

# QWG 11 – Payload Data Ground Segment Status

D. Clarijs

25-26/06/2020 QWG #11 – Virtual Meeting

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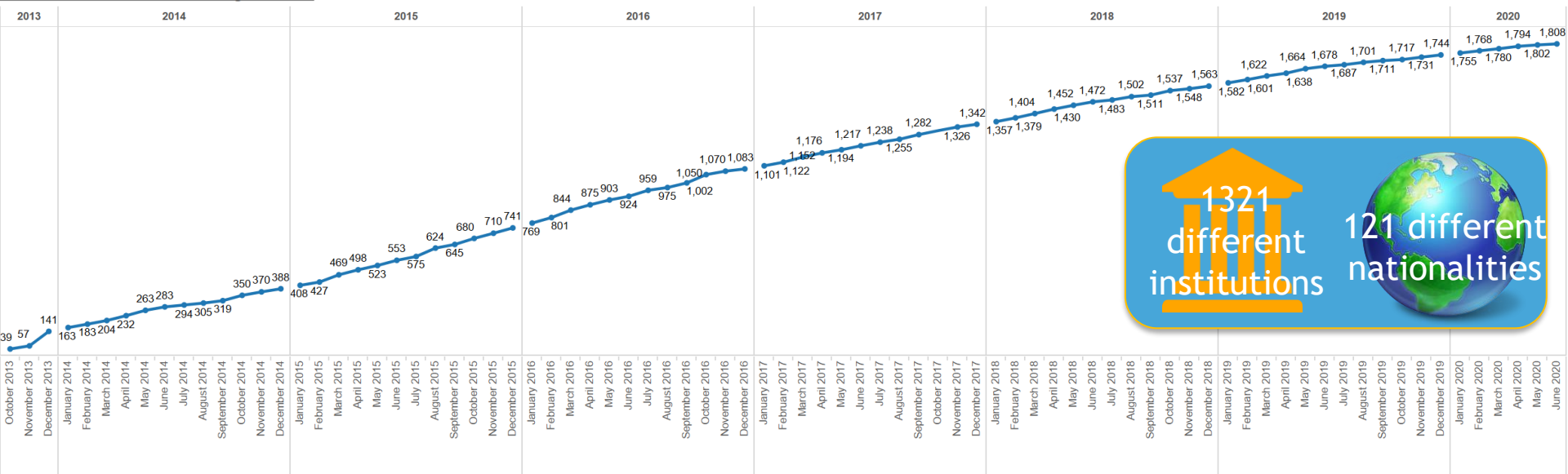


# USER SEGMENT STATISTICS



# PROBA-V user registrations

PROBA-V Evolution User Registration





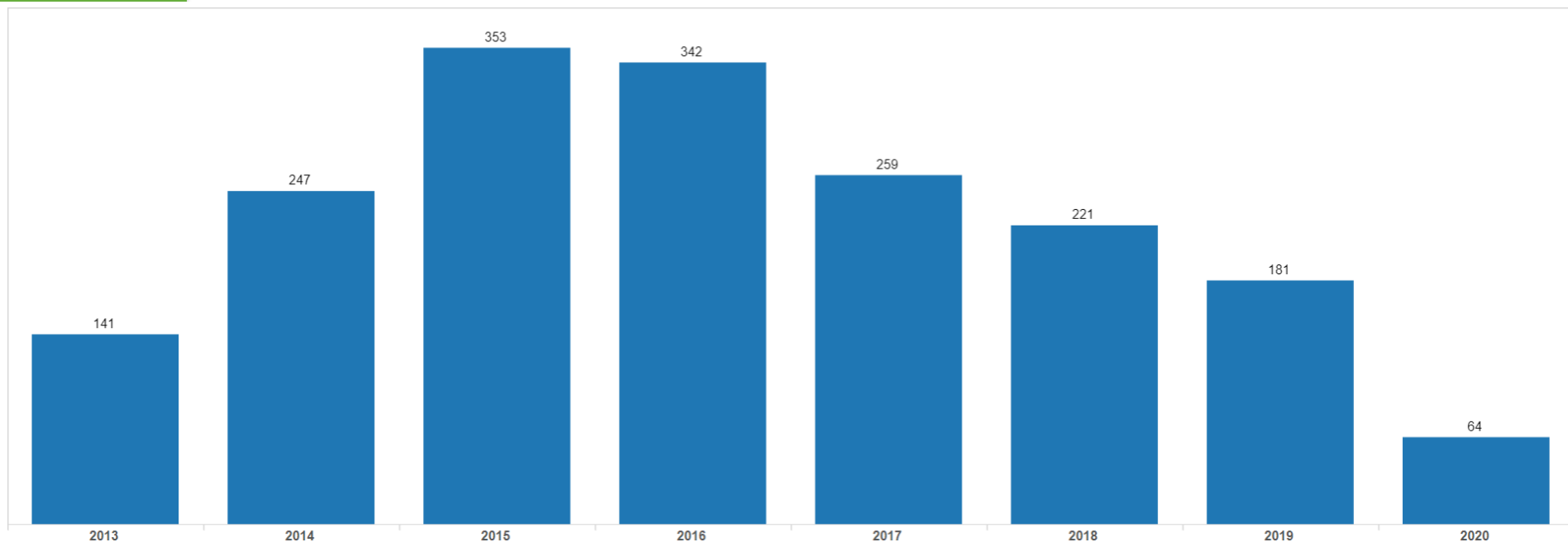
**1321**  
different  
institutions



**121** different  
nationalities



# PROBA-V evolution user registrations per year

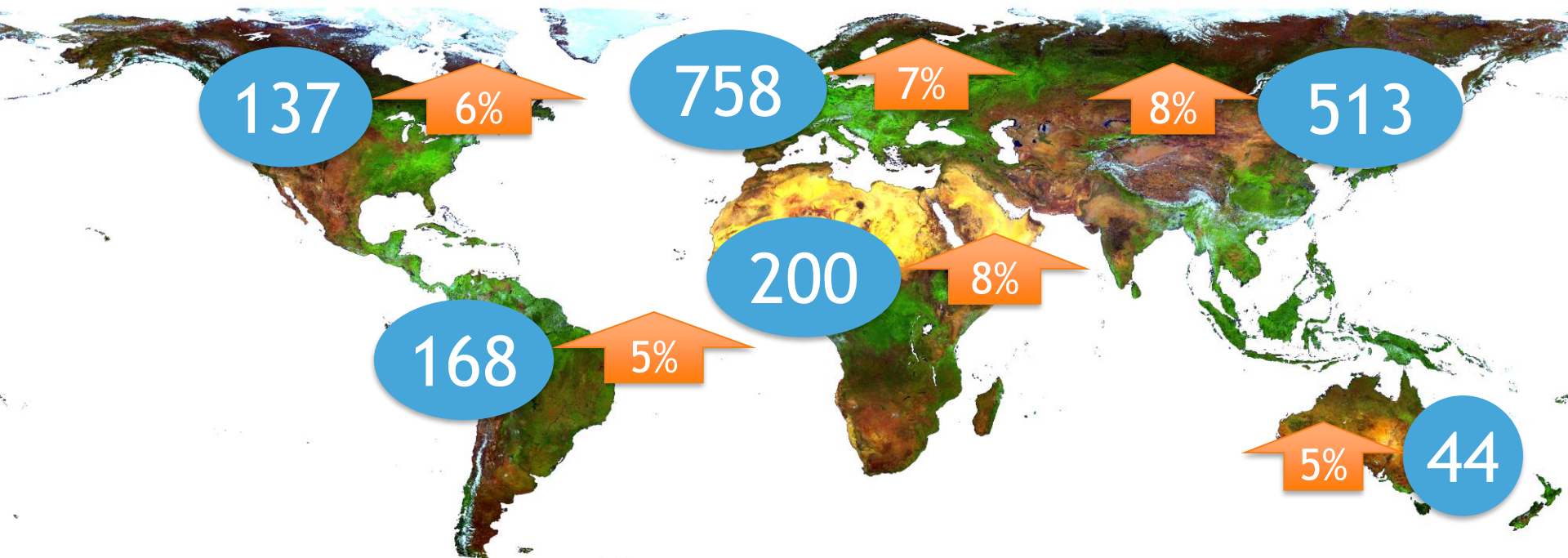




# Geographical spread of PROBA-V users

Spread of users on 23/06/2020

User growth since QWG #10 (10/2019)





# Top 20 user companies

## TOP 20 Companies PROBA-V

1	SAN JOSE STATE UNIVERSITY	UNITED STATES	8,030
2	KIGAM	KOREA (SOUTH)	5,330
3	DESCARTES UNDERWRITING	FRANCE	3,716
4	LIAONING TECHNICAL UNIVERSITY,	CHINA	2,988
5	VITO	BELGIUM	2,144
6	NCU	TAIWAN	1,546
7	1988	BELGIUM	1,339
8	IOWA STATE UNIVERSITY	UNITED STATES	1,243
9	ESA	ITALY	1,239
10	-	ITALY	5
11	-	NAMIBIA	1,223
12	JOINT RESEARCH CENTRE	ITALY	1,117
13	EOSENSE	UNITED KINGDOM	1,057
14	PLANETA	RUSSIAN FEDERATION	1,029
15	FST	MOROCCO	962
16	CESBIO	FRANCE	945
17	TRIER UNIVERSITY	GERMANY	919
18	UCLouvain	BELGIUM	867
19	UPMC	FRANCE	832
20	INSTITUTE OF SOIL AND WATER CONS..	CHINA	811
21	CAS	CHINA	746

## TOP 20 Companies PROBA-V

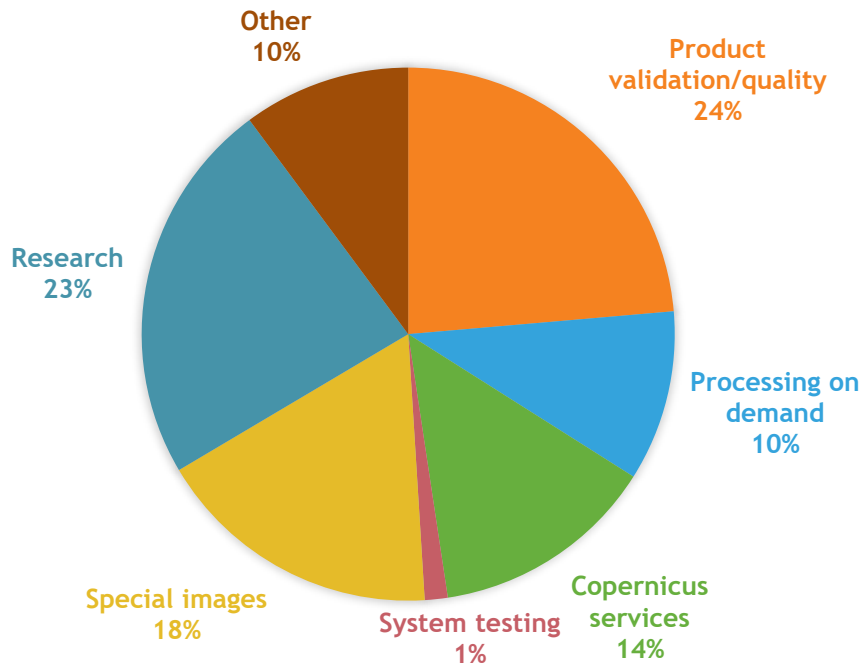
1	VITO	BELGIUM	95,651
2	GOOGLE	UNITED STATES	19,329
3	ESA	BELGIUM	144
4	ESA	ITALY	12,267
5	ESA	NETHERLANDS	5,618
6	ESA	PORTUGAL	1
7	METEO FRANCE	FRANCE	12,316
8	CSIR-IHBT	INDIA	11,755
9	UCLouvain	BELGIUM	11,363
10	GSI LTD	UNITED KINGDOM	10,719
11	VISIOTERRA	FRANCE	10,586
12	STARLAB	SPAIN	9,335
13	IREA-CNR	ITALY	8,892
14	VUB	BELGIUM	8,581
15	ARGANS	UNITED KINGDOM	8,422
16	SPACE RESEARCH INSTITUTE RAS (IKI..	RUSSIAN FEDERATION	8,163
17	SAN JOSE STATE UNIVERSITY	UNITED STATES	8,030
18	TRASYS	BELGIUM	8,011
19	TECHNICAL UNIVERSITY OF DRESDEN	GERMANY	7,589
20	GEOSYS	FRANCE	7,465
21	NSMC	CHINA	7,330
22	RADI	CHINA	6,792
23	UNIVERSITY OF LEICESTER	UNITED KINGDOM	6,789

23/10/2019 - 23/06/2020

Oct 2013 - Today



# VITO data use all time



Registered users: 6492 (March 2020)  
Eumetcast reach: 742 registered users







# Top 20 countries with most product downloads

## Top 20 Countries of Users' Origin

1	UNITED STATES	10,035
2	FRANCE	7,092
3	CHINA	6,579
4	KOREA (SOUTH)	5,346
5	BELGIUM	5,103
6	ITALY	2,556
7	TAIWAN	1,546
8	GERMANY	1,284
9	NAMIBIA	1,249
10	RUSSIAN FEDERATION	1,240
11	MOROCCO	1,088
12	UNITED KINGDOM	1,081
13	PORTUGAL	796
14	SPAIN	679
15	INDIA	659
16	HUNGARY	377
17	BRAZIL	373
18	DENMARK	356
19	PAKISTAN	264
20	JAPAN	252

## Top 20 Countries of Users' Origin

1	BELGIUM	142,690
2	CHINA	65,261
3	FRANCE	54,357
4	UNITED STATES	38,638
5	ITALY	33,487
6	UNITED KINGDOM	30,031
7	RUSSIAN FEDERATION	20,677
8	GERMANY	20,067
9	NETHERLANDS	18,647
10	INDIA	18,401
11	SPAIN	17,282
12	BRAZIL	15,146
13	NAMIBIA	8,696
14	KOREA (SOUTH)	8,546
15	SLOVENIA	7,907
16	JAPAN	7,661
17	TAIWAN	6,072
18	PAKISTAN	5,975
19	AUSTRIA	5,758
20	ARGENTINA	5,053



# Top 20 countries with most product downloads

ESA 1KM	PROBA-V S10 NDVI 1KM TOC	71
	PROBA-V S1 1KM TOA	19
	PROBA-V S10 1KM TOC	15
	PROBA-V S1 1KM TOC	12
	PROBA-V Level 2A 1KM	6
	PROBA-V Level 1C	5
	PROBA-V Level 2A 1KM Antarctica	1
PROBA-V 100M	PROBA-V S5 100M TOC NDVI	40
	PROBA-V S1 100M TOC NDVI	27
	PROBA-V S1 100M TOA	26
	PROBA-V Level 2A 100M	22
	PROBA-V S1 100M TOC	18
	PROBA-V S5 100M TOC	15
	PROBA-V S5 100M TOA	5
	PROBA-V Level 2A 100M Antarctica	1
PROBA-V 300M	PROBA-V S10 NDVI 300M TOC	33
	PROBA-V S1 300M TOA	18
	PROBA-V S1 300M TOC	18
	PROBA-V Level 2A 300M	11
	PROBA-V S10 300M TOC	10

ESA 1KM	PROBA-V S10 NDVI 1KM TOC	384
	PROBA-V S1 1KM TOA	197
	PROBA-V Level 1C	164
	PROBA-V S10 1KM TOC	159
	PROBA-V S1 1KM TOC	153
	PROBA-V Level 2A 1KM	46
	PROBA-V Level 2A 1KM Antarctica	9
PROBA-V 100M	PROBA-V S5 100M TOC NDVI	429
	PROBA-V S5 100M TOC	297
	PROBA-V S1 100M TOC	278
	PROBA-V S1 100M TOC NDVI	261
	PROBA-V S1 100M TOA	221
	PROBA-V Level 2A 100M	109
	PROBA-V S5 100M TOA	108
	PROBA-V Level 2A 100M Antarctica	14
PROBA-V 300M	PROBA-V S10 NDVI 300M TOC	409
	PROBA-V S1 300M TOA	237
	PROBA-V S1 300M TOC	235
	PROBA-V S10 300M TOC	217
	PROBA-V Level 2A 300M	54
	PROBA-V Level 2A 333M Antarctica	6



# Product downloads: Full mission

## Amount Download/products - Users Origin

	Africa	Asia	Europe	N-America	Oceania	S-America	Grand Total	Number of Records
PROBA-V Level 1C	7	5,696	23,364	20	6	126	29,219	
PROBA-V Level 2A 1KM	4	249	5,393	479	2	4	6,131	
PROBA-V Level 2A 1KM Antarctica			28	13			41	
PROBA-V Level 2A 100M	1,407	1,957	13,574	197	2	484	17,621	
PROBA-V Level 2A 100M Antarctica			41	10			51	
PROBA-V Level 2A 300M	175	688	17,711	243		2	18,819	
PROBA-V Level 2A 333M Antarctica			79				79	
PROBA-V S1 1KM TOA	293	1,576	16,131	2,277		51	20,328	
PROBA-V S1 1KM TOC	801	1,808	28,316	56	1	379	31,361	
PROBA-V S1 100M TOA	62	9,615	12,535	1,208	161	1,049	24,630	
PROBA-V S1 100M TOC	3,898	24,742	62,431	7,857	156	1,125	100,209	
PROBA-V S1 100M TOC NDVI	5,703	27,799	16,766	7,790	170	67	58,295	
PROBA-V S1 300M TOA	59	5,148	18,092	1,268	150	814	25,531	
PROBA-V S1 300M TOC	1,988	10,611	67,600	13,910	62	5,988	100,159	
PROBA-V S5 100M TOA	260	782	2,299	747	2	1,130	5,220	
PROBA-V S5 100M TOC	1,390	10,342	23,209	1,982	296	2,889	40,108	
PROBA-V S5 100M TOC NDVI	3,949	21,299	17,746	2,716	605	4,853	51,168	
PROBA-V S10 1KM TOC	2,574	1,195	5,877	797	1	369	10,813	
PROBA-V S10 300M TOC	722	2,225	6,828	174	220	307	10,476	
PROBA-V S10 NDVI 1KM TOC	7,103	19,711	11,541	1,154	156	1,409	41,074	
PROBA-V S10 NDVI 300M TOC	2,844	8,439	11,880	2,259	297	2,290	28,009	
Grand Total	33,239	153,882	361,441	45,157	2,287	23,336	619,342	



# Product downloads in GBs: Full mission

## # GB per Product Type PROBA-V

		Africa	Asia	Europe	N-America	Oceania	S-America	Grand Total	ProductSize in GB
ESA 1KM	PROBA-V Level 1C	16	12,013	43,502	26	6	255	55,818	
	PROBA-V Level 2A 1KM	0	9	15	10	0	0	34	
	PROBA-V Level 2A 1KM Ant..			3	1			5	
	PROBA-V S1 1KM TOA	13	38	14,124	2,225		1	16,401	
	PROBA-V S1 1KM TOC	2	95	24,755	10	0	56	24,919	
	PROBA-V S10 1KM TOC	144	210	2,887	410	0	82	3,734	
	PROBA-V S10 NDVI 1KM T..	43	783	338	64	0	16	1,243	
PROBA-V 100M	PROBA-V Level 2A 100M	435	1,409	4,206	149	1	262	6,461	
	PROBA-V Level 2A 100M An..			84	27			111	
	PROBA-V S1 100M TOA	6	1,669	22,542	203	1	196	24,617	
	PROBA-V S1 100M TOC	2,276	46,829	193,855	70,245	19	134	313,359	
	PROBA-V S1 100M TOC ND..	371	1,573	473	104	3	5	2,528	
	PROBA-V S5 100M TOA	341	2,407	9,895	54	2	1,397	14,096	
	PROBA-V S5 100M TOC	2,241	16,570	40,366	8,811	130	8,992	77,110	
	PROBA-V S5 100M TOC ND..	976	10,955	14,273	593	1,475	1,488	29,761	
PROBA-V 300M	PROBA-V Level 2A 300M	0	5	1,587	34		0	1,627	
	PROBA-V Level 2A 333M An..			42				42	
	PROBA-V S1 300M TOA	213	410	94,509	255	5	7,457	102,851	
	PROBA-V S1 300M TOC	154	3,290	158,209	35,610	15	428	197,707	
	PROBA-V S10 300M TOC	560	2,903	19,651	77	22	44	23,255	
	PROBA-V S10 NDVI 300M T..	135	501	921	125	7	211	1,901	
Grand Total		7,926	101,669	646,239	119,036	1,688	21,023	897,581	

Storage:

L1C: 211,45 TB

L2A: 178,19 TB

L3 100 m: 411,18 TB

L3 300 m: 115,68 TB

L3 1 km: 15,57 TB

Total: 932 TB



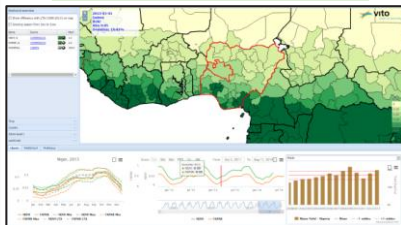
# MEP application statistics full mission

## Geo Viewer



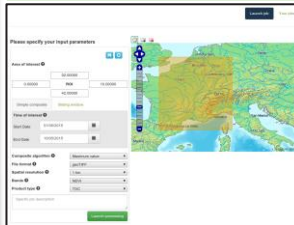
3459 users  
4584 sessions

## Time Series Viewer



2991 users  
3831 sessions

## N-Daily Compositor



324 users

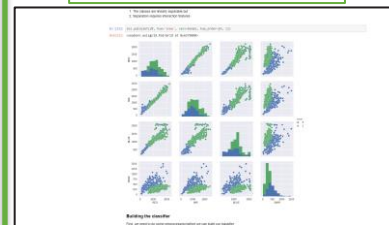
## Virtual Machines



Total user VMs: 290  
Active user VMs: 60  
Growth : + 179



## Jupyter Notebooks



157 users total  
Growth: + 95





# ANOMALIES



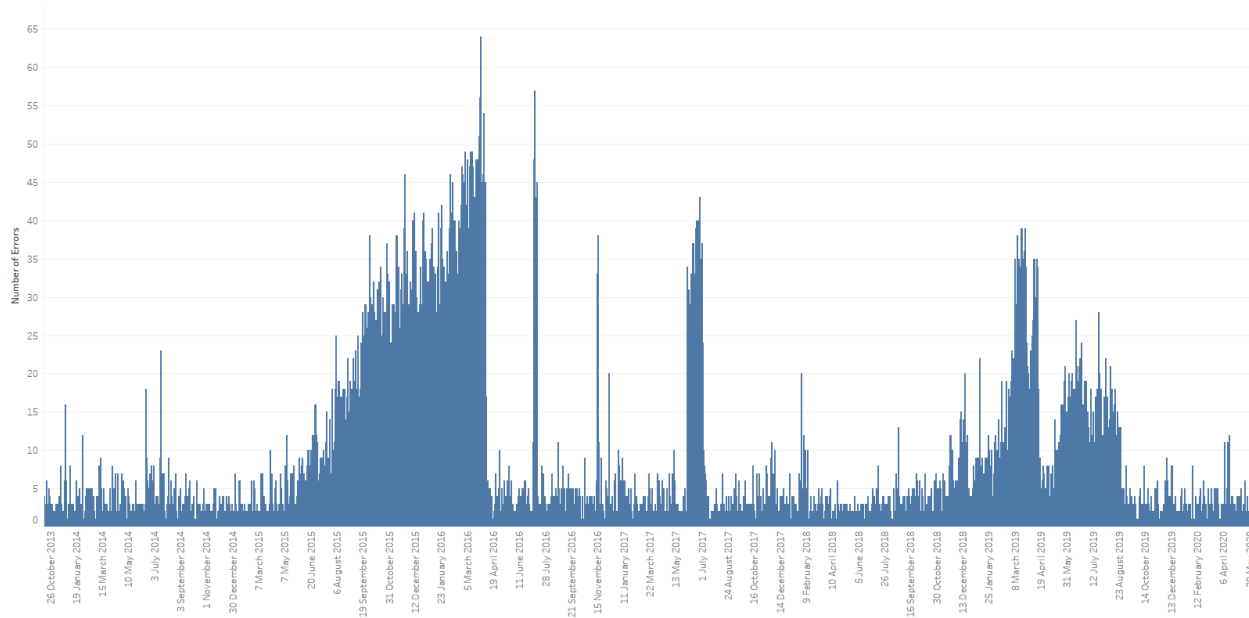
# # Decompression errors evolution

## Synthesis date

14/10/2013 00:00:00 to 23/06/2020 00:00:00

## Geometric & Decompression Errors

Decompression error





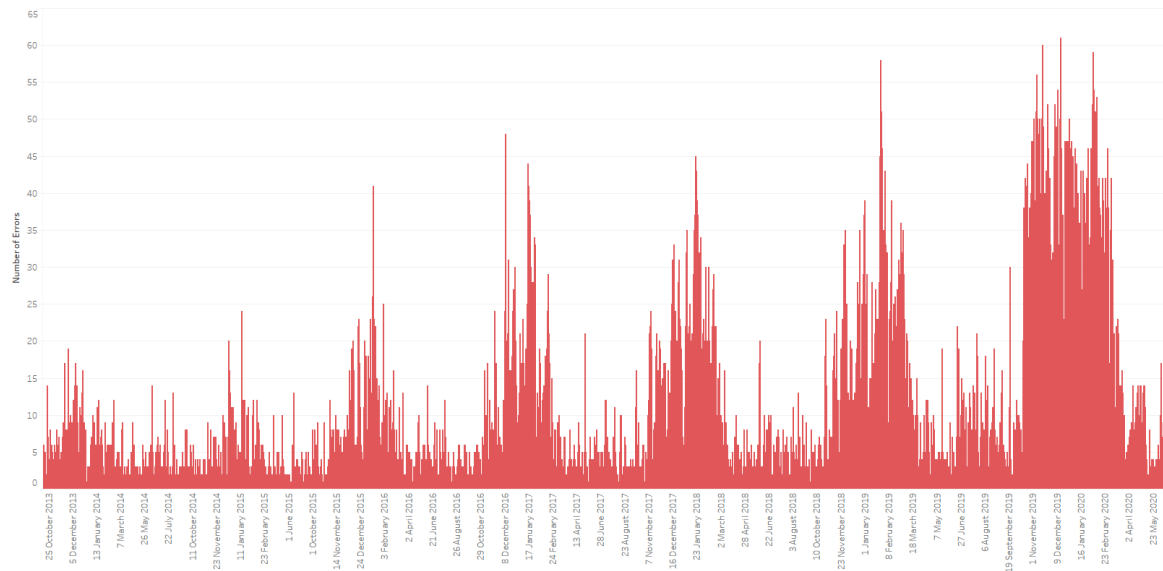
# Geometric Errors evolution

Synthesisdato

14/10/2013 00:00:00 to 23/06/2020 00:00:00

Geometric & Decompression Errors

Geometric error



- Seasonal effect
- Impact estimation too high
- Only during wintertime
- Missing pixels app updated
- General update archive in C2
- 150 m threshold?





## Events with large impact on end products

- 7/04/2020 - Platform safe mode
- 5-6/05/2020 - Data was received, but GPS data was invalid



# REPROCESSING



# Tentative reprocessing timeline

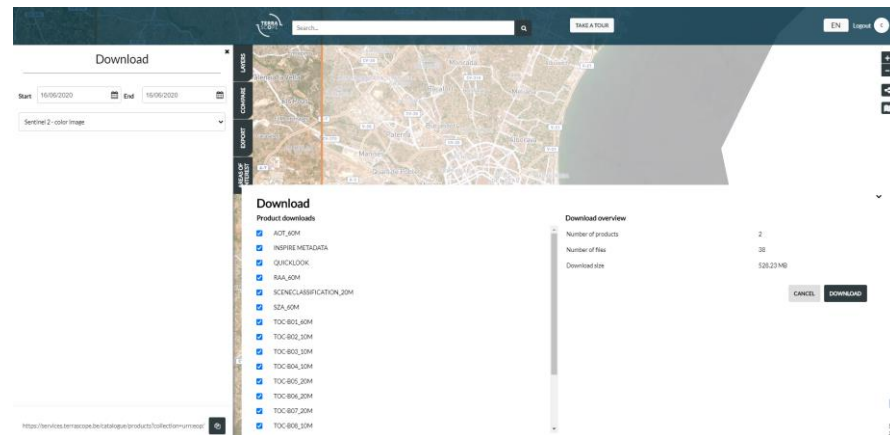
- Implementation/validation (Q3 2020):
  - Cloud detection modules
  - Atm Correction module
  - COG processing module
  - Various JIRA tickets
- Setup of reprocessing infrastructure (Sept/Oct 2020)
- Redeployment of reprocessing software layer (Nov 2020)
- Reprocessing entire archive: 6 months (Dec 2020 - May 2021)
- Evaluation of collection 2 + publication (Summer 2021)
- Intercomparison SPOT VGT C3 - PROBA-V C2 - S3 (Summer 2021)



# Collection 2 integration after reprocessing



New user interface  
Integrated time series  
Comparison features



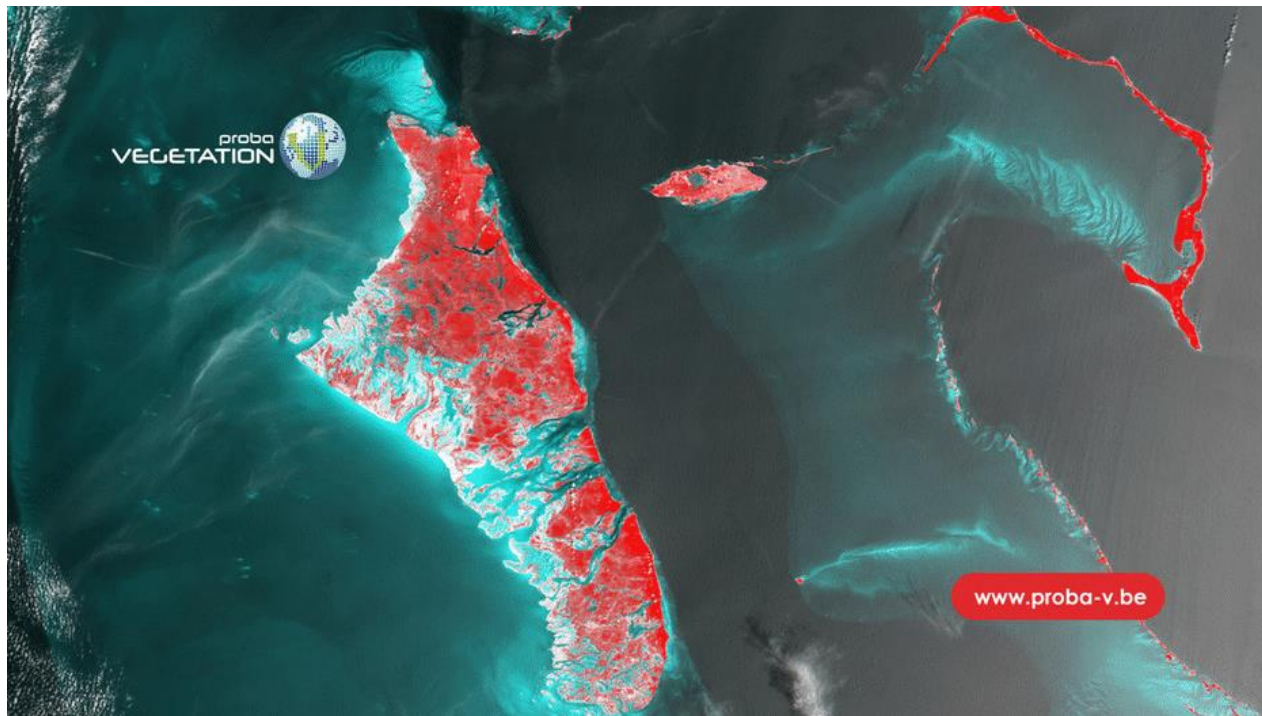
New catalogue: OSCARS  
Authentication update



# ACTIVITIES

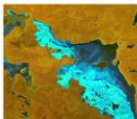
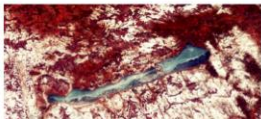
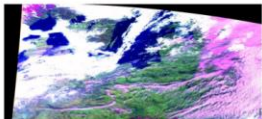
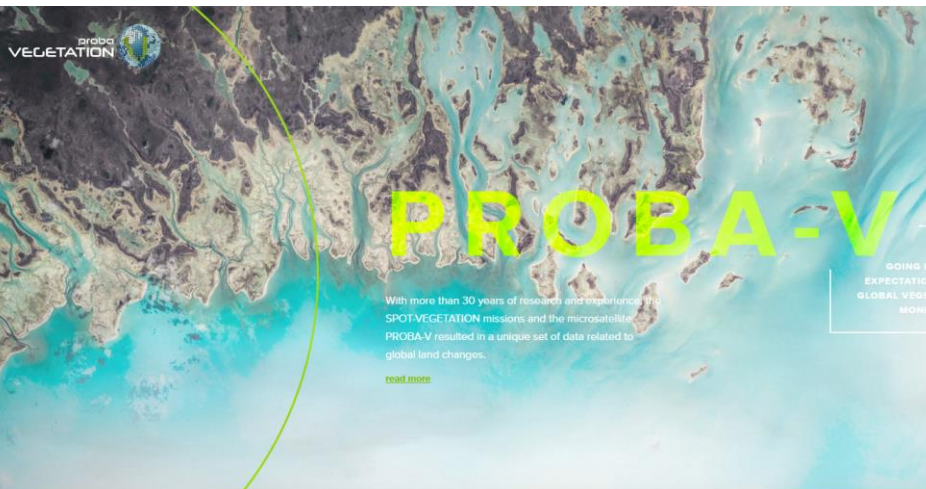


# Communication: 7 years celebration





# Communication: End of the operational mission



PROBA-V and Sentinel-3 satellites

## End of PROBA-V's operational lifetime! What's next?

**DENNIS CLARIUS**  
- PROBA-V PDGS operations manager, VITO Remote Sensing

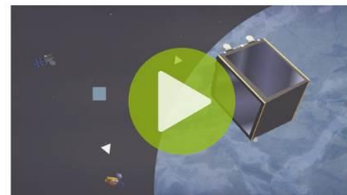
### 7 YEARS OF CELEBRATION WITH A CHERRY ON THE CAKE

Unfortunately, all good stories come to an end, even so for PROBA-V.

What started as a "gap-filler" mission between SPOT/VEGETATION and the Sentinel-3 mission, soon extended to a full blown mission with the addition of 100 m data. The satellite built a stable link between the past and the present, to prepare the future.

After 7 years successfully monitoring our Earth's surface, ESA's small satellite will officially end its operational duties on June 30, 2020.

Sad? Perhaps. Exciting? Definitely! Because this story isn't completely over yet! Dennis Clarius, PDGS operations manager, explains more about PROBA-V's upcoming phase and ... and stay tuned for what's coming next week!



Watch the full video in

06 23 19 50



# Communication: End of the operational mission

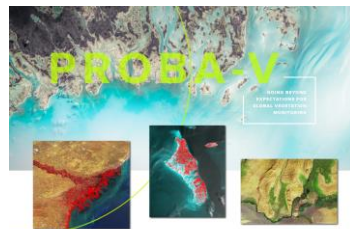


ENABLING & SUPPORT

## Ending global plant tracking, Proba-V assigned new focus

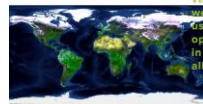
20/04/2020 3245 VIEWS 76 LIKES

via sat - Proba-V global vegetation monitoring



With only a few weeks to go till PROBA-V's seventh birthday, marking the final countdown of its operational mission, we're happy to release a series of memorable moments and testimonials provided by [key Earth Observation colleagues](#) closely associated in the SPOT VEGETATION and PROBA-V missions.

To celebrate its successful path and the new adventures still to come, we compiled these [PROBA-V insides](#) and published them online, together with a selection of our most fascinating images captured from all around the world.



Thanks to the sensor, we count more than 4,000 users, many developing operational applications in environmental sectors all around the world

Michel Mouton  
European Commission

Discover the more than 15 stories and 50 images of our small but brave satellite that was launched in May 2013 with the intention to monitor our Earth's surface for 2.5 years, but provided us all with so much more...

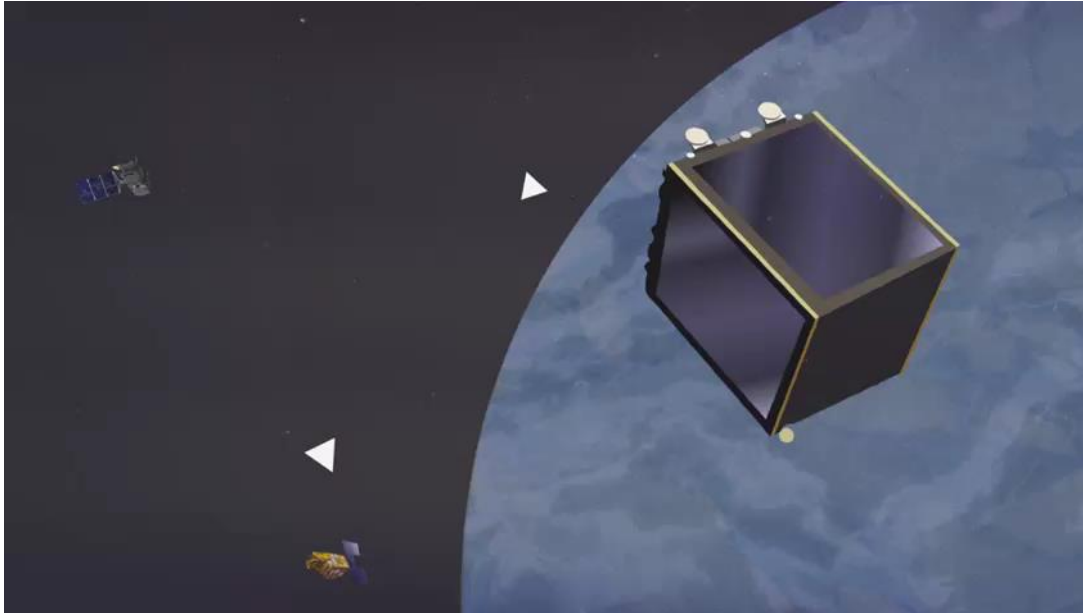
explore ...







# Communication: End of an Era, Start new phase



Release 30 June 2020

- End operational mission
- Start experimental mission incl EUR & AFR
- Scripting contest MEP
- Outlook towards next years



# Communication: End of the operational mission

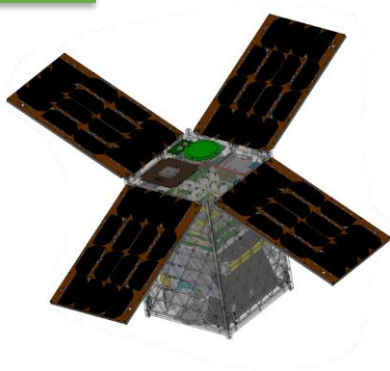


# THANK YOU

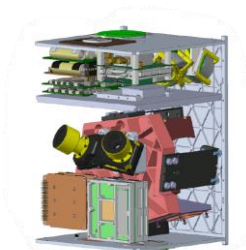
[remotesensing.vito.be](http://remotesensing.vito.be)



# Cubesat missions update



- PROBA-V CC Cubesat IOD:
  - Update current PDGS using Collection 2 parameters
  - 2 year operations



- 2<sup>nd</sup> Cubesat (SATIRIM or CSIMBA) IOD:
  - Risk in instrument development
  - Development of new Payload Data Ground Segment
  - Learn from first cubesat behaviour
  - 2 year operations



# PROBA-V + Cubesats time allocation

