



MONTHLY OPERATIONS REPORT

MOR#028

Reporting period from 16-Mar-2016 to 15-Apr-2016

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1. Summary

This reporting period, several steps have been taken to improve the data quality of PROBA-V. On March 18, a new release of the PF component was installed to fix the products that contained data gaps at higher latitudes. In this region, the 4th component of the quaternions ($\cos(\theta/2)$) was crossing zero causing all other quaternions elements to suddenly change sign as well. This change in quaternions signs was not properly handled by the attitude check modules in the processing facility causing a gap in the images.

Secondly, on April 5, a switch was performed to the on-board redundant computer and mass memory, greatly reducing the amount of decompression errors that were experienced on a daily basis.

Finally, for calibration purposes, a 90° yaw manoeuvre was performed by the platform in order to have an image of the same location on Earth with all pixels of the Vegetation instrument (all bands and all cameras). This took place on April 11th and resulted in important data to optimize the radiometric calibration parameters. For both the switch to the redundant lane and the yaw manoeuvre, there was a planned gap of 1 orbit of data.

Three synthesis products contained large gaps due to these specific on-board events or a missing TFF file. All other products were nearly complete with a negligible impact of decompression errors, geometric errors, missing VC4 data or an automatic recovery.

There were no major issues with the image quality during this reporting period, both for radiometric as geometric quality.

Furthermore, a new cloud detection algorithm is under validation and will be implemented after formal approval of the PROBA-V Quality Working Group which planned at the end of April 2016. Once the new algorithm is implemented, a reprocessing campaign of the entire archive will be executed for all resolutions.

2. System Infrastructure

Category	% Up Time	% Down Time
Switches	99.98	0.02
Database Servers	99.83	0.17
Mid Term File Servers	99.95	0.05
Short Term File Servers	100.0	0.0
Master Servers	100.0	0.0
Worker Nodes	100.0	0.0
PDF	100.0	0.0

Table 1: System Infrastructure availability for this reporting period

(*) Down time caused by moving 2 switches to a new backbone architecture

3. Image Processing Services

3.1. Ingested and archived products

Product Type	Total	Received	Missing data, ingested by VITO	Archived
METEO	248	248	0	247
TFF	311	309	2 ^(*)	309

Table 2: Ingested and archived products for this reporting period

(*) 1 x TFF missing due to a configuration issue at the DRS (TFF 9314), 1 x TFF reported missing (TFF 9160): occurred on March 15, but has been recorded on March 16. (Belongs to previous period)

3.2. Generated and archived products

Product Type	Total	Processed	Error	Archived
PROBAV_L1A - Calibration	263	263	0	263
PROBAV_L1A - Nominal	2630	2623	7 ^(*)	2628
PROBAV_L1C	2623	2614	0	2623
PROBAV_L3_S1_TOA_100M	31	31	0	31
PROBAV_L3_S1_TOC_100M	31	31	0	31
PROBAV_L3_S1_TOC_NDVI_100M	31	31	0	31
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	31	31	0	31
PROBAV_L3_S1_TOC_300M	31	31	0	31
PROBAV_L3_S10_TOC_300M	3	3	0	3
PROBAV_L3_S10_TOC_NDVI_300M	3	3	0	3
PROBAV_L3_S1_TOA_1KM	31	31	0	31
PROBAV_L3_S1_TOC_1KM	31	31	0	31
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

(*) 7 x L1A error: Error-GeometricProcessing

3.3. Backup and archiving service

Product type	Total Files	Total File Size (GB)
TFF	301	786.89
L1A	2805	1390.47
Database transaction logs	2954	213.67
Database incremental back-up	216	99.64
Database full back-up	24	548.61

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

Product type	Total Files	Total File Size (GB)
PROBAV_TRANSFERFRAMES	269	761.68
PROBAV_L1A	2544	1346.21
PROBAV_L1C	3436	3890.50
PROBAV_L3_S1_TOA_100M	64	1756.71
PROBAV_L3_S1_TOC_100M	66	1835.71
PROBAV_L3_S1_TOC_NDVI_100M	57	172.70
PROBAV_L3_S5_TOA_100M	11	1153.42
PROBAV_L3_S5_TOC_100M	12	1281.90
PROBAV_L3_S5_TOC_NDVI_100M	12	134.49
PROBAV_L3_S1_TOA_300M	64	766.01
PROBAV_L3_S1_TOC_300M	67	816.26
PROBAV_L3_S10_TOC_300M	5	109.96
PROBAV_L3_S10_TOC_NDVI_300M	7	12.13
PROBAV_L3_S1_TOA_1KM	338	495.11
PROBAV_L3_S1_TOC_1KM	65	105.39
PROBAV_L3_S10_TOC_1KM	7	19.24
PROBAV_L3_S10_TOC_NDVI_1KM	32	6.45
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	216	0.27
METEO_METEOSERVICES	215	1.15
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	3127	153	176
PROBAV_L3_S1_TOA_100M	31	698	585
PROBAV_L3_S1_TOC_100M	31	504	427
PROBAV_L3_S1_TOC_NDVI_100M	31	593	407
PROBAV_L3_S5_TOA_100M	6	11	21
PROBAV_L3_S5_TOC_100M	6	130	132
PROBAV_L3_S5_TOC_NDVI_100M	6	380	426
PROBAV_L3_S1_TOA_300M	31	356	390
PROBAV_L3_S1_TOC_300M	31	2670	3269
PROBAV_L3_S10_TOC_300M	3	473	598
PROBAV_L3_S10_TOC_NDVI_300M	3	259	272
PROBAV_L3_S1_TOA_1KM	31	1546	2100
PROBAV_L3_S1_TOC_1KM	31	252	544
PROBAV_L3_S10_TOC_1KM	3	136	162
PROBAV_L3_S10_TOC_NDVI_1KM	3	751	842

Table 6: Ordered and delivered products for this reporting period

3.5. End-user activity

26 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 **784** with **95** different nationalities representing **614** different companies/universities.

Product type	Africa	Asia	Europe	N-America	Oceania	S-America
PROBAV_L1C	0	11.67	375.13	0	0	0.78
PROBAV_L3_S1_TOA_100M	0	58.03	15.79	96.20	0	16.11
PROBAV_L3_S1_TOC_100M	0	726.58	750.44	0	19.24	0.04
PROBAV_L3_S1_TOC_NDVI_100M	0	5.56	0.32	0.54	0	0
PROBAV_L3_S5_TOA_100M	0	0	97.95	21.33	0	9.09
PROBAV_L3_S5_TOC_100M	24.68	0	29.75	4.22	0	0
PROBAV_L3_S5_TOC_NDVI_100M	0	332.58	35.12	0.01	0	0.38
PROBAV_L3_S1_TOA_300M	0	0	2480.47	0	0	0.31
PROBAV_L3_S1_TOC_300M	0	59.74	1702.92	0	0	0.04
PROBAV_L3_S10_TOC_300M	2.02	0.10	361.71	0	0	0.20
PROBAV_L3_S10_TOC_NDVI_300M	0	4.85	2.12	0.04	0	0.04
PROBAV_L3_S1_TOA_1KM	0	0.01	259.31	1618.03	0	0.27

PROBAV_L3_S1_TOC_1KM	0.00	0.03	454.11	3.19	0	0.01
PROBAV_L3_S10_TOC_1KM	9.50	0.45	19.60	0.82	0	0
PROBAV_L3_S10_TOC_NDVI_1KM	0.41	17.76	28.22	0.45	0	0

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

Product Type	Global
L1C	387.58
PROBAV_L3_S1_TOA_100M	186.14
PROBAV_L3_S1_TOC_100M	1744.76
PROBAV_L3_S1_TOC_NDVI_100M	6.42
PROBAV_L3_S5_TOA_100M	128.37
PROBAV_L3_S5_TOC_100M	58.65
PROBAV_L3_S5_TOC_NDVI_100M	368.09
PROBAV_L3_S1_TOA_300M	2480.77
PROBAV_L3_S1_TOC_300M	1807.42
PROBAV_L3_S10_TOC_300M	364.04
PROBAV_L3_S10_TOC_NDVI_300M	7.04
PROBAV_L3_S1_TOA_1KM	1877.61
PROBAV_L3_S1_TOC_1KM	457.34
PROBAV_L3_S10_TOC_1KM	30.37
PROBAV_L3_S10_TOC_NDVI_1KM	46.83

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

Company	# Downloads
GOOGLE	1834
GEOSYS	1183
RADI/CAS	1090
VITO	966
METEO FRANCE	767
BROCKMANN CONSULT	467
BEIJING FORESTRY UNIVERSITY	368
MSU	359
UNIVERSITY OF ZIMBABWE	247
UNIVERSITE CATHOLIQUE DE LOUVAIN	184

Table 9: Top 10 user companies for the reporting period

Country	# Users
BELGIUM	75
CHINA	74
ITALY	45
FRANCE	35
UNITED STATES	32
BRAZIL	32
UNITED KINGDOM	31
INDIA	26
NETHERLANDS	25
GERMANY	25

Table 10: Top 10 countries with most registered users

List of issues raised by users:

ProbaV:

- Problem reading HDF5 files
- No account confirmation
- Unblock access
- Order delivery emails not received
- ProbaV TOC tile definition
- Why images of ProbaV not overlap
- software on Windows 7 - 64 bits
- data not downloaded successfully
- Afghanistan missing in country list
- Overpass prediction PROBA-V
- proba ppt startup error

PDF:

- User registration PDF

4. Image Calibration services

4.1. Radiometric Calibration

Calibration request type	Total	Processed	Not received	Error
CLOUDS	15	15	0	0
DARK CURRENT	20	20	0	0
MOON	2	2	0	0
RAYLEIGH	52	48	3	1
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	261	125	133
PROBA-V_L1B_INTERSECTION	674	249	424
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 effect of the update of the absolute calibration coefficients of the SWIR strips performed on February 6 is now visible in all the Libya-4 results of the different strips..

For the VNIR strips calibration results from the Libya4, Rayleigh and DCC methods remain relatively stable. No clear and/or consistent trend can be seen in the different results.

Similarly as in previous months, the dark current of a few SWIR pixels has suddenly increased in the last month, which might cause the presence of a few stripes. An update of the SWIR dark current values is required to correct for this. For two pixels, i.e. Left SWIR3 pixel 568 and Center SWIR2 pixel 831, the increase in dark current is extremely high and unstable, therefore this pixel will be assigned the status BAD.

Radiometric ICP file

ICP dark values will be updated in the coming days and two bad pixels, i.e. Left SWIR3 pixel 568 and Center SWIR2 pixel 831, will be added.

The current ICP files are:

- PROBAV_ICP_RADIOMETRIC#LEFT_20160319_V01
- PROBAV_ICP_RADIOMETRIC#CENTER_20160319_V01
- PROBAV_ICP_RADIOMETRIC#RIGHT_20160319_V01

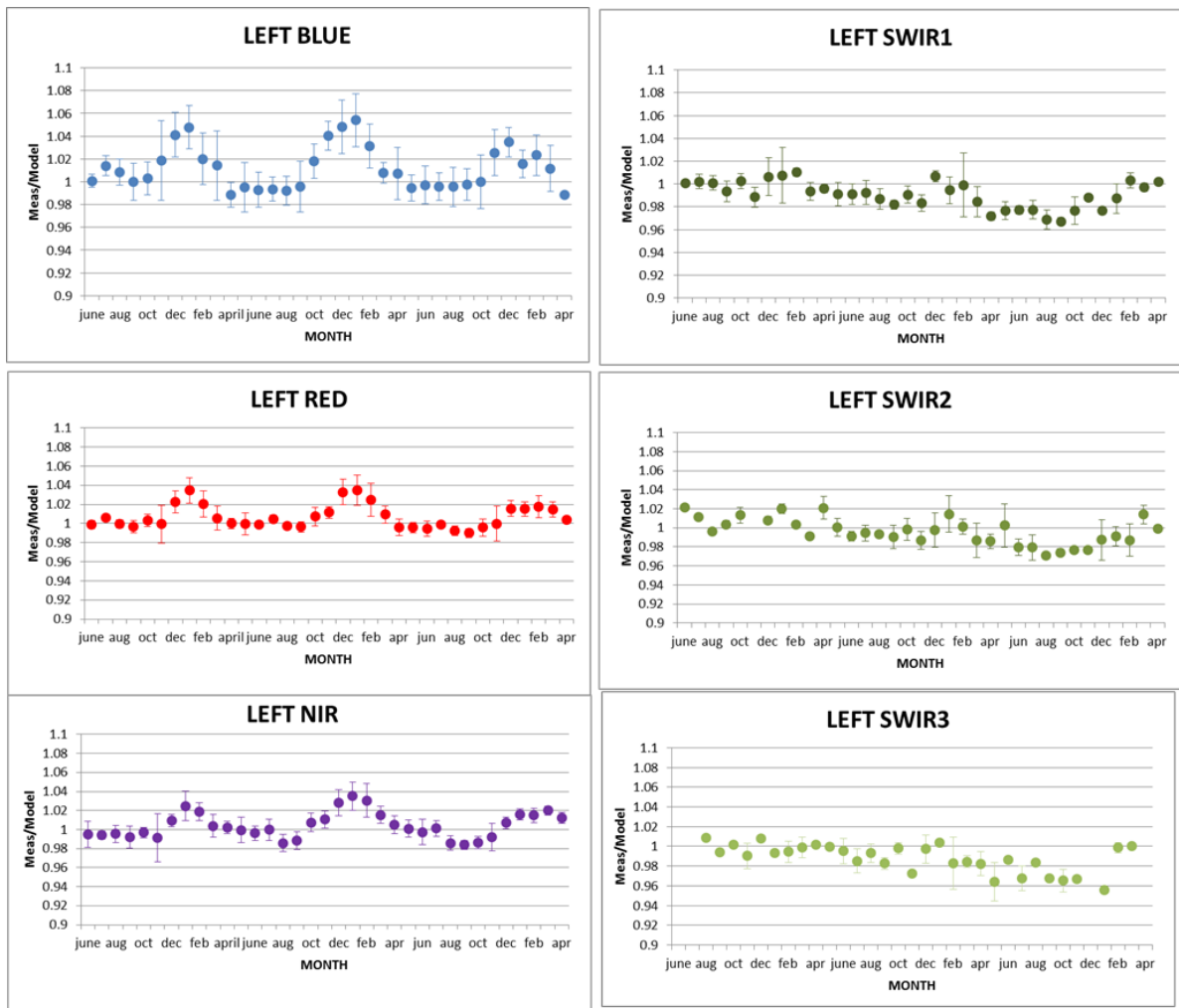


Figure 1. Libya-4 desert calibration results: LEFT monthly averaged results

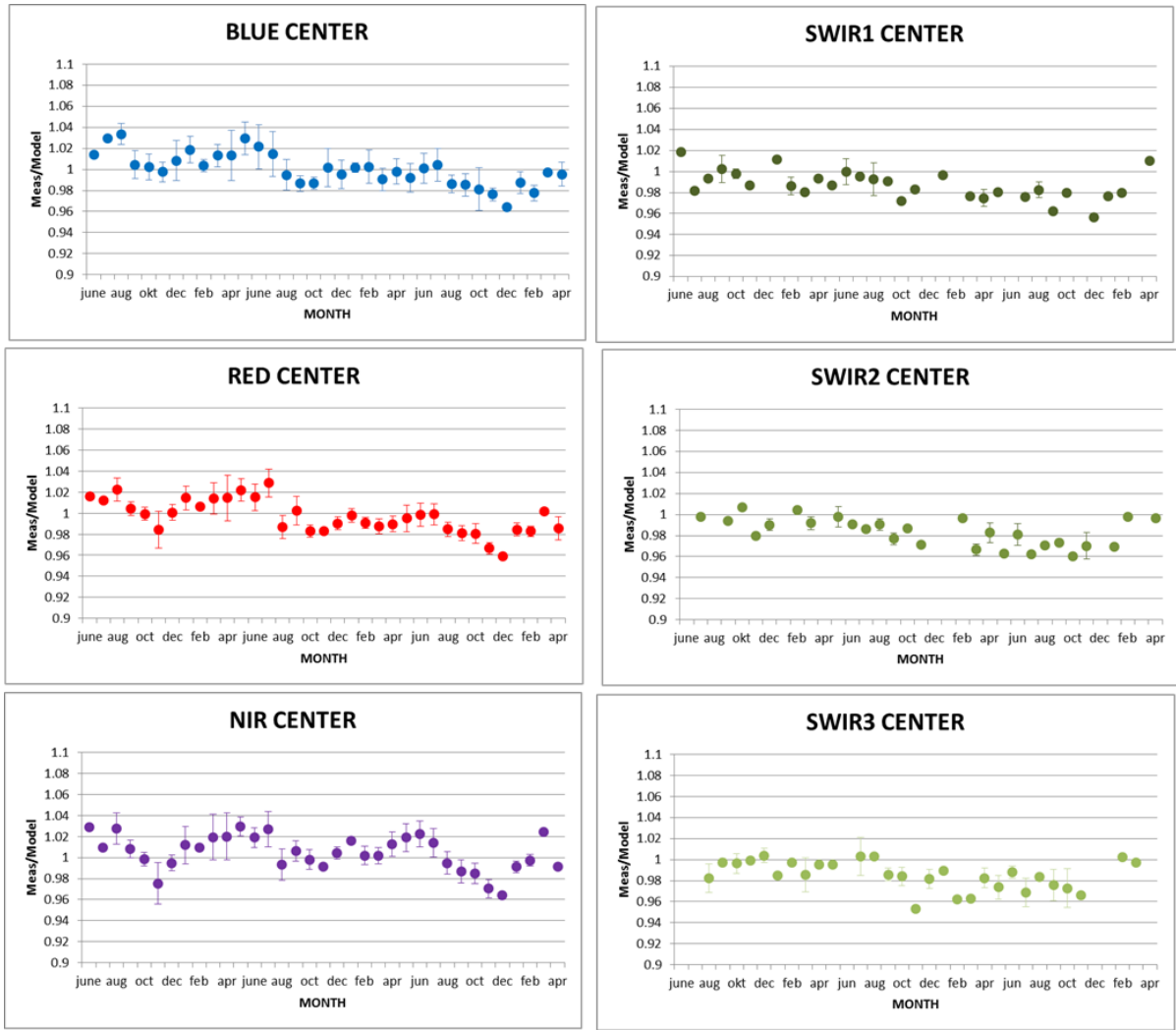


Figure 2. Libya-4 desert calibration results: CENTER monthly averaged results

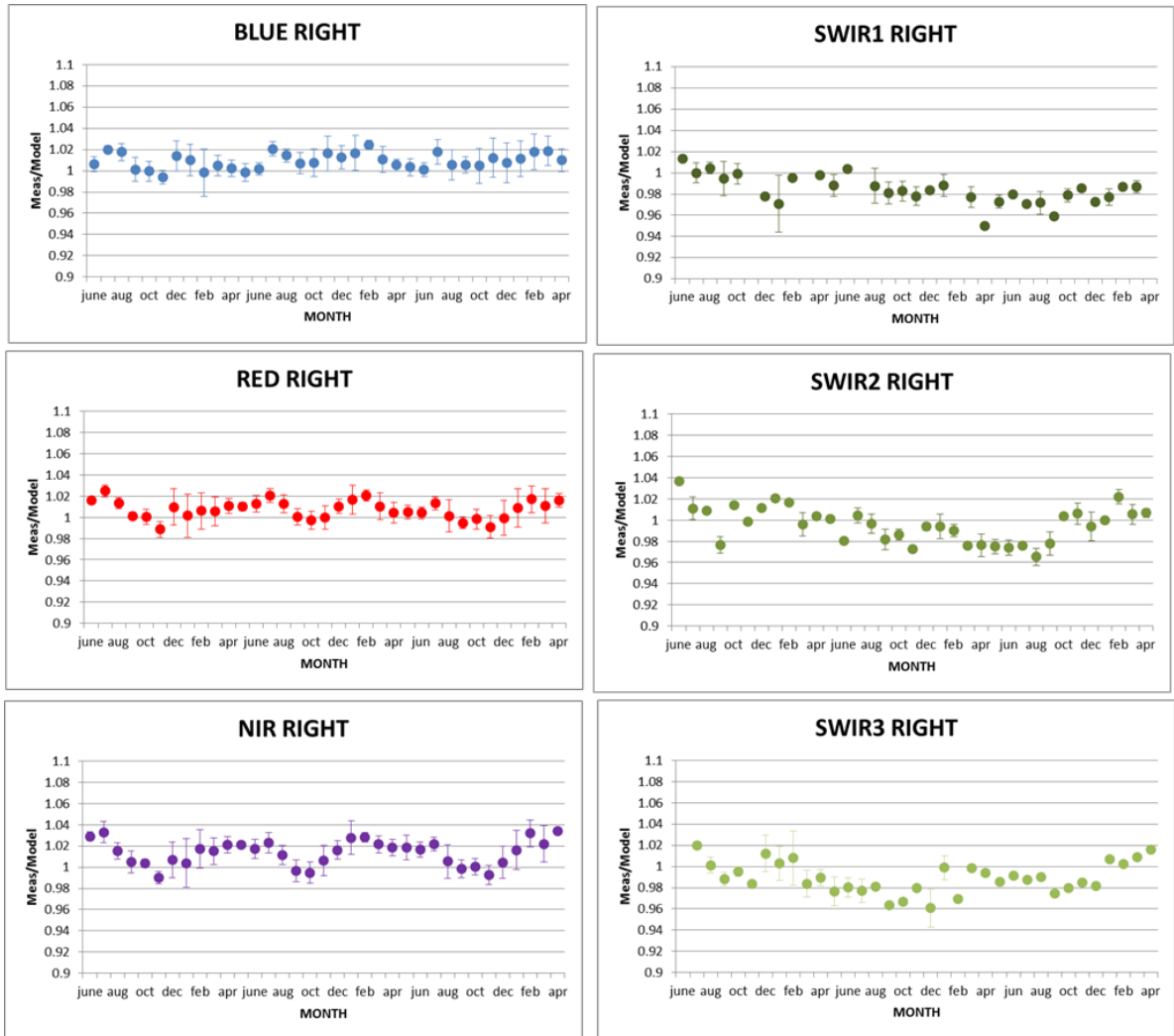


Figure 3. Libya-4 desert calibration results: RIGHT monthly averaged results

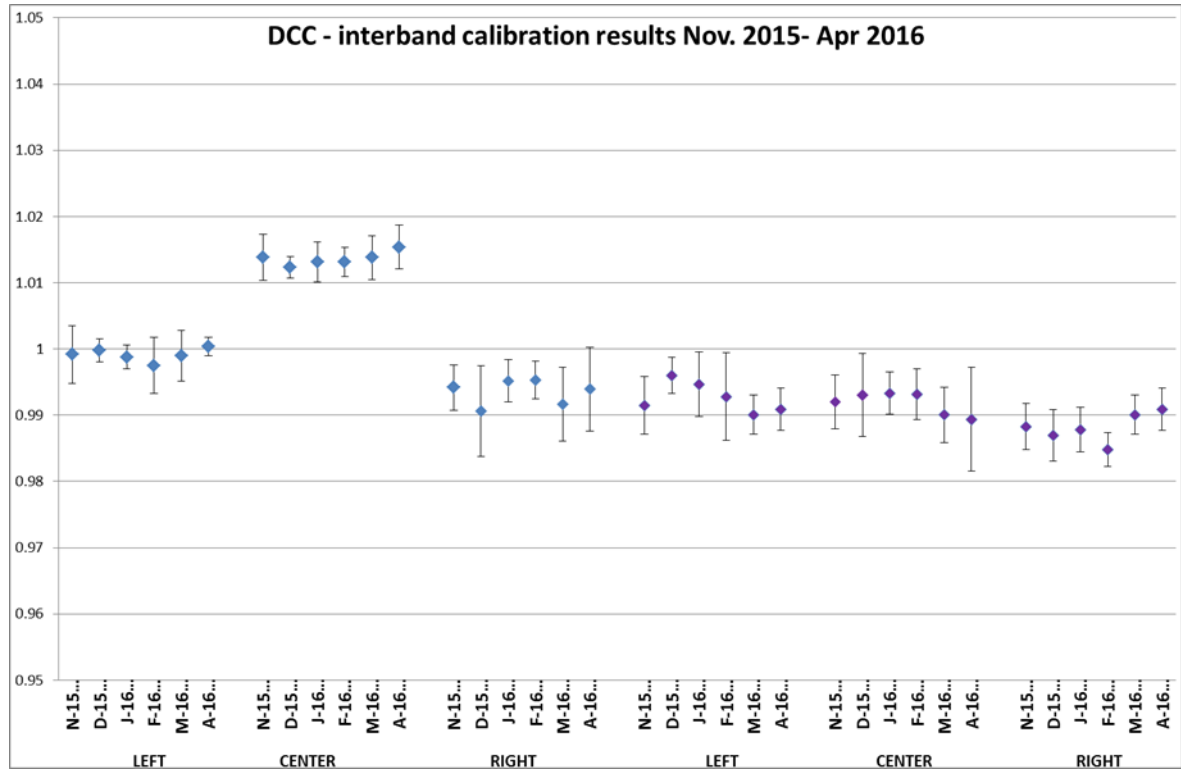


Figure 4. DCC inter-band calibration results: LEFT, CENTER and RIGHT camera

4.2. Geometric Calibration

Calibration image type	Total	Processed	Error
PROBA-V_L1C_INTERSECTION	14124	14124	0

Table13: Processed calibration images for this reporting period

During the period 16/3 – 15/4, the average ALE was < 85 m ($\sigma < 97$ m). The evolution of daily values (see Figure 5) shows three peaks, with the sharp increase from ~75 m to ~110 m between 4/4 and 7/4 being the most prominent feature.

This rapid increase was followed by a decline to values around 75 m at the end of the period.

The geometric accuracy was within the requirement of < 300 m, with an average compliance of 99.0%, ranging from 98.4% for the BLUE channel to 99.7% for the SWIR channel.

Daily compliance values for the BLUE channel were < 98% between 5/4 and 10/4 and increased towards 99% by the end of the period.

Geometric ICP file

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

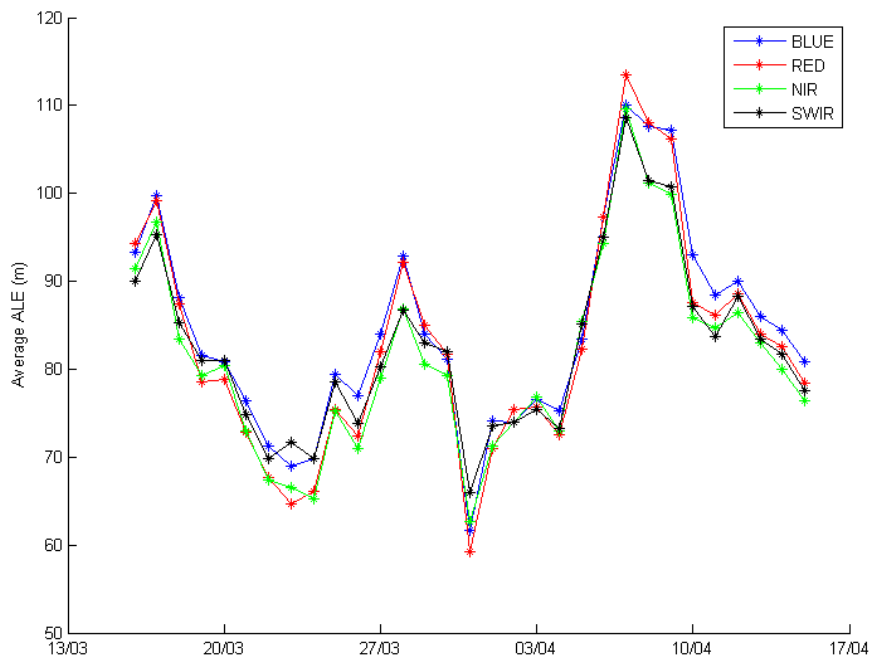


Figure 5 - Daily ALE for this reporting period

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-61	Inaccurate longitude/latitude coordinates	Resolved	24/02/2016	Software

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

5.2. Image processing issues

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 km ² (missing TFF))	2	31/03, 05/04
Large Gaps (< 21600 km ²)	1	11/04
Medium Gaps (< 10000 km ²)	2	16/03, 24/03
Minor Gaps (< 3600 km ²)	4	06/04, 07/04, 08/04, 03/04
Negligible Gaps (< 1000 km ²)	20	01/04, 28/03, 02/04, 19/03, 25/03, 20/03, 13/04, 29/03, 30/03, 04/04, 26/03, 21/03, 27/03, 14/04, 10/04, 17/03, 22/03, 15/04, 18/03, 23/03
Complete synthesis (no gaps)	2	09/04, 12/04,

Table14: Overview of S1 for this reporting period

6. Scheduled activities for the next period(s)

- Software upgrades:
A new release of the PDF platform will be implemented in week 16 in order to improve the estimated download
- Hardware:
An assessment is ongoing to identify older critical hardware in the processing chain for future replacement.
- Development:
An improvement of the cloud detection algorithm is under investigation.
- No other activities scheduled.

7. Operational remarks

No operational remarks.