MONTHLY OPERATIONS REPORT

MOR#080

Reporting period from 16-Jul-2020 to 15-Aug-2020

Reference: ***PROBA-V_D5_MOR-080_08_v1.0***
Author(s): Dennis Clarijs, Sindy Sterckx, Erwin Wolters, Jan Vanhout
Version: 1.0
Date: 19/08/2020

DOCUMENT CONTROL

Signatures

Author(s)	Dennis Clarijs, Sindy Sterckx, Erwin Wolters, Jan Vanhout
Reviewer(s)	Dennis Clarijs
Approver(s)	Dennis Clarijs
Issuing authority	

Change record

Release	Date	Pages	Description	Editor(s)/Reviewer(s)
1.0	**19/08/2020**	All	Initial version	

TABLE OF CONTENT

1. Summary

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

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

The timeliness of the products in now 17h instead of 9h as there are no quality operators available throughout the weekends and public holidays.

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	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	93	93	0	93

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	256	256	0	256
PROBAV_L1A - Nominal	642	641	1(*)	642
PROBAV_L1C	641	641	0	641
PROBAV_L2A_100M	232	232	0	232
PROBAV_L2A_300M	641	641	0	641
PROBAV_L2A_1KM	641	641	0	641
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

(*) 1 L1A error due to geometric processing

3.3. Backup and archiving service

Product type	Total Files	Total File Size (GB)
TFF	90	261.12
L1A	872	463.47
Database transaction logs	768	37.63
Database incremental back-up	44	15.40
Database full back-up	8	409.96

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

Product type	Total Files	Total File Size (GB)
PROBAV_TRANSFERFRAMES	84	260.34
PROBAV_L1A	802	461.18
PROBAV_L1C	587	804.37
PROBAV_L2A_100M	431	381.58
PROBAV_L2A_300M	1174	203.36
PROBAV_L2A_1KM	1175	26.89
PROBAV_L3_S1_TOA_100M	56	408.22
PROBAV_L3_S1_TOC_100M	56	424.91
PROBAV_L3_S1_TOC_NDVI_100M	56	50.81
PROBAV_L3_S5_TOA_100M	12	346.04
PROBAV_L3_S5_TOC_100M	12	360.50
PROBAV_L3_S5_TOC_NDVI_100M	12	41.60
PROBAV_L3_S1_TOA_300M	56	194.03
PROBAV_L3_S1_TOC_300M	56	201.80
PROBAV_L3_S10_TOC_300M	6	37.17
PROBAV_L3_S10_TOC_NDVI_300M	6	3.25
PROBAV_L3_S1_TOA_1KM	56	26.10
PROBAV_L3_S1_TOC_1KM	56	26.94
PROBAV_L3_S10_TOC_1KM	6	4.98
PROBAV_L3_S10_TOC_NDVI_1KM	6	0.41
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	224	0.28
METEO_METEOSERVICES	224	1.19
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	647	0	0
PROBAV_L2A_100M	363	4	335
PROBAV_L2A_300M	647	0	3
PROBAV_L2A_1KM	647	0	0
PROBAV_L3_S1_TOA_100M	31	91	84
PROBAV_L3_S1_TOC_100M	31	125	360
PROBAV_L3_S1_TOC_NDVI_100M	31	46	80
PROBAV_L3_S5_TOA_100M	6	0	2
PROBAV_L3_S5_TOC_100M	6	0	0
PROBAV_L3_S5_TOC_NDVI_100M	6	113	111
PROBAV_L3_S1_TOA_300M	31	62	62
PROBAV_L3_S1_TOC_300M	31	62	208
PROBAV_L3_S10_TOC_300M	3	6	6
PROBAV_L3_S10_TOC_NDVI_300M	3	3	179
PROBAV_L3_S1_TOA_1KM	31	62	63
PROBAV_L3_S1_TOC_1KM	31	62	147
PROBAV_L3_S10_TOC_1KM	3	6	6
PROBAV_L3_S10_TOC_NDVI_1KM	3	842	1304

Table 6: Ordered and delivered products for this reporting period

3.5. End-user activity

9 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 **1837** with **122** different nationalities representing **1332** different companies/universities.

Product type	Africa	Asia	Europe	N-America	Oceania	S-America
PROBAV_L1C	0	0	0	0	0	0
PROBAV_L2A_100M	0	650.56	5.40	0	0	0
PROBAV_L2A_300M	0	0	0.79	0	0	0
PROBAV_L2A_1KM	0	0	0	0	0	0
PROBAV_L3_S1_TOA_100M	0	0	1370.33	0	0	0
PROBAV_L3_S1_TOC_100M	0	0	1941.88	270.81	0	0
PROBAV_L3_S1_TOC_NDVI_100M	0.63	0	0.32	0	0	0
PROBAV_L3_S5_TOA_100M	0	0.03	0	0	0	0
PROBAV_L3_S5_TOC_100M	0	0	0	0	0	0
PROBAV_L3_S5_TOC_NDVI_100M	0	64.23	0.09	0	0	0
PROBAV_L3_S1_TOA_300M	0	0	184.38	0	0	0
PROBAV_L3_S1_TOC_300M	0.06	0	279.87	121.29	0	0
PROBAV_L3_S10_TOC_300M	0	0	37.01	0	0	0
PROBAV_L3_S10_TOC_NDVI_300M	0	0.11	11.57	0	0	0
PROBAV_L3_S1_TOA_1KM	0	0	27.45	0	0	0
PROBAV_L3_S1_TOC_1KM	0	0	40.68	0	0	0
PROBAV_L3_S10_TOC_1KM	0.57	0	2.57	0	0	0
PROBAV_L3_S10_TOC_NDVI_1KM	0.55	16.91	0.00	0	0	0

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

Product Type	Global
L1C	0
PROBAV_L2A_100M	655.96
PROBAV_L2A_300M	0.79
PROBAV_L2A_1KM	0
PROBAV_L3_S1_TOA_100M	1370.33
PROBAV_L3_S1_TOC_100M	2212.69
PROBAV_L3_S1_TOC_NDVI_100M	0.96
PROBAV_L3_S5_TOA_100M	0.03
PROBAV_L3_S5_TOC_100M	0
PROBAV_L3_S5_TOC_NDVI_100M	64.32
PROBAV_L3_S1_TOA_300M	184.38
PROBAV_L3_S1_TOC_300M	401.22
PROBAV_L3_S10_TOC_300M	37.01
PROBAV_L3_S10_TOC_NDVI_300M	11.68
PROBAV_L3_S1_TOA_1KM	27.45
PROBAV_L3_S1_TOC_1KM	40.68
PROBAV_L3_S10_TOC_1KM	3.15
PROBAV_L3_S10_TOC_NDVI_1KM	17.46

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

Company	# Downloads
BAYERO UNIVERSITY KANO	439
UCLOUVAIN	413
EWHA WOMANS UNIVERSITY	397
KIGAM	329
YUNNAN NORMAL UNIVERSITY	216
JOINT RESEARCH CENTRE	173
ESA	158
VITO	140
DESCARTES UNDERWRITING	123
R&D	114

Table 9: Top 10 user companies for the reporting period

Country	# Users
CHINA	187
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:

Nieuwe index pid_c3s_1 niet zichtbaar in Kibana nieuwe server
Mounts /data/cgl_vol2 + /data/cgl_vol3

4. Image Calibration services

4.1. Radiometric Calibration

Calibration request type	Total	Processed	Not received	Error
CLOUDS	33	29	4	0
DARK CURRENT	19	16	3	0
MOON	2	2	0	0
RAYLEIGH	45	38	5	2
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	254	241	13
PROBA-V_L1B_INTERSECTION	744	473	271
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.

Observed trends are similar as reported in previous months:
An increase in the radiometric calibration results of RED, NIR and SWIR strips is observed which seems to be related to the overall increase in temperature over the mission lifetime.
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 : Left SWIR2 Pixel ID 841 (0-based).

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 one bad pixel will be added Left SWIR2 Pixel ID 841 (0-based).

The current ICP files are

- PROBAV_ICP_RADIOMETRIC#LEFT_20200801_V01
- PROBAV_ICP_RADIOMETRIC#CENTER_20200801_V01
- PROBAV_ICP_RADIOMETRIC#RIGHT_202000801_V01

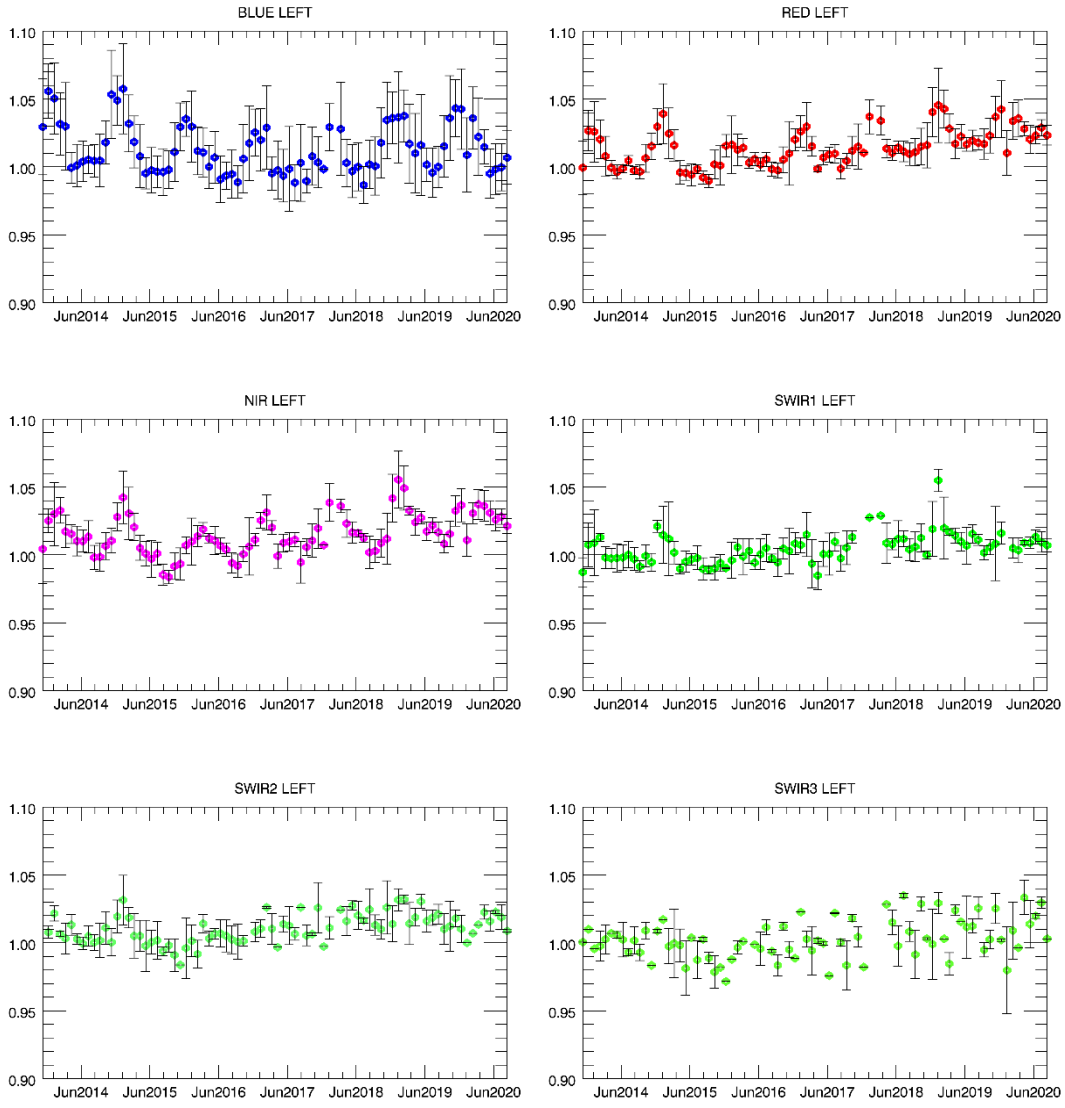

Figure 1. Libya-4 desert calibration results: LEFT monthly averaged results (collection 1)

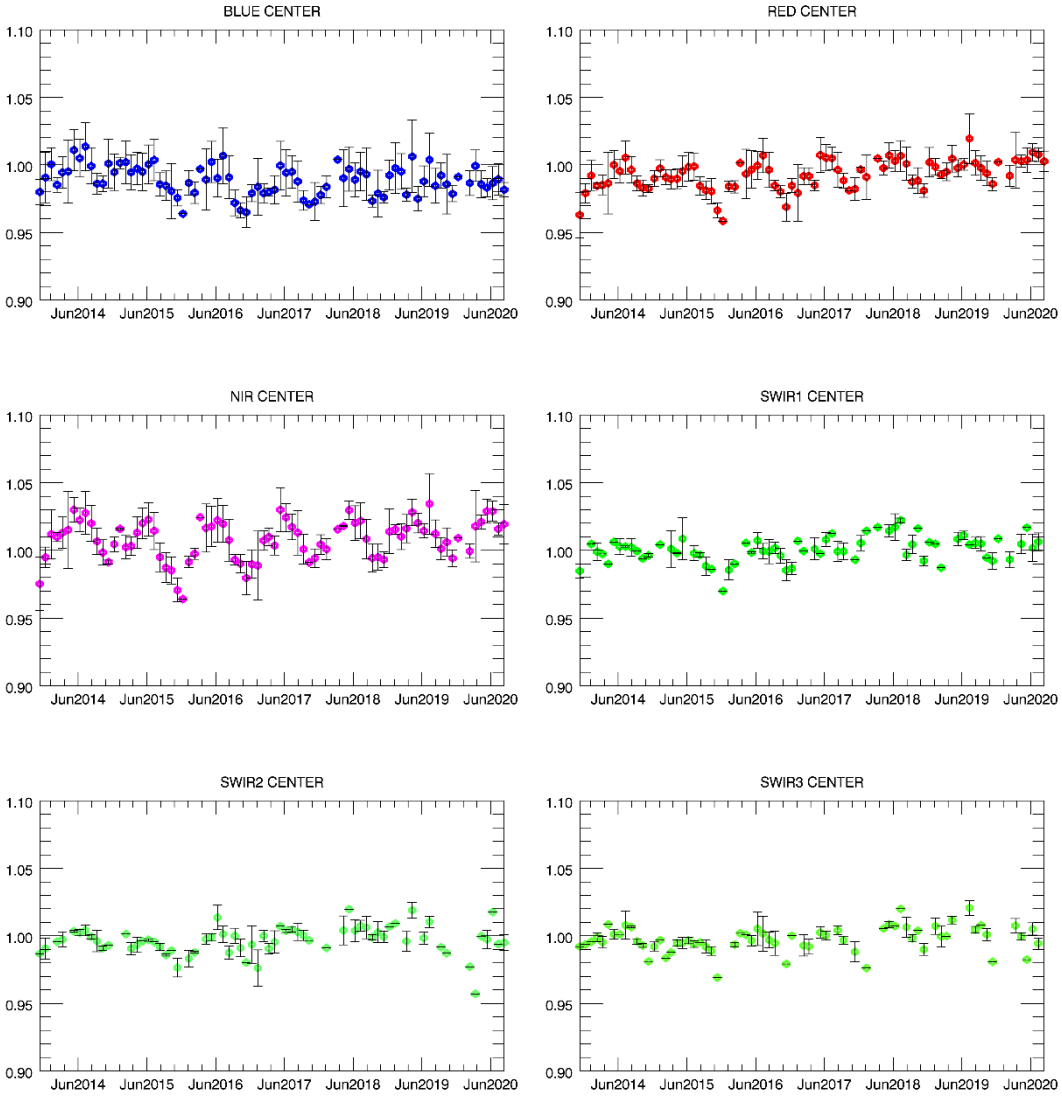

Figure 2. Libya-4 desert calibration results: CENTER monthly averaged results (collection 1)

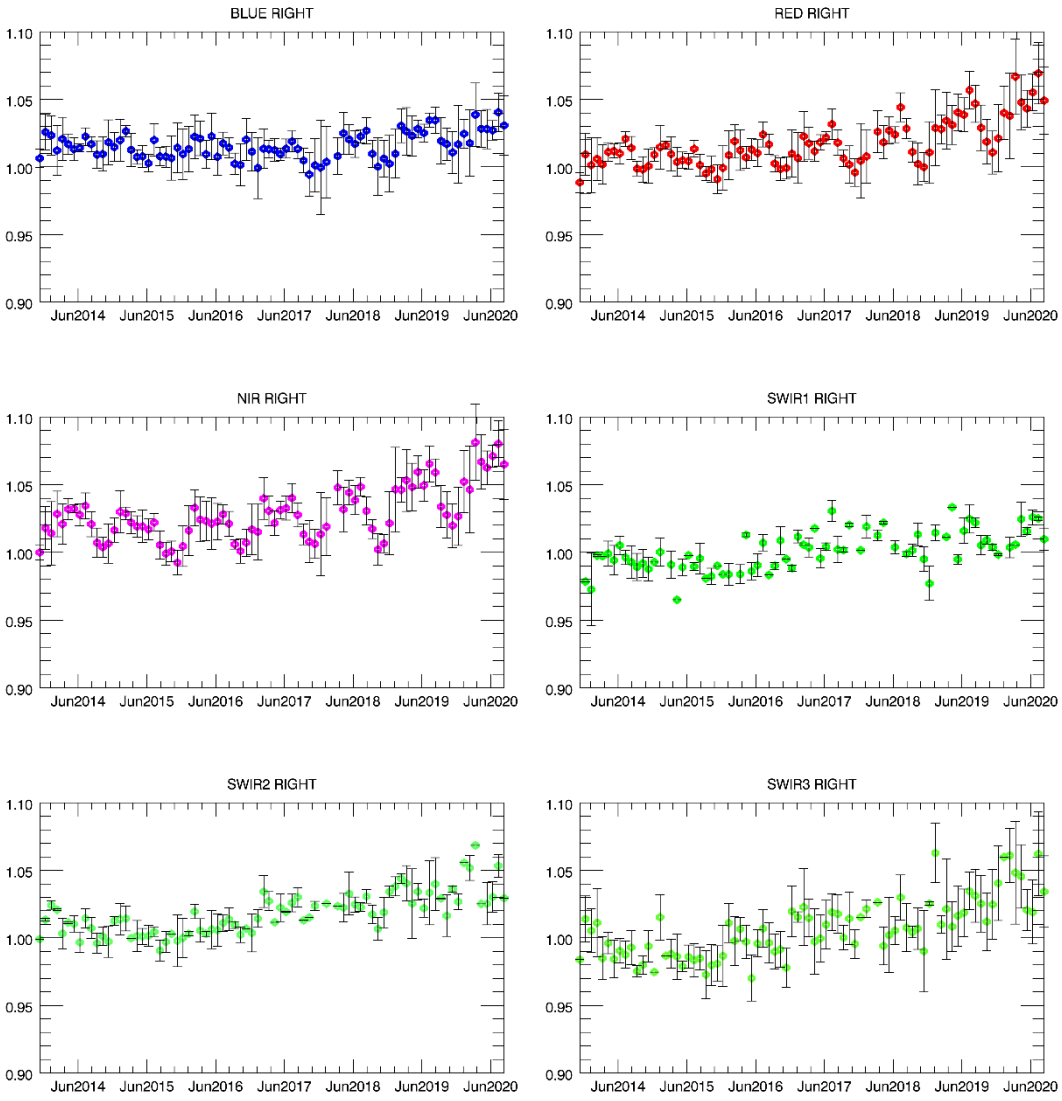

Figure 3. Libya-4 desert calibration results: RIGHT monthly averaged results (collection 1)

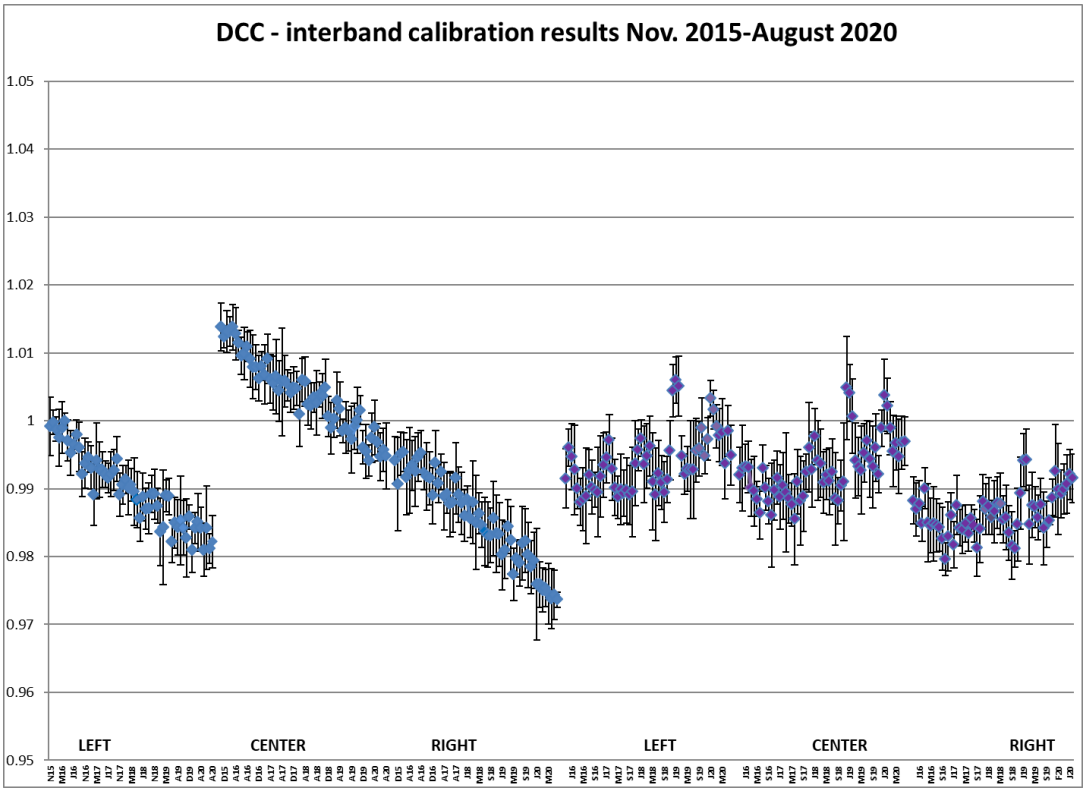

Figure 4. DCC inter-band calibration results: LEFT, CENTER and RIGHT camera (collection 1)

4.2. Geometric Calibration

Calibration image type	Total	Processed	Error
PROBA-V_L1C_INTERSECTION	4227	4227	0

Table13: Processed calibration images for this reporting period

During the period 16/7 – 15/8, the average ALE was < 70 m (σ < 93 m) and the daily ALE evolution in Figure X shows that no major peaks occurred.
The average compliance was 99.20% (98.73% - 99.68% for BLUE – SWIR).

Geometric ICP file

Throughout the month, no large fluctuations were recorded.

- PROBAV_ICP_GEOMETRIC#LEFT_20160907_V01
- PROBAV_ICP_GEOMETRIC#CENTER_20160907_V01
- PROBAV_ICP_GEOMETRIC#RIGHT_20160907_V01

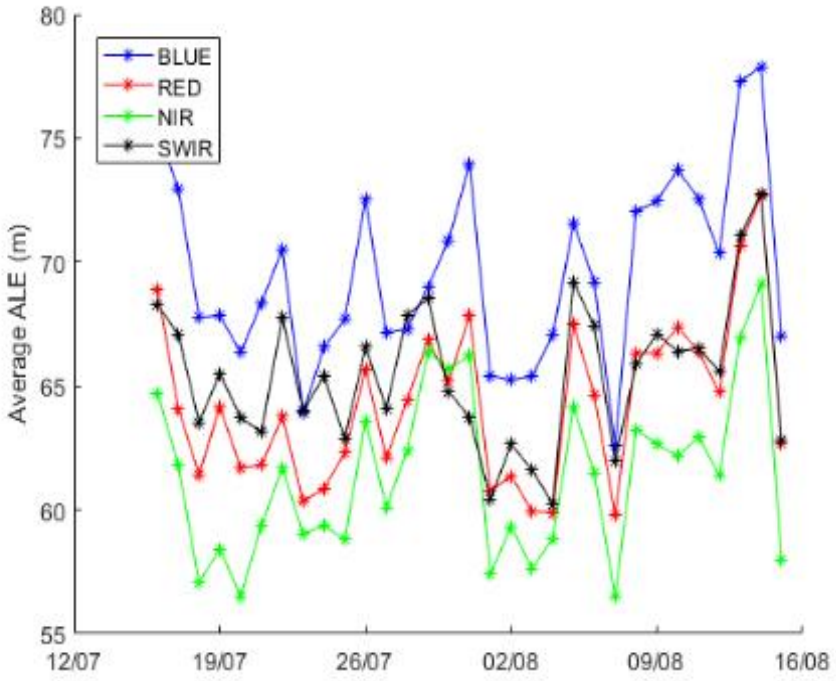

Figure 5: Daily ALE evolution for 16/7 – 15/8/2020.

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
Major Gaps (> 21600 km² (missing TFF))	0	
Large Gaps (< 21600 km²)	0	
Medium Gaps (< 10000 km²)	0	
Minor Gaps (< 3600 km²)	1	19/07
Negligible Gaps (< 1000 km²)	23	24/07, 03/08, 08/08, 29/07, 20/07, 25/07, 14/08, 09/08, 04/08, 21/07, 31/07, 26/07, 05/08, 15/08, 10/08, 27/07, 06/08, 11/08, 17/07, 23/07, 12/08, 07/08, 13/08
Complete synthesis (no gaps)	7	22/07, 01/08, 30/07, 18/07, 28/07, 02/08, 16/07

Table14: Overview of S1 for this reporting period

Synthesis	Missing (*)	Decom. Error	Geom. Error	Missing TFF	Autom. Recovery	VC4 Missing	Create Contours	Other
20200716	65.66%							
20200717	65.97%		2					
20200718	65.94%							
20200719	66.89%				1			
20200720	64.58%	2						
20200721	66.14%	2						
20200722	65.97%							
20200723	66.33%	3						
20200724	65.59%	1	4					
20200725	65.66%		1					
20200726	66.06%	1	5					
20200727	65.92%		1					
20200728	65.93%							
20200729	64.76%		1					
20200730	66.08%							
20200731	66.08%	1						
20200801	66.16%							
20200802	65.62%							
20200803	65.75%	1						
20200804	66.06%		5					
20200805	65.90%	3						
20200806	66.00%		3					
20200807	65.03%	2	3		1		2	
20200808	66.15%		3					
20200809	66.28%		9					
20200810	66.28%							
20200811	65.74%		3					
20200812	65.76%		1					
20200813	66.12%		2					
20200814	65.94%		4					
20200815	66.07%	1	2					

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

(*) Missing % of pixels are still calculated on a global basis. This requires a development and will be corrected in the upcoming reprocessing campaign.

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 1st, 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.