
esa
Metrics For Addressing ESA SSA End User Needs
A Glover, J Luntama
ESA SSA Programme Office, ESOC, Germany
ESA UNCLASSIFIED - For Official Use
European Space Agency

Objectives of the SSA Programme

"The objective of the Space Situational Awareness (SSA) programme is to support the European independent utilisation of, and **access to, space** for research or services, through the **provision of timely and quality data**, information, services and knowledge regarding the **space environment**, the **threats** and the sustainable exploitation of the outer space **surrounding our planet Earth."**

- **ESA Ministerial Council November 2008**

ESA SSA SWE Segment Objectives

Detection and forecasting of Space Weather events and their effects on European space assets and ground based infrastructure

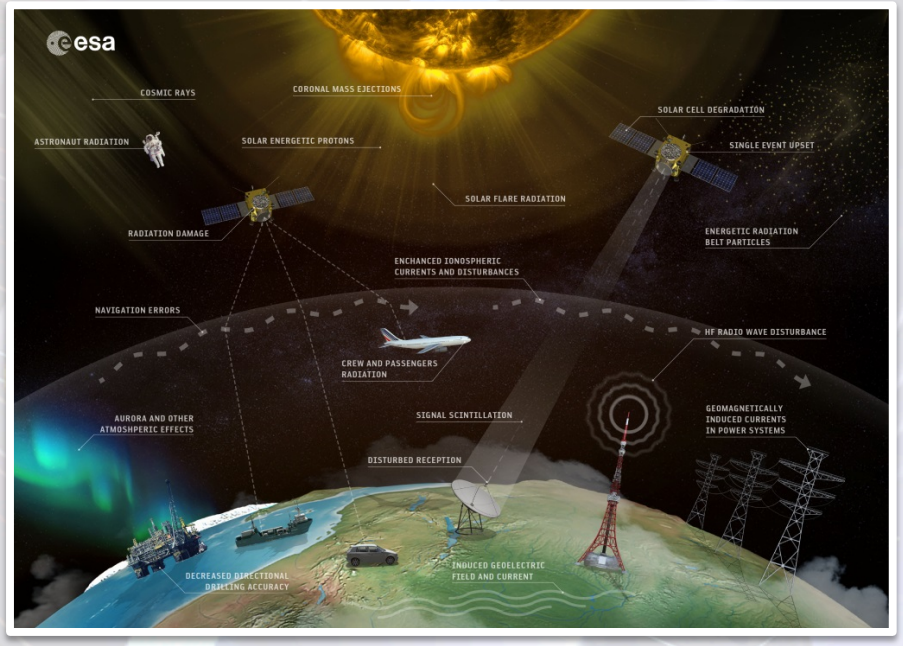
Developments target 8 distinct user domains

39 tailored services:

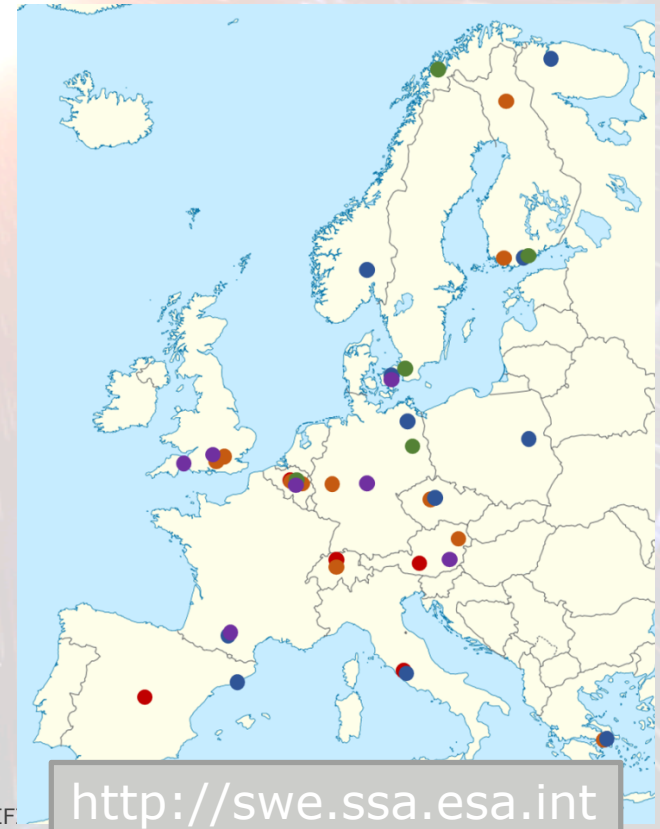
- Products & toolkits
- Alerting
- User support

End users:

- Continuous dialogue & consultation
- Inform & improve requirements baseline



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

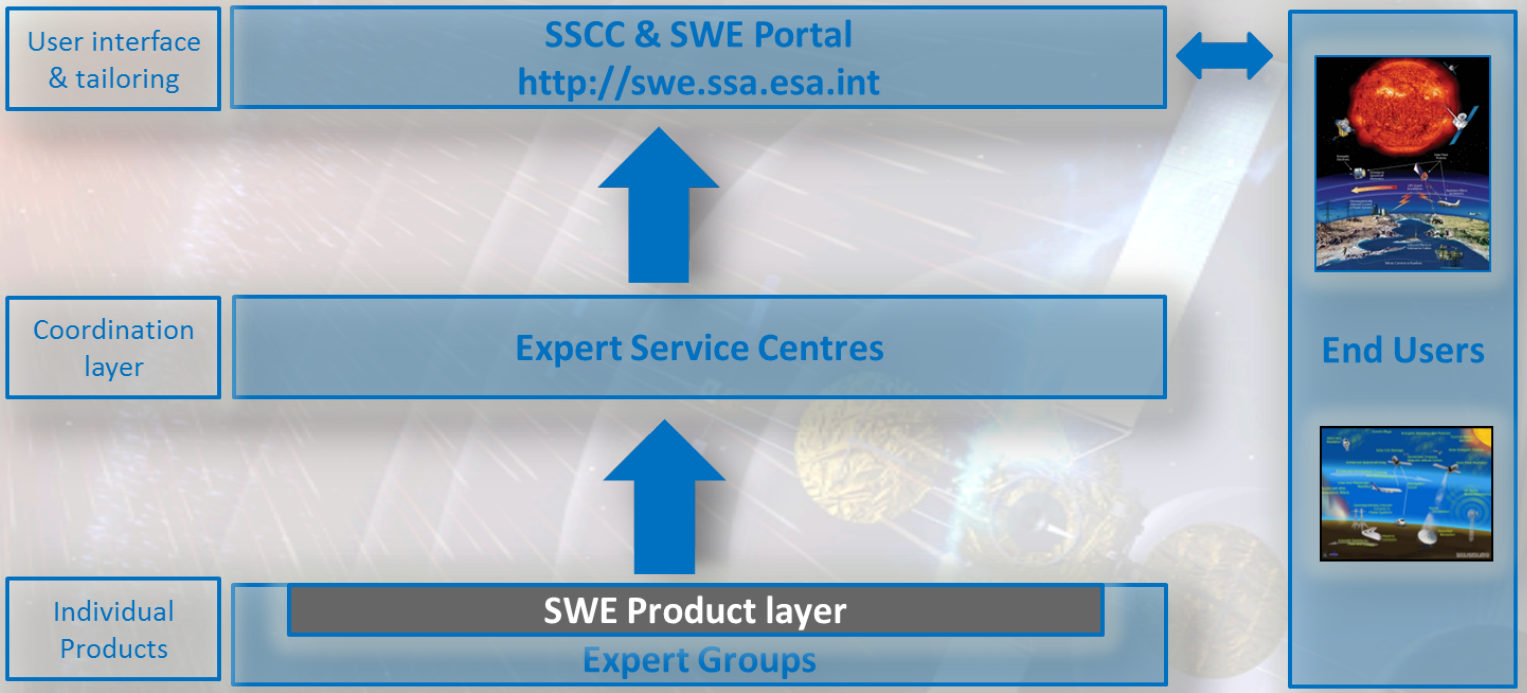
SWE Expert Service Centres (ESCs)

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

European expert groups and centres of excellence

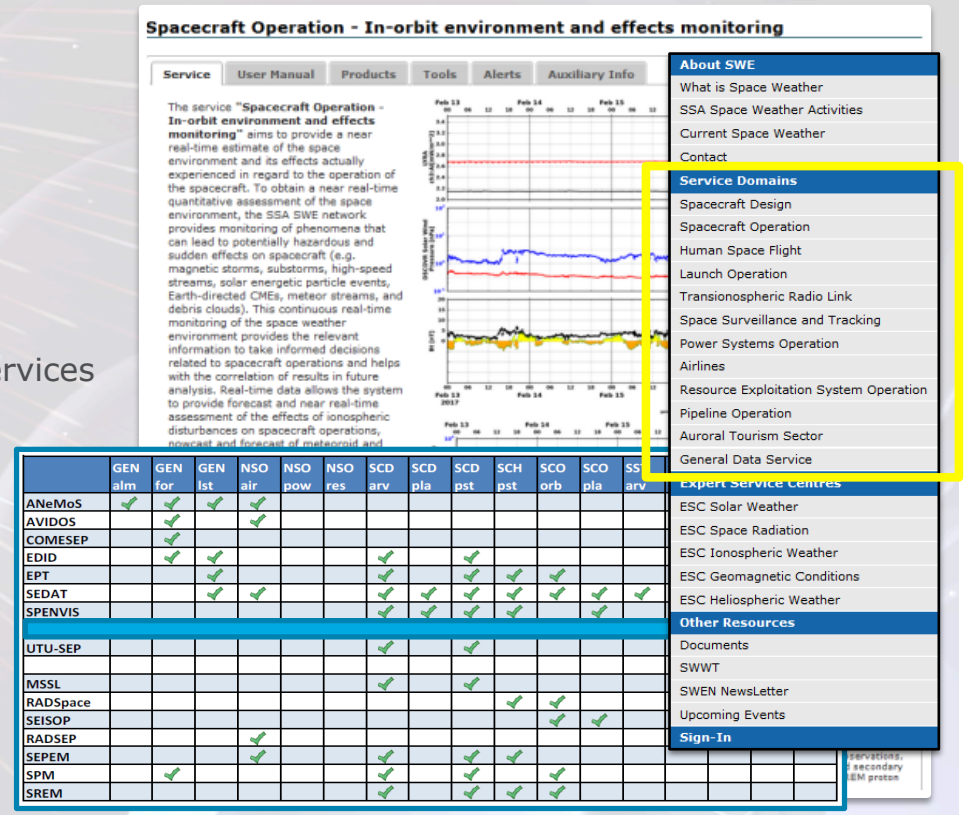
Sensor systems

SWE Services Business Logic



Building a Federated System

- Utilisation of existing assets and expertise:
  - Many high quality assets
  - Widely different heritage
  - Widely different capabilities
- Networking + targeted development
- Development of network structure towards SWE services
- SWE Services:
  - products
  - Tools
  - Alerts/reporting
  - User support
- Current status: >115 elements, 20 service pages



Capability Assessment

- Measure maturity of services and constituent elements with respect to SWE requirements baseline
- Provide clear accuracy and reliability information to SWE users
  - Product maturity
    - How well does the product match the target requirement? Scope… accuracy…timeliness
  - Service maturity
    - Combination of available product maturity + operational implementation

Product Accuracy within Expert Service Centres

- Develop common practice and common approach to assessing accuracy of comparable products
- First case study initiated within Ionospheric Weather Expert Service Centre (*lead: DTU*)
  - ✓ TEC map focus
  - ✓ Validation against independent reference data and tbc modelling
  - ✓ Selection of appropriate metrics & periods
- Extend approach to wider network in P3

Ref.	Product Name	Provider
I.101	IMPC – TEC Map (Europe), current	DLR
I.103	IMPC – TEC Map (Global), current	DLR
I.103	IMPC – TEC Map (Global), current, beta version	DLR
I.107	VTEC maps (Northern Europe)	NMA
I.121	IONMON TEC maps	ESA
I.122e	DC-IV/ISM TEC and Err(TEC) maps	CLS/IEEA
I.117	Near real-time TEC maps (Europe)	INGV/NOA

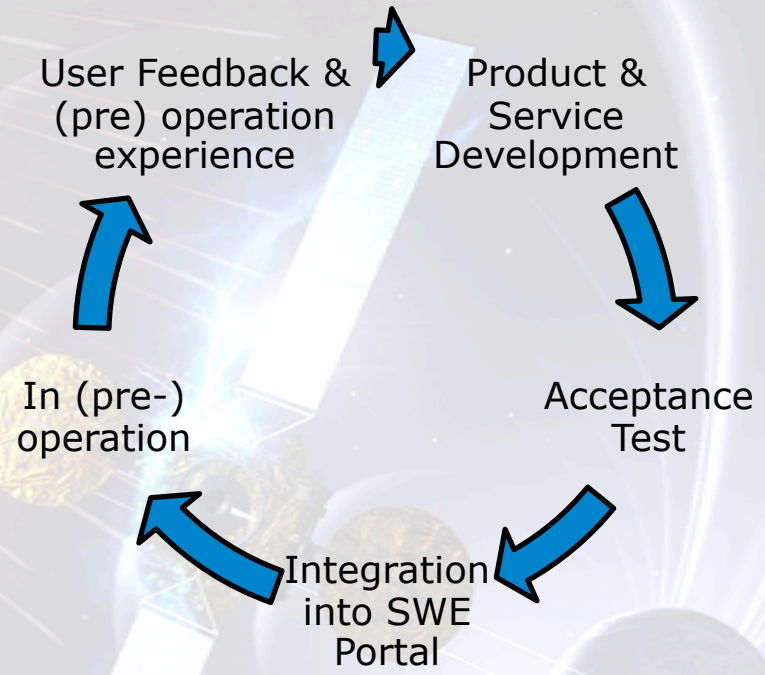
Product & Service Development Lifecycle

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

New and upgraded products & service pages subject of user test campaigns Dec 16 - Apr 17

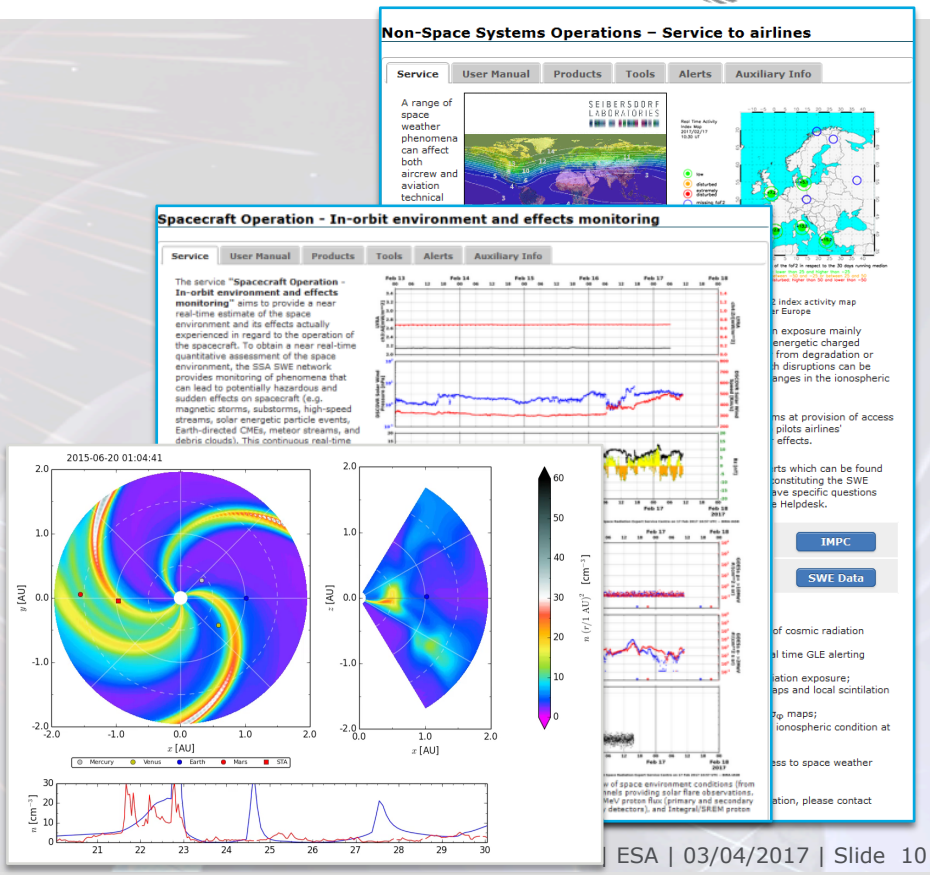
Test campaign Results :

- Requirements for improved products & services
- Feed into longer term definition and development planning



SWE Implementation Targets for Period 3 (2017-2019)

- Establish robust R2O process for models and tools developed within and outside the Programme
- Mature elements of the SSA SWE system for transitioning to operations
- Develop and validate improved services for key user domains => develop required models and applications



Summary

- SWE Network has developed rapidly during SSA Period 2 (2013-2016)
    - >40 teams proving >115 products plus user support constituting 20 initial services
- Now maturing, continuing to grow and addressing transition of elements towards operations as part of Period 3 (2017 – 2019)
- Selection and utilisation of appropriate metrics vital to ensure effective benchmarking, reliable and consistent accuracy information

- Further SSA SWE capability assessment discussion:
    - Dedicated working meetings at ESWW14 (http://stce.be/esww14)
    - SWE Network (~annual) "Thematic Workshops"


esa
THANK YOU
swe.ssa.esa.int
www.esa.int
European Space Agency