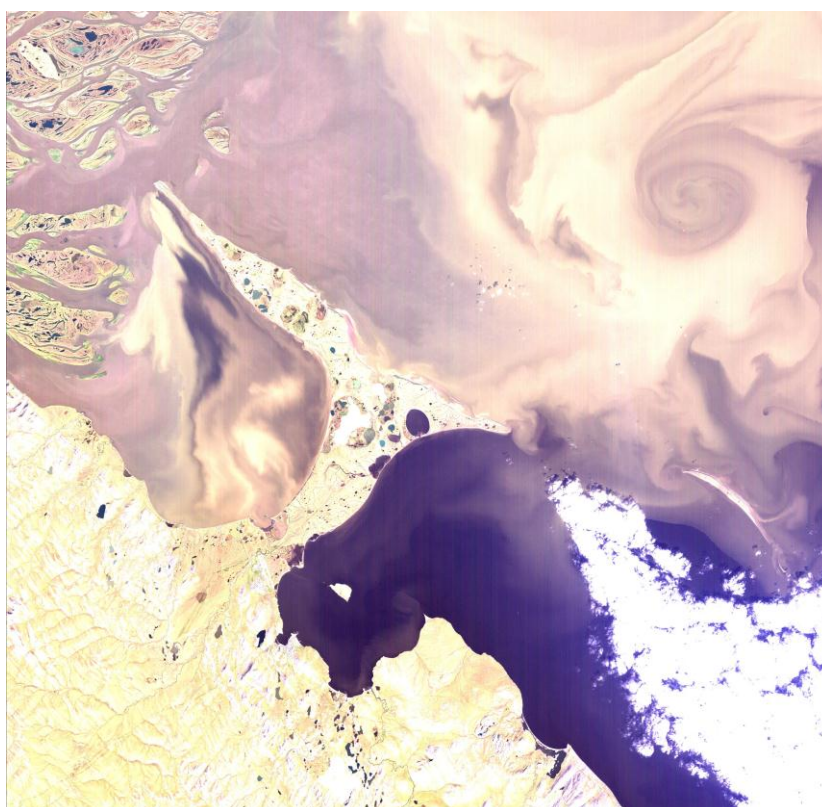


ADEN ALOS AVNIR-2 CYCLIC REPORT

CYCLIC REPORT #30

12 SEPTEMBER 2009 TO 28 OCTOBER 2009



This RGB composite AVNIR-2 image has been taken on the 11th of August, 2007 from orbit 8228.

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AVNIR-2 CYCLIC REPORT # 30

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: 30

Cycle Start: 12 September 2009

Cycle End: 28 October 2009

The main issues during the cycle have been as follows:

- **Processor Version**

Current PRISM processor version: 5.04

Validation activities have been initiated with Version v5.08. 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 will be initiated with this new version when v5.08 will be validated. The new version includes an update to PRISM image abnormality and to the PRISM Pointing Alignment Parameter.

See **Section 3** for install dates of ADEN processors.

3 SOFTWARE & AUX FILE VERSION CONFIGURATION

Current Optical Processor Version	ESRIN	Matera	Tromso
5.04	27/04/09	27/04/09	27/04/09

Table 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/prism/userinfo/>.

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

4 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 to 28/10/2009 is reported in this document.

4.1 *Planned Instrument Unavailability*

For the periods described in Table 4-1, JAXA has announced planned instrument unavailability. Exact times of the periods are not available.

From (UT)		To (UT)		Reason
Date	Time	Date	Time	
Sept. 25 th , 2009	18:50:00.000000	Sept. 25 th , 2009	19:53:00.000000	OCM
Oct. 2 nd , 2009	20:09:00.000000	Oct. 2 nd , 2009	21:13:00.000000	OCM
Oct. 09 th , 2009	16:40:00.000000	Oct. 09 th , 2009	17:43:00.000000	OCM
Oct. 17 th , 2009	08:50:00.000000	Oct. 17 th , 2009	09:53:00.000000	OCM

Table 4-1 : Planned instrument unavailability

4.2 *Unplanned Instrument Unavailability*

For the periods described in Table 4-2, JAXA announced unplanned instrument unavailability.

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

Table 4-2 : Unplanned instrument unavailability

4.3 *Current Platform Status*

Information on the platform provided by JAXA:

Current platform status: **Normal**

4.4 **Upcoming Instrument Unavailability**

For the periods described in Table 4-3, JAXA has announced planned instrument unavailability.

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

Table 4-3 : Upcoming instrument unavailability

4.5 **ADEN PDS Unavailability**

None reported during this cycle.

4.6 **Periods of missing precision orbit data**

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

From (UT)		To (UT)		Reason
Date	Time	Date	Time	
Sept. 25 th , 2009	18:50:00.000000	Sept. 25 th , 2009	19:53:00.000000	Due to orbit manoeuvring
Oct. 2 nd , 2009	20:09:00.000000	Oct. 2 nd , 2009	21:13:00.000000	Due to orbit manoeuvring
Oct. 09 th , 2009	16:40:00.000000	Oct. 09 th , 2009	17:43:00.000000	Due to orbit manoeuvring
Oct. 17 th , 2009	08:50:00.000000	Oct. 17 th , 2009	09:53:00.000000	Due to orbit manoeuvring

Table 4-4 : Missing Precision Orbit Data

4.7 **Periods of missing precision attitude data**

For the periods described in Table 4-5, JAXA has announced that precision attitude data is missing.

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

Table 4-5 : Missing Precision Attitude Data

4.8 **Periods lacking Yaw steering**

For the periods described in Table 4-6, JAXA has announced that Yaw steering was not available.

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

Table 4-6 : No Yaw steering

4.9 JAXA Observation Strategy

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

4.10 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>

5 DATA QUALITY CONTROL

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

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 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 products have been examined during the course of this cycle, and no new issues have been highlighted by the browse inspections.

5.4 *Visual Inspection Report Issues*

There were no other 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>

5.5 *User Information*

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

An updated version of this document will be issued shortly.

The most recent version of this document can be found at:
<http://earth.esa.int/pcs/alos/avnir/userinfo/>

The information for this section will be included in a future cyclic report.

6 CALIBRATION/VALIDATION ACTIVITIES & RESULTS

- One paper has been written by Jaxa calibration team (http://www.eorc.jaxa.jp/en/hatoyama/satellite/data_tekyo_setsume/alos_hyouka_e.html). The reference is;
 - T. Tadono, M. Shimada, H. Murakami, and J. Takaku, "Calibration of PRISM and AVNIR-2 Onboard ALOS "Daichi"," IEEE Trans. Geoscience and Remote Sensing, Vol. 47, No. 12, Dec. 2009, in press.

- Geometric calibration accuracy

1. Absolute Accuracy

	Pixel direction (cross track)	Line direction (along track)	Distance
0 deg. pointing angle (RMS)	71.1 m	7.5 m	71.9 m
+/-41.5deg. pointing angles (RMS)	60.9 m	96.6 m	114.2 m

- Measurements: Statistical evaluation of the worldwide GCPs in total 1,035 points in 54 scenes and calculation of the RMS of the distance between the position of GCPs, that were identified in the each AVNIR-2 image and obtained from the coordination conversion formula, and their true location on the GRS 80 that were calculated from the GCPs true measurement by GPS and the AVNIR-2 observation geometry.

2. Relative Accuracy

	Pixel direction	Line direction	Distance
Std. dev. in a scene(1 σ)	3.4 m	7.7 m	8.5 m

- Measurements: Averaged value of standard deviation of geometric errors in a scene in evaluating absolute accuracy.

- Radiometric calibration accuracy

1. Absolute accuracy

Band 1 to 3: 3% (RMS)
Band 4: 7% (RMS)

- Measurements: Compared with calibrated MODIS instruments onboard TERRA and AQUA satellites as cross calibration over deserts, salt lakes, snow and ice fields, ocean etc.

2. Relative Accuracy (three radiometers)

Better than 0.4 % (better than 1DN) (RMS)

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.

- 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.
- 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.
- 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:
 - 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

8.1 *Past Events:*

- 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
- 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
- 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

AVNIR-2	Radiometric accuracy	Geometric accuracy			
Level1B2	Band 1 +5.05% (1 σ) Band 2 -0.1% (1 σ) Band 3 -1.3% (1 σ) Band 4 +5.16% (1 σ)	RMS	Pixel (CT)	Line (AT)	Norm
		Nadir*	35.732 m	17.401 m	39.744 m
	Sensor Intercomparison with various EO Sensor (Meris, Landsat ...) as reference (ESA/ESTEC, USGS, LISE)	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	Pixel (CT)	Line (AT)
	Band 1	0.51	0.24
	Band 2	0.50	0.30
	Band 3	0.48	0.32
	Band 4*	N/A	N/A
	HR/LR Method (ONERA) *Not evaluated due to image saturation		

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 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,
- 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.

APPENDIX D PROCESSOR UPDATE SUMMARY

Upgrade Version: 5.04

Previous Version: 4.05

Modifications:

(1) Update of Processing Software

- None

(2) Update of Correction Parameter

- Table of Geometric correction information (Update version of October 20, 2008) (for AVNIR-2) [Ver_AV2_PR_GeometricModel (6.21)]
- PRISM Pointing Alignment parameter file (Update version of November 26, 2008) (for PRISM) [Ver_PSM_PR_AlignmentParameter(6.22)]

(3) Update of DEM data directory

- None

Comments:

None