



# Intégration de TAP dans SITools 2

Integrated Data Operation Center

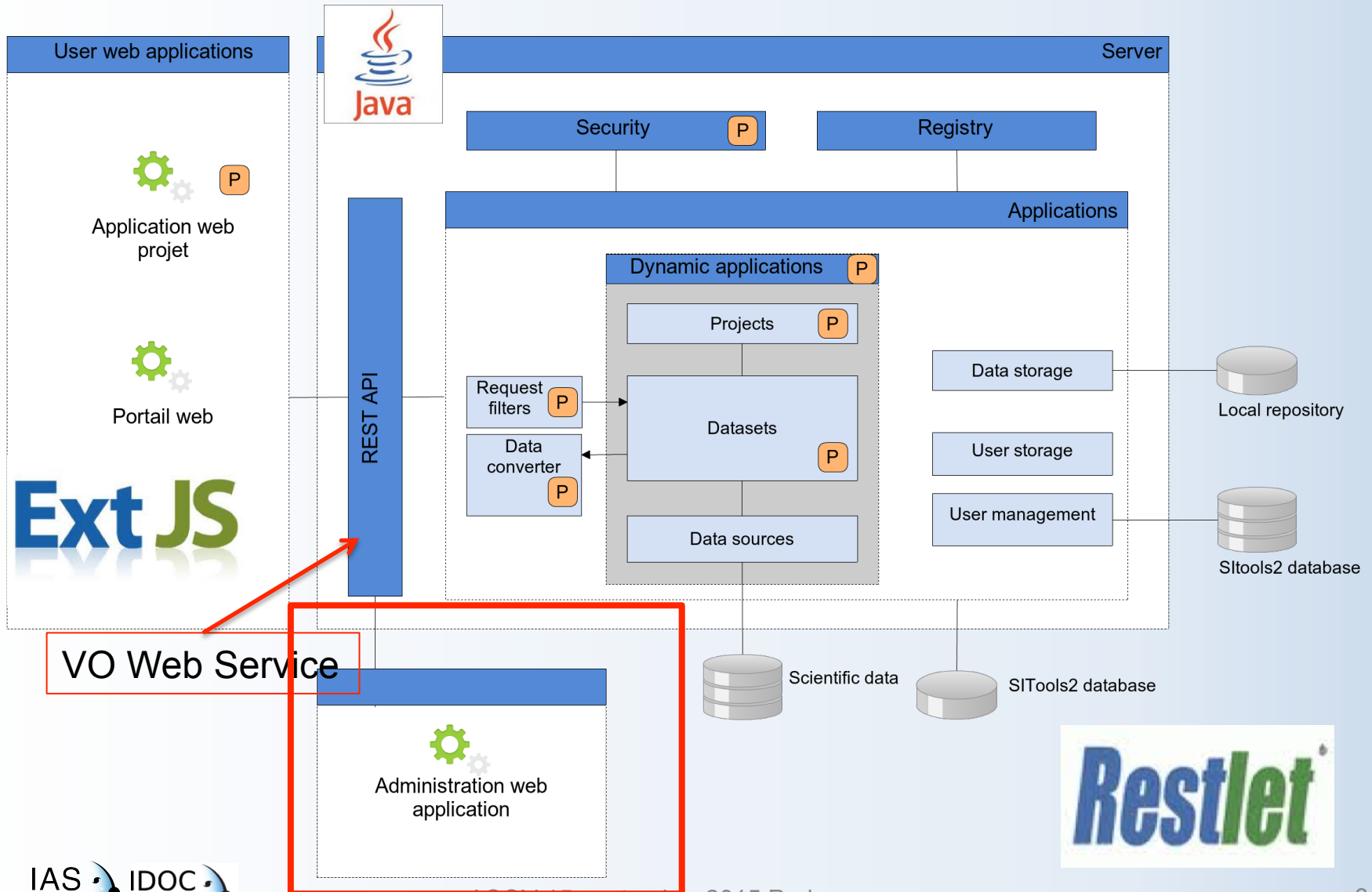
Institut d'Astrophysique Spatiale

Karin Dassas, Marc Nicolas

## SITools2 Présentation

- Un outil générique du CNES issu d'une collaboration entre le CNES et plusieurs laboratoires spatiaux français.
- Il s'agit d'une application Client/Serveur sécurisée qui permet la gestion des droits utilisateurs et des données ainsi qu'un accès aux données à travers une interface Web 2.
- L'ajout de plugins permet d'ajouter des fonctionnalités aussi bien au niveau client qu'au niveau serveur (cas pour le web service VO).
- <https://github.com/SITools2>
- Contact: [jean-christophe.malapert@cnes.fr](mailto:jean-christophe.malapert@cnes.fr)

## SITools2 General Architecture



## SITools2 HESIOD client interface

HESIOD (**HErSchel IdOc Database**) Portail IDOC = Integrated Data and Operation Center  
<http://idoc-herschel.ias.u-psud.fr/client-user/>



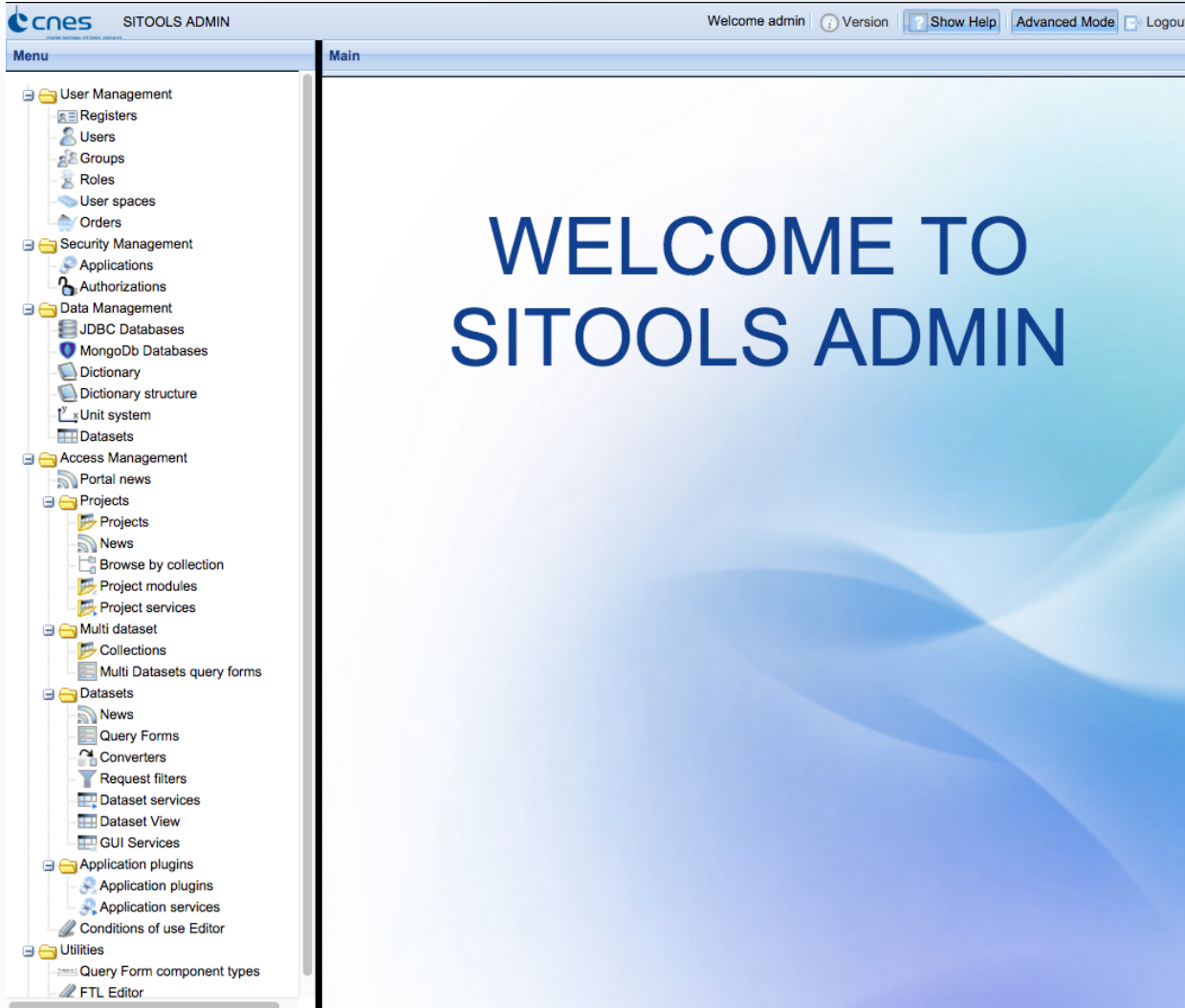
The screenshot displays the HESIOD client interface. At the top, there is a navigation bar with the cnes logo, SITools2 logo, and user information (Welcome Guest, Version, Login). The main header features the IDOC logo and the text 'HESIOD HerSchel IdOc Database'. To the right, logos for IAS, CNRS, Université Paris Sud, cnes, and esa are displayed.

The interface is divided into three main sections:

- Public Projects:**
  - Main Public Project:** A large image of the Herschel All public Archive.
  - Other Public Projects:** A grid of smaller images representing various projects: DDT\_MustDo\_4, Lens\_Mahotra, SAG-4, Cluster-Low-Z, OT1\_ateliens, and SAG-3.
- Private Projects:** A grid of images representing private projects: OT2\_ehabart, OT1\_lho, OT1\_mmville, SAG-1, H-ATLAS, and Planck-High-z OT2\_hodie OT1\_lmcriter and DDT\_mustdo\_5.
- News:** A section with a dropdown menu for 'HESIOD' and a 'Date' filter. It contains several news items:
  - Sky Viewer (Mizar) is now available!** (4/27 11:12 am)
  - Density Products added for Planck High-z project** (9/15 10:19 am)
  - Release R4 Spire FTS** (4/25 2:56 pm)
  - Release R5 Spire Photo** (4/18 2:36 pm)
  - Release R1 Pacs Photo** (11/22 4:29 pm)

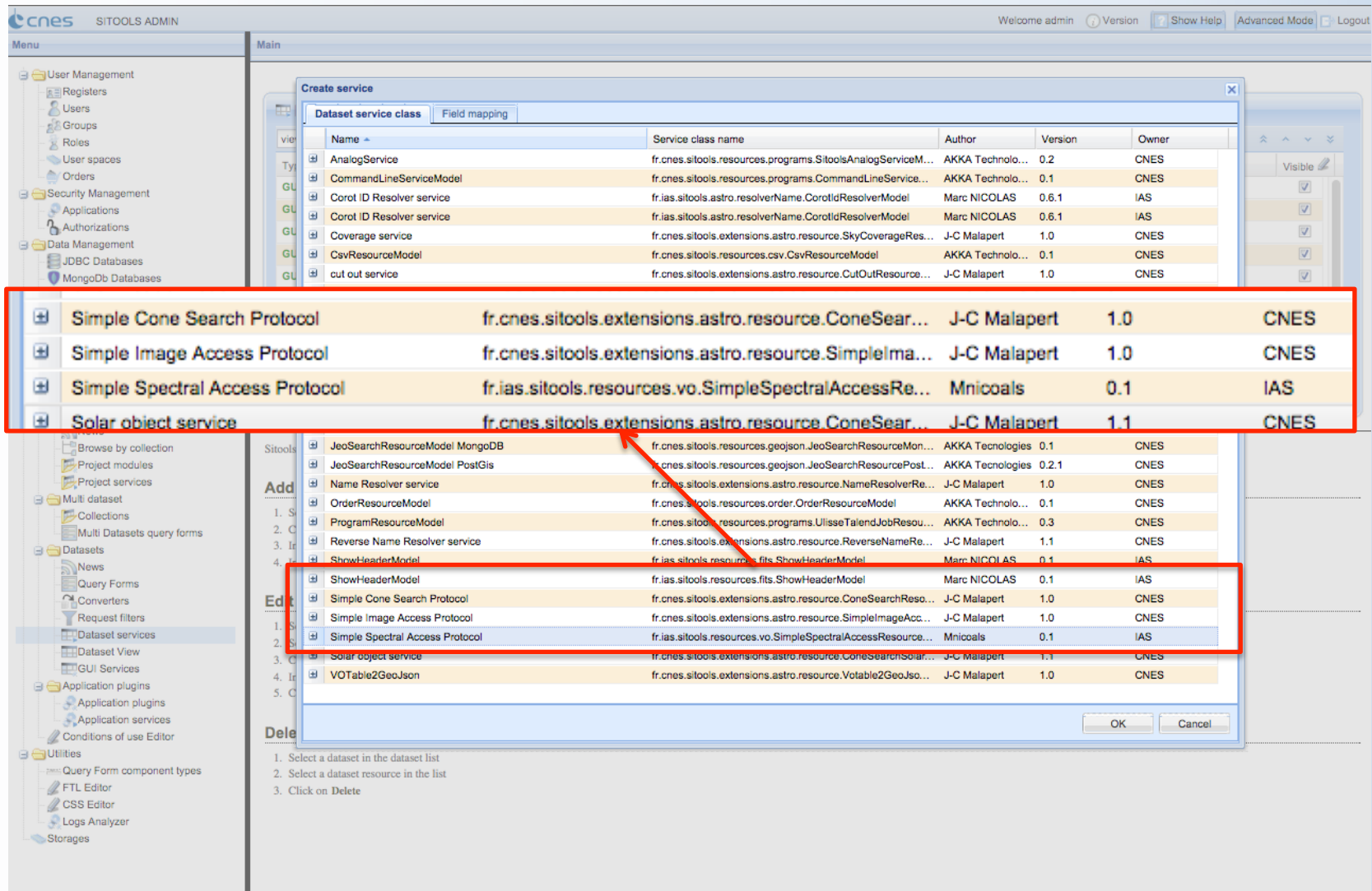
## SITools2 HESIOD administration interface

HESIOD (**HErSchel IdOc Database**) Portail IDOC = Integrated Data and Operation Center  
<http://idoc-herschel.ias.u-psud.fr/client-admin/>



The screenshot displays the SITools ADMIN web interface. The top navigation bar includes the Cnes logo, the text "SITOOOLS ADMIN", and user information: "Welcome admin", "Version", "Show Help", "Advanced Mode", and "Logout". A left-hand navigation menu is visible, listing various administrative categories such as User Management, Security Management, Data Management, Access Management, and Utilities. The main content area on the right features a large, stylized blue background with the text "WELCOME TO SITOOOLS ADMIN" in a bold, blue, sans-serif font.

## SITools VO services availables



The screenshot shows the 'Create service' dialog box in the SITools ADMIN interface. The dialog has two tabs: 'Dataset service class' (selected) and 'Field mapping'. Below the tabs is a table listing available services. A red box highlights the following services:

Name	Service class name	Author	Version	Owner
Simple Cone Search Protocol	fr.cnes.sitools.extensions.astro.resource.ConeSear...	J-C Malapert	1.0	CNES
Simple Image Access Protocol	fr.cnes.sitools.extensions.astro.resource.SimpleIma...	J-C Malapert	1.0	CNES
Simple Spectral Access Protocol	fr.ias.sitools.resources.vo.SimpleSpectralAccessRe...	Mnicoals	0.1	IAS
Solar object service	fr.cnes.sitools.extensions.astro.resource.ConeSear...	J-C Malapert	1.1	CNES

Below the highlighted services, there is another list of services with a red box around the following entries:

Simple Cone Search Protocol	fr.cnes.sitools.extensions.astro.resource.ConeSearchReso...	J-C Malapert	1.0	CNES
Simple Image Access Protocol	fr.cnes.sitools.extensions.astro.resource.SimpleImageAcc...	J-C Malapert	1.0	CNES
Simple Spectral Access Protocol	fr.ias.sitools.resources.vo.SimpleSpectralAccessResource...	Mnicoals	0.1	IAS

The interface also shows a 'Delete' section with instructions:

1. Select a dataset in the dataset list
2. Select a dataset resource in the list
3. Click on Delete

## Registered IDOC VO services

### [Herschel Idoc Database \(HESIOD\) SPIRE PACS \[HESIOD\]](#)

[ CHECK | XML | EDIT | CLONE ]

IVOA identifier: <ivo://idoc.ginco/herschel/spirepacs> [CatalogService] [SimpleImageAccess]

All data for the Herschel SPIRE and PACS guaranteed time program on Interstellar Medium (SAG-4) and other public data processed at IDOC. All data have been reprocessed at IDOC using advanced reprocessing pipeline.

Published by: IDOC GINCO on the 2014-03-20T13:35:29Z and last updated on the 2014-03-20T13:35:29Z

### [Herschel Idoc Database \(HESIOD\) SPIRE PACS CutOut \[HESIOD\]](#)

[ CHECK | XML | EDIT | CLONE ]

IVOA identifier: <ivo://idoc.ginco/herschel/spirepacsCutOut> [CatalogService] [SimpleImageAccess]

All data for the Herschel SPIRE and PACS guaranteed time program on Interstellar Medium (SAG-4) and other public data processed at IDOC. All data have been reprocessed at IDOC using advanced reprocessing pipeline.

Published by: IDOC GINCO on the 2014-03-27T12:30:58Z and last updated on the 2014-03-27T12:30:58Z

### [IDOC SZ Clusters \(szcluster-db\) ACT/PLANCK/SPT ConeSearch \[SZCLUSTER-DB\]](#)

[ CHECK | XML | EDIT | CLONE ]

IVOA identifier: <ivo://idoc.ginco/szcluster-db/szcluster-db-conesearch> [CatalogService] [ConeSearch]

This database provides access to IDOC catalogues and complementary information on clusters of galaxies observed through the Sunyaev-Zeldovich (SZ) effect.







Published by: IDOC GINCO on the 2014-04-16T09:20:13Z and last updated on the 2014-04-16T09:20:13Z

## SITools VO service TAP

Main

**Dataset services**

spire\_catalog | Add GUI Service | Add SERVER Service | Edit | Delete | Save properties

Type	Name	Description	Label	Category	Position	Icon	Visible
GUI	Columns Definition	retrieve the columns definition for a dataset	label.definitionTitle				<input type="checkbox"/>
GUI	Filter Tool	a filter tool for dataset	label.filter				<input type="checkbox"/>
GUI	Record details Service	Display the details of a selected record	label.details				<input type="checkbox"/>
GUI	Sorter Tool	a GUI service to sort	label.multiSort				<input type="checkbox"/>
SERVER	Table Access Protocol	This plugin provides an access to your data th...					<input type="checkbox"/>
GUI	ViewCubeFits	service to display spectrum cube data	label.cubeExplorer				<input type="checkbox"/>
GUI	viewShowHeader	display the showHeader GUI service	View Header				<input type="checkbox"/>
GUI	Window Image Zoomer	Display an image with zoom functions	label.windowImgZoomer				<input type="checkbox"/>

Page 1 of 1 | Display 1 - 8 to 8

Click on the icon to add dataset services



## SITools VO service TAP

TAP-1.1-20150512.pdf

[ADQL-20081030.pdf](#) (ADQL 2.0)

UCDlist-20070402.pdf

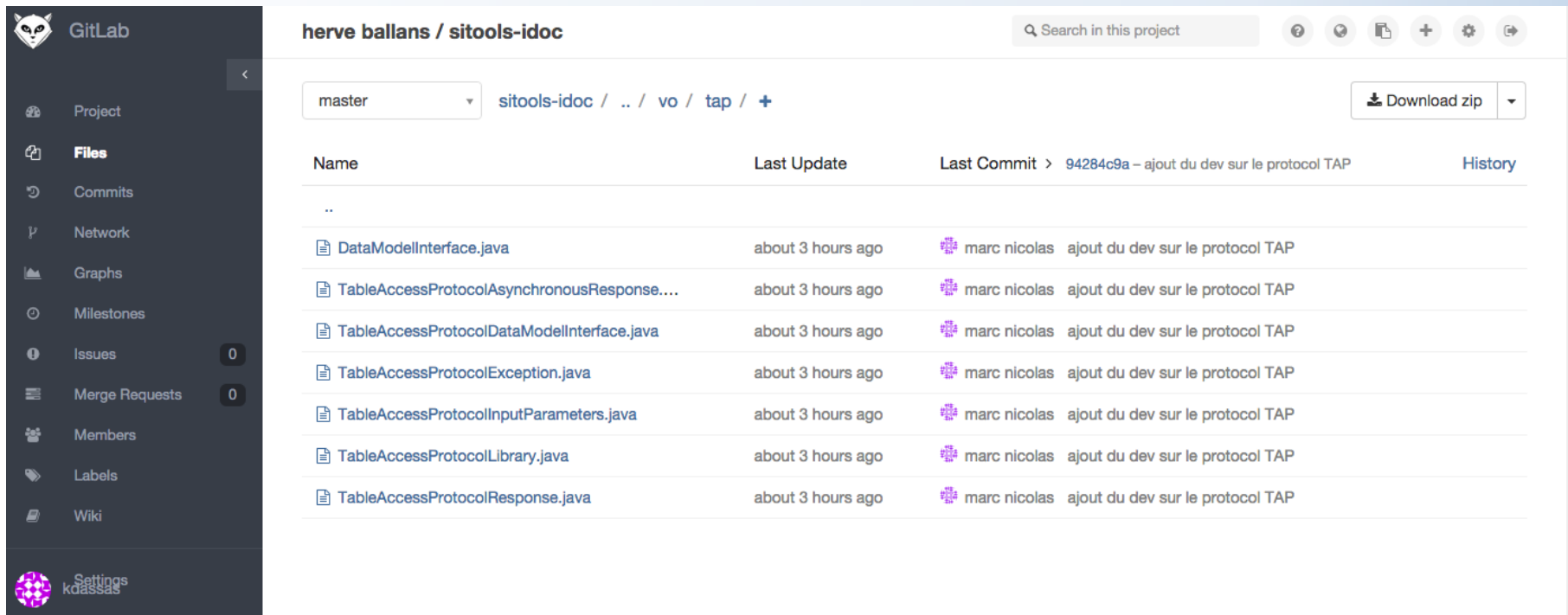
Java 1.6 - postgres (PostgreSQL) 8.3.1

<https://git.ias.u-psud.fr/hballans/sitools-idoc/>

**ADQL Library1.1 from CDS (Grégory Mantelet)**

<http://cdsportal.u-strasbg.fr/adqltuto/>

VOTable 1.2



herve ballans / sitools-idoc

Search in this project

master sitools-idoc / .. / vo / tap / +

Download zip

Name	Last Update	Last Commit	History
..			
DataModellInterface.java	about 3 hours ago	94284c9a – ajout du dev sur le protocol TAP	
TableAccessProtocolAsynchronousResponse....	about 3 hours ago	94284c9a – ajout du dev sur le protocol TAP	
TableAccessProtocolDataModellInterface.java	about 3 hours ago	94284c9a – ajout du dev sur le protocol TAP	
TableAccessProtocolException.java	about 3 hours ago	94284c9a – ajout du dev sur le protocol TAP	
TableAccessProtocolInputParameters.java	about 3 hours ago	94284c9a – ajout du dev sur le protocol TAP	
TableAccessProtocolLibrary.java	about 3 hours ago	94284c9a – ajout du dev sur le protocol TAP	
TableAccessProtocolResponse.java	about 3 hours ago	94284c9a – ajout du dev sur le protocol TAP	

## SITools VO service TAP

```
4  * and open the template in the editor.  
5  */  
6  
7  package fr.ias.sitools.vo.tap;  
8  
9  import adql.parser.ADQLParser;  
10 import adql.parser.ParseException;  
11 import adql.query.ADQLQuery;  
12 import adql.translator.ADQLTranslator;  
13 import adql.translator.PostgreSQLTranslator;  
14 import adql.translator.TranslationException;  
15 //import fr.cnes.sitools.astro.representation.DatabaseRequestModel;  
16 import fr.cnes.sitools.common.exception.SitoolsException;  
17 import fr.cnes.sitools.dataset.DataSetApplication;  
18 import fr.cnes.sitools.dataset.converter.business.ConverterChained;  
19 import fr.cnes.sitools.dataset.database.DatabaseRequest;  
20 import fr.cnes.sitools.dataset.database.DatabaseRequestFactory;  
21 import fr.cnes.sitools.dataset.database.DatabaseRequestParameters;  
22 import fr.cnes.sitools.dataset.database.common.DataSetExplorerUtil;  
23 import fr.cnes.sitools.dataset.dto.ColumnConceptMappingDTO;  
24 import fr.cnes.sitools.dataset.dto.DictionaryMappingDTO;  
25 import fr.cnes.sitools.dataset.model.Column;  
26 import fr.cnes.sitools.dataset.model.Predicat;  
27 import fr.cnes.sitools.dictionary.model.Concept;  
28 import fr.cnes.sitools.plugins.resources.model.ResourceModel;  
29 import fr.cnes.sitools.util.Util;  
30 import fr.ias.sitools.vo.representation.DatabaseRequestIasModel;  
31 import freemarker.template.TemplateSequenceModel;  
32 import java.math.BigInteger;  
33
```

Modules de la librairie CDS utilisés :

AQLParser

PostgreSQLTranslator

Coming soon :  
utilisation de PGSphereTranslator

PostGISTranslator ?

## SiTools VO service TAP

- Requête ADQL :

```
SELECT TOP 5 ra,dec,flux FROM spire_catalog WHERE flux > 500
```

- Requête PSQL traduite :

```
SELECT ra AS ra , dec AS dec , flux AS flux  
FROM spire_catalog  
WHERE flux > 500  
Limit 5
```

- Requête envoyée par SiTools2:

```
SQL = SELECT "spire_catalog".ra as ra, "spire_catalog".dec as dec,  
"spire_catalog".flux as flux, "spire_catalog".source_id as source_id  
FROM "public"."spire_catalog" WHERE 1=1 and ("spire_catalog".source_id<=35000 )  
AND flux > 500 ORDER BY "spire_catalog".source_id ASC
```

## SITools VO service TAP configuration

**Dataset services**

spire\_catalog

1 : rajout du service TAP pour un dataset donné (SPIRE\_CATALOG ici)

Type	Name	Description	Label	Categ
GUI	Columns Definition	retrieve the columns definition for a dataset	label.definitionTitle	
GUI	Filter Tool	a filter tool for dataset	label.filter	
GUI	Record details Service	Display the details of a selected record	label.details	
GUI	Sorter Tool	a GUI service to sort	label.multiSort	
SERVER	Table Access Protocol	This plugin provides an access to your data throu...		
GUI	ViewCubeFits	service to display spectrum cube data	label.cubeExplorer	
GUI	viewShowHeader	display the showHeader GUI service		
GUI	Window Image Zoomer	Display an image with zoom functions		

**Edit dictionary**

3 : définition du dictionnaire pour SPIRE Catalog

Name	Description	ID	datatype	width	precision	unit
source_id	primary key in spire catalog table		double			
ra	ICRS right-ascension of the cent...	pos.eq.ra	double			degree
dec	ICRS declination of the center of ...	pos.eq.dec	double			degree
object	Observed source viewed on the ...	src	char			
x	coord x		double			
y	coord y		double			
rapluserr	ra + err		double			
decpluserr	dec + err		double			
raminuserr	ra - err		double			
decminuserr	dec - err		double			
xpluserr	x + err		double			
ypluserr	y + err		double			
xminuserr	x - err		double			
yminuserr	y - err		double			
flux	Flux density in mJ?	phot.flux.density	double			mJ
fluxpluserr	flux + err		double			

**Edit service**

2 : configuration du service TAP

Name: Table Access Protocol  
Purpose: DISPLAY\_IN\_DESKTOP  
Behavior: DISPLAY\_IN\_DESKTOP

**Parameters Mapping**

Name	Type	Value
url	PARAMETER_ATTACHMENT	/plugin/services/vo/tap/{tapRequestType}
methods	PARAMETER_INTERN	GET
fileName	PARAMETER_USER_INPUT	
image	PARAMETER_INTERN	
PARAM_Dictionary	PARAMETER_INTERN	TableAccessProtocolForSpireCatalog
Description	PARAMETER_INTERN	Spire Source Catalog Table Access Service
Service Name	PARAMETER_INTERN	Table Access Protocol
Instrument	PARAMETER_INTERN	Spire
Max records	PARAMETER_INTERN	-1

## SI Tools VO service TAP

[http://idoc-herschel-test.ias.u-psud.fr/ds/priv/spirecatalog/plugin/services/vo/tap/sync?](http://idoc-herschel-test.ias.u-psud.fr/ds/priv/spirecatalog/plugin/services/vo/tap/sync?REQUEST=doQuery&PHASE=RUN&QUERY=SELECT%20ra,%20dec,%20flux%20FROM%20spire_catalog%20WHERE%20flux%20%3E%20500&FORMAT=votable&LANG=ADQL)  
[REQUEST=doQuery&PHASE=RUN&QUERY=SELECT%20ra,%20dec,%20flux%20FROM%20spire\\_catalog%20WHERE%20flux%20%3E%20500&FORMAT=votable&LANG=ADQL](http://idoc-herschel-test.ias.u-psud.fr/ds/priv/spirecatalog/plugin/services/vo/tap/sync?REQUEST=doQuery&PHASE=RUN&QUERY=SELECT%20ra,%20dec,%20flux%20FROM%20spire_catalog%20WHERE%20flux%20%3E%20500&FORMAT=votable&LANG=ADQL)

This XML file does not appear to have any style information associated with it. The document tree is shown below.

```
▼<VOTABLE xmlns="http://www.ivoa.net/xml/VOTable/v1.2" version="1.2">
  ▼<RESOURCE type="results">
    <INFO name="QUERY_STATUS" value="OK"/>
    <INFO name="ADQL query" value="SELECT source_id,ra,dec,flux FROM spire_catalog WHERE flux > 300"/>
    <PARAM name="Instrument" datatype="char" value="Spire"/>
    <PARAM name="Service Name" datatype="char" value="Table Access Protocol"/>
    ▼<FIELD name="source_id" datatype="double" arraysize="*">
      <DESCRIPTION>primary key in spire catalog table</DESCRIPTION>
    </FIELD>
    ▼<FIELD name="ra" ucd="pos.eq.ra" datatype="double" unit="degree">
      <DESCRIPTION>ICRS right-ascension of the center of the image</DESCRIPTION>
    </FIELD>
    ▼<FIELD name="dec" ucd="pos.eq.dec" datatype="double" unit="degree">
      <DESCRIPTION>ICRS declination of the center of the image</DESCRIPTION>
    </FIELD>
    ▼<FIELD name="flux" ucd="phot.flux.density" datatype="double" unit="mJ"/>
      <DESCRIPTION>Flux density in mJ/?</DESCRIPTION>
    </FIELD>
    ▼<TABLE nrows="92">
      ▼<DATA>
        ▼<TABLEDATA>
          ▼<TR>
            <TD>1000</TD>
            <TD>80.7426</TD>
            <TD>-36.45874</TD>
            <TD>1959.0992</TD>
          </TR>
          ▼<TR>
            <TD>1345</TD>
            <TD>287.7903</TD>
            <TD>-20.114862</TD>
            <TD>446.9112</TD>
          </TR>
          ▼<TR>
            <TD>1489</TD>
            <TD>291.2125</TD>
            <TD>-29.241245</TD>
            <TD>953.7273</TD>
          </TR>
          ▼<TR>
            <TD>2336</TD>
            <TD>191.69522</TD>
```

## VO service TAP questions

MANDATORY synchrone et asynchrone, getCapabilities

**sync /sync must (anonymous)**

**async /async must (anonymous)**

VOSI-availability /availability should

**VOSI-capabilities /capabilities must**

VOSI-tables /tables should

DALI-examples /examples should

TAP 1.1 / 1.0 avec seulement `standardID="ivo://ivoa.net/std/TAP#sync-1.1`

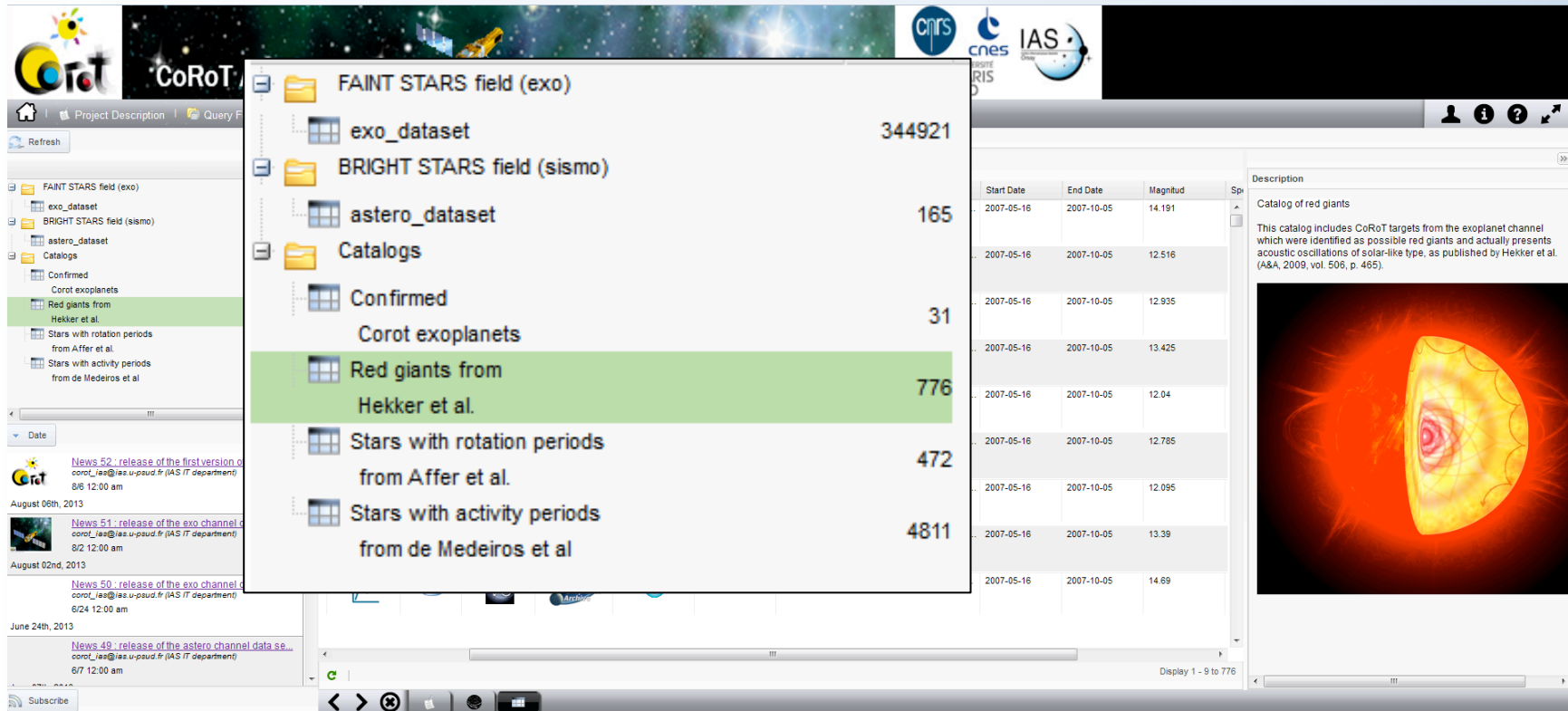
« *In TAP-1.0 the base URL was described with a single standard identifier; in TAP-1.1 and beyond, individual resources are described with their own standardID.* »

TAP\_SCHEMA ? Quand 1 table ?

Tests des erreurs

## TAP @ IDOC

- Catalogues de sources Herschel, Planck
- Au moins 4 catalogues Corot IDOC



The screenshot displays the CoRoT IDOC interface. On the left, a file explorer shows a tree structure of data folders. A central window lists the contents of the 'Catalogs' folder with the following items and counts:

Folder Name	Count
FAINT STARS field (exo)	344921
exo_dataset	344921
BRIGHT STARS field (sismo)	165
astero_dataset	165
Catalogs	
Confirmed	31
Corot exoplanets	
Red giants from Hekker et al.	776
Stars with rotation periods from Affer et al.	472
Stars with activity periods from de Medeiros et al.	4811

On the right, a table displays star data with columns for Start Date, End Date, Magnitud, and Sp. Below the table, a description for the 'Catalog of red giants' is shown, along with a corresponding image of a red giant star.

**Description: Catalog of red giants**  
This catalog includes CoRoT targets from the exoplanet channel which were identified as possible red giants and actually presents acoustic oscillations of solar-like type, as published by Hekker et al. (A&A, 2009, vol. 508, p. 465).

## TAP @ IDOC Futur plus lointain

- TAP-EPN pour PSUP (instance martienne)

**Planetary Surface Portal**

Home | Project Description | MarsSI | Mars Visu

**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 BSS to be kept up to date on new releases.

datasets

- OMEGA data
- rasters
- vectors

SI TOOLS 2  
INFORMATION SYSTEM TOOL

Copyright 2015 OSUPS/OSUL - Built with SITools2 framework

- TAP pour autres données MEDOC (filaments solaires...)



## Conclusion

- TAP :
  - implémentation en bonne voie grâce à la librairie ADQL du CDS
  - fonctions mathématiques et géométriques ( + postGIS)
  - validateur TAP (taplint ? )
- Intérêt du cone search protocol / TAP ?
- Contacts IDOC VO: scientifique [alexandre.beelen@ias.u-psud.fr](mailto:alexandre.beelen@ias.u-psud.fr), ingénieur [karin.dassas@ias.u-psud.fr](mailto:karin.dassas@ias.u-psud.fr)
- Contact SITools2 at IDOC [herve.ballans@ias.u-psud.fr](mailto:herve.ballans@ias.u-psud.fr)

# ANNEXES

# SITools2 SIA Module

<http://idoc-herschel.ias.u-psud.fr/ds/pub/spirephoto2/services/sia?>

<http://voparis-validator.obspm.fr>

Edit service

Field mapping


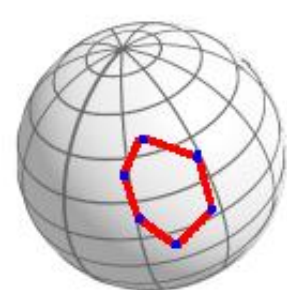
Name: Simple Image Access Protocol

Purpose:

Behavior: DISPLAY\_IN\_NEW\_TAB

Parameters Mapping

Name	Type	Value
uri	PARAMETER_ATTACHMENT	/services/sia
methods	PARAMETER_INTERN	GET
fileName	PARAMETER_USER_INPUT	
image	PARAMETER_INTERN	
PARAM_Dictionary	PARAMETER_INTERN	SIADico
Description : Dictionary name that sets up the service		
INTERSECT	PARAMETER_INTERN	OVERLAPS
Description : how matched images should intersect the region of interest		
geoAttribut	PARAMETER_INTERN	spoly
Description : Geographical attribut for OVERLAPS mode. The geographical attribut must be spoly datatype from pgsphere		
VERB	PARAMETER_INTERN	1
Responsible party	PARAMETER_INTERN	
Image service	PARAMETER_INTERN	Pointed Image Archive
Description	PARAMETER_INTERN	Herschel Spire SIA protocol
Instrument	PARAMETER_INTERN	Spire
Waveband Coverage	PARAMETER_INTERN	infrared
Description : The waveband of the observations		
Spatial Coverage	PARAMETER_INTERN	
Temporal Coverage	PARAMETER_INTERN	
Max query size	PARAMETER_INTERN	64800
Max image size	PARAMETER_INTERN	



# SITools2 SIA Module spoly



SI TOOLS 2  
INFORMATION SYSTEM TOOL

```
def calculateSpoly(filepath=""):
    hdulist=pyfits.open(filepath)
    try:
        Image = hdulist['Image']
        wcs = pywcs.WCS(Image.header)
        hdr1=hdulist[1].header
    except:
        try:
            ##### for SCANAMORPHOS fits files
            Image=hdulist['PrimaryImage']
            PrimaryHeader=hdulist['Primary'].header
            wcs = pywcs.WCS(PrimaryHeader)
            hdr1=Image.header
            print wcs
            print hdr1
        except KeyError:
            print "EE - No 'Image' extension in "+os.path.basename(inputImage)
            return 2
    poly1=wcs.wcs_pix2sky([[0.5,0.5]],0)
    print poly1
    poly2=wcs.wcs_pix2sky([[0.5+hdr1['NAXIS1'],0.5]],0)
    print poly2
    poly3=wcs.wcs_pix2sky([[0.5+hdr1['NAXIS1'],0.5+hdr1['NAXIS2']]],0)
    print poly3
    poly4=wcs.wcs_pix2sky([[0.5,0.5+hdr1['NAXIS2']]],0)
    print poly4
    poly1="("+str(poly1[0,0])+"d,"+str(poly1[0,1])+"d)"
    poly2="("+str(poly2[0,0])+"d,"+str(poly2[0,1])+"d)"
    poly3="("+str(poly3[0,0])+"d,"+str(poly3[0,1])+"d)"
    poly4="("+str(poly4[0,0])+"d,"+str(poly4[0,1])+"d)"
    poly="{ "+poly4+", "+poly3+", "+poly2+", "+poly1+"}"
    #poly="("+poly1+", "+poly3+")"
    return poly
```

## Registered IDOC VO services

### [VO Integrated Data Operation Center \[IDOC\]](#)

[ XML | EDIT | CLONE ]

IVOA identifier: [ivo://idoc](#) [Authority]

This naming authority is the root of the naming of the resources from IDOC

Published by: IDOC on the 2013-01-25T09:21:30Z and last updated on the 2013-01-25T10:31:24Z

### [GINCO: Galaxy, Interstellar matter and Cosmology \[GINCO\]](#)

[ XML | EDIT | CLONE ]

IVOA identifier: [ivo://idoc.ginco](#) [Authority]

GINCO is a center for expertise for several space, balloon and ground mission. It has an important role in data processing, distribution and interpretation, for several astronomy missions at long wavelength. In this matter, GINCO : develops and maintains high level analysis pipelines develops and maintains data archives & access develops, maintains and distribute high level software for data analysis offers scientific expertise for mission using long wavelength detectors plays an important role in education and outreach to the general public

Published by: IDOC on the 2013-01-25T09:21:30Z and last updated on the 2013-01-25T14:21:11Z

### [HErSchel IdOc Database \(HESIOD\) \[HESIOD\]](#)

[ XML | EDIT | CLONE ]

IVOA identifier: [ivo://idoc.ginco/herschel](#) [Organisation]

HErSchel IdOc Database (HESIOD)

Published by: IDOC GINCO on the 2013-01-25T11:01:53Z and last updated on the 2013-03-29T10:57:43Z