TECHNICAL NOTE

SSA Space Weather Network Service
Product Catalogue Summary

Prepared by
SSCC Team
BIRA-IASB

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<tr>
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<td>SCC Team</td>
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<td>Approved By</td>
<td>SSA-SWE-P3SWEXVII Project Manager</td>
</tr>
<tr>
<td>Date of Approval</td>
<td>Sophie Chabanski</td>
</tr>
<tr>
<td></td>
<td>ESA Technical Officer</td>
</tr>
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<td>Alexi Glover</td>
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| Update for SWE Portal 2.10.0: [http://swe.ssa.esa.int/release-notes-2.10.0](http://swe.ssa.esa.int/release-notes-2.10.0) | 8 | 27 Sep 2018 |
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| Update for SWE Portal 2.11.0: [http://swe.ssa.esa.int/release-notes-2.11.0](http://swe.ssa.esa.int/release-notes-2.11.0) | 9 | 07 Jan 2019 |
| Addition of the following products: R.135, R.142-R.157, S.107f, S.123c, S.109e, I.101b, I.134(a,b), I.137, I.138 |
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| Update for SWE Portal 2.12.0: [http://swe.ssa.esa.int/release-notes-2.12.0](http://swe.ssa.esa.int/release-notes-2.12.0) | 10 | 28 May 2019 |
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Purpose of this document

The purpose of this document is to list the Space Weather data products available through the ESA SSA Space Weather Portal.

The SSA Space Weather Portal provides the main online entry point to the ESA SSA Space Weather Service Network and consequently gives access to a range of space weather products and applications for the eight SWE Service Domains ('Spacecraft design', 'Spacecraft operation', 'Human spaceflight', 'Launch operation', 'Transionospheric radio communications', 'SSA surveillance & tracking', 'Non-space system operation', 'General Data Service') and links all elements of the Space Weather Service Network, including the five Expert Service Centres.

In this document, details of each SWE data product currently available are presented as well as contact information of their provider. Note that this document does not list all Expert Groups participating in each of the Expert Centres with products in development. For this information, the reader is referred to the ESC pages available via the SSA SWE portal (http://swe.ssa.esa.int). Only groups actively providing products are listed in this document. The document will be updated following each new product deployment.

This document has been prepared by the SSA Space Weather Coordination Centre (SSCC).

Part 1 of this document lists the Space Weather data products available on the SWE Portal.

Part 2 describes the Expert Groups providing these products.
Part 1: Space weather products

The first part of this document presents the Space Weather federated products available through the ESA SSA Space Weather Network.

The products are classified per Expert Service Centre (ESC) and Expert Group. The different ESC's and contributing number of Expert Groups currently providing SWE data products are:

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The expert groups referred to here are only those which are currently providing products, and not an exhaustive list of all EGs affiliated with each Expert Service Centre.

One chapter is dedicated per Expert Service Centre. It includes a short description of the Centre (coordinator, point of contacts and members) and a detailed description of the products grouped by product provider.

The details of each product provider are gathered in Part 2.
1 Geomagnetic conditions products

Expert groups

German Research Centre for Geosciences (GFZ)

G.107 Quicklook Kp index
G.108 Most recent definitive Kp index
G.109 Kp and Ap index on tabular form
G.110 Kp and Ap index archive
G.123 Swarm Polar Electrojet (PEJ)
G.124 Swarm Field-Aligned Current (FAC)
G.125 Swarm Vector Magnetic Field (MAG)

Norwegian Mapping Authority (NMA)

G.120 Real-time and historic geomagnetic activity plots and data files for geomagnetic surveying (total field) [currently unavailable]
G.121 Real-time and historic geomagnetic activity plots and data files for directional drilling (total field, declination and inclination) [currently unavailable]
G.122 E-mail alerts for geomagnetic disturbances [currently unavailable]

Solar Influences Data analysis Center (SIDC)

G.105 Provisional AA indices

Space and Earth Observation Centre (FMI)

G.106 Aurora forecast service
G.111 Maps for power and pipeline operators
G.112 Table of modelled GIC
G.114 Pipe-to-soil voltage (PSV)

Swedish Institute of Space Physics in Lund (IRF-Lund)

G.113 Forecasts of dB/dt
G.134 Forecast of Kp
G.135 Forecast of Dst

Tromsø Geophysical Observatory (TGO)

G.101 Magnetogrammes from North(west) Europe and Greenland [currently unavailable]
G.102 Provisional K-indices from Northwest Europe [currently unavailable]
G.103 Geomagnetic activity index for auroral zone (AZ), last 33 days [currently unavailable]
G.104 Geomagnetic activity index for auroral zone (AZ), long term variation [currently unavailable]
G.117 27 day global forecast issued every 24 hours [currently unavailable]
G.118 Short term (1 hour) Kp forecast [currently unavailable]
G.119 Short term (1 hour) local geomagnetic forecast [currently unavailable]

Universidad de Alcalá (UAH)

G.126 Local Disturbance index for Spain
G.127 Local Current index for Spain
G.128 Geomagnetic Storm Occurrence
G.129 Geomagnetic Storm Recovery Phase
G.130 Geomagnetic Storm Subscription
G.131 Geomagnetic Conditions Scale
G.132 GIC Conditions Scale
G.133 Conditions Reports
G.101 Magnetogrammes from North(west) Europe and Greenland [currently unavailable]

*Description*
This display shows the magnetic condition in northwest Europe during the previous 24 hours in the form of time series - magnetogrammes - from 10 observing stations. They range from Svalbard and Tromsø in the auroral zone to mid-latitude in Denmark.

*Provider*
Tromsø Geophysical Observatory (TGO)

*Portal Entry Point*
http://swe.ssa.esa.int/web/guest/tgo-federated

G.102 Provisional K-indices from Northwest Europe [currently unavailable]

*Description*
In this figure we present last week’s local K-index at four stations. The stations are Ny-Ålesund (NAL) and Tromsø (TRO) in the auroral zone, Dombås (DOB) at subauroral latitude and Brorfelde (BFE) at magnetic mid-latitude.

*Provider*
Tromsø Geophysical Observatory (TGO)

*Portal Entry Point*
http://swe.ssa.esa.int/web/guest/tgo-federated

G.103 Geomagnetic activity index for auroral zone (AZ), last 33 days [currently unavailable]

*Description*
This figure tells the geomagnetic activity as observed from Tromsø (in the auroral zone) during the last 33 days. As a measure of activity we have used an index describing the average deviation of the horizontal field component from its normal value.

*Provider*
Tromsø Geophysical Observatory (TGO)

*Portal Entry Point*
http://swe.ssa.esa.int/web/guest/tgo-federated

G.104 Geomagnetic activity index for auroral zone (AZ), long term variation [currently unavailable]

*Description*
In this plot we see the magnetic activity back to 1987, i.e. during the previous two solar cycles. The activity measure is the AZ – index.
**Provider**
Tromsø Geophysical Observatory (TGO)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/tgo-federated

**G.105 Provisional AA indices**

**Description**
The SIDC computes weekly the Provisional AA indices based on measurements of the K index from Canberra and Hartland.

**Provider**
Solar Influences Data analysis Center (SIDC)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/sidc-G105-federated

**G.106 Aurora forecast service**

**Description**
The estimated present auroral oval and expected location of the oval up to 12 hours from the present are shown for Finland and Norway.

**Provider**
Space and Earth Observation Centre (FMI)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/fmi-federated

**G.107 Quicklook Kp index**

**Description**
This product shows the 3-hourly nowcast Kp index of global geomagnetic activity during the present UTC day as a bar plot. The height of the bar(s) corresponds to the index value (0 to 9) and the colour represents the geomagnetic activity level (low - green (Kp < 3.3), intermediate - yellow (3 < Kp < 6.3), high - red (Kp > 6)). A smaller version of this plot is given for the preceding 6 days. The nowcast Kp values are calculated at GFZ from near real-time geomagnetic observatory data provided by the contributing observatories. Nowcast values of Kp are typically made available at the end of the measurement interval.

**Provider**
German Research Centre for Geosciences (GFZ)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/potsdam-federated
G.108 Most recent definitive Kp index

Description
This product, the so-called musical diagram, shows a plot of the 3-hourly definitive Kp index of global geomagnetic activity during approximately 5 recent solar rotations. A key at the bottom of the plot provides an explanation on how to read it and solar rotation numbers as well as UTC days are indicated in the plot. The definitive Kp is calculated from K values provided by the contributing observatories. This figure is typically produced with a lag time of one to four weeks, as K values from contributing observatories become available. The contributing observatories report these K values in half-monthly intervals with typical delay times of one or two weeks after each half-monthly interval.

Provider
German Research Centre for Geosciences (GFZ)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/potsdam-federated

G.109 Kp and Ap index on tabular form

Description
This product shows a table of the nowcast Kp, ap and Ap index of global geomagnetic activity for the present day and the preceding 14 days. Kp and ap are 3-hourly indices, whereas Ap is a daily index. The index values are given in one line per day. Non-existing values are indicated by 'nan'. Below the table, there are links to two downloadable ASCII-files representing the same information. One file gives Kp (in steps of 0.3 or 0.4 from 0 to 9), ap, and Ap and indicates missing values as 'nan'. The other file gives Kp*10 (in steps of 3 or 4 from 0 to 90), ap and Ap and has 99 and 999 as missing data indicator. ap values are derived from Kp. Ap is the daily average of ap. The nowcast Kp values are calculated at GFZ from near real-time geomagnetic observatory data provided by the contributing observatories. Nowcast values of Kp are typically made available at the end of the measurement interval.

Provider
German Research Centre for Geosciences (GFZ)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/potsdam-federated

G.110 Kp and Ap index archive

Description
In this product yearly files of the definitive Kp, ap and Ap index are given back to 1932. The index values are given in one line per day. Non-existing values are indicated by 'nan'. Next to the table, there are links to two downloadable ASCII-files representing the same information. One file gives Kp (in steps of 0.3 or 0.4 from 0 to 9), ap, and Ap and indicates missing values as 'nan'. The other file gives Kp*10 (in steps of 3 or 4 from 0 to 90), ap and Ap and has 99 and 999 as missing data indicator. ap values are derived from Kp. Ap is the daily average of ap. The
definitive Kp is calculated from K values provided by the contributing observatories. The files are typically updated with a lag time of one to four weeks, as K values from contributing observatories become available. The contributing observatories report these K values in half-monthly intervals with typical delay times of one or two weeks after each half-monthly interval.

**Provider**
German Research Centre for Geosciences (GFZ)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/potsdam-federated

**G.111 Maps for power and pipeline operators**

**Description**
The electric field on the ground and geomagnetically induced currents are modelled using geomagnetic recordings. GIC are shown for the Finnish and Norwegian power grids.

**Provider**
Space and Earth Observation Centre (FMI)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/fmi-federated

**G.112 Table of modelled GIC**

**Description**
Text files of the modelled GIC in the Finnish and Norwegian power grids during the latest 24 hours, and similarly for the Finnish natural gas pipeline.

**Provider**
Space and Earth Observation Centre (FMI)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/fmi-federated

**G.113 Forecasts of dB/dt**

**Description**
Forecast of the 30-minute maximum of horizontal |dB/dt| with lead times between 20 to 80 minutes depending on solar wind speed.

**Provider**
Swedish Institute of Space Physics in Lund (IRF-Lund)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/irf-federated
G.114 Pipe-to-soil voltage (PSV)

**Description**
Modelled PSV, and the measured and modelled GIC in the Finnish natural gas pipeline.

**Provider**
Space and Earth Observation Centre (FMI)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/fmi-federated

G.117 27 day global forecast issued every 24 hours [currently unavailable]

**Description**
Next 27-day forecast of the Ap index, produced with the ARIMA algorithm.

**Provider**
Tromsø Geophysical Observatory (TGO)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/tgo-federated

G.118 Short term (1 hour) Kp forecast [currently unavailable]

**Description**
Predicted hourly Kp values for last 24 hours and next ~1 hour

**Provider**
Tromsø Geophysical Observatory (TGO)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/tgo-federated

G.119 Short term (1 hour) local geomagnetic forecast [currently unavailable]

**Description**
Local geomagnetic forecasts and overview for Ny-Ålesund, Tromsø and Dombås for Horizontal component, Inclination, Declination and total field.

**Provider**
Tromsø Geophysical Observatory (TGO)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/tgo-federated
G.120 Real-time and historic geomagnetic activity plots and data files for geomagnetic surveying (total field) [currently unavailable]

Description
Real-time and historic geomagnetic activity plots and data files for geomagnetic surveying (total field)

Provider
Norwegian Mapping Authority (NMA)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/resoss-federated

G.121 Real-time and historic geomagnetic activity plots and data files for directional drilling (total field, declination and inclination) [currently unavailable]

Description
Real-time and historic geomagnetic activity plots and data files for directional drilling (total field, declination and inclination)

Provider
Norwegian Mapping Authority (NMA)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/resoss-federated

G.122 E-mail alerts for geomagnetic disturbances [currently unavailable]

Description
E-mail alert product based on real-time data as provided by the TGO magnetometer network.

Provider
Norwegian Mapping Authority (NMA)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/resoss-federated

G.123 Swarm Polar Electrojet (PEJ)

Description
Intense horizontal currents flowing in the ionosphere in the auroral oval, i.e. PEJs (Polar Electrojets) are believed to be the principal cause of magnetic disturbances giving rise to problems in power systems as a result of geomagnetically induced currents

Provider
German Research Centre for Geosciences (GFZ)
**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/gfz-sua-federated

**G.124 Swarm Field-Aligned Current (FAC)**

**Description**
FAC (Field-Aligned Current) are intense within the auroral region and used to indicate the bounders of the auroral oval

**Provider**
German Research Centre for Geosciences (GFZ)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/gfz-sua-federated

**G.125 Swarm Vector Magnetic Field (MAG)**

**Description**
MAG provides time series of 1 Hz (low resolution) vector measurements of the magnetic field and the magnetic field intensity from the scalar magnetometer (ASM)

**Provider**
German Research Centre for Geosciences (GFZ)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/gfz-sua-federated

**G.126 Local Disturbance index for Spain**

**Description**
Indication of the geomagnetic disturbance field on the ground for Spain

**Provider**
Universidad de Alcalá (UAH)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/uah-senmes-federated

**G.127 Local Current index for Spain**

**Description**
Indication of the geoelectric field on the ground for Spain

**Provider**
Universidad de Alcalá (UAH)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/uah-senmes-federated
G.128 Geomagnetic Storm Occurrence

*Description*
Geomagnetic storm alert predicting a variation greater than 50 nT

*Provider*
Universidad de Alcalá (UAH)

*Portal Entry Point*
http://swe.ssa.esa.int/web/guest/uah-senmes-federated

G.129 Geomagnetic Storm Recovery Phase

*Description*
Geomagnetic storm recovery phase prediction when Dst values are less than -100 nT

*Provider*
Universidad de Alcalá (UAH)

*Portal Entry Point*
http://swe.ssa.esa.int/web/guest/uah-senmes-federated

G.130 Geomagnetic Storm Subscription

*Description*
Automatic e-mail warnings from SolarHeed [G.128] and SolarHoldover[G.129]

*Provider*
Universidad de Alcalá (UAH)

*Portal Entry Point*
http://swe.ssa.esa.int/web/guest/uah-senmes-federated

G.131 Geomagnetic Conditions Scale

*Description*
Color code scale indicating the level of disturbance according to LDiñ

*Provider*
Universidad de Alcalá (UAH)

*Portal Entry Point*
http://swe.ssa.esa.int/web/guest/uah-senmes-federated

G.132 GIC Conditions Scale

*Description*
Color code scale indicating the level of disturbance according to LCiñ
Provider
Universidad de Alcalá (UAH)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/uah-senmes-federated

G.133 Conditions Reports

Description
An automatic report describing the values of Sentinel G [G.131] and Sentinel C [G.132]

Provider
Universidad de Alcalá (UAH)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/uah-senmes-federated

G.134 Forecast of Kp

Description
Forecast of Kp index with up to 4 hours lead-time.

Provider
Swedish Institute of Space Physics in Lund (IRF-Lund)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/irf-federated

G.135 Forecast of Dst

Description
Forecast of Dst index with up to 2 hours lead-time.

Provider
Swedish Institute of Space Physics in Lund (IRF-Lund)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/irf-federated
2 Heliospheric weather products

ESC Coordinator
Chris Perry, STFC-RAL Space

Expert groups

Centre de Données de la Physique des Plasmas (CDPP)
H.103c Heliospheric propagation tool
H.107b Solar wind propagation (Heliopropa)
H.114a Automated Multi Dataset Analysis (AMDA)

Centre for mathematical Plasma-Astrophysics (CmPA)
H.200a Virtual Space Weather Modelling Centre [product provided for demonstration, not assigned to service]

Institute of Physics (UNIGRAZ)
H.101b Forecast of solar wind high-speed streams (ESWF)
H.101e Forecast of solar wind high-speed streams (STEREO+CH)
H.103b CME near-Earth arrival time predictions (Drag Based Model Tool)
H.108b CME arrival time predictions (Drag Based Ensemble Model Tool)

RAL Space (RAL Space)
H.101g EUHFORIA 3D MHD Heliosphere (Earth) [product provided for demonstration, not assigned to service]
H.107c_Mars EUHFORIA 3D MHD Heliosphere (Mars) [product provided for demonstration, not assigned to service]
H.107c_Mercury EUHFORIA 3D MHD Heliosphere (Mercury) [product provided for demonstration, not assigned to service]
H.107c_Venus EUHFORIA 3D MHD Heliosphere (Venus) [product provided for demonstration, not assigned to service]
H.112a H-ESC product assessment Report
H.113a H-ESC archive product browser
H.115a H-ESC statistical products

Technical University of Denmark (DTU)
H.101f AWARE_NEXT Enhanced 24 hour solar wind forecast
H.106b Automated WARnings of Earth arrivals (AWARE)
H.110b Automated WARnings of STEREO_A arrivals (AWARE_A)

UK Met Office (UKMO)
H.101a Near-Earth solar wind forecasts (Enlil Ensemble)
H.101c Solar Wind Near-Earth Forecasts (Enlil Ensemble)
H.102a Near-Earth NRT solar wind
H.103a Near-Earth CME arrival time predictions (Enlil Ensemble)
H.105a Near-Earth NRT energetic particles
H.106a Near-Earth space weather notifications
H.107a_Mars Heliospheric solar wind forecasts for Mars based on 3D-MHD modelling using Enlil
H.107a_Mercury Heliospheric solar wind forecasts for Mercury based on 3D-MHD modelling using Enlil
H.107a_Venus Heliospheric solar wind forecasts for Venus based on 3D-MHD modelling using Enlil
H.108a_Mars CME Tailored Heliospheric arrival predictions
H.108a_Mercury CME Tailored Heliospheric arrival predictions
H.108a_Venus CME Tailored Heliospheric arrival predictions
H.110a_Mars Tailored Heliospheric Space Weather Alerts
H.110a_Mercury Tailored Heliospheric Space Weather Alerts
H.110a_Venus Tailored Heliospheric Space Weather Alerts
H.101a Near-Earth solar wind forecasts (Enlil Ensemble)

Description
The Solar Wind Near-Earth forecasts are produced by Met Office Space Weather Operations Centre (MOSWOC) forecasters using the WSA-Enlil Model and SOHO LASCO coronagraph images. The WSA-Enlil Model is a large-scale, physics-based prediction model of the heliosphere, run on Met Office supercomputers to provide 1-4 day advance warning of solar wind structures and Earth-directed coronal mass ejections (CMEs) that cause geomagnetic storms. For times when there are Earthward directed CMEs an additional ensemble product is produced. This consists of a low resolution version of the Enlil model is run 24 times with different perturbations on the CME characteristics. Time series plots of the solar wind density and speed at the Near-Earth location are plotted for each member the spread providing an indication of the uncertainty.

Provider
UK Met Office (UKMO)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/metoffice-enlil-e-federated

H.101b Forecast of solar wind high-speed streams (ESWF)

Description
The Empirical Solar Wind Forecast (ESWF) is based on an empirical relation linking the area of coronal holes observed in remote sensing EUV data and high speed streams measured at Earth after about 4 days. The product provides the extracted areas from EUV (NASA SDO/AIA 193 Å) image data, as well as a graphical output of the forecasted solar wind speed at L1 for three different time-ranges. The service product is updated automatically every hour, with a delay of 2 hours to real-time, and compared to actual L1 in-situ measurements. Previous output can be found in the H-ESC archive (see the HPARC/PB product).

Provider
Institute of Physics (UNIGRAZ)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/graz-eswf-federated

H.101c Solar Wind Near-Earth Forecasts (Enlil Ensemble)

Description
The Solar Wind Near-Earth forecasts are produced by Met Office Space Weather Operations Centre (MOSWOC) forecasters using the WSA-Enlil Model and SOHO LASCO coronagraph images. The WSA-Enlil Model is a large-scale, physics-based prediction model of the heliosphere, run on Met Office supercomputers to provide 1-4 day advance warning of solar wind structures and Earth-directed coronal mass ejections (CMEs) that cause geomagnetic storms. For times when there are Earthward directed CMEs an additional ensemble product is produced. This consists of a low resolution version of the Enlil model is run 24 times with
different perturbations on the CME characteristics. Time series plots of the solar wind density and speed at the Near-Earth location are plotted for each member the spread providing an indication of the uncertainty.

**Provider**  
UK Met Office (UKMO)

**Portal Entry Point**  
http://swe.ssa.esa.int/web/guest/metoffice-enlil-e-federated

**H.101e Forecast of solar wind high-speed streams (STEREO+CH)**

**Description**  
Since the fast solar wind speed undergoes only long-term changes, as it emanates from long-lived and stable coronal holes, we use a persistence model to forecast the solar wind speed at Earth. An estimate of the uncertainty is provided based on changes to the coronal hole measurements between STEREO-A and Earth. Previous output can be found in the H-ESC archive (see the HPARC/PB product)

**Provider**  
Institute of Physics (UNIGRAZ)

**Portal Entry Point**  
http://swe.ssa.esa.int/web/guest/graz-stereo-ch-federated

**H.101f AWARE_NEXT Enhanced 24 hour solar wind forecast**

**Description**  
The AWARE NEXT product provides automated prediction of the potentially geo-effective solar wind disturbances called co-rotating interaction regions (CIRs) and the associated trailing high-speed streams (HSSs), estimates the risk for occurrence of CIRs in L1 within the next 24 hours.

**Provider**  
Technical University of Denmark (DTU)

**Portal Entry Point**  
http://swe.ssa.esa.int/web/guest/dtu-aware-next-federated

**H.101g EUHFORIA 3D MHD Heliosphere (Earth) [product provided for demonstration, not assigned to service]**

**Description**  
EUHFORIA (v 1.0.3) is a 3D MHD heliosphere model that propagates near-Sun solar wind properties and transient related to CME events out into the heliosphere. This product makes use of the version of EUHFORIA that is installed and accessible via the Virtual Space Weather Modelling Centre VSWMC as described in S. Poedts, 2018. The product is generated on a daily schedule with the latest model results being presented to the user. The EUHFORIA product is run automatically each morning and makes use of the current published Enlil/E configuration.
available from UK Met Office at that time. This is the version of the product for target Earth. The product is currently considered a prototype and so is only accessible via the H-ESC home page.

**Provider**
RAL Space (RAL Space)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/ral-euhforia-e-federated

**H.102a Near-Earth NRT solar wind**

**Description**
This product is a graphical nowcast representation of the observational data available from the DSCOVR satellite. This includes: 1) Bulk Wind Speed, 2) Proton Density, 3) Proton Temperature, 4) Magnetic Field

**Provider**
UK Met Office (UKMO)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/metoffice-sw-l1-federated

**H.103a Near-Earth CME arrival time predictions (Enlil Ensemble)**

**Description**
This product is generated by Met Office Space Weather Operations Centre (MOSWOC) forecaster based on Enlil model output, described in product description H101a and H101c (ensemble). The CME arrival time forecast will be included within the forecaster’s commentary. For times when there are Earthward directed CMEs an ensemble run of the model is also used. This consists of a low resolution version of the Enlil model run 24 times with different perturbations on the CME characteristics. The forecasters assess the output to determine the likely spread in arrival times.

**Provider**
UK Met Office (UKMO)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/metoffice-enlil-e-federated

**H.103b CME near-Earth arrival time predictions (Drag Based Model Tool)**

**Description**
The Drag-Based Model (DBM) tool provides predictions of the interplanetary coronal mass ejection (ICME) travel and its arrival at an arbitrary ecliptic-plane location or at already listed planets and satellites in ecliptic-plane orbits. Calculations are based on the assumption that the dominant force in the heliospheric dynamics of ICMEs is the magnetohydrodynamical (MHD) equivalent of the aerodynamic drag.
**Provider**
Institute of Physics (UNIGRAZ)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/graz-dbм-federated

**H.103c Heliospheric propagation tool**

**Description**
The propagation tool supports the assessment of CME (Coronal Mass Ejections) and CIR (Corotating Interaction Regions) and SEP (Solar Energetic Particle) arrival times at planets, spacecraft and other solar system objects such as comets. It supports the tracking of heliospheric structures using white light J-maps and has access to catalogues of CME/CIR trajectories. It is also connected to science archives of in-situ data (AMDA) and imagery data to assist with posteriori analysis.

**Provider**
Centre de Données de la Physique des Plasmas (CDPP)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/cdpp-proptol-federated

**H.105a Near-Earth NRT energetic particles**

**Description**
This product is a graphical representation of the observational data available from the GOES satellites. The Proton Flux and Electron Flux from the geostationary GOES 13 and GOES 15 are displayed.

**Provider**
UK Met Office (UKMO)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/metoffice-sep-e-federated

**H.106a Near-Earth space weather notifications**

**Description**
This product is generated by Met Office Space Weather Operations Centre (MOSWOC) forecaster based on available all data and model output. H.106a Near-Earth Space Weather Alerts describes all notifications (alerts, watches, and warnings) issued by the Met Office and shown below:

**Provider**
UK Met Office (UKMO)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/metoffice-alerts-e-federated
H.106b Automated WARnings of Earth arrivals (AWARE)

Description
The Near-Earth Near-Real-Time alert service Automated WARnings of Earth arrivals (AWARE) product provides an automated detection and subsequent classification of solar wind disturbances arriving at the L1 point. Focus is on disturbances with a potential for creating geomagnetic storms. The service requires solar wind in situ plasma and magnetic field observations. These are currently provided in NRT directly from NOAA/NASA from the ACE SWEPAM and MAG instruments. Periods of significantly enhanced magnetic field are identified and classified according to their most likely cause, being either propagating ICMEs or high speed streams creating SIRs (including CIRs). In addition, significant interplanetary shocks are identified. Independently, Kp is predicted 1-2h ahead based on the latest solar wind measurements. Previous output can be found in the H-ESC archive (see the HPARC product).

Provider
Technical University of Denmark (DTU)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/dtu-aware-federated

H.107a_Mars Heliospheric solar wind forecasts for Mars based on 3D-MHD modelling using Enlil

Description
The Solar Wind Mars forecasts are produced by Met Office Space Weather Operations Centre (MOSWOC) forecasters using the WSA-Enlil Model and SOHO LASCO coronagraph images. The WSA-Enlil Model is a large-scale, physics-based prediction model of the heliosphere that provides 1-4 day advance warning of solar wind structures and target-directed coronal mass ejections (CMEs) that can cause space weather effects.

Provider
UK Met Office (UKMO)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/metoffice-enlil-ma-federated

H.107a_Mercury Heliospheric solar wind forecasts for Mercury based on 3D-MHD modelling using Enlil

Description
The Solar Wind Mercury forecasts are produced by Met Office Space Weather Operations Centre (MOSWOC) forecasters using the WSA-Enlil Model and SOHO LASCO coronagraph images. The WSA-Enlil Model is a large-scale, physics-based prediction model of the heliosphere that provides 1-4 day advance warning of solar wind structures and target-directed coronal mass ejections (CMEs) that can cause space weather effects.
**H.107a_Venus Heliospheric solar wind forecasts for Venus based on 3D-MHD modelling using Enlil**

**Description**
The Solar Wind Venus forecasts are produced by Met Office Space Weather Operations Centre (MOSWOC) forecasters using the WSA-Enlil Model and SOHO LASCO coronagraph images. The WSA-Enlil Model is a large-scale, physics-based prediction model of the heliosphere that provides 1-4 day advance warning of solar wind structures and target-directed coronal mass ejections (CMEs) that can cause space weather effects.

**Provider**
UK Met Office (UKMO)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/metoffice-enlil-me-federated

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**H.107b_Solar wind propagation (Heliopropa)**

**Description**
The heliopropa tool uses a simple 1D MHD code to propagate in situ L1 data to provide background solar wind parameters at other locations within the solar system.

**Provider**
Centre de Données de la Physique des Plasmas (CDPP)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/cdpp-heliopropa-federated

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**H.107c_Mars EUHFORIA 3D MHD Heliosphere (Mars) [product provided for demonstration, not assigned to service]**

**Description**
EUHFORIA (v 1.0.3) is a 3D MHD heliosphere model that propagates near-Sun solar wind properties and transient related to CME events out into the heliosphere. This product makes use of the version of EUHFORIA that is installed and accessible via the Virtual Space Weather Modelling Centre VSWMC as described in S. Poedts, 2018. The product is generated on a daily schedule with the latest model results being presented to the user. The EUHFORIA product is run automatically each morning and makes use of the current published Enlil/E configuration available from UK Met Office at that time. This is the version of the product for target Mars. The product is currently considered a prototype and so is only accessible via the H-ESC home page.
**Provider**
RAL Space (RAL Space)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/ral-euhforia-ma-federated

**H.107c_Mercury EUHFORIA 3D MHD Heliosphere (Mercury) [product provided for demonstration, not assigned to service]**

**Description**
EUHFORIA (v 1.0.3) is a 3D MHD heliosphere model that propagates near-Sun solar wind properties and transient related to CME events out into the heliosphere. This product makes use of the version of EUHFORIA that is installed and accessible via the Virtual Space Weather Modelling Centre VSWMC as described in S. Poedts, 2018. The product is generated on a daily schedule with the latest model results being presented to the user. The EUHFORIA product is run automatically each morning and makes use of the current published Enlil/E configuration available from UK Met Office at that time. This is the version of the product for target Mercury. The product is currently considered a prototype and so is only accessible via the H-ESC home page.

**Provider**
RAL Space (RAL Space)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/ral-euhforia-me-federated

**H.107c_Venus EUHFORIA 3D MHD Heliosphere (Venus) [product provided for demonstration, not assigned to service]**

**Description**
EUHFORIA (v 1.0.3) is a 3D MHD heliosphere model that propagates near-Sun solar wind properties and transient related to CME events out into the heliosphere. This product makes use of the version of EUHFORIA that is installed and accessible via the Virtual Space Weather Modelling Centre VSWMC as described in S. Poedts, 2018. The product is generated on a daily schedule with the latest model results being presented to the user. The EUHFORIA product is run automatically each morning and makes use of the current published Enlil/E configuration available from UK Met Office at that time. This is the version of the product for target Venus. The product is currently considered a prototype and so is only accessible via the H-ESC home page.

**Provider**
RAL Space (RAL Space)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/ral-euhforia-v-federated
H.108a_Mars CME Tailored Heliospheric arrival predictions

**Description**
The expected arrival time of any target directed CMEs are reported in the forecaster commentary displayed below the H.107a model output and CME input list.

**Provider**
UK Met Office (UKMO)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/metoffice-enlil-ma-federated

H.108a_Mercury CME Tailored Heliospheric arrival predictions

**Description**
The expected arrival time of any target directed CMEs are reported in the forecaster commentary displayed below the H.107a model output and CME input list.

**Provider**
UK Met Office (UKMO)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/metoffice-enlil-me-federated

H.108a_Venus CME Tailored Heliospheric arrival predictions

**Description**
The expected arrival time of any target directed CMEs are reported in the forecaster commentary displayed below the H.107a model output and CME input list.

**Provider**
UK Met Office (UKMO)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/metoffice-enlil-v-federated

H.108b CME arrival time predictions (Drag Based Ensemble Model Tool)

**Description**
The Drag-Based Ensemble Model (DBEM) tool provides predictions of the Interplanetary Coronal Mass Ejection (ICME) travel and its arrival at an arbitrary ecliptic-plane location. Calculations are based on the standard DBM assumption that the dominant force is the MHD equivalent of aerodynamic drag. In the ensemble version the model is run multiple times by perturbing input parameters to build up a statistical view of the most likely outcome.

**Provider**
Institute of Physics (UNIGRAZ)
H.110a_Mars Tailored Heliospheric Space Weather Alerts

**Description**
Space weather alerts (notifications) are provided as part of the forecaster commentary section (i.e. in conjunction with H.108a). Notifications are currently limited to assessment of high speed streams based on the H.107a heliospheric model output.

**Provider**
UK Met Office (UKMO)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/graz-dbem-federated

H.110a_Mercury Tailored Heliospheric Space Weather Alerts

**Description**
Space weather alerts (notifications) are provided as part of the forecaster commentary section (i.e. in conjunction with H.108a). Notifications are currently limited to assessment of high speed streams based on the H.107a heliospheric model output.

**Provider**
UK Met Office (UKMO)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/metoffice-enlil-ma-federated

H.110a_Venus Tailored Heliospheric Space Weather Alerts

**Description**
Space weather alerts (notifications) are provided as part of the forecaster commentary section (i.e. in conjunction with H.108a). Notifications are currently limited to assessment of high speed streams based on the H.107a heliospheric model output.

**Provider**
UK Met Office (UKMO)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/metoffice-enlil-me-federated

H.110b Automated WARnings of STEREO_A arrivals (AWARE_A)

**Description**
The STEREO-A Near-Real-Time alert service Automated WARnings of STEREO-A arrivals (AWARE_A) product provides an automated detection and subsequent classification of solar wind disturbances arriving at the location of the STEREO-A spacecraft. The product requires solar wind in situ plasma and magnetic field observations. These are currently provided in NRT.
STEREO-A. Periods of significantly enhanced magnetic field are identified and classified according to their most likely cause, being either propagating ICMEs or high speed streams creating SIRs (including CIRs). In addition, significant interplanetary shocks are identified. Independently Kp is predicted 1-2h ahead based on the latest solar wind measurements. Previous output can be found in the H-ESC archive (see the HPARC product).

**Provider**
Technical University of Denmark (DTU)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/dtu-aware-a-federated

**H.112a H-ESC product assessment Report**

**Description**
The H-ESC product assessment report provides a monthly overview of the events identified during the interval and the accuracy with which they could be determined. Initially this activity is focused on CME arrival and solar wind speed forecasts.

**Provider**
RAL Space (RAL Space)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/ral-hparc-par-federated

**H.113a H-ESC archive product browser**

**Description**
The H-ESC product browser provides a quick way to review the H-ESC products as they were available at a specific time.

**Provider**
RAL Space (RAL Space)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/ral-hparc-pb-federated

**H.114a Automated Multi Dataset Analysis (AMDA)**

**Description**
The AMDA system provides an archive of planetary, solar wind, Earth magnetosphere and ionosphere mission and ground based products. In addition it supports a range of standard models such as magnetic footprints, magnetic fields, solar wind propagation to planets and probes as well as access to external databases of observations and simulations. A key functionality of the system is its embedded plotting, data mining and cataloguing functionalities which are extremely useful in relation to posteriori analysis.
**Provider**  
Centre de Données de la Physique des Plasmas (CDPP)

**Portal Entry Point**  
http://swe.ssa.esa.int/web/guest/cdpp-amda-federated

**H.115a H-ESC statistical products**

**Description**  
The H-ESC statistical products tool allows the calculation of statistical parameters and event lists based on long time series of data such as solar wind parameters.

**Provider**  
RAL Space (RAL Space)

**Portal Entry Point**  
http://swe.ssa.esa.int/web/guest/ral-hparc-stat-federated

**H.200a Virtual Space Weather Modelling Centre [product provided for demonstration, not assigned to service]**

**Description**  
A full scale, open, end-to-end (meaning from the Sun to the Earth) space weather modelling tool, enabling users to combine (couple) various space weather models in an integrated tool.

**Provider**  
Centre for mathematical Plasma-Astrophysics (CmPA)

**Portal Entry Point**  
http://swe.ssa.esa.int/web/guest/kul-cmpa-federated
3 Ionospheric weather products

ESC Coordinator
Claudia Borries, DLR

Expert groups

Department of Ionosphere and Aeronomy (IAP)

I.136 MSTID activity over Czechia [product provided for demonstration, not assigned to service]
German Aerospace Center (DLR)

I.101 Near-real-time map of the Total Electron Content (TEC) for the European region
I.101b IMPC TEC map (Europe), current, beta version [product provided for demonstration, not assigned to service]
I.102 1 hour forecast of the Total Electron Content (TEC) for the European region.
I.103 Near-real-time global map of the Total Electron Content (TEC)
I.103b Near-real-time global map of the Total Electron Content (TEC) [product provided for demonstration, not assigned to service]
I.104 1 hour forecast of the Total Electron Content (TEC) worldwide.
I.105a Equivalent slab thickness for Juliusruh
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I.106a Local scintillation indices S4 & σφ for Kiruna
I.106b Local scintillation indices S4 & σφ for Neustrelitz (Germany)
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I.106d Local scintillation indices S4 & σφ for Laguna (Tenerife/Spain)
I.106e Local scintillation indices S4 & σφ for Toulouse (France)
I.124 The Rate of change of TEC index (ROTI) maps for Europe
I.137 IMPC 3D Electron Density Based on Kriging Tomography [product provided for demonstration, not assigned to service]
German Research Centre for Geosciences (GFZ)

I.128 Swarm Rate Of change of TEC (ROT)
I.129 Swarm Total Electron Content (TEC)
I.130 Swarm electron density (Ne)
I.131 Swarm Ionospheric Bubble Index (IBI)

Heliogeophysical Prediction Service Laboratory (SRC PAS)

I.125 Past values of solar activity indices used in atmosphere models
I.126 Past values of geomagnetic activity indices used in atmosphere models
I.134 Borowiec Riometer raw [V] and relative [dB]
I.134b Hornsund riometer measurements [product provided for demonstration, not assigned to service]

Institute of Space Science Romania (ISS Romania)


Ionospheric Group of the National Observatory of Athens (EIS)

I.114 Long term prediction (up to 3 month ahead) of foF2, European maps based on the upgraded SIRM model
I.115 Nowcast European maps of foF2 (based on the upgraded SIRMUP model)
I.116 Maps of forecasted foF2 over Europe for the next 24 hours, (based on SWIF and GCAM models)
I.117 Near-real-time TEC maps for the European region (based on the TaD model)
I.118 Alerts for ionospheric disturbances in the European sector (based on the Alert Algorithm of the SWIF model)
I.119 Maps, updated in real-time showing the current ionospheric conditions at each station location.
I.120 Forecast foF2 values for the next 24 hours over each DIAS ionosonde station, based on the SWIF and on the GCAM models

Norwegian Mapping Authority (NMA)

I.107 VTEC maps (Northern Europe)
I.108 GIVE maps (Northern Europe)
I.109a ROTI maps (Northern Europe)
I.109b ROTI@Ground maps (Fennoscandia)
I.110a S4 maps (Northern Europe)
I.110b σφ maps (Northern Europe)
I.110c S4 maps [product provided for demonstration, not assigned to service]
I.110d σφ maps [product provided for demonstration, not assigned to service]
I.138 GNSS Performance Indicator

Space and Earth Observation Centre (FMI)

I.135a TomoScand3D [product provided for demonstration, not assigned to service]
I.135b TomoScand2D [product provided for demonstration, not assigned to service]

SWE Data Centre (SWE Portal)

I.121 IONMON TEC maps
I.122c Ionospheric Scintillation Monitoring service (ISM): S4 and Err(S4) nowcast modelled maps [currently unavailable]
I.122d Ionospheric Scintillation Monitoring service (ISM): SigmaPhi and Err(SigmaPhi) nowcast modelled maps [currently unavailable]
I.122e Ionospheric Scintillation Monitoring service (ISM): TEC and Err(TEC) nowcast modelled maps [currently unavailable]
I.122f Ionospheric Scintillation Monitoring service (ISM): S4 and Err(S4) 6-hour forecast modelled maps [currently unavailable]
I.122g Ionospheric Scintillation Monitoring service (ISM): SigmaPhi and Err(SigmaPhi) 6-hour forecast modelled maps [currently unavailable]
I.122h Ionospheric Scintillation Monitoring service (ISM): TEC and Err(TEC) 6-hour forecast modelled maps [currently unavailable]

I.122i Ionospheric Scintillation Monitoring service (ISM): S4 and Err(S4) nowcast modelled values at a given location [currently unavailable]

I.122j Ionospheric Scintillation Monitoring service (ISM): SigmaPhi and Err(SigmaPhi) nowcast modelled values at a given location [currently unavailable]

I.122k Ionospheric Scintillation Monitoring service (ISM): TEC and Err(TEC) nowcast modelled values at a given location [currently unavailable]

I.122l Ionospheric Scintillation Monitoring service (ISM): S4 and Err(S4) 6h forecast modelled values at a given location [currently unavailable]

I.122m Ionospheric Scintillation Monitoring service (ISM): SigmaPhi and Err(SigmaPhi) 6h forecast modelled values at a given location [currently unavailable]

I.122n Ionospheric Scintillation Monitoring service (ISM): TEC and Err(TEC) 6h forecast modelled values at a given location [currently unavailable]

UK Met Office (UKMO)

I.132 Atmospheric Density Estimates of Forecast and Prior Total Density for Atmospheric Drag Calculation

UPC-IonSAT (IonSAT)

I.123a Sunlit Ionosphere Sudden TEC Enhancement Detector

I.123b SOLar Euv flux RAte GNSS proxy drift rate

I.123c SOLERA

I.123d SISTED warning

I.123e SOLERA warning
I.101 Near-real-time map of the Total Electron Content (TEC) for the European region

Description
Near-real-time map of the Total Electron Content (TEC) for the European region. It is generated from GNSS data streams which are assimilated into the Neustrelitz TEC Model NTCM-EU, which is a regional TEC model for Europe.

Provider
German Aerospace Center (DLR)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/swaci-federated

I.101b IMPC TEC map (Europe), current, beta version [product provided for demonstration, not assigned to service]

Description
DLR's TEC maps for the European region provide information about vertical TEC (VTEC) derived from ground-based GNSS measurements with a latency of not more than 5 minutes and an update rate of 15 minutes. The maps cover the region between 30°N – 72°N and 30°W – 50°E with 2° in latitudes and 2° in longitude spatial resolution.

Provider
German Aerospace Center (DLR)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/swaci-federated

I.102 1 hour forecast of the Total Electron Content (TEC) for the European region.

Description
1 hour forecast of the Total Electron Content (TEC) for the European region. This forecast is derived from the near-real-time TEC maps.

Provider
German Aerospace Center (DLR)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/swaci-federated
I.103 Near-real-time global map of the Total Electron Content (TEC)

*Description*
Near-real-time map of the Total Electron Content (TEC) for the world. It is generated from GNSS data streams which are assimilated into the Neustrelitz TEC Model NTCM-GL, which is a global TEC model.

*Provider*
German Aerospace Center (DLR)

*Portal Entry Point*
http://swe.ssa.esa.int/web/guest/swaci-federated

I.103b Near-real-time global map of the Total Electron Content (TEC) [product provided for demonstration, not assigned to service]

*Description*
DLR's global TEC maps provide information about vertical TEC (VTEC) derived from ground-based GNSS measurements with a latency of not more than 5 minutes and an update rate of 15 minutes. This version of the global TEC maps is a beta version, which benefits from a new GNSS pre-processing resulting in a much better data coverage than the recent version. Please consider, the validation of this product has not been completed so far.

*Provider*
German Aerospace Center (DLR)

*Portal Entry Point*
http://swe.ssa.esa.int/web/guest/swaci-federated

I.104 1 hour forecast of the Total Electron Content (TEC) worldwide.

*Description*
1 hour forecast of the Total Electron Content (TEC) worldwide. This forecast is derived from the near-real-time TEC maps.

*Provider*
German Aerospace Center (DLR)

*Portal Entry Point*
http://swe.ssa.esa.int/web/guest/swaci-federated

I.105a Equivalent slab thickness for Juliusruh

*Description*
The equivalent slab thickness is a measure of the width of the shape of the vertical electron density profile of the ionosphere. The equivalent slab thickness is defined by the ratio of the total electron content (TEC) and the peak electron density of the local ionosphere. To compute
the peak electron density, vertical sounding data from the Juliusruh ionosonde stations is used. The corresponding TEC data are extracted from the TEC maps.

**Provider**
German Aerospace Center (DLR)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/swaci-federated

### I.105b Equivalent slab thickness for Pruhonice

**Description**
The equivalent slab thickness is a measure of the width of the shape of the vertical electron density profile of the ionosphere. The equivalent slab thickness is defined by the ratio of the total electron content (TEC) and the peak electron density of the local ionosphere. To compute the peak electron density, vertical sounding data from the Pruhonice ionosonde stations is used. The corresponding TEC data are extracted from the TEC maps.

**Provider**
German Aerospace Center (DLR)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/swaci-federated

### I.106a Local scintillation indices S4 & σφ for Kiruna

**Description**
Local scintillation indices S4 & σφ for Kiruna (Sweden)

**Provider**
German Aerospace Center (DLR)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/swaci-federated

### I.106b Local scintillation indices S4 & σφ for Neustrelitz (Germany)

**Description**
Local scintillation indices S4 & σφ for Neustrelitz (Germany)

**Provider**
German Aerospace Center (DLR)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/swaci-federated
I.106c Local scintillation indices $S_4$ & $\sigma_\phi$ for Svalbard (Norway)

Description
Local scintillation indices $S_4$ & $\sigma_\phi$ for Svalbard (Norway)

Provider
German Aerospace Center (DLR)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/swaci-federated

I.106d Local scintillation indices $S_4$ & $\sigma_\phi$ for Laguna (Tenerife/ Spain)

Description
Local scintillation indices $S_4$ & $\sigma_\phi$ for Laguna (Tenerife/ Spain)

Provider
German Aerospace Center (DLR)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/swaci-federated

I.106e Local scintillation indices $S_4$ & $\sigma_\phi$ for Toulouse (France)

Description
Local scintillation indices $S_4$ & $\sigma_\phi$ for Toulouse (France)

Provider
German Aerospace Center (DLR)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/swaci-federated

I.107 VTEC maps (Northern Europe)

Description
Most recent map of VTEC.

Provider
Norwegian Mapping Authority (NMA)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/rtim-federated

I.108 GIVE maps (Northern Europe)

Description
Most recent map of GIVE.
Provider
Norwegian Mapping Authority (NMA)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/rtim-federated

I.109a ROTI maps (Northern Europe)

Description
Most recent map of the ionospheric disturbance index ROTI.

Provider
Norwegian Mapping Authority (NMA)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/rtim-federated

I.109b ROTI@Ground maps (Fennoscandia)

Description
Most recent map of the ionospheric disturbance index ROTI, as received at ground level.

Provider
Norwegian Mapping Authority (NMA)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/rtim-federated

I.110a S4 maps (Northern Europe)

Description
Most recent map of the S4 scintillation index.

Provider
Norwegian Mapping Authority (NMA)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/rtim-federated

I.110b σφ maps (Northern Europe)

Description
Most recent map of the σφ scintillation index.

Provider
Norwegian Mapping Authority (NMA)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/rtim-federated
I.110c S4 maps [product provided for demonstration, not assigned to service]

**Description**
Expanded scintillation maps, including data from additional scintillation receivers which cannot be included in the real-time service. The maps are produced as they would look if the scintillation data from the additional receivers were received in real-time.

**Provider**
Norwegian Mapping Authority (NMA)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/rtim-federated

I.110d σφ maps [product provided for demonstration, not assigned to service]

**Description**
Expanded scintillation maps, including data from additional scintillation receivers which cannot be included in the real-time service. The maps are produced as they would look if the scintillation data from the additional receivers were received in real-time.

**Provider**
Norwegian Mapping Authority (NMA)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/rtim-federated

I.114 Long term prediction (up to 3 month ahead) of foF2, European maps based on the upgraded SIRM model

**Description**
The long term prediction map of foF2 for the whole European region for the current and the following 2 months, developed with data from 10 ionospheric stations, based on the SIRM/CCIR mapping routine.

**Provider**
Ionospheric Group of the National Observatory of Athens (EIS)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/dias-federated

I.115 Nowcast European maps of foF2 (based on the upgraded SIRMUP model)

**Description**
The real-time map of foF2 for the whole European region, developed with data from 10 ionospheric stations, based on the SIRMUP mapping routine. The map is made available with a latency of 20 min every hour in both ASCII and PNG formats.
I.116 Maps of forecasted foF2 over Europe for the next 24 hours, (based on SWIF and GCAM models)

**Description**
The maps over Europe (latitude from 34 to 80 deg) of the foF2 parameter, for the next 24 hours, calculated with the SWIF forecast model and mapped using the real-time updated SIRMUP method with background models the SIRM (for mid latitudes) and the CCIR (for the high latitudes). The maps are made available with a latency of 20 min every hour in both ASCII and PNG formats.

**Provider**
Ionospheric Group of the National Observatory of Athens (EIS)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/dias-federated

I.117 Near-real-time TEC maps for the European region (based on the TaD model)

**Description**
Four different maps are produced for the European region each 15 min of the hour: the map of the integrated electron density from 90km to hmF2 (bottomside TEC), the map of the integrated electron density from hmF2 to the transition height (topside TEC), the map of the integrated electron density from the transition height to 20,000km (Plasmaspheric TEC) and the map of the integrated electron density from 90km to 20,000 km (TEC). The mapped area extends from -10°W to 40°E in longitude and from 34°N to 60°N in latitude, and the spatial resolution of the maps is 1°x1°. The product is based on the 3D electron density grids that are calculated using TaD model (Belehaiki et al., 2012; Kutiev et al., 2012) in DIAS system. The maps are made available with a latency of 30 min in both ASCII and PNG formats.

**Provider**
Ionospheric Group of the National Observatory of Athens (EIS)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/dias-federated

I.118 Alerts for ionospheric disturbances in the European sector (based on the Alert Algorithm of the SWIF model)

**Description**
The EIS Ionospheric Alerts are calculated in the DIAS backend (http://dias.space.noa.gr, Belehaiki et al., 2006; 2007), and are based on the implementation of the Solar Wind driven
autoregression model for Ionospheric short-term Forecast (SWIF) developed and validated by Tsagouri et al. (2009) and Tsagouri (2011).

Provider
Ionospheric Group of the National Observatory of Athens (EIS)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/dias-federated

I.119 Maps, updated in real-time showing the current ionospheric conditions at each station location.

Description
A map of Europe that presents the current level of ionospheric activity, expressed as the deviation of the observed foF2 parameter in respect to the running 30 days median. The color code (green-orange-red) corresponds to the ionospheric disturbance level (quiet - disturbed - extremely disturbed). The maps are made available with a latency of 15 min in both ASCII and PNG formats.

Provider
Ionospheric Group of the National Observatory of Athens (EIS)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/dias-federated

I.120 Forecast foF2 values for the next 24 hours over each DIAS ionosonde station, based on the SWIF and on the GCAM models

Description
A map of Europe that presents the current level of ionospheric activity, expressed as the deviation of the observed foF2 parameter in respect to the running 30 days median. The color code (green-orange-red) corresponds to the ionospheric disturbance level (quiet - disturbed - extremely disturbed). The maps are made available with a latency of 15 min in both ASCII and PNG formats.

Provider
Ionospheric Group of the National Observatory of Athens (EIS)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/dias-federated

I.121 IONMON TEC maps

Description
The Ionosphere Monitoring Facility (IONMON, v2) is currently under development at ESA/ESOC and uses an analytic function approach to describe ionospheric structures by means of vertical
profile functions combined with horizontal surface functions [Feltens, 2007]. The mathematical models include, among others, different types of profile functions; empirical models for height-dependent scale heights; and a TEC integrator. TEC data derived from dual-frequency GNSS data can be processed in combination with observed electron density profiles. Currently these are derived from radio occultation measurements, however, the inclusion of other sources such as ionosondes, is in principle possible.

**Provider**
SWE Data Centre (SWE Portal)

**Portal Entry Point**
http://swe.ssa.esa.int/ionmon/

**I.122c Ionospheric Scintillation Monitoring service (ISM): S4 and Err(S4) nowcast modelled maps [currently unavailable]**

**Description**
Near-real-time (nowcast) worldwide and continental map and error map of amplitude scintillation index, based on GISM model and assimilated data from dedicated scintillation receivers (MONITOR) and geodetic GNSS receivers (IGS, SOPAC, CORS)

**Provider**
SWE Data Centre (SWE Portal)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/ism-public/

**I.122d Ionospheric Scintillation Monitoring service (ISM): SigmaPhi and Err(SigmaPhi) nowcast modelled maps [currently unavailable]**

**Description**
Near-real-time (nowcast) worldwide and continental map and error map of phase scintillation index, based on GISM model and assimilated data from dedicated scintillation receivers (MONITOR) and geodetic GNSS receivers (IGS, SOPAC, CORS)

**Provider**
SWE Data Centre (SWE Portal)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/ism-public/

**I.122e Ionospheric Scintillation Monitoring service (ISM): TEC and Err(TEC) nowcast modelled maps [currently unavailable]**

**Description**
Near-real-time (nowcast) worldwide and continental map and error map of Total Electron Content, based on GISM model and assimilated data from dedicated scintillation receivers (MONITOR) and geodetic GNSS receivers (IGS, SOPAC, CORS)
**Provider**  
SWE Data Centre (SWE Portal)

**Portal Entry Point**  
http://swe.ssa.esa.int/web/guest/ism-public/

**I.122f Ionospheric Scintillation Monitoring service (ISM): S4 and Err(S4) 6-hour forecast modelled maps [currently unavailable]**

**Description**  
6 hour forecast worldwide and continental maps and error maps of amplitude scintillation index, based on GISM model and assimilated data from dedicated scintillation receivers (MONITOR) and geodetic GNSS receivers (IGS, SOPAC, CORS)

**Provider**  
SWE Data Centre (SWE Portal)

**Portal Entry Point**  
http://swe.ssa.esa.int/web/guest/ism-public/
I.122g Ionospheric Scintillation Monitoring service (ISM): SigmaPhi and Err(SigmaPhi) 6-hour forecast modelled maps [currently unavailable]

**Description**
6 hour forecast worldwide and continental maps and error maps of phase scintillation index, based on GISM model and assimilated data from dedicated scintillation receivers (MONITOR) and geodetic GNSS receivers (IGS, SOPAC, CORS)

**Provider**
SWE Data Centre (SWE Portal)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/ism-public/

I.122h Ionospheric Scintillation Monitoring service (ISM): TEC and Err(TEC) 6-hour forecast modelled maps [currently unavailable]

**Description**
6 hour forecast worldwide and continental maps and error maps of Total Electron Content, based on GISM model and assimilated data from dedicated scintillation receivers (MONITOR) and geodetic GNSS receivers (IGS, SOPAC, CORS)

**Provider**
SWE Data Centre (SWE Portal)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/ism-public/

I.122i Ionospheric Scintillation Monitoring service (ISM): S4 and Err(S4) nowcast modelled values at a given location [currently unavailable]

**Description**
Near-real-time (nowcast) values of amplitude scintillation index at a given location, and its associated error, based on GISM model and assimilated data from dedicated scintillation receivers (MONITOR) and geodetic GNSS receivers (IGS, SOPAC, CORS)

**Provider**
SWE Data Centre (SWE Portal)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/ism-public/
I.122j Ionospheric Scintillation Monitoring service (ISM): SigmaPhi and Err(SigmaPhi) nowcast modelled values at a given location [currently unavailable]

Description
Near-real-time (nowcast) values of phase scintillation index at a given location, and its associated error, based on GISM model and assimilated data from dedicated scintillation receivers (MONITOR) and geodetic GNSS receivers (IGS, SOPAC, CORS)

Provider
SWE Data Centre (SWE Portal)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/ism-public/

I.122k Ionospheric Scintillation Monitoring service (ISM): TEC and Err(TEC) nowcast modelled values at a given location [currently unavailable]

Description
Near-real-time (nowcast) values of Total Electron Content at a given location, and its associated error, based on GISM model and assimilated data from dedicated scintillation receivers (MONITOR) and geodetic GNSS receivers (IGS, SOPAC, CORS)

Provider
SWE Data Centre (SWE Portal)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/ism-public/

I.122l Ionospheric Scintillation Monitoring service (ISM): S4 and Err(S4) 6h forecast modelled values at a given location [currently unavailable]

Description
6 hours graph of amplitude scintillation index at a given location, and its associated error, based on GISM model and assimilated data from dedicated scintillation receivers (MONITOR) and geodetic GNSS receivers (IGS, SOPAC, CORS)

Provider
SWE Data Centre (SWE Portal)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/ism-public/
I.122m Ionospheric Scintillation Monitoring service (ISM): SigmaPhi and Err(SigmaPhi) 6h forecast modelled values at a given location [currently unavailable]

Description
6 hours graph of phase scintillation index at a given location, and its associated error, based on GISM model and assimilated data from dedicated scintillation receivers (MONITOR) and geodetic GNSS receivers (IGS, SOPAC, CORS)

Provider
SWE Data Centre (SWE Portal)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/ism-public/

I.122n Ionospheric Scintillation Monitoring service (ISM): TEC and Err(TEC) 6h forecast modelled values at a given location [currently unavailable]

Description
6 hours graph of Total Electron Content at a given location, and its associated error, based on GISM model and assimilated data from dedicated scintillation receivers (MONITOR) and geodetic GNSS receivers (IGS, SOPAC, CORS)

Provider
SWE Data Centre (SWE Portal)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/ism-public/

I.123a Sunlit Ionosphere Sudden TEC Enhancement Detector

Description
SISTED is monitoring simultaneous sudden enhancements in the ionospheric Total Electron Content (TEC) using the drift rate (second time derivative) of the ionospheric carrier phase product (LI) which can be derived from the GNSS signals. LI is linearly related to the Slant TEC (STEC) along the satellite-receiver ray path under consideration. The drift rate is used to generate a set of three Impact Parameters (IP). An IP tells (in %) how many satellite-receiver pairs are affected by an abrupt over ionization. The service extracts Near-Real-Time (NRT) data from multiple NTRIP broadcasters, including the ones from the International GNSS Service (IGS, http://igs-ip.net) and from the European Reference Frame (EUREF, http://euref-ip.net). SISTED is provided as well through the ESA MONITOR project (http://monitor.estec.esa.int).

Provider
UPC-IonSAT (IonSAT)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/upc-federated
I.123b SOLar Euv flux RAte GNSS proxy drift rate

**Description**
SOLERA (formerly GSFLAI) is based on the impact of ionospheric electron content as response to solar flare activity. The ionospheric response appears as a change in Vertical TEC whose time derivative has a linear dependency on the cosine of Solar Zenith Angle. This relationship can be used to create a proxy for the time derivative of Solar EUV flux (in the spectral band of 21-34 nm). Validation studies with direct Solar EUV measurements by the SOHO SEM instrument (X-class flares during the years 2001-2011) have shown that the GSLAI proxy for EUV flux rate is accurate particularly during moderate and strong activity. In particular, SOLERA drift rate is tailored to detect solar flares occurrence and includes error bars. The service extracts Near-Real-Time (NRT) data from multiple NTRIP broadcasters, including the ones from the International GNSS Service (IGS, http://igs-ip.net) and from the European Reference Frame (EUREF, http://euref-ip.net). SOLERA is provided as well through the ESA MONITOR project considering its former name GSFLAI (http://monitor.estec.esa.int).

**Provider**
UPC-IonSAT (IonSAT)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/upc-federated

I.123c SOLERA

**Description**
SOLERA (formerly GSFLAI) is based on the impact of ionospheric electron content as response to solar flare activity. The ionospheric response appears as a change in Vertical TEC whose time derivative has a linear dependency on the cosine of Solar Zenith Angle. This relationship can be used to create a proxy for the time derivative of Solar EUV flux (in the spectral band of 21-34 nm). Validation studies with direct Solar EUV measurements by the SOHO SEM instrument (X-class flares during the years 2001-2011) have shown that the GSLAI proxy for EUV flux rate is accurate particularly during moderate and strong activity. The service extracts Near-Real-Time (NRT) data from multiple NTRIP broadcasters, including the ones from the International GNSS Service (IGS, http://igs-ip.net) and from the European Reference Frame (EUREF, http://euref-ip.net).

**Provider**
UPC-IonSAT (IonSAT)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/upc-federated

I.123d SISTED warning

**Description**
SISTED Warning is associated to the detection of mid and strong geoefffective solar flares affecting the sunlit ionosphere. SISTED Warning is triggered in case the sunlit SISTED Impact
Parameter (IP) is above a certain threshold and a minimum number of 50 Ionospheric Pierce Points (IPPs) are processed in the sunlit region.

Provider
UPC-IonSAT (IonSAT)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/upc-federated

I.123e SOLERA warning

Description
SOLERA-drift Warning is associated to the detection of mid and strong geoeffective solar flares. SOLERA Warning is triggered in case different conditions are fulfilled: (i) minimum slope of 0.002625, (ii) estimated error at least 3 times lower than the absolute GSFLAI value, (iii) minimum number of 140 IPPs in the dayside, and (iv) the range between the maximum and minimum SZA cosine in the dayside should be one or greater.

Provider
UPC-IonSAT (IonSAT)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/upc-federated

I.124 The Rate of change of TEC index (ROTI) maps for Europe

Description
The Rate of change of TEC index (ROTI) can be used as a measure to detect disturbances in the ionosphere. We calculate the ROTI from real-time data streams and associate the calculated values to the ionospheric Pierce points. The world map is overlaid with a grid and the averaged ROTI values falling in a certain tile are shown.

Provider
German Aerospace Center (DLR)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/swaci-federated

I.125 Past values of solar activity indices used in atmosphere models

Description
R (sunspot number), F10.7 (10.7-cm radio flux proxy for solar EUV in solar flux units), S10.7 (10.7-cm radio flux proxy for solar EUV in solar flux units), M10.7, Y10.7 F30 (30-cm solar radio flux)

Provider
Heliogeophysical Prediction Service Laboratory (SRC PAS)
I.126 Past values of geomagnetic activity indices used in atmosphere models

Description
Ap (planetary daily magnetic index), Kp (planetary three-hour magnetic index), Dst (Disturbance Storm Time Index), IG12 (12-month-running mean of the ionospheric IG index), IMF (Interplanetary Magnetic field), Aa (K-derived index measured at two antipodal observatories).

Provider
Heliogeophysical Prediction Service Laboratory (SRC PAS)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/src-federated

I.128 Swarm Rate Of change of TEC (ROT)

Description
Swarm Rate Of change of TEC is derived from Swarm Total Electron Content (TEC), which provides integrated electron density along the line of sight of a GPS ray received at the Swarm satellites (A, B, and C). The new Swarm ROT product plots are combined with the existing Swarm product plots, TEC, electron density (Ne), and Ionospheric Bubble Index (IBI). ROT data are continuously provided with a 1 Hz cadence.

Provider
German Research Centre for Geosciences (GFZ)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/gfz-sua-federated

I.129 Swarm Total Electron Content (TEC)

Description
Swarm Total Electron Content (TEC) provides integrated electron density along the line of sight of a GPS ray received at the Swarm satellites (A, B, and C). Each of the Swarm satellite receives up to 8 GPS satellite signals simultaneously; therefore, multiple TEC observations at the same coordinated universal time (UTC) are possible. TEC data are continuously provided for each received GPS satellite with a 1 Hz cadence.

Provider
German Research Centre for Geosciences (GFZ)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/gfz-sua-federated
I.130 Swarm electron density (Ne)

**Description**
Swarm electron density (Ne) is the in situ measured parameter derived from the Langmuir Probe on-board of the Swarm satellites (A, B, and C). Ne data are continuously provided with a 2 Hz cadence.

**Provider**
German Research Centre for Geosciences (GFZ)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/gfz-sua-federated

I.131 Swarm Ionospheric Bubble Index (IBI)

**Description**
Swarm Ionospheric Bubble Index (IBI) provides information on bubble climatology itself as well as on disturbance level of magnetic field data by combining electron density and magnetic field observations. Bubbles (low-latitude post-sunset plasma irregularities) are an intrinsic regular phenomenon in the F-region ionosphere that leaves severe plasma density gradients, magnetic field variations and causes GPS signal scintillations. IBI data are continuously provided with a 1 Hz cadence.

**Provider**
German Research Centre for Geosciences (GFZ)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/gfz-sua-federated

I.132 Atmospheric Density Estimates of Forecast and Prior Total Density for Atmospheric Drag Calculation

**Description**
The ATMDE service provides estimates of total atmospheric neutral density in the altitude range 120 – 1500 km based on the DTM2013 model.

**Provider**
UK Met Office (UKMO)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/atmden-federated


**Description**
The tool provides nowcasts and forecasts of solar and geomagnetic indices needed for atmospheric modelling in support of atmospheric drag calculation. These indices are stored on a
dedicated FORIND database and can be retrieved, in a custom tailored and homogenous form, via a web page or a REST interface in CSV and JSON formats or visualized in PNG format. The FORIND webpage is classed as a tool in the SWE Portal terminology as it provides an interface to numerous indices provided from other sources.

**Provider**
Institute of Space Science Romania (ISS Romania)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/forind-federated

**I.134 Borowiec Riometer raw [V] and relative [dB]**

**Description**
Measurement of 30 MHz by passive riometer antenna in Borowiec (near Poznan, Poland).

**Provider**
Heliogeophysical Prediction Service Laboratory (SRC PAS)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/SRC_RIO-federated

**I.134b Hornsund riometer measurements [product provided for demonstration, not assigned to service]**

**Description**
Measurement of 30 Mhz by passive riometer antenna in Hornsund (Svalbard).

**Provider**
Heliogeophysical Prediction Service Laboratory (SRC PAS)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/SRC_RIO-federated

**I.135a TomoScand3D [product provided for demonstration, not assigned to service]**

**Description**
Volumetric reconstructions of ionospheric electron density above Fennoscandia and Svalbard.

**Provider**
Space and Earth Observation Centre (FMI)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/fmi-tomoscand-federated

**I.135b TomoScand2D [product provided for demonstration, not assigned to service]**

**Description**
Two altitude-longitude slices and one altitude—latitude slice from the TomoScand 3D product.
Provider
Space and Earth Observation Centre (FMI)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/fmi-tomoscan-federated

I.136 MSTID activity over Czechia [product provided for demonstration, not assigned to service]

Description
Detection of Medium Scale Travelling Ionospheric Disturbances (MSTID) activity in the ionosphere from the ionospheric Doppler sounder measurements. The ionospheric Doppler sounder monitors the ionospheric perturbations (MSTID), which are signature of atmospheric gravity waves over western Czechia. This is considered to be a good representative for the whole central Europe. The information is updated each 15 minutes. MSTIDs create horizontal gradients in the ionosphere with potential impact on utilization of GNSS signals. The product is a table with the latest MSTID observations. Each table entry is highlighted in a color-coded manner to indicate potential effects to HF and GNSS communications. It is provided along with images of Doppler shifty spectrograms, supporting the visualization of MSTIDs.

Provider
Department of Ionosphere and Aeronomy (IAP)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/cas-iap-federated

I.137 IMPC 3D Electron Density Based on Kriging Tomography [product provided for demonstration, not assigned to service]

Description
This prototype product uses a novel ionospheric tomography approach providing the estimation of the electron density's spatial covariance and based on a best linear unbiased estimator of the 3-D electron density. Therefore a non-stationary and anisotropic covariance model is set up and its parameters are determined within a maximum-likelihood approach incorporating GNSS total electron content measurements and the NeQuick model as background. As a first assessment this 3-D simple kriging approach is applied to a part of Europe.

Provider
German Aerospace Center (DLR)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/swaci-federated

I.138 GNSS Performance Indicator

Description
The GNSS Performance Indicator initial tool is an on-demand tool concept that provides a measure of space weather impacts on a specified Use Case, based on data from various products in the space weather portal. The indicator is given as a number, a color, and a text description. A machine-to-machine interface is also available.

**Provider**
Norwegian Mapping Authority (NMA)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/GPI-federated
4 Space radiation products

ESC Coordinator
Norma Crosby, BIRA-IASB

Expert groups

Athens Neutron Monitor Station (ANeMoS)
R.102 GLE alert+ service
R.108 Multi-station neutron monitor data

BIRA-IASB Space Weather Services (BIRA-IASB)
R.103 Space Environment Information System (SPENVIS)
R.134 The COMESEP Alert System
R.135 Solar Energetic Particle Environment Modelling (SEPEM)
R.136 SWIFF Plasmasphere (SPM) electron density distribution model

British Antarctic Survey (BAS)
R.142 SaRIF Risk Indicator Panel
R.143 SaRIF GOES-15 Internal Charging Current
R.144 SaRIF GOES-15 Total Ionising Dose and Dose Rate
R.145 SaRIF GOES-15 Radiation Environment
R.146 SaRIF GOES-14 Internal Charging Current
R.147 SaRIF GOES-14 Total Ionising Dose and Dose Rate
R.148 SaRIF GOES-14 Radiation Environment
R.149 SaRIF GIOVE-A Internal Charging Current
R.150 SaRIF GIOVE-A Total Ionising Dose and Dose Rate
R.151 SaRIF GIOVE-A Radiation Environment
R.152 SaRIF Slot Region Internal Charging Current
R.153 SaRIF Slot Region Total Ionising Dose and Dose Rate
R.154 SaRIF Slot Region Radiation Environment
R.155 MOSWOC high energy electron forecast for geostationary orbit
R.156 MOSWOC Forecaster Summary
R.157 SaRIF Best Reconstruction of the Radiation Environment

Center for Space Radiations (CSR)
R.109 PROBA-V/EPT Electron flux spectra time series
R.110 PROBA-V/EPT Proton flux spectra time series
R.111 PROBA-V/EPT Helium flux spectra time series
R.112 PROBA-V/EPT Electron flux geographical maps
R.113 PROBA-V/EPT Proton flux geographical maps
R.114 PROBA-V/EPT Helium flux geographical maps
R.115 PROBA-V/EPT Auroral electron energy spectrum characterisation
R.116 PROBA-V/EPT SAA proton energy spectrum characterisation
R.117 PROBA-V/EPT SAA helium energy spectrum characterisation

Department Radiation Biology (DLR-IAM)
R.123 Radiation environment outside the ISS (RADSpace)
R.124 Radiation environment inside the ISS (RADSpace)
R.125 Accumulated dose in human phantoms onboard the ISS (RADSpace)
R.127 SEP Post-event analysis for aviation radiation exposure (RADSEP)

Mullard Space Science Laboratory (MSSL)
R.131 Electron population model at GEO
R.132 Electron population model at MEO
R.133 Electron population model at LEO

Paul Buehler (PB)
R.118 Time series of PROBA-1/SREM radiation rates
R.119 Time series of Integral/SREM radiation rates
R.120 Time series of Rosetta/SREM radiation rates
R.121 Time series of Herschel/SREM radiation rates
R.122 Time series of Planck/SREM radiation rates

Radiation Hardness Assurance and Space Weather (RAS)
R.101 AVIDOS Radiation exposure estimation at aircraft altitude

Space Research Laboratory, Department of Physics and Astronomy (SRL)
R.128 Very high-energy Solar Energetic Particle environment mission specification: proton fluence
R.129 Very high-energy Solar Energetic Particle environment mission specification: proton peak flux
R.130 Solar Energetic Particle event catalogue: high-energy solar proton events
R.138 High-energy Solar Energetic Particle environment mission specification: heavy ion fluence

SWE Data Centre (SWE Portal)
R.104 Space Environment Data System (SEDAT) [currently unavailable]
R.106 The Space Environment Information System for Operations (SEISOP) [currently unavailable]
R.107 European Debris Impact Database (EDID)

UK Met Office (UKMO)
R.142 SaRIF Risk Indicator Panel
R.143 SaRIF GOES-15 Internal Charging Current
R.144 SaRIF GOES-15 Total Ionising Dose and Dose Rate
R.145 SaRIF GOES-15 Radiation Environment
R.146 SaRIF GOES-14 Internal Charging Current
R.147 SaRIF GOES-14 Total Ionising Dose and Dose Rate
R.148 SaRIF GOES-14 Radiation Environment
R.149 SaRIF GIOVE-A Internal Charging Current
R.150 SaRIF GIOVE-A Total Ionising Dose and Dose Rate
R.151 SaRIF GIOVE-A Radiation Environment
R.152 SaRIF Slot Region Internal Charging Current
R.153 SaRIF Slot Region Total Ionising Dose and Dose Rate
R.154 SaRIF Slot Region Radiation Environment
R.155 MOSWOC high energy electron forecast for geostationary orbit
R.156 MOSWOC Forecaster Summary
R.157 SaRIF Best Reconstruction of the Radiation Environment
R.101 AVIDOS Radiation exposure estimation at aircraft altitude

_Description_
AVIDOS 2.0 is an online, informational and educational software for the assessment of cosmic radiation exposure at flight altitudes. AVIDOS 2.0 performs assessment of cosmic radiation due to galactic cosmic radiation and attempts to nowcast radiation exposure due to solar energetic particles. AVIDOS 2.0 uses real-time data from Oulu neutron monitor station and real-time alerts from GLE-alerting service ANeMoS.

_Provider_
Radiation Hardness Assurance and Space Weather (RAS)

_Portal Entry Point_
http://swe.ssa.esa.int/web/guest/avidos-federated

R.102 GLE alert+ service

_Description_
Alerts for ground level enhancement (GLE) events are provided by GLE Alert Plus. This system produces every minute a General GLE Alert Graph and station alert graphs for all the stations participating in the network.

_Provider_
Athens Neutron Monitor Station (ANeMoS)

_Portal Entry Point_
http://swe.ssa.esa.int/web/guest/anemos-federated

R.103 Space Environment Information System (SPENVIS)

_Description_
SPENVIS (Space Environment Information System) is a web-based interface for assessing the space environment and its effects on spacecraft systems and crews. The system is used for mission analysis and planning. SPENVIS includes several empirical models of the space environment covering mainly cosmic rays, solar energetic particles, the natural radiation belts, magnetic fields, space plasmas and the upper atmosphere. A range of engineering models are also available to help assess the effects of the space environment on spacecraft such as surface and internal charging, energy deposition, solar cell damage and SEU rates. Usually these later models take their inputs from the empirical models present in SPENVIS. The system also includes extensive background information on the space environment, the environment models and the related standards.

_Provider_
BIRA-IASB Space Weather Services (BIRA-IASB)

_Portal Entry Point_
https://spenvis.ssa-swe.eu
R.104 Space Environment Data System (SEDAT) [currently unavailable]

**Description**
SEDAT (Space Environment Data System) is a tool for the engineering analysis of spacecraft charged particle environments. The facility provides access to the ODI database containing a large and comprehensive set of data about that environment as measured in-situ by a number of space missions. The user can select a set of space environment data appropriate to the engineering problem under study. SEDAT also offers a set of software tools, which can operate on the data retrieved from the database. These tools allow the user to carry out a wide range of engineering analyses. SEDAT is using a GUI written in Java.

**Provider**
SWE Data Centre (SWE Portal)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/sedat1

R.106 The Space Environment Information System for Operations (SEISOP) [currently unavailable]

**Description**
The Space Environment Information System for Operations (SEISOP) provides an interface for spacecraft operators allowing comparison of space environment information with spacecraft housekeeping data. The combination of these different data types enables advanced correlation and analysis, for a better understanding of how Space Weather effects impact the status and health of the operator’s spacecraft. In addition to presenting data originating from diverse external data providers, SEISOP provides several built-in Space Weather models for near-real-time forecasting of Space Weather events and alerting.

**Provider**
SWE Data Centre (SWE Portal)

**Portal Entry Point**
https://ssa-be-vm-fe-06p.ssa.esa.int/seisopweb

R.107 European Debris Impact Database (EDID)

**Description**
EDID (European Debris Impact Database) provides automated data processing and dissemination functions for measurements retrieved from European debris and meteoroids impact detectors. It covers impacts from the DEBIE-1, DEBIE-2 and GORID detectors. Users can access more than 3,000,000 debris and micro-meteoroid event records plus sensor and spacecraft housekeeping data via a user-friendly web interface. Filters can be defined for each available parameter and be used for regular data retrieval.

**Provider**
SWE Data Centre (SWE Portal)
R.108 Multi-station neutron monitor data

**Description**
The multi-station Neutron Monitor data provides continuous measurements of galactic cosmic rays from neutron monitors located around the world.

**Provider**
Athens Neutron Monitor Station (ANeMoS)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/anemos-federated

R.109 PROBA-V/EPT Electron flux spectra time series

**Description**
Time series of electron flux spectra in the energy range 0.5-8 MeV as measured by the Energetic Particle Telescope (EPT) on board PROBA-V.

**Provider**
Center for Space Radiations (CSR)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/csr-ept-federated

R.110 PROBA-V/EPT Proton flux spectra time series

**Description**
Time series of proton flux spectra in the energy range 9.5-248 MeV as measured by the Energetic Particle Telescope (EPT) on board PROBA-V.

**Provider**
Center for Space Radiations (CSR)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/csr-ept-federated

R.111 PROBA-V/EPT Helium flux spectra time series

**Description**
Time series of helium flux spectra in the energy range 38-980 MeV as measured by the Energetic Particle Telescope (EPT) on board PROBA-V.

**Provider**
Center for Space Radiations (CSR)
**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/csr-ept-federated

R.112 PROBA-V/EPT Electron flux geographical maps

*Description*
The weekly averaged electron flux in each energy channel in the energy range 0.5-8 MeV as measured by the Energetic Particle Telescope (EPT) on board PROBA-V are provided as a function of geographical position.

*Provider*
Center for Space Radiations (CSR)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/csr-ept-federated

R.113 PROBA-V/EPT Proton flux geographical maps

*Description*
The weekly averaged proton flux in each energy channel in the energy range 9.5-248 MeV as measured by the Energetic Particle Telescope (EPT) on board PROBA-V are provided as a function of geographical position.

*Provider*
Center for Space Radiations (CSR)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/csr-ept-federated

R.114 PROBA-V/EPT Helium flux geographical maps

*Description*
The weekly averaged helium flux in each energy channel in the energy range 38-980 MeV as measured by the Energetic Particle Telescope (EPT) on board PROBA-V are provided as a function of geographical position.

*Provider*
Center for Space Radiations (CSR)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/csr-ept-federated

R.115 PROBA-V/EPT Auroral electron energy spectrum characterisation

*Description*
Energy spectrum characterization of the auroral electrons in the energy range 0.5-8 MeV based on PROBA-V/EPT measurements. Auroral electrons are selected based on McIlwain L coordinate (L>3) separately for the Southern and Northern hemisphere, and resulting fluxes averaged over a time interval of a week.
Provider
Center for Space Radiations (CSR)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/csr-ept-federated

R.116 PROBA-V/EPT SAA proton energy spectrum characterisation

Description
Energy spectrum characterization of the South Atlantic Anomaly (SAA) protons in the energy range 10-248 MeV based on PROBA-V/EPT measurements. The SAA protons are selected based on McIlwain L coordinate and the Earth magnetic field intensity (1.1<L<2.1 and 0.16<B(G)<0.22), and resulting fluxes averaged over a time interval of a week. They are subdivided into two categories: night data when EPT is looking eastwards and day data when EPT is looking eastwards.

Provider
Center for Space Radiations (CSR)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/csr-ept-federated

R.117 PROBA-V/EPT SAA helium energy spectrum characterisation

Description
Energy spectrum characterization of the South Atlantic Anomaly (SAA) helium in the energy range 38-980 MeV based on PROBA-V/EPT measurements. The SAA helium is selected based on McIlwain L coordinate and the Earth magnetic field intensity (1.1<L<2.1 and 0.16<B(G)<0.22), and resulting fluxes averaged over a time interval of a week. They are subdivided into two categories: night data when EPT is looking eastwards and day data when EPT is looking eastwards.

Provider
Center for Space Radiations (CSR)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/csr-ept-federated

R.118 Time series of PROBA-1/SREM radiation rates

Description
Radiation situation reports based on data from the SREM instrument in several key regions along the orbit of the PROBA-1 spacecraft. Daily measurements are compared with reference particle rates and spectra for the proton and electron belts and the slot region.

Provider
Paul Buehler (PB)
Portal Entry Point
http://swe.ssa.esa.int/web/guest/pb-srem-federated

R.119 Time series of Integral/SREM radiation rates

Description
Radiation situation reports based on data from the SREM instrument in several key regions along the orbit of the Integral spacecraft. Daily measurements are compared with reference particle spectra for the electron belt, while comparison of rates with long term averages, as well as spectra and flux time series are provided when an SEP is detected in interplanetary space.

Provider
Paul Buehler (PB)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/pb-srem-federated

R.120 Time series of Rosetta/SREM radiation rates

Description
Radiation situation reports based on data from the SREM instrument on board Rosetta. When an SEP is detected in interplanetary space, daily rates are compared with long term averages, and spectra and flux time series are provided.

Provider
Paul Buehler (PB)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/pb-srem-federated

R.121 Time series of Herschel/SREM radiation rates

Description
Radiation situation reports based on data from the SREM instrument on board Herschel. When an SEP is detected at L2, daily rates are compared with long term averages, and spectra and flux time series are provided.

Provider
Paul Buehler (PB)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/pb-srem-federated

R.122 Time series of Planck/SREM radiation rates

Description
Radiation situation reports based on data from the SREM instrument on board Planck. When an SEP is detected at L2, daily rates are compared with long term averages, and spectra and flux time series are provided.
 Provider
Paul Buehler (PB)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/pb-srem-federated

R.123 Radiation environment outside the ISS (RADSpace)

Description
Statistics on the accumulated equivalent/effective doses in human phantoms outside the ISS.

Provider
Department Radiation Biology (DLR-IAM)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/dlr-iam-federated

R.124 Radiation environment inside the ISS (RADSpace)

Description
Count rates, dose rates and daily averaged dose rates inside the ISS.

Provider
Department Radiation Biology (DLR-IAM)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/dlr-iam-federated

R.125 Accumulated dose in human phantoms onboard the ISS (RADSpace)

Description
Statistics on the accumulated equivalent/effective doses in human phantoms on board the ISS.

Provider
Department Radiation Biology (DLR-IAM)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/dlr-iam-federated

R.127 SEP Post-event analysis for aviation radiation exposure (RADSEP)

Description
A post event analysis of SEP events for aviation radiation exposure.

Provider
Department Radiation Biology (DLR-IAM)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/dlr-iam2-federated
**R.128 Very high-energy Solar Energetic Particle environment mission specification: proton fluence**

*Description*

The very high-energy proton fluence in the near-Earth interplanetary space integrated over the mission for a user-specified mission length (0.5–7 years) and confidence level (e.g., 90, 95, 99%) in twelve differential energy channels between 10.46 and 1012.5 MeV, plus an integral channel at >1012.5 MeV.

*Provider*

Space Research Laboratory, Department of Physics and Astronomy (SRL)

*Portal Entry Point*

http://swe.ssa.esa.int/web/guest/utu-srl-federated

**R.129 Very high-energy Solar Energetic Particle environment mission specification: proton peak flux**

*Description*

The very high-energy hourly and 5 minute proton peak flux in the near-Earth interplanetary space integrated over the mission for a user-specified mission length (0.5–7 years) and confidence level (e.g., 90, 95, 99%).

*Provider*

Space Research Laboratory, Department of Physics and Astronomy (SRL)

*Portal Entry Point*

http://swe.ssa.esa.int/web/guest/utu-srl-federated

**R.130 Solar Energetic Particle event catalogue: high-energy solar proton events**

*Description*

This catalogue will be based on the SEPServer event catalog, determined from high energy protons (55-80 MeV) measured with SOHO/ERNE. The information per event will consist of event start time, apparent solar release time (protons and electrons), peak intensity (high-energy protons and electrons), and proton fluence (in several channels). Heavy-ion observations will be included when available.

*Provider*

Space Research Laboratory, Department of Physics and Astronomy (SRL)

*Portal Entry Point*

http://swe.ssa.esa.int/web/guest/utu-srl-federated
R.131 Electron population model at GEO

Description
Empirical model of the 10 eV to 40 keV electron population at GEO (L=6-7) under different geomagnetic activity levels or solar wind velocity levels. The model is based on ESA Cluster II PEACE data from 2001-2014.

Provider
Mullard Space Science Laboratory (MSSL)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/mssl-federated

R.132 Electron population model at MEO

Description
Empirical model of the 10 eV to 40 keV electron population at MEO (L=4-6) under different geomagnetic activity levels or solar wind velocity levels. The model is based on ESA Cluster II PEACE data from 2001-2014.

Provider
Mullard Space Science Laboratory (MSSL)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/mssl-federated

R.133 Electron population model at LEO

Description
Empirical model of the 10 eV to 40 keV electron population at LEO under different geomagnetic activity levels or solar wind velocity levels. The model is based on the NASA Van Allen Probes HOPE data from 2012-2018 supplemented by data from the EFW instrument.

Provider
Mullard Space Science Laboratory (MSSL)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/mssl-federated

R.134 The COMESEP Alert System

Description
The COMESEP (COronal Mass Ejections and Solar Energetic Particles: forecasting the space weather impact) project developed tools for forecasting geomagnetic storms and solar energetic particle (SEP) radiation storms, which were validated and implemented into an operational space weather alert system that runs without human intervention. When a solar flare or CME is automatically detected, the different modules of the system communicate in order to exchange...
information. The system displays alerts online and provides notifications for the space weather community.

**Provider**  
BIRA-IASB Space Weather Services (BIRA-IASB)

**Portal Entry Point**  
[http://swe.ssa.esa.int/web/guest/bira-comesep-federated](http://swe.ssa.esa.int/web/guest/bira-comesep-federated)

**R.135 Solar Energetic Particle Environment Modelling (SEPEM)**

**Description**  
SEPEM (Solar Energetic Particle Environment Modelling) is a WWW interface to solar energetic particle data and a range of modelling tools and functionalities intended to support space mission design. The system provides an implementation of several well known modelling methodologies, built on cleaned datasets. It also gives the user increased flexibility in his/her analysis and allows generation of mission integrated fluence statistics, peak flux statistics and other functionalities. It also integrates effects tools that calculate single event upset rates and radiation doses for a variety of scenarios.

**Provider**  
BIRA-IASB Space Weather Services (BIRA-IASB)

**Portal Entry Point**  
[https://sepem.ssa-swe.eu/](https://sepem.ssa-swe.eu/)

**R.136 SWIFF Plasmasphere (SPM) electron density distribution model**

**Description**  
The SWIFF plasmasphere model (SPM) is a 3D dynamic model of the plasmasphere which calculates the number density and the temperature of the electrons inside and outside the plasmasphere. The model runs once a day using predicted Kp values providing a forecast of these parameters for the following day. Updated animations are expected to appear around 14:30 UTC at latest.

**Provider**  
BIRA-IASB Space Weather Services (BIRA-IASB)

**Portal Entry Point**  
[http://swe.ssa.esa.int/web/guest/bira-swiff-federated](http://swe.ssa.esa.int/web/guest/bira-swiff-federated)

**R.138 High-energy Solar Energetic Particle environment mission specification: heavy ion fluence**

**Description**  
The high-energy heavy ion fluence in the near-Earth interplanetary space integrated over the mission for a user-specified mission length (0.5–7 years) and confidence level (e.g., 90, 95, 99%) in three differential energy channels between 13 and 100 MeV/n for He, two differential energy
channels between 25 and 100 MeV/n for CNO, and one differential energy channel between 50 and 100 MeV/n for heavier ions up to Fe.

Provider
Space Research Laboratory, Department of Physics and Astronomy (SRL)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/utu-srl-federated

**R.142 SaRIF Risk Indicator Panel**

**Description**
A table of colour-coded risk indicators showing the risk from internal charging and the total ionising dose rate for GOES-15, GOES-14, GIOVE-A and a satellite in an equatorial orbit at 8000 km altitude. The risk indicators are based on the latest available data and model results at the time the website was last updated and are updated hourly. The basis for the risk indicators is set out in the individual sections below.

**Provider**
British Antarctic Survey (BAS)
UK Met Office (UKMO)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/sarif-federated

**R.143 SaRIF GOES-15 Internal Charging Current**

**Description**
A combined nowcast and forecast for the charging current behind 0.5mm of aluminium shielding at the GOES-15 location in graphical form. Calculated by DICTAT using data from GOES-15. The background of the plot is coloured to denote the risk level – the same charging current thresholds are used to colour the corresponding entry in the risk indicator panel.

**Provider**
British Antarctic Survey (BAS)
UK Met Office (UKMO)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/sarif-federated

**R.144 SaRIF GOES-15 Total Ionising Dose and Dose Rate**

**Description**
A combined nowcast and forecast for the total ionising dose and dose rate due to electron, proton and Bremsstrahlung radiation behind 2 mm of aluminium shielding at the GOES-15 location. Calculated by SHIELDOSE using GOES-15 data. 2 panels are shown: the dose rate and
the total dose accumulated since the system began operating. Each panel displays data for the last week. A separate page, available via a link, shows the most recent proton and electron spectra at the spacecraft location. The background of the dose rate plot is colour coded to denote the risk level – the same dose rate thresholds are used to colour the corresponding entry in the risk indicator panel.

**Provider**
British Antarctic Survey (BAS)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/sarif-federated

**R.145 SaRIF GOES-15 Radiation Environment**

**Description**
A combined nowcast and forecast for the outer radiation belt from $2 \leq L^* \leq 7$ in graphical form calculated by the BAS-RBM. Separate pages show the electron flux as a function of time and $L^*$ at 4 selected energies (800 keV, 2 MeV, >800 keV and >2 MeV). On each page the location of GOES-15 and the position of the magnetopause are indicated. The modelled electron flux at the location of GOES-15 is shown on a separate panel, along with the measured GOES-15 flux where available. Further plots show GOES-15 >10 MeV proton flux, the solar wind speed and pressure and IMF Bz as measured by the DSCOVR spacecraft and the KP and Dst indices.

**Provider**
British Antarctic Survey (BAS)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/sarif-federated

**R.146 SaRIF GOES-14 Internal Charging Current**

**Description**
A combined nowcast and forecast for the charging current behind 0.5mm of aluminium shielding at the GOES-14 location in graphical form. Calculated by DICTAT using data from GOES-14. The background of the plot is coloured to denote the risk level – the same charging current thresholds are used to colour the corresponding entry in the risk indicator panel.

**Provider**
British Antarctic Survey (BAS)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/sarif-federated
R.147 SaRIF GOES-14 Total Ionising Dose and Dose Rate

Description
A combined nowcast and forecast for the total ionising dose and dose rate due to electron, proton and Bremsstrahlung radiation behind 2 mm of aluminium shielding at the GOES-14 location. Calculated by SHIELDOSE using GOES-14 data. 2 panels are shown: the dose rate and the total dose accumulated since the system began operating. Each panel displays data for the last week. A separate page, available via a link, shows the most recent proton and electron spectra at the spacecraft location. The background of the dose rate plot is colour coded to denote the risk level – the same dose rate thresholds are used to colour the corresponding entry in the risk indicator panel.

Provider
British Antarctic Survey (BAS)
UK Met Office (UKMO)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/sarif-federated

R.148 SaRIF GOES-14 Radiation Environment

Description
A combined nowcast and forecast for the outer radiation belt from $2 \leq L^* \leq 7$ in graphical form calculated by the BAS-RBM. Separate pages show the electron flux as a function of time and $L^*$ at 4 selected energies (800 keV, 2 MeV, >800 keV and >2MeV). On each page the location of GOES-14 and the position of the magnetopause are indicated. The modelled electron flux at the location of GOES-14 is shown on a separate panel, along with the measured GOES-14 flux where available. Further plots show GOES-14 >10 MeV proton flux, the solar wind speed and pressure and IMF Bz as measured by the DSCOVR spacecraft and the KP and Dst indices.

Provider
British Antarctic Survey (BAS)
UK Met Office (UKMO)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/sarif-federated

R.149 SaRIF GIOVE-A Internal Charging Current

Description
A combined nowcast and forecast for the charging current behind 0.5mm of aluminium shielding at the GIOVE-A location in graphical form. Calculated by DICTAT using results from the BAS-RBM. The background of the plot is coloured to denote the risk level – the same charging current thresholds are used to colour the corresponding entry in the risk indicator panel.
**Provider**
British Antarctic Survey (BAS)
UK Met Office (UKMO)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/sarif-federated

**R.150 SaRIF GIOVE-A Total Ionising Dose and Dose Rate**

**Description**
A combined nowcast and forecast for the total ionising dose and dose rate due to electron, proton and Bremsstrahlung radiation behind 2 mm of aluminium shielding at the GIOVE-A location. Calculated by SHIELDOSE using results from the BAS-RBM. 2 panels are shown: the dose rate and the total dose accumulated since the system began operating. Each panel displays data for the last week. A separate page, available via a link, shows the most recent proton and electron spectra at the spacecraft location. The background of the dose rate plot is colour coded to denote the risk level – the same dose rate thresholds are used to colour the corresponding entry in the risk indicator panel.

**Provider**
British Antarctic Survey (BAS)
UK Met Office (UKMO)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/sarif-federated

**R.151 SaRIF GIOVE-A Radiation Environment**

**Description**
A combined nowcast and forecast for the outer radiation belt from 2 ≤ L* ≤ 7 in graphical form calculated by the BAS-RBM. Separate pages show the electron flux as a function of time and L* at 4 selected energies (800 keV, 2 MeV, >800 keV and >2MeV). On each page the location of GIOVE-A and the position of the magnetopause are indicated. Charging currents from the SURF instrument on GIOVE-A are shown in a separate panel. Further plots show GOES-15 10 MeV proton flux, the solar wind speed and pressure and IMF Bz as measured by the DSCOVR spacecraft and the KP and Dst indices.

**Provider**
British Antarctic Survey (BAS)
UK Met Office (UKMO)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/sarif-federated
R.152 SaRIF Slot Region Internal Charging Current

Description
A combined nowcast and forecast for the charging current behind 0.5mm of aluminium shielding for a spacecraft in an equatorial orbit at 8000km altitude (L* ~ 2.2) in graphical form. Calculated by DICTAT using results from the BAS-RBM. The background of the plot is coloured to denote the risk level – the same charging current thresholds are used to colour the corresponding entry in the risk indicator panel.

Provider
British Antarctic Survey (BAS)
UK Met Office (UKMO)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/sarif-federated

R.153 SaRIF Slot Region Total Ionising Dose and Dose Rate

Description
A combined nowcast and forecast for the total ionising dose and dose rate due to electron, proton and Bremsstrahlung radiation behind 2 mm of aluminium shielding for an equatorial slot region orbit at 8000km altitude. Calculated by SHIELDOSE using results from the BAS-RBM. 2 panels are shown: the dose rate and the total dose accumulated since the system began operating. Each panel displays data for the last week. A separate page, available via a link, shows the most recent proton and electron spectra at the spacecraft location. The background of the dose rate plot is colour coded to denote the risk level – the same dose rate thresholds are used to colour the corresponding entry in the risk indicator panel.

Provider
British Antarctic Survey (BAS)
UK Met Office (UKMO)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/sarif-federated

R.154 SaRIF Slot Region Radiation Environment

Description
A combined nowcast and forecast for the outer radiation belt from 2 ≤ L* ≤ 7 in graphical form calculated by the BAS-RBM. Separate pages show the electron flux as a function of time and L* at 4 selected energies (800 keV, 2 MeV, >800 keV and >2MeV), with the location of the slot region orbit (equatorial, 8000km) and the position of the magnetopause indicated. A second panel shows the flux for the selected energy from the Van Allen probes (VAP) spacecraft. Further plots show the VAP 20 MeV proton flux, the solar wind speed and pressure and IMF Bz as measured by the DSCOVR spacecraft and the KP and Dst indices.
Provider
British Antarctic Survey (BAS)
UK Met Office (UKMO)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/sarif-federated

R.155 MOSWOC high energy electron forecast for geostationary orbit

Description
The >2 MeV daily-averaged electron fluence, as predicated by the REFM model, shown for the last 7 days with a 4 day forecast and updated every 3 hours.

Provider
British Antarctic Survey (BAS)
UK Met Office (UKMO)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/sarif-federated

R.156 MOSWOC Forecaster Summary

Description
A text-based assessment of the likely high energy electron environment, based on available observations and model forecasts, produced by the forecasters at MOSWOC and updated twice daily at midnight and midday.

Provider
British Antarctic Survey (BAS)
UK Met Office (UKMO)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/sarif-federated

R.157 SaRIF Best Reconstruction of the Radiation Environment

Description
A recreation of the radiation environment from 2 ≤ L* ≤ 7 in graphical form calculated by the BAS-RBM. Each simulation shows a week (starting and ending at midnight on Saturday). These simulations are created once a week, two weeks after the end of the period simulated. Separate pages show the electron flux as a function of time and L* at 4 selected energies (800 keV, 2 MeV, >800 keV and >2MeV). On each page the position of the magnetopause is indicated. The modelled electron flux at the location of GOES-15 is shown on a separate panel, along with the measured GOES-15 flux where available. Further plots show GOES-15 >10 MeV proton flux, the solar wind speed and pressure and IMF Bz as measured by the DSCOVR spacecraft and the KP and Dst indices.
Provider
British Antarctic Survey (BAS)
UK Met Office (UKMO)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/sarif-federated
5 Solar weather products

ESC Coordinator
Jesse Andries, ROB

Expert groups

Catania Astrophysical Observatory (OACT)
S121 INAF/OACT White light Solar images
S122 INAF/OACT Halpha Solar images
S123a INAF/OACT Sunspot group characteristics

Institute of 4D-Technologies (i4D)
S105b eCallisto Solar radio spectrograms
S109e FLARECAST Solar flare forecast

Kanzelhöhe Observatory for Solar and Environmental Research (KSO)
S107a UGraz/KSO Halpha Solar images
S107c UGraz/KSO Solar flare detections
S107d UGraz/KSO Solar flare alerts
S107e UGraz/KSO White light Solar images
S107f UGraz/KSO Solar filament detection

Research Center for Astronomy and Applied Mathematics (RCAAM)
S124 A-EFFort Solar flare forecast

Solar Influences Data analysis Center (SIDC)
S101 Proba2/SWAP Images
S101c Proba2/SWAP Active region annotated image
S102 Proba2/LYRA Data
S103 SIDC/USET Halpha Solar images
S104 SIDC/USET White light Solar images
S105a SIDC Humain Callisto Solar radio spectrograms
S105c SIDC Automated Solar radio burst detections
S105d SIDC/Humain Solar radio light curves
S106 SDO/AIA Solar EUV images
S108 SIDC/SILSO International sunspot number
S108b SIDC/SILSO Sunspot number forecast
S109a SIDC 10.7cm Solar radio flux (F10.7) forecast
S109b SIDC Solar flare forecast
S110 SIDC Daily space weather bulletin
S111 SIDC/CACTus Automated CME detection
S112a SIDC Solar GOES-flare alert
S112b SIDC/CACTus Automated halo CME alert
S112z SIDC Human operator alert moderation
S113 SIDC All quiet alert
S123b SIDC/USET Sunspot group characteristics
S126 SIDC Automated coronal hole detection

UK Met Office (UKMO)

S109c UKMO Solar flare forecast
S123c UKMO Solar active region analysis
SSA Space Weather Network Service Product Catalogue Summary

Issue Date 28/05/2019  Ref SSA-SWE-SSCC-TN-0011

S101 Proba2/SWAP Images

**Description**
The SWAP instrument onboard the Proba2 spacecraft provides full disk solar EUV images in the 174 Angstrom bandpass. The latest level 0 quicklook image is uncalibrated and meant to monitor instrument status, while the media level image has undergone extensive calibration, image compression and enhancement processing to bring out the best of the image for Space weather forecasting operations.

**Provider**
Solar Influences Data analysis Center (SIDC)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/sidc-S101-federated

S101c Proba2/SWAP Active region annotated image

**Description**
This service allows to combine Sunspot group information from the Catania Observatory and active region information as distributed by NOAA (National Oceanic and Atmospheric Administration) with media level SWAP images. The service allows to browse back and forward in time using always the closest available observations and images.

**Provider**
Solar Influences Data analysis Center (SIDC)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/sidc-S101c-federated

S102 Proba2/LYRA Data

**Description**
The LYRA instrument onboard the Proba2 spacecraft registers UV and EUV irradiance using 4 different filters. Calibrated level 2 and level 3 (1 minute averaged) data are available in daily FITS-files as well as level 4 calibrated daily PNG plots. The LYRA Rescaled data provide rescaled values from the Aluminium and Zirconium channels which have been cross-calibrated with GOES X-ray data in order to provide a proxy for X-ray flare intensity. The rescaled data are available in daily TEXT files as well as daily PNG plots.

**Provider**
Solar Influences Data analysis Center (SIDC)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/sidc-S102-federated
S103 SIDC/USET Halpha Solar images

Description
Halpha solar images are produced by the SIDC local observing facilities (Uccle Solar Equatorial Table). The CCD camera is a Qimaging Retiga 4000R. It has an inter-line transfer detector of 2048x2048 pixels. Each pixel is 7.5 micron x 7.5 micron, and the sensitive area is 15.6 mm x 15.6 mm. The H-alpha filter is made by Solar Spectrum. It has a nominal wavelength of 656.2808nm and a bandwidth of 0.05nm. The telescope is a Celestron 80mm ED refractor. The images are provided in FITS files and quicklook PNGs.

Provider
Solar Influences Data analysis Center (SIDC)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/sidc-S103-federated

S104 SIDC/USET White light Solar images

Description
Solar white light images are produced by the SIDC local observing facilities (Uccle Solar Equatorial Table). The CCD camera is a Qimaging Retiga 4000R. It has an inter-line transfer detector of 2048x2048 pixels. Each pixel is 7.5 micron x 7.5 micron, and the sensitive area is 15.6 mm x 15.6 mm. The telescope is a Lichtenknecker 150mm diameter achromatic doublet refractor, equipped with full-aperture neutral-density filter with an attenuation of 100,000 (5 densities). The images are provided in FITS files and quicklook PNGs.

Provider
Solar Influences Data analysis Center (SIDC)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/sidc-S104-federated

S105a SIDC Humain Callisto Solar radio spectrograms

Description
This page provides access to the radio spectrograms from the Callisto instrument installed in Humain (Belgium). The spectrometer is plugged to a Sun-tracking broadband antenna and is operated automatically from Brussels. The spectrum covers the band 45 - 440 MHz with 200 samples (frequencies) 4 times per second. The empty "areas" on the spectrum correspond to parts in the spectrum that intentionally not covered to protect the instrument from high power emitters (e.g. FM band).

Provider
Solar Influences Data analysis Center (SIDC)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/sidc-S105a-federated
S105b eCallisto Solar radio spectrograms

**Description**
The CALLISTO spectrometer is a programmable heterodyne receiver built in the framework of IHY2007 and ISWI by former Radio and Plasma Physics Group (PI Christian Monstein) at ETH Zurich, Switzerland. This application provides access to the data from these receivers that are installed on radio antennas around the globe. The data are used for the identification of radio bursts as indications of Solar phenomena driving Space Weather.

**Provider**
Institute of 4D-Technologies (i4D)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/ecallisto-federated

S105c SIDC Automated Solar radio burst detections

**Description**
The radio spectrograms obtained by the Callisto instrument installed in Humain (Belgium) are processed by an automated burst detection algorithm that analyses for each individual spectrum (vertical line, in time) its brightness distribution. A burst is detected when the brightness distribution varies significantly in time. The bursts are annotated on the quicklook images. Currently, the algorithm may still trigger false alerts (e.g. fast antenna motion at end and start of observations, lightnings due to thunderstorms, strong interferences).

**Provider**
Solar Influences Data analysis Center (SIDC)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/sidc-S105c-federated

S105d SIDC/Humain Solar radio light curves

**Description**
The Humain Solar Radio Spectrometer (HSRS) is a Software Defined Radio receiver which is plugged to a Sun-tracking broadband antenna in Humain (Belgium). The HSRS observations are rather unique radio observations in Europe that cover a large frequency range including the ones used by the air traffic controllers and some of the GNSS services. This product offers real-time information about the intensity of the Solar radio flux at those specific frequency bands.

**Provider**
Solar Influences Data analysis Center (SIDC)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/sidc-S105d-federated
S106 SDO/AIA Solar EUV images

Description
The AIA instrument onboard the SDO spacecraft provides full disk images in several different UV and EUV wavelength bands. The SIDC redistributes AIA 1024 x 1024 pixels AIA quicklook images at a 3 minutes cadence in near-real-time; 4096 by 4096 pixels AIA and HMI images in science quality at a 1 hour cadence; and videos for the last 24 hours of AIA images in all wavelengths for forecasting purposes.

Provider
Solar Influences Data analysis Center (SIDC)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/sidc-S106-federated

S107a UGraz/KSO Halpha Solar images

Description
Every minute, when the weather conditions permit, a new full disk Hα image of the Sun is displayed. The images are recorded with a size of 2048 x 2048 pixels and 4096 grey levels in the center of the Hα line (656.3 nm ± 0.07nm). The hourly movie of the images observed during the last 60 minutes can be controlled via the buttons beneath the movie. The 360 degrees panoramic view shows the actual weather conditions at the observatory.

Provider
Kanzelhöhe Observatory for Solar and Environmental Research (KSO)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/kso-S107a-federated

S107c UGraz/KSO Solar flare detections

Description
The image quality of the Hα images is checked immediately after acquisition. If the quality is good enough these images are processed and an image recognition algorithm called surya detects flaring regions and filaments. If a region reaches a certain intensity and size a flare event is detected.

Provider
Kanzelhöhe Observatory for Solar and Environmental Research (KSO)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/kso-S107c-federated

S107d UGraz/KSO Solar flare alerts

Description
Flare alerts based on Solar flare detections from KSO. Only flares of a size larger than 50 microhemispheres will issue an alert. Emails are sent out for flares of at least importance class 1.

**Provider**  
Kanzelhöhe Observatory for Solar and Environmental Research (KSO)

**Portal Entry Point**  
http://swe.ssa.esa.int/web/guest/kso-S107d-federated

**S107e UGraz/KSO White light Solar images**

**Description**  
Every minute, when the weather conditions permit, a full disk Whelight image of the Sun is displayed. The images are recorded with a size of 2048 x 2048 pixels and 4096 grey levels using a broad band filter in the green light at 546 nm (± 10nm). Additionally one image per hour is stored for a quick daily overview (right side). The 360 degrees panoramic view shows the actual weather conditions at the observatory.

**Provider**  
Kanzelhöhe Observatory for Solar and Environmental Research (KSO)

**Portal Entry Point**  
http://swe.ssa.esa.int/web/guest/kso-S107e-federated

**S107f UGraz/KSO Solar filament detection**

**Description**  
Every hour the filaments detected by the feature recognition algorithm are combined to a single filament image. For each filament the position, the area, the length, and the east-west and the south-north ranges are calculated. Place the mouse pointer over a filament to get information about it. The images are updated every hour. The 360 degrees panoramic view shows the actual weather conditions at the observatory.

**Provider**  
Kanzelhöhe Observatory for Solar and Environmental Research (KSO)

**Portal Entry Point**  
http://swe.ssa.esa.int/web/guest/kso-S107f-federated

**S108 SIDC/SILSO International sunspot number**

**Description**  
The World Data Centre for the International Sunspot Number collects observations of sunspots from a network of about 85 observers around the world and produces the daily International Sunspot number and its monthly and yearly means (the time series extends back over several centuries). An estimated sunspot number (EISN) is updated continuously in near-real-time (5 minutes) up to the current day of the month. Provisional numbers for the past month are
produced on the first day of each calendar month. A final update of the monthly provisional numbers is done after a delay of 3 months to establish the definitive Sunspot Numbers.

**Provider**
Solar Influences Data analysis Center (SIDC)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/sidc-S108-federated

### S108b SIDC/SILSO Sunspot number forecast

**Description**
The SIDC/SILSO (Sunspot Index and Long-term Solar Observations) produces 12 months ahead predictions of the monthly smoothed sunspot number using three different methods. In addition, for each of the methods, there is also a Kalman filter optimised version available.

**Provider**
Solar Influences Data analysis Center (SIDC)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/sidc-S108b-federated

### S109a SIDC 10.7cm Solar radio flux (F10.7) forecast

**Description**
The forecaster on duty at the SIDC produces each day (nominal issuetime 12:30UT) a forecast of the F10.7 radio flux as it is expected to be observed over the next 3 days (the day of issue included). The forecast is based on a combination of statistical techniques and expert judgement on the evolution of active regions on the solar disk including regions rotating onto or off the disk.

**Provider**
Solar Influences Data analysis Center (SIDC)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/sidc-S109a-federated

### S109b SIDC Solar flare forecast

**Description**
The forecaster on duty at the SIDC produces each day (nominal issuetime 12:30UT) a probabilistic forecast for the occurrence of X-ray flares over the next 24h time span. Probabilities are provided for flare classes C, M and X separately. A full disk as well as an active region specific forecast is provided where region identification schemes of both NOAA and Catania Observatory are being considered. The forecast is based on a combination of statistical techniques based on the active region properties and expert judgement on the evolution of active regions on the solar disk including regions rotating onto or off the disk.
**Provider**
Solar Influences Data analysis Center (SIDC)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/sidc-S109b-federated

**S109c UKMO Solar flare forecast**

**Description**
To determine the probability of solar flares, the Met Office Space Weather Operations Centre (MOSWOC) forecaster calculates a set of raw flare forecasts using an empirical model (observational statistics of flare events for each McIntosh class spanning several decades). These are assessed by the forecaster, who then makes a subjective assessment of current space weather conditions to produce a final probability percentage. The accuracy of this is routinely verified.

**Provider**
UK Met Office (UKMO)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/ukmo-s109c-federated

**S109e FLARECAST Solar flare forecast**

**Description**
FLARECAST uses a machine learning algorithm to compute for a given point in time the probability of occurrence of a solar flare within the next day.

**Provider**
Institute of 4D-Technologies (i4D)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/fhnw-S109e-federated

**S110 SIDC Daily space weather bulletin**

**Description**
The forecaster on duty at the SIDC produces each day (nominal issuetime 12:30UT) a daily bulletin of Solar and Space Weather. The bulletin includes a summary of the observed activity over the past 24h, as well as an outlook on the activity for the next days.

**Provider**
Solar Influences Data analysis Center (SIDC)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/sidc-S110-federated
S111 SIDC/CACTus Automated CME detection

**Description**
CACTus is a software routine that autonomously detects coronal mass ejections (CMEs) in image sequences from SOHO/LASCO. The output is a list of events, similar to the classic catalogs, with principle angle, angular width and velocity estimation for each CME.

**Provider**
Solar Influences Data analysis Center (SIDC)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/sidc-S111-federated

S112a SIDC Solar GOES-flare alert

**Description**
The SIDC data processing pipeline analyses incoming GOES X-ray data in near-real-time and reports on the occurrence of X-ray flares of Classes M5 and up.

**Provider**
Solar Influences Data analysis Center (SIDC)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/sidc-S112a-federated

S112b SIDC/CACTus Automated halo CME alert

**Description**
The SIDC data processing pipeline analyses the outcome of the near-real-time runs of the CACTus package and alerts for the occurrence of CMEs with an angular width of over 150 degrees.

**Provider**
Solar Influences Data analysis Center (SIDC)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/sidc-S112b-federated

S112z SIDC Human operator alert moderation

**Description**
The forecaster on duty at the SIDC observes and processes all relevant Space Weather data, including automated feature alert processes. Based on his/her observations the forecaster on duty triggers alerts where automated processes have failed or are late and follows up and provides complementary information on the automated alerts.

**Provider**
Solar Influences Data analysis Center (SIDC)
**S113 SIDC All quiet alert**

*Description*
Based on the Space Weather forecasts produced by the forecaster on duty at the SIDC, periods when the overall Space Weather conditions are expected to be or remain exceptionally quiet are marked as "All quiet". The conditions for marking expectations as "All Quiet", observe a time horizon of 48 hours in the future with flaring expected to remain below C level, solar wind parameters to be at nominal levels and geomagnetic conditions to be at quiet to unsettled levels (K<4).

*Provider*
Solar Influences Data analysis Center (SIDC)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/sidc-S113z-federated

**S121 INAF/OACT White light Solar images**

*Description*
When the weather conditions permit, every 60 minutes a full disc image of the Sun in the continuum (656.78 nm ± 0.25 nm) near the Hα line is displayed. The images are recorded with a size of 2200 x 2200 pixels and a digital resolution of 16 bit.

*Provider*
Catania Astrophysical Observatory (OACT)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/catania-S121-federated

**S122 INAF/OACT Halpha Solar images**

*Description*
When the weather conditions permit, every 10 minutes a full disc image of the Sun in the center of the Hα line (656.28 nm ± 0.25 nm) is displayed. The images are recorded with a size of 2200 x 2200 pixels and a digital resolution of 16 bit.

*Provider*
Catania Astrophysical Observatory (OACT)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/catania-S122-federated
SSA Space Weather Network Service Product Catalogue Summary

Issue Date 28/05/2019  Ref SSA-SWE-SSCC-TN-0011

S123a INAF/OACT Sunspot group characteristics

Description
When the weather conditions permit, daily drawings of sunspot groups and pores are made using a Cooke refractor (150mm/2230 mm) on a 24.5 cm diameter projected image of the Sun. These drawings are used to determine some characteristics of the Sunspot groups visible on the photosphere and to report them in form of a numerical code (ursigram), named USSPS.

Provider
Catania Astrophysical Observatory (OACT)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/catania-S123a-federated

S123b SIDC/USET Sunspot group characteristics

Description
The operator of the SIDC local observing facilities (Uccle Solar Equatorial Table) produces every day a drawing of the white light Solar disk as it appears projected on paper sheet. The analysis of the drawing provides characteristics of the Sunspot groups visible on the disk and occurs through a combination of human interaction (grouping spots together and judging their classification) and automated routines (calculation of the area and position).

Provider
Solar Influences Data analysis Center (SIDC)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/sidc-S123b-federated

S123c UKMO Solar active region analysis

Description
The Solar Region Analysis is undertaken by the Met Office Space Weather Operations Centre (MOSWOC) forecaster using GONG H-Alpha imagery and 4K SDO/AIA and SDO/HMI images (4096 resolution) from the SDO website, along with Helioviewer software to determine the heliographic parameters (such as location in latitude and longitude) of any active regions. The forecaster analyses the sunspots using the Zurich and Mount Wilson classification methodologies. The active solar regions are identified by using the NOAA SWPC active region numbers.

Provider
UK Met Office (UKMO)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/ukmo-s123c-federated
S124 A-EFFort Solar flare forecast

**Description**
This product pertains to the prediction of major solar flares, using the methodology published by RCAAM / Academy of Athens researchers. It provides 24-hour forecast probabilities for GOES class M1+, M5+, X1+ and X5+ flares (“+” meaning cumulative, of a certain class and above). There is zero latency for forecasts, meaning that forecasts are effective immediately upon issue. Forecast refresh time is three (3) hours and the product includes a remaining-time countdown until the next forecast.

**Provider**
Research Center for Astronomy and Applied Mathematics (RCAAM)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/rcaam-federated

S126 SIDC Automated coronal hole detection

**Description**
Coronal holes are regions of open magnetic field on the Sun which appear as dark patches on the surface of the Sun when viewed in Extreme-Ultra-Violet (EUV) and X-ray emission. The coronal holes are automatically detected in EUV solar images from SDO/AIA data at 193Å using the SPoCA suite software and a set of characteristics are extracted, including: area, time of the first and last detection in observations and location.

**Provider**
Solar Influences Data analysis Center (SIDC)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/sidc-S126-federated
**Part 2: Expert groups**

The second part of this document gathers contact details of the product providers.

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<th>Product Provider</th>
<th>Geomagnetic conditions products</th>
<th>Heliospheric weather products</th>
<th>Ionospheric weather products</th>
<th>Solar Weather products</th>
<th>Space Radiation products</th>
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</table>
Athens Neutron Monitor Station (ANeMoS)

Homepage
http://cosray.phys.uoa.gr

Affiliation
Panepistimiopolis
15771 Ilissia
Greece

Contribution to the SSA SWE network
Space radiation (3)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/anemos-federated

BIRA-IA SB Space Weather Services (BIRA-IA SB)

Homepage

Affiliation
Avenue Circulaire 3
1180 Uccle
Belgium

Contribution to the SSA SWE network
Space radiation (4)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/bira-comesep-federated
http://swe.ssa.esa.int/web/guest/bira-swiff-federated
https://sepem.ssa-swe.eu/
https://spenvis.ssa-swe.eu
British Antarctic Survey (BAS)

Homepage
https://www.bas.ac.uk/

Affiliation
High Cross, Madingley Road
Cambridge CB3 0ET
United Kingdom

Contribution to the SSA SWE network
Space radiation (16)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/sarif-federated

Catania Astrophysical Observatory (OACT)

Homepage
http://www.oact.inaf.it/

Affiliation
Via S. Sofia 78
95123 Catania
Italy

Contribution to the SSA SWE network
Space weather (3)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/catania-S121-federated
http://swe.ssa.esa.int/web/guest/catania-S122-federated
http://swe.ssa.esa.int/web/guest/catania-S123a-federated
Center for Space Radiations (CSR)

Homepage
http://web.csr.ucl.ac.be/uclelicsr/

Affiliation
2 Chemin du Cyclotron
B-1348 Louvain-la-Neuve
Belgium

Contribution to the SSA SWE network
Space radiation (12)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/csr-ept-federated

Centre de Données de la Physique des Plasmas (CDPP)

Homepage
http://www.cdpp.eu

Affiliation
9, avenue du Colonel Roche
31028 Toulouse Cedex 4
France

Contribution to the SSA SWE network
Heliospheric weather (3)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/cdpp-amda-federated
http://swe.ssa.esa.int/web/guest/cdpp-heliopropa-federated
http://swe.ssa.esa.int/web/guest/cdpp-proptol-federated
Centre for mathematical Plasma-Astrophysics (CmPA)

Homepage
https://wis.kuleuven.be/CmPA

Affiliation
Oude Markt 13
3000 Leuven
Belgium

Contribution to the SSA SWE network
Heliospheric weather (1)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/kul-cmpa-federated

Department of Ionosphere and Aeronomy (IAP)

Homepage
http://www.ufa.cas.cz/?lang=en

Affiliation
Boční II 1401
Prague 4
Czech Republic

Contribution to the SSA SWE network
Ionospheric weather (1)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/cas-iap-federated
Department Radiation Biology (DLR-IAM)

Homepage
http://www.dlr.de/me/en/desktopdefault.aspx/tabid-1933/

Affiliation
Linder Hoehe
51147 Koeln
Germany

Contribution to the SSA SWE network
Ionospheric weather (1)
Space radiation (5)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/dlr-iam-federated
http://swe.ssa.esa.int/web/guest/dlr-iam2-federated

German Aerospace Center (DLR)

Homepage
https://www.dlr.de

Affiliation
Linder Höhe
51147 Cologne
Germany

Contribution to the SSA SWE network
Ionospheric weather (14)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/swaci-federated
German Research Centre for Geosciences (GFZ)

Homepage
http://www.gfz-potsdam.de/en

Affiliation
Telegrafenberg
14473 Potsdam
Germany

Contribution to the SSA SWE network
Geomagnetic conditions (7)
Ionospheric weather (4)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/gfz-sua-federated
http://swe.ssa.esa.int/web/guest/potsdam-federated

Heliogeophysical Prediction Service Laboratory (SRC PAS)

Homepage
http://rwc.cbk.waw.pl/

Affiliation
Bartycka 18A
00-716 Warsaw
Poland

Contribution to the SSA SWE network
Ionospheric weather (4)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/SRC_RIO-federated
http://swe.ssa.esa.int/web/guest/src-federated
Institute of Physics (UNIGRAZ)

Homepage
http://physik.uni-graz.at/en

Affiliation
Universitätsplatz 3
8010 Graz
Austria

Contribution to the SSA SWE network
Heliospheric weather (4)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/graz-dbem-federated
http://swe.ssa.esa.int/web/guest/graz-dbm-federated
http://swe.ssa.esa.int/web/guest/graz-eswf-federated
http://swe.ssa.esa.int/web/guest/graz-stereo-ch-federated

Institute of Space Science Romania (ISS Romania)

Homepage
http://www.spacescience.ro/

Affiliation
409, Atomistilor Street
Magurele, Ilfov
Romania

Contribution to the SSA SWE network
Ionospheric weather (1)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/forind-federated
Ionospheric Group of the National Observatory of Athens (EIS)

**Homepage**
http://www.iono.noa.gr

**Affiliation**
Lofos Nymphon, Thissio, P.O. Box 20048
GR-11810 Athens
Greece

**Contribution to the SSA SWE network**
Ionospheric weather (7)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/dias-federated

Kanzelhöhe Observatory for Solar and Environmental Research (KSO)

**Homepage**
http://www.kso.ac.at/index_en.php

**Affiliation**
Universitätsplatz 3
8010 Graz
Austria

**Contribution to the SSA SWE network**
Space weather (5)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/kso-S107a-federated
http://swe.ssa.esa.int/web/guest/kso-S107c-federated
http://swe.ssa.esa.int/web/guest/kso-S107d-federated
http://swe.ssa.esa.int/web/guest/kso-S107e-federated
http://swe.ssa.esa.int/web/guest/kso-S107f-federated
Mullard Space Science Laboratory (MSSL)

Homepage
http://www.ucl.ac.uk/mssl

Affiliation
Gower Street
London WC1E 6BT
United Kingdom

Contribution to the SSA SWE network
Space radiation (3)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/mssl-federated

Norwegian Mapping Authority (NMA)

Homepage
http://www.kartverket.no/en/

Affiliation
Kartverksveien 21
Hønefoss 3507
Norway

Contribution to the SSA SWE network
Geomagnetic conditions (3)
Ionospheric weather (10)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/GPI-federated
http://swe.ssa.esa.int/web/guest/resoss-federated
http://swe.ssa.esa.int/web/guest/rtim-federated
Paul Buehler (PB)

Homepage
https://srem.buehler-paschen.at

Affiliation
Haspelmeistersgasse 15
1140 Viena
Austria

Contribution to the SSA SWE network
Space radiation (5)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/pb-srem-federated

Radiation Hardness Assurance and Space Weather (RAS)

Homepage
http://www.seibersdorf-laboratories.at/en/

Affiliation
Forschungszentrum
2444 Seibersdorf
Austria

Contribution to the SSA SWE network
Space radiation (1)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/avidos-federated
RAL Space (RAL Space)

Homepage
https://www.ralspace.stfc.ac.uk/Pages/Space-weather.aspx

Affiliation
Oxfordshire
OX11 0QX
United Kingdom

Contribution to the SSA SWE network
Heliospheric weather (7)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/ral-euhforia-e-federated
http://swe.ssa.esa.int/web/guest/ral-euhforia-ma-federated
http://swe.ssa.esa.int/web/guest/ral-euhforia-me-federated
http://swe.ssa.esa.int/web/guest/ral-euhforia-v-federated
http://swe.ssa.esa.int/web/guest/ral-hparc-par-federated
http://swe.ssa.esa.int/web/guest/ral-hparc-pb-federated
http://swe.ssa.esa.int/web/guest/ral-hparc-stat-federated

Research Center for Astronomy and Applied Mathematics (RCAAM)

Homepage
http://astro.academyofathens.gr/

Affiliation
Soranou Efesiou 4
GR-11527 Athens
Greece

Contribution to the SSA SWE network
Space weather (1)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/rcaam-federated
Solar Influences Data analysis Center (SIDC)

Homepage
http://sidc.oma.be/

Affiliation
Avenue Circulaire – Ringlaan, 3
1180 Brussels
Belgium

Contribution to the SSA SWE network
Geomagnetic conditions (1)
Space weather (21)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/sidc-G105-federated
http://swe.ssa.esa.int/web/guest/sidc-S101-federated
http://swe.ssa.esa.int/web/guest/sidc-S101c-federated
http://swe.ssa.esa.int/web/guest/sidc-S102-federated
http://swe.ssa.esa.int/web/guest/sidc-S103-federated
http://swe.ssa.esa.int/web/guest/sidc-S104-federated
http://swe.ssa.esa.int/web/guest/sidc-S105a-federated
http://swe.ssa.esa.int/web/guest/sidc-S105c-federated
http://swe.ssa.esa.int/web/guest/sidc-S105d-federated
http://swe.ssa.esa.int/web/guest/sidc-S106-federated
http://swe.ssa.esa.int/web/guest/sidc-S108-federated
http://swe.ssa.esa.int/web/guest/sidc-S108b-federated
http://swe.ssa.esa.int/web/guest/sidc-S109a-federated
http://swe.ssa.esa.int/web/guest/sidc-S109b-federated
http://swe.ssa.esa.int/web/guest/sidc-S110-federated
http://swe.ssa.esa.int/web/guest/sidc-S111-federated
http://swe.ssa.esa.int/web/guest/sidc-S111a-federated
http://swe.ssa.esa.int/web/guest/sidc-S1112a-federated
http://swe.ssa.esa.int/web/guest/sidc-S112b-federated
http://swe.ssa.esa.int/web/guest/sidc-S112z-federated
http://swe.ssa.esa.int/web/guest/sidc-S113-federated
http://swe.ssa.esa.int/web/guest/sidc-S123b-federated
http://swe.ssa.esa.int/web/guest/sidc-S126-federated
Space and Earth Observation Centre (FMI)

**Homepage**
http://space.fmi.fi

**Affiliation**
Erik Palménin aukio 1
FI-00560 HELSINKI
Finland

**Contribution to the SSA SWE network**
Geomagnetic conditions (4)
Ionospheric weather (2)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/fmi-federated
http://swe.ssa.esa.int/web/guest/fmi-tomoscand-federated

Space Research Laboratory, Department of Physics and Astronomy (SRL)

**Homepage**
http://www.srl.utu.fi

**Affiliation**
FI-20014 University of Turku
Finland

**Contribution to the SSA SWE network**
Space radiation (4)

**Portal Entry Point**
http://swe.ssa.esa.int/web/guest/utu-srl-federated
SWE Data Centre (SWE Portal)

Homepage
http://swe.ssa.esa.int/

Affiliation
Robert-Bosch-Straße 5
64293 Darmstadt
Germany

Contribution to the SSA SWE network
Ionospheric weather (1)
Space radiation (3)

Portal Entry Point
http://swe.ssa.esa.int/ionmon/
http://swe.ssa.esa.int/web/guest/edid1/
http://swe.ssa.esa.int/web/guest/sedat1
https://ssa-be-vm-fe-06p.ssa.esa.int/seisopweb

Swedish Institute of Space Physics in Lund (IRF-Lund)

Homepage
http://lund.irf.se/

Affiliation
Box 812, SE-981 28
Kiruna
Sweden

Contribution to the SSA SWE network
Geomagnetic conditions (3)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/irf-federated
Technical University of Denmark (DTU)

Homepage
http://www.space.dtu.dk/english

Affiliation
Elektrovej building 327+328+371 and Ørsteds Plads building 348
DK-2800 Kgs. Lyngby
Denmark

Contribution to the SSA SWE network
Heliospheric weather (3)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/dtu-aware-a-federated
http://swe.ssa.esa.int/web/guest/dtu-aware-federated
http://swe.ssa.esa.int/web/guest/dtu-aware-next-federated

Tromsø Geophysical Observatory (TGO)

Homepage
http://www.tgo.uit.no/

Affiliation
N-9037 Tromsø
Norway

Contribution to the SSA SWE network
Geomagnetic conditions (9)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/tgo-federated
UK Met Office (UKMO)

Homepage
http://www.metoffice.gov.uk

Affiliation
FitzRoy Road
Exeter
United Kindom

Contribution to the SSA SWE network
Heliospheric weather (15)
Ionospheric weather (1)
Space weather (2)
Space radiation (16)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/atmden-federated
http://swe.ssa.esa.int/web/guest/metoffice-alerts-e-federated
http://swe.ssa.esa.int/web/guest/metoffice-enlil-e-federated
http://swe.ssa.esa.int/web/guest/metoffice-enlil-ma-federated
http://swe.ssa.esa.int/web/guest/metoffice-enlil-me-federated
http://swe.ssa.esa.int/web/guest/metoffice-enlil-v-federated
http://swe.ssa.esa.int/web/guest/metoffice-sep-e-federated
http://swe.ssa.esa.int/web/guest/metoffice-sw-1l-federated
http://swe.ssa.esa.int/web/guest/sarif-federated
http://swe.ssa.esa.int/web/guest/ukmo-s109c-federated
http://swe.ssa.esa.int/web/guest/ukmo-s123c-federated

Universidad de Alcalá (UAH)

Homepage
https://www.uah.es/en/

Affiliation
Pza. San Diego, s/n
828801 - Alcalá de Henares
Spain

Contribution to the SSA SWE network
Geomagnetic conditions (8)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/uah-senmes-federated
UPC-IonSAT (IonSAT)

Homepage
https://futur.upc.edu/IonSAT

Affiliation
Campus Nord, Calle Jordi Girona
08034 Barcelona
Spain

Contribution to the SSA SWE network
Ionospheric weather (5)

Portal Entry Point
http://swe.ssa.esa.int/web/guest/upc-federated