P2SC-ROB-WR-043-20110110 Weekly report #43	**P2SC Weekly report**	
Period covered: Date: Written by: Released by:	Mon January 10 to Sun January 16 2011 Mon January 17 Marie Dominique Joe Zender	Royal Observatory of Belgium PROBA2 Science Center
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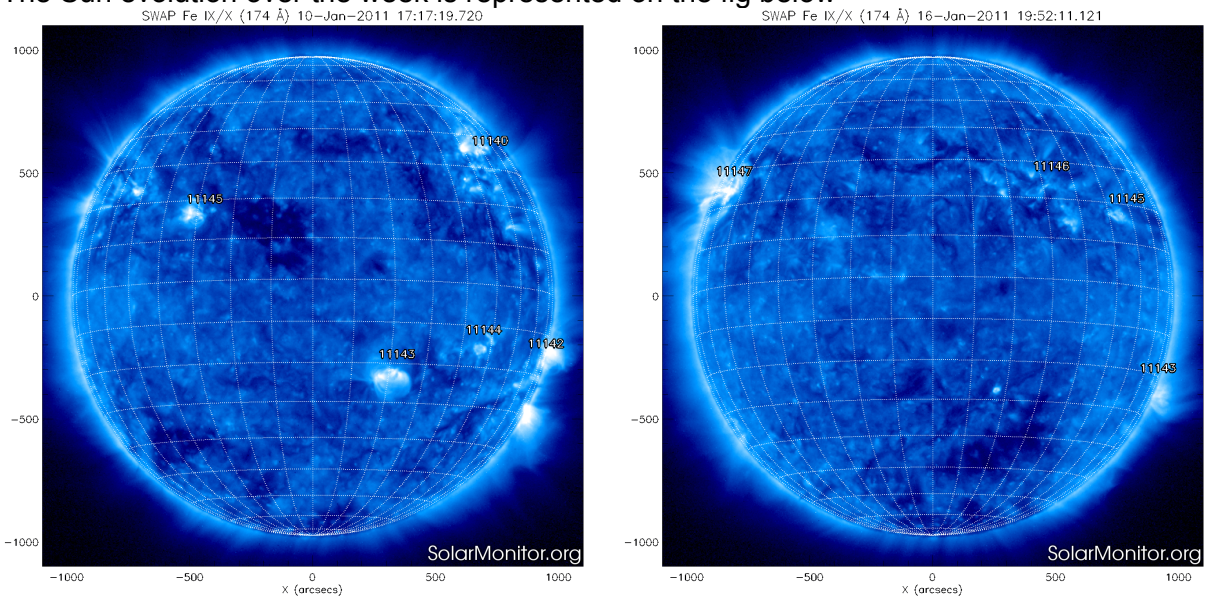
1. Science

Solar activity

The Sun evolution over the week is represented on the fig below

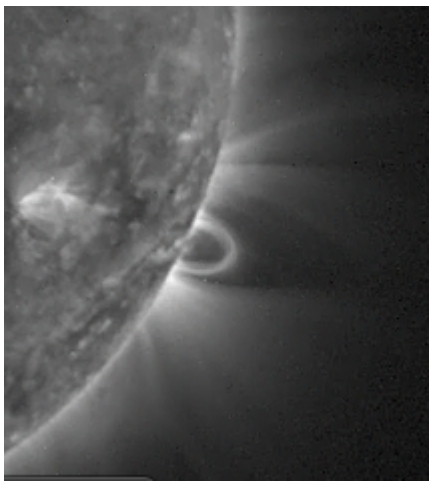


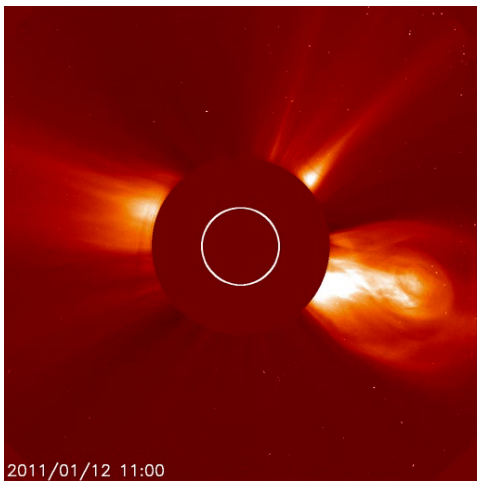
From Jan 12 to Jan 14, regions 11142 and 11147 were very active with flares of intensities up to category C and CMEs. Those two regions were located just behind the limb (respectively west and east) as seen from SWAP when they erupted. And the development of nice post-flare loops could be observed.

On Jan 15 14:20, GOES detected a C1.1 flare, which is not visible on SWAP and LYRA data.

<u>Jan 12</u>

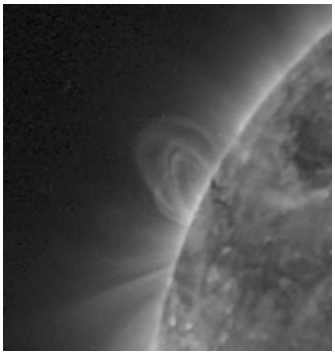
From 10:00, we also observed the development of very well-seen helmet-type structure in SWAP data, from region 11142 (see left fig, from SWAP). This structure was the source of a CME (see right fig, from LASCO).





<u>Jan 13</u>

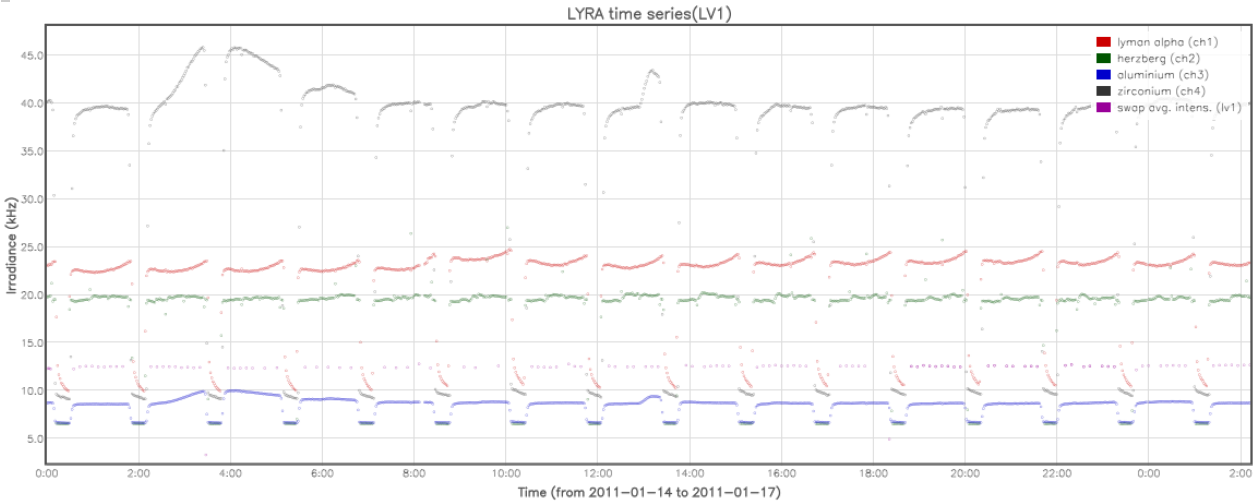
At 09:00, there was a CME on the east limb. For info, this CME is centered in Stereo B images and therefore appears there as a halo CME. This region saw the development of nice post-flare loops from 12:00 onward (see fig below, from SWAP).



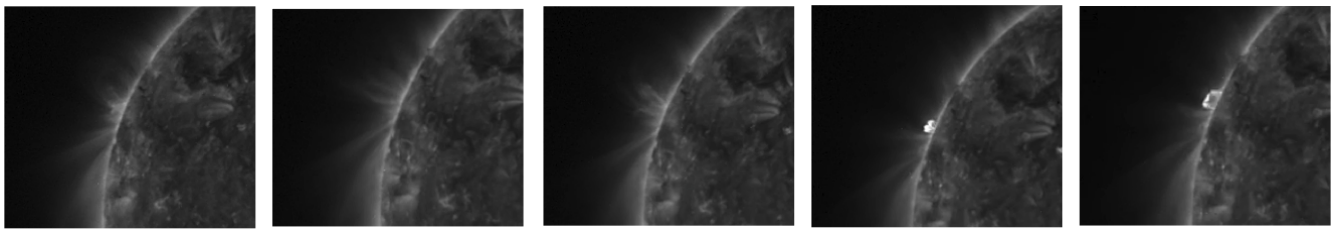
Jan 14

There were two C-class flares (a C1.6 and a C1.0), both observed with Lyra.

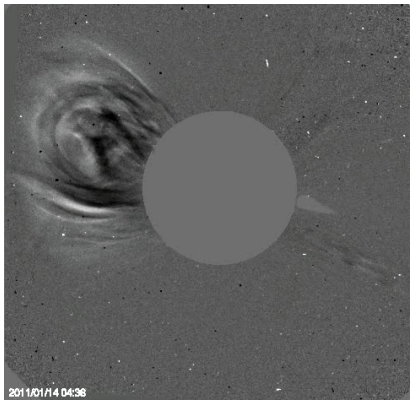
3300	0128	0330	0438	G15	5	XRA	1-8A	C1.6	9.8E-03
3310	1252	1307	1325	G15	5	XRA	1-8A	C1.0	1.4E-03



Both flares happened in the 11147 region and were visible by SWAP, which also saw the development of nice post-flares loops.
The first flare was associated to a CME



Zoom on the CME as seen in SWAP diff images and LASCO.



Scientific campaigns

- LYRA occultation campaigns with unit 2&3 :
  - Jan 10, 08:27:45 to 08:55:40 combined with SWAP high cadence campaign
  - Jan 11, 07:37:00 to 08:04:47
  - Jan 12, 06:46:14 to 07:13:54
  - Jan 13, 07:34:43 to 08:02:14
  - Jan 14, 08:23:13 to 08:50:34
- Resistojet campaign: 3min burn in anti-flight mode. SWAP and LYRA were commanded via IOS respectively in IDLE mode and OFF on January 12 from 08:05 to 08:50.
- LYRA paving campaign with units 2 and 3 on Jan 13, from 12:50 to 15:25.
- LOCOOS activities, with SWAP acquiring raw, low cadence data from Jan 14 00:00 to Jan 15 03:00

Outreach, papers, presentations, etc.

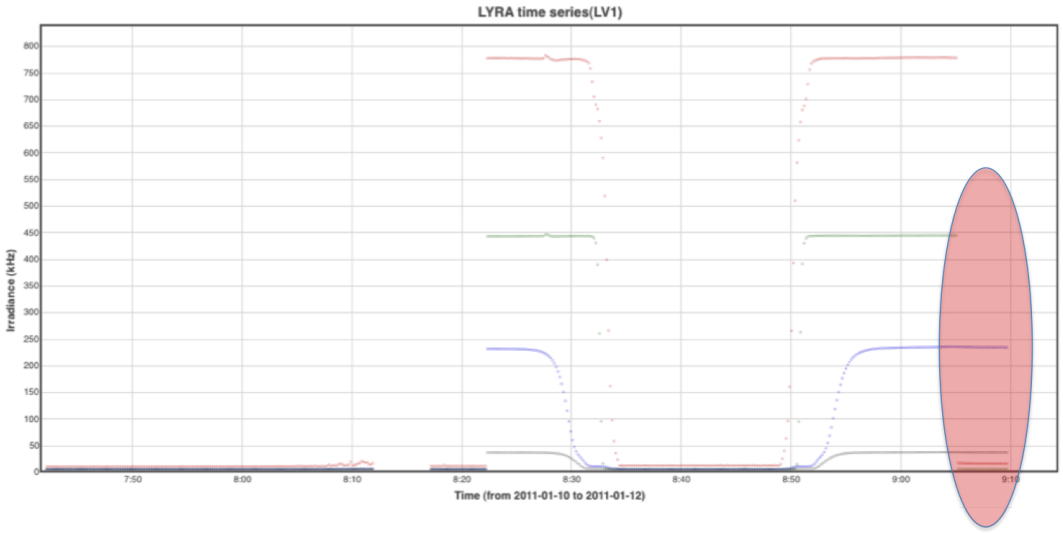
- Guest investigator Martin Snow joined us

To be explored

2. LYRA instrument status

Anomaly

Jan 10: The same anomaly as for Jan 03 occurred when closing cover 3 at the end of the occultation campaign: the cover is obviously half closed (Ly alpha and Hz channels acquiring dark current, while Al and Zr obviously acquire solar signal), and the cover status is ambiguous after the commanded closing: LY COV3 OPEN=0 & LY COV3 CLOSED=0.
It was fixed by resending the manual command to close the covers at 13:40.



Calibration

No calibration campaign this week.

IOS & operations

- LYIOS00130 overwritten by LYIOS00131: occultation campaigns (TC repeated in the subsequent IOS)
- LYIOS00132: resistojet campaign on Jan 12
- LYIOS00133: LYRA paving campaign with units 2 and 3 of Jan 13
- LYIOS00134 overwritten by LYIOS00135: occultation campaigns for next week
- LYIOS00136 was sent to cover the resistojet campaign of Jan 18. It was overwritten later by LYIOS00137

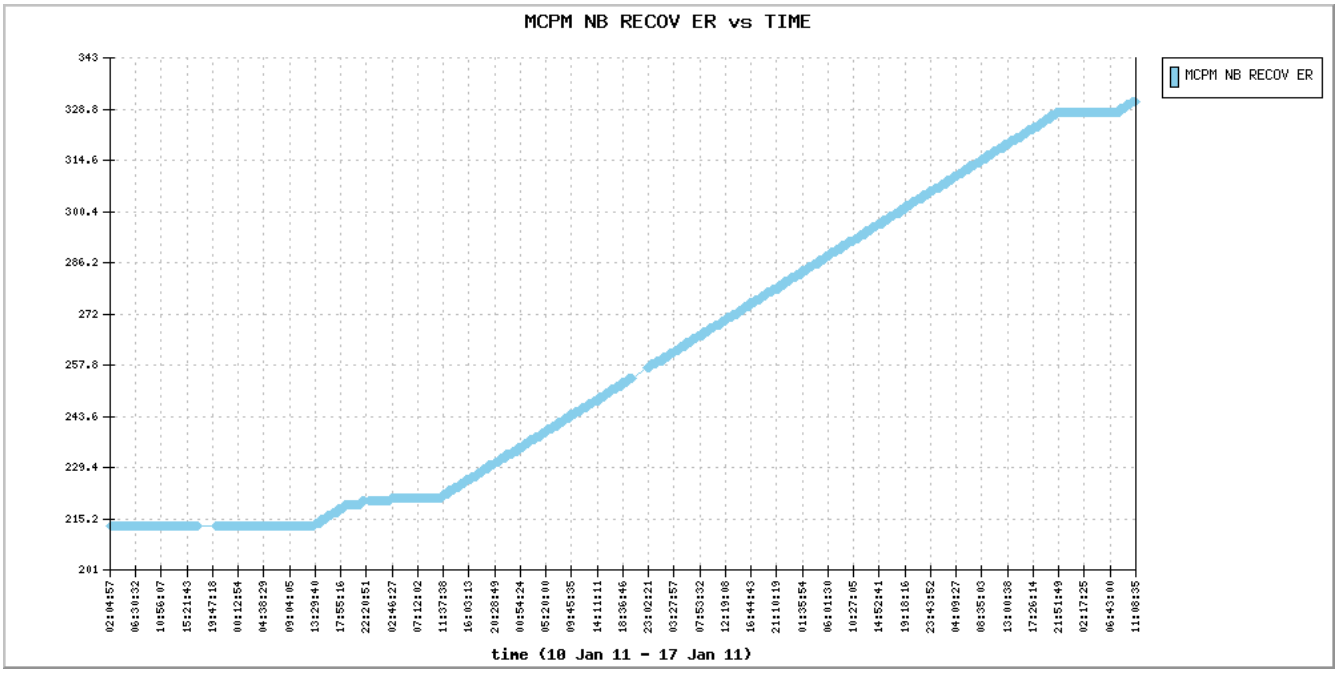
An ASIC reload (automatically scheduled onboard every 100 orbits) took place on Jan 15, at 05:03.

To be explored

3. SWAP instrument status

MCPM recoverable errors

From Jan 11 13:25, MCPM_MB_RECOV_ER started to periodically increase (~one error every hour). Over the whole week it increased from 213 to 328. It stopped increasing on Jan 16 21:25, but restarted on Jan 17. The problem is under investigation by Qinetiq.



Note: a few of these jumps were not detected by the DCVC. For example:
- MCPM NB RECOV ER changes at time 2011-01-12T12:25:30.000Z from 222 to 223
- MCPM NB RECOV ER changes at time 2011-01-12T13:25:30.000Z from 223 to 224

The number of MCPM unrecoverable errors remained 0.

Calibration
No calibration this week.

IOS & operations

- IOS00231: fast cadence occultation campaign of Jan 10 + jumping over eclipses till Jan 12
- IOS00232: Resistojet campaign + jumping over eclipses till Jan 12
- IOS00233: Activities of Jan 13 (LYRA paving campaign + jumping over eclipses)
- IOS00234 overwritten by IOS00235: LOCOOS ACTIVITIES + jump over eclipses from Jan 14 to Jan 17
- IOS 00235 was sent to cover the activities of Jan 18 (resistojet + SWAP LED campaigns)

SWAP detector and IIU temperature
The SWAP Cold Finger Temperature globally fluctuated between -1.0 and 2.5 degrees Celsius and was slowly rising in the second part of the week.
But there were two peaks outside this range:

- Jan 12 from 09:00 to 10:40 when switching the instrument back on after the resistojet campaign (temperature up to 3.5°)
- Jan 13 during the LYRA paving campaign (negative peak: temperature down to -1.5°).

To be explored

4. PROBA2 Science Center Status

Marie Dominique was operator during this week.
All tools were running automatically. The LYRA preliminary calibration (dark current subtraction and

degradation compensation) was running on a test server in parallel.

Tool updated

- The LY-QLV was updated on Jan 11 to r3862 to correct a bug in the time for the SWAVINT channel and to include the legend in saved plots.

5. Data reception & discussions with MOC

Passes
Because of seasonal effects, passes 3469, 3479, and 4955 experienced drops of signal, leading to a loss of data:.

Pass 3462 completely failed because of scheduling problems at Svalbard.

Extraction of passes 3468, 3488, and 3505 was incomplete at first. The corresponding data were resent later.

Data coverage HK
The coverage of the received HK data was complete during the period except data gaps

- from Jan 09 22:53 to Jan 10 01:56 (pass 3462 failed)
- on Jan 10, from 17:14 to 20:12 (drop of signal in pass 3469)
- on Jan11, from 22:00 to 22:38 (drop of signal in pass 3479)

Data coverage SWAP
Several images got lost due to corruption or problems during the download. Below an overview is given per pass.

- pass 3462: No data at all (but part of the data on-board were downloaded during subsequent passes)
- pass 3465: 2 missing image + 1 corrupted image (1 first packet corrupted)
- pass 3469: 3 missing image + 2 corrupted image (1 first packet corrupted)
- pass 3470: 2 missing images
- pass 3471: 1 image with an invalid CRC
- pass 3475: 2 images with an invalid CRC
- pass 3479: 3 missing images
- pass 3480: 2 missing images
- pass 3488: 1 missing image
- pass 3490: 2 missing images
- pass 3496: 2 missing images
- pass 3497: 1 missing image + 1 packet with a wrong CRC
- pass 3499: 2 missing images + 1 first packet corrupted
- pass 3502: 2 missing images + 1 truncated packet
- pass 3506: 3 missing images
- pass 3515: 1 missing image + 1 image with a corrupted CRC

- pass 3517: 3 missing images
- pass 3518: 3 missing images + 1 image with a corrupted CRC
- pass 3520: 4 missing images + 2 corrupted first packets + 1 image with a corrupted CRC

The overall data coverage was still allright. Every orbit, there was a typical gap of 28 minutes due to an EUV occultation in which no images were taken. Apart from those gaps, there were only a few extra gaps larger than 6 minutes.

The default commanded cadence in between the eclipses was 85s.

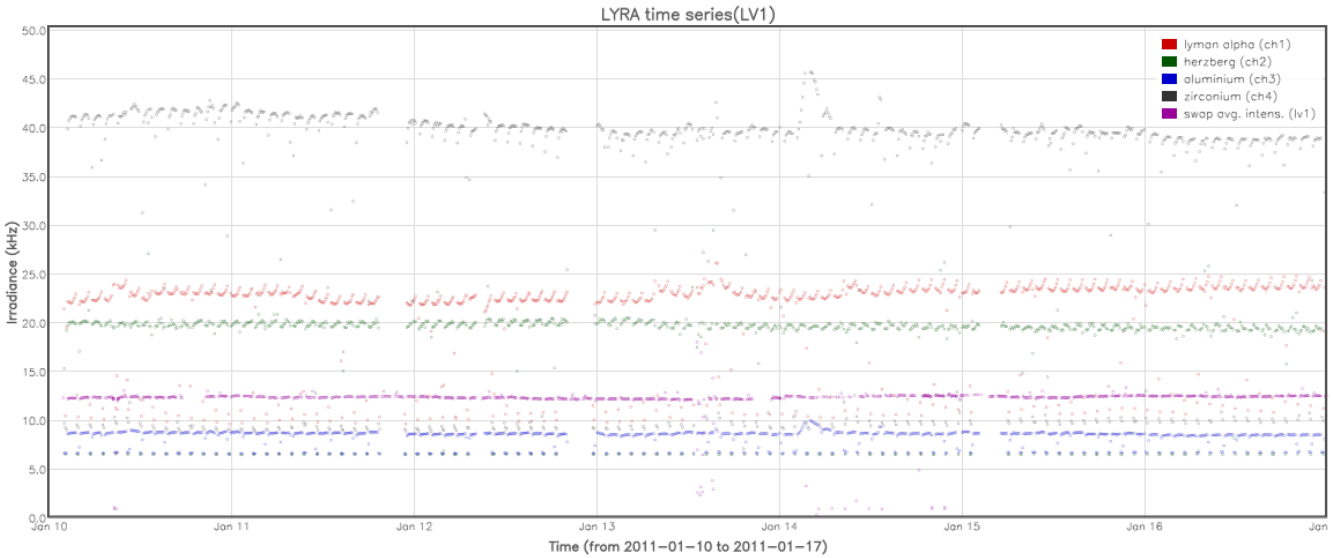
Statistics for complete week:

Total number of images between 2011 Jan 03 0UT and 2011 Jan 10 0UT: 4460
Highest cadence in this period: 20 seconds
Average cadence in this period: 135.58 seconds
Number of image gaps larger than 300 seconds: 231
Largest data gap: 48.82 minutes

Data coverage LYRA

- No data received for pass 3462, data from 3461 are corrupted => We got no data till 2011-01-10 01:55
- BINLYRA from pass 3479 was corrupted => gap in the data from 19:15 to 22:55
- Data from pass 3490 are corrupted => gap in the data from 20:09 to 23:25

The complete LYRA timeline over the week is as follows:



There was no significant jump in Herzberg channel (only small jumps correlated to the opening/cloosing of cover 3).

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