P2SC-ROB-WR-031-20101011 Weekly report #031	**P2SC Weekly report**	
Period covered: Date: Written by: Released by:	Mon Oct 11 to Sun Oct 17 2010 Wed Oct 27 2010 David Berghmans Anik De Groof	Royal Observatory of Belgium PROBA2 Science Center
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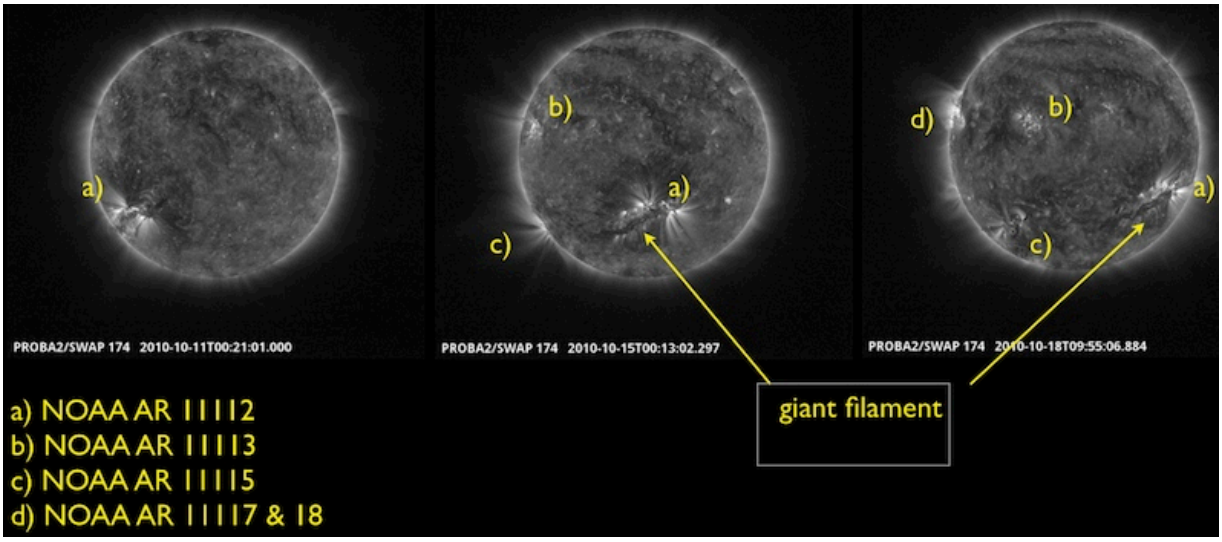
1. Science

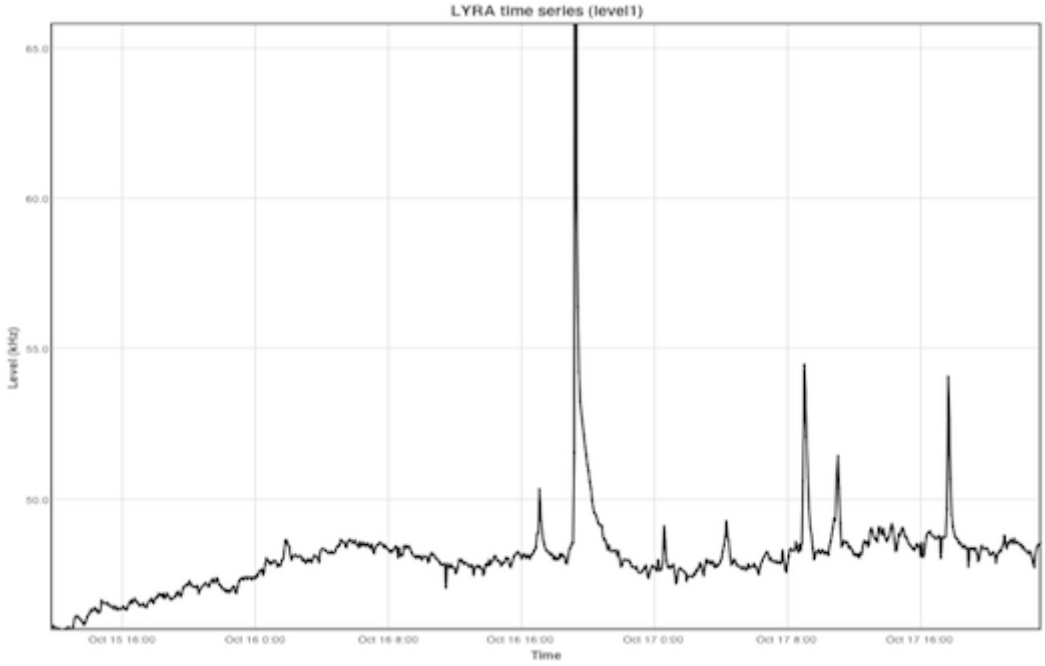
Solar & Space weather events

Solar activity gradually increased over the period. The background GOES level increased from A6.4 in the beginning of the period to B1.0 at the end of the period. Similarly, the estimated international sunspot index (EISN) increased from 8 to 37 over the period. This increase was clearly visible in SWAP images by the popping up of new active regions.



In the second half of the week NOAA AR 11112 developed an opposite polarity island in the left handside of the active region and, as a consequence, started microflaring. This activity increase culminated in an M2.9 flare on Oct 16, 19:12UT, followed by a few more C-flares (see

LYRA Zirconium channel below).



The flare kernel produced an X-type diffraction pattern in the SWAP image of 19:13:04. SWAP also revealed an eruption (difference movie at 19:15.04) and a small dimming to the East of the active region. Nevertheless, the large filament in the vicinity of the active region did not erupt and SOHO/LASCO and STEREO/SECCHI didn't show any evidence of an associated, strong CME.

Scientific campaigns

None.

Outreach, papers, presentations, etc.

Julia Shugay (PROBA2 guest investigator) presented her research plan on Oct 11 11:00 in the P2SC room. It involves detecting coronal holes in SWAP images by intensity thresholding based on this, predicting the solar wind speed at L1 with the help of neural network techniques.

Also Dr. Kariyappa is still visiting the P2SC as Guest Investigators for LYRA.

To be explored

The diffraction pattern in the SWAP image at a flare kernel was a first. The M2.9 flare was the biggest flare of the present solar cycle (together with another M2.9 flare on February 6 2010).

2. LYRA instrument status

Calibration

LREP2+ LREP03 (unit 2) was scheduled (IOS00092) on Oct 14, 14:00.

Ingolf Dammasch compared the impact of the Feb 6 M2.9 flare and the Oct 16 M2.9 flare on the LYRA Al and Zr signals of unit 2. Both flares cause a similar increase in LYRA signal, for both channels.
This is quite remarkable as the Aluminium channel (and also Ly-a and Hz) has degraded considerably, due to a polymerization layer (outgassing material polymerized by UV light) on the filters. The hypothesis that this layer is blocking primarily the longer wavelenghts seems to be confirmed: the "dirt film" on the filters has very little effect on the Soft X-Ray radiation of the flare.
This is good news for the lifetime of the LYRA channels as flare detectors. On the other hand, it will make the calibration - removing the degradation effect - even more complicated.

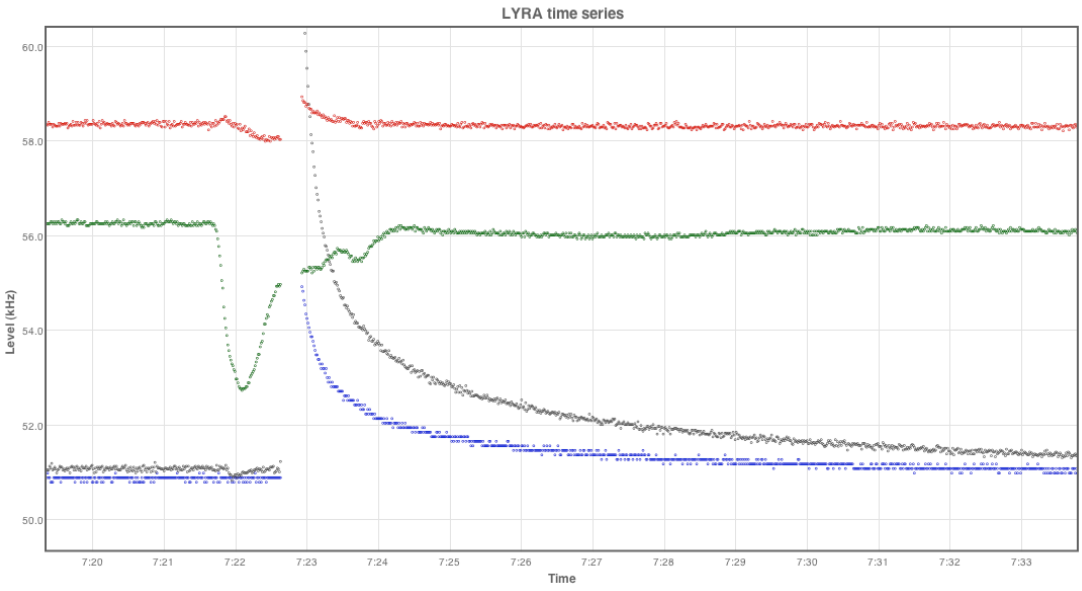
IOS & operations

The SWAP bake-out campaign (Oct 12 10:20 - Oct 13 10:20) involved an off-pointing. LYRA was scheduled to observe 1 hour into the off-pointing period (up till Oct 12 10:20) and then go to IDLE mode. It was interesting to note that in this 1 hour off-pointing period, LYRA produced a similar pattern as during the flight mode/anti flight mode campaign.

LYRA IOS 00090 scheduled the start-up following the SWAP bake-out period from Oct 13 13:30 onwards. However, this IOS did not include a switch off the heaters and, as a consequence, the LYRA detectors became unusually hot (TEMP DD1 and TEMP DD3 ~ 47C, and TEMP DD2 ~ 50C).

To be explored
The Herzberg channel (unit 2) behaved erratically (jumps over LARs) during the second half of the week.

A pseudo-flare was observed on 2010/10/14T07:22, seen by no other solar instrument. This turned out to be an ASIC reload (see below):

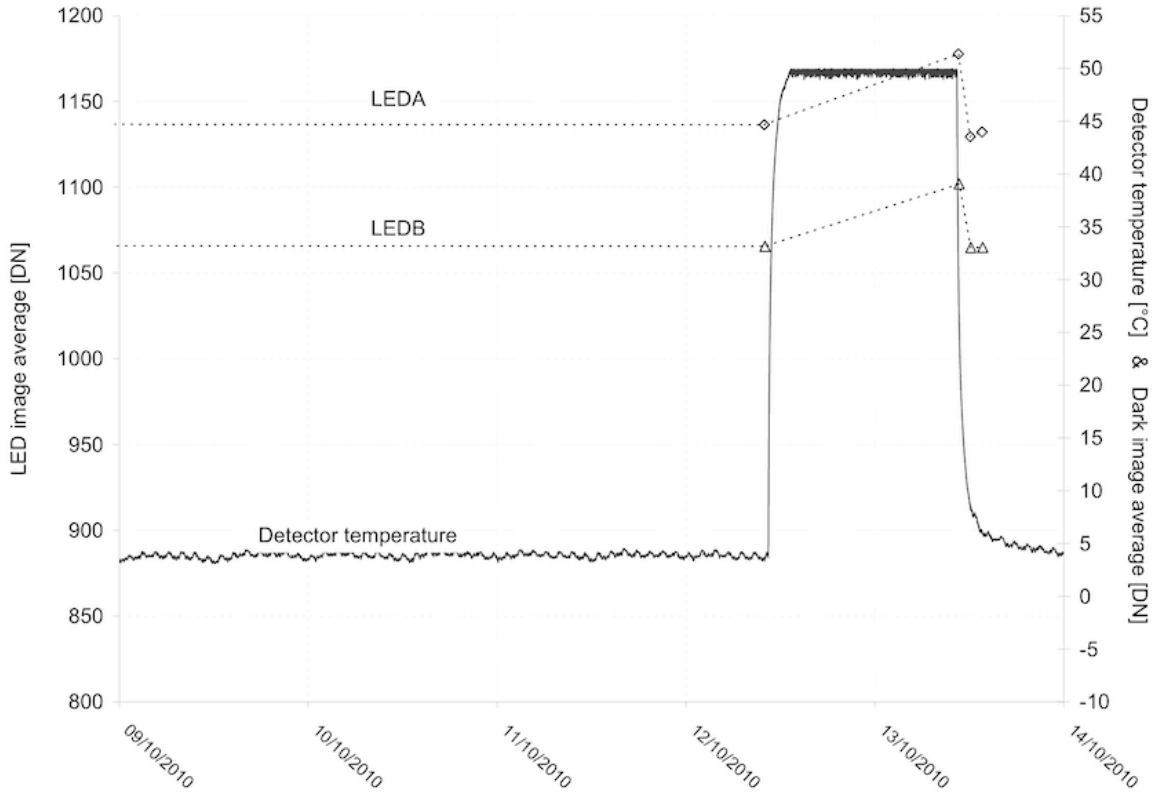


3. SWAP instrument status

MCPM errors
The number of MCPM recoverable errors stayed fixed at 203 and the number of MCPM unrecoverable errors stayed fixed at 0.

IOS & operations
SWAP run a 24h bake-out campaign from Oct 12 10:20 onwards, preceded and followed by usual calibration sequence (IOS00186/IOS00187). During the bake-out, the SWAP detector was brought to 50C.

The comparison of the pre- and post-bake out LED sequences (by JP Halain CSL) is not easy as the temperature before and after the bake-out was different and the LEDs are known to emit less light with increasing temperature. In any case the effect of the bake-out has not been dramatic. Further LED sequences in the near future will potentially reveal more subtle trends.



SWAP detector temperature
The SWAP Cold Finger Temperature increased from 3.8C in the beginning of the period to 4.5C at the end of the period.

4. PROBA2 Science Center Status

David Berghmans was operator during this week. SWAP daily movies were created manually.

Various P2SC malfunctionings happened on October 13 late as a consequence of local network problems and a power failure. Early October 14, all pending problems were cleaned up and everything was back to nominal.

The following tools were updated on the operational server:

Software name	Update	Date	Comment
ADB	3773	Oct 11	The PHP interface of the Ancillary Data Browser was completely rewritten by C.Cabanas. Improved SQL queries give faster response.
ODP/PP_PLOT	3790, 3792	Oct 14, 15	Bug correction by E. D'Huys in the lyraql_makeplot.pro that became active when the LYRA temperatures are above 50C.

5. Data reception & discussions with MOC

Passes

- "Packet CRC does not validate" for at least 1 BINSWAP image in pass 2630 (Oct 12), pass 2639 (Oct 13), pass 2659 (Oct 15), pass 2675 (Oct 16),

Data coverage HK

- Housekeeping data is complete except for a small gap on Oct 15 around 21:34. Reason is unknown.

Data coverage SWAP

- The SWAP data coverage was interrupted by the SWAP bake-out campaign (see above).

- Statistics for complete week:

  Total number of images between 2010 Oct 11 0UT and 2010 Oct 18 0UT: 4435
  Highest cadence in this period: 30 seconds
  Average cadence in this period: 136.37 seconds
  Number of image gaps larger than 300 seconds: 10
  Largest data gap: 1454.98 minutes

Data coverage LYRA

The LYRA STD FITS files are complete except for the known interruptions (SWAP bake-out campaign and LYRA calibration campaign).

6. APPENDIX Frequently used acronyms

ADP	Ancillary Data Processor
ADPMS	Advanced Data and Power Management System
AOCS	Attitude and Orbit Control System
APS	Active Pixel image Sensor
ASIC	Application Specific Integrated Circuit
BBE	Base Band Equipment
CME	Coronal Mass Ejection
COGEX	Cool Gas Generator Experiment
CRC	Cyclic Redundancy Check
DR	Destructive Readout
DSLP	Dual Segmented Langmuir Probe
EIT	Extreme ultraviolet Imaging Telescope
FITS	Flexible Image Transport System
FOV	Field Of View FPA Focal Plane Assembly
FPGA	Field Programmable Gate Arrays
GPS	Global Positioning System
HAS	High Accuracy Star tracker
HK	Housekeeping
ICD	Interface Control Document
IIU	Instrument Interface Unit
IOS	Instrument Operations Sheet
LED	Light Emitting Diode
LEO	Low Earth Orbit
LYRA	LYman alpha RAdiometer
LYTMR	LYRA Telemetry Reformatter (software module of P2SC)
LYEDG	LYRA Engineering Data Generator (software module of P2SC)
MCPM	Mass Memory, Compression and Packetisation Module
MOC	Mission Operation Center
NDR	Non Destructive Readout
OBET	On board Elapsed Time
OBSW	On board Software
PE	Proximity Electronics
PGA	Programmable Gain Amplifier
PI	Principal Investigator
P2SC	PROBA2 Science Center
PPT	Pointing, Positioning and Time (software module of P2SC)
ROB	Royal Observatory of Belgium
SAA	South Atlantic Anomaly
SCOS	Spacecraft Operation System
SEU	Single Event Upset
SOHO	Solar and Heliospheric Observatory
SWAP	Sun Watcher using APS detector and image Processing
SWBSDG	SWAP Base Science Data Generator
SWEDG	SWAP Engineering Data Generator (software module of P2SC)
SWTMR	SWAP Telemetry Reformatter (software module of P2SC)
TBC	To Be Confirmed
TBD	To Be Defined
TBW	To Be Written
TC	Telecommand
TPMU	Thermal Plasma Measurement Unit
UTC	Coordinated Universal Time
UV	Ultraviolet