

MASER (Mesures Analyses Simulations d'Emissions Radio)

— a toolbox for low frequency radio astronomy —

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A Toolbox for Data Providers

- Distribute data catalogues
- Distribute data for direct access
- Standard APIs

A Toolbox for Scientists

- Search for data of interest
- Visualize online data
- Use a library of tools and codes

An Open Toolbox

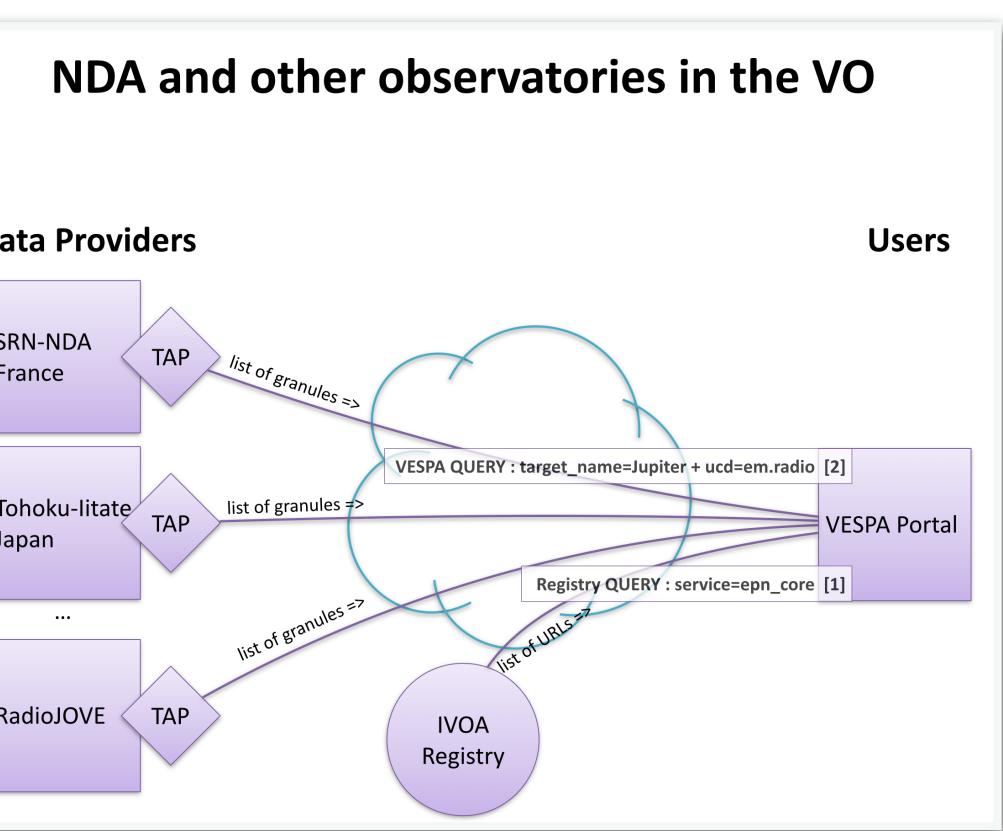
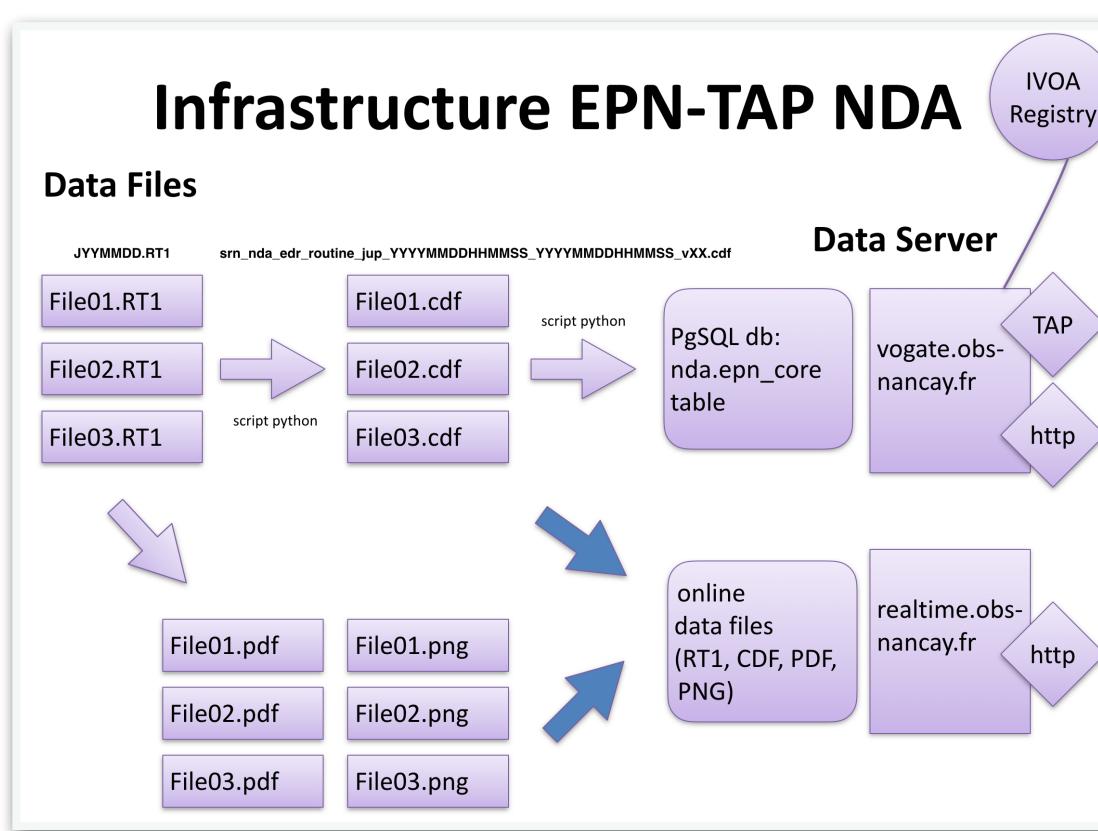
- Interoperable standards
- Virtual Observatory access
- Reuse of existing software

Interfaces

- Distribution of catalogues (events and products) : **VESPA**
- Online visualization: **Das2 + Autoplot**

What Data?

- Low Frequency radio data: up to ~100 MHz
- Mostly spectrograms (time-frequency)
- Ground observatories and Space platforms
- Catalogues of events
- Raw and derived data
- Standard formats (CDF) and metadata



Web Portal

<http://maser.lesia.obspm.fr>

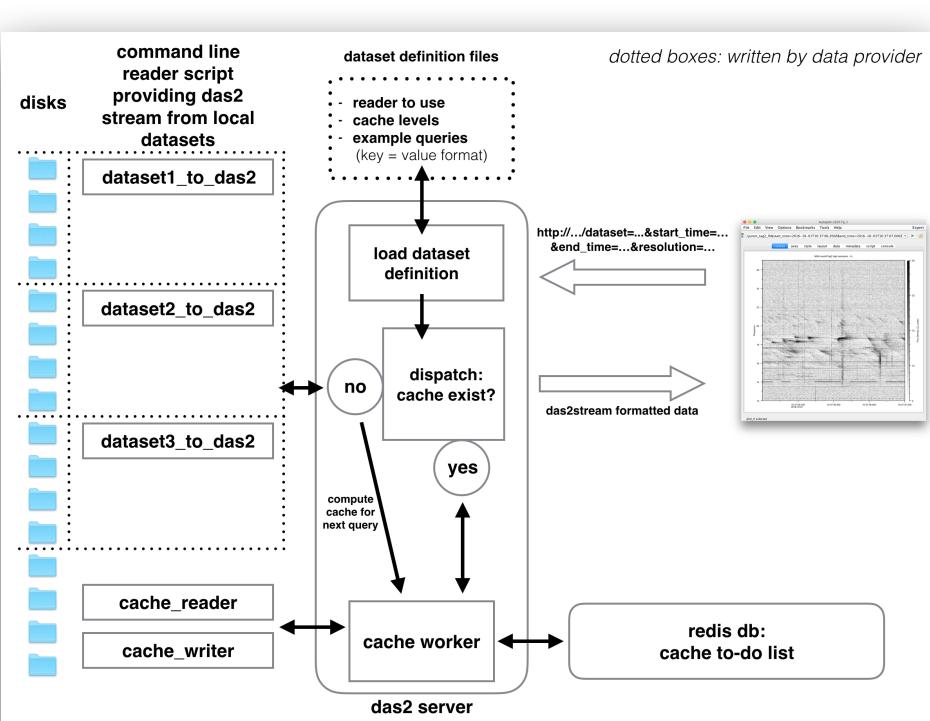
Main Tools and Software

- **ExPRES** (Exoplanetary & Planetary Radio Emissions Simulator)
Simulation of CMI [maser cyclotron instability] emissions
Public query interface coming soon.
- **Maser4py**: Python (3.5+) software library
<https://github.com/maserlib/maser4py> (open source)
- **ARTEMIS-P** (ray tracing code for planetary radio emissions)
[available soon]
- **Das2** servers (currently under test): Meudon and Nançay.
<http://voparis-maser-das.obspm.fr/das2/server>
- **Project interfaces**: Juno-Ground-Radio, RadioJOVE

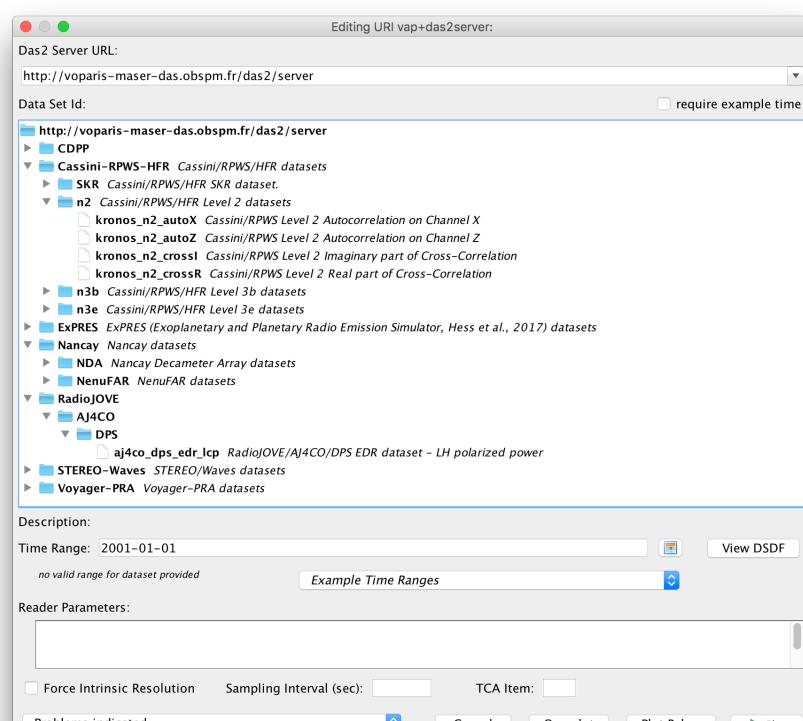
2018 Deployment Plan

- **Datasets (das2 + VESPA)**
 - **CDPP**: Interball, Viking, Demeter, Wind, Ulysses, STEREO, Cassini, Cluster, ISEE3...
 - **LESIA**: Cassini, STEREO, Ulysses, Wind, ISEE3, Voyager, Radio-Expla, RadioJOVE (amateurs)...
 - **Nançay**: NDA-Routine, NDA-NewRoutine, NDA-JunoN, NenuFAR...
- **Catalogs (VESPA)**
 - Historic: Voyager-Nançay (1977-1981) catalogs
 - Jovian radio emissions (Marques et al 2017)
 - Solar radio emissions (Reid et al 2016)
 - Heliophysics Feature Catalog (HELIO-HFC)
- **Space Missions support (das2 + VESPA)**
 - Solar Orbiter/Parker Solar Probe
 - Juno-Ground Radio
- **Codes**
 - ExPRES run-on-demand interface.
 - ARTEMIS-P (study phase)

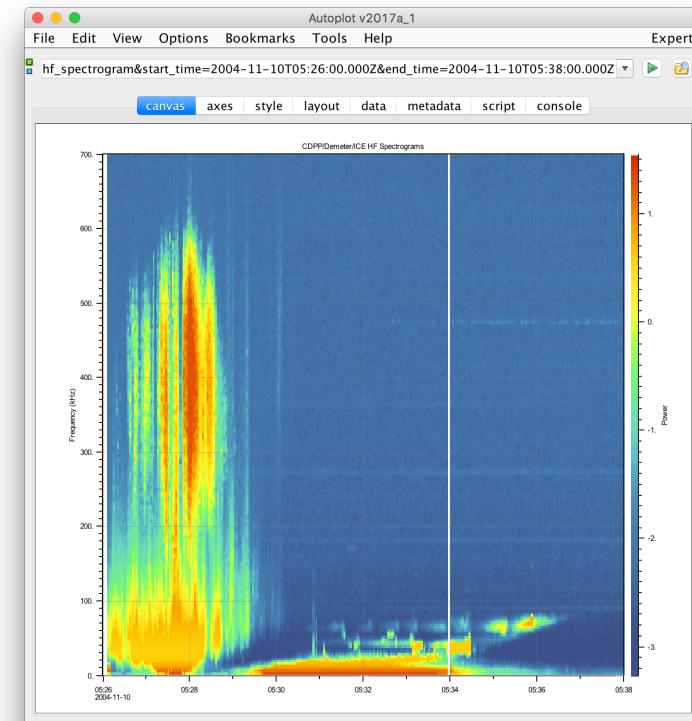
Das2 server bloc diagram



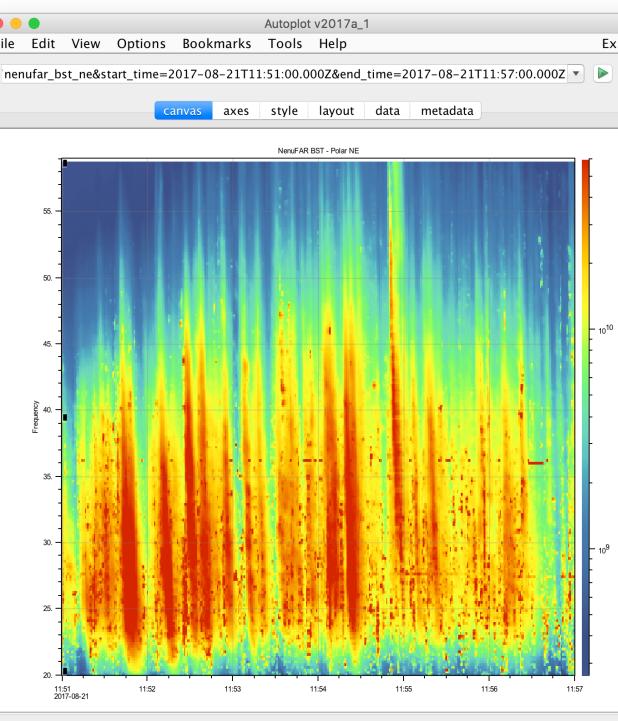
Das2 server catalog in Autoplot



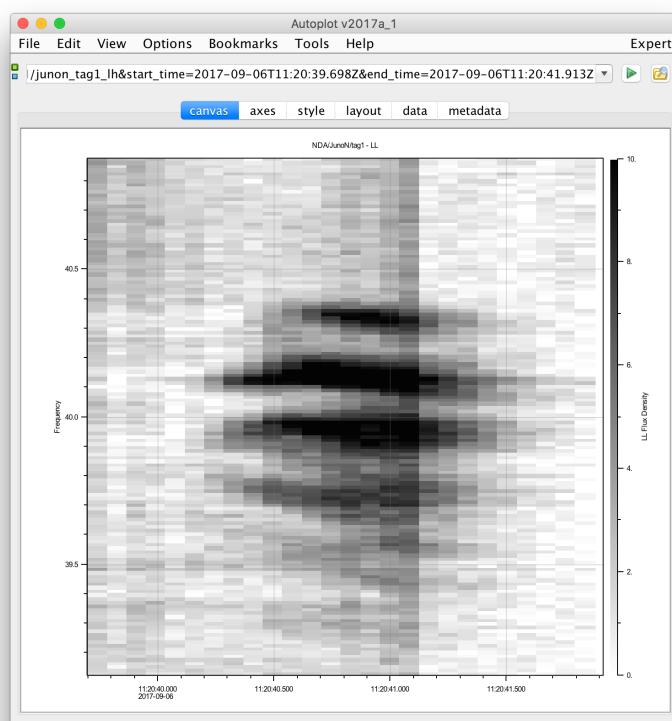
CDPP/Demeter [LPC2E]



Nançay/NenuFAR

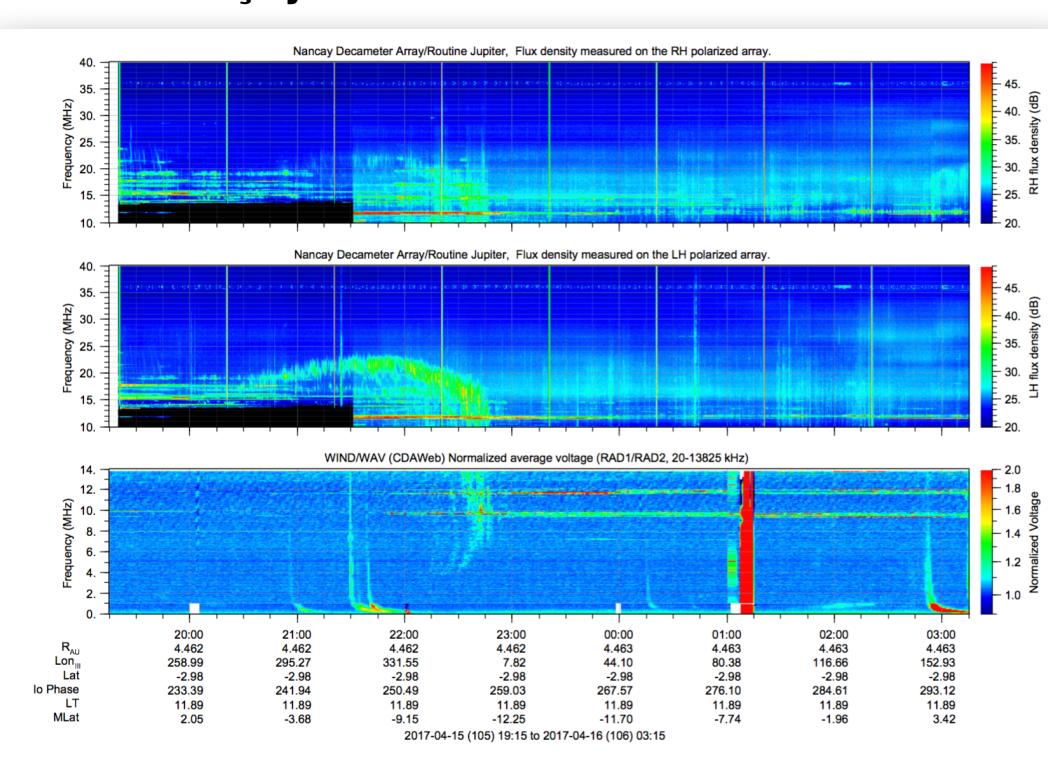


Nançay/NDA/JunoN

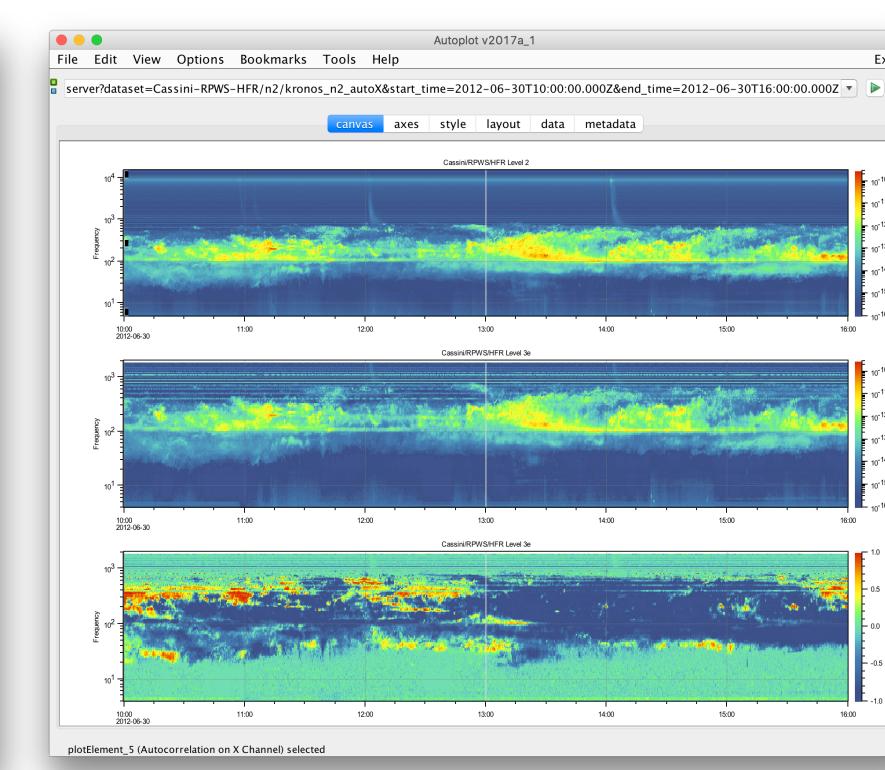


VESPA result page in Nançay/NDA EPN-TAP service

Nançay/NDA/Routine + Wind/Waves



Cassini/RPWS/HFR



Nançay/NDA/JunoN

