SSA Space Weather Radiation Expert Service Centre in Period 3 (2017-2019)

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SSA SWE Network: A unique Space Weather Service System

http://swe.ssa.esa.int

Data archives

- SSA SWE Data Centre (Redu)
- Federated data repositories

SSA SWE Coordination Centre

- User Helpdesk
- Space Pole, Belgium

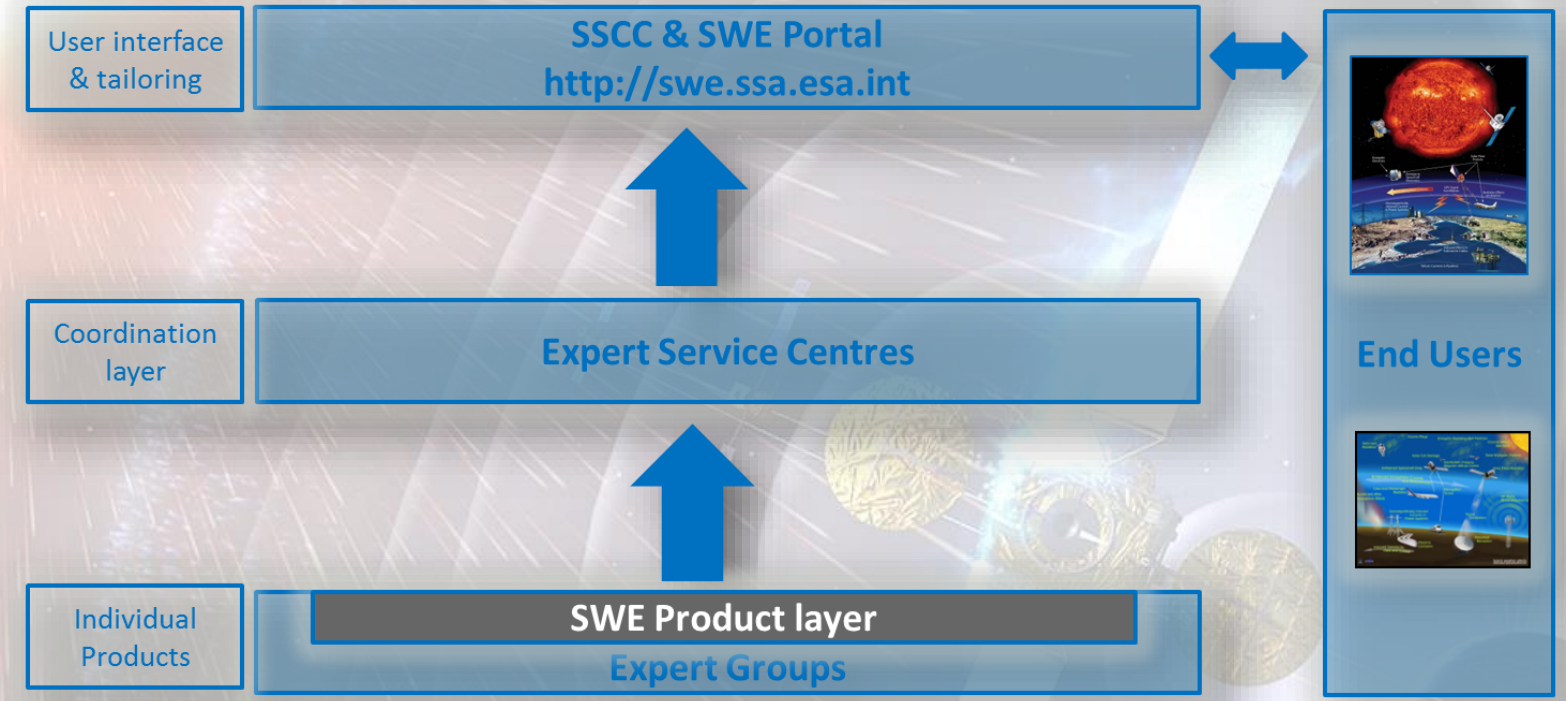
SWE Expert Service Centres (ESCs)

Solar Weather | Ionospheric Weather | Space Radiation | Geomagnetic Conditions | Heliospheric Weather

European expert groups and centres of excellence

Sensor systems

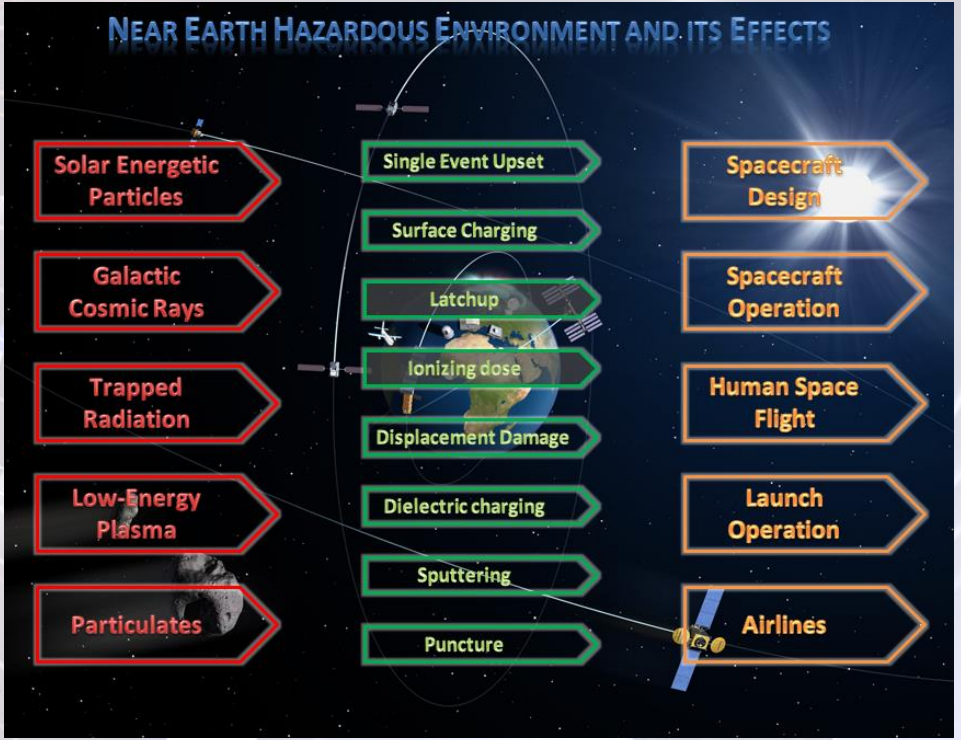
SWE Services Business Logic



R-ESC Scope & Aims

- *Provide and develop domain functionalities, capabilities and expertise within the ESA SSA SWE network to achieve as a collaborative enterprise, reliable and timely products and (pre-) operational services, tailored to customer requirements*

- *Monitoring, modelling and forecasting of space particle radiation (ambient plasma, SEPs, radiation belts, GCRs), micron-size particulates (from meteoroids and space debris), as well as induced effects on technologies and biological systems.*



R-ESC Consortium

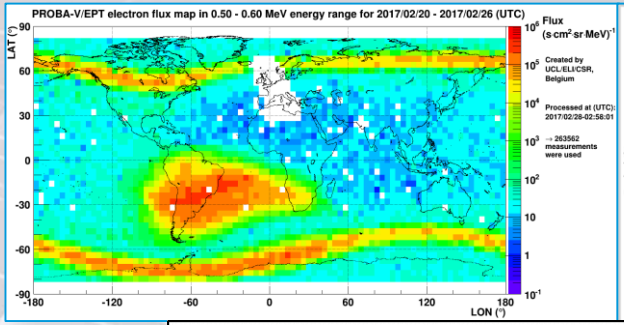
- Coordinator: BIRA, Belgium

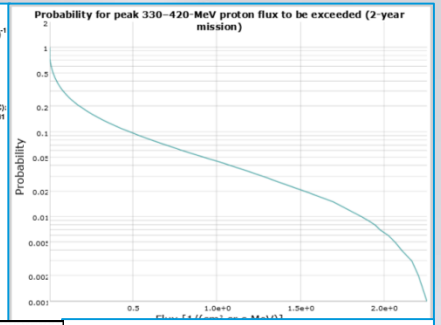
- Expert Groups & consultants:
  - Seibersdorf, Austria
  - NKU, Greece
  - CSR, Belgium
  - DLR, Germany
  - MSSL-UCL, UK
  - Paul Buehler, Austria
  - U Turku, Finland
  - IAP, Prague
  - SGO, Finland

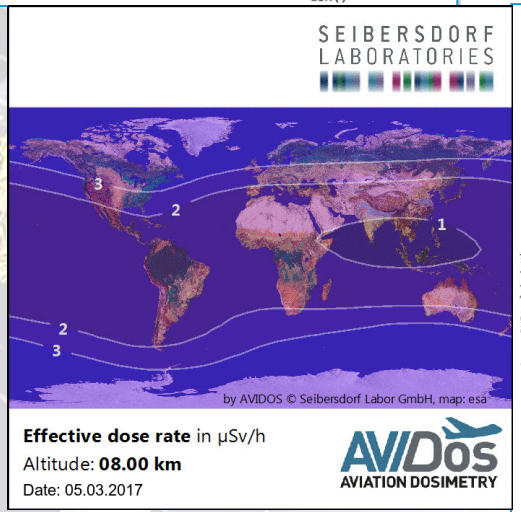
- http://swe.ssa.esa.int/space-radiation

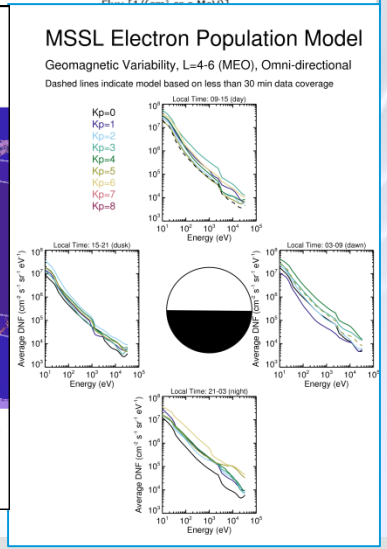
R-ESC Products

- Products
  - PROBA-V EPT
  - SREM radiation rates
  - ISS onboard dosimetry archive
  - Very high energy proton flux/fluence
  - multi station neutron monitor data
  - Very low energy electron radiation belts
  - SWIFF plasmasphere model
  - EDID debris
- Toolkits and analysis
  - AVIDOS Aviation dosimetry
  - SPENVIS
  - SEDAT
  - SEISOP
  - SEPEM
- Reports and alerts
  - COMESEP
  - GLE event reporting for aviation

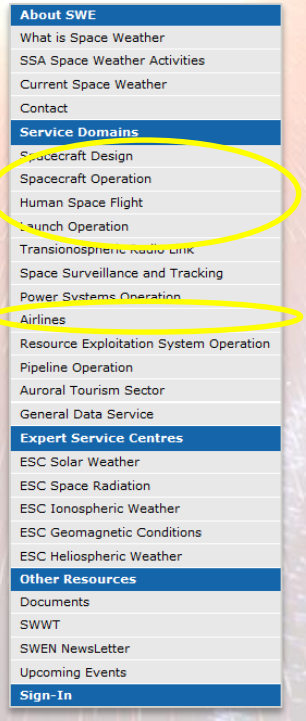








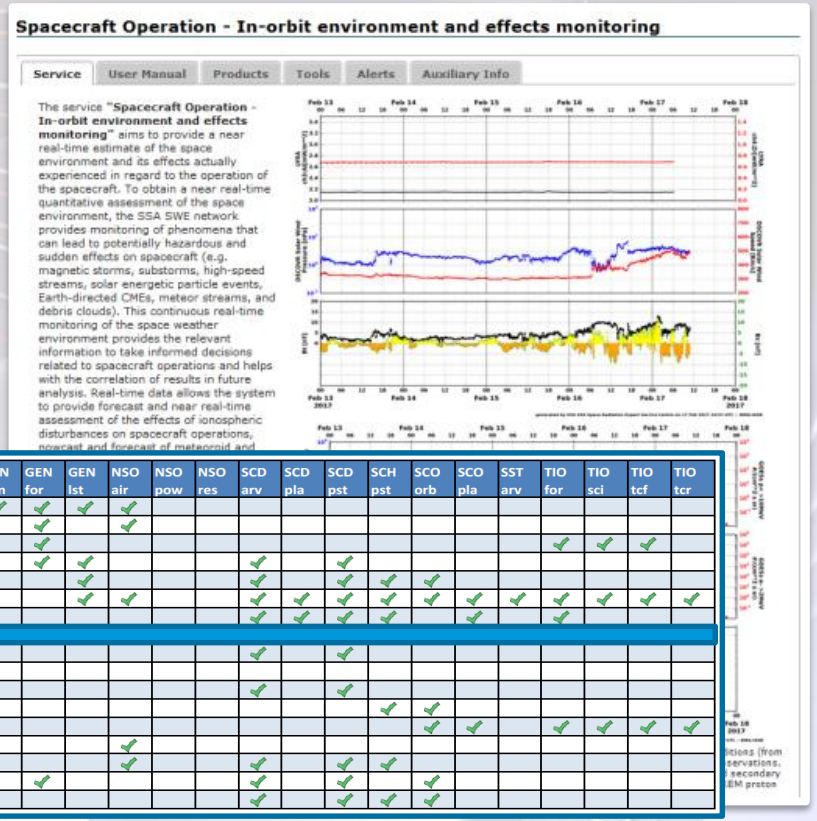
Initial SWE Services



- ***Products, tools, reports/alerts & user support***

Initial focus for P2:

- **Spacecraft design (SCD): Data archive (arv), Post event analysis (pst)**
- **Spacecraft operation (SCO): In orbit environment and effects monitoring (orb),**
- **Human space flight (SCH): Cumulative crew radiation exposure (pst)**
- **Non-space systems operations (NSO): Aviation (air)**



	GEN alm	GEN for	GEN lst	NSO air	NSO pow	NSO res	SCD arv	SCD pla	SCD pst	SCH pst	SCO orb	SCO pla	SST arv	TIO for	TIO sci	TIO tcf	TIO tcr
ANeMoS	✓	✓	✓	✓													
AVIDOS		✓		✓													
COMESEP		✓												✓	✓	✓	
EDID		✓	✓				✓		✓								
EPT			✓				✓		✓	✓	✓						
SEDAT			✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SPENVIS							✓	✓	✓	✓		✓		✓			
UTU-SEP							✓		✓								
MSSL							✓		✓								
RADSpace										✓	✓						
SEISOP											✓	✓		✓	✓	✓	✓
RADSEP				✓													
SEPEM				✓			✓		✓	✓							
SPM		✓					✓		✓		✓						
SREM							✓		✓	✓	✓						

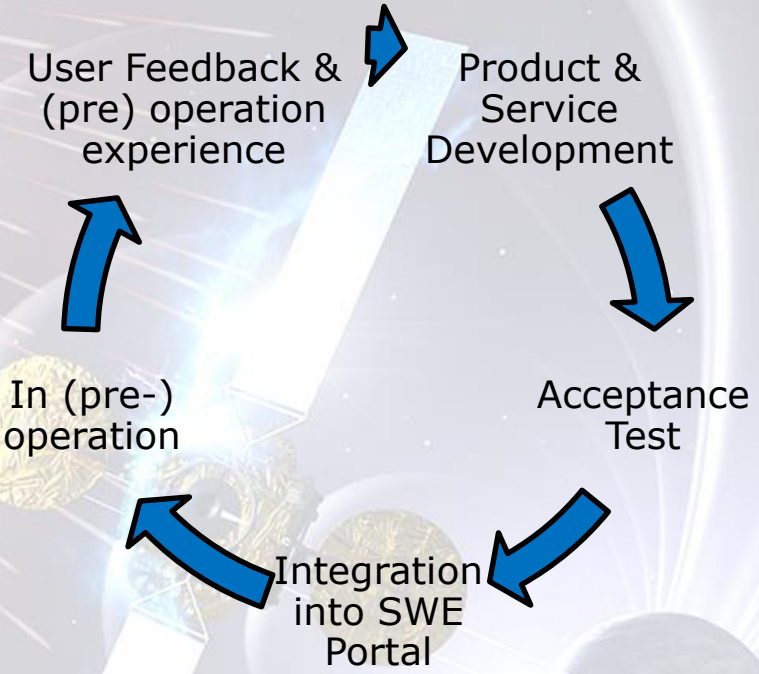
Product & Service Development Lifecycle

Establishment of a process whereby SWE products & services are tested with real users in the loop

R-ESC new and upgraded products & 5 new service pages subject of user test campaigns Dec 16 - Apr 17

Test campaign Results :

- Improved products & services
- feed into longer term definition and development planning



SWE Targeted Developments

SN-VI: Services for aviation, resource exploitation & data visualisation toolkit

RHEA

P2-SWE-II
Services for SST domain users

elecnor deimos

P2-SWE-XIV: Virtual Space Weather Modelling Centre

KU LEUVEN

Expert Service Centres Definition & Development
P2-SWE-I

STFC RAL Space

UNIVERSITY OF TROMSØ

BIRA-IASB

Royal Observatory of Belgium

DLR

AIRBUS DEFENCE & SPACE

P2-SWE-XVI
Utilisation of Swarm data for SWE services

GFZ Helmholtz-Zentrum Potsdam

P2-SWE-XXIV
Advanced geomagnetic services

P2-SWE-XIII
Advanced prototypes: spacecraft operations

British Antarctic Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Met Office

ESC Development

- Ongoing assessment of current capabilities
  - (annual) Thematic workshops
  - Review of asset database
  - Horizon scanning
  - Gap identification
- Customer Requirements
  - Test campaigns
  - User feedback from dedicated meetings/workshops
  - Build ongoing dialogue with high priority users
- Update SWE service development roadmaps
- ESC evolution

http://swe.ssa.esa.int/web/guest/asset-database

Looking forward P3

- Period 3 focus on maturing current services & beginning transition towards operational system

- Within R-ESC domain:
  - Extended monitoring capability including
    - Tailored products based on SWE hosted payload data
    - Tailored products based on existing data sources
  - Improved analysis toolkits supporting both off-line analysis and near real-time services.
  - Improved nowcast and short term forecast of key parameters for spacecraft operators in a range of orbits, human spaceflight and aviation users
  - Development of underpinning physics based modelling capability supporting long term improvement in both nowcast and forecast provision.

THANK YOU

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