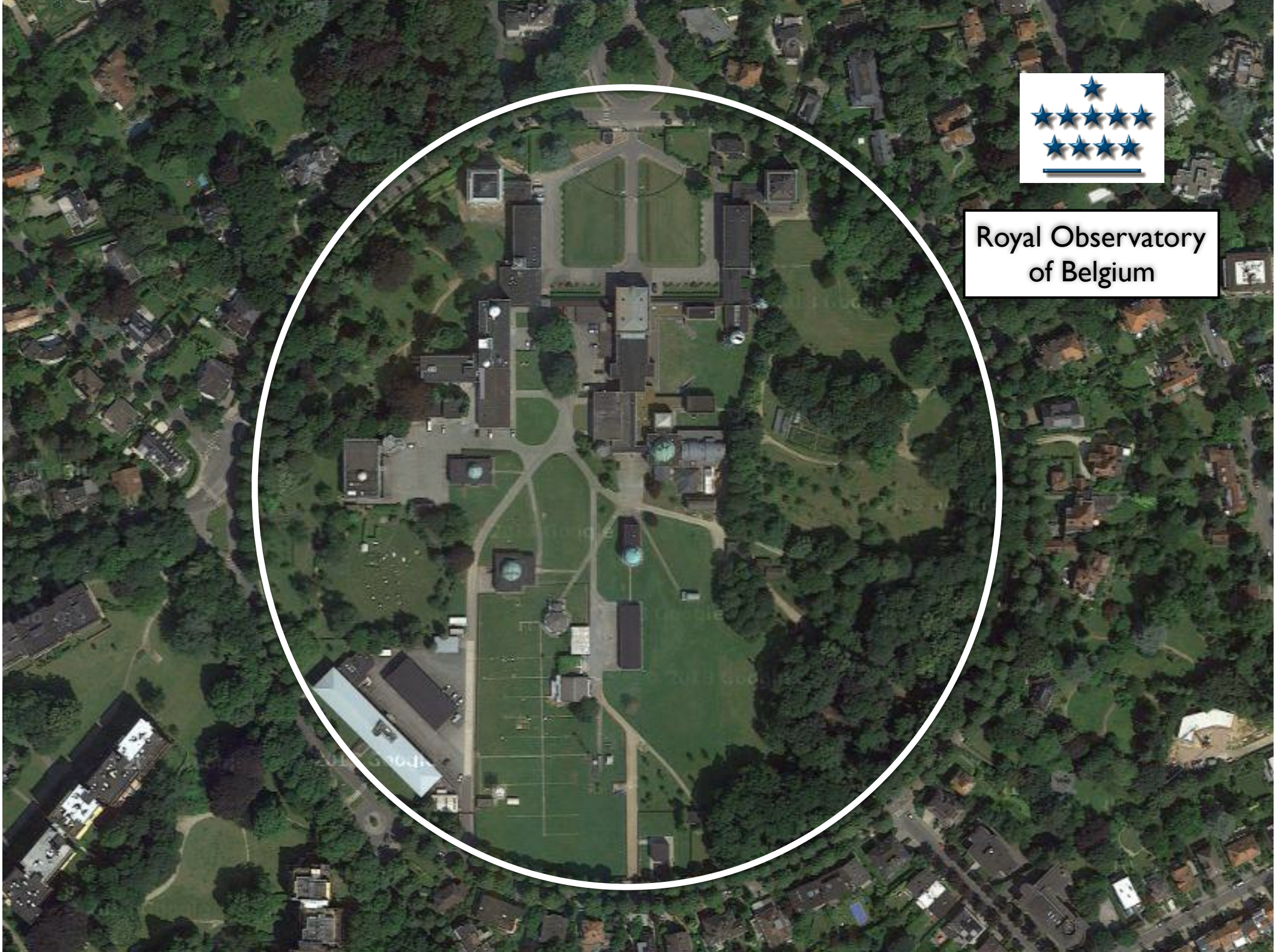
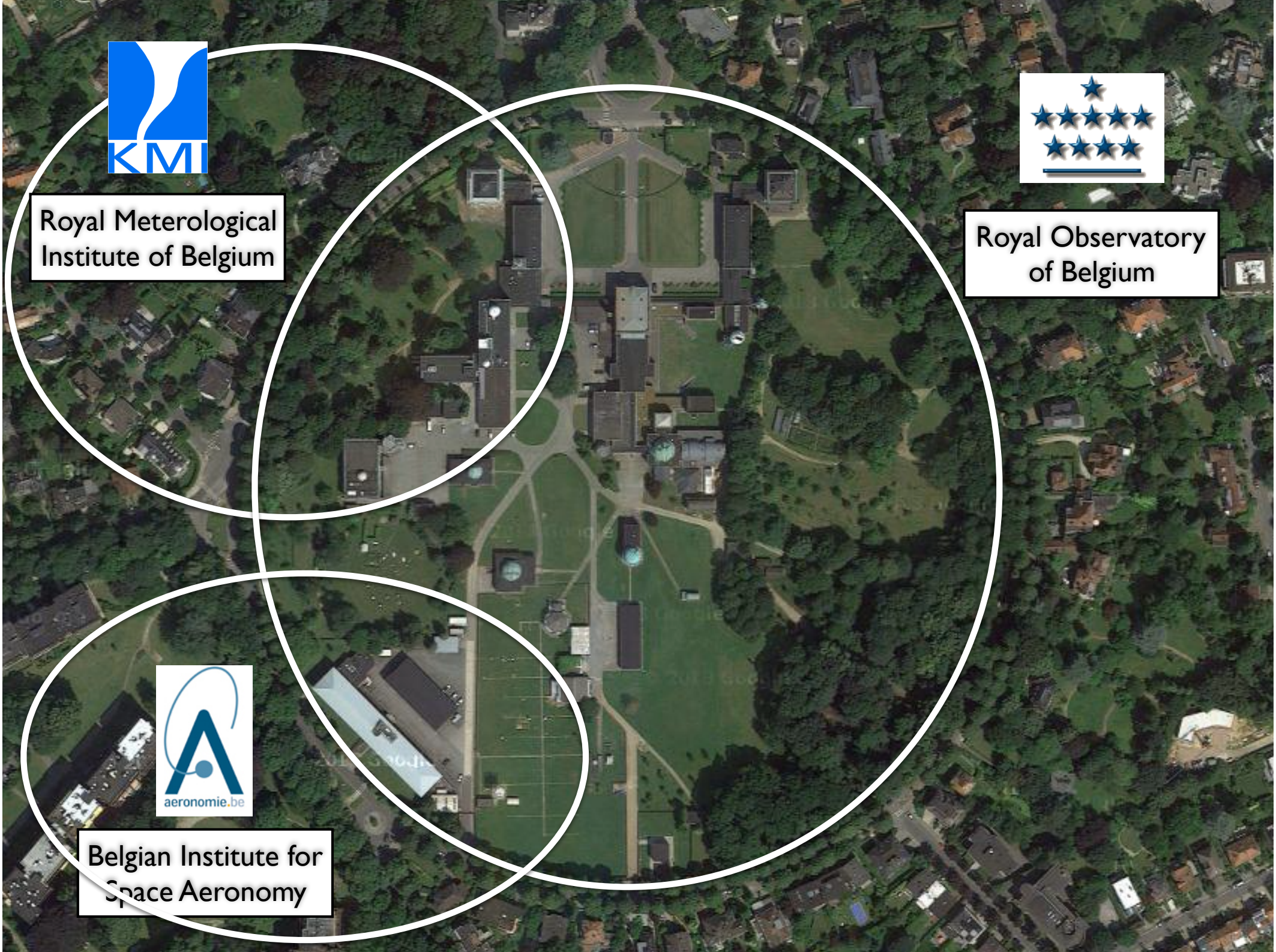
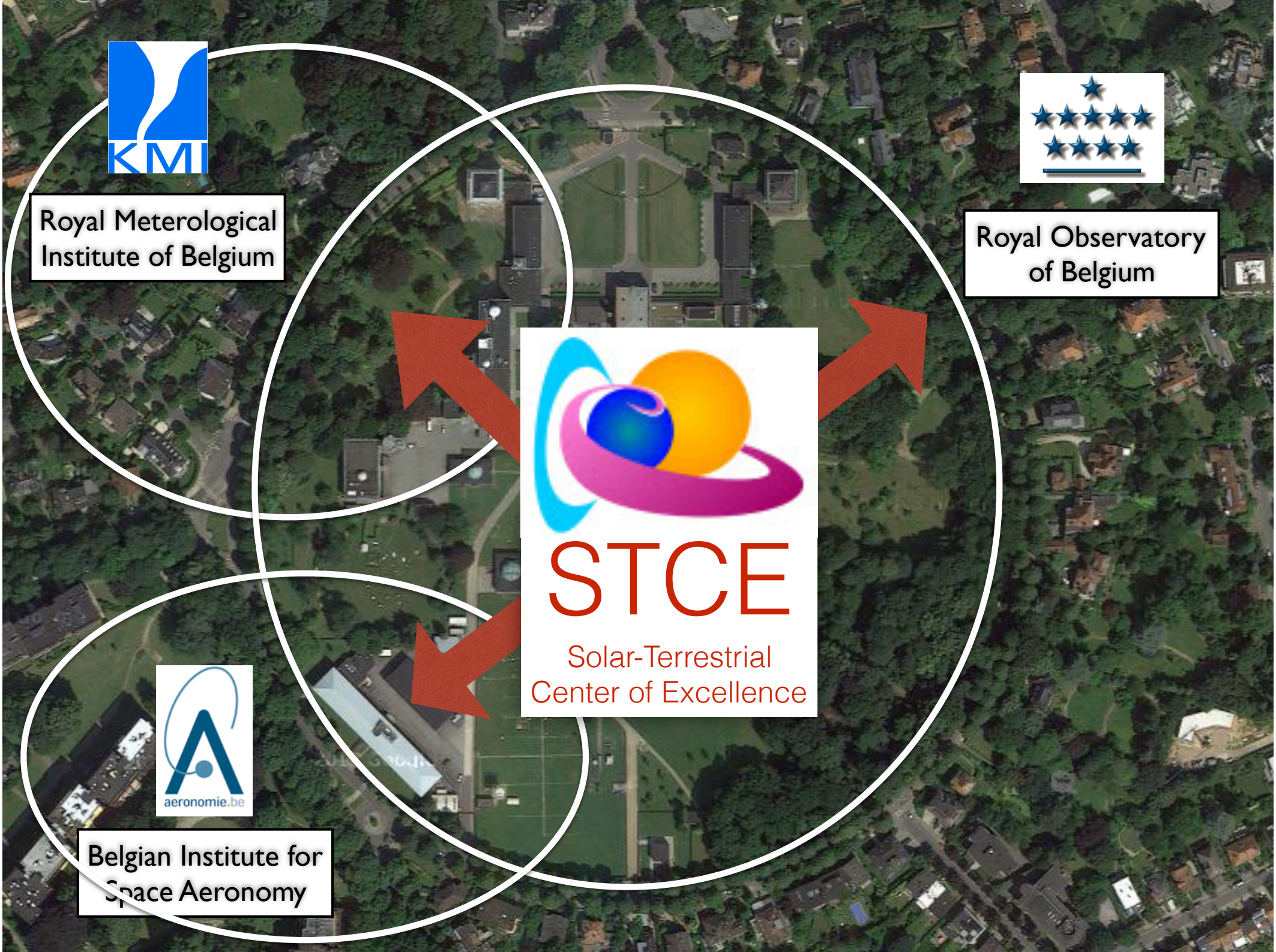
Space Weather Service Centers

@ RMI, ROB and BISA


Royal Observatory
of Belgium


KMI
Royal Meterological Institute of Belgium
Royal Observatory of Belgium
aeronomie.be
Belgian Institute for Space Aeronomy


KMI
Royal Meterological Institute of Belgium
Royal Observatory of Belgium
STCE
Solar-Terrestrial Center of Excellence
aeronomie.be
Belgian Institute for Space Aeronomy

A tradition in space weather

RMI Geophysical Center at Dourbes

Magnetic Valley

RMI **Royal Meteorological Institute**

Ionosphere and Space Weather (ISW) section

ISES International Space Environment Service

SIDC - Solar Influences Data Analysis Center

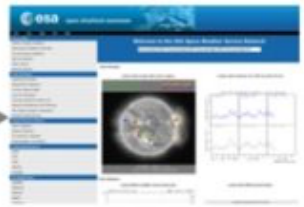
Protons: Quiet Predicted 10CM Flux: 83 Predicted Ap index: 18

Royal Observatory of Belgium
GNSS Research Group

BIRA•IASB 1964•2014

Koninklijk Belgisch Instituut voor Ruimte-Aeronomie
Institut royal d'Aéronomie Spatiale de Belgique
Royal Belgian Institute for Space Aeronomy

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	Ionospheric Weather	Space Radiation	Geomagnetic Conditions	Heliospheric Weather
ROB, Belgium (coord.) Uni. Graz, Austria	DLR, Germany (coord.) NMA, Norway NOA, Greece CLS, France	BIRA, Belgium (coord.) AIT, Austria UOA, Greece	TGO, Norway (coord.) FMI, Finland	Met Office

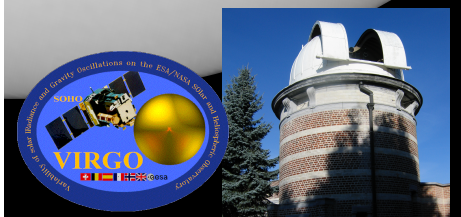
Space Weather Observational Infrastructure

SUNSPOT GROUP

SOLAR FLARE

FILAMENT

TOTAL SOLAR IRRADIANCE



DIARAD

USET

SUNSPOT GROUP

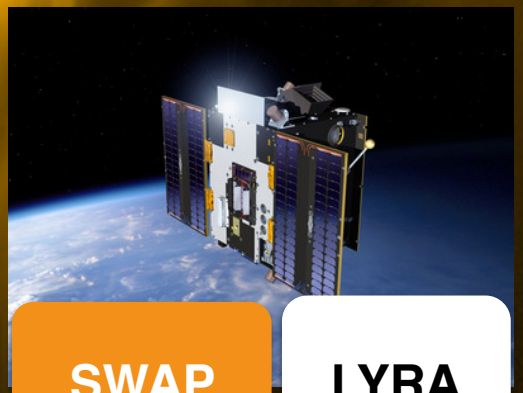
SOLAR FLARE

FILAMENT

TOTAL SOLAR IRRADIANCE

CORONAL MASS EJECTION

CORONAL HOLE

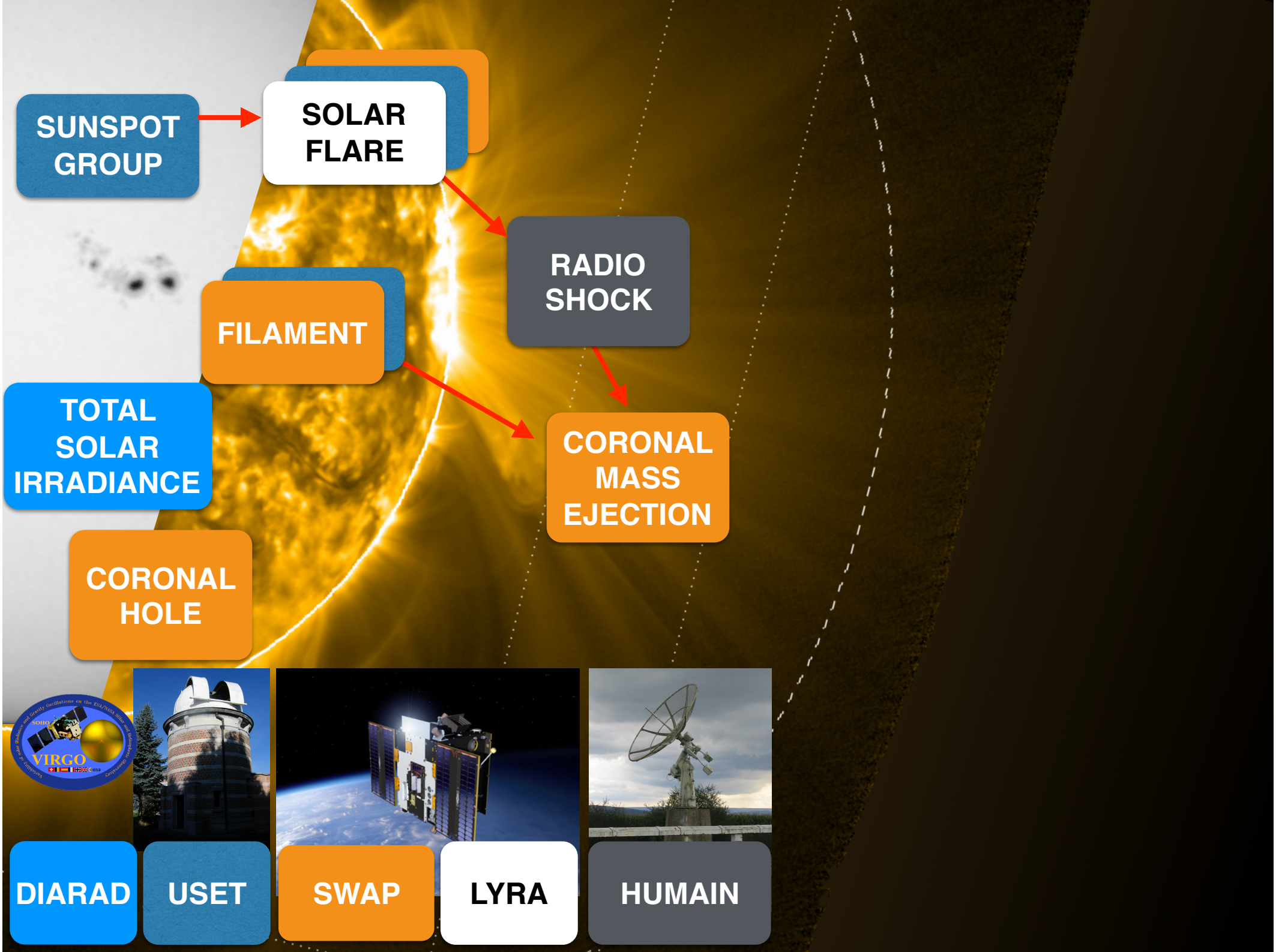


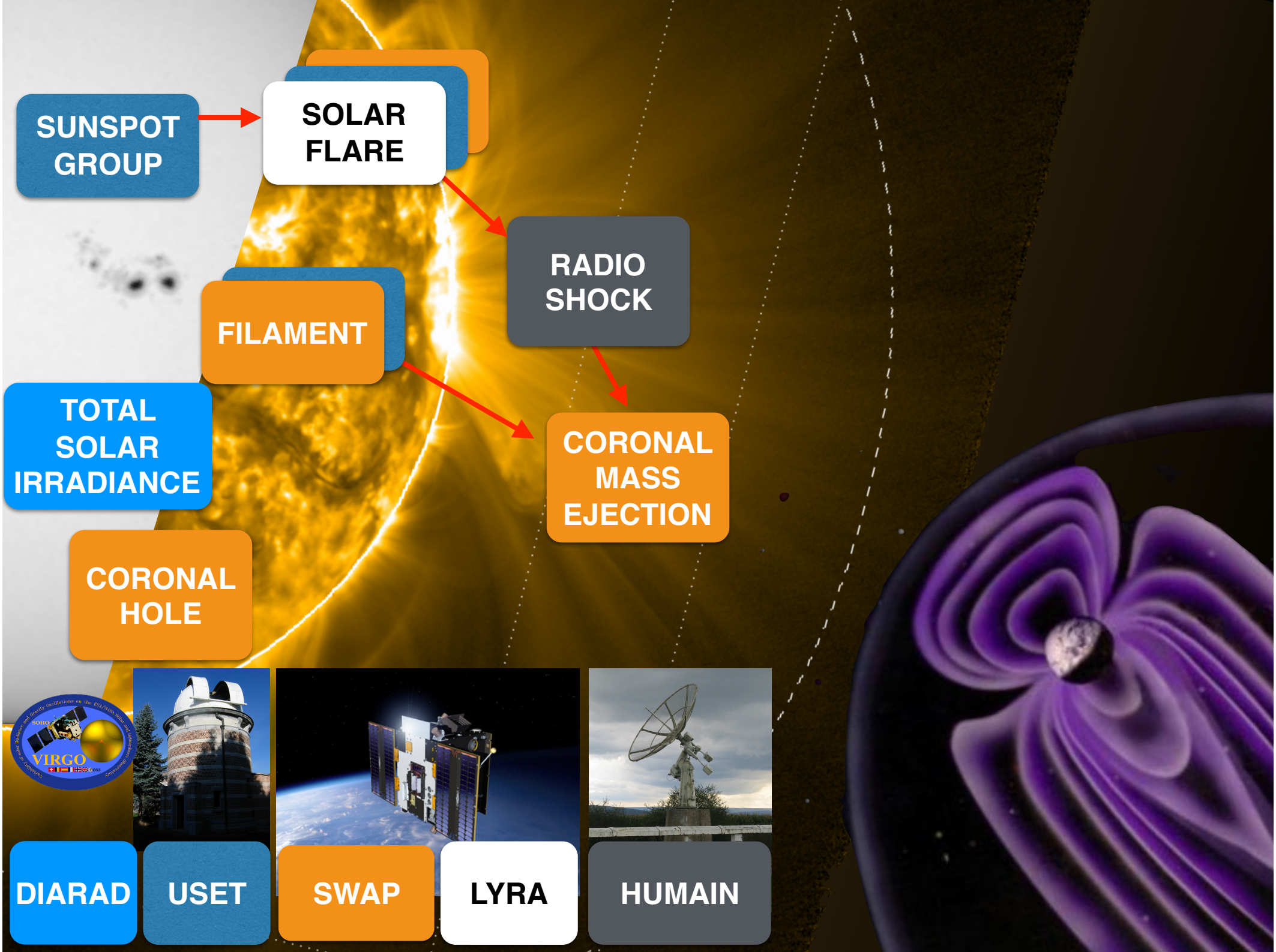
DIARAD

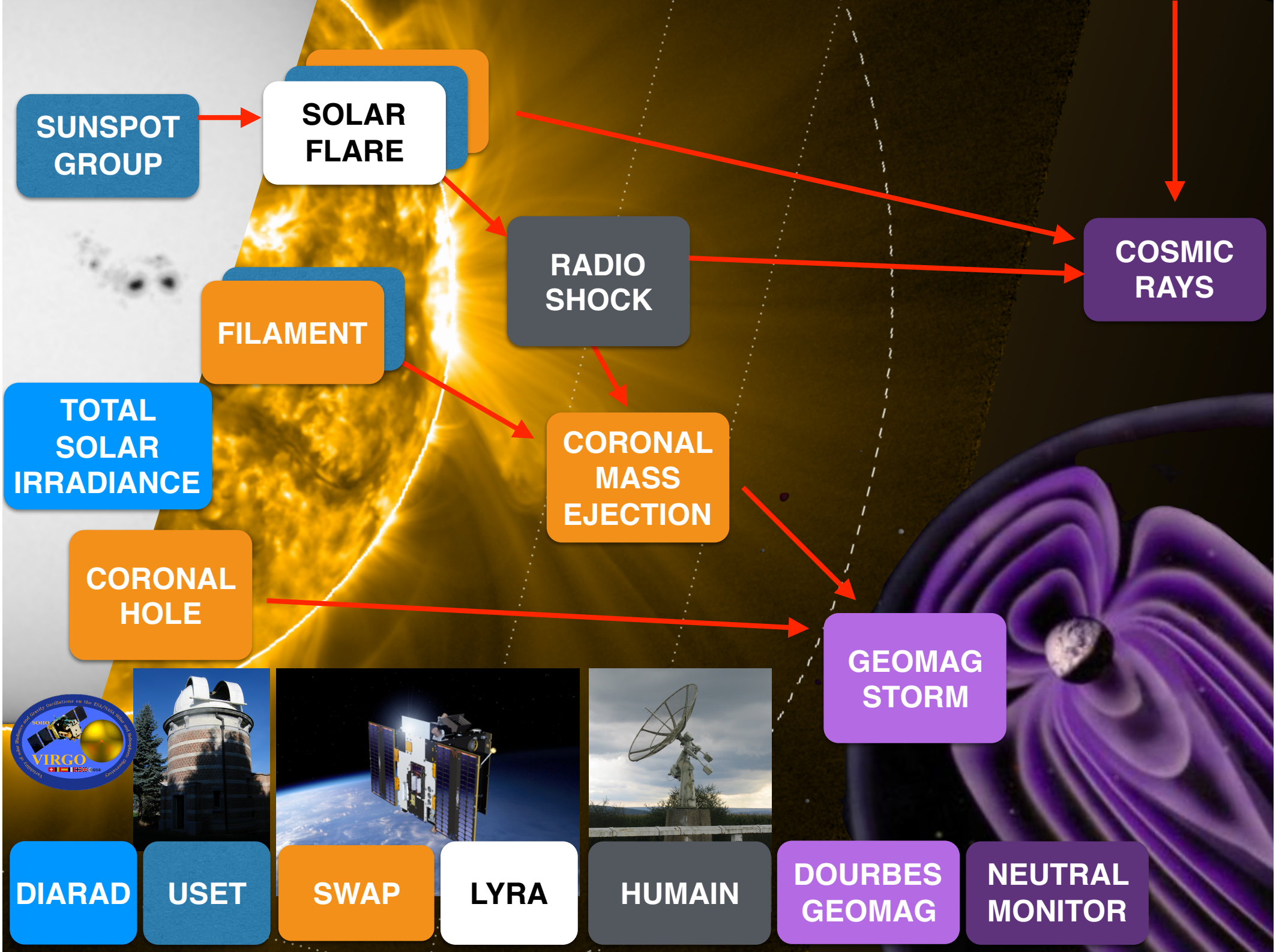
USET

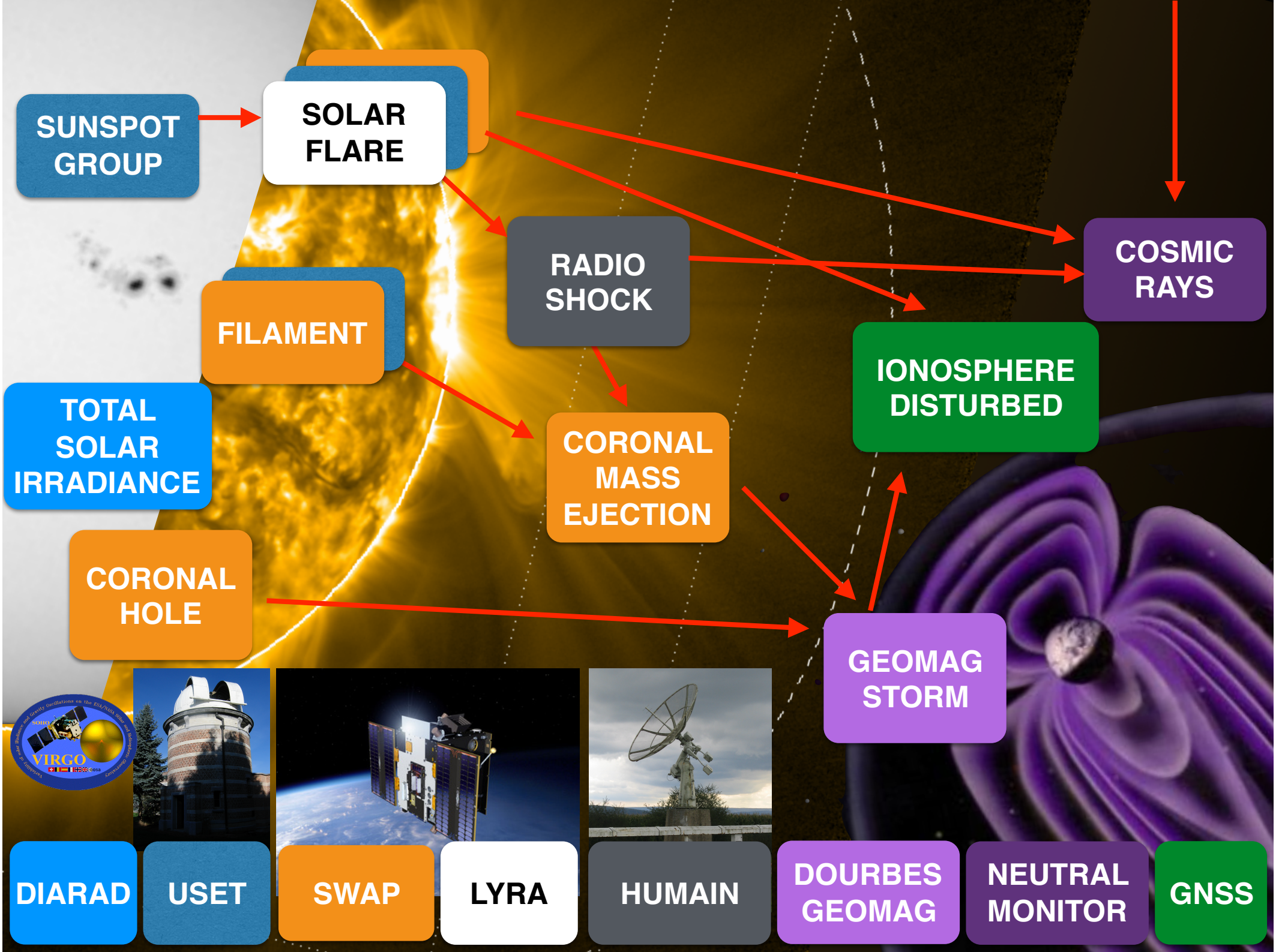
SWAP

LYRA


SUNSPOT GROUP
SOLAR FLARE
RADIO SHOCK
FILAMENT
TOTAL SOLAR IRRADIANCE
CORONAL MASS EJECTION
CORONAL HOLE
VIRGO
DIARAD
USET
SWAP
LYRA
HUMAIN


SUNSPOT GROUP
SOLAR FLARE
RADIO SHOCK
FILAMENT
TOTAL SOLAR IRRADIANCE
CORONAL MASS EJECTION
CORONAL HOLE
VIRGO
DIARAD
USET
SWAP
LYRA
HUMAIN


SUNSPOT GROUP
SOLAR FLARE
FILAMENT
TOTAL SOLAR IRRADIANCE
CORONAL HOLE
RADIO SHOCK
CORONAL MASS EJECTION
COSMIC RAYS
GEOMAG STORM
DIARAD
USET
SWAP
LYRA
HUMAIN
DOURBES GEOMAG
NEUTRAL MONITOR

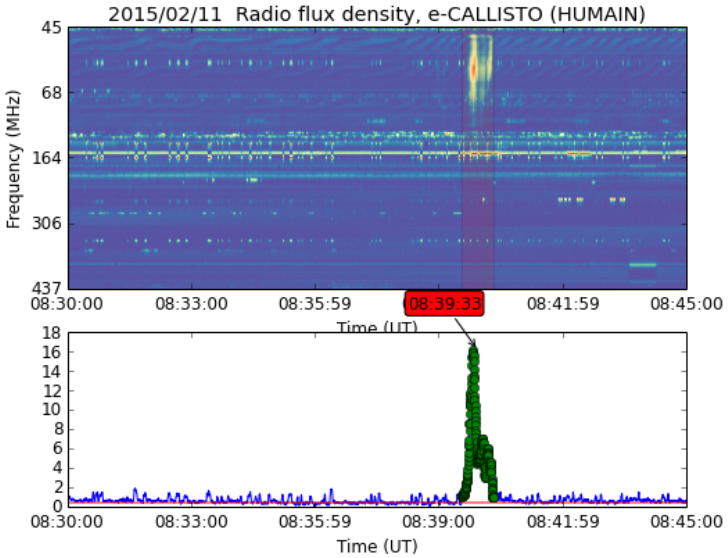

SUNSPOT GROUP
SOLAR FLARE
FILAMENT
RADIO SHOCK
COSMIC RAYS
IONOSPHERE DISTURBED
TOTAL SOLAR IRRADIANCE
CORONAL MASS EJECTION
CORONAL HOLE
GEOMAG STORM
DIARAD
USET
SWAP
LYRA
HUMAIN
DOURBES GEOMAG
NEUTRAL MONITOR
GNSS

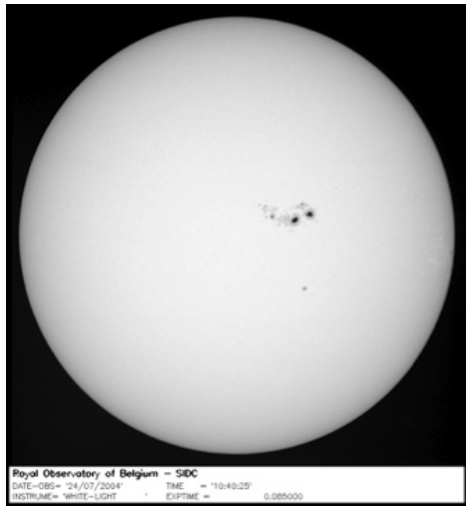
CATEGORIES & EXAMPLES	sensors on the ground	sensors in space
in-situ observations	Earth's magnetic field, ground level events	solar wind plasma, space particle radiation
remote sensing observations	Earth's ionsphere solar surface radio astronomy	solar corona & solar flares

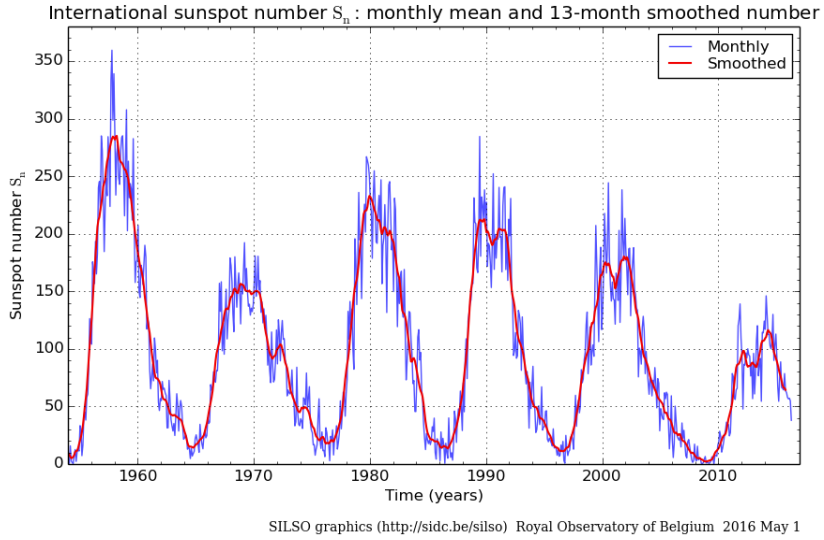
national infrastructure

ESA science satellites

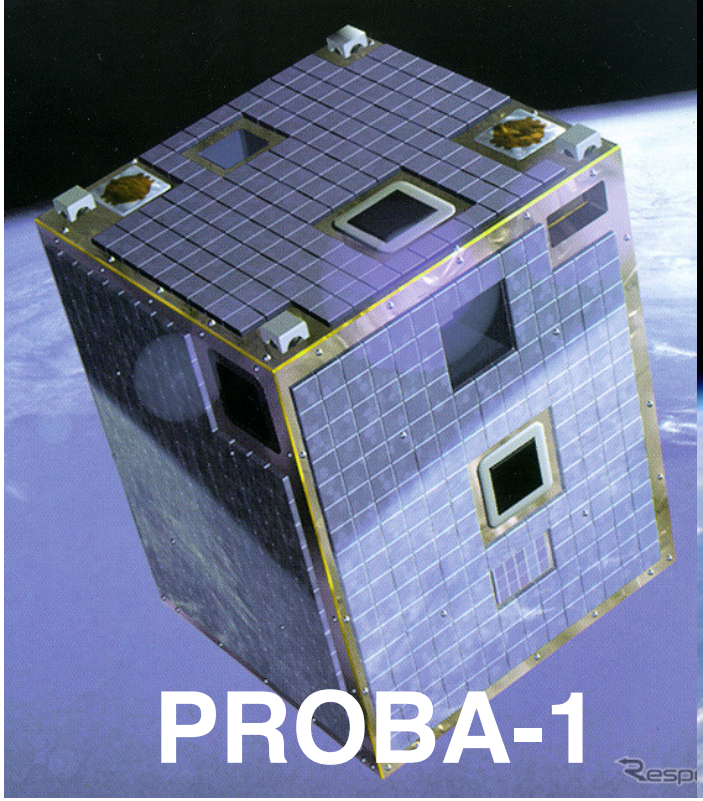
Ground-based Solar Observations





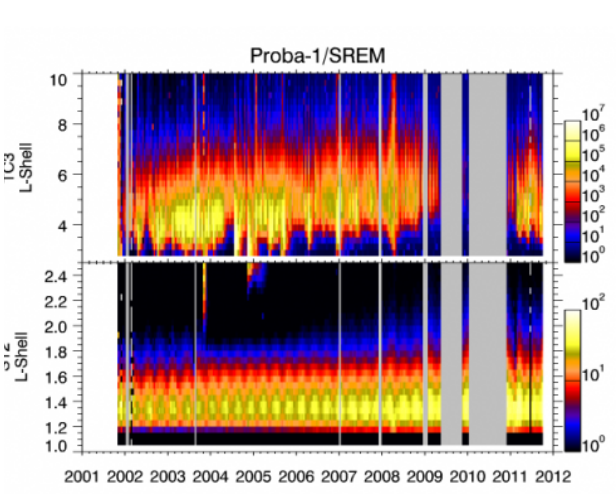


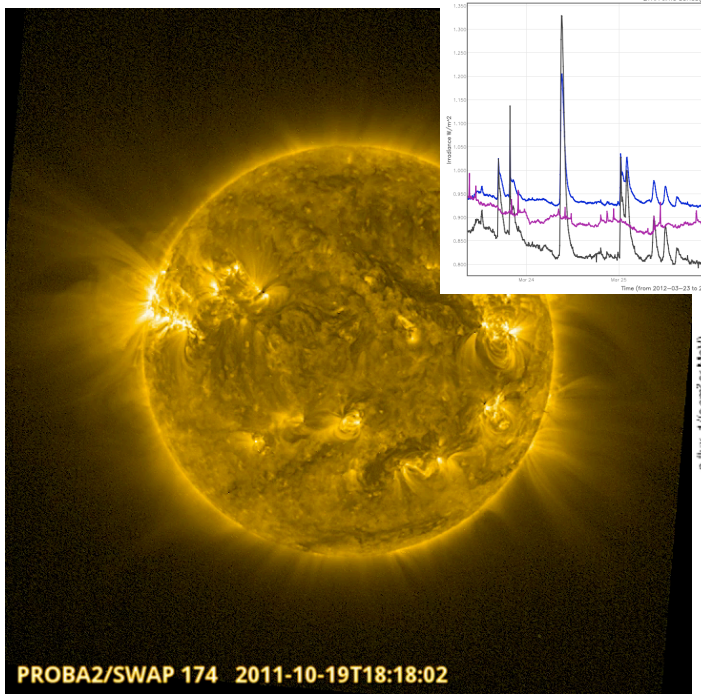
1. Ground-based solar observations need international networks to cover 24 hours
2. World Data Centers with global impact should not be depend on very constrained institutional resources


PROBA-1

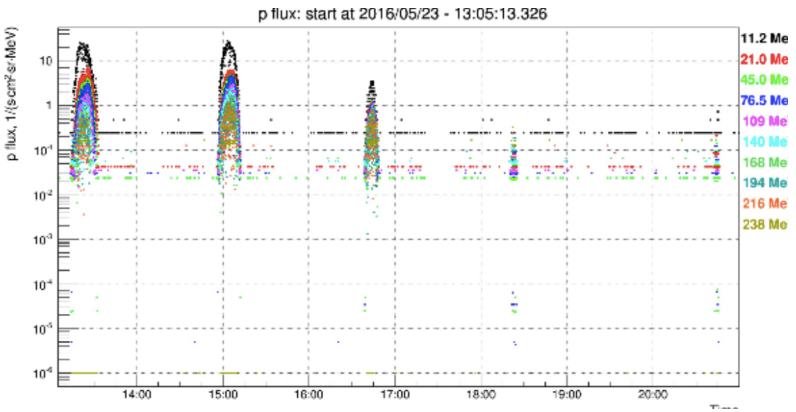

PROBA2


PROBA-V


Proba-1/SREM
L-Shell
L-Shell
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012

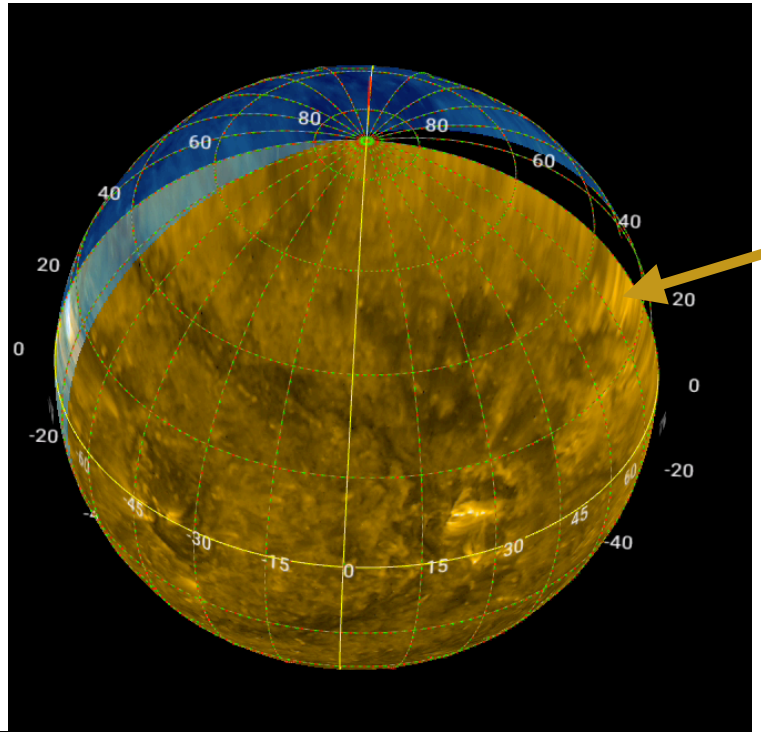

PROBA2/SWAP 174 2011-10-19T18:18:02

LYRA time series(LV2)


p flux: start at 2016/05/23 - 13:05:13.326
11.2 Me
21.0 Me
45.0 Me
76.5 Me
109 Me
140 Me
168 Me
194 Me
216 Me
238 Me

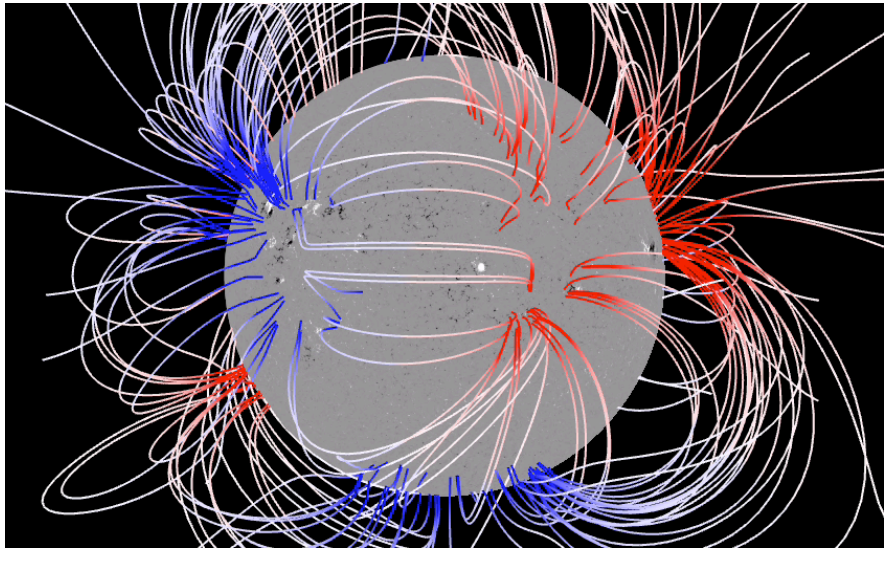
esa belspo

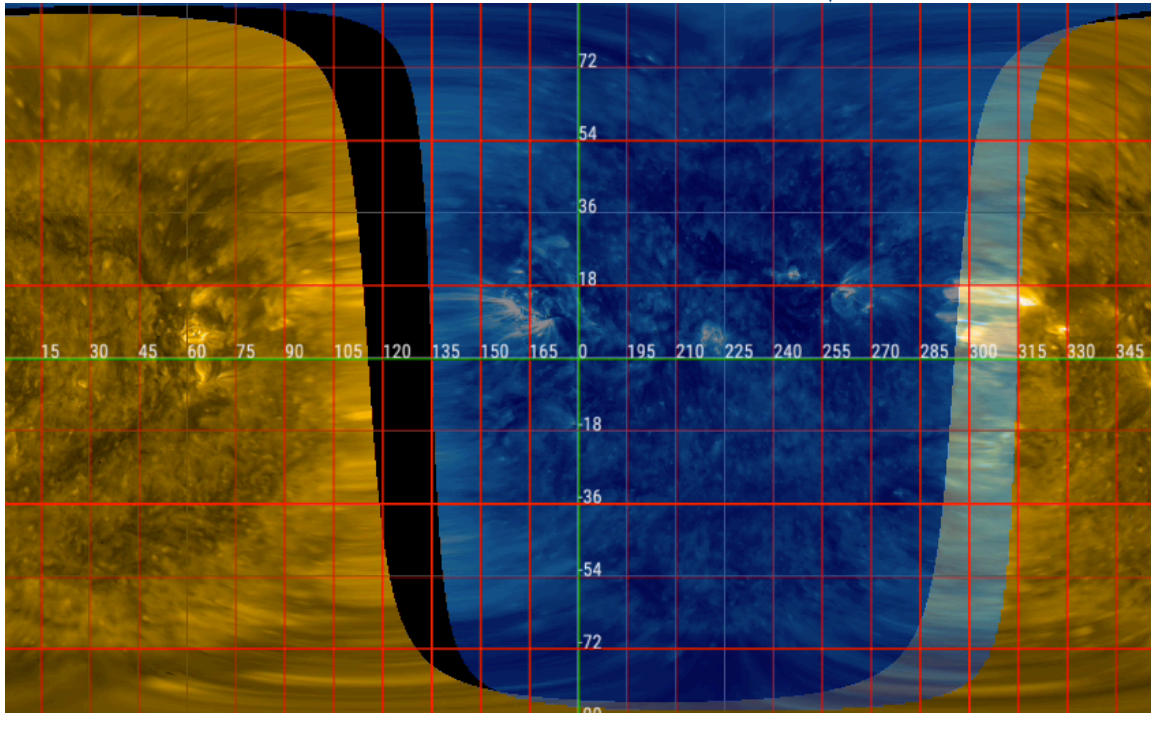
IT infrastructure



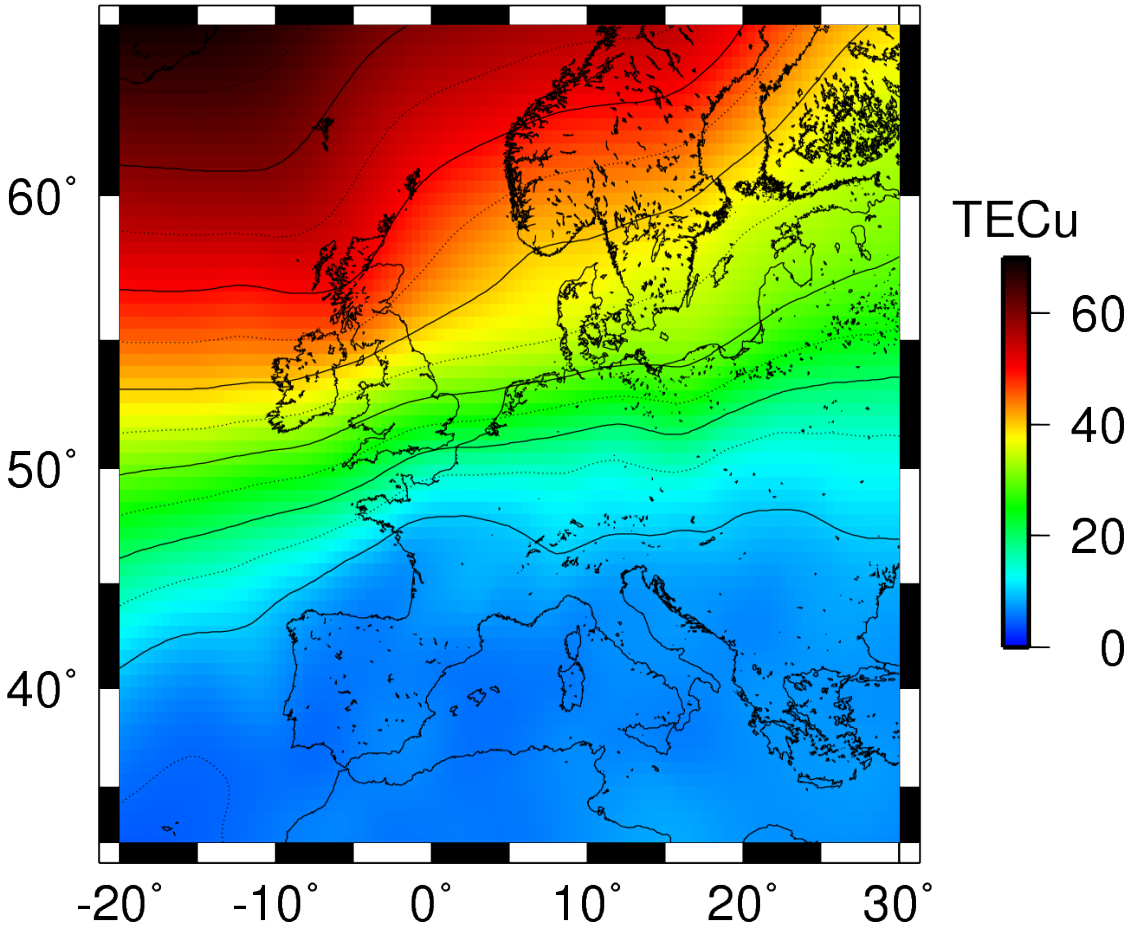
ESA mission “PROBA2”

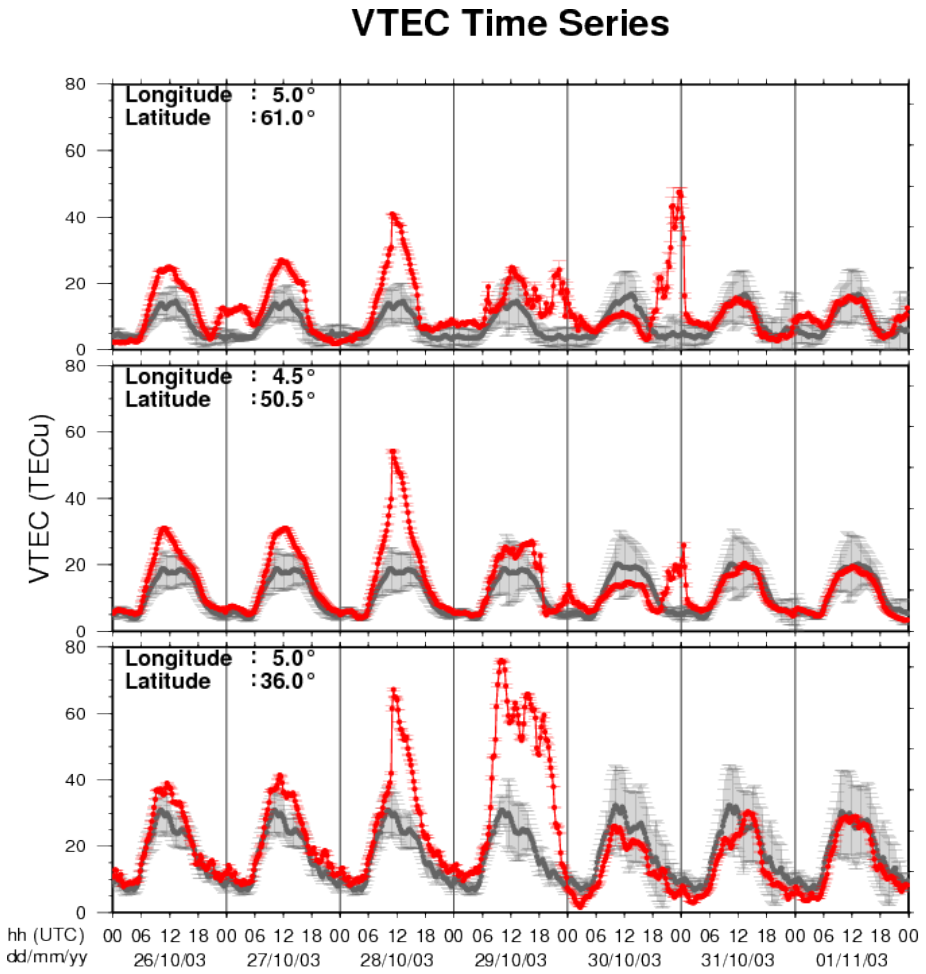
NASA mission “STEREO” with partially European instruments



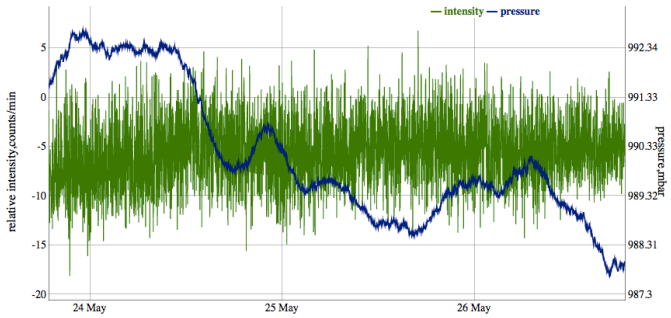


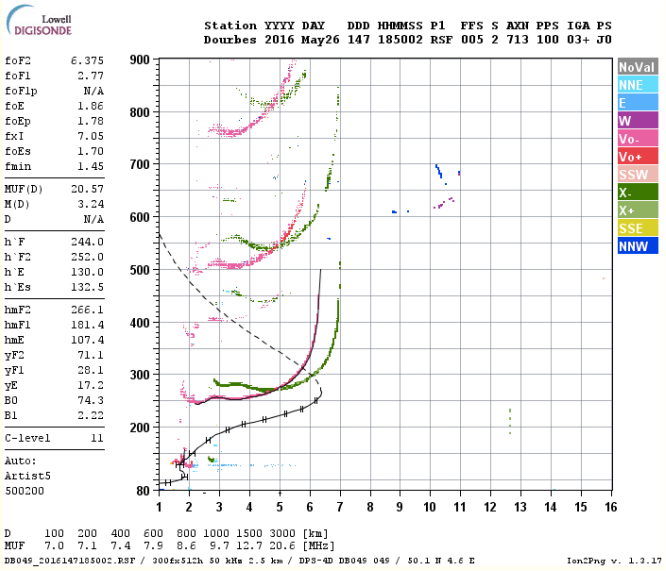
Ionospheric mapping from GNSS

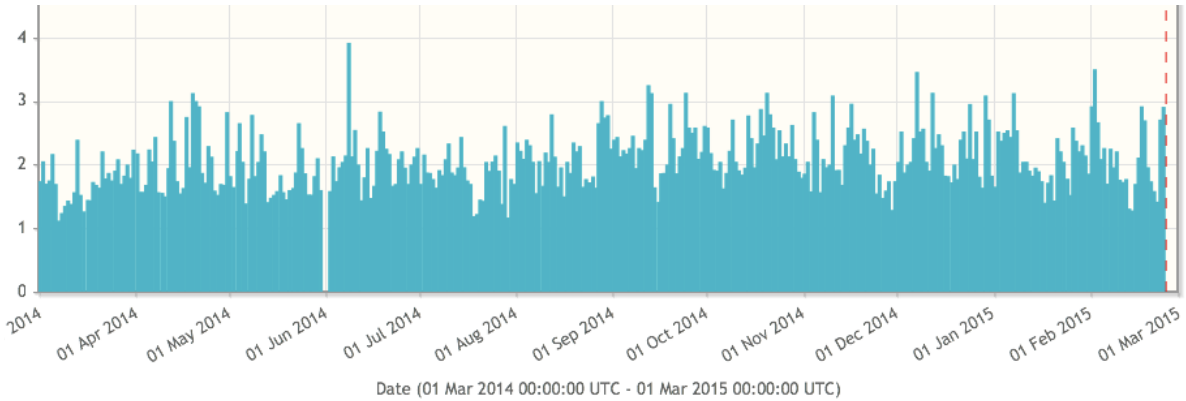




Dourbes observatory







KMI

Measurements of local space weather effects