

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

A Glover, J Luntama

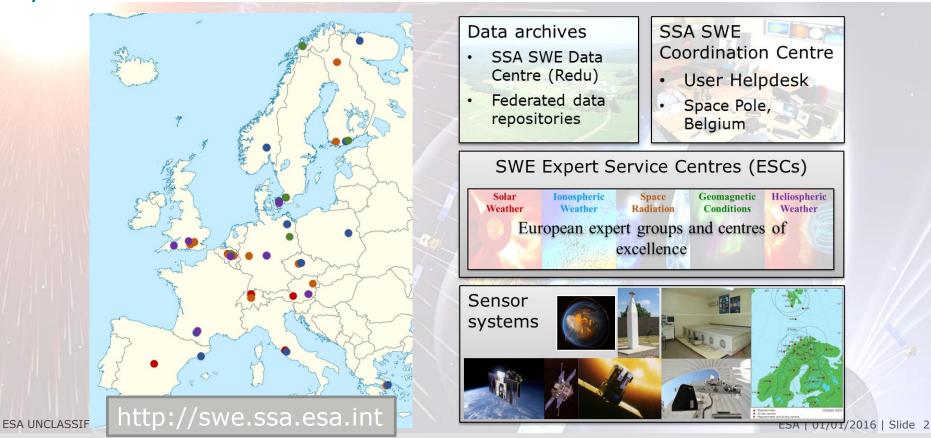
SSA Programme Office, ESOC, Darmstadt, German

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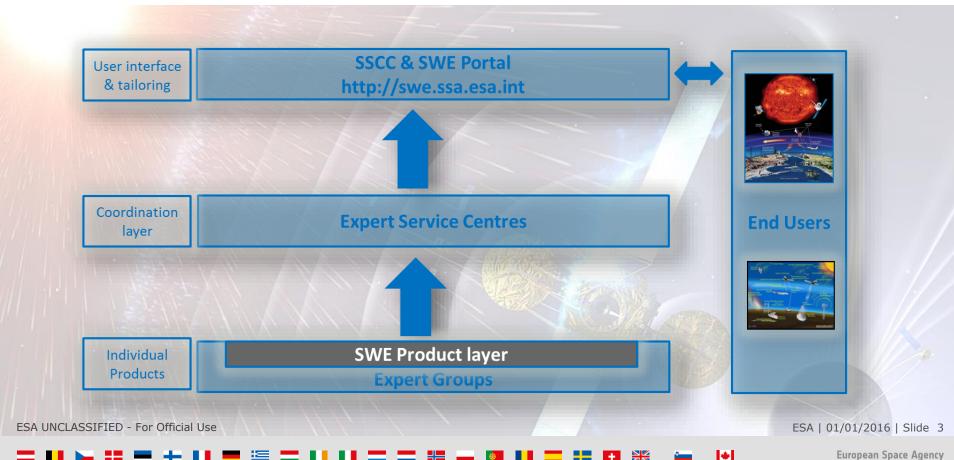
# SSA SWE Network: A unique Space Weather Service System





### SWE Services Business Logic

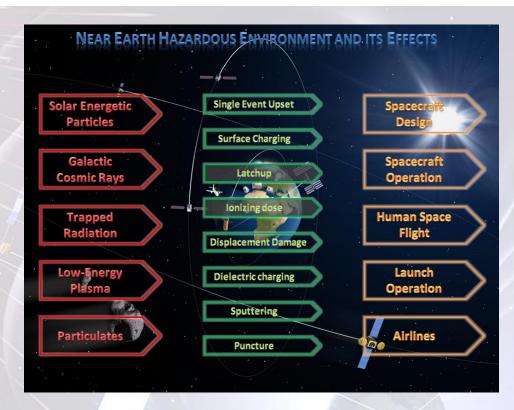




### R-ESC Scope & Aims



- 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.



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### 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



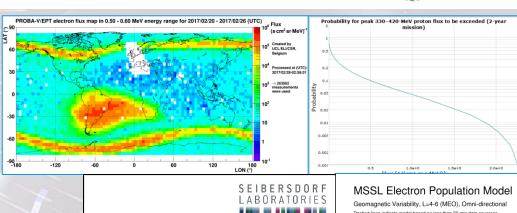
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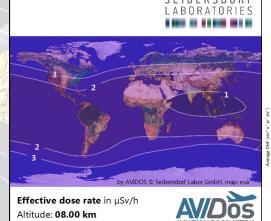
### **R-ESC Products**

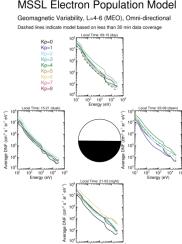


- **Products** 
  - PROBA-V EPT
  - SREM radiation rates
  - ISS onboard dosimetry archive
  - Very high energy proton flux/fluence
  - multi station neutron monitor data
  - Very low energy electron radiation belts
  - •SWIFF plasmasphere model
  - EDID debris
- Toolkits and analysis
  - AVIDOS Aviation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

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Date: 05.03.2017





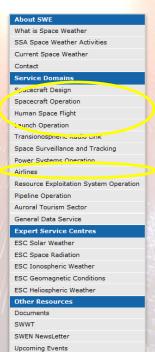






### **Initial SWE Services**





Sign-In

 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)

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## Product & Service Development Lifecycle

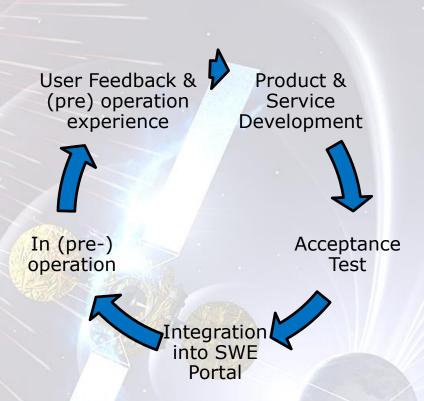


Establishment of a process whereby SWE products & services are tested with real users in the loop

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



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# **SWE Targeted Developments**



P2-SWE-II Services for SST domain users



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



Expert Service Centres Definition &



Development P2-SWE-I





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









P2-SWE-XXIV
Advanced geomagnetic
services

P2-SWE-XIV: Virtual Space Weather Modelling Centre

**KU LEUVEN** 

P2-SWE-XIII Advanced prototypes: spacecraft operations



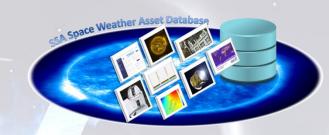


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## **ESC** Development

esa

- 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.

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# **THANK YOU**

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