

Status of the space programmes after Luxembourg 2014 and Lucerne 2016

1. Introduction
2. Belgian space activities in 2018
3. Return
4. Way forward in 2019
5. Preparation of Space19+

BELSPO info session – 18 January 2019

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Global situation

- BELSPO
 - No chairman since Feb 2018
 - No progress in the integration of Belspo in another administration
 - No progress in the setting up of a Belgian space agency
 - New HoD to ESA on 01/01/2019: F. Monteny takes over from J. Nijskens
 - Retirement of Director J. Nijskens end Feb 2019 and recruitment of a new director in 2019

- **ESA**

- Implementation of the decisions of the ESA-CM at Luxembourg in Dec 2014 and at Lucerne in Dec 2016, mainly for BE:

- 2014 - Development of Ariane-6 and Vega-C
 - 2014-2016 - Techno programmes (GSTP, ARTES)
 - 2014-2016 - Support to scientists (PRODEX)
 - 2016 - Altius mission
 - 2016 - Vegetation follow-up

- IMM at Madrid in Oct 2018

- Relations between ESA and EU
 - Strategic guidelines for the preparation of the ESA programmes and activities
 - Signature by ESA, DE, FR, IT, ES and CH of a Declaration on the grouped procurements for launch services for their institutional missions

- Space19+: next ESA-CM at Seville in Nov 2019

- EU
 - Deployment of GALILEO
 - Deployment of COPERNICUS
 - Supporting space R&D with H2020
 - Preparing the future (2021-2027)
 - Regulation for the European Space Programme
 - EU Agency for the Space Programme (EUSPA)
 - New R&D framework programme "Horizon Europe"
- BELSPO info session – 09/11/2018
 - See http://www.belspo.be/belspo/space/index_en.stm

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 - Exploration
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 - Support to scientists (PRODEX)
 - Technology Programme (GSTP)
 - Others: ESEC, NTP
- **Bilateral Programmes**
- **National Programmes**

Basic Activities

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- Discovery, Preparation and Technology Development Programme (DPTD) succeeds to TRP and GSP

The Science Programme

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- Operations in orbit
 - XMM, CLUSTER, INTEGRAL, MARS EXPRESS, GAIA, BEPI COLOMBO
 - EXOMARS/TGO
 - HST, SOHO, HINODE, IRIS
- Development
 - CHEOPS, SOLAR ORBITER, EUCLID, JUICE, PLATO, ARIEL, ATHENA, LISA
 - F1, M5 (ENVISION or SPICA or THESEUS)
 - EXOMARS 2020, PROBA-3
 - JWST, SMILE, EINSTEIN PROBE, XRISM, MMX
- Future calls
 - S, M, L missions
 - New Missions of Opportunity
- Basic activities
 - Technology development
 - Science management support
 - Programme contingency

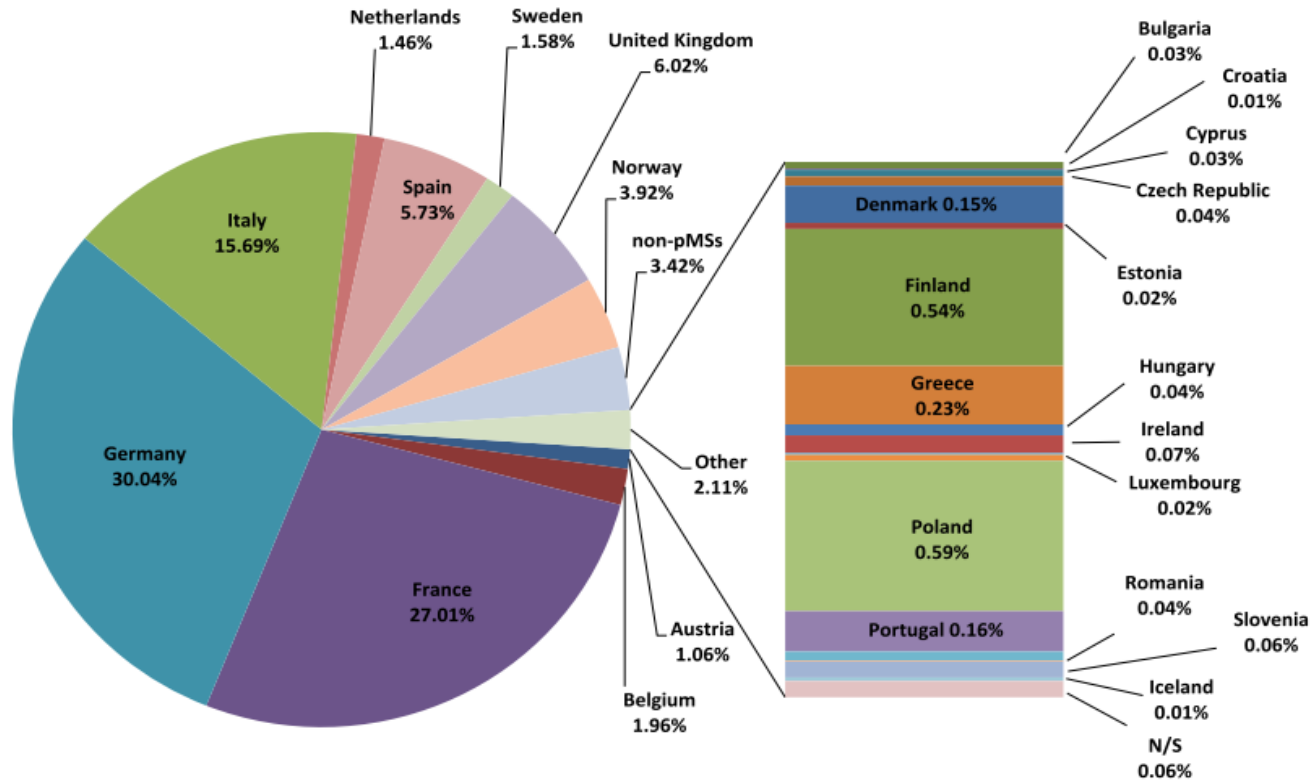
Earth Observation

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- Copernicus space component
 - Current launched Sentinels
 - Sentinel-1A: 03/04/2014, Soyuz ST
 - Sentinel-2A: 22/06/2015, Vega
 - Sentinel-3A: 16/02/2016, Rockot
 - Sentinel-1B: 25/04/2016, Soyuz ST
 - Sentinel-2B: 06/03/2017, Vega
 - Sentinel-5P: 13/10/2017, Rockot
 - Sentinel-3B: 25/04/2018, Rockot
 - Under development
 - Sentinel 4 (instr. MTG)
 - Sentinel 5 (instr. METOP SG)
 - Sentinel 6
 - Production of the recurrent C and D units of Sentinel 1, 2 and 3 is ongoing

- "EU Return"

Value of Contracts per Country till end 2017 in % (primes & subcontractors)
 Total: € 2.690.808.518,83



• Sentinel expansion missions

- 2 phase A/B1 studies in EOEP in parallel for each of the 6 types of expansion missions
 - CO2M (CO₂-monitoring)
 - PICE (Polar snow and ice Topo)
 - LSTM (Land Surface Temperature Monitoring) (TIR)
 - CHIME (Hyperspectral)
 - CIMR (Passive Microwave Radiometer (PMR))
 - ROSE-L (L-band-SAR)
- Belgian involvement known in one of the parallel study for the hyperspectral expansion mission (AMOS and VITO)
- Procurement ITT's for the expansion missions will be published in a staggered way from mid 2019 till end 2019

- Earth Watch: ALTIUS Programme

- May 2016: ALTIUS included as a new EW element

Belgium	91,72 M€	Luxembourg	2,00 M€
Canada	3,20 M€	Romania	1,05 M€

- 2018

- **27/09 IPC: approval of the procurement proposal**
- Continuation of instrument pre-development (1,5 year, OIP)
- Space segment system consolidation phase (1 year, QinetiQ Space)
- Start of the ground segment preparatory phase (1 year, Spacebel)

- 2019

- Q1: release of RFQ for the space segment and FOS (B2/C/D)
- Q3: start of phase B2/C/D for the space segment and FOS
- Space19+: budgets for launch and operations

- Earth Watch: PROBA-V Exploitation
 - PROBA-V launched on 07/05/2013
 - Operational lifetime: initially 5 years until Dec 2018, currently extended until Nov 2019
 - PROBA-V Mission Exploitation Platform (MEP)
 - "Bring user to the data"
 - Technology contributes to Copernicus
 - Terrascope (collaborative ground segment)
 - Under investigation
 - Further extension of the operations of PROBA-V beyond 2019

- VGT follow-up
 - Budget foreseen at CM 2016: 48,81 M€ currently in GSTP Fly
 - Extension and Expansion of PROBA-V mission
 - 3 IOD missions based on multi-cubesats (12 U), each with a specific payload
 - TMA
 - ✓ Use of a spare TMA camera of PROBA-V
 - ✓ Fly together with PROBA-V
 - ✓ Launch: 2020 TBC
 - TIR
 - ✓ Qualification of a military camera
 - ✓ To prepare a constellation
 - ✓ Launch of proto-flight: 2021 TBC
 - Hyperspectral
 - ✓ CHIEM camera in development
 - ✓ Launch: 2021 TBC

Telecom

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ARTES = Advanced Research in Telecommunications Systems



FP = Future Preparation

CC = Core Competitiveness

BA = Business Applications (formerly IAP)

Partner = Public Private Partnerships (PPP)

TBA = To Be Allocated

- Financial status ARTES end 2018 (M€)

Element	e.c.	Subscriptions before 2016 ¹	Subscriptions 2016 ¹	Transfer from TBA (2016 e.c.) ¹	Balance ¹	Identified ¹
FP	2016		0,80	0,00		
CC	2016	4,86	48,41	6,25	0,00	-8,14
BA	2016	1,82	6,25	0,00	2,28	-2,40
SGEO SE1	2006	7,21	0,00	0,00	0,00	
SGEO SE3	2008	0,50	0,00	0,88	0,00	
NEOSAT	2012	12,00	2,82	6,37	0,15	-7,00
ELECTRA	2012	5,60	0,00	2,35	0,00	
INDIGO	2016	14,00	0,00	0,00	0,11	
ECO	2016	12,60	0,00	0,00	5,68	-5,68
Govsatcom Prec	2016		8,00	0,00	1,30	
QKDSat	2017		0,00	13,15	13,15	
TBA	2016	0,71	33,42	29,00	5,13	

¹ Including ESA costs

Navigation

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- NAVISP
 - Element 1 - Innovation in Satellite Navigation
 - Element 3 - Support to Member States
- Budget
 - BE subscription: 1,98 M€
 - Still available: 0,43 M€

Exploration

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- E3P Phase 1: no new major development
- 4 main destinations
 - LEO
 - Beyond LEO
 - Moon
 - Mars

Space Transportation

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- Ariane-6, P120-C and Vega-C Programme
 - No request for complementary subscription to BE in 2018
 - Risk provision for Ariane-6 and P120-C
 - Agreed at ESA Council of June 2018
 - Max 80,00 M€
 - BE: max 2,80 M€ (3,5 %) covered by 0,5 % left-over Ariane-6 development

- Ariane-6 and P120-C Transition Programme
 - Support to first batch of contracts for Ariane-6 production: max 200,00 M€ industrial costs
 - Step 1: 2018-2019
 - Open to subscription at ESA Council of June 2018
 - 68,30 M€ e.c. 2017 (including 3,30 M€ ESA costs)
 - BE subscription (Dec 2018): 2,39 M€ (3,5 %) covered by 0,5 % left-over Ariane-6 development
 - Step 2: 2020-2023
 - To be subscribed at Space19+

• Space Weather (SWE)

- Development and pre-operations of services (SSCC, ESC's, Data Centre)
- Development of applications
- Sun-Earth-connection modelling
- Development of instrumentation for hosted payload missions
- Operational space weather mission to L5:
 - Phase A/B1 started in 2018 for mission (OHB-DE and Airbus-UK) and payload (RAL-UK and UCL-UK) – for BE: 0,30 M€ for EUV imager in PRODEX
 - Phase B2/C/D to be proposed for Space19+
 - Launch: 2025
 - Cooperation with NASA for payload dev. and observing strategy

• **Near-Earth Objects (NEO)**

- Development and pre-operations of services
- Development and deployment of optical telescopes for survey and orbit determination (Fly-Eye)
- Development of sensors
- HERA mission to characterize asteroid Didymos
 - Phase B1 started in 2018 in GSTP for mission (OHB-DE) and payload – for BE: 1,25 M€ for mission and 0,50 M€ for hyperspectral camera
 - Phase B2/C/D to be proposed at Space19+
 - Launch: 2024
 - Cooperation with NASA (impact mission DART)

• **Space Surveillance and Tracking (SST)**

- Deployment and validation of radars
- Development of sensor technology and data processing algorithms

Support to scientists (PRODEX)

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- Financial status PRODEX end 2018
 - In M€, at current e.c.
 - Budget foreseen for period 01/01/2013 - 31/12/2020

	Subscriptions 2012-2014-2016¹	Balance²	Identified²
PRODEX	148,45	18,70	- 15,56

¹ Including ESA costs

² Industrial costs (without ESA costs)

Technology Programme (GSTP)

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- Financial status GSTP end 2018
 - In M€, at current e.c.
 - Budget foreseen for period 01/01/2013 - 31/12/2020

	Subscriptions 2012-2014-2016 ¹	Engaged at BELSPO level ²	Balance ²	Identified ²
GSTP Develop	138,30	- 76,76	25,98	- 6,00
GSTP Make	35,00	- 34,52		
GSTP Fly	49,81	- 2,21	37,64	-18,00
GSTP PROBA-3	50,83	- 42,70	0	

¹ Including ESA costs

² Industrial costs (without ESA costs)

Others

- ESEC

- Total BE support : 5,00 M€
- Education: 1,70 M€
 - Support to ESERO
 - Transfer and development of activities in Galaxia
- Security: 1,80 M€
 - Training courses in/for cyber range
 - Secure multi-mission ground station (1 study)
 - Space cyber ops centre (2 studies)
- Infrastructure: 1,50 M€

- NTP 2019

- 5 new trainees in 1st year
- 1 trainee in 2nd year

Bilateral Programmes

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- Agreements
 - Existing: France, Argentina, Russia, South Africa, Vietnam and China
 - In preparation: UAE and Mexico
- MUSIS
 - Budget
 - Subscribed: 50,00 M€
 - Fully allocated by end 2018
 - Launch CSO-1: Dec 2018

National Programmes

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- CVB contract 01/07/2018-30/06/2023 (5 years) for 17,50 M€ signed in Oct 2018
- Selection process of the last call of STEREO-III completed in Dec 2018 - budget: 2,60 M€

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General process

- Participation to programmes proposed by BELSPO to Minister Sci. Pol. including estimation of regional return
 - Based on past statistics for running programmes
 - Based on BELSPO knowledge and interactions with ESA and stakeholders for new programmes
- Intercabinets' negotiation (with support of BELSPO)
- Decision by the BE-CM on proposition of Minister Sci. Pol.
- Implementation by BELSPO
- Control by Minister Sci. Pol.
 - Reporting by BELSPO (last report in March 2018)
 - Reporting on return every 6 months since 2018

BE return at ESA

- Return in ESA programmes on 30/06/2018

Domain	Return coefficient	Deviation (k€)
Overall	1,04	+ 29 666
Basic Activities	1,91	+ 11 073
The Science Programme	1,06	+ 2 056
Earth Observation	1,07	+ 3 948
Telecom, IAP, Navigation	0,98	- 3 590
HME	1,14	+ 17 100
Space Transportation	1,00	- 873
SSA Programme - Period 3	1,54	+ 971

Return by regions and communities

- Calculation
 - List of contracts for all Belgian entities
 - ESA: information as furnished by ESA
 - Bilateral and national: as implemented by BELSPO
 - Full amount charged to the entity is taken into account
 - Regional repartition: for all private companies based on their location in Belgium
 - Community repartition: for all universities and institutes based on their location in Belgium

- Report March 2018: period 01/01/2015 - 31/12/2017

	ESA (k€)	BIL/VGT/ STEREO (k€)	%
Industriële werkzaamheden			
Brussels Hoofdstedelijk Gewest	38 163	0	9,8
Vlaams Gewest	213 583	1 430	55,4
Waals Gewest	131 094	3 672	34,7
Totaal	382 841	5 102	
Wetenschappelijke werkzaamheden			
Universiteiten en onderzoekscentra van de Vlaamse Gemeenschap	14 773	11 595	28,0
Universiteiten en onderzoekscentra van de Franse Gemeenschap	35 900	3 408	41,8
Federale wetenschappelijke instellingen	23 614	1 211	26,4
Internationale wetenschappelijke instelling (VKI)	3 544		3,8
Totaal	77 831	16 214	
Installaties ESA			
Testcentrum ESA (CSL)	1 000		
ESEC in Redu	3 499		
Overzeese installaties (CSG)	3 315		
Totaal	7 814		
Lanceringen (Arianespace) + LEAP			
Totaal	25 923	0	
Niet per bedrijf gesplitste bedragen			
Totaal	88 354		
ALGEMEEN TOTAAL	582 763	21 316	

- Last update (only ESA): period 01/01/2015 – 30/06/2018

	ESA (k€)	BIL/VGT/ STEREO (k€)	%
Industriële werkzaamheden			
Brussels Hoofdstedelijk Gewest	86 126	0	16,9
Vlaams Gewest	219 528	1 430	43,3
Waals Gewest	199 709	3 672	39,8
Totaal	505 363	5 102	
Wetenschappelijke werkzaamheden			
Universiteiten en onderzoekscentra van de Vlaamse Gemeenschap	18 640	11 595	27,5
Universiteiten en onderzoekscentra van de Franse Gemeenschap	42 465	3 408	41,8
Federale wetenschappelijke instellingen	28 773	1 211	27,3
Internationale wetenschappelijke instelling (VKI)	3 753		3,4
Totaal	93 632	16 214	
Installaties ESA			
Testcentrum ESA (CSL)	1 000		
ESEC in Redu	3 669		
Overzeese installaties (CSG)	18 788		
Totaal	23 458		
Lanceringen (Arianespace) + LEAP			
Totaal	27 677	0	
Niet per bedrijf gesplitste bedragen			
Totaal	1 108		
ALGEMEEN TOTAAL	651 238	21 316	

- Specific report on return to Minister Sci. Pol. (Z. Demir) on 28/06/2018

Région	01/01/2015-31/12/2017 (%)	01/01/2015-31/03/2018 (%) - (A)	Post 31/03/2018 (%) - (B)	Cumul (A) et (B) (%)	CM ESA Lucerne (%)
	effectif (cf. rapport spatial 2018)	effectif	estimé	effectif et estimé	estimé en décembre 2016
Bruxelles	9,8	17,4	16	17	19
Flandre	55,4	43,3	56	49	50
Wallonie	34,7	39,3	28	34	31

Région	GSTP Lucerne (%)	GSTP 2015-2017 (%)	ARTES Lucerne (%)	ARTES 2015-2017 (%)	PRODEX Lucerne (%)	PRODEX 2015-2017 (%)
	estimé	effectif	estimé	effectif	estimé	Effectif
Bruxelles	12	10	1	3	¹ 39	¹ 47
Flandre	66	69	65	65	23	14
Wallonie	22	21	34	32	38	39

¹ Includes ULB, VUB and the Federal Scientific Institutions

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Way forward in 2019

- Further implementation of BE priorities
 - Through mandatory and optional programmes of ESA
 - Through GSTP, ARTES and PRODEX
 - Altius
 - Vegetation follow-up
 - ...
- Preparation of a proposition to Minister Wilmès to reallocate 20 M€ from the 49 M€ originally foreseen for Vegetation follow-up to GSTP and ARTES

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Space19+

- Seville on 27 and 28 Nov 2019
- Period 2020-2024 (5 years)
- Programmes distributed in 4 pillars
 - Science and Exploration
 - Safety and Security
 - Applications (Earth Observation – Telecom – Navigation)
 - Enabling and Support (Space Transportation – Technology and Scientific Support – Operations)

- Evolution of ESA industrial policy
- First drafts of proposals expected from ESA in April 2019: 1st Council working group on 17/04/2019
- BE budgets
 - Same level of ~ 205 M€/year
 - Opening for new engagements: ~ 400 M€
- Information to stakeholders
 - Structured interactions with space organisations
 - On demand
 - Usual briefing and debriefing sessions

Thank you