P2SC-ROB-WR-061-20110516 Weekly report #061	**P2SC Weekly report**	
Period covered: Date: Written by: Released by:	Mon May 16 to Sun May 22 2011 Wed May 25 2011 Carlos Cabanas Anik De Groof	Royal Observatory of Belgium PROBA2 Science Center
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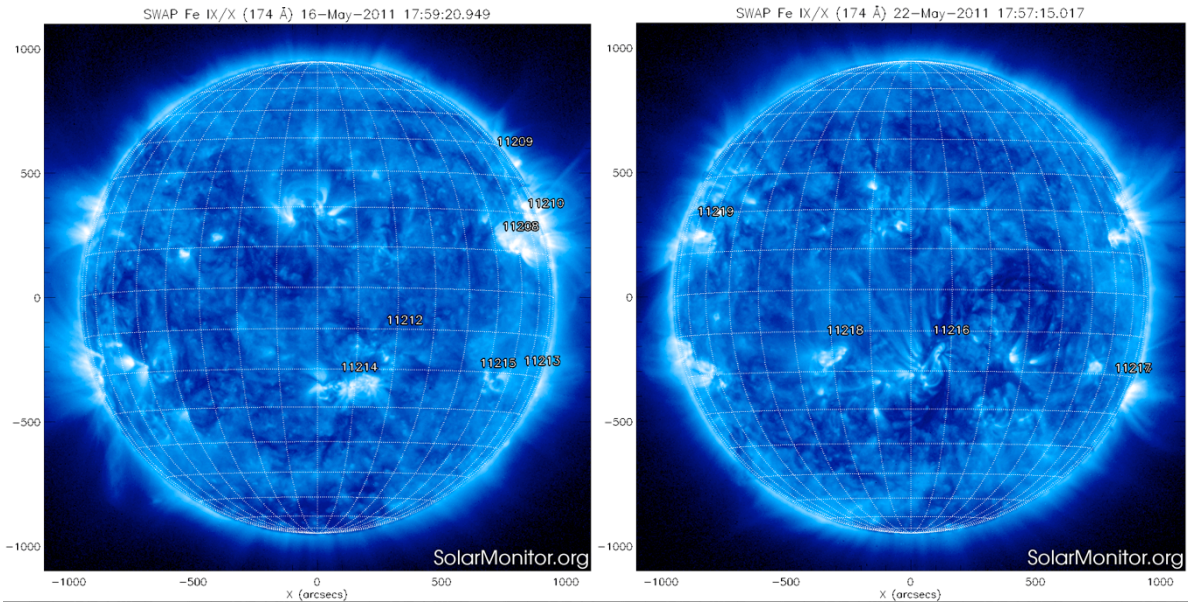
1. Science

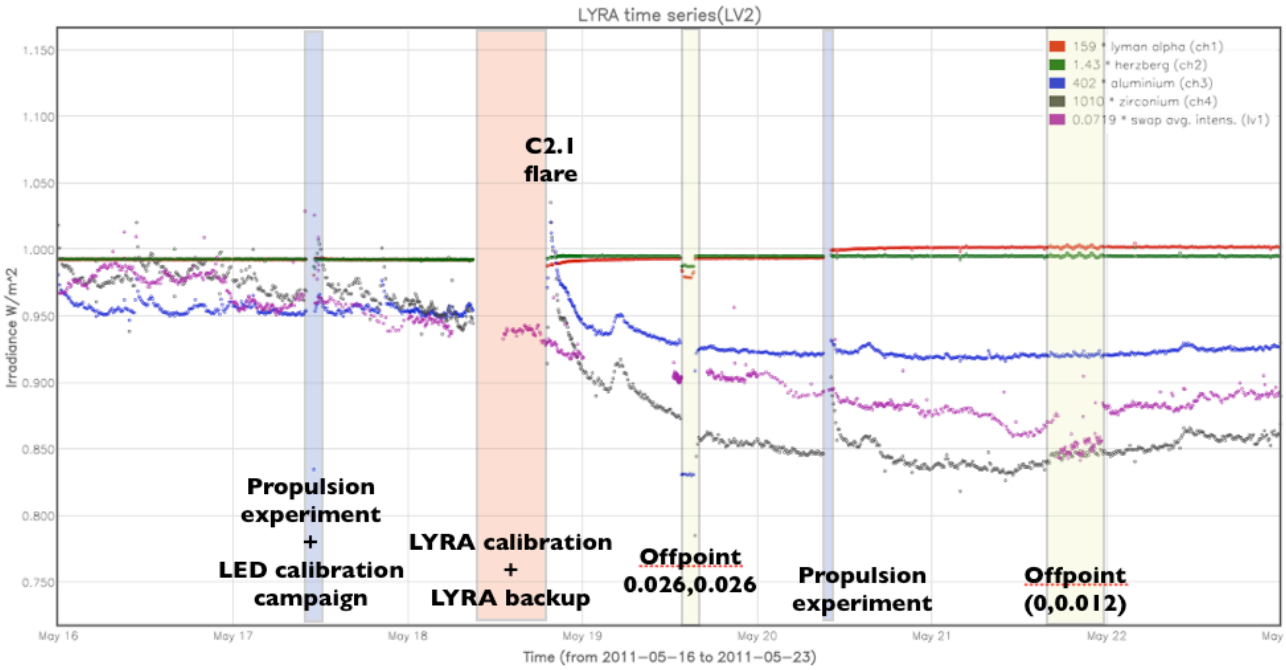
Solar & Space weather events



The two figures above show the active regions on SWAP images in the beginning and end of the reporting period.

Solar activity remained low during the whole week. There were just a couple of C flares during the week: a C1.2 and a C2.1 on Wednesday 18 at 12:59 and at 18:30 respectively. The first flare was not

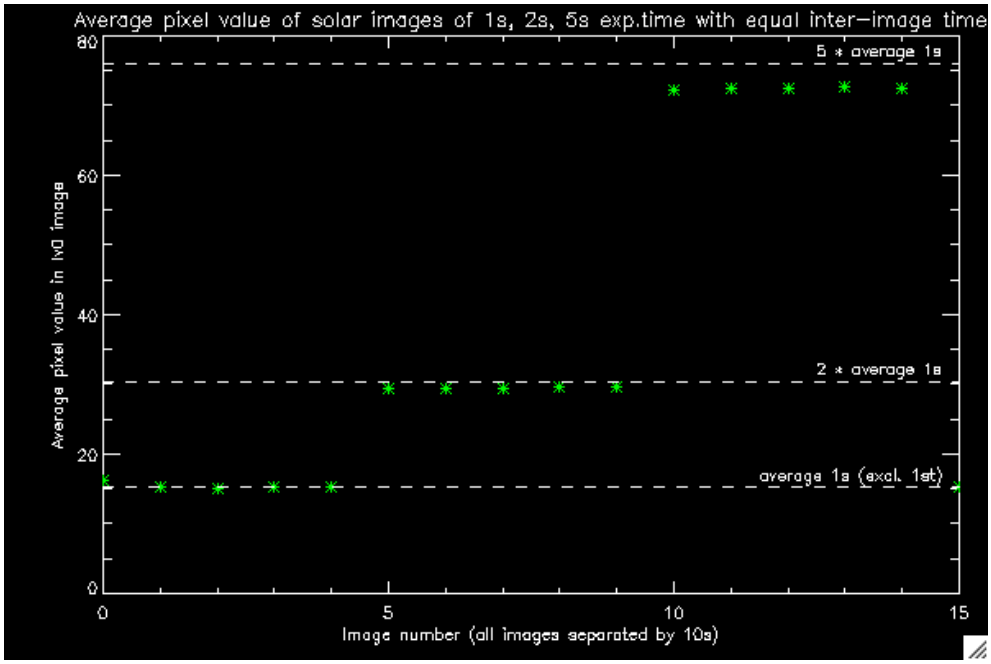
recorded by LYRA as it happened during calibration.
Zirconium and Aluminium showed the active regions disappearing along the week.



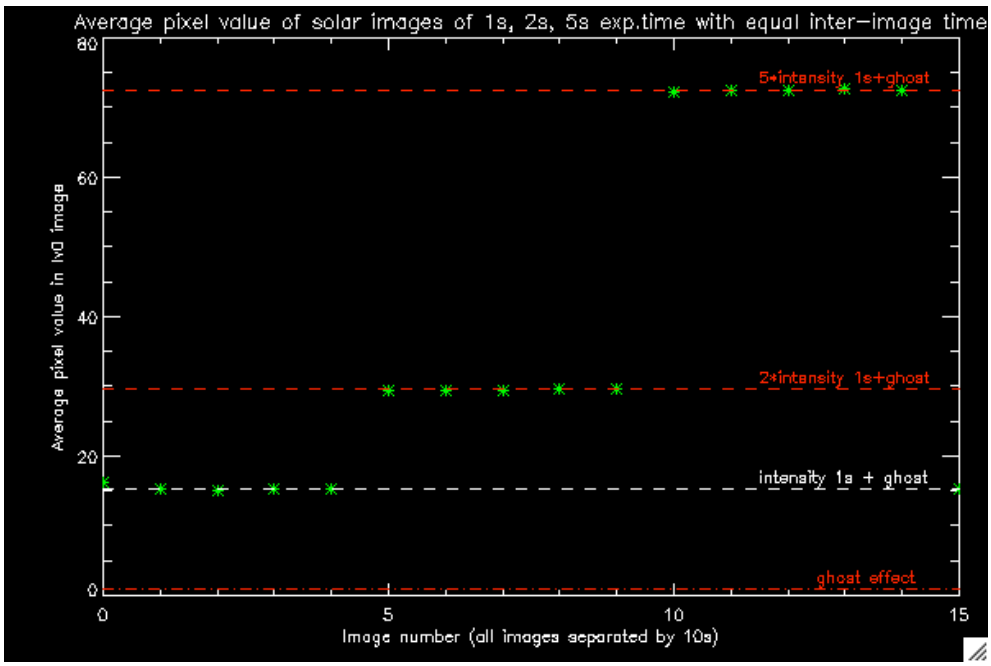
Lyman Alpha and Herzberg presented a jump after the propulsion experiment that cannot be explained.

Scientific campaigns

Name: **CDS ghost effect campaign**
Period: Tuesday 17th from 11:39 to 11:43 UT.
Aim : Attempt to understand the ghost effect in CDS images, often seen in SWAVINT when SWAP cadence changes.
Asked by: Anik De Groof
Results: The campaign was based on three sets of small exposure time images (1s,2s and 5s) with and inter-image time of 10s.
Below, the average pixel value for every (lev0) image is plotted.



The first campaign image shows a deviating average pixel intensity, because it was preceded by 30s of no imaging (and not 10s as for the other images). The attempt to match the average intensity of 2s and 5s images by multiplying the average intensity of 1s images failed, as it can be seen by the dashed lines.
This was expected as we believe that the 'average 1s' is the sum of the real sun intensity after 1s exposure time + some kind of ghost which is constant in this particular campaign.
If we calculate the ghost as 2 * 'average 1s' - 'average 2s' and we then model the average intensities we get the following result:



It is important to remark that dark current was not taken into account. It is now part of the 'intensity 1s' and is taken to evolve linearly for images of 1 to 5s integration time. Even if it is not totally true, it is not far off as these images were taken at 0degrees Celsius.
The simple approach used above will not hold for longer exposures.

Name: **Photon Transfer Curve Campaign**
Period: Thursday 19th from 13:30 to 15:24 UT.
Description: 11 different set of off-pointed LED sequences.
Asked by: Katrien Bonte
Results: Not yet

Name: **High cadence campaign**
Period: Thursday 19th from 12:30 to 13:30 UT.
Description: imaging every 60 seconds, instead of 120 seconds.
Aim: Coordinated campaign with other observatories/instruments such as: Hvar Observatory: (H-alpha and white light), SDO, Kanzelhoehe Observatory, RHESSI and some radio observations to monitor active regions.
Asked by: Roman Brajsa, Hvar Observatory, Faculty of Geodesy, University of Zagreb
Results: High spatial resolution movies from Hvar Observatory (in H-alpha) were produced to be compared with SWAP movies. Analysis ongoing.

Name: **Possible limb eruption campaign**
Period: Saturday 21th from 17:20 to 13:20 UT.
Description: imaging every 60 seconds
Aim: 6 hours off-pointing to track a possible limb eruption.
Asked by: David Berghmans
Results: No eruptions during the high cadence campaign.

Outreach, papers, presentations, etc.
none

To be explored
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2. LYRA instrument status

Calibration
A LREP_02_calibration campaign took place on Wednesday 18th of May from 09:00 to 18:50.
A backup campaign took place the same day from 19:20 to 19:40.

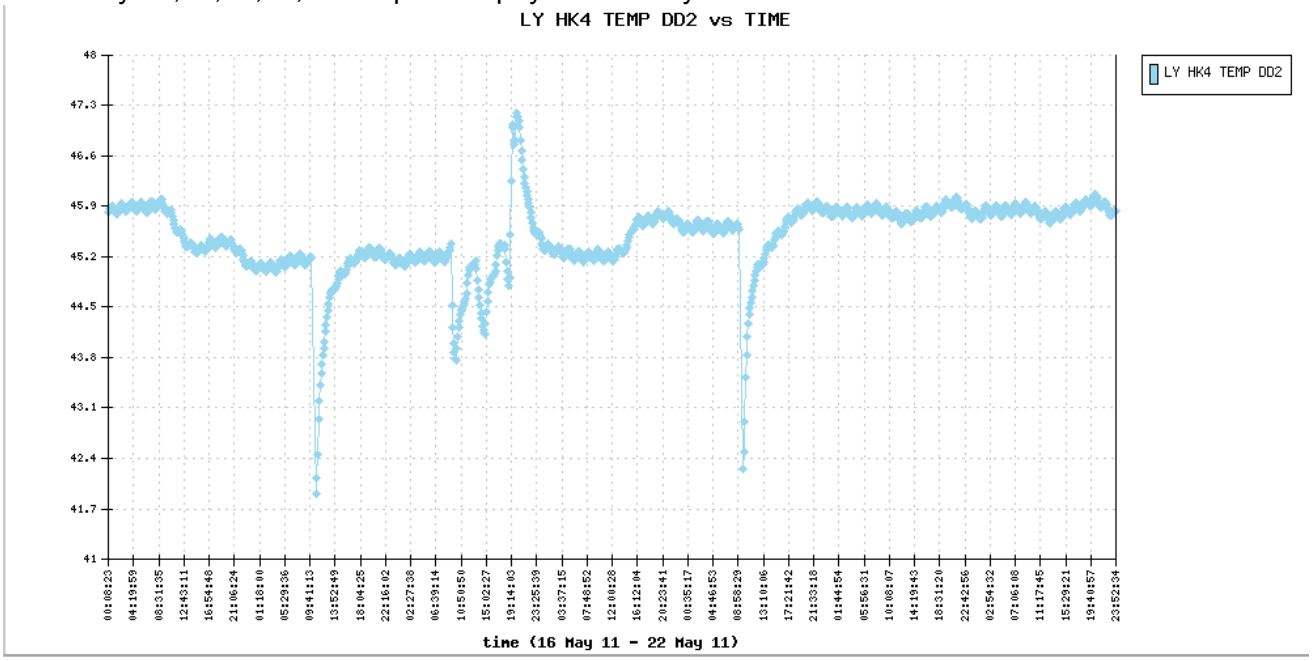
IOS & operations

Monday May 16	Tuesday May 17	Wednesday May 18	Thursday May 19	Friday May 20	Saturday May 21	Sunday May 22
Nominal acquisition (IOS0165)	nominal acquisition + Thruster campaign (IOS0166)	nominal acquisition + LREP_02_Sequence + Backup campaign. (IOS0166)	nominal acquisition (IOS0166)	nominal acquisition + Thruster campaign (IOS0166)	nominal acquisition (IOS0166)	nominal acquisition (IOS0166)

LYRA detector temperature

The LYRA detector 2 temperature (nominal unit) fluctuated between 41C and 47 degrees Celsius. Next effects were seen:

- On May 17 and May 19, the thruster campaign (LYRA off). (the two big hanging stalactites)
- On May 18, the LREP2_calibration campaign. (two little stalactites)
- On May 18 and after the LREP2 campaign, the backup campaign. (big stalagmite)
- On May 16,19,20,21,22 the plasma payload activity.



To be explored

3. SWAP instrument status

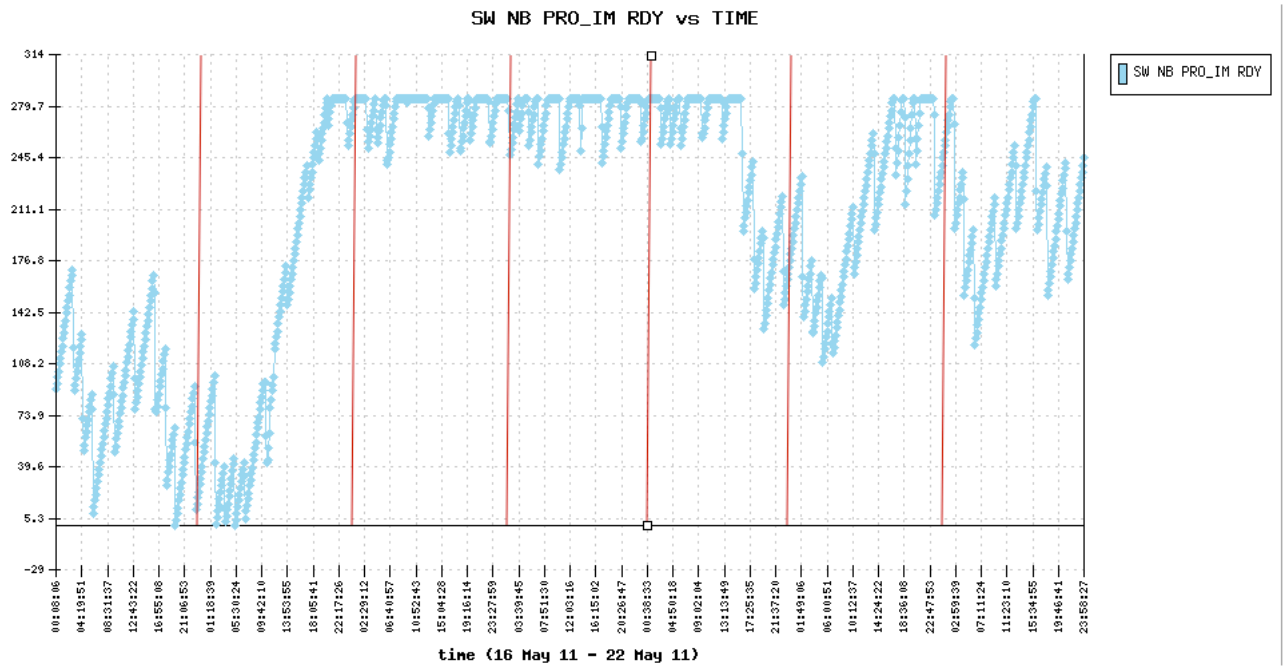
MCPM errors

The number of MCPM recoverable errors increased from 1156 to 1212. The number of unrecoverable errors is still 0.

IOS & operations

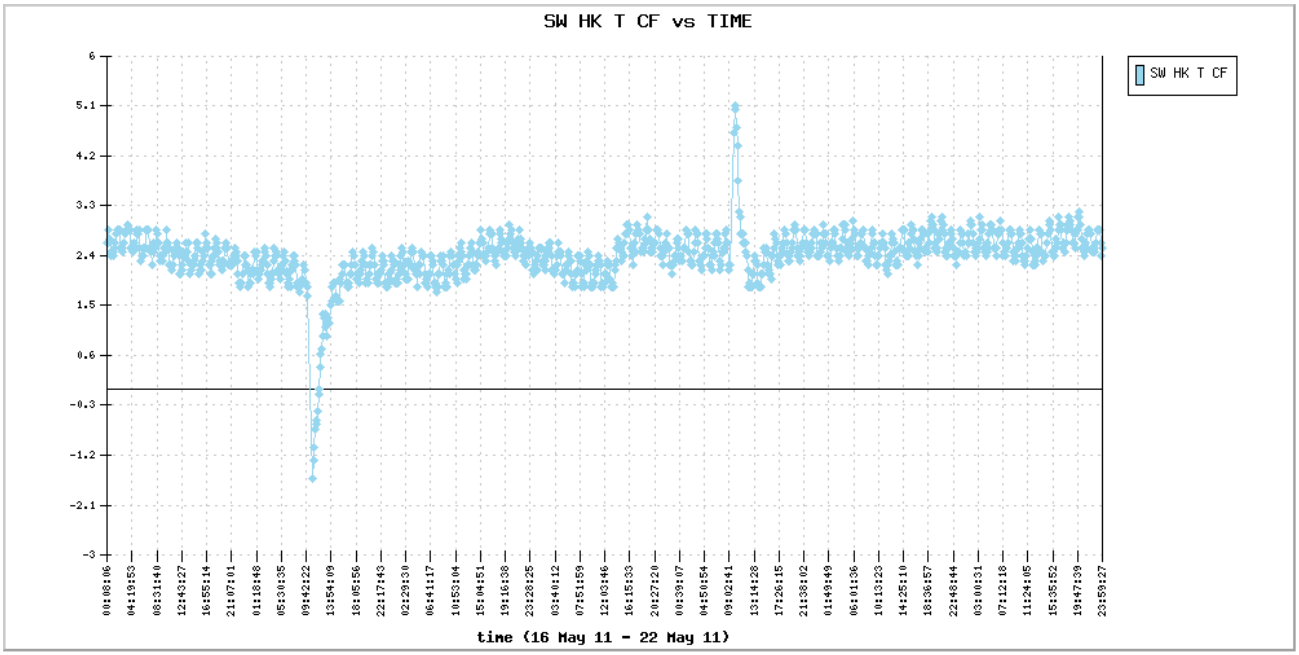
Monday May 16	Tuesday May 17	Wednesday May 18	Thursday May 19	Friday May 20	Saturday May 21	Sunday May 22
Nominal acquisition	nominal acquisition + Thruster campaign + SREP_02_LED_Sequence + CDS Ghost campaign	nominal acquisition + Photon Transfer Campaign	nominal acquisition + ESP jump + High cadence campaign + Photon	nominal acquisition + Thruster campaign	nominal acquisition + offpoint campaign	nominal acquisition

(IOS0294) 720 images	(IOS00295) 476 images	(IOS0295) 479 images	Transfer Campaign (IOS00296) (IOS00297) 429 images	(IOS00297) 418 images	(IOS0298) 730 images	(IOS0298) 653 images



The above figure represent the number of processed images for each day of the week.
Although SWAP imaging cadence was not higher than normally, 120 seconds (except during high cadence and offpoint campaigns), the on board buffer was almost full on Tuesday, Wednesday and Thursday, getting down on Friday, but another time getting full on Saturday. It can be explained by the numerous campaigns where unprocessed images where acquired.

SWAP detector temperature
The SWAP Cold Finger Temperature fluctuated between 1.6 and 2.9 degrees Celsius.
The influence of the thruster campaigns was clearly observed with excursions down to -1.5C on Tuesday May 17 (flight mode in velocity direction) and up to 5 C on Friday May 20 (flight mode in anti-velocity).



To be explored
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4. PROBA2 Science Center Status

Carlos Cabanas was operator during this week.

The following tools were updated on the operational server:

Software name	Update	Date	Comment
swapbsd_catalog.mysql swapeng_catalog.mysql	4067/4077	16/05/11	CLOG: tweak MySQL catalog SWAP eng & bsd schemas (data types)
DCVC	4079	17/05/11	Make sure all OFF and IDLE commands are taken into account when checking covers and power on heads
DCVC	4082	18/05/11	Change DCVC message on MCPM errors from warning to info
PPT	4089	19/05/11	Get rid of checked-in PCK kernels

5. Data reception & discussions with MOC

Passes
BINSWAP_4621 was received twice because first extraction was incomplete.

Data coverage HK
Housekeeping data was complete throughout the week.

Data coverage SWAP
Couple of corrupted packets:
- BINSWAP_4640_RED3_2011.05.19T05.37.24.tar
- BINSWAP_4633_SVA1_2011.05.18T13.22.27.tar

Statistics for complete week:

Total number of images between 2011 May 16 0UT and 2011 May 23 0UT: 3905
Average cadence in this period: 154.88 seconds
Number of image gaps larger than 300 seconds: 438 (due to the priority schema for the scientific campaigns)
Largest data gap: 745.00 minutes (to download all the unprocessed images of the Photon Transfer Campaign)

Data coverage LYRA
Complete

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