



MONTHLY OPERATIONS REPORT

MOR#033

Reporting period from 16-Aug-2016 to 15-Sep-2016

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1. Summary

In this reporting period, the majority of the synthesis products were complete. Anomalies impacting the incomplete products were automatic recoveries of the platform, some geometric instabilities and a low rate of decompression errors. Several transfer frame files were missing due to antenna issues at the Inuvik DRS and missing VC4 data of the platform due to MMM being blocked for some time.

There were no major issues with the image quality during this reporting period for the radiometric quality. A new set of ICP files were generated and implemented on 07/09 to correct for a small geometric degradation.

End of August a hardware upgrade of the firewall was executed without any interruptions in operation.

Lastly, after thorough testing by the VITO science team, the new algorithm has been implemented in production environment and initial off-line reprocessing of the entire PROBA-V archive has started since early August. Reprocessed products and implementation in NRT processing will be done after validation of a longer time series, currently projected for the September/October timeframe.

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 | 100.0 | 0.0 |
| Worker Nodes | 100.0 | 0.0 |
| PDF | 99.98 | 0.02 ^(*) |

Table 1: System Infrastructure availability for this reporting period

(*) some downtime registered on servers ORA4 + Pnode31

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 | 311 | 300 | 11 ^(*) | 300 |

Table 2: Ingested and archived products for this reporting period

(*) 11 missing TFF: 10864 – 10866 due to missing VC4 data; 10883 – 10887 due to MMM being blocked; 10970 – 10971 due to missing VC4 data; 10974 due to antenna failure at Inuvik DRS;

3.2. Generated and archived products

| Product Type | Total | Processed | Error | Archived |
|-----------------------------|-------|-----------|------------------|----------|
| PROBAV_L1A - Calibration | 297 | 297 | 0 | 297 |
| PROBAV_L1A - Nominal | 2548 | 2539 | 9 ^(*) | 2542 |
| PROBAV_L1C | 2539 | 2539 | 0 | 2538 |
| 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

(*) L1A errors: 2 in Radiometric Processing, 1 in Geometric Processing, 6 L1A errors due to automatic recovery

3.3. Backup and archiving service

| Product type | Total Files | Total File Size (GB) |
|------------------------------|-------------|----------------------|
| TFF | 303 | 775.73 |
| L1A | 2753 | 1385.83 |
| Database transaction logs | 2574 | 513.95 |
| Database incremental back-up | 211 | 227.8 |
| Database full back-up | 25 | 926.55 |

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

| Product type | Total Files | Total File Size (GB) |
|-----------------------------|-------------|----------------------|
| PROBAV_TRANSFERFRAMES | 853 | 2411.05 |
| PROBAV_L1A | 10122 | 4959.55 |
| PROBAV_L1C | 8308 | 9051.91 |
| PROBAV_L3_S1_TOA_100M | 37 | 983.30 |
| PROBAV_L3_S1_TOC_100M | 37 | 1024.47 |
| PROBAV_L3_S1_TOC_NDVI_100M | 37 | 122.80 |
| PROBAV_L3_S5_TOA_100M | 7 | 661.79 |
| PROBAV_L3_S5_TOC_100M | 7 | 690.40 |
| PROBAV_L3_S5_TOC_NDVI_100M | 7 | 79.87 |
| PROBAV_L3_S1_TOA_300M | 207 | 1998.21 |
| PROBAV_L3_S1_TOC_300M | 205 | 2034.92 |
| PROBAV_L3_S10_TOC_300M | 17 | 346.18 |
| PROBAV_L3_S10_TOC_NDVI_300M | 17 | 28.07 |
| PROBAV_L3_S1_TOA_1KM | 208 | 277.16 |
| PROBAV_L3_S1_TOC_1KM | 206 | 281.24 |
| PROBAV_L3_S10_TOC_1KM | 17 | 47.49 |
| PROBAV_L3_S10_TOC_NDVI_1KM | 17 | 3.61 |
| ICP_GEOMETRIC_CENTRE | 1 | 0.01 |
| ICP_GEOMETRIC_LEFT | 1 | 0.01 |
| 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 | 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 | 2556 | 115 | 326 |
| PROBAV_L3_S1_TOA_100M | 31 | 55 | 77 |
| PROBAV_L3_S1_TOC_100M | 31 | 4375 | 2793 |
| PROBAV_L3_S1_TOC_NDVI_100M | 31 | 595 | 352 |
| PROBAV_L3_S5_TOA_100M | 6 | 17 | 22 |
| PROBAV_L3_S5_TOC_100M | 6 | 662 | 730 |
| PROBAV_L3_S5_TOC_NDVI_100M | 6 | 556 | 611 |
| PROBAV_L3_S1_TOA_300M | 31 | 375 | 488 |
| PROBAV_L3_S1_TOC_300M | 31 | 867 | 1114 |
| PROBAV_L3_S10_TOC_300M | 3 | 176 | 182 |
| PROBAV_L3_S10_TOC_NDVI_300M | 3 | 652 | 671 |
| PROBAV_L3_S1_TOA_1KM | 31 | 157 | 158 |
| PROBAV_L3_S1_TOC_1KM | 31 | 228 | 330 |
| PROBAV_L3_S10_TOC_1KM | 3 | 126 | 141 |
| PROBAV_L3_S10_TOC_NDVI_1KM | 3 | 508 | 533 |

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 **926** with **100** different nationalities representing **712** different companies/universities.

| Product type | Africa | Asia | Europe | N-America | Oceania | S-America |
|-----------------------------|--------|--------|----------|-----------|---------|-----------|
| PROBAV_L1C | 0.95 | 4.29 | 718.61 | 0 | 0 | 0 |
| PROBAV_L3_S1_TOA_100M | 0.06 | 0 | 20.66 | 0.13 | 0 | 0 |
| PROBAV_L3_S1_TOC_100M | 0 | 726.00 | 20972.22 | 805.27 | 0 | 0 |
| PROBAV_L3_S1_TOC_NDVI_100M | 0 | 5.32 | 0.39 | 0.02 | 2.87 | 0 |
| PROBAV_L3_S5_TOA_100M | 0.26 | 0 | 4.47 | 0 | 0 | 0.11 |
| PROBAV_L3_S5_TOC_100M | 17.21 | 190.80 | 15.35 | 84.81 | 0 | 0 |
| PROBAV_L3_S5_TOC_NDVI_100M | 10.75 | 0.99 | 7.27 | 0.33 | 0.03 | 2.21 |
| PROBAV_L3_S1_TOA_300M | 0.04 | 6.73 | 1969.23 | 0.05 | 0 | 0 |
| PROBAV_L3_S1_TOC_300M | 0 | 0 | 1328.77 | 3417.34 | 0 | 66.34 |
| PROBAV_L3_S10_TOC_300M | 2.65 | 5.76 | 201.24 | 0 | 0 | 7.49 |
| PROBAV_L3_S10_TOC_NDVI_300M | 0.10 | 31.58 | 155.02 | 0.10 | 0 | 0.03 |
| PROBAV_L3_S1_TOA_1KM | 0 | 0.01 | 189.49 | 0 | 0 | 0 |

| | | | | | | |
|----------------------------|------|------|--------|------|---|------|
| PROBAV_L3_S1_TOC_1KM | 0.00 | 0.05 | 338.08 | 0 | 0 | 0 |
| PROBAV_L3_S10_TOC_1KM | 1.49 | 6.67 | 17.92 | 0.85 | 0 | 0 |
| PROBAV_L3_S10_TOC_NDVI_1KM | 0.01 | 3.78 | 2.92 | 4.18 | 0 | 0.15 |

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

| Product Type | Global |
|-----------------------------|----------|
| L1C | 723.84 |
| PROBAV_L3_S1_TOA_100M | 20.85 |
| PROBAV_L3_S1_TOC_100M | 22503.49 |
| PROBAV_L3_S1_TOC_NDVI_100M | 8.60 |
| PROBAV_L3_S5_TOA_100M | 4.84 |
| PROBAV_L3_S5_TOC_100M | 308.16 |
| PROBAV_L3_S5_TOC_NDVI_100M | 21.57 |
| PROBAV_L3_S1_TOA_300M | 1976.05 |
| PROBAV_L3_S1_TOC_300M | 4812.45 |
| PROBAV_L3_S10_TOC_300M | 217.14 |
| PROBAV_L3_S10_TOC_NDVI_300M | 186.83 |
| PROBAV_L3_S1_TOA_1KM | 189.50 |
| PROBAV_L3_S1_TOC_1KM | 338.13 |
| PROBAV_L3_S10_TOC_1KM | 26.94 |
| PROBAV_L3_S10_TOC_NDVI_1KM | 11.05 |

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

| Company | # Downloads |
|---------------------------|-------------|
| VITO | 1452 |
| GSI LTD | 1102 |
| BOKU VIENNA | 904 |
| ARID LAND RESEARCH CENTER | 740 |
| IFSULDEMINAS | 523 |
| GOOGLE | 490 |
| UNESCO-IHE | 423 |
| SUST | 301 |
| RBINS | 253 |
| IRD | 201 |

Table 9: Top 10 user companies for the reporting period

| Country | # Users |
|----------------|---------|
| CHINA | 92 |
| BELGIUM | 84 |
| ITALY | 47 |
| BRAZIL | 42 |
| FRANCE | 39 |
| UNITED STATES | 38 |
| UNITED KINGDOM | 37 |
| INDIA | 35 |
| NETHERLANDS | 34 |
| GERMANY | 29 |

Table 10: Top 10 countries with most registered users

List of issues raised by users:

ProbaV:

- S1 TOC NDVI
- PPT configuration file
- lost username
- Difficulté de téléchargement
- MEP account validation failed
- Download problems
- new FTP account and PBV order
- Looking for PROBA-V data
- new registration
- Change email address
- 3 passes lost
- relative spectral responses
- product customization tool - missing gdal dll error
- Klish - two expiring orders

4. Image Calibration services

4.1. Radiometric Calibration

| Calibration request type | Total | Processed | Not received | Error |
|--------------------------|-------|-----------|--------------|-------|
| CLOUDS | 17 | 16 | 1 | 0 |
| DARK CURRENT | 24 | 22 | 2 | 0 |
| MOON | 3 | 2 | 1 | 0 |
| RAYLEIGH | 61 | 57 | 2 | 2 |
| 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 | 3 | 3 | 0 |
| PROBA-V_L1B_CALIBRATION | 294 | 207 | 27 |
| PROBA-V_L1B_INTERSECTION | 638 | 456 | 182 |
| 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.

Radiometric ICP file

Long-term monthly Libya-4 mean plots for different cameras are given in Figure 1, Figure 2 and Figure 3. Deep convective clouds interband calibration results are given in Figure 4.

The calibration results for the VNIR and SWIR strips remain relatively stable. For the SWIR strips the linear degradation model is used to update monthly the absolute calibration coefficients of the different SWIR strips which explain the stable trend observed over the last months.

Two pixels in the CENTER SWIR3 strip, i.e. pixel 266 and 579, show a deviating response. It will be evaluated in the coming days if this can be sufficiently corrected for through a dark current update. If not, the pixels will have to be assigned the status "BAD".

- PROBAV_ICP_RADIOMETRIC#LEFT_20160823_V01
- PROBAV_ICP_RADIOMETRIC#CENTER_20160823_V01

- PROBAV_ICP_RADIOMETRIC#RIGHT_ 20160823_V01

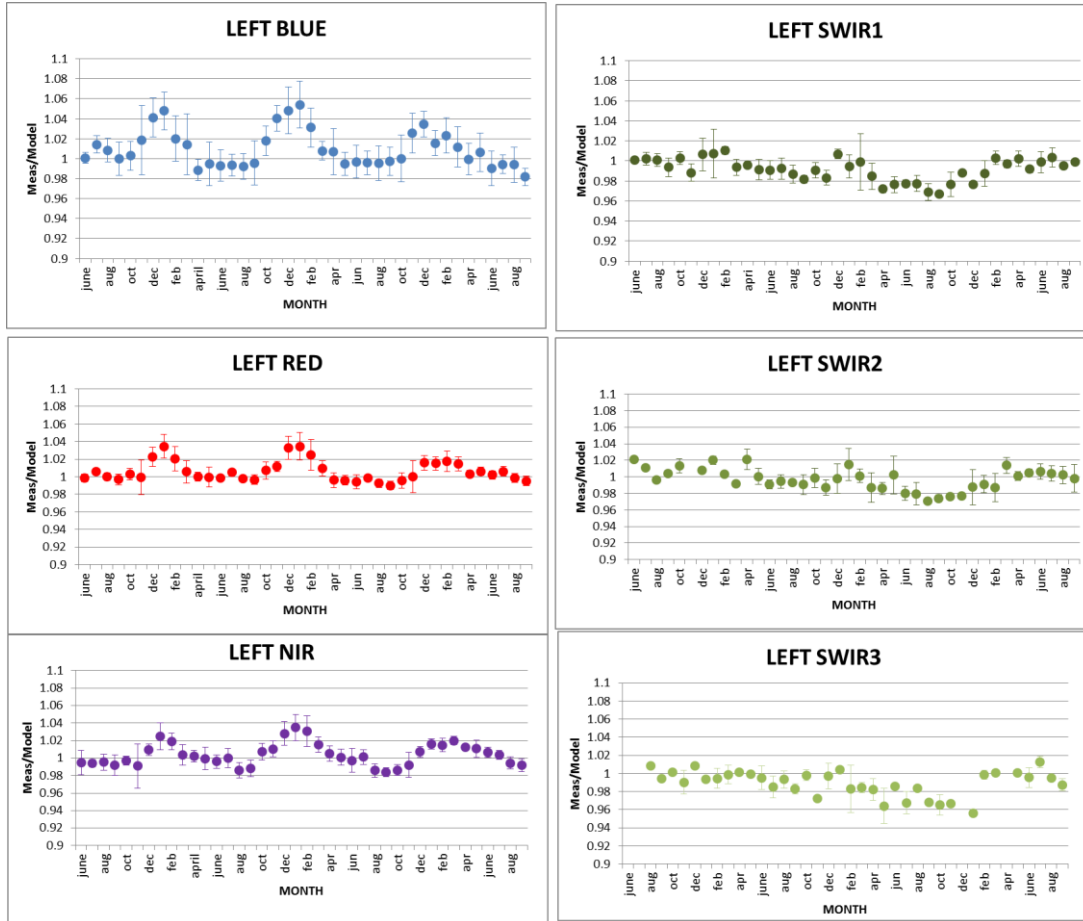


Figure 1. Libya-4 desert calibration results: LEFT monthly averaged results

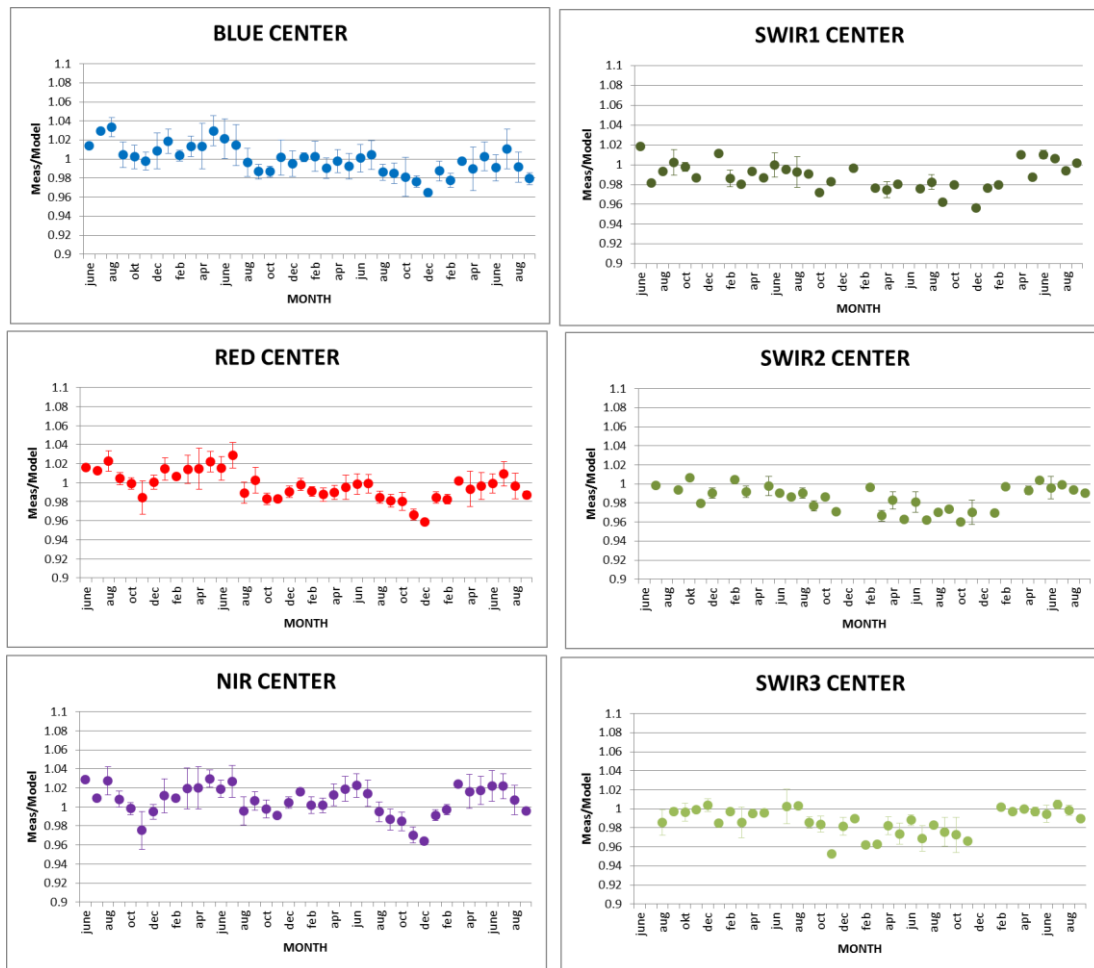


Figure 2. Libya-4 desert calibration results: CENTER monthly averaged results

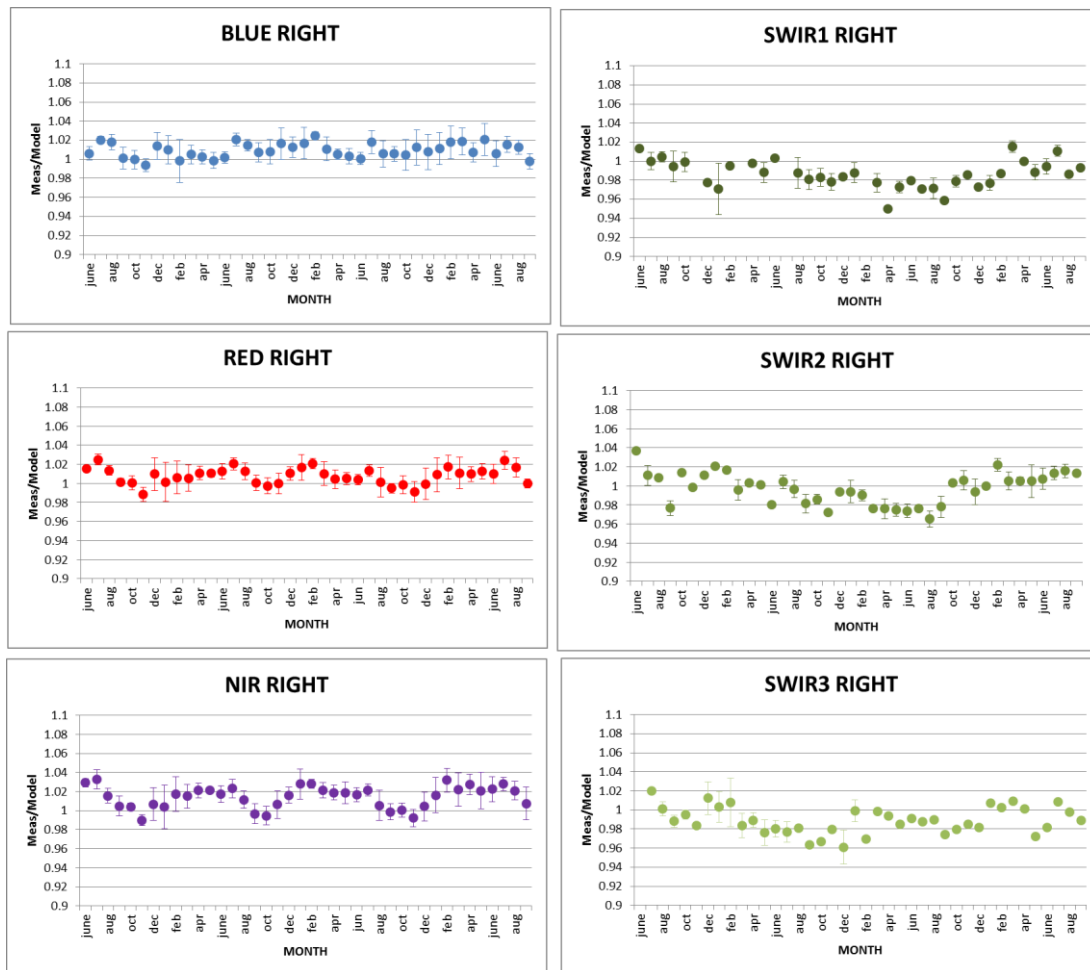


Figure 3. Libya-4 desert calibration results: RIGHT monthly averaged results

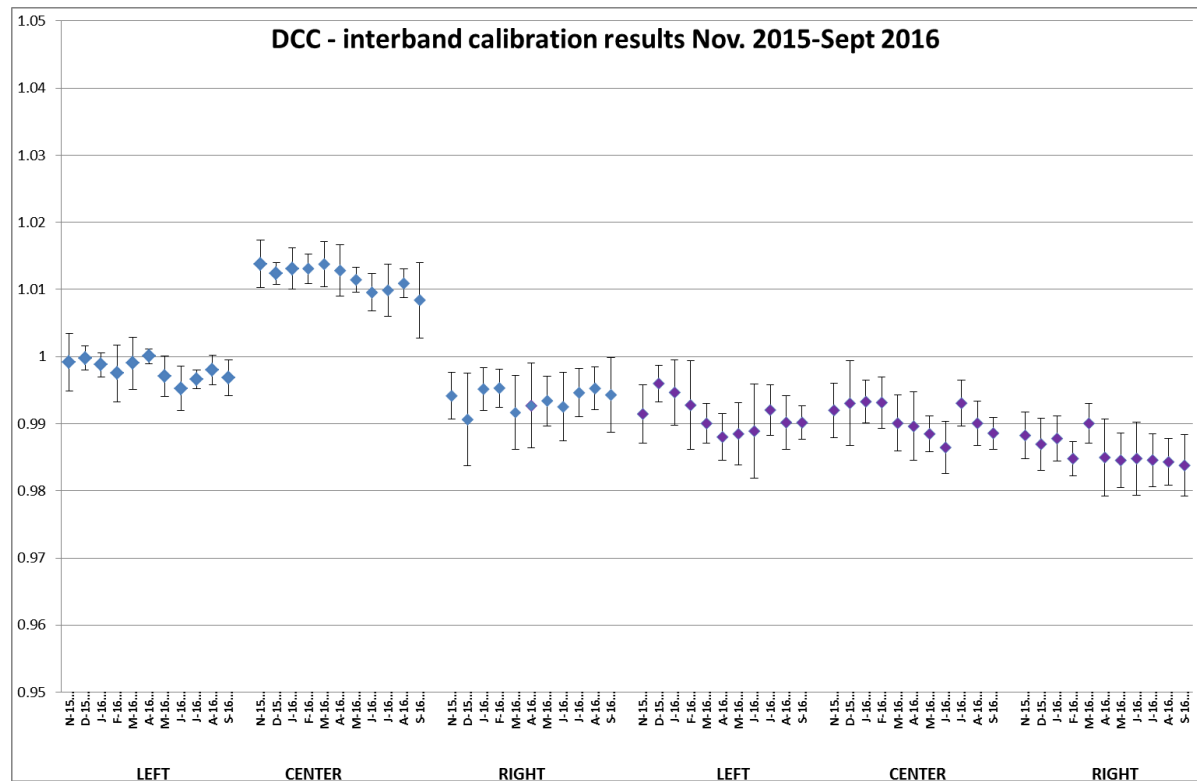


Figure 4. DCC inter-band calibration results: LEFT, CENTER and RIGHT camera

4.2. Geometric Calibration

| Calibration image type | Total | Processed | Error |
|--------------------------|-------|-----------|-------|
| PROBA-V_L1C_INTERSECTION | 13664 | 13664 | 0 |

Table13: Processed calibration images for this reporting period

During previous month, the average ALE was < 72 m ($\sigma < 86$ m). The daily ALE evolution (see Figure 5) shows three alternating minor maxima and minima between 20/8 and 2/9, with the highest peak value on 22/8 for the RED channel (85 m). A sharp ALE increase occurred between 3/9 and 7/9, with a highest value of 103 m for the RED channel on 7/9. These high values necessitated the implementation of a new geometric ICP file on 8/9, which effectively decreased the ALE towards 60 – 80 m for the remainder of the period.

The geometric accuracy was within the requirement of < 300 m, with an average compliance of 99.3% for all cameras and spanning a range from 98.9% for the BLUE channel to 99.8% for the SWIR channel. Throughout the month, no large fluctuations were recorded.

Geometric ICP file

- PROBAV_ICP_GEOMETRIC#LEFT_20160907_V01
- PROBAV_ICP_GEOMETRIC#CENTER_20160907_V01
- PROBAV_ICP_GEOMETRIC#RIGHT_20160907_V01
-

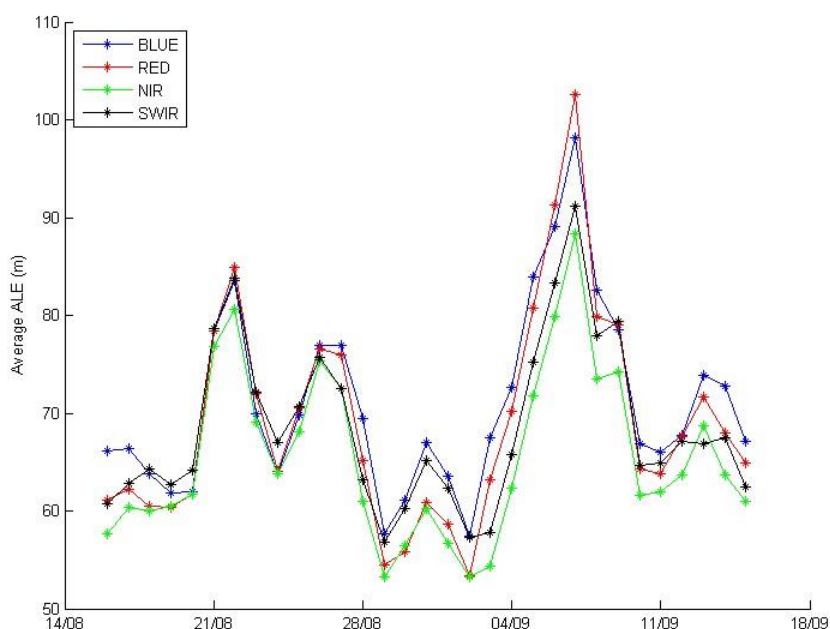


Figure 5 - Overview of the absolute location error in this reporting period

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 |
|-----------------------------|-------------------------------------------------------------------------|----------|------------|-------------|
| PROBAVUS-7 | Very small images fail to process | Resolved | 10/01/2014 | General |
| PROBAVUS-60 | LTDA Restore fails when product destination already exists on disk | Open | 22/01/2016 | Software |
| PROBAVUS-63 | Cloud shadow detection at high solar zenith angles not working properly | Open | 11/05/2016 | Software |
| PROBAVUS-65 | Processing statuses L2 products | Open | 16/09/2016 | Software |

1 new issue 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
1 issue(s) are resolved but remain in the list logging purposes
3 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 km² (missing TFF)) | 3 | 05/09, 14/09, 13/09 |
| Large Gaps (< 21600 km²) | 1 | 03/09 |
| Medium Gaps (< 10000 km²) | 8 | 26/08, 28/08, 12/09, 30/08, 09/09, 17/08, 01/09, 19/08 |
| Minor Gaps (< 3600 km²) | 0 | |
| Negligible Gaps (< 1000 km²) | 13 | 21/08, 10/09, 15/09, 25/08, 20/08, 22/08, 11/09, 27/08, 06/09, 18/08, 02/09, 24/08, 08/09 |
| Complete synthesis (no gaps) | 6 | 16/08, 31/08, 23/08, 07/09, 04/09, 29/08 |

Table14: Overview of S1 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 are planned
- No other activities scheduled.

7. Operational remarks

No operational remarks