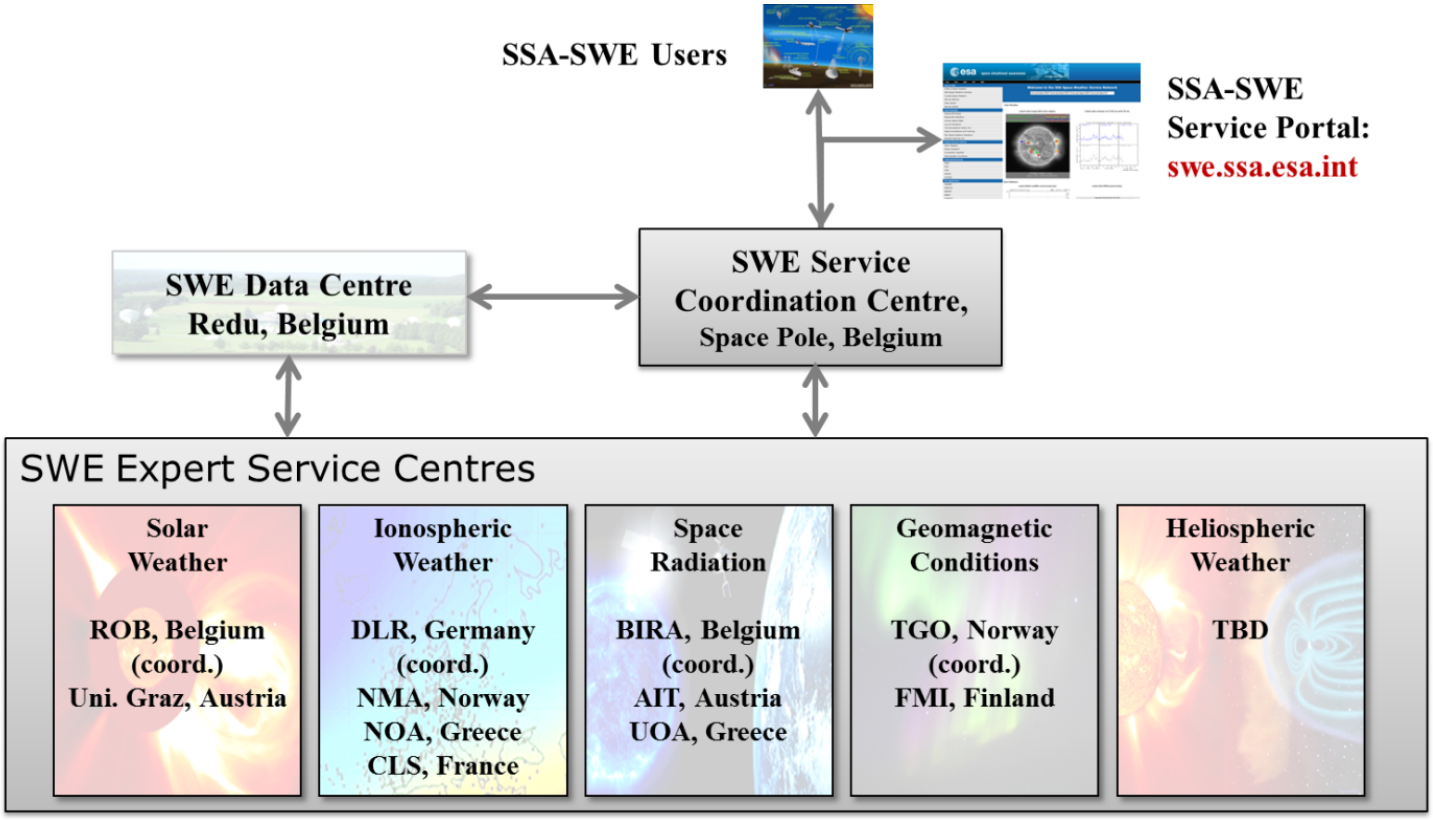
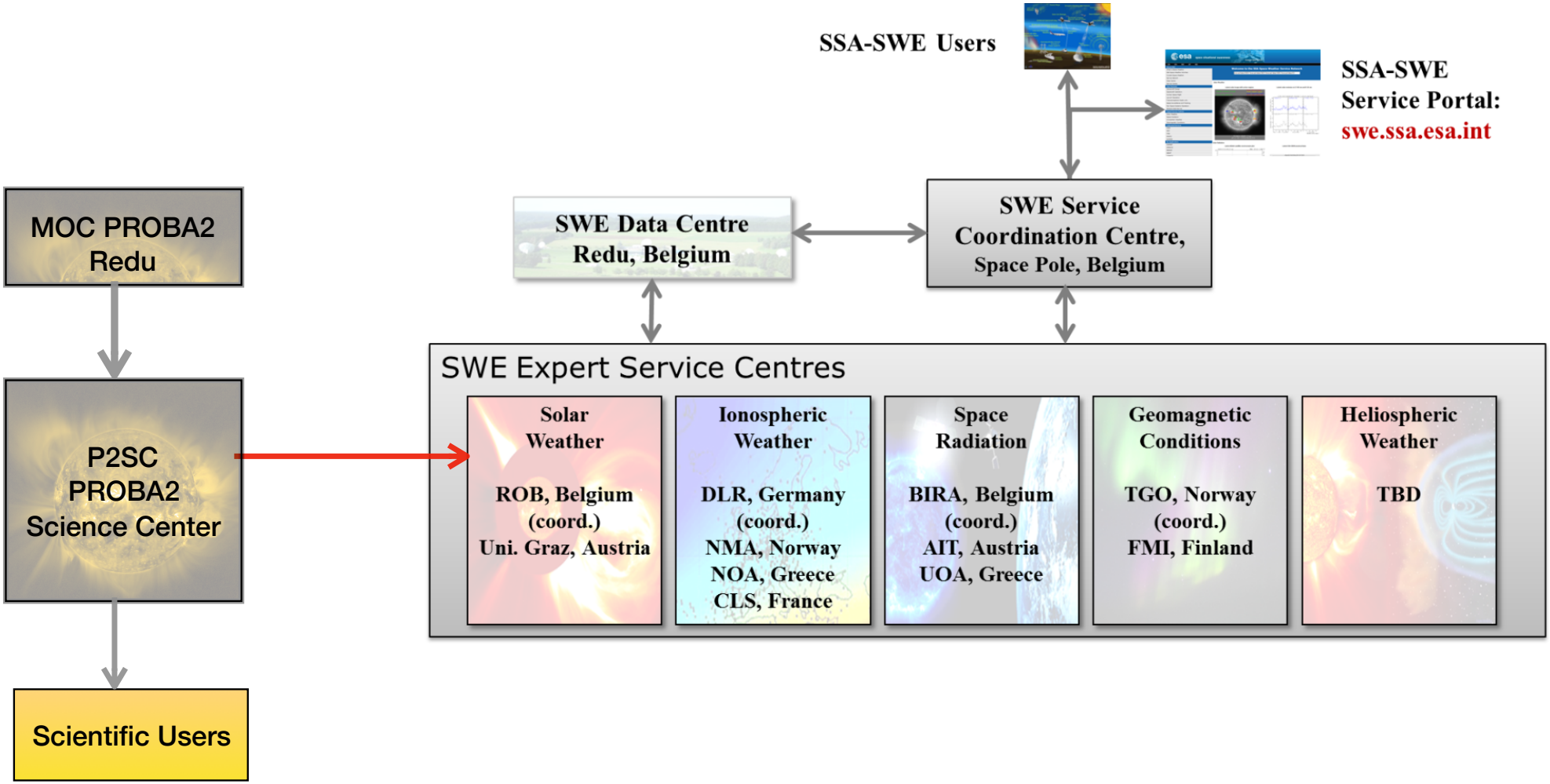
Mission Day
3385

PROBA2 space weather services
at the SSA Solar Weather Expert Service Center

David Berghmans
Jesse Andries @ Solar Expert Service Center
Marie Dominique, Ingolf Dammasch, Katrien Bonte


SSA-SWE Users
SSA-SWE Service Portal: swe.ssa.esa.int
SWE Data Centre Redu, Belgium
SWE Service Coordination Centre, Space Pole, Belgium
SWE Expert Service Centres
Solar Weather
ROB, Belgium (coord.)
Uni. Graz, Austria
Ionospheric Weather
DLR, Germany (coord.)
NMA, Norway
NOA, Greece
CLS, France
Space Radiation
BIRA, Belgium (coord.)
AIT, Austria
UOA, Greece
Geomagnetic Conditions
TGO, Norway (coord.)
FMI, Finland
Heliospheric Weather
TBD


SSA-SWE Users
SSA-SWE Service Portal: swe.ssa.esa.int
MOC PROBA2 Redu
P2SC PROBA2 Science Center
Scientific Users
SWE Data Centre Redu, Belgium
SWE Service Coordination Centre, Space Pole, Belgium
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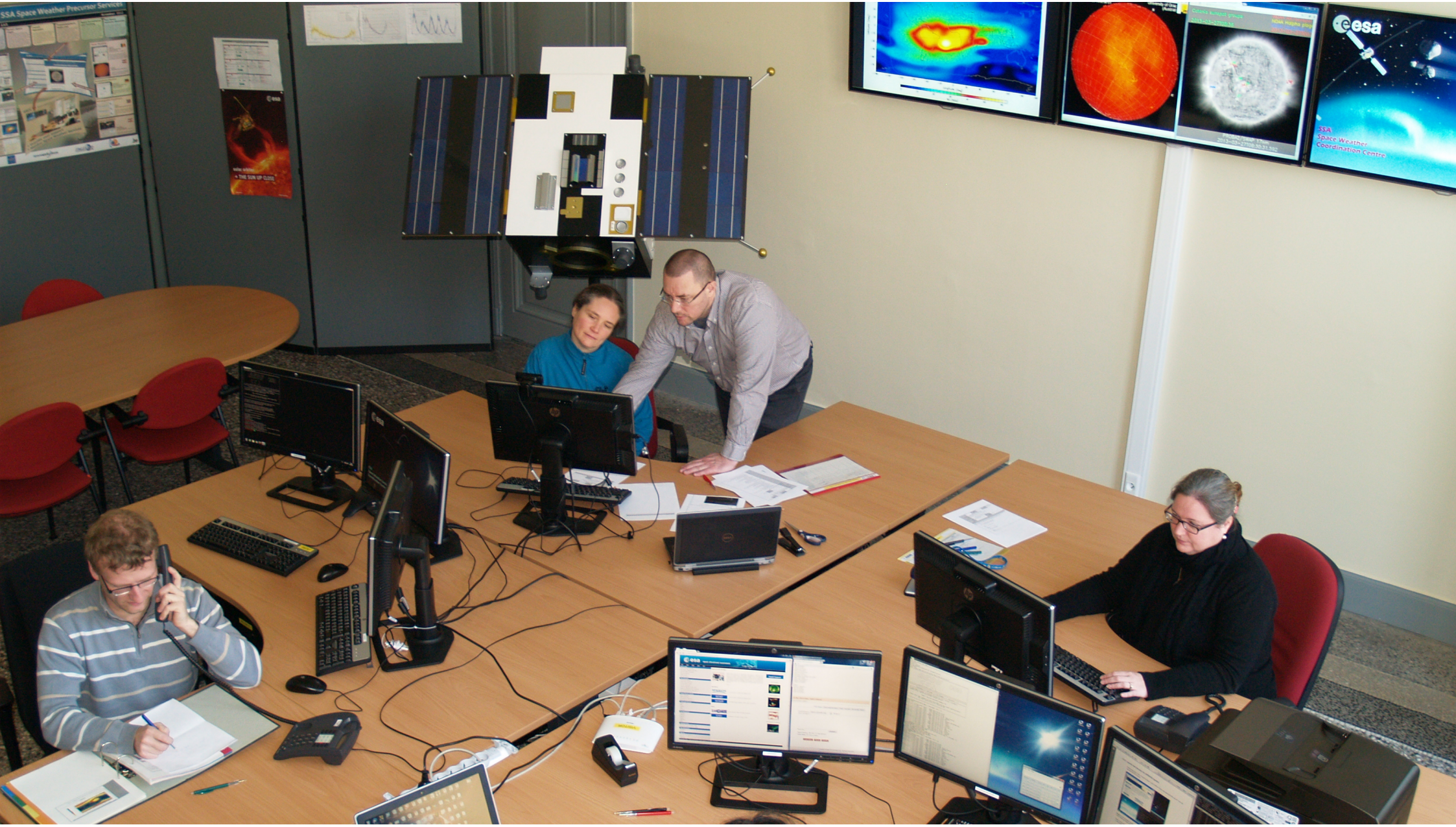
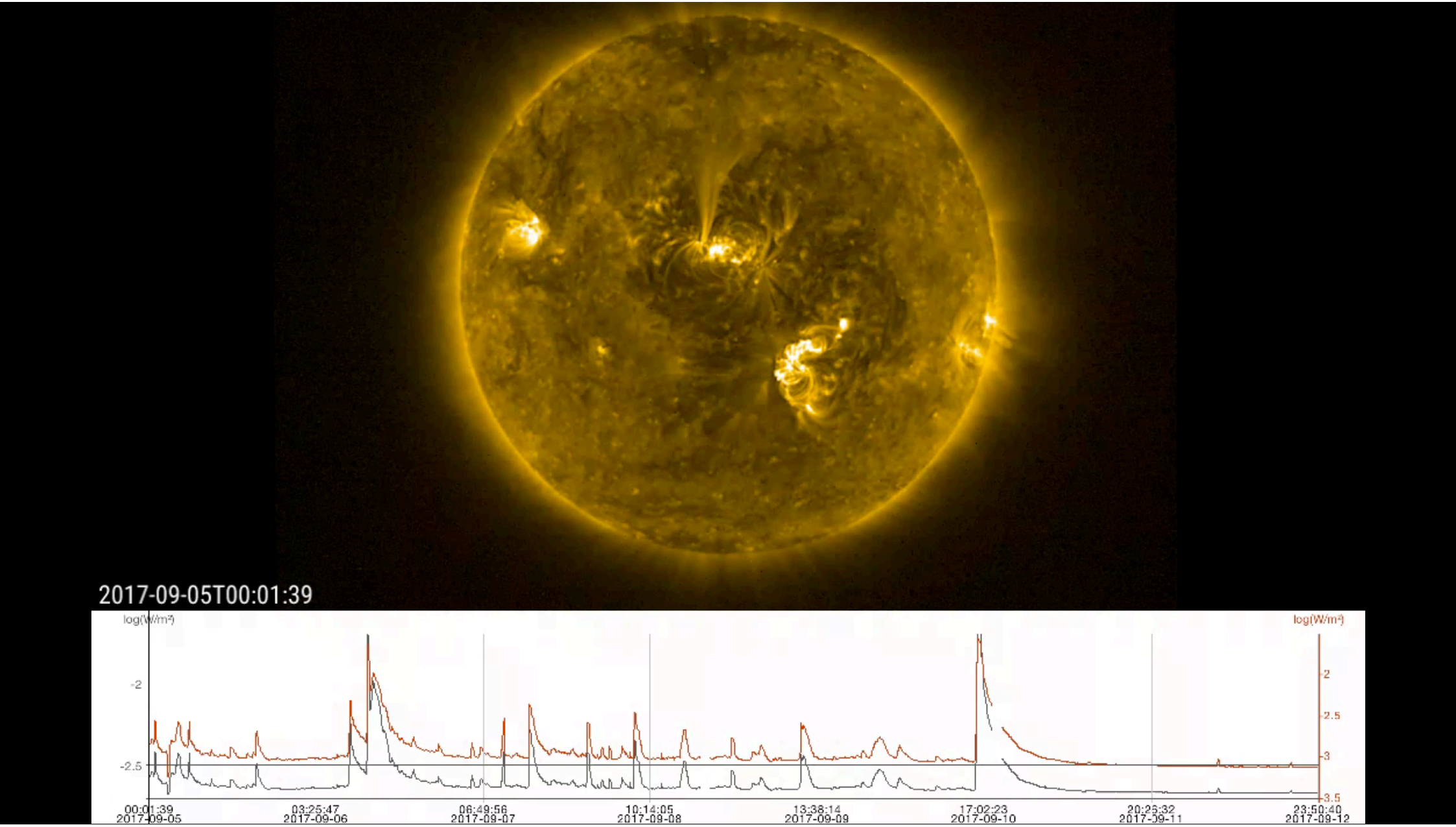

SSA Space Weather Precursor Services
esa
SSA
Space Weather
Coordination Centre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log(W/m²)
-2
-2.5
log(W/m²)
2
2.5
3
3.5
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03:25:47
2017-09-06
06:49:56
2017-09-07
10:14:05
2017-09-08
13:38:14
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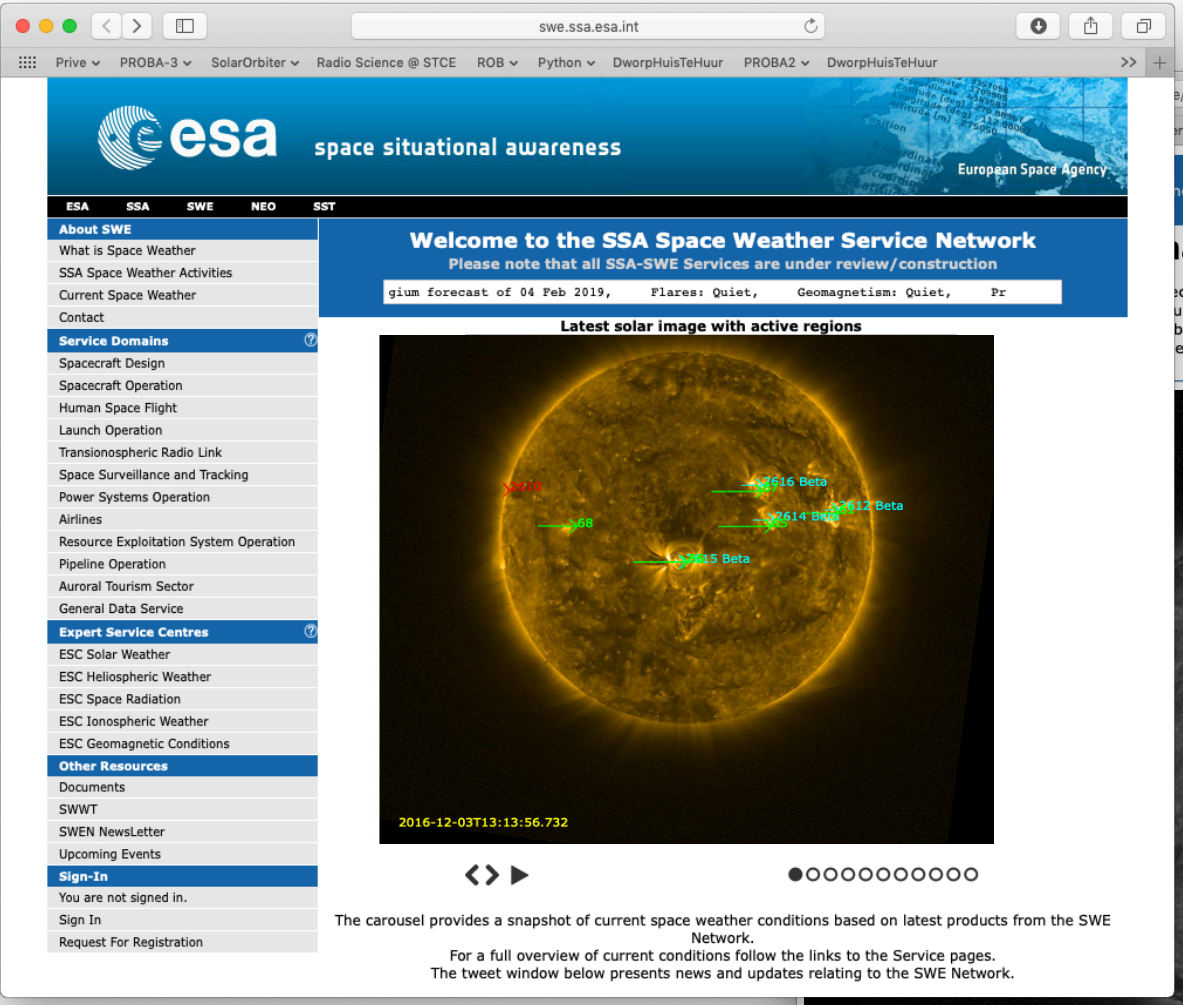
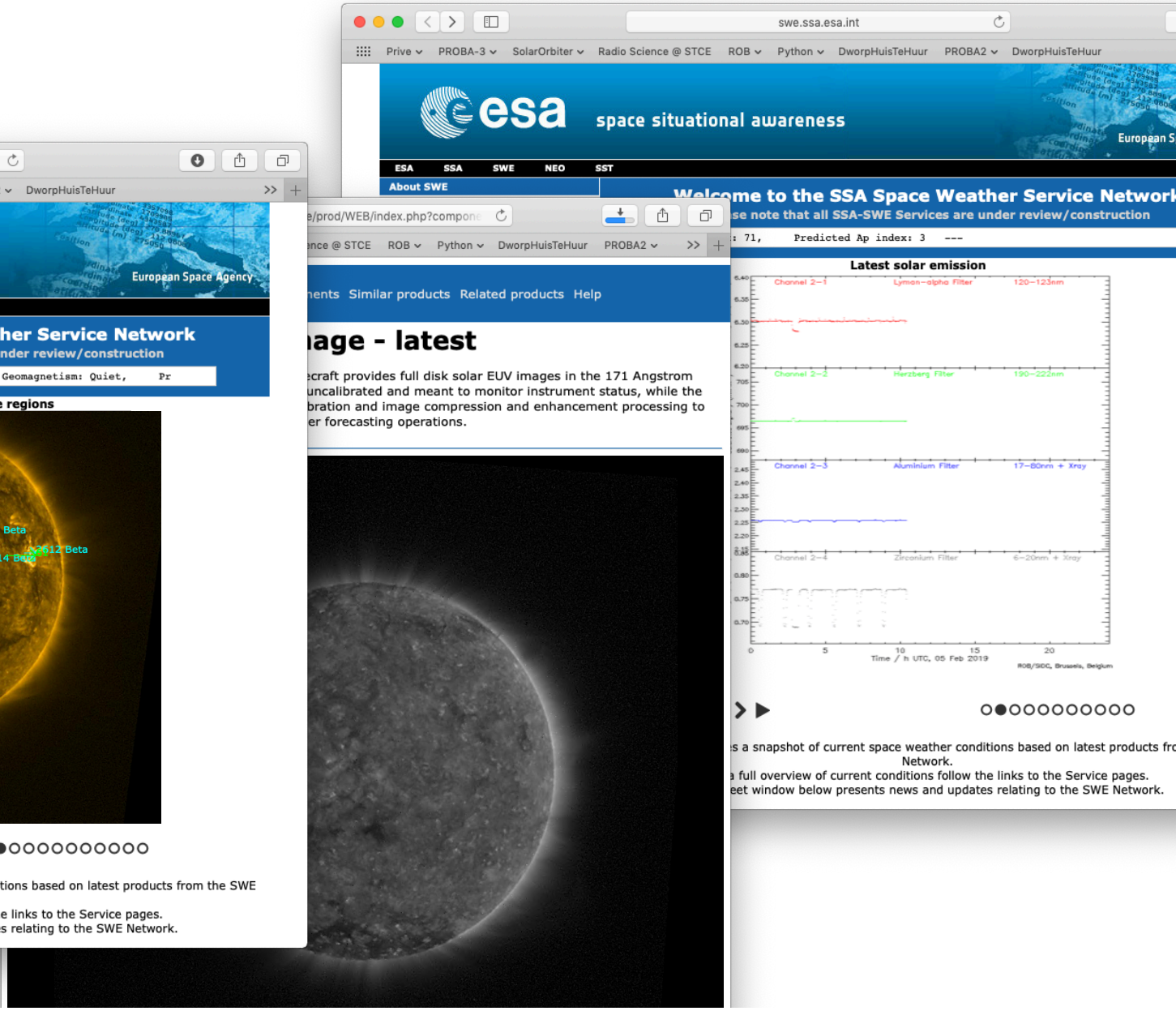
2017-09-12

Federated Products

http://swe.esa.int

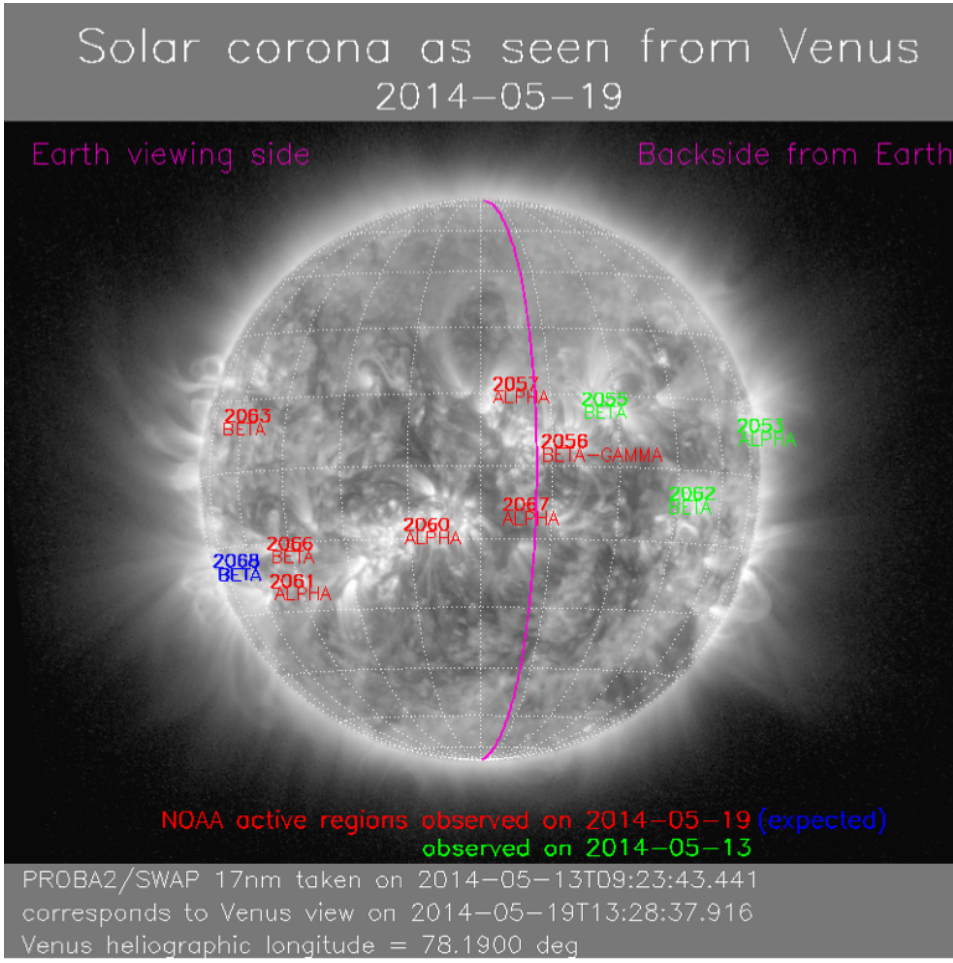


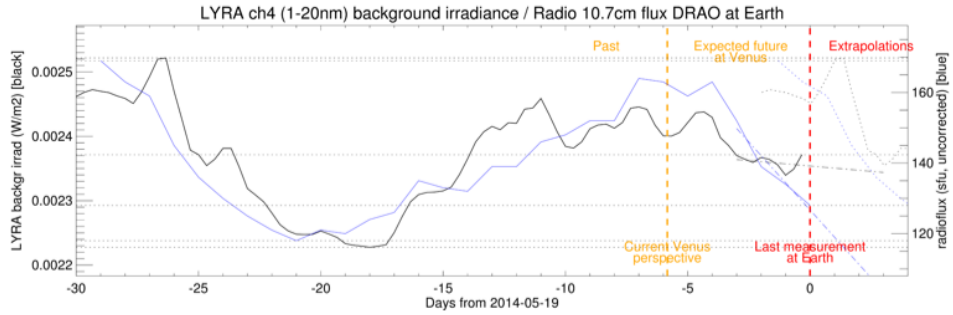


Tailored Space Weather bulletins

2014 Venus express aerobreaking maneuvre

```
== Space Weather bulletin for Venus Express aerobraking operations ==

Bulletin #1
prepared by SSCC and SIDC forecaster
on May 19, 2014 at 14:10 UTC.

Valid until May 21, 2014 at 14:10 UTC.

=== Past 24 hours (Earth viewpoint) ===
Solar flare activity: no C, M or X flares
10-MEV proton flux:    < 0.2 pfu
F10.7 index:           128 sfu at Earth

=== Next 48 hours (Earth viewpoint) ===
All quiet:        no
Solar flares:     quiet (less than 50 % chance of a C flare)
Solar protons:    quiet

=== Comment ===
There were no C flares nor CMEs during the past 24 hours. In the next 48 hours,
quiet conditions (without C flares) are likely. There is a slight chance for C flares
NOAA active regions 2056 and 2066.
```





Tailored Space Weather bulletins

2014 Venus express aerobreaking maneuvre

venus express

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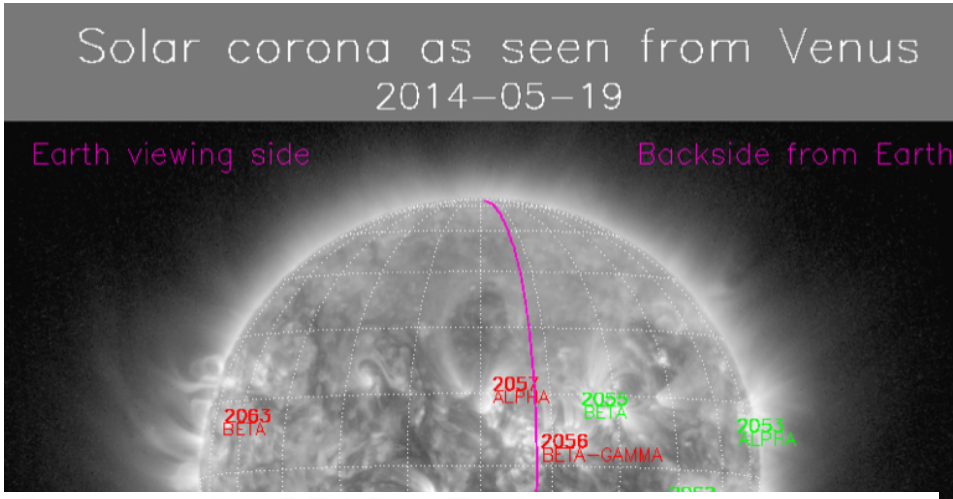
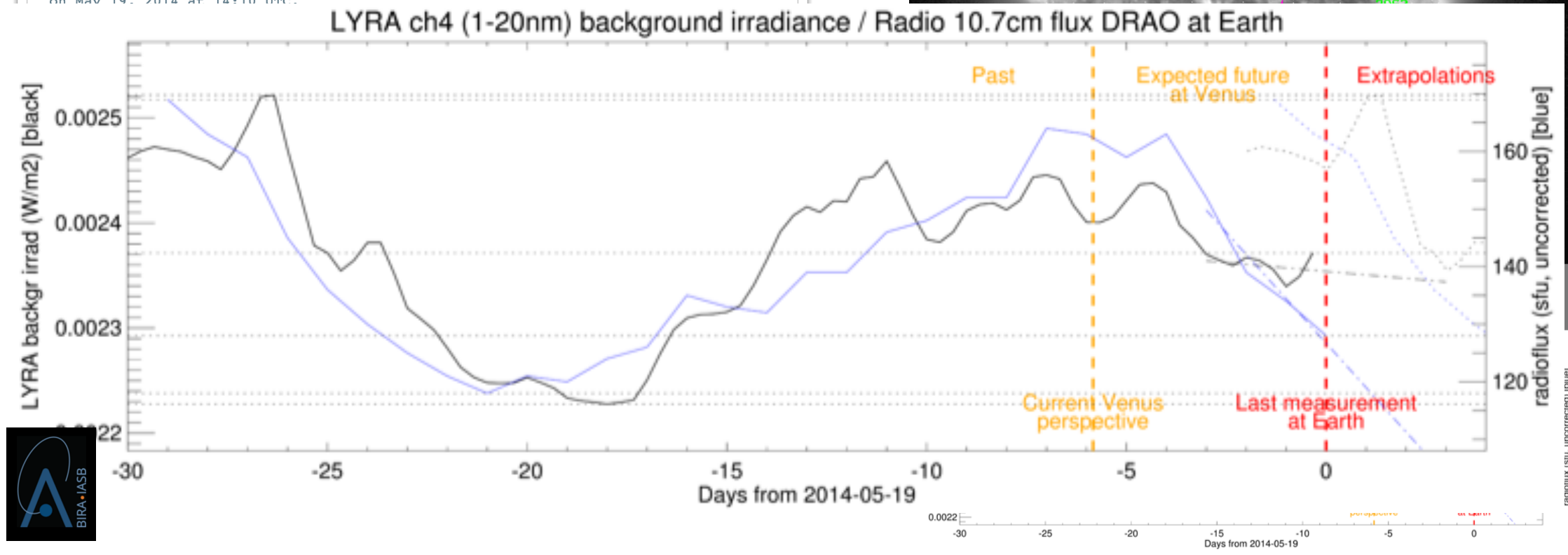
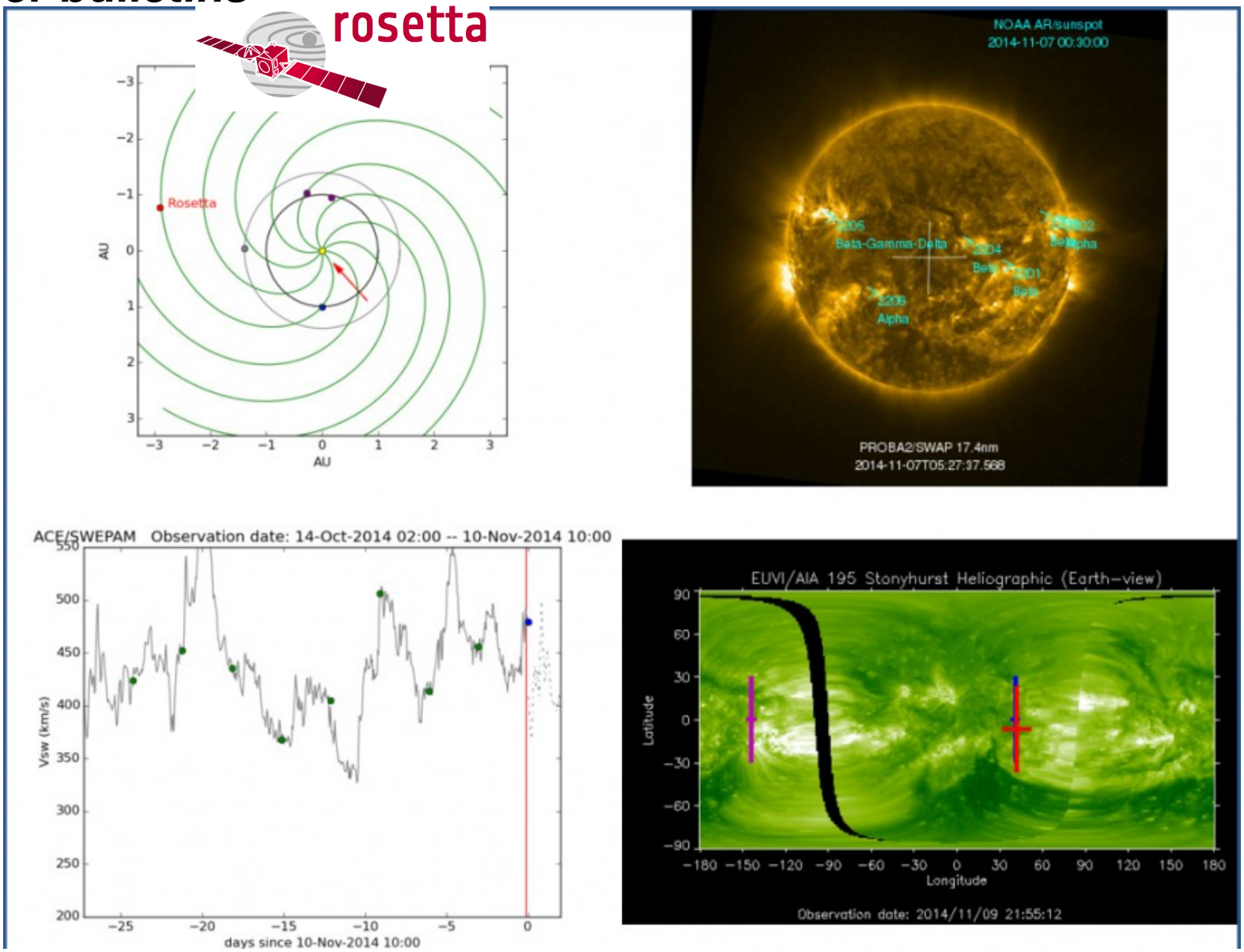


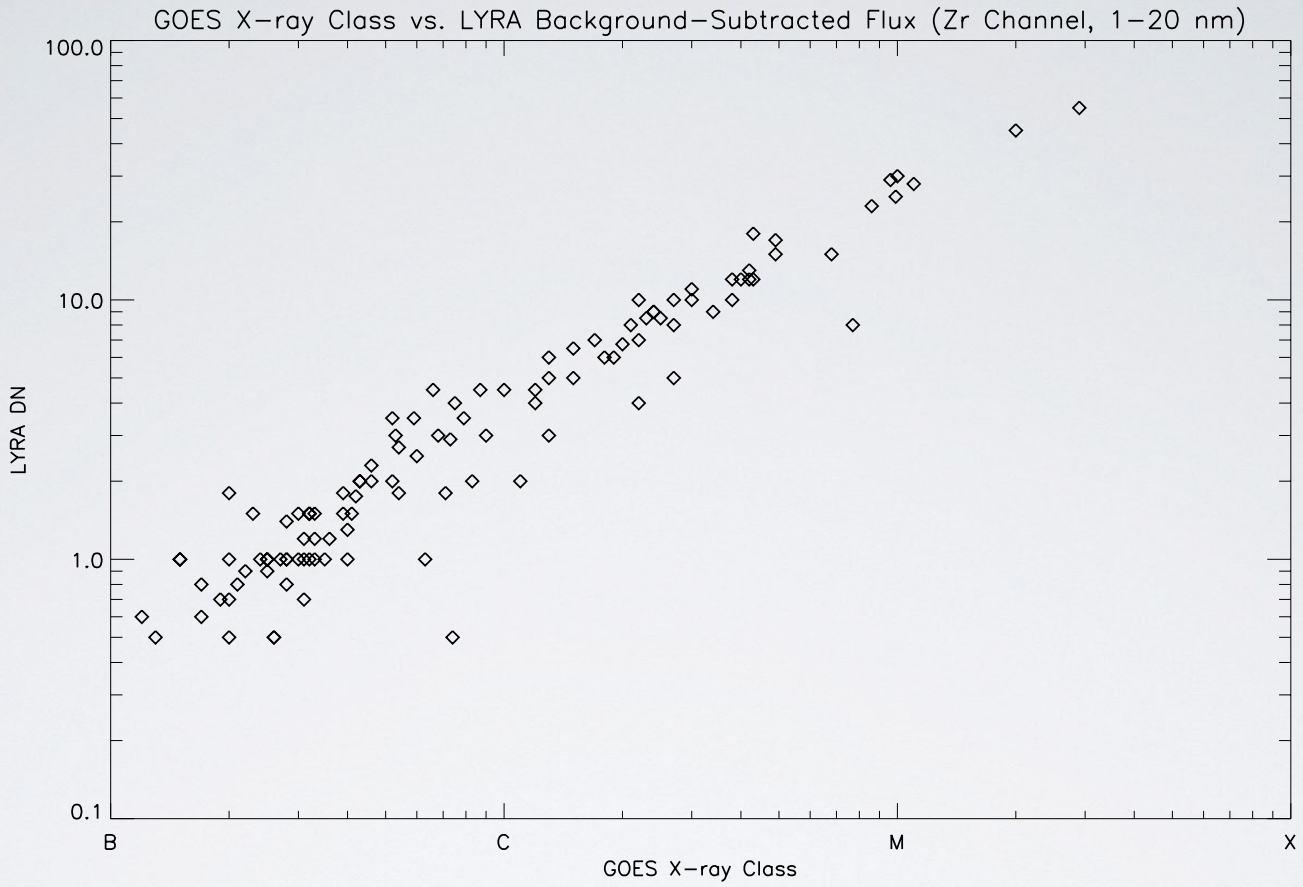


BIRA-IASB

Tailored Space Weather bulletins

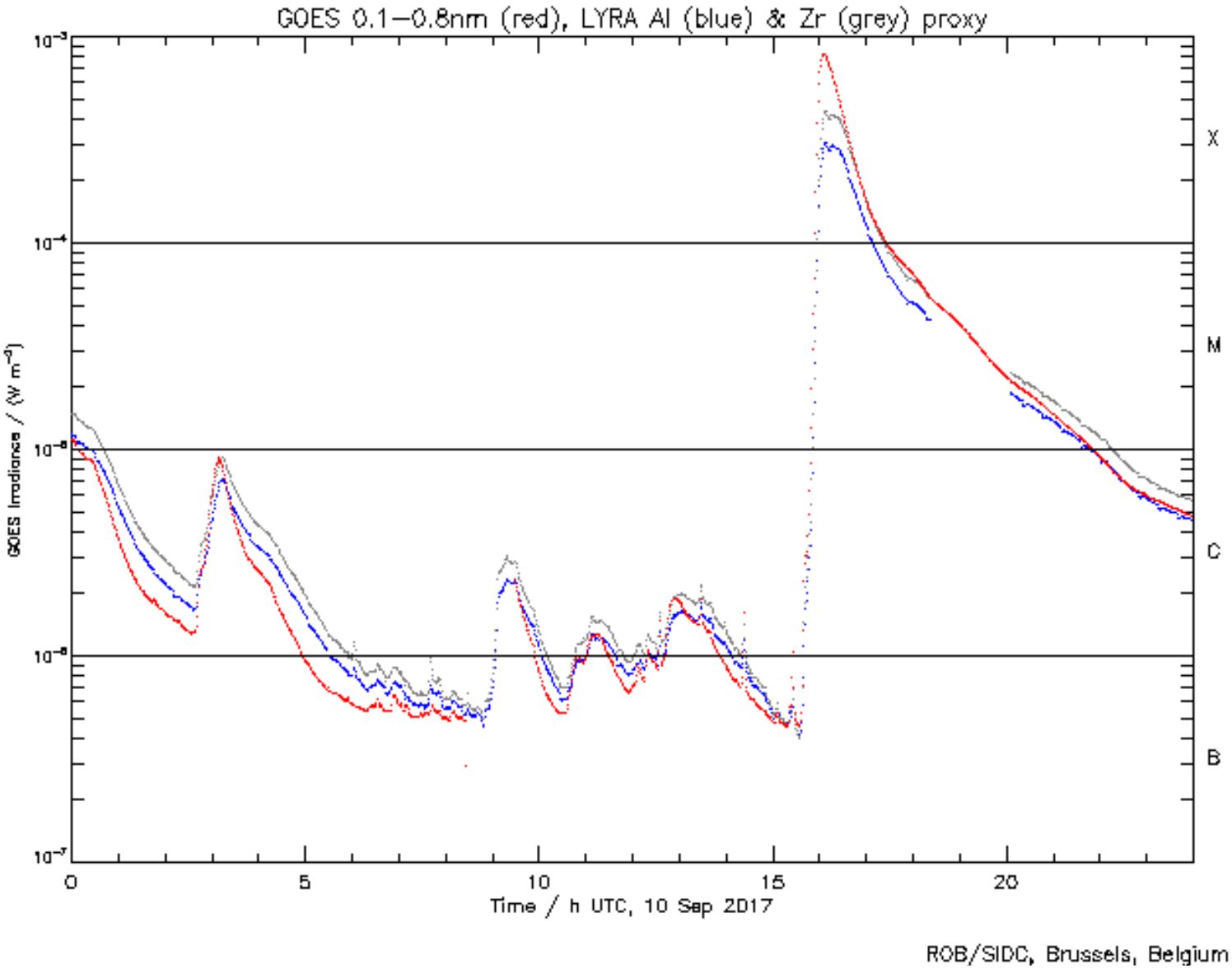
Arrival of Rosetta at Comet 67P/C-G

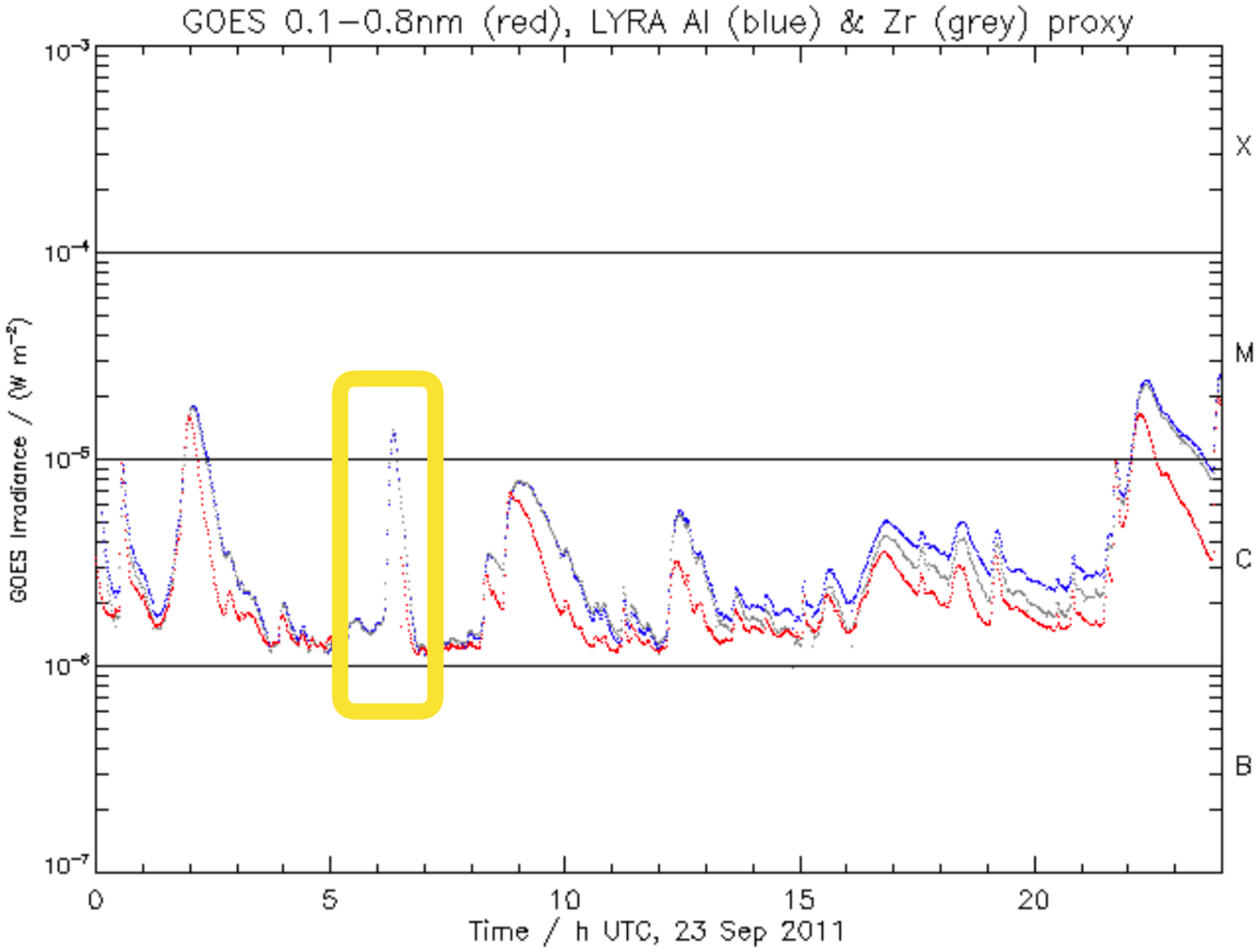


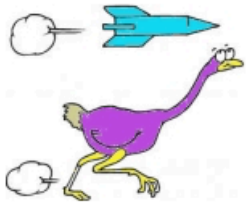


LYRA & GOES FLUX

Flares observed in 2010, LYRA Zr Channel


GOES 0.1–0.8nm (red), LYRA Al (blue) & Zr (grey) proxy
GOES Irradiance / (W m^{-2})
10^{-3}
10^{-4}
10^{-5}
10^{-6}
10^{-7}
X
M
C
B
0
5
10
15
20
Time / h UTC, 10 Sep 2017
ROB/SIDC, Brussels, Belgium


GOES 0.1–0.8nm (red), LYRA Al (blue) & Zr (grey) proxy
GOES Irradiance / (W m⁻²)
10⁻³
10⁻⁴
10⁻⁵
10⁻⁶
10⁻⁷
X
M
C
B
0
5
10
15
20
Time / h UTC, 23 Sep 2011

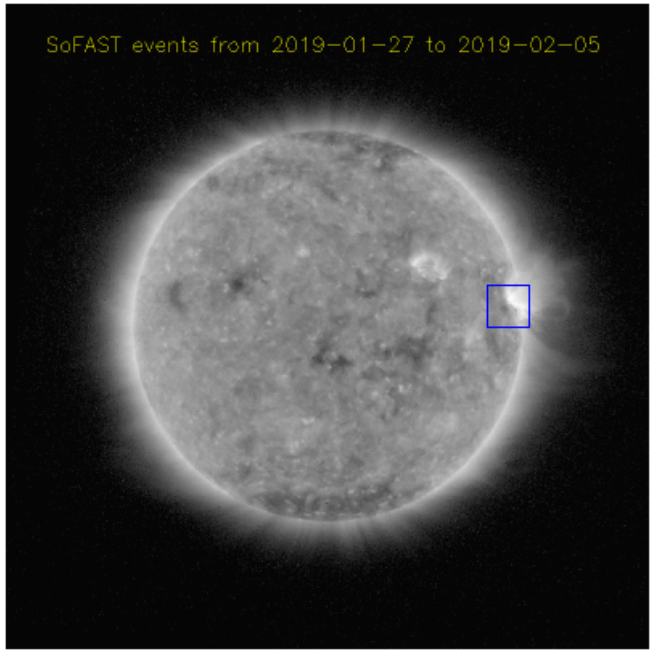


SoFAST 1.2.0

The 'Solar Flare Automated Search Tool'

EUV-flares detected by SoFAST

```
:Issued: Tue Feb  5 10:29:00 2019
:Product: SoFAST catalogue (http://www.sidc.be/sofast)
#-------------------------------------------------------------------------
# Instrument: SWAP| Detector: CMOS APS 1024 x 1024
# Flare-threshold : 2 | Rebinsize : 16 | Maxhits : 4 | Offset : 65
# Modus : (1) SW service
#
  first SWAP image this run: swap_lv1_20190127_002429.fits
  last  SWAP image this run: swap_lv1_20190205_070135.fits
#
#
#-------------------------------------------------------------------------
# Output: Detected EUV-flare list with the following characteristics:
#
#   EUV FLARE:          FLARE number
#   date:               Day of observation
#   start:              Start time, earliest indication of detection (hh:mm UT)
#   end:                End time, last indication of detection (hh:mm UT)
#   pos:                Derived position (Heliographic coordinates)
#   size:               Spatial size of event in number of macropixels
#   #images:            Duration of event in number of images (dt)
#   EUV-significance:   EUV relative variability, in %.
#
# EUV FLARE |     date     | start |  end  |    pos     | size | #images | EUV-significance
   001      | 2019-01-30 | 08:10 | 08:34 |  N04W69    |  001 |   014   |      007 %
CLICK IMAGE
to see the complete SWAP movie during this run (with indication of detected events)
```



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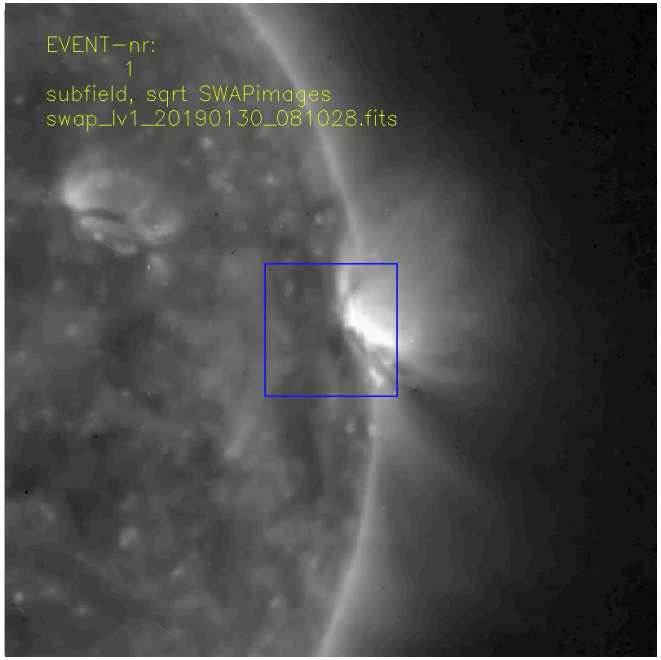

PROBA2 as a space weather monitoring mission

strengths

- in LEO, protected by Earth magnetosphere
- independent data source, excellent data coverage, very few outages
- local expertise in data handling creates rapid prototyping opportunities

weaknesses

- LEO implies a number of passes per day, resulting in a few hours data latency. Influence of eclipse seasons & SAA.
- instruments are not unique, nor the best available
- transitioning from research context to operational context is long & difficult process

Looking forward!