

AUSTRIAN STATEMENT

58. STSC (19. – 30. April 2021)

ITEM 10

“Space Weather”

Madame Chair, Excellencies, Colleagues, Ladies and Gentlemen,

Let me inform you about the current activities of the Austrian Space Weather community:

To briefly **introduce the importance of space weather**: The sun is an active star that interacts with Earth and has effects on near-Earth space. Solar coronal mass ejections (so-called CMEs) and high-speed solar wind streams are the most geo-affecting space weather phenomena, along with energetic particles from the sun. These activity phenomena may cause ground-induced currents, damage power grids and increase the neutral density in the thermosphere, causing spacecraft orbits to drop. In addition, accelerated particles increase radiation at commercial aircraft altitudes.

The **University of Graz and its Kanzelhöhe Observatory for Solar and Environmental Research (KSO)** is Austria's *Regional Warning Centre (RWC)* in the network of the International Space Environment Service ISES and provides data in real time (spaceweather.at). The *University of Graz - Institute of Physics* is part of ESA's *Space Safety Programme* with *Expert Service Groups for Solar and Heliospheric Weather* and will soon become an *Expert Service Group for Ionospheric Weather*. The *University of Graz* is also member of the ESA “*L5-concept study*” on *the use of L5 data in CME propagation models* and leads two work packages on CME propagation and high speed solar wind streams.

The Austrian **National Meteorological Office “Zentralanstalt für Meteorologie und Geodynamik (ZAMG)”** maintains the *Conrad Observatory*, which basically covers all geophysical disciplines. The geomagnetic part of the observatory is certified by the

Permanent Mission of Austria

to the United
Nations in Vienna

international INTERMAGNET - network for global geomagnetic observation. From here, high-quality real-time geomagnetic data are made available to the *World Data Centres*.

In close cooperation with the operators of the *Austrian Power Grid (APG)*, the expected geomagnetically induced currents within the power lines are determined in real time and their hazard potential quantified.

At **Graz University of Technology**, the working group "*Satellite Geodesy and Theoretical Geodesy*" within the *Institute of Geodesy* investigates, among other things, thermospheric variations triggered by solar events such as solar flares, coronal mass ejections and corotating interaction regions. The research is conducted within the project *SWEETS (878876)*, a project of the *Austrian Space Programme ASAP*. Through correlation with interplanetary observations (e.g. Bz), a prediction of the thermosphere and satellite trajectory is possible that will be provided as ESA service for forecasting satellite orbit drops (SODA).

The ***Institute of Space Research Graz (IWF) of the Austrian Academy of Sciences*** conducts various researches in the field of space weather based on both spacecraft data analysis and numerical simulations. The IWF is involved in ESA science missions relevant to space weather research, such as Solar Orbiter, the Solar wind-Magnetosphere-Ionosphere Link Explorer (SMILE), the joint mission between the European Space Agency (ESA) and the Chinese Academy of Sciences (CAS) and is a consortium member of the *SOSMAG (Service Oriented Spacecraft Magnetometer) project*. IWF is also involved in a design study of the magnetometer on board the *Lagrange 5 (L5) mission*, which is a candidate for a space weather monitoring mission under *ESA's Space Safety programme*.

Seibersdorf Laboratories (a brand name of *Seibersdorf Labor GmbH, SL*) actively supports the European space industry and research in the fields of space weather and radiation hardness assurance. The experience gained over the years with measurements and numerical modelling led to the development of a *code for aircrew dosimetry - AVIDOS*. Together with AVIDOS, SL is a member of the *PECASUS consortium - Partnership of Excellence for Civil Aviation Space Weather User Services*, which provides space weather information services to the

Permanent Mission of Austria

to the United
Nations in Vienna

International Civil Aviation Organization (ICAO) and part of ESA's Space Safety Programme within the Expert Service Group for Space Radiation.

Recently, **two project proposals** were submitted to further deepen our knowledge of space weather effects in Austria and to increase networking and coordination between institutions affected by space weather.

1) *SWAP* is a project proposal that outlines plans to consolidate and expand space weather efforts in Austria and to create a **national data portal**. The project proposal was submitted to the *Austrian Space Programme ASAP* (main applicant: Conrad Observatory, ZAMG).

2) *ELSON* is a project that examines in detail possible **implications of solar storms for Austria** and discusses the needs of stakeholders and operators of critical infrastructure. The project proposal was submitted to the *Austrian Research Promotion Agency FFG* as part of the *Austrian Security Research Programme KIRAS 2020* call for proposals (main applicant: Joanneum Research).

Austria is currently highly active in national networking for better connecting different Space Weather research institutions, using the synergy between them, and for bridging the gap to potential users

THANK YOU