

# **IHDEA Agency Report CNRS/INSU**

**Institut National des Sciences de l'Univers  
*National Institute of the Sciences of the Universe***

# INSU supported Services

## focus on Heliophysics

- INSU = all astrophysics/planetary/heliophysics at national level.
- French Heliophysics labs are all co-managed with INSU
- National Observation Services (SNO):  
*activities certified by INSU for community services.*

### SNO related to Heliophysics:

- APIS (auroral imaging and spectroscopy): <http://apis.obspm.fr>
- CLIMSO (solar): <https://climso.fr>
- CDPP (space plasma): <http://www.cdpp.eu> (see CNES/CDPP report)
- ISGI (geomagnetic indices): <http://isgi.unistra.fr>
- MASER (radio astronomy): <https://maser.lesia.obspm.fr>
- MEDOC (solar): <https://idoc-medoc.ias.u-psud.fr/>
- STORMS (space weather): <http://storms-service.irap.omp.eu>
- 3Soleil (solar): <https://observations-solaires.obspm.fr>

# CDPP services

## A large portfolio of services. News from 2023

- **AMDA** (Automated Multi Dataset Analysis). <http://amda.cdpp.eu>
  - Juno FGM, JEDI, WAVES & JADE L3: New perijoves 45-47
  - Add Juno JADE L5 datasets: Differential Energy Flux & moments
  - Add Juno JEDI Pitch Angle Distribution
- **TREPS** (Space Physics Frame Transforms). <http://treps.cdpp.eu/>  
=> comprehensive list of helio/magnetospheric frames
- **3dview**. <http://3dview.cdpp.eu>
  - Saturn magnetic field model (Dougherty et al., 2018)
  - Venus boundary model (Martinecz et al., 2008)
  - Dynamical boundaries at Earth (Safrankova et al., 2002)
  - Predefined scenes (Solar system and Mars now)
  - Jupiter magnetic field model JRM33
  - Improvement of Lagrange points display
  - Dynamic boundary crossings
  - JUICE and PSP kernels management
  - Improvement of Earth's terminator display
  - Access to ESA/Cluster Science Archive with TAP
  - HelioSwarm 9-spacecraft trajectories (with initial launch in 2026)
- **PropagationTool**. <http://propagationtool.cdpp.eu/>
  - New tool component: '3D Shocks'.
  - Updated display of Fermi-LAT solar flux.
- **HelioPropa** (1D MHD propagation code). <http://heliopropa.irap.omp.eu/>
- **TransPlanet** (IPIM ionosphere model applied to planets). <http://transplanet.irap.omp.eu/>

# Open Science Context

## in France

- **Open Science activities** at national and institutional levels:
  - Increasing implication into the European Open Science Cloud (EOSC)
  - Data center certification (Core Trust Seal) is recommended
  - Citation of data collection, DOIs on data collection...
  - Better data management required for most funding calls
- **Recherche.Data.Gouv** (French national research data repository)
  - generic data repository (based on Dataverse)
  - physical infrastructure managed at national level
  - content curated at local level
  - sub-repositories per institutions
- **Data Factory**: university level « one-stop shop » for open data preparation, management and curation.
- NB: Not yet fully deployed in all research institutions

# EOSC related EU projects

## semantics and science knowledge graphs

- **FAIR-IMPACT** project ( <https://fair-impact.eu/> )
  - Goal: use semantics to improve discoverability in EOSC
  - ObsParis:
    - representing astronomy community
    - gathering semantic artefacts from astro/helio/planetary
    - work on mappings
- **OStrails** project ( starting early 2024 )
  - Goal: build machine actionable DMP and Science Knowledge Graphs
  - ObsParis:
    - representing astronomy community
    - propose our DMP template for astro/helio/planetary
    - learn about science knowledge graphs

# FAIRization of datasets

## focus onto Heliophysics

- **Findable** VESPA infrastructure for generic data discovery:  
*Data products from CDPP, MASER, APIS, MEDOC, CLIMSO & 3Soleil are findable through EPN-TAP*  
*(also including heliophysics services from Belgium, Czech Rep, Ireland, Japan, Poland...)*
- **Accessible** All datasets are open access (CC-BY-4.0)
- **Interoperable** Most of the services are proposing standard data formats (CDF, FITS, TFCat...), standards metadata (EPNcore, ISTP, SPASE, SolarNet, WCS...) and standard interfaces (Das2, HAPI).
- **Reusable** Most datasets are citable (DOI). Documentation also available. Software library for non-standard formats.

# FAIRization of datasets

## Examples

APIS

### APIS/HST data collection

The APIS primary database consists of an internal base of HST FUV planetary auroral observations acquired by the STIS, ACS/SBC (and WFPC2) instruments since 1997. These include >12500 individual images and spectra, obtained with different instrumental configurations (filters, slits, gratings), for each of which is derived a set of higher level data.

#### Reference :

- *Title* : APIS/HST data collection
- *Abstract* : The APIS/HST data collection is composed of 3 data levels built from original omages and spectra of solar systems planets and satellites acquired by the Hubble Space Telescope (HST) in the Far-Ultraviolet range (100-180 nm) since 1997 (Lamy et al., Astronomy & Computing, 2015).
- *DOI* : <https://doi.org/10.25935/T184-3B87>
- *Publisher* : PADC, Observatoire de Paris
- *License* : CC-BY 4.0
- *Citation* : Lamy, L., & Henry, F. (2021). APIS/HST data collection (Version 1.0). PADC. <https://doi.org/10.25935/T184-3B87>

MASER

### Catalogue of Jupiter radio emissions identified in the Juno/Waves observations

Wednesday 27 October 2021, by Baptiste Cecconi, Corentin Louis, Philippe Zarka

This data set contains the catalogue of Jupiter radio emissions identified in the Juno/Waves observations, and published in Louis et al (2021, doi: 10.1029/2021JA029435)

- ▶ DOI: <https://doi.org/10.25935/nhb2-wy29>
- ▶ Publisher: PADC/MASER
- ▶ License: [CC-BY 4.0](#)
- ▶ Citation: C. K. Louis, P. Zarka and B. Cecconi (2021). *Catalogue of Jupiter radio emissions identified in the Juno/Waves observations* (Version 1.0) [Data set], PADC, <https://doi.org/10.25935/nhb2-wy29>

#### Link to data repository

- ▶ [Link to the catalogue](#)

The data is available in [TFCat format](#) and can be loaded



### ORN NDA NewRoutine Jupiter EDR FITS Dataset Specification

Monday 29 August 2022, by Baptiste Cecconi

This documents describes the ORN NDA NewRoutine Jupiter EDR FITS data collection.

- ▶ DOI: <https://doi.org/10.25935/mpf0-v756>
- ▶ Publisher: PADC/CDN
- ▶ Citation: Duchêne, A., L. Lamy, A. Loh, B. Cecconi, C. Viou & P. Renaud. (2022). *ORN NDA NewRoutine Jupiter EDR FITS Dataset Specification*. Version 1.1. PADC/CDN. <https://doi.org/10.25935/MPF0-V756>
- ▶ License: CC-BY-4.0

#### Link to document



### Wind/Waves/RAD1 LESIA L3 DF Data Collection V01

Thursday 6 July 2023, by Baptiste Cecconi

This collection is composed of Wind/Waves/RAD1 daily L3 DF files.

A new version of this dataset is available at: <https://doi.org/10.25935/hegh-1r24>

- ▶ DOI: <https://doi.org/10.25935/h5np-2m47>
- ▶ Publisher: PADC
- ▶ Citation: Bonnin, X., Hoang, S., Cecconi, B. & Issautier, K. (2022). *Wind/Waves/RAD1 LESIA L3 DF Data Collection* (Version 01) [Data set]. PADC. <https://doi.org/10.25935/h5np-2m47>

This collection is part of the Wind/Waves LESIA Collection (TBD).

#### Link to data repository

The files are available from the LESIA/Wind data repository (link below). The repository file hierarchy and the link with the other LESIA/Wind collection are described in TBD.

- ▶ This dataset is not available anymore. Use the [new version](#) instead.



the Jupiter EDR FITS Dataset Specification, version 1.1

# National Plasma Physics Data Hub

## INSU national transverse service

- The *National Plasma Physics Data Hub* coordinates between heliophysics services related to space plasma: CDPP, APIS, ISGI MASER and STORMS.
- Coordination actions (ongoing):
  - interoperability (exchange protocols: HAPI, Das2)
  - discoverability (VESPA-EPNTAP)
  - SPASE registry for associated services (naming authority=INSU)
- Future actions:
  - include Solar observation services => "heliophysics data hub »?
  - MEDOC (space solar observation) participate in IHDEA?