CEOS AC-VC #15

Tokyo, 10-12 June 2018

Copernicus and the Global Effort for Monitoring of Anthropogenic GHG Emissions

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Space

Copernicus EU Copernicus EU

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Foundation for an international CO_2 and GHG monitoring system (2017-2018#)

1. Completion and follow-on activities of the Atmospheric Composition Virtual Constellation (AC-VC) whitepaper on defining an optimum constellation for CO_2 and GHG monitoring (joint competences of CEOS and CGMS, CEOS Carbon strategy).

Whitepaper completed (big thanks to David Crisp) & endorsed, provides baseline for addressing future international coordination and Implementation

2. Advance the relationships with CGMS for an operationally implemented and sustained observation capability (formal working relationship between CEOS and CGMS).

Coordination mechanism defined including both CEOS and CGMS entities, roadmap for implementation being defined

3. Place the space segment in the broader context of a fully sustained system for CO_2 monitoring (CEOS Agencies have counterparts in their individual countries/regions).

Workshop organized bringing space agencies together with modelling, in-situ and inventory institutions. Priorities and best practices for future interactions identified .

#Under the chairmanship of the European Commission

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Europe's eyes on Earth

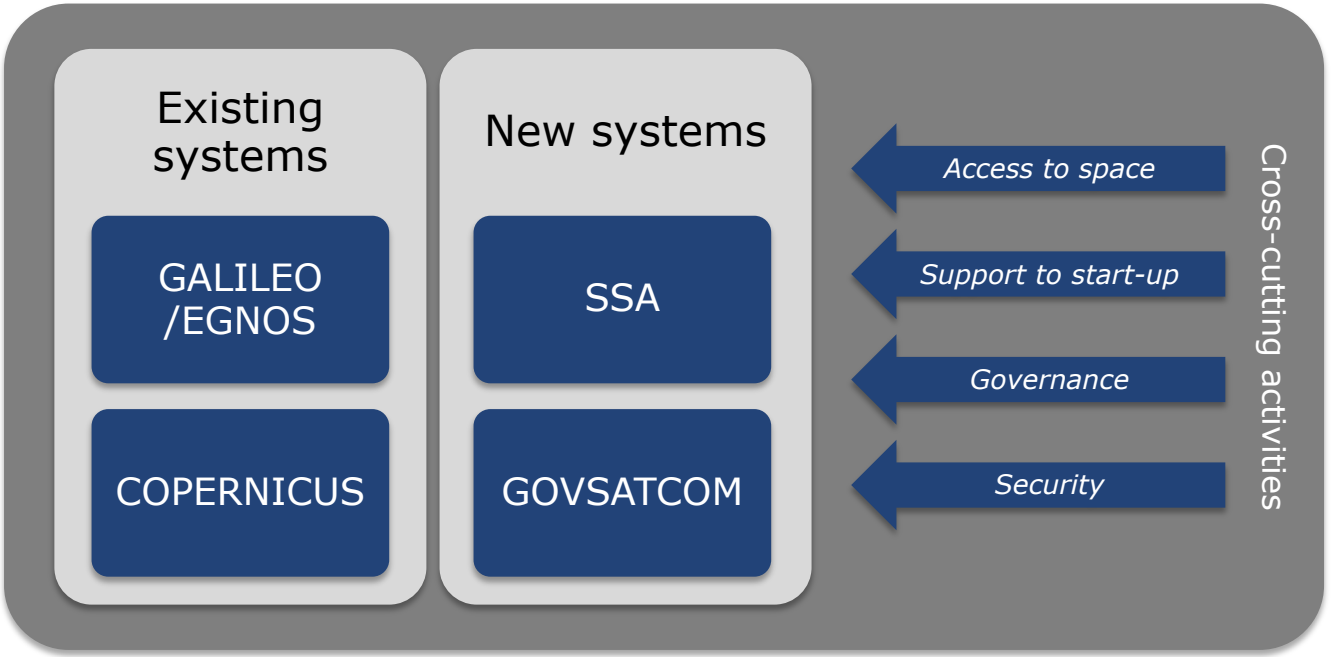
Context

Definition

Outlook

European Commission

Scope of the new regulation



Space in support of EU policies

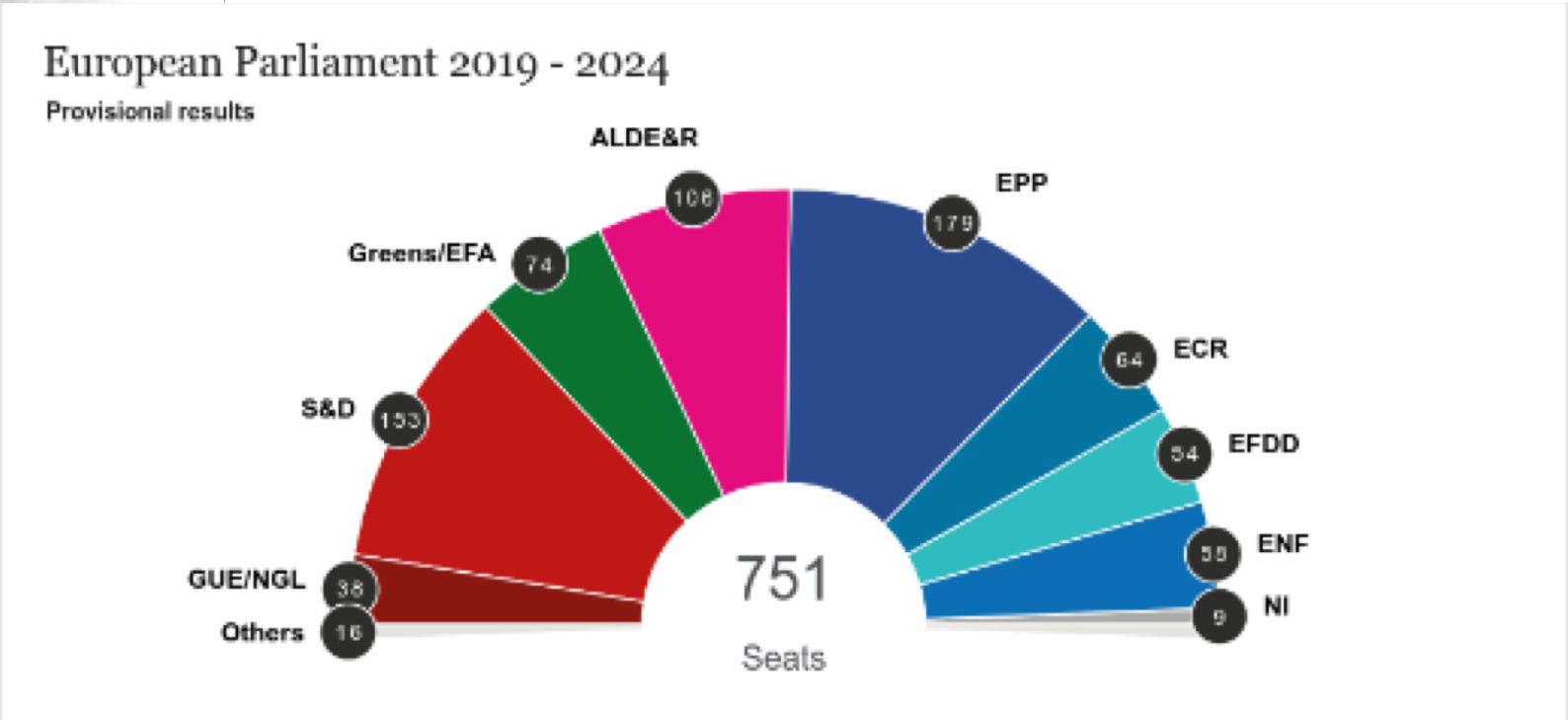
- Mapping of natural disturbances and weather-related challenges
- Monitoring COP21 commitments and CO_2 emissions
- Better execution of CAP due to policy monitoring and precision farming
- Enabling technologies in automotive, aviation and maritime sectors
- Supporting civil protection thanks to Emergency Management Service
- Aiding the digitalisation through space and satellite communication

The Commission's Ambition

- "New Copernicus missions such as CO2 monitoring will enable the EU to become a technological leader in the fight against climate change, in line with the commitments made under the Paris Agreement."
  European Commission, Press Release IP/18/4022, 6. June 2018

- "A very significant new [Copernicus] service is about monitoring anthropogenic CO2 emissions to help countries in assessing their efforts to reduce CO2 emissions and to contribute to the stocktaking exercise as part of the UNFCCC process as defined in the Paris agreement."
  Commissioner Bieńkowska, COP24 Katowice, 10. December 2018

New European Parliament as of July 2019



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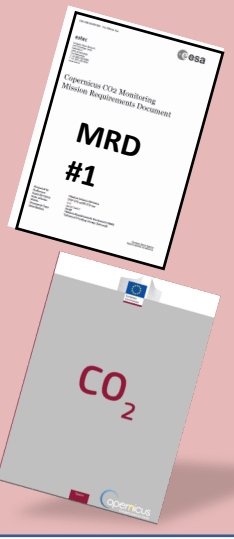
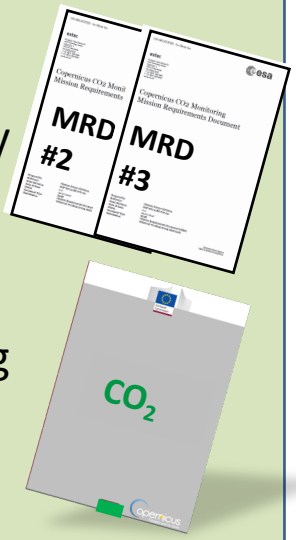
Previously …

1st period	2nd period	3rd period
Team of International experts	EC, ESA, EUMETSAT, ECMWF, team of European experts	EC, ESA, EUMETSAT, ECMWF, team of European experts
	CO_2 MTF Sub task A: Space Component	Mission Advisory Group
	CO_2 MTF Sub task B: end-to-end system	CO_2 Monitoring Task Force



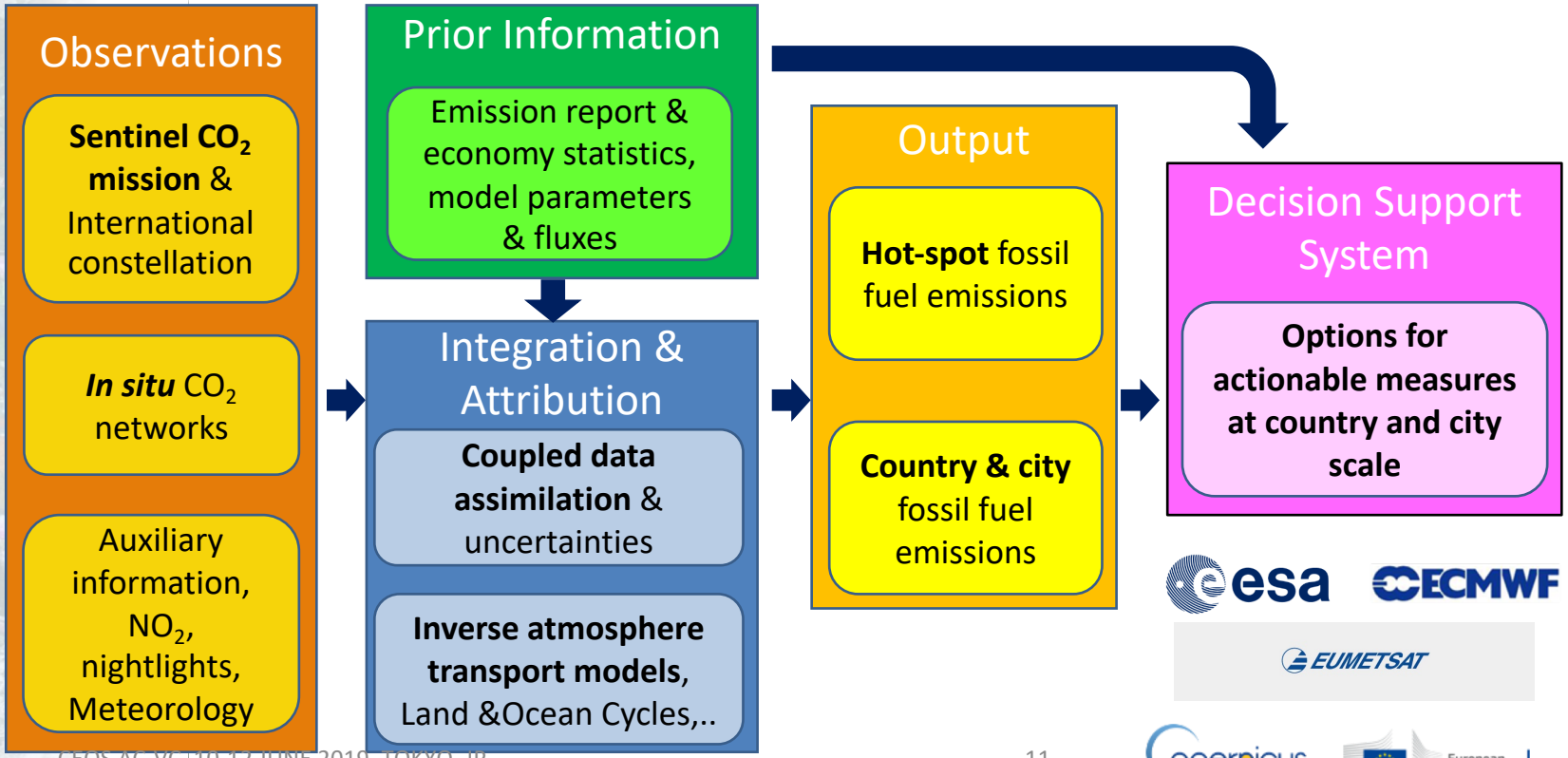


October 2015 — Spring 2016 — Winter 2017 — Spring 2018 — present

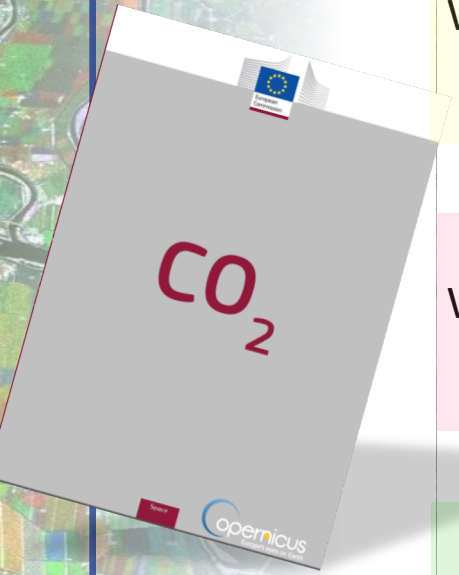
Boundary conditions

- Emphasis on systems: inventories, space-borne and in-situ observations, data assimilation framework, inversion system, transport models, decision support system
- Emphasis on operational intent
- Fundamentally underpinned by strong user requirements based on international commitments and corresponding EU Policy implementation
- Fundamental international dimension on multiple aspects of system implementation/development

An Operational Anthropogenic CO_2 Emissions Monitoring & Verification Support Capacity



Way Forward with 3 sub-groups



WG1	Assess system performance, critical issues on system design, functionalities for a decision support system, road map **BAMS IN BOX paper**
WG2	Outlining governance options and implementation planning **Work in progress with institutional partners**
WG3	Assessing the requirements for in situ observations **Report to be available before Summer break**

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Roadmap for an operational CO_2 Monitoring & Verification Support Capacity

Copernicus

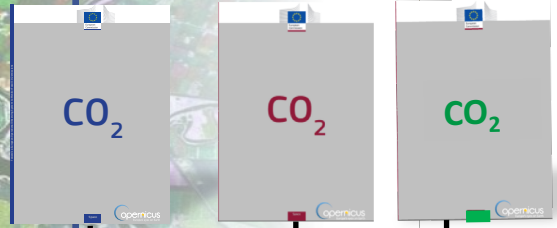
CO2 Monitoring Task Force

H2020 CSA: CHE

H2020: CHE Follow-on

H2020: VERIFY

Prototyping activities including relevant CO_2 satellites from China, Japan, USA and others

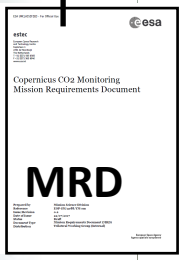


1st global stocktake

inventories

2nd global stocktake

2015 2018 2020 2022 2024 2026 2028



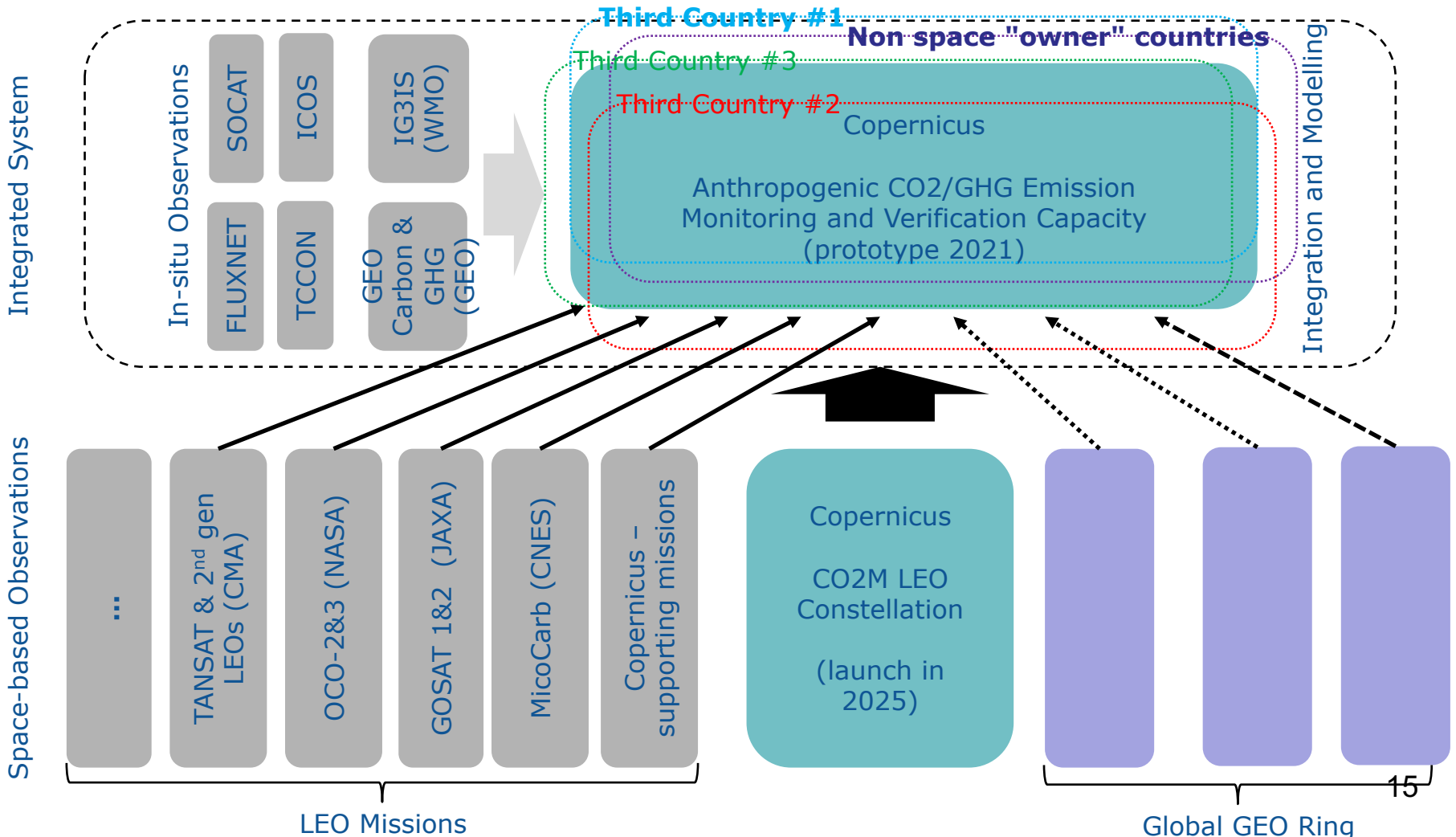
LEO satellite development and production

Launch of the CO_2 Sentinels constellation

Copernicus service in its full operational capacity with the CO_2 Sentinels

ESA studies

ESA CO2M Phase A/B1


Integrated System
In-situ Observations
SOCAT
ICOS
IG3IS (WMO)
FLUXNET
TCCON
GEO Carbon & GHG (GEO)
Third Country #1
Non space "owner" countries
Third Country #3
Third Country #2
Copernicus
Anthropogenic CO2/GHG Emission Monitoring and Verification Capacity (prototype 2021)
Integration and Modelling
Space-based Observations
...
TANSAT & 2nd gen LEOs (CMA)
OCO-2&3 (NASA)
GOSAT 1&2 (JAXA)
MicoCarb (CNES)
Copernicus – supporting missions
Copernicus
CO2M LEO Constellation
(launch in 2025)
LEO Missions
Global GEO Ring

European Commission

Thank you for your attention

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Space

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