

SOLAR-TERRESTRIAL CENTRE OF EXCELLENCE : SERVICES





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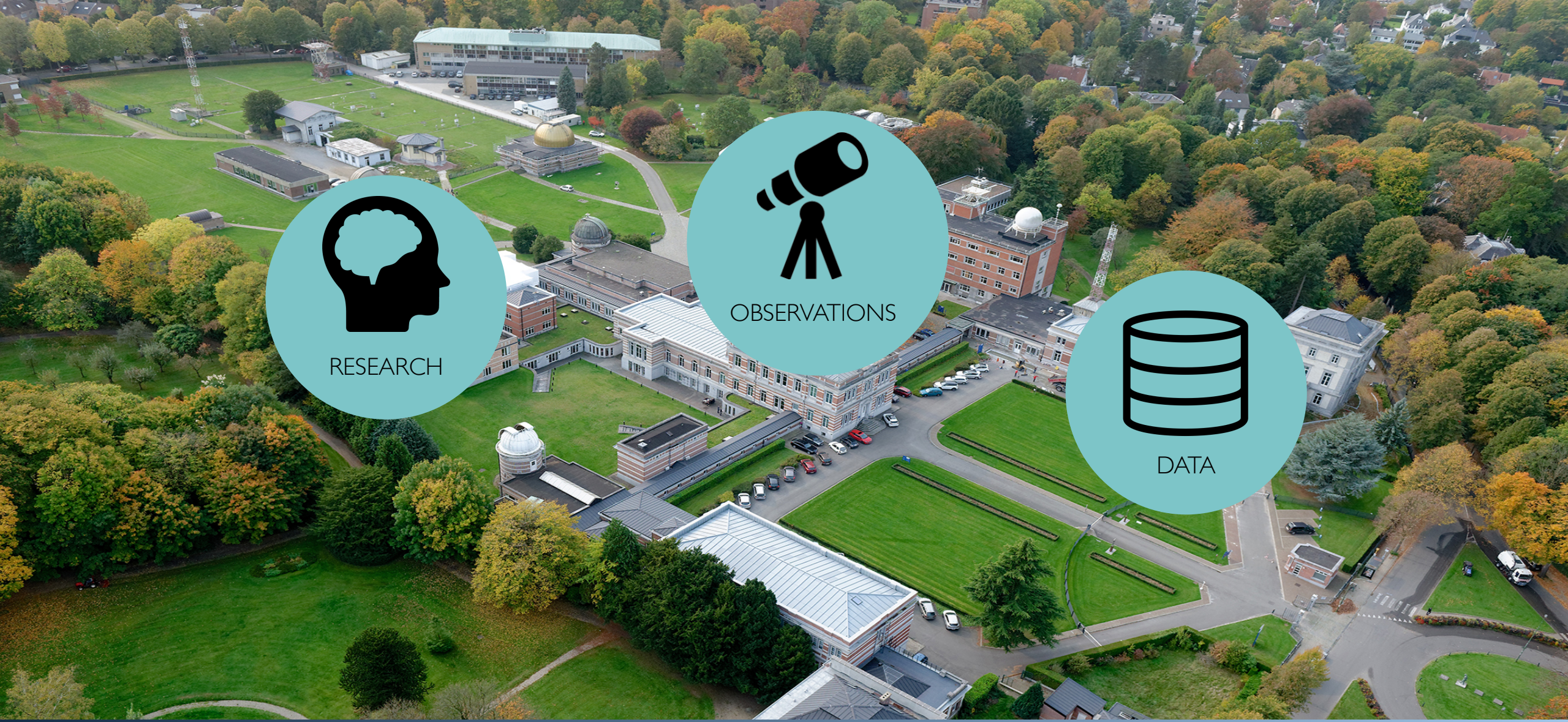

SOLAR-TERRESTRIAL CENTRE OF EXCELLENCE

Our Foundations



SOLAR-TERRESTRIAL CENTRE OF EXCELLENCE

ROB/SIDC: Regional Warning Centre

- SIDC history in space weather services
  - 1981 SIDC (**Solar Influences Data analysis Centre)**
  - Established in 2000 as an **International Space Environment Service** (ISES) **regional warning centre**: a collaborative network of space weather service-providing organizations around the globe.
  - First daily bulletin issued in October 2000
- Now:



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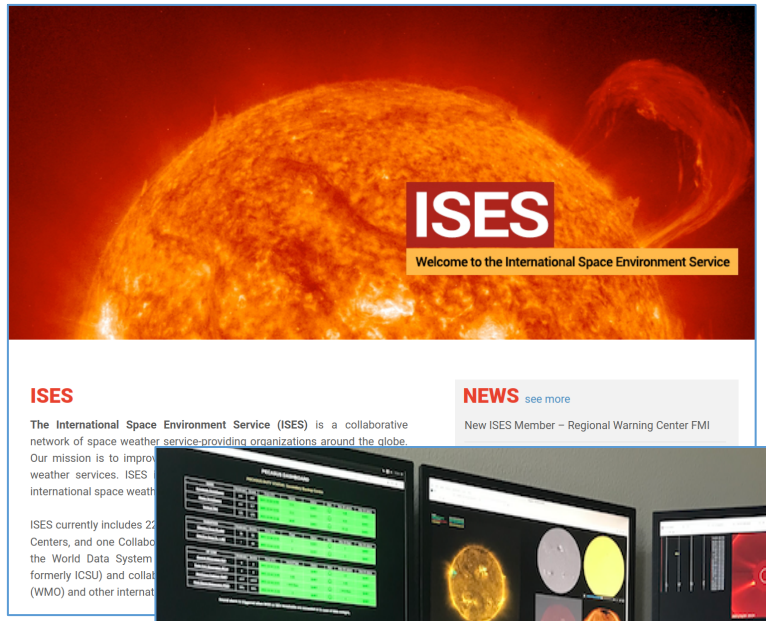
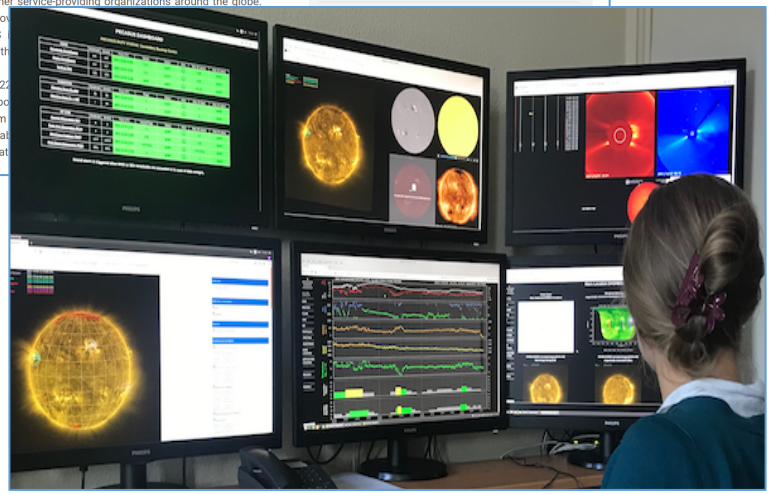
  - First daily bulletin issued in October 2000
- Now:
  - World famous centre for Space Weather forecasting
  - Team of ~12-13 Space Weather Forecasters and on-call operators
  - Forecasts and alerts disseminated through multiple channels and supporting multiple services.
  - Creating and hosting multiple ground based and spaced based data sets and observations.

Foundation for many of our more specific services (PECASUS / ESA / …)





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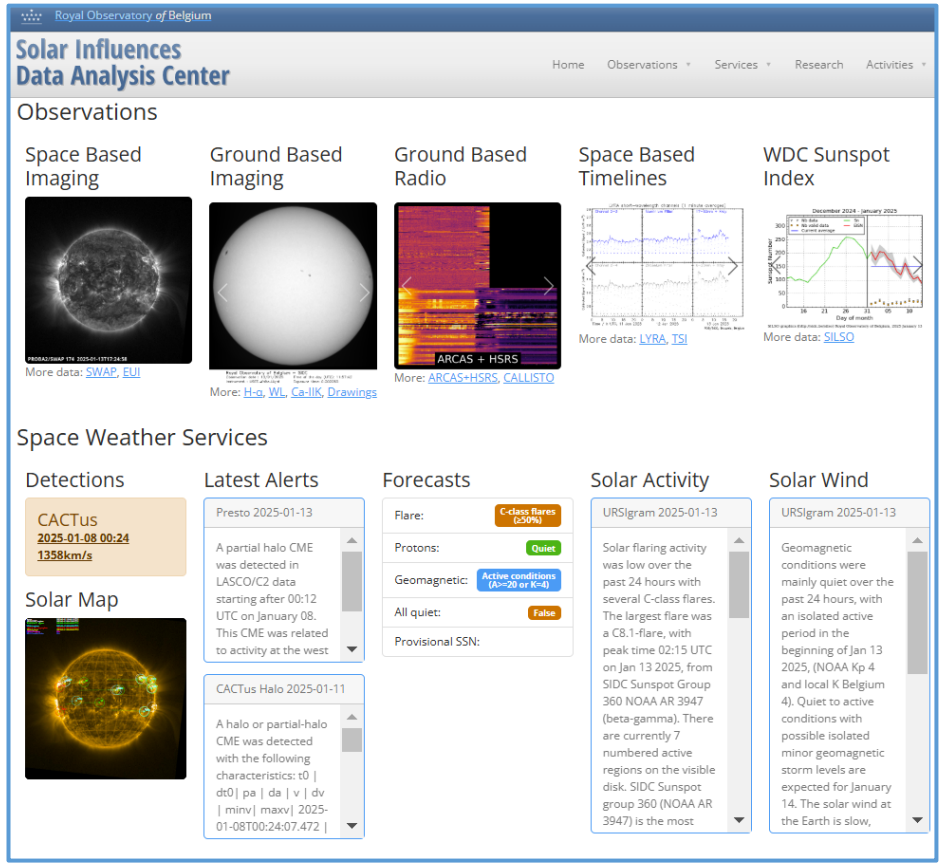
ROB/SIDC: Regional Warning Centre

- General Space Weather Services:
  - **Daily Bulletins** on Space Weather conditions, including a 24h forecast
  - **Alert messages**:
    - Issued by operators based on thresholds
    - Automatic alerts for certain observations (flares, halo Coronal Mass Ejections)
  - SIDC flare lists catalogue (new since 2024!)
  - SIDC Sunspot number catalogue (new since 2024!)

- Complimented by:



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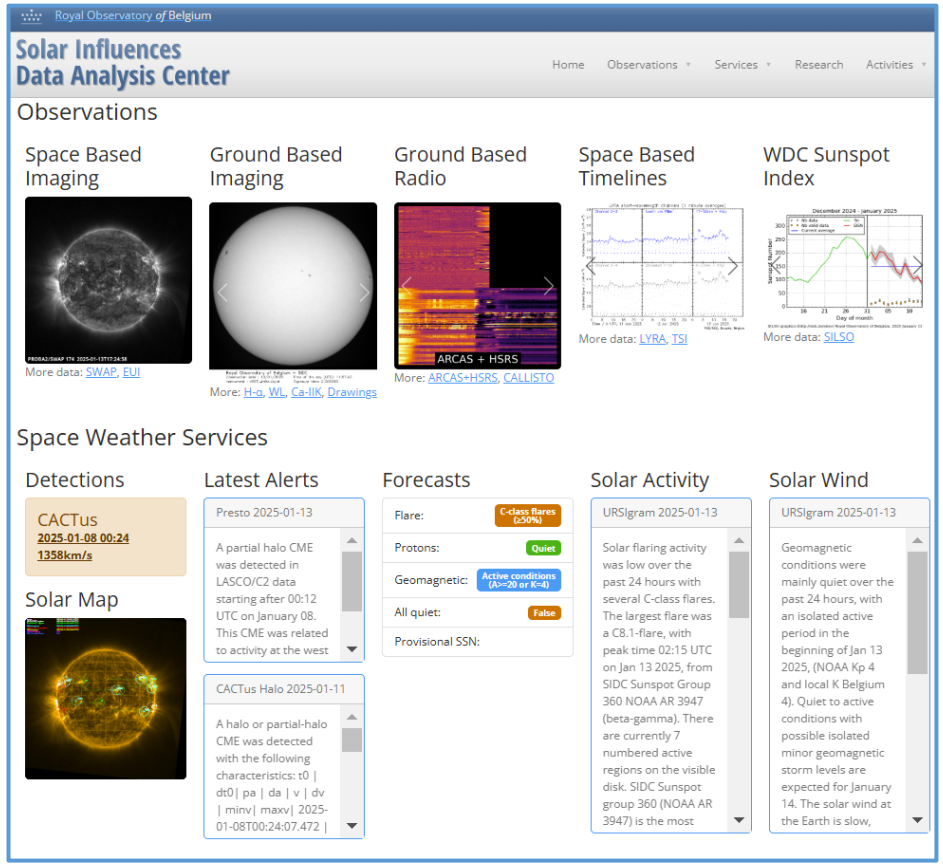
  - **Tools** created to detect solar features/eruptions
  - **Visualizations**:
    - of solar wind model forecasters
    - Solar disk regions, coronal holes, filaments, etc.



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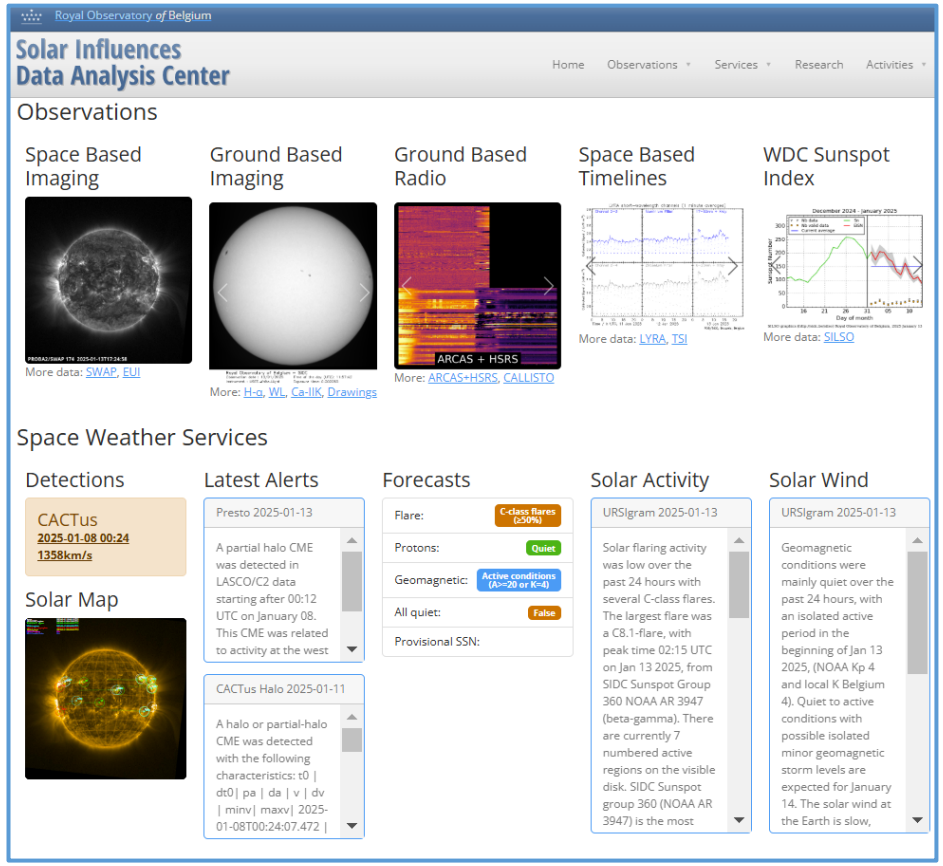
Built upon foundations of **research, data** and space and ground-based **observations**



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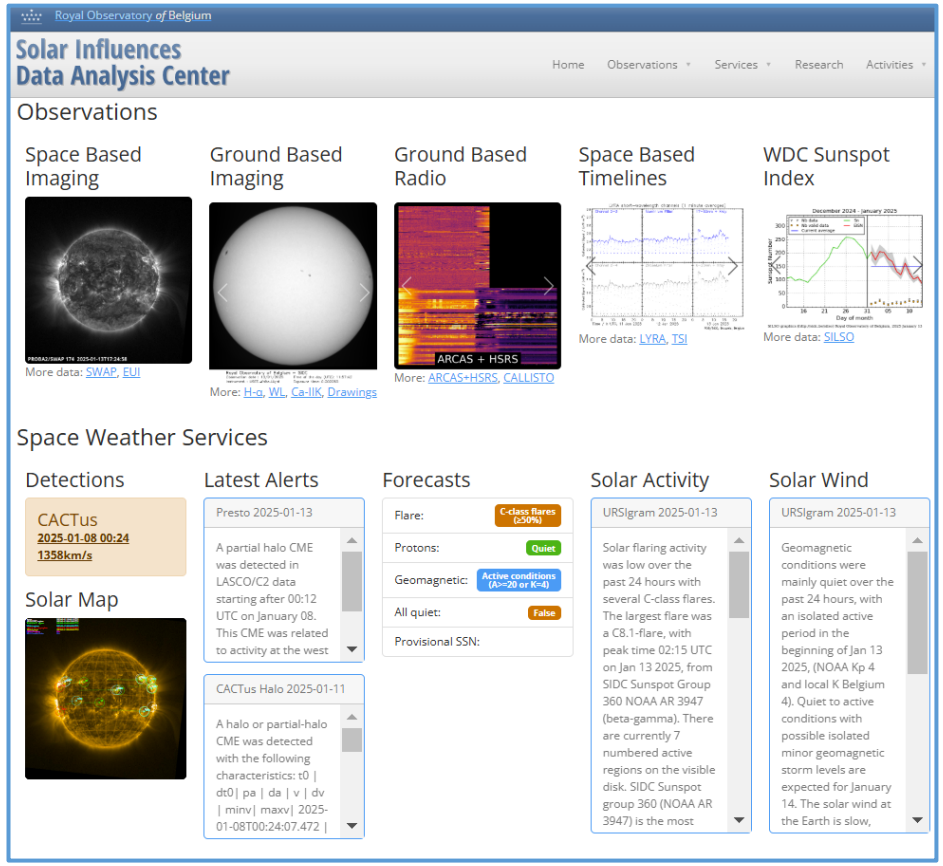

Foundation for more tailored user services

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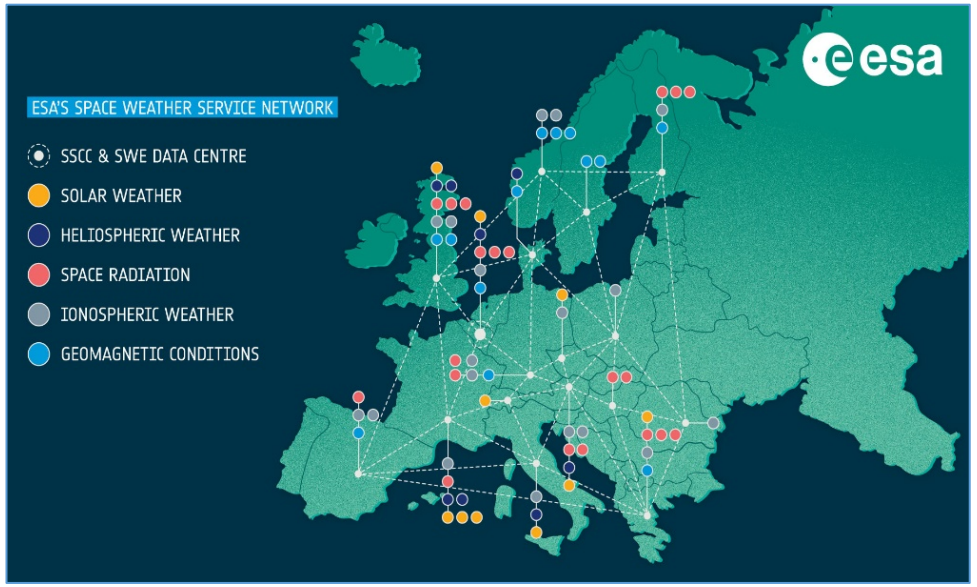
ESA Space Weather Network - Coordination

- **Aim**: Develop R&D activities and pre-operational services
- ROB and BIRA-IASB part of ESA Space weather network since **its conception**
  - **ESA's Space Situational Awareness (SSA) programme (2009-2019)**,
  - **ESA Space Safety Programme (S2P).**



- Acting as the Coordinating Expert groups to drive the development of the

BIRA-IASB

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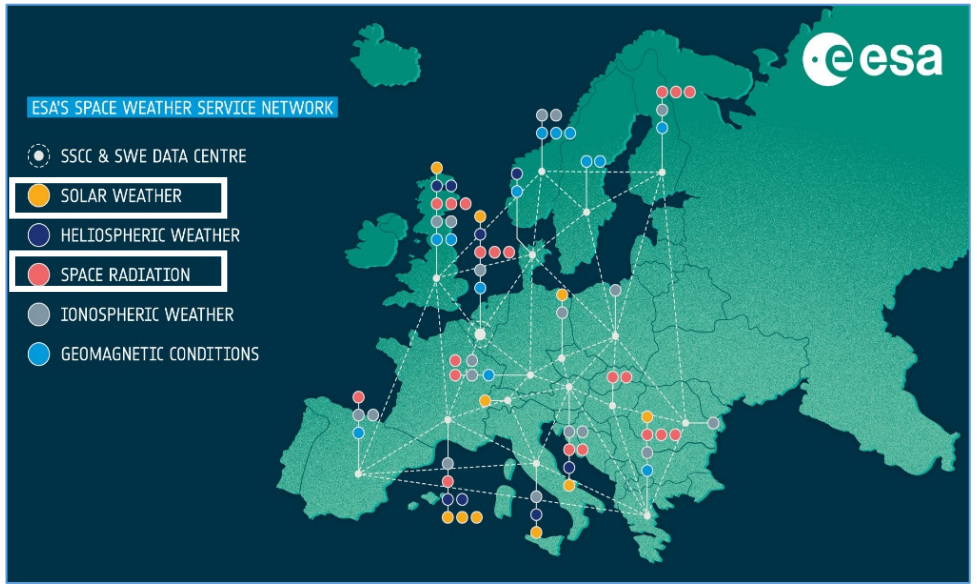
- ROB and BIRA-IASB part of ESA Space weather network since **its conception**
  - **ESA's Space Situational Awareness (SSA) programme (2009-2019)**,
  - **ESA Space Safety Programme (S2P).**
- Since February 2021:
  - B.USOC/BIRA-IASB is leading a consortium of 52 groups all over Europe as part of **SWESNET** project, for operating, developing and improving this network of services.
- Acting as the Coordinating Expert groups to drive the development of the network assets in the areas of:
  - **Solar Weather Expert Service Centre** (S-ESC led by ROB)
  - **Space Radiation Expert Service Centre** (R-ESC led by BIRA-IASB)



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ESA Space Weather Network - Coordination

- Leading the **SSCC – ESA Space weather Coordination Centre** (ROB/BIRA-IASB):
  - Located on site here at the space pole
  - Acting as the interface with users and the network: oranising **training**, **end user campaigns** (for aviation, spacecraft operators, power grid companies etc),
  - Providing a Helpdesk for daily provision of user support
  - Central entity for driving network wide coordination
  - Monitoring the data available to users through the **ESA SWE Portal**



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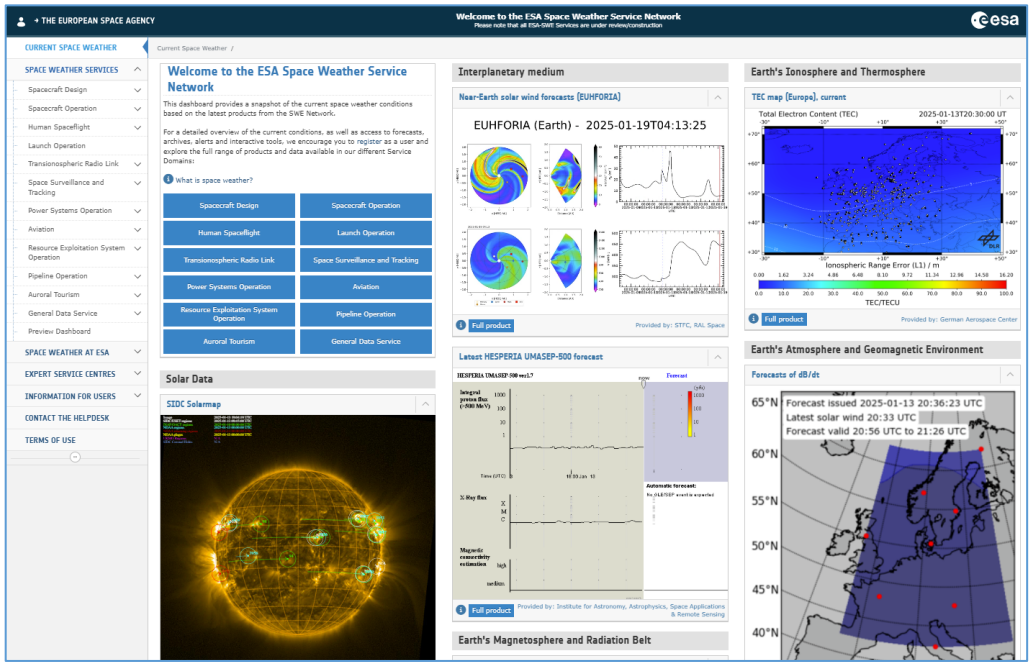
ESA Space Weather Network – Product Providers

- **ESA Space Weather Portal**: User interface to services, showing collections of data and tools for specific user groups.



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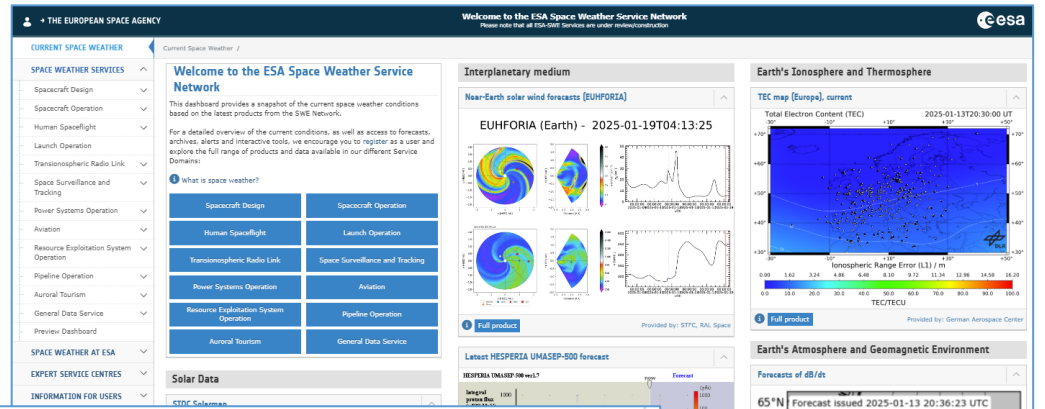
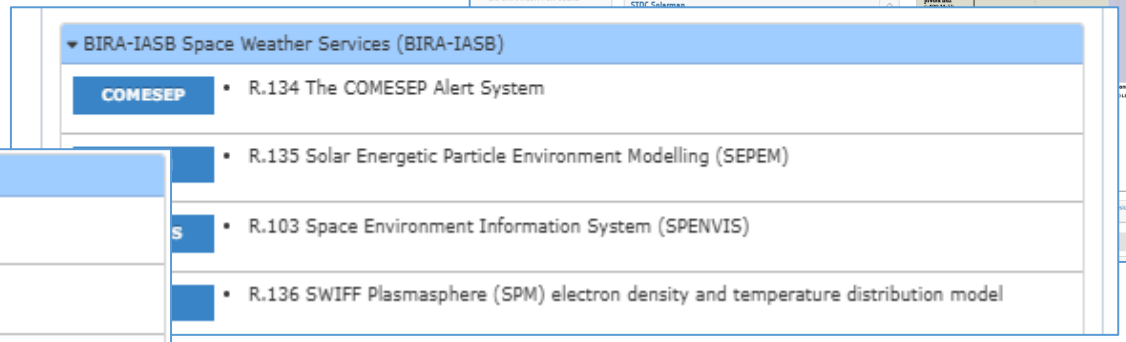
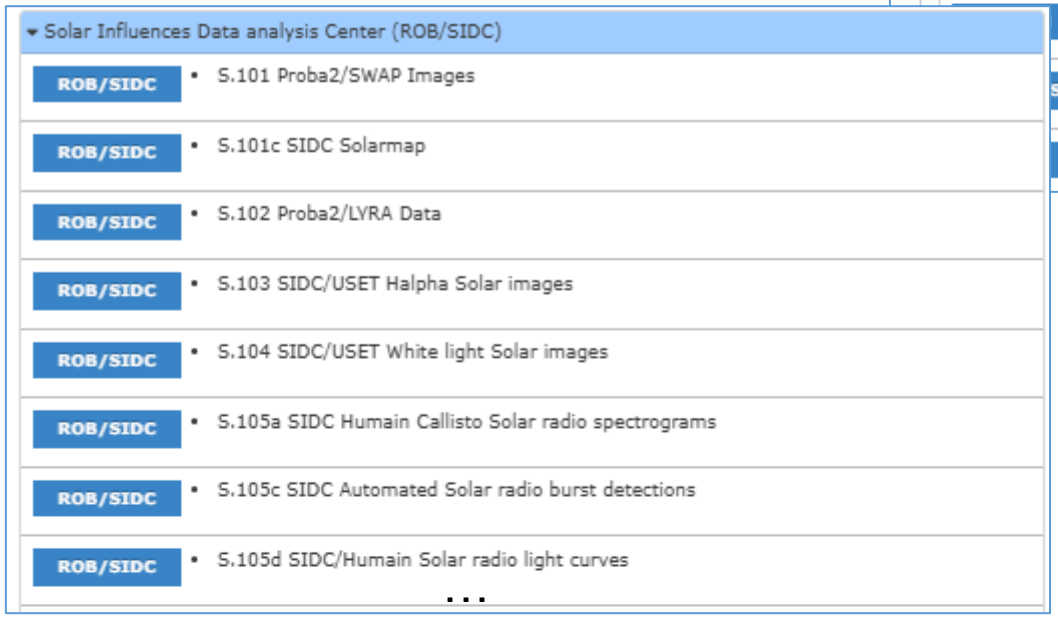
ESA Space Weather Network – Product Providers

- **ESA Space Weather Portal**: User interface to services, showing collections of data and tools for specific user groups.
- ROB and BIRA are also developing, hosting / providing data and tools for users in their areas of expertise:







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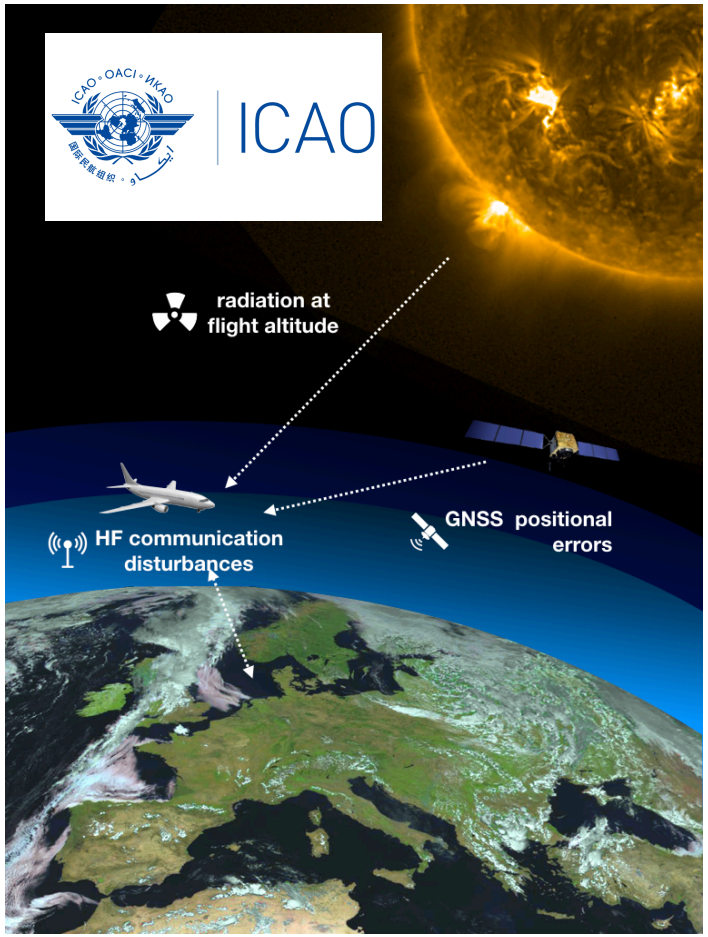
PECASUS - Service for Aviation

- ROB, BIRA and KMI part of **PECASUS consortium** since its creation in 2018: Pan-European Consortium for Aviation Space weather User Services led by Finnish Meteorological Institute (FMI).
- Operational service since November 2019



- Finnish Meteorological Institute, **Finland**
- Solar-Terrestrial Centre of Excellence, **Belgium**
- Seibersdorf Labor GmbH, **Austria**
- Istituto Nazionale di Geofisica e Vulcanologia, **Italy**
- UK Met Office, **United Kingdom**
- Frederick University, **Cyprus**
- Centrum Badan Kosmiccznych Polskiej Akademii Nauk, **Poland**
- Royal Netherlands Meteorological Institute, the **Netherlands**
- Deutsches Zentrum für Luft- und Raumfahrt e.V., **Germany**



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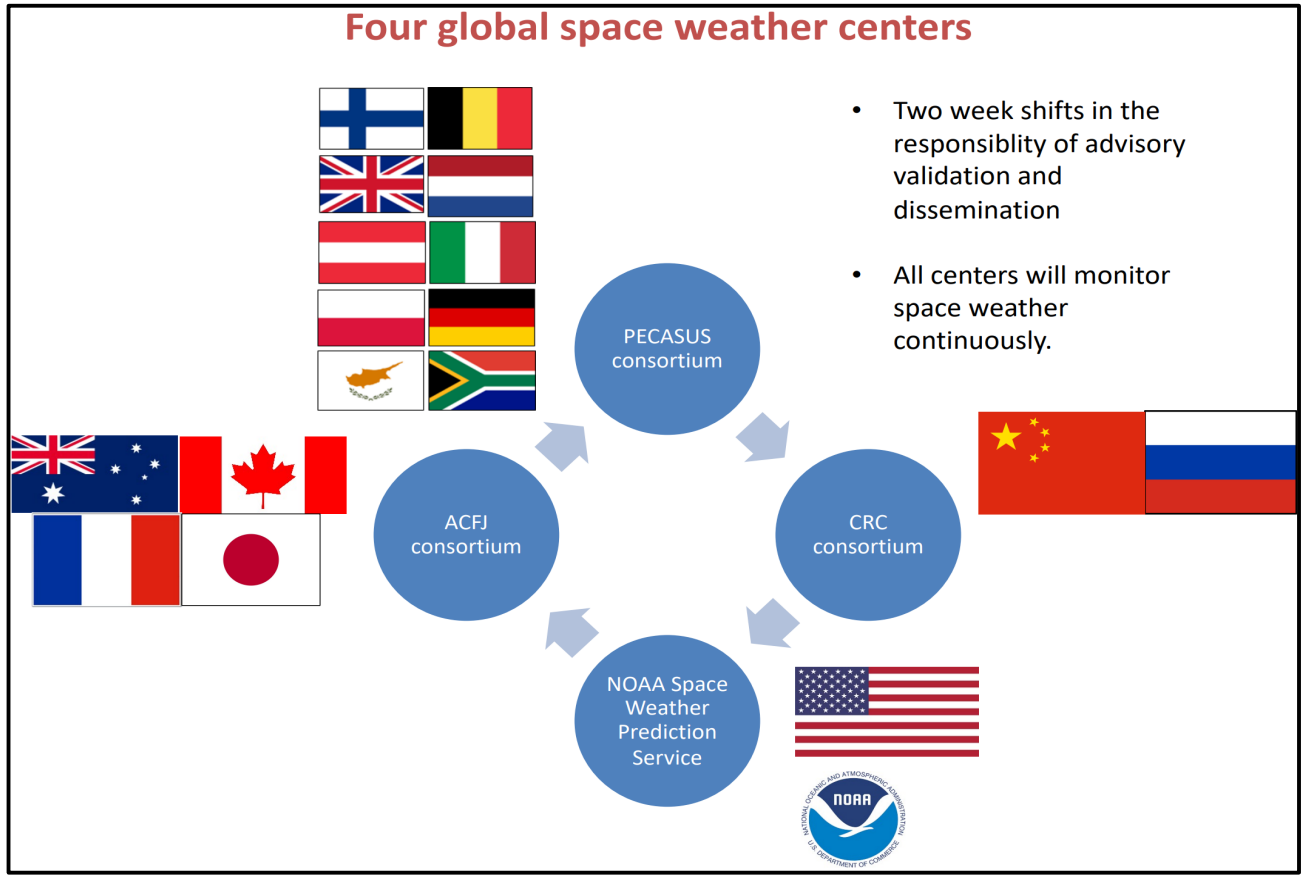
PECASUS - Service for Aviation

- One of four global space weather centres providing aviation advisories for ICAO (International Civil Aviation Organization)



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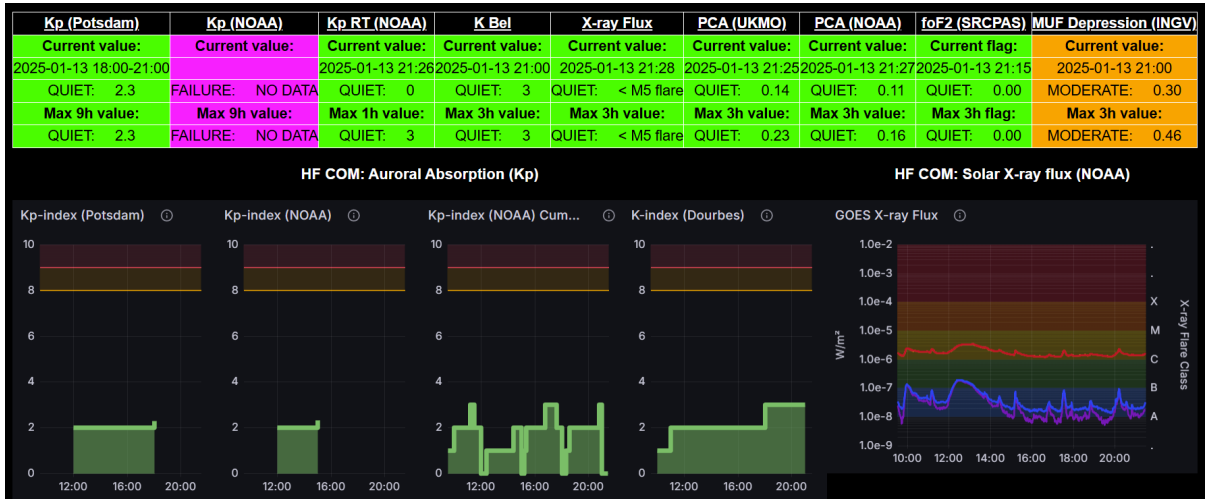
PECASUS - Service for Aviation

- STCE role:
  - **Data provider** (ROB, BIRA, KMI: e.g local K inicies, solar data, radiation alerts etc…)
  - **Data centre** host
  - Creation and monitoring of bespoke service **dashboards**
  - **24/7 on call** with collaboration with **Meteowing**



Kp (Potsdam)	Kp (NOAA)	Kp RT (NOAA)	K Bel	X-ray Flux	PCA (UKMO)	PCA (NOAA)	foF2 (SRCPAS)	MUF Depression (INGV)
Current value:	Current value:	Current value:	Current value:	Current value:	Current value:	Current value:	Current flag:	Current value:
2025-01-13 18:00-21:00		2025-01-13 21:26	2025-01-13 21:00	2025-01-13 21:28	2025-01-13 21:25	2025-01-13 21:27	2025-01-13 21:15	2025-01-13 21:00
QUIET: 2.3	FAILURE: NO DATA	QUIET: 0	QUIET: 3	QUIET: < M5 flare	QUIET: 0.14	QUIET: 0.11	QUIET: 0.00	MODERATE: 0.30
Max 9h value:	Max 9h value:	Max 1h value:	Max 3h value:	Max 3h value:	Max 3h value:	Max 3h value:	Max 3h flag:	Max 3h value:
QUIET: 2.3	FAILURE: NO DATA	QUIET: 3	QUIET: 3	QUIET: < M5 flare	QUIET: 0.23	QUIET: 0.16	QUIET: 0.00	MODERATE: 0.46

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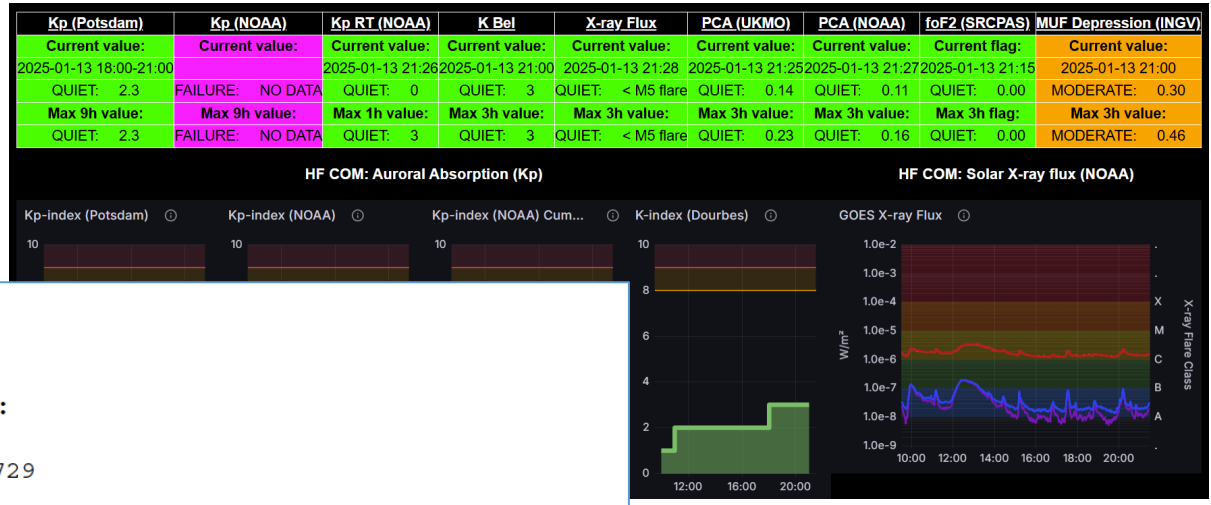
  - **Training provider** (Space Weather Education Centre)



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Advisories

HF Communication:

```
  0000058201
FNXX02 EFKL 290729
SWX ADVISORY
DTG:              20241229/0729Z
SWXC:             PECASUS
ADVISORY NR:      2024/345
SWX EFFECT:       HF COM MOD
OBS SWX:          29/0720Z DAYLIGHT SIDE
FCST SWX +6 HR:   29/1400Z NOT AVBL
FCST SWX +12 HR:  29/2000Z NOT AVBL
FCST SWX +18 HR:  30/0200Z NOT AVBL
FCST SWX +24 HR:  30/0800Z NOT AVBL
RMK:              SPACE WEATHER EVENT (SOLAR FLARE) IN
PROGRESS. IMPACT ON LOWER HF COM FREQUENCY BANDS EXPECTED
ON THE DAYLIGHT SIDE. HIGHER FREQUENCY BANDS MAY BE LESS
IMPACTED.
NXT ADVISORY:     WILL BE ISSUED BY 20241229/1320Z=
```

KMI

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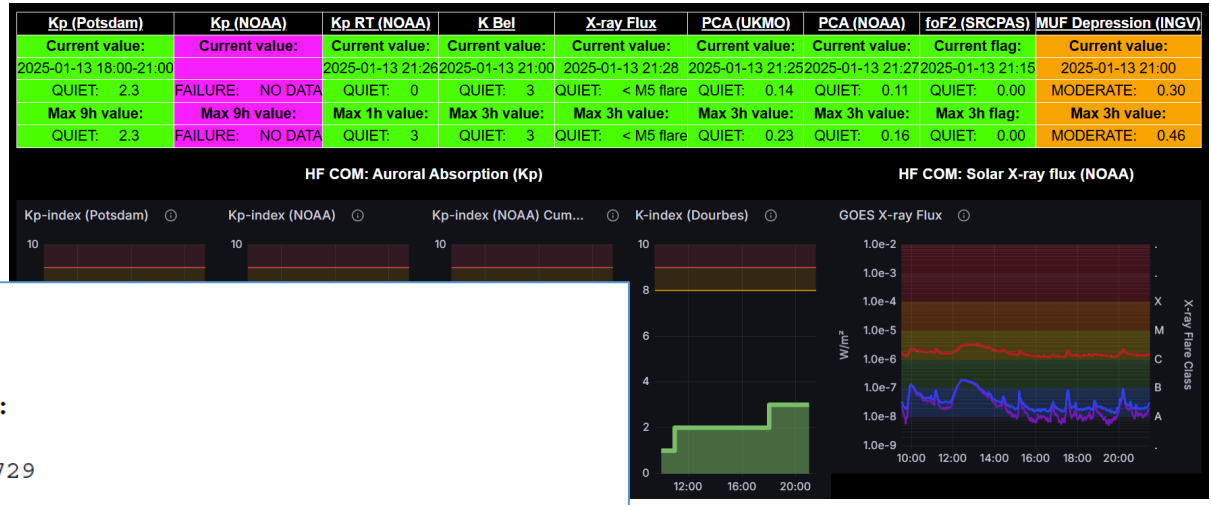

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FNXX02 EFKL 290729
SWX ADVISORY
DTG:              20241229/0729Z
SWXC:             PECASUS
ADVISORY NR:      2024/345
SWX EFFECT:       HF COM MOD
OBS SWX:          29/0720Z DAYLIGHT SIDE
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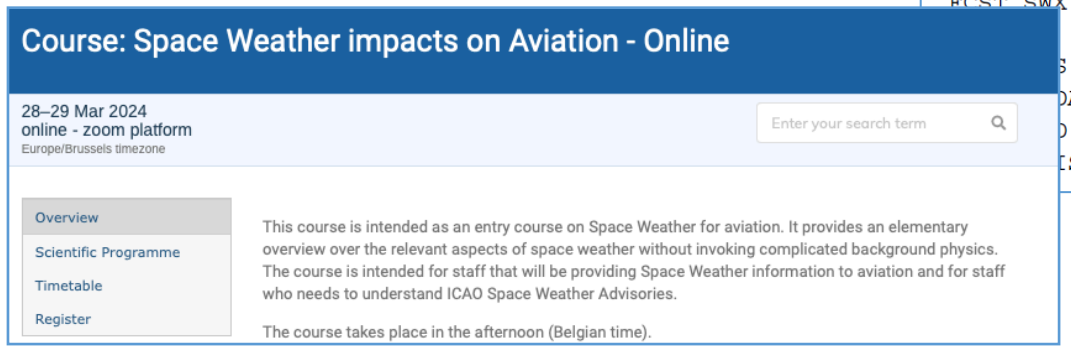

KMI

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Thank you

Jennifer.ohara@oma.be

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