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Dissemination level		
PU	Public	x
PP	Restricted to other programme participants (including the Commission Service)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (excluding the Commission Services)	

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Abstract: Under Horizon 2020, the Europlanet 2020 Research Infrastructure (EPN2020-RI) includes an entirely new Virtual Access Service, "Planetary Space Weather Services" (PSWS) that extends the concepts of space weather and space situational awareness to other planets in our Solar System and in particular to spacecraft that voyage through it. PSWS provide twelve new services to the research community, space agencies, and industrial partners planning space missions. These services are in particular dedicated to the following key planetary environments: Mars (in support of the NASA MAVEN and European Space Agency (ESA) Mars Express and ExoMars missions), comets (building on the outstanding success of the ESA Rosetta mission), and outer planets (in preparation for the ESA JUpiter ICy moon Explorer mission), and one of these services aims at predicting and detecting planetary events like meteor showers and impacts in the Solar System. This gives the European planetary science community access to new methods, interfaces, functionalities and/or plugins dedicated to planetary space weather as well as to space situational awareness in the tools and models available within the partner institutes.

The present report describes the 12 PSWS prototyped for EPN2020-RI.

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1. Context

Space Weather – the monitoring and prediction of disturbances in our near-space environment and how they are controlled by the Sun - is now recognised as an important aspect of understanding our Earth and protecting vital assets such as orbiting satellites and power grids. The Europlanet 2020 Research Infrastructure (http://www.europlanet-2020-ri.eu/) aims to enhance the science of space weather, by extending its scope throughout the Solar System. An entirely new Virtual Access Service, "Planetary Space Weather Services" (PSWS, http://planetaryspaceweather-europlanet.irap.omp.eu/) has therefore been included in the Europlanet H2020 Research Infrastructure funded by the European Union Framework Programme for Research and Innovation.

2. PSWS Prototyped Services

The Planetary Space Weather Services provide 12 services distributed over 4 different service domains – Prediction, Detection, Modelling, Alerts - having each its specific groups of end users. The PSWS portal (http://planetaryspaceweather-europlanet.irap.omp.eu/) gives access to a presentation of PSWS activities.

The 12 Planetary Space Weather Services prototyped are available at the following addresses together with their associated user manual/publication:

A1. 1D MHD Solar Wind Prediction Tool - Heliopropa (CNRS)

http://heliopropa.irap.omp.eu/

Publication: André et al., The Heliopropa service, in preparation for Planetary and Space Sciences, 2019

A2. Propagation Tool (GFI Informatique)

http://propagationtool.cdpp.eu/

Publication: Rouillard et al., A propagation tool to connect remote-sensing observations with in-situ measurements of heliospheric structures, Planetary and Space Science, Volume 147, p. 61-77, 2017

Publication: Grison et al., Shock deceleration in interplanetary coronal mass ejections (ICMEs) beyond Mercury's orbit until one AU, Journal of Space Weather and Space Climate, Volume 8, id.A54, 10 pp., 2018

A3. Meteor showers (OBSPARIS)

http://vespa.obspm.fr/planetary/data

Publication: Cecconi et al., VOEvent for Solar and Planetary Sciences, in revision for Journal of Space Climate and Space Review, 2019

A4. Cometary tail crossings - Tailcatcher (UCL)

https://www.ucl.ac.uk/mssl/planetary-science/tailcatcher

B1. Lunar impacts (ABER)

http://users.aber.ac.uk/atc/alfi.htm

B2. Giant planet fireballs (EHU-UPV)

http://pvol2.ehu.eus/psws/jovian_impacts/

Publication: Hueso et al., Detectability of possible space weather effects on Mars upper atmosphere and meteor impacts in Jupiter and Saturn with small telescopes, Journal of Space Weather and Space Climate, Volume 8, 2018

B3. Cometary tails – Solar Windsocks (UCL)

https://www.ucl.ac.uk/mssl/planetary-science/Solar_Windsocks

C1. Transplanet – Earth, Mars, Venus, Jupiter (CNRS)

http://transplanet.irap.omp.eu

Publication: Blelly et al., Transplanet: a web service dedicated to modeling of planetary ionospheres, in press for Planetary and Space Sciences, 2019

C2. Mars radiation environment (ABER, DLR+CNRS)

http://radmaree.irap.omp.eu/

Publication: Guo, J. et al., Implementation and validation of the GEANT4/AtRIS code to model the radiation environment at Mars, Journal of Space Weather and Space Climate, Volume 9, 2019

C3. Giant planet magnetodiscs (UCL+CNRS)

http://magnetodisc.irap.omp.eu/

Publication: Achilleos et al., Influence of Solar Wind on Giant Planet Magnetospheres, in revision for Journal of Space Weather and Space Climate, 2019

C4. Jupiter's thermosphere (UCL)

http://heliopropa.irap.omp.eu/

Publication: André et al., The Heliopropa service, in preparation for Planetary and Space Sciences, 2019

D. Alerts (OBSPARIS and CNRS)

http://alerts-psws.irap.omp.eu/

Publication: Cecconi et al., VOEvent for Solar and Planetary Sciences, in revision for Journal of Space Climate and Space Review, 2019