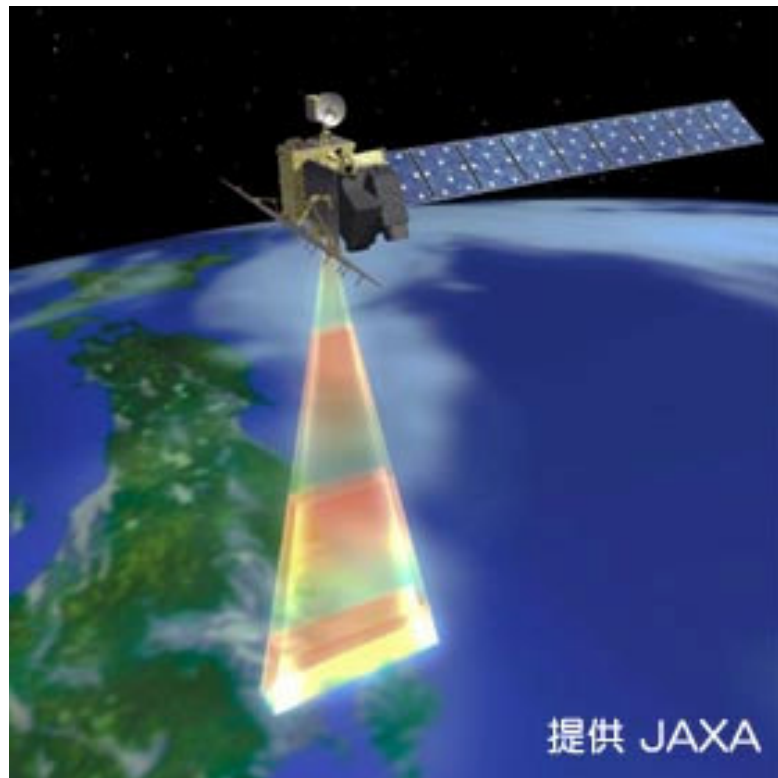


**ALOS – AVNIR-2**  
**CYCLIC REPORT #17**  
**23 JANUARY 2008 TO 09 MARCH 2008**



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## AVNIR-2 CYCLIC REPORT # 17

### 1 INTRODUCTION

The AVNIR-2 Cyclic Report is distributed by the ADEN AVNIR-2 QC team to keep the AVNIR-2 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 AVNIR-2 instrument is part of the Japanese JAXA ALOS mission and its products are received and processed via 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-product.

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

#### 1.1 *Acronyms and Abbreviations*

ADEN	ALOS Data European Node
ALOS	Advanced Land Observing Satellite
AVNIR-2	Advanced Visible and Near Infra-red Radiometer Type-2
CEOS	Committee on Earth Observation Satellites
EO Help	Earth Observation Help Desk
GCP	Ground Control Points
JAXA	Japan Aerospace Exploration Agency
OCM	Orbit Control Manoeuvre
PDS	Payload Data Segment
PI	Principal Investigator
QC	Quality Control
SPPA	Sensor Performance Products Algorithms
TOA	Top of Atmosphere

## **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 | Saunier S., Goryl. P et 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 AVNIR-2 Instrument Issue 1 Rev 0 – July 2007  |

## **1.3 Background information**

The AVNIR-2 instrument is an optical instrument part of the ALOS mission built by the Japanese Space Agency (JAXA).

The ALOS mission has its data 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.

The ADEN-ALOS team is responsible for the operation and maintenance of the data received in Europe and North Africa. The ADEN team took part in the Cal/Val 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.

Details on the commissioning phase will be uploaded onto the ALOS PCS website, which can be found: <http://earth.esa.int/pcs/alos/>

## 2 SUMMARY

**Cyclic Report:** 17

**Cycle Start:** 23 January 2008

**Cycle End:** 09 March 2008

The main issues during the cycle have been as follows:

- **Processor Version**

Current AVNIR-2 processor version: 4.05

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 Optical 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.

Please note that there is a discrepancy between the optical processor version number within the product header and work report, and that reported by the ADEN operations team. This issue is currently being investigated, and will be clarified in future reports.

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/>



## 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:

None reported during this cycle.

### 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	
Mar 08, 2008	07:20:00.0	Mar 08, 2008	08:23:00.0	Due to OCM
Feb 29, 2008	16:47:00.0	Feb 29, 2008	17:50:00.0	Due to OCM
Feb 15, 2008	18:51:00.0	Feb 15, 2008	19:55:00.0	Due to OCM
Feb 02, 2008	10:15:00.0	Feb 02, 2008	10:15:00.0	Due to OCM
Jan 26, 2008	07:16:00.0	Jan 26, 2008	08:19:00.0	Due to OCM

Table 4-1 Missing Precision Orbit Data

### 4.6 *JAXA Observation Strategy*

The JAXA observation strategy can be found:

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

## **5 DATA QUALITY CONTROL**

### **5.1 *Instrument Related Anomalies***

No reported anomalies this cycle.

### **5.2 *Processor Related Anomalies***

No reported anomalies this cycle.

### **5.3 *Daily Report Issues***

During the past cycle, daily checks have been undertaken on all AVNIR-2 products generated by ADEN, although on a weekly basis due to current data volumes.

249 products have been examined during the course of this cycle, and no issues have arisen from the checks.

### **5.4 *User Queries***

An AVNIR-2 FAQ containing common user requests can be found on the ESA PCS website.

The link to this site is: <http://earth.esa.int/pcs/alos/avnir/userinfo/>

### **5.5 *Image quality status***

Image quality analysis continued throughout this cycle in the form of Visual Anomaly Reports by the ADEN QC Optical operations team.

There were no image anomalies detected that have not already been documented in the JAXA document that details common expected visual issues:

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

### **5.6 *Product Performance Monitoring***

#### **5.6.1 RADIOMETRIC STABILITY**

Radiometric stability analysis has been continued; the last dataset is dated June 07. The analysis is focused on one year of operation. For every AVNIR-2 channel, a red circle overlays the symbol of the measurement. Both measurements are temporally

spaced of a one Year period. The geometry of observation is the same for the both acquisition dates.

The figure highlights that radiometric stability is confirmed, at least for the three bands, blue, green and red band. The difference is on the order of 0.01 (TOA reflectance). The band4 results vary by 0.1 between both acquisitions.

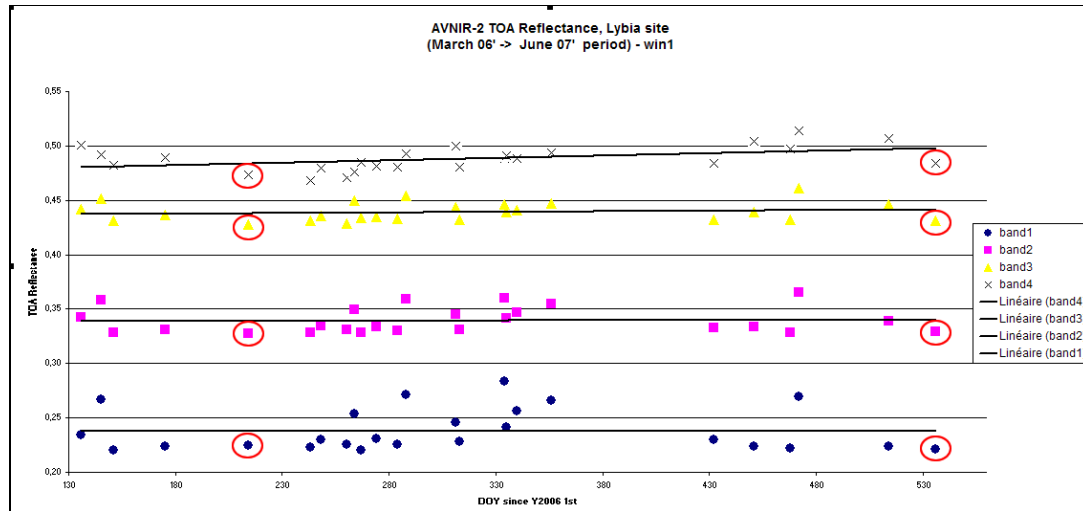
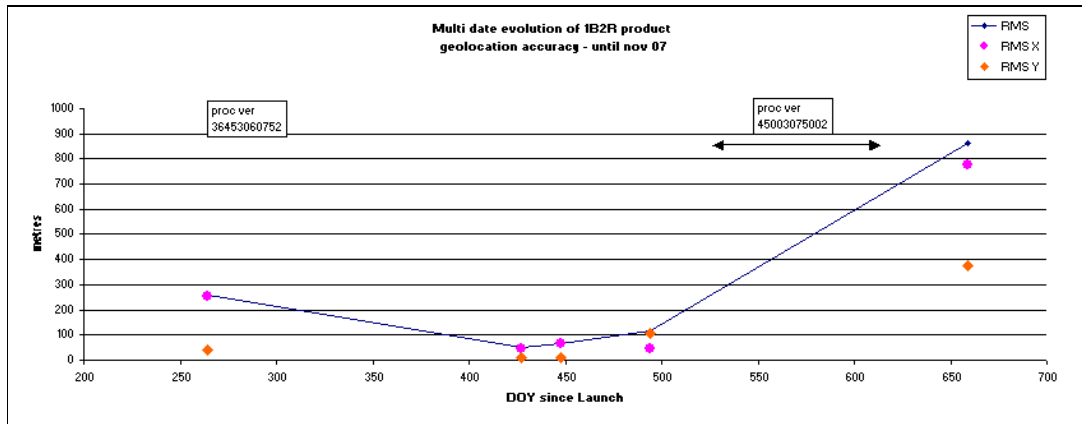


Figure 5-1 Radiometric calibration stability

### 5.6.2 1B2R PRODUCT GEO LOCATION

For the last product that we investigated for this reporting period (ALAV2A096182720); we observed an important shift in across track and along track direction (RMSX, pixel direction, RMSY, line direction). This product has been processed at Tromso, with an old processing software version (36450062650). This could be due to:

- The quality of the orbit and attitude data used during the product processing.
- An anomaly due to processing parameters set by the station. The following line is written within the work report file embedded within the product; *"Rst\_AV2\_Preproc Warning : cannot use Precise orbit data file, Did not specified ALOS Precise Orbital Data filename in Work Order."*



**Figure 5-2 AVNIR-2 product, geolocation stability**

The same product but generated as 1B2G product level has been assessed as well, and the results are in agreements with those found on the 1B2R (827 RMS).

## 6 CALIBRATION/VALIDATION ACTIVITIES & RESULTS

This information will be reported on in future cyclic reports.

### 6.1 VICARIOUS CALIBRATION

This information will be reported on in future cyclic reports.

### 6.2 SENSOR INTER COMPARISON

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](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 3<sup>rd</sup> to the 7<sup>th</sup> of November in Rhodes, Greece. For more information, please see <http://earth.esa.int/ALOS2008>. Note that the deadline for abstract submission is June 1st 2008.
- The submission of request files for ALOS simulation number 9 is due by March 21, 2008
- ALOS simulation #8 for Cycle 18-21
  - The results of the second stage simulation were made available by JAXA on Feb.4<sup>th</sup>.
  - The Analysis Report on ALOS simulation #8 was delivered by JAXA on Feb.12<sup>th</sup>.
- 29 January 2008: Users are now able to submit orders for ALOS future acquisitions via EOLI-SA (email [eohelp@esa.int](mailto:eohelp@esa.int) for more information)

### 8.1 *Past Events:*

- The ALOS PCS Site is now available at: <http://earth.esa.int/pcs/alos/>



## APPENDIX B      PRODUCT      SPECIFICATION      AS DETERMINED FROM THE ADEN VERIFICATION PERIOD

Geometric activities performed during data verification period demonstrated that the pointing accuracy improved over time and with processing software updates. The orbit shift in time was been significantly reduced and is now below the pixel. The geo-location accuracy of the 1B2R product reaches 50 metres (RMS). The internal accuracy which reflects the image geometry is evaluated to be around 18 metres (RMS).

Several assessments to compute the inter-band registration have been done; results are agree that the band-to-band registration remains mainly 0.5 pixel.

Radiometric activities performed on stable and invariant test site demonstrated that the radiometric band to band calibration and radiometric calibration remains very stable over one year. In addition, the sensor inter-comparison procedures have been set up and applied to a same dataset. The conclusions of these three methods agree that the radiometric calibration of AVNIR-2 is satisfactory, given the error bar of the methodologies which is estimated to be around 5%.

The product specifications as output from ADEN data verification periods can be summarised as follow:

AVNIR-2	Radiometric accuracy	Geometric accuracy			
Level1B2	Band 1 -5.6% (1 $\sigma$ ) Band 2 -0.1% (1 $\sigma$ ) Band 3 N/A* Band 4 -2.7% (1 $\sigma$ )	<b>RMS</b>	<b>Pixel (CT)</b>	<b>Line (AT)</b>	<b>Norm</b>
		Nadir*	48 m	10 m	49 m
	Sensor Intercomparison with various EO Sensor (Meris, Landsat ...) as reference (ESA/ESTEC, USGS, LISE) *Not evaluated due to image saturation	Polynomial coefficients embedded within product are used to predict geo location (GAEL). *Acquisition with a 0 pointing degree.			

**AVNIR-2 Product specifications, radiometric and geometric accuracy**



AVNIR-2		Image Quality	
Level 1B1	MTF@Nyquist	<b>Pixel (CT)</b>	<b>Line (AT)</b>
	<b>Band 1</b>	0.51	0.24
	<b>Band 2</b>	0.50	0.30
	<b>Band 3</b>	0.48	0.32
	<b>Band 4*</b>	N/A	N/A
HR/LR Method (ONERA)			
*Not evaluated due to image saturation			

**AVNIR-2 Product specifications, image quality**