P2SC-ROB-WR-070-20110718 Weekly report #070	**P2SC Weekly report**	
Period covered: Date: Written by: Released by:	Mon Jul 18 to Sun Jul 24 2011 Mon Jul 25 2011 E. Pylyser M. Dominique	Royal Observatory of Belgium PROBA2 Science Center
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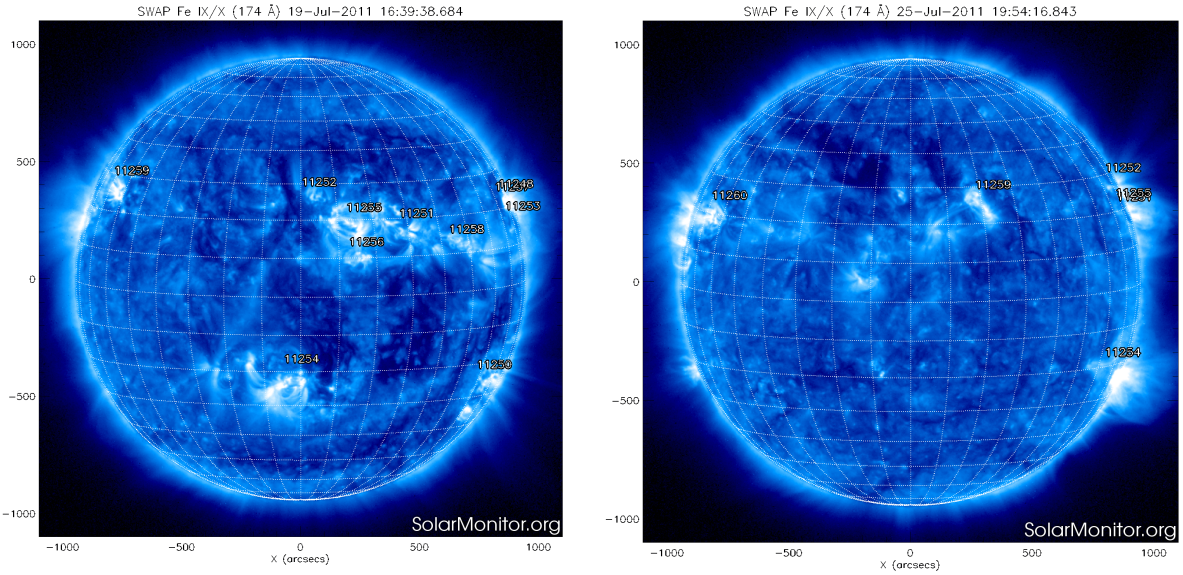
1. Science

Solar & Space weather events

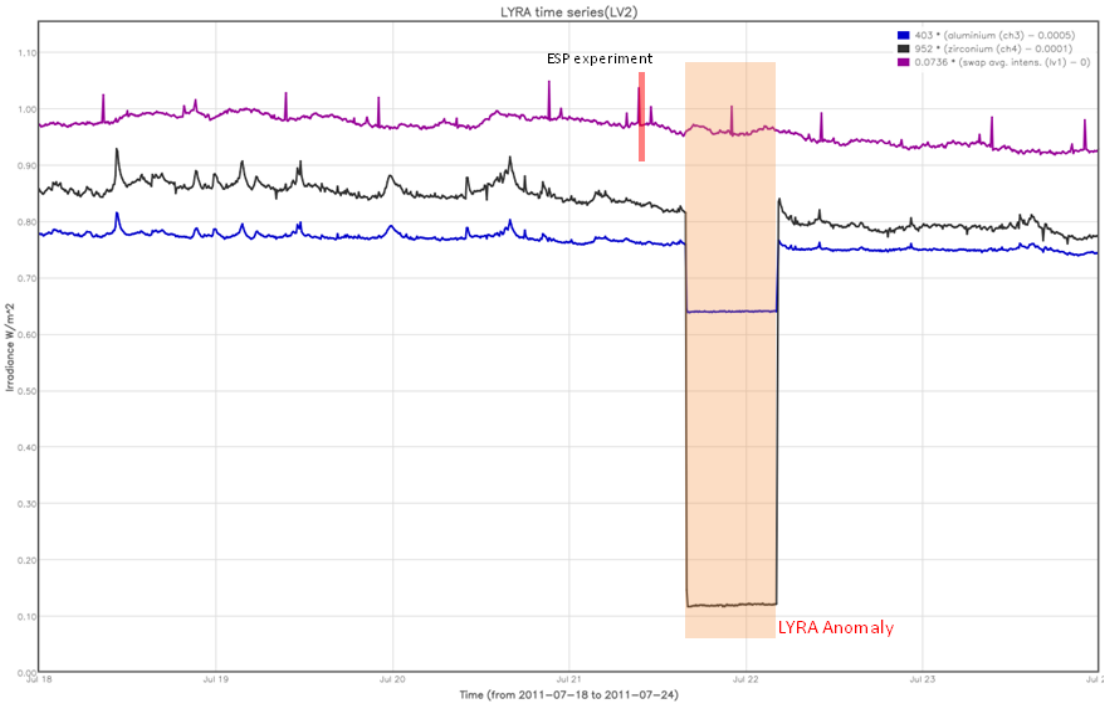
Overview

The SWAP images of Jul 18 and Jul 24 are shown below, with annotated active regions:



The solar activity was low this week. Flare activity was limited to B flares and 1 C1.0 flare on Jul 18.

Week overview of LYRA Al/Zr signals and SWAP average intensity (SWAVINT in purple):



The calibration campaigns are annotated in blue, data gaps in red. The peaks in LYRA signals are due to solar flares. The tiny, periodical peaks in SWAVINT were caused by crossing over the SAA. At 21/07-15:57, LYRA exhibited unexpected behavior (see section 2 for details). An anomaly report was created (see below).

Scientific campaigns
There were no scientific campaigns performed this week. The calibration campaigns are described in the sections below.

Outreach, papers, presentations, etc.
/ (quiet holiday week)

To be explored
/

2. LYRA instrument status

Calibration
No calibration this week**.**

IOS & operations

Monday 18 Jul	Tuesday 19 Jul	Wednesday 20 Jul	Thursday 21 Jul	Friday 22 Jul	Saturday 23 Jul	Sunday 24 Jul
Nominal acquisition LYIOS00180	Nominal acquisition LYIOS00180	Nominal acquisition LYIOS00180	Nominal acquisition LYIOS00180	Nominal acquisition re-initialised by command - IOS00181 - during pass 5022 LYIOS00181	Nominal acquisition LYIOS00181	Nominal acquisition LYIOS00181

At 21/07-15:57, LYRA exhibited unexpected behavior. It started acquiring dark current at 15:57 and at 21:30 the HK COV data showed closure of COVER2. A warmup command, re-initialising LYRA nominal unit 2 acquisition, was sent on 22/07 (pass 5022) and executed successfully. LYRA resumed nominal acquisition of data at 04:18 on 22/07. The exact cause of this behavior is (as yet) unclear. An anomaly report was created (ref. email Anik Degroof, Fri 7/22/2011 10:52 AM) + addendum (ref. email Marie Dominique Mon 7/25/2011 1:40 PM):

Jul 21 whole day upto 16UT:
LYRA is acquiring with unit 2, nominally, and all signals and HK data look fine. No command was given since last week.
The only thing that happened today was an ESP test (SWAP halted acquisition) from 09:52 to 10:21.

Jul 21 16:00UT: ***LYRA anomaly - unexplained upto now:***
** The LYRA signal drops suddenly to dark current levels.*
** The temperature of detector 2 suddenly drops as well, with 2 degrees.*
** The 2 other unit's temperatures slightly increase, probably because of plasma experiments have been switched on at 10UT.*
This could all be explained by cover 2 being closed at 16:00 but:
** no command was given, no event was reported*
** the HK parameters LYRA COV 2 OPEN and LYRA COV2 CLOSED are as expected: resp. 1 and 0*

Jul 21 18UT:
The behaviour above is noticed by P2SC after pass 5216. As the situation was still the same (and unexplained) after pass 5218 (20UT), an IOS00181 was sent to get back to nominal acquisition after the 1st upload pass which is pass 5220 on Jul 22 at 4UT.

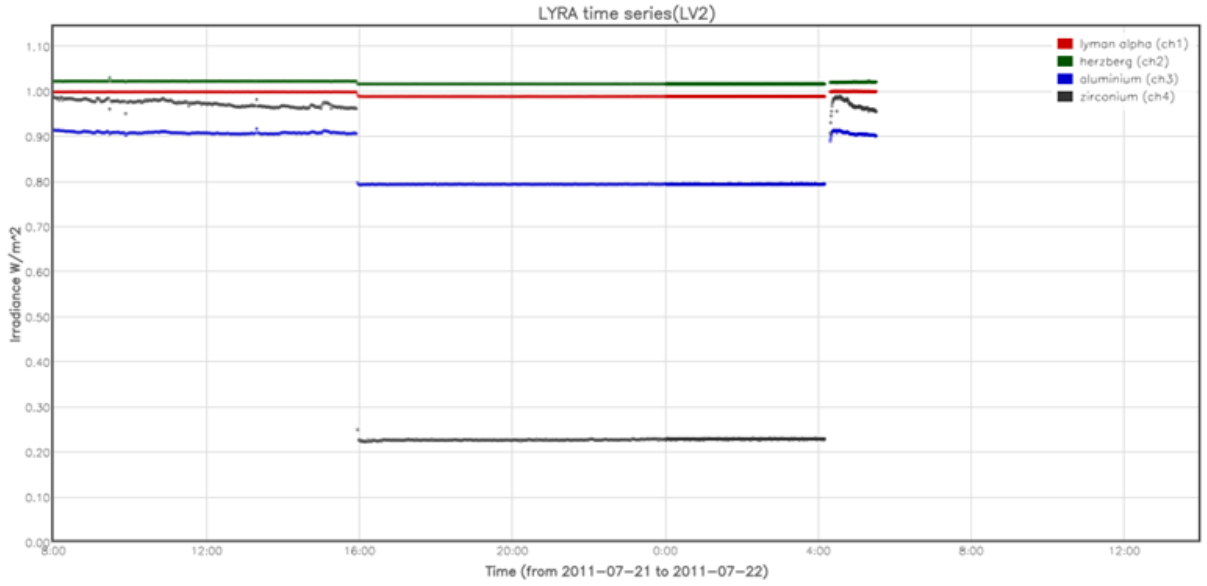
Jul 21 21:30UT:
** LYRA COV 2 OPEN and LYRA COV2 CLOSED switch to 0 and 1 respectively.* ***It is not clear why.***
** All LYRA detector temperatures now decrease (while nothing changes in HK values for COV1 and COV3).* ***Also unclear why.***
** No event is reported at that time. No command was given.*

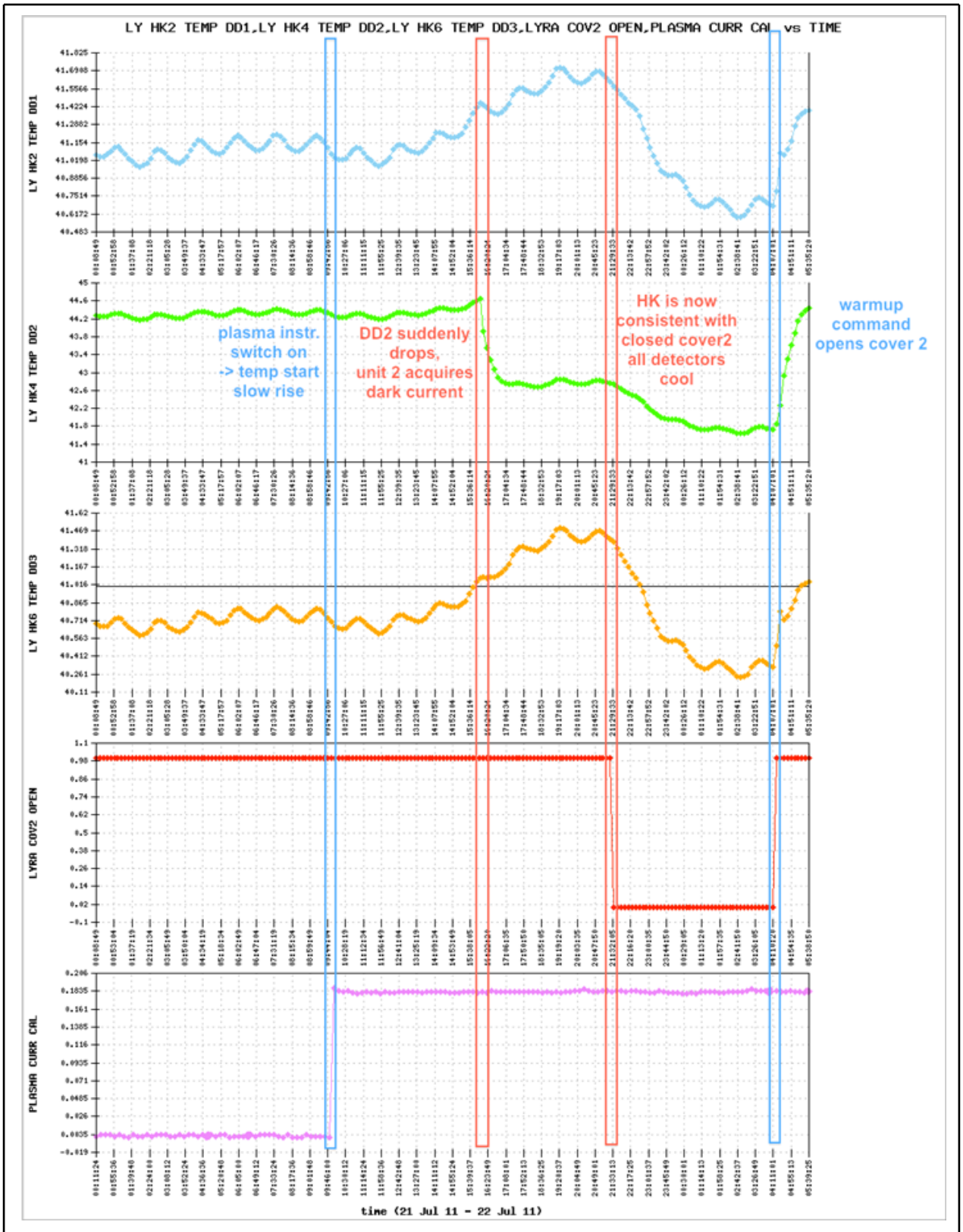
Jul 22 4:10UT: LYRA command to start a warmup (during which covers are closed), then open cover 2 and start acquiring nominally at 4:18UT.

Jul 22 04:16UT: LYRA COV 2 OPEN and LYRA COV2 CLOSED switch to 1 and 0 respectively. The cover is open again and HK data is consistent.

<u>Jul 22 04:18UT</u>: The LYRA unit 2 signal shows solar signal again.

Conclusion: there was an anomaly which is still not explained, but due to a new IOS, LYRA is back to normal. It is not clear what caused the anomaly and why the HK parameters were not consistent with the instrument. In addition, they switched to a consistent value 5,5 hours later than the anomaly. The latter 5,5 hours ring a bell: this is probably the period of the automatic calibration set in LYRA. Still it is not fully understand how this all happened …



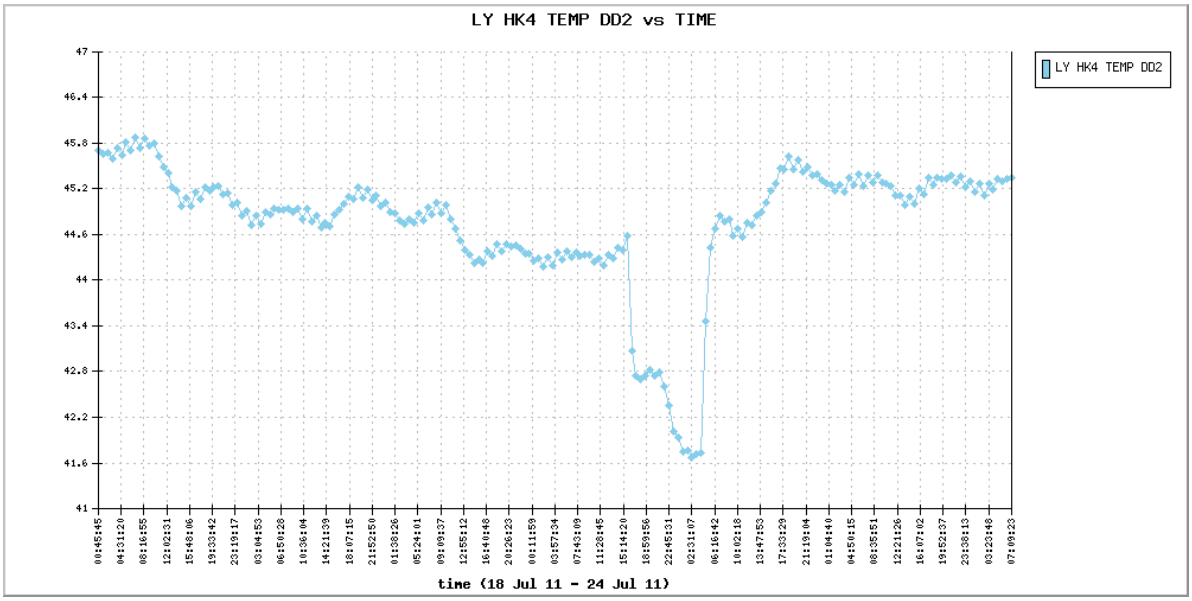

LY HK2 TEMP DD1,LY HK4 TEMP DD2,LY HK6 TEMP DD3,LYRA COV2 OPEN,PLASMA CURR CAL vs TIME
LY HK2 TEMP DD1
LY HK4 TEMP DD2
LY HK6 TEMP DD3
LYRA COV2 OPEN
PLASMA CURR CAL
plasma instr. switch on -> temp start slow rise
DD2 suddenly drops, unit 2 acquires dark current
HK is now consistent with closed cover2 all detectors cool
warmup command opens cover 2
time (21 Jul 11 - 22 Jul 11)

Marie Dominique: On Mon 7/25/2011 1:40 PM:

A few additional comments:
- lyra voltages (especially +28V and +5V) dropped and currents raised at 16UT. All went back to normal at 21:30
- both transition happened directly after a 10 sec VFC calibration

LYRA detector temperature

The LYRA detector 2 temperature (nominal unit) fluctuated between 44.2C and 45.8C not taking into account the temperatures during the LYRA anomaly. The anomaly can be seen in the figure below at the large drop of temperature on 21/22 Jul.



To be explored

* the behavior of LYRA on 21/07/2011.

3. SWAP instrument status

Calibration
No calibration campaign was executed this week.

MCPM recoverable errors
increased from 129 to 137 this week. The number of MCPM unrecoverable errors is still 0.

IOS & operations

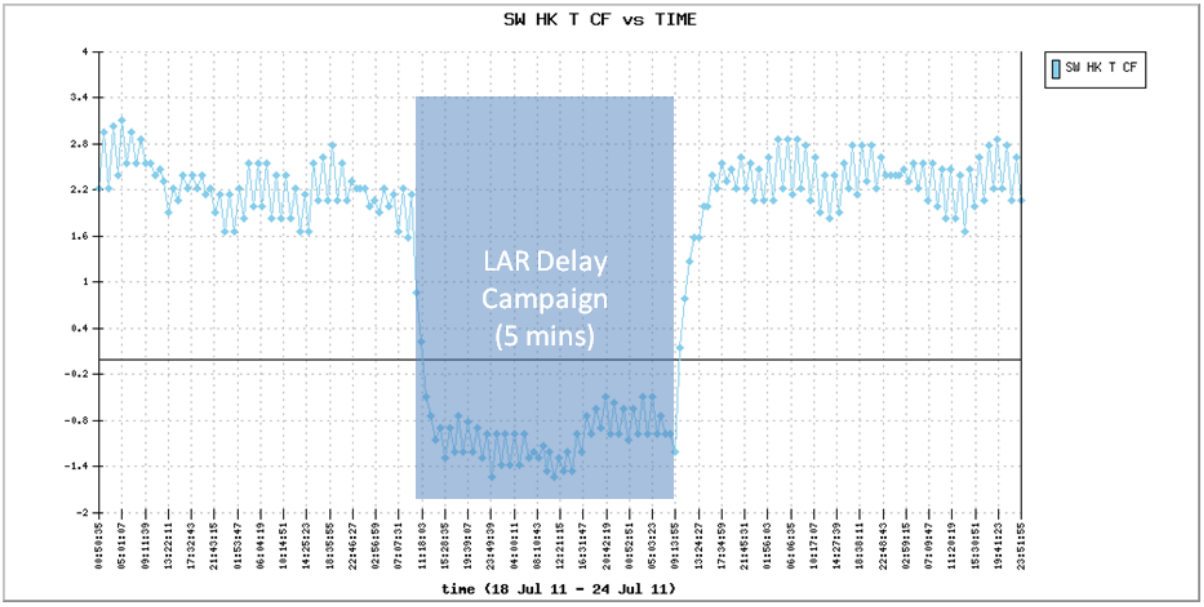
Monday 18 Jul	Tuesday 19 Jul	Wednesday 20 Jul	Thursday 21 Jul	Friday 22 Jul	Saturday 23 Jul	Sunday 24 Jul

Nominal acquisition IOS00317 698 images	Nominal acquisition IOS00317 762 images	Nominal acquisition + LAR delay IOS00317 749 images	Nominal acquisition + LAR delay and ESP campaigns IOS00318 702 images	Nominal acquisition + LAR delay campaign IOS00318 697 images	Nominal acquisition IOS00318 740 images	Nominal acquisition IOS00318 735 images

- From Jul 20 09:05 to Jul 22 09:05, LARs were delayed by 5 min in order to test the impact of such a delay on SWAP detector temperature.
- The weekly ESP campaign took place on Jul 21 from 09:52 to 10:22

SWAP detector temperature

The SWAP Cold Finger Temperature fluctuated between 1.6C and 3.2C in nominal conditions. From Jul 20 09:05 to Jul 22 09:05, LARs were delayed by 5 min in order to test the impact of such a delay on SWAP detector temperature. A delay in LAR times causes the SWAP radiator to be more exposed to deep space (when it is facing Earth it is heated), and is expected to result in lower SWAP detector temperatures. This effect was indeed seen. At the start of the LAR delay campaign, a decrease of 3C to 3.6C was observed. The temperature increased again to 2.5C after the test was finished.



To be explored

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4. PROBA2 Science Center Status

E. Pylyser was operator during this week.

On 18/07, the following ground commands were executed manually:

/p2sc/bin/LMAT/scheduler.pl --cron LYQLK --args "ADP 2011-07-15T07:04:02Z 2011-07-15T07:05:09Z"

/p2sc/bin/LMAT/scheduler.pl --cron LYQLK --args "ADP 2011-07-14T23:14:04Z 2011-07-14T23:15:44Z"

The following tools were updated on the operational server:

Software name	Update	Date	Comment
SWEDG	TBC	19/07/2011	Installed fix for SWAP plate scale confusion
SWBSDG	r4146	19/07/2011	Installed fix for SWAP plate scale confusion
SWTMR	rebuilt (r4032)	19/07/2011	Installed fix for SWAP plate scale confusion
SWMPG	r4148	19/07/2011	Installed fix for SWAP plate scale confusion
PPT	r4144	19/07/2011	Installed fix for SWAP plate scale confusion
libswap	r4148	19/07/2011	Installed fix for SWAP plate scale confusion
LMAT-UI	r4150	19/07/2011	made more efficient by including an index on ‘messageID’ and ‘runID’ columns in all log databases
complete update repository	r4150	19/07/2011	
support/cinema	rebuilt (r4143)	19/07/2011	

5. Data reception & discussions with MOC

Passes
In general the data reception this week was nominal. There were no passes containing corrupted or (more than 2) truncated data.

Data coverage HK
The HK data were complete this week.
Pass 5215 HK data ended up in LYRA_AD 5216

Data coverage SWAP

The SWAP data were as planned this week.

Statistics for complete week:

Total number of images between 2011 Jul 18 0UT and 2011 Jul 25 0UT: 5102
Highest cadence in this period: 110 seconds
Average cadence in this period: 118.54 seconds
Number of image gaps larger than 300 seconds: 3
Largest data gap: 29.00 minutes

Data gaps occurred from:

- 09:52 to 10:22 on 21/07 (ESP campaign - 29 minutes)
- 2 small gaps (max 5.50 min) on 18/07

Data coverage LYRA
The LYRA data were as planned this week, except for the anomaly.
Dark current was recorded from Jul 21 - 15:57 to Jul 22 - 04:12 (LYRA anomaly)

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
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
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
SWAVINT	SWAP AVerage INTensity
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