QUARTERLY OPERATIONS REPORT

QOR#012

Reporting period from 16/09/2016 to 15/12/2016

DOCUMENT CONTROL

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1. Summary

In this reporting period, the majority of the synthesis products were nearly complete. On November 17th, a planned on-board switch from the primary to the redundant lane was performed, causing loss of data for that day. Other factors that influenced data gaps were decompression errors and automatic recoveries. An increased amount of geometric errors have been observed in the past ten days. This will be closely investigated. Only one transfer frame file was missing this period due to an automatic recovery of the platform during an X-band pass. There were however some late deliveries of the RAW data by the INUVIK ground station.

Next to the regular distribution channel, the PROBA-V Mission Exploitation Platform (MEP) was also deployed in an operational context on November 9, 2016. Applications such as the N-daily compositor, Time series viewer, Geoviewer are being monitored and Virtual Machines close to the data can be initiated. User and system statistics are also included in each quarterly report from this report onwards.

A successful validation of one year of reprocessed data of 'Collection 1' was performed by the VITO science team. This resulted in the decision to switch the NRT processing to use the new cloud detection algorithm. The switch was executed on December 5th, 2016 without any interruptions in the user subscriptions. At the same time, a first batch of Collection 1 (C1) data was released along with the accompanying L2A products. At the time of writing the report, data of February 2016 is being reprocessed onwards at a steady processing rate of 7-8 days of data per day. Expectation is that the complete reprocessing campaign will be finished at the end of January 2017.

During this reporting period we reached the milestone of reaching more than 1000 active PROBA-V users through our PDF distribution channel.

A new product user manual (V2.0) was released on 26/10. It contains changes for collection 1 of the data alongside a variety of other minor updates.

In an agreement with ESA, it was decided to seize the generation and distribution of the PV weekly operation reports as from 11/10/2016. Instead, an overview of the daily anomalies has been added in section 5.2 of the monthly reports.

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

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	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	99.99	0.01
PDF	99.99	0.01

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**	100.0	0.0
	Controller nodes	100.0	0.0
	Stacklight servers	100.0	0.0
Hadoop	**Processing nodes**	100.0	0.0

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	728	728	0	726
TFF	910	909	1$^{(*)}$	909

Table 3: Ingested and archived products for this reporting period

$^{(*)}$ Missing TFF's: 1 due to an automatic recovery during an X-band pass

3.2. Generated and archived products

Product Type	Total	Processed	Error	Archived
PROBAV_L1A - Calibration	1022	1020	2	1022
PROBAV_L1A - Nominal	7660	7632	28	7644
PROBAV_L1C	7632	7632	0	7632
PROBAV_L3_S1_TOA_100M	91	91	0	91
PROBAV_L3_S1_TOC_100M	91	91	0	91
PROBAV_L3_S1_TOC_NDVI_100M	91	90	0	91
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	91	91	0	91
PROBAV_L3_S1_TOC_300M	91	91	0	91
PROBAV_L3_S10_TOC_300M	9	9	0	9
PROBAV_L3_S10_TOC_NDVI_300M	9	9	0	9
PROBAV_L3_S1_TOA_1KM	91	91	0	91
PROBAV_L3_S1_TOC_1KM	91	91	0	91
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	891	2285.06
L1A	8423	4045.69
Database transaction logs	6454	1844.87
Database incremental back-up	356	416.59
Database full back-up	44	1725.07

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

Product type	Total Files	Total File Size (GB)
PROBAV_TRANSFERFRAMES	7493	20696.67
PROBAV_L1A	62443	32400.68
PROBAV_L1C	55022	62152.29
PROBAV_L3_S1_TOA_100M	989	25110.96
PROBAV_L3_S1_TOC_100M	947	25301.40
PROBAV_L3_S1_TOC_NDVI_100M	517	1701.80
PROBAV_L3_S5_TOA_100M	90	9040.79
PROBAV_L3_S5_TOC_100M	88	9115.49
PROBAV_L3_S5_TOC_NDVI_100M	77	911.27
PROBAV_L3_S1_TOA_300M	594	6865.29
PROBAV_L3_S1_TOC_300M	598	7087.53
PROBAV_L3_S10_TOC_300M	103	2154.42
PROBAV_L3_S10_TOC_NDVI_300M	101	172.99
PROBAV_L3_S1_TOA_1KM	598	937.09
PROBAV_L3_S1_TOC_1KM	599	954.92
PROBAV_L3_S10_TOC_1KM	103	298.16
PROBAV_L3_S10_TOC_NDVI_1KM	103	22.74
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	700	0.87
METEO_METEOSERVICES	698	3.72
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	7622	350	598
PROBAV_L3_S1_TOA_100M	91	705	751
PROBAV_L3_S1_TOC_100M	91	6615	6611
PROBAV_L3_S1_TOC_NDVI_100M	91	2010	1986
PROBAV_L3_S5_TOA_100M	18	479	462
PROBAV_L3_S5_TOC_100M	18	1687	1575
PROBAV_L3_S5_TOC_NDVI_100M	18	2325	2516
PROBAV_L3_S1_TOA_300M	91	979	1060
PROBAV_L3_S1_TOC_300M	91	5370	55951
PROBAV_L3_S10_TOC_300M	9	491	634
PROBAV_L3_S10_TOC_NDVI_300M	9	576	2037
PROBAV_L3_S1_TOA_1KM	91	698	704
PROBAV_L3_S1_TOC_1KM	91	3058	3383
PROBAV_L3_S10_TOC_1KM	9	657	664
PROBAV_L3_S10_TOC_NDVI_1KM	9	2770	5467

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

82 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 **1022** with **102** different nationalities representing **778** 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
UNITED KINGDOM	49 013
BELGIUM	9 299
UNITED STATES	7 825
CHINA	4 621
SWITZERLAND	2 681
FRANCE	2 678
BRAZIL	1 820
JAPAN	1 730
NAMIBIA	1 201
AUSTRIA	900

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

User	# of downloads
padilla	47,317
earthengine-proba	5,827
nitinbhatia	3,712
dingmingjun	3,032
alisol	2,674
vito4IMAG_MeteoFR	2,093
ozumdurgun	1,970
cleverli1984	1,728
egoodyer	1,685
devseed	1,394

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

Company	# of downloads
UNIVERSITY OF LEICESTER	47317
VITO	6342
GOOGLE	5827
JXNU	3032
CELSIUSPRO	2674
METEO FRANCE	2093
ARID LAND RESEARCH CENTER	1728
GSI LTD	1685
DEVELOPMENT SEED	1394
SASSCAL	1181

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	80.53	1011.17	0	0	0
PROBAV_L3_S1_TOA_100M	0.26	0.17	238.43	0.06	0	79.59
PROBAV_L3_S1_TOC_100M	0.17	1818.02	22851.64	2122.85	0	77.92
PROBAV_L3_S1_TOC_NDVI_100M	20.81	70.44	3.05	0.06	0	0.12
PROBAV_L3_S5_TOA_100M	273.53	0.30	7.38	0	0	55.84
PROBAV_L3_S5_TOC_100M	61.65	57.92	1382.01	2.38	4.70	143.55
PROBAV_L3_S5_TOC_NDVI_100M	599.71	1852.88	22.70	0.46	0.29	24.91
PROBAV_L3_S1_TOA_300M	0.00	7.24	4954.96	0.00	0	7.18
PROBAV_L3_S1_TOC_300M	0.05	13.52	6656.65	955.95	0	1.45
PROBAV_L3_S10_TOC_300M	10.66	7.33	601.46	0.09	6.93	0.36
PROBAV_L3_S10_TOC_NDVI_300M	0.82	7.87	21.50	26.14	5.11	0.92
PROBAV_L3_S1_TOA_1KM	0	0.00	771.31	0	0	0.18
PROBAV_L3_S1_TOC_1KM	0.01	0	1314.06	0	0	0.00
PROBAV_L3_S10_TOC_1KM	1.72	82.58	91.53	2.43	0	0
PROBAV_L3_S10_TOC_NDVI_1KM	0.09	56.55	17.59	0.00	0	0.93

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

Product Type	Global
L1C	1091.70
PROBAV_L3_S1_TOA_100M	318.50
PROBAV_L3_S1_TOC_100M	26870.59
PROBAV_L3_S1_TOC_NDVI_100M	94.47
PROBAV_L3_S5_TOA_100M	337.05
PROBAV_L3_S5_TOC_100M	1652.21
PROBAV_L3_S5_TOC_NDVI_100M	2500.95
PROBAV_L3_S1_TOA_300M	4969.39
PROBAV_L3_S1_TOC_300M	7627.63
PROBAV_L3_S10_TOC_300M	626.82
PROBAV_L3_S10_TOC_NDVI_300M	62.35
PROBAV_L3_S1_TOA_1KM	771.49
PROBAV_L3_S1_TOC_1KM	1314.07
PROBAV_L3_S10_TOC_1KM	178.27
PROBAV_L3_S10_TOC_NDVI_1KM	75.17

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:

- Help please
- Image Gallery
- change of username
- retrieve username
- PDF: N.A. - doc_luc - 2016/9/28 - Recent data
- PDF: N.A. - ankit kamboj - 2016/9/27 - research
- S10 NDVI access and scaling
- Regarding saving of files
- Mosaicking files for Africa
- Problem in India Administration Layer
- Help!ask for PROBA-V_SRF.excel
- Access for research
- Proba satellite
- Commercial use of PROBA data
- Help! error when reprojection
- Lost username
- No data available since 16/10/2016
- Google Maps - Terms of Service
- collection Level 1C [C1] access rights
- disk space on VM
- calendar ordering problem
- Free proba data
- SPOT & Proba S10 NDVI-products
- First S10 of Dec: full C1 or combination C0-C1?
- availaibility of V101 data
- Owrangi - username
- help！About transit time
- Mosaicking files for Africa
- Problem in India Administration Layer

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	1	0	0	1
TOC 1 KM	96	9	1	106
TOA 300 M	9	0	0	9
TOC 300 M	18	0	0	18
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
951	2369	358 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
147	268	22 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 (**)
35	35

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

(*) Total amount of user VMs include test accounts
(**) In total 17 test accounts

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	48	48	0	0
DARK CURRENT	63	62	1	0
MOON	8	7	1	0
RAYLEIGH	165	164	1	0
SNOW	84	83	0	1
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	8	8	0
PROBA-V_L1B_CALIBRATION	1003	893	104
PROBA-V_L1B_INTERSECTION	2116	1150	949
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	41019	41019	0

Table 15: Processed calibration images for this reporting period

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.

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
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
PROBAVUS-66	Cloud cover percentages on PDF products are not reliable	Open	19/10/2016	PDF
PROBAVUS-67	PDF customization.exe: L2 geotiff bands are not grouped	Open	25/11/2016	Software

3 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
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 File
- Some 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-012_2016-Q4_v1.0". All action items were discussed and formulated at the PROBA-V Quality Working Group, held in November 2016.

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 after the reprocessing campaign has finished.

- Development:
  No developments expected.

- Other activities:

  o The reprocessing activities are running at a steady pace at 7-8 days of data per day. Current expectation is that these activities will be finished by end of January 2017, early February 2017. Users will be informed about the end of the reprocessing activities. After Collection 1 (C1) is complete, access to Collection 0 (C0) data will be disabled in the PDF portal and erased from disk. The data will still be available in our tape archive.