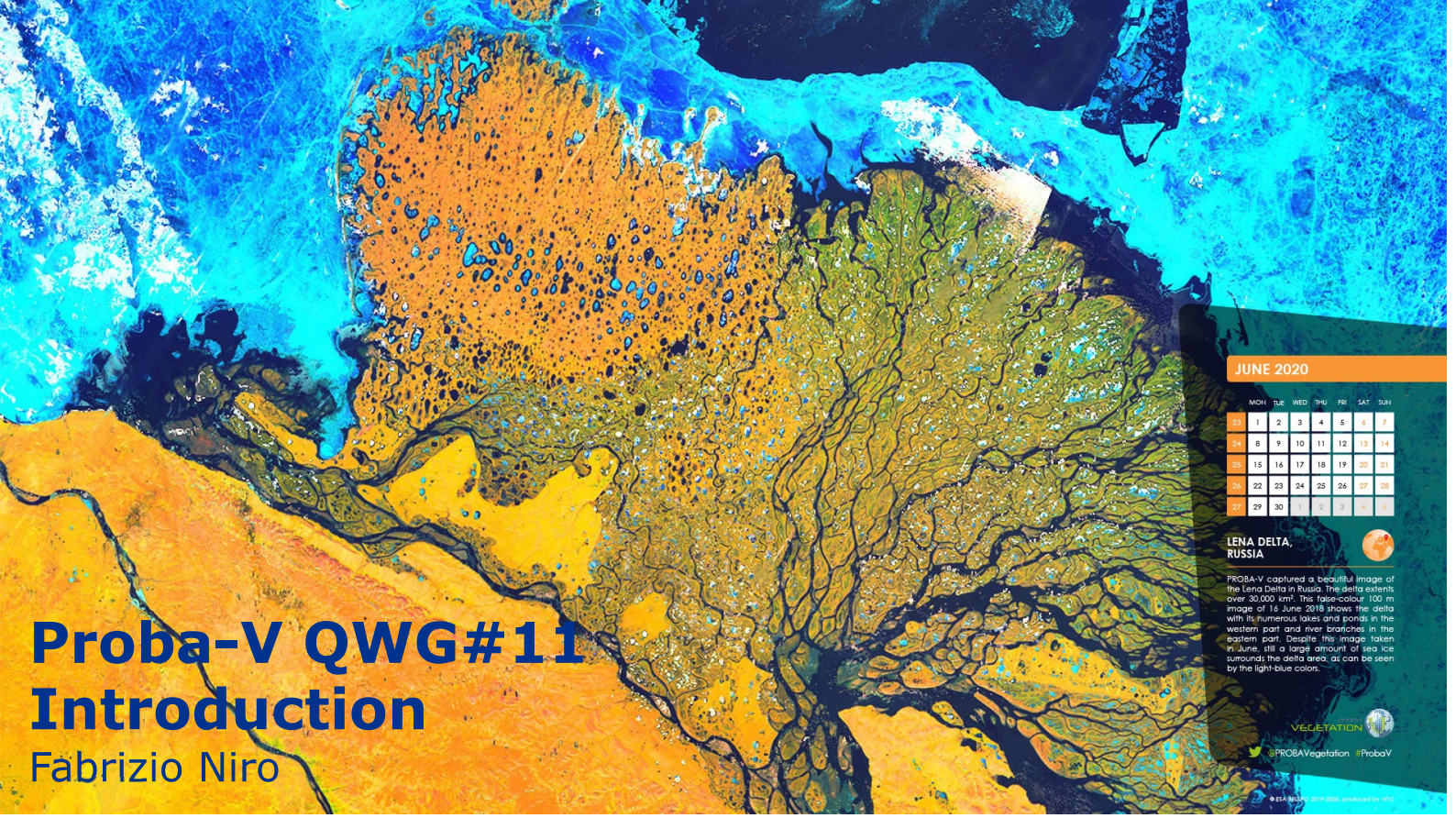
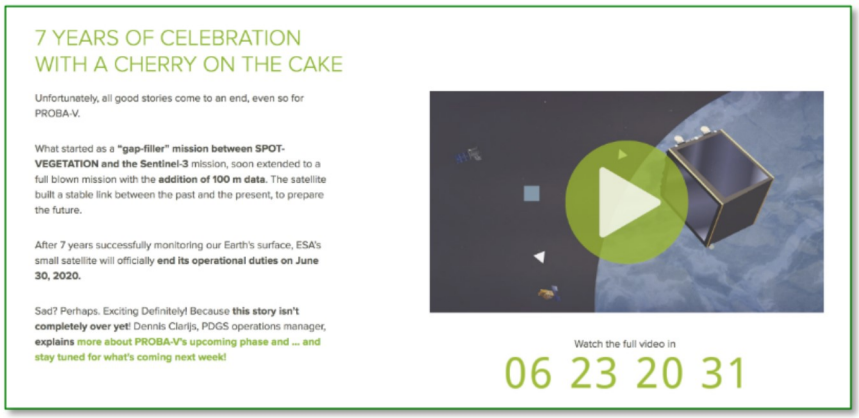


Proba-V QWG#11 Introduction

Fabrizio Niro

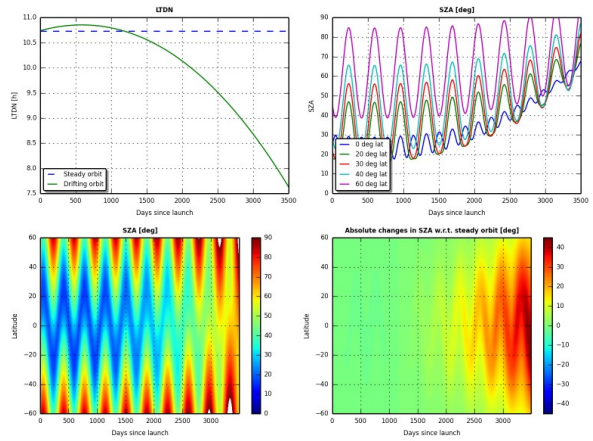
Outline

- Mission Status and Highlights
  - ✓ End of Operational Phase
  - ✓ Experimental Phase
  - ✓ Highlights
- QWG Agenda points
  - ✓ Status and Calibration
  - ✓ Collection 2
  - ✓ Experimental Phase
  - ✓ Continuity with S3
- Actions and Agenda
- Discussion Session



End of Operational Phase and Hand-over to S-3

- FS and GS status after more than **7 years** in space is **excellent**, mission has fully met its primary objective of ensuring **continuity** to VGT data series bridging the gap to S3 for land global/daily monitoring
- The decision was taken to **discontinue** the operational mission by 30 June 2020 to prevent impact of orbital drift on consistency of the long-term archive
- As from July 2020 the task of ensuring global/daily coverage of land surfaces will be taken over by **S-3 A+B** with its suite of optical sensors
- Real-time generation of S3 OLCI-SLSTR **L1c** products will ensure smooth continuation of downstream services at CGLS, S3 **SYN-VGT** product will guarantee continuation of the VGT long-term archive

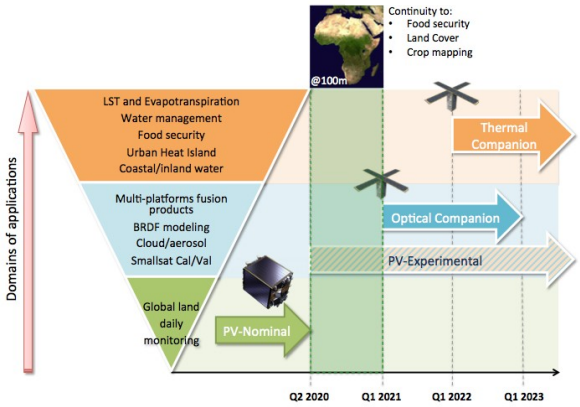


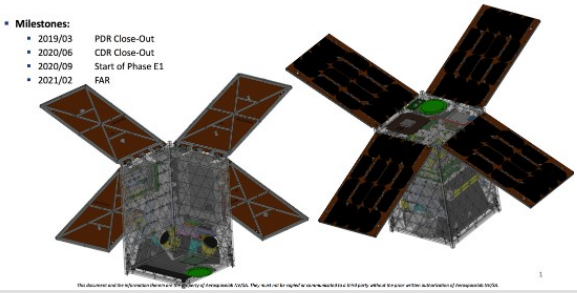
Experimental Phase

- As from 1st July 2020 a new **Experimental Phase** will start with limited commitment on real time delivery of operational products to end-users

Objectives of this phase:

- **Focus** on systematic acquisition of **Africa** (3 passes/ day), where illumination conditions are expected to be still favorable despite orbit drift, and where **100 m** resolution provides an added value compared to 300m-type sensors, notably for cropland mapping
- Investigate synergistic **exploitation** of Proba-V with Companion Cubesat satellites (PV-CC)
- Explore advanced acquisitions for **Science and Cal/Val** purposes, such as Moon calibration, yaw manoeuvre over PICS sites, super-resolution experiment





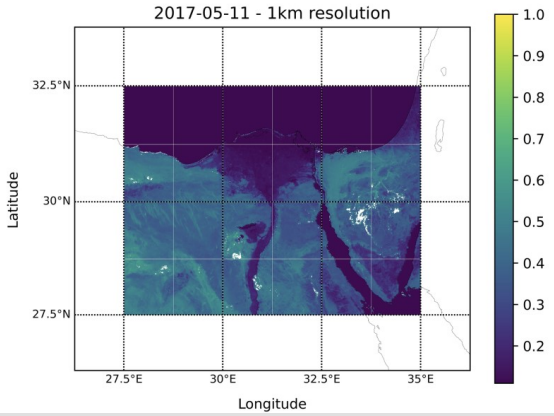
Highlights from Exploitation activities

PV-LC@100m (U. C. Louvain)

- Project was terminated during April 2020 with delivery of required documents and outcomes, notably the Global LC map@100m
- Scientific publication is in preparation; as soon as it will be accepted, the web browser and the global LC map will be released to the public

SPAR@MEP (Rayference)

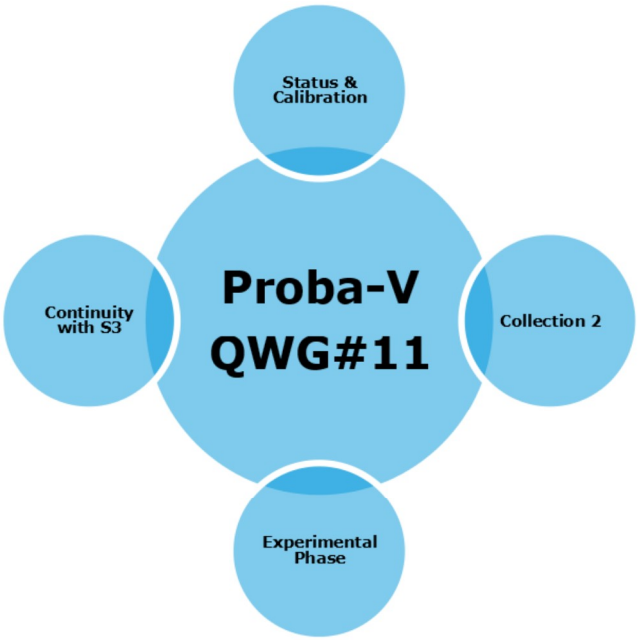
- Project is progressing well within schedule
- An advanced version of the PV-LAC algorithm successfully developed and installed in the MEP
- Optimization of the code to fully exploit the MEP CPU cluster is on-going (thanks to VITO support), first BHR/ AOD maps generated show promising results



Discussion points for QWG Meeting#11

The following points will be reviewed and discussed within this QWG Meeting:

- Mission Status and Calibration
- Collection 2
- Experimental Phase
- Continuity with S3

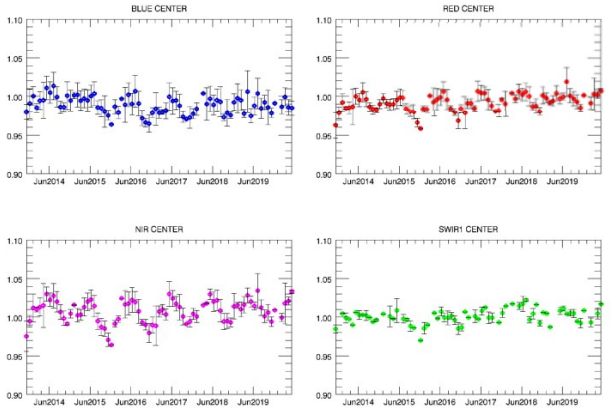


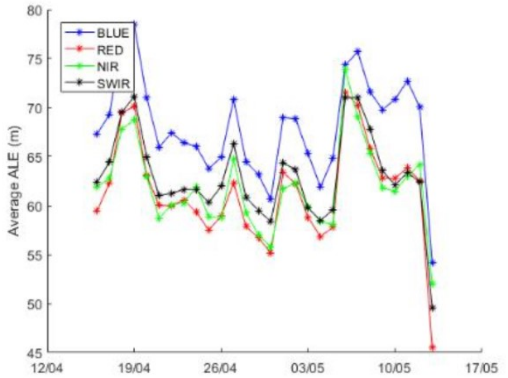
Mission Status and Calibration

- Flight and Ground Segment overall **performances** are excellent with no sign of degradation
- **Radiometric** and **Geometric accuracy** are well within the mission goal requirements, long-term trends are minor and well modeled
- An **independent** assessment over Libya-4 recently performed by YG (in the frame of the SPAR@MEP project) demonstrated an overall good radiometric accuracy

Discussion points :

- Review status of FS/GS performances and expectations for the mission extension phase
- Review and discuss on radiometric calibration factors to be applied for C2 reprocessing



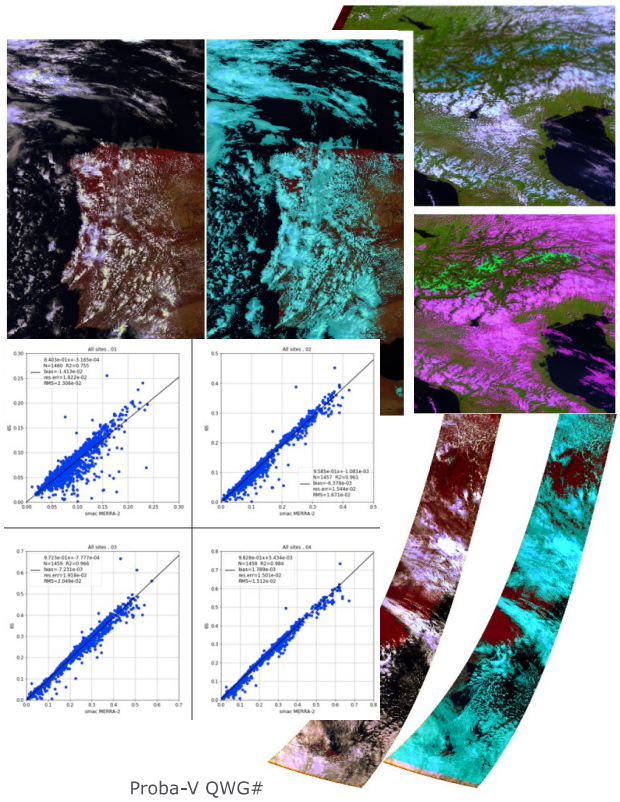


Collection 2

- Development, verification and validation of the new **Cloud Mask** (Uni. Valencia) was completed for all resolutions (1km, 333m and 100m) → CM algorithm is ready for C2 (re-)processing
- Development of the new **AC** algorithm (HYGEOS) well advanced with draft ATBD, prototype & TDS provided to VITO for integration tests
- Assessment of the best AOD **climatology** (CAMS Vs. MERRA-2) on-going to be completed by end July

Discussion points :

- Review baseline and discuss on potential refinement/ tuning in C2 as well as future evolution for C3
- Discuss on C2 deployment, final verification and validation in PDGS, and (re-)processing plan

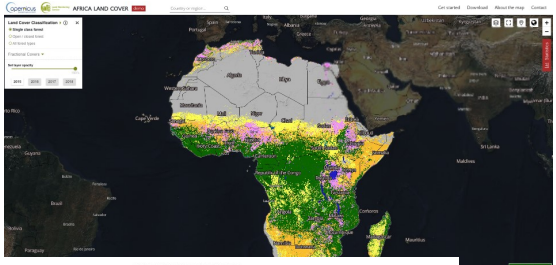


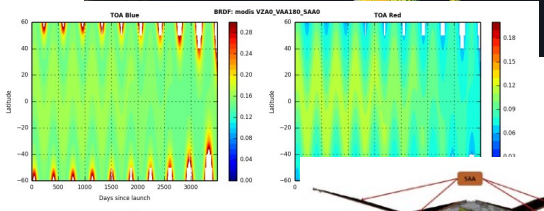
Mission Experimental Phase

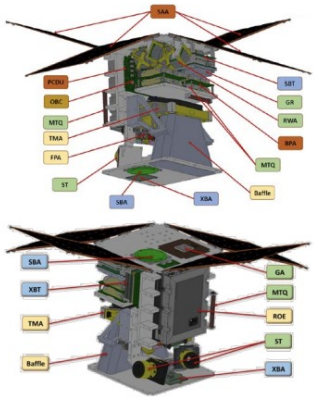
- Initial **schedule** for the extension has drifted slightly owing to shift in launch date of the first Cubesat (VNIR), currently set to Q1 2021
- Therefore a **gap** need to be filled between end of Operational Phase and start of PV-CC
- After discussion with key users it becomes clear that continuity of **Africa** acquisitions with emphasis on **100m** is the highest priority

Discussion points:

- Review new mission scenario (including FS/GS implementation), report on the status of CC and discuss on potential experimental acquisitions
- Propose and discuss Cal/Val and Exploitation plan for the experimental phase with PV-CC

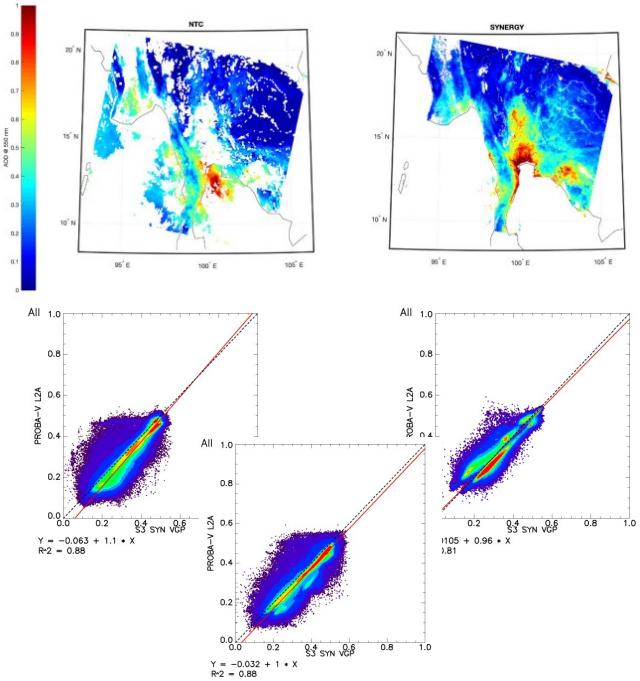






Continuity with S-3

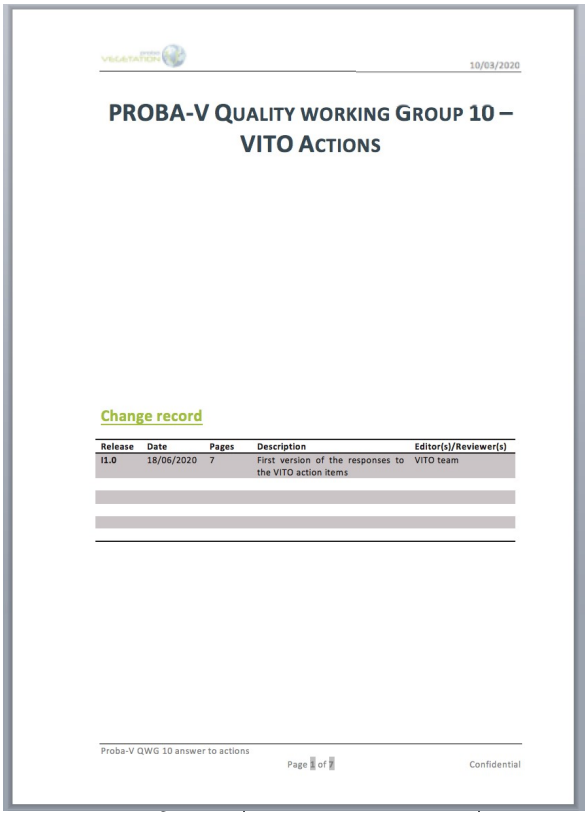
- Radiometric **validation** of SYN-VGT against Proba-V data at VITO on-going
- Currently waiting for the fix of a number of change **requests**: compositing for VGT-S, L/S classification module, cloud shadow flagging, updated SLSTR calibration factors, SNAP update for wrong interpretation of VGT grid
- **CGLS** products will be continued with Proba-V (1km, 300m) until last dekad of June 2020
- Starting from 1st July 2020 CGLS will switch to **Sentinel-3** OLCI/SLSTR for the NRT generation of the following biophysical variables at 300m resolution: **NDVI, LAI, FAPAR, FCOVER, GDMP and BA**



Report on VITO Action Items

- Actions from QWG#10 completed and detailed **report** provided by VITO : "*Proba-V QWG#10 – VITO Actions*", v1, 18/6/2020, E. Swinnen
- The content of the report will be presented during this meeting
- For detailed answer to the AI, please refer to the report available in the QWG document **Repository**:

  http://proba-v.skytek.com/home
- Tracking of Action Items (Excel sheet) status is also available in document repository



10/03/2020

PROBA-V QUALITY WORKING GROUP 10 – VITO ACTIONS

Change record

Release	Date	Pages	Description	Editor(s)/Reviewer(s)
I1.0	18/06/2020	7	First version of the responses to the VITO action items	VITO team

Proba-V QWG 10 answer to actions

Page 1 of 7

Confidential

Report on ESA Action Items

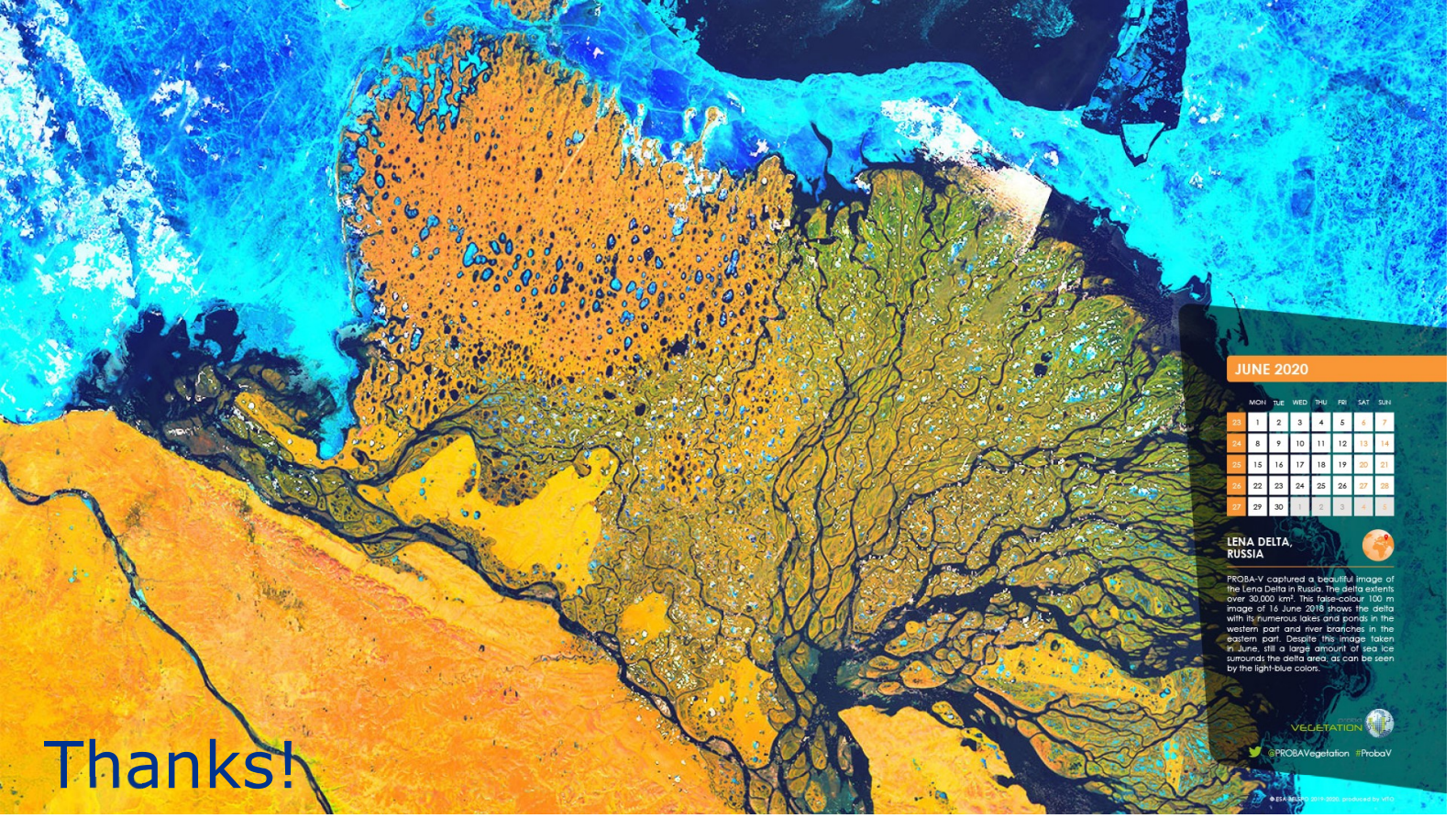
AI8.17	To verify which common DEM is going to be used for the Copernicus missions and VITO to investigate on the possibility to use this common DEM also for Proba-V C2 baseline	**Closed**	A corser version (90m) is available for free and was released on Dec 2019. Impact of updating DEM in Proba-V PDGS needs to be reviewed by VITO. **→ Decision to be taken during this QWG**
AI10.12	To prepare a web story on the Proba-V Experimental Phase and to consult the user community on potential regional 100 m acquisitions to be performed during this phase	**Closed**	VITO in collaboration with ESA prepared the web story and advertised the end of the operational phase and start of the experimental phase. **→ Well done by VITO !**
AI10.13	To assess the baseline budget required to maintain the Proba-V alive and performing some basic calibration activities during the 6-months time gap until the launch of the first CC	**Closed**	Analysis made and reviewed in the frame of Proba-V Board meeting

SPAR@MEP ESA Actions

A17	The conditions under which pixels with a bad radiometric quality in the SWIR band could be processed should be clarified with VITO	**Open**	In the PUM these pixels are defined as having sub-standard radiometric quality, owing to higher dark current values. In another part of the PUM it is stated: "In most cases the pixel values involved are still reliable“ **→ We should discuss within the QWG and provide a clearer message to users: can these pixels be used, or we should suggest interpolation with neighbour pixels, in the current status striping in downstream products appear and impact is not negligible**
A18	Verify with VITO the PROBA-V harmonisation recommendations concerning the left camera in the blue band.	**Open**	**→ To be discussed and clarified by VITO during the calibration session**

Agenda

25/6/20	26/6/20
Mission Status Calibration & Data Quality 9:30 – 12:00	Continuity Experimental Phase 9:30 – 12:00
Discussion 12:00 – 12:45	Discussion 12:00 – 12:45
LUNCH – 12:45 – 14:00	LUNCH – 12:45 – 14:00
Algorithm C2 Baseline 14:00 – 15:30	Final Discussion Wrap-up 14:00 – 15:30
Discussion 15:30 – 16:30	


JUNE 2020
MON TUE WED THU FRI SAT SUN
23 1 2 3 4 5 6 7
24 8 9 10 11 12 13 14
25 15 16 17 18 19 20 21
26 22 23 24 25 26 27 28
27 29 30 1 2 3 4 5
LENA DELTA, RUSSIA
PROBA-V captured a beautiful image of the Lena Delta in Russia. The delta extents over 30,000 km². This false-colour 100 m image of 16 June 2018 shows the delta with its numerous lakes and ponds in the western part and river branches in the eastern part. Despite this image taken in June, still a large amount of sea ice surrounds the delta area, as can be seen by the light-blue colors.
PROBA-V
VEGETATION
@PROBAVegetation #ProbaV
© ESA 2019-2020, produced by VITO

Thanks!

Discussion on C2 baseline and evolution

Objectives → Review/consolidate C2 status, identify potential short term updates, as well as long-term evolution for C3

- Are the calibration factors consolidated for C2? Geometry/radiometry ? Which are the evolution for C3 (e.g., non-linearity, pixel-level uncertainty)
- Are there any potential short-term updates in products format for C2 (e.g., quality flags)? What about long-term upgrades in format (e.g., DOI) ?
- Do we consider upgrade to Copernicus DEM in C2, or leave it for C3 ?
- Are there potential evolution for cloud mask in C3 (e.g., cloud shadows, non-binary cloud mask, cloud buffer mask) ?
- Which are the potential improvements in AC for C3, e.g., BRDF, pixel-level uncertainty in TOC (potentially ready for C2, but impact on data volume) ?
- Any other potential evolution: compositing, ice/snow mask, …

Discussion on C2 and path towards C3

Tasks	Output
Baseline Definition: • Calibration upgrades (radiometry/geometry) • Algorithm baseline (clouds, AC, …) • Products format (e.g., COG, any other?)	TN listing C2 upgrades → **[VITO; Sep 2020]**
Reprocessing Strategy: • Deployment and implementation Plan • SW Verification and Quality Control approach • Scientific Validation approach	TN describing C2 Reprocessing Strategy → **[VITO and QWG; Draft in Oct 2020]**
Evolution Plan • Initial list of potential C3 evolution • Estimated effort for implementation	TN describing C3 Evolution → **[VITO and QWG; Draft in Nov 2020]**

Discussion on Experimental Phase

Objectives → Review/consolidate Cal/Val and Exploitation Plan for PV-CC

- Are the calibration (and cross-calibration) tools and methodologies ready for PV-CC ? What needs to be done in the short/medium-term?
- How much of the Cal/Val Plan for Proba-V can be reused for PV-CC and what need to be done specifically for this Cubesat ?
- Is the operational scenario consolidated, namely how to operate PV-CC to maximize synergy with Proba-V or other Sentinels ?
- Are the objectives and priorities of the PV-CC Experimental Phase clearly defined ? On which focus area we should put more effort, e.g.: Cubesat cross-calibration, data fusion, multi-looking observations for BRDF ?
- Are the products well defined, shall we foresee ad-hoc synergistic products ? Shall we stick to Proba-V format and convention ?

Discussion on Experimental Phase

Tasks	Output
PV-CC Cal/Val Plan • Radiometry and Geometry Cal/Val • Cross-calibration with Proba-V • Cross-calibration with other sensors • Surface reflectances Cal/Val	TN on Cal/Val approach **[VITO and QWG; Draft on Dec 2020]** → Required as input to next ESA-BELSPO Board Meeting
PV-CC Exploitation Plan • PV+CC acquisitions plan • Singel-sensor and synergistic processing • Scientific Validation approach • Potential new applications	TN on Exploitation approach **[VITO and QWG; Draft Dec 2020]** → Required as input to next ESA-BELSPO Board Meeting