

ESA Space Situational Awareness – Space Weather Segment

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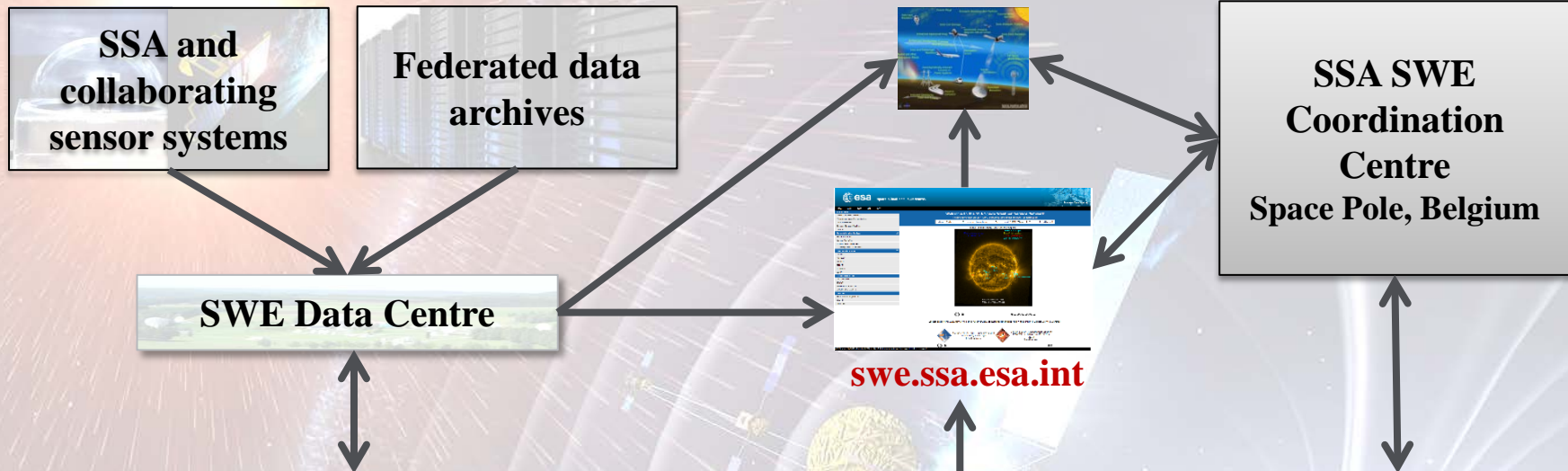
**ESA SSA Programme Office
Space Weather Segment
European Space Agency**

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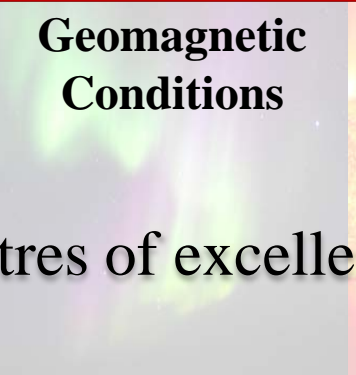
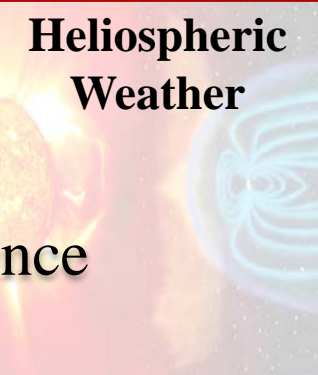
European Space Agency



SSA-SWE Users



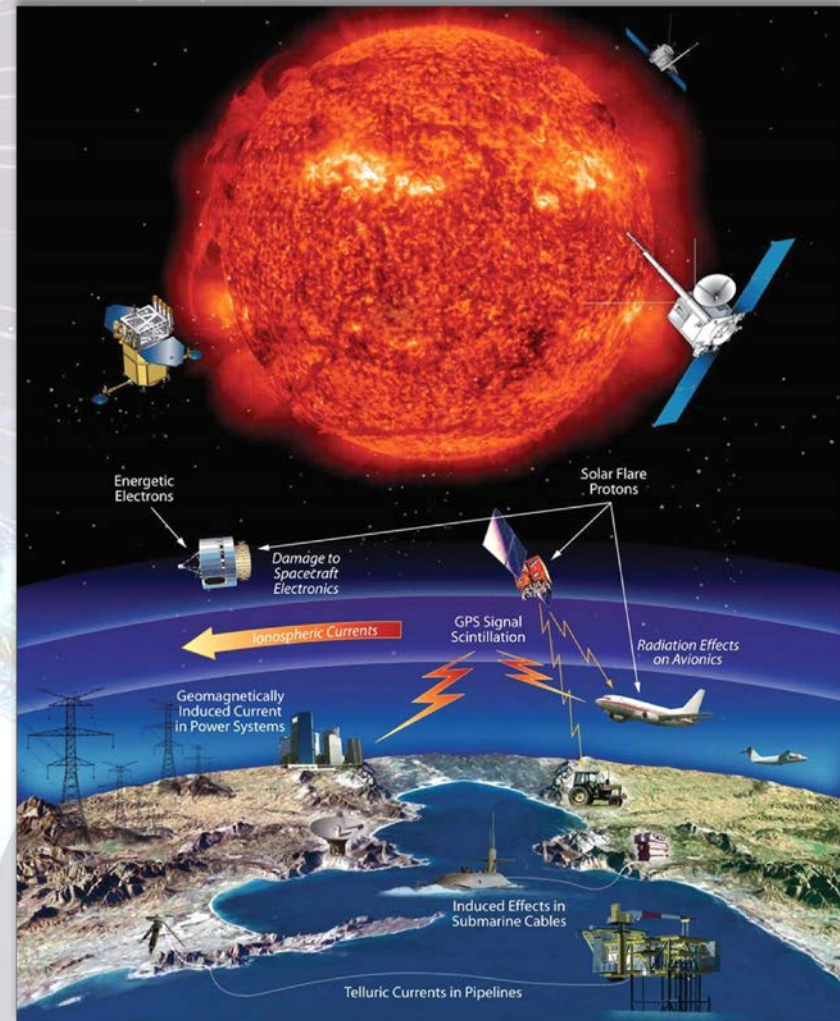
SWE Expert Service Centres

 <p>Solar Weather</p>	 <p>Ionospheric Weather</p>	 <p>Space Radiation</p>	 <p>Geomagnetic Conditions</p>	 <p>Heliospheric Weather</p>
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European expert groups and centres of excellence

SSA SWE Network Goals

- Leverage European expertise in all areas of space weather to build an network of space weather services based on high quality data, state-of-the-art modelling and scientific know-how.
- Advance space weather service provision for SWE customers & stakeholders according to the SWE CRD baseline as part of a sustainable network



Radiation Environment ESC (R-ESC)

- Belgian Institute for Space Aeronomy
- Seibersdorf Laboratories GmbH
- Université Catholique de Louvain (UCL)
Center for Space Radiations
- DLR Institute of Aerospace Medicine
- University of Turku
- University College London (UCL)
Mullard Space Science Laboratory
- Paul Buehler
- Institute of Atmospheric Physics
- University of Oulu Sodankylä Geophysical
Observatory
- CSDRadConsultancy Ltd
- National & Kapodistrian University of Athens
- DH Consultancy

Ionospheric Weather ESC (I-ESC)

- DLR
- Norwegian Mapping Authority
- National Observatory of Athens
- Finnish Meteorological Institute
- Istituto Nazionale di Geofisica e Vulcanologia
- Space Research Centre of the Polish Academy
of Sciences
- Technical University of Denmark
- Institute of Atmospheric Physics
- CLS Collecte Localisation Satellites

Geomagnetic Conditions ESC (G-ESC)

- Tromsø Geophysical Observatory
- Finnish Meteorological Institute
- Technical University of Denmark
- SIDC - Solar Influences Data Center
- Helmholtz-Centre Potsdam – GFZ
- Swedish Institute for Space Physics
- Polar Geophysical Institute

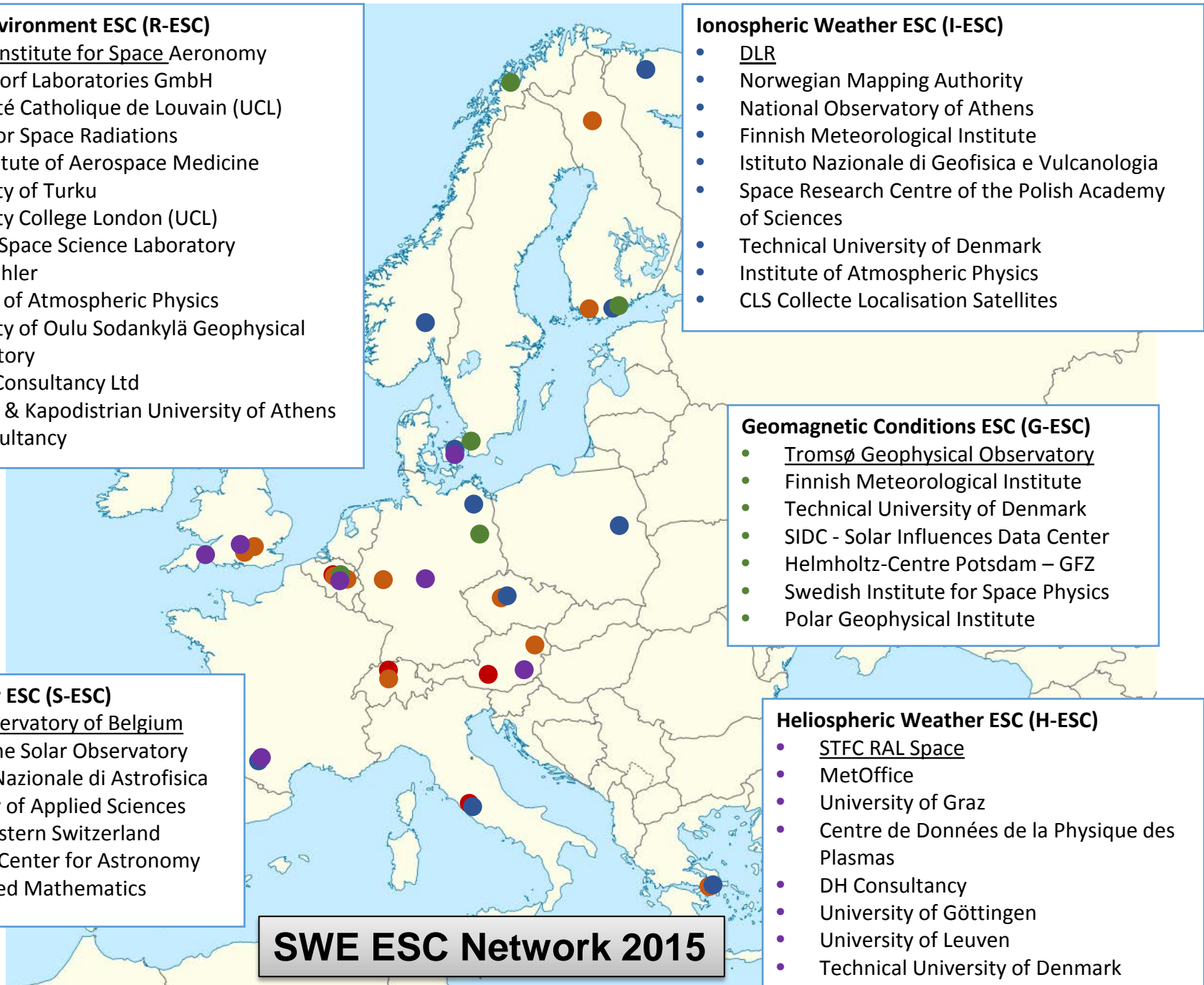
Solar Weather ESC (S-ESC)

- Royal Observatory of Belgium
- Kanzelhöhe Solar Observatory
- Istituto Nazionale di Astrofisica
- University of Applied Sciences
North Western Switzerland
- Research Center for Astronomy
and Applied Mathematics

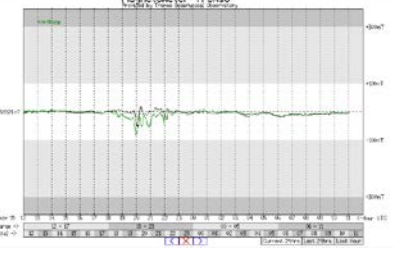
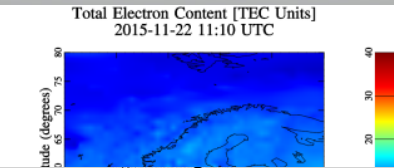
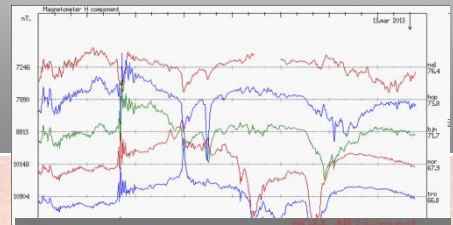
Heliospheric Weather ESC (H-ESC)

- STFC RAL Space
- MetOffice
- University of Graz
- Centre de Données de la Physique des
Plasmas
- DH Consultancy
- University of Göttingen
- University of Leuven
- Technical University of Denmark

SWE ESC Network 2015

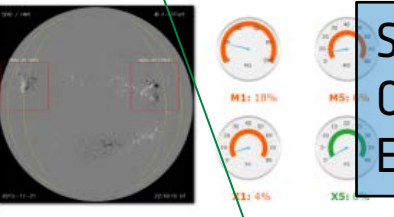
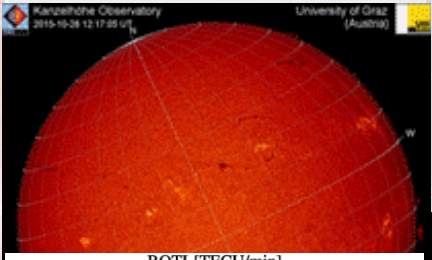
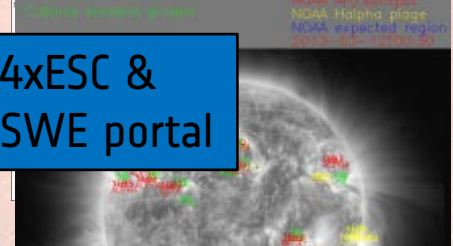


SWE Network Product Growth

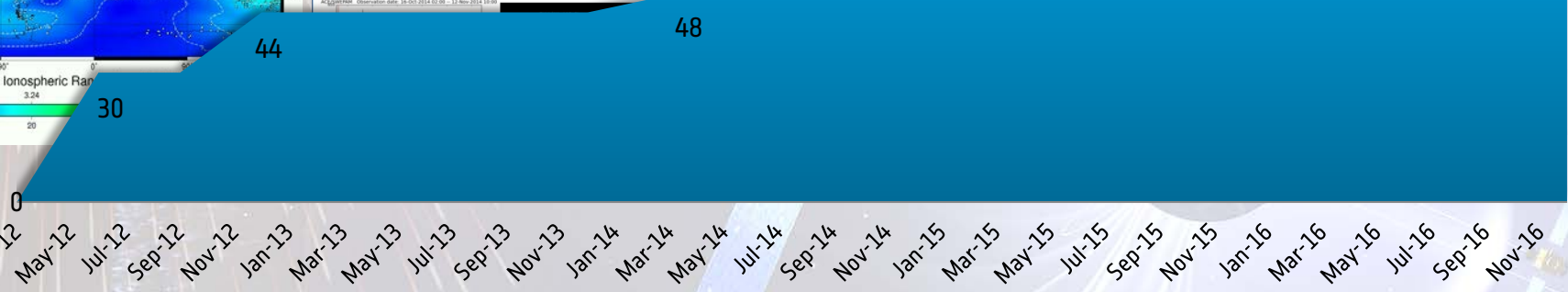
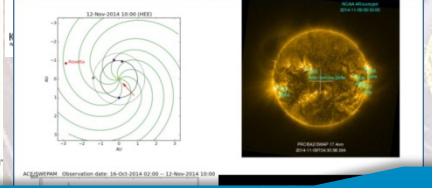
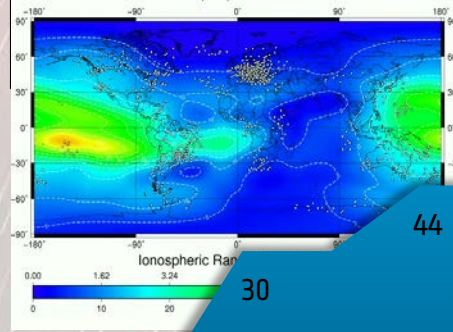
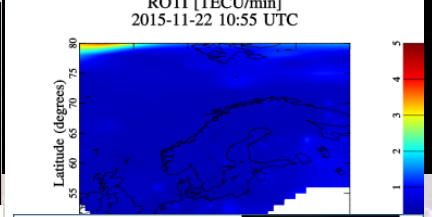
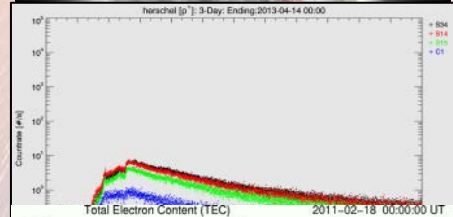


SWE-I pt2 + others

4xESC & SWE portal



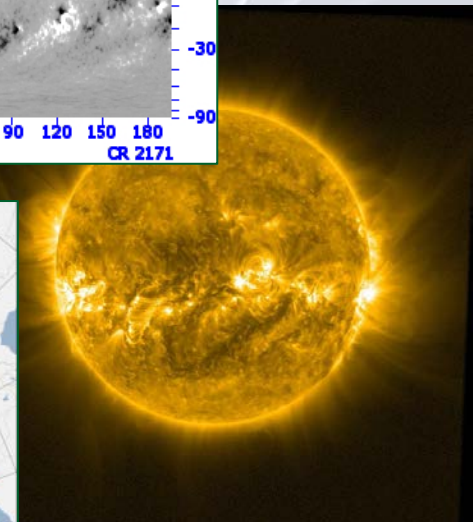
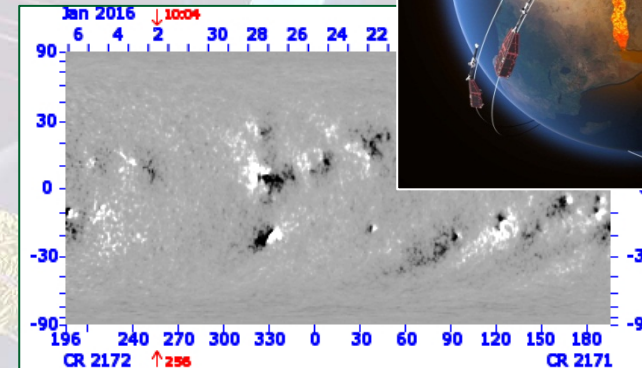
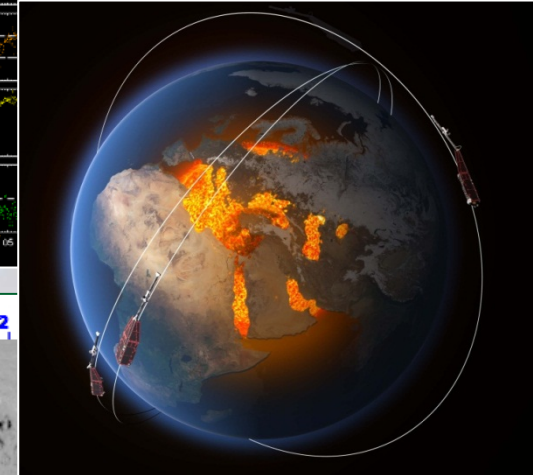
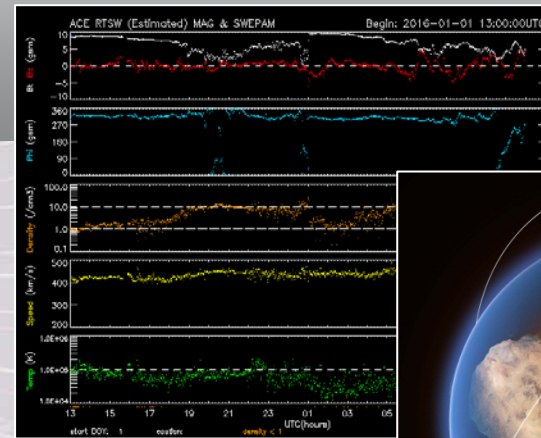
SWE-I pt1: Opening H-ESC



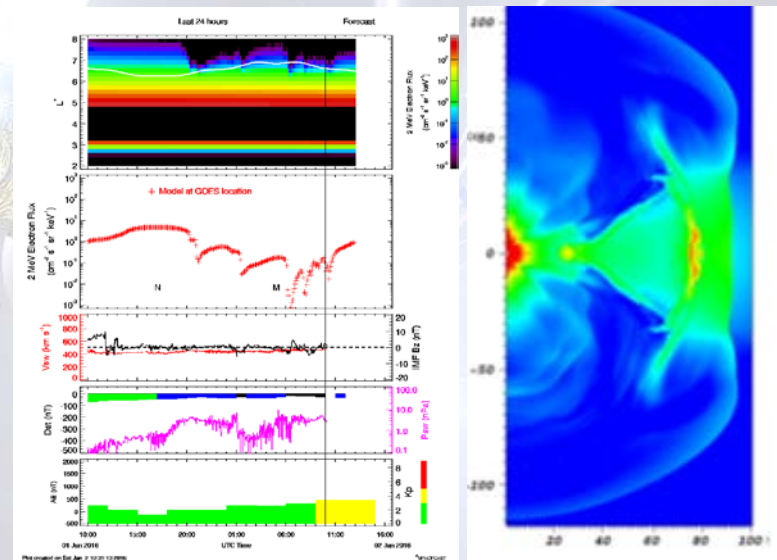
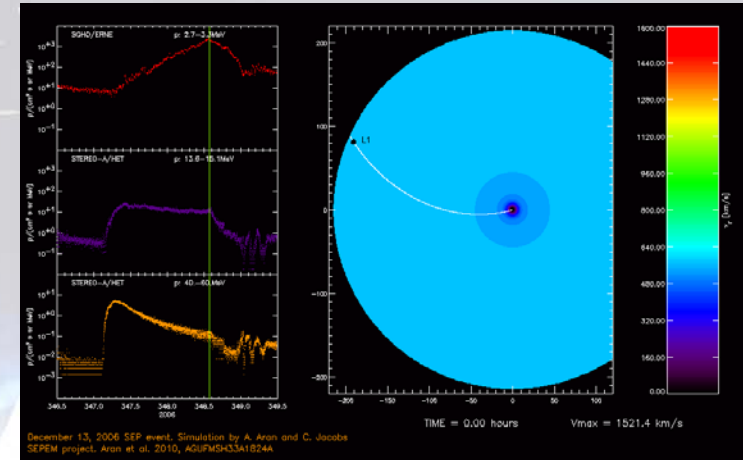
SSCC operations

SWE Data Utilisation

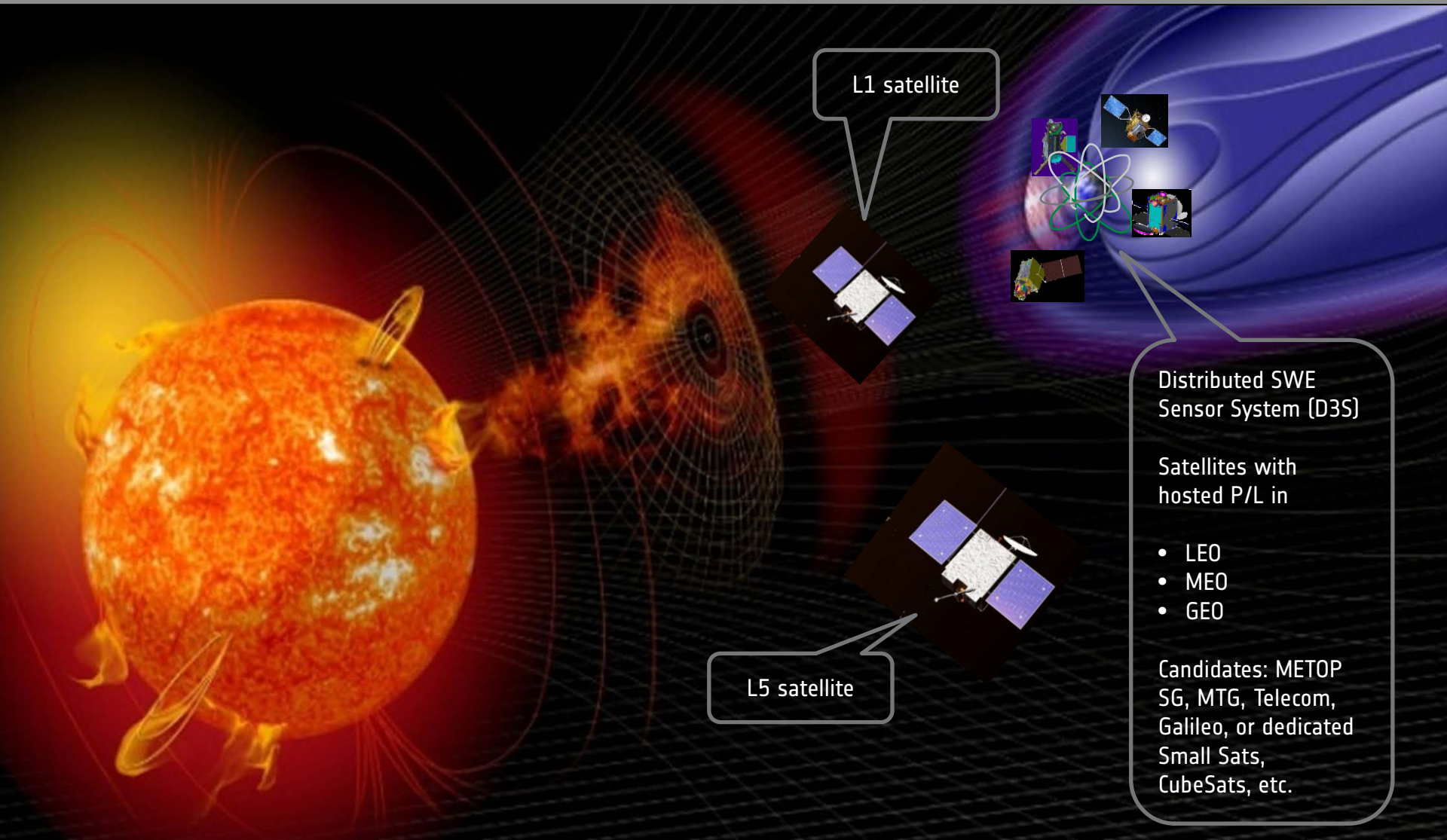
- Critical space & ground based data required for services & identified within Period 2 activities will be secured through SLAs during Period 3
- Utilisation of data from European missions (PROBA-2, Swarm, MetOp,...) will continue & is foreseen to increase (MTG, MetOp-SG,...)
- Agreements to be pursued ensuring availability of key data from international missions (e.g. GOES, ACE/DSCOVR, GK2A,...)
- Utilise SWE Data Centre at Redu as hub for data and product search throughout the federated network.



- Known limitations in current state-of-the-art service capability: e.g. major geomagnetic storm onset forecast with >24h lead times required by power grid operators.
- **Focussed development:** services building on physics-based models where applicable
 - e.g. heliospheric modelling, ionospheric scintillation
 - development of required models & tools utilising L5 mission data
- **ESC service benchmarking & validation** framework provides an essential element facilitating the adoption of new developments
- **Regular update of SWE Service Roadmaps** captures new results showing promise for future service improvement

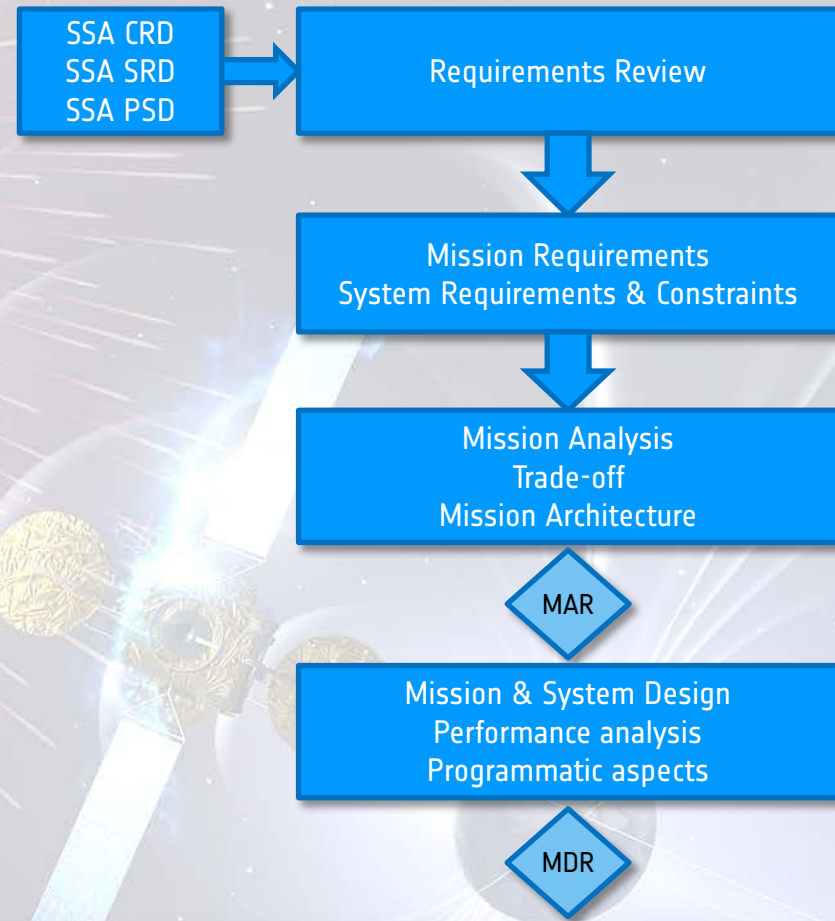


SSA SWE Space Segment in a nutshell

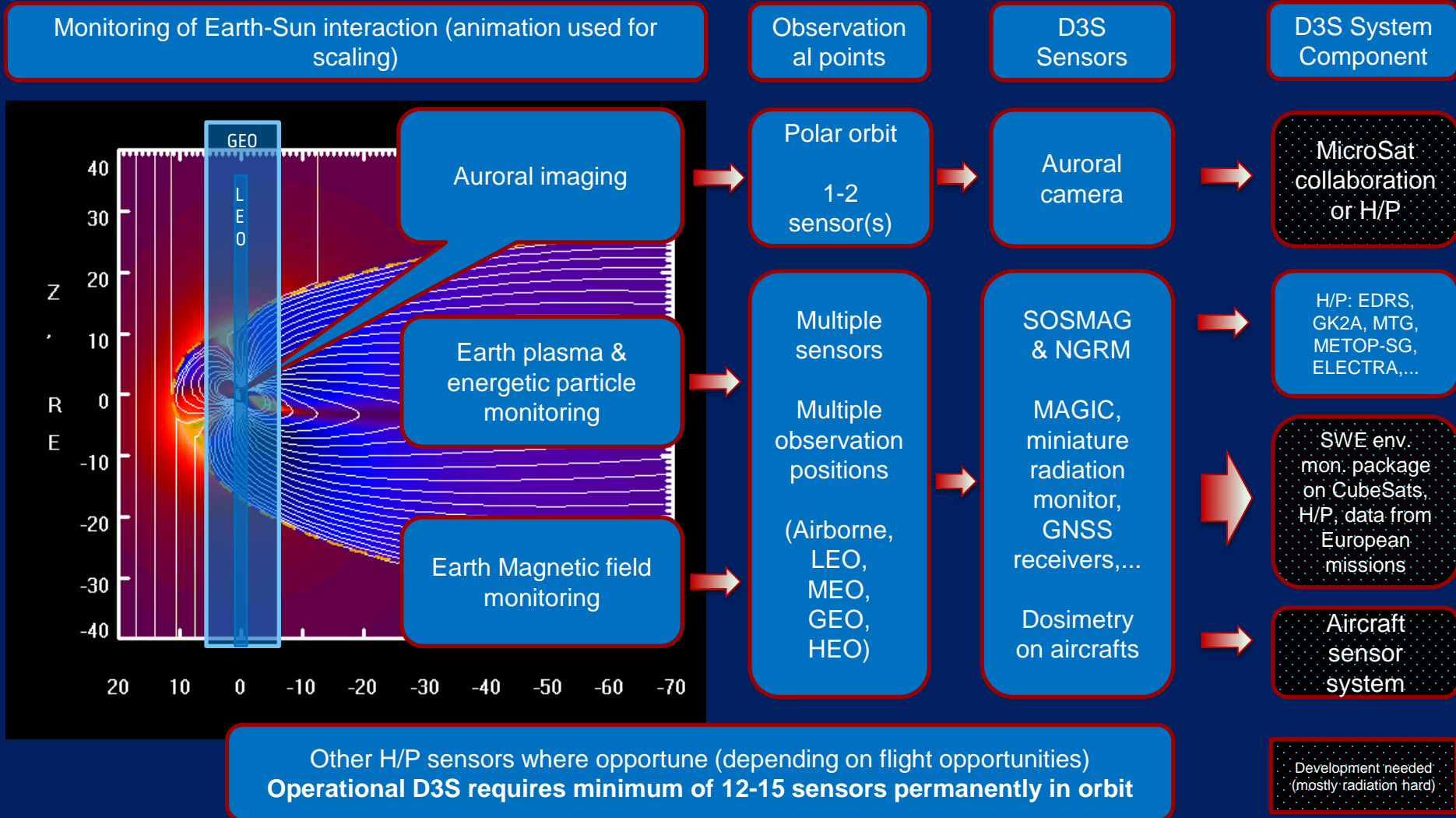


SSA L1 and L5 Mission Concept Studies

- Two parallel studies addressing both L1 and L5 missions
- Equal approach for both missions
- Both studies passed Mission Architecture Review (MAR)
- Benefits of implementing L1 and L5 together included in the analysis
- Mission Design Review (MDR) planned in summer 2016



Distributed SWE Sensor System (D3S)





THANK YOU

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