



MONTHLY OPERATIONS REPORT

MOR#074

Reporting period from 16-Jan-2020 to 15-Feb-2020

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1. Summary

In this reporting period, the majority of the synthesis products were nearly complete. One missing transfer frame file and six automatic recoveries with visual impact were recorded. The amount of geometric errors remains at a high level, but closer look into the actual impact of these type of errors is very limited on the daily products. The actual reported missing percentage of pixels was estimated too high and currently refactoring of this algorithm and scripting is ongoing to reflect values that are closer to reality.

Besides a small bump on 12/02 in the average location error there were no anomalies recorded. Some minor trends on Red and NIR band were observed in the radiometric calibration assessment.

8 additional new users registered and downloaded PROBA-V data and the direct userbase surpassed 1755 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.

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	247
TFF	309	308	1	308

Table 2: Ingested and archived products for this reporting period

- Missing TFF: 23488

3.2. Generated and archived products

Product Type	Total	Processed	Error	Archived
PROBAV_L1A - Calibration	182	173	9	182
PROBAV_L1A - Nominal	2590	2588	2	2590
PROBAV_L1C	2588	2588	0	2588
PROBAV_L2A_100M	903	903	0	903
PROBAV_L2A_300M	2588	2588	0	2587
PROBAV_L2A_1KM	2588	2588	0	2588
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	30
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

11 * L1A error due geometric error

3.3. Backup and archiving service

Product type	Total Files	Total File Size (GB)
TFF	299	746.10
L1A	2694	1340.78
Database transaction logs	768	70.12
Database incremental back-up	42	13.46
Database full back-up	10	588.17

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

Product type	Total Files	Total File Size (GB)
PROBAV_TRANSFERFRAMES	280	746.48
PROBAV_L1A	2512	1339.95
PROBAV_L1C	2354	2660.89
PROBAV_L2A_100M	1062	760.84
PROBAV_L2A_300M	2984	411.84
PROBAV_L2A_1KM	2985	56.69
PROBAV_L3_S1_TOA_100M	35	793.07
PROBAV_L3_S1_TOC_100M	35	676.84
PROBAV_L3_S1_TOC_NDVI_100M	36	79.01
PROBAV_L3_S5_TOA_100M	8	738.06
PROBAV_L3_S5_TOC_100M	8	666.53
PROBAV_L3_S5_TOC_NDVI_100M	8	70.86
PROBAV_L3_S1_TOA_300M	35	385.06
PROBAV_L3_S1_TOC_300M	35	347.15
PROBAV_L3_S10_TOC_300M	3	62.22
PROBAV_L3_S10_TOC_NDVI_300M	4	5.99
PROBAV_L3_S1_TOA_1KM	36	55.81
PROBAV_L3_S1_TOC_1KM	36	50.93
PROBAV_L3_S10_TOC_1KM	4	10.76
PROBAV_L3_S10_TOC_NDVI_1KM	4	0.78
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	223	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	2588	0	138
PROBAV_L2A_100M	883	0	8
PROBAV_L2A_300M	2588	0	99
PROBAV_L2A_1KM	2588	0	1
PROBAV_L3_S1_TOA_100M	31	1943	882
PROBAV_L3_S1_TOC_100M	31	1348	669
PROBAV_L3_S1_TOC_NDVI_100M	31	5293	5098
PROBAV_L3_S5_TOA_100M	6	362	362
PROBAV_L3_S5_TOC_100M	6	367	367
PROBAV_L3_S5_TOC_NDVI_100M	6	362	368
PROBAV_L3_S1_TOA_300M	31	97	97
PROBAV_L3_S1_TOC_300M	31	120	197
PROBAV_L3_S10_TOC_300M	3	16	16
PROBAV_L3_S10_TOC_NDVI_300M	3	298	333
PROBAV_L3_S1_TOA_1KM	31	64	64
PROBAV_L3_S1_TOC_1KM	31	62	112
PROBAV_L3_S10_TOC_1KM	3	49	53
PROBAV_L3_S10_TOC_NDVI_1KM	3	766	774

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 **1759** with **121** different nationalities representing **1278** different companies/universities.

Product type	Africa	Asia	Europe	N- America	Oceania	S- America
PROBAV_L1C	0	165.12	0	0	0	0
PROBAV_L2A_100M	0	17.35	2.13	0	0	0
PROBAV_L2A_300M	0	0	26.36	0	0	0
PROBAV_L2A_1KM	0	0.04	0	0	0	0
PROBAV_L3_S1_TOA_100M	0	0	1390.30	25.56	0	0
PROBAV_L3_S1_TOC_100M	0.46	0	2960.08	455.22	0	0
PROBAV_L3_S1_TOC_NDVI_100M	0.04	0	0.15	59.87	0	0
PROBAV_L3_S5_TOA_100M	0	0	0	21.54	0	0
PROBAV_L3_S5_TOC_100M	18.69	0	0	22.39	0	0
PROBAV_L3_S5_TOC_NDVI_100M	0.15	0	0	3.13	0	0.52
PROBAV_L3_S1_TOA_300M	0	0	627.36	0	0	0
PROBAV_L3_S1_TOC_300M	0	0	685.11	241.38	0	0
PROBAV_L3_S10_TOC_300M	2.13	0	116.12	0	0	0
PROBAV_L3_S10_TOC_NDVI_300M	0.02	0.30	12.69	0	0	0.05
PROBAV_L3_S1_TOA_1KM	0	0	94.34	0	0	0
PROBAV_L3_S1_TOC_1KM	0	0	116.56	0	0	0
PROBAV_L3_S10_TOC_1KM	0.60	0.00	8.09	8.06	0	0
PROBAV_L3_S10_TOC_NDVI_1KM	0.03	0.03	11.04	0	0	0.01

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



Product Type	Global
L1C	165.12
PROBAV_L2A_100M	19.48
PROBAV_L2A_300M	26.36
PROBAV_L2A_1KM	0.04
PROBAV_L3_S1_TOA_100M	1415.86
PROBAV_L3_S1_TOC_100M	3415.77
PROBAV_L3_S1_TOC_NDVI_100M	60.06
PROBAV_L3_S5_TOA_100M	21.54
PROBAV_L3_S5_TOC_100M	41.08
PROBAV_L3_S5_TOC_NDVI_100M	3.80
PROBAV_L3_S1_TOA_300M	627.36
PROBAV_L3_S1_TOC_300M	926.49
PROBAV_L3_S10_TOC_300M	118.24
PROBAV_L3_S10_TOC_NDVI_300M	13.05
PROBAV_L3_S1_TOA_1KM	94.34
PROBAV_L3_S1_TOC_1KM	116.56
PROBAV_L3_S10_TOC_1KM	16.76
PROBAV_L3_S10_TOC_NDVI_1KM	11.10

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

Company	# Downloads
SAN JOSE STATE UNIVERSITY	6953
CESBIO	540
VITO	314
-	254
BAYERO UNIVERSITY	217
UNIVERSITÉ PARIS DIDEROT	188
ESA	158
DESCARTES UNDERWRITING	157
PLANETA	138
UCLouvain	113

Table 9: Top 10 user companies for the reporting period

Country	# Users
CHINA	178
BELGIUM	155
INDIA	84
FRANCE	83
BRAZIL	81
UNITED STATES	77
ITALY	74
UNITED KINGDOM	60
NETHERLANDS	60
GERMANY	56

Table 10: Top 10 countries with most registered users

List of issues raised by users:

Re: Proba-V MEP / Terrascope: Docker small maintenance window
Project Proposal id57814 (Okorie) - Final Acceptance
FW: Terrascope VM access to Belharmony folder
FW: API and/or how to connect to geospatial data
PDF: (API) - Mario Lebrato - 2020/2/8 - PROBA-V Mission Exploitation Platform - API and/or how to connect to geospatial data
Order "M0183356" is submitted
Question regarding cluster
Parallel met sparkcontext
No space left on device
RE: [VITO RS] Request received: Re: Proba-V MEP: migration of user VM's to Terrascope
Re: [VITO RS] Request received: Re: Proba-V MEP: migration of user VM's to Terrascope
Data Subject Request from Mandjo Bore under the GDPR
[user: j_leon] cores allocation
HD-AT INC0020741 - Incomplete Proba-V dataset
Terrascope UserVM access to /data/nca_vol1
INC0020741 - Incomplete Proba-V dataset

4. Image Calibration services

4.1. Radiometric Calibration

Calibration request type	Total	Processed	Not received	Error
CLOUDS	10	10	0	0
DARK CURRENT	14	11	0	3
MOON	2	2	0	0
RAYLEIGH	36	36	0	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	171	53	118
PROBA-V_L1B_INTERSECTION	796	342	454
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.

Similar observations can be made as in previous months :

- Over the whole mission the Libya-4 calibration results for RED and NIR bands of all cameras show a positive trend ; the trend is most pronounced for the RIGHT and LEFT camera. Currently the increasing trend for RED and NIR bands are not corrected for in the ICP files. The cause of this increasing trend is not yet fully understood.
- The positive trend in turn results in a more pronounced negative trend in the blue DCC results which are expressed relatively to the RED band.
- A lot of scattering is observed in Libya-4 results for the LEFT SWIR3 strip and the RIGHT SWIR1 strip. These are the “edge” strips and might be more affected by BRDF related changes due to the orbital drift.

One new bad pixel was identified :
CENTER SWIR3 Pixel ID 836 (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 new bad pixel will be added: CENTER SWIR3 Pixel ID 836 (0-based)

The current ICP files are:

- PROBAV_ICP_RADIOMETRIC#LEFT_20200204_V01
- PROBAV_ICP_RADIOMETRIC#CENTER_20200204_V01
- PROBAV_ICP_RADIOMETRIC#RIGHT_20200204_V01

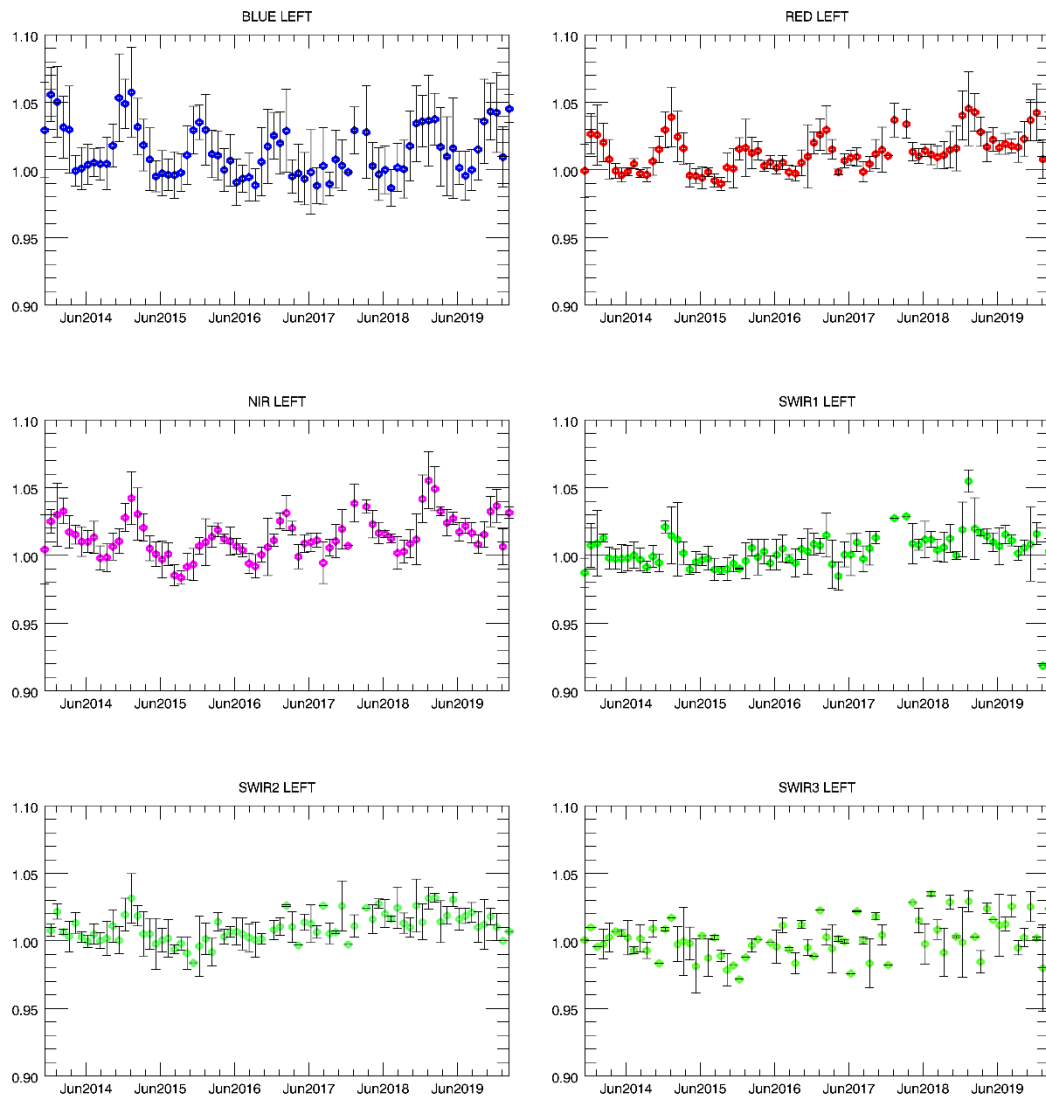


Figure 1. Libya-4 desert calibration results: LEFT monthly averaged results (collection 1)

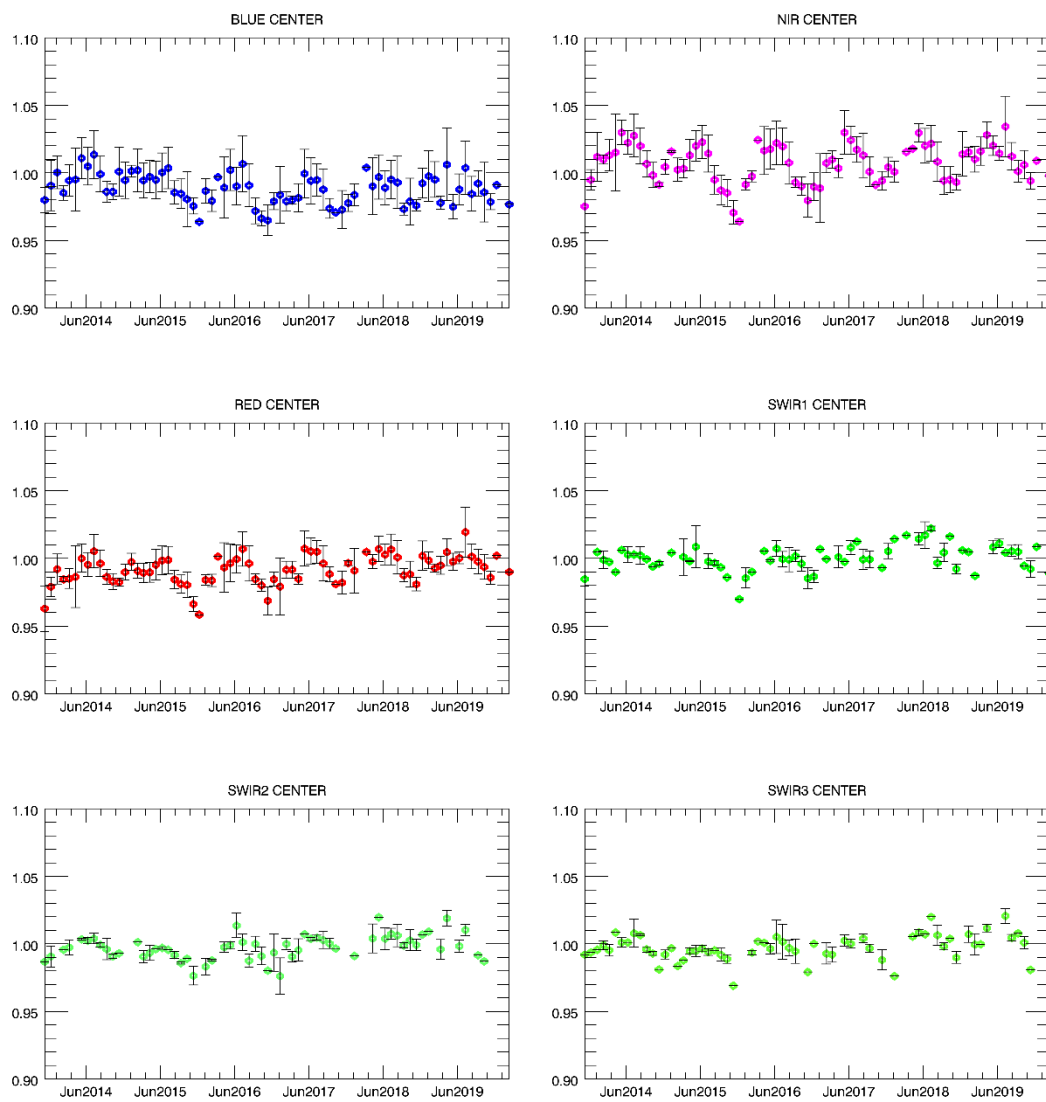


Figure 2. Libya-4 desert calibration results: CENTER monthly averaged results (collection 1)

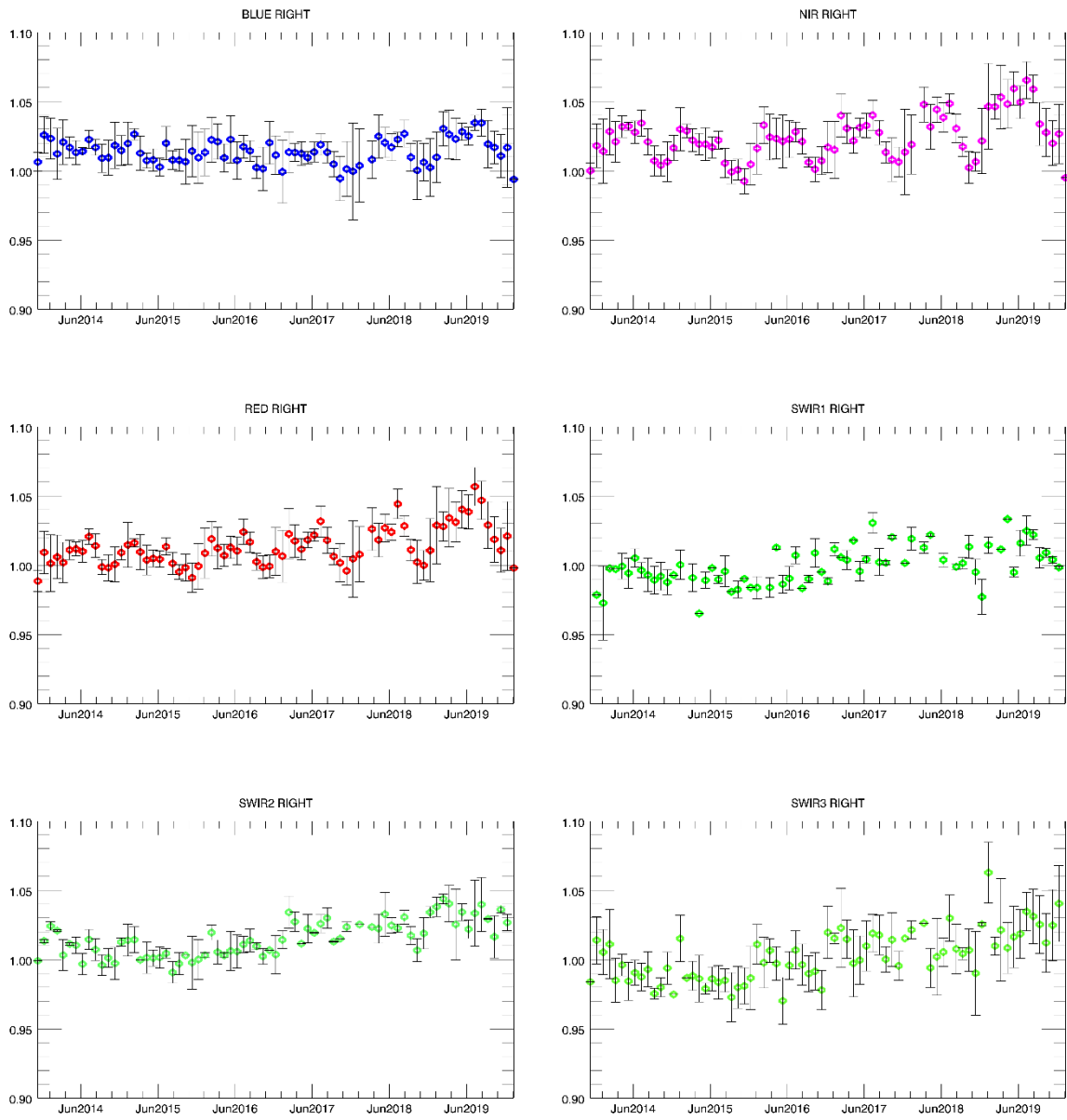


Figure 3. Libya-4 desert calibration results: RIGHT monthly averaged results (collection 1)

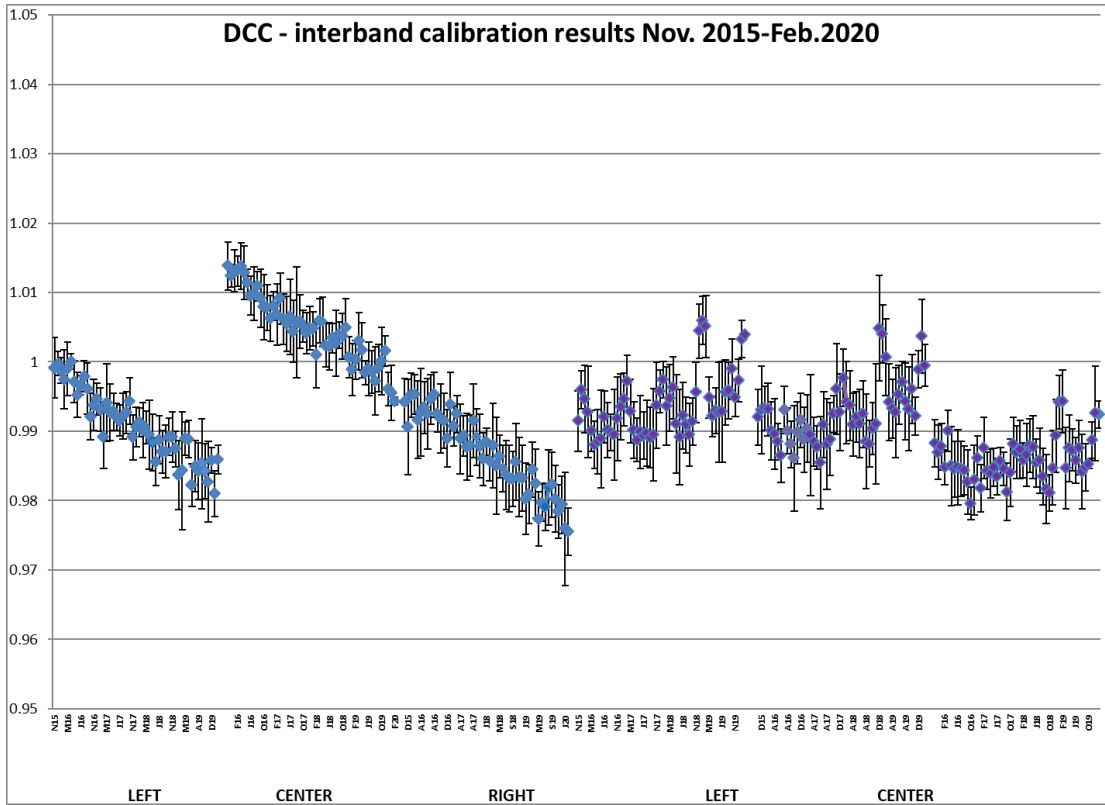


Figure 4. DCC inter-band calibration results: LEFT, CENTER and RIGHT camera (collection 1)

4.2. Geometric Calibration

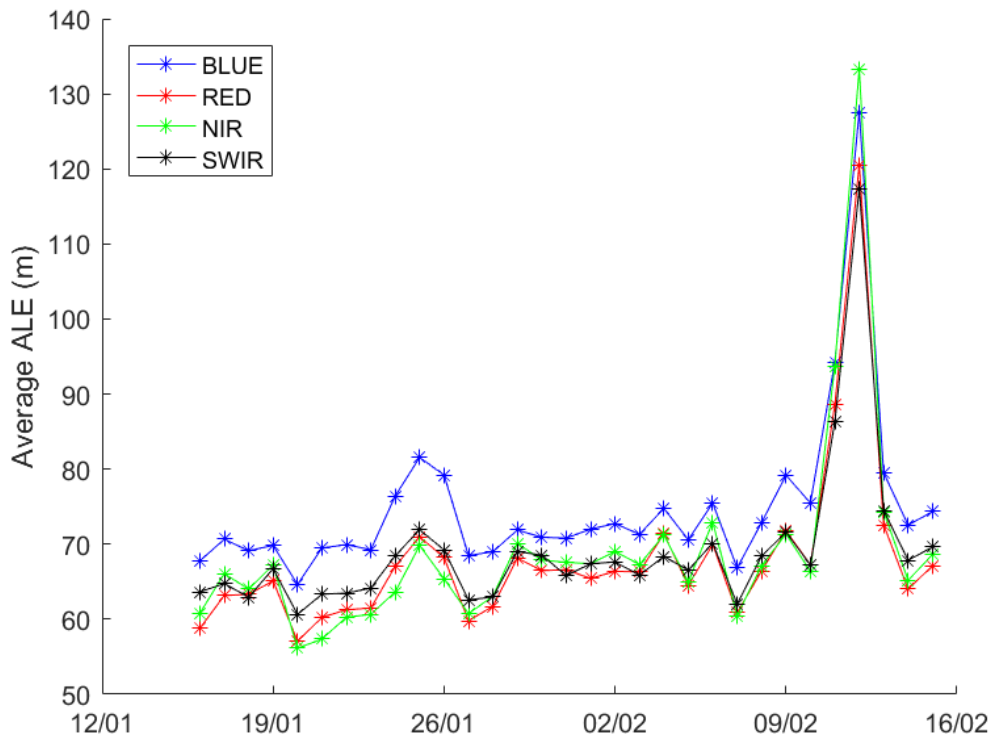
Calibration image type	Total	Processed	Error
PROBA-V_L1C_INTERSECTION	13847	13847	0

Table13: Processed calibration images for this reporting period

Geometric ICP file

During previous month, the average ALE was < 75 m ($\sigma < 96$ m). For most of the time, the ALE was well within 100 m, except for 12/2, for which an ALE of 117 – 127 m was observed. However, the sharp increase was followed by an equally sharp decrease and ALE values were down to 70 – 80 m during the last three days of the reporting period.

The average compliance was 99.15% (98.58% - 99.71% for BLUE – SWIR), with the lowest values (compliance < 95% for the BLUE channel) corresponding with the ALE maximum on 12/2.



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
PROBAVUS-7	Very small images fail to process	Resolved	10/01/2014	General
PROBAVUS-63	Cloud shadow detection at high solar zenith angles not working properly	Open	11/05/2016	Software
PROBAVUS-65	Processing statuses L2 products	In Progress	16/09/2016	Software
PROBAVUS-66	Cloud cover percentages on PDF products are not reliable	Resolved	19/10/2016	Software
PROBAVUS-68	ICP file version not taken into account when processing	In Progress	20/03/2017	Software
PROBAVUS-69	Version number of segment not filtered when querying for syntheses	Open	20/03/2017	Software
PROBAVUS-70	Investigate L2A artefact in data	Open	31/05/2017	Software
PROBAVUS-72	Status mask of data with decompression error is not correctly set	Open	22/06/2017	Software
PROBAVUS-75	Clear pixel edge in cloud shadow detection	Open	15/11/2017	Software

0 new issues were logged during this reporting period

0 issue(s) was resolved and closed during this reporting period

1 issues are resolved but remain to be closed formally

1 issues are resolved but remain in the list logging purposes

7 issue(s) 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
Major Gaps (> 21600 km² (missing TFF))	0	
Large Gaps (< 21600 km²)	1	14/02
Medium Gaps (< 10000 km²)	2	19/01, 24/01
Minor Gaps (< 3600 km²)	6	08/02, 13/02, 03/02, 31/01, 29/01, 10/02
Negligible Gaps (< 1000 km²)	22	16/01, 21/01, 26/01, 06/02, 11/02, 30/01, 25/01, 20/01, 12/02, 02/02, 07/02, 18/01, 28/01, 23/01, 09/02, 04/02, 01/02, 17/01, 27/01, 22/01, 05/02, 15/02
Complete synthesis (no gaps)	0	

Table14: Overview of S1 for this reporting period

Synthesis	Missing (*)	Decom. Error	Geom. Error	Missing TFF	Autom. Recovery	VC4 Missing	Create Contours	Other
20200116	4.71%		43					
20200117	2.90%	2	23					
20200118	1.98%		27					
20200119	4.28%	1	43		1			
20200120	3.29%		38					
20200121	6.50%		40					
20200122	6.89%	1	40					
20200123	5.61%	3	36					
20200124	8.40%	3	32		1			
20200125	6.44%	3	42					
20200126	6.79%	1	27					
20200127	4.69%	1	46					
20200128	3.73%	1	30					
20200129	7.02%	8	25		1			
20200130	4.47%		33					
20200131	5.84%	1	34					
20200201	8.89%	1	46					
20200202	9.54%		46					
20200203	11.97%		52					
20200204	9.00%	1	53					
20200205	9.03%		59					
20200206	6.55%	1	54					
20200207	7.40%	4	12					
20200208	8.07%	3	51		1			
20200209	5.88%		47					
20200210	5.57%	3	53		1			
20200211	12.22%		41					
20200212	11.86%	3	40					
20200213	11.06%	3	32		1		2	
20200214	13.84%	1	40	1				
20200215	7.74%	2	38					

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

(*) The displayed missing percentage of pixels are overestimated. Corrective actions are being taken to generate these figures in a more realistic way.

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