



# MONTHLY OPERATIONS REPORT

**MOR#079**

**Reporting period from 16-Jun-2020 to 15-Jul-2020**

**Reference: *PROBA-V\_D5\_MOR-079\_07\_v1.0***

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**Version: 1.0**

**Date: 17/07/2020**

## DOCUMENT CONTROL

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### Change record

Release	Date	Pages	Description	Editor(s)/Reviewer(s)
1.0	17/07/2020	All	Initial version	

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## 1. Summary

PROBA-V's operational lifetime ended on 30 June 2020. From July 1<sup>st</sup> onwards, the mission continues to exist with emphasis of acquiring the European and African continent until October 2021 and some experiments.

To accommodate this, the LS mask was updated on July 1<sup>st</sup>, limiting also the downlink capacity to 3 downlinks per day. On July 13, another update of the ELSM was done to eliminate some pole segment that were still acquired, causing the memory to overflow in some cases on July 9 and 10. Prior to July 1<sup>st</sup>, the majority of the synthesis products were nearly complete. No transfer frame files were missing and two automatic recoveries were recorded, which had a larger impact on the end products. The amount of decompression errors and geometric errors remained at the same acceptable level.

The user community was informed several time on the mission end on all PROBA-V related platforms and a small PROBA-V aftermovie was released on <https://blog.vito.be/proba-v>, also announcing a coding contest on the PROBA-V MEP.

No anomalies were recorded in the radiometric and geometric quality assessment.

A small downtime was recorded on the 100 m server rack due to a failing power supply.

Preparation of the development of collection 2 workflows are initiated, with main focus on the new A/C algorithm.

## 2. System Infrastructure

Category	% Up Time	% Down Time (*)
Switches	99.98	0.02
Database Servers	100.0	0.0
Mid Term File Servers	100.0	0.0
Short Term File Servers	100.0	0.0
Master Servers	99.98	0.02
Worker Nodes	99.98	0.02
PDF	100.0	0.0

Table 1: System Infrastructure availability for this reporting period

(\*) Downtime PROBA-V 100 m rack due to broken power supply

## 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	190	190	0	190

Table 2: Ingested and archived products for this reporting period

### 3.2. Generated and archived products

Product Type	Total	Processed	Error	Archived
PROBAV_L1A - Calibration	158	158	0	158
PROBAV_L1A - Nominal	1729	1725	4	1729
PROBAV_L1C	1725	1725	0	1725
PROBAV_L2A_100M	630	630	0	630
PROBAV_L2A_300M	1725	1725	0	1725
PROBAV_L2A_1KM	1725	1725	0	1725
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

### 3.3. Backup and archiving service

Product type	Total Files	Total File Size (GB)
TFF	300	790.22
L1A	2796	1394.43
Database transaction logs	770	80.23
Database incremental back-up	44	17.38
Database full back-up	12	728.32

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

Product type	Total Files	Total File Size (GB)
PROBAV_TRANSFERFRAMES	191	564.63
PROBAV_L1A	1898	998.49
PROBAV_L1C	1736	1948.27
PROBAV_L2A_100M	1269	1070.61
PROBAV_L2A_300M	3472	560.10
PROBAV_L2A_1KM	3472	74.03
PROBAV_L3_S1_TOA_100M	58	1157.92
PROBAV_L3_S1_TOC_100M	58	1190.01
PROBAV_L3_S1_TOC_NDVI_100M	58	137.97
PROBAV_L3_S5_TOA_100M	12	947.67
PROBAV_L3_S5_TOC_100M	12	974.22
PROBAV_L3_S5_TOC_NDVI_100M	12	110.43
PROBAV_L3_S1_TOA_300M	59	506.55
PROBAV_L3_S1_TOC_300M	59	519.15
PROBAV_L3_S10_TOC_300M	6	95.41
PROBAV_L3_S10_TOC_NDVI_300M	6	8.47
PROBAV_L3_S1_TOA_1KM	60	70.16
PROBAV_L3_S1_TOC_1KM	59	69.80
PROBAV_L3_S10_TOC_1KM	6	12.89
PROBAV_L3_S10_TOC_NDVI_1KM	6	1.06
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	240	0.30
METEO_METEOSERVICES	240	1.28
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	1736	1214	1311
PROBAV_L2A_100M	623	334	589
PROBAV_L2A_300M	1736	93	96
PROBAV_L2A_1KM	1736	1	1
PROBAV_L3_S1_TOA_100M	29	97	696
PROBAV_L3_S1_TOC_100M	29	125	1356
PROBAV_L3_S1_TOC_NDVI_100M	29	1	129
PROBAV_L3_S5_TOA_100M	6	1	63
PROBAV_L3_S5_TOC_100M	6	13	76
PROBAV_L3_S5_TOC_NDVI_100M	6	1591	1602
PROBAV_L3_S1_TOA_300M	29	62	64
PROBAV_L3_S1_TOC_300M	29	61	281
PROBAV_L3_S10_TOC_300M	3	6	6
PROBAV_L3_S10_TOC_NDVI_300M	3	15	58
PROBAV_L3_S1_TOA_1KM	29	63	63
PROBAV_L3_S1_TOC_1KM	29	61	127
PROBAV_L3_S10_TOC_1KM	3	252	263
PROBAV_L3_S10_TOC_NDVI_1KM	3	972	990

Table 6: Ordered and delivered products for this reporting period

(\*) At the time of reporting not all synthesis products might have been delivered to the catalogue

### 3.5. End-user activity

10 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 **1824** with **122** different nationalities representing **1324** different companies/universities.

Product type	Africa	Asia	Europe	N-America	Oceania	S-America
PROBAV_L1C	0	83.64	1318.26	0	0	0
PROBAV_L2A_100M	0	447.54	20.80	0	0	0
PROBAV_L2A_300M	0	0	10.10	0	0	0
PROBAV_L2A_1KM	0	0	0.05	0	0	0
PROBAV_L3_S1_TOA_100M	0	5.53	1188.84	0	0	0
PROBAV_L3_S1_TOC_100M	0	8.69	2815.07	970.86	0	4.72
PROBAV_L3_S1_TOC_NDVI_100M	0	0.02	2.23	0	0	0
PROBAV_L3_S5_TOA_100M	0	77.62	0	0	0	0

PROBAV_L3_S5_TOC_100M	33.37	1.46	1.84	0	0	0
PROBAV_L3_S5_TOC_NDVI_100M	0	2.71	31.92	0	0	0.84
PROBAV_L3_S1_TOA_300M	0.13	0	452.11	0	0	0
PROBAV_L3_S1_TOC_300M	0	0	868.69	430.89	0	0
PROBAV_L3_S10_TOC_300M	0	0	95.90	0	0	0
PROBAV_L3_S10_TOC_NDVI_300M	0	1.21	6.11	0	0	0.08
PROBAV_L3_S1_TOA_1KM	0	0	66.85	0	0	0
PROBAV_L3_S1_TOC_1KM	0	0	100.57	0	0	0
PROBAV_L3_S10_TOC_1KM	0.94	424.99	6.73	5.61	0	0
PROBAV_L3_S10_TOC_NDVI_1KM	0.14	57.74	7.43	0	0	0.01

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

Product Type	Global
L1C	1401.90
PROBAV_L2A_100M	468.35
PROBAV_L2A_300M	10.10
PROBAV_L2A_1KM	0.05
PROBAV_L3_S1_TOA_100M	1194.37
PROBAV_L3_S1_TOC_100M	3799.34
PROBAV_L3_S1_TOC_NDVI_100M	2.25
PROBAV_L3_S5_TOA_100M	77.62
PROBAV_L3_S5_TOC_100M	36.66
PROBAV_L3_S5_TOC_NDVI_100M	35.47
PROBAV_L3_S1_TOA_300M	452.24
PROBAV_L3_S1_TOC_300M	1299.57
PROBAV_L3_S10_TOC_300M	95.90
PROBAV_L3_S10_TOC_NDVI_300M	7.41
PROBAV_L3_S1_TOA_1KM	66.85
PROBAV_L3_S1_TOC_1KM	100.57
PROBAV_L3_S10_TOC_1KM	438.26
PROBAV_L3_S10_TOC_NDVI_1KM	65.32

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





Company	# Downloads
KIGAM	2008
1988	1339
EOSENSE	1206
IGSNRR CAS	661
UCLOUVAIN	335
ILE SAS	332
VITO	245
CIRAD	241
ARID LAND RESEARCH CENTER	224
ESA	152

Table 9: Top 10 user companies for the reporting period

Country	# Users
CHINA	186
BELGIUM	163
FRANCE	86
INDIA	86
BRAZIL	83
UNITED STATES	80
ITALY	77
NETHERLANDS	62
UNITED KINGDOM	60
GERMANY	57

Table 10: Top 10 countries with most registered users

**List of issues raised by users:**

Issue
j_leon permissions
Re: GlobAlbedo - extra 12 months of VGT-2 data?
Mounts hangen op VM
Website ververst iedere 4 sec
De klokken van de gmgit airflow serves lopen achter.
new docker tag, jobs RUNNING (but not)
RE: [VITO RS] Re: executor fail
RE: [VITO RS] Re: executor fail
slow reading-in

## 4. Image Calibration services

### 4.1. Radiometric Calibration

Calibration request type	Total	Processed	Not received	Error
CLOUDS	13	13	0	0
DARK CURRENT	13	13	0	0
MOON	2	2	0	0
RAYLEIGH	26	25	0	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	0	2
PROBA-V_L1B_CALIBRATION	153	129	24
PROBA-V_L1B_INTERSECTION	694	447	247
PROBA-V_L1B_OVERLAPREGION	0	0	0

Table 12: Processed calibration images for this reporting period

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

Preliminary analyses indicate that the observed increase in the radiometric calibration results of RED, NIR and SWIR strips seem to be linked to the overall increase in temperature over the mission lifetime. Also in correlation between the seasonal pattern in the Libya-4 calibration results and the seasonal temperature variation was observed.

The observed decreasing trend in the DCC interband calibration results for the BLUE strips are thought to be related to the increasing trend in the RED band which is used as the reference band in the DCC calibration.

1 new bad pixels was identified : Center SWIR3 Pixel ID 712 (0-based),the brings the total number of bad pixels in Center SWIR3 to 25.

### Radiometric ICP file

The BLUE LEFT/CENTER absolute calibration coefficients will be updated following a linear degradation model. Furthermore the dark currents will be updated and t-one bad pixel will be added Center SWIR3 Pixel ID 712 (0-based).

The current ICP files are:

- PROBAV\_ICP\_RADIOMETRIC#LEFT\_20200701\_V01
- PROBAV\_ICP\_RADIOMETRIC#CENTER\_20200701\_V01
- PROBAV\_ICP\_RADIOMETRIC#RIGHT\_202000701\_V01

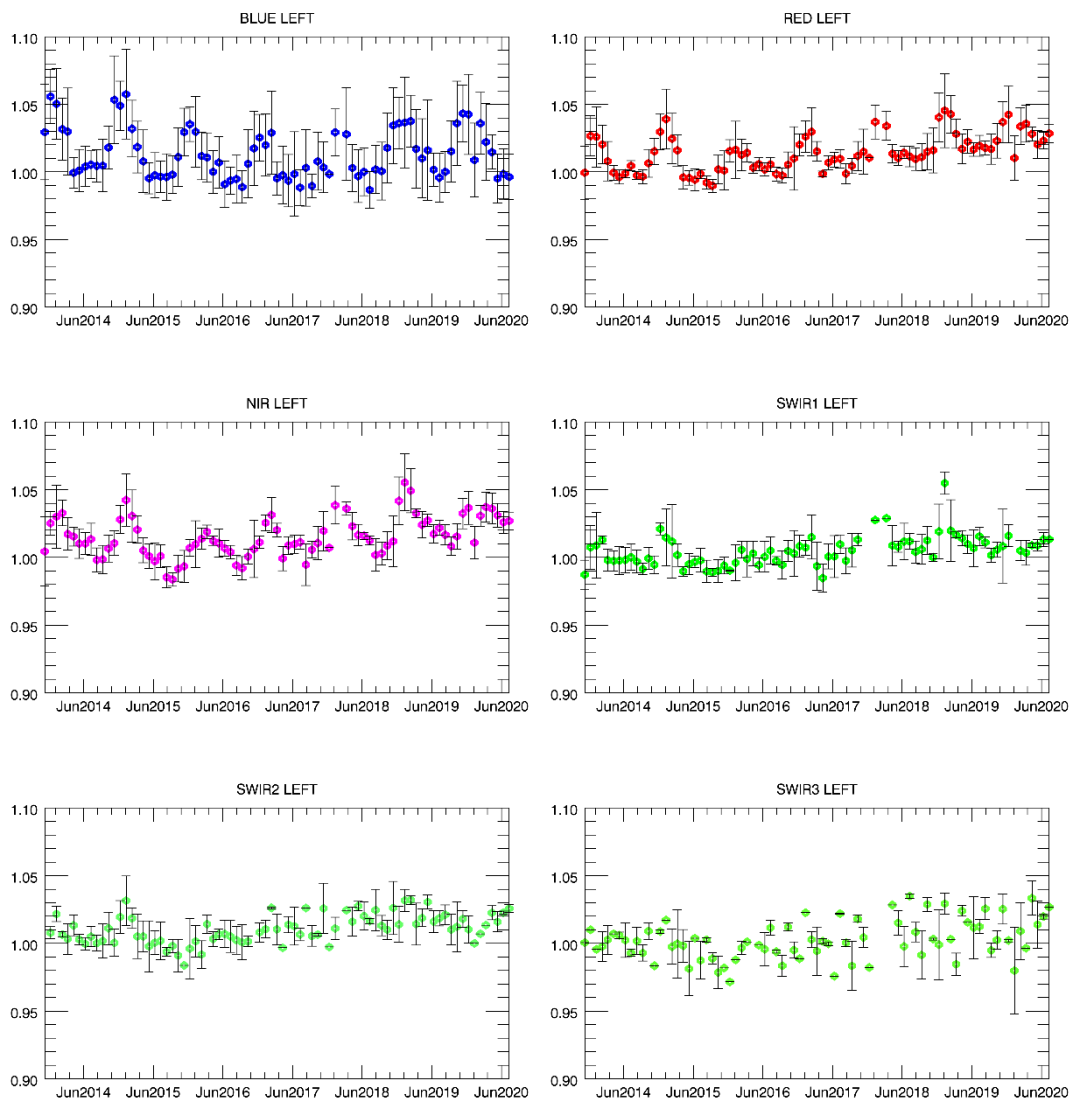


Figure 1. Libya-4 desert calibration results: LEFT monthly averaged results (collection 1)

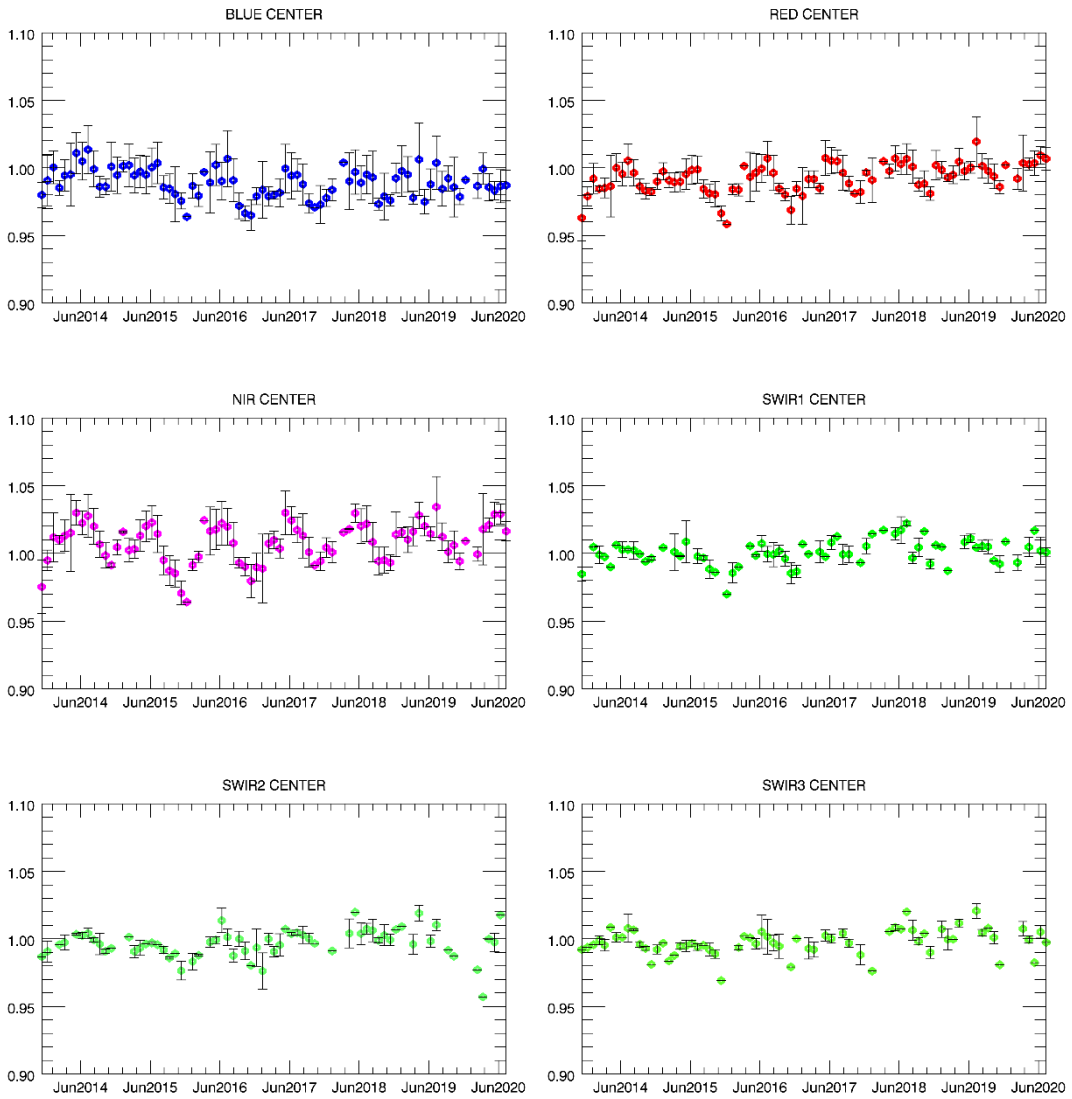


Figure 2. Libya-4 desert calibration results: CENTER monthly averaged results (collection 1)

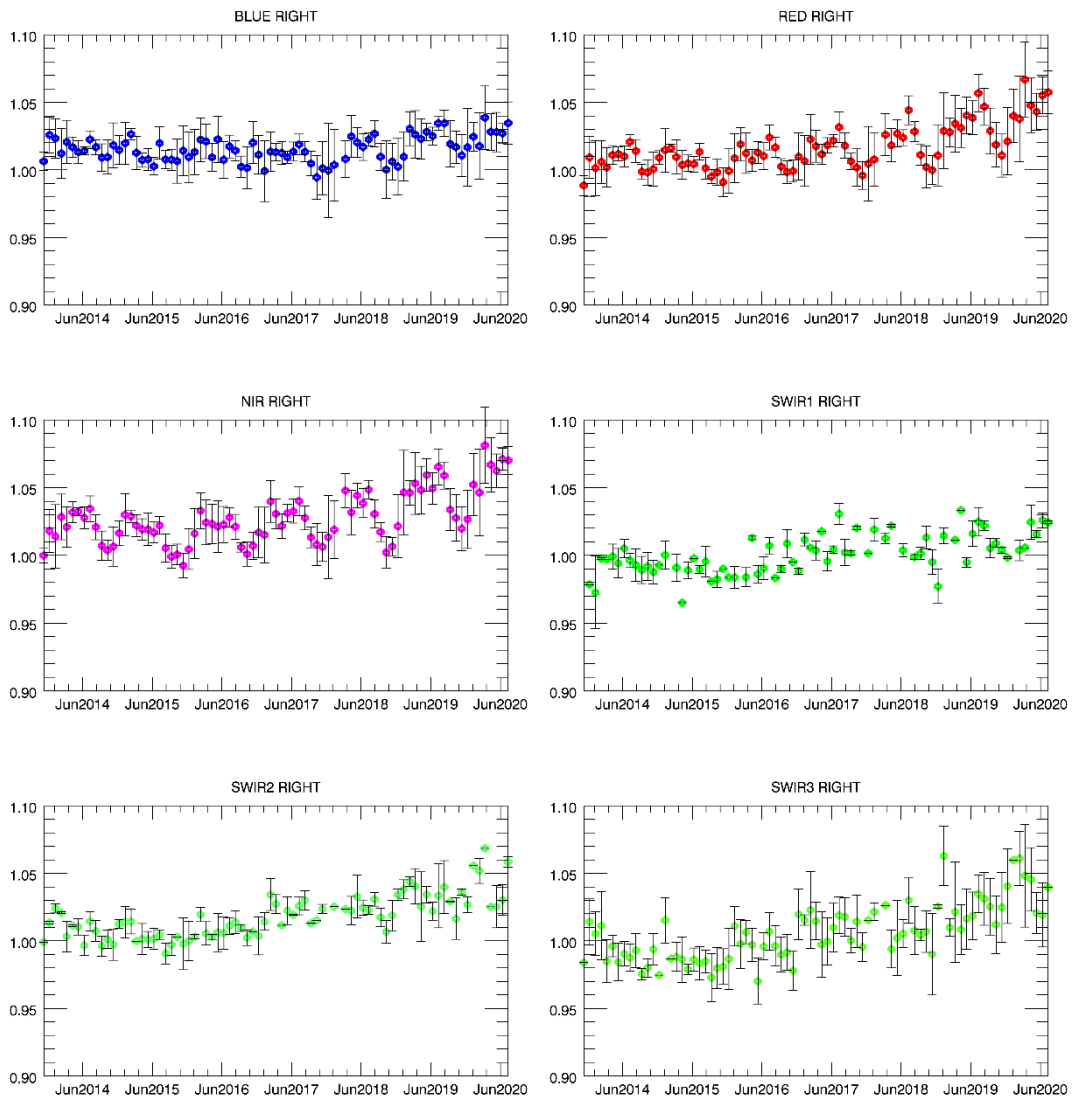


Figure 3. Libya-4 desert calibration results: RIGHT monthly averaged results (collection 1)

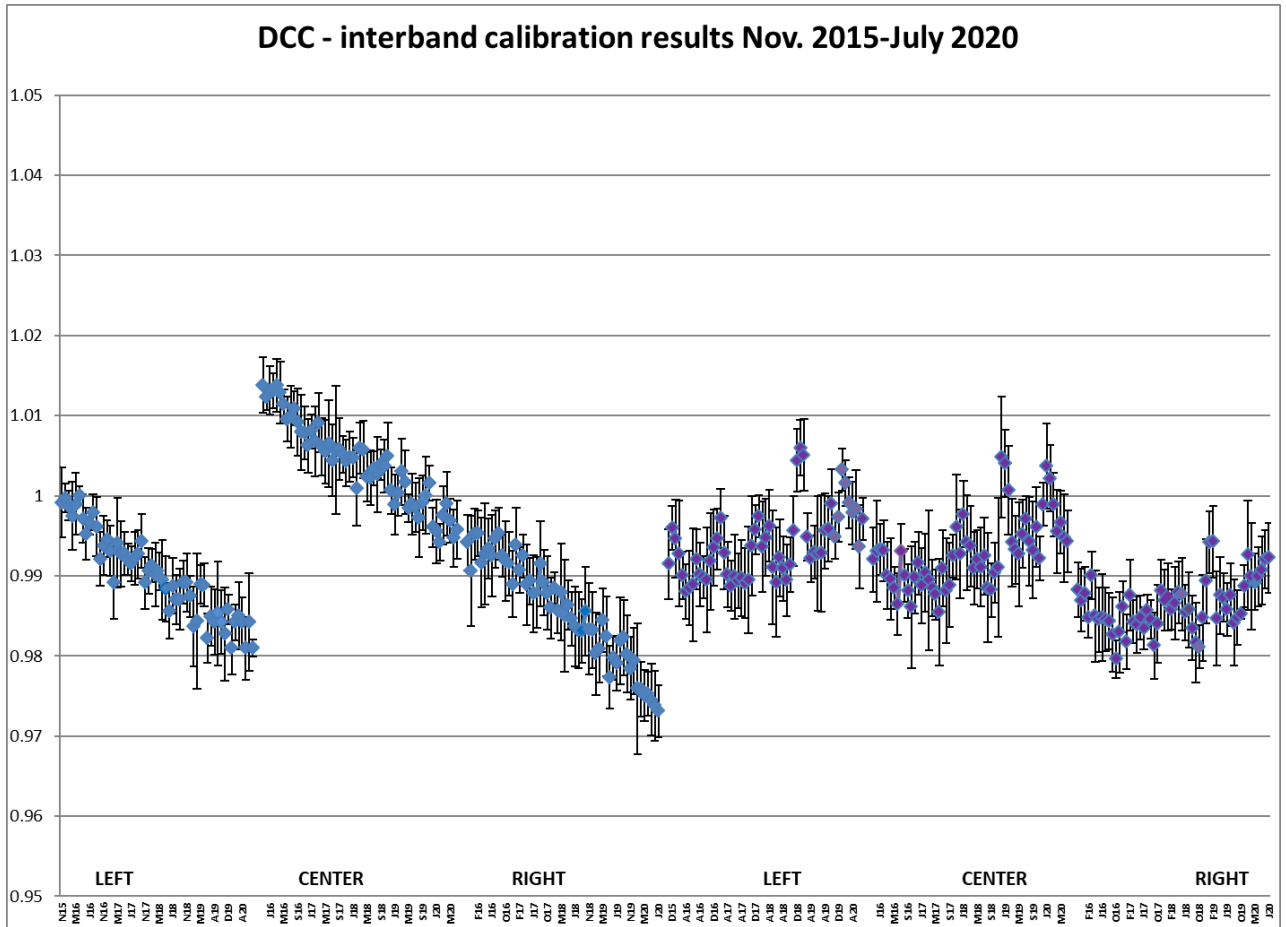


Figure 4. DCC inter-band calibration results: LEFT, CENTER and RIGHT camera (collection 1)

## 4.2. Geometric Calibration

Calibration image type	Total	Processed	Error
PROBA-V_L1C_INTERSECTION	8789	8789	0

Table13: Processed calibration images for this reporting period

During the period 16/6 - 13/7, the average ALE was < 69 m ( $\sigma < 93$  m).

As for previous months, there were no major ALE maxima, the highest ALE occurred on 11/7, with values between 71 m (NIR) and 82 m (SWIR).

The average compliance was 99.25%, ranging between 98.82% (BLUE) and 99.68% (SWIR).

Please note that due to some processing issues, no ALE data for 28/6 – 30/6 were available.

### Geometric ICP file

Throughout the month, no large fluctuations were recorded and current ICP files remain applicable:

- PROBAV\_ICP\_GEOMETRIC#LEFT\_20160907\_V01
- PROBAV\_ICP\_GEOMETRIC#CENTER\_20160907\_V01
- PROBAV\_ICP\_GEOMETRIC#RIGHT\_20160907\_V01

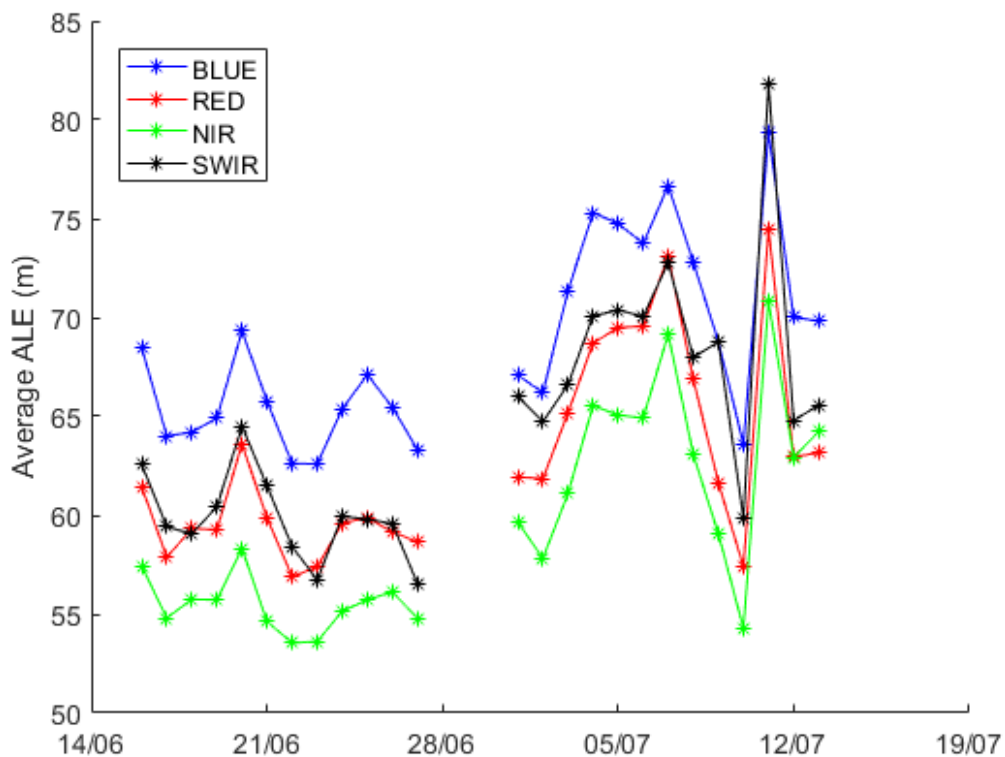


Figure 5 - Daily ALE evolution for 16/06 - 13/07/2020

## 5. Anomalies

### 5.1. 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
<b>Major Gaps (&gt; 21600 km<sup>2</sup> (missing TFF))</b>	0	
<b>Large Gaps (&lt; 21600 km<sup>2</sup>)</b>	0	
<b>Medium Gaps (&lt; 10000 km<sup>2</sup>)</b>	3	09/07, 10/07, 08/07
<b>Minor Gaps (&lt; 3600 km<sup>2</sup>)</b>	2	24/06, 30/06
<b>Negligible Gaps (&lt; 1000 km<sup>2</sup>)</b>	23	19/06, 04/07, 29/06, 05/07, 15/07, 25/06, 20/06, 26/06, 21/06, 16/06, 01/07, 11/07, 12/07, 17/06, 22/06, 02/07, 27/06, 07/07, 03/07, 13/07, 23/06, 28/06, 18/06
<b>Complete synthesis (no gaps)</b>	2	14/07, 06/07

Table14: Overview of S1 for this reporting period



Synthesis	Missing	Decom. Error	Geom. Error	Missing TFF	Autom. Recovery	VC4 Missing	Create Contours	Other
20200616	0.00%	1						
20200617	0.44%	4	3					
20200618	0.98%	3	3					
20200619	0.32%		4					
20200620	0.02%	1	6					
20200621	0.13%	4	5					
20200622	0.82%	1						
20200623	0.34%	1	2					
20200624	1.16%	9	10		1	1		
20200625	0.05%	3	2					
20200626	0.40%	3	7					
20200627	0.98%	1	3					
20200628	0.46%	6	5			1		
20200629	0.01%	2	3					
20200630	1.53%	5	8		1		2	1
20200701	62.82%		3					
20200702	61.33%	2	2			1		
20200703	62.86%		5					
20200704	62.60%	1	4					
20200705	63.27%	3	5					
20200706	62.26%							
20200707	62.60%	1						
20200708	67.59%	3	3				2	
20200709	69.42%	1	6					1
20200710	67.85%	2	3					1
20200711	64.05%	4	12					
20200712	65.97%	2	6					
20200713	63.29%	2						
20200714	66.14%							
20200715	65.43%		1					

Table 15: List of synthesis with an error overview of the missing percentages and errors for this reporting period

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

- Software upgrades:  
No software upgrades planned
- Hardware:  
No hardware upgrades planned
- Development:  
Preparations in the workflows for the reprocessing to Collection 2 is ongoing.
- No other activities scheduled.

## 7. Operational remarks

As from July 1<sup>st</sup> 2020 onwards, the PROBA-V mission is treated as an experimental phase. This means that the coverage is limited to acquiring only over the EUR and AFR continents, next to the usual calibration segments. All data is downlinked in 3 scheduled passes per day, limiting the acquired data to about 30% of the original mission with global coverage. The LS mask was updated on July 1<sup>st</sup> to cover only EUR+AFR. Another update was done on 13 of July to correct for some pole segments to be acquired during the day. This caused the MMM to overflow in some cases, with some loss of data as a result on 9-10/07/2020.