

→ BALTIC FROM SPACE WORKSHOP

29–31 March 2017 | Helsinki, Finland



ESA UNCLASSIFIED - For Official Use



European Space Agency

ESA facts and figures



- Over 50 years of experience
- 22 Member States
- Eight sites/facilities in Europe, about 2300 staff
- 5.75 billion Euro budget (2017)
- Over 80 satellites designed, tested and operated in flight



“To provide for and promote, for exclusively peaceful purposes, cooperation among European states in **space research and technology** and their **space applications.**”

Article 2 of ESA Convention



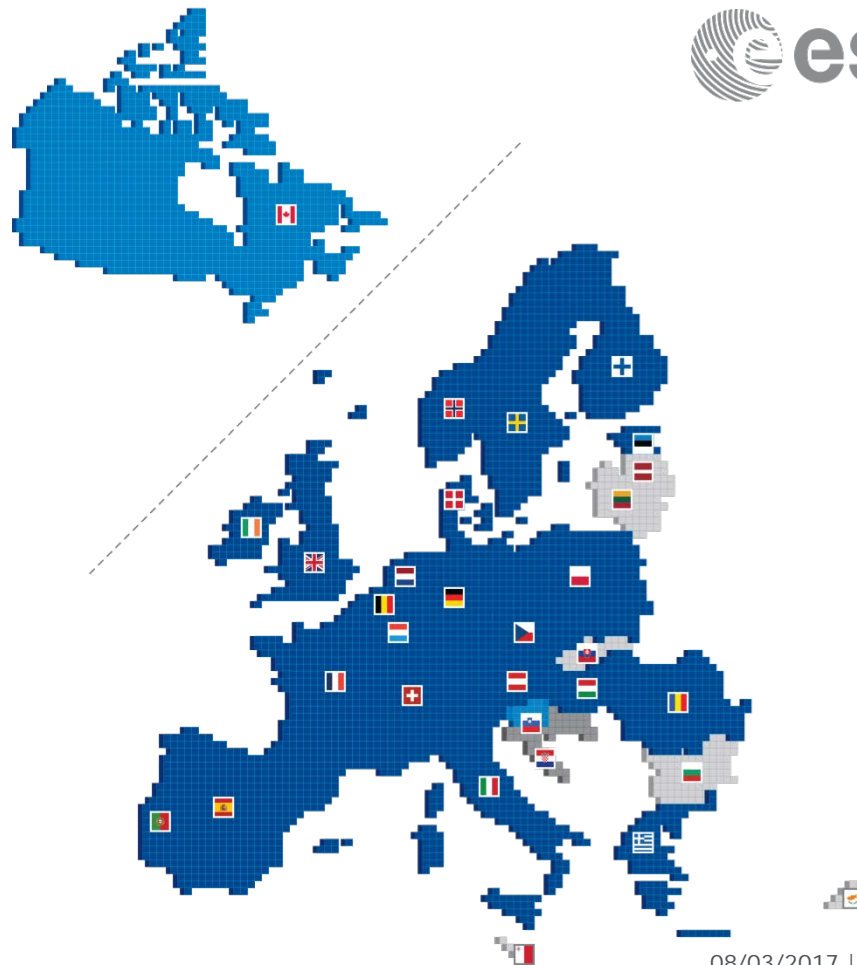
Member States

ESA has 22 Member States: 20 states of the EU (AT, BE, CZ, DE, DK, EE, ES, FI, FR, IT, GR, HU, IE, LU, NL, PT, PL, RO, SE, UK) plus Norway and Switzerland.

Seven other EU states have Cooperation Agreements with ESA: Bulgaria, Cyprus, Latvia, Lithuania, Malta and Slovakia. Discussions are ongoing with Croatia.

Slovenia is an Associate Member.

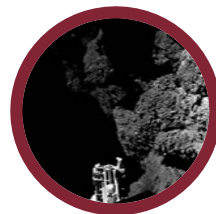
Canada takes part in some programmes under a long-standing Cooperation Agreement.



Activities



ESA is one of the few space agencies in the world to combine responsibility in nearly all areas of space activity.



space science



human spaceflight



exploration



earth observation



launchers



navigation



operations



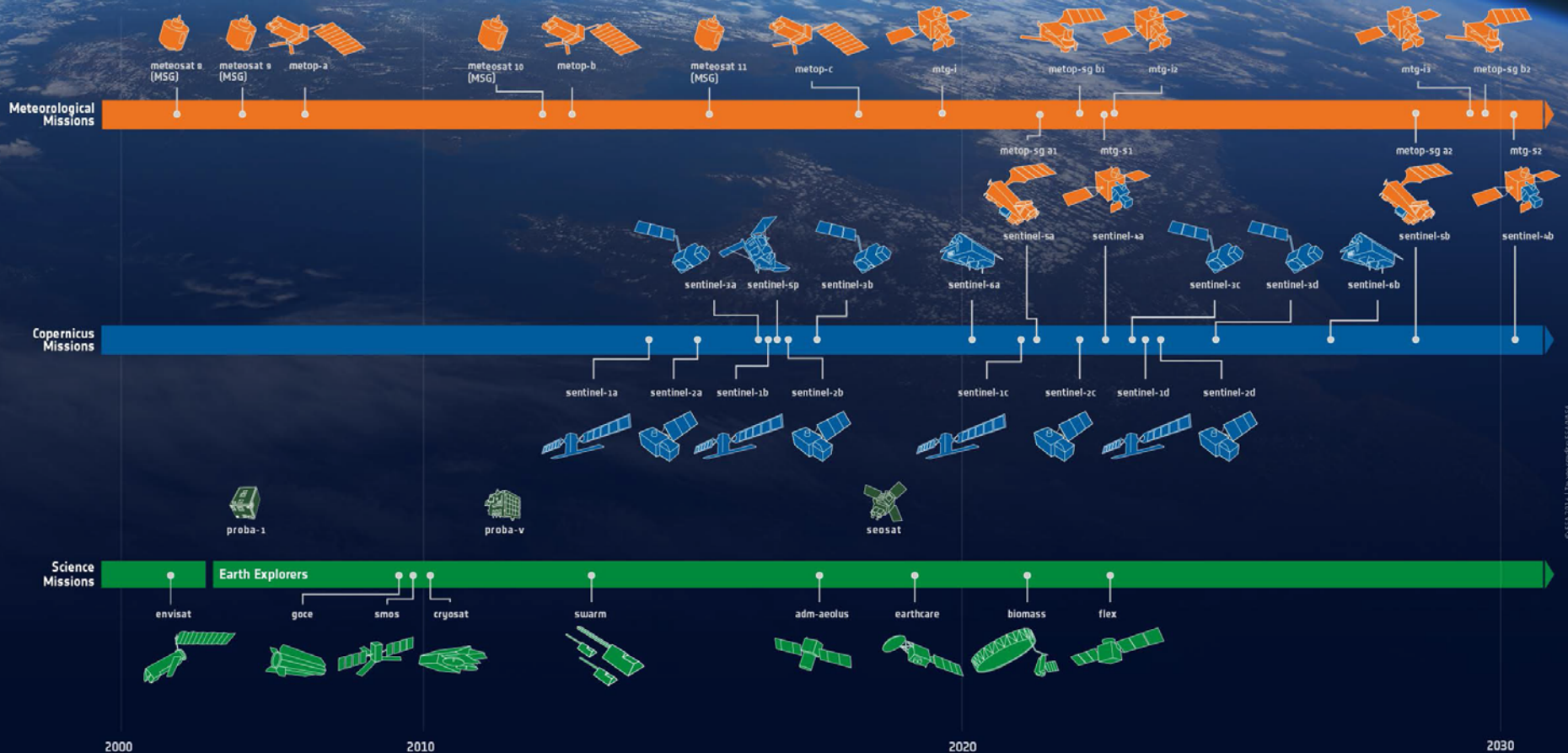
technology



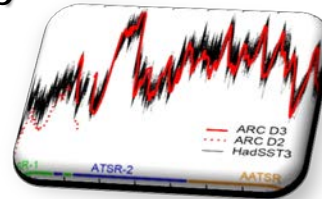
telecommunications

* Space science is a Mandatory programme, all Member States contribute to it according to GNP. All other programmes are Optional, funded 'a la carte' by Participating States.

→ ESA DEVELOPED EARTH OBSERVATION MISSIONS



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BLOCK 4 – EO Science for Society



Scientific Data Exploitation

- ✓ Engaging the International Science Community
- ✓ Developing Open Science Practices and Tools
- ✓ Advancing EO Methods and Techniques
- ✓ Advancing Earth System Science
- ✓ Translating exploitation into novel mission concepts

- ❖ *Foster scientific excellence*
- ❖ *Pioneer new EO applications*
- ❖ *Stimulate downstream industry growth*
- ❖ *Support international responses to global societal challenges*

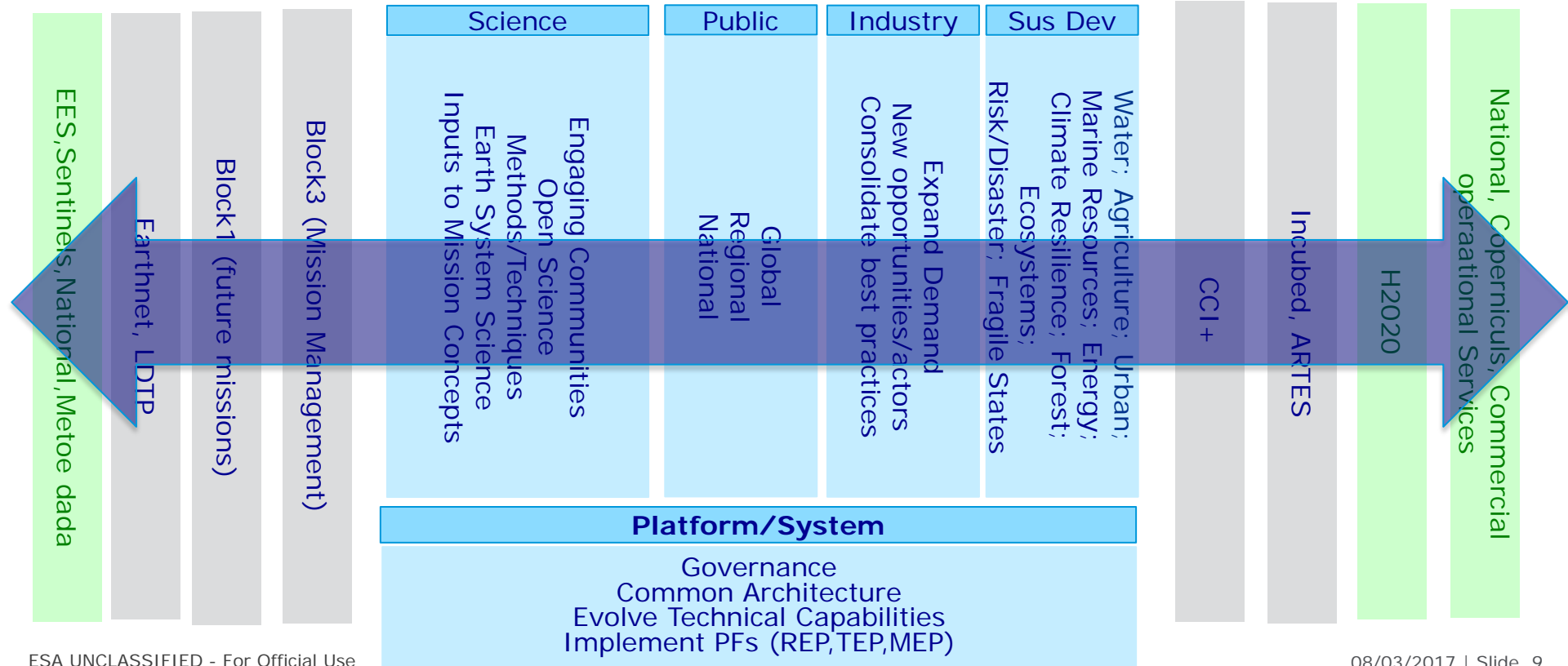
EO Exploitation Platforms

- ✓ Transversal sub-element (e.g. architecture, governance, ...)
- ✓ Expanding Public Sector Benefits (global, regional, national)
- ✓ Enabling Industrial Growth
- ✓ Implementing the EO Exploitation Platforms Network

It is built upon the success of previous EOEP exploitation activities, adapt them to the new European EO context and respond to the relevant recommendations of the EOEP4 programmatic and scientific review.

EO for Sustainable Development

Block 4 and EOEP-5 Coherence



Block 4 principles - Implementation

- **All activities** shall respond to needs of authoritative international user communities and downstream industries, who shall be consulted systematically and participate in co-design, implementation and assessment
- **All activities** shall be designed to complement, seed, cross-fertilize and enrich relevant activities of ESA Member states' national programmes, H2020 and Copernicus.
- Access and utilization of EO data shall be massively enhanced and democratized by accelerated use of ICT, bringing users to data and scalable hosted processing (*i.e. Network of Platforms*)

EOEP-5 Block 4: *Scientific Exploitation*



Addressing the needs of the scientific community in terms of novel observations, new methods, innovative product and leading edge scientific results maximizing the scientific return of ESA and European missions

Engaging international
Science community

Organising and contributing to a series of regular international **thematic workshops** for consulting scientists and gathering feedback

Developing Open Science
Practices-Tools

Developing Open Science 2.0 activities and practices using latest tools and techniques

Advancing EO methods
and Techniques

Launching state-of-the-art **R&D studies** for maximizing scientific exploitation of EO missions in terms of new methods and products;

Advancing Earth
System Science

Addressing major **open questions in Earth system science** in close collaboration with major international science efforts.

Translating Exploitation
Results into Novel Mission
concepts

Reinforcing the role of exploitation results as a driver for **future missions**

Development of innovative user-driven EO data products, methods and tools to support international community responses to global societal challenges, capitalizing on ESA's international reach.

GLOBAL

Development of global EO-based approaches and datasets to support major collaborative international initiatives.

- Intl. Env. agreements
- GEO Initiatives
- Global Environment Programs

REGIONAL

Enhance and integrate EO within existing regional monitoring and assessment systems in cooperation with regional/ national authorities.

- In Europe and neighbouring countries.
- Atlantic, Baltic, Black Sea, Mediterranean, Alps.

NATIONAL

Foster new EO capacities within existing national environmental & natural resource monitoring and assessment networks.

- In countries without EO national programs.
- In new and small ESA Member States

Best use of “collaborative platforms” adapted to serve user communities

Primary Users: *international organisations, inter-governmental bodies, national governments and agencies, civil society and NGOs.*

Atmosphere

Marine

Terrestrial

EOEP-5 Block 4 : *EO Exploitation Platforms*

Enabling Industry Growth



Development of user-oriented environments with extensive EO data product use-cases and tools for benchmarking to support wider use of EO products through establishing industrial guidelines and comprehensive requirements mapping.

Expand Demand

User sectors that offer significant potential to grow the use of EO enabled by step-increase in operational demonstrations (eg. Large-scale, NRT, massive computing, Data Analytics).

New Opportunities & Actors

Stimulate entrepreneurship/innovation by exploring many small-scale disruptive ideas, Develop a network of Earth Lab Accelerators (ELA), Develop outreach / MOOC portfolio.

Best-Practices

User sectors initial use of EO has been made, but comprehensive understanding of the EO potential needs to be established through trade associations/organizations.

Best use of “collaborative platforms” for enhanced ICT capabilities,
Making use of European National Missions (VHR Radar & Optical)

Primary Users: Industrial Private-Sector

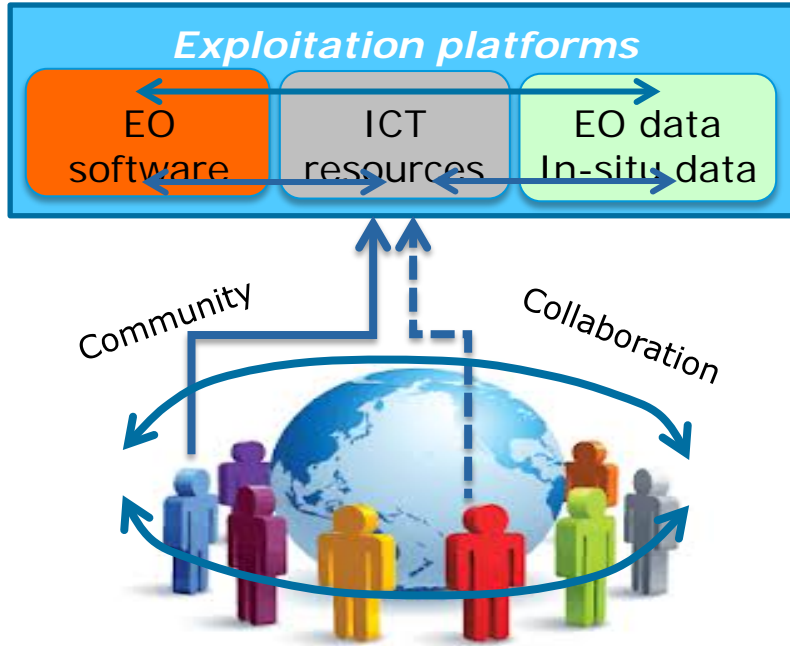
Oil & Gas, Law Enforcement, Ports & e-Maritime,
Renewable Energies, Civil Engineering, Corporate SD,

Agro-Chemicals, Agri-Insurance, Re/Insurance, Mining
/ Raw Materials, Polar Tourism, Rail Transport,

EOEP-5 Block 4 : EO Exploitation Platforms



“Move User activities to the Data”



A complementary operations concept: users access a work environment containing the data and resources required, as opposed to downloading and replicating the data 'at home'.

Exploitation platform (or community platform)
=
Virtual open and collaborative environment

bringing together:

- data centre (EO and non-EO data)
- computing resources and hosted processing
- collaborative tools (processing tools, data mining)
 - development tools and test bench functions
- application shops and market place functionalities
 - communication tools (social network)
- accounting tools to manage resource utilisation



geohazards
tep



hydrology
tep



polar
tep



urban
tep



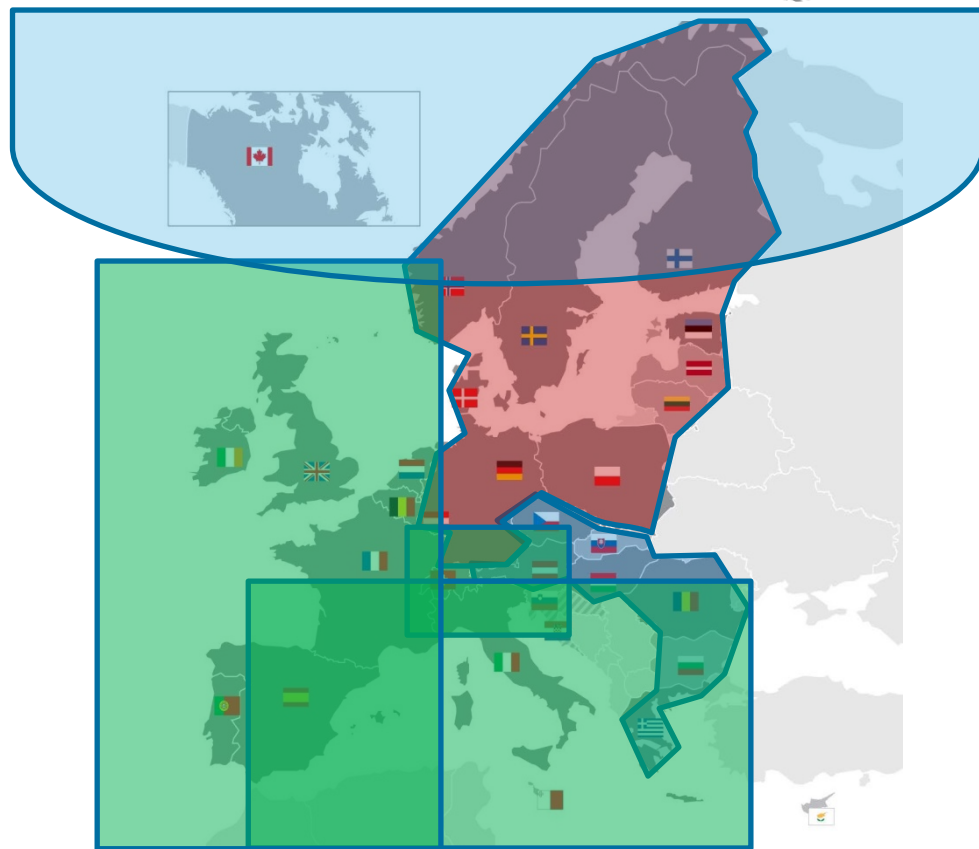
forestry
tep



coastal
tep

Block 4 principles – Regional Initiatives

- Set of coordinated activities across Block-4: **science, public sector, industry growth and infrastructure components**;
- **Focus on regional priorities** with high interest for Member States;
- **Coherent approach** to exploitation across lines (implementation, communication, synergies, reporting?) while maintaining flexibility inside each programme line;
- Initial set of target regions preliminary identified: **Baltic, Black-sea/Danube**, Arctic, Atlantic, Alpine, Mediterranean? Mainly driven by interest of groups of Member States;
- **Link with existing regional institutions, H2020 activities and initiatives**: e.g., Baltic Earth, BONUS, Black Sea Commission, Danube Delta Commission, International Institute for Black Sea studies, etc...



- **Baltic case:**

- **7 Member states** (+2 cooperation states);
- New member states involved (e.g., Lithuania, Poland) + cooperating states (Estonia, Lithuania)
- Large degree of **identification of MS with Baltic** issues (e.g., Baltic Development Forum, Baltic Sea Treaties);
- **Good degree of pre-existent regional institutional coordination** on science and applications (e.g., Baltic Earth, Baltic Sea Commission, HELCOM);
- **Existing dedicated initiatives** of EC (e.g., through H2020 BONUS);
- **How we arrived here?:**
 - Meeting with **Baltic Earth** SSG, 13-17 June 2016, in Nida, Lithuania;
 - **Discussion** and high involvement of MSs;
 - MSs preparation of **white paper/concept paper**;
- **Next step:**
 - **This Workshop!!**

Set of high level common objectives

ITTS

Science: e.g.,	Public sector: e.g.,	Industry growth: e.g.,	Infrastructure: e.g.,
<ul style="list-style-type: none"> • <i>Salinity dynamics</i> • <i>Extremes in hydrological cycle</i> • <i>Land-sea biochemical feedbacks</i> • <i>Sea level dynamics</i> • <i>Regional climate change assessment</i> • <i>Tools/Virtual Labs</i> • <i>Dedicated training</i> • <i>Connect with BONUS, Baltic Earth and Baltic Science Network/TRAM</i> 	<ul style="list-style-type: none"> • <i>Maritime spatial planning</i> • <i>Harmonised approach for Helcom reporting, WFD/MSFD reporting and biodiversity/ecosystem management (eg grassland, peatland etc)</i> • <i>Integration of EO derived information in safety/security cooperation networks</i> • <i>Connect with CBSS, VASAB, Baltic 21, EUSBSR and BSRBCC</i> 	<ul style="list-style-type: none"> • <i>Customised information services for following sectors:</i> <ul style="list-style-type: none"> • <i>Aquaculture</i> • <i>Tourism</i> • <i>Resource extraction</i> • <i>Energy</i> • <i>Transport</i> • <i>Waste</i> • <i>Enable innovative exploitation of EO within regional innovation clusters and business accelerators</i> 	<ul style="list-style-type: none"> • <i>Integrate with existing infrastructures (discovery, access, storage, processing)</i> • <i>Link with Copernicus ICT (DIAS) and Core Services</i> • <i>Enable innovative data fusion/ mining/ data analytics</i> • <i>Developing dedicated front-office facilities and services.</i>

Coordination (synergies, requirements, maturity chain)

Communication (community workshops, publications, web, forums)

OVERARCHING GOAL

Assess the opportunities for EO research and development as well as downstream activities in the Baltic region that may be the basis for a dedicated ESA EO Regional Initiative on the Baltic:

- Novel Earth science results,
- Development of novel applications,
- Testing innovative information services and
- Implementing required upgrades to capabilities to manage and manipulate large data volumes.

The workshop discussions and conclusion will support ESA in defining future investments in EO research and development activities to foster EO innovation in the Baltic region and launch a dedicated Baltic initiative in 2017.

SPECIFIC OBJECTIVES

- To review the main requirements from geo-information in the Baltic Region from science to information services;
- To review the main activities, projects and initiatives taking place in the region where EO may contribute;
- To assess the potential of the increasing observation capacity offered by satellites to address the needs for science, applications and future information services;
- To characterise gaps and identify high-level requirements and associated solutions for supporting the exploitation of large datasets relevant to the Baltic region, including the basis for developing the related platform front-office services.

European Space Agency

