



# MONTHLY OPERATIONS REPORT

**MOR#032**

**Reporting period from 16-Jul-2016 to 15-Aug-2016**

**Reference: *PROBA-V\_D5\_MOR-032\_2016-08\_v1.0***

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## 1. Summary

In this reporting period, the majority of the synthesis products were complete. Anomalies impacting the incomplete products were automatic recoveries of the platform, some geometric instabilities and a low rate of decompression errors. One TFF was missing due to a HDR setup issue at the Inuvik DRS.

Between 02/08, 21h45 to 03/08 02h15, there was a general network failure on the Belnet network, which is the ISP VITO is connected to. This caused an interruption on all IP connectivity for all connected organisations. Specifically for PROBA-V, this caused the VITO PDF and HMA interface to be unreachable during this time period and the ability to download TFF's or any auxiliary data was lost. All internal systems remained up and running.

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

Lastly, after thorough testing by the VITO science team, the new algorithm has been implemented in production environment and initial off-line reprocessing of the entire PROBA-V archive has started. Reprocessing the data will be speed up in the following weeks by gradually increasing new worker servers to the processing chain. 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	100.0	0.0
PDF	100.0	0.0

Table 1: System Infrastructure availability for this reporting period



## 3. Image Processing Services

### 3.1. Ingested and archived products

Product Type	Total	Received	Missing data, ingested by VITO	Archived
METEO	248	248	0	248
TFF	309	308	1 <sup>(*)</sup>	308

Table 2: Ingested and archived products for this reporting period

(\*) 1 missing TFF: TFF Id 10376 lost due to HDR setup issue at the Inuvik DRS.

### 3.2. Generated and archived products

Product Type	Total	Processed	Error	Archived
PROBAV_L1A - Calibration	293	293	0	293
PROBAV_L1A - Nominal	2655	2648	7 <sup>(*)</sup>	2655
PROBAV_L1C	2648	2648	0	2647
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 errors: Geometric Processing

### 3.3. Backup and archiving service

Product type	Total Files	Total File Size (GB)
TFF	300	796.55
L1A	2847	1422.92
Database transaction logs	2974	281.12
Database incremental back-up	208	85.26
Database full back-up	40	945.75

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

Product type	Total Files	Total File Size (GB)
PROBAV_TRANSFERFRAMES	308	882.87
PROBAV_L1A	2940	1576.27
PROBAV_L1C	2641	3056.97
PROBAV_L3_S1_TOA_100M	60	1721.63
PROBAV_L3_S1_TOC_100M	59	1755.65
PROBAV_L3_S1_TOC_NDVI_100M	59	207.98
PROBAV_L3_S5_TOA_100M	12	1218.44
PROBAV_L3_S5_TOC_100M	12	1266.58
PROBAV_L3_S5_TOC_NDVI_100M	12	147.39
PROBAV_L3_S1_TOA_300M	58	712.81
PROBAV_L3_S1_TOC_300M	58	739.89
PROBAV_L3_S10_TOC_300M	7	148.18
PROBAV_L3_S10_TOC_NDVI_300M	6	11.39
PROBAV_L3_S1_TOA_1KM	59	98.61
PROBAV_L3_S1_TOC_1KM	61	103.17
PROBAV_L3_S10_TOC_1KM	6	17.20
PROBAV_L3_S10_TOC_NDVI_1KM	6	1.40
ICP_GEOMETRIC_CENTRE	0	0
ICP_GEOMETRIC_LEFT	0	0
ICP_GEOMETRIC_RIGHT	0	0
ICP_RADIOMETRIC_CENTRE	32	1.33
ICP_RADIOMETRIC_LEFT	33	1.37
ICP_RADIOMETRIC_RIGHT	33	1.37
METEO_ECMWF	248	0.31
METEO_METEOSERVICES	248	1.32
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	2639	122	126
PROBAV_L3_S1_TOA_100M	31	619	608
PROBAV_L3_S1_TOC_100M	31	671	452
PROBAV_L3_S1_TOC_NDVI_100M	31	1800	1695
PROBAV_L3_S5_TOA_100M	6	280	279
PROBAV_L3_S5_TOC_100M	6	661	664
PROBAV_L3_S5_TOC_NDVI_100M	6	1044	1074
PROBAV_L3_S1_TOA_300M	31	197	325
PROBAV_L3_S1_TOC_300M	31	178	517
PROBAV_L3_S10_TOC_300M	3	31	38
PROBAV_L3_S10_TOC_NDVI_300M	3	278	290
PROBAV_L3_S1_TOA_1KM	31	159	176
PROBAV_L3_S1_TOC_1KM	31	229	226
PROBAV_L3_S10_TOC_1KM	3	55	56
PROBAV_L3_S10_TOC_NDVI_1KM	3	410	414

Table 6: Ordered and delivered products for this reporting period

### 3.5. End-user activity

18 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 902 with 99 different nationalities representing 696 different companies/universities.

Product type	Africa	Asia	Europe	N-America	Oceania	S-America
PROBAV_L1C	0	8.25	306.62	0	0	0
PROBAV_L3_S1_TOA_100M	0	0.02	126.08	0.64	0	0
PROBAV_L3_S1_TOC_100M	0	710.09	804.46	715.46	0	0
PROBAV_L3_S1_TOC_NDVI_100M	0.15	0.09	105.87	0.04	0	0
PROBAV_L3_S5_TOA_100M	0.01	0	66.57	0	0	0
PROBAV_L3_S5_TOC_100M	32.59	0.00	37.94	0.40	3.77	283.67
PROBAV_L3_S5_TOC_NDVI_100M	2.12	1.68	57.72	0.59	0	15.90
PROBAV_L3_S1_TOA_300M	0	2.11	2521.45	0.08	0	0
PROBAV_L3_S1_TOC_300M	0	0	1600.14	329.64	0	0
PROBAV_L3_S10_TOC_300M	1.96	1.03	193.33	0.49	0	0

PROBAV_L3_S10_TOC_NDVI_300M	0.01	3.20	1.47	0.07	0	1.47
PROBAV_L3_S1_TOA_1KM	0	0	196.02	0.01	0	0
PROBAV_L3_S1_TOC_1KM	0.00	0.01	255.13	0	0	0
PROBAV_L3_S10_TOC_1KM	3.63	0	18.23	0.85	0	0
PROBAV_L3_S10_TOC_NDVI_1KM	1.95	6.36	2.84	0.00	0	0

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

Product Type	Global
L1C	314.88
PROBAV_L3_S1_TOA_100M	126.75
PROBAV_L3_S1_TOC_100M	2230.01
PROBAV_L3_S1_TOC_NDVI_100M	106.15
PROBAV_L3_S5_TOA_100M	66.58
PROBAV_L3_S5_TOC_100M	358.37
PROBAV_L3_S5_TOC_NDVI_100M	78.01
PROBAV_L3_S1_TOA_300M	2523.63
PROBAV_L3_S1_TOC_300M	1929.78
PROBAV_L3_S10_TOC_300M	196.81
PROBAV_L3_S10_TOC_NDVI_300M	6.22
PROBAV_L3_S1_TOA_1KM	196.03
PROBAV_L3_S1_TOC_1KM	255.14
PROBAV_L3_S10_TOC_1KM	22.71
PROBAV_L3_S10_TOC_NDVI_1KM	11.15

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

Company	# Downloads
COPENHAGEN UNIVERISTY	1897
VITO	824
FEDERAL UNIVERSITY OF ALAGOAS	563
OSS	336
UNIVERSITY OF LEICESTER	240
UNICAMP	214
FREIE UNIVERSITÄT BERLIN	199
SIPAM	199
UNIVERSIDAD DE SONORA	181
CNES	169

Table 9: Top 10 user companies for the reporting period



Country	# Users
CHINA	89
BELGIUM	84
ITALY	47
BRAZIL	42
FRANCE	38
UNITED STATES	36
INDIA	35
UNITED KINGDOM	32
NETHERLANDS	32
GERMANY	29

Table 10: Top 10 countries with most registered users

**List of issues raised by users:**

ProbaV:

- Composition of IOTW
- forgot username
- decompress proba-v geotiff
- n-Daily compositor down for maintenance
- PROBA-V 100 m syntheses
- SNAP does not work on incomplete HDF5
- decompress proba-v geotiff
- Need Some Help with PPT configuration file

## 4. Image Calibration services

### 4.1. Radiometric Calibration

Calibration request type	Total	Processed	Not received	Error
CLOUDS	24	15	9	0
DARK CURRENT	35	22	13	0
MOON	4	2	2	0
RAYLEIGH	94	57	37	0
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	291	265	26
PROBA-V_L1B_INTERSECTION	665	487	178
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 explain the stable trend observed over the last months.

One extra bad pixel (Center SWIR 3 pixel 579) will be assigned the status BAD.

**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. Furthermore one BAD pixel, i.e. Center SWIR 3 pixel 579 will be added.

The current ICP files are

- PROBAV\_ICP\_RADIOMETRIC#LEFT\_20160719\_V01
- PROBAV\_ICP\_RADIOMETRIC#CENTER\_20160719\_V01
- PROBAV\_ICP\_RADIOMETRIC#RIGHT\_20160719\_V01

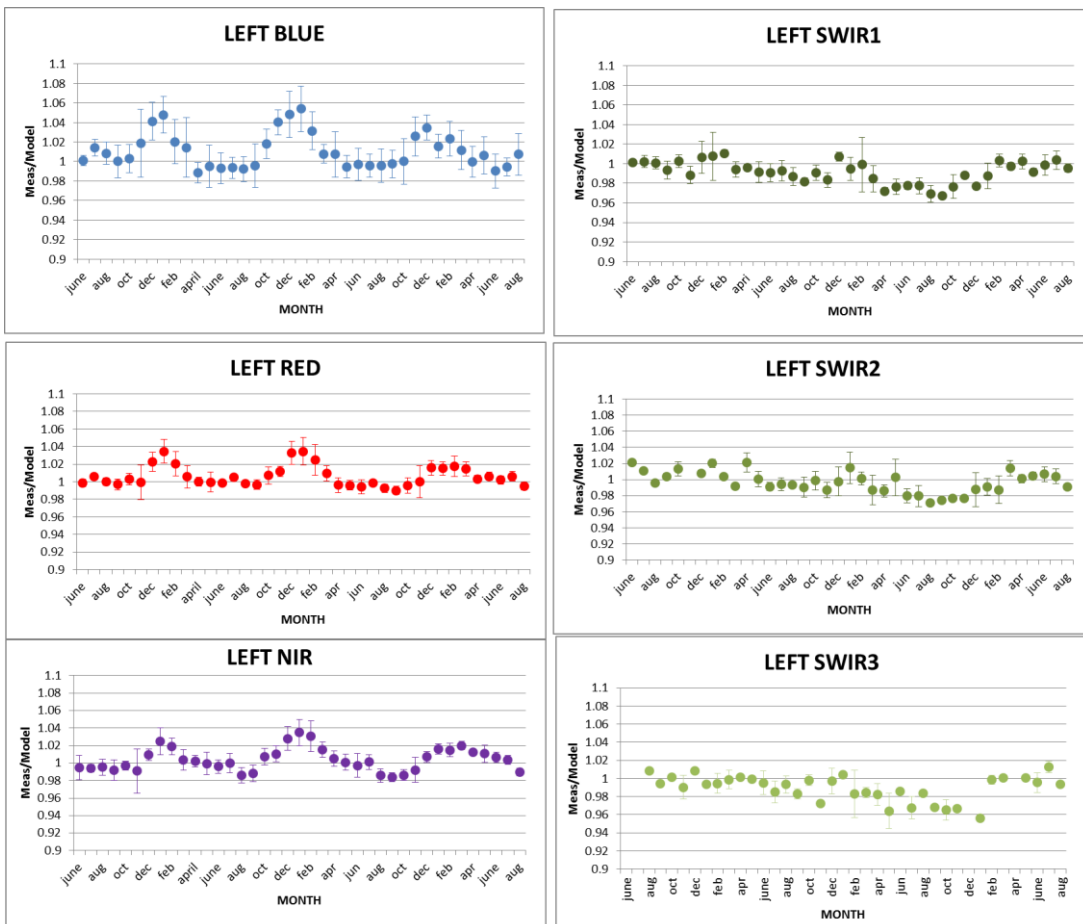


Figure 1. Libya-4 desert calibration results: LEFT monthly averaged results

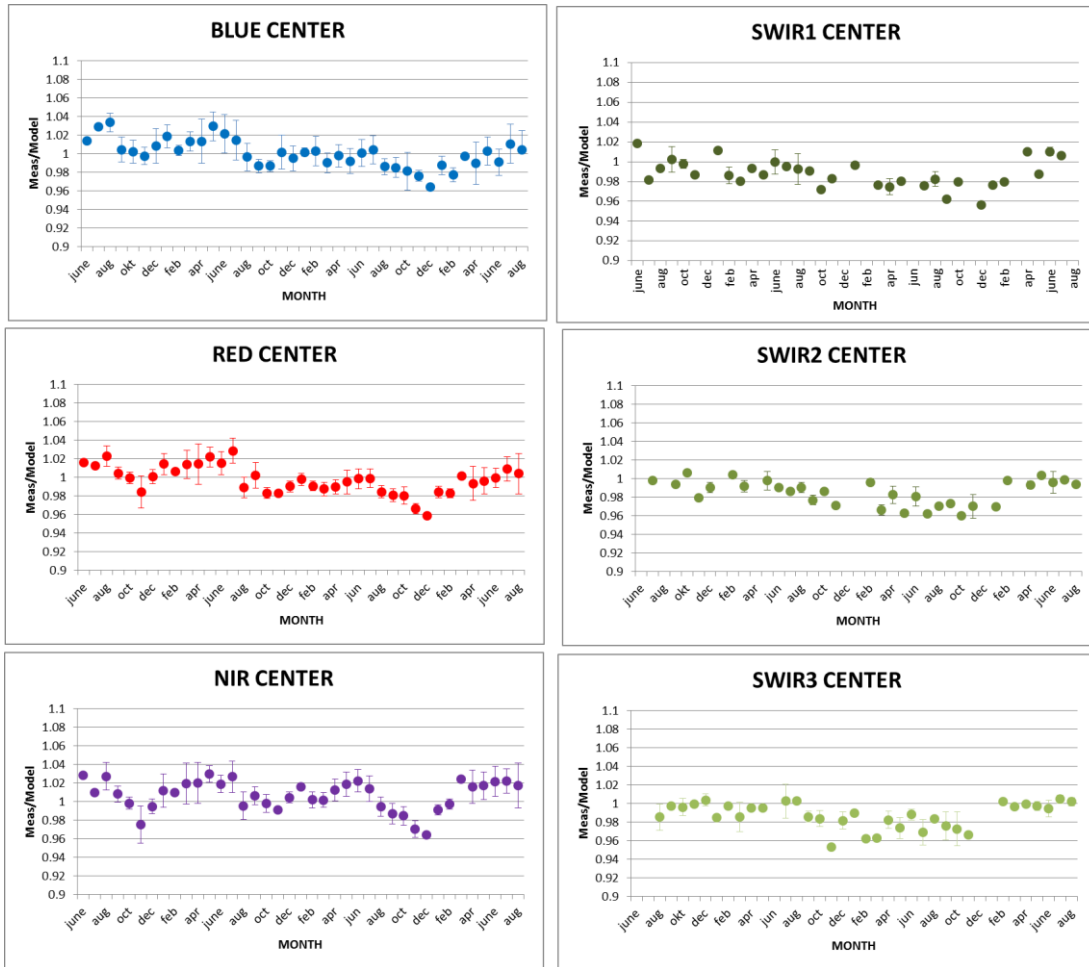


Figure 2. Libya-4 desert calibration results: CENTER monthly averaged results

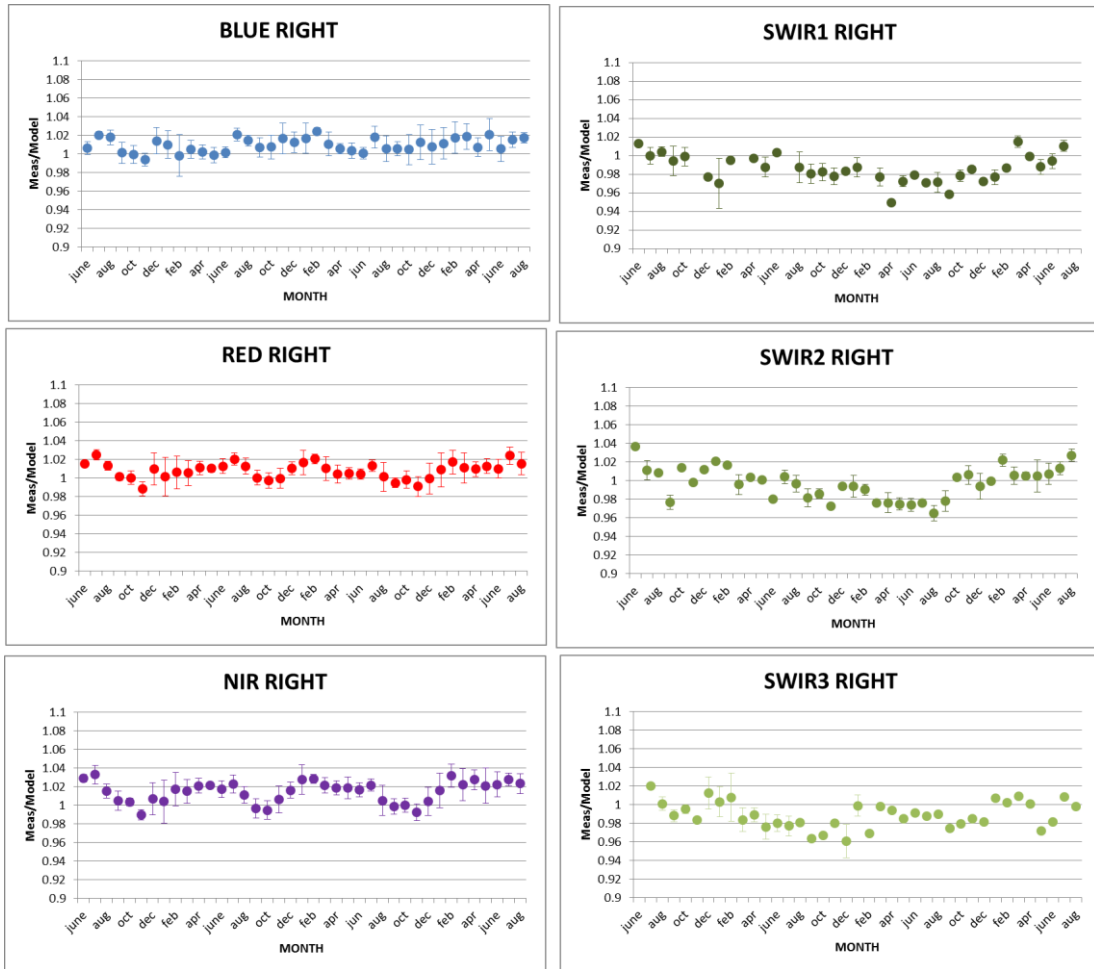


Figure 3. Libya-4 desert calibration results: RIGHT monthly averaged results

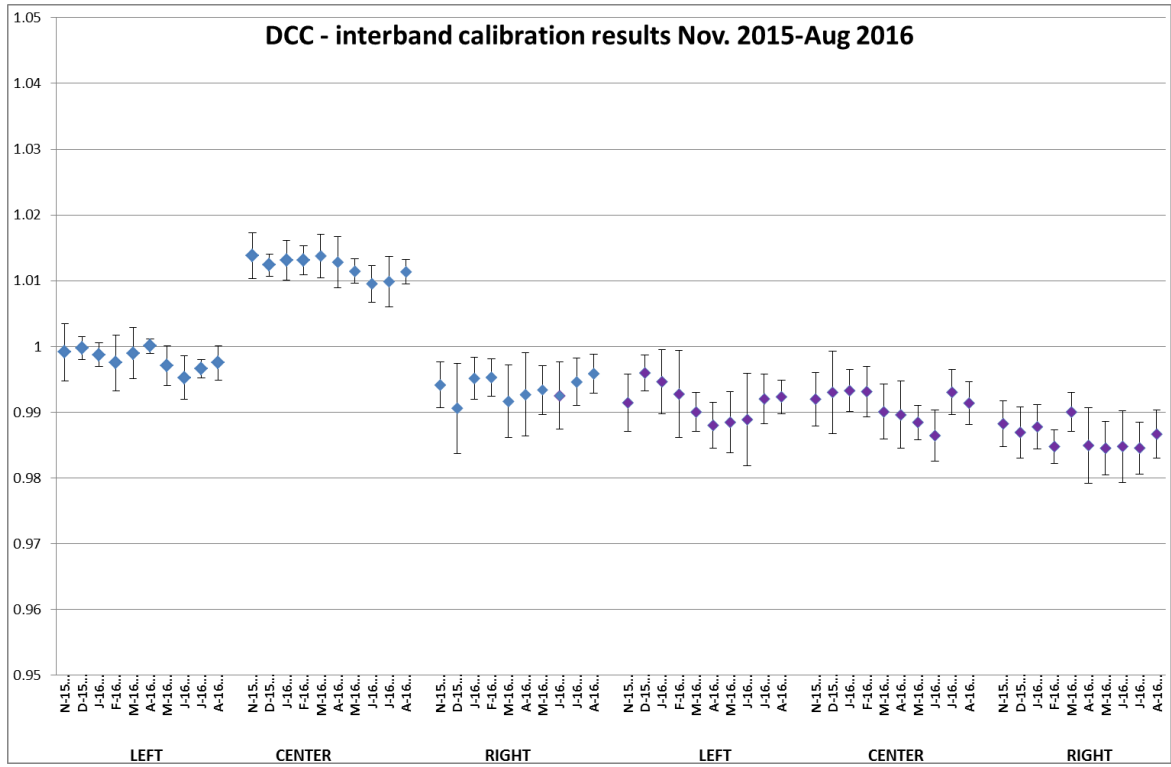


Figure 4. DCC inter-band calibration results: LEFT, CENTER and RIGHT camera

## 4.2. Geometric Calibration

Calibration image type	Total	Processed	Error
PROBA-V_L1C_INTERSECTION	14216	14216	0

Table13: Processed calibration images for this reporting period

During previous month, the average ALE was < 65 m ( $\sigma < 70$  m). The daily ALE evolution (see Figure 5) show a decreasing trend from 85 – 55 m between 16/07 and 25/07, followed by two peaks, respectively on 28/07 and 01/08 with maximum values of ~88 m and 82 m. After these peaks, values declined to roughly 55 – 62 m on 07/08 and remained stable until the end of this reporting period.

The geometric accuracy was within well the requirement of < 300 m, with an average compliance for all cameras of 99.4%.

### Geometric ICP file

- PROBAV\_ICP\_GEOMETRIC#LEFT\_20160216\_V01
- PROBAV\_ICP\_GEOMETRIC#CENTER\_20160216\_V01
- PROBAV\_ICP\_GEOMETRIC#RIGHT\_20160216\_V01

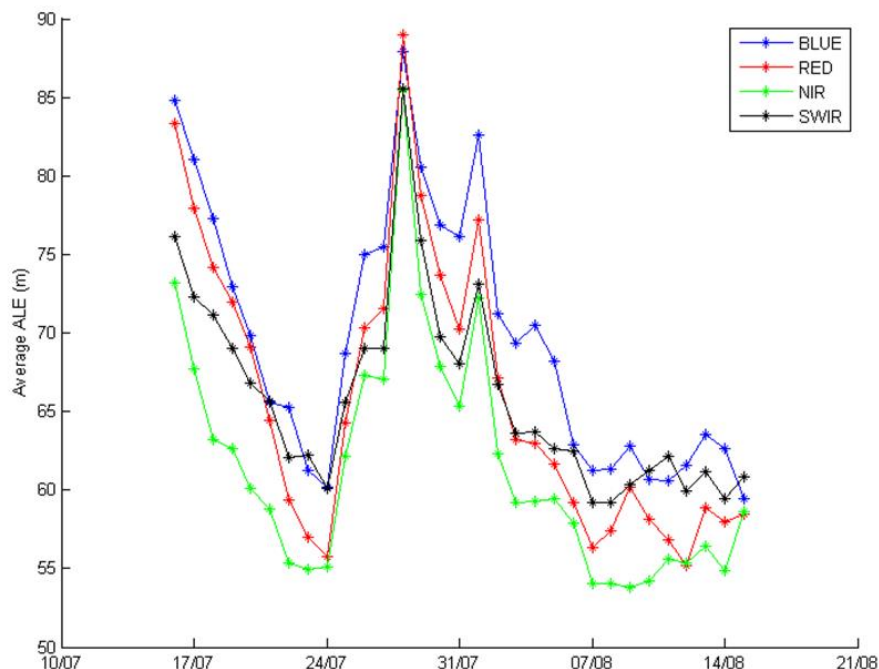


Figure 5 - Daily average ALE in this reporting period

## 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
<a href="#">PROBAVUS-7</a>	Very small images fail to process	Resolved	10/01/2014	General
<a href="#">PROBAVUS-60</a>	LTDA Restore fails when product destination already exists on disk	Open	22/01/2016	Software
<a href="#">PROBAVUS-63</a>	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
- 0 issue(s) was resolved and closed during this reporting period
- 0 issue(s) are resolved but remain to be closed formally
- 1 issue is resolved but remain in the list logging purposes
- 2 issues are 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 <sup>2</sup> (missing TFF))	0	
Large Gaps (< 21600 km <sup>2</sup> )	1	01/08
Medium Gaps (< 10000 km <sup>2</sup> )	8	19/07, 24/07, 10/08, 16/07, 28/07, 23/07, 09/08, 22/07
Minor Gaps (< 3600 km <sup>2</sup> )	4	08/08, 05/08, 12/08, 27/07
Negligible Gaps (< 1000 km <sup>2</sup> )	16	31/07, 21/07, 26/07, 15/08, 07/08, 02/08, 17/07, 11/08, 06/08, 03/08, 29/07, 20/07, 25/07, 04/08, 14/08, 30/07
Complete synthesis (no gaps)	2	13/08, 18/07

Table14: Overview of S1 for this reporting period

## 6. Scheduled activities for the next period(s)

- Software upgrades:  
No software upgrades planned
  
- Hardware:  
No hardware upgrades planned
  
- Development:  
No new developments planned
  
- Other activities:
  - After thorough testing by the VITO science team, the new algorithm has been implemented in production environment and initial off-line reprocessing of the entire PROBA-V archive has started. Reprocessing the data will be speed up in the following weeks by gradually increasing new worker servers to the processing chain. Reprocessed products and implementation in NRT processing will be done after validation of a longer time series, currently projected for the September/October timeframe.
  - A new Product user manual (PUM) will be released in the near future containing updates on the new cloud detection algorithm, L2A products, and other minor updates.

## 7. Operational remarks

Between 02/08, 21h45 to 03/08 02h15, there was a general network failure on the Belnet network, which is the ISP VITO is connected to. This caused an interruption on all IP connectivity for all connected organisations. Specifically for PROBA-V, this caused the VITO PDF and HMA interface to be unreachable during this time period and the ability to download TFF's or any auxiliary data was lost. All internal systems remained up and running.