IDOC Space Mission Data Distribution services

Institut d'Astrophysique Spatiale – Orsay

K. Dassas on behalf of the IDOC team

Outlines

- Context
- IDOC data interfaces
- Tools behind
- Conclusion

Environment

UMR (CNRS and Paris-Sud University) - Orsay France
OSUPS = IAS + GEOPS = Science of Universe Observatory Paris-Sud
Staff : 150 members
IDOC staff : 9 permanent members + 6 contractants

Scientific Teams :

- Solar and Planetary systems
- Interstellar Matter and Cosmology
- Stellar and Solar Physics
- Astrochemistry and Origins

Context :

- Space Mission
  - International Consortiums
  - « Astronomical » budget
  - Long terms engagements
  - Time constraints
- Paris – Saclay (P2IO, SPU)

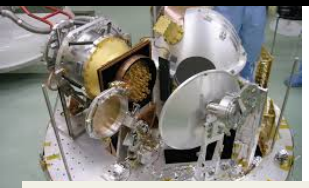
IDOC Integrated Data and Operation Center

IDOC technical head: gilles.poulleau@ias.u-psud.fr
IDOC scientific head: marian.douspis@ias.u-psud.fr
https://idoc.ias.u-psud.fr

Partners :

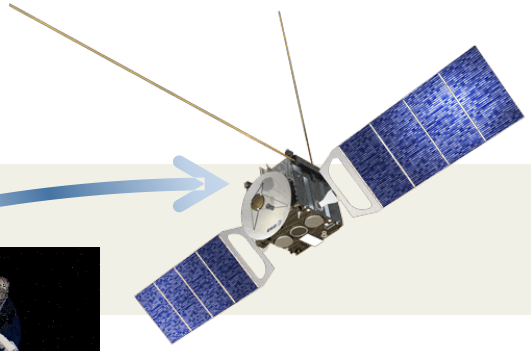
- Others laboratories French or foreign
- Space agencies : CNES, ESA, NASA, JAXA, CSSAR, FKA,…
- Industry (IT or Space)
- Airbus, Leonardo-Finemeccanica,Thales-Alenia…

IDOC in the different space mission phases



Before launch

0) Instruments conception & tests



1) Instrument Operations

Ground Segments

External data providers

2) Pipelines

Data Centers

3) Datasets, interfaces, tools, virtual observatories

4) Medium & long term Archive

Scientific community

Outreach

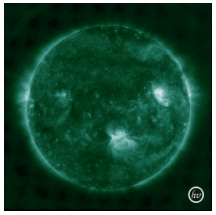
Space Missions

IDOC Activity fields	Futures Mission	On-going	Past
Before flight 0) Instrument design & tests	Euclid 0/2, JWST 2/3/4, Plato 2/3/4, Juice 0/1/2/3, Bepi-Colombo 0, Solar Orbiter 0/1/2/3/4	Mars-express 0/1/2/3/4, SoHo 0/1/2/3/4, Stereo 3/4, SDO 3/4, Fripon 1/2	Rosetta 0/1/2, CoRot 2/3/4, Planck 0/1/2/3, Herchel 3/4, Trace 3/4, Coronas 3/4, Picard 3/4, Iras 2/3/4
Ground Segment 1) Instrument Operations 2) Pipelines			
Dataset Management 3) Dataset interfaces, access and tools 4) Medium and long term archive			

IDOC Thematic Data Centers https://idoc.ias.u-psud.fr

Galaxy, INterstellar matter and Cosmology (GINCO)

https://idoc.ias.u-psud.fr/ginco



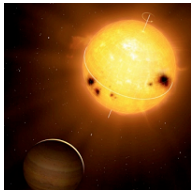
Multi Experiment Data & Operation Center (MEDOC)

National Center for Space Solar Physics Data

https://idoc.ias.u-psud.fr/MEDOC

Planetary Operation & Data Center (IPOD) new name : PSUP

https://idoc.ias.u-psud.fr/ipod



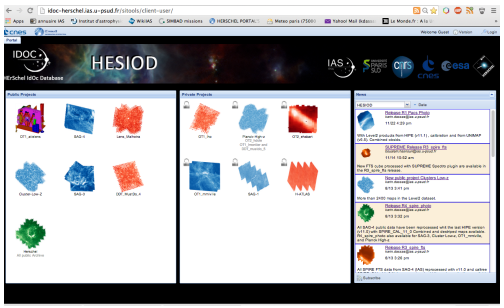
Stellar System Data (D2S)

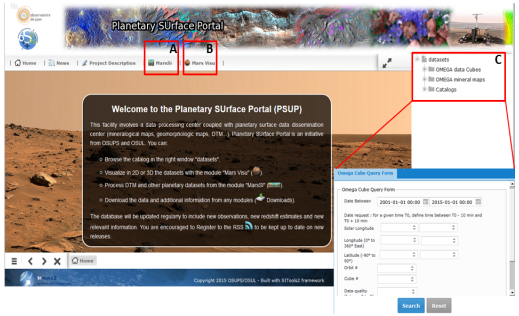
https://idoc.ias.u-psud.fr/D2S

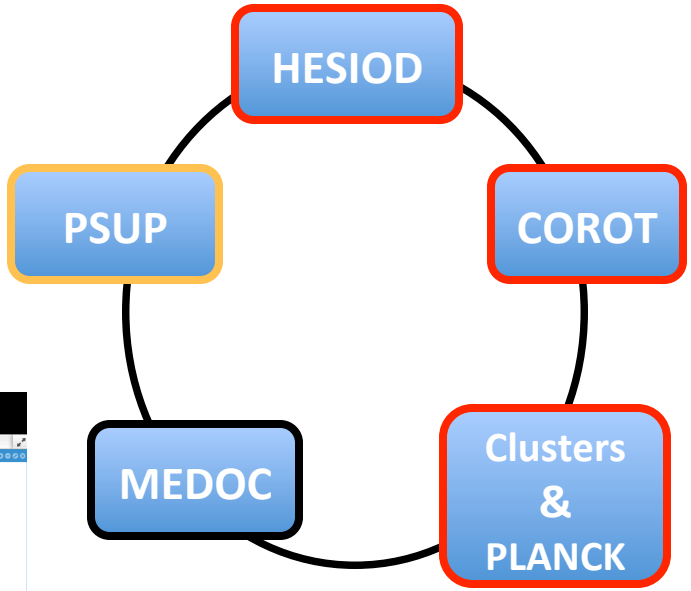
IDOC Data Interfaces

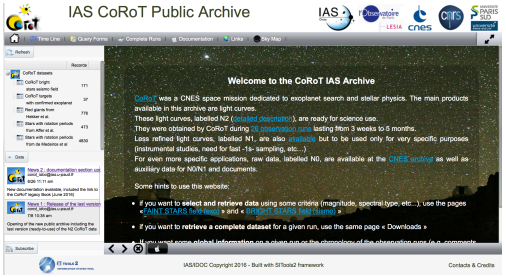
Data Access and Visualization

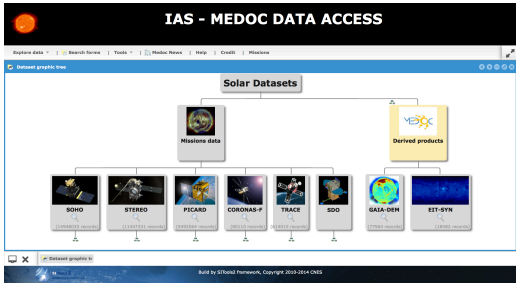
https://github.com/SITools2/SITools2-core/projects

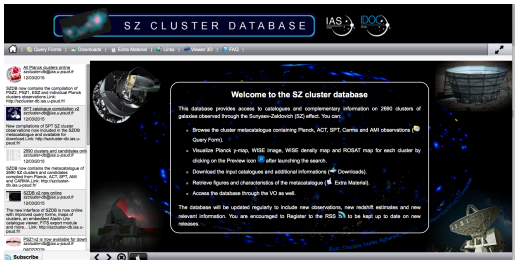






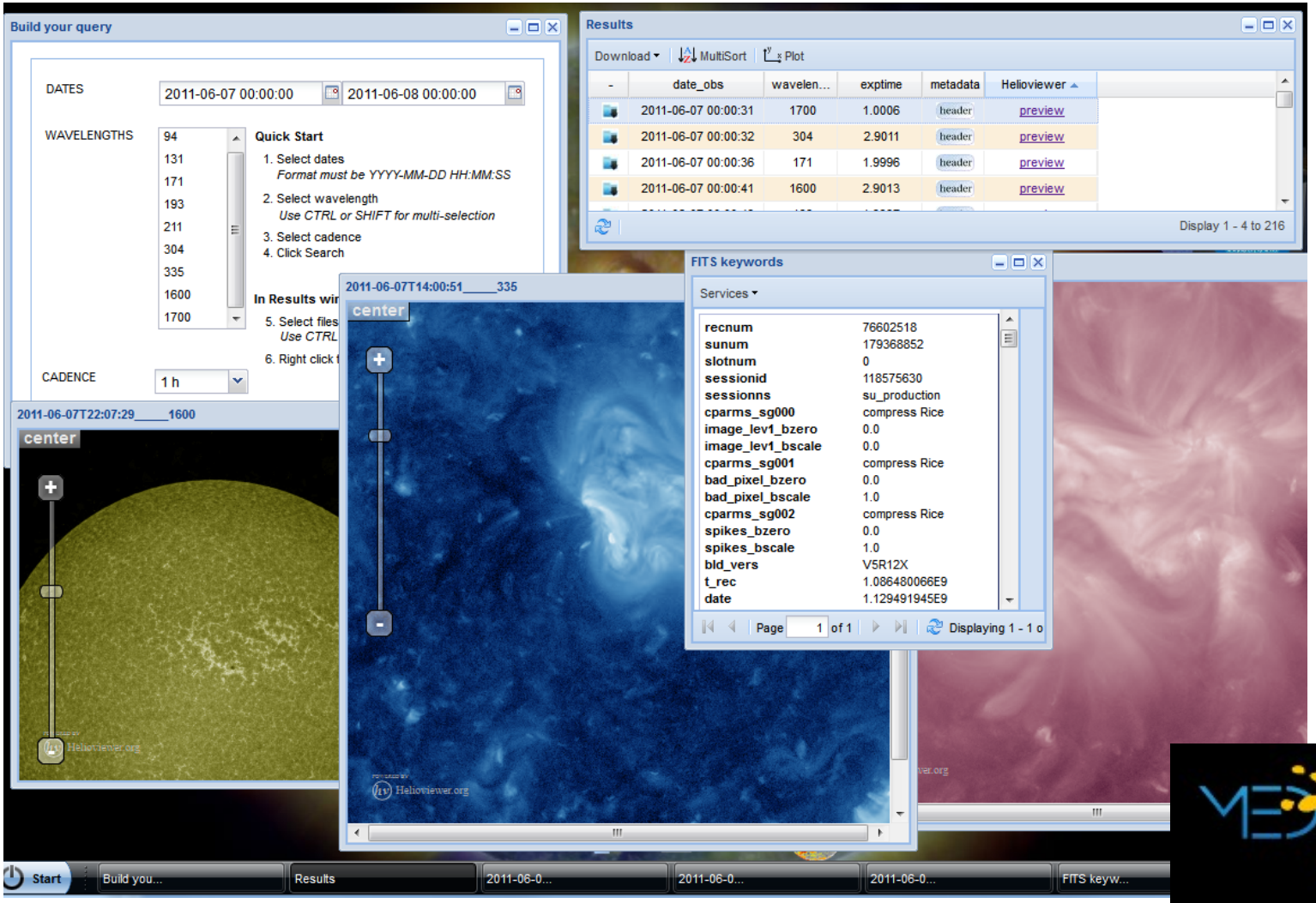




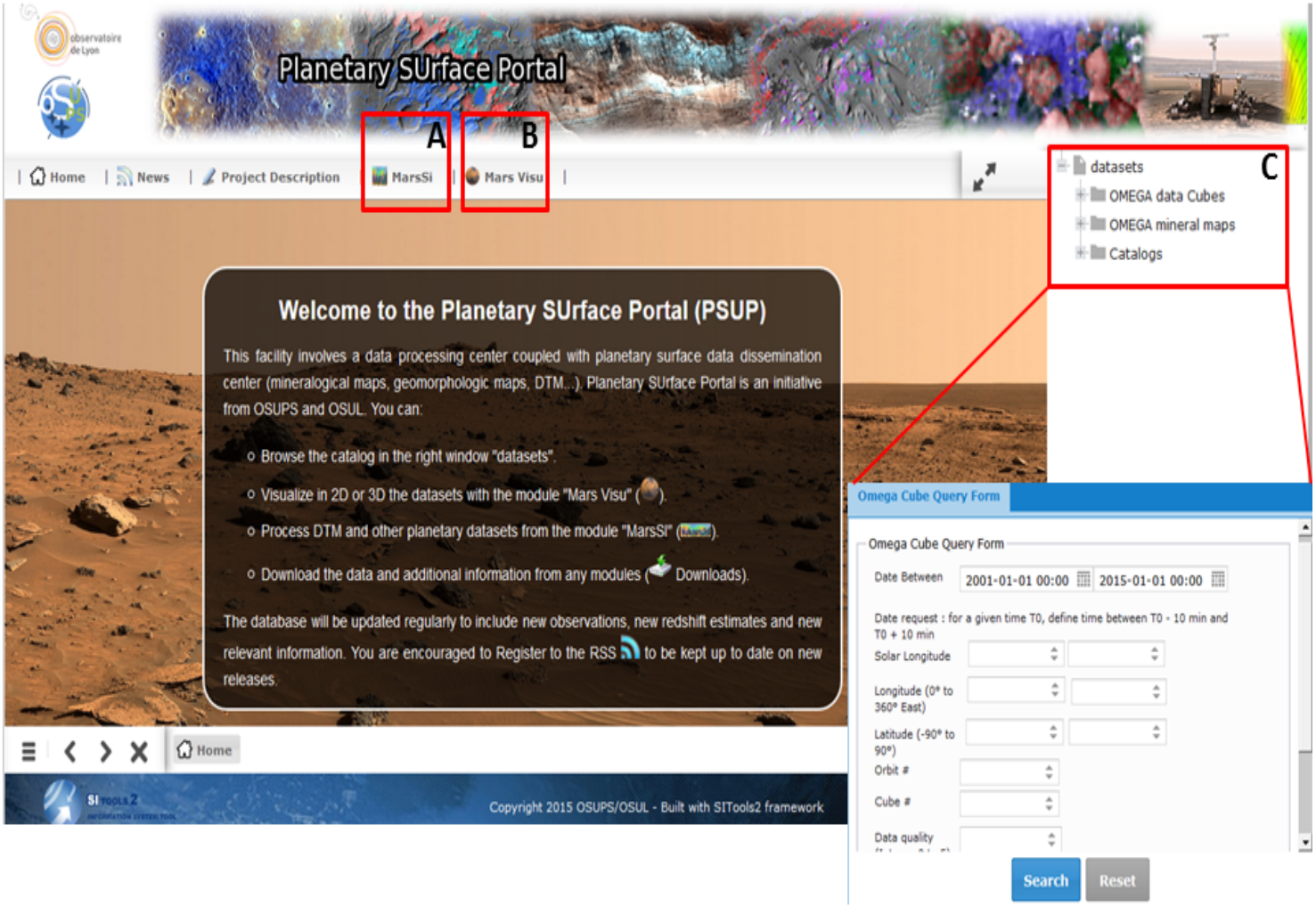


+ Magyc (UWS servers IAS + OCA)

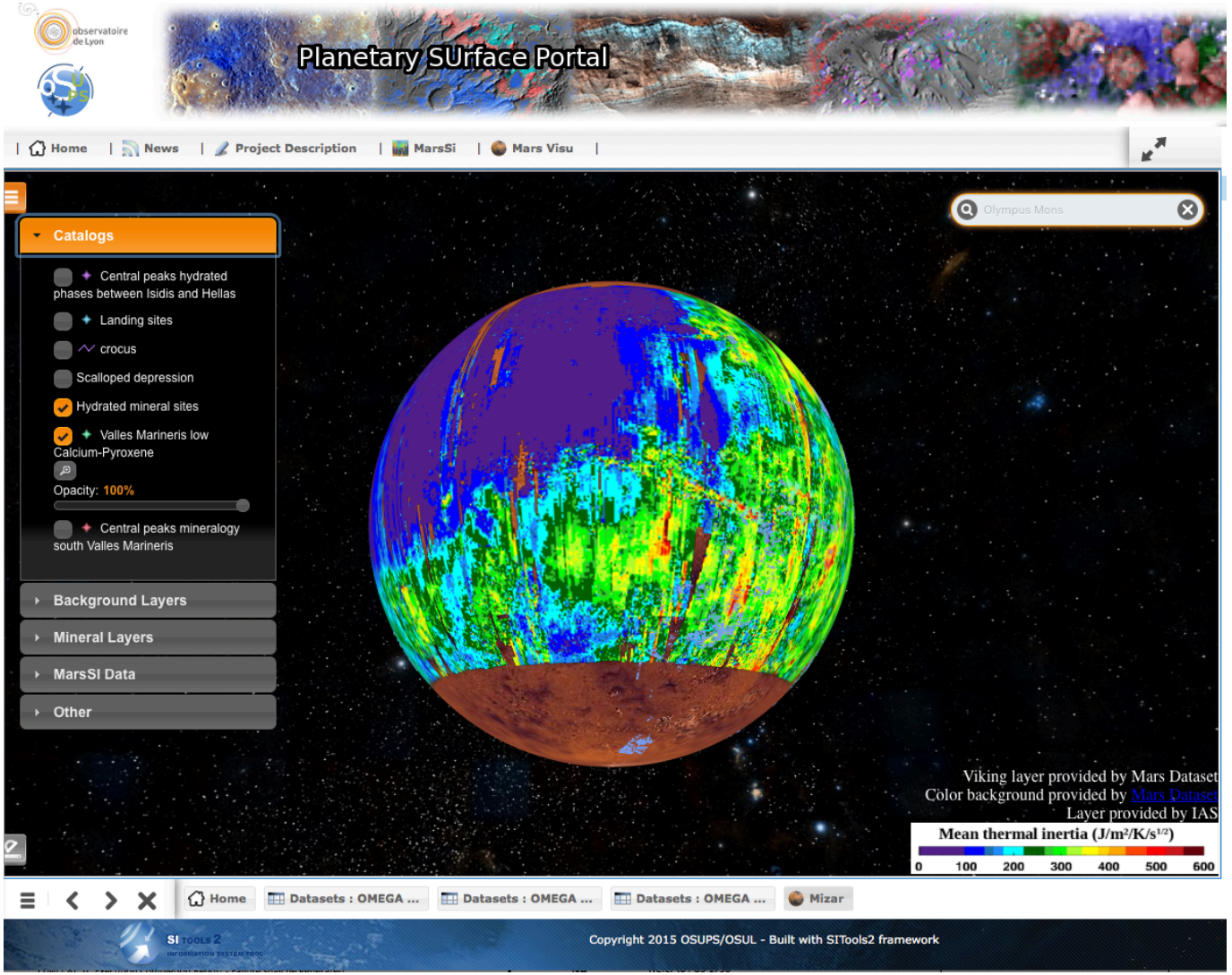
Data Access and Vizualisation : http://medoc-sdo.ias.u-psud.fr



PSUP 1/3


Planetary SUrface Portal
A
B
C
Home
News
Project Description
MarsSi
Mars Visu
datasets
OMEGA data Cubes
OMEGA mineral maps
Catalogs
Welcome to the Planetary SUrface Portal (PSUP)
This facility involves a data processing center coupled with planetary surface data dissemination center (mineralogical maps, geomorphologic maps, DTM...). Planetary SUrface Portal is an initiative from OSUPS and OSUL. You can:
Browse the catalog in the right window "datasets".
Visualize in 2D or 3D the datasets with the module "Mars Visu" ( ).
Process DTM and other planetary datasets from the module "MarsSi" ( ).
Download the data and additional information from any modules (Downloads).
The database will be updated regularly to include new observations, new redshift estimates and new relevant information. You are encouraged to Register to the RSS to be kept up to date on new releases.
Home
Copyright 2015 OSUPS/OSUL - Built with SITools2 framework
Omega Cube Query Form
Omega Cube Query Form
Date Between
2001-01-01 00:00
2015-01-01 00:00
Date request : for a given time T0, define time between T0 - 10 min and T0 + 10 min
Solar Longitude
Longitude (0° to 360° East)
Latitude (-90° to 90°)
Orbit #
Cube #
Data quality
Search
Reset

PSUP 2/3


Planetary SUrface Portal
Home
News
Project Description
MarsSi
Mars Visu
Olympus Mons
Catalogs
Central peaks hydrated phases between Isidis and Hellas
Landing sites
crocus
Scalloped depression
Hydrated mineral sites
Valles Marineris low Calcium-Pyroxene
Opacity: 100%
Central peaks mineralogy south Valles Marineris
Background Layers
Mineral Layers
MarsSI Data
Other
Viking layer provided by Mars Dataset
Color background provided by Mars Dataset
Layer provided by IAS
Mean thermal inertia (J/m²/K/s¹/²)
0 100 200 300 400 500 600
Home
Datasets : OMEGA ...
Datasets : OMEGA ...
Datasets : OMEGA ...
Mizar
Copyright 2015 OSUPS/OSUL - Built with SITools2 framework

PSUP 2/3 WMS, WCS, and WFS

Getting georeferenced Images : **WMS** requests to the IDOC Mapserver

Background Viking

http://idoc-wmsmars.ias.u-psud.fr/wmsmap?WIDTH=1500&HEIGHT=750&STYLES=&FORMAT=image/png&TRANSPARENT=false&SERVICE=WMS&REQUEST=GetMap&VERSION=1.1.1&SRS=EPSG:4326&BBOX=0,-90,180,90&LAYERS=Viking

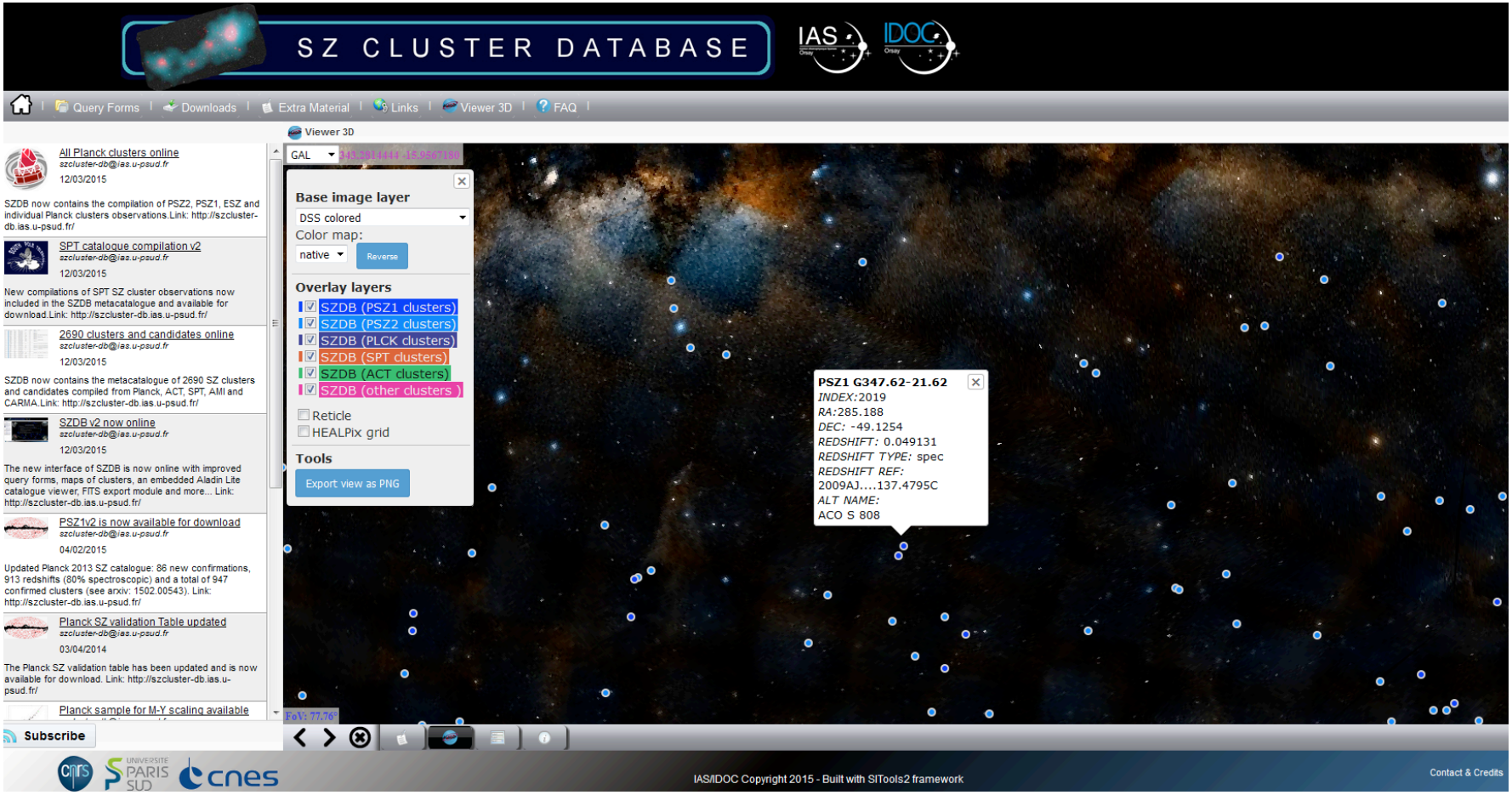
ALBEDO Layer

http://idoc-wmsmars.ias.u-psud.fr/wmsmap?WIDTH=1500&HEIGHT=750&STYLES=&FORMAT=image/png&TRANSPARENT=false&SERVICE=WMS&REQUEST=GetMap&VERSION=1.1.1&SRS=EPSG:4326&BBOX=0,-45,180,45&LAYERS=OMEGA_solar_albedo

Getting coverage : **WCS** requests to the IDOC Mapserver

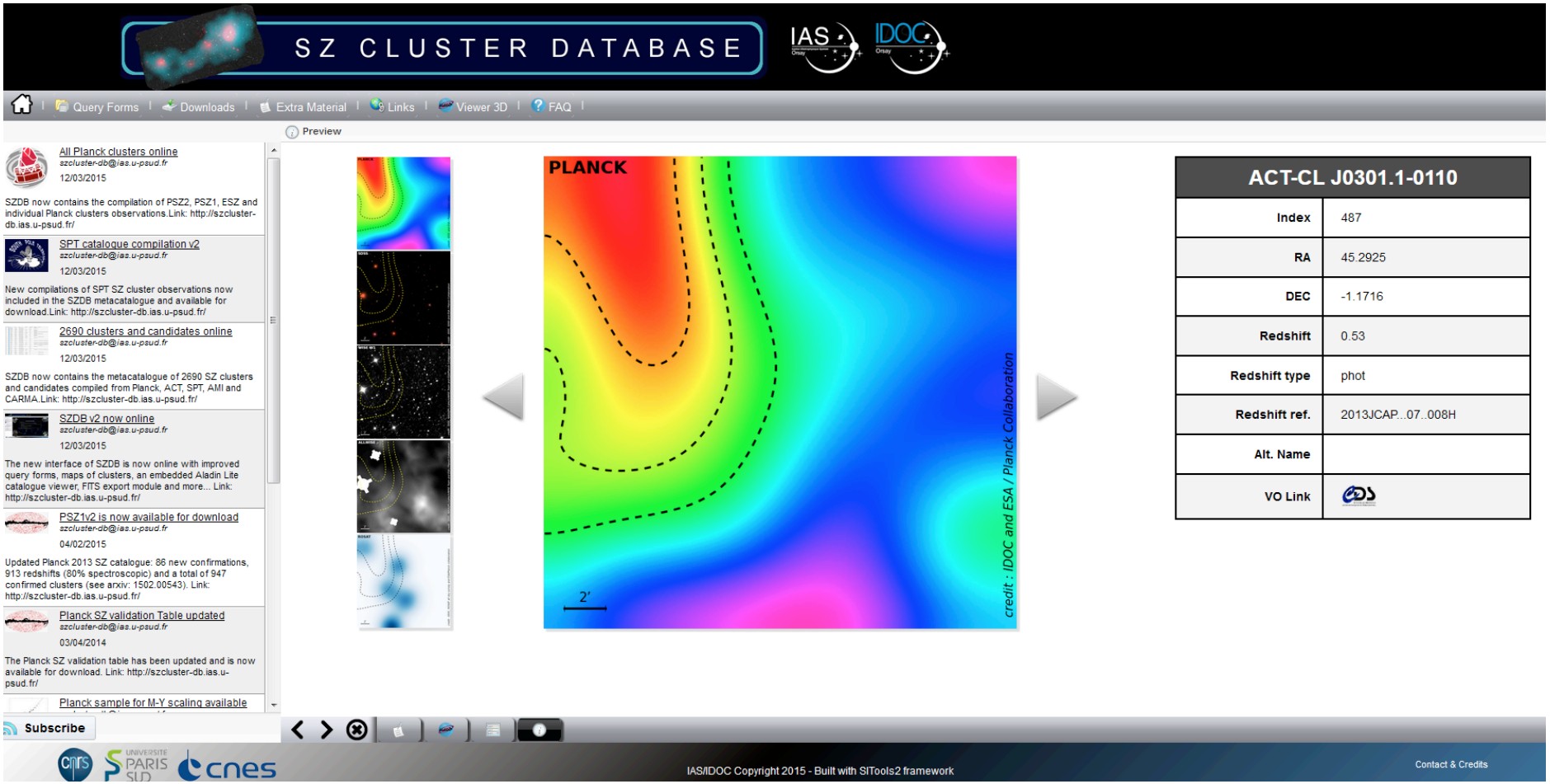
Getting Footprints and metadata (geojson): **WFS** requests to the MArsSI Geoserver

Planck – SZ cluster database

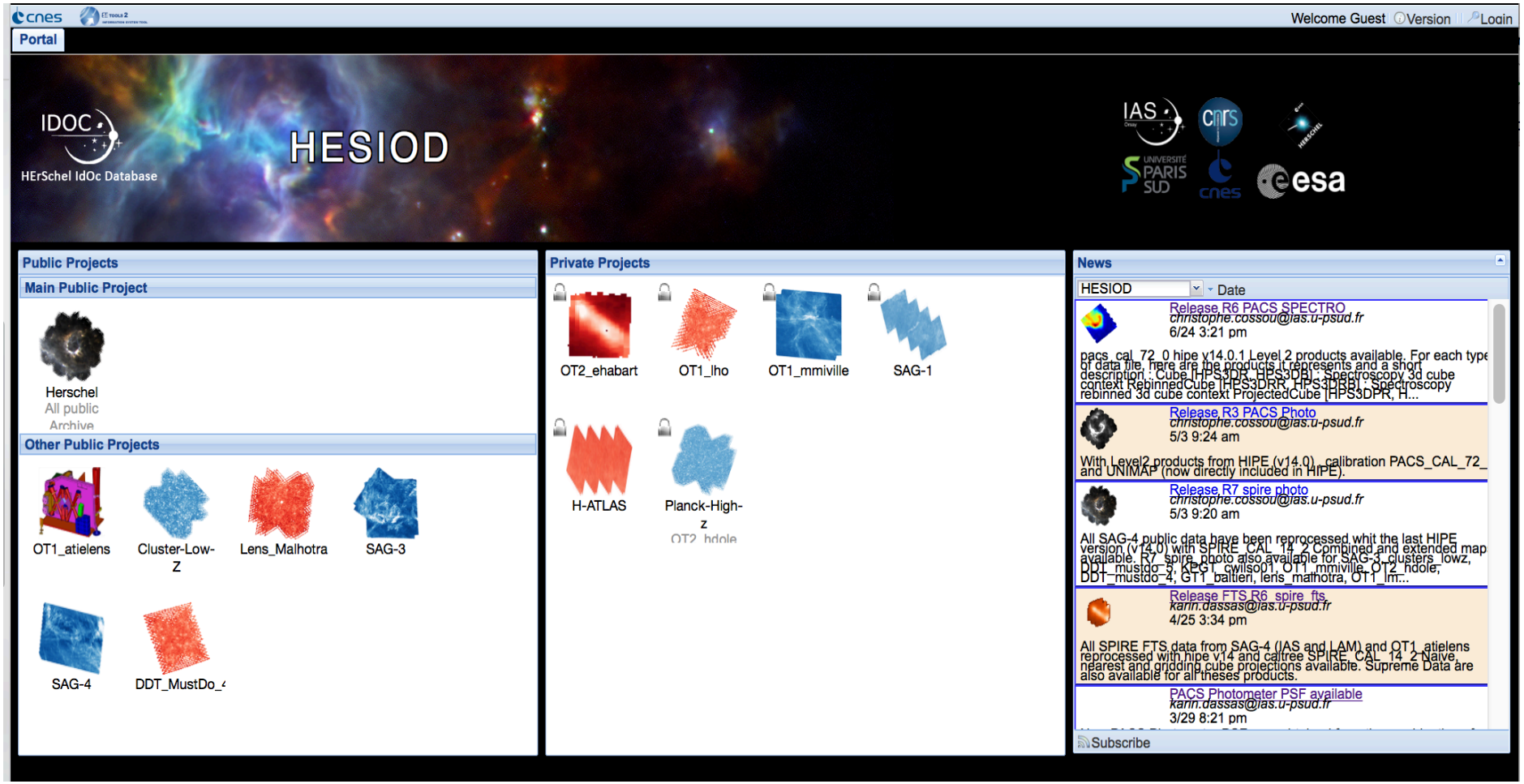


SITOOLS 2
INFORMATION SYSTEM TOOL

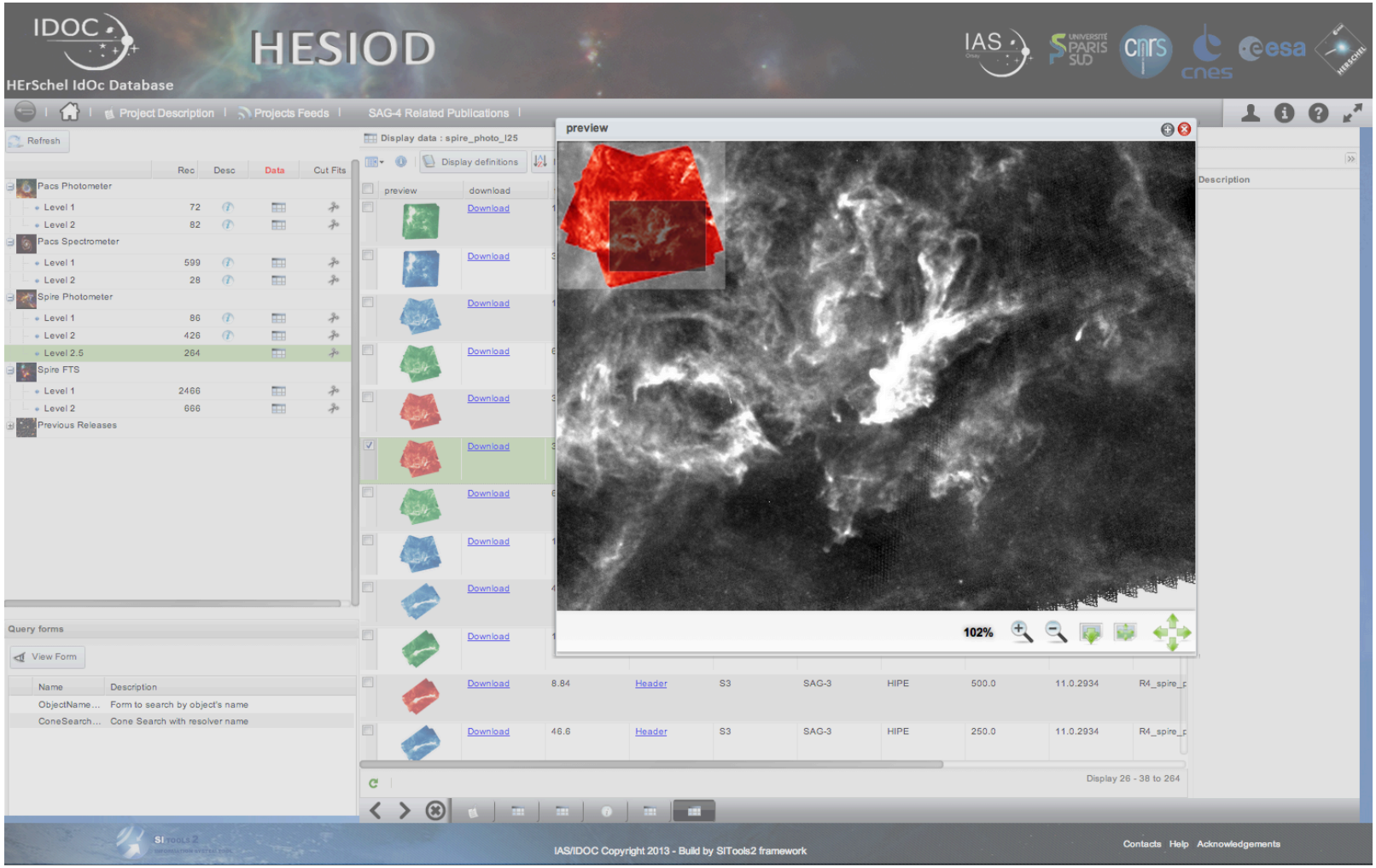
Planck – SZ cluster database



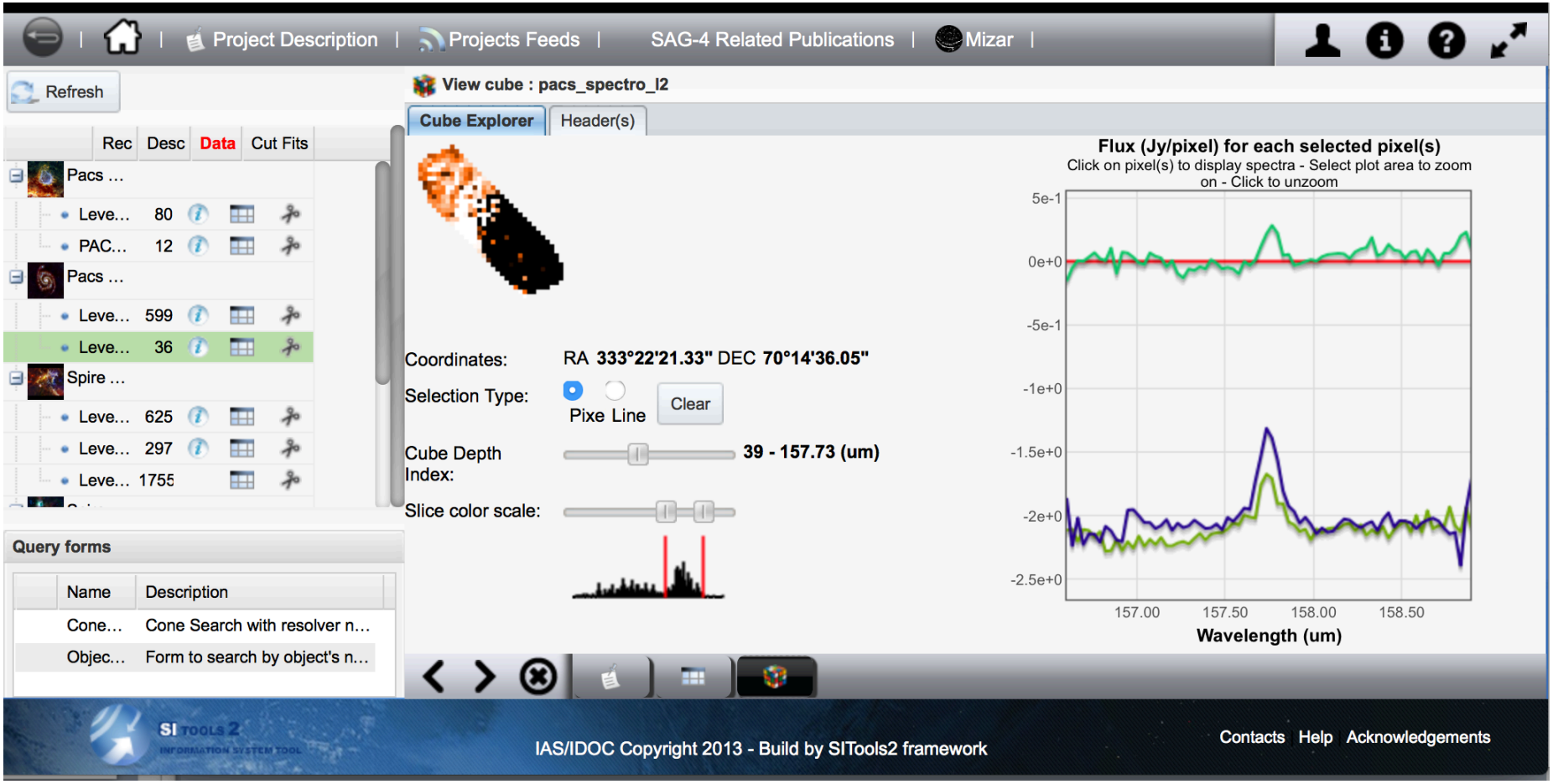
Herschel – HESIOD http://idoc-herschel.ias.u-psud.fr/



Herschel - HESIOD

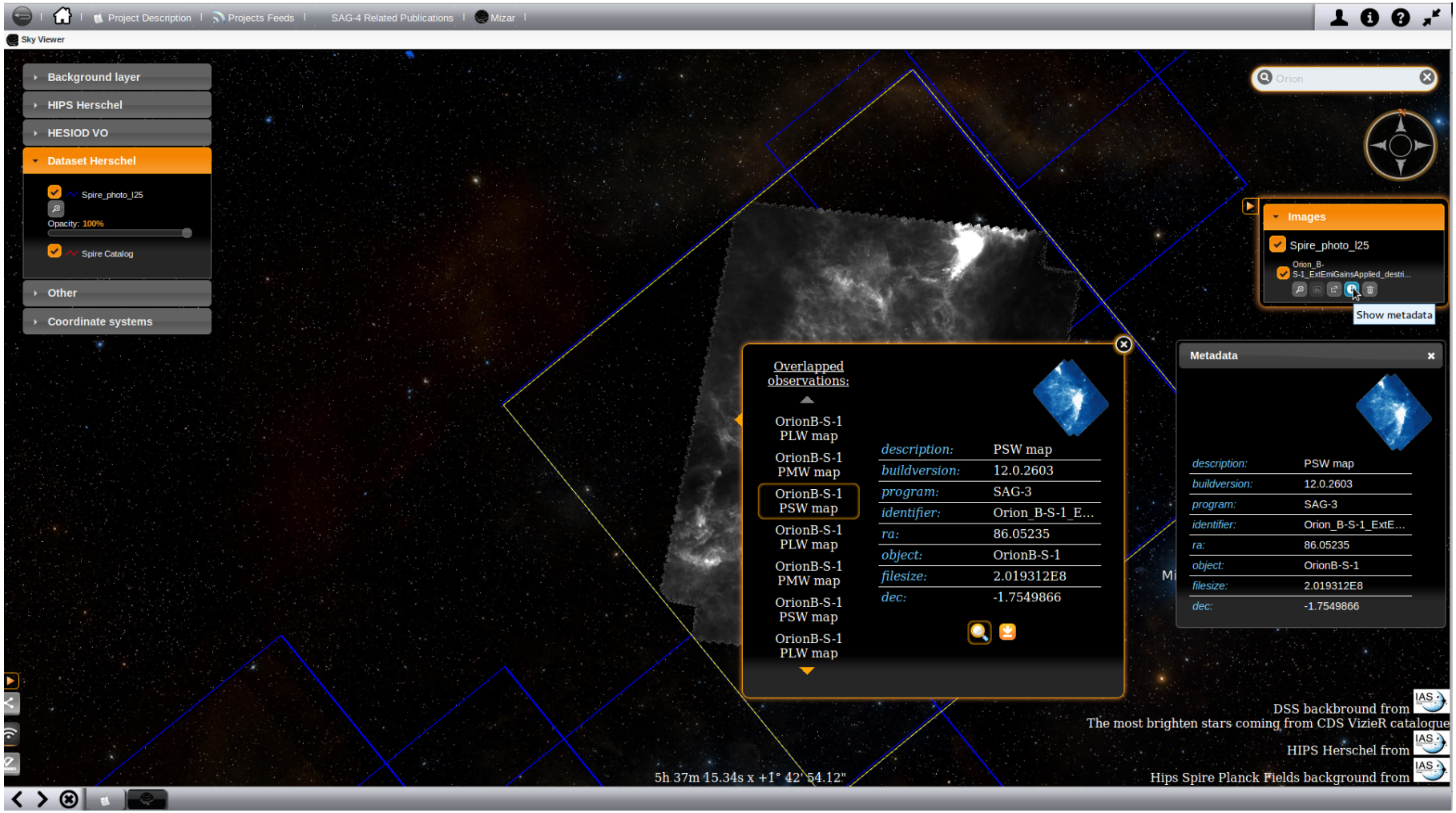


Herschel – HESIOD – Cube Explorer

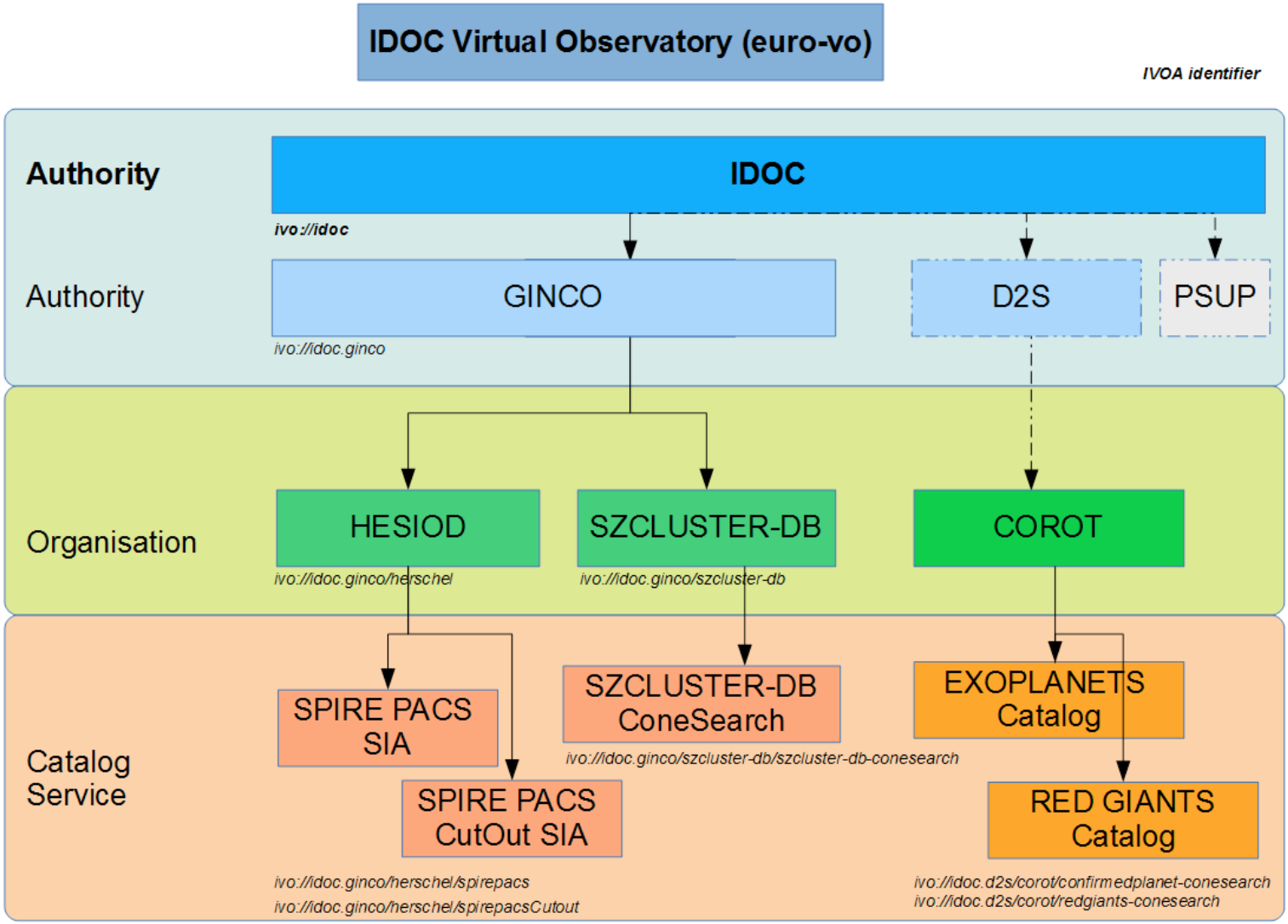


To be improved : data size management, genericity, robustness…

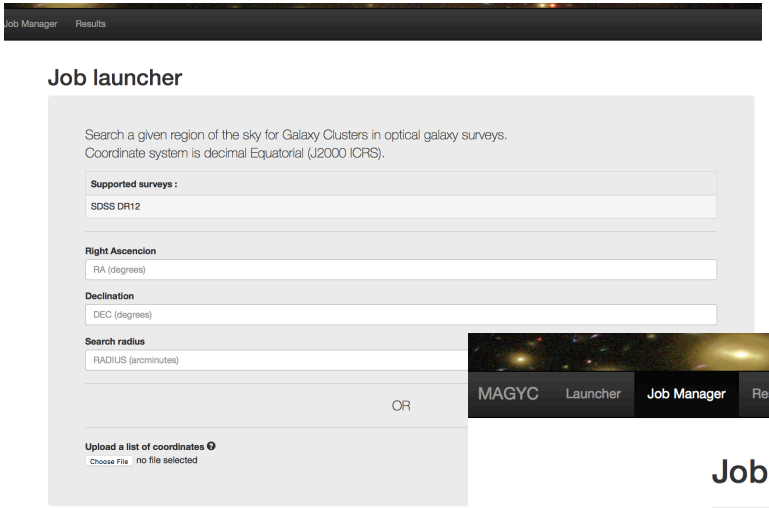
Herschel - HESIOD



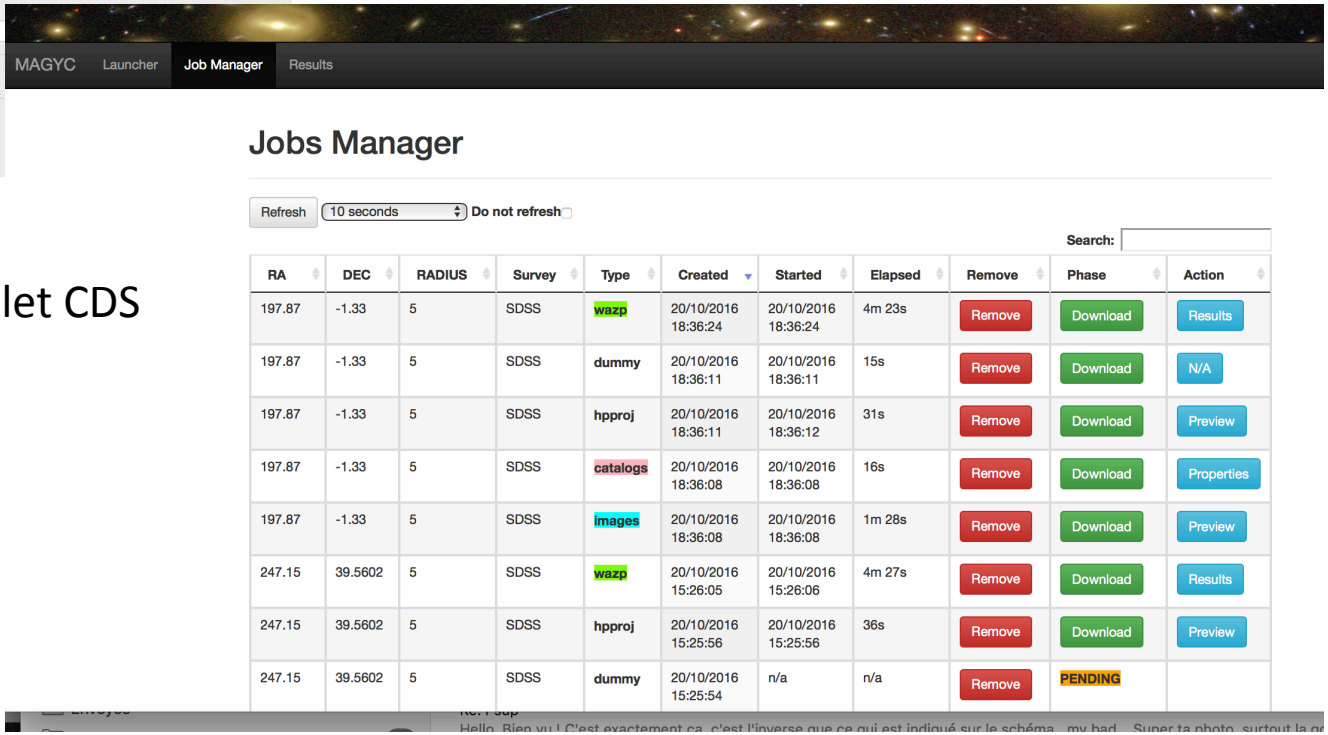
IDOC VO registered services summary



MAGYC : Multi wAvelength GalaxY Clusters



OCA
C.Benoist, C.Ordenovic, E.Slezak
IAS
M.Douspis, A.Beelen, H. Balans, F. Lefebvre
CDS
T.Boch, P.Fernique,A.Schaaff



RA	DEC	RADIUS	Survey	Type	Created	Started	Elapsed	Remove	Phase	Action
197.87	-1.33	5	SDSS	wazp	20/10/2016 18:36:24	20/10/2016 18:36:24	4m 23s	Remove	Download	Results
197.87	-1.33	5	SDSS	dummy	20/10/2016 18:36:11	20/10/2016 18:36:11	15s	Remove	Download	N/A
197.87	-1.33	5	SDSS	hpproj	20/10/2016 18:36:11	20/10/2016 18:36:12	31s	Remove	Download	Preview
197.87	-1.33	5	SDSS	catalogs	20/10/2016 18:36:08	20/10/2016 18:36:08	16s	Remove	Download	Properties
197.87	-1.33	5	SDSS	images	20/10/2016 18:36:08	20/10/2016 18:36:08	1m 28s	Remove	Download	Preview
247.15	39.5602	5	SDSS	wazp	20/10/2016 15:26:05	20/10/2016 15:26:06	4m 27s	Remove	Download	Results
247.15	39.5602	5	SDSS	hpproj	20/10/2016 15:25:56	20/10/2016 15:25:56	36s	Remove	Download	Preview
247.15	39.5602	5	SDSS	dummy	20/10/2016 15:25:54	n/a	n/a	Remove	PENDING	

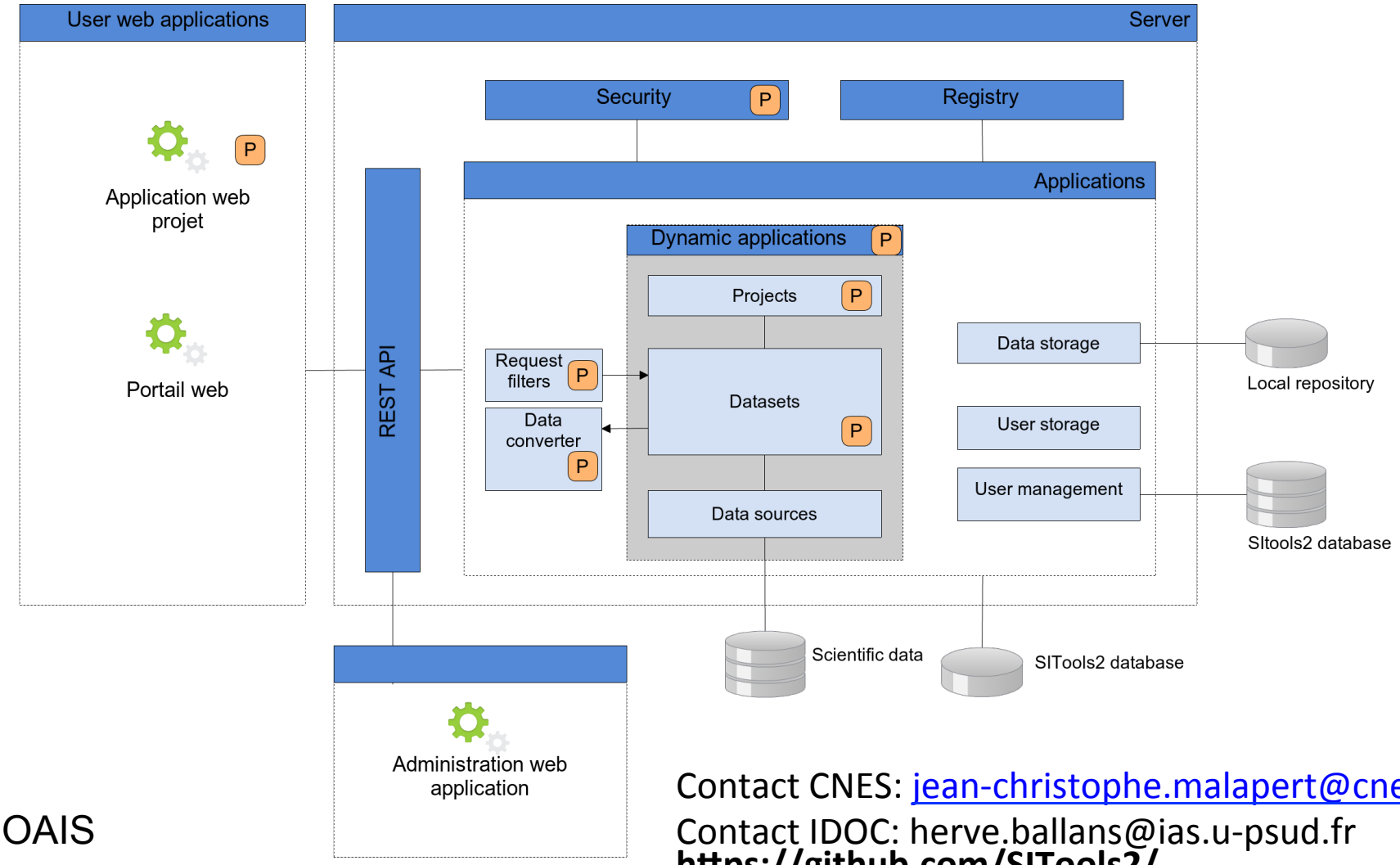
2 UWS servers
(Library Gregory Mantelet CDS UWS 1.0)

SkyView, SkyServer
Aladin Lite

Wazp at OCA
Hpproj at IAS

Tools behind

SItools 2

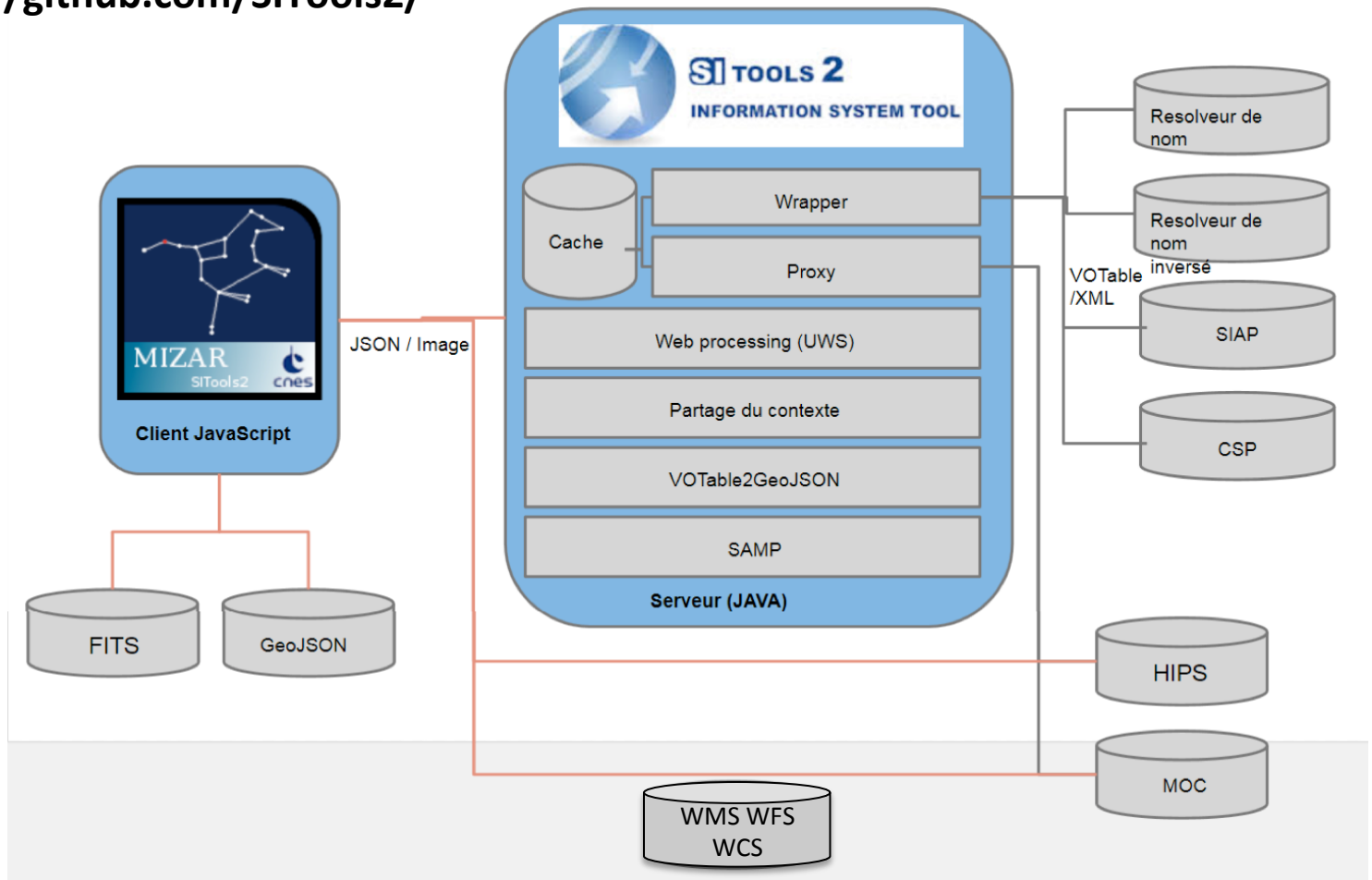


OAIS

Contact CNES: jean-christophe.malapert@cnes.fr
Contact IDOC: herve.ballans@ias.u-psud.fr
https://github.com/SITools2/

SItools 2

https://github.com/SITools2/



Coming next : Regard

Needs

- OAIS main functions
- OAIS data preservation
- Software multitenancy
- Interoperability : OGC & IVOA
- Modular OAIS functions & adaptable
- Scalability
- SSO
- Development kit

Solutions

- Microservice architecture
- Each microservice Is adaptable : plugins
- REST API
- ElasticSearch

Targets

About 20 projects in different fields : astronomy, solar system, oceanography, ISS experiences, ...

Contact: jean-christophe.malapert@cnes.fr

Conclusion

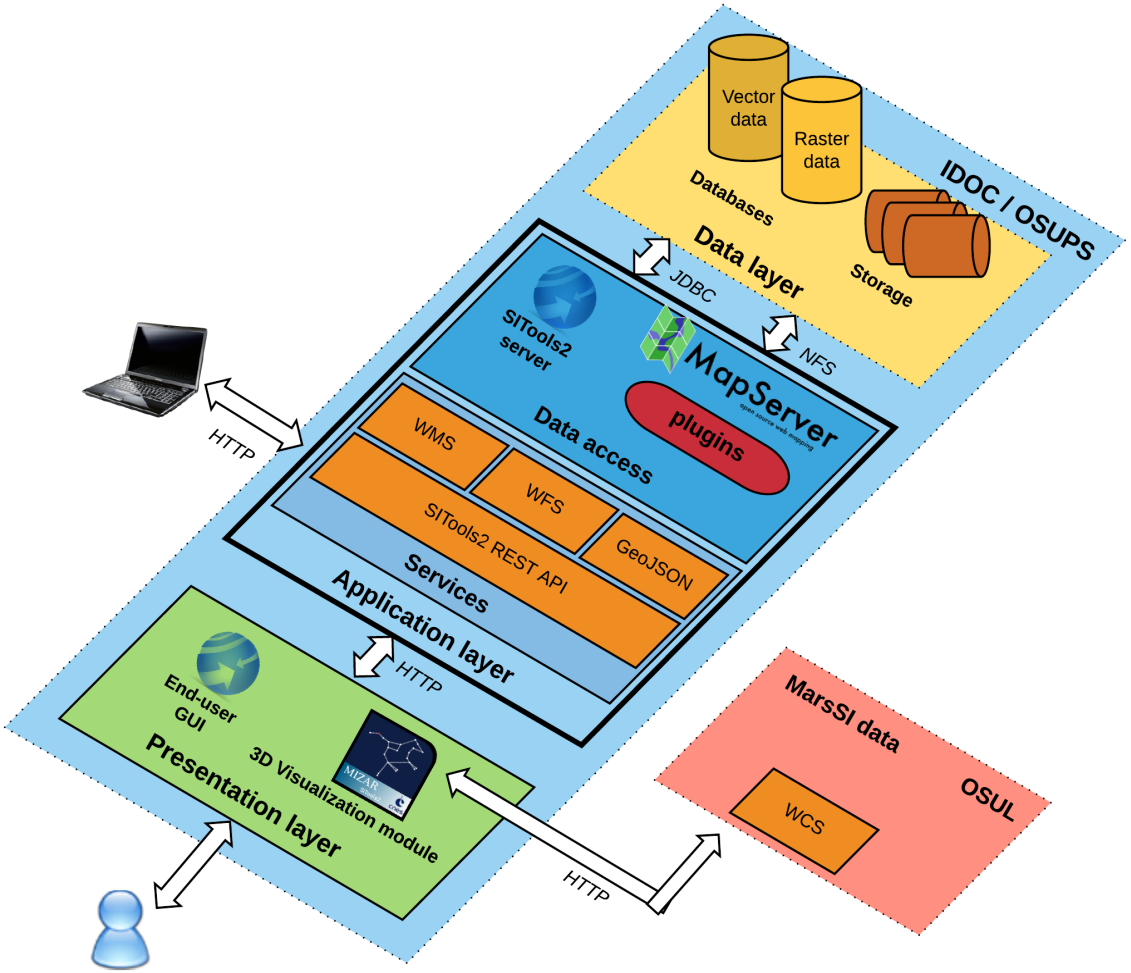
- Plan to publish new data into the VO
(for current and next missions)

- TAP and EPN-TAP for the planetary portal

- UWS

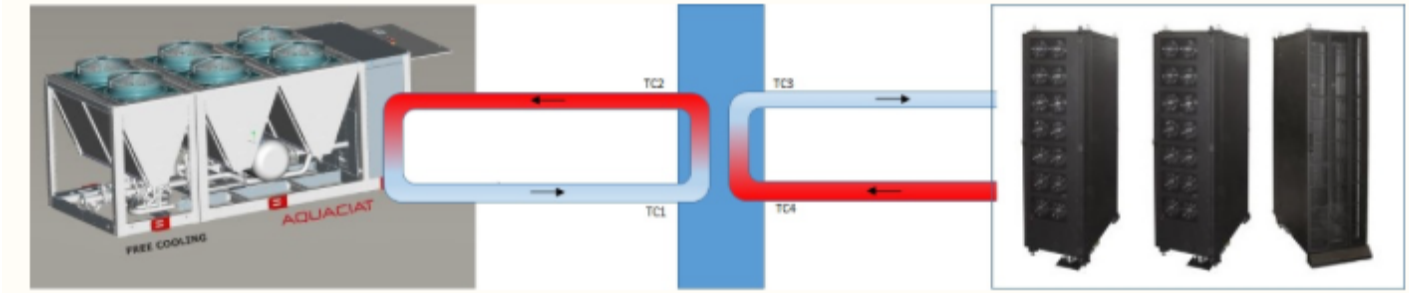
- New interfaces with Regard (end 2017)

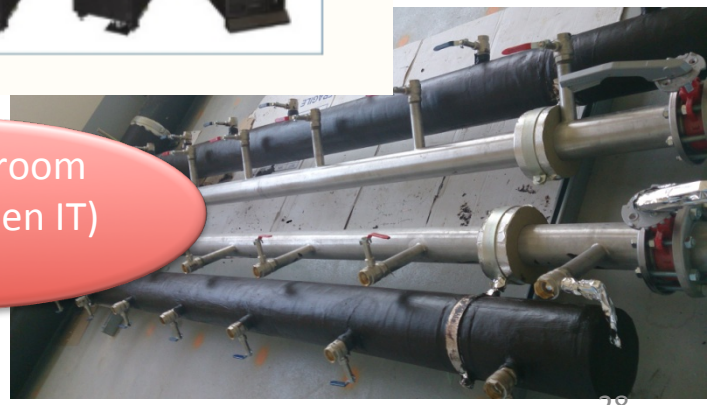
Thank you for your attention !


Vector data
Raster data
Databases
IDOC / OSUPS
Data layer
JDBC
NFS
Storage
SITools2 server
MapServer
plugins
HTTP
WMS
WFS
Data access
SITools2 REST API
GeoJSON
Services
Application layer
HTTP
End-user GUI
3D Visualization module
Presentation layer
MarsSI data
OSUL
WCS
HTTP

Labex P2IO « Vallée » computer room

- Shared by 8 laboratories (LAL, IPN, CSNSM…)
- Project realization : 2013
- Joint developments of competencies networks
- Governance documents
- Phase II (x2) already started : goal 2017
- 500 physical servers, 8000 cores, 5 PO of data.





Budget : 1st phase 1M€
2 more planned phases
R O I : 3 years

Computer room sharing (green IT)

Formalization

- OAIS : Open Archival Information System
- ITIL : Information Technology Infrastructure Library (« best practices »)
- Label DSA : Data Seal of Approval