JUNO-Ground-Radio Observation Support

Baptiste Cecconi, Renaud Savalle
& the JUNO-Ground-Radio team

JUNO-Ground-Radio team

Scientific coordination: Baptiste Cecconi
Technical coordination: Renaud Savalle

Sacha Konovalenko (UA)
Andrée Coffre (FR)
Cédric Viou (FR)
Chuck Higgins (US)
Dave Typinski (US)
Glenn Orton (US)
Yasuhide Hobara (JP)
Hanna Rothkaehl (PL)
Kazumasa Imai (JP)
Masafumi Imai (US)
Jean-Mathias Griessmeier (FR)
Julien Girard (SA)
Yasumasa Kasaba (JP)
Atsushi Kumamoto (JP)
Laurent Denis (FR)
Laurent Lamy (FR)

Hiroaki Misawa (JP)
Marin Anderson (US)
Tomoyuki Nakajo (JP)
Nicolas André (FR)
Philippe Zarka (FR)
Pierre Le Sidaner (FR)
Rob Ebert (US)
Vladimir Ryabov (JP)
Anastasia Skoryk (UA)
Tobia Carozzi (SE)
Tomoki Kimura (JP)
Tracy Clarke (US)
Fuminori Tsuchiya (JP)
William S. Kurth (US)
Serge Yerin (UA)

Outline

- Ground Observatories
- Observation Planning
- Data Distribution and Tools
- Status and Future Work

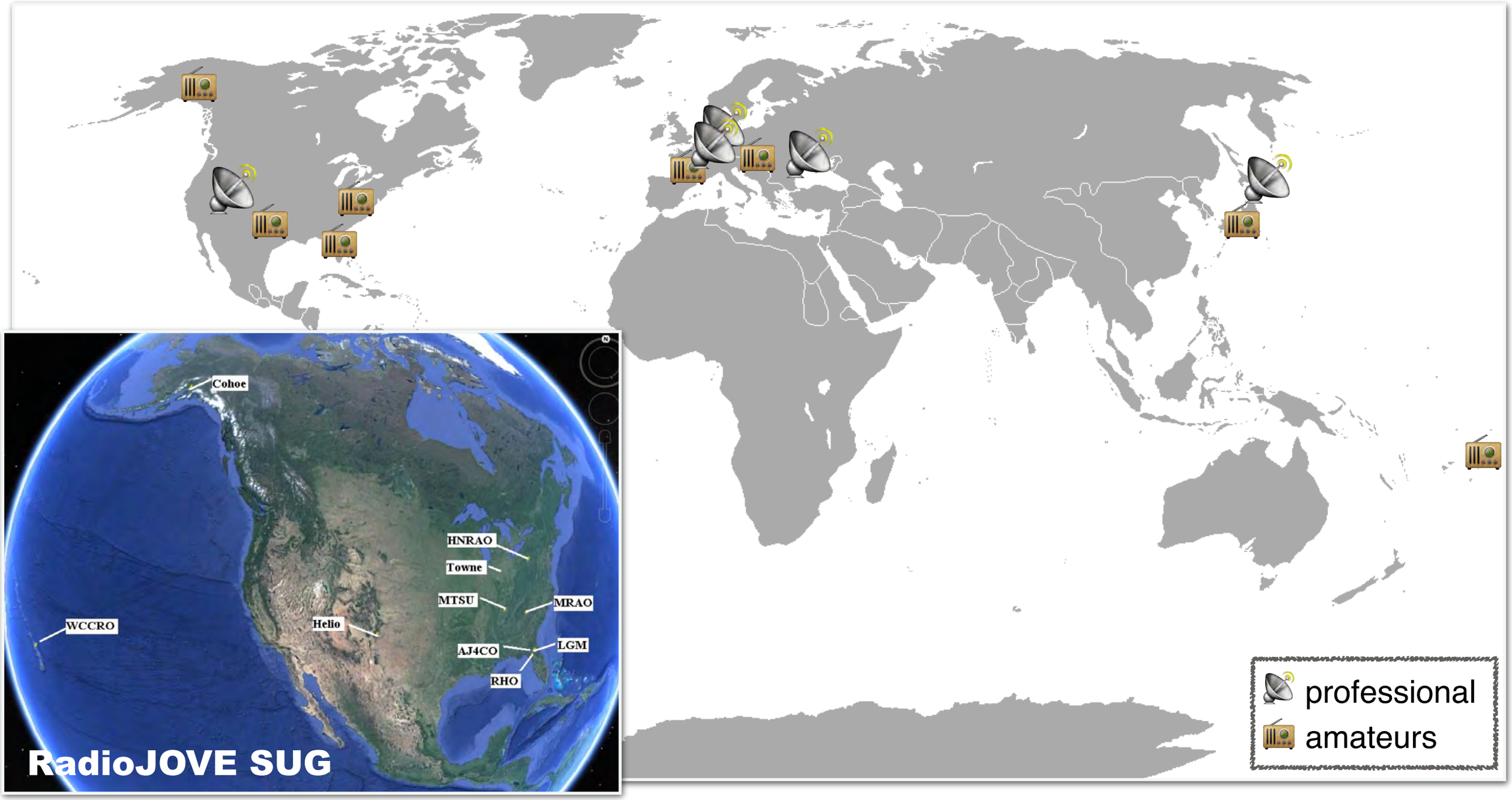
JUNO Ground Radio Observation Support

- **Professional low frequency telescopes (10-40 MHz)**:
  - Nançay (France): Decameter Array, LOFAR station (NenuFAR)
  - Europe: LOFAR
  - Kharkov (Ukraine): UTR-2
  - Japan: Iitate and Fukui observatories
  - New Mexico (USA): LWA1

- **Radio Emission modeling/prediction tools**
  - ExPRES tool: http://maser.obspm.fr/serpe, by Obs Paris team (France)
  - JRM (Jovian Radio Map) iPhone App, by Kochi College team (Japan)

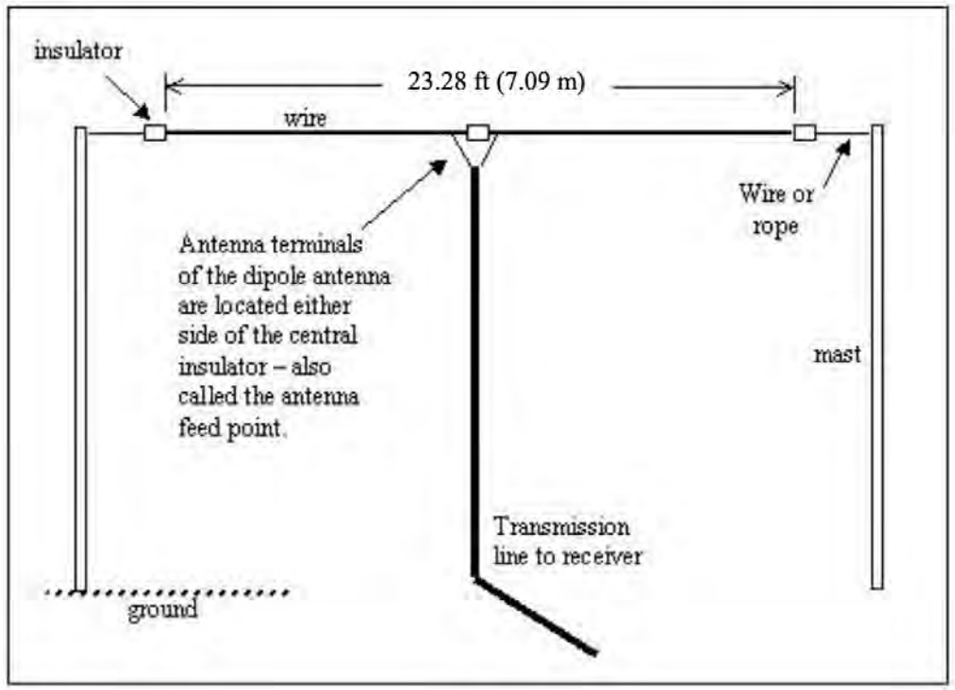
- **Amateur community: RadioJOVE**
  - 2000 RadioJOVE kits sold (single frequency at ~20 MHz)
  - ~10 “RadioJOVE-SUG” (Spectrograph User Group): USA

JUNO Ground Radio Observation Support



RadioJOVE

- **RadioJOVE** is an EPO project developed in the USA: http://radiojove.org
  - **Goal**: introducing low frequency radioastronomy concepts to students, teachers, amateur radio community and the general public.
  - **The participants are building their own radio telescope**, using a kit sold by the Radio JOVE team. This instrument can observe the sky at frequencies around **20 - 30 MHz**.
  - The users can share their observations on an archive web site, and on a mailing list.
  - About 2000 kits have been shipped to date, all over the world.



- Radio-JOVE web site: http://radiojove.gsfc.nasa.gov

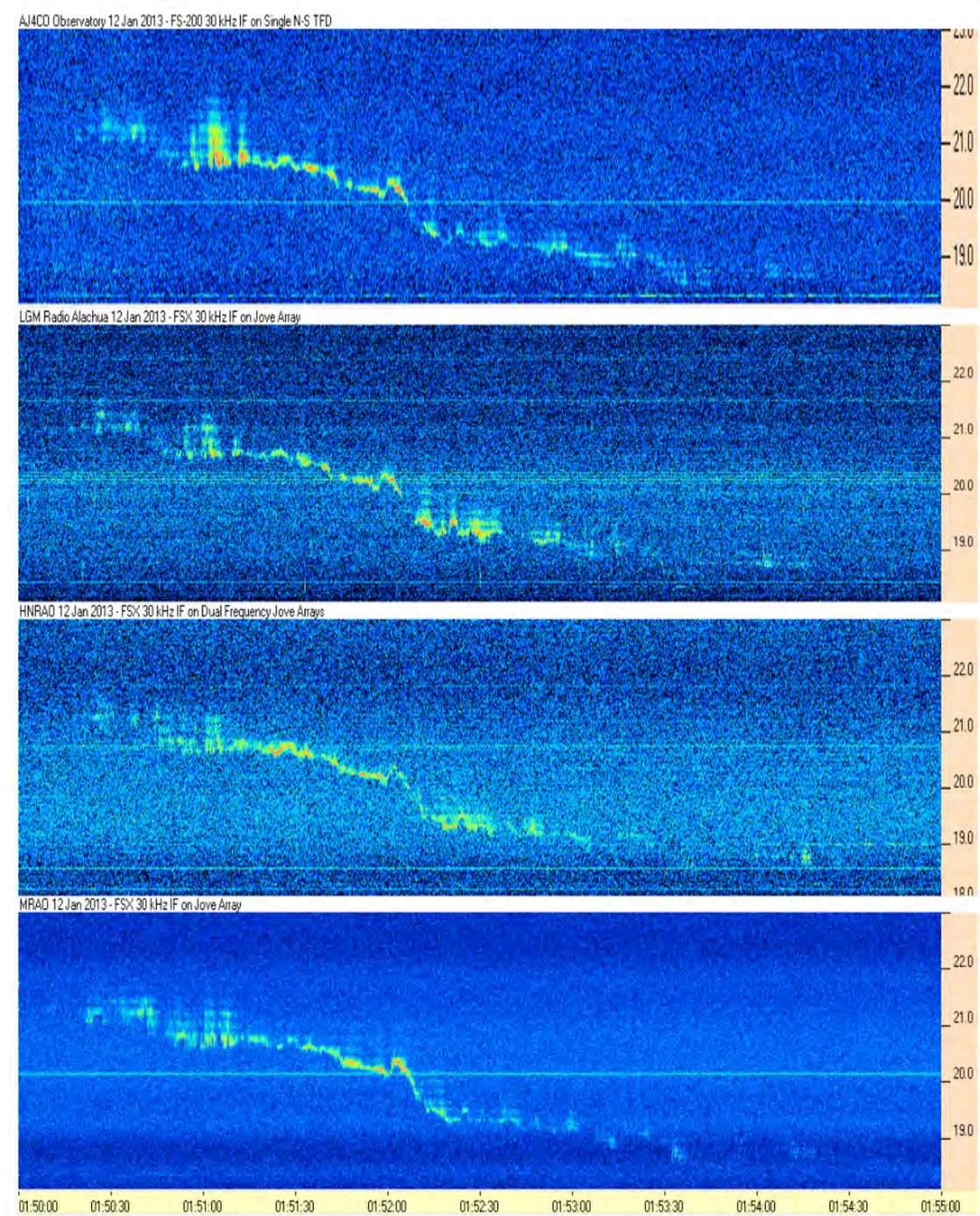
- Radio-JOVE data Archive : http://radiojove.org/cgi-bin/calendar/calendar.cgi

RadioJOVE-SUG

- **RadioJOVE** Spectrograph Users is a group of amateur radio-astronomer with advanced spectrograph capabilities.

- Despite the relatively low sensitivity, due to the effective area of their antenna arrays, this set of instruments is very valuable. Efforts are currently done to improve the data quality, in terms timing accuracy, gain calibration…

Participant	Observatory / Org	Loc	Instrumentation / Description
Thomas Ashcraft	Heliotown	NM	FSX-4, Jove array
Jim Brown	HNRAO	PA	FSX-8S, 4-cross LWA array
Richard Flagg	WCCRO	HI	FS-200, LPDA
Dr Shing Fung	NASA GSFC	MD	Space plasma scientist
Wes Greenman	LGM	FL	FSX-1S, square TFD array
Dr Chuck Higgins	MTSU	TN	FSX-6S, square TFD array
Dr Andy Mount	MRAO	SC	FSX-3, Jove array
Whitham Reeve	CRO †	AK	FSX-5, LPDA
Dr Francisco Reyes	RHO †	FL	FSX-7S, square TFD array
Jim Sky	Radio-Sky Software	KY	Software genius
Dr Jim Thieman	NASA GSFC	MD	Jupiter emission scientist
Nathan Towne	Towne	OH	Experimental FPGA FFT, Jove array
Dave Typinski	AJ4CO Observatory	FL	FS-200, DPS, TWB, TFD array



Planning Tool

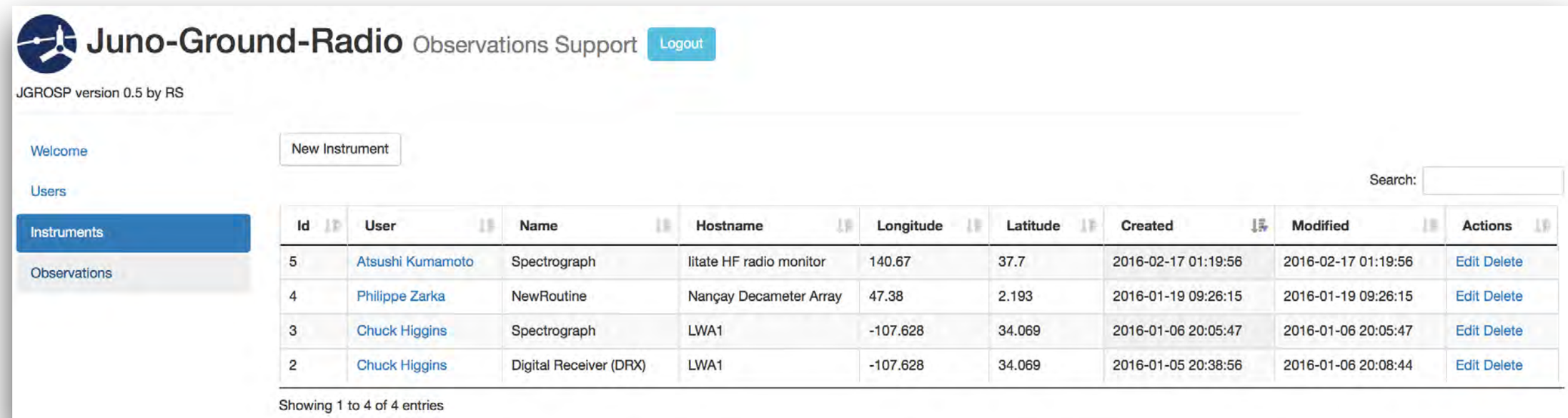
- https://voparis-juno.obspm.fr (registration required)

- Observation teams submit their observations plans
  - Observatory Name
  - Instrument Name
  - Start and Stop times
  - Spectral and temporal resolutions

- Planning freely available on
  http://maser.obspm.fr
  (or any where else if needed, please contact us if you want to connect to the planning database for any purpose).

Planning Tool

Instruments



Juno-Ground-Radio Observations Support Logout

JGROSP version 0.5 by RS

Welcome

Users

Instruments

Observations

New Instrument

Search:

Id	User	Name	Hostname	Longitude	Latitude	Created	Modified	Actions
5	Atsushi Kumamoto	Spectrograph	Iitate HF radio monitor	140.67	37.7	2016-02-17 01:19:56	2016-02-17 01:19:56	Edit Delete
4	Philippe Zarka	NewRoutine	Nançay Decameter Array	47.38	2.193	2016-01-19 09:26:15	2016-01-19 09:26:15	Edit Delete
3	Chuck Higgins	Spectrograph	LWA1	-107.628	34.069	2016-01-06 20:05:47	2016-01-06 20:05:47	Edit Delete
2	Chuck Higgins	Digital Receiver (DRX)	LWA1	-107.628	34.069	2016-01-05 20:38:56	2016-01-06 20:08:44	Edit Delete

Showing 1 to 4 of 4 entries

Planning Tool

Observations

Juno-Ground-Radio Observations Support Logout

JGROSP version 0.5 by RS

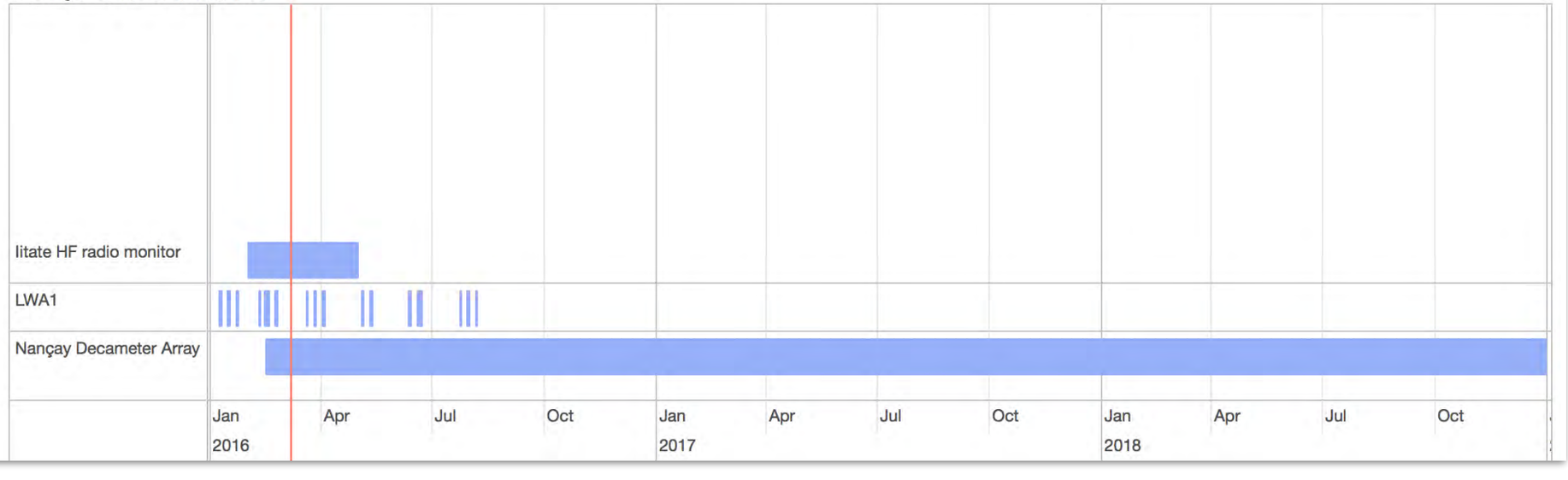
- Welcome
- Users
- Instruments
- Observations

New Observation | Export Observations | Import Observations

Search:

Id	User	Instrument hostname/name	JD Start	JD Stop	Date Start UTC	Date Stop UTC
1,173	Atsushi Kumamoto	Iitate HF radio monitor/Spectrograph	2,457,455.5	2,457,456.499988	2016-03-08T00:00:00Z	2016-03-08T23:59:58Z
1,172	Atsushi Kumamoto	Iitate HF radio monitor/Spectrograph	2,457,454.5	2,457,455.499988	2016-03-07T00:00:00Z	2016-03-07T23:59:58Z
1,165	Philippe Zarka	Nançay Decameter Array/NewRoutine	2,458,482.747222	2,458,483.080544	2018-12-30T05:55:59Z	2018-12-30T13:55:59Z
1,164	Philippe Zarka	Nançay Decameter Array/NewRoutine	2,458,481.75	2,458,482.083322	2018-12-29T06:00:00Z	2018-12-29T13:59:59Z
1,163	Philippe Zarka	Nançay Decameter Array/NewRoutine	2,458,480.752083	2,458,481.085405	2018-12-28T06:02:59Z	2018-12-28T14:02:59Z

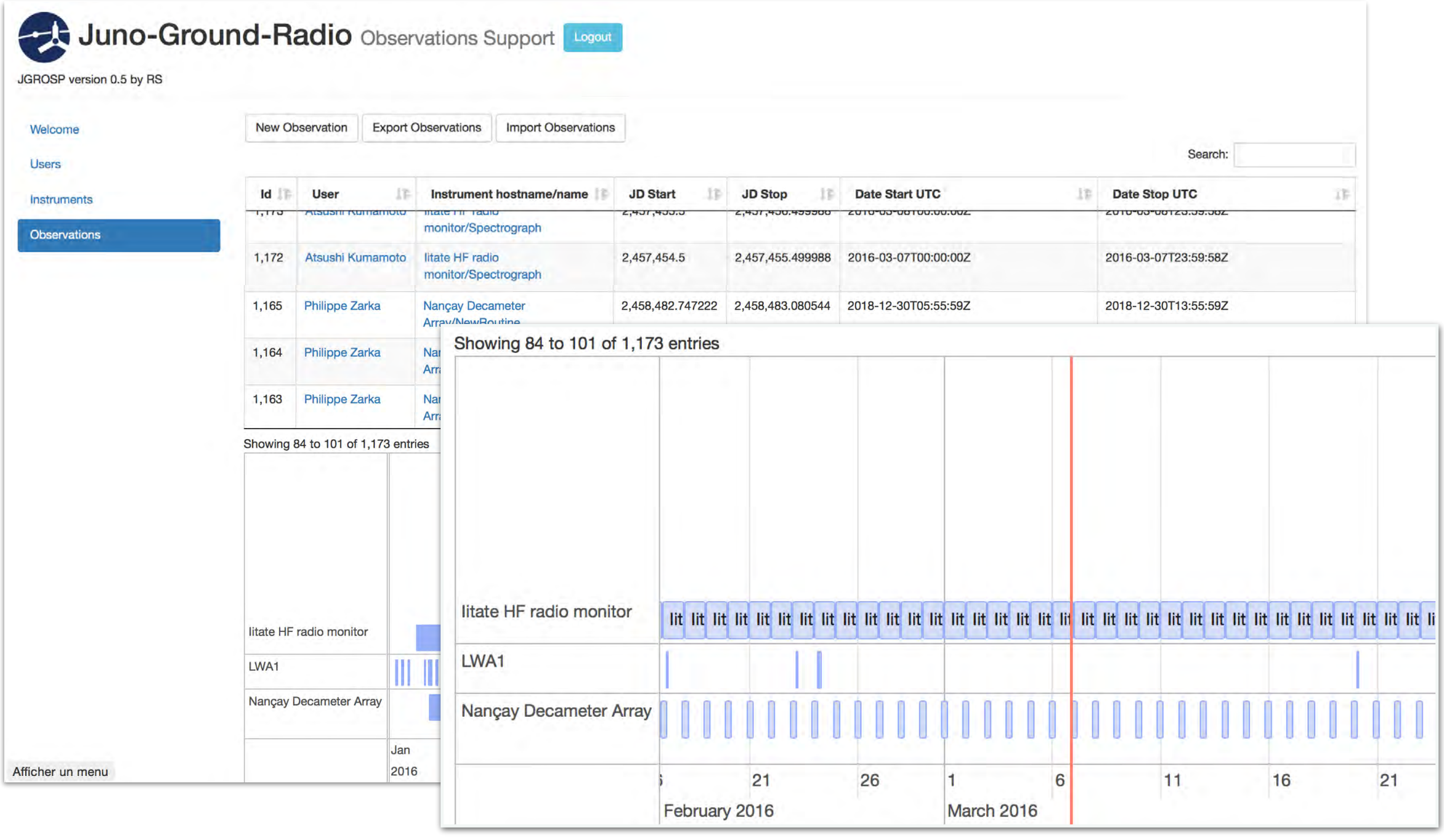
Showing 84 to 101 of 1,173 entries



Afficher un menu

Planning Tool

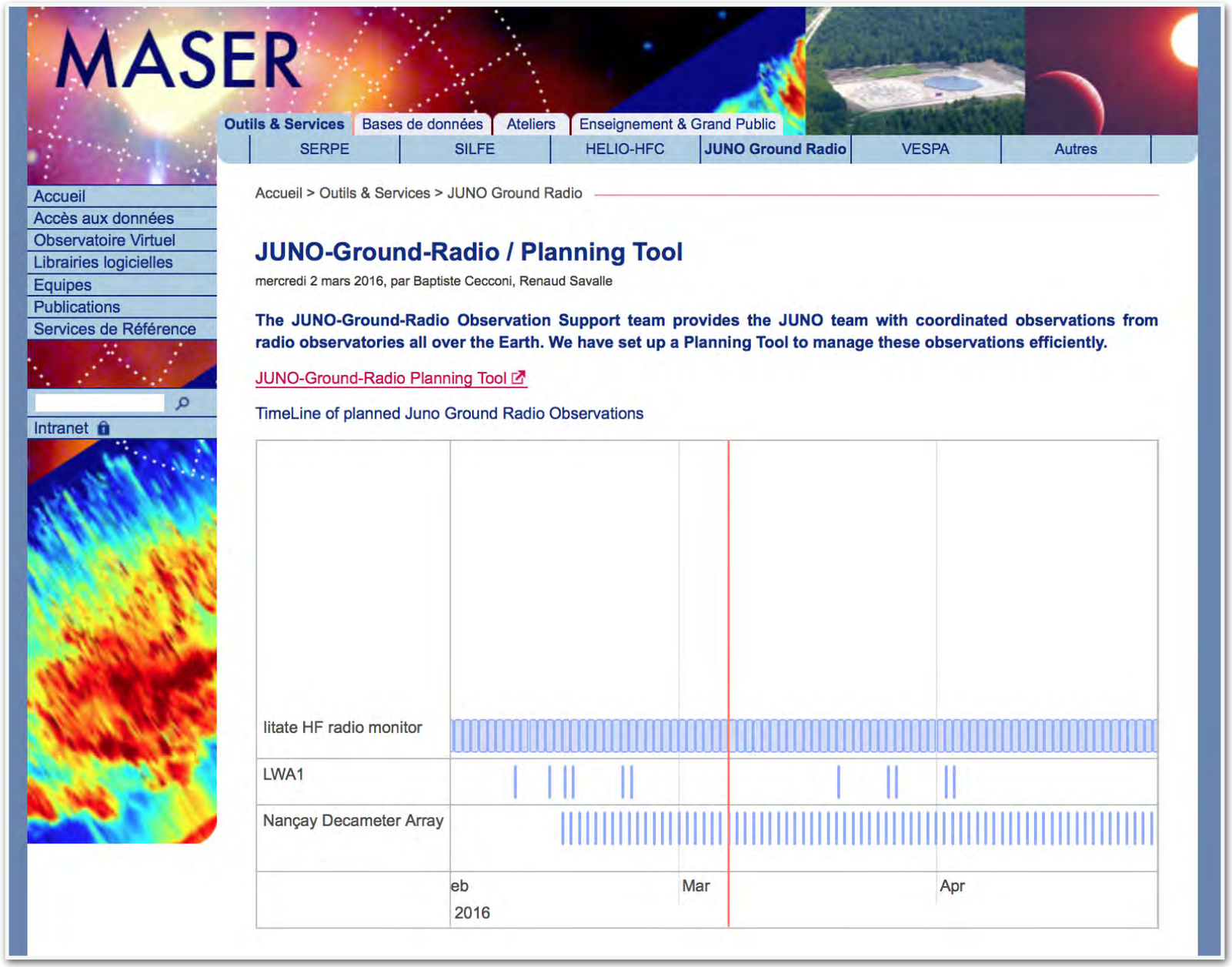
Observations



Planning Tool

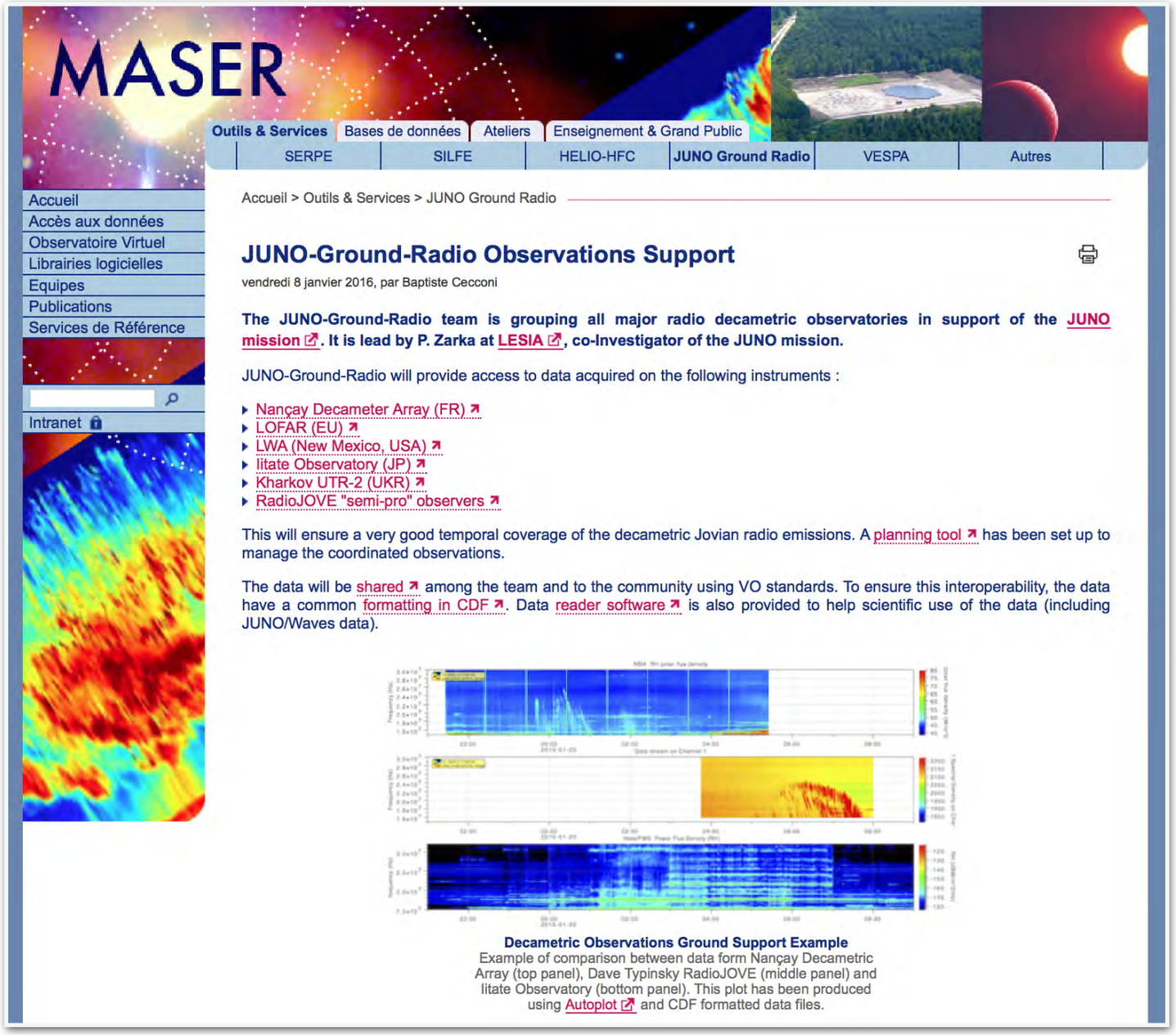
Free Access

http://maser.lesia.obspm.fr/tools-services/juno-ground-radio/juno-ground-radio-planning-tool.html



JUNO-Ground-Radio on MASER web portal

http://maser.lesia.obspm.fr



MASER

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Accueil > Outils & Services > JUNO Ground Radio

JUNO-Ground-Radio Observations Support

vendredi 8 janvier 2016, par Baptiste Cecconi

The JUNO-Ground-Radio team is grouping all major radio decametric observatories in support of the JUNO mission. It is lead by P. Zarka at LESIA, co-Investigator of the JUNO mission.

JUNO-Ground-Radio will provide access to data acquired on the following instruments :

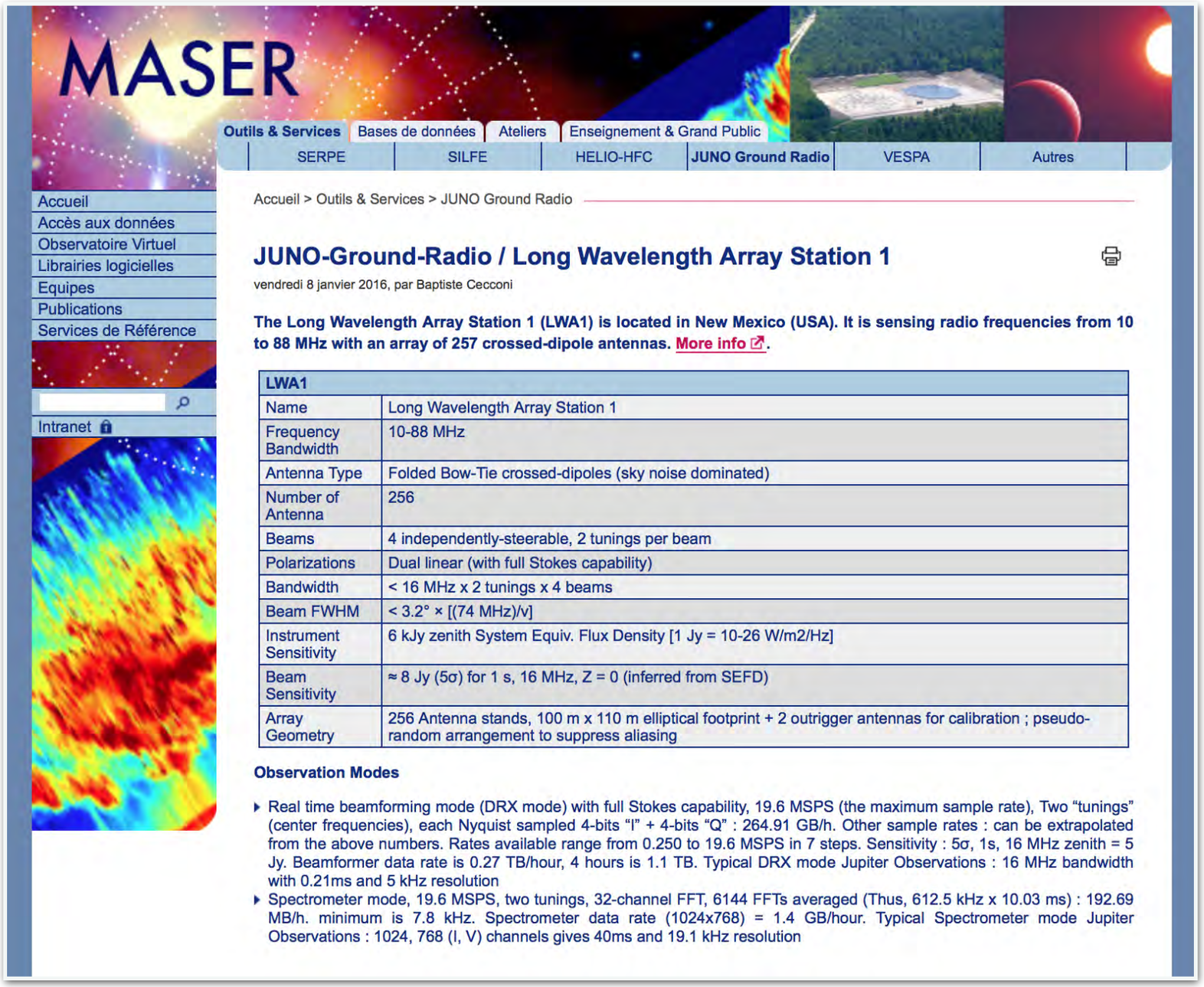
- Nançay Decameter Array (FR)
- LOFAR (EU)
- LWA (New Mexico, USA)
- Iitate Observatory (JP)
- Kharkov UTR-2 (UKR)
- RadioJOVE "semi-pro" observers

This will ensure a very good temporal coverage of the decametric Jovian radio emissions. A planning tool has been set up to manage the coordinated observations.

The data will be shared among the team and to the community using VO standards. To ensure this interoperability, the data have a common formatting in CDF. Data reader software is also provided to help scientific use of the data (including JUNO/Waves data).

Decametric Observations Ground Support Example
Example of comparison between data form Nançay Decametric Array (top panel), Dave Typinsky RadioJOVE (middle panel) and Iitate Observatory (bottom panel). This plot has been produced using Autoplot and CDF formatted data files.

JUNO-Ground-Radio on MASER web portal



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JUNO-Ground-Radio / Long Wavelength Array Station 1

vendredi 8 janvier 2016, par Baptiste Cecconi

The Long Wavelength Array Station 1 (LWA1) is located in New Mexico (USA). It is sensing radio frequencies from 10 to 88 MHz with an array of 257 crossed-dipole antennas. More info.

LWA1	
Name	Long Wavelength Array Station 1
Frequency Bandwidth	10-88 MHz
Antenna Type	Folded Bow-Tie crossed-dipoles (sky noise dominated)
Number of Antenna	256
Beams	4 independently-steerable, 2 tunings per beam
Polarizations	Dual linear (with full Stokes capability)
Bandwidth	< 16 MHz x 2 tunings x 4 beams
Beam FWHM	< 3.2° × [(74 MHz)/ν]
Instrument Sensitivity	6 kJy zenith System Equiv. Flux Density [1 Jy = 10-26 W/m2/Hz]
Beam Sensitivity	≈ 8 Jy (5σ) for 1 s, 16 MHz, Z = 0 (inferred from SEFD)
Array Geometry	256 Antenna stands, 100 m x 110 m elliptical footprint + 2 outrigger antennas for calibration ; pseudo-random arrangement to suppress aliasing

Observation Modes

- Real time beamforming mode (DRX mode) with full Stokes capability, 19.6 MSPS (the maximum sample rate), Two "tunings" (center frequencies), each Nyquist sampled 4-bits "I" + 4-bits "Q" : 264.91 GB/h. Other sample rates : can be extrapolated from the above numbers. Rates available range from 0.250 to 19.6 MSPS in 7 steps. Sensitivity : 5σ, 1s, 16 MHz zenith = 5 Jy. Beamformer data rate is 0.27 TB/hour, 4 hours is 1.1 TB. Typical DRX mode Jupiter Observations : 16 MHz bandwidth with 0.21ms and 5 kHz resolution
- Spectrometer mode, 19.6 MSPS, two tunings, 32-channel FFT, 6144 FFTs averaged (Thus, 612.5 kHz x 10.03 ms) : 192.69 MB/h. minimum is 7.8 kHz. Spectrometer data rate (1024x768) = 1.4 GB/hour. Typical Spectrometer mode Jupiter Observations : 1024, 768 (I, V) channels gives 40ms and 19.1 kHz resolution

Data Distribution Server

- Each team distributes their own data, using “Virtual Observatory” portal, as developed within Europlanet/VESPA*.

- They install a server following VESPA tutorials. This includes:
  - a data access layer (VO compliant): for automated remote access;
  - a regular web server to host a website: for sharing data files if needed;
  - a standard access statistic tool: for monitoring purposes.

- This server can easily be used to share other datasets once installed.

- The VESPA team is providing online support for setting up services: http://discussions.europlanet-vespa.eu

**VESPA: Virtual European Solar and Planetary Access. http://www.europlanet-vespa.eu/*

Data Distribution Format

- Each team distributes their data using standard format. We recommend CDF. Scripting from any documented format to CDF is easy (especially with PyCDF Python library).

- CDF Metadata are compliant with ISTP (Space Physics), PDS4 (Planetary Sciences). CDF files can then be archived at NASA/PDS next to the JUNO archive.

- Raw or original format (such as FITS) can also be distributed, so that usual user can still use their own software.

CDF Header ISTP Section

```
"Project"             1:    CDF_CHAR     { "ObsNancay>Observatory of Nancay" }
                      2:    CDF_CHAR     { "VOPDC>VO Paris Data Center" } .
"Discipline"          1:    CDF_CHAR     { "Planetary Physics>Waves" } .
"Data_type"           1:    CDF_CHAR     { "EDR>Experiment Data Record" } .
"Descriptor"          1:    CDF_CHAR     { "routine_jup" } .
"Data_version"        1:    CDF_CHAR     { "01" } .
"Instrument_type"     1:    CDF_CHAR     { "Radio Telescope" }
"Logical_file_id"     1:    CDF_CHAR     { “nda_routine_jup_edr_000000000000_000000000000_V05.cdf" } .
"Logical_source"      1:    CDF_CHAR     { "nda" } .
"Logical_source_description"
                      1:    CDF_CHAR     { "Jupiter Routine Observations from the Nancay Decameter Array" } .
"File_naming_convention"
                      1:    CDF_CHAR     { "source_descriptor_yyyymmddhhmm_yyyymmddhhmm_ver" } .
"Mission_group"       1:    CDF_CHAR     { "Nancay Decametric Array" } .
"PI_name"             1:    CDF_CHAR     { "A. Lecacheux" } .
"PI_affiliation"      1:    CDF_CHAR     { "Observatoire de Paris" } .
"Source_name"         1:    CDF_CHAR     { "NDA>Nancay Decametric Array" } .
"TEXT"                1:    CDF_CHAR     { " " } .
"Generated_by"        1:    CDF_CHAR     { "LESIA" }
                      2:    CDF_CHAR     { "ObsNancay" } .
"Generation_date" .
"LINK_TEXT"           1:    CDF_CHAR     { "Nancay DAM webpage" } .
"LINK_TITLE"          1:    CDF_CHAR     { "Nancay DAM archive" } .
"HTTP_LINK"           1:    CDF_CHAR     { "http://www.obs-nancay.fr/" } .
"MODS" .
"Parents" .
"Rules_of_use" .
"Skeleton_version"    1:    CDF_CHAR     { "0.5" } .
"Software_version"    1:    CDF_CHAR     { "0.5" } .
"Time_resolution" .
"Acknowledgement" .
```

CDF Header PDS4 Section

```
“PDS_Observation_start_time"        1:    CDF_CHAR     { "0000-01-01T00:00:00.000Z" } .
“PDS_Observation_stop_time"         1:    CDF_CHAR     { "0000-01-01T00:00:00.000Z" } .
“PDS_Observation_target"            1:    CDF_CHAR     { "Jupiter" } .
“PDS_Observation_type"              1:    CDF_CHAR     { "Radio" } .
```

CDF Header VESPA Section

```
“VESPA_dataproduct_type"            1:    CDF_CHAR     { "DS>Dynamic Spectra" } .
“VESPA_target_class"                1:    CDF_CHAR     { "planet" } .
“VESPA_target_region"               1:    CDF_CHAR     { "aurora" }
                                    2:    CDF_CHAR     { "magnetosphere" } .
“VESPA_target_element"              1:    CDF_CHAR     { "DAM radio emissions" } .

“VESPA_time_min"                    1:    CDF_REAL8    { 0.0 } .
“VESPA_time_max"                    1:    CDF_REAL8    { 0.0 } .
“VESPA_time_sampling_step_min"      1:    CDF_REAL4    { 0.0 } .
“VESPA_time_sampling_step_max"      1:    CDF_REAL4    { 0.0 } .

“VESPA_spectral_range_min"          1:    CDF_REAL8    { 0.0 } .
“VESPA_spectral_range_max"          1:    CDF_REAL8    { 0.0 } .
“VESPA_spectral_sampling_step_min"  1:    CDF_REAL4    { 0.0 } .
“VESPA_spectral_sampling_step_max"  1:    CDF_REAL4    { 0.0 } .

“VESPA_instrument_host_name"        1:    CDF_CHAR     { "NDA>Nancay Decameter Array" } .
“VESPA_instrument_name"             1:    CDF_CHAR     { "Routine" } .
“VESPA_measurement_type”            1:    CDF_CHAR     { "phys.flux.density;em.radio" } .
“VESPA_access_format"               1:    CDF_CHAR     { "cdf" } .
```

CDF Variables

! Variable Name	Data Type	Number Elements	Dims	Sizes	Record Variance	Dimension Variances
"Epoch"	CDF_EPOCH	1	0		T	
"ISO_DATE"	CDF_CHAR	24	0		T	
"JD_TIME"	CDF_REAL8	1	0		T	
"FLUX_RR"	CDF_REAL4	1	1	400	T	T
"FLUX_LL"	CDF_REAL4	1	1	400	T	T
"FLUX_RL"	CDF_REAL4	1	1	400	T	T
"FLUX_LR"	CDF_REAL4	1	1	400	T	T
"FLUX_XX"	CDF_REAL4	1	1	400	T	T
"FLUX_YY"	CDF_REAL4	1	1	400	T	T
"FLUX_XY"	CDF_REAL4	1	1	400	T	T
"FLUX_YX"	CDF_REAL4	1	1	400	T	T
"FLUX_S"	CDF_REAL4	1	1	400	T	T
"FLUX_Q"	CDF_REAL4	1	1	400	T	T
"FLUX_U"	CDF_REAL4	1	1	400	T	T
"FLUX_V"	CDF_REAL4	1	1	400	T	T
"Frequency"	CDF_REAL4	1	1	400	F	T

CDF Variables Attributes

```
"CATDESC"     CDF_CHAR     { "LH polar flux density" }
"DEPEND_0"    CDF_CHAR     { "Epoch" }
"DEPEND_1"    CDF_CHAR     { "Frequency" }
"LABL_PTR_1"  CDF_CHAR     { "Frequency" }
"DICT_KEY"    CDF_CHAR     { "electric_field>power" }
"DISPLAY_TYPE"
              CDF_CHAR     { "time_series" }
"FIELDNAM"    CDF_CHAR     { "LH_FLUX" }
"FILLVAL"     CDF_REAL4    { -1.0e+31 }
"FORMAT"      CDF_CHAR     { "E12.2" }
"LABLAXIS"    CDF_CHAR     { "LH polar flux density" }
"UNITS"       CDF_CHAR     { "W/m^2/Hz" }
"VALIDMIN"    CDF_REAL4    { 0.0 }
"VALIDMAX"    CDF_REAL4    { 1.0e+06 }
"VAR_TYPE"    CDF_CHAR     { "data" }
"SCALETYP"    CDF_CHAR     { "log" }
"SCALEMIN"    CDF_REAL4    { 0.0 }
"SCALEMAX"    CDF_REAL4    { 20.0 }
"UCD"         CDF_CHAR     { "phys.flux.density;em.radio" } .
```

Overview of Europlanet/VESPA

- VESPA is a “virtual research infrastructure”. It provides tools to share, access and work with data using standard protocols.

- VESPA is using existing standards developed by the astronomy community (IVOA). Hence the infrastructure is not maintained by VESPA.

- VESPA data services are hosted by science teams, and must registered with the IVOA registry to be accessible from VO tools.

- NB: *Tools and libraries have been selected for their ease of operation.*

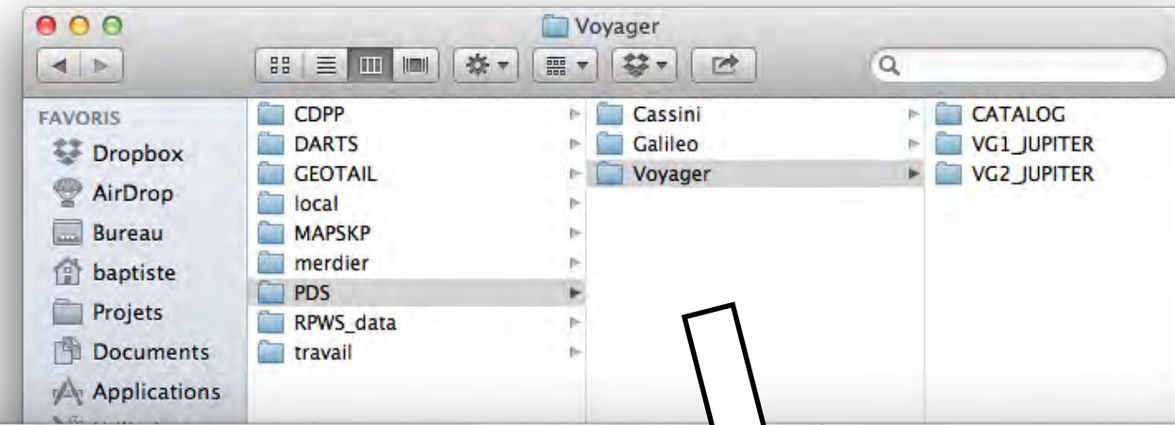
The Europlanet H2020 Research Infrastructure project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 654208.

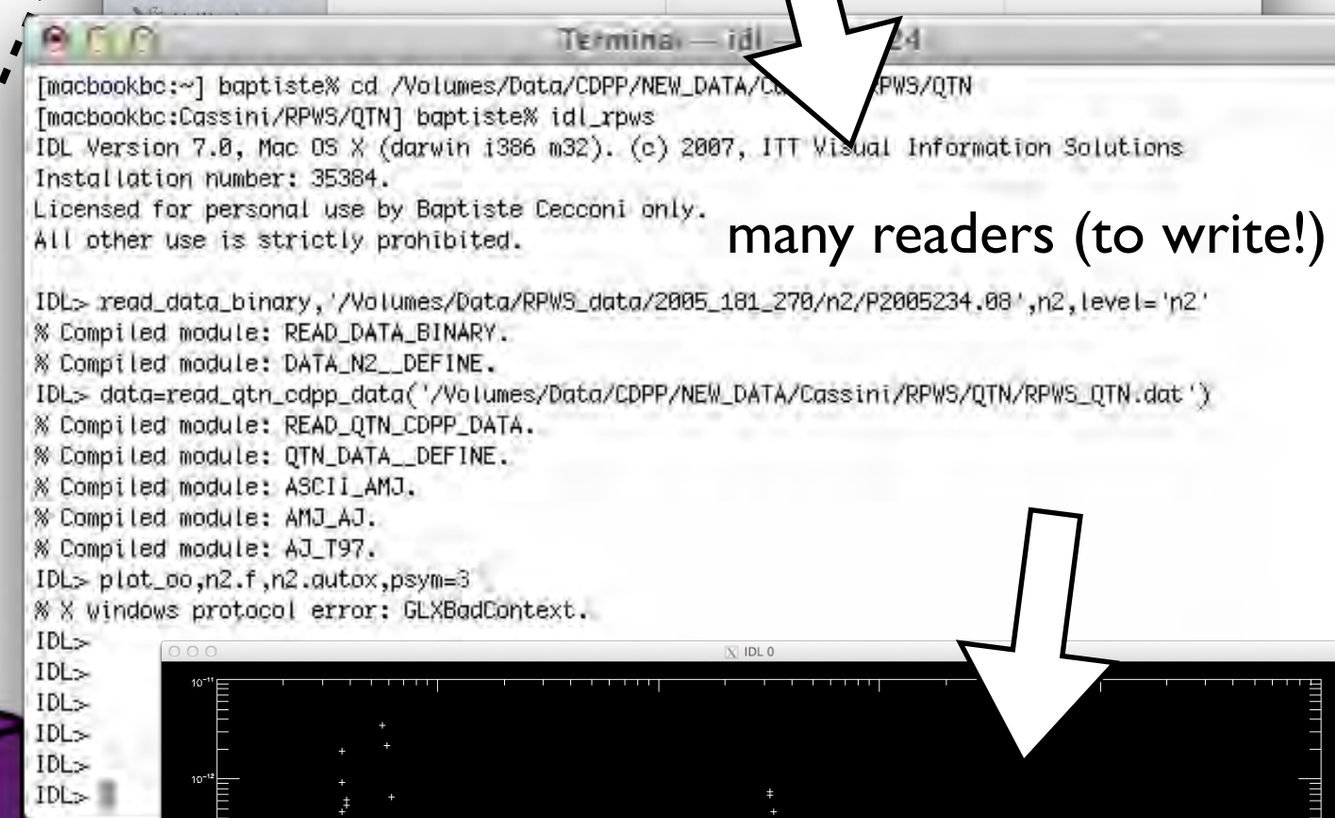
User's experience

«classic»

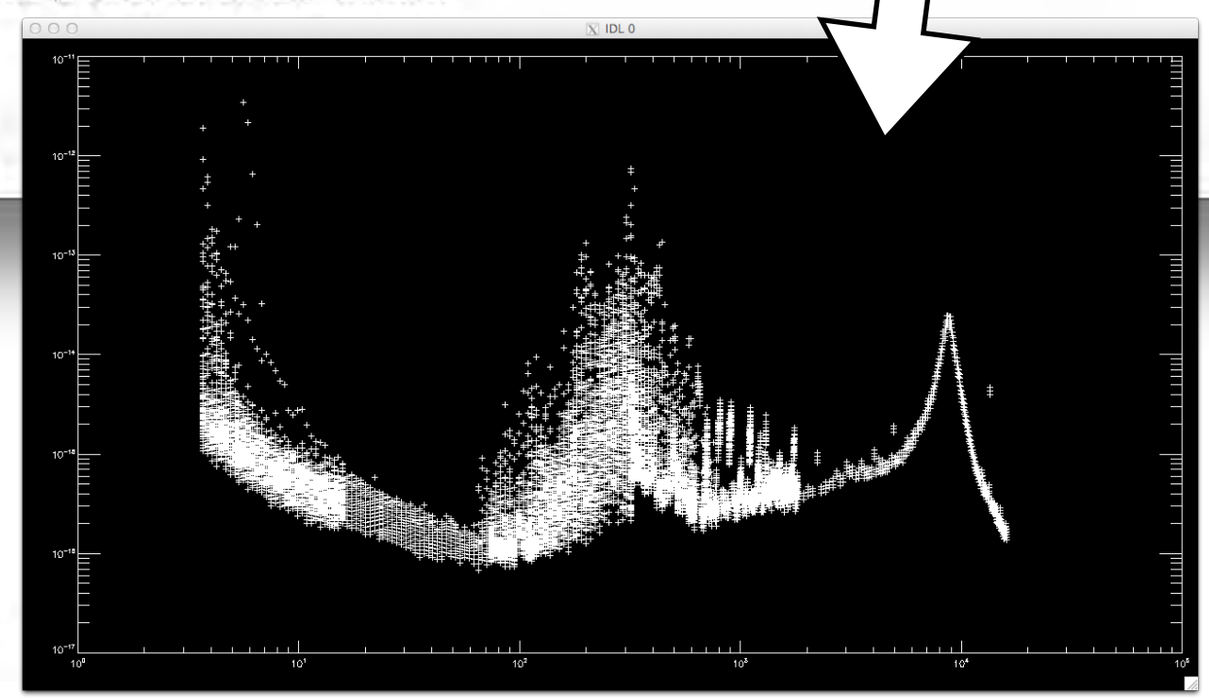
Search Data
(many interfaces)

Get Data
(many formats)





many readers (to write!)



SSODnet

GhoSST
KIDA

PSA

AMDA...

EPN

PDS

Data bases

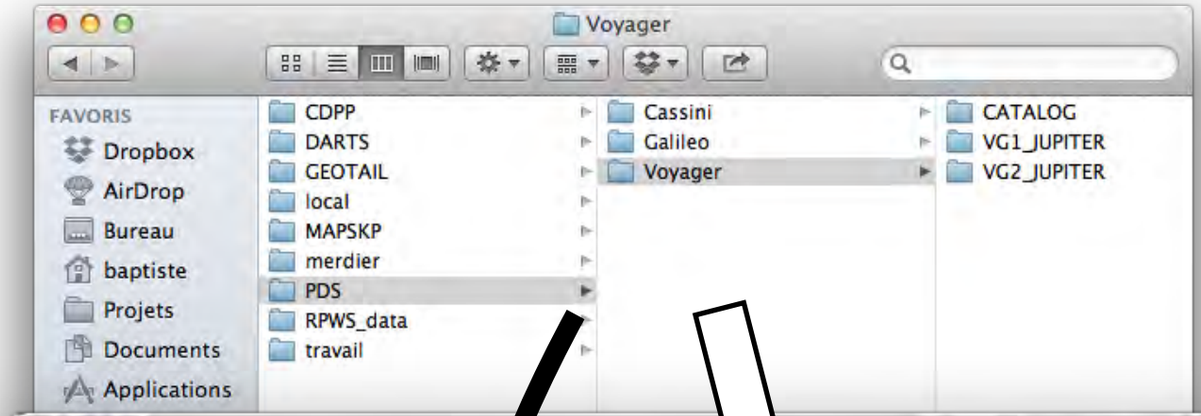
Space agency archives

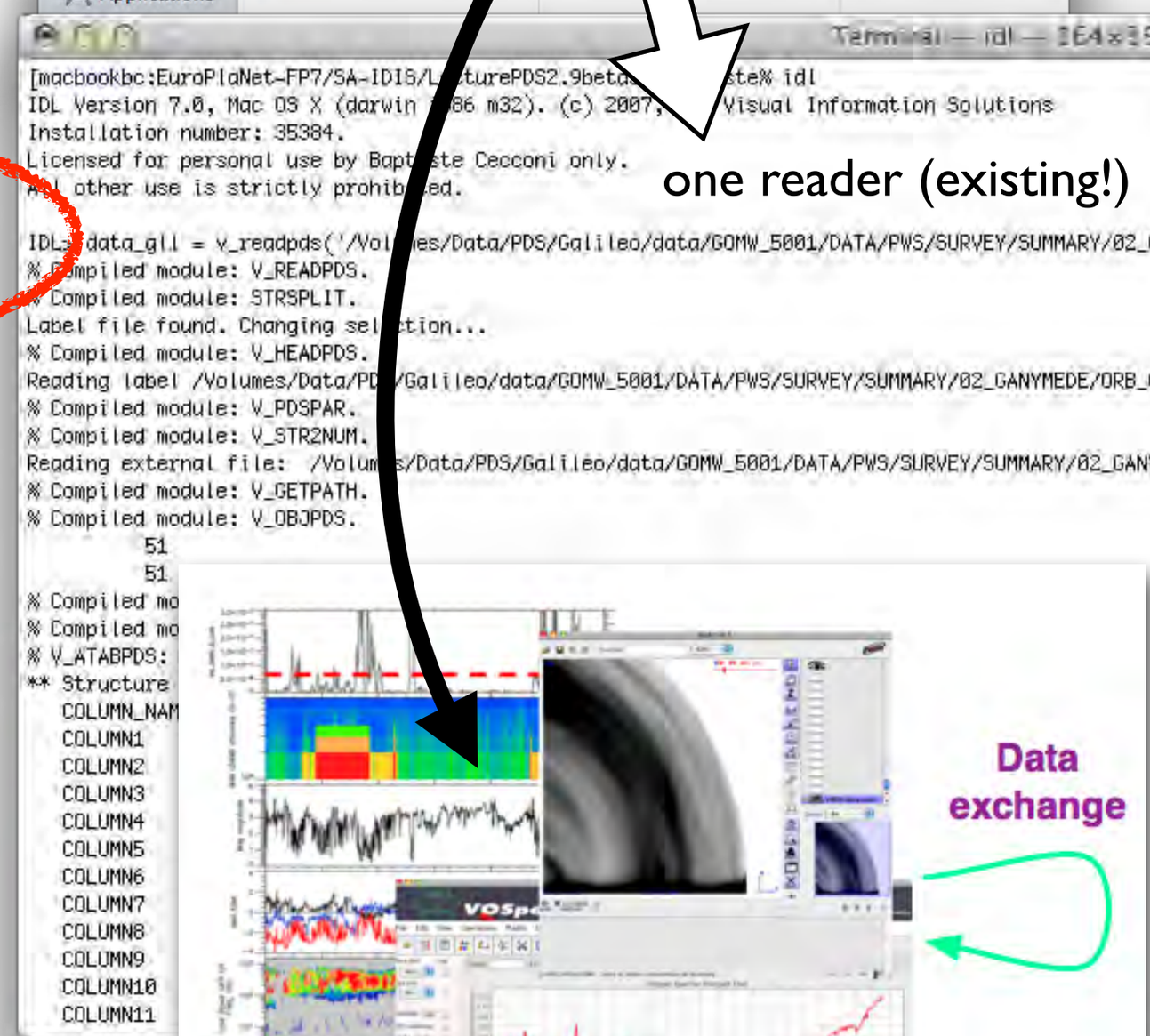
User's experience

«enhanced»

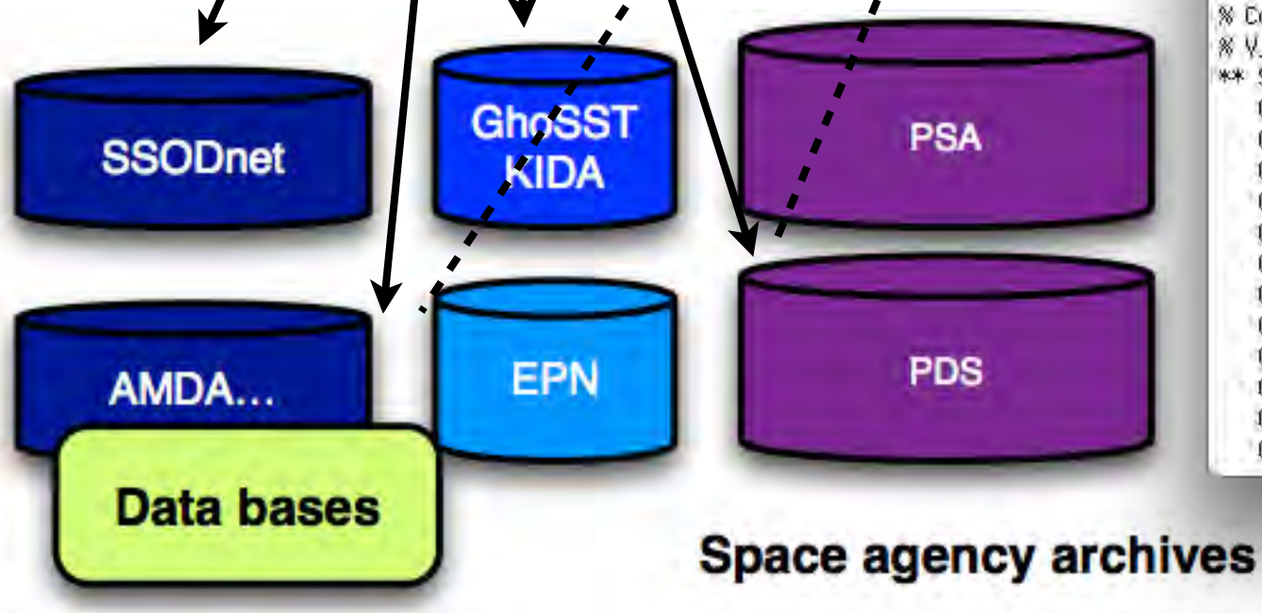
Search Data
(many interfaces)

Get Data
(Standard format)
[VOTable, CDF,...]





one reader (existing!)

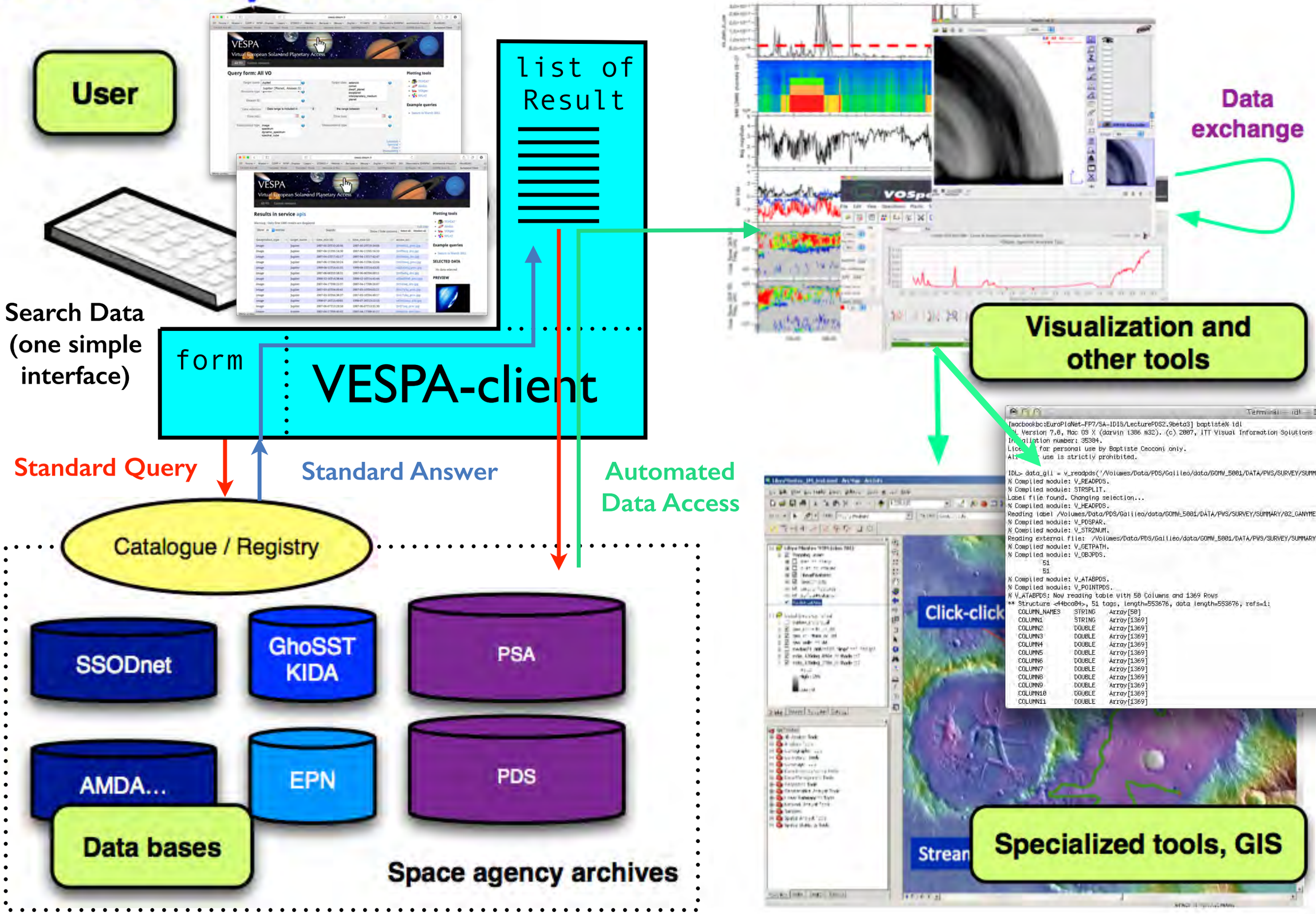


Data exchange

Visualization and other tools

User's experience

«ultimate»

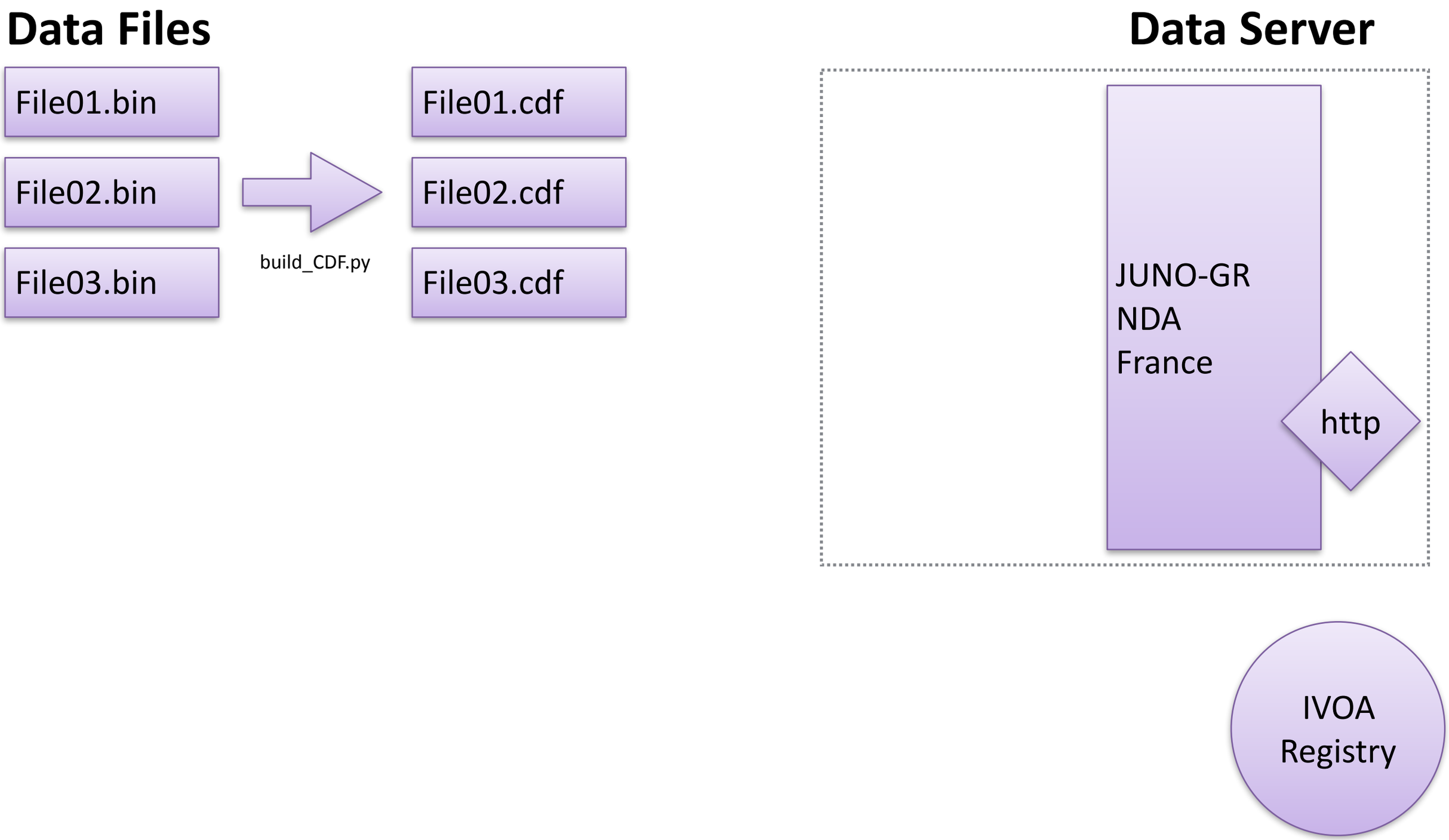


JUNO-Ground-Radio

using VESPA infrastructure: on data provider side

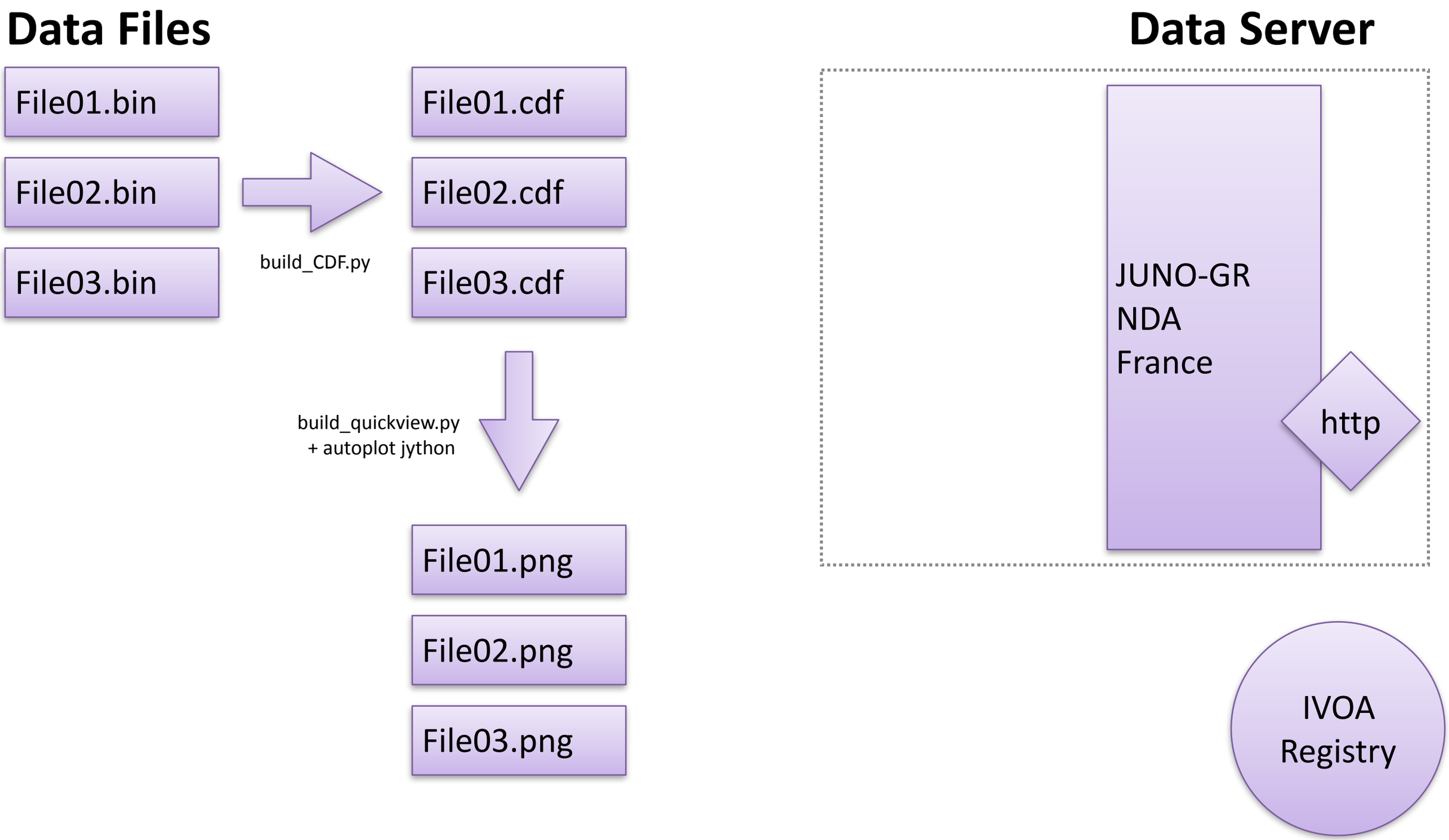
JUNO-Ground-Radio

using VESPA infrastructure: on data provider side



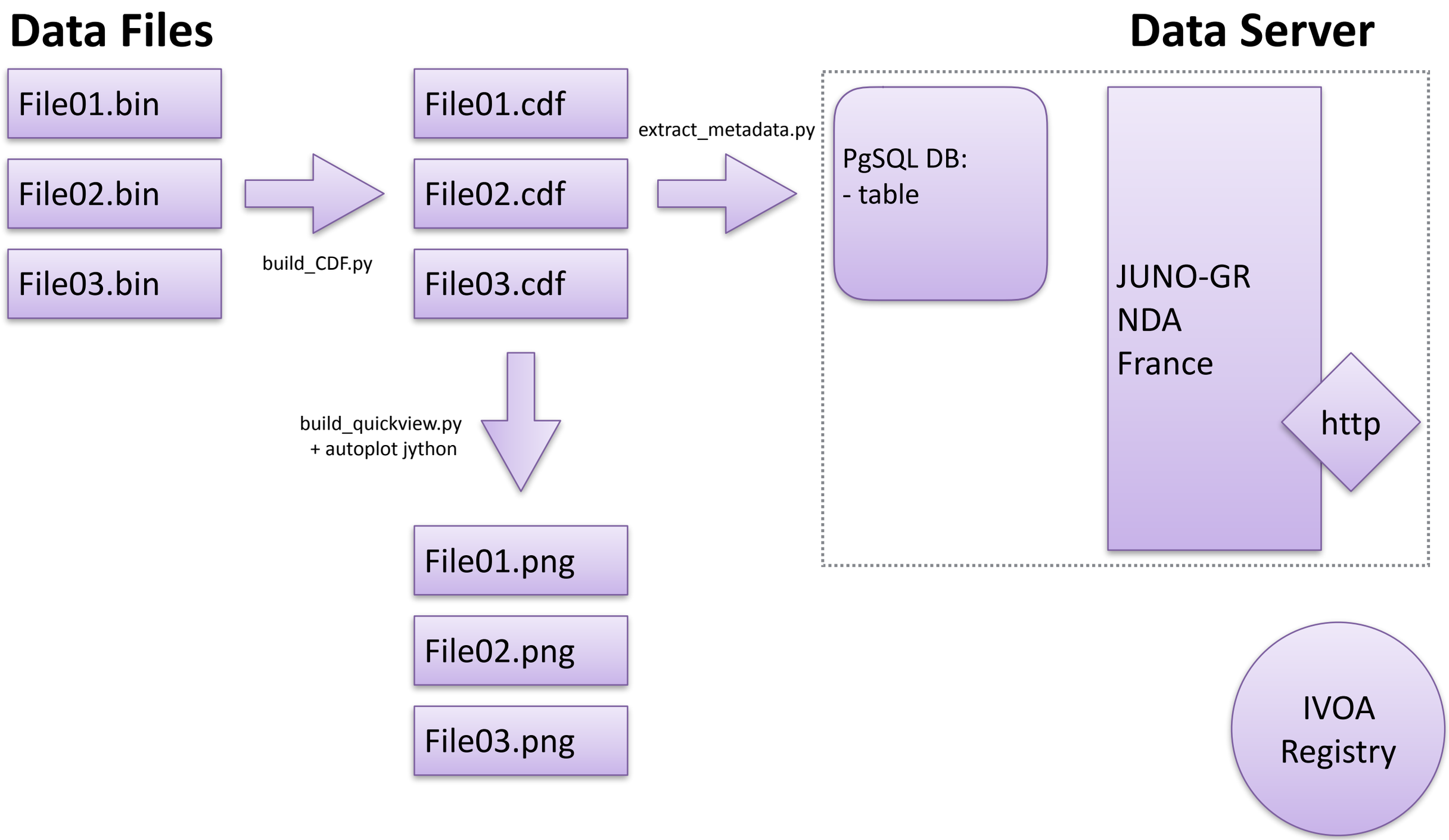
JUNO-Ground-Radio

using VESPA infrastructure: on data provider side



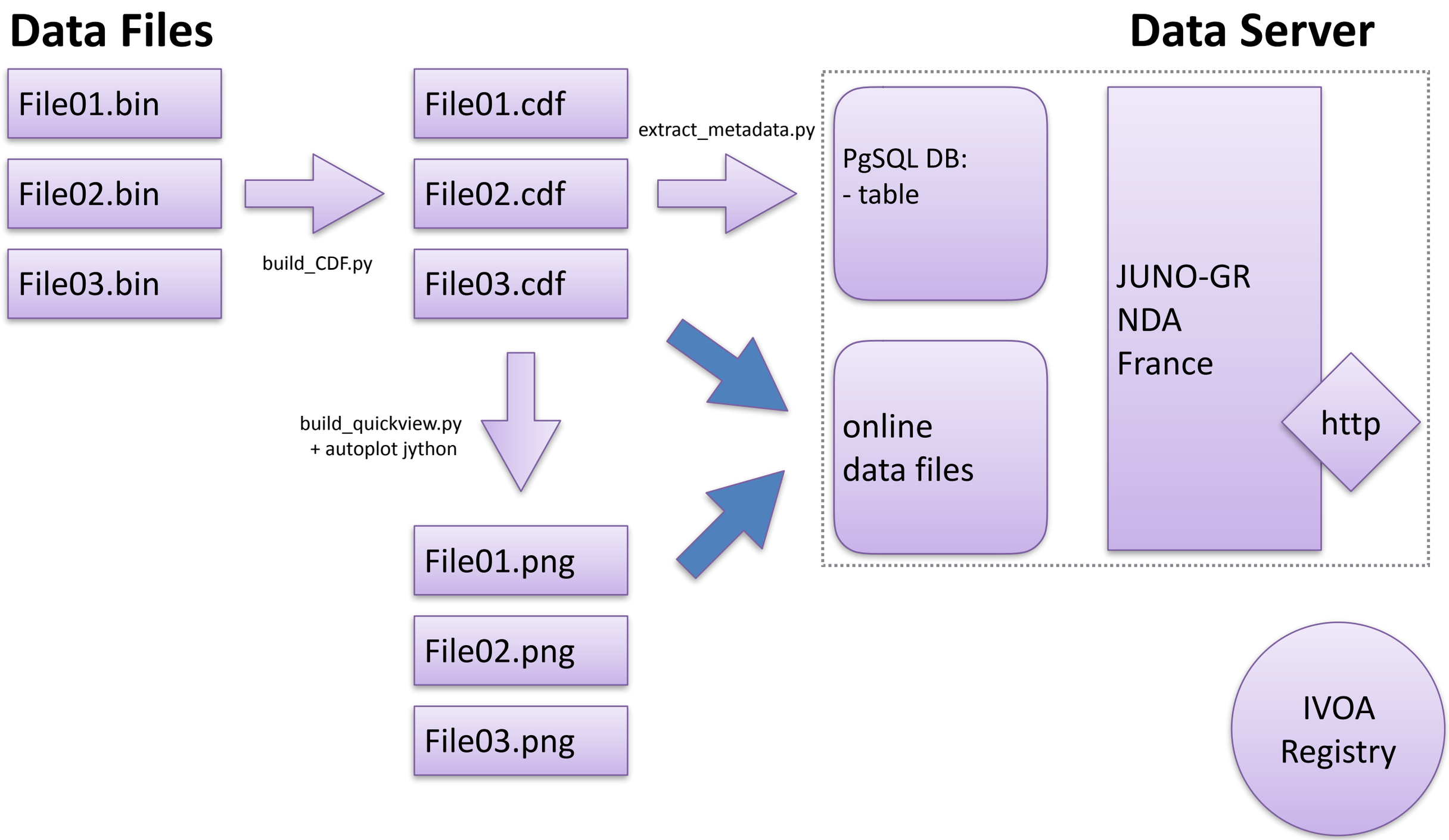
JUNO-Ground-Radio

using VESPA infrastructure: on data provider side



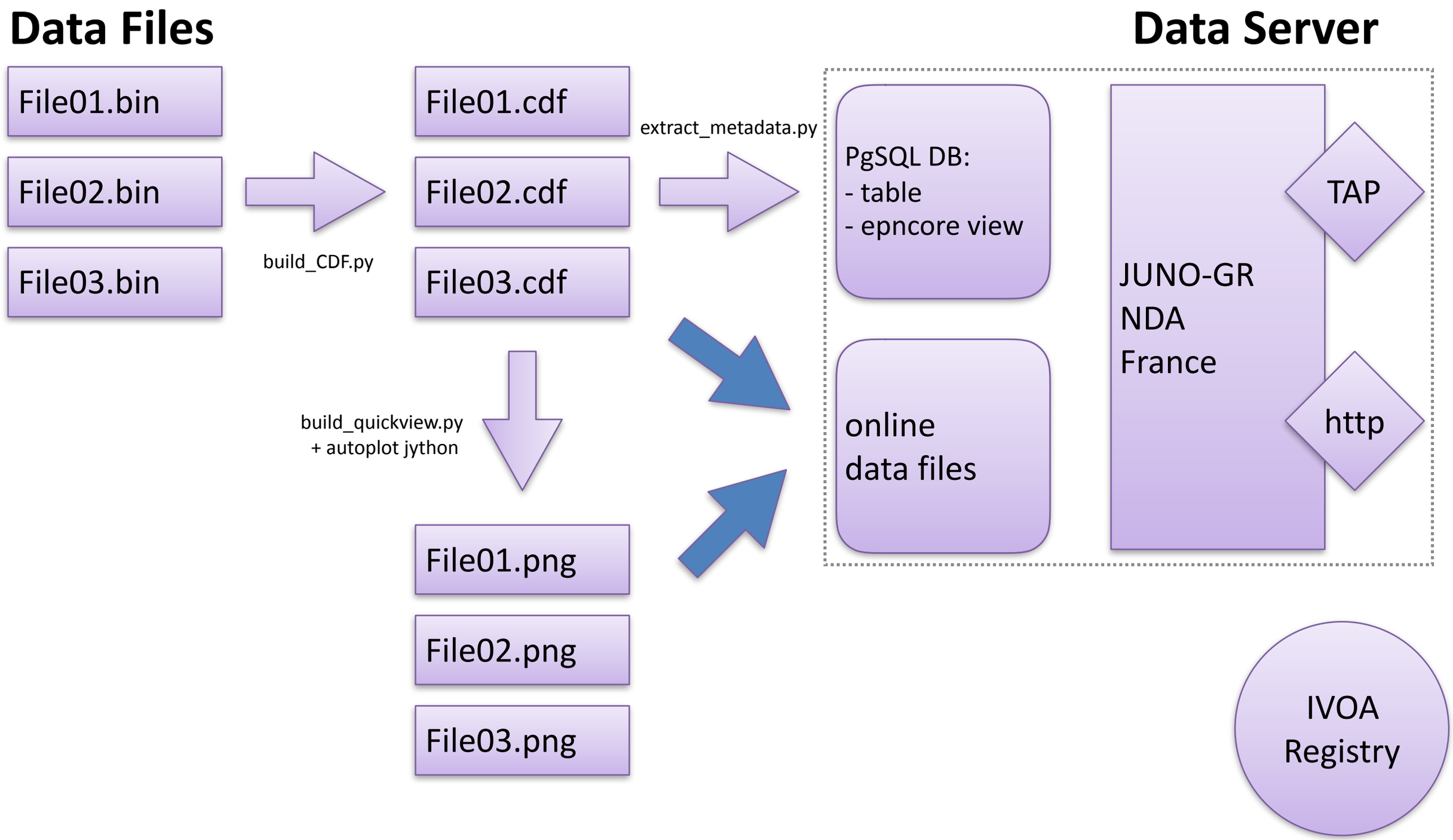
JUNO-Ground-Radio

using VESPA infrastructure: on data provider side



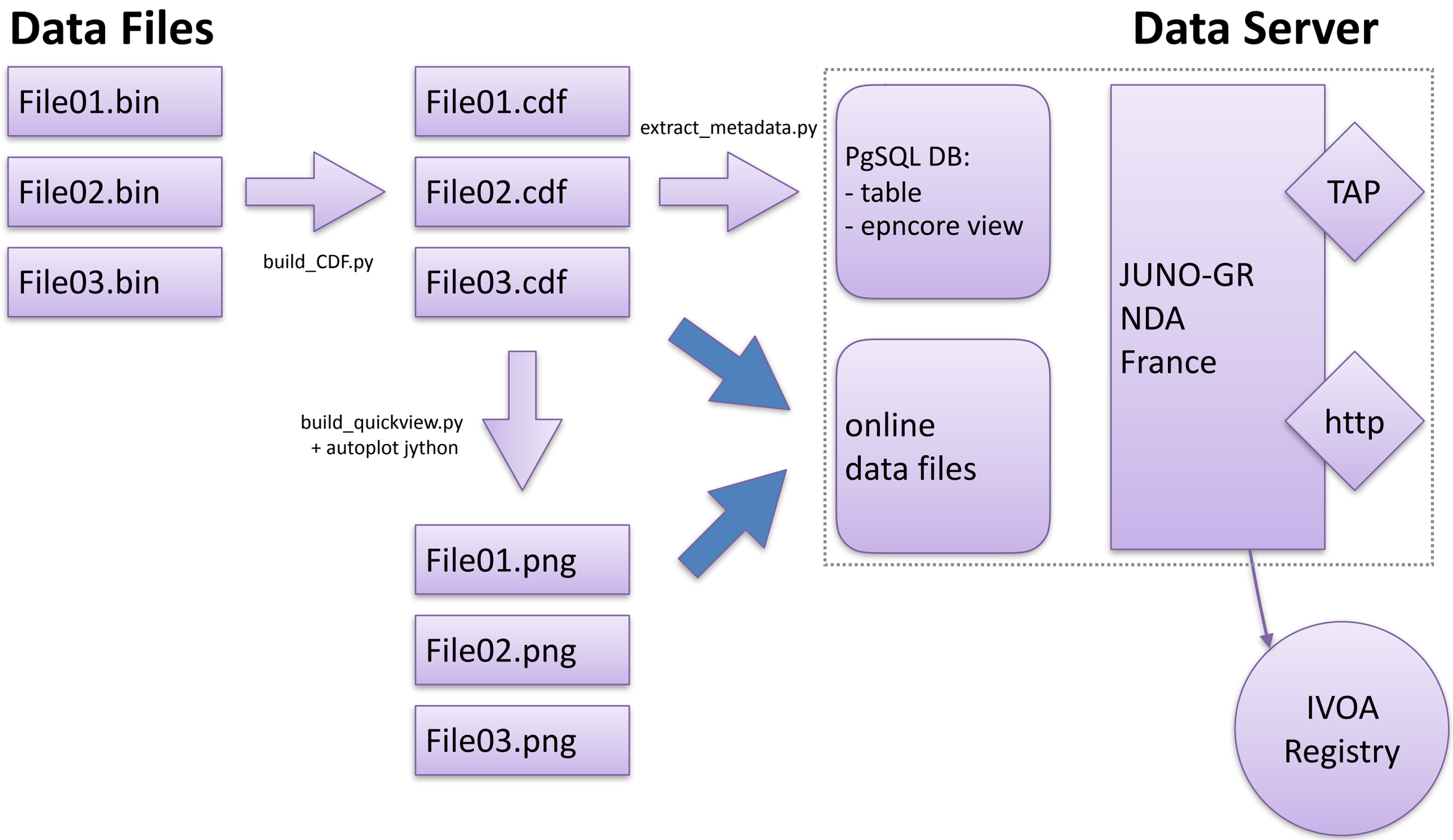
JUNO-Ground-Radio

using VESPA infrastructure: on data provider side



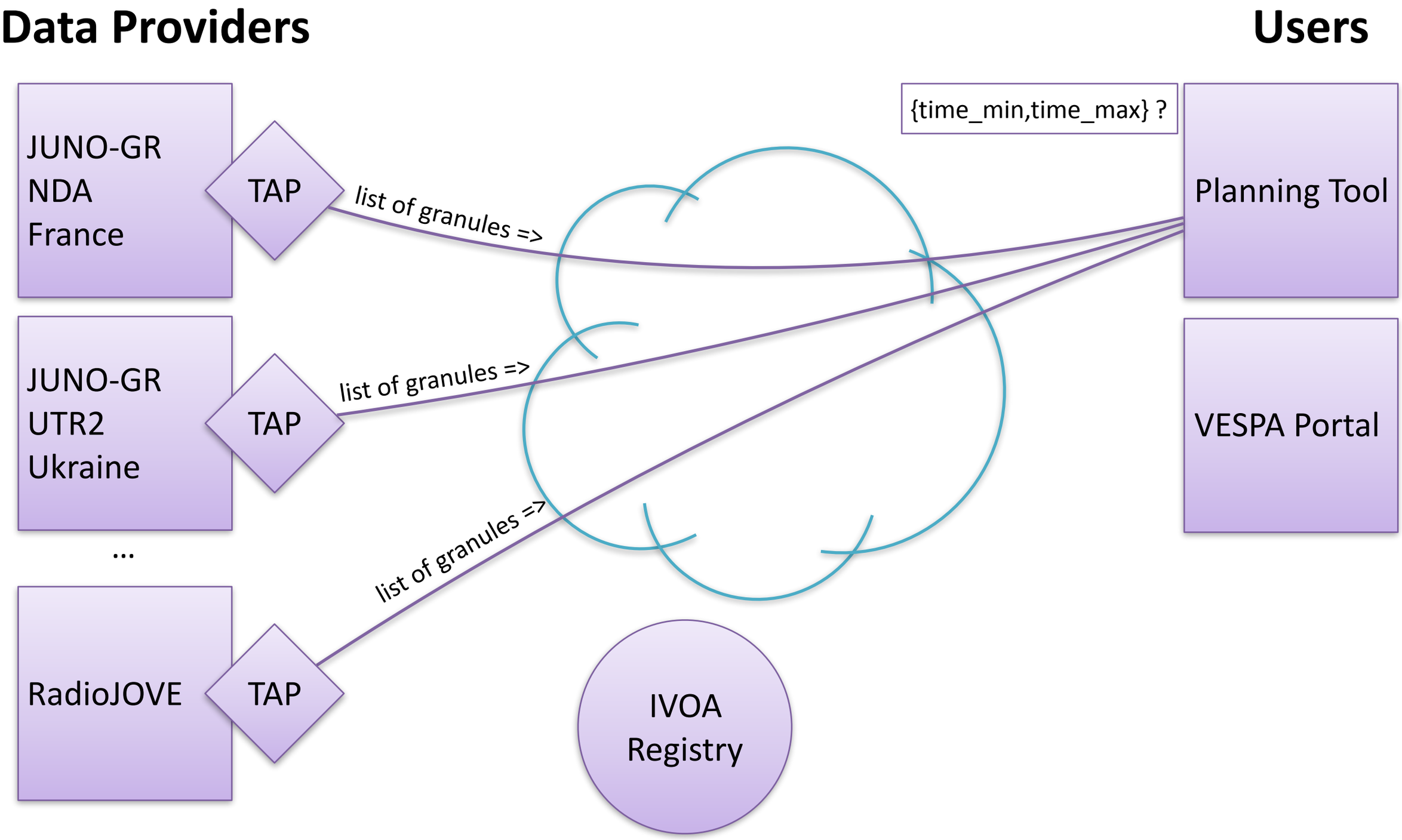
JUNO-Ground-Radio

using VESPA infrastructure: on data provider side



JUNO-Ground-Radio

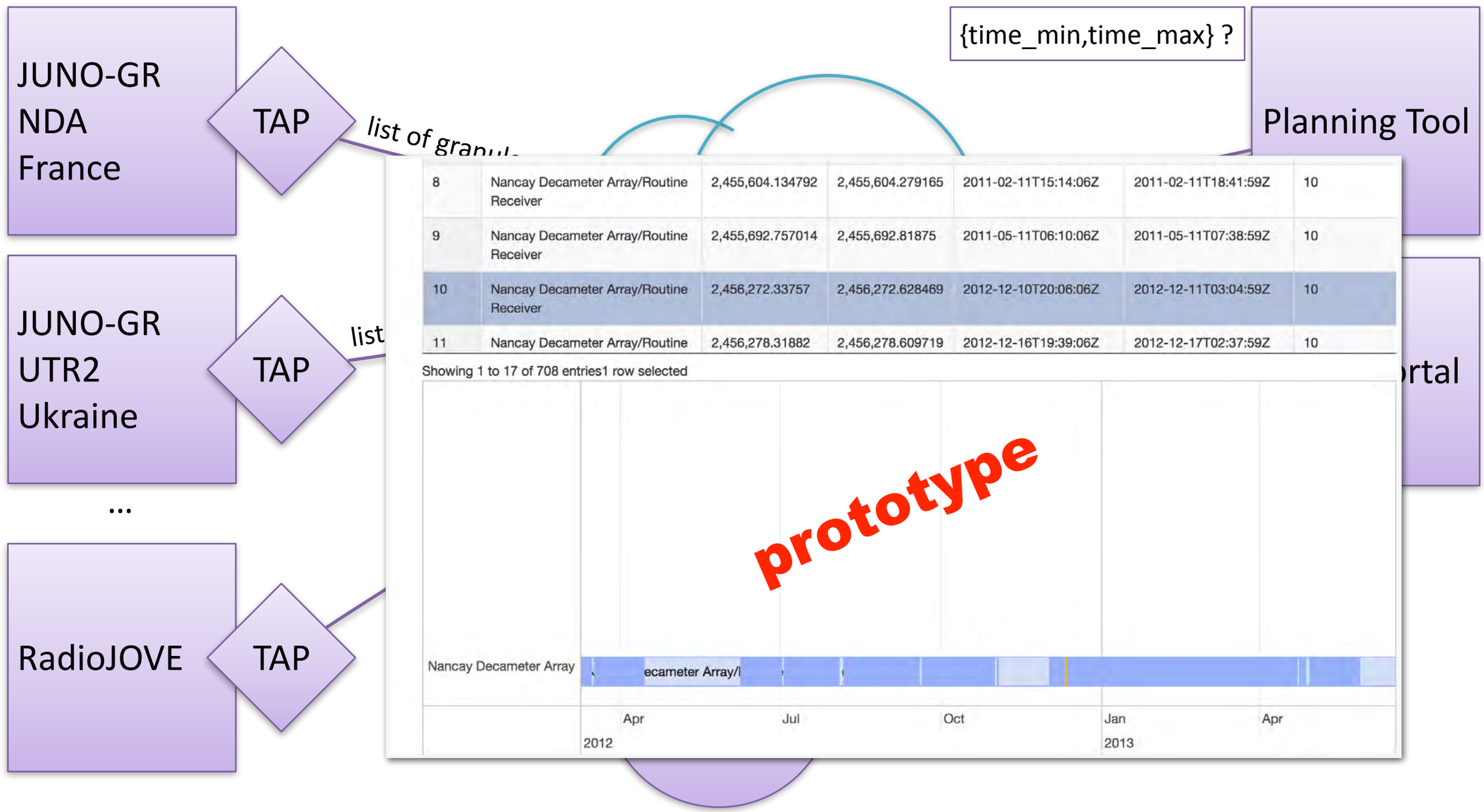
using VESPA infrastructure: getting real observations times



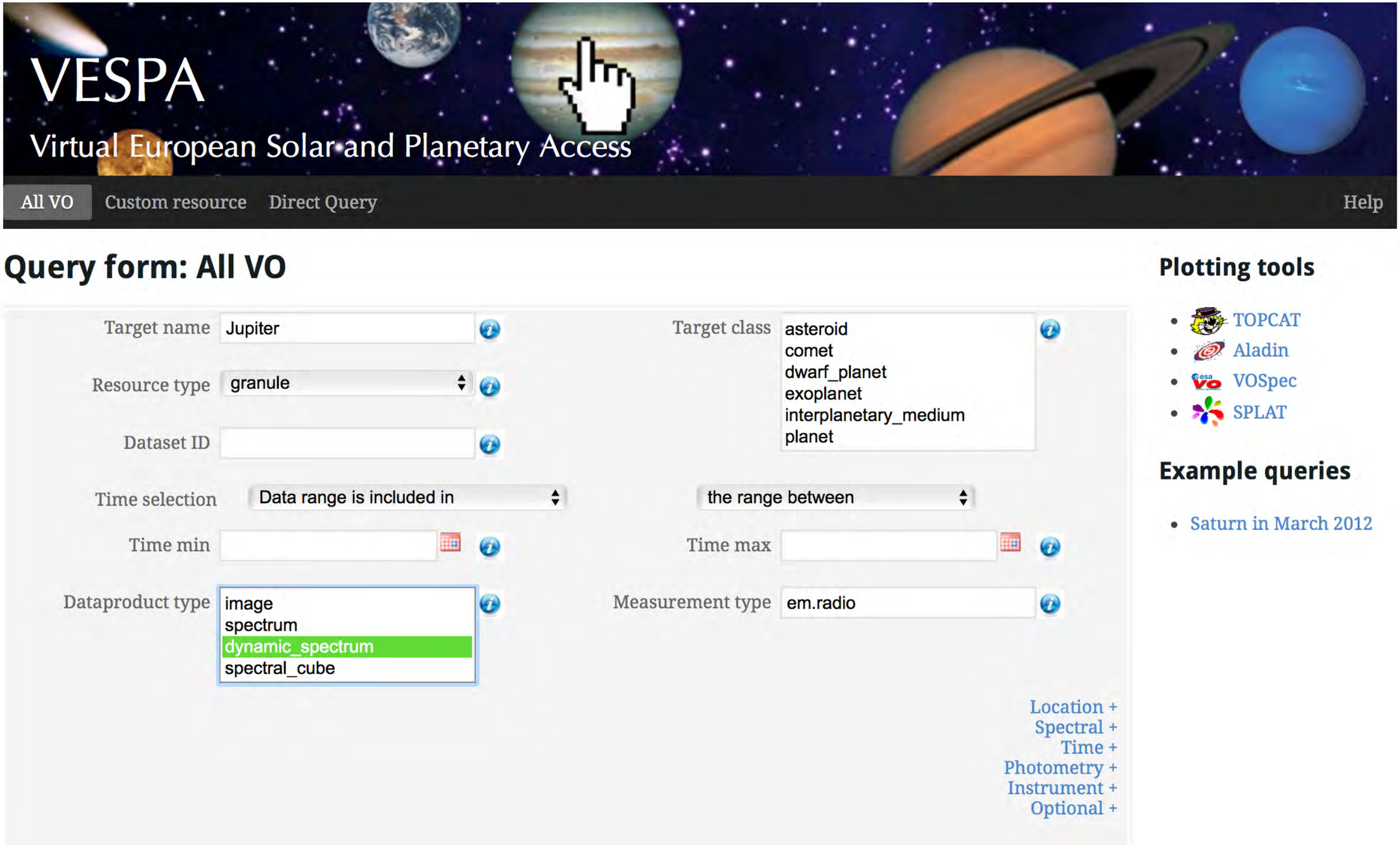
JUNO-Ground-Radio

using VESPA infrastructure: getting real observations times

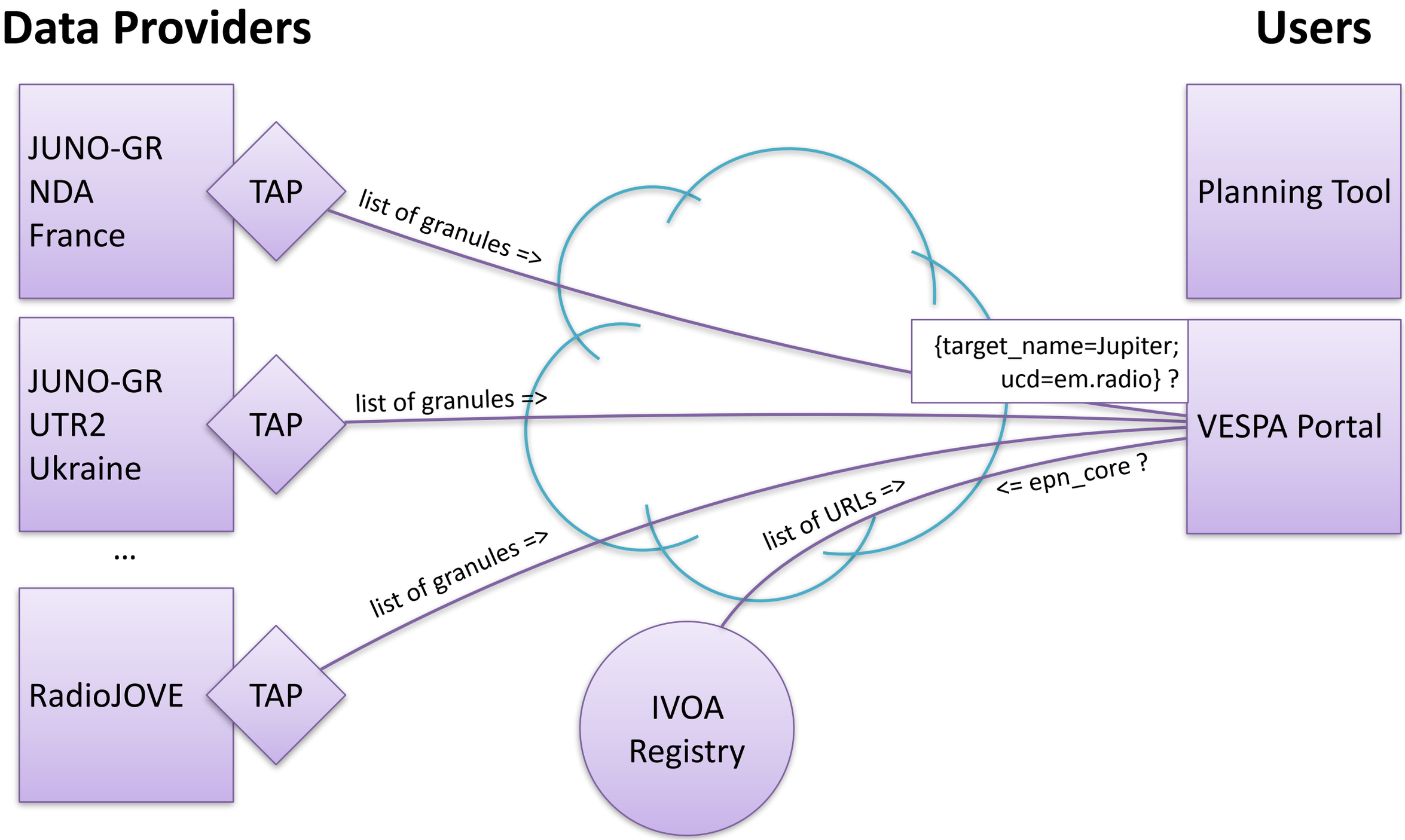
Data Providers **Users**



JUNO-Ground-Radio
using VESPA infrastructure



JUNO-Ground-Radio
using VESPA infrastructure



VESPA

Virtual European Solar and Planetary Access

All VO | Custom resource | Direct Query | Help

Results in service dam

Show 20 entries | Search: | Show / hide columns | Select all | Deselect all | Full Text

dataproduct_type	target_name	time_min (d)	time_max (d)	access_url
dynamic_spectrum	jupiter	2012-07-07T06:00:00	2012-07-07T06:00:00	J120707.xml
dynamic_spectrum	jupiter	2012-03-31T18:00:00	2012-03-31T18:00:00	J120331.xml
dynamic_spectrum	jupiter	2013-02-03T18:00:00	2013-02-04T00:00:00	J130203.xml
dynamic_spectrum	jupiter	2012-08-22T00:00:00	2012-08-22T06:00:00	J120822.xml
dynamic_spectrum	jupiter	2011-09-27T00:00:00	2011-09-27T06:00:00	J110927.xml
dynamic_spectrum	jupiter	2013-02-15T18:00:00	2013-02-16T00:00:00	J130215.xml
dynamic_spectrum	jupiter	2012-08-30T00:00:00	2012-08-30T06:00:00	J120830.xml
dynamic_spectrum	jupiter	2011-02-11T18:00:00	2011-02-11T18:00:00	J110211.xml
dynamic_spectrum	jupiter	2011-05-11T06:00:00	2011-05-11T06:00:00	J110511.xml
dynamic_spectrum	jupiter	2012-12-10T18:00:00	2012-12-11T06:00:00	J121210.xml
dynamic_spectrum	jupiter	2012-12-16T18:00:00	2012-12-17T00:00:00	J121216.xml
dynamic_spectrum	jupiter	2012-12-24T18:00:00	2012-12-25T00:00:00	J121224.xml
dynamic_spectrum	jupiter	2012-07-05T06:00:00	2012-07-05T06:00:00	J120705.xml
dynamic_spectrum	jupiter	2011-01-14T18:00:00	2011-01-14T18:00:00	J110114.xml

Plotting tools

- TOPCAT
- Aladin
- VOSpec
- SPLAT

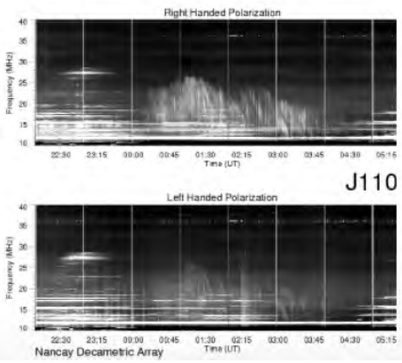
Example queries

- Saturn in March 2012

SELECTED DATA

No data selected

PREVIEW



VESPA

Virtual European Solar and Planetary Access

All VO | Custom resource | Direct Query | Help

Results in service iitate

Warning : Only first 1000 results are displayed

Full Text

Show 20 entries Search: Show / hide columns Select all Deselect all

dataproduct_type	target_name	time_min (d)	time_max (d)	access_url
dynamic_spectrum	Jupiter	2011-10-27T00:00:00	2011-10-27T23:59:59.500	it_h1_hf_20111027_v01.cdf
dynamic_spectrum	Jupiter	2011-10-28T00:00:00	2011-10-28T23:59:59.500	it_h1_hf_20111028_v01.cdf
dynamic_spectrum	Jupiter	2011-10-29T00:00:00	2011-10-29T23:59:59.500	it_h1_hf_20111029_v01.cdf
dynamic_spectrum	Jupiter	2011-10-30T00:00:00	2011-10-30T23:59:59.500	it_h1_hf_20111030_v01.cdf
dynamic_spectrum	Jupiter	2011-10-31T00:00:00	2011-10-31T23:59:59.500	it_h1_hf_20111031_v01.cdf
dynamic_spectrum	Jupiter	2011-11-01T00:00:00	2011-11-01T23:59:59.500	it_h1_hf_20111101_v01.cdf
dynamic_spectrum	Jupiter	2011-11-02T00:00:00	2011-11-02T23:59:59.500	it_h1_hf_20111102_v01.cdf
dynamic_spectrum	Jupiter	2011-11-03T00:00:00	2011-11-03T23:59:59.500	it_h1_hf_20111103_v01.cdf
dynamic_spectrum	Jupiter	2011-11-04T00:00:00	2011-11-04T23:59:59.500	it_h1_hf_20111104_v01.cdf
dynamic_spectrum	Jupiter	2011-11-05T00:00:00	2011-11-05T23:59:59.500	it_h1_hf_20111105_v01.cdf
dynamic_spectrum	Jupiter	2011-11-06T00:00:00	2011-11-06T23:59:59.500	it_h1_hf_20111106_v01.cdf
dynamic_spectrum	Jupiter	2011-11-07T00:00:00	2011-11-07T23:59:59.500	it_h1_hf_20111107_v01.cdf
dynamic_spectrum	Jupiter	2011-11-08T00:00:00	2011-11-08T23:59:59.500	it_h1_hf_20111108_v01.cdf
dynamic_spectrum	Jupiter	2011-11-09T00:00:00	2011-11-09T23:59:59.500	it_h1_hf_20111109_v01.cdf
dynamic_spectrum	Jupiter	2011-11-10T00:00:00	2011-11-10T23:59:59.500	it_h1_hf_20111110_v01.cdf

Plotting tools

- TOPCAT
- Aladin
- VOSpec
- SPLAT

Example queries

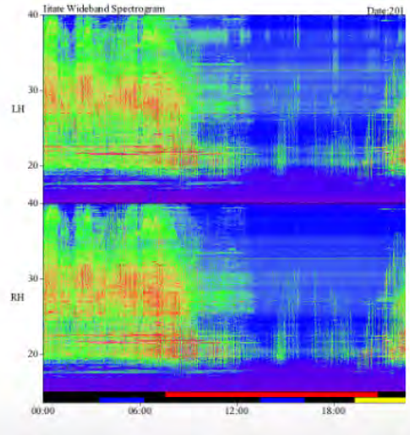
- Saturn in March 2012

SELECTED DATA

2 selected data

- 2 : dynamic_spectrum

PREVIEW



RadioJOVE archive+distribution

- Ongoing project with RadioJOVE team to prepare archive of their data in NASA/PDS/PPI.

- Data submission website:
  https://voparis-radiojove.obspm.fr
  registration required, data validation by science team. Once validated, data is converted into CDF, preview file is computed and data is put online in VESPA infrastructure.

- Data collection will be assessed with NASA/PDS/PPI for archive soon (starting April 2016).

RadioJOVE archive

Paris Data Centre | l'Observatoire de Paris | LESIA | RADIO JOVE Files

RJAP version 0.6 by RS | Logout

New File

Search:

- Welcome
- Users
- Roles
- **Instruments**
- Sources
- **Observations**
- Softwares
- File Types
- File Statuses
- **Files**

Id	User	Name	Obs Id	Software
21	davetyp@typnet.net	radiojove_edr_sp2_300_201601051000_201601051229_v09.cdf	17	make_radiojove_cdf IDL routines
20	davetyp@typnet.net	160104100000 corrected using CA 2014 12 18 B.sps	17	make_radiojove_cdf IDL routines
19	renaud.savalle@obspm.fr	radiojove_edr_sp1_400_201301301953_201301301955_v09.cdf	16	make_radiojove_cdf IDL routines
18	renaud.savalle@obspm.fr	130129195300 N-Event LGM.sps	16	Radio Sky Pipe (RSP)
17	renaud.savalle@obspm.fr	jbrown_UT150220015855.spd	15	Radio Sky Pipe (RSP)
16	renaud.savalle@obspm.fr	radiojove_edr_sp1_400_201301301953_201301301955_v08.cdf	14	Radio Sky Pipe (RSP)

Showing 1 to 6 of 6 entries

RadioJOVE archive

Paris Data Centre | l'Observatoire de Paris | LESIA | RADIO JOVE Files

RJAP version 0.6 by RS | Logout

New File

Search:

- Welcome
- Users
- Roles
- **Instruments**
- Sources
- **Observations**
- Softwares
- File Types
- File Statuses
- **Files**

Id	User	Name	Obs Id	Software
21	davetyp@typnet.net	radiojove_edr_sp2_300_201601051000_201601051229_v09.cdf	17	make_radiojove_cdf IDL routines
20	dav			
19	ren			
18	ren			
17	ren			
16	ren			

Showing 1

	Obs Id	Software	Type	Status	Size	Created	Modified	Actions
v09.cdf	17	make_radiojove_cdf IDL routines	CDF	validated	138,591,839	2016-01-08 01:53:32	2016-01-08 01:54:39	View Edit
	17	make_radiojove_cdf IDL routines	SPS	new	68,931,336	2016-01-08 01:40:32	2016-01-08 01:40:32	View Edit Delete Convert
v09.cdf	16	make_radiojove_cdf IDL routines	CDF	validated	1,011,405	2016-01-07 18:44:19	2016-01-07 18:45:08	View Edit
	16	Radio Sky Pipe (RSP)	SPS	new	482,219	2016-01-07 18:43:33	2016-01-07 18:43:33	View Edit Delete Convert
	15	Radio Sky Pipe (RSP)	SPD	new	37,736	2016-01-07 18:42:07	2016-01-07 18:42:07	View Edit Delete Convert
v08.cdf	14	Radio Sky Pipe (RSP)	CDF	new	1,011,428	2016-01-07 18:41:24	2016-03-02 16:13:51	View Edit Delete Validate

RadioJOVE archive

Paris Data Centre | l'Observatoire de Paris | LESIA | RADIO JOVE Files

RJAP version 0.6 by RS | Logout

New File

Search:

- Welcome
- Users
- Roles
- **Instruments**
- Sources
- **Observations**
- Softwares
- File Types
- File Statuses
- **Files**

Id	User	Name	Obs Id	Software
21	davetyp@typnet.net	radiojove_edr_sp2_300_201601051000_201601051229_v09.cdf	17	make_radiojove_cdf IDL routines
20	dav			
19	ren			
18	ren			
17	ren			
16	ren			

Showing 1

	Obs Id	Software	Type	Status	Size	Created	Modified	Actions
v09.cdf	17	make_radiojove_cdf IDL routines	CDF	validated	138,591,839	2016-01-08 01:53:32	2016-01-08 01:54:39	View Edit
	17	make_radiojove_cdf IDL routines	SPS	new	68,931,336	2016-01-08 01:40:32	2016-01-08 01:40:32	View Edit Delete Convert
v09.cdf	16	make_radiojove_cdf IDL routines	CDF	validated	1,011,405	2016-01-07 18:44:19	2016-01-07 18:45:08	View Edit
	16	Radio Sky Pipe (RSP)	SPS	new	482,219	2016-01-07 18:43:33	2016-01-07 18:43:33	View Edit Delete Convert
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v08.cdf	14	Radio Sky Pipe (RSP)	CDF	new	1,011,428	2016-01-07 18:41:24	2016-03-02 16:13:51	View Edit Delete Validate

RadioJOVE on VESPA

Results in service radiojove

Full Text

Show 20 entries Search: Show / hide columns Select all Deselect all

dataproduct_type	target_name	time_min (d)	time_max (d)	access_url
DS>Dynamic Spe...	Jupiter	2013-01-30T19...	2013-01-30T1...	radiojove_edr_sp1_400_201301301953_201301301955_
DS>Dynamic Spe...	Jupiter	2016-01-05T10...	2016-01-05T1...	radiojove_edr_sp2_300_201601051000_201601051229_

Showing 1 to 2 of 2 entries First Previous 1 Next Last

Download selection SAMP selection as Samp VOTable selection Samp all VOTable

Plotting tools

- TOPCAT
- Aladin
- VOSpec
- SPLAT

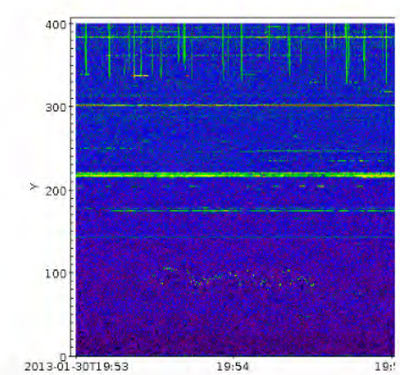
Example queries

- Saturn in March 2012

SELECTED DATA

No selected data

PREVIEW



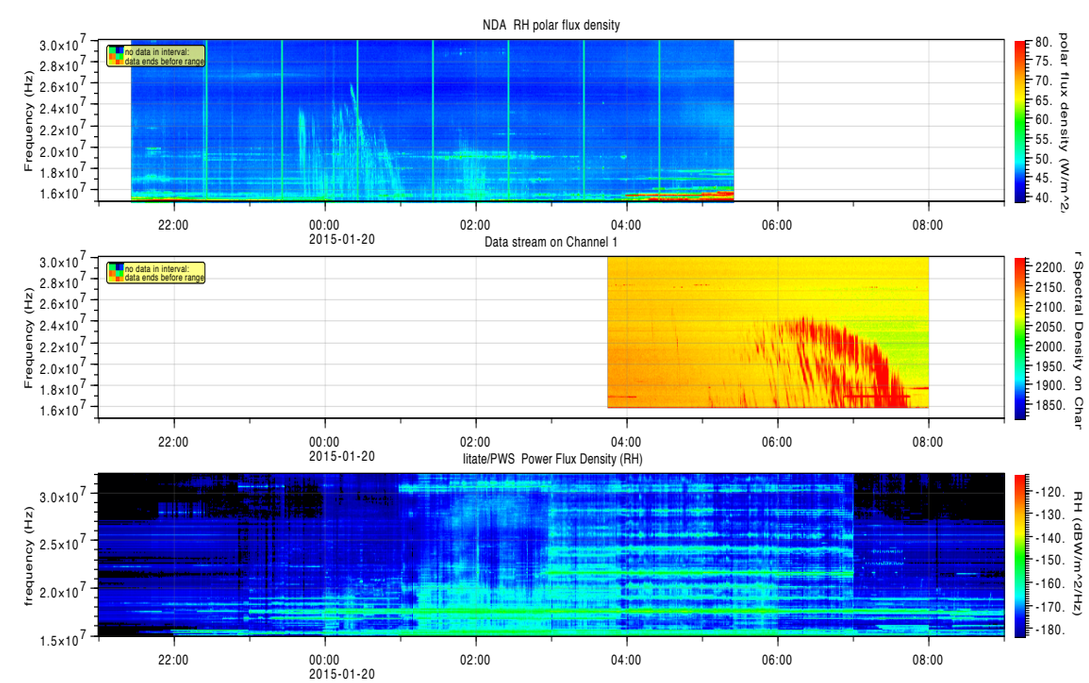
ExPRES
(Radio Emission Simulator)

- History:
  - Designed for JUNO ~10 years ago, with S. Hess.
  - Adapted to Saturn for Cassini studies (L. Lamy)
  - Now developed by new PhD student, C. Louis.
  See Philippe's talk tomorrow.

- Emission mechanism: CMI (Cyclotron Maser Instability) with shell or loss-cone (energy of unstable population is adjustable). Sources can be on galilean satellites or auroral field lines.
  Output: modeled spectrograms for a given observer, with polarization.

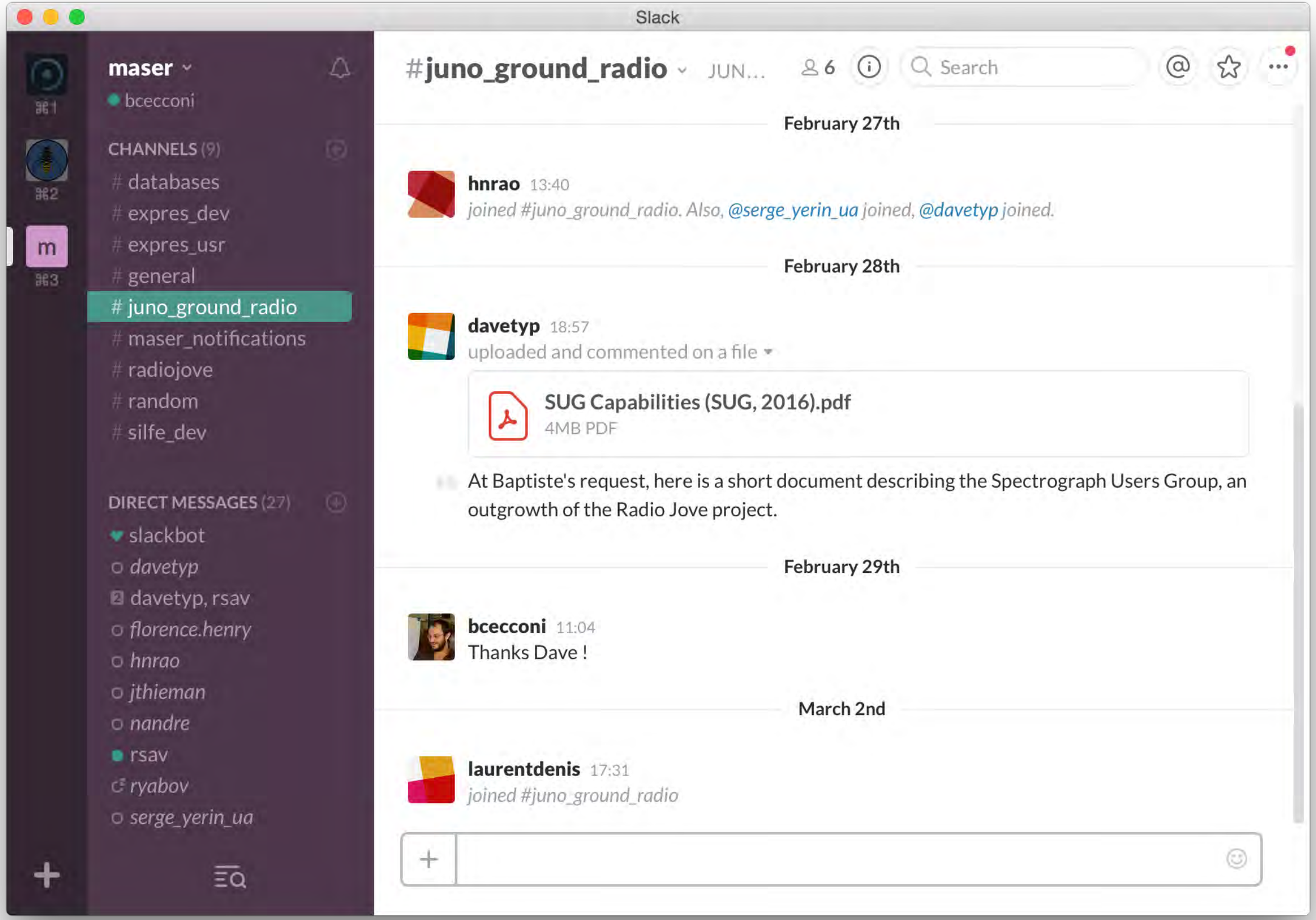
JUNO-Ground-Radio
Observation Support team

- All data providers use the same infrastructure:
  - VESPA server + CDF files with same metadata
- Metadata compliant with:
  - **International Solar Terrestrial Program** guidelines:
    ok with NASA/SPDF or CNES/CDPP
  - **NASA Planetary Data System – Planetary Plasma Interaction** node recommendation
  - **EPNcore**: automated distribution in VESPA
- Usage of CDF:
  - Data can be plotted in various tools (such as **autoplot**). Example
- Usage of VESPA:
  - Unified access.
  - Used for scheduling (time_min/max)



Tools Summary

- Web site: http://maser.lesia.obspm.fr
  MASER: Measurement Analysis and Simulation of Emissions in Radio *(sounds better in French…)*
- Planning Tool: https://voparis-juno.obspm.fr
  (Twitter support planned for new submissions)
- Data distribution support: http://discussions.europlanet-vespa.eu
- RadioJOVE archive: https://voparis-radiojove.obspm.fr
  (Twitter just added for new submissions: @radiojove_arch)
- Online support and discussion:
  https://maser.slack.com (#juno-ground-support)
- Accessing data: http://vespa.obspm.fr



https://maser.slack.com (ask for an invitation!)

Sharing other data?

- Amateur observation imaging.
  R. Hueso (EHU, Bilbao) + M Scherf (Graz, Austria) will share on VESPA the amateur data they store on PVOL (http://www.pvol.ehu.es/pvol/)

- Preliminary discussions with Hisaki team (T. Kimura) for sharing EVU spectra (FITS files) using VESPA.

- Any other candidate?

Status

- ♲ JUNO-Ground-Radio section of MASER Web site
- ♲ Data distribution servers:
  - [FR] Nançay Decameter Array: registered but must be updated;
  - [JP] Iitate Observatory: ready but not registered; CDF ready.
  - [US] LWA1: under construction (C. Higgins in charge)
  - [UA] UTR-2: planned for mid-April.
  - [EU] LOFAR: status unknown
  - [US] RadioJOVE: ready (data coming soon).
- ✓ Online tutorials, support and discussion tools
- ✓ Accessing data (VESPA)
- ✓ Planning (inputs from each participant to be completed)
- ♲ ExPRES: new public access release planned for 2017.