



# MONTHLY OPERATIONS REPORT

**MOR#045**

**Reporting period from 16-Aug-2017 to 15-Sep-2017**

**Reference: *PROBA-V\_D5\_MOR-045\_2017-09\_v1.0***

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## DOCUMENT CONTROL

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## 1. Summary

During this reporting period, most synthesis products were completed with only negligible or minor gaps. Most of the missing data is due to missing TFF's (3) and 2 automatic platform recoveries.

Since the first yaw manoeuvre on July 3, 2017, the number of decompression errors remains stable and low. The highest number of decompression errors now occurs when there are problems with the overpasses (lost frames and gaps).

There were no major issues with the radiometric or geometric image quality during this reporting period.

The Collection 1 data validation is almost complete and the documentation of this completed validation will be published in the near future.

No new developments are expected in the coming period.

## 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	95.33	4.67 <sup>(*)</sup>
Worker Nodes	100.0	0.0
PDF	100.0	0.0

*Table 1: System Infrastructure availability for this reporting period*

(\*) Pmaster17 downtime due to technical problems – no effect on product delivery.

## 3. Image Processing Services

### 3.1. Ingested and archived products

Product Type	Total	Received	Missing data, ingested by VITO	Archived
METEO	248	248	0	247
TFF	311	308	3 <sup>(*)</sup>	308

Table 2: Ingested and archived products for this reporting period

- (\*) 1 missing TFF on 15/08/2017 (TFF 14334 Subject: Antenna problem during pass)  
1 missing TFF on 11/09/2017 (TFF 14599 Subject: Antenna did not move during)  
1 missing TFF on 14/09/2017 (TFF 14630 Subject: No lock data during pass)

### 3.2. Generated and archived products

Product Type	Total	Processed	Error	Archived
PROBAV_L1A - Calibration	242	242	0	242
PROBAV_L1A - Nominal	2626	2624	2 <sup>(*)</sup>	2626
PROBAV_L1C	2624	2624	0	2623
PROBAV_L2A_100M	915	915	0	914
PROBAV_L2A_300M	2624	2624	0	2622
PROBAV_L2A_1KM	2624	2624	0	2623
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	5
PROBAV_L3_S5_TOC_100M	6	6	0	5
PROBAV_L3_S5_TOC_NDVI_100M	6	5	0	5
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

- (\*) 2 x L1A error due geometric processing

### 3.3. Backup and archiving service

Product type	Total Files	Total File Size (GB)
TFF	301	692.72
L1A	2769	1414.53
Database transaction logs	797	142.91
Database incremental back-up	48	47.17
Database full back-up	10	440.54

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

Product type	Total Files	Total File Size (GB)
PROBAV_TRANSFERFRAMES	309	769.52
PROBAV_L1A	2871	1577.91
PROBAV_L1C	2627	3080.14
PROBAV_L2A_100M	1429	1286.62
PROBAV_L2A_300M	4092	668.84
PROBAV_L2A_1KM	4097	90.25
PROBAV_L3_S1_TOA_100M	48	1339.13
PROBAV_L3_S1_TOC_100M	48	1394.29
PROBAV_L3_S1_TOC_NDVI_100M	49	166.56
PROBAV_L3_S5_TOA_100M	9	901.04
PROBAV_L3_S5_TOC_100M	9	939.39
PROBAV_L3_S5_TOC_NDVI_100M	9	107.21
PROBAV_L3_S1_TOA_300M	47	567.96
PROBAV_L3_S1_TOC_300M	47	591.19
PROBAV_L3_S10_TOC_300M	5	104.84
PROBAV_L3_S10_TOC_NDVI_300M	5	9.27
PROBAV_L3_S1_TOA_1KM	47	78.73
PROBAV_L3_S1_TOC_1KM	47	81.27
PROBAV_L3_S10_TOC_1KM	5	14.51
PROBAV_L3_S10_TOC_NDVI_1KM	5	1.18
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	248	0.31
METEO_METEOSERVICES	249	1.33
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	2624	187	197
PROBAV_L2A_100M	917	34	39
PROBAV_L2A_300M	2624	155	159
PROBAV_L2A_1KM	2624	2	11
PROBAV_L3_S1_TOA_100M	31	57	56
PROBAV_L3_S1_TOC_100M	31	1614	4103
PROBAV_L3_S1_TOC_NDVI_100M	31	4272	4222
PROBAV_L3_S5_TOA_100M	6	13	13
PROBAV_L3_S5_TOC_100M	6	1082	1065
PROBAV_L3_S5_TOC_NDVI_100M	6	1571	1668
PROBAV_L3_S1_TOA_300M	31	315	320
PROBAV_L3_S1_TOC_300M	31	153	202
PROBAV_L3_S10_TOC_300M	3	33	45
PROBAV_L3_S10_TOC_NDVI_300M	3	414	457
PROBAV_L3_S1_TOA_1KM	31	124	137
PROBAV_L3_S1_TOC_1KM	31	189	197
PROBAV_L3_S10_TOC_1KM	3	61	77
PROBAV_L3_S10_TOC_NDVI_1KM	3	1412	1463

Table 6: Ordered and delivered products for this reporting period

### 3.5. End-user activity

17 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 **1226** with **111** different nationalities representing **926** different companies/universities.

Product type	Africa	Asia	Europe	N-America	Oceania	S-America
PROBAV_L1C	0	374.23	186.48	9.66	0	0
PROBAV_L2A_100M	7.87	0	6.69	2.92	0	0
PROBAV_L2A_300M	0	0.02	0.23	0.36	0	0.12
PROBAV_L2A_1KM	0	0	0.04	0.27	0	0
PROBAV_L3_S1_TOA_100M	0	0	7.50	0.04	0	0.53
PROBAV_L3_S1_TOC_100M	0	1888.29	794.70	720.01	0	12.02
PROBAV_L3_S1_TOC_NDVI_100M	0	228.06	0.08	0.20	0	0
PROBAV_L3_S5_TOA_100M	0	0	178.61	0	0	0.01
PROBAV_L3_S5_TOC_100M	55.78	0	655.85	0	0	65.56

PROBAV_L3_S5_TOC_NDVI_100M	0	22.97	93.34	8.30	14.86	9.07
PROBAV_L3_S1_TOA_300M	0	2.77	990.66	0	0	1384.95
PROBAV_L3_S1_TOC_300M	0	0.01	1050.56	309.44	0	0
PROBAV_L3_S10_TOC_300M	1.90	1.13	178.90	0	0	0
PROBAV_L3_S10_TOC_NDVI_300M	0	0.62	1.85	0	1.23	0.04
PROBAV_L3_S1_TOA_1KM	0.01	0.00	146.62	0	0	0.04
PROBAV_L3_S1_TOC_1KM	0.00	0.01	201.54	0	0	0
PROBAV_L3_S10_TOC_1KM	0.39	0.10	17.87	0.88	0	15.15
PROBAV_L3_S10_TOC_NDVI_1KM	0.01	34.30	2.37	0.00	0.14	0.01

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

Product Type	Global
L1C	570.37
PROBAV_L2A_100M	17.48
PROBAV_L2A_300M	0.74
PROBAV_L2A_1KM	0.30
PROBAV_L3_S1_TOA_100M	8.07
PROBAV_L3_S1_TOC_100M	3415.02
PROBAV_L3_S1_TOC_NDVI_100M	228.35
PROBAV_L3_S5_TOA_100M	178.63
PROBAV_L3_S5_TOC_100M	777.19
PROBAV_L3_S5_TOC_NDVI_100M	148.53
PROBAV_L3_S1_TOA_300M	2378.39
PROBAV_L3_S1_TOC_300M	1360.02
PROBAV_L3_S10_TOC_300M	181.92
PROBAV_L3_S10_TOC_NDVI_300M	3.75
PROBAV_L3_S1_TOA_1KM	146.67
PROBAV_L3_S1_TOC_1KM	201.55
PROBAV_L3_S10_TOC_1KM	34.40
PROBAV_L3_S10_TOC_NDVI_1KM	36.84

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

Company	# Downloads
CSIR-IHBT	4009
SPACE RESEARCH INSTITUTE RAS (IKI RAN)	3093
GSJ LTD	970
KOREA NATIONAL PARK SERVICE	701
VITO	652



OEH	479
SPACE RESEARCH INSTITUTE (IKI)	473
HUMBOLDT-UNIVERSITÄT ZU BERLIN	377
ARMSTATEHYDROMET	339
NAGOYA UNIVERSITY	268

Table 9: Top 10 user companies for the reporting period

Country	# Users
CHINA	116
BELGIUM	99
ITALY	62
FRANCE	60
UNITED STATES	59
BRAZIL	55
INDIA	50
UNITED KINGDOM	48
GERMANY	45
NETHERLANDS	41

Table 10: Top 10 countries with most registered users

**List of issues raised by users:**

- ProbaV:  
- Large geometric shift (20160218-20160219)

## 4. Image Calibration services

### 4.1. Radiometric Calibration

Calibration request type	Total	Processed	Not received	Error
CLOUDS	15	13	2	0
DARK CURRENT	23	21	2	0
MOON	2	2	0	0
RAYLEIGH	47	44	3	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	2	0
PROBA-V_L1B_CALIBRATION	240	218	22
PROBA-V_L1B_INTERSECTION	780	364	416
PROBA-V_L1B_OVERLAPREGION	0	0	0

Table 12: Processed calibration images for this reporting period

(\*) Due to insufficient overlap with the calibration region of interest, not enough pixels (e.g. clouds contamination), site not sufficiently uniform (illumination), etc.

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.

Since September 2017 the degradation model for LEFT and CENTER BLUE bands have been adapted as the previous coefficient seemed to slightly underestimate the observed trend and therefore also needs to be adapted. The coefficients of the degradation model for RIGHT SWIR strips have also been adapted as the previous model overcorrected the observed trend.

The analyses of the data of the yaw manoeuvres performed on 3rd and 12th of July for CENTER and RIGHT cameras is on-going. Preliminary results show that the yaw manoeuvre data allow to consistently retrieve the low frequency equalization profiles. Before updating the equalization coefficients in the ICP files, the retrieved profiles will be verified on nominal images.

No new bad pixels have been found.

The status of the PROBA-V radiometric calibration has been presented at the Workshop on Radiometric Calibration for European Optical Missions" which was held in ESRIN from 30th through 31st of August.

#### **Radiometric ICP file**

Both the SWIR and 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\_20170901\_V01
- PROBAV\_ICP\_RADIOMETRIC#CENTER\_20170901\_V01
- PROBAV\_ICP\_RADIOMETRIC#RIGHT\_20170901\_V01

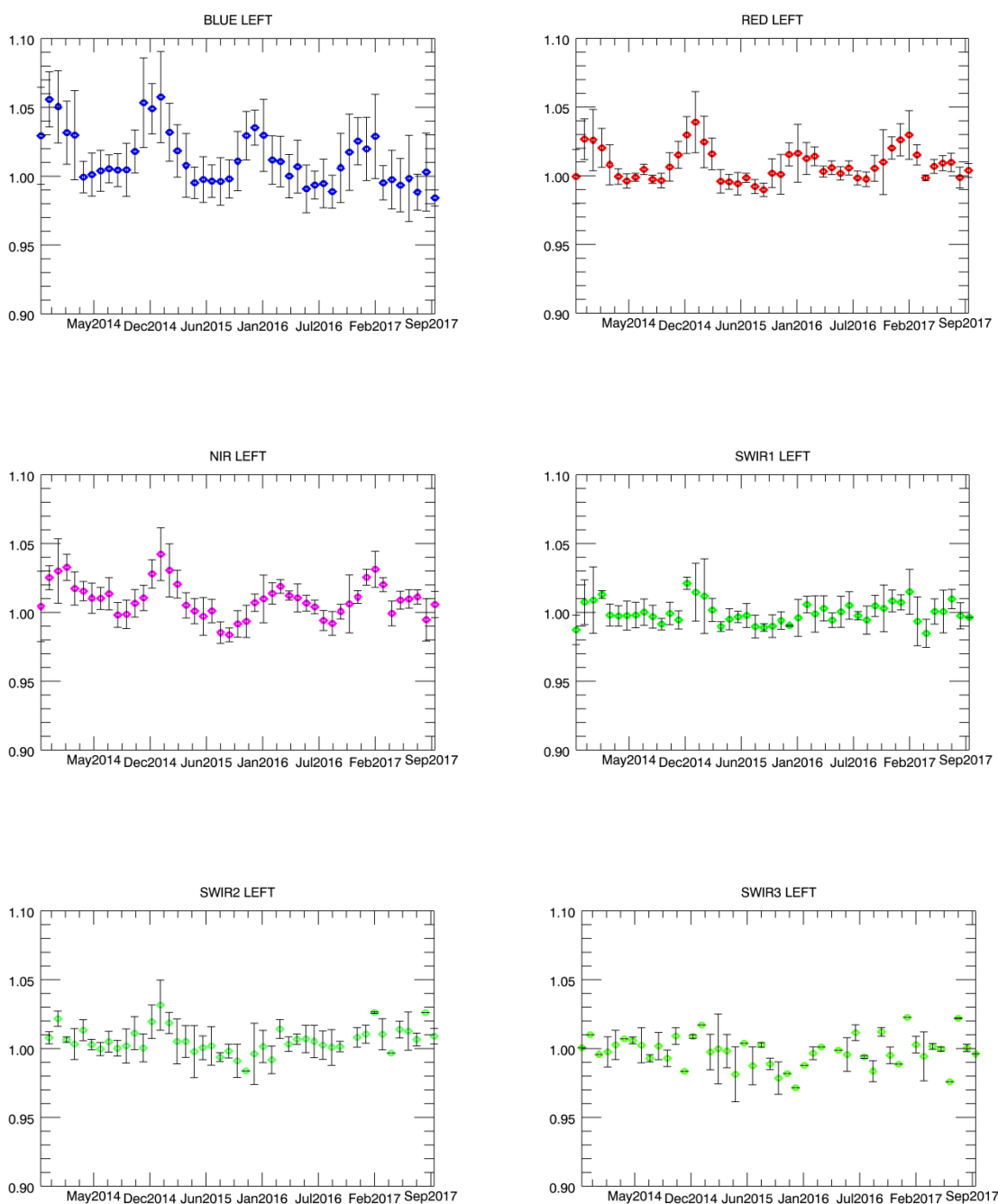


Figure 1. Libya-4 desert calibration results: LEFT monthly averaged results (collection 1)

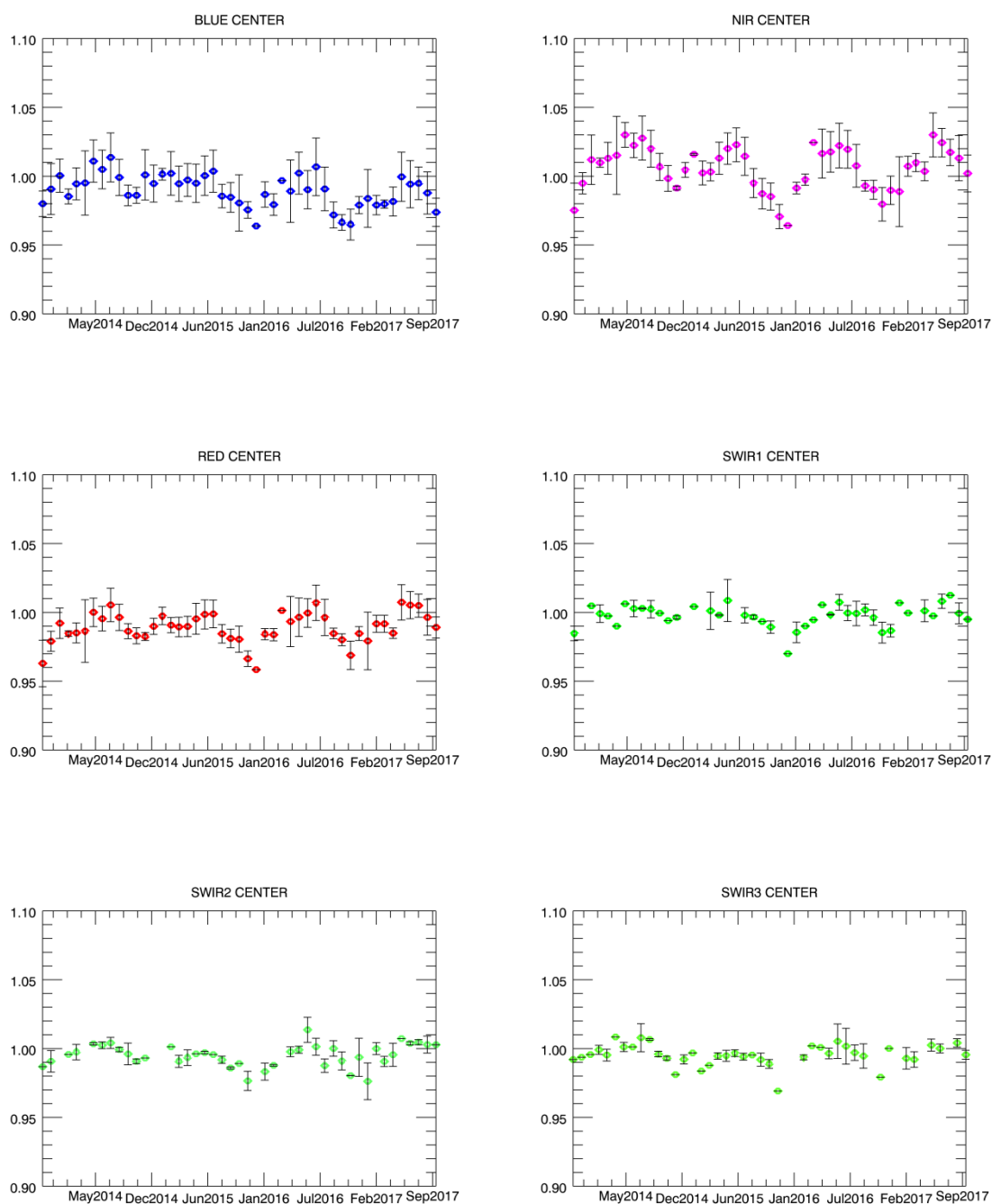


Figure 2. Libya-4 desert calibration results: CENTER monthly averaged results (collection 1)

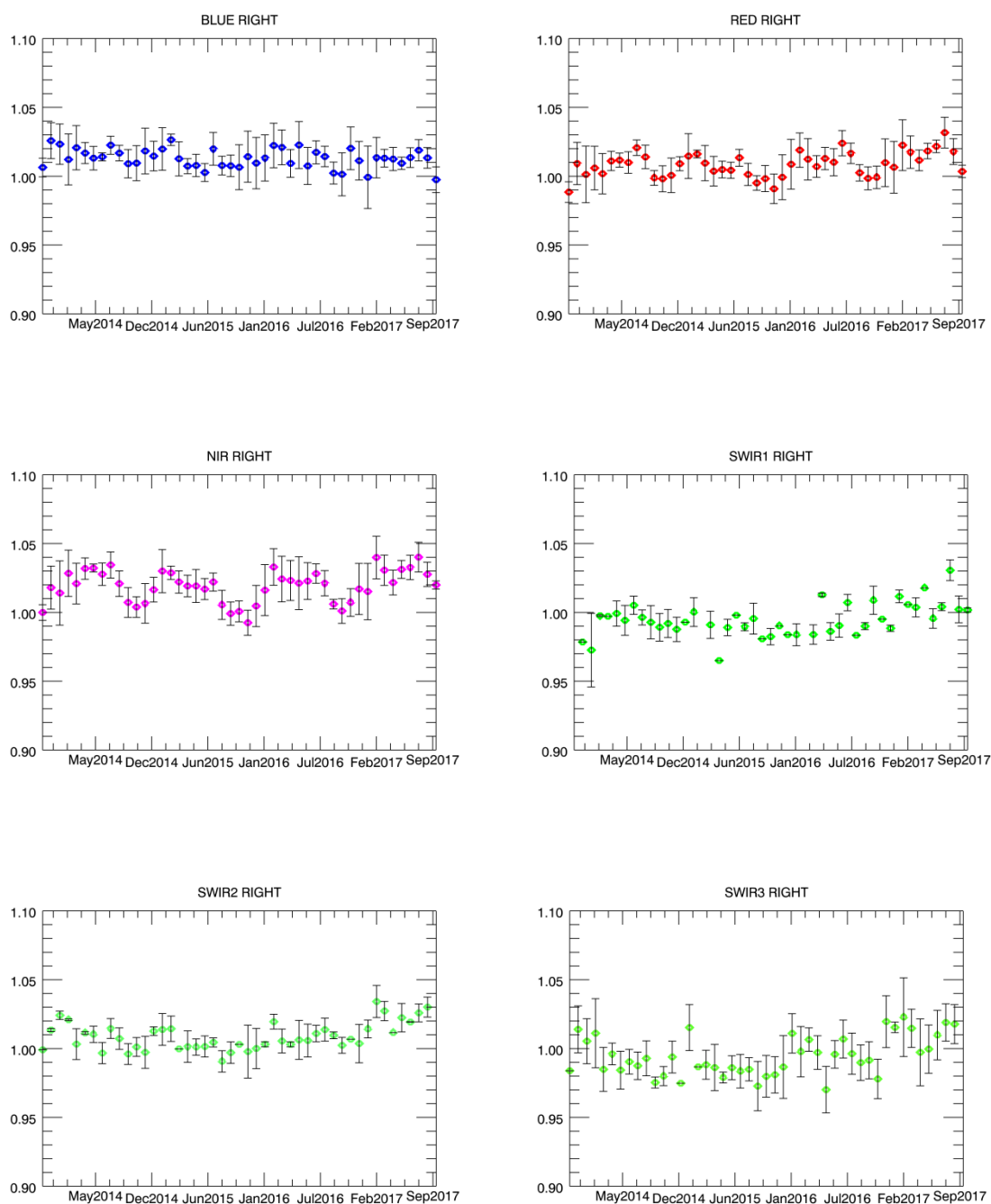


Figure 3. Libya-4 desert calibration results: RIGHT monthly averaged results (collection 1)

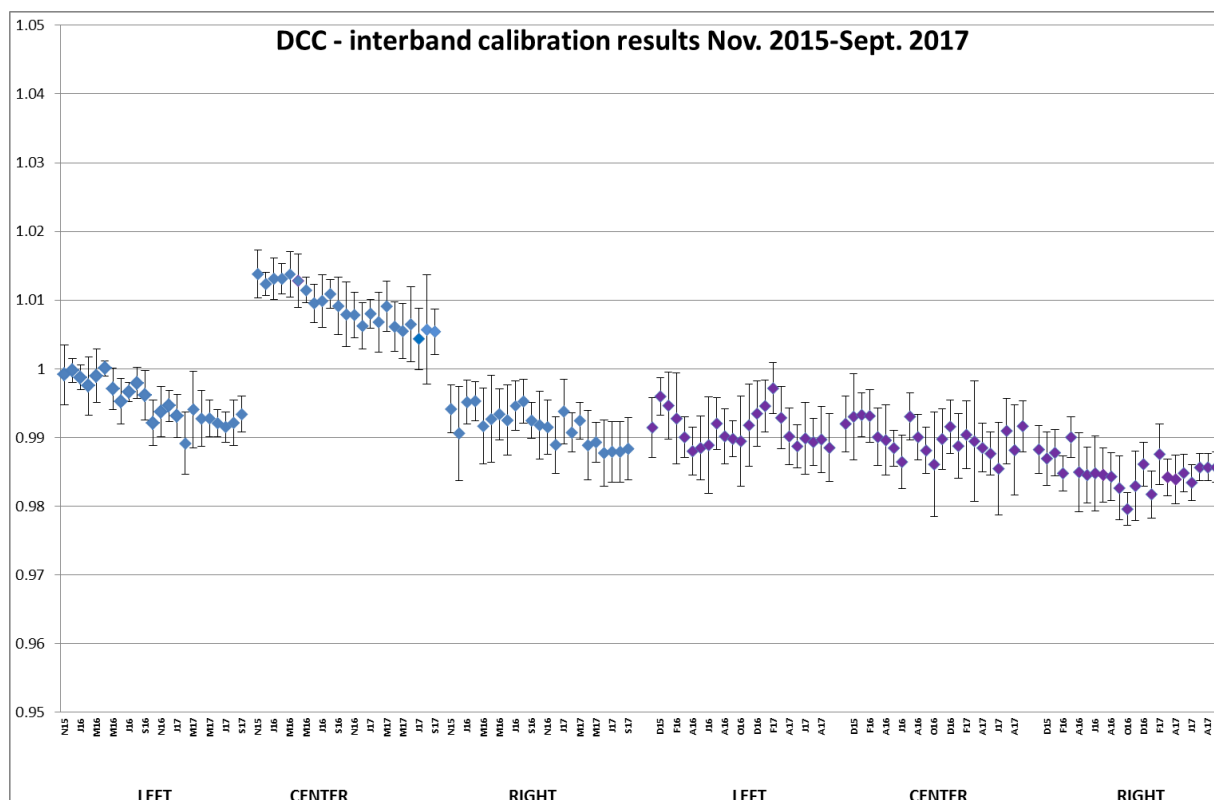


Figure 4. DCC inter-band calibration results: LEFT, CENTER and RIGHT camera (collection 1)

## 4.2. Geometric Calibration

Calibration image type	Total	Processed	Error
PROBA-V_L1C_INTERSECTION	14231	14231	0

Table13: Processed calibration images for this reporting period

During the previous month, the average ALE was < 77 m ( $\sigma$  < 90 m). Daily values started off at 80 – 90 m and gradually decreased to a minimum of 55 – 67 m at 26/8. This minimum was followed by a steep increase to maxima of 85 – 96 m and 87 – 105 m at 1/9 and 5/9, respectively. After the latter maximum, values sharply declined to < 75 m during the remaining period. The daily ALE evolution is shown in Figure 5.

The geometric accuracy was within the requirement of < 300 m, with an average compliance of 99.2% (98.80 – 99.76% from BLUE to SWIR).

The usual compliance minima synchronous with the ALE maxima occurred, with the lowest values occurring at 5/9 (98.2 – 99.7 from BLUE to SWIR).

### Geometric ICP file

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

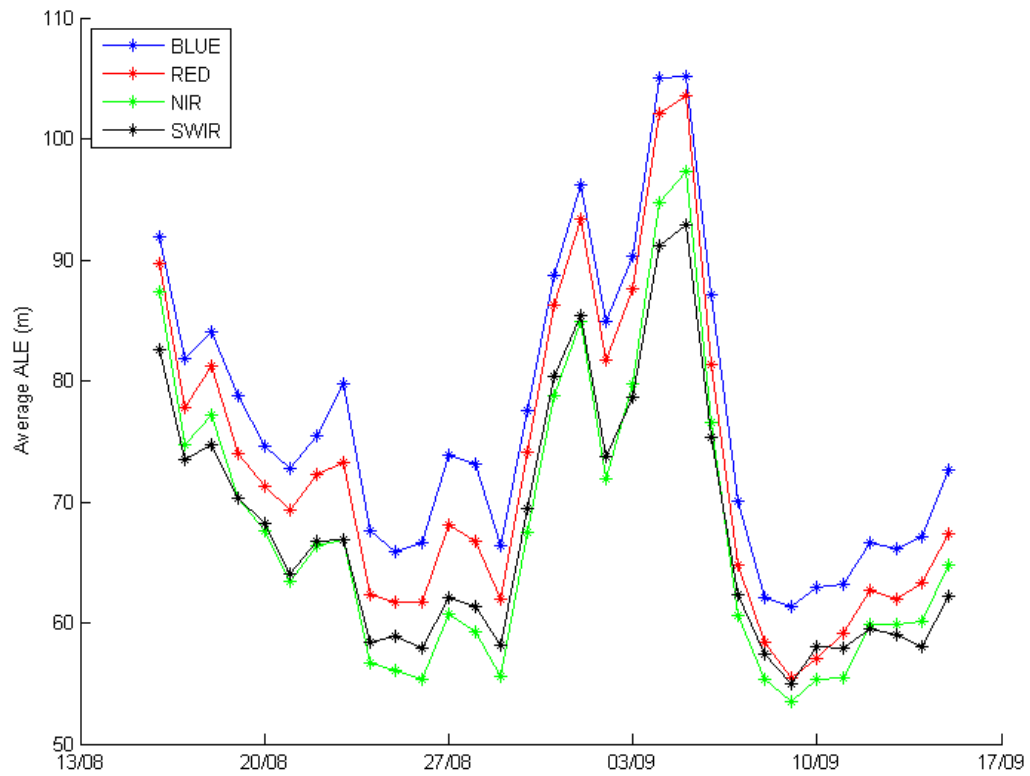


Figure 5: Daily ALE evolution for all PROBA-V spectral bands for 16/8/2017 – 15/9/2017.



## 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	PDF
<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-73</a>	Large geometirc shift (20160218-20160219)	Open	30/08/2017	Geometry

- 0 new issues were logged during this reporting period
- 0 issue(s) was resolved and closed during this reporting period
- 0 issues are resolved but remain to be closed formally
- 0 issues are resolved but remain in the list logging purposes
- 0 issue(s) is 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
Major Gaps (> 21600 km <sup>2</sup> (missing TFF))	1	11/09
Large Gaps (< 21600 km <sup>2</sup> )	1	13/09
Medium Gaps (< 10000 km <sup>2</sup> )	3	18/08, 25/08, 14/09
Minor Gaps (< 3600 km <sup>2</sup> )	2	08/09, 07/09
Negligible Gaps (< 1000 km <sup>2</sup> )	21	19/08, 24/08, 29/08, 23/08, 02/09, 28/08, 06/09, 01/09, 22/08, 27/08, 17/08, 16/08, 21/08, 31/08, 05/09, 10/09, 15/09, 30/08, 04/09, 09/09, 20/08
Complete synthesis (no gaps)	3	03/09, 26/08, 12/09

Table14: Overview of S1 for this reporting period

Synthesis	Missing	Decom. Error	Geom. Error	Missing TFF	Autom. Recovery	VC4 Missing	Create Contours	Other
20170816	0.00%	1						
20170817	0.01%	2						
20170818	3.64%	4	2		1		1	
20170819	0.15%	1	2					
20170820	0.03%		3					
20170821	0.01%	2						
20170822	0.05%		1					
20170823	0.40%		7					
20170824	0.02%	2	2					
20170825	2.51%	4	6		1			
20170826	0.00%							
20170827	0.41%	1						
20170828	0.00%	1						
20170829	0.01%	2						
20170830	0.02%	4						
20170831	0.01%	2						
20170901	0.44%	3						
20170902	0.01%	2						
20170903	0.00%							
20170904	0.01%	3						
20170905	0.38%	5						
20170906	0.00%	1						
20170907	1.11%	1	3		1			
20170908	0.46%	7	2		1	1		
20170909	0.11%	4	3			1		
20170910	0.37%	2	1					
20170911	9.45%	1		1	1			
20170912	0.00%							
20170913	0.01%	6	3					1
20170914	13.53%	1		1				
20170915	0.01%	2	3					

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:  
An improvement of the cloud detection algorithm is under investigation.
- No other activities scheduled.

## 7. Operational remarks

Since the first yaw manoeuvre on July 3, 2017 the number of decompression errors remains stable and low. The highest number of decompression errors now occurs when there are problems with the overpasses (lost frames and gaps).