



# MONTHLY OPERATIONS REPORT

**MOR#085**

**Reporting period from 16-Dec-2020 to 15-Jan-2021**

**Reference: *PROBA-V\_D5\_MOR-085\_1\_v1.0***

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## DOCUMENT CONTROL

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## TABLE OF CONTENT

1. Summary.....	4
2. System Infrastructure.....	4
3. Image Processing Services .....	5
3.1. Ingested and archived products .....	5
3.2. Generated and archived products .....	5
3.3. Backup and archiving service .....	6
3.4. Dissemination service .....	8
3.5. End-user activity .....	9
4. Image Calibration services.....	12
4.1. Radiometric Calibration .....	12
4.2. Geometric Calibration .....	17
5. Anomalies .....	18
5.1. Image processing issues .....	18
6. Scheduled activities for the next period(s) .....	20
7. Operational remarks .....	20

## 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.

In this reporting period, all of the synthesis products were nearly complete. No missing transfer frame files were missing, and no automatic recoveries were recorded with impact on the products. The amount of decompression errors and geometric errors remained at a low acceptable level.

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

The timeliness of the products is now on average 17h instead of 9h as there are no quality operators available throughout the weekends and public holidays. 15 new users registered and downloaded data in this period.

Preparation of the development of collection 2 workflows are further implemented, with main focus on the new A/C algorithm and preparation of the new reprocessing environment and conversion to Cloud Optimized GeoTIFF.

## 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	290	236	54 <sup>(*)</sup>	290
PROBAV_L1A - Nominal	518	518	0	518
PROBAV_L1C	518	518	0	518
PROBAV_L2A_100M	167	167	0	167
PROBAV_L2A_300M	518	518	0	518
PROBAV_L2A_1KM	518	518	0	518
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

(\*) 54 L1A error due geometric processing in dark current scenes

### 3.3. Backup and archiving service

Product type	Total Files	Total File Size (GB)
TFF	90	247.87
L1A	775	441.4
Database transaction logs	768	36.79
Database incremental back-up	44	11.24
Database full back-up	8	430.22

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

Product type	Total Files	Total File Size (GB)
PROBAV_TRANSFERFRAMES	87	256.86
PROBAV_L1A	746	456.91
PROBAV_L1C	486	780.72
PROBAV_L2A_100M	327	323.54
PROBAV_L2A_300M	971	186.52
PROBAV_L2A_1KM	972	24.40
PROBAV_L3_S1_TOA_100M	58	344.45
PROBAV_L3_S1_TOC_100M	58	302.95
PROBAV_L3_S1_TOC_NDVI_100M	58	35.63
PROBAV_L3_S5_TOA_100M	12	306.83
PROBAV_L3_S5_TOC_100M	12	281.27
PROBAV_L3_S5_TOC_NDVI_100M	12	32.00
PROBAV_L3_S1_TOA_300M	58	181.40
PROBAV_L3_S1_TOC_300M	58	169.04
PROBAV_L3_S10_TOC_300M	6	31.51
PROBAV_L3_S10_TOC_NDVI_300M	6	2.68
PROBAV_L3_S1_TOA_1KM	58	23.94
PROBAV_L3_S1_TOC_1KM	58	22.50
PROBAV_L3_S10_TOC_1KM	6	4.12
PROBAV_L3_S10_TOC_NDVI_1KM	6	0.33
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	232	0.29
METEO_METEOSERVICES	232	1.24
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	521	6	8
PROBAV_L2A_100M	157	0	1
PROBAV_L2A_300M	521	1	7
PROBAV_L2A_1KM	521	0	0
PROBAV_L3_S1_TOA_100M	31	79	87
PROBAV_L3_S1_TOC_100M	31	500	455
PROBAV_L3_S1_TOC_NDVI_100M	31	573	371
PROBAV_L3_S5_TOA_100M	6	0	5
PROBAV_L3_S5_TOC_100M	6	17	25
PROBAV_L3_S5_TOC_NDVI_100M	6	405	421
PROBAV_L3_S1_TOA_300M	31	182	189
PROBAV_L3_S1_TOC_300M	31	44	149
PROBAV_L3_S10_TOC_300M	3	39	42
PROBAV_L3_S10_TOC_NDVI_300M	3	230	869
PROBAV_L3_S1_TOA_1KM	31	44	45
PROBAV_L3_S1_TOC_1KM	31	44	92
PROBAV_L3_S10_TOC_1KM	3	6	6
PROBAV_L3_S10_TOC_NDVI_1KM	3	120	204

Table 6: Ordered and delivered products for this reporting period



### 3.5. End-user activity

15 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 **1897** with **122** different nationalities representing **1376** different companies/universities.

Product type	Africa	Asia	Europe	N-America	Oceania	S-America
PROBAV_L1C	1.45	0.88	12.85	0	0	0
PROBAV_L2A_100M	0	2.10	0	0	0	0
PROBAV_L2A_300M	0	0	1.84	0	0	0
PROBAV_L2A_1KM	0	0	0	0	0	0
PROBAV_L3_S1_TOA_100M	0.89	26.33	1351.03	0	0	0
PROBAV_L3_S1_TOC_100M	0.18	17.03	1825.75	141.36	0	0
PROBAV_L3_S1_TOC_NDVI_100M	0	4.91	0.10	0	0	0
PROBAV_L3_S5_TOA_100M	4.11	19.63	0	0	0	0
PROBAV_L3_S5_TOC_100M	24.48	4.02	0.39	0	0	0
PROBAV_L3_S5_TOC_NDVI_100M	0	2.59	2555.03	0	0	0
PROBAV_L3_S1_TOA_300M	0	0	118.80	0	0	1432.80
PROBAV_L3_S1_TOC_300M	0	0	244.79	79.83	0	0
PROBAV_L3_S10_TOC_300M	2.71	0	23.96	0	0	0
PROBAV_L3_S10_TOC_NDVI_300M	0	0	387.27	0	0	0
PROBAV_L3_S1_TOA_1KM	0	0	17.18	0	0	0
PROBAV_L3_S1_TOC_1KM	0	0	25.45	0	0	0
PROBAV_L3_S10_TOC_1KM	0.62	0	2.16	0	0	0
PROBAV_L3_S10_TOC_NDVI_1KM	0.16	1.55	0	0	0	0

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



Product Type	Global
L1C	15.18
PROBAV_L2A_100M	2.10
PROBAV_L2A_300M	1.84
PROBAV_L2A_1KM	0
PROBAV_L3_S1_TOA_100M	1378.25
PROBAV_L3_S1_TOC_100M	1984.33
PROBAV_L3_S1_TOC_NDVI_100M	5.01
PROBAV_L3_S5_TOA_100M	23.74
PROBAV_L3_S5_TOC_100M	28.90
PROBAV_L3_S5_TOC_NDVI_100M	2557.63
PROBAV_L3_S1_TOA_300M	1551.61
PROBAV_L3_S1_TOC_300M	324.63
PROBAV_L3_S10_TOC_300M	26.67
PROBAV_L3_S10_TOC_NDVI_300M	387.27
PROBAV_L3_S1_TOA_1KM	17.18
PROBAV_L3_S1_TOC_1KM	25.45
PROBAV_L3_S10_TOC_1KM	2.78
PROBAV_L3_S10_TOC_NDVI_1KM	1.71

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

Company	# Downloads
JOINT RESEARCH CENTRE	635
OPENGEOHUB	550
AGRICULTURE MINISTRY OF INDONESIA	527
UCLOUVAIN	178
VITO	140
HZU	138
ICMBIO	137
DESCARTES UNDERWRITING	123
GRONINGEN UNIVERSITY	83
NANJING UNIVERSITY	78

Table 9: Top 10 user companies for the reporting period

Country	# Users
ITALY	706
NETHERLANDS	550
INDONESIA	527
BELGIUM	318
CHINA	216
FRANCE	153
BRAZIL	137
KENYA	83
INDIA	72
UNITED STATES	62

Table 10: Top 10 countries with most registered users

**List of issues raised by users:**

- PDF: N.A. - caglar - 2020/11/19 - Helping
- Fortran compiler op virtual machine

## 4. Image Calibration services

### 4.1. Radiometric Calibration

Calibration request type	Total	Processed	Not received	Error
CLOUDS	38	30	8	0
DARK CURRENT *	18	0	0	18
MOON	11	11	0	0
RAYLEIGH	57	45	12	0
SNOW	0	0	0	0
SUN_GLINT	0	0	0	0

Table 11: Calibration Image requests for this reporting period

(\*) Delay due to geometric error

Calibration image type	Total	Valid	Invalid
PROBA_V_L1A_CALIBRATION	11	11	0
PROBA-V_L1B_CALIBRATION	225	91	134
PROBA-V_L1B_INTERSECTION	743	284	459
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.

There was a delay in the generation of the ICP file for January 2021 due to a geometric error in processing of dark current scenes. This issue has been solved now.

Almost all DCC scenes (except 1 scene) acquired in January 2021 failed during processing in the IQC. The cause of this failure is under investigation.

2 new band pixels were identified:

The ICP file for January seems not be updated for the bad pixel identified in previous report (ie. RIGHT SWIR1 strip Pixel ID 496). This will be corrected for in the next update

**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 3 bad pixels will be added (ie. pixel ID496 in the Right SWIR1 strip , LEFT SWIR1 strip Pixel ID 877 ,CENTER SWIR2 strip Pixel ID 121)

The current ICP files are:

- PROBAV\_ICP\_RADIOMETRIC#LEFT\_20210112\_V01
- PROBAV\_ICP\_RADIOMETRIC#CENTER\_20210112\_V01
- PROBAV\_ICP\_RADIOMETRIC#RIGHT\_20210112\_V01

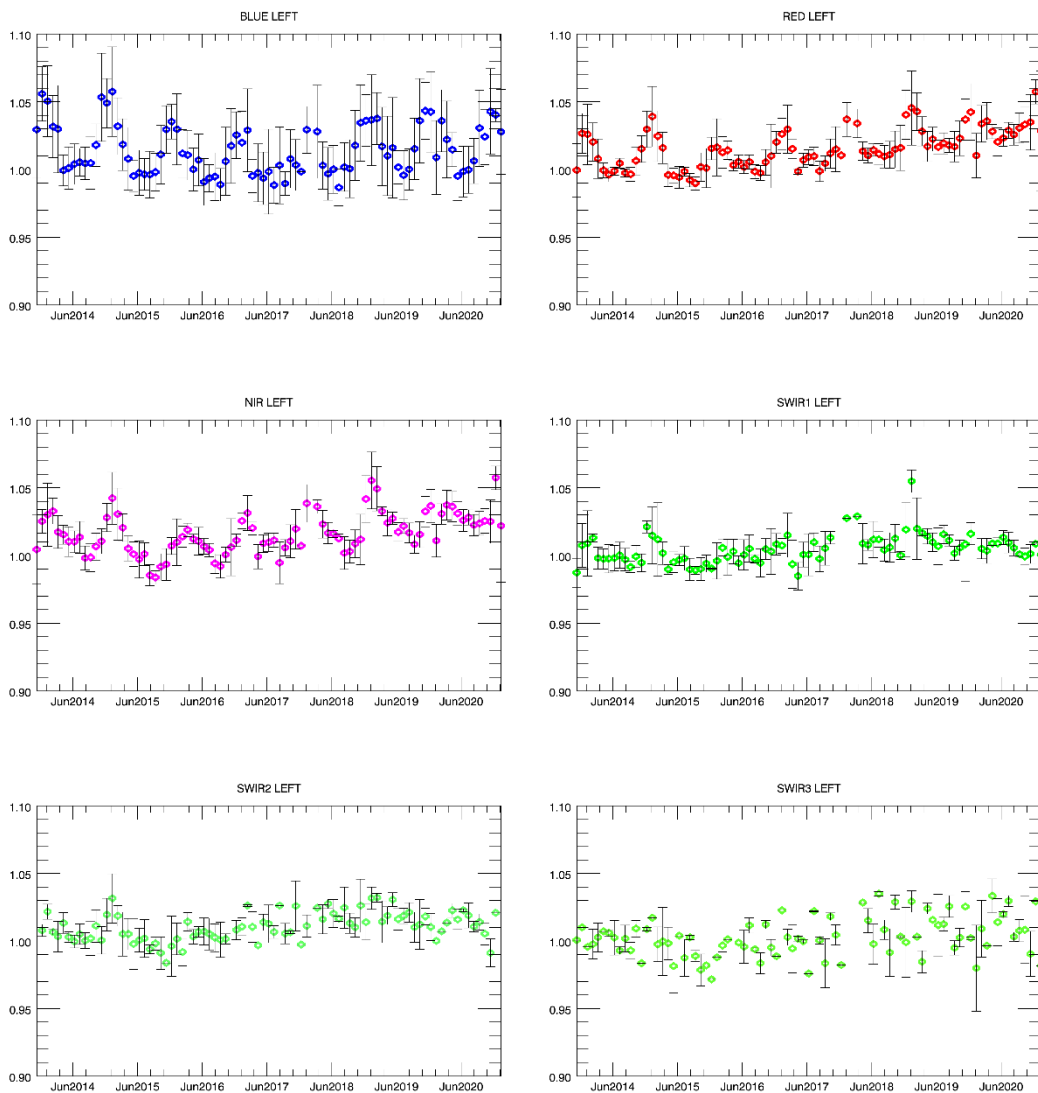


Figure 1. Libya-4 desert calibration results: LEFT monthly averaged results (collection 1)

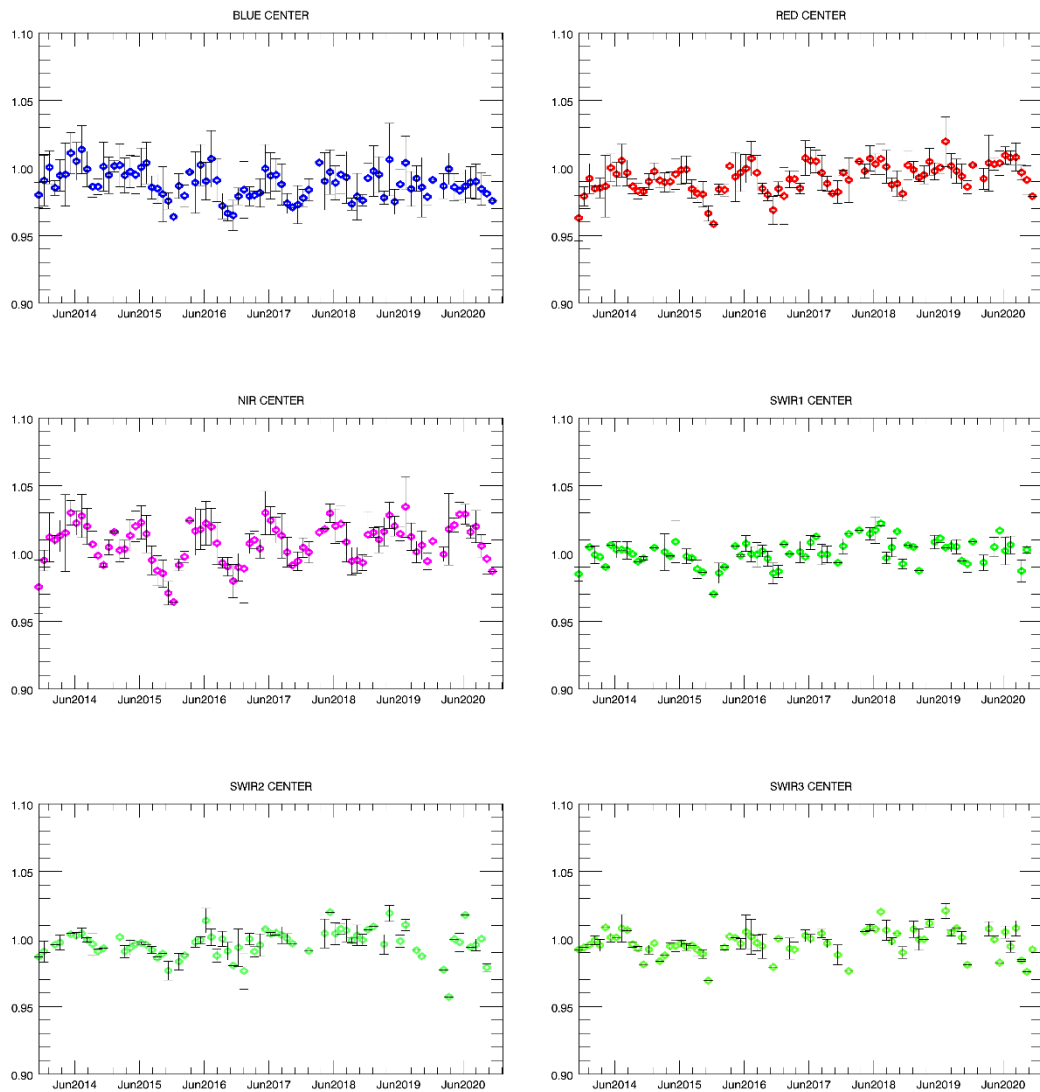


Figure 2. Libya-4 desert calibration results: CENTER monthly averaged results (collection 1)

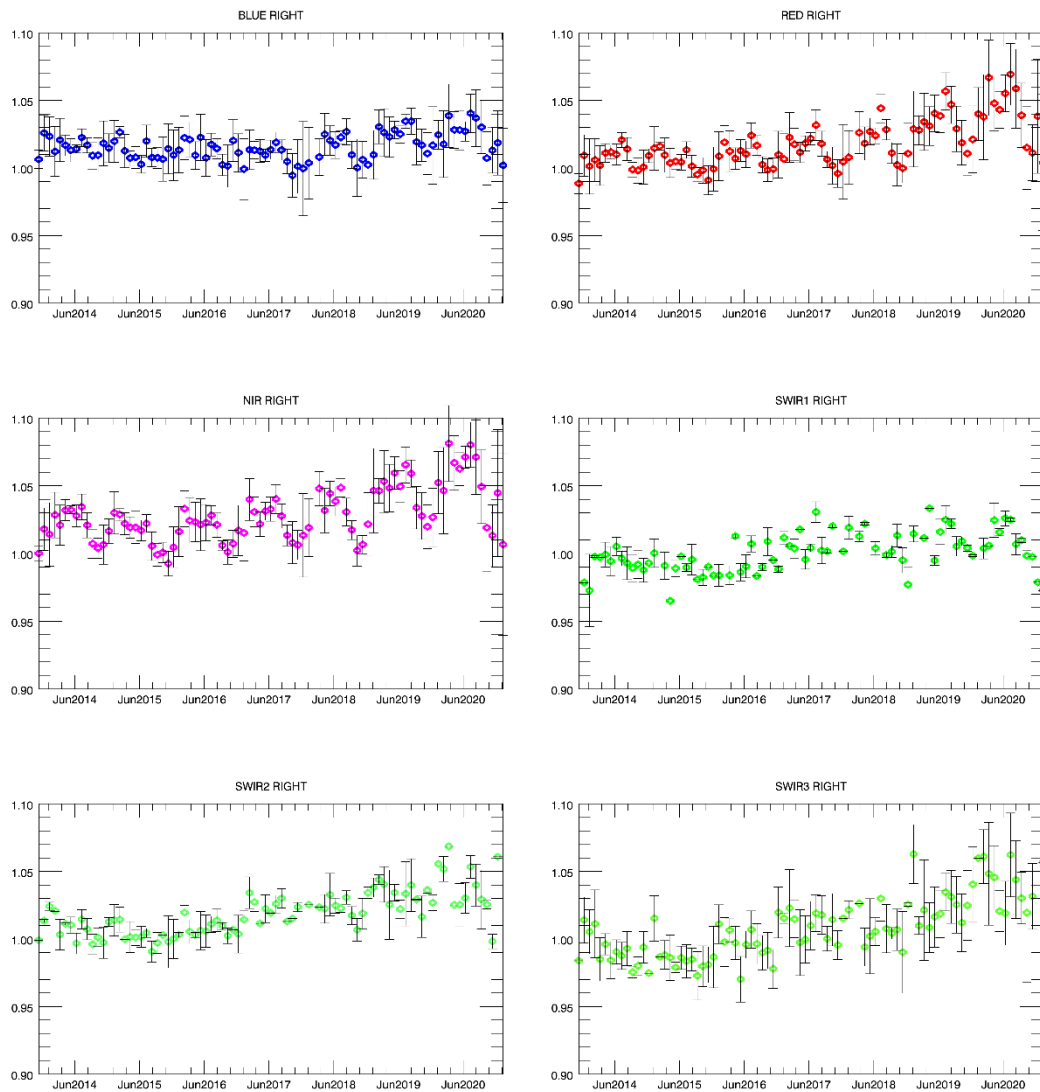


Figure 3. Libya-4 desert calibration results: RIGHT monthly averaged results (collection 1)

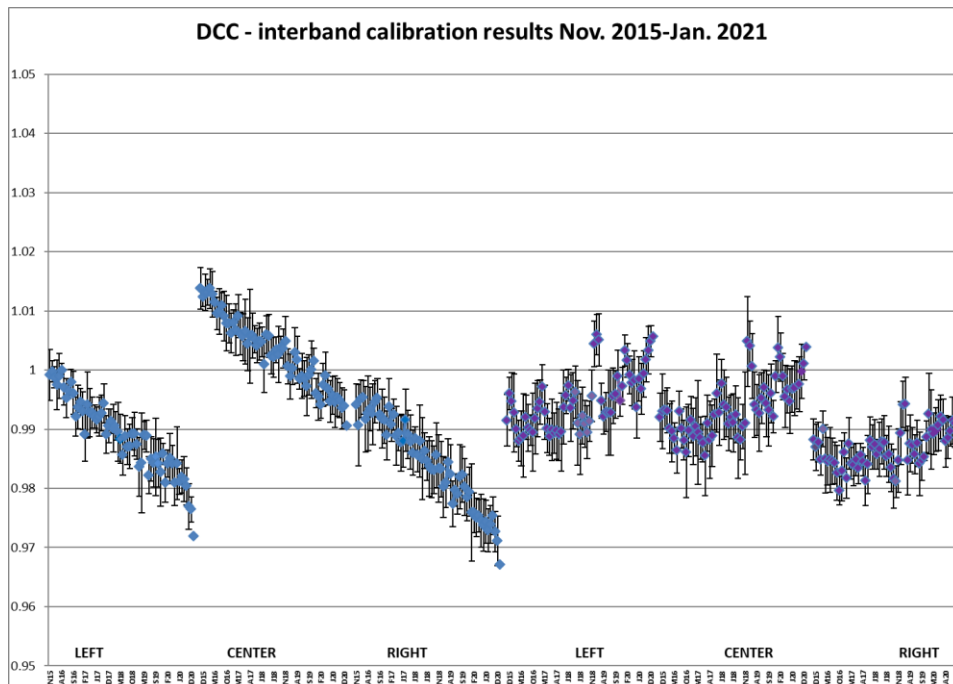


Figure 4. DCC inter-band calibration results: LEFT, CENTER and RIGHT camera (collection 1)



## 4.2. Geometric Calibration

Calibration image type	Total	Processed	Error
PROBA-V_L1C_INTERSECTION	3892	3892	0

Table13: Processed calibration images for this reporting period

During the reporting period, the average ALE was < 76 m ( $\sigma < 94$  m). Especially from 25/12 onwards, there were quite some fluctuations. However, the ALE maxima were < 100 m and highest values were 75 - 89 m on 31/12.

The average compliance was 99.20% (98.72% - 99.63% for BLUE - SWIR). Minimum compliance values were 98.12% - 99.43%.

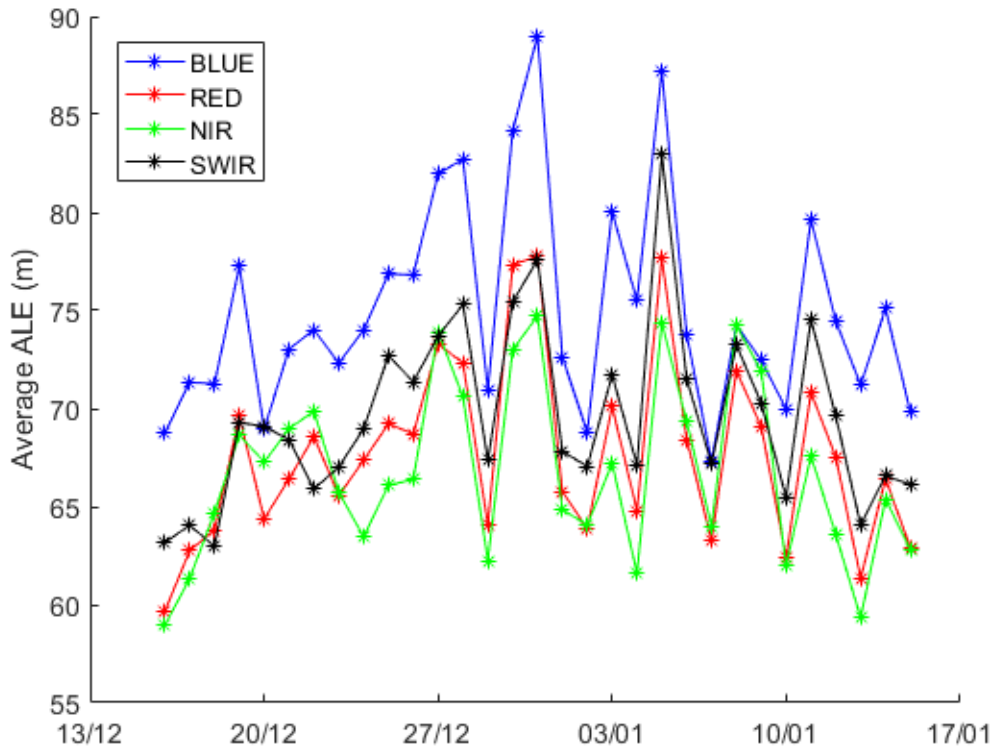


Figure 5: Daily ALE evolution for 16/12/2020 – 15/01/2021

## 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>	0	
<b>Minor Gaps (&lt; 3600 km<sup>2</sup>)</b>	2	24/12, 25/12
<b>Negligible Gaps (&lt; 1000 km<sup>2</sup>)</b>	29	04/01, 09/01, 14/01, 30/12, 20/12, 10/01, 05/01, 26/12, 31/12, 15/01, 21/12, 16/12, 28/12, 23/12, 18/12, 02/01, 12/01, 07/01, 29/12, 08/01, 03/01, 19/12, 13/01, 22/12, 01/01, 11/01, 06/01, 27/12, 17/12
<b>Complete synthesis (no gaps)</b>	0	

Table14: Overview of S1 for this reporting period

Synthesis	Missing	Decom. Error	Geom. Error	Missing TFF	Autom. Recovery	VC4 Missing	Create Contours	Other
20201216	60.89%	3	9					
20201217	59.95%		4					
20201218	60.54%	4	6					
20201219	60.63%	3	12					
20201220	61.24%	4	7					
20201221	60.42%	4	8					
20201222	60.97%	1	5					
20201223	60.65%	5	10					
20201224	61.44%	6	11					
20201225	61.47%	4	5					
20201226	60.30%	4	12					
20201227	60.87%	2	6					
20201228	60.64%	2	7					
20201229	61.52%	3	9					
20201230	60.50%	1	5					
20201231	61.01%	4	9					
20210101	61.01%	4	8					
20210102	62.39%	7	11					
20210103	61.74%	3	8					
20210104	60.73%		10					
20210105	61.16%	3	9					
20210106	60.88%	1	10					
20210107	61.65%	4	10					
20210108	60.70%	7	7					
20210109	60.82%	1	4					
20210110	60.82%	3	7					
20210111	62.27%	1	11					
20210112	62.10%		11					
20210113	60.93%		9					
20210114	61.76%	3	12					
20210115	61.24%	3	5					

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:  
New servers are being configured in preparation of the C2 reprocessing activity. An expansion of the storage capacity is to be installed early January 2021.
- Development:  
Preparation for the Collection 2 are ongoing, with focus on the new atmospheric correction integration and update to the Cloud Optimized GeoTIFF format.
- No other activities scheduled.

## 7. Operational remarks

No operational remarks