



eur^oPLANET Planetary Space Weather Services

Planetary Space Weather Services for the Europlanet 2020 Research Infrastructure

**N. André, M. Grande, N. Achilleos, M. Barthélémy, P.-L. Bély, S. Caussarie, B. Cecconi,
T. Cook, V. Génot, R. Hueso, G. Jones, J. Liliensten, D. Matthiä, A. Opitz, F. Pitout, G.
Reitz, A. Rouillard, I. Stanislawska, O. Santolik, J. Soucek, L. Tomasik, J. Vaubaillon
CNRS, Aberystwyth, DLR, GFI Informatique, IAP, OBSPARIS, UCL, UPV/EHU, SRC, Wigner**

The Europlanet 2020 Research Infrastructure (RI) is funded under the European Commission's Horizon 2020 programme under grant agreement No 654208; it was launched on 1st September 2015 and will run until 31 August 2019.

The Research Infrastructure includes a new and unique Joint Research Activity (JRA) and a Virtual Access (VA) dedicated to **Planetary Space Weather Services** (PSWS).

The overall objectives of PSWS/JRA will be to review, test, improve and adapt methods and tools available within the partner institutes in order to **make prototype planetary event and space weather services** operational in Europe at the end of the programme.

PSWS/VA will make five entirely new ‘toolkits’ accessible to the research community and to industrial partners e.g. planning for space missions:

- 1. General planetary space weather toolkit**
2. Novel “**event-diary**” toolkit aiming at predicting and detecting planetary events like meteor showers and impacts

as well as three toolkits dedicated to the following key planetary environments:

3. **Mars** (in support of ESA ExoMars missions to be launched in 2016 and 2018)
4. **Comets** (building on the expected success of the ESA Rosetta mission)
5. **Outer planets** (in preparation for ESA JUICE mission to be launched in 2022)

PSWS Deliverables (before September 2017)

1. Planetary meteor shower prediction tool (J. Vaubaillon)
2. Lunar impact detection software (T. Cook)
3. Giant planet fireball detection software (R. Hueso)
4. Generic space weather 1D MHD propagation tool (CDPP, France)
5. Coupled solar wind/magnetosphere/ionosphere models at Mars (P.-L. Blelly)
6. Comet tail analysis and crossing detection (G. Jones)
7. Coupled solar wind/magnetosphere/ionosphere models at Mars (P.-L. Blelly)
8. Coupled solar wind/magnetosphere/ionosphere models at Jupiter (N. Achilleos)
9. Coupled solar wind/atmosphere/surface model at Mars (M. Grande)

PSWS users

User #1. Scientific community

User #2. Amateur community and General Public

User #3. Space Agencies and Industrial Partners



Siding spring comet at Mars / Lunar flashes

MAVEN, MEX, MSL observations in 2014

All PSWS users impacted (e.g. MAVEN Instruments turned-off for safety)



Comet Encke causes seasonal showers of meteor at Mercury

MESSENGER observations in 2013

All PSWS users impacted (e.g. BepiColombo operation scenario)

Shoemaker-Levy 9 at Jupiter / Giant planet fireballs at Saturn

Dedicated campaign in 1994 / Detection by amateur astronomer A. Wesley

All PSWS users impacted (e.g. Jupiter Watch network)

HST observation of shock-driven auroral emissions at Uranus

HST observations by Lamy et al. in 2012

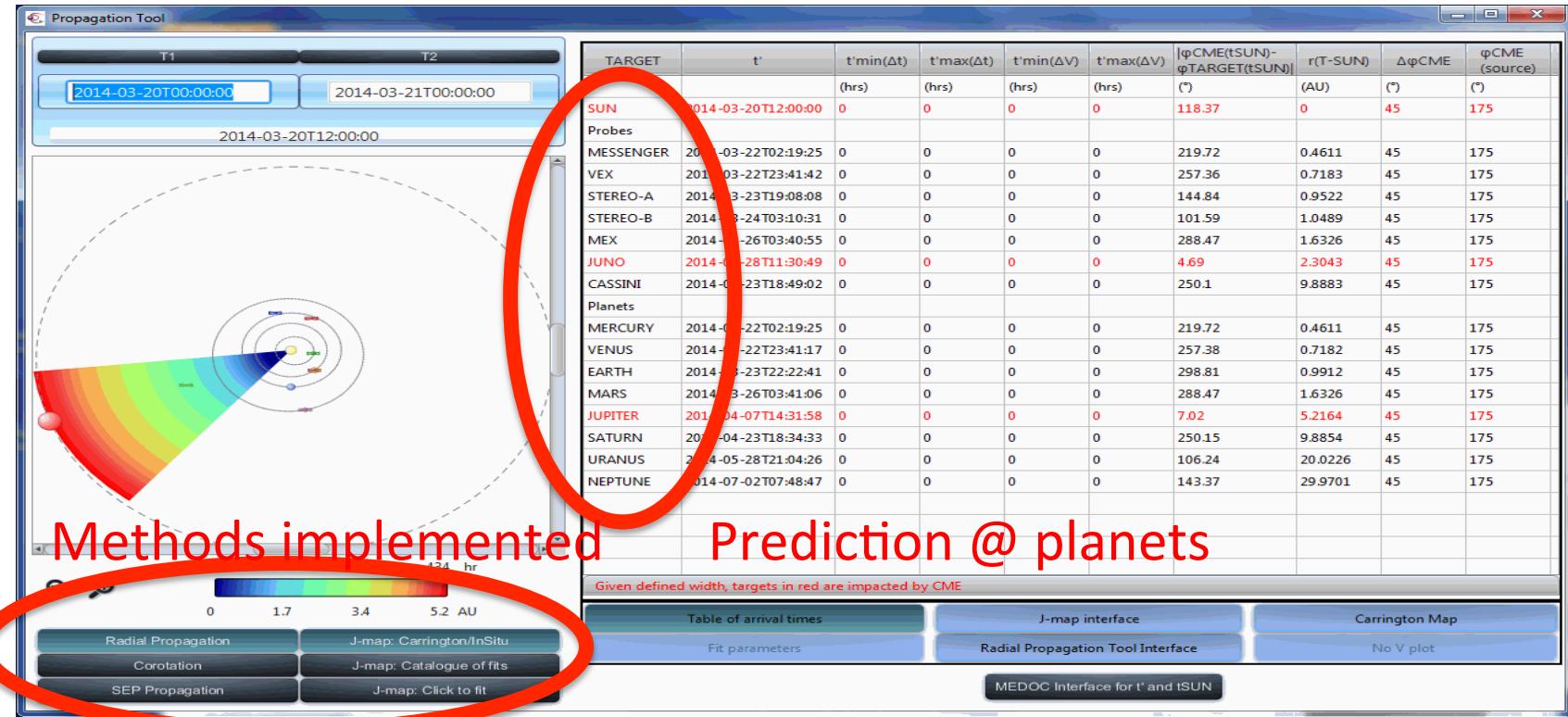
All PSWS users impacted (e.g. Ice Giant mission design)

PSWS

Hosted Models at a Glance

Domain	Model Name	Developer(s)	Institution	Pre-project	Project-funded	End of project
Heliosphere	Propagation Tool	A. Rouillard et al.	CDPP, France	Publicly available	Extension to comets and giant planet aurorae+catalogue ingestion+development of alerts	Alert Service operational
	1D-MHD propagation software	C. Tao et al.	CDPP, France	Example outputs available	Under development	Publicly available
	Space Weather Tool	A. Rouillard et al.	CDPP, France	Under development		Publicly available
Earth and Moon	TRANSCAR-Earth	P.L. Bielby et al.	IRAP, France	On request	Online service	Publicly available
	HelgeoSSA	I. Stanislawski et al.	SRC PAS, Poland	Publicly available	Development of alerts	Alert Service operational
	Lunar impact detection software	T. Cook et al.	ABER, UK	On request	Upgrades and conversion	Publicly available
Mars	TRANSCAR-Mars	P.L. Bielby et al.	IRAP, France	On request	Online service	Publicly available
	Mars surface environment	M. Grande et al.	ABER, UK		Under development	Alert Service operational
Giant Planets	Jupiter magnetotidis model outputs	N. Achilleos et al.	UCL, UK	On request	Online service	Publicly available
	Jupiter thermospheric model outputs	N. Achilleos et al.	UCL, UK	On request	Online service	Publicly available
	TRANSCAR-Jupiter	P.L. Bielby et al.	IRAP, France	Under development	Online service	Publicly available
	TRANSCAR-Saturn	P.L. Bielby et al.	IRAP, France	Under development	Online service	Publicly available
	Fireball detection software	R. Hueso et al.	UPV/EHU, Spain	Publicly available	Upgrades and conversion	Publicly available
Comets	Cometary tail detection software	G. Jones et al.	UCL, UK	On request	Upgrades and conversion	Publicly available
Planetary Diary	Meteor showers Calendar	J. Vaubaillon et al.	OBSParis, France	Publicly available	Development of alerts	Alert Service operational

CDPP/Propagation Tool (<http://propagationtool.cdpp.eu>)



Predict, e.g. meteor showers at planets (Jérémie Vaubaillon)

IMCCE - Ephémérides

www.imcce.fr/langues/fr/ephemerides/phenomenes/meteor/database.php

INSTITUT DE MÉCANIQUE CÉLESTE ET DE CALCUL DES ÉPHÉMÉRIDES

Navigation rapide
[phénomènes célestes](#) > [meteor showers](#)

IMCCE Meteor Showers - Data Base

Introduction

► [Meteor showers for beginner:](#)

- What is a meteor? a meteoroid? a meteorite?
- Where do they come from?
- What is a meteor shower/storm?
- How to observe a meteor shower?

Note for space agencies and spacecraft operators

► [The threat of meteoroids for spacecrafts](#)

► [What if the spacecraft is orbiting/surfacing another planet?](#)

Ephémérides of Terrestrial meteor showers

► [Method used to do meteor shower ephemerides](#)

► [Prediction of meteor showers](#)

- Ephemeris by meteor shower (Leonids, Perseids etc.)

► [Calendar of meteor showers](#)

- Annual/regular meteor shower (by date)

► [List of the parent bodies of meteor showers](#)

► [Other meteor showers predictions \(useful links\)](#)

Ephémérides of meteor showers on other planets

► [Scientific interest \(why?\)](#)

► [Brief Calendar for Venus \(2005-2007\)](#)

► [Brief Calendar for Mars \(2005-2007\)](#)

RECHERCHE

OK

MENU PRINCIPAL

:: Présentation

:: Publications

:: Ephémérides

- Générateur d'éphémérides
- Phénomènes célestes
- Bases de données

:: Grand public

:: Pages de l'observateur

:: Formations, stages et emplois

NOUVELLES ASTRONOMIQUES

- 19-10-2013 : Météorite de Tcheliabinsk (Chelyabinsk)
- 19-10-2013 : Météorite de Tcheliabinsk (Chelyabinsk)
- 02-10-2013 : La comète ISON : un passage au périhélie périlleux
- 29-07-2013 : Météores

RSIS PRITCHARD

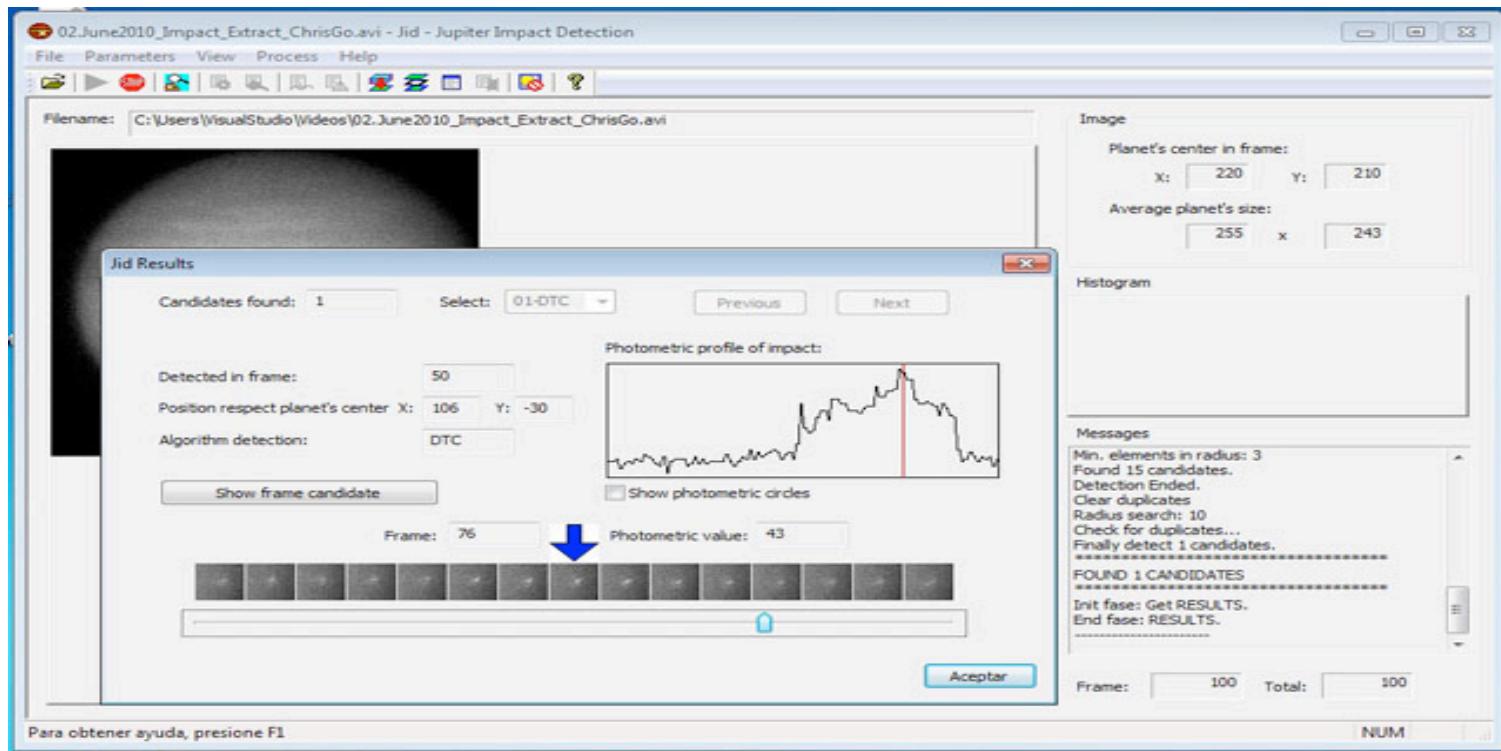
OBSERVATOIRE VIRTUEL

LETTERE D'INFORMATION

SITES HÉBERGÉS

Accueil | Introduction | Observations | CABERNET | Ephémérides | News | Bibliographie | Remerciements | Credits

Detect, e.g. Jovian Impacts Detection Software (Ricardo Hueso)



Towards an operational planetary space weather alert system: use of VOEvent / the Skyalert experience

