



# MONTHLY OPERATIONS REPORT

**MOR#077**

**Reporting period from 16-Apr-2020 to 15-May-2020**

**Reference: *PROBA-V\_D5\_MOR-077\_05\_v1.0***

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## 1. Summary

Due to the current COVID-19 outbreak, VITO personnel is obliged to work from home at least to June 8, 2020. VITO took the necessary measurements so that the PROBA-V operations are not interrupted and that everything can be followed up from home. Exception on this rule is that we have one system administrator on site to intervene in case of an unplanned downtime. So, service levels can be guaranteed at the time of writing.

In this reporting period, the majority of the synthesis products were nearly complete. There were no missing transfer frame files, but seven automatic recoveries were recorded with impact on end products. The amount of decompression and geometric decreased to nearly zero on some days. However, on 5<sup>th</sup> and 6<sup>th</sup> of May, on-board GPS issues caused quite some data to be unprocessable due to the invalid GPS data. This was corrected on 6<sup>th</sup> of May and the user community was informed on the usual channels.

On a positive note, we celebrated the 7<sup>th</sup> Birthday of PROBA-V by publishing virtual meeting backgrounds. These were well received in the broad community.

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

13 new users registered and the total user community of PROBA-V surpassed 1800 users since this reporting period.

Tests were executed on a new cloud masking algorithm in development environment in preparation for 'Collection 2' of the data. Furthermore, a new A/C algorithm is also being prepared for further integration into the PROBA-V workflows.

## 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	240	240	0	240
TFF	299	299	0	299

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	209	206	3 <sup>(*)</sup>	206
PROBAV_L1A - Nominal	2561	2495	66 <sup>(**)</sup>	2498
PROBAV_L1C	2495	2495	0	2495
PROBAV_L2A_100M	881	881	0	881
PROBAV_L2A_300M	2495	2495	0	2495
PROBAV_L2A_1KM	2495	2495	0	2495
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

<sup>(\*)</sup> 3 \* L1A error due geometric error;

<sup>(\*\*)</sup> 66 \* due generate L1A error due to GPS issues on 5-6<sup>th</sup> of May.

### 3.3. Backup and archiving service

Product type	Total Files	Total File Size (GB)
TFF	290	761.97
L1A	2617	1301.62
Database transaction logs	768	68.35
Database incremental back-up	41	10.3
Database full back-up	9	595.87

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

Product type	Total Files	Total File Size (GB)
PROBAV_TRANSFERFRAMES	278	786.09
PROBAV_L1A	2493	1341.19
PROBAV_L1C	2304	2634.04
PROBAV_L2A_100M	1650	1419.30
PROBAV_L2A_300M	4609	740.23
PROBAV_L2A_1KM	4609	98.32
PROBAV_L3_S1_TOA_100M	56	1514.21
PROBAV_L3_S1_TOC_100M	56	1556.86
PROBAV_L3_S1_TOC_NDVI_100M	56	173.19
PROBAV_L3_S5_TOA_100M	12	1226.44
PROBAV_L3_S5_TOC_100M	12	1267.91
PROBAV_L3_S5_TOC_NDVI_100M	12	135.97
PROBAV_L3_S1_TOA_300M	56	662.18
PROBAV_L3_S1_TOC_300M	56	683.40
PROBAV_L3_S10_TOC_300M	6	125.73
PROBAV_L3_S10_TOC_NDVI_300M	6	10.61
PROBAV_L3_S1_TOA_1KM	56	88.95
PROBAV_L3_S1_TOC_1KM	56	91.29
PROBAV_L3_S10_TOC_1KM	6	16.86
PROBAV_L3_S10_TOC_NDVI_1KM	6	1.32
ICP_GEOMETRIC_CENTRE	0	0
ICP_GEOMETRIC_LEFT	0	0
ICP_GEOMETRIC_RIGHT	0	0
ICP_RADIOMETRIC_CENTRE	2	0.08
ICP_RADIOMETRIC_LEFT	2	0.08
ICP_RADIOMETRIC_RIGHT	2	0.08
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	2493	6	135
PROBAV_L2A_100M	866	0	1
PROBAV_L2A_300M	2487	0	1
PROBAV_L2A_1KM	2487	0	1
PROBAV_L3_S1_TOA_100M	30	121	92
PROBAV_L3_S1_TOC_100M	30	157	889
PROBAV_L3_S1_TOC_NDVI_100M	30	0	0
PROBAV_L3_S5_TOA_100M	6	0	4
PROBAV_L3_S5_TOC_100M	6	66	66
PROBAV_L3_S5_TOC_NDVI_100M	6	578	1099
PROBAV_L3_S1_TOA_300M	30	60	61
PROBAV_L3_S1_TOC_300M	30	68	161
PROBAV_L3_S10_TOC_300M	3	16	18
PROBAV_L3_S10_TOC_NDVI_300M	3	48	87
PROBAV_L3_S1_TOA_1KM	30	1526	1519
PROBAV_L3_S1_TOC_1KM	30	1526	1554
PROBAV_L3_S10_TOC_1KM	3	81	82
PROBAV_L3_S10_TOC_NDVI_1KM	3	270	394

Table 6: Ordered and delivered products for this reporting period

### 3.5. End-user activity

13 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 **1801** with **121** different nationalities representing **1307** different companies/universities.

Product type	Africa	Asia	Europe	N-America	Oceania	S-America
PROBAV_L1C	0	154.28	17.19	0	0	0
PROBAV_L2A_100M	0	0	1.03	0	0	0
PROBAV_L2A_300M	0	0.26	0	0	0	0
PROBAV_L2A_1KM	0	0	0	0	0	0
PROBAV_L3_S1_TOA_100M	0	0	1283.83	0	0	0
PROBAV_L3_S1_TOC_100M	0	0	3545.70	727.16	0.03	0
PROBAV_L3_S1_TOC_NDVI_100M	0	0	0	0	0	0
PROBAV_L3_S5_TOA_100M	0.00	0	0.03	0	0	0
PROBAV_L3_S5_TOC_100M	8.71	0	0.07	0	44.94	0
PROBAV_L3_S5_TOC_NDVI_100M	139.39	63.87	0.14	0	0	17.08
PROBAV_L3_S1_TOA_300M	0	0	613.67	0	0	0
PROBAV_L3_S1_TOC_300M	0	0.05	671.02	337.72	0	0
PROBAV_L3_S10_TOC_300M	0.68	0	127.53	0.22	0	0
PROBAV_L3_S10_TOC_NDVI_300M	11.28	0.29	3.52	1.67	0	0.03
PROBAV_L3_S1_TOA_1KM	0	28.01	90.52	0	0	0
PROBAV_L3_S1_TOC_1KM	0	28.81	130.22	0	0	0.01
PROBAV_L3_S10_TOC_1KM	0	0.65	16.21	5.93	0	0
PROBAV_L3_S10_TOC_NDVI_1KM	0.13	4.32	0.20	0	0	0.01

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





Product Type	Global
L1C	171.47
PROBAV_L2A_100M	1.03
PROBAV_L2A_300M	0.26
PROBAV_L2A_1KM	0
PROBAV_L3_S1_TOA_100M	1283.83
PROBAV_L3_S1_TOC_100M	4272.89
PROBAV_L3_S1_TOC_NDVI_100M	0
PROBAV_L3_S5_TOA_100M	0.03
PROBAV_L3_S5_TOC_100M	53.71
PROBAV_L3_S5_TOC_NDVI_100M	220.48
PROBAV_L3_S1_TOA_300M	613.67
PROBAV_L3_S1_TOC_300M	1008.80
PROBAV_L3_S10_TOC_300M	128.42
PROBAV_L3_S10_TOC_NDVI_300M	16.78
PROBAV_L3_S1_TOA_1KM	118.53
PROBAV_L3_S1_TOC_1KM	159.04
PROBAV_L3_S10_TOC_1KM	22.78
PROBAV_L3_S10_TOC_NDVI_1KM	4.66

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

Company	# Downloads
LIAONING TECHNICAL UNIVERSITY,	2988
VISIOTERRA	587
FST	509
GADJAH MADA UNIVERSITY	224
VITO	223
FACULTAD DE AGRONOMIA	208
R&D	171
DESCARTES UNDERWRITING	160
ESA	153
JKUAT	144

Table 9: Top 10 user companies for the reporting period

Country	# Users
CHINA	183
BELGIUM	158
FRANCE	86
INDIA	84
BRAZIL	81
UNITED STATES	80
ITALY	76
NETHERLANDS	61
UNITED KINGDOM	60
GERMANY	57

Table 10: Top 10 countries with most registered users

**List of issues raised by users:**

task hanging  
vm freezing again  
Welcome to PROBA-V Mission Exploitation Platform Joris Blommaert  
running on mep\_c3s queue  
Memory use of MEP cluster  
job history weg na 1 dag  
Kibana dashboards  
Jupyter Notebook Copernicus  
[VITO RS] Re: application FAILED ( Futures timed out)  
jobs hangen  
my VM session being terminated  
PDF: (API) - Antoine DENIS - 2020/4/29 - PROBA-V Mission Exploitation Platform - URGENT  
time series viewer not working  
Spark memlogger  
Your submission to the PROBA-V helpdesk  
logfiles verdwenen op Hadoop portal  
connectie naar MEP weg  
many jobs failing without rising error  
issues with hanging processes in the Yarn/Hadoop system  
my pycharm professional does not open anymore

## 4. Image Calibration services

### 4.1. Radiometric Calibration

Calibration request type	Total	Processed	Not received	Error
CLOUDS	16	16	0	0
DARK CURRENT	16	16	0	0
MOON	2	2	0	0
RAYLEIGH	43	42	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	204	184	15
PROBA-V_L1B_INTERSECTION	761	430	331
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.

Similarly as reported in previous months a relatively strong positive trend is observed in the Libya-4 results of all strips of the RIGHT camera since roughly a year. The trend is a bit less pronounced in the BLUE band which causes also a clear trend in the BLUE DCC interband calibration results which are expressed relatively to the RED band.

At the moment this increasing trend is not taking into account in the ICP files. It is being investigated how to correct for it in the next reprocessing .

No new bad pixels were identified.

#### **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.

The current ICP files are:

- PROBAV\_ICP\_RADIOMETRIC#LEFT\_20200502\_V01
- PROBAV\_ICP\_RADIOMETRIC#CENTER\_20200502\_V01
- PROBAV\_ICP\_RADIOMETRIC#RIGHT\_20200502\_V01

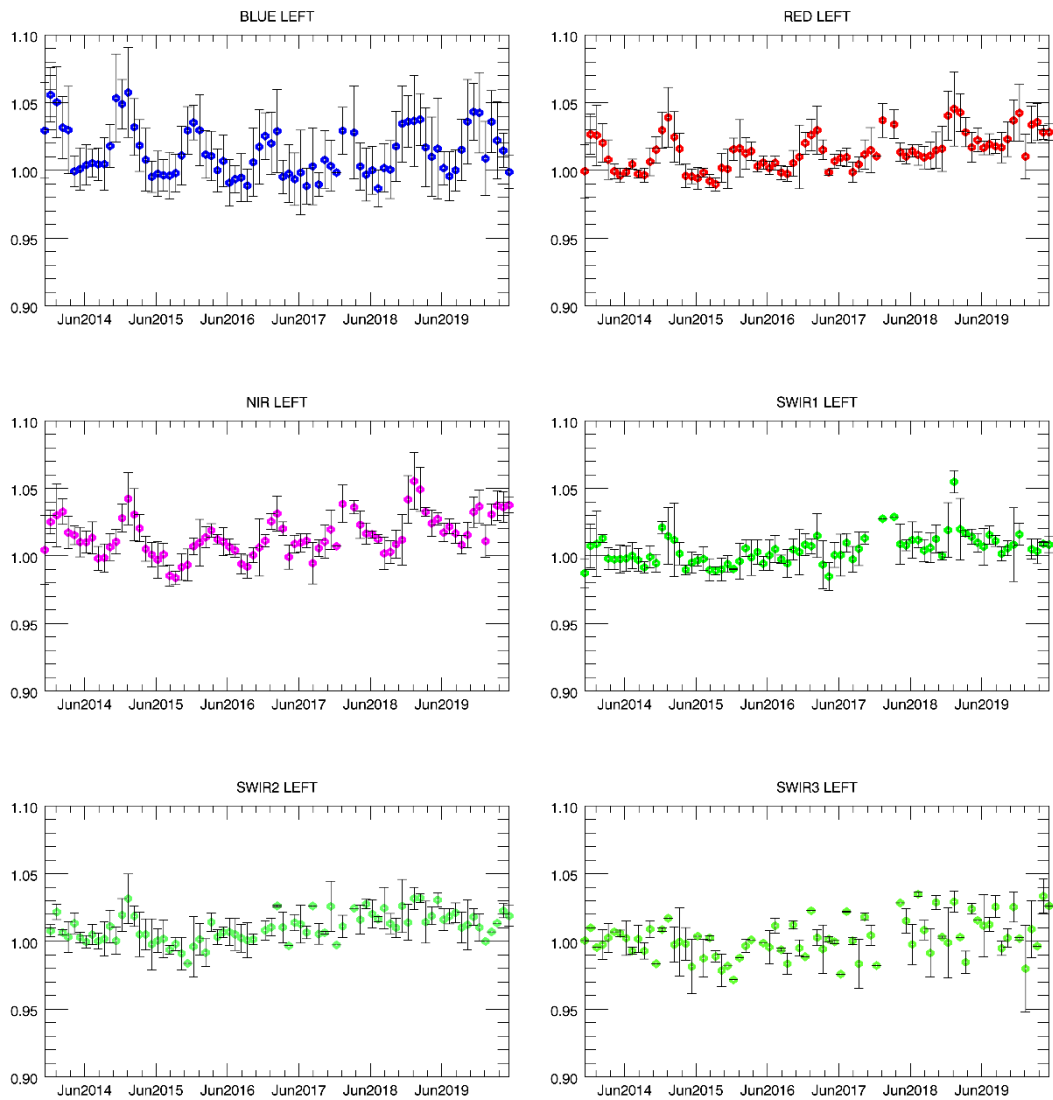


Figure 1. Libya-4 desert calibration results: LEFT monthly averaged results (collection 1)

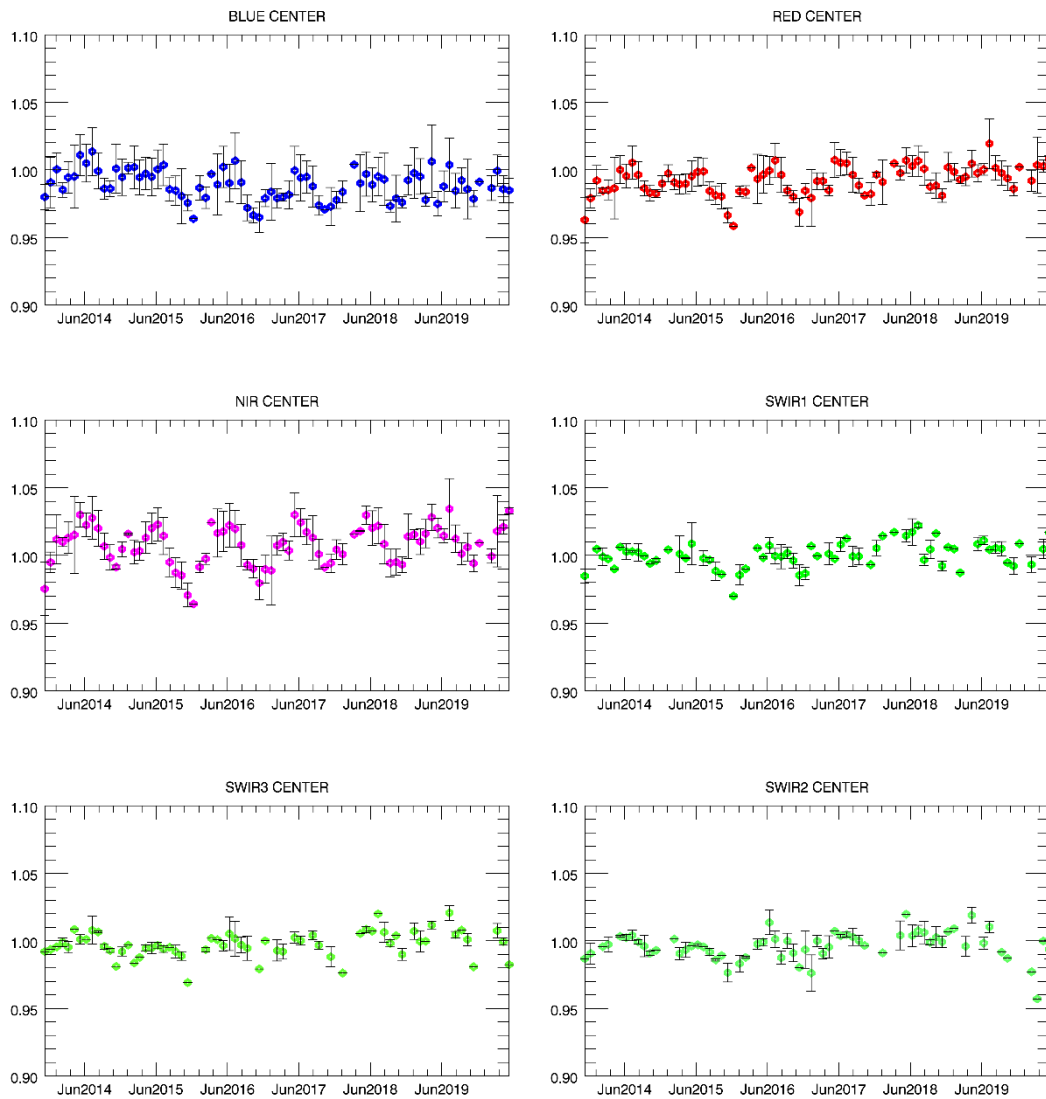


Figure 2. Libya-4 desert calibration results: CENTER monthly averaged results (collection 1)

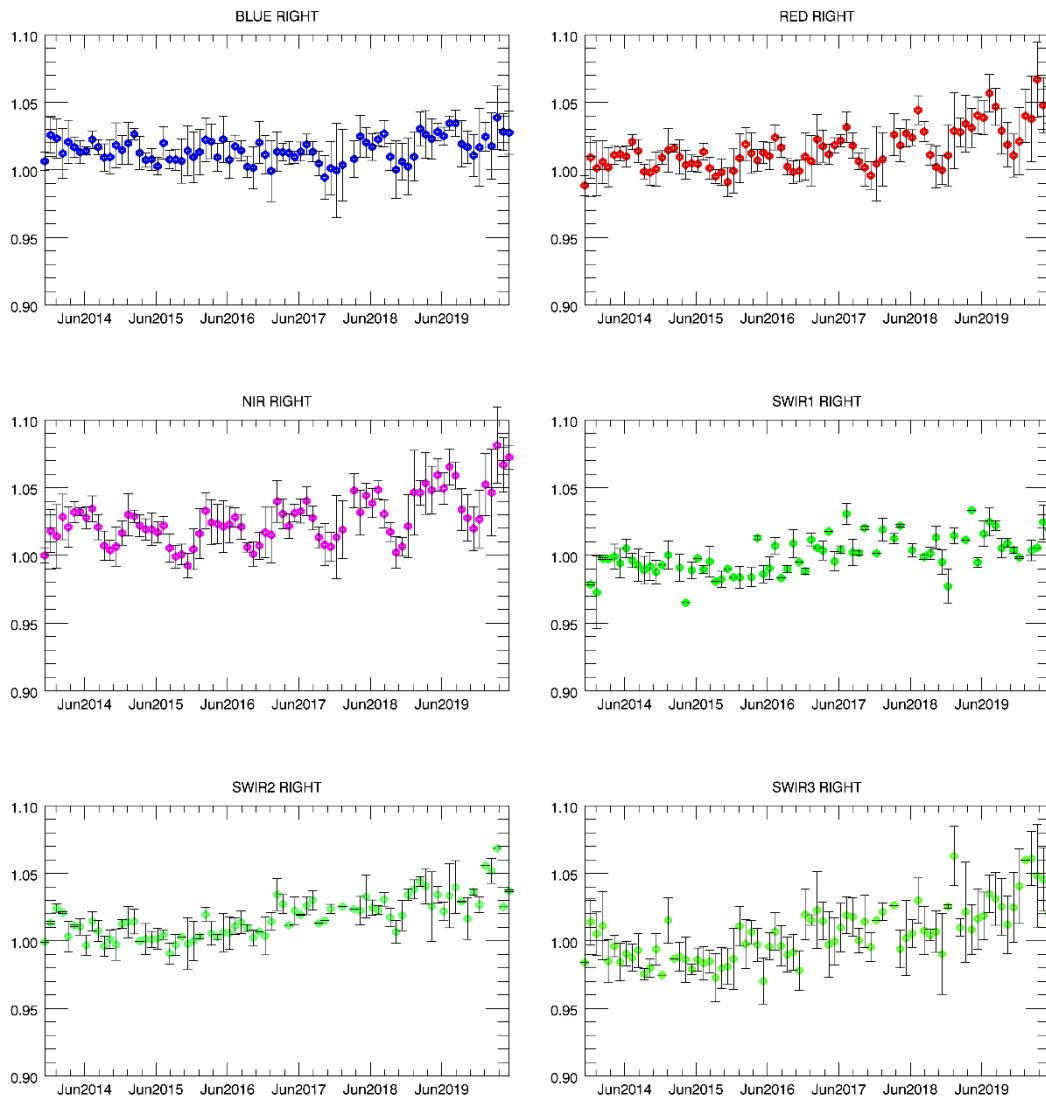


Figure 3. Libya-4 desert calibration results: RIGHT monthly averaged results (collection 1)

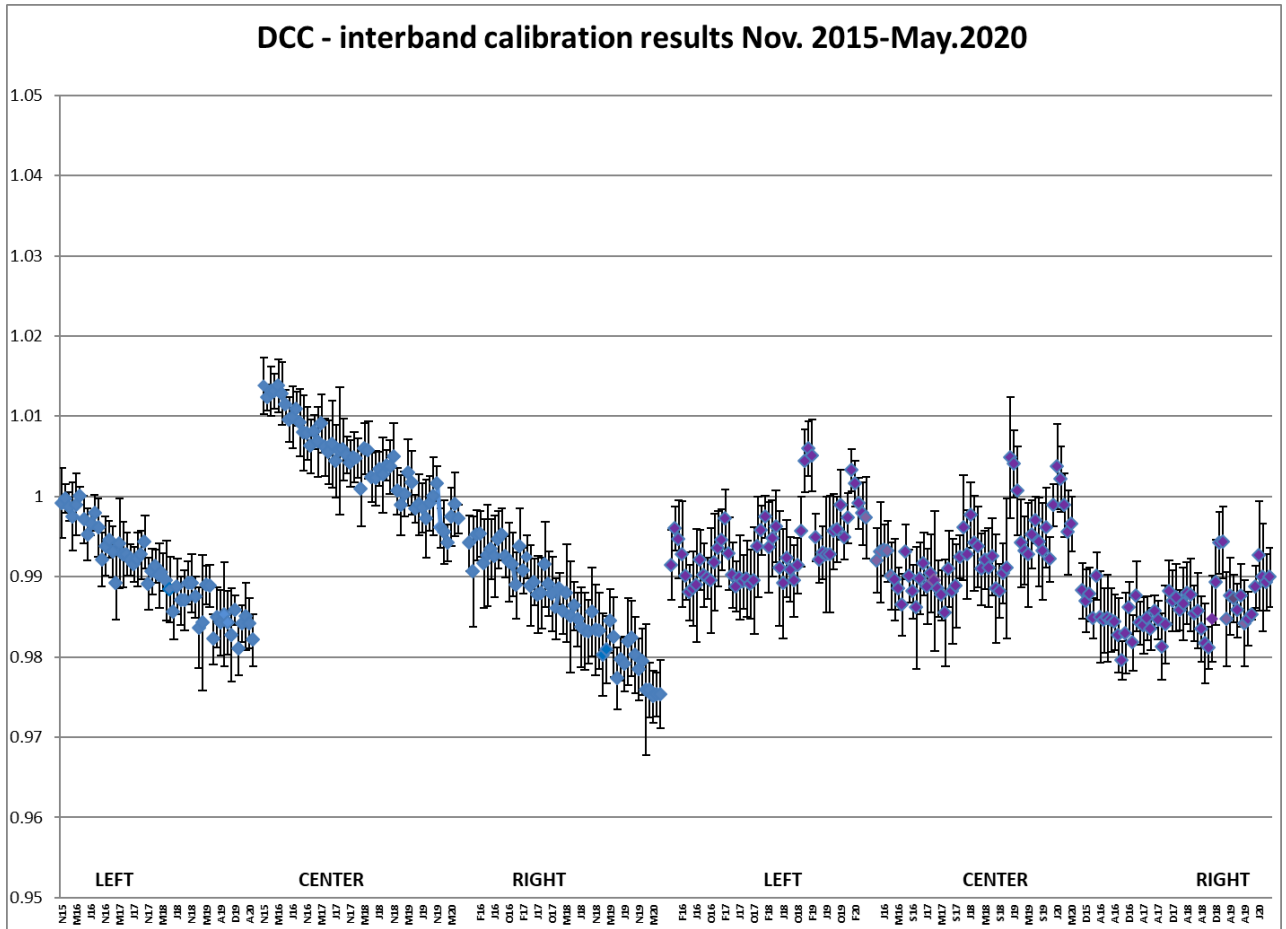


Figure 4. DCC inter-band calibration results: LEFT, CENTER and RIGHT camera (collection 1)

## 4.2. Geometric Calibration

Calibration image type	Total	Processed	Error
PROBA-V_L1C_INTERSECTION	13419	13419	0

Table13: Processed calibration images for this reporting period

### Geometric ICP file

During the reporting period, the average ALE was < 69 m ( $\sigma < 93$  m). The highest values occurred on 19/4 (69 – 78 m) and 7-8/5 (71 – 76 m).

The average compliance was 99.33% (98.92% - 99.72% for BLUE - SWIR), with no distinct minimum values.

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

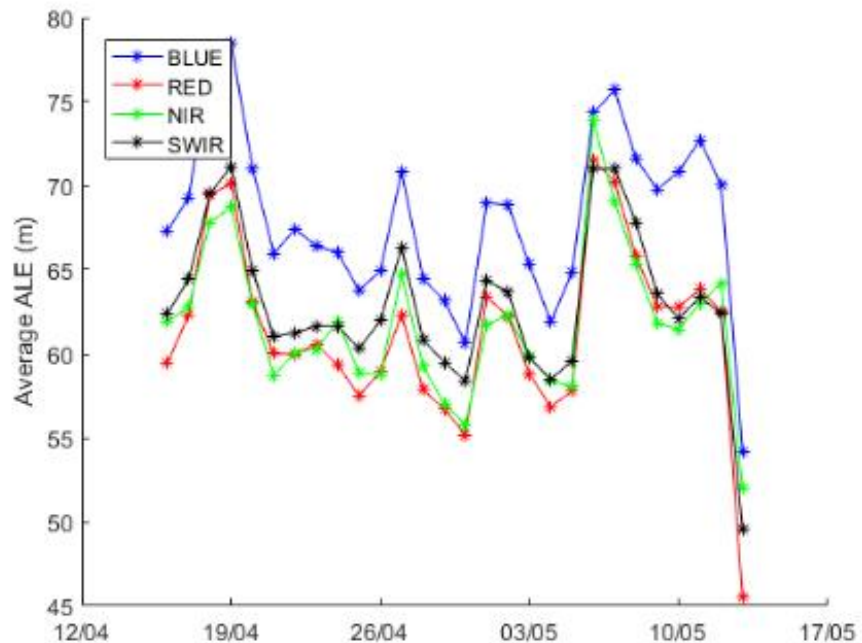


Figure 5 - Daily ALE evolution over the period 16/4 – 15/5/2020.



## 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-63</a>	Cloud shadow detection at high solar zenith angles not working properly	Open	11/05/2016	Software
<a href="#">PROBAVUS-65</a>	Processing statuses L2 products	In Progress	16/09/2016	Software
<a href="#">PROBAVUS-66</a>	Cloud cover percentages on PDF products are not reliable	Resolved	19/10/2016	Software
<a href="#">PROBAVUS-68</a>	ICP file version not taken into account when processing	In Progress	20/03/2017	Software
<a href="#">PROBAVUS-69</a>	Version number of segment not filtered when querying for syntheses	Open	20/03/2017	Software
<a href="#">PROBAVUS-70</a>	Investigate L2A artefact in data	Open	31/05/2017	Software
<a href="#">PROBAVUS-72</a>	Status mask of data with decompression error is not correctly set	Open	22/06/2017	Software
<a href="#">PROBAVUS-75</a>	Clear pixel edge in cloud shadow detection	Open	15/11/2017	Software

- 0 new issues were logged during this reporting period
- 0 issues were resolved and closed during this reporting period
- 1 issue is resolved but remain to be closed formally
- 1 issue is resolved but remain in the list logging purposes
- 7 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
<b>Major Gaps (&gt; 21600 km<sup>2</sup> (missing TFF))</b>	2	05/05, 06/05
<b>Large Gaps (&lt; 21600 km<sup>2</sup>)</b>	1	17/04
<b>Medium Gaps (&lt; 10000 km<sup>2</sup>)</b>	2	07/05, 01/05
<b>Minor Gaps (&lt; 3600 km<sup>2</sup>)</b>	6	22/04, 10/05, 03/05, 16/04, 21/04, 14/05
<b>Negligible Gaps (&lt; 1000 km<sup>2</sup>)</b>	17	15/05, 25/04, 20/04, 30/04, 11/05, 26/04, 27/04, 02/05, 12/05, 23/04, 28/04, 18/04, 08/05, 04/05, 29/04, 19/04, 24/04
<b>Complete synthesis (no gaps)</b>	2	13/05, 09/05

Table14: Overview of S1 for this reporting period

Synthesis	Missing	Decom. Error	Geom. Error	Missing TFF	Autom. Recovery	VC4 Missing	Create Contours	Other
20200416	1.18%	3	4		1			
20200417	8.67%	12	14		1	1	1	
20200418	0.03%		5					
20200419	0.05%	1	10					
20200420	0.64%	3	14				3	
20200421	1.21%	4	14		1			
20200422	0.25%	4	8			1		
20200423	0.04%	4	9					
20200424	0.62%	3	6					
20200425	0.20%		13					
20200426	0.45%	2	14			1		
20200427	0.11%	3	14					
20200428	0.05%	1	11					
20200429	0.65%	2	6					
20200430	0.00%	1						
20200501	0.30%	4	4		1			
20200502	0.01%	1	1					
20200503	0.29%		2					
20200504	0.16%	4						
20200505	13.88%							3
20200506	57.09%		2					2
20200507	7.91%	2	1		1		2	1
20200508	0.71%	4						
20200509	0.00%							
20200510	0.50%	4	8		1	1		
20200511	0.03%	4						1
20200512	0.31%	5						
20200513	0.36%							
20200514	1.19%	2	3		1			
20200515	0.01%	2						

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:  
Tests in acceptance environment are ongoing related to the new cloud masking algorithm on different resolutions. In parallel, preparation for an integration of a new A/C module is ongoing.
- No other activities scheduled.

## 7. Operational remarks

Due to the current CIVID-19 outbreak, VITO personnel is obliged to work from home at least to June 8, 2020. VITO took the necessary measurements so that the PROBA-V operations are not interrupted and that everything can be followed up from home. Exception on this rule is that we have one system administrator on site to intervene in case of an unplanned downtime. So, service levels can be guaranteed at the time of writing.