



MONTHLY OPERATIONS REPORT

MOR#031

Reporting period from 16-Jun-2016 to 15-Jul-2016

Reference: *PROBA-V_D5_MOR-031_2016-07_v1.0*

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Version: 1.0

Date: 18/07/2016



DOCUMENT CONTROL

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Change record

Release	Date	Pages	Description	Editor(s)/Reviewer(s)
1.0	18/07/2016	All	Initial version	



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1. Summary

In this reporting period, several synthesis products contained large gaps, mainly due to missing TFF files. Related passes were missing due to antenna problems in the Inuvik data reception station. Other anomalies impacting the data were decompression errors, automatic recoveries of the platform and missing VC4 data in downlinked data. Nine synthesis products contained large or medium gaps, other products had no or negligible gaps.

On 07/07/2016, a successful switch to the primary lane on the on-board computer was performed to investigate the impact of a possible radiation effect on one of components. Unfortunately, this switch introduced a large increase in amount of decompression errors again. After a few days of careful monitoring, it was decided to switch back to the redundant lane of the on-board computer on 14/07/2016. After the successful switch, the amount of decompression in the payload data ground segment decreased again.

There were no major issues with the image quality during this reporting period, both for radiometric as geometric quality, although a slight increase has been seen in the geometric performance in the last few days. This will be carefully monitored.

Lastly, now the official go-ahead has been given by the QWG, the new cloud detection algorithm has been implemented in acceptance environment and thoroughly tested by the science team. This will be implemented in the short term in production environment to start the off-line reprocessing of the entire PROBA-V archive. Reprocessed products and implementation in NRT processing will be done after validation of a longer time series, currently projected for the September/October timeframe.

2. System Infrastructure

Category	% Up Time	% Down Time
Switches	100.0	0.0
Database Servers	100.0	0.0
Mid Term File Servers	100.0	0.0
Short Term File Servers	100.0	0.0
Master Servers	100.0	0.0
Worker Nodes	99.99	0.01 ^(*)
PDF	100.0	0.0

Table 1: System Infrastructure availability for this reporting period

^(*) Due to a planned network upgrade

3. Image Processing Services

3.1. Ingested and archived products

Product Type	Total	Received	Missing data, ingested by VITO	Archived
METEO	240	240	0	240
TFF	292	287	13 ^(*)	287

Table 2: Ingested and archived products for this reporting period

(*) TFF 10150 & 10151: No VC4 data in downlink

(*) TFF 10170, 10171, 10172; Pass ID 13861-13863, 13873-19878, 13879-13880 (No TFF id created for these passes): Lost passes due to antenna problems at Inuvik.

3.2. Generated and archived products

Product Type	Total	Processed	Error	Archived
PROBAV_L1A - Calibration	227	227	0	227
PROBAV_L1A - Nominal	2419	2413	6 ^(*)	2415
PROBAV_L1C	2413	2413	0	2413
PROBAV_L3_S1_TOA_100M	30	30	0	30
PROBAV_L3_S1_TOC_100M	30	30	0	30
PROBAV_L3_S1_TOC_NDVI_100M	30	30	0	30
PROBAV_L3_S5_TOA_100M	6	6	0	6
PROBAV_L3_S5_TOC_100M	6	6	0	6
PROBAV_L3_S5_TOC_NDVI_100M	6	6	0	6
PROBAV_L3_S1_TOA_300M	30	30	0	30
PROBAV_L3_S1_TOC_300M	30	30	0	30
PROBAV_L3_S10_TOC_300M	3	3	0	3
PROBAV_L3_S10_TOC_NDVI_300M	3	3	0	3
PROBAV_L3_S1_TOA_1KM	30	30	0	30
PROBAV_L3_S1_TOC_1KM	30	30	0	30
PROBAV_L3_S10_TOC_1KM	3	3	0	3
PROBAV_L3_S10_TOC_NDVI_1KM	3	3	0	3

Table 3: Generated and archived products for this reporting period

(*) 6 x L1A error: Geometric Processing

3.3. Backup and archiving service

Product type	Total Files	Total File Size (GB)
TFF	282	725.85
L1A	2548	1290.23
Database transaction logs	2862	179.5
Database incremental back-up	216	99.06
Database full back-up	29	684.61

Table 4: Back-up data volumes for this reporting period

Product type	Total Files	Total File Size (GB)
PROBAV_TRANSFERFRAMES	247	696.00
PROBAV_L1A	2262	1239.63
PROBAV_L1C	2080	2430.98
PROBAV_L3_S1_TOA_100M	51	1394.02
PROBAV_L3_S1_TOC_100M	53	1491.51
PROBAV_L3_S1_TOC_NDVI_100M	52	171.97
PROBAV_L3_S5_TOA_100M	20	2036.54
PROBAV_L3_S5_TOC_100M	19	1992.47
PROBAV_L3_S5_TOC_NDVI_100M	12	141.00
PROBAV_L3_S1_TOA_300M	54	635.48
PROBAV_L3_S1_TOC_300M	54	656.27
PROBAV_L3_S10_TOC_300M	9	192.95
PROBAV_L3_S10_TOC_NDVI_300M	6	11.18
PROBAV_L3_S1_TOA_1KM	54	85.98
PROBAV_L3_S1_TOC_1KM	54	88.19
PROBAV_L3_S10_TOC_1KM	8	22.58
PROBAV_L3_S10_TOC_NDVI_1KM	6	1.37
ICP_GEOMETRIC_CENTRE	0	0
ICP_GEOMETRIC_LEFT	0	0
ICP_GEOMETRIC_RIGHT	0	0
ICP_RADIOMETRIC_CENTRE	1	0.04
ICP_RADIOMETRIC_LEFT	1	0.04
ICP_RADIOMETRIC_RIGHT	1	0.04
METEO_ECMWF	208	0.26
METEO_METEOSERVICES	208	1.11
POLARMOTION	1	0.00

Table 5: Archived data volumes for this reporting period

3.4. Dissemination service

Product type	Added to catalogue	Ordered	Delivered
PROBAV_L1C	2415	131	134
PROBAV_L3_S1_TOA_100M	30	2172	1612
PROBAV_L3_S1_TOC_100M	30	2926	1373
PROBAV_L3_S1_TOC_NDVI_100M	30	1067	1304
PROBAV_L3_S5_TOA_100M	10	243	170
PROBAV_L3_S5_TOC_100M	10	609	615
PROBAV_L3_S5_TOC_NDVI_100M	6	847	1073
PROBAV_L3_S1_TOA_300M	30	159	164
PROBAV_L3_S1_TOC_300M	30	1576	2091
PROBAV_L3_S10_TOC_300M	5	40	44
PROBAV_L3_S10_TOC_NDVI_300M	3	155	168
PROBAV_L3_S1_TOA_1KM	31	164	1135
PROBAV_L3_S1_TOC_1KM	31	2314	2348
PROBAV_L3_S10_TOC_1KM	4	117	122
PROBAV_L3_S10_TOC_NDVI_1KM	3	79	85

Table 6: Ordered and delivered products for this reporting period

3.5. End-user activity

28 new user(s) were registered in this reporting period.

The total number of users registered for PROBA-V data and that have ordered data is **879** with **97** different nationalities representing **676** different companies/universities.

Product type	Africa	Asia	Europe	N-America	Oceania	S-America
PROBAV_L1C	0	1.05	328.92	0	3.13	0
PROBAV_L3_S1_TOA_100M	0.80	67.47	62.30	0	0	0
PROBAV_L3_S1_TOC_100M	0	689.23	751.97	705.79	0	0
PROBAV_L3_S1_TOC_NDVI_100M	292.62	5.20	0.12	0	0	0.02
PROBAV_L3_S5_TOA_100M	0.38	16.84	0.31	0	0	0.13
PROBAV_L3_S5_TOC_100M	491.31	30.31	18.94	0	2.71	0
PROBAV_L3_S5_TOC_NDVI_100M	24.21	1001.83	8.20	2.61	0	36.23
PROBAV_L3_S1_TOA_300M	0.03	0	1258.25	0	0	0
PROBAV_L3_S1_TOC_300M	0.06	17.45	1303.45	6176.11	0	34.38
PROBAV_L3_S10_TOC_300M	4.73	1.00	190.28	0	0.32	0
PROBAV_L3_S10_TOC_NDVI_300M	2.88	0.24	0.90	0	0	0.08
PROBAV_L3_S1_TOA_1KM	0	0.01	1089.54	0	0	0.17

PROBAV_L3_S1_TOC_1KM	0.93	0	273.59	0	0	0
PROBAV_L3_S10_TOC_1KM	0.60	0	27.09	0.84	0	0
PROBAV_L3_S10_TOC_NDVI_1KM	0.33	0.27	5.12	0	0	0.49

Table 7: Data download (GB) in total per Origin of the User for the reporting period

Product Type	Global
L1C	333.09
PROBAV_L3_S1_TOA_100M	130.57
PROBAV_L3_S1_TOC_100M	2147.00
PROBAV_L3_S1_TOC_NDVI_100M	297.96
PROBAV_L3_S5_TOA_100M	17.66
PROBAV_L3_S5_TOC_100M	543.27
PROBAV_L3_S5_TOC_NDVI_100M	1073.07
PROBAV_L3_S1_TOA_300M	1258.29
PROBAV_L3_S1_TOC_300M	7531.45
PROBAV_L3_S10_TOC_300M	196.32
PROBAV_L3_S10_TOC_NDVI_300M	4.09
PROBAV_L3_S1_TOA_1KM	1089.73
PROBAV_L3_S1_TOC_1KM	274.52
PROBAV_L3_S10_TOC_1KM	28.53
PROBAV_L3_S10_TOC_NDVI_1KM	6.21

Table 8: Data download (GB) in total for the reporting period

Company	# Downloads
UNIVERSITY OF EXTREMADURA	1978
VITO	1264
BC	931
OSS	883
IFSULDEMINAS	865
GOOGLE	693
COPENHAGEN UNIVERSITY	656
NSMC	614
LEGOS	488
TUSUR	429

Table 9: Top 10 user companies for the reporting period

Country	# Users
CHINA	87
BELGIUM	83
ITALY	46
BRAZIL	40
FRANCE	38
UNITED STATES	35
INDIA	33
UNITED KINGDOM	32
NETHERLANDS	32
GERMANY	27

Table 10: Top 10 countries with most registered users

List of issues raised by users:

ProbaV:

- FTP push fail
- Bonnet - Time grid
- SNAP does not work on incomplete HDF5
- image for court case
- Problem in your downloads
- username and password
- Details on ADS-B experiment
- NDVI coefficients
- Atcorr and BRDF

4. Image Calibration services

4.1. Radiometric Calibration

Calibration request type	Total	Processed	Not received	Error
CLOUDS	18	14	4	0
DARK CURRENT	22	17	5	0
MOON	6	2	4	0
RAYLEIGH	64	44	16	4
SNOW	0	0	0	0
SUN_GLINT	0	0	0	0

Table 11: Calibration Image requests for this reporting period

Calibration image type	Total	Valid	Invalid ^(*)
PROBA_V_L1A_CALIBRATION	2	2	0
PROBA-V_L1B_CALIBRATION	213	156	14
PROBA-V_L1B_INTERSECTION	640	482	141
PROBA-V_L1B_OVERLAPREGION	0	0	0

Table 12: Processed calibration images for this reporting period

^(*) Due to insufficient overlap with the calibration region of interest, not enough pixels (e.g. clouds contamination), site not sufficiently uniform (illumination), etc.

Long-term monthly Libya-4 mean plots for different cameras are given in Figure 1, Figure 2 and Figure 3. Deep convective clouds interband calibration results are given in Figure 4.

The calibration results for the VNIR strips remain stable.

The linear degradation model fitted to the seasonally corrected OSCAR desert results obtained over 16 deserts sites, as discussed in previous reporting periods, is used to update the absolute calibration coefficients of the different SWIR strips which explains the stable trend observed over the last months

Radiometric ICP file

ICP dark values will be updated in the coming days and the SWIR absolute calibration coefficients will be updated following the linear degradation model.

The current ICP files are:

- PROBAV_ICP_RADIOMETRIC#LEFT_20160622_V01
- PROBAV_ICP_RADIOMETRIC#CENTER_20160622_V01
- PROBAV_ICP_RADIOMETRIC#RIGHT_20160622_V01

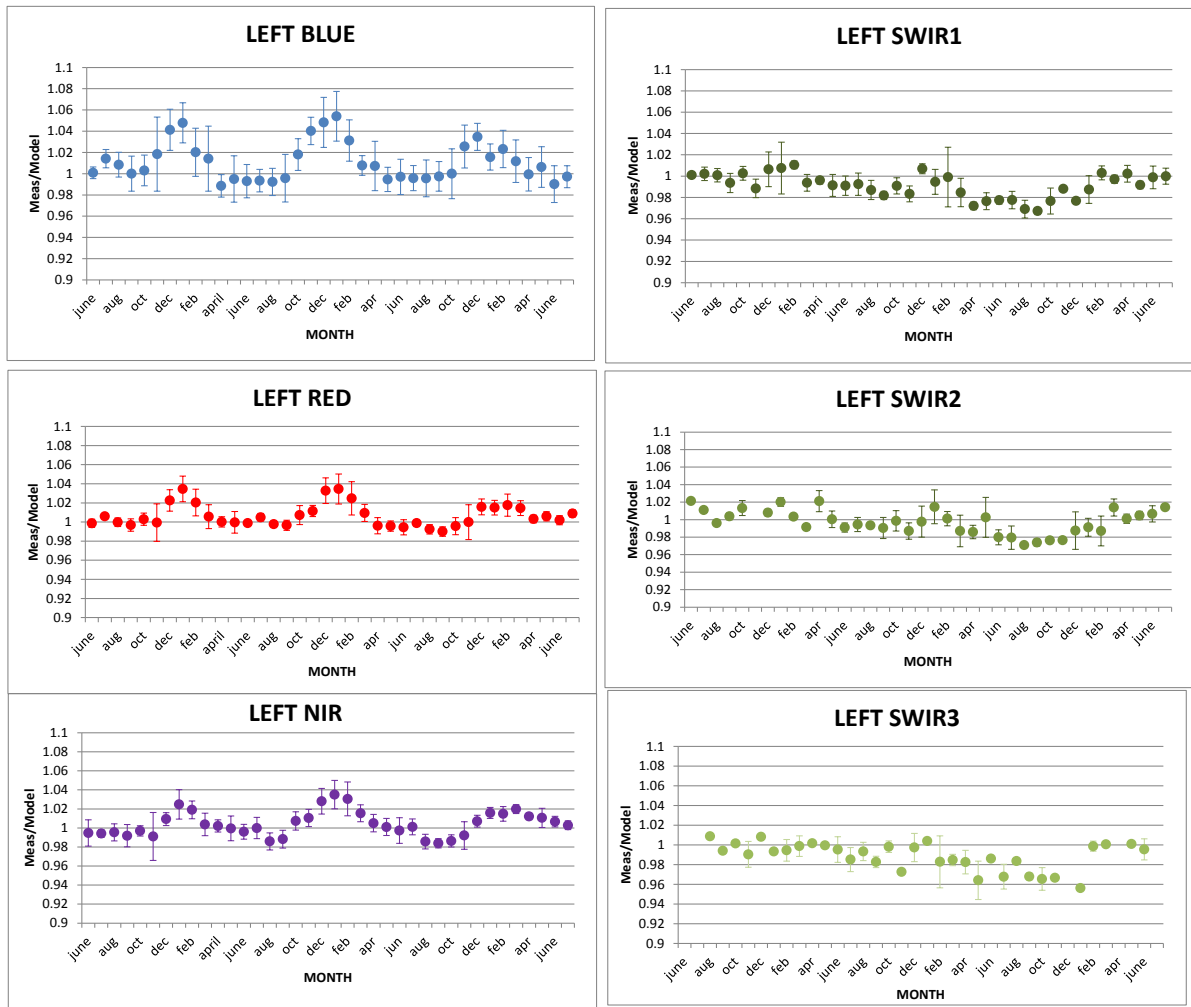


Figure 1. Libya-4 desert calibration results: LEFT monthly averaged results

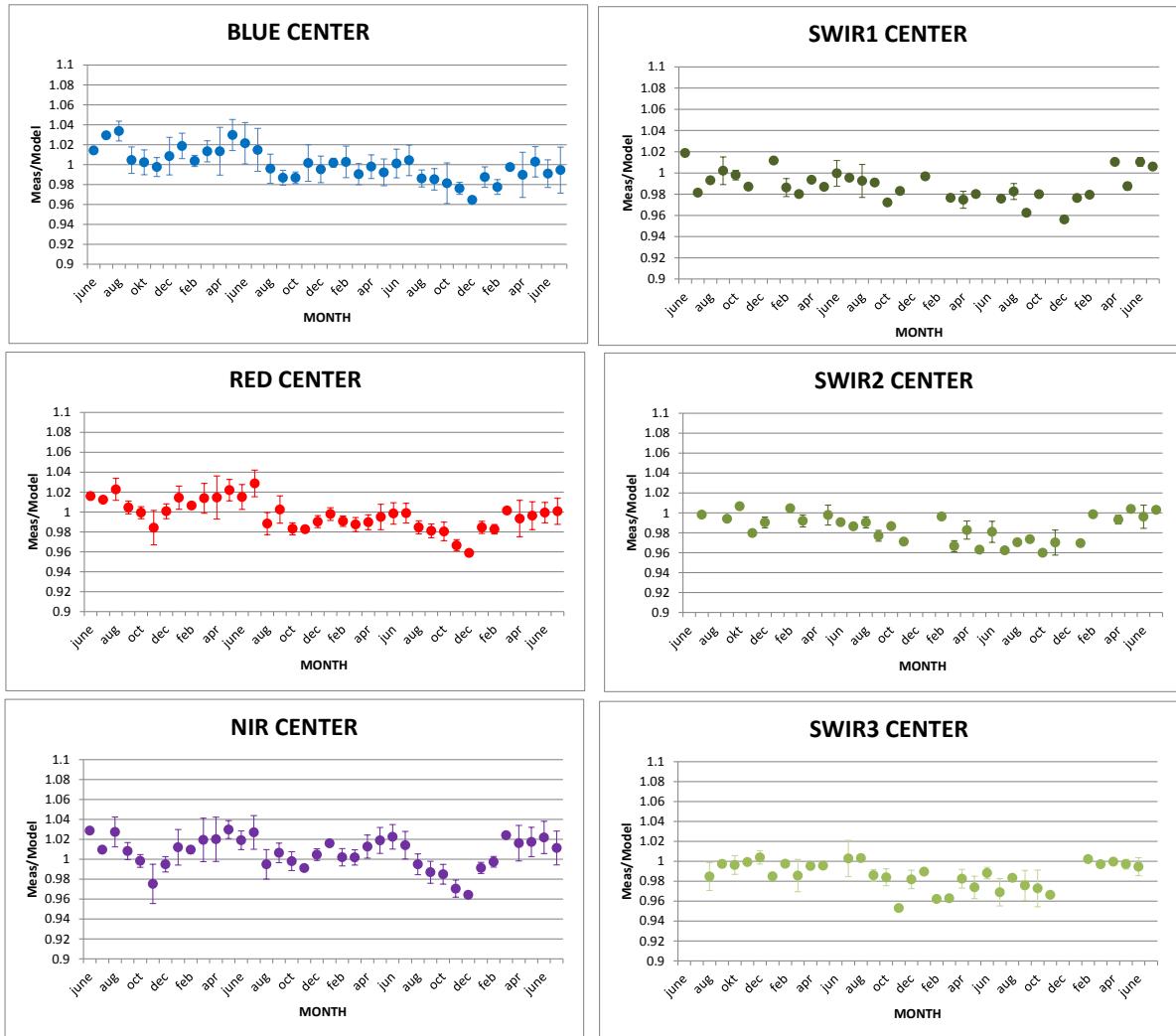


Figure 2. Libya-4 desert calibration results: CENTER monthly averaged results

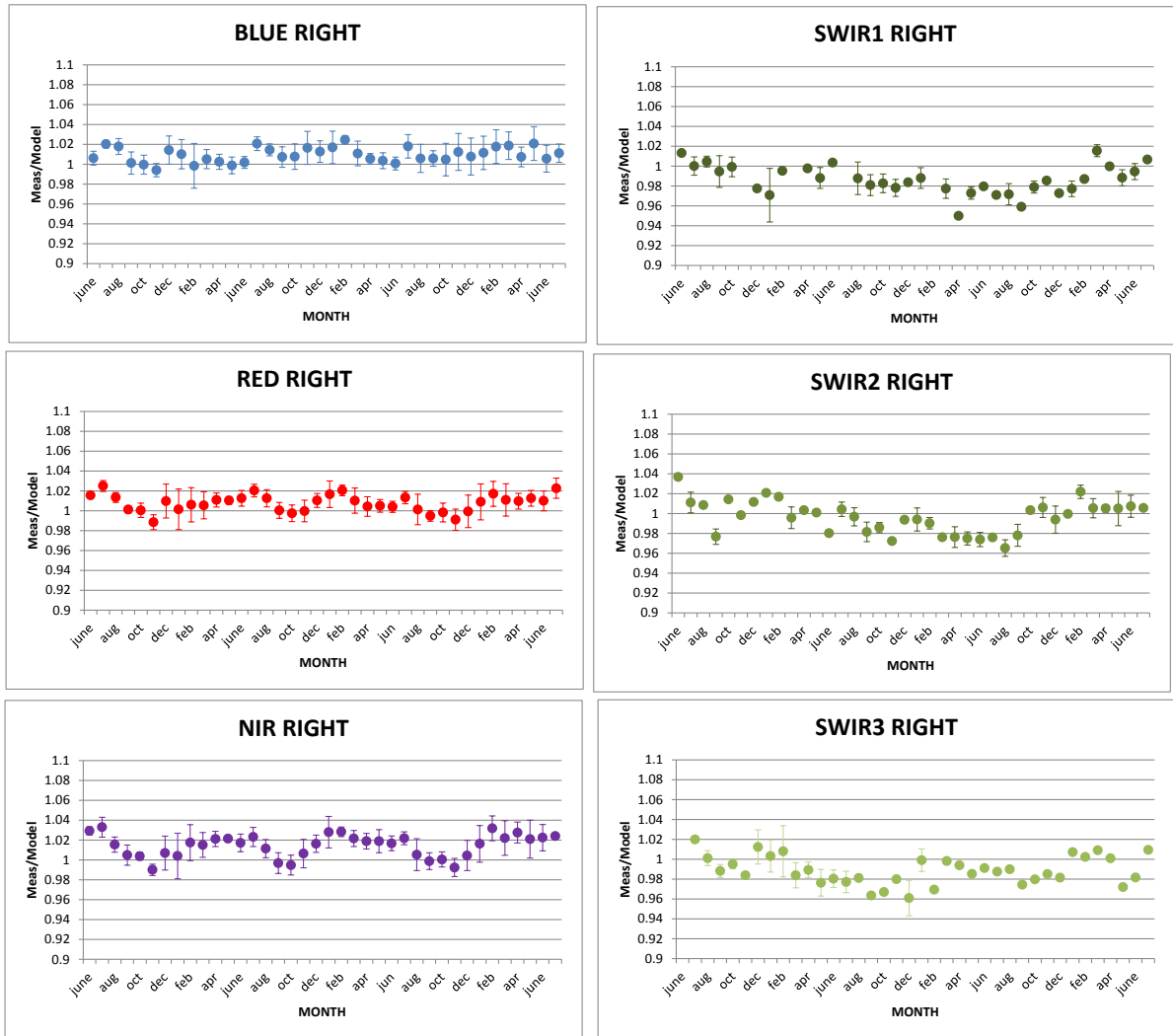


Figure 3. Libya-4 desert calibration results: RIGHT monthly averaged results

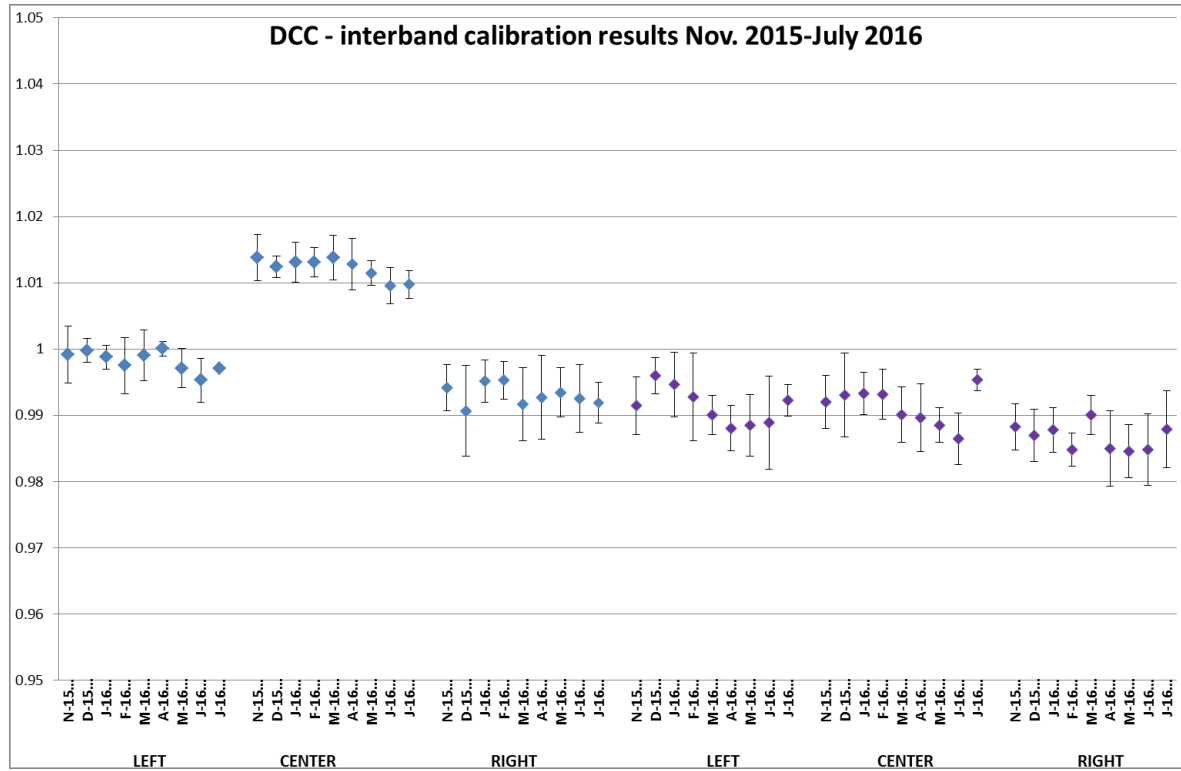


Figure 4. DCC inter-band calibration results: LEFT, CENTER and RIGHT camera

4.2. Geometric Calibration

Calibration image type	Total	Processed	Error
PROBA-V_L1C_INTERSECTION	13046	13046	0

Table13: Processed calibration images for this reporting period

During previous month, the average ALE was < 79 m (σ < 92 m). The daily ALE evolution (see Figure 5) shows values of generally 60 – 80 m between 16/6 and 30/6, followed by a minor peak on 2/7 – 3/7 with maximum values of ~88 m.

After this peak, values declined to roughly 60 – 65 m on 5/7 – 9/7, but rapidly increased again to a maximum of ~105 m between 12/7 and 15/7.

The geometric accuracy was within the requirement of < 300 m, with an average compliance for all cameras of 99.2%. Daily values became < 98% for the BLUE channel between 12/7 and 15/7 and on 14/7 for the RED channel.

Geometric ICP file

- PROBAV_ICP_GEOMETRIC#LEFT_20160216_V01
- PROBAV_ICP_GEOMETRIC#CENTER_20160216_V01
- PROBAV_ICP_GEOMETRIC#RIGHT_20160216_V01

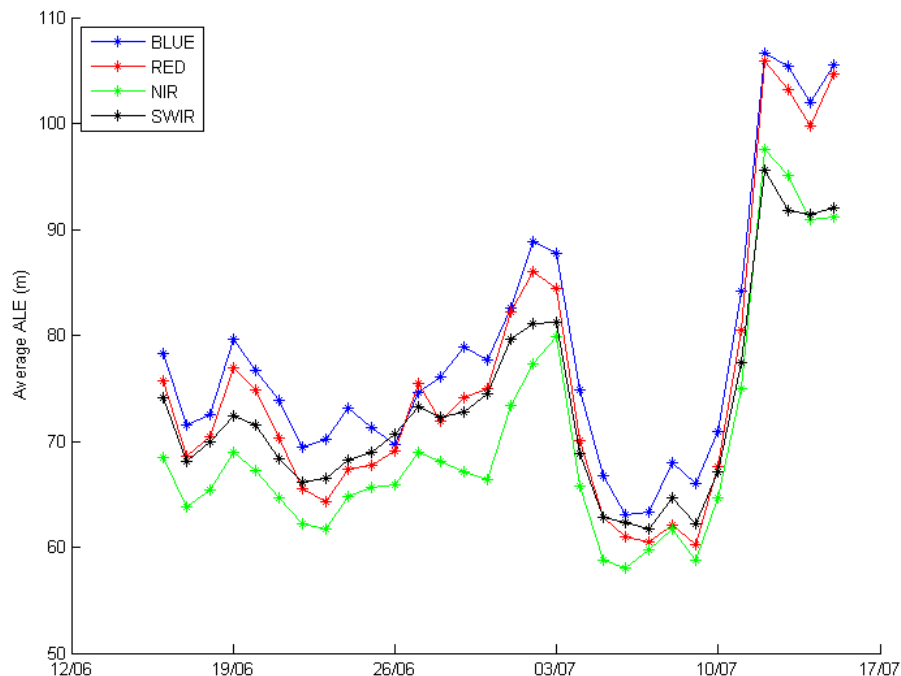


Figure 5: Daily ALE evolution for all PROBA-V spectral bands.

5. Anomalies

5.1. System related issues

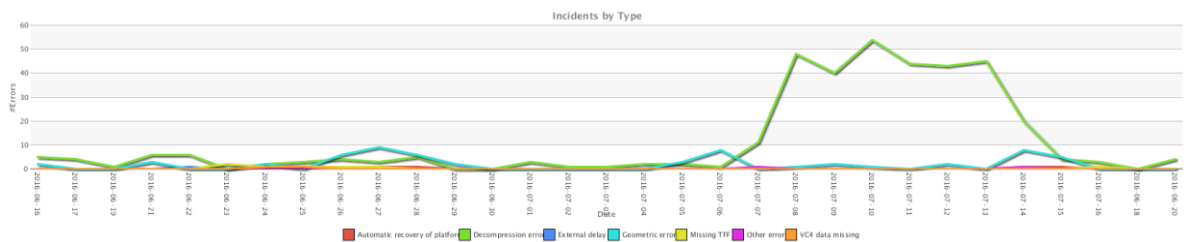
A detailed description of each issue is available in the issue tracking system <http://jira.vgt.vito.be>

Key	Summary	Status	Created	Component/s
PROBAVUS-7	Very small images fail to process	Resolved	10/01/2014	General
PROBAVUS-60	LTDA Restore fails when product destination already exists on disk	Open	22/01/2016	Software
PROBAVUS-63	Cloud shadow detection at high solar zenith angles not working properly	Open	11/05/2016	Software

- 0 new issues were logged during this reporting period
- 1 issue(s) was resolved and closed during this reporting period
- 0 issues are resolved but remain to be closed formally
- 1 issue is resolved but remain in the list logging purposes
- 2 issue(s) are open and remain to be solved

5.2. Image processing issues

On Thursday 07/07/2016, an on-board switch to the primary lane was performed to investigate the effect on decompression errors that were experienced in the past. Due to this switch it became clear the amount of decompression errors increased again and that a switch to the redundant lane was necessary again. This was performed on Thursday 14/07/2016. Due to these planned switches, the imaging instrument was switched off and some data was lost. In figure 6, the green line indicates the amount of decompression errors experienced during this reporting period. The increase coincides with the time that the platform was imaging on the primary lane, between 07/07 and 14/7.



A detailed description of each issue is available in the Weekly Report and the image processing tracking system <https://juniper.vgt.vito.be/ciptools>

The below table gives an overview of the S1's of this reporting period:

	# S1	Dates
Major Gaps (> 21600 km² (missing TFF))	6	24/06, 25/06, 26/06, 27/06, 07/07, 14/07
Large Gaps (< 21600 km²)	0	
Medium Gaps (< 10000 km²)	3	23/06, 11/07, 15/07
Minor Gaps (< 3600 km²)	1	28/06
Negligible Gaps (< 1000 km²)	18	16/06, 21/06, 06/07, 01/07, 13/07, 08/07, 12/07, 02/07, 17/06, 22/06, 19/06, 09/07, 29/06, 04/07, 03/07, 20/06, 10/07, 05/07
Complete synthesis (no gaps)	2	18/06, 30/06,

Table14: Overview of S1 for this reporting period

6. Scheduled activities for the next period(s)

- Software upgrades:
The new cloud detection algorithm is currently under implementation validation. Once approved, off-line reprocessing of the entire PROBA-V archive will start.
- Hardware:
Several servers in the PROBA-V processing chain will be upgraded as they have reached their expected lifetime. Servers will be used in the reprocessing chain first to speed up the processing
- Development:
No new developments
- No other activities scheduled.

7. Operational remarks

No operational remarks.