



# MONTHLY OPERATIONS REPORT

**MOR#076**

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

**Reference: *PROBA-V\_D5\_MOR-076\_2020\_04\_v1.0***

**Author(s): Dennis Clarijs, Sindy Sterckx, Erwin Wolters, Jan Vanhout**

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### Signatures

Author(s) Dennis Clarijs, Sindy Sterckx, Erwin Wolters, Jan Vanhout

Reviewer(s) Dennis Clarijs

Approver(s) Dennis Clarijs

Issuing authority

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## 1. Summary

Due to the current COVID-19 outbreak, Belgium is currently in lockdown, meaning that everyone in non-crucial sectors is obliged to work from home. 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. Five automatic recoveries were recorded with impact on the synthesis products. The seasonal effect on the geometric errors also decreased in this reporting period. On April 7, the PROBA-V platform was in safe mode, resulting in a major loss of data for that day.

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

Mailings were initiated and a blog was written on the change of PROBA-V from an operational mission to an experimental mission soon: <https://blog.vito.be/remotesensing/probav-whatsnext>

Furthermore, tests were executed on a new cloud masking algorithm in development environment in preparation for 'Collection 2' of the data.

## 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	310	306	4 <sup>(*)</sup>	306

Table 2: Ingested and archived products for this reporting period

(\*) Four expected files missing due to safe mode of the platform.

### 3.2. Generated and archived products

Product Type	Total	Processed	Error	Archived
PROBAV_L1A - Calibration	291	291	0	291
PROBAV_L1A - Nominal	2616	2610	6 <sup>(*)</sup>	2612
PROBAV_L1C	2611	2611	0	2611
PROBAV_L2A_100M	920	920	0	920
PROBAV_L2A_300M	2611	2611	0	2611
PROBAV_L2A_1KM	2611	2611	0	2611
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 geometric error;

5 \* due generate L1A error

### 3.3. Backup and archiving service

Product type	Total Files	Total File Size (GB)
TFF	299	793.36
L1A	2813	1412.41
Database transaction logs	768	86.55
Database incremental back-up	42	21.36
Database full back-up	8	581.43

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

Product type	Total Files	Total File Size (GB)
PROBAV_TRANSFERFRAMES	306	883.70
PROBAV_L1A	2906	1567.44
PROBAV_L1C	2615	3054.73
PROBAV_L2A_100M	2399	2210.16
PROBAV_L2A_300M	6797	1152.97
PROBAV_L2A_1KM	6795	149.71
PROBAV_L3_S1_TOA_100M	80	2314.09
PROBAV_L3_S1_TOC_100M	80	2376.38
PROBAV_L3_S1_TOC_NDVI_100M	80	251.68
PROBAV_L3_S5_TOA_100M	16	1715.01
PROBAV_L3_S5_TOC_100M	16	1763.02
PROBAV_L3_S5_TOC_NDVI_100M	15	170.56
PROBAV_L3_S1_TOA_300M	80	1003.49
PROBAV_L3_S1_TOC_300M	79	1019.84
PROBAV_L3_S10_TOC_300M	8	168.09
PROBAV_L3_S10_TOC_NDVI_300M	8	14.14
PROBAV_L3_S1_TOA_1KM	80	131.29
PROBAV_L3_S1_TOC_1KM	80	134.49
PROBAV_L3_S10_TOC_1KM	8	22.31
PROBAV_L3_S10_TOC_NDVI_1KM	8	1.73
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	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	2628	693	824
PROBAV_L2A_100M	902	1	1
PROBAV_L2A_300M	2627	0	4
PROBAV_L2A_1KM	2627	0	0
PROBAV_L3_S1_TOA_100M	31	122	93
PROBAV_L3_S1_TOC_100M	31	178	367
PROBAV_L3_S1_TOC_NDVI_100M	31	300	248
PROBAV_L3_S5_TOA_100M	6	0	0
PROBAV_L3_S5_TOC_100M	6	890	887
PROBAV_L3_S5_TOC_NDVI_100M	6	0	7
PROBAV_L3_S1_TOA_300M	31	93	96
PROBAV_L3_S1_TOC_300M	31	143	335
PROBAV_L3_S10_TOC_300M	3	20	20
PROBAV_L3_S10_TOC_NDVI_300M	3	3	59
PROBAV_L3_S1_TOA_1KM	31	62	62
PROBAV_L3_S1_TOC_1KM	31	194	294
PROBAV_L3_S10_TOC_1KM	3	33	34
PROBAV_L3_S10_TOC_NDVI_1KM	3	304	435

Table 6: Ordered and delivered products for this reporting period



### 3.5. End-user activity

8 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 **1785** with **121** different nationalities representing **1300** different companies/universities.

Product type	Africa	Asia	Europe	N-America	Oceania	S-America
PROBAV_L1C	0	173.76	756.43	0	0	0
PROBAV_L2A_100M	0	0	0.16	0	0	0
PROBAV_L2A_300M	0	0.56	0.42	0	0	0
PROBAV_L2A_1KM	0	0	0	0	0	0
PROBAV_L3_S1_TOA_100M	0	0	1382.21	0	0	0
PROBAV_L3_S1_TOC_100M	0.00	0	3634.95	731.34	0	0
PROBAV_L3_S1_TOC_NDVI_100M	0.00	2.58	0	0	0	0
PROBAV_L3_S5_TOA_100M	0	0	0	0	0	0
PROBAV_L3_S5_TOC_100M	18.49	12.13	0.58	0	0	0
PROBAV_L3_S5_TOC_NDVI_100M	0.07	0	0	0	0	0.73
PROBAV_L3_S1_TOA_300M	0	4.53	656.64	0	0	0
PROBAV_L3_S1_TOC_300M	0	0.21	1150.52	339.31	0	0
PROBAV_L3_S10_TOC_300M	2.02	0.55	129.77	0	0	0
PROBAV_L3_S10_TOC_NDVI_300M	0.02	0.19	6.07	0	0	0.05
PROBAV_L3_S1_TOA_1KM	0	0	95.97	0	0	0
PROBAV_L3_S1_TOC_1KM	0	0.20	241.39	0	0	0
PROBAV_L3_S10_TOC_1KM	0.23	0	9.01	9.00	0	0
PROBAV_L3_S10_TOC_NDVI_1KM	1.67	2.14	0.00	8.98	0	0.01

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



Product Type	Global
L1C	930.19
PROBAV_L2A_100M	0.16
PROBAV_L2A_300M	0.98
PROBAV_L2A_1KM	0
PROBAV_L3_S1_TOA_100M	1382.21
PROBAV_L3_S1_TOC_100M	4366.29
PROBAV_L3_S1_TOC_NDVI_100M	2.58
PROBAV_L3_S5_TOA_100M	0
PROBAV_L3_S5_TOC_100M	31.20
PROBAV_L3_S5_TOC_NDVI_100M	0.80
PROBAV_L3_S1_TOA_300M	661.17
PROBAV_L3_S1_TOC_300M	1490.04
PROBAV_L3_S10_TOC_300M	132.34
PROBAV_L3_S10_TOC_NDVI_300M	6.34
PROBAV_L3_S1_TOA_1KM	95.97
PROBAV_L3_S1_TOC_1KM	241.59
PROBAV_L3_S10_TOC_1KM	18.24
PROBAV_L3_S10_TOC_NDVI_1KM	12.81

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

Company	# Downloads
EOSENSE	687
UPMC	454
CSIR-IHBT	427
VITO	239
COLEGIO DE POSTGRADUADOS	225
IGSNRR	206
TUSUR	203
DESCARTES UNDERWRITING	161
ESA	158
PLANETA	131

Table 9: Top 10 user companies for the reporting period

Country	# Users
CHINA	182
BELGIUM	156
FRANCE	84
INDIA	84
BRAZIL	81
UNITED STATES	79
ITALY	74
NETHERLANDS	61
UNITED KINGDOM	60
GERMANY	56

Table 10: Top 10 countries with most registered users

**List of issues raised by users:**

Pulse VPN connection time-out to TAP network  
unable to monitor running applications  
Problemen activatie account  
Benchmark  
application FAILED ( Futures timed out)  
nieuwe VM kan geen jobs lanceren  
FW: application\_1583932306391\_69137  
issues with epod65.vgt.vito.be  
Lost username  
terrascope uservm onbereikbaar  
issues with cluster  
DataStreamer Exception - help  
RE: docker container  
Problem with account registration - validation code  
probleem docker daemon?  
Test for NoR Support Requests  
jobs blijven hangen  
FW: [RECOVERY] disks on claes is OK!  
PDF: (API) - mariaculman - 2020/3/25 - PROBA-V Mission Exploitation Platform - Volume  
permission  
Mijn VM is rustig onbereikbaar geworden  
Permissies Terrascope Vm 23027  
local spark niet in docker container  
user groups externen  
PDF: N.A. - zyhtinking - 2020/3/18 - download a tile  
access denied terrascope (moparthys)  
Connection to the mep of mparde  
Yarn docker implementatie

## 4. Image Calibration services

### 4.1. Radiometric Calibration

Calibration request type	Total	Processed	Not received	Error
CLOUDS	22	21	1	0
DARK CURRENT	26	26	0	0
MOON	2	2	0	0
RAYLEIGH	60	59	1	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	0	2
PROBA-V_L1B_CALIBRATION	289	238	51
PROBA-V_L1B_INTERSECTION	766	409	357
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.

A strong positive trend is observed in the Libya-4 results of all strips of the RIGHT camera. The assumption that is related to the orbital drift of PROBA-V is still under investigation.

3 new bad pixels were identified :

Center SWIR3 Pixel ID 669 and Pixel ID 674\_(0-based), LEFT SWIR3 PixelD 4 (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 three bad pixel will be added: Center SWIR3 Pixel ID 669 and Pixel ID 674 (0-based), LEFT SWIR3 PixelD 4 (0-based).

The current ICP files are:

- PROBAV\_ICP\_RADIOMETRIC#LEFT\_20200402\_V01
- PROBAV\_ICP\_RADIOMETRIC#CENTER\_20200402\_V01
- PROBAV\_ICP\_RADIOMETRIC#RIGHT\_202000402\_V01

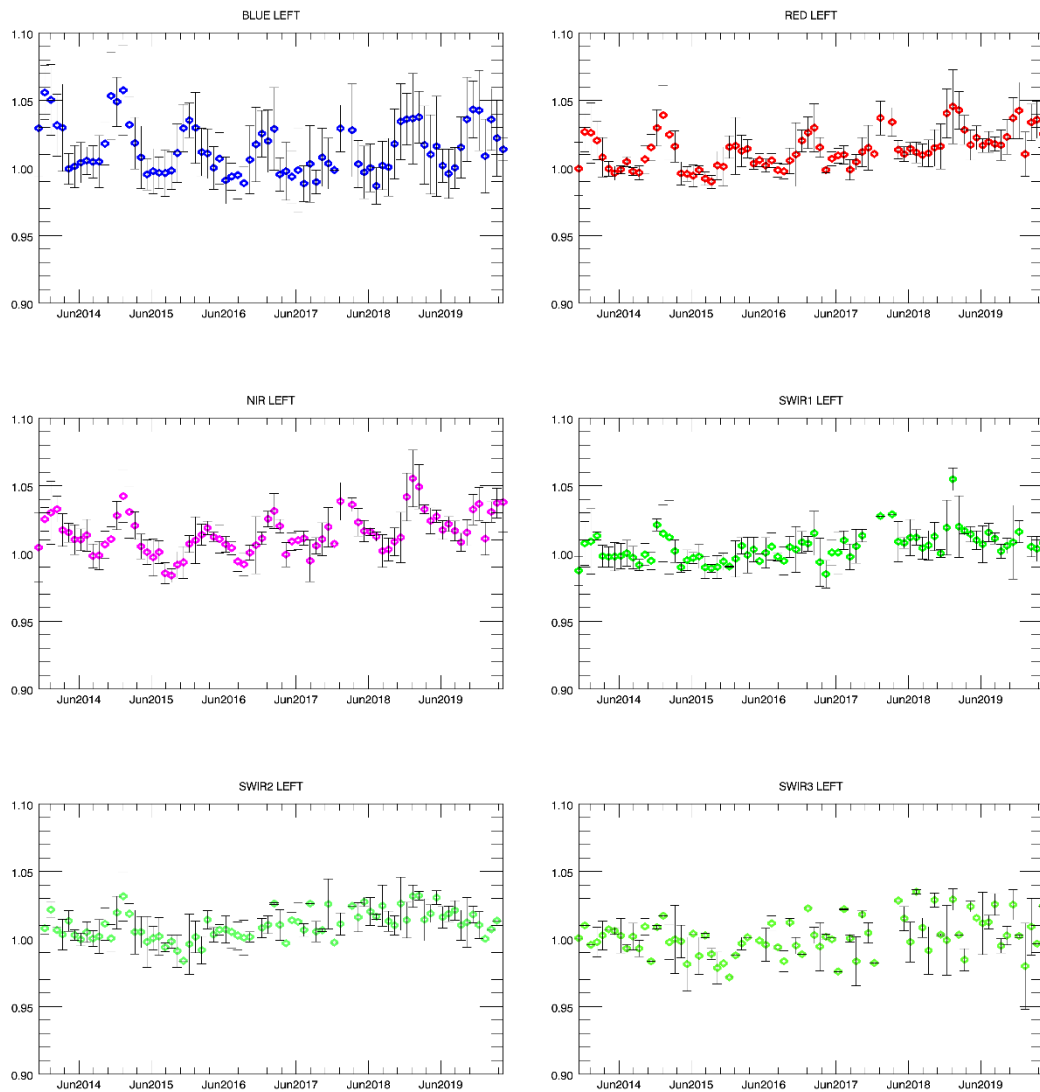


Figure 1. Libya-4 desert calibration results: LEFT monthly averaged results (collection 1)

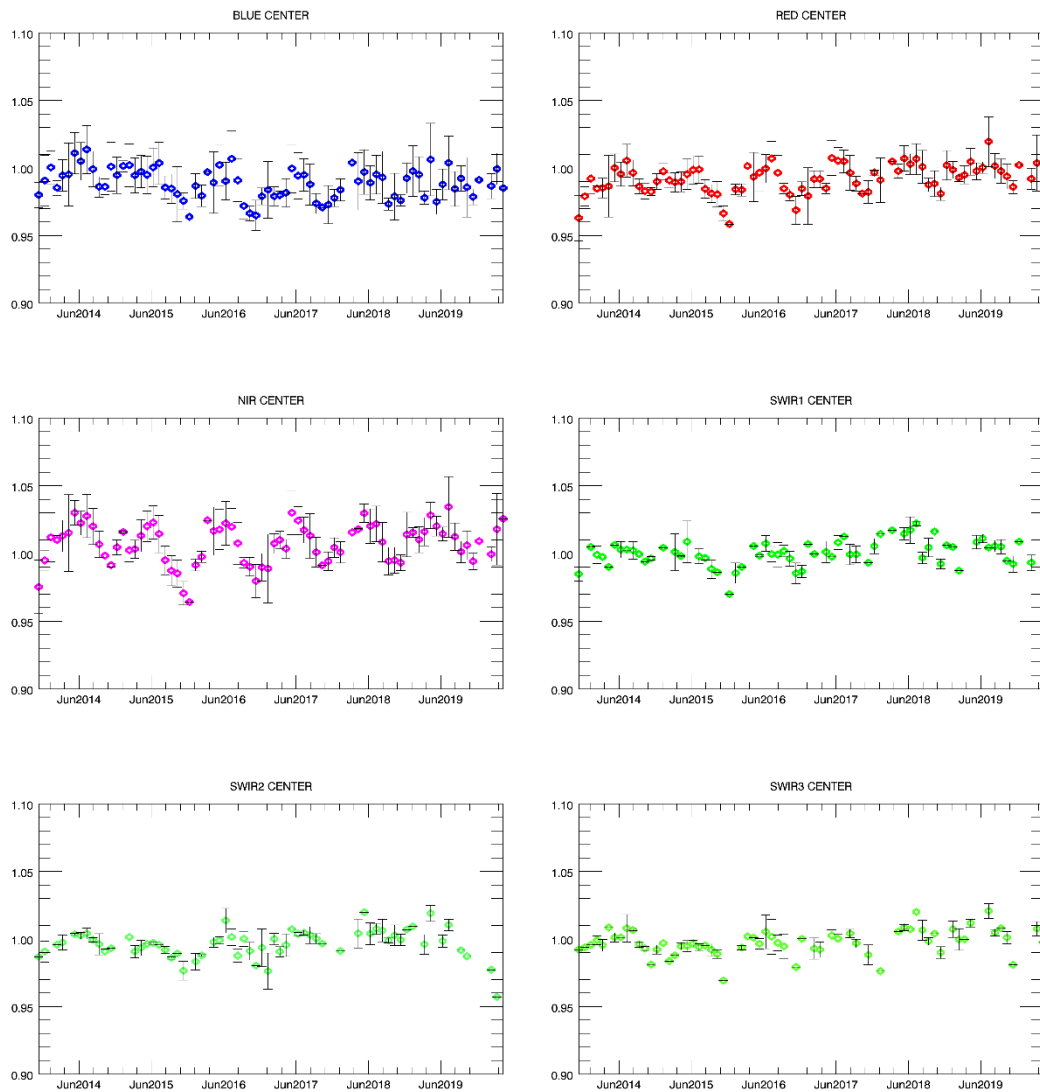


Figure 2. Libya-4 desert calibration results: CENTER monthly averaged results (collection 1)

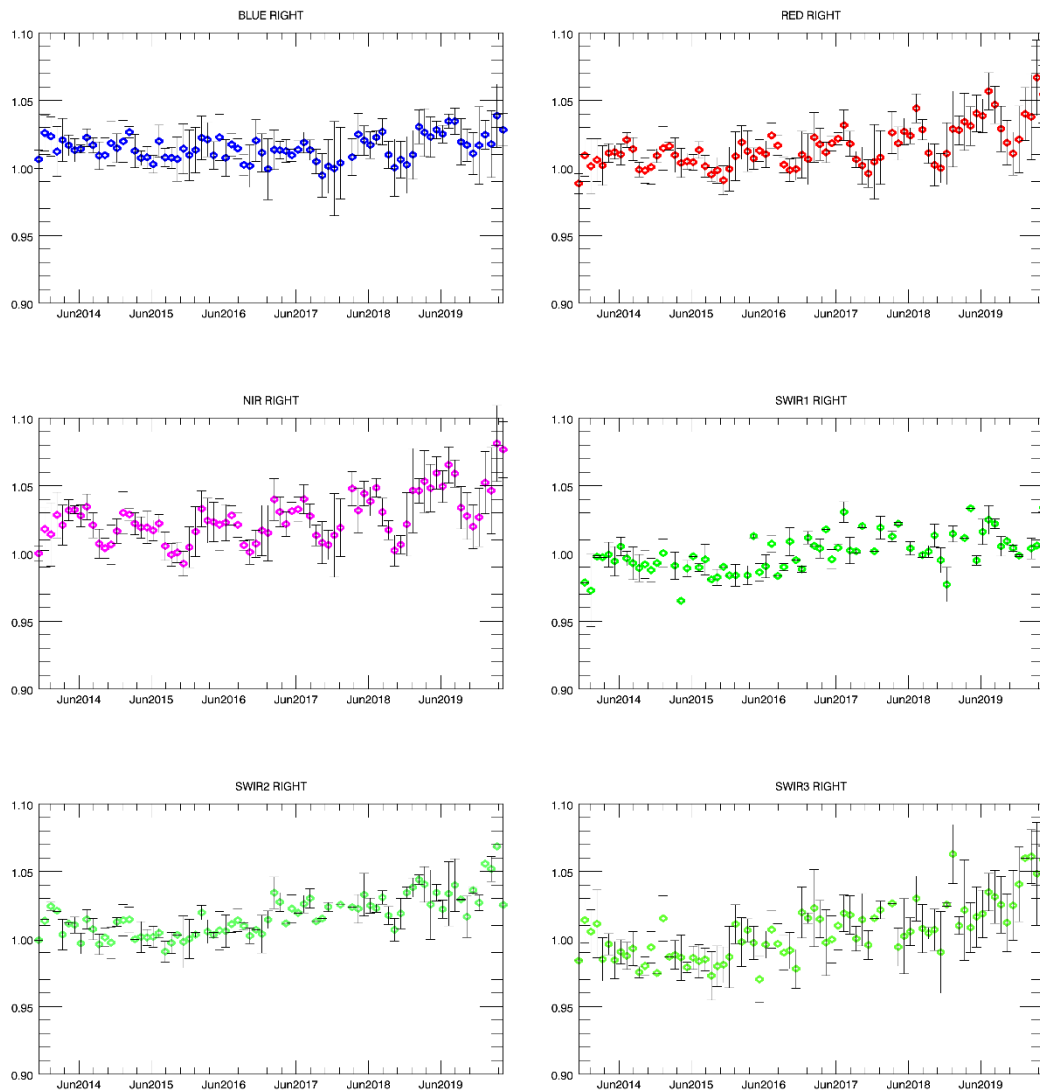


Figure 3. Libya-4 desert calibration results: RIGHT monthly averaged results (collection 1)

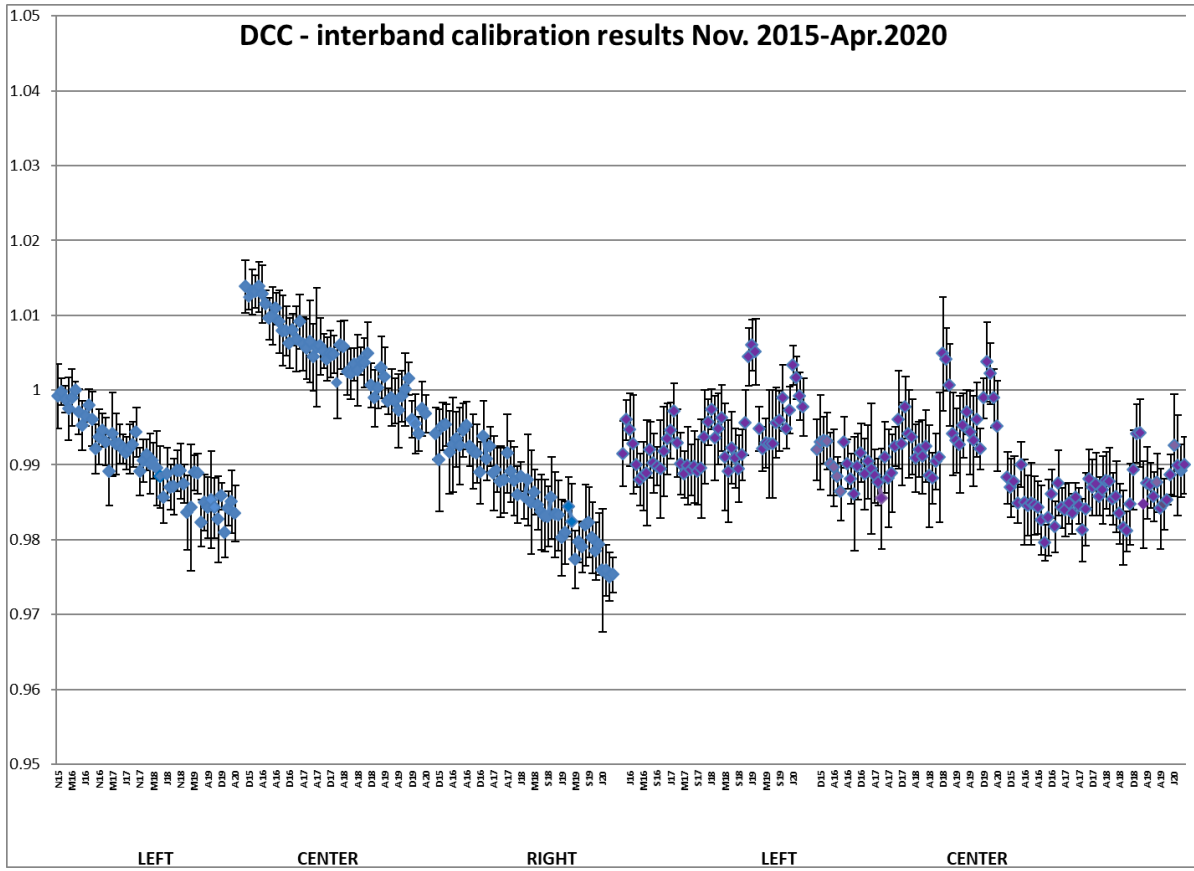


Figure 4. DCC inter-band calibration results: LEFT, CENTER and RIGHT camera (collection 1)



## 4.2. Geometric Calibration

Calibration image type	Total	Processed	Error
PROBA-V_L1C_INTERSECTION	14035	14035	0

Table13: Processed calibration images for this reporting period

### Geometric ICP file

During previous month, the average ALE was < 68 m ( $\sigma < 95$  m).

The daily ALE evolution showed only minor changes, with lowest and highest daily average values fluctuating between 55 m (25/3, NIR) and 74 m (31/3, BLUE), see Figure X.

The average compliance was 99.30% (98.89 – 99.61% from BLUE – SWIR), without any major fluctuations.

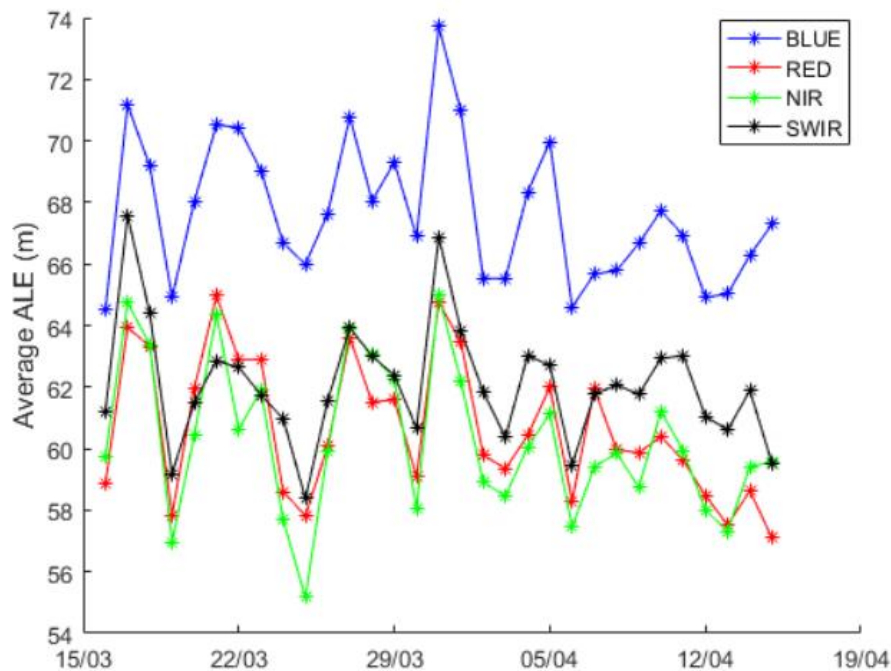


Figure 5 - Daily absolute location error for this reporting period

## 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-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>	1	07/04
<b>Large Gaps (&lt; 21600 km<sup>2</sup>)</b>	3	31/03, 18/03, 29/03
<b>Medium Gaps (&lt; 10000 km<sup>2</sup>)</b>	0	
<b>Minor Gaps (&lt; 3600 km<sup>2</sup>)</b>	7	12/04, 05/04, 25/03, 08/04, 13/04, 03/04, 04/04
<b>Negligible Gaps (&lt; 1000 km<sup>2</sup>)</b>	18	17/03, 27/03, 22/03, 15/04, 10/04, 23/03, 28/03, 01/04, 11/04, 24/03, 19/03, 02/04, 20/03, 16/03, 21/03, 30/03, 14/04, 09/04
<b>Complete synthesis (no gaps)</b>	1	26/03, 06/04

Table14: Overview of S1 for this reporting period

Synthesis	Missing	Decom. Error	Geom. Error	Missing TFF	Autom. Recovery	VC4 Missing	Create Contours	Other
20200316	0.27%	5	21					
20200317	0.06%	2	14					
20200318	2.69%	5	8		1		1	
20200319	0.20%		14					
20200320	0.07%	2	14					
20200321	0.08%		16					
20200322	0.05%		13					
20200323	0.03%		8					
20200324	0.16%	3	8					
20200325	4.24%	5	10		1			
20200326	0.00%							
20200327	0.02%		4					
20200328	0.02%	3	1					
20200329	7.28%	1	5		1			3
20200330	0.01%	1	2					
20200331	8.91%	1	6					
20200401	0.02%	1	6					
20200402	0.20%		5					
20200403	0.41%	3	7		1			
20200404	0.14%	2	8			1		
20200405	1.28%	3	5			1		
20200406	0.04%	3	9					1
20200407	49.41%	1	5	4				
20200408	1.30%	11	14			4		
20200409	0.03%	2	4					
20200410	0.02%	2	2					
20200411	0.37%	3	8					
20200412	0.44%	5	9		1			
20200413	0.52%	11	11			2		
20200414	0.41%	3	4					
20200415	0.08%		13					

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:  
No new developments planned
- No other activities scheduled.

## 7. Operational remarks

No operational remarks