
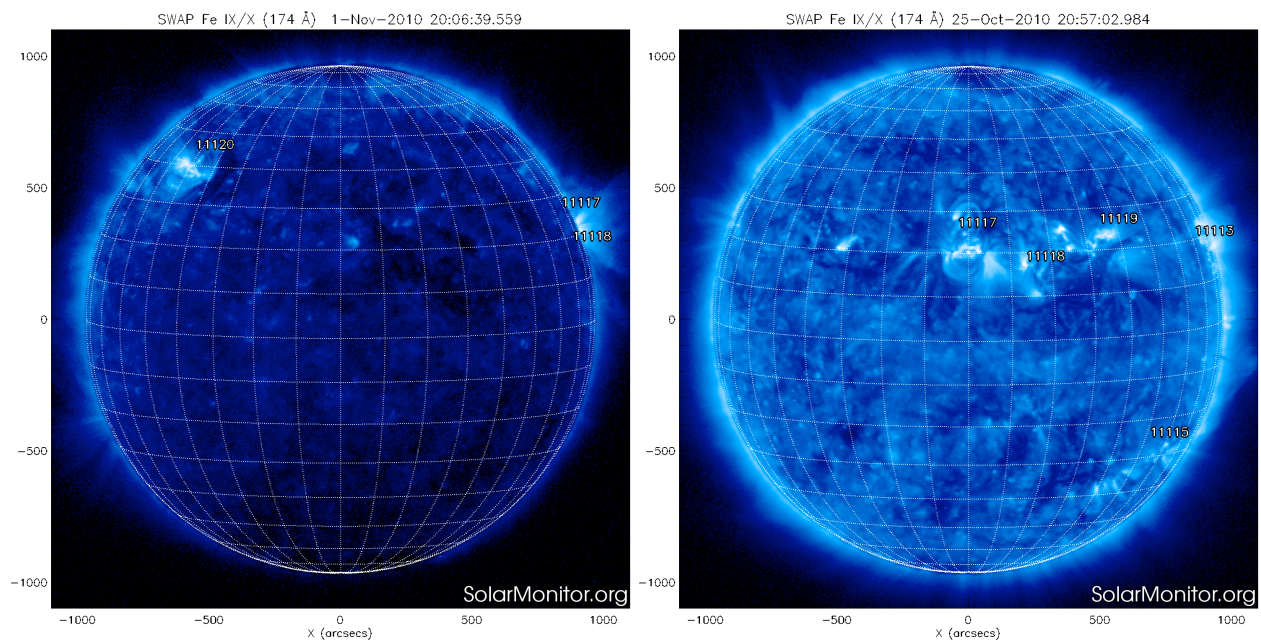


P2SC-ROB-WR-033- 20101025 Weekly report #033	<b>P2SC Weekly report</b>	
Period covered: Date: Written by: Released by:	Mon Oct 25 to Sun Oct 31 2010 Nov 4 2010 Anik De Groof Joe Zender	Royal Observatory of Belgium PROBA2 Science Center
To:	LYRA PI, marie.dominique@oma.be SWAP PI, david@sidc.be	<a href="http://proba2.sidc.be">http://proba2.sidc.be</a> ++ 32 (0) 2 373 0 559
cc:	ROB DIR, ronald@oma.be ESA Redu, Etienne.Tilmans@esa.int ESA D/SRE, Joe.Zender@esa.int ESA D/TEC, Karsten.Strauch@esa.int	

## 1. Science

### Solar & Space weather events



Active Region 11117 passed over the disk from disk center to the West limb and produced plenty of B-flares and also several C flares as listed below. Most of the latter are associated with CMEs in LASCO C2 (halo CMEs in the beginning of the week):

- C2.3 (Mon 22:06)
- C1.1 (Tue 01:06)
- C1.2 (Wed 16:59)
- C1.8 (Sun 03:13)

- C5.7 (Sun 04:26)

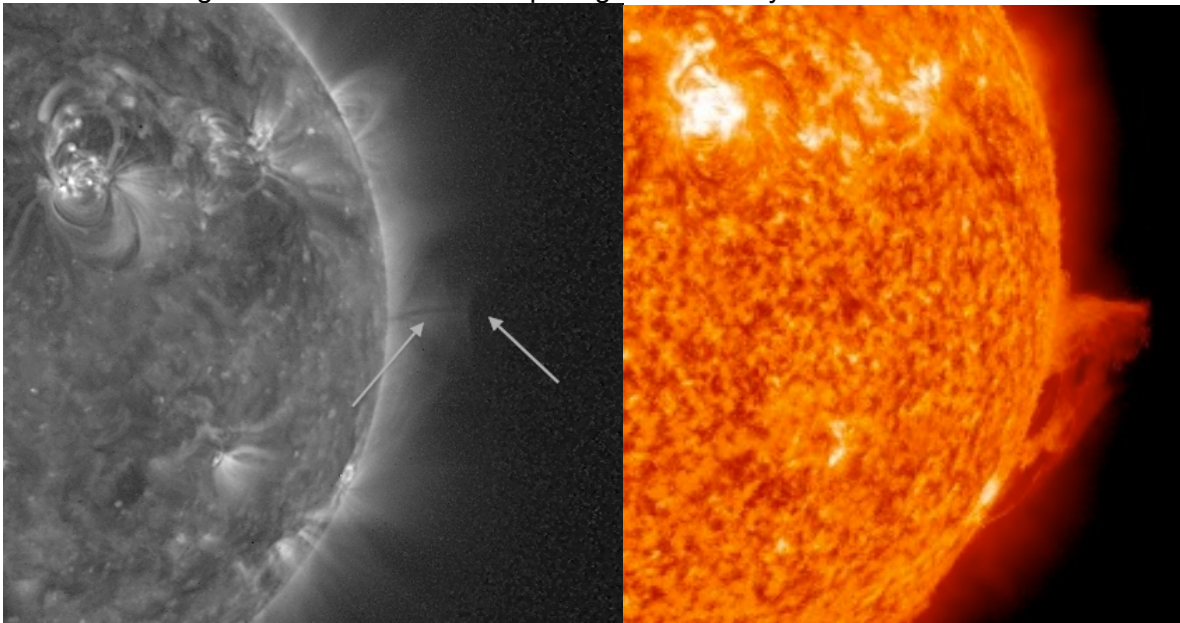
Also AR1119 produced one C1.0-flare on Tue at 08:09, associated with a south-directed LASCO CME.

**SWAP** observed AR1117 in all its glory, continuously flaring over several days.

In addition, on Oct 25-27 two filaments on the West limb got activated and the Northern one erupted on Oct 26.

The prominence plasma was especially visible in 30.4nm (e.g in SDO/AIA data) but SWAP 17.4nm showed a narrow dark line which was co-aligned with the main axis of the active prominence, and a dark cavity above it (see figures below for the Southern prominence).

We presume the dark line shows that part of the cool prominence plasma which was dense enough to absorb the EUV light. More detailed analysis and comparisons with the other AIA lines is ongoing. This is an interesting scientific event to study further as the cavity can only be seen in SWAP. The edge of the AIA FOV is hampering further analysis in SDO data.

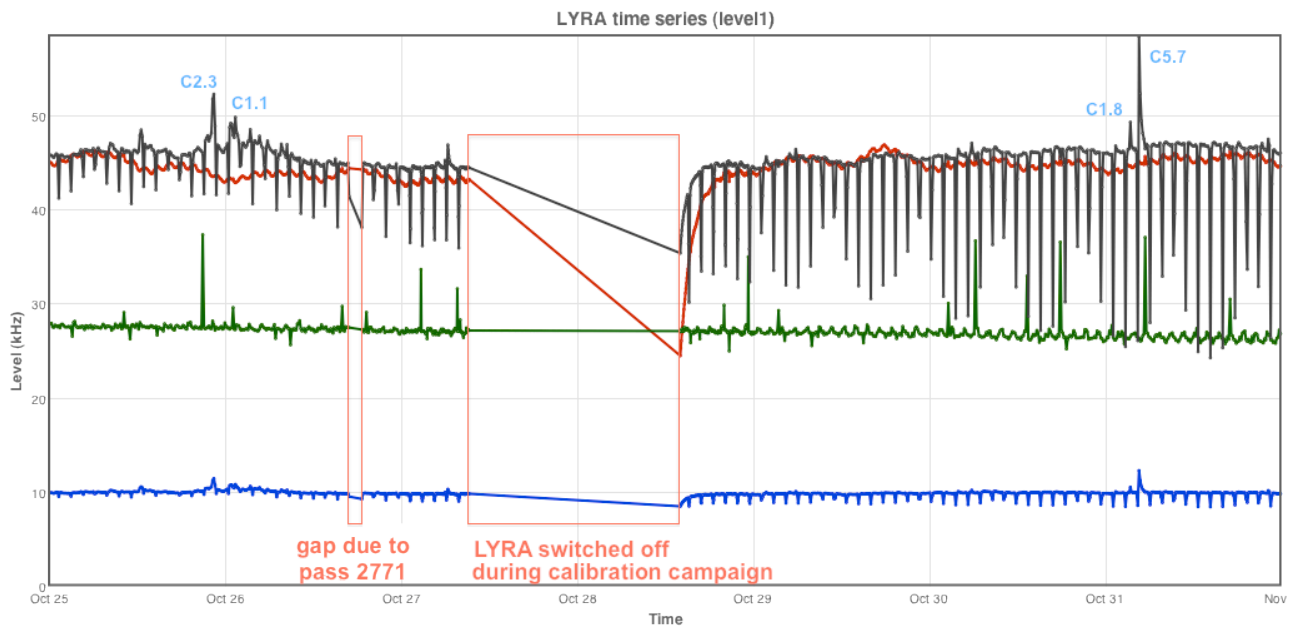


PROBA2/SWAP 17.4nm 2010-10-27 9:43

SDO/AIA 30.4nm 2010-10-27 9:48

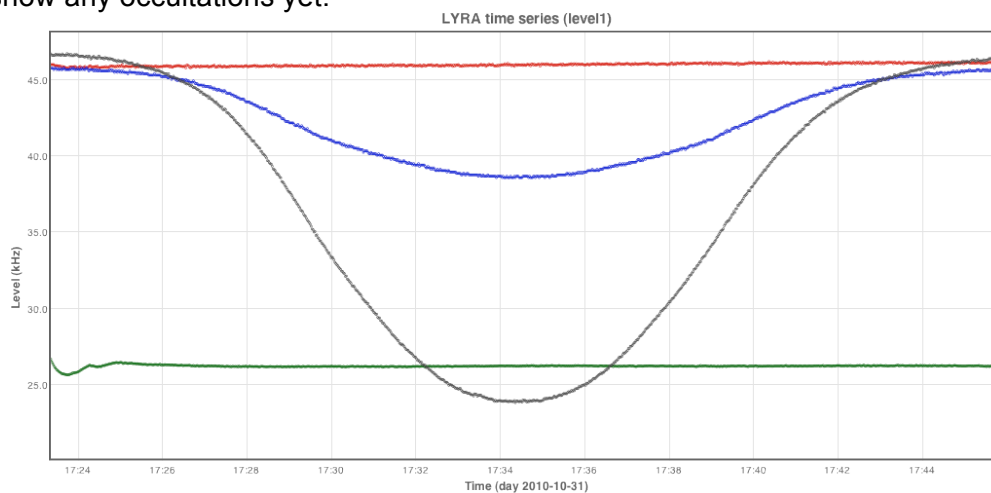
**LYRA** caught all C flares except the one on Wed Oct 27 .

LYRA overview of the week:

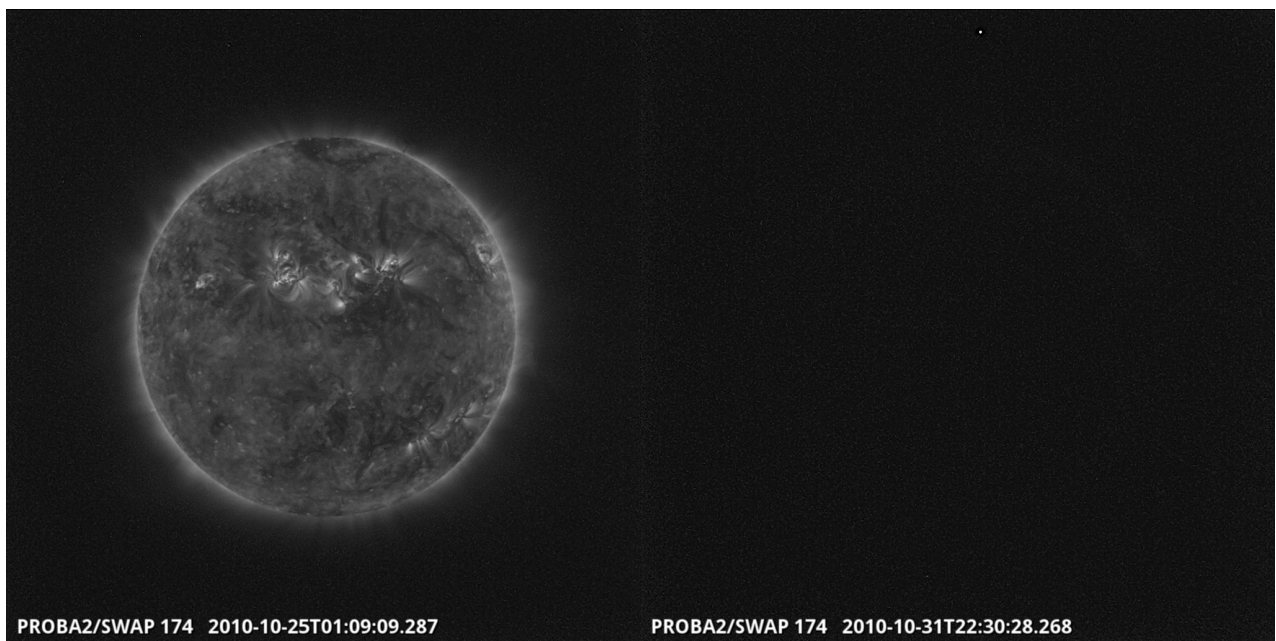


**PROBA2** experiences more and deeper EUV eclipses. The lowest tangential altitude reached this week was 147km on Oct 31.

The effects of the EUV eclipses are more and more present in LYRA-Al and Zr channels. Ly-a and Zr do not show any occultations yet.



Also SWAP images are obscured and occulted: see difference between the eclipse maxima at the start and end of the week - 265km and 160km tangential altitude respectively:



### Scientific campaigns

No campaigns were scheduled to support specific scientific observations.

But dedicated tests were performed to avoid downloading occulted SWAP images. In the Planning Tool Interface (PTI) a script was added which automatically generated IOS commands to

- 1) skip SWAP images by holding the acquisition during the eclipse period
- 2) give all SWAP images taken during eclipses a very low priority (these will probably be overwritten onboard)

Both algorithms were successfully tested on Oct 30 0-8UT (type 1) and Oct 31 0-8UT (type 2) via SWAP IOS00197.

### Outreach, papers, presentations, etc.

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### To be explored

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## 2. LYRA instrument status

### Calibration

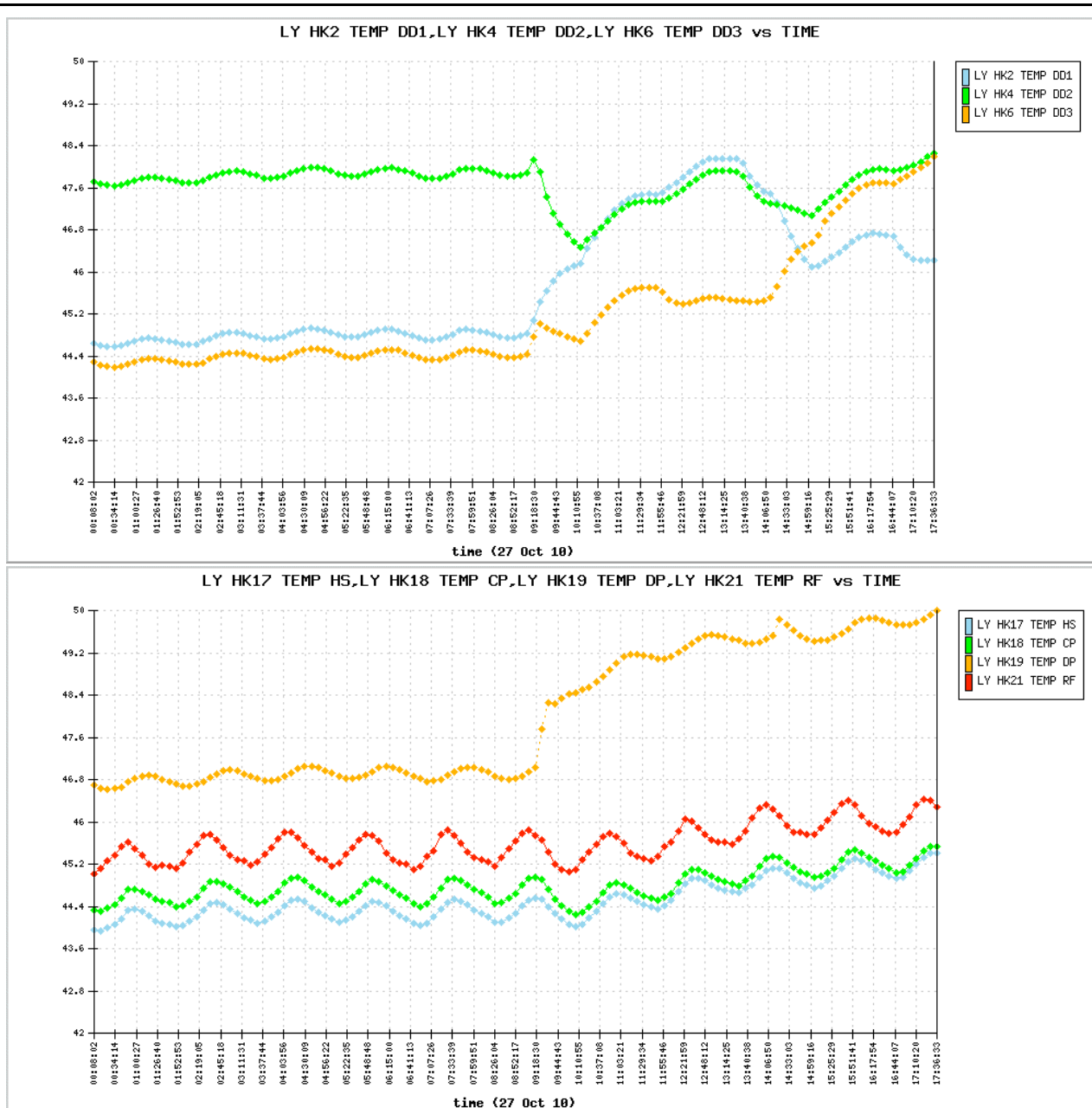
On Oct 27 9:13-19:00UT the biweekly calibration campaign was scheduled with dark current acquisition and LED acquisitions with unit 2+unit1 and then unit2+unit3. All went fine until 17:37, 1,5 hours before the planned end of the calibration campaign.

Due to the high initial temperature of the LYRA instrument and the temperature increase when LEDs are switched on and 2 units are acquiring together, one of the LYRA temperatures LY HK19 TEMP DP (Digital Print) reached 50 degrees towards the end of the campaign. As a consequence,

**LYRA was switched off at 17:37UT** with event:

*Event 351 EVT\_LYRA\_TEMP\_DIGITAL\_PRINT\_HIGH\_LIMIT*

Also the detector temperatures of LYRA were quite high at that moment:



The backup acquisition campaign with units 2 and 3, scheduled from 19UT to 19:30UT did not take place due to the switch-off.

## IOS & operations

LYIOS00096 was written to perform the biweekly calibration campaign, as described above.

LY IOS00097 & SW IOS00195 were sent to schedule a paving campaign for Oct 28 but they were both cancelled by LYIOS00099 and IOS00196. As LYRA had been switched off, the paving campaign was postponed to next week.

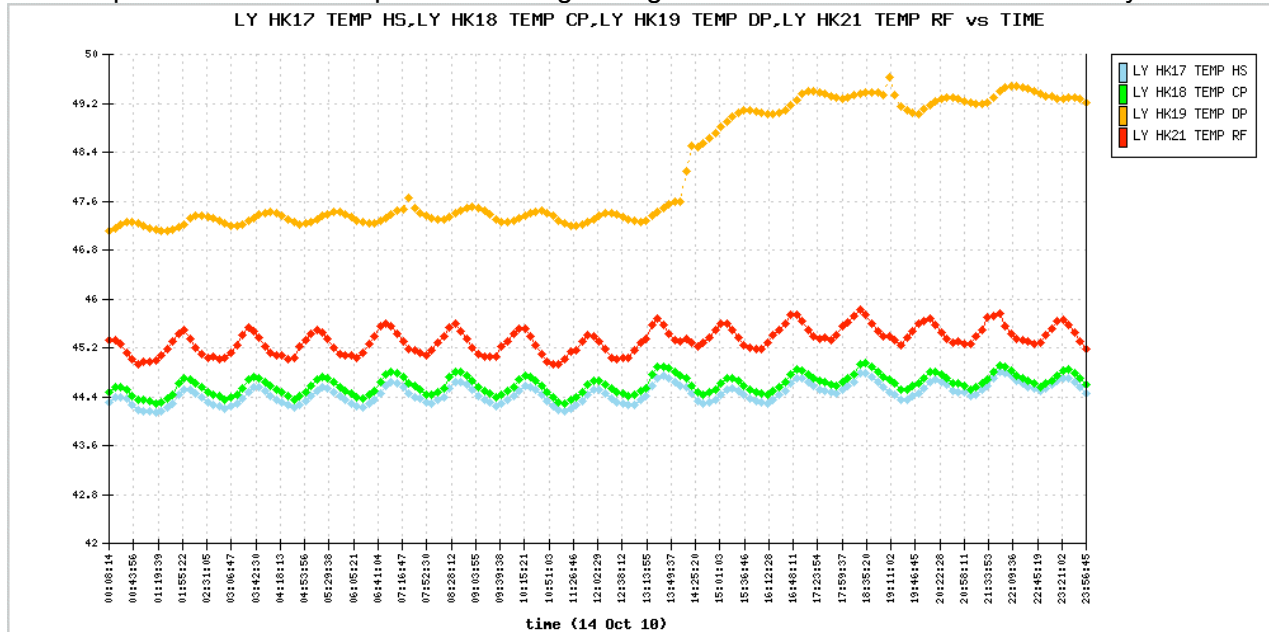
LYRA switched on again by IOS in LYIOS00100. The temperatures were still high (~47 degrees) but the instrument's health was fine.



No other operations were performed the rest of the week.

### To be explored

On Oct 14, exactly the same sequence was used, also with hot background T because of seasonal effect. That time, the temps did not cross 50degrees (although close to). The main difference was that temperature did not keep on increasing during the calibration. We are not sure why.



## 3. SWAP instrument status

### MCPM recoverable errors

increased from 203 to 205 on Oct 27 at 01:23:55UT.

The number of MCPM unrecoverable errors is still 0.

### SWAP calibration

No SWAP calibration was performed this week.

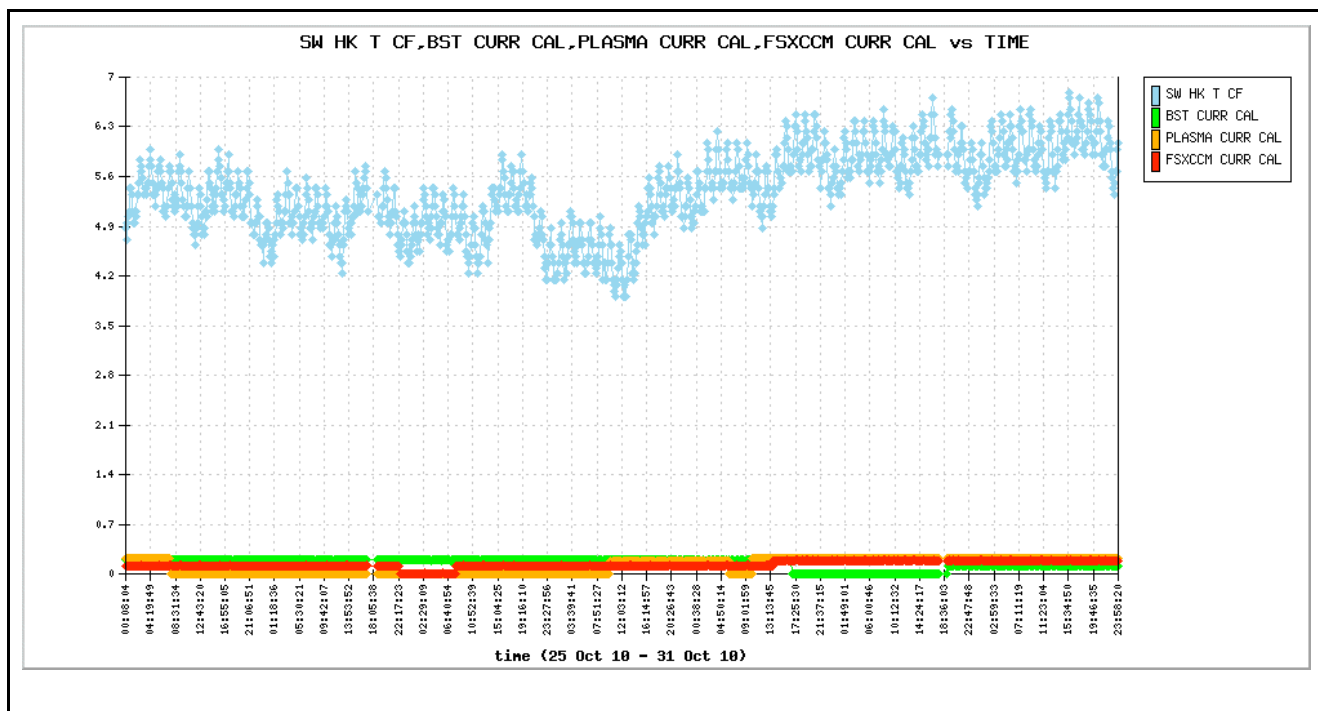
### IOS & operations

- IOS00193 increased the SWAP cadence to 110s
- IOS00194/IOS00195 scheduled the SWAP support during the LYRA paving campaign but was cancelled by IOS00196.
- IOS00197 tested the eclipse skipping by taking **no** SWAP images during eclipse or **only with low priority** on Oct 30-31 am.

### SWAP detector and IIU temperature

The SWAP Cold Finger Temperature fluctuated between 4 and 6.5 degrees Celsius. This is the highest SWAP temperature ever (outside bakeout campaigns).

Effects were seen of LYRA calibration and of other instruments/experiments switching on/off.



## 4. PROBA2 Science Center Status

Anik De Groof was operator during this week.

SWAP daily movies were created manually.

The following tools were updated on the operational server:

Software name	Update	Date	Comment
SWAVINT	r3762	25/10/2010	SWAVINT is now running automatically in the pipeline after each CLOG: FITS files with timelines showing the average SWAP intensity are created per day.
SW-PTI	r3812	29/10/2010	An automatic generation of IOScommands to skip or lower the priority of SWAP eclipse images has been implemented.

## 5. Data reception & discussions with MOC

### Passes

All passes were fine except 3 in which part of data got lost (or corrupted on the way down):

- REDU pass 2771 on Oct 26 (18:30):  
Due to signal interference (between the top and bottom antennas) from 18:30:45z to 18:32:10z, we lost the whole HK store and some SWAP images.

- SVA pass 2802 on Oct 29 (22:24):  
The signal was quite good on this pass but 5 bad SWAP packets were received along the pass. This resulted in 1 SWAP image rejected by our extraction tool and 4 truncated images.
- SVA pass 2810 on Oct 30 (19:58): the signal was very perturbed for the first 3 minutes. The deepest drop of signal happened just when the HK store was being dumped (from 19:59:18z to 20:00:09z) and caused a gap in HK data.

#### **Data coverage HK**

3 gaps were observed:

- Oct 26 Gap from 17UT to 18:30UT due to missing HK data of pass 2771.
- Oct 27 17:37 - 13:40: missing LYRA HK data because the instrument was switched off:  
-> some parameters show their nominal values (labelled Good): COVER status = 0, both for OPEN or CLOSED
- Oct 30: gap in HK data from ~17:45 to ~19UT due to disturbed signal during pass 2810

#### **Data coverage SWAP**

The overall data coverage was fine this week but got hampered by several lost and truncated images. Most longer gaps were caused by:

- On Oct 28, SWAP stopped imaging during 30 minutes to support the ESP test.
- On Oct 30-31, images taken during eclipses were skipped, respectively given lower priorities (and as such overwritten onboard)

Corrupted first packets (image cannot be processed) & truncated data (image can still be partially reconstructed) in the following passes:

- Pass 2763: BINSWAP201010252019170000179015PROCESSED - Corrupted first packet
- Pass 2771: 8 images got lost between passes 2770 and (during) 2771
- Pass 2779: BINSWAP201010270931080000180323PROCESSED - Corrupted first packet
- pass 2801: BINSWAP201010290535000000182045PROCESSED - JPEG data truncated
- pass 2802:
  - BINSWAP201010292022220000182056PROCESSED - JPEG data truncated
  - BINSWAP201010292128220000182068PROCESSED - JPEG data truncated
  - BINSWAP201010291945420000182082PROCESSED - JPEG data truncated
  - BINSWAP201010290646300000182126PROCESSED - JPEG data truncated
- pass 2810: 3 images (numbers) missing.

1 image number missing in passes 2763, 2764, 2769, 2802

#### Statistics for the complete week:

*Total number of images between 2010 Oct 25 00UT and 2010 Nov 01 00UT: 5086*

*Highest cadence in this period: 110 seconds*

*Average cadence in this period: 118.91 seconds -> very good seen the gaps below*

*Number of image gaps larger than 30 seconds: 12*

*Largest data gap: 29.50 minutes -> due to ESP test on Oct 28*

*The other 11 gaps are due to eclipse skipping on Oct 30-31 and are typically 20mins long.*

#### **Data coverage LYRA**

There are 2 gaps in the LYRA data (see Sect 1):



- Oct 26 between 16:54 and 18:30UT because Pass 2771 failed processing:
  - size of packet BINLYRA201010261657530001983856RAW000075809520101026185244 is 1692, but the expected value given in the header is 136
  - size of packet BINLYRA201010261700230001983858RAW429336446820101026185244 is 1719, but the expected value given in the header is 759
  - size of packet BINLYRA201010261702540001983860RAW000076410720101026185244 is 1740, but the expected value given in the header is 1314
  - the filename BINLYRA193512140053150001983864RAW4294519822 doesn't match the naming conventions
  - the decompression of the lump failed on the following error: local variable 'uncompressedlumpname' referenced before assignment
- Oct 27 17:37-13:40 due to instrument being switched off.

## 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
DSLPL	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
IU	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