

PREPARATION AND OPERATIONS OF THE MISSION PERFORMANCE  
CENTRE (MPC) FOR THE COPERNICUS SENTINEL-3 MISSION

**S3-A SLSTR Cyclic Performance Report**

**Cycle No. 018**

**Start date: 18/05/2017**

**End date: 14/06/2017**



*Mission  
Performance  
Centre*



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**Date:** 20/06/2017

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## Sentinel-3 MPC

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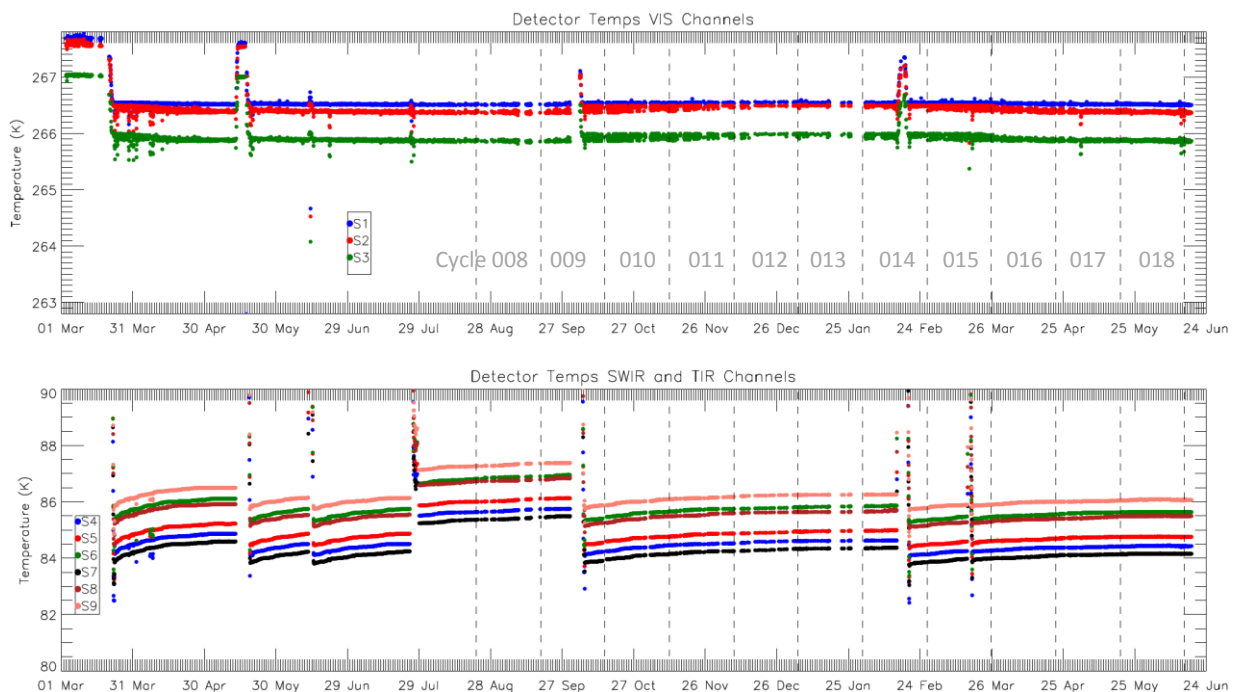
Figure 10: VISCAL signal trend for SWIR channels (nadir view).-----10



# 1 Instrument monitoring

## 1.1 Instrument temperatures

- ❖ Instrument temperatures were stable and consistent with previous operations. The apparent drop in visible channel temperatures at the end of cycle 18 is due to the blackbody crossover test performed on 13<sup>th</sup> and 14<sup>th</sup> June (see Section 2).
- ❖ Blackbody, baffle and OME temperatures peaked around 3<sup>rd</sup> January when the Earth was at perihelion. The changes in blackbody temperature during the crossover test are visible at the end of cycle 18 on 13<sup>th</sup> and 14<sup>th</sup> June.

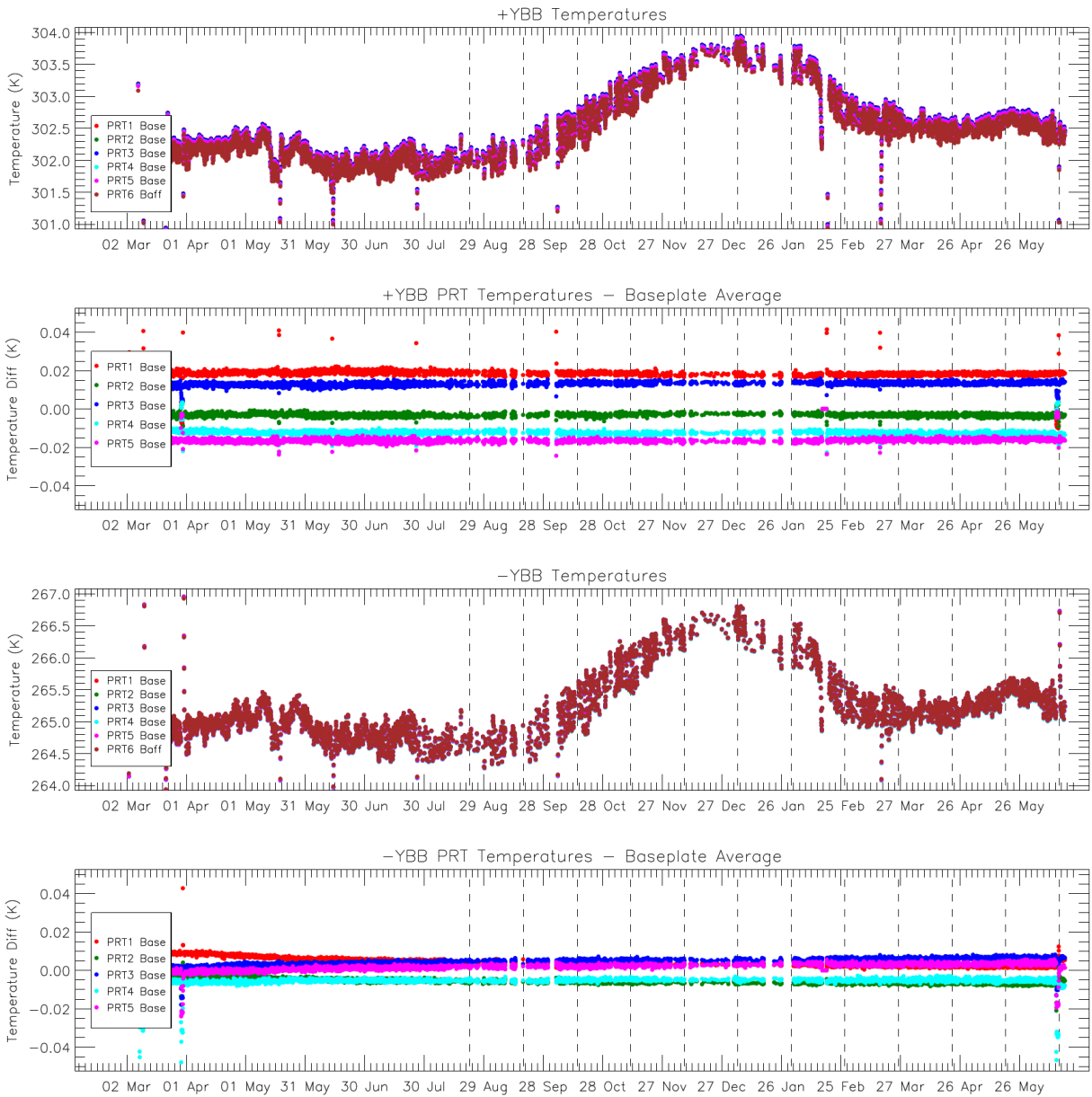


**Figure 1: Detector temperatures for each channel from 1st March 2016. Discontinuities occur for the infrared channels where the FPA was heated for decontamination or following an anomaly. The vertical dashed lines indicate the start and end of each cycle.**



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**Figure 2: Blackbody temperature and baseplate gradient trends. The vertical dashed lines indicate the start and end of each cycle.**

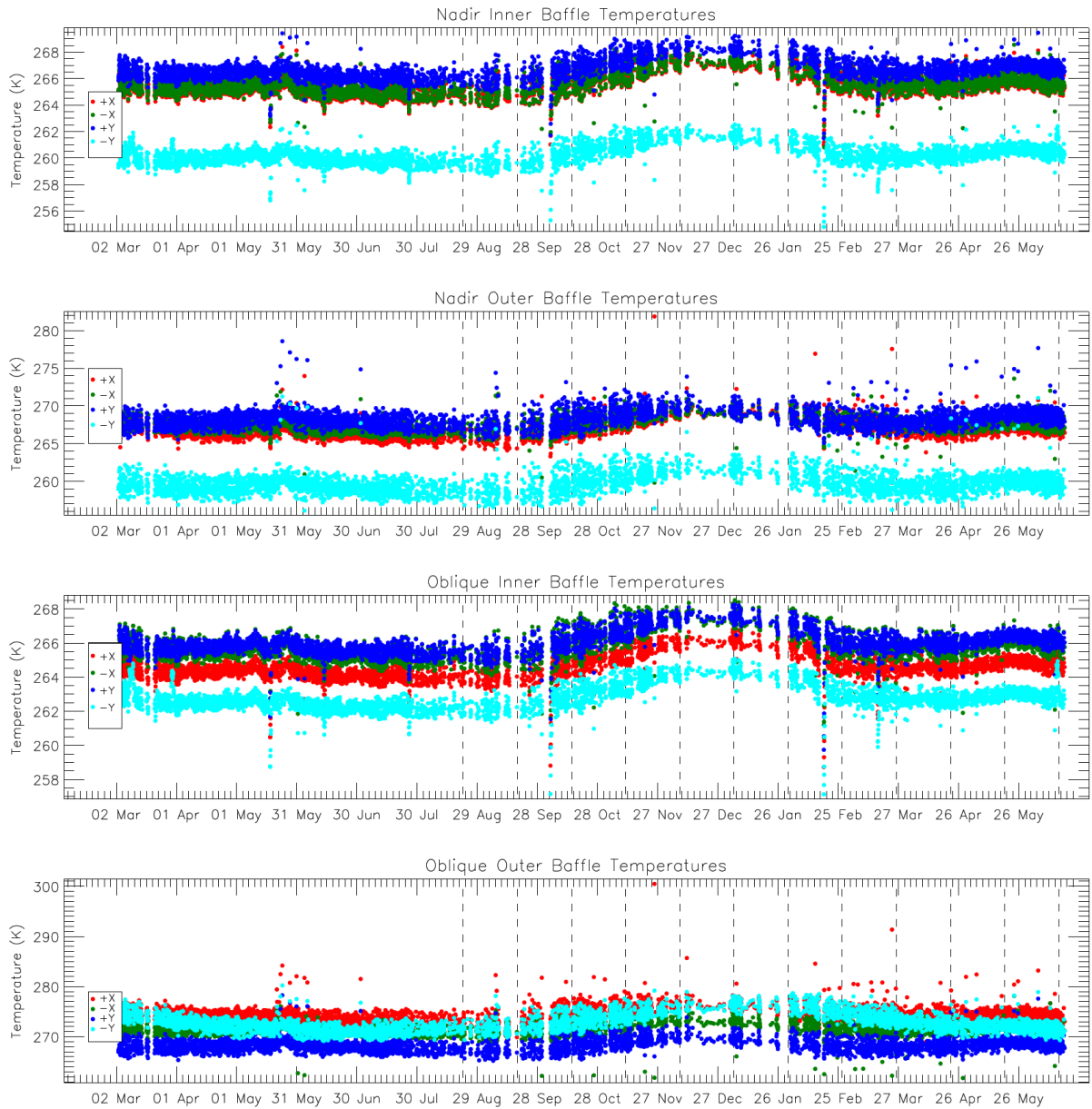


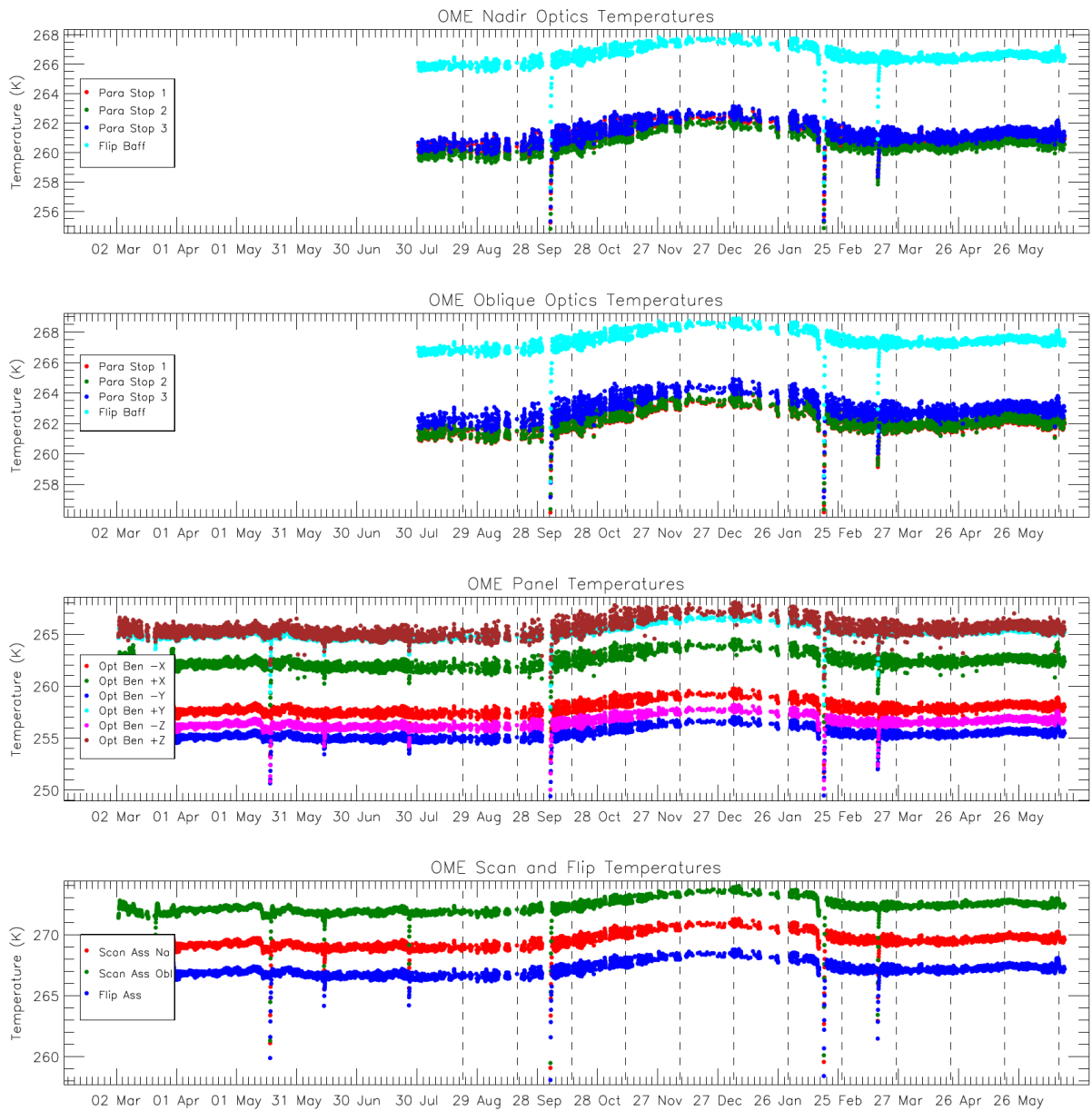
Figure 3: Baffle temperature trends. The vertical dashed lines indicate the start and end of each cycle.





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**Figure 4: OME temperature trends showing the paraboloid stops and flip baffle (top two plots) and optical bench and scanner and flip assembly (lower two plots). The top two plots only show data starting from 30th July 2016. The vertical dashed lines indicate the start and end of each cycle.**



## 1.2 Scanner performance

Scanner performance has been consistent with previous operations and within required limits. The oblique scanner and flip mirror jitter has been lower than normal in cycle 18, although still within the range seen in previous operations.

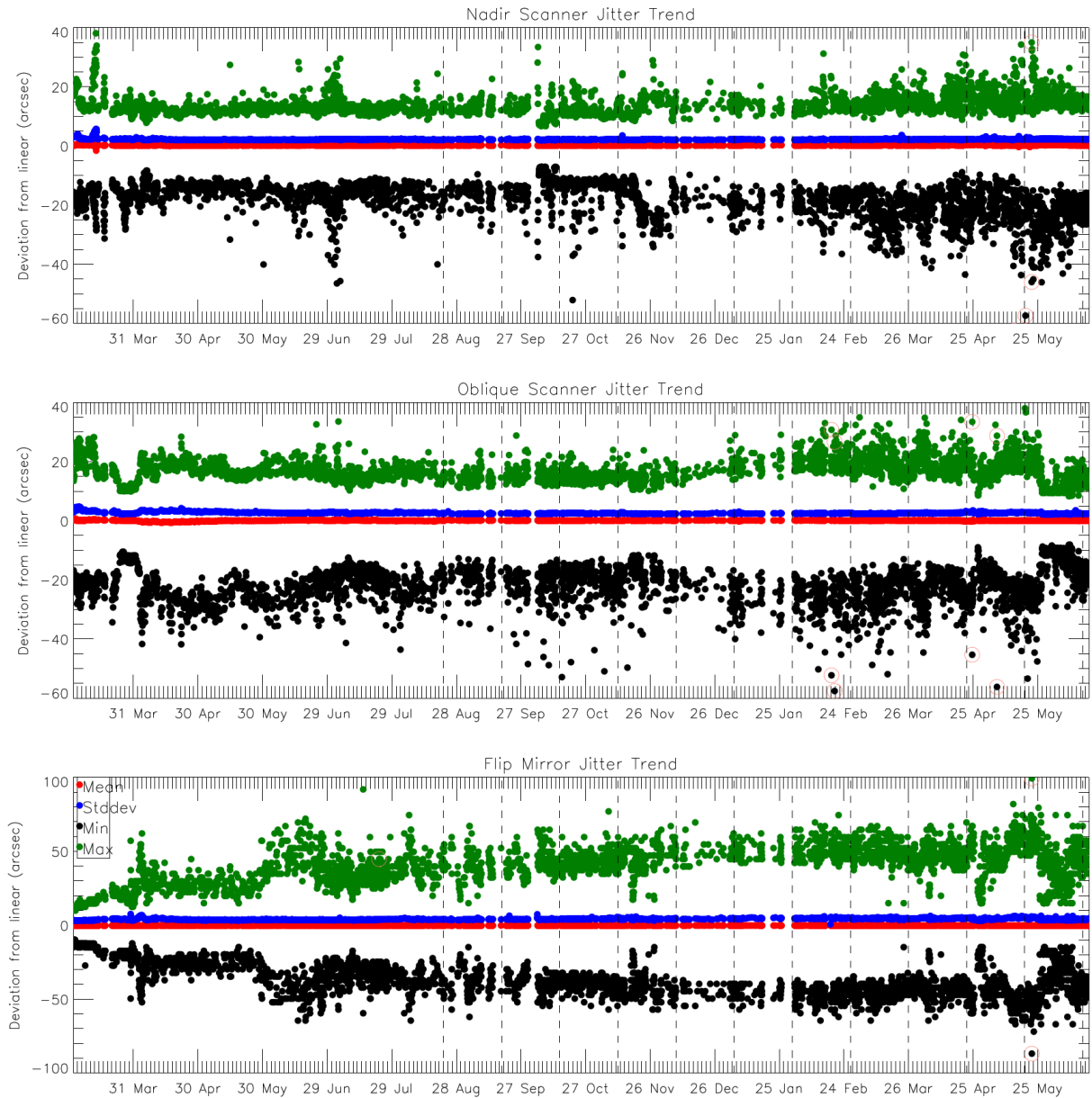


Figure 5: Scanner and flip jitter, showing mean, stddev and max/min position compared to the expected one for the nadir view. The vertical dashed lines indicate the start and end of each cycle.

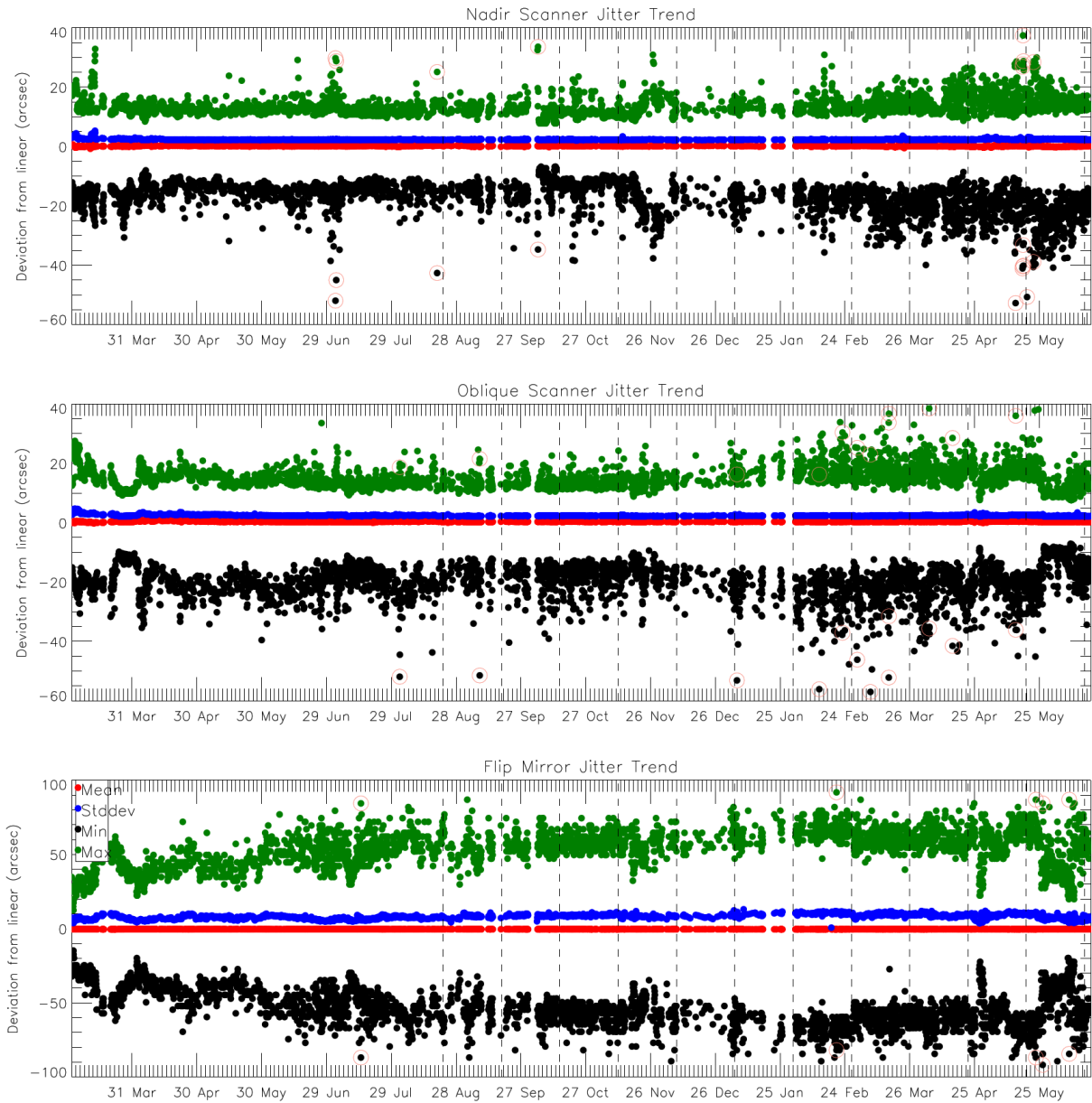


Figure 6: Scanner and flip jitter, showing mean, stddev and max/min position compared to the expected one for the oblique view. The vertical dashed lines indicate the start and end of each cycle.

### 1.3 Detector noise levels

#### 1.3.1 VIS and SWIR channel signal-to-noise

The VIS and SWIR channel signal-to-noise is stable and consistent with previous operations.



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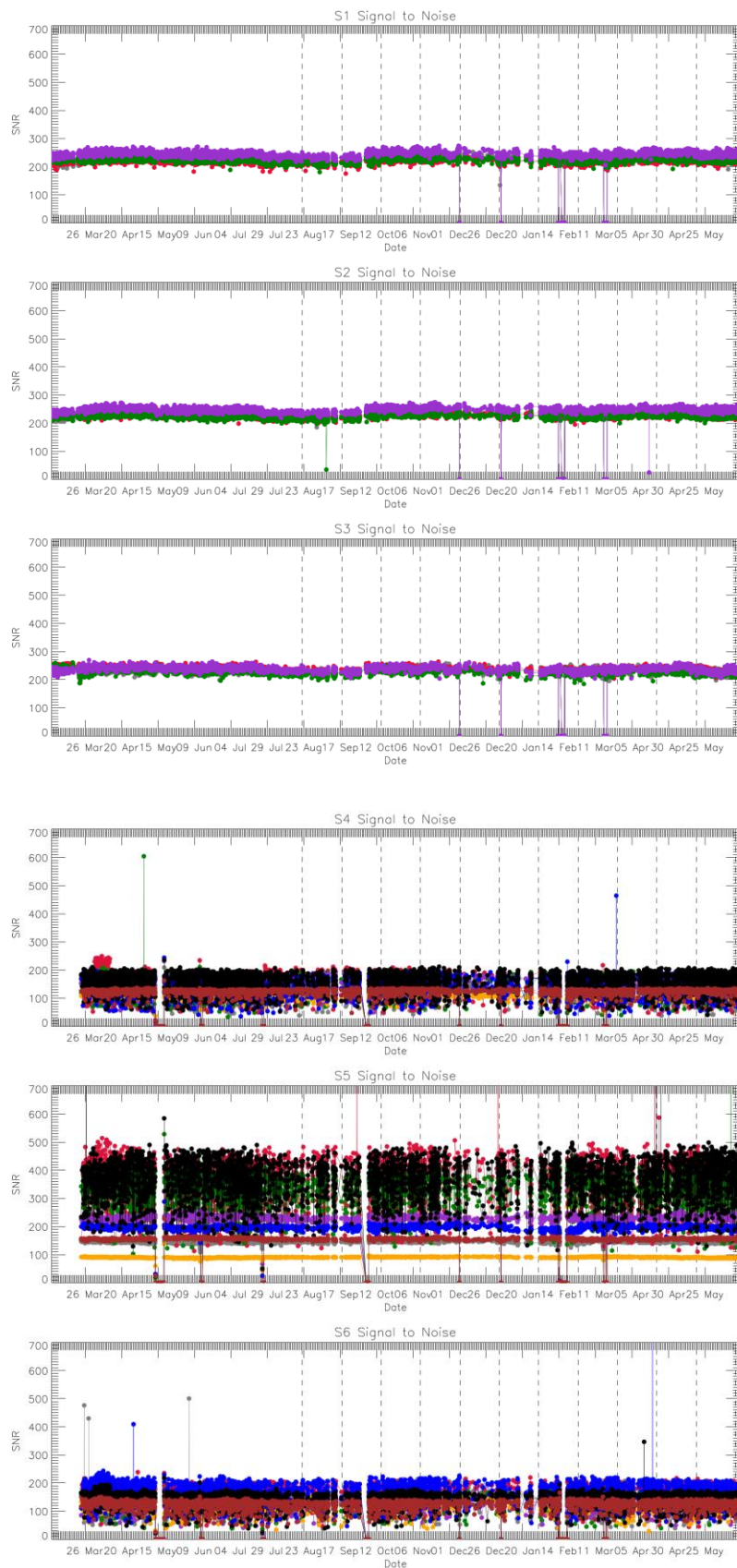


Figure 7: VIS and SWIR channel signal-to-noise. Different colours indicate different detectors.

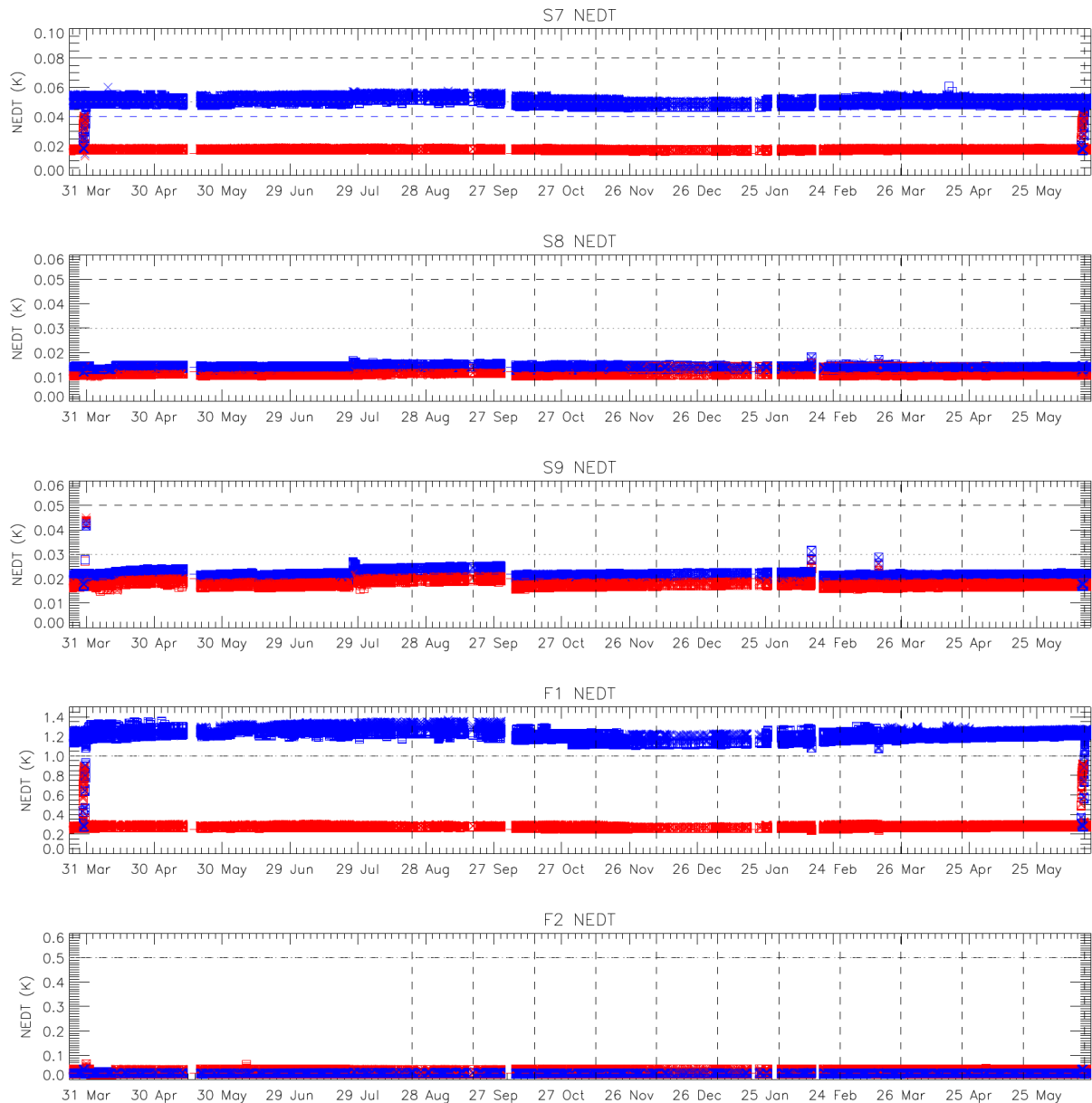


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### 1.3.2 TIR channel NEDT

The thermal channel NEDT values are consistent with previous operations and within the requirements. The change in NEDT at the end of the cycle is due to the blackbody crossover test (see Section 2).



**Figure 8: NEDT trend for the thermal channels. Blue points were calculated from the cold blackbody signal and red points from the hot blackbody. Horizontal lines indicate the requirement (dashed) and goal (dotted) as well as the measured values on ground (red and blue dashed).**



## 1.4 Calibration factors

### 1.4.1 VIS and SWIR VISCAL signal response

Signals from the VISCAL source for the VIS channels show oscillations due to the build up of ice on the optical path within the FPA. Decontamination is carried out periodically, in order to warm up the FPA and remove the ice. The last decontamination cycle was successfully performed following the anomaly on 14<sup>th</sup> February. The dip in S5 and S6 signal at the end of cycle 18 occur during the blackbody crossover test (see Section 2).

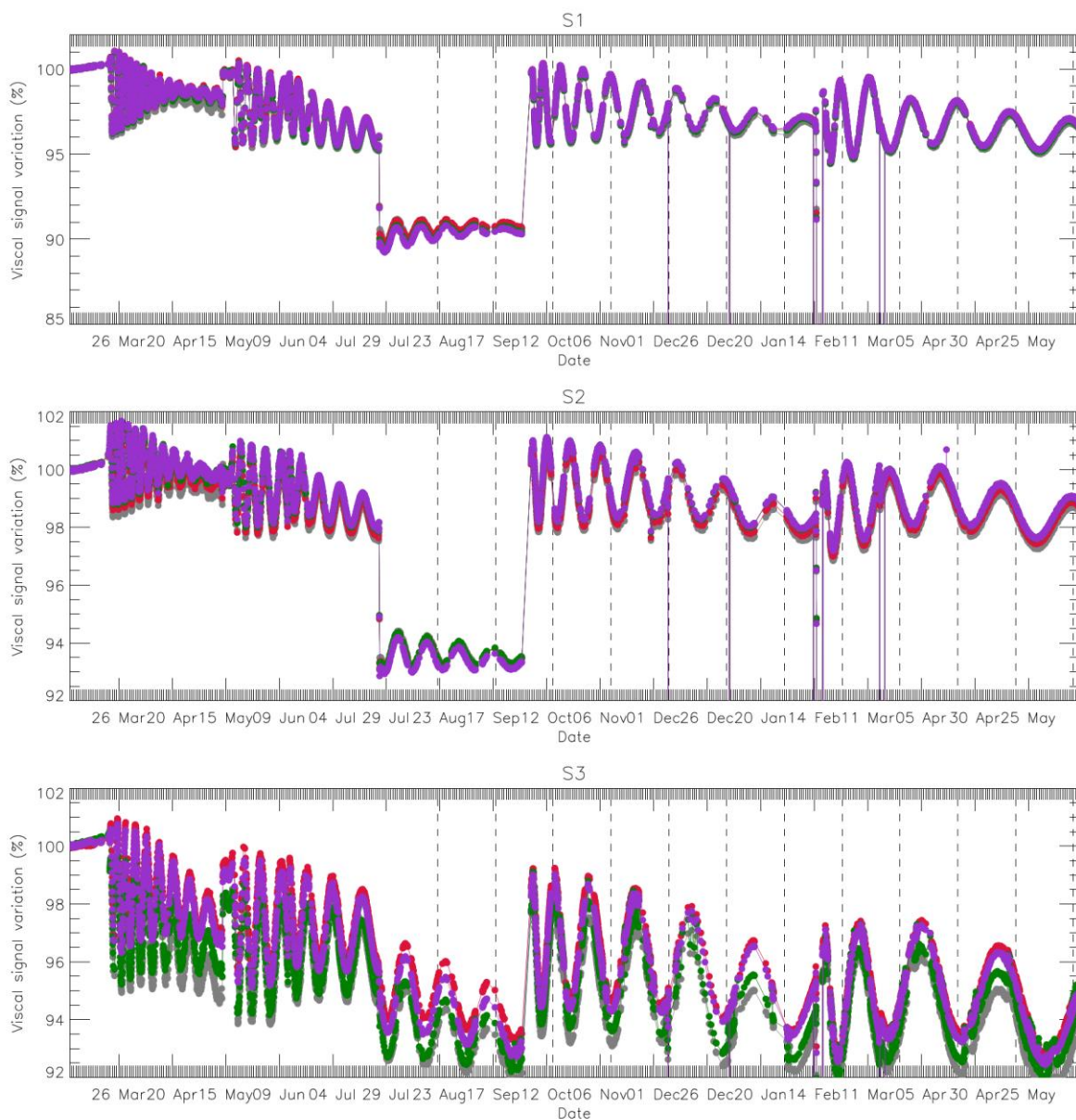


Figure 9: VISCAL signal trend for VIS channels (nadir view).

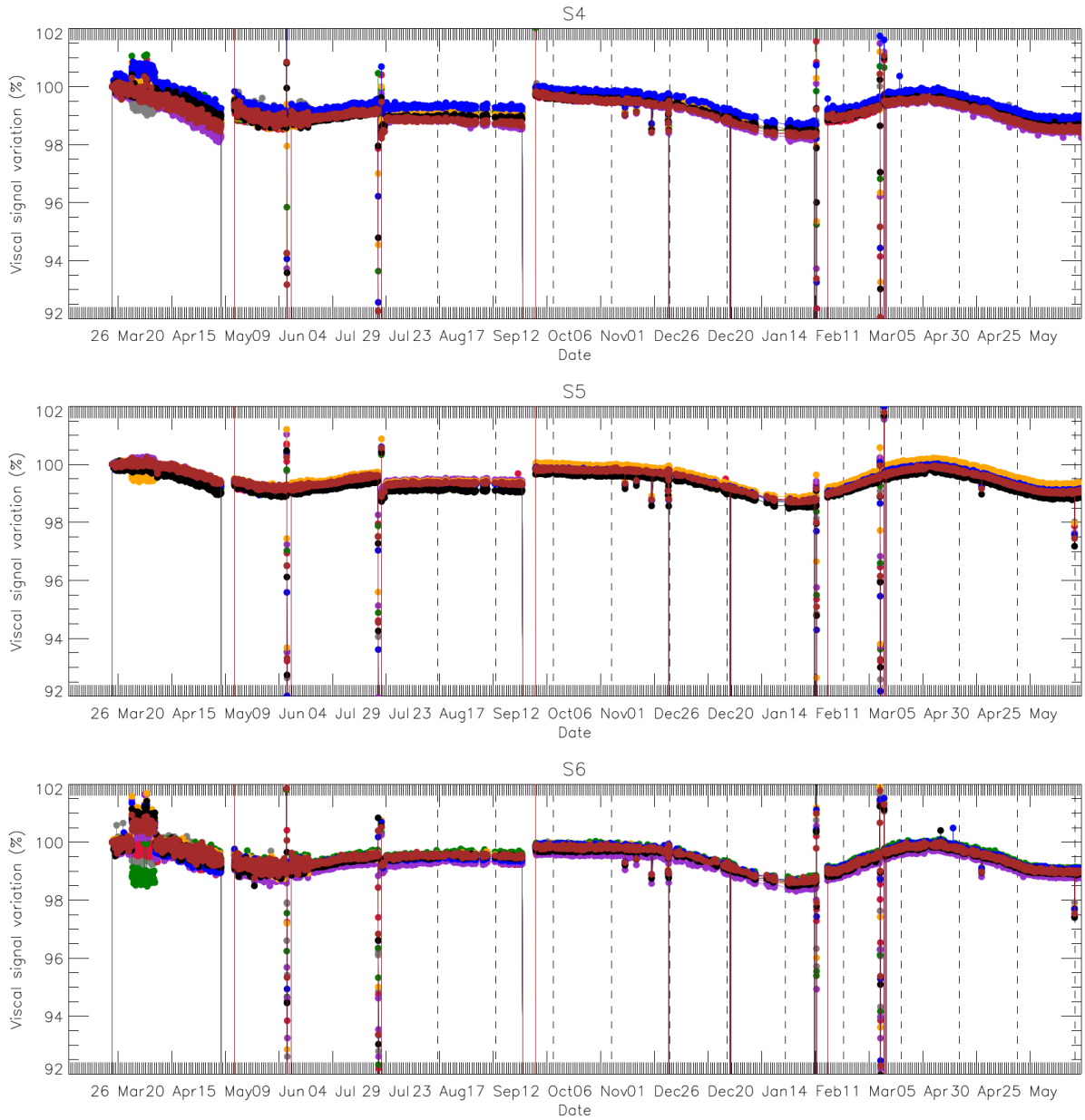


Figure 10: VISCAL signal trend for SWIR channels (nadir view).



## 2 Events

SLSTR has been switched on and operating nominally during the cycle, with SUE scanning and autonomous switching between day and night modes, apart from the following events/tests:


- ❖ Following successful tests in Cycle 16, the vibration cancellation was permanently deactivated at 11:53:55 on 19<sup>th</sup> May. This was carried out as a mitigating action to prevent reoccurrences of the FPU trap anomalies which caused disruption in February and March.
- ❖ A blackbody crossover test was performed on 13<sup>th</sup> and 14<sup>th</sup> June. This test involves swapping the temperatures of the two blackbody sources such that the normally hot blackbody (+YBB) is cooled and the normally cold blackbody (-YBB) is heated. The test will give information about the performance of the blackbodies and the calibration, particularly using data recorded by the instrument when the two blackbodies were at the crossover point and have equal temperatures.

During the test, the calibration of Level-1 images was affected and data should not be used. In particular, when the command to start heating was sent at 11:05 on 13<sup>th</sup> June and 15:36 on 14<sup>th</sup> June, there is a period of approximately 1 minute when the detector temperatures were affected.

The timings of the blackbody crossover test were as follows:

Date and approximate time	Event
13 <sup>th</sup> June 2017 11:05	Start heating of -YBB and cooling of +YBB
13 <sup>th</sup> June 2017 12:45	Temperatures of -YBB and +YBB crossed at T = 289K
13 <sup>th</sup> June 2017 21:50	-YBB stabilized at 303K (+YBB at 273K)
14 <sup>th</sup> June 2017 15:36	Start heating of +YBB and cooling of -YBB
14 <sup>th</sup> June 2017 16:47	Temperatures of -YBB and +YBB crossed at T = 290K
15 <sup>th</sup> June 2017 07:30	Both BBs stable with normal configuration (+YBB at 302.5K and -YBB at 265.7K)



 The logo for the Sentinel-3 Mission Performance Centre. It features a blue satellite icon at the top, the text 'SENTINEL 3' in blue, and 'Mission Performance Centre' in blue. Below the text are four small square images: a sunset, a satellite, a landscape, and a person. A green checkmark icon is at the bottom right.	<b>Sentinel-3 MPC</b> <b>S3-A SLSTR Cyclic Performance Report</b> <b>Cycle No. 018</b>	Ref.: S3MPC.RAL.PR.02-018 Issue: 1.0 Date: 20/06/2017 Page: 12
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### 3 Appendix A

Other reports related to the Optical mission are:

- ❖ S3-A OLCI Cyclic Performance Report, Cycle No. 018 (ref. S3MPC.ACR.PR.01-018)

All Cyclic Performance Reports are available on MPC pages in Sentinel Online website, at:  
<https://sentinel.esa.int>

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