

# ESA EO Programmes for CM16

## Introduction to proposed programmes

Bilateral meeting with  
Austrian Delegation  
and Space Actors

Vienna, 24/05/2016

## Optional programmes

- **EOEP-5 (new period of an on-going programme)**
- **GMECV+ (extension of on-going element of Earth Watch Programme)**
- **InCubed (new element of Earth Watch Programme)**
- **Altius (new element of Earth Watch Programme)**

## Within General Budget

- **LTDP+ (a.k.a “Heritage Data Programme”, new period of existing programmatic line)**
- **Earthnet (new period of existing programmatic line)**

# EOP at CM16 – Overview (tentative)



ID No.	EOEP-5	Cost (Meuro)	Percentage
<b>BLOCK 1 - FUTURE MISSIONS</b>		<b>197</b>	<b>14%</b>
1	Mission prep and instr. Predev	197	
<b>BLOCK 2 - MISSION DEVELOPMENT</b>		<b>695</b>	<b>49%</b>
2	EE-7 / Biomass	60	
3	EE-8 / FLEX	285	
4	EE-9 / New Call	200	
5	Sentinel Evolution	90	
6	SAOCOM-CS	60	
<b>BLOCK 3 - MISSION MANAGEMENT</b>		<b>235</b>	<b>17%</b>
7	Mission Management	235	
<b>BLOCK 4 - EO SCIENCE FOR SOCIETY</b>		<b>200</b>	<b>14%</b>
8	Scientific Data Exploitation	60	
9	EO Application Platform	115	
10	EO for Sustainable Development	25	
11	<b>BLOCK 5 - CONTINGENCIES</b>	<b>83</b>	<b>6%</b>
<b>TOTAL EOEP-5</b>		<b>1410</b>	<b>100%</b>

12	EarthWatch - GMECV+	70	
13	EarthWatch - InCubed	40	
15	EarthWatch - Altius	148	
<b>TOTAL EOP (EOEP-5 + InCubed + Altius + CCI+)</b>		<b>1668</b>	

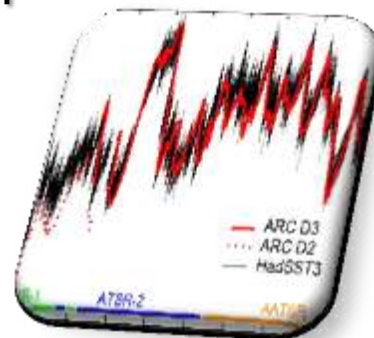
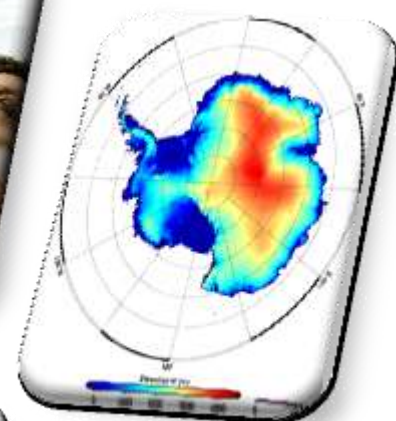
<b>BASIC ACTIVITIES - EOP ELEMENTS</b>		<b>TBC</b>	
14	Earthnet	TBC	
15	LTDP+	TBC	



# Earth Observation Envelope Programme - 5 (2017-2021)

EO backbone programme to implement ESA's Space 4.0

- Addresses societal challenges (climate, water, food, SDG, etc.)
- Enhances competitiveness of European space, ground and services industry
- From pre-development to exploitation
- Prepares all future missions
- Drives scientific excellence and innovation
- Improved, user-ready data access
- Brings EO to all levels of society



# EOEP-4 – Facts & figures

- **4 Explorer missions in operation** during EOEP-4;
- **4 further Explorer missions under development;**
- **>300 industrial/academic teams;**
- **>200 EO Service companies;**
- **>180 public sector and international research organizations** engaged for new EO products;
- **>12,000 registered users;**
- **>2,000 peer-reviewed publications** by ESA investigators;
- **55+ ESA workshops** attended by **~10,300 scientists;**
- **1,700 participants** @ ESA Living Planet Symposium in Edinburgh (2013); **3,300 participants** @ ESA Living Planet Symposium in Prague (2016)



# EOEP-5: Four Blocks of Activity

1. Future Missions
2. Mission Development
3. Mission Management
4. EO Science for Society

# EOEP-5 - Future Missions (Block 1)

1. Industrial studies on systems & key technologies
  2. End-to-end simulation frameworks and s
  3. Instrument pre-development
- EE10 early phases
  - Copernicus evolution - early phases (new)
  - EO Opportunity Mission - early phases (new)
  - Call for early mission concepts (new)
  - Polaris preparatory activities

# EOEP-5 - Mission Development (Block 2)

1. Definition, development, launch, commissioning of Earth Explorers and Missions of Opportunity
2. Copernicus Evolution Instrument Models
3. SAOCOM-CS

- Biomass (EE-7)
- Flex (EE-8)
- EE-9 (under selection)
- Copernicus Evolution: CO<sub>2</sub>, TIR, "Cryosat-FO", hyperspectral, "SMOS-FO")





# EOEP-5: Mission Management (Block 3)

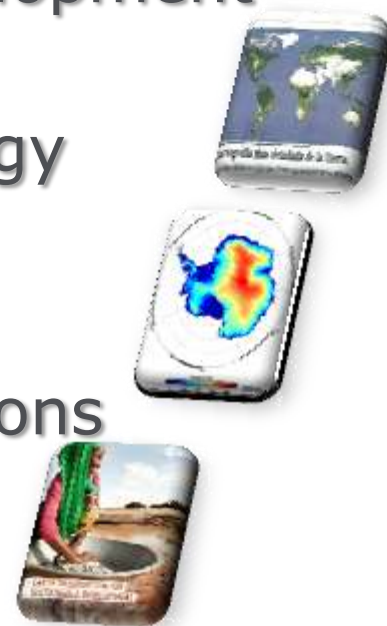
1. EE operations
2. Ground Segment, Data Access
3. EE Level-2 Products
  - FOS/PDGS for SMOS, Cryosat, Swarm, ADM, Aeolus, EarthCARE
  - Data Access
  - Cal/Val
  - GS development – EO Innovation Europe (new)



# EOEP-5: EO Science for Society (Block 4)



1. Scientific data exploitation
2. EO Exploitation Platforms
3. EO for Sustainable Development
  - Community engagement, science/development projects, toolbox development (new)
  - Develop data access/platform technology (new)
  - Business incubation
  - Cooperation with Intl. Funding Institutions
  - Open science, EO social networking



# GMECV+: ESA's Climate Change Initiative

- 10 new ECVs
- Science driven, but prepares operational hand-over of all ECVs
- Tightly linked to international climate community
- Supports COP-21 implementation
- Outreach



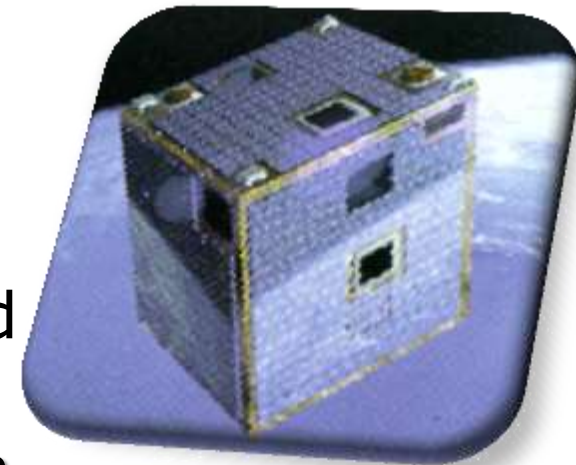
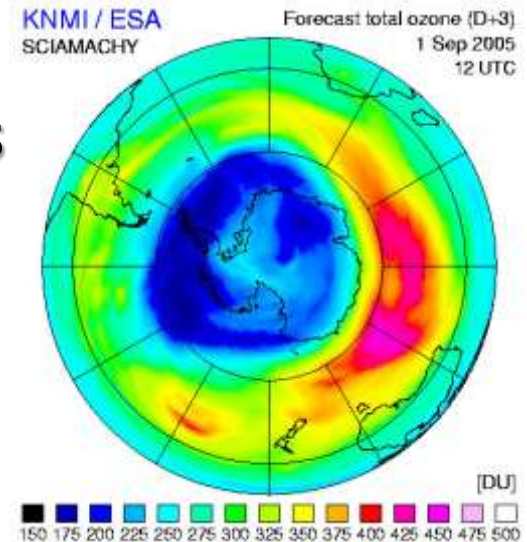
# InCubed - Investing in Industrial Innovation

- PPPs in EO
  - Enhances competitiveness of industry
  - Requested by industry, led by industry
  - Focus on space segment, technology and ground segment ('application PPPs' in IAP)
- 
- Activities proposed by industry (AO in 2017)
  - Rapid proposal evaluation (<3 months)
  - Member State endorsement letter
  - Different forms of ESA contribution:
    - Expertise
    - Co-funding / in-kind support
    - validation, testing, link to customers



# Earth Watch: Altius

- Small mission for operational high-res stratospheric ozone monitoring (vertical O3 profiles)
- Limb-sounding UV/VIS/NIR spectral imager
- Proposed by Belgium, based on PROBA platform
- Opportunities for competitive items (Fabry-Perot interferometer, instrument electronics, platform equipment, satellite structure, ground segment)
- Launch Q4/2020,  $\geq 3$  years operation



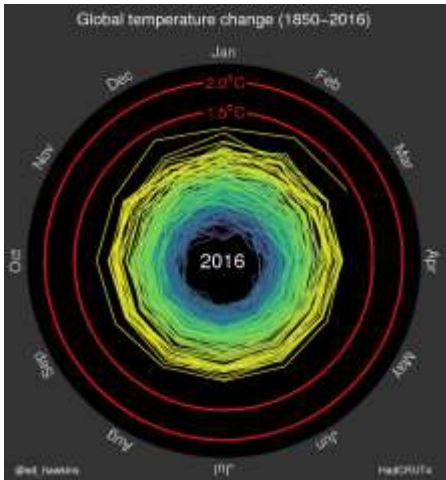
# “Heritage Data” (a.k.a. LTDP+)

A key element in the ESA General Budget 2017-2021

**Space data is at the core of “Space 4.0” promoted by ESA**  
 → *data from the heritage missions (ERS, Envisat, Rosetta, Planck, ...) are crucial in this context*

## LTDP+ expands data preservation into innovation:

- assures **discoverability and usability** of heritage data, including climate data, to support innovation in academia and industry,
- essential to ensure highest-quality assessments in Europe **to support policy and business decisions** related to climate, energy, resources and other issues.



## LTDP+ provides for ESA:

- a unique and stimulating technical challenge across 4 directorates (EOP, SCI, HRE, OPS)
- tangible activities to realise the ESA “Digital Agenda for Space”
- the means to cope with societal problems (Climate Change, Migration, etc.)
- an enhancement of international role of Europe (e.g. NASA counts on ESA as potent partner in active data management)

- *Heritage data are the only persistent ESA assets !*
- *Heritage data will be valuable resource for problems not yet recognized*

# Earthnet - A key element in the ESA General Budget 2017-2021

**Earthnet has been a cornerstone for international cooperation with other Space Agencies and Partners for more than 36 years**

## Earthnet complements the ESA Earth Observation Programme by:

- safeguarding international agreements approved by Council
- assuring equal & persistent MS access to Third Party Mission data
- contributing to the digital evolution of "Space 4.0" with national missions



## Earthnet provides for ESA:

- [ cf. Earthnet Medium-Term plan (2017-2021) recommended in November 2016 ]
- the means for a strong international role of Europe,
  - 24/7 coordination of the International Charter on Space and Major Disasters,
  - the presence in organisations and committees (e.g. UN, GEO, CEOS) and in initiatives for promoting the international use of EO data (e.g. in Africa, China),
  - a strong impact in the coordinated evolution of EO data management (e.g. IPRs), in particular with operators of EO missions in Europe,
  - data access for Third Party Missions, in particular for academia in Europe.

