corresponding to the third Vision for Solar System Workshop.

1.2 Concept of the Vision for Solar System Workshops

A principal objective of CASSIS is to improve the interoperability of data, metadata and services in solar system related infrastructures in order to engender a more integrated approach to the infrastructure supporting solar system science in the future, with the possibility of reducing the cost of developing new capabilities.

While much of the work towards this aim is covered in WP2 (Interoperability of data and services) and WP3 (Networking), the Vision for Solar System Science Workshops provide a way of promoting CASSIS ideas to a wider audience, gathering and discussing opinions on how best to proceed.

The Vision for Solar System Science Workshops, in particular, aim at bringing together all stakeholders, including scientists, industry, funding bodies, government agencies and policy makers both at the national and European level in order to discuss the role and opportunities created by solar system science within the context of global research, the European jobs market and industry and to champion the concept of joined up solar system science within Europe.

Concerning the format, the Vision for Solar System Science workshops are conceived to last 2-3 days, but this is discussed with the stakeholders on a case by case basis.
Particular attention is paid to ensure that key individuals are invited to the workshop in order to attract a wider audience. Funds are available to cover the external experts' travel costs.

Since the workshops' aim is to define as wide a set of cross-domain user requirements as possible, CASSIS Partners have identified in the "Solar Orbiter" project a good interlocutor to interact with, given the different instruments and institutions that are involved in the project, but some other projects of great importance for Heliosphysics are presented here.

2. Interoperability in various projects

2.1 Europlanet Data Model (Baptiste Cecconi, OBSPARIS)

It is developed through Europlanet/IDIS and aims at prototyping a planetary virtual observatory
EPN-DM Europlanet Data Model is based as much as possible on IVOAA standards

Data Model required metadata

- It describes datasets and granules (ie file or smallest unit distributed by service)
- Provides resource identification (instrument details)
- Gives target details (IAU name, class from a list of target classes)
- Gives parameter details (extension of IVOA Characterization DM)
- Inform on data product type (image, spectrum, time series, movies, etc)

TAPcore data model is a subset of the full EPN-DM with 19 mandatory keywords. Some of these can optionally remain empty but they have to be all 19 present. So you can use standard query for all data and get no error even if a field is not relevant.
More information on TAPcore at:
http://voparis-europlanet.obspm.fr/xml/TAPCore/doc/html/
The EPN client is compatible with IVOA tools such as TOPCAT.

2.2 FOREST (David O'Callaghan, TCD)

FOREST is a Google-like search of solar data
Context: Solar Orbiter, Solar Probe+, multi-instruments, multi-missions working together.
Example of use case: tracking solar storms from the Sun to the Earth, solar wind at high latitudes, etc

Project is in early phase (few months running)

The Data Models available are:
EGSO: lacks fine semantic description
HELIO
SPASE
FITS & WCS
IVOA: space time coordinate metadata, astronomical dataset characterisation, observation data more core, ucd1+, UTypes

The FOREST Data Model is an extension of the IVOA standard.
Incoming FITS files are translated in the FOREST Data Model.

RDF (Resource Description Framework):
subject ----(predicate)----> object

Dublin Core
title, creator, subject, description, publisher, contributor, date, type, format, ...

Useful resources at GAVO DaCHS (Data Center Helper Suite ...) (GAVO = German Astrophysics Virtual Observatory)
http://docs.g-vo.org/DaCHS/
http://vo.ari.uni-heidelberg.de/soft/subpkgs

GAVO DaCHS has an extractor of FITS keyword info and builds a VO like system from it.

http://d3js.org provides information for timelines

Example of FITS files description derived from SOHO can be found at:
http://bass2000.bagn.obs-mip.fr/Tarbes/spip.php?rubrique22

2.3 Solar Orbiter (David Berghmans, ROB)

The strategy is to propose a "book of recommendations" as a reference that PI can adopt fully or partially.
Note that Spice data may be difficult to describe.
There will be a SQL database (web service) with a column per FITS keyword.
Metadata will be repeated in associated XML file following IVOA standards as much as possible.
Many of the descriptors are static and could appear as separate information, keeping only the dynamic part.

2.4 IMPEx (Ronan Modolo, LATMOS)

IMPEx is an FP7 project http://impex-fp7.oeaw.ac.at

It aims at the creation of an interactive IT framework that allows to easily relate data from planetary missions to numerical models,
simulate planetary phenomena
test models versus experimental models
fill gaps in the measurements
perform preparation of mission operations

It includes scientific tools and functionalites for the support of preparation and operation of space missions (virtual spacecraft in modelled environment, 3Dview)

The IMPEX environment is: AMDA, 3DView (http://3dview.cesr.fr), CLWeb, Simulations, HWA
AMDA and 3DView connected through SAMP (IVOA) protocol

IMPEx data model v1.0 is an extension of SPASE in order to include simulation data (http://impex.latmos.ipsl.fr/tools/DataModel.htm).

Note that no query service is available nor to come.
Only the IMPEx portal may provide a way to search for data (but you need to download all data to query them). In fact, there will be links from the portal to AMDA where you'll make your query.

3. Conclusions of discussions on SODAWG

3.1 Book of Recommendations

The goal is to have a document of 6-7 pages covering for now
structure of data archive
format of data files
coordinate systems
The draft will be shown to Daniel to ask for his agreement. The goal is to have a final draft ready before summer such that it can be approved by SWT.
David is going to start a draft.

3.2 IVOA definition of FITS keywords

In order to unambiguously define the meaning of metadata of the Solar Orbiter instrument we want to define this metadata according to IVOA standards. The first steps towards this will be:
we take SECCHI FITS keyword list as template for SolO remote sensing instruments (the same will be done later for CDF in situ)
from this list, we take the common core which applies to all instruments (later on we do the same for instrument specific keywords)
for each item on this sublist we identify the IVOA standard description (STC, but also in analogy with the IVOA spectral data model)
we invent an XML description of the above mapping (in VOTable?)
we propose this to the FITS office in GSFC and to anybody close to standards

Bob and Peter to start the process during their meeting next week.
Information on IVAO vocabularies can be found at:
http://www.ivoa.net/documents/REC/Semantics/Vocabularies-20091007.pdf

Annex

I. Acronyms

DM: Data Model
EPN: EuroPlaNet
GSFC: Goddard Space Flight Center
IAU: International Astronomical Union
IDIS: Integrated and Distributed Information Service
IVOA: International Virtual Observatory Alliance
SODAWG: Solar Orbiter Data Analysis Working Group
SolO: Solar Orbiter
SQL: Standard Query Language
SWT: Science Working Team
TAP: Transfer Access Protocole

II. Participants

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Peter Gallagher	peter.gallagher@tcd.ie	
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Kevin Benson	k.benson@ucl.ac.uk	
Bob Bentley	b.bentley@ucl.ac.uk	
Ronan Modolo	rnana.modolo@latmos.ipsl.fr	
Luis Sanchez	luis.sanchez@esa.int	(excused)
Daniel Mueller	dmueller@rssd.esa.int	(excused)
Anik De Groof	anik.degroof@sciops.esa.int	(excused)

3.3 Minutes

Minutes CASSIS Interoperability Workshop

April 29-30 2013, Paris Observatory

Participants:

Baptiste Cecconi <Baptiste.Cecconi@obspm.fr>,
Jean Aboudarham <Jean.Aboudarham@obspm.fr>
David Berghmans <david.berghmans@gmail.com>,
Peter Gallagher <peter.gallagher@tcd.ie>,
Jesse Andries <Jesse.Andries@oma.be>
David O'Callaghan <ocallap@tcd.ie>
Sebastien Hess <Sebastien.hess@obspm.fr>
Kevin Benson <k.benson@ucl.ac.uk>
Bob Bentley <b.bentley@ucl.ac.uk>
Ronan Modolo <rnana.modolo@latmos.ipsl.fr> (Tuesday)

Excused:

Luis Sanchez (ESA)
Anik De Groof (ESA)
Daniel Mueller (ESA)

Meeting started 14:00
(No... 14:03 due to Baptiste eating late...)

Introduction on HELIO (by Bob Bentley)

The purpose of the meeting is to discuss how to improve interoperability of capabilities, etc. that facilitate science in the Solar System; this includes the both the data and the services.

The focus is mainly on heliophysics but we should be mindful that the effects of the Sun can go deep into atmospheres and affect the planetary surfaces and that the Sun represents our nearest star. There may therefore be a need for other disciplines to access the data and services that we are discussing; this implies that we should thinking as generically as possible and that, as far as possible, all services and data should be understandable by users that are not fully familiar with a domain.

If we consider that we are working towards some sort of collaborative research environment for heliophysics then we are discussing a set of guidelines that will make it simpler to create capabilities in the future that will be able to work with and build on what already exists.

HELIO has produced a set of services that allow the user to conduct an intelligent search for data but this represents only part of the picture. If we can establish a framework within which services could be made more interoperable, then the work being done by IMPEx, Europlanet and other projects could result in capabilities that could easily be used in conjunction with the HELIO services and capabilities from other sources. Ultimately this saves time and money…

These are some of the issues that we need to consider:

- What are the interfaces that are already in use for the various services?
- What standards do the interfaces comply to, have any changes been necessary or are any needed?
- Could the interfaces be made more interoperable?
- What format should the exchange of information between services be in?
- Is there anything that can make it easier to handle the different types of data being used in the different domains?
- Any other issues???

I would suggest that on the Monday afternoon we have presentations from everyone describing what people are working on; where possible they should highlight issues relevant to interoperability.

We should then start discussing interfaces and data; straw-man ideas are welcome.

Discussion on HELIO, in particular registry of registers:
All the HELIO services are in the IVOA registry.
The 4 HEC (Event Catalogues) are not completely synchronized.

The IVOA standards on describing online services do not seem to be completely adequate for the heliospheric application.

Suggestion by Baptiste, for the use of IVOA standards: present the current use of their standards, then provide the limitations of these standards, and discuss to find a compromise (probably showing that there is no need of such a precise description of things...)
In this way the IVOA standards can be improved and extended.

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Interoperability of the analysis tools within the IMPEx Project (by Ronan Modolo)

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