

A satellite night view of Europe, showing the continent illuminated by city lights against the dark background of the night sky and the blue glow of the atmosphere. The lights are concentrated in major urban centers and along coastlines.

PROBA-V

Cubesat Companion

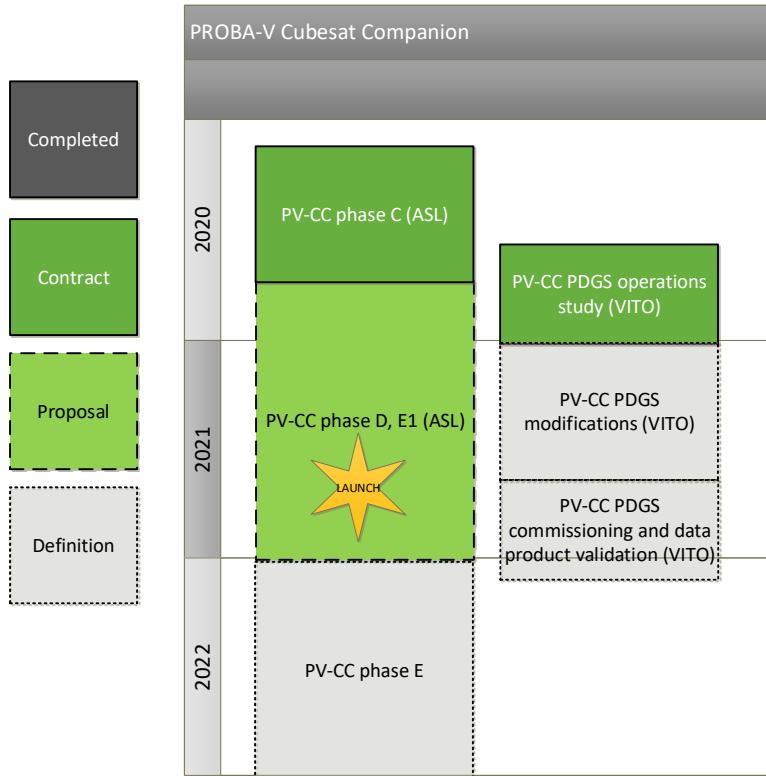
PDGS Operations study – status update



PROJECT OVERVIEW

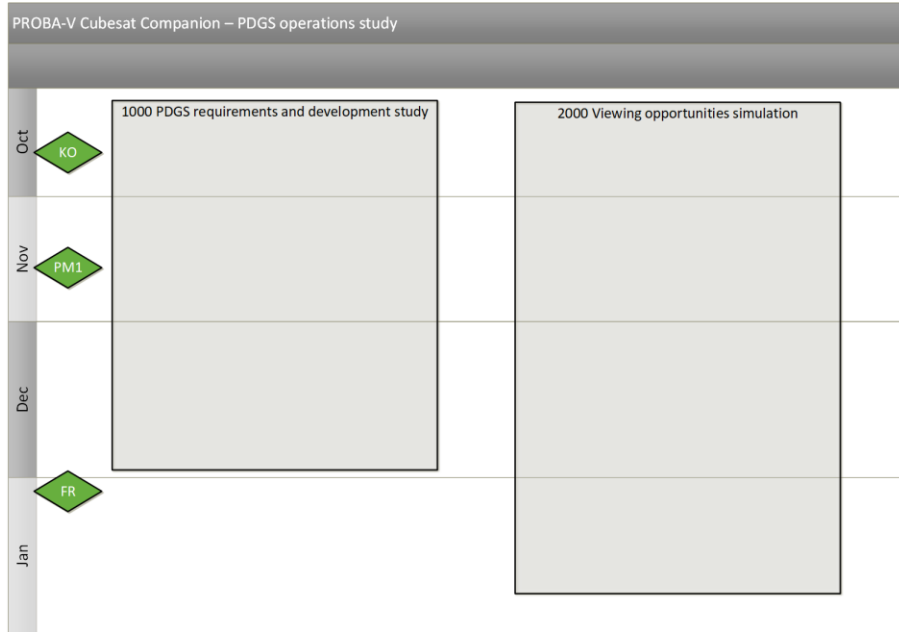


Program overview





Project activities



Type	ID	Deliverable
DOC	D_1	PROBA-V CC PDGS Requirements documents
DOC	D_2	PROBA-V CC PDGS Development and test plan
DOC	D_3	Concurrent viewing opportunities PROBA-V/PROBA-V CC



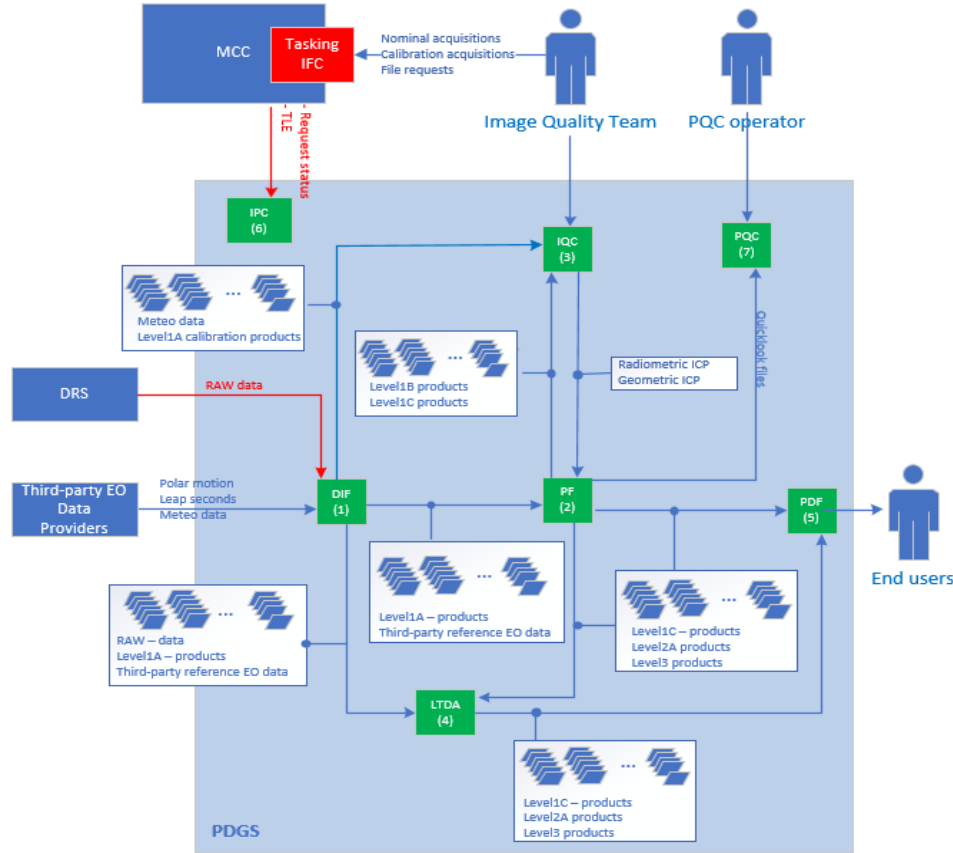
1000 PDGS REQUIREMENT DEFINITION

Required inputs for VITO

Required inputs		Applicable documents	Request	Status
PDGS ICD				
ICD version (raw data format)		PROBAV-ICD-03469-VE L0 Definition of raw data products.pdf (issue L0 - 10/04/2013)	Confirmation of the ICD or delivery of an alternative applicable ICD document	Open
On-board data handling				
	Details of compression algorithm	TBD	Applicable document describing the details	Open
	Bad pixel replacement	TBD	Applicable document describing the details	Open
	Grouping of data for all spectral bands	TBD	Applicable document describing the details	Open
	Time-synchronisation between platform and instrument	TBD	Applicable document describing the details	Open
	How does the PDGS know which data to group: based on request identifier, segment counter, ...?	TBD	Applicable document describing the details	Open
PDGS-FOS interface		SPB-PBVGIT-872-ICD-001.pdf (v3.2 issue date 31/08/2012)	Confirmation of the ICD or delivery of an alternative applicable ICD document	Open
	How will the calibration requests take place?	TBD		Open
	How does nominal imaging takes place: based on on-board land-sea mask, based on on-demand requests?	TBD		Open
	ITM: integration time matrix	TBD		Open
	LCF linearity check file	TBD		Open
	BPM bad pixel map	TBD		Open
	Interface with the platform simulator tool (to be developed by ASL) needed to generate calibration requests? What are the constraints in terms of platform memory, power, etc...? What are the formulas to calculate those constraints?	TBD	Applicable document describing the details	Open
PDGS-ground segment		N77D7-PV02-IF-1-US-ICD-v2_13.pdf (date 27/02/2013)	Confirmation of the ICD or delivery of an alternative applicable ICD document	Open
Latest status of the PV-CC mission:				
	Mission requirements document	TBD	Provide document	Open
	Mission description document	TBD	Provide document	Open
	PV CC Requirements document	ESA-TECSP-RS-009522, Proba V - Companion Cubesat Requirements Document	Provide document	Open
	Planning	TBD	Provide document	Open
PV-CC ground testing				
	Test plan: On-ground calibration and test overview (including end-to-end system validation test) with planning	TBD	Provide document	Open
	Radiometric calibration:	N77D7-PV02-US-6-PF-DPM-v1_8.pdf (date 9/01/2014)	Confirmation of the sensor model or delivery of an alternative sensor model	Open
	Geometric calibration:	N77D7-PV02-US-6-PF-DPM-v1_8.pdf (date 9/01/2014)	Confirmation of the sensor model or delivery of an alternative sensor model	Open
Test data/tools for PDGS test				
	Test data	Relevant instrument and platform data compliant to the raw data format ICD as input for the system validation test (SVT)		Open
	Platform simulator tool prototype	Platform simulator tool prototype as input for calibration request definition and generation		Open



PDGS Overview diagram – to be baselined





PDGS requirement definition activities

- Analysis of PV-CC high-level mission requirements and impact assessment on PDGS
- Analysis of PDGS external interfaces and impact assessment on PDGS:
 - The MCC – User Segment interface
 - The definition of RAW data products
 - MCC tasking and commanding interface vs. land-sea mask imaging

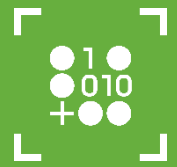


PDGS requirement definition activities (cont'd)

- Analysis of PV-CC on-board data handling (e.g. timing synchronisation, (de)compression, data grouping, etc.) and impact assessment on PDGS
- Impact of updated RSM on on-ground radiometric calibration performance (if applicable)
- Impact of updated geolocation budgets on geometric calibration performance (if applicable)
- Definition of required PDGS test data



2000 VIEWING OPPORTUNITIES SIMULATION



Viewing opportunities WP



Objective

- supporting the PV-CC definition and acquisition plan to maximize the usage of PV-CC dataset and to help combining/calibrating the data coming from both PROBA-V and PV-CC

Tasks

- Simulate the overlap opportunities between PROBA-V and PV-CC above a predefined ROIs within a limited time period.
- how frequent the collocation opportunities are at all latitudes along the orbit.



Viewing opportunities WP (cont'd)

- Identify the PV-CC required roll maneuvers to maximize a revisit time above a specific ROIs.
- support the in-flight calibration acquisition plan. The PV-CC instrument may have to be calibrated/validated by comparing results with a PROBA-V instruments. For this purpose, swath overlaps on the same area are required

Outputs (simulation)

- **D_3: Concurrent viewing opportunities** PROBA-V/PV-CC (excel table) including
 - Concurrent viewing opportunities PROBA-V/PV-CC as function of time
 - Required PV-CC roll maneuver for a specific ROIs to increase their viewing opportunities
- simulation of the calibration acquisitions above specific ROIs (start/stop time + detailed information of the acquisition)



PROBA-V Companion Cubesat

- Belgian Nanosat platform flying the spare PROBA-V Instrument
- Re-use of PROBA-V ground segment (existing HW / modified SW) for the IOD data
- Sun-synchronous orbit **500-550 km** altitude range

Technology Objectives

- Demonstrate TRL level of the platform
- Verification of the ground station (control & command as well as downlink capacity)
- Cross calibration of PROBA-V with the companion cubesat

Application Objectives

- Studies on BRDF effects (allowing better modeling) thanks to different observation geometry (viewing and sun angles)
- Harmonization of datasets captured by different platforms, in a different orbit, but with the same sensor
- Calibration / Validation for small satellites



Cal/Val and Exploitation Plan for PV-CC

- PV-CC operations study started on 15/10
- Currently collecting the latest information on the PV-CC mission
- Detailed discussion with ESA and ASL planned for 30/10
- PV-CC mission information and overlap simulations to be executed
- Request for ideas: open to share all ideas for data exploitation for the PV-CC mission with VITO