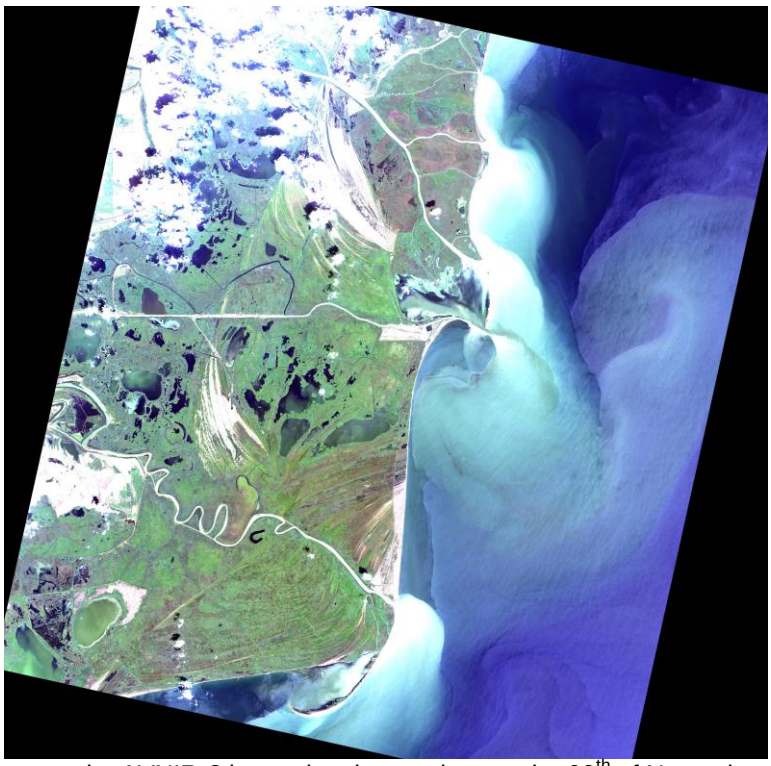
ADEN ALOS AVNIR-2 CYCLIC REPORT

CYCLIC REPORT #32

13 DECEMBER 2009 TO 28 JANUARY 2010



This RGB composite AVNIR-2 image has been taken on the 09th of November, 2009 from orbit 20211.

prepared by/*préparé par*	IDEAS Optical Team
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A P P R O V A L

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C H A N G E L O G

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AVNIR-2 CYCLIC REPORT # 32

1 INTRODUCTION

The AVNIR-2 Cyclic Report is distributed by the IDEAS AVNIR-2 QC team to keep the AVNIR-2 community informed of any modifications 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
IDEAS	Instrument Data quality Evaluation and Analysis Service
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

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

RD.5 Saunier S., Chander G., Goryl P. et al. Radiometric, Geometric and Image Quality Assessment of the ALOS AVNIR-2 and PRISM sensors. 2008

RD.6 Saunier S., IDEAS Team, ALOS PRISM & AVNIR2 Data, ADEN Product Quality Status. 2008. http://www.gael.fr/eoqc/alos_optical_mission/GAEL_PRES_003-ALOS-RHODES-QC.VF_exportable.pdf

1.3 Background information

The AVNIR-2 instrument is an optical instrument on board 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 team is responsible for the operation and maintenance of the node that receives data acquired over 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.

2 SUMMARY

Cyclic Report: 32

Cycle Start: 13 December 2009

Cycle End: 28 January 2010

The main issues during the cycle have been as follows:

- **Processor Version**

- ~~. This included an update to the PRISM Pointing Alignment Parameter.~~

- ALOS Core Processing Software v5.09 has been released on 2009, October 15th and validation activities started with this new version.

  See Section 3 for install dates of ADEN processors.

Mis en forme : Police :(Par défaut) Arial, 12 pt, Anglais (Royaume-Uni)

Mise en forme : Puces et numéros

Mis en forme : Avec puces + Niveau : 1 + Alignement : 1,25 cm + Tabulation après : 1,89 cm + Retrait : 1,89 cm

3 SOFTWARE & AUX FILE VERSION CONFIGURATION

Current Optical Processor Version	ESRIN	Matera	Tromso
5.08	09/12/2009~~27/04/09~~	09/12/2009~~27/04/09~~	09/12/2009~~27/04/09~~

Table 1.3-1 : AVNIR-2 Processing Versions

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/ReleaseNote_AVN_V05L08.pdf
~~A summary of the updates made to version 5.04 of the optical processor is given in Appendix A.~~

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Mis en forme : Couleur de police : Automatique

Mis en forme : Couleur de police : Automatique

Mis en forme : Couleur de police : Automatique

PDS Status
Please note; the major source of information for this document is the ALOS monthly report provided by JAXA. The monthly reporting timescale means that data concerning events conducted within this cycle may not be available at the time of writing. In this event, information will be included in the next cyclic report.

Instrument information provided by JAXA during the period ~~12/09/2009~~ 13 December 2009 to 28 January 2010 ~~28/10/2009~~ is reported in this document.

3.1 Planned Instrument Unavailability

For the periods described in Table 3.1-1, JAXA has announced planned instrument unavailability. Exact times of the periods are not available.

From (UT)		To (UT)		Reason
Date	Time	Date	Time	
Jan. 16, 2010	09:57:00.000000	Jan. 16, 2010	11:00: 00.000000	OCM
Jan. 1, 2010	16:22:00.000000	Jan. 1, 2010	17:26:00.000000	OCM
Dec. 25, 2009	21:34:00.000000	Dec. 25, 2009	22:37:00.000000	OCM
Dec. 18, 2009	20:13:00.000000	Dec. 18, 2009	21:17:00.000000	OCM

Table 3.1-1 : Planned instrument unavailability

3.2 Unplanned Instrument Unavailability

For the periods described in **Table 3.2-1**, JAXA announced unplanned instrument unavailability.

From (UT)		To (UT)		Reason
Date	Time	Date	Time	
None				

Table 3.2-1 : Unplanned instrument unavailability

3.3 Current Platform Status

Information on the platform provided by JAXA:

Current platform status: **Normal**

3.4 Upcoming Instrument Unavailability

For the periods described in Table 3.4-1, JAXA has announced planned instrument unavailability.

From (UT)		To (UT)		Reason
Date	Time	Date	Time	
None				

Table 3.4-1 : Upcoming instrument unavailability

3.5 ADEN PDS Unavailability

None reported during this cycle.

3.6 Periods of missing precision orbit data

For the periods described in Table 3.6-1, JAXA has announced that precision orbit data is missing.

From (UT)		To (UT)		Reason
Date	Time	Date	Time	
Jan. 16, 2010	09:57:00.000000	Jan. 16, 2010	11:00: 00.000000	Due to orbit manoeuvring
Jan. 1, 2010	16:22:00.000000	Jan. 1, 2010	17:26:00.000000	Due to orbit manoeuvring
Dec. 25, 2009	21:34:00.000000	Dec. 25, 2009	22:37:00.000000	Due to orbit manoeuvring
Dec. 18, 2009	20:13:00.000000	Dec. 18, 2009	21:17:00.000000	Due to orbit manoeuvring

Table 3.6-1: Missing Precision Orbit Data

3.7 Periods of missing precision attitude data

For the periods described in Table 3.7-1, JAXA has announced that precision attitude data is missing.

From (UT)		To (UT)		Reason
Date	Time	Date	Time	
None				

Table 3.7-1 : Missing Precision Attitude Data

3.8 Periods lacking Yaw steering

No Yaw steering announced by JAXA, during the period for cycle 32 (Table 3.8-1).

From (UT)		To (UT)		Reason
Date	Time	Date	Time	
None				

Table 3.8-1 : No Yaw steering

3.9 JAXA Observation Strategy

The JAXA observation strategy can be found at:
~~http://www.eorc.jaxa.jp/ALOS/obs/overview.htm~~
http://www.eorc.jaxa.jp/ALOS/en/obs/overview.htm

3.10 Artefact repositories

A number of image 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

4 DATA QUALITY CONTROL

The following sections in this Cyclic Report do not contain inputs from the ALOS SPPA scientific experts.

4.1 Instrument Related Anomalies

No reported anomalies this cycle.

4.2 Processor Related Anomalies

No reported anomalies this cycle.
Le message de simone?

4.3 Daily Report Issues

During the past cycle, daily checks have been undertaken on all AVNIR-2 products generated by ADEN which were electronically disseminated. Checks are currently conducted on a weekly basis due to data volumes.

Browse products for all optical images are visually inspected and reported on in each weekly report.

~~213~~ 34 products have been examined during the course of this cycle; and 1 anomaly was highlighted by the browse inspections.

Scene Id	Inspection date	Cloud %	Gain	Summary
ALAV2A020772580	25/01/2010	0-2	0.588, 0.573, 0.502, 0.835	Faulty attitude missing auxiliary data.

4.4 Visual Inspection Report Issues

There were no visual anomalies which have not already been documented in the JAXA document that details expected image features:

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

4.5 User Information

An AVNIR-2 FAQ containing common user requests can be found on the ESA PCS website. The most recent version of this document can be found at: http://earth.esa.int/download/alos/IDEAS-VEG-OQC-REP0124 20ALOS 20OPTICAL 20FAQ.pdf. It has been issued 18 January 2010.

5 CALIBRATION/VALIDATION ACTIVITIES & RESULTS

Update values have been added in FAQ (updated 15 January 2010).
AVNIR-2 calibration values can be found in annexe E of the FAQ.
FAQ link:
http://earth.esa.int/download/alos/IDEAS-VEG-OQC-REP-0124 20ALOS 20OPTICAL 20FAQ.pdf

6 DISCLAIMERS

- ~~No~~ One disclaimer~~s~~ has~~ve~~ been issued during this cycle, focusing on limitation in ALOS product precision (ALOS precise attitude data unavailable).

  The data is available when the on site data cannot be obtained due to lack of precise attitude data.

  Products have been reordered with "most available precise data" to avert this limitation. The scenes (the time of observation) without precise on site attitude data can be tracked via Ticketing system (EO SPPA #2531).

- 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

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Mise en forme : Puces et numéros

Commentaire [gj1]: a mettre isi ou pas?

Mise en forme : Puces et numéros

Mis en forme : Retrait : Gauche : 2,5 cm

7 EVENTS

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

- ~~ALOS Core Processing Software v5.09 for AVNIR-2/PRISM (Core processing) was released on October, 15th, 2009.~~
- Two publications of jaxa team concerning the AVNIR calibration are foreseen on IEEE~~next~~ , December 2009.

~~(2)~~ Operational restriction: (information source: Masanobu Morioka, Earth Observation Dept. Remote Sensing Technology Center of Japan (RESTEC))

- Maintenance of data receiving facility at EOC (From 00:00 on Dec. 22nd to 23:59 on Dec. 23rd (UT))

- Events announced for January 2010 but not reported yet on ALOS Web pages for the cycle 32 time period.
  - → Suspension of Data Relay Satellite Communication Subsystem (Only DT is conducted.) From 9:15 to 12:00 on Jan. 13th (UT)
  - → Suspension of observations due to HK operation #1 of S/C From 11:45 to 13:34 on Jan. 6th (UT)
  - → Observation suspended because power supply will be lowered due to an eclipse caused by the moon. From 6:42 to 7:02 on Jan. 15th (UT)
  - → HK operation #2 of S/C.
  - → Suspension of observations From 23:58 on Jan. 26th to 01:06 on Jan. 27th. From 02:18 to 03:15, from 05:33 to 06:37 and from 22:20 to 23:08 on Jan 27th (UT), From 01:21 to 02:15 and from 23:08 to 23:58 on Jan. 28th
  - → Suspension of Precision Attitude Determination
    - Approximately, from 0:35 to 7:10 on Jan. 27th (UT)
- ALOS simulation#17 (Cycle 34 –37)
- Request files are due on January, 8th. Result files will be available in late January.

~~ALOS PI SYMPOSIUM: The 3rd Annual ALOS Joint PI Symposium is hosted by the Americas ALOS Data Node and will be held on the Big Island of Hawai'I (2009, November 09th to13th). The Symposium will focus on PALSAR, PRISM, AVNIR-2, InSAR, Land Cover/Use, Geohazards, Forestry, Ocean Processes, Polarimetry, Glaciology, Kyoto/Carbon, Sea Ice, Hydrology, Floods/Wetlands, Software and Tools, Agriculture/Vegetation, and IPY.~~

~~The session dedicated to Calibration/Validation is foreseen: Monday, November 9th 2009. The following presentations have been made:~~

~~oImage Quality Evaluation on PRISM and AVNIR-2, Latest Evaluation Results, Akira Mukaida, Naritoshi Imoto, Sachi Kawamoto,Takeo Tadono~~

~~oPRISM Geometric Calibration Updates and DSM, Generation Status, Junichi Takaku, Takeo Tadono~~

~~oRPC Generations on PRISM/AVNIR-2 Level 1B2 Images, Junichi Takaku, Takeo Tadono~~

~~oThe ALOS PRISM AVNIR-2 Quality Control at ADEN, a Status After 3 years of Operation, Sebastien Saunier, A. Mambimba, V. Motti~~

~~oAssessment of DEM Extraction Joanna Tan, M.Z Mat Jafri, H.S. Lim, K. Abdullah~~

~~oTime Trend Evaluations of Absolute Accuracies for PRISM and AVNIR-2, Takeo~~

Mis en forme : Couleur de police : Rouge

Mis en forme : Couleur de police : Rouge

Mise en forme : Puces et numéros

Mise en forme : Puces et numéros

~~Tadono, Masanobu Shimada, Hiroshi Murakami, Junichi Takaku, Sachi Kawamoto~~

7.1 Past Events:

- Result files and statistics of second stage of ALOS simulation #16 (Cycle 32 – 35) have been released on November 9th.

- ~~ALOS simulation#15 (Cycle 31 – 40): Result files have been available on Sep. 29th, 2009.~~
- Adoption/Rejection Information of Sim#16. Last Updated: November 17, 2009.

- ALOS simulation #17(cycle 34 - 37) will be conducted in January 2010. Please develop and submit your request files before the due date below.Otherwise, no change is made other than two exceptions as follows: <Cycle 35> A11 of AVNIR-2 deleted from Sim#16. C2 of PRISM changed from OB1 into OB2 from Sim#15.

- EO-Modernisation project is going to have a significant impact on EO systems :
  - By 14th January 2010, e-mail was sent to inform that ESA IP addresses servers changed even firewall IP address. "*For applications, installed locally on IDEAS premises, which access ESA servers it is needed to verify that they rely on servers names and not on IP addresses*" (information provided by e-mail from Massimo Cardaci). It mainly concerns:

  - *ESA Servers identification [Action for all IDEAS] [by 14.01.2009]*), servers hosting only EOP-GQ applications -> marked as "EOP-GQ servers", servers accessed by us as clients, but managed at application level by other EOP groups -> marked as "we are clients", servers with applications, managed by other EOP groups, which talk (input or output) with our applications located in other servers -> marked as "we have application dependency".

    - *"List of firewall entries pointing to ESA servers [Action for all IDEAS] [by 14.01.2009]"*

    - "Local applications exchanging data with ESA servers [Action for all IDEAS] [by 14.01.2009]"

- RESTEC note: Downlink Segment Numbers (DLS#) for January 10th in acquisition/Observation Plan files were changed due to emergency observations, and related MOIFs have been redistributed. Please issue your acquisition/processing result MOIFs, such as REAC, L0RN, and so forth, carrying the DLS numbers updated.

- ALOS Core Processing Software v5.08 for AVNIR-2/PRISM (PRISM Pointing Alignment Parameter) was released on December 09th. V5.08 includes an update to the PRISM Pointing Alignment Parameter in comparison to v5.04, the previous ALOS Core processing.

- *ALOS Symposium:*

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Mis en forme : Police :12 pt

Commentaire [gj2]: A metre ou pas?

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Mise en forme : Puces et numéros

Nov. 9 - 13, 2009: 3rd Joint PI symposium of ALOS Data Nodes for ALOS Science Program in Kona, Hawaii, US. Details are available on site: http://www.asf.alaska.edu/pi_symp/

Presentations in session dedicated to Calibration/Validation (November 9th 2009) context:

Image Quality Evaluation on PRISM and AVNIR-2, Latest Evaluation Results, Akira Mukaida, Naritoshi Imoto, Sachi Kawamoto,Takeo Tadono

PRISM Geometric Calibration Updates and DSM, Generation Status, Junichi Takaku, Takeo Tadono
RPC Generations on PRISM/AVNIR-2 Level 1B2 Images, Junichi Takaku, Takeo Tadono
The ALOS PRISM AVNIR-2 Quality Control at ADEN, a Status After 3 years of Operation, Sebastien Saunier, A. Mambimba, V. Motti
Assessment of DEM Extraction Joanna Tan, M.Z Mat Jafri, H.S. Lim, K. Abdullah
Time Trend Evaluations of Absolute Accuracies for PRISM and AVNIR-2, Takeo Tadono, Masanobu Shimada, Hiroshi Murakami, Junichi Takaku, Sachi Kawamoto

~~ALOS Core Processing Software v5.08 for AVNIR-2/PRISM (PRISM Pointing Alignment Parameter) were released on August 12th~~

- Submission of the request files for the first stage simulation #15 (Cycle 31 – 40) was due to the end of August.

~~ALOS Core Processing Software v5.07 for AVNIR-2/PRISM (PRISM Pointing Alignment Parameter) were released on June 10th~~

- Submission of request files for the first stage of simulation #15 (Cycle 30 – 33) was due towards the end of June.

- The simulation #15 is given because #14 is assigned to ALOS Long-term Full Simulation Cycle31–70.

- ALOS Core Processing Software v5.09 for AVNIR-2/PRISM (Core processing) was released on October, 15th, 2009.

- Result files and statistics of second stage simulation #13 were released on May 22nd. Analysis report was released on May 28th

- The results of first stage simulation #13 were available from April 6th

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Mise en forme : Puces et numéros

Mis en forme : Couleur de police : Automatique

Mise en forme : Puces et numéros

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Mise en forme : Puces et numéros

Mis en forme : Retrait : Gauche : 1,25 cm, Éviter veuves et orphelines

Mise en forme : Puces et numéros

Mise en forme : Puces et numéros

- Submission of request files for the first stage simulation#13 (Cycle28 - 31) was due on March 12th
- ALOS Core Processing Software PRISM/AVNIR-2 Version 5.05 (PRISM Pointing Alignment Parameter) was released on Feb. 6th
- ADN-15 meeting was held on Feb. 24th and 25th in Tokyo
- The result files and statistics for the second stage simulation#12 were released on Feb. 13th.
- Analysis Report and Adoption/Rejection Information for simulation#12 was released on Feb. 20th.
- The submission of request files for the second stage simulation#12 is due on Jan. 19th.
- 11th Science Team meeting for ALOS Kyoto and Carbon Initiative, January 13 - 16, 2009 (Tue. - Fri.), JAXA.
  http://www.eorc.jaxa.jp/ALOS/kyoto/jan2009_kc11/kyoto_meeting_2009jan.htm
- The result files of first stage simulation#12 will be available on Jan. 3rd
- ALOS Core Processing Software (Version 5.03 for PALSAR and Version 5.04 for PRISM/AVNIR-2) was provided Dec. 19th.
- Result files and statistics for simulation#11 were released on Nov. 21st
- Analysis Report and Adoption/Rejection Information for simulation#11 were released on Nov. 29th.
- The submission of request files for the first stage of simulation#12 was due Dec. 16th.
- The second ALOS PI Symposium took place from the 3rd to the 7th of November in Rhodes, Greece.
- Results of first stage simulation#11 made available on Oct. 15th.
- The submission of request files for the second stage simulation#11 was due on Oct. 28th.
- Analysis report and Adoption/Rejection information of simulation#10 were released by JAXA on 21/08/2008.
- The due date of Observation/Acquisition request files for ALOS simulation 11 was 25/09/2008. This simulation covers the period 10/12/2008 to 11/06/2008.

- ADN-14 meeting was held at ASF from Sep. 9th to 11th
- Analysis report and Adoption/Rejection information of simulation#10 were released by JAXA on 21/08/2008.
- The submission of request files for ALOS simulation number 10 was due by 20th of June.
- The submission of request files for ALOS simulation number 9 was due by March 21, 2008
- The ALOS PCS Site is now available at: http://earth.esa.int/pcs/alos/
- 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.
- 29 January 2008: Users are now able to submit orders for ALOS future acquisitions via EOLI-SA (email eohelp@esa.int for more information)

APPENDIX A DATASET FOR L1B2 PERFORMANCE MONITORING

There was no L1B2 performance monitoring in this report.

APPENDIX B PRODUCT SPECIFICATION

<table>
<tr><th>AVNIR-2</th><th>Radiometric accuracy</th><th>Geometric accuracy</th></tr>
<tr><td rowspan="2">Level1B2</td><td>Band 1 +5.05% (1σ)
Band 2 -0.1% (1σ)
Band 3 -1.3% (1σ)
Band 4 +5.16% (1σ)</td><td><table><tr><th>RMS</th><th>Pixel (CT)</th><th>Line (AT)</th><th>Norm</th></tr><tr><td>Nadir*</td><td>35.732 m</td><td>17.401 m</td><td>39.744 m</td></tr></table></td></tr>
<tr><td>Sensor Intercomparison with various EO Sensor
(Meris, Landsat …) as reference
(ESA/ESTEC, USGS, LISE)</td><td>Polynomial coefficients embedded within product are used to predict geo location (GAEL).
*Acquisition with a 0 pointing degree.</td></tr>
</table>

AVNIR-2 Product specifications, radiometric and geometric accuracy

<table>
<tr><th>AVNIR-2</th><th>Image Quality</th></tr>
<tr><td rowspan="6">Level 1B1</td><td><table><tr><th>MTF@Nyquist</th><th>Pixel (CT)</th><th>Line (AT)</th></tr><tr><td>Band 1</td><td>0.51</td><td>0.24</td></tr><tr><td>Band 2</td><td>0.50</td><td>0.30</td></tr><tr><td>Band 3</td><td>0.48</td><td>0.32</td></tr><tr><td>Band 4*</td><td>N/A</td><td>N/A</td></tr></table></td></tr>
<tr><td>HR/LR Method (ONERA)
*Not evaluated due to image saturation</td></tr>
</table>

AVNIR-2 Product specifications, image quality

APPENDIX C 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).

- Orbit manoeuvres conducted on 5 and 12 December 2009
- Orbit manoeuvres conducted on 6, 13, 20, 28 November 2009
- Orbit manoeuvres conducted on 31 October 2009
- Orbit manoeuvres conducted on 2nd, 9 and 17 October 2009
- Orbit manoeuvres conducted on 25th September 2009
- Orbit manoeuvres conducted on 14th and 28th August 2009
- Orbit manoeuvres conducted on 20th June, 3rd, 4th, 5th 7th, 10th and 13th July 2009
- Orbit manoeuvre conducted on 16th May 2009
- Orbit manoeuvres conducted on 13th and 28th March 2009
- Orbit manoeuvres conducted on 14th February 2009
- Orbit manoeuvres conducted on 3rd, 10th, 16th and 30th of January 2009
- Orbit manoeuvres conducted on 15th, 29th November 2008
- Orbit manoeuvres conducted on 11th, 18th, 24th October 2008
- Orbit manoeuvres conducted on 12th, 26th September 2008
- Orbit manoeuvres conducted on 5th, 8th August 2008
- Orbit manoeuvres conducted from 2nd August 2008 14:27 – 3rd August 2008 06:05
- Inclination and related in plane orbit manoeuvres conducted from 29th July 22:26 – 31st July 05:42
- Orbit manoeuvres conducted on 19th July 2008,
- LSSR acquisition failure 11th June 2008,
- Orbit manoeuvres conducted on 19th July 2008,
- Orbit manoeuvres conducted on 11th, 14th, 17th, 20th, 23rd June 2008,

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Mise en forme : Puces et numéros
Mise en forme : Puces et numéros

- 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.

Mis en forme : Anglais (Royaume-Uni)

Mis en forme : Retrait : Gauche : 0,63 cm

APPENDIX D PROCESSOR UPDATE SUMMARY

Upgrade Version: 5.084
Previous Version: ~~4.0~~5.04
Modifications:

(1) Update of Processing Software

- None

(2) Update of Correction Parameter

- Table of Geometric correction information (Update version of Octber20, 2008) (for AVNIR-2) [Ver_AV2_PR_GeometricModel (6.21)]
- PRISM Pointing Alignment parameter file (Update version of November26, 2008) (for PRISM) [Ver_PSM_PR_AlignmentParameter(6.22)]

(3) Update of DEM data directory

- None

Comments:
None