LYRA Instrumental Effects
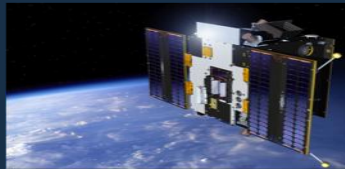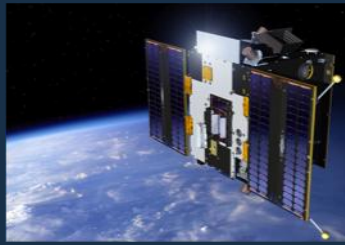
T. Katsiyannis & M. Dominique on behalf of the LYRA team

Collimator assembly   Precision apertures   Detector head

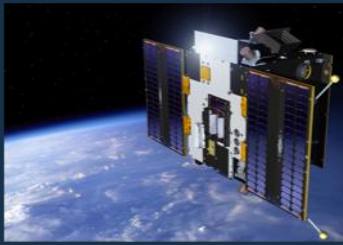View-limiting aperture   Filters   Calibration LEDs
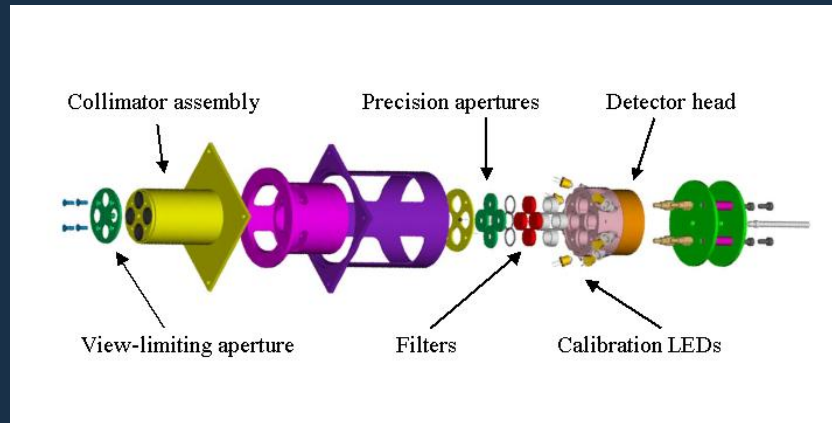
❑ Three redundant Units

❑ Four broad-band channels in each Unit

❑ Three types of detectors:

    I.   Standard Silicon (Si)

    II. Diamond MSM

    III. Diamond PIN

Calibration of LYRA data

- Dark Current Subtraction
- Correction of degradation by adding a constant
- Conversion from counts to W/m^2 (and rescaling to 1 AU)
- Flat-field corrections soon to be included
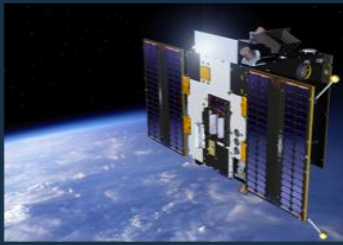
Comparison to GOES data

❑ Linear two-parameters scaling:

0,015*[ch3-min(ch3)] + min(GOES)

0,018*[ch4-min(ch4)] + min(GOES)

❑ http://proba2.oma.be

❑ http://solwww.oma.be/users/dammasch/GoesVsLyra.html

LYRA Degradation

Channel	"Spare" Unit 1 (90 hrs)	"Nominal" Unit 2 (2500 hrs)	"Campaign" Unit 3 (960 hrs)
"1" (Ly-α: 120-123 nm)	53% (MSM)	<0,5% (MSM)	67% (Si)
"2" (Herzberg: 190 – 222 nm)	77% (PIN)	<0,5% (PIN)	31% (PIN)
"3" (Al: 17-80 nm + <5 nm)	100% (MSM)	7% (MSM)	38% (Si)
"4" (Zirconium: 6-20 nm + <2 nm)	100% (Si)	56% (MSM)	83% (Si)

Reasons for Degradation:
I.   Filter Contamination Layer
II. Space Ageing

Non-Solar Features

2010-08-02 WDWSZE:02

Color representing max deviation at a point. 0.001 –> 5
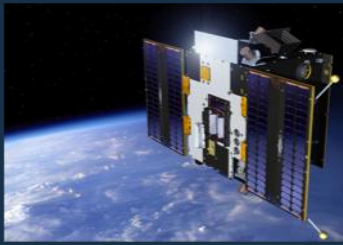
- ☐ Large Angle Rotations
- ☐ South Atlantic Anomaly
- ☐ Spacecraft Jitter
- ☐ Occultations (mid Oct – mid Feb)
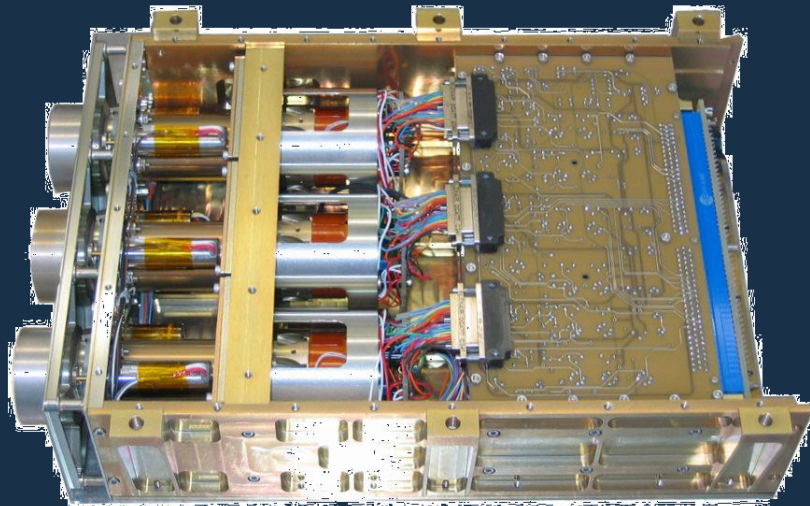- ☐ Aurora Pertubations (Kp > 3, affects Al & Zr channels)
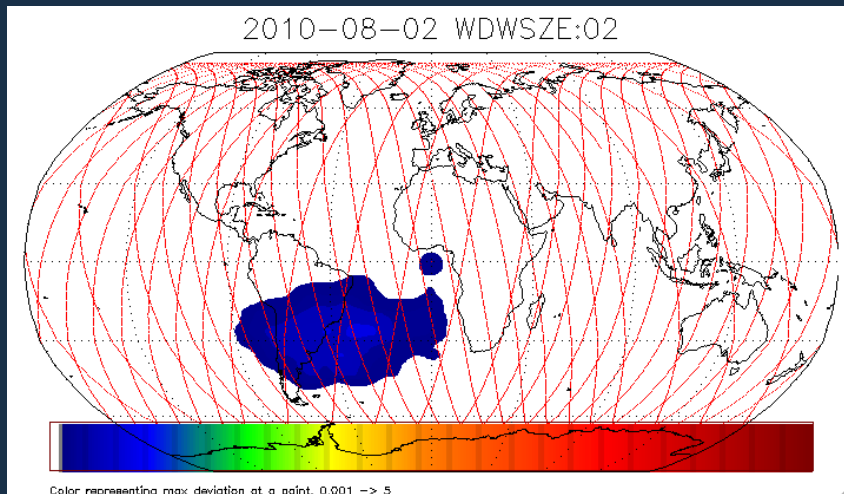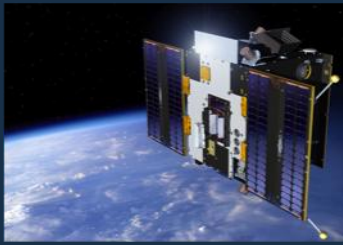
Main Fields of Scientific Work

- Solar Flares (Ly-α, Multi-wavelength, short timescale, quasi-periodic pulsations)
- Variability of Long-term Solar Spectral Irradiance
- Sun – Moon Eclipses
- Occultations
- Degradation process and ageing
- Performance of Wide-Bandgap detectors
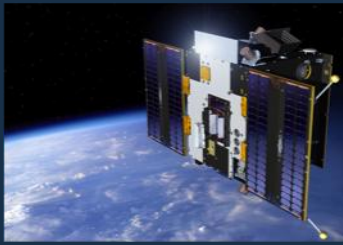
Mission Status

- Funded until end of 2014 by ESA Science Directorate & SSA
- Topical Issue Released in early 2013
- Forth Call of Guest Investigation Programme this Summer
- http://proba2.oma.be