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

S3-A SLSTR Cyclic Performance Report

Cycle No. 016

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SENTINEL 3

Mission Performance Centre

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Changes Log

Version	Date	Changes
1.0	26/04/2017	First Version

List of Changes

Version	Section	Answers to RID	Changes

Table of content

List of Figures

1 Instrument monitoring

1.1 Instrument temperatures

- Instrument temperatures were stable and consistent with previous operations.
- Blackbody, baffle and OME temperatures all showed a decreasing trend over the last few cycles since the satellite was at perihelion on January 3rd. This has started to level off during cycle 16.

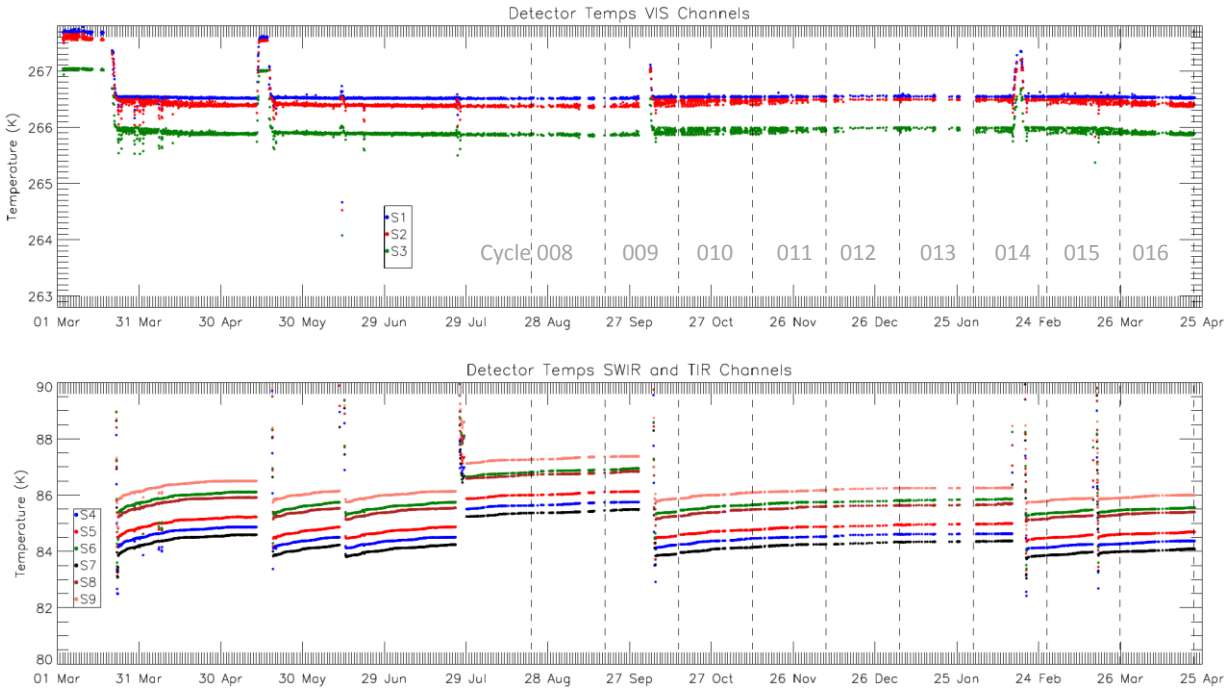

Figure 1: Detector temperatures for each channel from 1st March 2016. Discontinuities occur for the infrared channels where the FPA was heated for decontamination or following an anomaly. The vertical dashed lines indicate the start and end of each cycle.

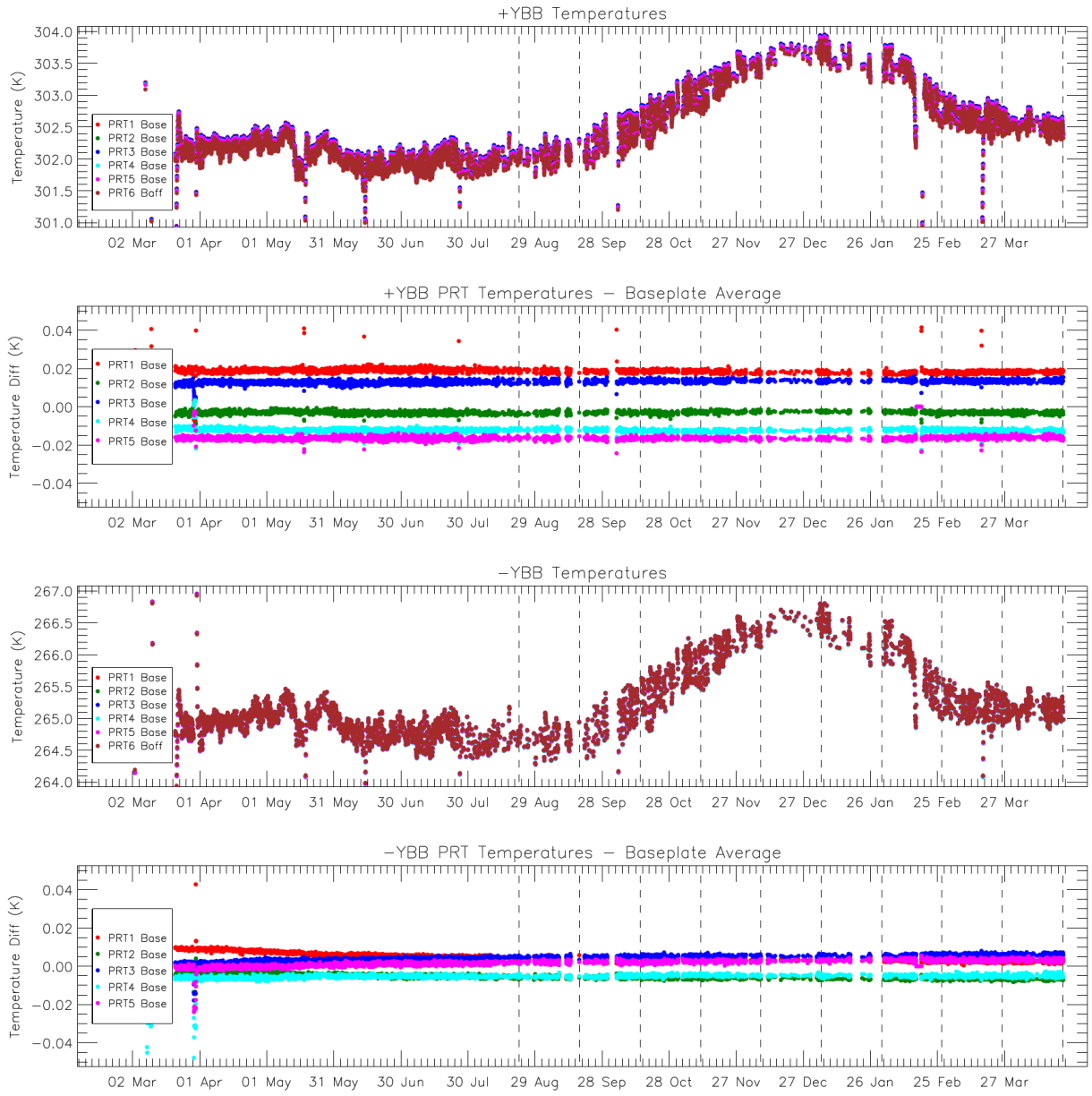

Figure 2: Blackbody temperature and baseplate gradient trends. The vertical dashed lines indicate the start and end of each cycle.

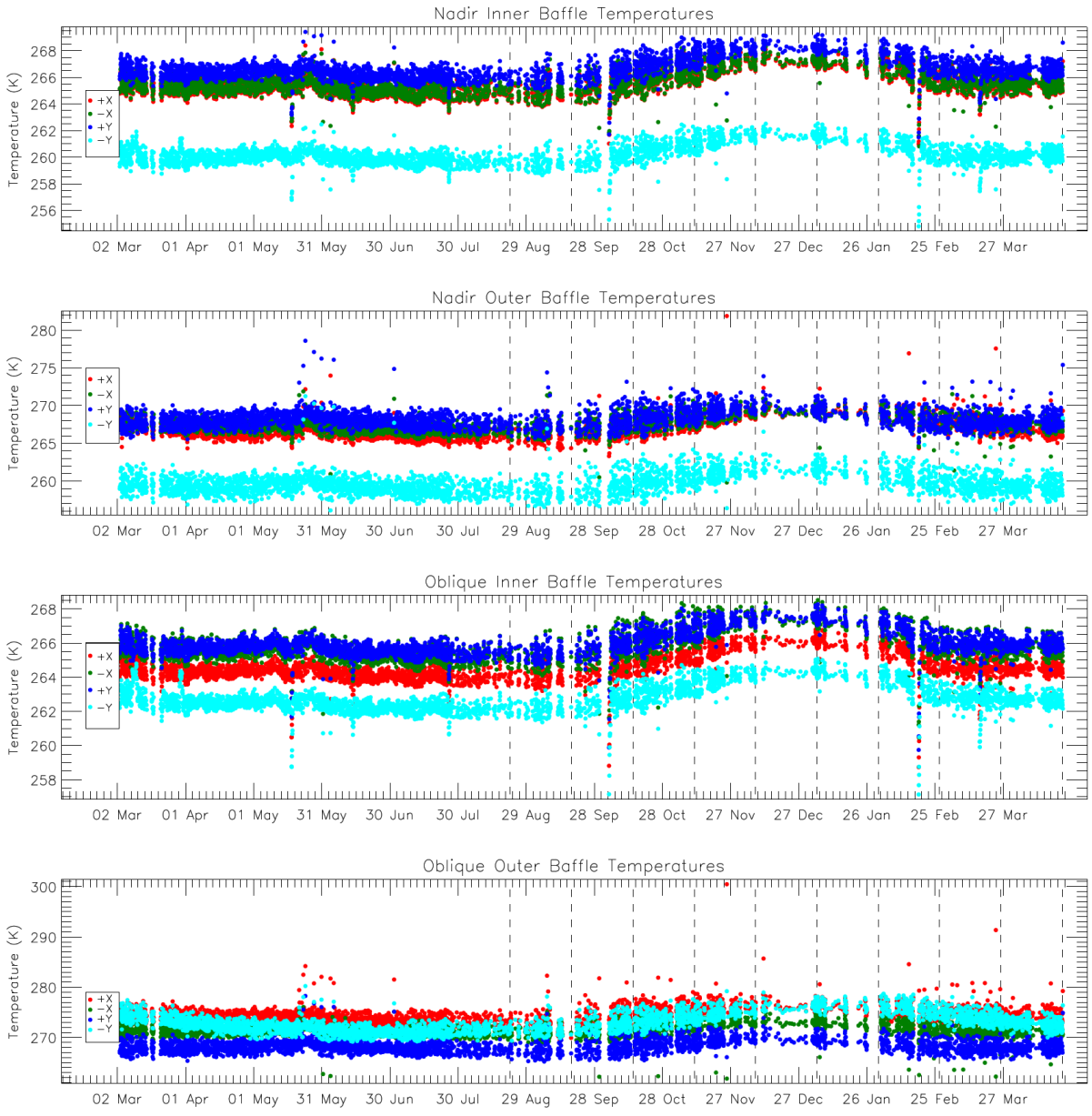

Figure 3: Baffle temperature trends. The vertical dashed lines indicate the start and end of each cycle.

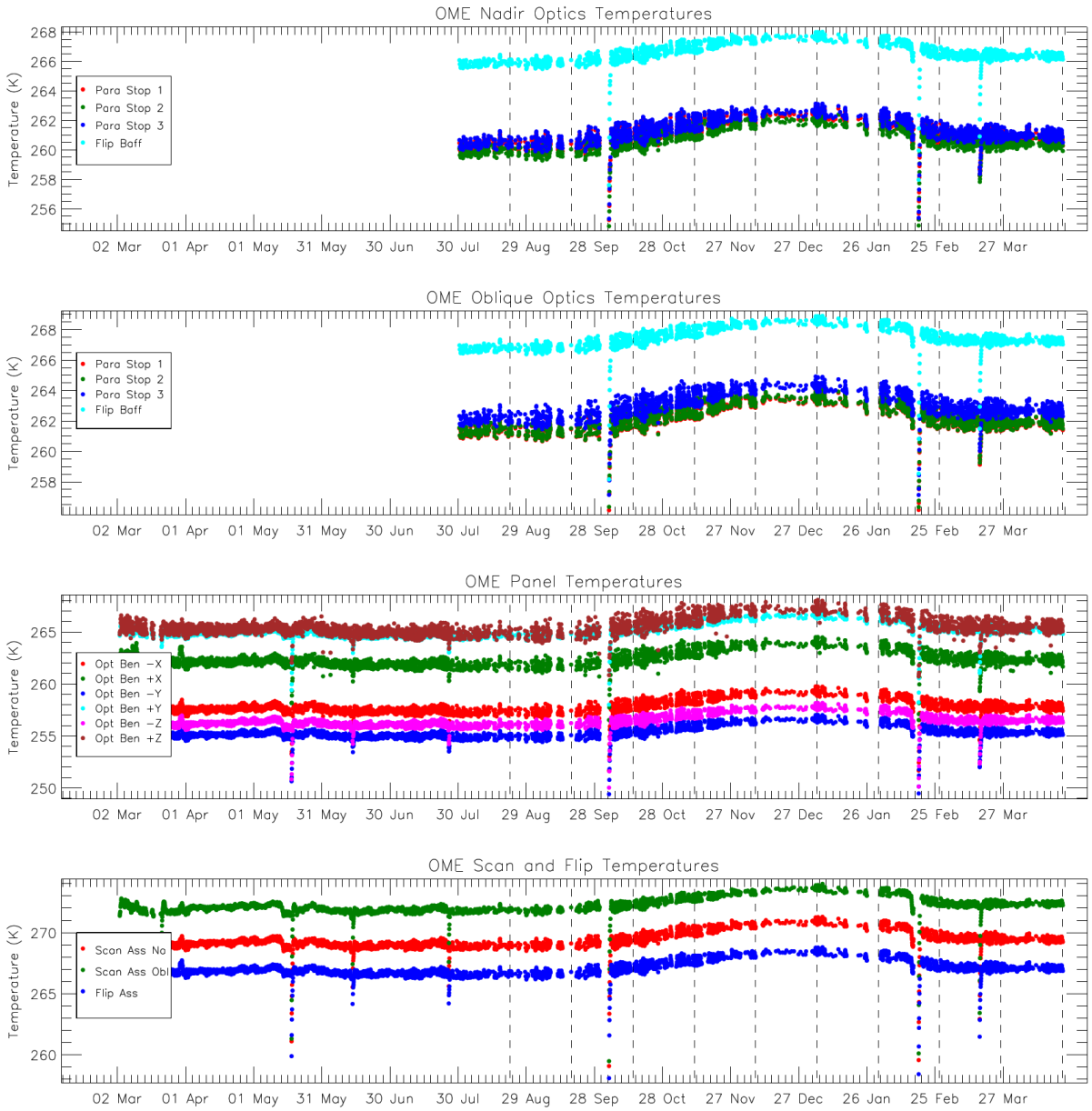

Figure 4: OME temperature trends showing the paraboloid stops and flip baffle (top two plots) and optical bench and scanner and flip assembly (lower two plots). The top two plots only show data starting from 30th July 2016. The vertical dashed lines indicate the start and end of each cycle.

1.2 Scanner performance

- Scanner performance has been consistent with previous operations and within required limits.

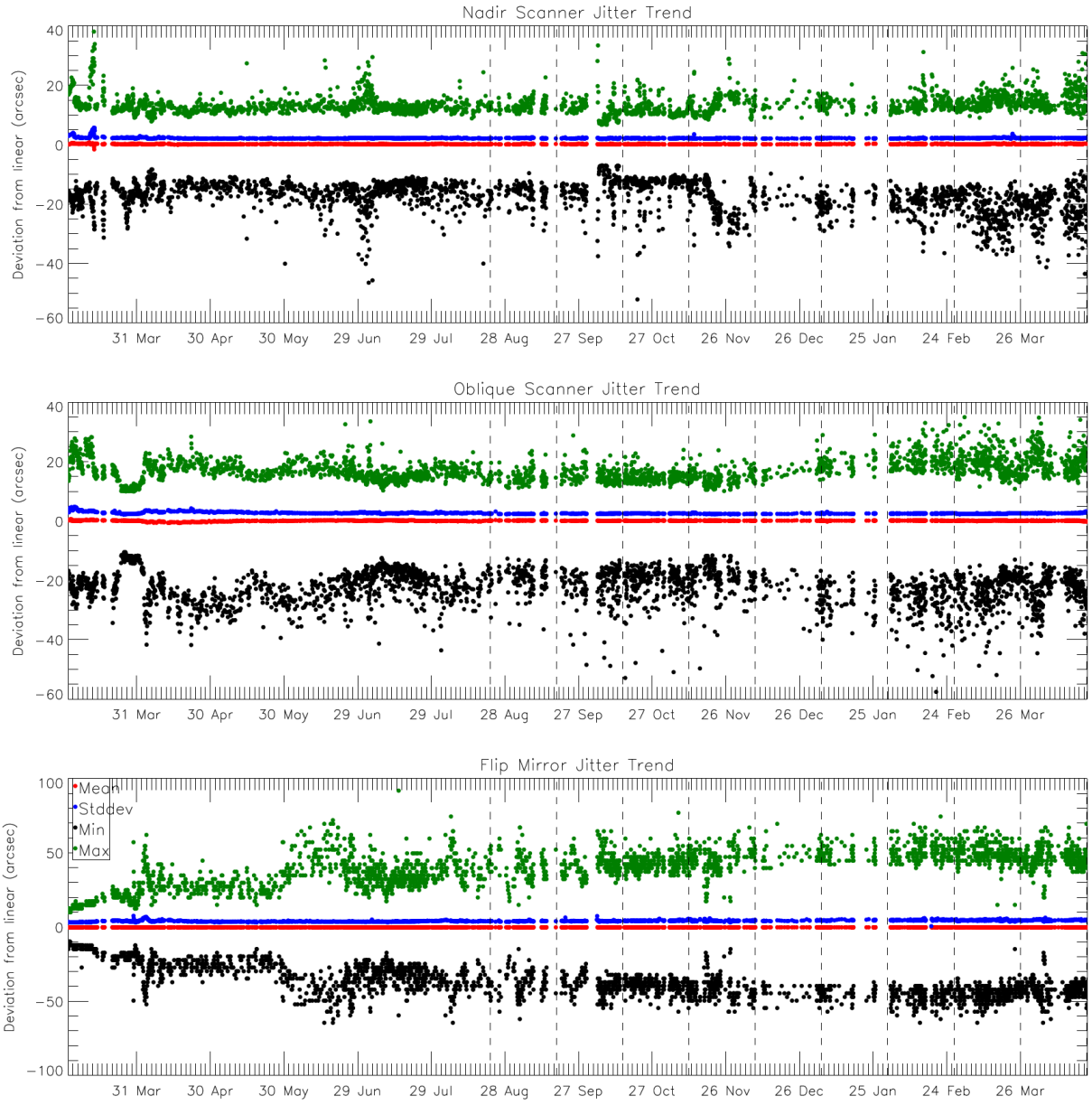

Figure 5: Scanner and flip jitter, showing mean, stddev and max/min position compared to the expected one for the nadir view. The vertical dashed lines indicate the start and end of each cycle.

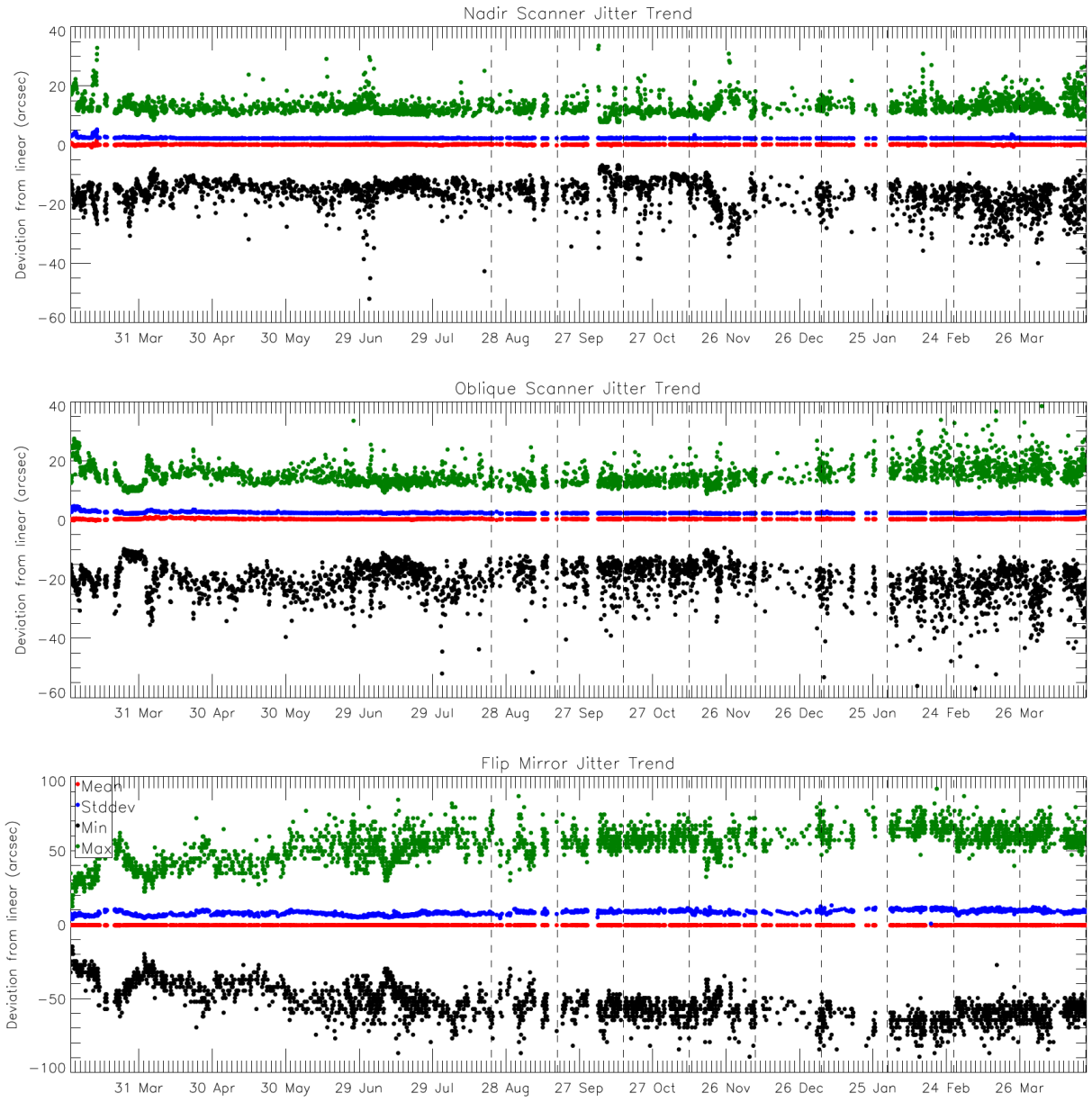

Figure 6: Scanner and flip jitter, showing mean, stddev and max/min position compared to the expected one for the oblique view. The vertical dashed lines indicate the start and end of each cycle.

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.

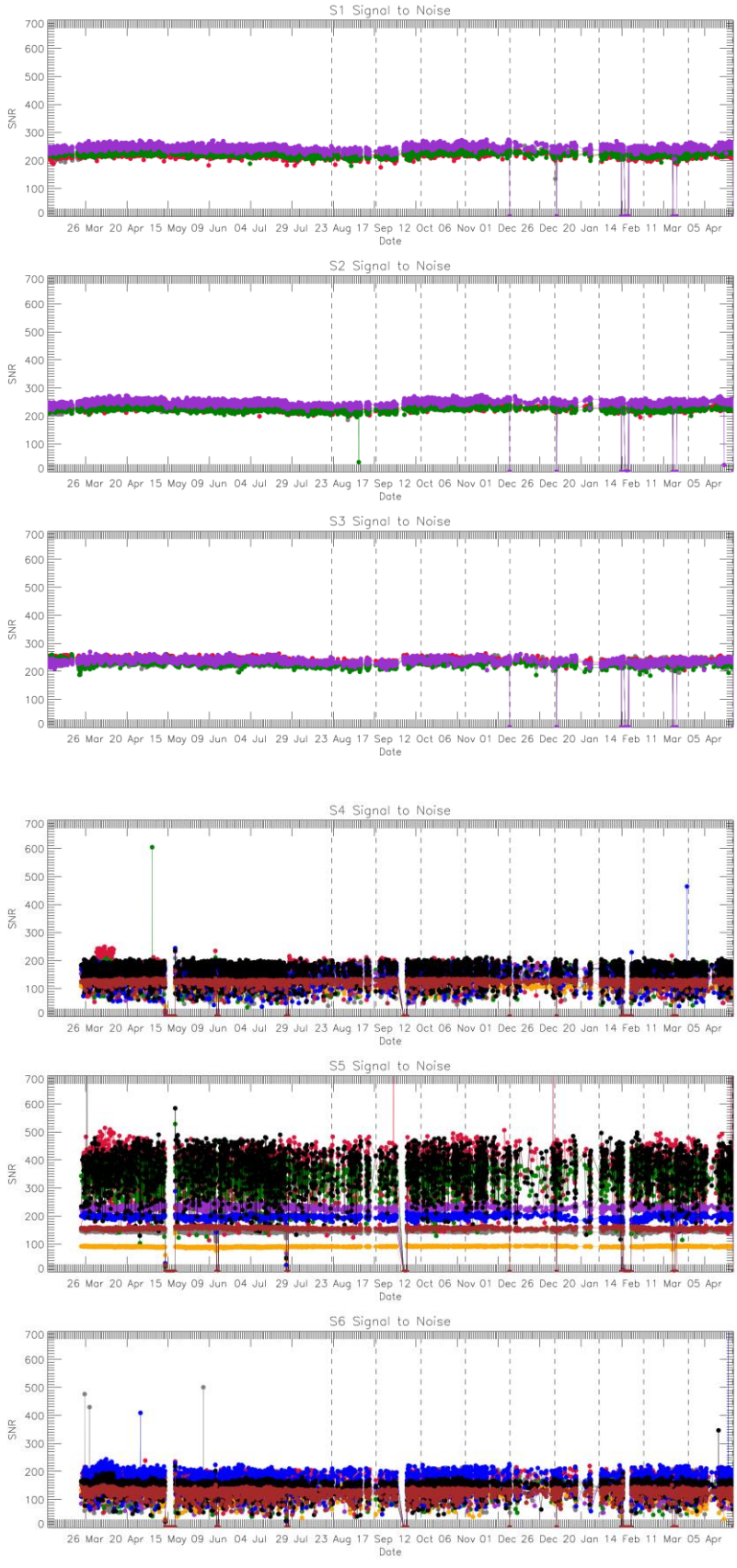

Figure 7: VIS and SWIR channel signal-to-noise. Different colours indicate different detectors.

1.3.2 TIR channel NEDT

The thermal channel NEDT values are consistent with previous operations and within the requirements.

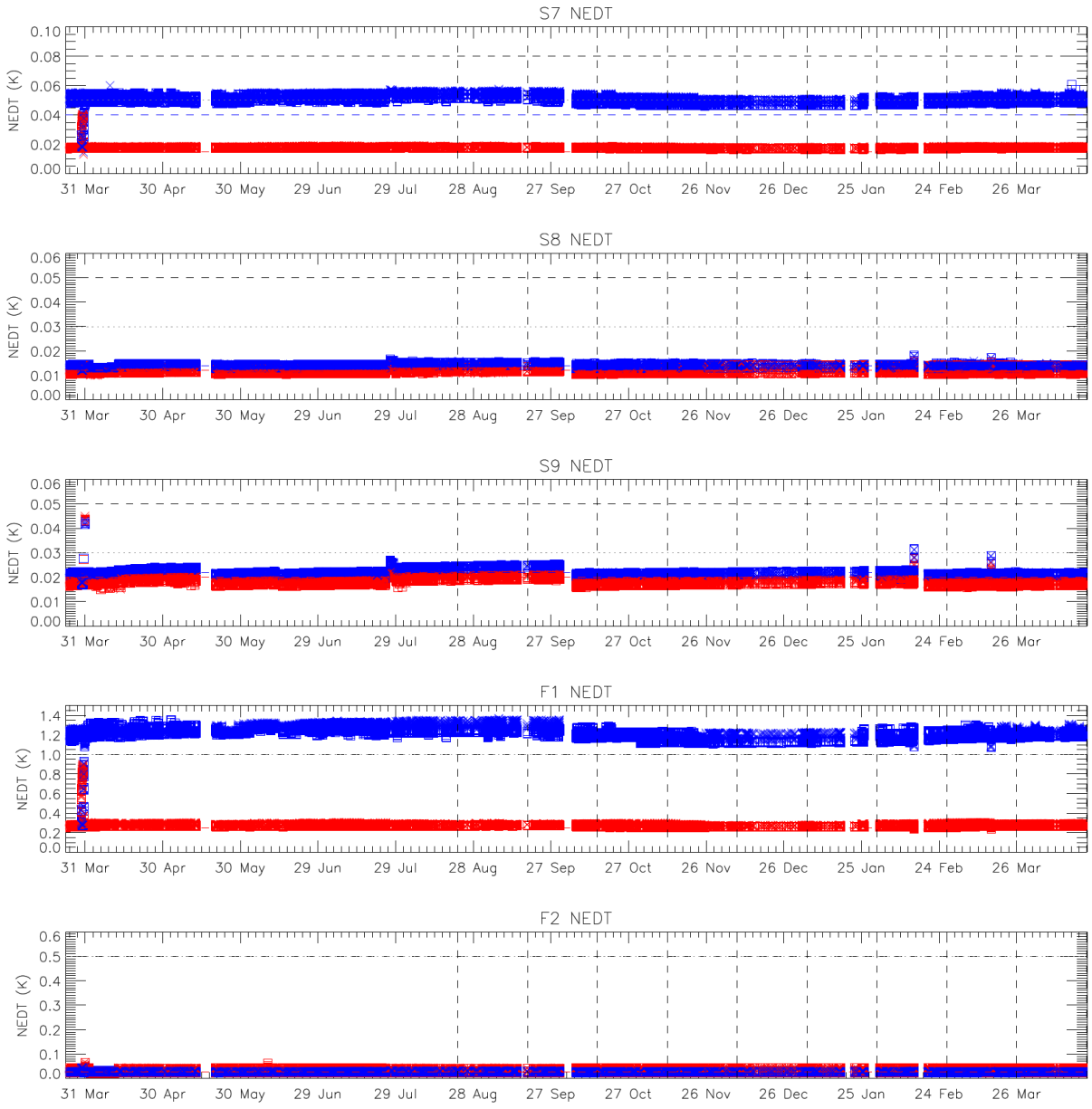

Figure 8: NEDT trend for the thermal channels. Blue points were calculated from the cold blackbody signal and red points from the hot blackbody. Horizontal lines indicate the requirement (dashed) and goal (dotted) as well as the measured values on ground (red and blue dashed).

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 14th February. Following the anomaly on 16th March and the subsequent cooldown, the VISCAL signals have returned to their pre-anomaly levels and the oscillations in signal have continued from where they left off.

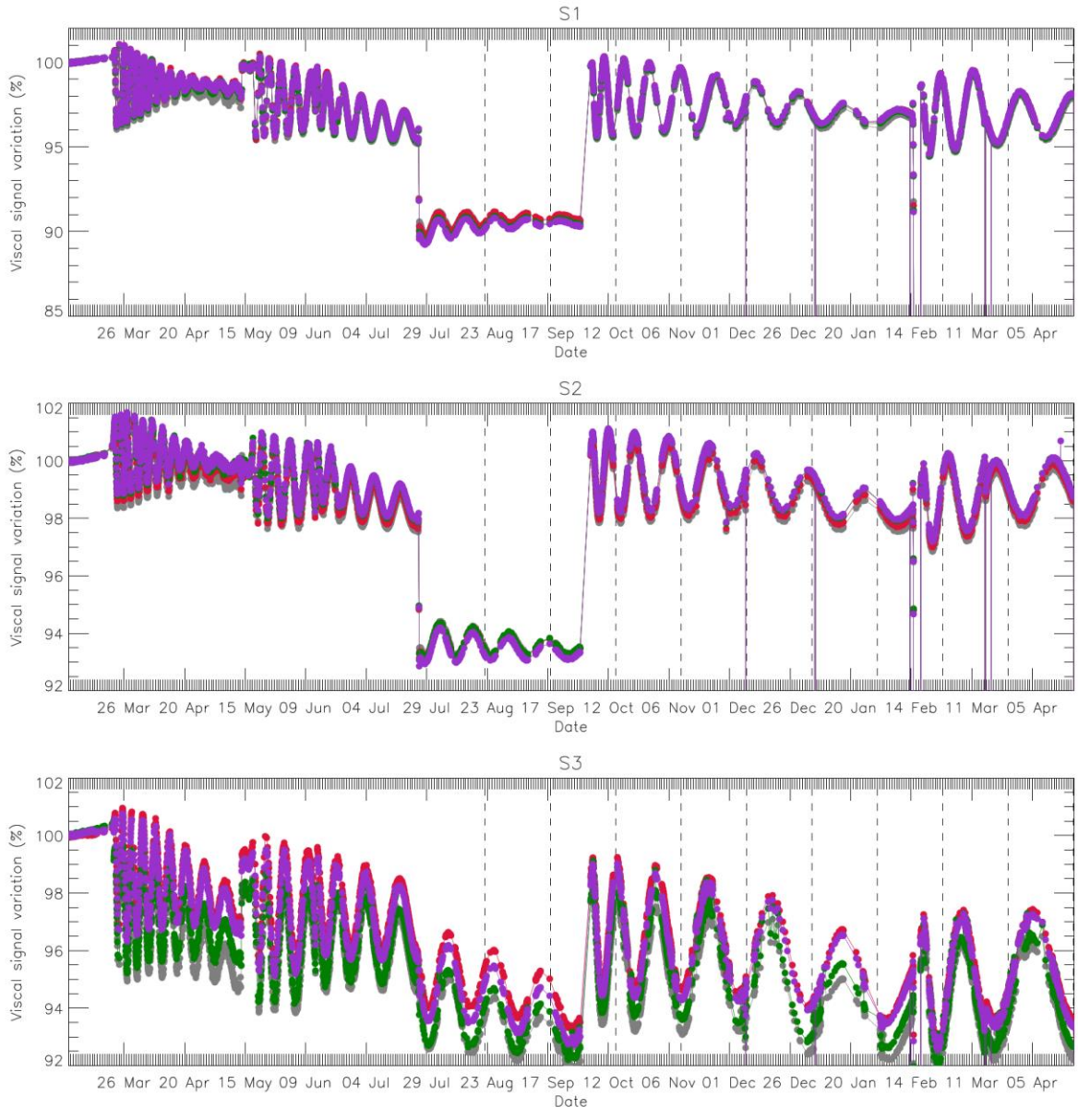

Figure 9: VISCAL signal trend for VIS channels (nadir view).

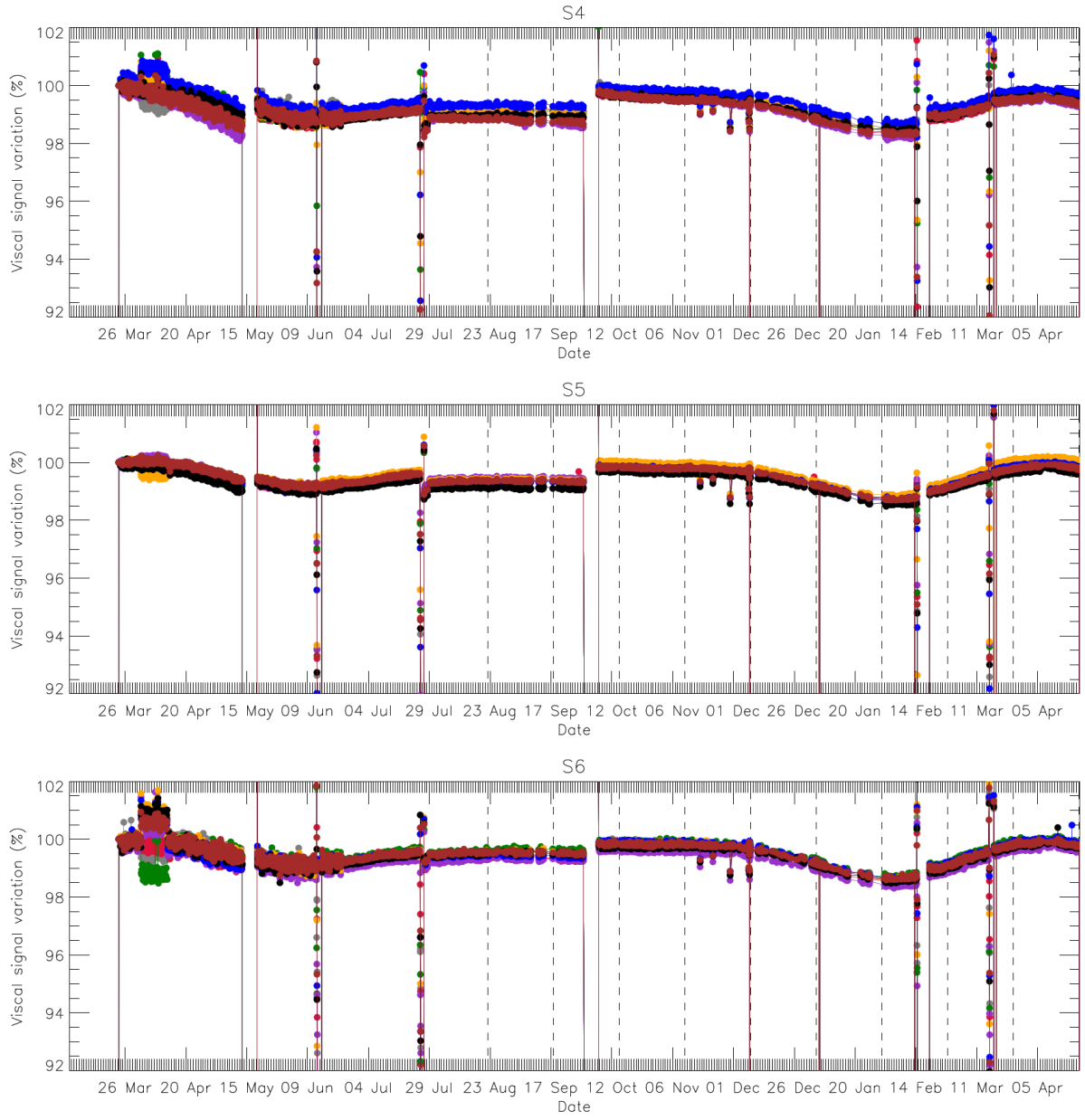

Figure 10: VISCAL signal trend for SWIR channels (nadir view).

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 test:

- The SLSTR cooler vibration cancelation system is suspected to be a contributor to the FPU trap anomaly that has occurred on 4 occasions since launch. To prevent further occurrences of the anomaly, it has been proposed to disable the control loop. To evaluate the impact on the instrument performance, a test was made on 5th April 2017 where the algorithm was disabled from 12:31 and re-enabled at 12:40. A further test was performed on 13th April 2017 for a whole orbit from 07:25 until 09:05. It was expected that disabling the vibration control loop would have a negligible impact on the pointing budget, and analysis of the scan and flip mirror stability and radiometric noise during the test period has shown that there were no significant changes. No noticeable effects were detected at satellite platform level, and no obvious degradation has been seen in Level-1 products.

3 Appendix A

Other reports related to the Optical mission are:

- S3-A OLCI Cyclic Performance Report, Cycle No. 016 (ref. S3MPC.ACR.PR.01-016)

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

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