

QWG 13 – Payload Data Ground Segment Status

D. Clarijs

21-22/04/2021 QWG #13 – Virtual Meeting

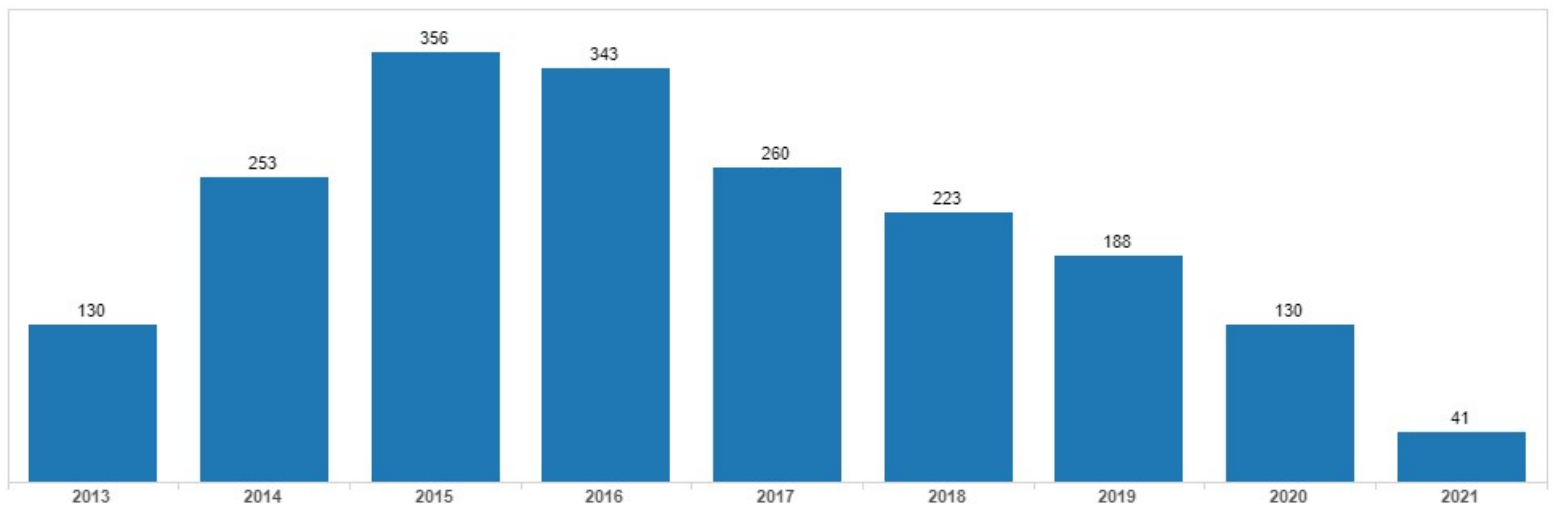


USER SEGMENT STATISTICS



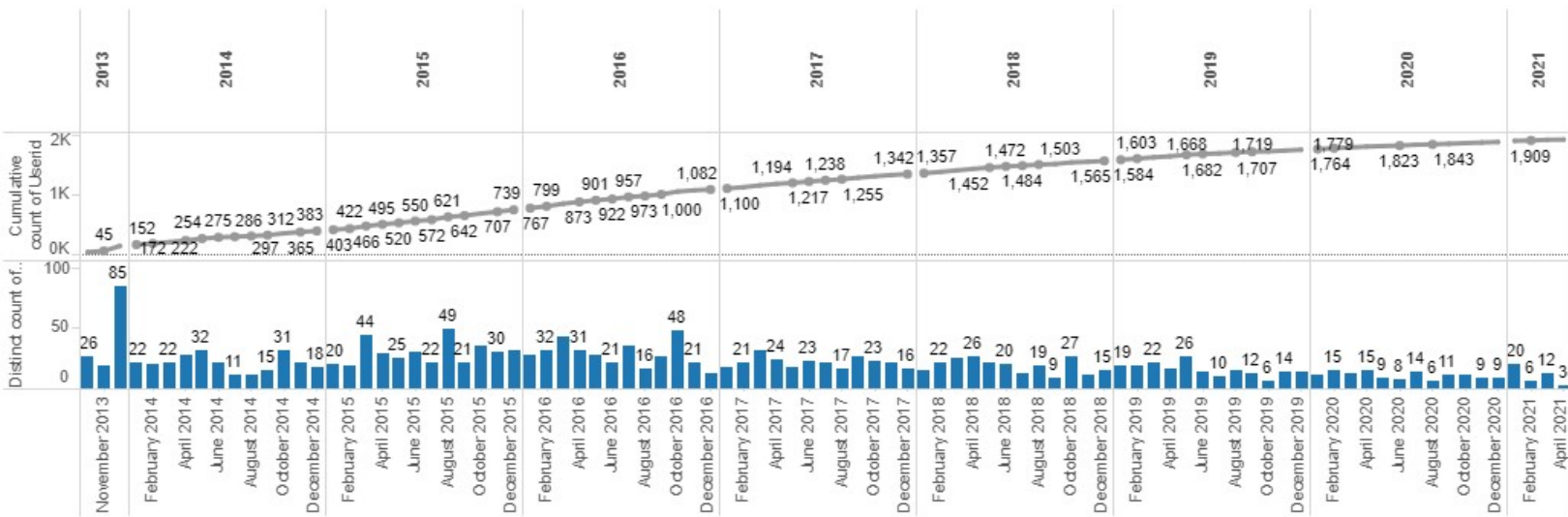
PROBA-V Evolution User registrations

- Period October 15, 2013 - April 20, 2021
- Active users registered via www.vito-eodata.be portal: 1 924





PROBA-V Evolution User registrations





User registration remarks



1 394
different
institutions



120 different
nationalities

Since experimental mission:

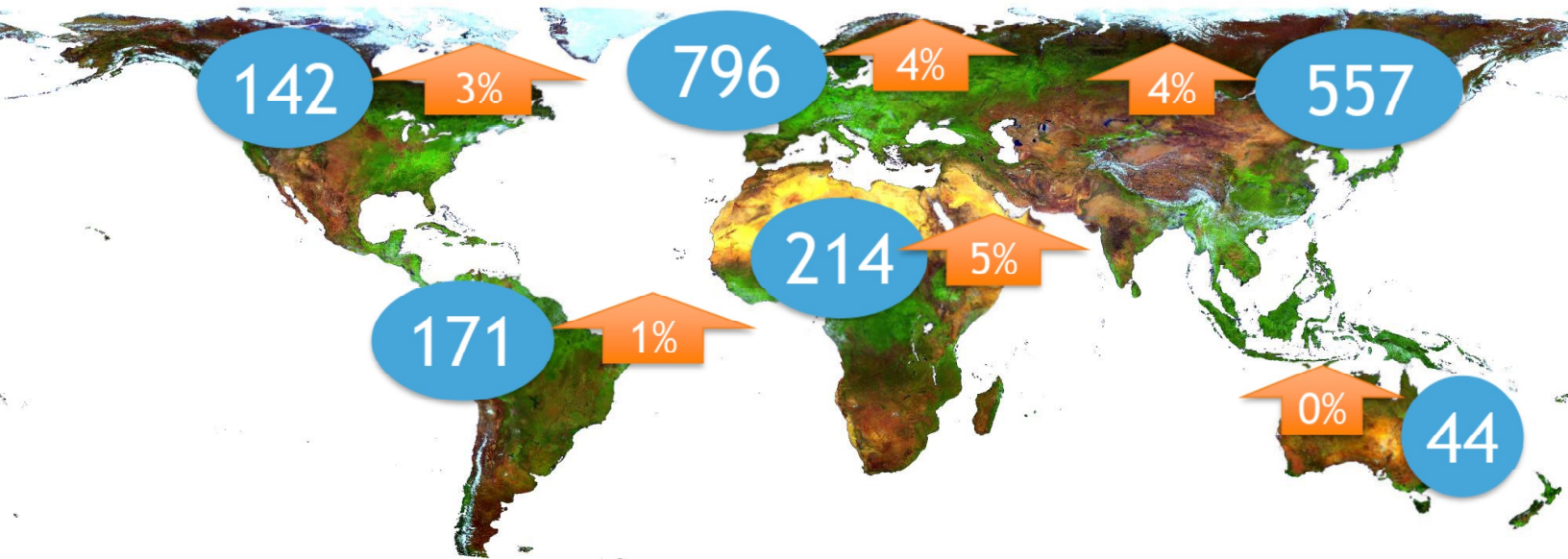
- 102 new registered users
- 93 institutions
- 40 nationalities



Geographical spread of PROBA-V users

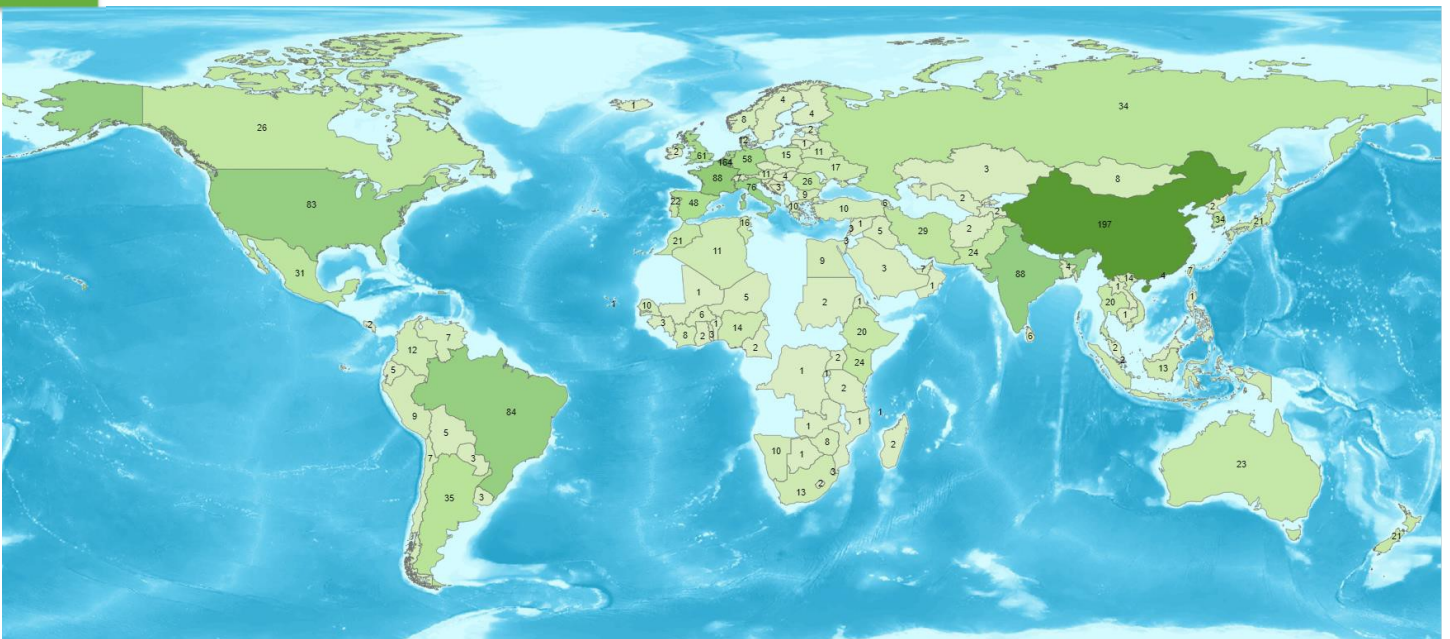
Spread of users on 13 April 2021

User growth since last QWG (22/11/2020)





Users per country – spread over the world: Start of mission – 13/04/2021



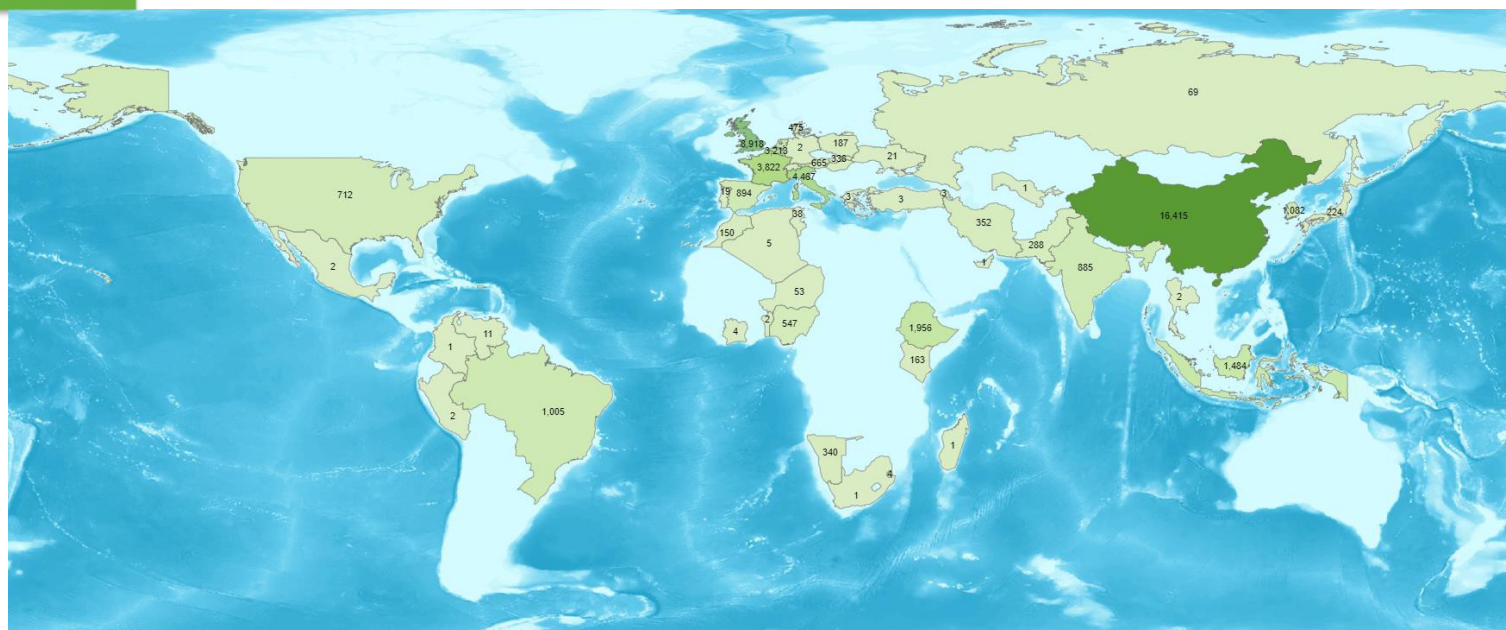


Deliveries per country - Total





Deliveries per country – Since July 2020





Top 20 # downloads per country

1	BELGIUM	146,012
2	CHINA	82,343
3	FRANCE	58,461
4	UNITED KINGDOM	40,155
5	UNITED STATES	39,368
6	ITALY	37,999
7	RUSSIAN FEDERATION	20,780
8	NETHERLANDS	20,168
9	GERMANY	20,069
10	INDIA	19,352
11	SPAIN	18,176
12	BRAZIL	16,179
13	KOREA (SOUTH)	10,280
14	NAMIBIA	9,036
15	SLOVENIA	7,907
16	JAPAN	7,885
17	AUSTRIA	6,423
18	PAKISTAN	6,263
19	INDONESIA	6,124
20	TAIWAN	6,072

Whole mission

1	CHINA	16,415
2	UNITED KINGDOM	8,918
3	ITALY	4,467
4	FRANCE	3,822
5	BELGIUM	3,213
6	ETHIOPIA	1,956
7	NETHERLANDS	1,521
8	INDONESIA	1,484
9	KOREA (SOUTH)	1,082
10	BRAZIL	1,005
11	SPAIN	894
12	INDIA	885
13	UNITED STATES	712
14	AUSTRIA	665
15	NIGERIA	547
16	DENMARK	475
17	IRAN	352
18	NAMIBIA	340
19	SLOVAK REPUBLIC	336
20	HUNGARY	289

Experimental mission

1	CHINA	11,923
2	FRANCE	2,597
3	UNITED KINGDOM	2,511
4	ITALY	2,468
5	NETHERLANDS	1,622
6	BELGIUM	1,416
7	ETHIOPIA	927
8	SPAIN	876
9	BRAZIL	746
10	INDONESIA	722
11	AUSTRIA	371
12	UNITED STATES	311
13	NAMIBIA	305
14	IRAN	234
15	MOROCCO	166
16	FRANCE, METROPOLITAN	143
17	INDIA	128
18	DENMARK	92
19	KENYA	83
20	THAILAND	72

Since QWG #12



Top 20 # users

1	VITO	BELGIUM	97,201
2	GOOGLE	UNITED STATES	20,039
3	ESA	BELGIUM	144
4	ESA	ITALY	13,229
5	ESA	NETHERLANDS	5,618
6	ESA	PORTUGAL	1
7	UCLouvain	BELGIUM	13,118
8	RADI	CHINA	12,480
9	METEO FRANCE	FRANCE	12,316
10	CSIR-IHBT	INDIA	11,755
11	EOSENSE	UNITED KINGDOM	11,123
12	GSi LTD	UNITED KINGDOM	10,719
13	VISITERRA	FRANCE	10,587
14	STARLAB	SPAIN	9,335
15	IREA-CNR	ITALY	8,892
16	VUB	BELGIUM	8,551
17	ARGANS	UNITED KINGDOM	8,422
18	SPACE RESEARCH INSTITUTE RAS (IKI)	RUSSIAN FEDERATION	8,163
19	SAN JOSE STATE UNIVERSITY	UNITED STATES	8,030
20	TRASYS	BELGIUM	8,011
21	TECHNICAL UNIVERSITY OF DRESDEN	GERMANY	7,589
22	GEOSYS	FRANCE	7,465
23	NSMC	CHINA	7,330

Whole mission

1	EOSENSE	UNITED KINGDOM	8,860
2	RADI	CHINA	5,688
3	JOINT RESEARCH CENTRE	ITALY	2,968
4	IGSNRR	CHINA	2,334
5	CESBIO	FRANCE	1,992
6	UCLouvain	BELGIUM	1,733
7	OPENGEHUB FOUNDATION	NETHERLANDS	1,514
8	VITO	BELGIUM	1,463
9	AGRICULTURE MINISTRY OF INDONES.	INDONESIA	1,407
10	SHANDONG FORESTRY SCIENCE RES.	CHINA	1,376
11	DESCARTES UNDERWRITING	FRANCE	1,189
12	PEKING UNIVERSITY	CHINA	1,178
13	ICMBIO	BRAZIL	1,003
14	ESA	ITALY	922
15	JIGJIGA UNIVERSITY	ETHIOPIA	917
16	NNNU	CHINA	806
17	南宁师范大学	CHINA	735
18	IRRI	INDIA	730
19	GOOGLE	UNITED STATES	692
20	INSTITUTE OF GEOGRAPHICAL SCIEN.	CHINA	635

Experimental mission

1	RADI	CHINA	5,688
2	EOSENSE	UNITED KINGDOM	2,486
3	JOINT RESEARCH CENTRE	ITALY	2,182
4	CESBIO	FRANCE	1,992
5	OPENGEHUB FOUNDATION	NETHERLANDS	1,620
6	SHANDONG FORESTRY SCIENCE RES.	CHINA	1,376
7	JIGJIGA UNIVERSITY	ETHIOPIA	917
8	ICMBIO	BRAZIL	746
9	NNNU	CHINA	739
10	南宁师范大学	CHINA	734
11	UCLouvain	BELGIUM	709
12	VITO	BELGIUM	692
13	AGRICULTURE MINISTRY OF INDONES.	INDONESIA	649
14	INSTITUTE OF GEOGRAPHICAL SCIEN.	CHINA	635
15	UNIVERSIDAD DE VALENCIA	SPAIN	616
16	DESCARTES UNDERWRITING	FRANCE	574
17	IGSNRR	CHINA	549
18	IGSNRR CAS	CHINA	525
19	BEIJING NORMAL UNIVERSITY	CHINA	490
20	NNSD	CHINA	400

Since QWG #12



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VITO usage remarks



Key user with own CDS portal:
Unknown amount of indirect users

Key user with own portal:
6000+ users registered
NDVI & Land cover popular

- FRAME (FAO) & MARS (JRC)
- Quality control
- PhD student
- Special images
- Processing-on-demand



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Downloads whole mission

	Africa	Asia	Europe	N-America	Oceania	S-America	Grand Total
PROBA-V Level 1C	8	5,767	33,487	35	6	126	39,429
PROBA-V Level 2A 1KM	4	249	5,409	481	2	4	6,149
PROBA-V Level 2A 1KM Antarctica			28	14			42
PROBA-V Level 2A 100M	1,409	2,539	13,950	197	2	484	18,581
PROBA-V Level 2A 100M Antarctica			41	10			51
PROBA-V Level 2A 300M	175	692	18,396	243		2	19,508
PROBA-V Level 2A 333M Antarctica			79				79
PROBA-V S1 1KM TOA	294	1,652	16,811	2,277		51	21,085
PROBA-V S1 1KM TOC	801	2,248	29,360	56	1	379	32,845
PROBA-V S1 100M TOA	63	9,754	13,304	1,208	161	1,050	25,540
PROBA-V S1 100M TOC	3,899	27,311	66,221	8,215	156	1,153	106,955
PROBA-V S1 100M TOC NDVI	5,752	28,799	17,059	7,791	170	69	59,640
PROBA-V S1 300M TOA	63	5,153	18,593	1,268	150	1,817	27,044
PROBA-V S1 300M TOC	1,992	13,047	68,694	14,263	62	5,988	104,046
PROBA-V S5 100M TOA	265	902	2,308	747	2	1,130	5,354
PROBA-V S5 100M TOC	1,468	14,180	24,100	1,982	296	2,890	44,916
PROBA-V S5 100M TOC NDVI	4,011	24,720	19,658	2,718	605	4,862	56,574
PROBA-V S10 1KM TOC	2,609	2,675	5,999	798	1	369	12,451
PROBA-V S10 300M TOC	784	3,199	7,028	174	220	307	11,712
PROBA-V S10 NDVI 1KM TOC	9,807	24,335	11,791	1,154	156	1,411	48,654
PROBA-V S10 NDVI 300M TOC	3,100	8,882	15,726	2,259	297	2,296	32,560
Grand Total	36,504	176,104	388,042	45,890	2,287	24,388	673,215



#Downloads Experimental mission

	Africa	Asia	Europe	N-America	S-America	Grand Total
PROBA-V Level 1C	1	37	9,743	15		9,796
PROBA-V Level 2A 1KM			16	2		18
PROBA-V Level 2A 1KM Antarctica				1		1
PROBA-V Level 2A 100M	3	538	376			917
PROBA-V Level 2A 300M		4	653			657
PROBA-V S1 1KM TOA	1	76	856			933
PROBA-V S1 1KM TOC		440	1,042			1,482
PROBA-V S1 100M TOA	1	139	747		1	888
PROBA-V S1 100M TOC	1	2,068	3,754	356		6,179
PROBA-V S1 100M TOC NDVI	49	1,000	293	1	2	1,345
PROBA-V S1 300M TOA	3	5	498		1,054	1,560
PROBA-V S1 300M TOC	4	2,436	1,091	351		3,882
PROBA-V S5 100M TOA	5	58	9			72
PROBA-V S5 100M TOC	81	3,793	890		1	4,765
PROBA-V S5 100M TOC NDVI	162	3,433	2,018	2	7	5,622
PROBA-V S10 1KM TOC	36	1,239	123	1		1,399
PROBA-V S10 300M TOC	65	974	201			1,240
PROBA-V S10 NDVI 1KM TOC	2,707	4,198	9		1	6,915
PROBA-V S10 NDVI 300M TOC	256	443	3,884		4	4,587
Grand Total	3,375	20,881	26,203	729	1,070	52,258

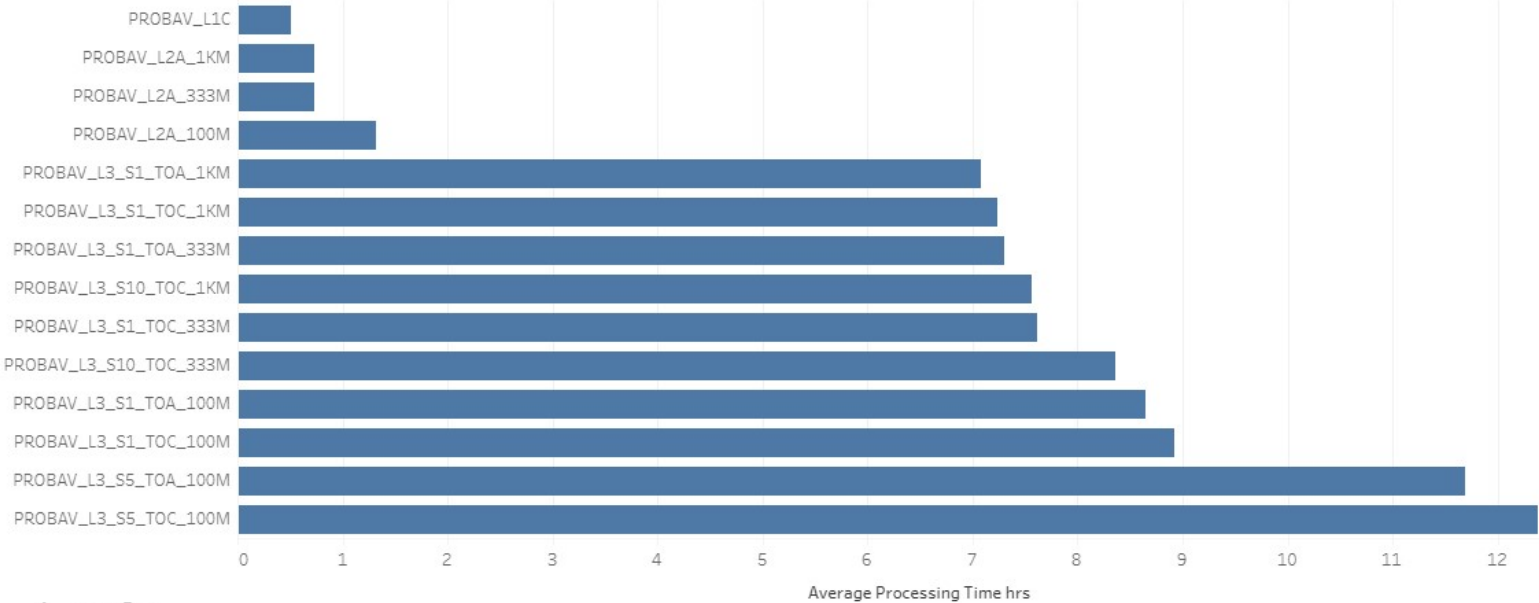


Downloads since QWG #12

	Africa	Asia	Europe	N-America	S-America	Grand Total
PROBA-V Level 1C	1	2	2,505			2,508
PROBA-V Level 2A 1KM			13			13
PROBA-V Level 2A 100M	3	1	34			38
PROBA-V Level 2A 300M		2	648			650
PROBA-V S1 1KM TOA		73	563			636
PROBA-V S1 1KM TOC		73	453			526
PROBA-V S1 100M TOA	1	16	329		1	347
PROBA-V S1 100M TOC	1	1,877	2,570	156		4,604
PROBA-V S1 100M TOC NDVI	2	496	14		2	514
PROBA-V S1 300M TOA	1		204		746	951
PROBA-V S1 300M TOC		2,436	417	156		3,009
PROBA-V S5 100M TOA	4	18	9			31
PROBA-V S5 100M TOC	35	3,371	366			3,772
PROBA-V S5 100M TOC NDVI	131	2,745	1,382			4,258
PROBA-V S10 1KM TOC	18	109	109			236
PROBA-V S10 300M TOC	34	242	52			328
PROBA-V S10 NDVI 1KM TOC	1,044	1,278	6			2,328
PROBA-V S10 NDVI 300M TOC	256	413	2,597			3,266
Grand Total	1,531	13,152	12,271	312	749	28,015

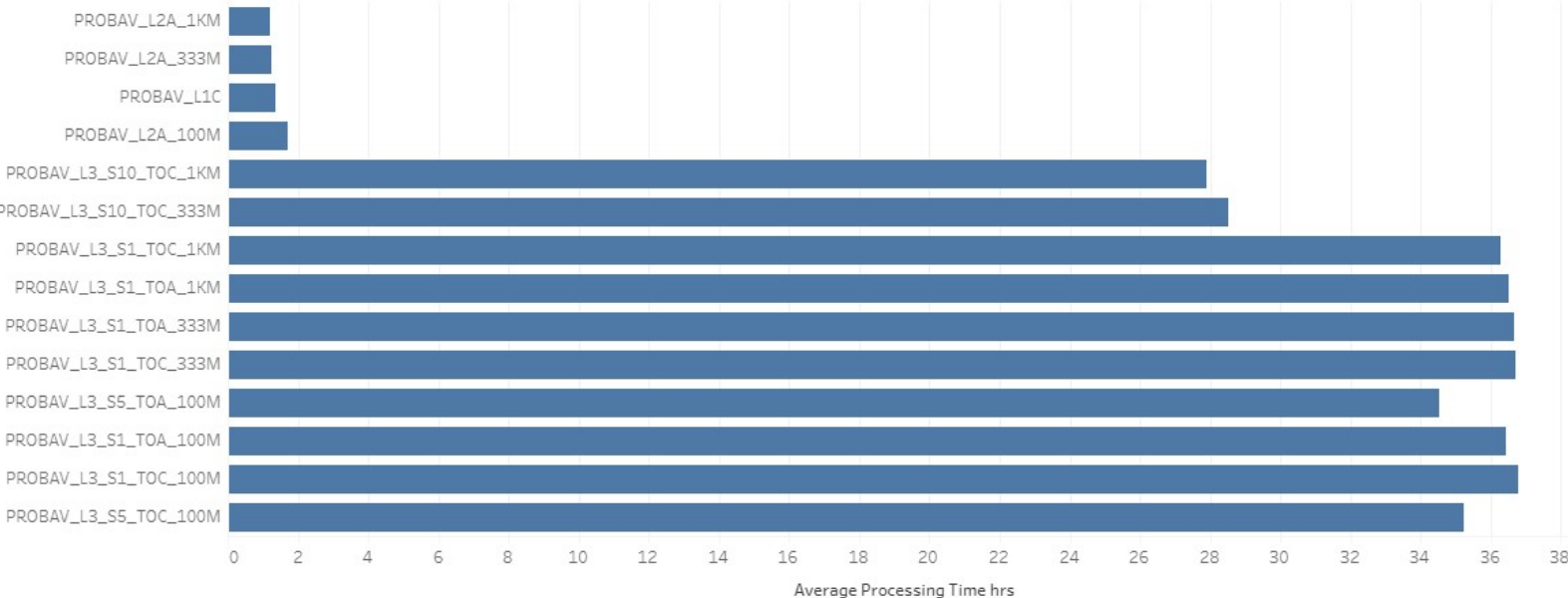


Data timeliness operational mission





Data timeliness experimental mission





System infrastructure availability since QWG #12

Nominal production

Category	Uptime
Switches	100%
Database servers	100%
Mid Term File Servers	100%
Short Term File Servers	99.99%
Master Servers	100%
Worker Nodes	100%
PDF	100%

MEP

Category	Uptime
OS Compute nodes	99.43%
OS Controller nodes	99.95%
Hadoop cluster	99.97%
User VMs	99.98%
Other	100%

Including planned downtime, upgrades, ...
27/03/2021: Power failure VITO DTC (*)



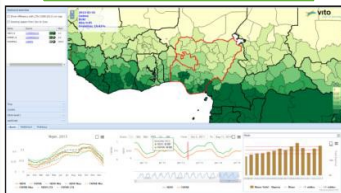
MEP application statistics since QWG #12

Geo Viewer



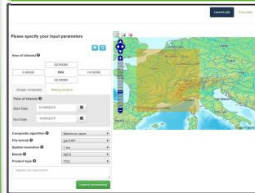
237 users
125 new users
381 sessions

Time Series Viewer



227 users
132 new users
320 sessions

N-Daily Compositor



167 users
1 new users
4 jobs

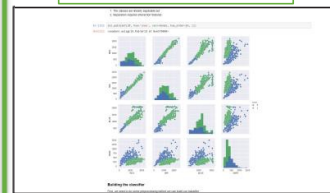
Virtual Machines



318 user VMs total
36 new user VMs



Jupyter Notebooks



213 users

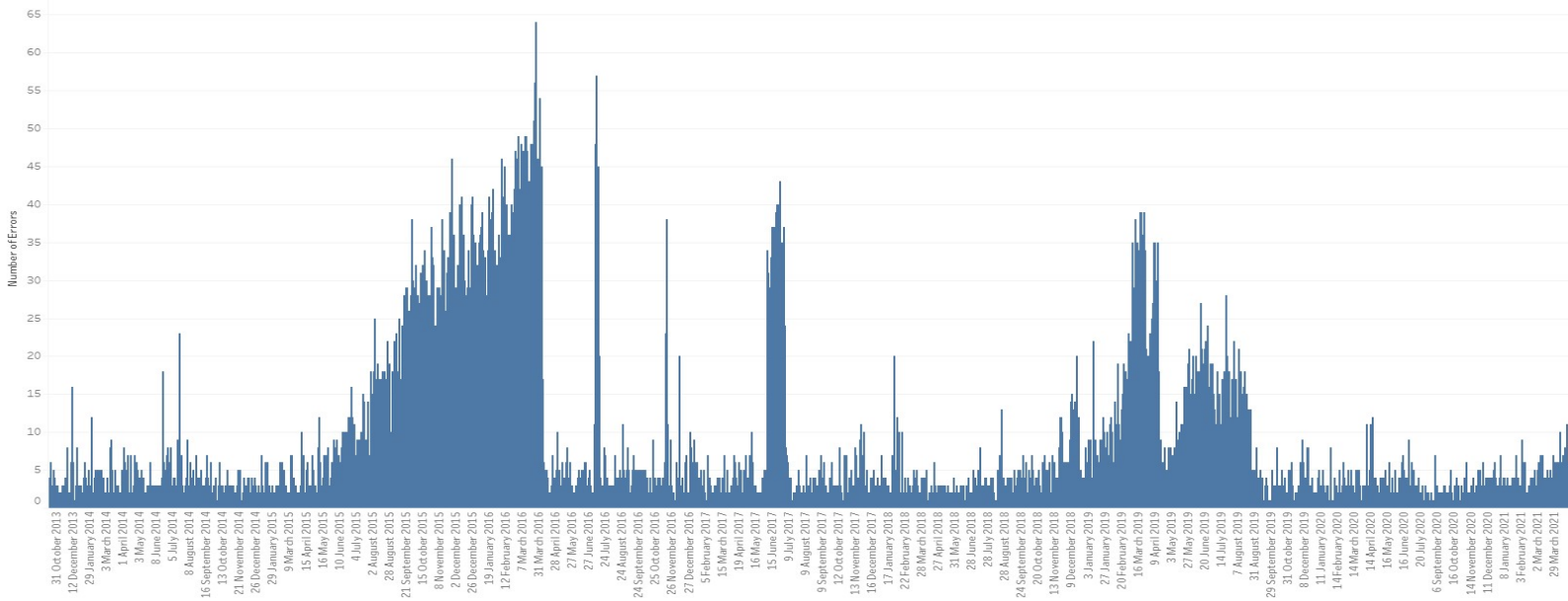




ANOMALIES

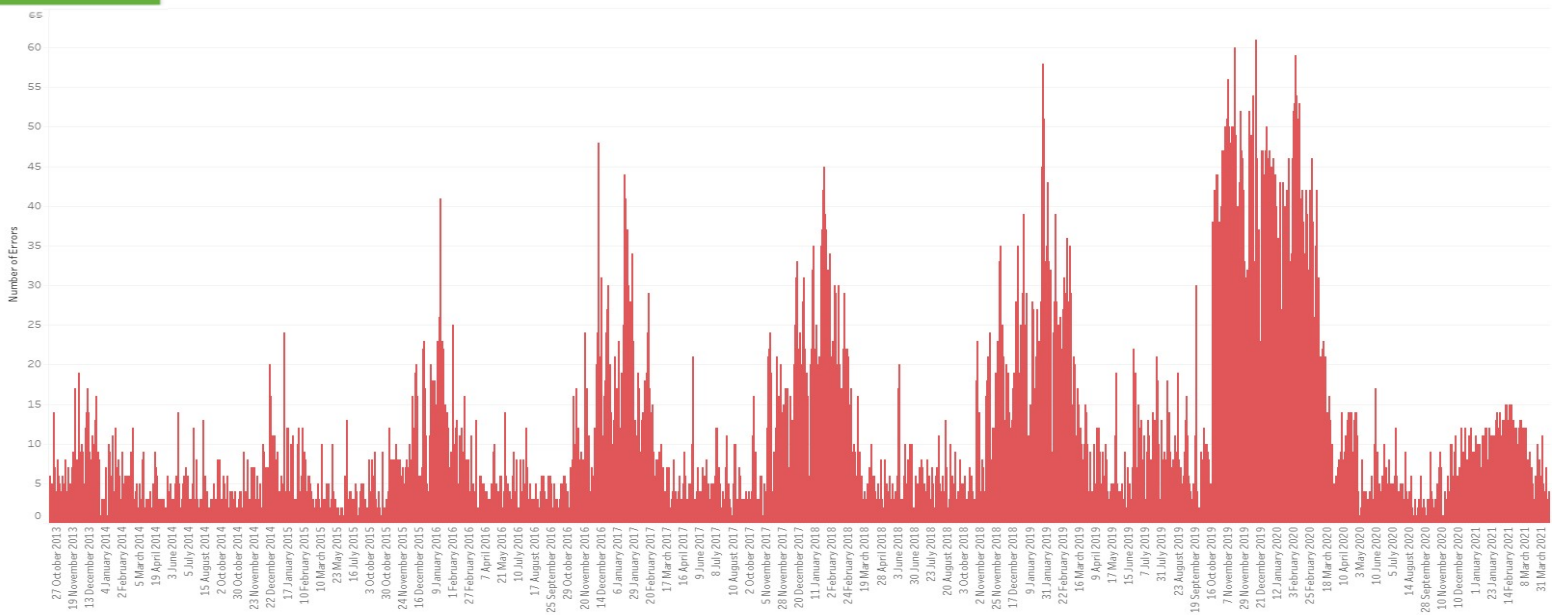


Decompression errors evolution





Geometric Errors evolution

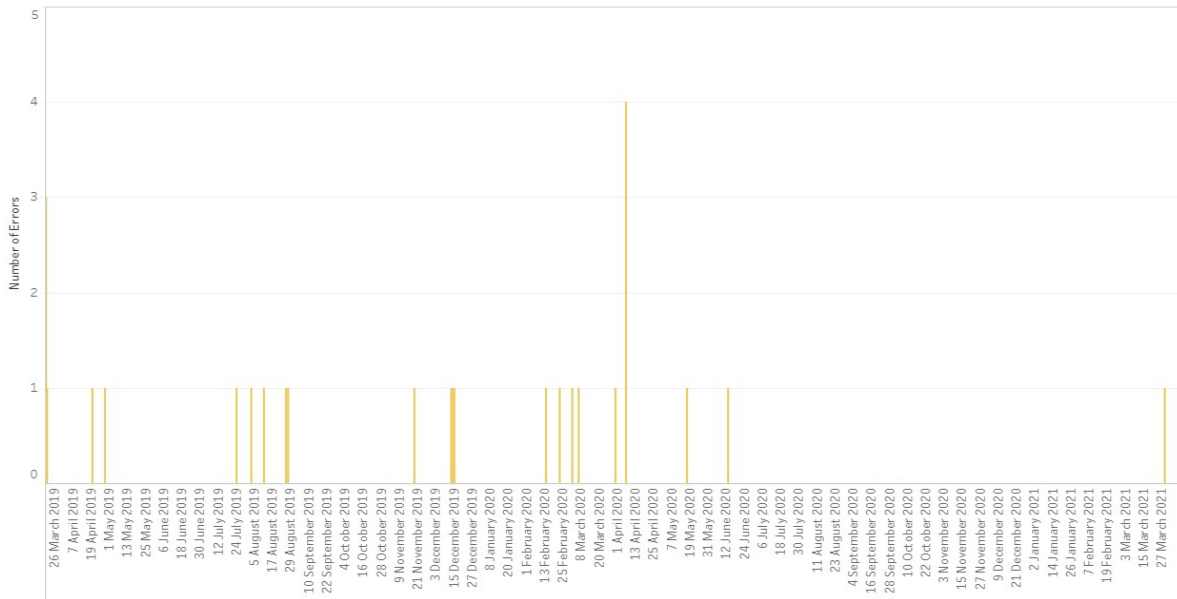


- Seasonal effect
- Missing pixels app to be updated

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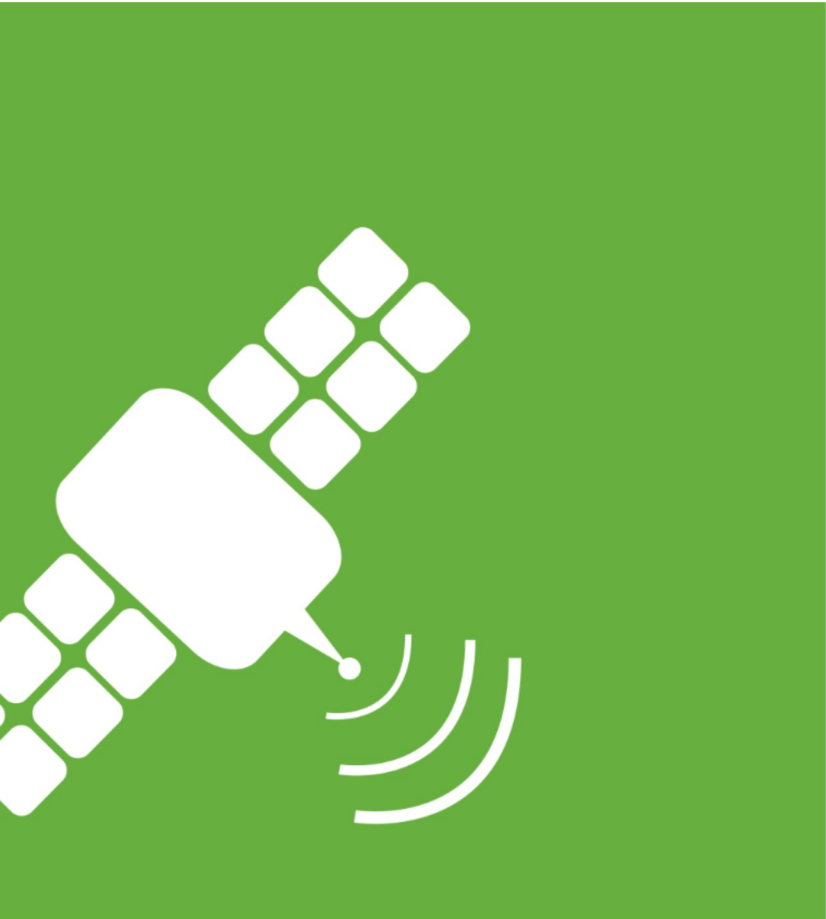


Missing Transfer Frame Files past two years



29/03/2021: Very late delivery of missing TFF (6/04/2021), corrected on 15/04/2021
10 & 11/04/2021: Missing TFFs due to human errors (SEKI/USAK)

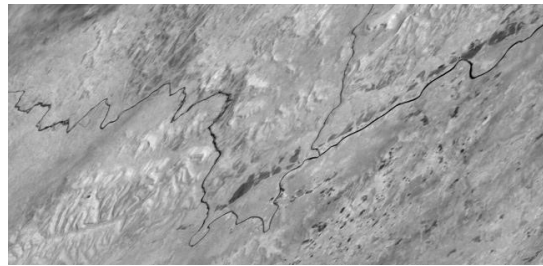
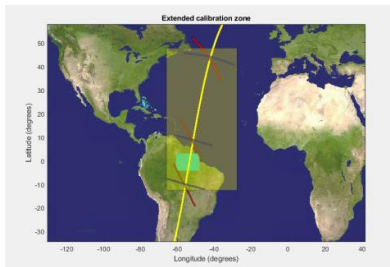
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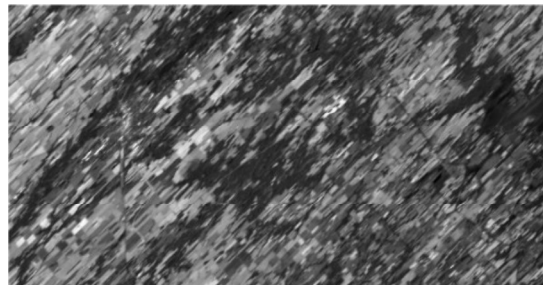
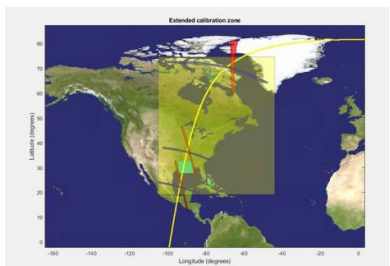
SPECIAL ACQUISITIONS



Super resolution experiment



Date of acquisition: 22-10-2020
Location: Amazonian site
Processed up to L2A



Date of acquisition: 01-11-2020
Location: USA site
Processed up to L2A



Delivered to ESTEC/ESRIN on March 24/03/2021

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Lunar calibration acquisition

Acquisition of moon calibration done from 23/10/2020 – 03/11/2020



masks



green : 90° phase
blue : 80° phase
black : 70° phase



C2 REPROCESSING STATUS



PROBA-V Collection 2 reprocessing

Timeline	Responsables	2020						2021								
		October	November	December	January	February	March	April	May	June	July	August	September	October	November	December
Software implementation																
Change 1: Cloud detection	Wouter, Lieve															
Change 2: Radiometric calibration	Sindy, Lieve															
Change 3: A/C module	Tom, Lieve															
Change 4: COG upgrade	Dirk, Lieve															
Change 5: Catalogue + UI	Martine, Bram, Lieve															
Change 6: bug fixes & updates	Tom, Lieve															
Infrastructure																
Compute & networking	Frank/Sarah															
Storage	Yves															
Tape storage	Frank - Martine/Bart															
Reprocessing																
TFF restore	Lieve															
Reprocessing	Lieve/Operators															
Validation																
Verification 5 dates	Else/Carolien															
Validation 1 year	Else/Carolien															
Complete validation	Else/Carolien															
Documentation publication																
C2 change summary	Dennis															
C2 Evaluation report	Else/Carolien															
C2 Comparison report SPOT VGT C3 & S3	Else/Carolien															
Updated PUM	Erwin															
Known issues section	Erwin															
Public release data/communication																
Beta release via VM	Dennis															
Public release data	Evelyn/Dennis															





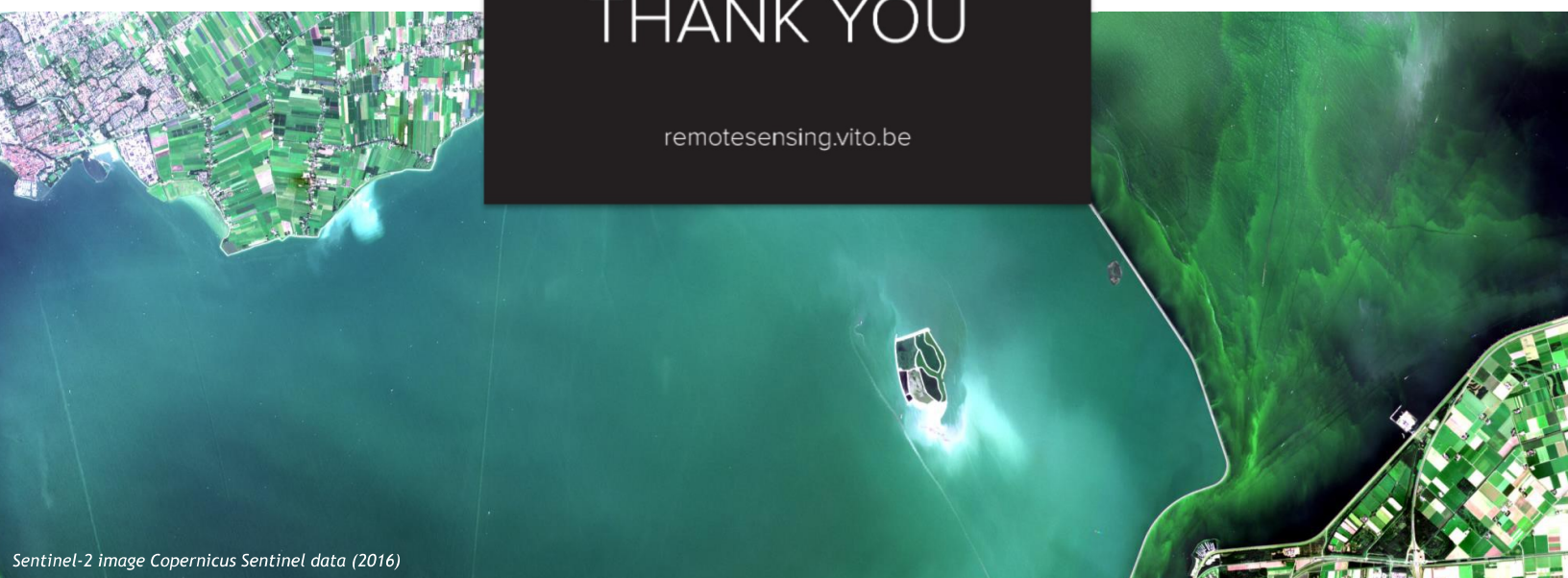
Quality approach to full collection for PROBA-V

<u>Phase</u>	<u>Dates / Period</u>	<u>Data description</u>	<u>Input needs</u>
1.Verification	5 dates (TBD) 20141221, 20160321 20170621, 20180921 20191221	TOA and TOC, both C1 and C2 S1 at 100m, 300m and 1km L1C for ICP update validation For one date also L2A	Brockmann validation report cloud detection Sensitivity analysis ICP files ATBD & validation report A/C ?
2.Validation over 1 year	July 2018 - June 2019	at 1km resolution: both C1 and C2 S1 (TOA and TOC) and S10 (TOC)	MODIS C6 NDVI Landval sites
	July 2018 - June 2019	at 300m resolution: both C1 and C2 S1 (TOA and TOC) and S10 (TOC)	MODIS C6 NDVI Landval sites
	July 2018 - June 2019	At 100m resolution: Both C1 and C2 S1 (TOA and TOC) and S5 (TOC)	MODIS C6 NDVI Landval sites
3.Complete validation	Entire period	Full dataset of S10 (S5 for 100m).	MODIS C6 NDVI + TOC refl, Landval sites Sentinel-3 SYN-VGT SPOT-VGT METOP-AVHRR



THANK YOU

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Sentinel-2 image Copernicus Sentinel data (2016)