



# QUARTERLY OPERATIONS REPORT

**QOR#013**

**Reporting period from 16/12/2016 to 15/03/2017**

**Reference: *PROBA-V\_D7\_QOR-013\_2017-Q1\_v1.0***

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## 1. Summary

In this reporting period, the majority of the synthesis products were nearly complete, but we see a slight increase of 'geometric errors' on a daily basis, which is monitored rigourously. These geometric instabilities result in small lines of data being set to 'no data' if they exceed a certain ALE threshold. Other factors that resulted data gaps were some missing transfer frame files, mainly due to high winds at the data reception station, automatic recoveries, some missing VC4 data and decompression errors.

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

In this reporting period, the reprocessing campaign towards Collection 1 (C1) was completed on February 7th. All reprocessed PROBA-V data in all spatial resolutions is now available in HDF5 and geoTIFF format via the Product Distribution Facility, including the newly introduced L2A products. Collection 0 (C0) data was available to the public until 1 March 2017. A news letter to the entire user community was communicated on 15 February, while at the same time the reprocessed collection 3 (C3) of SPOT-VGT was released.

Furthermore, a quality page has been launched on the PROBA-V website containing information on the product evaluation, calibration and some info on the PROBA-V Quality Working Group. The products evaluation page contains links to documents related to the evaluation of PROBA-V C1, SPOT-VGT C3 and the comparison of PROBA-V C1, SPOT-VGT C3 collections.

A new version of the PROBA-V Product User Manual was also published, mostly containing links to the above documents and more explanation on the PROBA-V Mission Exploitation Platform (MEP) applications. The MEP environment also has access to the new reprocessed collection of PROBA-V and SPOT-VGT.

Due to a planned power interruption on February 9, 2017, most of the nominal PROBA-V processing servers were shut down for several hours to prevent any damage on the system. They were restarted the same day, and most of the products were nicely delivered on time. No other system related events were logged.

No new developments are expected in the coming period.

## 2. System Infrastructure

### 2.1. PROBA-V System infrastructure

Category	% Up Time	% Down Time
Switches	100.0	0.0
Database Servers	99.99	0.01
Mid Term File Servers	99.99	0.01
Short Term File Servers	100.0	0.32
Master Servers	99.67	0.33
Worker Nodes	98.64	1.36
PDF	100.0	0.0

Table 1: PROBA-V System Infrastructure availability for this reporting period

### 2.2. MEP System infrastructure

Category	Group	% Up time	% Down time
OpenStack	Compute nodes	99.95	0.05
	Controller nodes	100.0	0.0
	Stacklight servers	100.0	0.0
Hadoop	Processing nodes	97.57	2.43

Table 2: MEP 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	720	720	0	720
TFF	900	892	8 <sup>(*)</sup>	892

Table 3: Ingested and archived products for this reporting period

- (\*)
- \* TFF 12055 missing due to no data from pass at USAK DRS.
  - \* TFF 12248, TFF 12496, TFF 12497, TFF 12498, TFF 12499, TFF 12500 lost due to strong winds at the DRS.
  - \* TFF 12575 - VC4 data missing.

### 3.2. Generated and archived products

Product Type	Total	Processed	Error	Archived
PROBAV_L1A - Calibration	1106	1106	0	1106
PROBAV_L1A - Nominal	7538	7470	68	7476
PROBAV_L1C	7470	7470	0	7469
PROBAV_L3_S1_TOA_100M	90	90	0	90
PROBAV_L3_S1_TOC_100M	90	90	0	90
PROBAV_L3_S1_TOC_NDVI_100M	90	90	0	90
PROBAV_L3_S5_TOA_100M	18	18	0	18
PROBAV_L3_S5_TOC_100M	18	18	0	18
PROBAV_L3_S5_TOC_NDVI_100M	18	18	0	18
PROBAV_L3_S1_TOA_300M	90	90	0	90
PROBAV_L3_S1_TOC_300M	90	90	0	90
PROBAV_L3_S10_TOC_300M	9	9	0	9
PROBAV_L3_S10_TOC_NDVI_300M	9	9	0	9
PROBAV_L3_S1_TOA_1KM	90	90	0	90
PROBAV_L3_S1_TOC_1KM	90	90	0	90
PROBAV_L3_S10_TOC_1KM	9	9	0	9
PROBAV_L3_S10_TOC_NDVI_1KM	9	9	0	9

Table 4: Generated and archived products for this reporting period

### 3.3. Backup and archiving service

Product type	Total Files	Total File Size (GB)
TFF	720	2265.22
L1A	8340	3905.78
Database transaction logs	5518	1424.71
Database incremental back-up	228	262.98
Database full back-up	48	3723.08

Table 5: Back-up data volumes for this reporting period

Product type	Total Files	Total File Size (GB)
PROBAV_TRANSFERFRAMES	4873	13577.07
PROBAV_L1A	53532	27756.35
PROBAV_L1C	48126	55011.53
PROBAV_L3_S1_TOA_100M	1159	30283.32
PROBAV_L3_S1_TOC_100M	1120	28976.94
PROBAV_L3_S1_TOC_NDVI_100M	1377	3981.77
PROBAV_L3_S5_TOA_100M	293	28100.13
PROBAV_L3_S5_TOC_100M	322	30966.79
PROBAV_L3_S5_TOC_NDVI_100M	263	2774.93
PROBAV_L3_S1_TOA_300M	1628	18627.61
PROBAV_L3_S1_TOC_300M	1524	17747.67
PROBAV_L3_S10_TOC_300M	112	2275.35
PROBAV_L3_S10_TOC_NDVI_300M	94	161.12
PROBAV_L3_S1_TOA_1KM	1623	2582.44
PROBAV_L3_S1_TOC_1KM	1598	2551.95
PROBAV_L3_S10_TOC_1KM	109	305.50
PROBAV_L3_S10_TOC_NDVI_1KM	91	19.69
ICP_GEOMETRIC_CENTRE	0	0
ICP_GEOMETRIC_LEFT	0	0
ICP_GEOMETRIC_RIGHT	0	0
ICP_RADIOMETRIC_CENTRE	11	0.46
ICP_RADIOMETRIC_LEFT	11	0.46
ICP_RADIOMETRIC_RIGHT	11	0.46
METEO_ECMWF	704	0.87
METEO_METEOSERVICES	704	3.75
POLARMOTION	3	0.00

Table 6: Archived data volumes for this reporting period

### 3.4. Dissemination service

Product type	Added to catalogue	Ordered	Delivered (*)
PROBAV_L1C	7473	264	270
PROBAV_L3_S1_TOA_100M	90	4159	1703
PROBAV_L3_S1_TOC_100M	90	10465	8779
PROBAV_L3_S1_TOC_NDVI_100M	90	4283	3698
PROBAV_L3_S5_TOA_100M	18	454	563
PROBAV_L3_S5_TOC_100M	18	1113	1154
PROBAV_L3_S5_TOC_NDVI_100M	18	2168	2834
PROBAV_L3_S1_TOA_300M	90	519	570
PROBAV_L3_S1_TOC_300M	90	2435	38460
PROBAV_L3_S10_TOC_300M	9	294	297
PROBAV_L3_S10_TOC_NDVI_300M	9	812	1108
PROBAV_L3_S1_TOA_1KM	90	437	453
PROBAV_L3_S1_TOC_1KM	90	695	1792
PROBAV_L3_S10_TOC_1KM	9	258	382
PROBAV_L3_S10_TOC_NDVI_1KM	9	1488	1697

Table 7: Ordered and delivered products for this reporting period

(\*) If amount of delivered products exceeds ordered products, some products have been downloaded multiple times.

### 3.5. End-user activity

43 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 **1073** with **105** different nationalities representing **818** different companies/universities.

Product Type	# Users
PROBA-V Level 1C	15
PROBA-V Level 2A 1KM	3
PROBA-V Level 2A 300M	2
PROBA-V S1 1KM TOA	25
PROBA-V S1 1KM TOC	24
PROBA-V S1 100M TOA	17
PROBA-V S1 100M TOC	38
PROBA-V S1 100M TOC NDVI	21
PROBA-V S1 300M TOA	18
PROBA-V S1 300M TOC	28
PROBA-V S5 100M TOA	9
PROBA-V S5 100M TOC	34





PROBA-V S5 100M TOC NDVI	42
PROBA-V S10 1KM TOC	21
PROBA-V S10 300M TOC	41

Table 8: End-Users per product type for the reporting period

Country	# of downloads
BELGIUM	16 564
UNITED STATES	5 127
UNITED KINGDOM	3 831
RUSSIAN FEDERATION	3 492
CHINA	3 091
IRAQ	2 348
FRANCE	1 786
AUSTRIA	1 735
ITALY	1 255
NETHERLANDS	1 205

Table 8: Top 10 countries with most product downloads this reporting period

User	# of downloads
Wolterse	4,686
earthengine-proba	4,022
nitinbhatia	3,966
Padilla	3,624
Sterckxs	2,560
Hamdan2017	2,348
Aklisch	1,735
UCLouvain	1,732
Caoxuejia	1,661
Nikolay	1,589

Table 9: Top 10 users with most product downloads this reporting period

Company	# of downloads
VITO	14218
GOOGLE	4026
UNIVERSITY OF LEICESTER	3624
BASRAH	2349
UCLouvain	1924
BOKU VIENNA	1735
BEIJING FORESTRY UNIVERSITY	1661
IKI-RAS	1437
METEO FRANCE	1437
UNESCO-IHE	1238

Table 10: Top 10 companies with most product downloads this reporting period

Product type	Africa	Asia	Europe	N-America	Oceania	S-America
PROBAV_L1C	0	7.14	548.22	0	0	0
PROBAV_L3_S1_TOA_100M	0.89	525.92	130.79	0	0	0.01
PROBAV_L3_S1_TOC_100M	0	5006.62	2340.72	22558.93	0	0
PROBAV_L3_S1_TOC_NDVI_100M	22.53	25.79	2.54	0	0	0.07
PROBAV_L3_S5_TOA_100M	0	2255.19	59.38	0	0	0.02
PROBAV_L3_S5_TOC_100M	106.93	99.43	2507.78	357.88	0	0.09
PROBAV_L3_S5_TOC_NDVI_100M	25.45	38.43	308.59	528.32	0.10	3.52
PROBAV_L3_S1_TOA_300M	0	4.12	3614.57	0	0	0
PROBAV_L3_S1_TOC_300M	0	0.10	12042.68	11469.27	0	0
PROBAV_L3_S10_TOC_300M	12.28	56.80	564.22	0	0	0.18
PROBAV_L3_S10_TOC_NDVI_300M	0.06	5.97	11.77	0	0.03	1.68
PROBAV_L3_S1_TOA_1KM	0.00	0.01	486.45	0	0	0.12
PROBAV_L3_S1_TOC_1KM	0.01	0	1797.93	3.11	0.00	0
PROBAV_L3_S10_TOC_1KM	8.20	0.00	69.46	2.57	0	0
PROBAV_L3_S10_TOC_NDVI_1KM	12.17	31.05	6.28	24.99	0	0.28

Table 11: Data download (GB) in total per Origin of the User for the reporting period



Product Type	Global
L1C	555.36
PROBAV_L3_S1_TOA_100M	657.60
PROBAV_L3_S1_TOC_100M	29906.27
PROBAV_L3_S1_TOC_NDVI_100M	50.94
PROBAV_L3_S5_TOA_100M	2314.58
PROBAV_L3_S5_TOC_100M	3072.12
PROBAV_L3_S5_TOC_NDVI_100M	904.42
PROBAV_L3_S1_TOA_300M	3618.70
PROBAV_L3_S1_TOC_300M	23512.06
PROBAV_L3_S10_TOC_300M	633.48
PROBAV_L3_S10_TOC_NDVI_300M	19.51
PROBAV_L3_S1_TOA_1KM	486.59
PROBAV_L3_S1_TOC_1KM	1801.04
PROBAV_L3_S10_TOC_1KM	80.23
PROBAV_L3_S10_TOC_NDVI_1KM	74.76

Table 12: Data download (GB) in total per Region of Interest for the reporting period



### 3.6. Helpdesk

The following helpdesk issues have been raised in this reporting period:

- \* calendar ordering problem
- \* Free proba data
- \* Order "M0159492" is completed
- \* PDF: N.A. - fatemeh farzanehpy - 2016/12/16
- \* Order "M0159503" is completed
- \* PDF issue - Malinee
- \* Collection 0 done?
- \* Proba V imagery for Zambia site
- \* Sample python script for Spark
- \* information - Patagonia image
- \* Problems uploading the ordered data
- \* Software that can read Probav
- \* Availability of PROBA V101 data
- \* Lost username
- \* Download in TIFF format and IDRISI cannot be imported because RGB Full Color Image is not supported
- \* Subscription LST for Proba-v App team
- \* Products of order "M0022500" (they do not include the .h5 format LAI data)
- \* Quicklook data for PROBA-V Image Products
- \* FTP Download Connection Problems
- \* SPOT NDVI dataset (2015 and 2016)
- \* Spot vegetation derived products
- \* Documentation subscription process
- \* Forgot my credentials
- \* NDVI 1km V2 C3
- \* confirm JRC email addresses
- \* Europe S10s VGT niet accessible

## 4. Mission Exploitation Platform

November 9, 2016 marked the start of the MEP operational services. It consists out of 4 applications of which user and service statistics will be reported in this paragraph.

### 4.1. N-Daily compositor

The N-daily compositor generates temporal composites starting from PROBA-V daily synthesis products (S1) and currently beholds the entire 1km and 300 m catalogue.

Product Type	Succeeded	Failed	Killed	Total
TOA 1 KM	3	0	0	3
TOC 1 KM	33	2	3	38
TOA 300 M	0	0	0	0
TOC 300 M	82	3	4	89
TOA 100 M (*)	0	0	0	0
TOC 100 M (*)	0	0	0	0

Table 9 : Amount of jobs executed per product family

Succeeded: Job finished successfully

Failed: Job failed due to an error

Killed: Job was killed by user

(\*) The 100 m collection is not yet available for processing in this release iteration.

Application LINK: <https://proba-v-mep.esa.int/applications/n-daily-compositor/app>

### 4.2. Geo Viewer

The Geo Viewer application shows the PROBA-V data in full resolution. The application currently comprises all 1 km data, 10-daily composites at 300 m and 5 daily TOC color composites in 100 m.

Users	Sessions	Median response time Geoservers
1037	2371	765 ms

Table 10: User statistics Geo Viewer application this reporting period

Application LINK: <https://proba-v-mep.esa.int/applications/geo-viewer/app/>

### 4.3. Time Series Viewer

This application allows you to explore and view PROBA-V time series and in the future as well derived indicators for vegetation and environmental monitoring.

Users	Sessions	Median response time TSViewer
25	34	4.99 ms

Table 11: User statistics Time Series Viewer application this reporting period

Application LINK: <https://proba-v-mep.esa.int/applications/time-series-viewer/app/app.html>

### 4.4. User VMs

With the user Virtual Machine (VM), a developer or researcher can access a Virtual Research Environment with access to the complete PROBA-V data archive and a powerful set of tools and libraries to work with the data (e.g. SNAP toolbox, GRASS GIS, QGIS) or to develop-debug test applications (R, Python or Java).

Total # VMs (*)	New VMs this reporting period (**)
43	8

Table 12: User statistics on total and new amount of VM this reporting period

(\*) Total amount of user VMs include test accounts, 18 in total

(\*\*) In total 1 new test account

## 5. Image Calibration services

In the Image Quality Report 'PROBAV\_D9\_IQR-012\_2016-Q4\_v1.0.pdf', the calibration services are elaborated in detail, in this report a short summary is given.

### 5.1. Radiometric Calibration

Calibration request type	Total	Processed	Not received	Error
CLOUDS	45	45	0	0
DARK CURRENT	62	61	1	0
MOON	5	5	0	0
RAYLEIGH	142	139	3	0
SNOW	169	167	2	0
SUN_GLINT	0	0	0	0

Table 13: Calibration Image requests for this reporting period

Calibration image type	Total	Valid	Invalid
PROBA_V_L1A_CALIBRATION	5	5	0
PROBA-V_L1B_CALIBRATION	1101	970	131
PROBA-V_L1B_INTERSECTION	2266	1053	1213
PROBA-V_L1B_OVERLAPREGION	0	0	0

Table 14: 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.....

## 5.2. Geometric Calibration

Calibration image type	Total	Processed	Error
PROBA-V_L1C_INTERSECTION	40018	40018	0

Table 15: Processed calibration images for this reporting period

In the Image Quality Report 'PROBAV\_D9\_IQR-013\_2017-Q1\_v1.0.pdf', the calibration services are elaborated in detail, in this report a short summary is given.

## 6. Anomalies

### 6.1. 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	Open	16/09/2016	Software
<a href="#">PROBAVUS-66</a>	Cloud cover percentages on PDF products are not reliable	Open	19/10/2016	Software
<a href="#">PROBAVUS-67</a>	PDF customisation.exe: L2 geotiff bands are not grouped	Closed	25/11/2016	PDF

0 new issues were logged during this reporting period  
 1 issue(s) was resolved and closed during this reporting period  
 0 issues are resolved but remain to be closed formally  
 1 issue is resolved but remains in the list logging purposes  
 3 issue(s) is open and remain to be solved



## 6.2. Image processing issues

During the last months the following image processing issues were logged:

- Missing Transfer Frame Files
- A decreasing amount of decompression errors
- Automatic recoveries
- Geometric errors
- Missing VC4 data

A detailed description of each issue is available in the Weekly Reports and the image processing tracking system <https://juniper.vgt.vito.be/ciptools>

## 7. Technical status assessment

### 7.1. Major Issues

No major issues were logged this reporting period.

### 7.2. Evolution progress status

The following versions of the subsystems are currently installed:

- Packages: 1.0.4
- Jodi: 3.1.0
- Jodiconsole: 3.1.0
- UAV: 2.0.0
- PVCommon: 2.1.0
- DIF: 2.3.0
- PF: 2.8.3
- PDF: 3.0.0
- ICQ: 2.0.0
- IPC: 2.0.0
- PQC: 2.3.0
- LTDA: 3.1.0
- SYS: 2.5.0

### 7.3. Action Items

A complete list of action items can be found in the quarterly management report: "PROBAV\_D1\_QMR-013\_2017-Q1\_v1.0". All action items were discussed and formulated at the PROBA-V Quality Working Group, held in November 2016 or at the JPV #7 meeting.

## 8. Scheduled activities for the next period(s)

- Software upgrades:  
No software upgrades planned
- Hardware:  
The servers currently used for the reprocessing activities will be shifted towards the nominal production to phase out the legacy servers. This is planned for the next coming months.
- Development:  
No developments expected.
- Other activities:  
No specific activities planned.