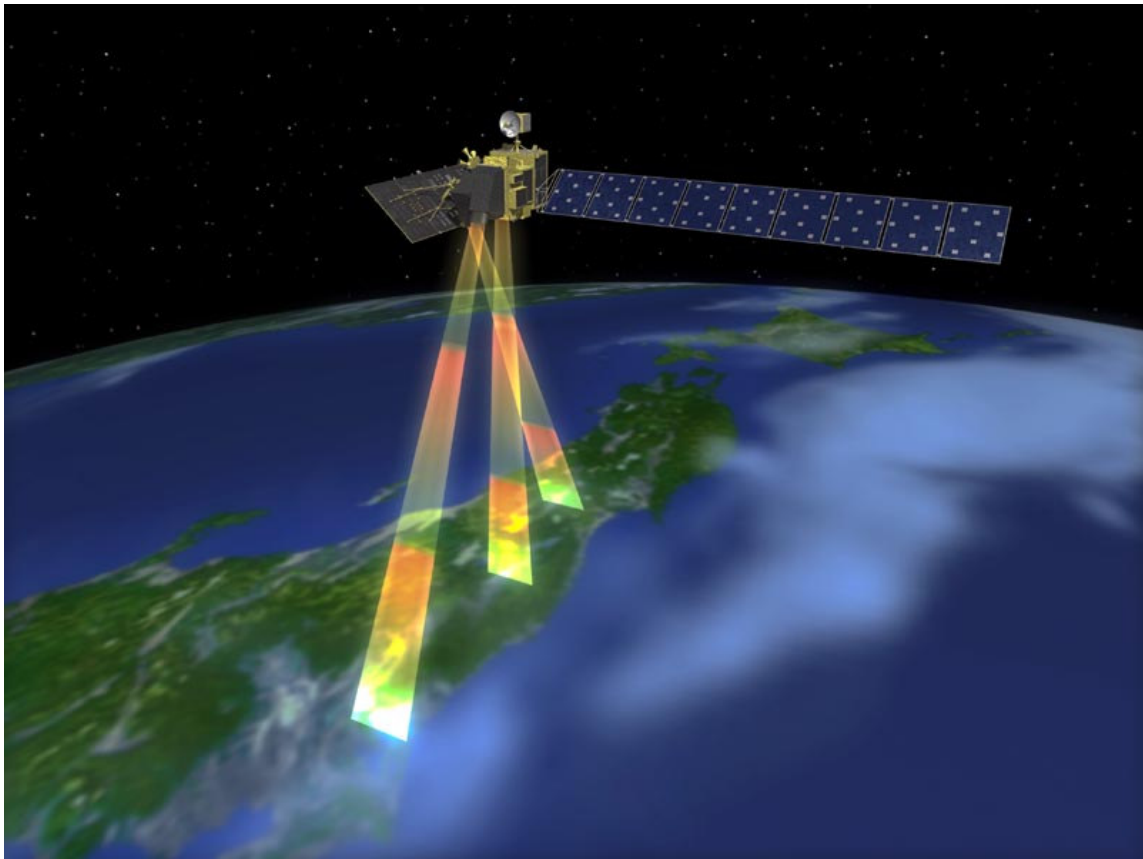


ADEN ALOS – PRISM CYCLIC REPORT
CYCLIC REPORT #19
24 APRIL 2008 TO 09 JUNE 2008



prepared by/ <i>préparé par</i>	ADEN ALOS QC Optical Team
reference/ <i>référence</i>	PRISM_CR_19_080424_080609
issue/ <i>édition</i>	1
revision/ <i>révision</i>	0
date of issue/ <i>date</i> <i>d'édition</i>	01 July 2008
status/ <i>état</i>	
Document type/ <i>type de</i> <i>document</i>	Technical Note
Distribution/ <i>distribution</i>	

A P P R O V A L

Title <i>titre</i>	ALOS PRISM Cyclic Report – Cycle 19	issue 1 <i>issue</i>	revision 0 <i>revision</i>
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author <i>auteur</i>	ADEN QC Optical Team	date <i>date</i>	01 July 2008
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approved by <i>approuvé par</i>		date <i>date</i>	
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C H A N G E L O G

reason for change / <i>raison du changement</i>	issue/ <i>issue</i>	revision/ <i>revision</i>	date/ <i>date</i>
Initial Issue	1	0	01 July 2008

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PRISM CYCLIC REPORT # 19

1 INTRODUCTION

The PRISM Cyclic Report is distributed by the ADEN PRISM QC team to keep the PRISM community informed of any modification regarding quality control, instrument performance, the data production chain and the results of calibration and validation campaigns at the end of each ALOS cycle, which represents 671 orbits, or 46 days.

The PRISM instrument is on board the Japanese JAXA ALOS mission. The ALOS mission falls down the ESA third party mission category. The data is routinely received and processed by the ESA's ADEN ground segment across Europe. This is done through an agreement between JAXA and ESA, where ALOS is classed as an ESA Third Party Mission, for which it is responsible for data reception and product dissemination across the European and African regions. A series of quality checks are undertaken in order to assess the ground segment, the instrument performance and the product quality.

Checks are currently made on a weekly (header parameters, PDS status) or bi-monthly (visual report) basis to have a constant view on the mission status. The cyclic report presents the results of the analysis for the different part of the chain, from satellite to end-user product.

This document is available online at:
<http://earth.esa.int/pcs/alos/prism/reports/cyclic/>

1.1 *Acronyms and Abbreviations*

ADEN	ALOS Data European Node
ALOS	Advanced Land Observing Satellite
CEOS	Committee on Earth Observation Satellites
DoM	Day of Mission
EO Help	Earth Observation Help Desk
GCP	Ground Control Points
JAXA	Japan Aerospace Exploration Agency
OCM	Orbit Control Manoeuvre
PCS	Product Control Service
PDS	Payload Data Segment
PI	Principal Investigator
PRISM	Panchromatic Remote-sensing Instrument Stereo Mapping
QC	Quality Control
SPPA	Sensor Performance Products Algorithms

TOA Top of Atmosphere
UT Universal Time

1.2 Reference Documents

- RD.1 ALOS/AVNIR-2 Level 1 product format description Rev J -
October, 2006 JAXA (NEB 00016)
- RD.2 Bouvet M., Goryl. P., Santer R., Chander G., Saunier S,
Preliminary radiometric calibration assessment of ALOS
AVNIR-2 IGARSS 2007 proceedings
- RD.3 R-3 Saunier S., Goryl. P and al
The contribution of ESA to the ALOS PRISM / AVNIR-2
commissioning phase
IGARSS 2007 proceedings.
- RD.4 Saunier S., Goryl P
Final calibration / Validation report: PRISM Instrument
Issue 1 Rev 0 – July 2007
- RD.5 JAXA
ALOS User Handbook
November, 03, 2007 (NDX 070015)
- RD.6 Gruen A., Kocaman S., Wolff K., 2007. Calibration and Validation of
Early ALOS/PRISM Images. The Journal of the Japan Society of
Photogrammetry and Remote Sensing, Vol 46, No. 1, pp. 24-38.

1.3 Background information

The PRISM instrument is an optical instrument which forms part of the ALOS mission built by the Japan Aerospace eXploration Agency (JAXA).

The ALOS mission data is produced and disseminated through geographical nodes. The European node (ADEN) was set up and is operated by ESA through the Tromso, Matera, Mas Palomas and Frascati ground stations. As a third party mission (TPM), only the ground segment and data processing are dealt with by ESA, the platform being the responsibility of the owner: JAXA. Each node operates their ground segment independently and shares results with JAXA when required in the frame of the Calibration Validation Science Team (CVST).

The ADEN-ALOS QC team is responsible for the operation and maintenance of the data received in Europe and North Africa. The ADEN team took part in the Calibration/Validation activities during the ALOS commissioning phase (January to October 2006). The methodologies used and results obtained are documented (RD.3 and RD.4) and made available to the user through the site:
<http://earth.esa.int/object/index.cfm?fobjectid=3738>

As part of the ADEN operations, a series of quality checks are undertaken in order to assess the ground segment and instrument performance and the product quality for products requested by European users. Checks are currently made on a weekly basis (header parameters, PDS status) to have a constant view on the mission status.

2 SUMMARY

Cyclic Report: 19

Cycle Start: 24 April 2008

Cycle End: 09 June 2008

The main issues during the cycle have been as follows:

- **Processor Version**

Current PRISM processor version: 3.00 (Tromso)

See Section 3 for more information

3 SOFTWARE & AUX FILE VERSION CONFIGURATION

Current Optical Processor Version	ESRIN	Matera	Tromso
4.05	09/01/08		
4.04		05/10/07	
3.00			20/08/07

Table 3-1 PRISM Processing Versions

The reason for this particular configuration of processor versions as listed in Table 3-1 is that the release of the v4.02 of the optical processor solved a number of problems with the previously installed v3.00. However the PRISM components of the processor experienced some issues with the newer version, and therefore, v3.00 was maintained at Tromso, while the updated version was installed at Matera and ESRIN. Subsequently, v4.02 has been upgraded to 4.04 in both ESRIN and Matera, but v3.00 is still maintained at Tromso.

Therefore, all PRISM products are generated using v3.00 of the optical processor.

A history of the ADEN optical processor release notes will be made available on the ALOS ADEN PCS website, location: <http://earth.esa.int/pcs/alos/avnir/userinfo/>

ALOS Precision Attitude Data and Precision parameters for PRISM were updated by JAXA to improve accuracy. Announced 02/05/08 Implemented 07/05/08.

4 PDS STATUS

4.1 *Planned Instrument Unavailability*

None reported during this cycle.

4.2 *Unplanned Instrument Unavailability*

None reported during this cycle.

4.3 *Current Platform Status*

Information on the platform provided by JAXA:

Current platform status: Normal

JAXA information reported on in this document cover the period 01/04/2008 to 31/05/2008

4.4 *ADEN PDS Unavailability*

None reported during this cycle.

4.5 *Periods of missing precision orbit data*

For the periods described in Table 4-1, JAXA has announced that precision orbit data is missing.

From (UT)		To (UT)		Reason
Date	Time	Date	Time	
Apr. 26, 2008	10:20:00	Apr. 26, 2008	11:23:00	Due to OCM
May 16, 2008	20:36:00	May. 16, 2008	21:40:00	Due to OCM

Table 4-1 Missing Precision Orbit Data

4.6 *Periods of missing precision attitude data*

For the periods described in Table 4-2, JAXA has announced that precision attitude data is missing.

From (UT)		To (UT)		Reason
Date	Time	Date	Time	
May. 11, 2008	00:30:00	May. 11, 2008	03:00:00 ¹	Star Tracker Calibration

Table 4-2 Missing Precision Attitude Data

4.7 *Periods lacking Yaw steering*

For the periods described in Table 4-3, JAXA has announced that Yaw steering was not available.

From (UT)		To (UT)		Reason
Date	Time	Date	Time	
May 10, 2008	23:55:00	May. 11, 2008	09:10:00	Star Tracker Calibration
May. 13, 2008	00:00:00	May. 13, 2008	23:59:00	Star Tracker Calibration

Table 4-3 No Yaw steering

4.8 *JAXA Observation Strategy*

The JAXA observation strategy can be found at:

<http://www.eorc.jaxa.jp/ALOS/obs/overview.htm>

4.9 *Artefact repositories*

A number of instrument artefacts are not due to instrument or processing chain malfunctions. These are fully documented in the following JAXA web pages.

<http://www.eorc.jaxa.jp/en/about/distribution/info/alos/characteristics.html>

¹ Tentative schedule, detail of exact times has not yet been confirmed.

5 DATA QUALITY CONTROL

5.1 *Instrument Related Anomalies*

No reported anomalies this cycle.

5.2 *Processor Related Anomalies*

The PRISM processor remains at version 3.00.

5.3 *Daily Report Issues*

During the past cycle, daily checks have been undertaken on all PRISM products generated by ADEN, although these are reported on a weekly basis due to current data volumes.

151 products have been examined during the course of this cycle, no issues have been identified.

5.4 *Visual Inspection Report Issues*

During the past cycle, visual inspections have been undertaken on a selected sample of PRISM products. The following issues have been identified:

- We continue to observe JPEG compression artefacts which are expected as a result of PRISM processing.
- Image 'Smearing' has been observed, see section 4.9, further details on specific smearing will be available after processing of necessary product levels.
- CCD Boundaries have been observed in 1B2R products, an example of which is given in Figure 5.1. This image is taken from frame 2775 of orbit 10289 in the backward view.



Figure 5.1 - Intercamera boundaries can be observed.

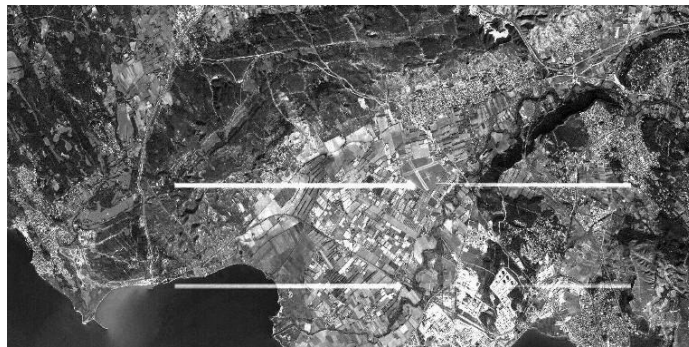


Figure 5.2 - Extreme smearing observed in product from orbit 10960, frame 2665

These anomalies are undergoing investigation, the results of which will be reported on in future cyclic reports. The smearing shown in Figure 5.2 occurred during an acquisition with a gain setting of 0.5410 and is restricted to CCD 7. The effect extends across the entire CCD and contaminates approximately 50 image records.

There were no image anomalies detected that have not already been documented by JAXA.

5.5 User Queries

All common queries received from users are placed in the PRISM FAQ, which can be found at: <http://earth.esa.int/pcs/alos/prism/userinfo/>

5.6 *Product Performance Monitoring*

This information will be reported on in future cyclic reports.

6 CALIBRATION/VALIDATION ACTIVITIES & RESULTS

6.1 1B2 Product geolocation

All the 1b2r product geolocation results for a period from the DOY since launch 200 up to DOY 600 have been put together.

The assessment has been performed on data observed over the following ESA test sites;

Turkey – Adana (reference IKONOS PAN)

South Africa – Cap Town (reference IKONOS PAN)

France - Paris (reference Ground control point derived from GPS measurement)

France - La Crau (reference Ground control point derived from GPS measurement)

We observed for the NADIR radiometer:

- The RMS error in across track direction is stable (pink square) along with time (about 13 metres pixels),
- The RMS error in the along track is not stable (yellow square) along with time and is about 70 metres RMS,
- The mean error variation in the along track direction indicated that a major change has occurred close to DOY 450 since launch, this assertion is confirmed when checking results from the other radiometers.

Geolocation from DOY since launch 200 up to 600, RMS/error trend per radiometer is given in the following figures.

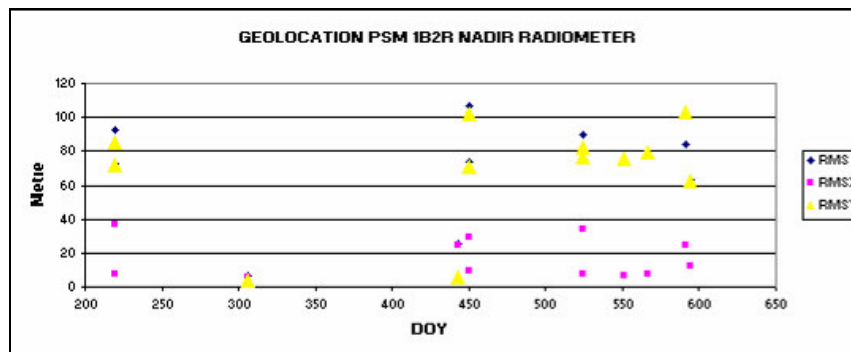


Figure 6.1 Geolocation RMS PRISM 1B2R NADIR

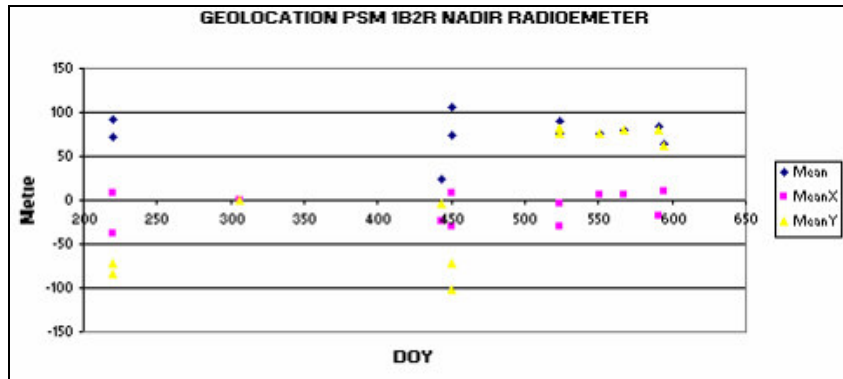


Figure 6.2 - Geolocation MEAN PRISM 1B2R NADIR

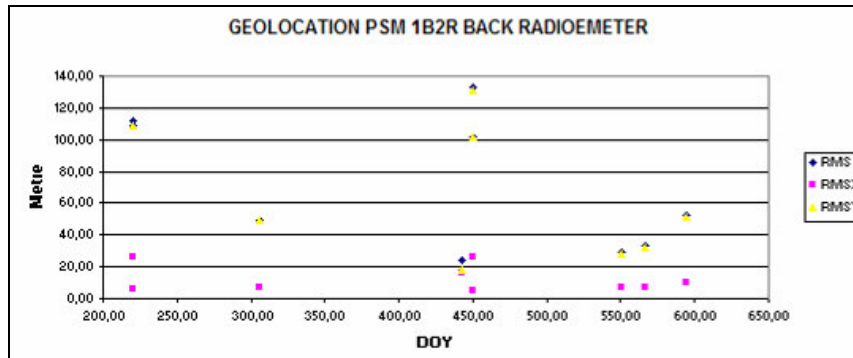


Figure 6.3 - Geolocation RMS PRISM 1B2R BACKWARDS

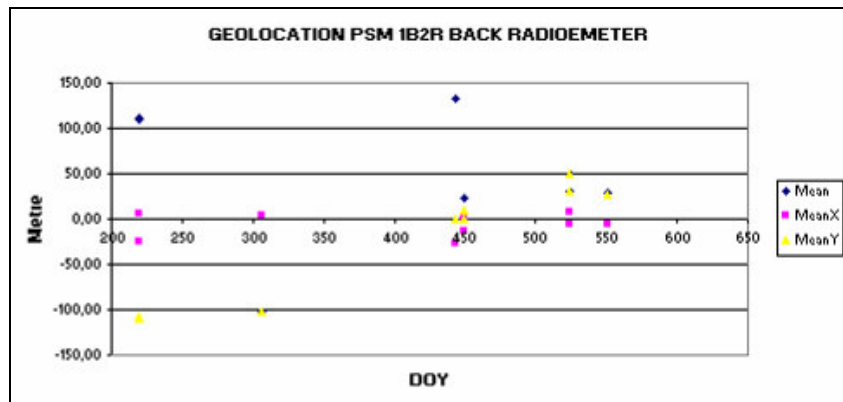


Figure 6.4 - Geolocation MEAN PRISM 1B2R BACKWARDS

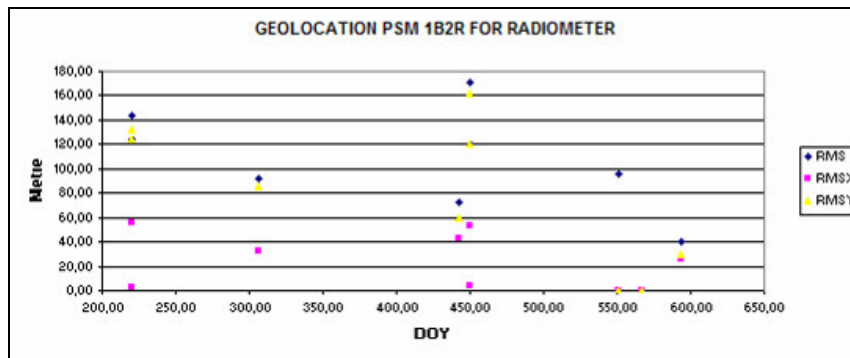


Figure 6.5 - Geolocation RMS PRISM FORWARD VIEW

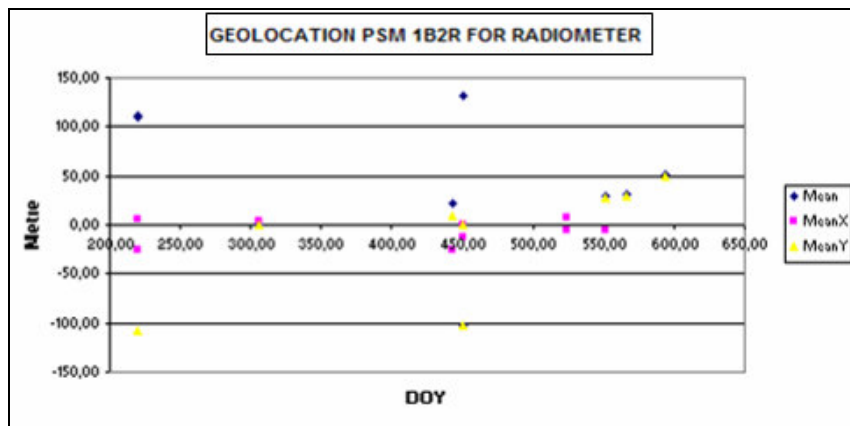


Figure 6.6 – Geolocation MEAN PRISM FORWARD VIEW

6.2 1B1 Image geometry accuracy

This information will be reported on in future cyclic reports.

6.3 Orbit stability – along track

This information will be reported on in future cyclic reports.

7 DISCLAIMERS

No new disclaimers have been issued during this cycle.

A list of known product errors caused by image processing algorithm errors is listed on the JAXA site at:

http://www.eorc.jaxa.jp/hatoyama/satellite/data_tekyo_setsumei/alos_renraku_e.html

8 EVENTS

The following section details events that may be of interest to ALOS data users.

- The second ALOS PI Symposium will be taking place from the 3rd to the 7th of November in Rhodes, Greece. For more information, please see <http://earth.esa.int/ALOS2008>.
 - Note that the deadline for abstract submission was June 15 2008.
- The submission of request files for ALOS simulation number 10 was due by 20th June 2008.

8.1 *Past Events:*

- The submission of request files for ALOS simulation number 9 was due by March 21, 2008
- The ALOS PCS Site is available at: <http://earth.esa.int/pcs/alos/>
- 29 January 2008: Users are now able to submit orders for ALOS future acquisitions via EOLI-SA (email eoHELP@esa.int for more information)
- ALOS simulation #8 for Cycle 18-21
 - The results of the second stage simulation were made available by JAXA on Feb.4th.
 - The Analysis Report on ALOS simulation #8 was delivered by JAXA on Feb.12th.

APPENDIX A PRODUCT SPECIFICATION AS DETERMINED DURING THE ADEN VERIFICATION PERIOD

PRISM	Radiometric accuracy	Geometric accuracy			
Level1B2R	Absolute: 5% (1 σ)	RMS	Pixel (CT)	Line (AT)	Norm
		Nadir	5.9 m	3.4 m	6.8 m
		Forward	33 m	85 m	92.5 m
		Backward	6.8 m	49.3 m	49.7 m
	Intercomparison with AVNIR-2 (GAEL).	Polynomial coefficients embedded within product are used to predict geo location (GAEL).			
Digital surface model		Vertical: 1.05m (1 σ) Horizontal: 2.34m (1 σ) Results obtained with five(5) ground control points and the used of Direct Georeferencing Model (ETH).			

PRISM Product specifications, radiometric and geometric accuracy

PRISM	Image Quality		
Level 1B1	MTF@Nyquist	Pixel (CT)	Line (AT)
	Backward View	0.07	0.25
	Non-parameteric approach - (ONERA).		

PRISM Product specifications, image quality

APPENDIX B INSTRUMENT ANOMALIES

Below is a list of ALOS anomalies that may have an impact on image quality, radiometric calibration or localisation accuracy (from 24th October 2006).

- Calibration operations for Star Tracker conducted on 11th and 13th of May 2008,
- Orbit manoeuvres conducted on 16th May 2008,
- Orbit manoeuvres conducted on 26th April 2008,
- Orbit manoeuvres conducted on 4th April 2008.

- Orbit manoeuvres conducted on 26th January and 2nd, 15th, 29th February 2008.
- YAW steering was suspended on 28th January 2008

- Orbit manoeuvres conducted on 15th December 2007, 4th, 11th & 18th January 2008.

- Observation, yaw steering, and precision attitude system suspended on 31st October 2006 between 03:50 and 15:50 UT due to change AOCS on-board orbit model to that of 15th order.

- Yaw steering suspended during 23rd February 00:12 UT to 24th February 2007 23:01 UT (yaw steering suspended due to calibrating operations for Star Tracker (STT) and Precision Attitude Determination).

- Yaw steering suspended during 22nd March 00:24 UT to 23rd March 2007 23:17 UT (yaw steering suspended due to calibrating operations for Star Tracker (STT) and Precision Attitude Determination).

- Yaw steering on/off switching on 10th April 2007:
Yaw steering on to off: 12:57 – 13:22 UT (data unavailable)
No yaw steering operation: 13:22 – 14:42 UT (data available)
Yaw steering off to on: 14:42 – 15:45 UT (data unavailable)

- Orbit manoeuvres on 25th, 27th and 29th April 2007.
- Orbit manoeuvres on 8th and 22nd June 2007.
- Orbit manoeuvres conducted on 7th and 20th July 2007.

- Yaw steering on/off switching on 31st July 2007:
Switching in progress: 00:00 – 00:30, 21:57 – 22:46 UT (Observation suspended)
No yaw steering observation: 00:30 – 21:57UT (Data available)

- Orbit manoeuvres conducted on 3rd and 25th August 2007.
- Orbit manoeuvres conducted on 6th, 12th and 26th October 2007.
- Orbit manoeuvres conducted on 10th and 23rd November 2007.
- Orbit manoeuvres conducted on 7th and 15th December 2007.
- Orbit manoeuvres conducted on 4th, 11th, 18th and 26th January 2008.
- Orbit manoeuvres conducted on 2nd, 15th and 29th February 2008.
- Orbit manoeuvres conducted on 8th March 2008.