

(Update on) developments in EO programmes

ECSAT

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EUROPEAN SPACE AGENCY

SPACE SUMMIT 2023

ESA Council meeting at ministerial level

The Director General's Proposal on
**Lifting Europe's Ambitions for a Green and Sustainable Future,
Access to Space and Space Exploration**

Summary

This document contains the Director Generals' Proposal "Lifting Europe's Ambitions for a Green and Sustainable Future, Access to Space and Space Exploration".

It constitutes the reference document to the draft Resolution "Draft Resolution on Lifting Europe's Ambitions for a Green and Sustainable Future, Access to Space and Space Exploration" contained in document ESA/C-M(2023)1.

The Director General's Proposal elaborates on ESA's proposals to the Ministers on driving space for our green future, subdivided into space for climate action, green transformation and reducing the impacts of crises on Earth, as well as a sustainable space sector and sustainability in space. The Director General's Proposal furthermore contains new perspectives for ESA driving European space ambitions and modernising the implementation of its programmes subdivided into guaranteeing Europe's access to space and new ambitions and next steps for space exploration.

It is intended to release this Director General's Proposal to the public, subject to acceptance by Council to be sought at the occasion of the adoption of the draft Resolution on Lifting Europe's Ambitions for a Green and Sustainable Future, Access to Space and Space Exploration, planned on 6 November 2023.

Required action

Delegations are invited to take note of the Director General's Proposal as reference document for the Draft Resolution.

Space Summit 2023



Green & sustainable future

Autonomous/guaranteed access to space

Human exploration beyond LEO



Driving space for a green future

The relationship between space actors and current and potential users of space-based applications is evolving. Driven by disruptive innovation, synergies and dependencies between space and user sectors are deepening. These developments offer new opportunities to boost the value of space for society and the economy. As underlined by ESA's Member States in the Matosinhos Manifesto and the Council Resolution agreed in Paris in November 2022, the development of new space solutions and their adoption in sectors ranging from energy infrastructure to the digital economy, must be accelerated to ensure that space supports European efforts to tackle urgent challenges stemming in particular from climate change for the benefit of Europe and its citizens at large.

In pursuit of this vision, ESA must contribute future-defining initiatives, including development of ambitious missions, providing effective responses to urgent global challenges associated with the green transition towards carbon neutrality, as well as initiatives for greener space activities.

Driving space for a green future

Serving the climate-related policies and goals of its Member States, ESA will continue to support climate action and the green transition on Earth and in Space and, in doing so, ensure that the European space sector is leading globally in these domains.

ESA also aims to foster the development of European capabilities in space-related technologies in synergy with EU policies and action plans to ensure a greener and safer future for Europe. For this purpose, ESA is building new strategic partnerships with the EU to strengthen synergies and avoid duplication of efforts, while leveraging established roles and responsibilities.

ESA strives towards the following ambitions:

- Continuing to develop cutting-edge, ambitious, and innovative missions delivering one-of-a-kind capabilities to address climate-related issues and to foster better usage of already existing data.
- Boosting the European space sector's role in the development of space-based contributions to the Green Transition, in line with national and European-level net-zero objectives by 2050 and embedding the space sector in Green Transition agendas.
- Significantly enhancing the European space sector's contribution to the implementation of the Paris Agreement, national green policies, and the European Green Deal.
- Fostering the development and the wide adoption of commercially sustainable integrated space-based solutions addressing the challenges and opportunities of the Green Transition in the main non-space greenhouse gas (GHG) generating sectors.

Concretely (cont'd)

- Significantly enhancing the contribution of space solutions to support the Sendai Framework for Disaster Risk Reduction, for the substantial reduction of economic losses as well as losses in lives, livelihoods, and health due to climate induced crises.
- Fostering a socially and environmentally responsible management of European space sector activities, in line with the commitment in Agenda 2025 and the Statement for a Responsible Space Sector opened for signature at the occasion of CM22.
- Contributing to European leadership in the development of a sustainable and responsible space by implementing a Zero Debris approach by 2030.

ESA is furthermore implementing a growing portfolio of development and demonstration projects focused on climate, green transition, and resilience on Earth and in space. In the coming years, ESA will endeavour to enlarge its activity portfolio with ambitious missions related to urgent climate action, decarbonisation and overall greening of society as well as addressing resilience to crises induced by climate impact and ensuring the sustainable use of space.

EC and ESA joint initiative on Space for Climate Action



EUROPEAN COMMISSION – ESA
Joint Initiative on Space for Climate Action

Signed 26 October 2023 and published on 6 November on the occasion of the Space Summit

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Space, and in particular Earth observation, offers a unique perspective on how to tackle climate challenges faced by humanity. Space technologies are crucial for reaching climate neutrality and climate resilience by 2050. Through our joint initiative, we are committed to exploring and enhancing opportunities for the development and broader implementation of space-based solutions dedicated to climate action.

Kurt Vandenberghe
Director General for Climate Action, European Commission



The climate crisis is upon us, and we have to act fast and act together for the benefit of Europe and, indeed, the world. Through this new initiative, together we will develop a structured cooperation that paves the way for information-sharing, mutual consultations and joint plans. Exploiting the complementarity between our respective programmes, together we will advance climate science, support policy implementation and boost green innovation on the road to the European Green Deal and a carbon-neutral future.

Josef Aschbacher
Director General, European Space Agency

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The objectives of such a cooperation process would be to:

- promote the use of space-based solutions in support of the implementation of the EU Green Deal and the further development of EU legislation with a view to achieving climate neutrality by 2050;
- reinforce the synergies between climate-related goals and development priorities for the European space sector, as relevant;
- spur the participation of space businesses in climate action, including through access to climate-related innovation and funding instruments, in particular by scaling up of spacebased solutions in support climate action;
- encourage the operational integration of space data and tools by public authorities at European, national, regional and local levels, and concerned stakeholders responsible for policy implementation, climate change mitigation and adaptation, in particular for what concerns implementation of LULUCF, GHG monitoring and non- CO₂ impacts (e.g aviation), or carbon removal certification, as well as the implementation of the EU Adaptation Strategy;

- promote business innovation in support of the green transition.

Cooperation opportunities have been identified in three key domains:

- Advancing climate science;
- Supporting climate policy implementation and, more generally, policies contributing to the reduction of GHG emissions;
- Accelerating green innovation.

The following sections outline examples, specific activities and a methodology for each of those cooperation opportunities.

Objectives: advancing climate science

3.1.2 Specific cooperation activities and related methodology

A reinforced cooperation between ESA and CLIMA on these programmes holds the potential to boost the value of climate science in support of informed policymaking, from decisions to actions. In this domain, CLIMA and ESA intend to explore:

Project portfolio

Earth system science and climate science and projects, which can support current climate action objectives at European and national levels, including contribution to the IPCC, WCRP's Coupled Model Intercomparison Project (CMIP), WCRP's Geoengineering Model Intercomparison Project (GeoMIP), including the scientific research of the ESA Science Cluster, especially on carbon, polar, ocean, atmosphere and hydro-climatic extremes;

Future research

to support possible gaps with respect to mitigation, adaptation or in relation to existing or upcoming climate action targets;

Modelling

Development of "what-if" scenarios in support of climate action implementation at European and national levels (e.g. targets, adaptation measures);

Long term prospects

e.g. assessment of solar radiation modification.



Objectives: climate policy implementation

3.2.2 Specific cooperation activities and related methodology

A reinforced cooperation between ESA and CLIMA on these programmes holds the potential to boost the value of space in support of policy implementation. In this domain, CLIMA and ESA intend to explore:

Demonstrators Earth Observation Applications projects that support the implementation of policies, providing MRV solutions, enabling the deployment of adaptation schemes and nature-based solutions, and empowering involved stakeholders. CLIMA may be invited to nominate an expert to participate in (e.g., by joining the Advisory Board) current and future ESA activities, including projects such as the: Forest Carbon Monitoring, World Emission, World, Peatland, World Ecosystem Extent Dynamics, Ecosystem Restorations, World Forest, Agriculture Atmospheric Emission, Coastal Blue Carbon. Such involvement would allow CLIMA to provide recommendations for the projects' requirements and full visibility on the projects' activities;

Support to future policy Identification and support to specific domains or legislation that has the potential to be further implemented with the use of space tools (e.g., contributing to improving, where possible, the monitoring, reporting and verification of aviation non-CO₂ effects under the EU ETS Directive);

Technical advice Support to the development of common technical specifications to help national, regional or local public authorities to implement policy with the use of space tools (e.g. carbon removals certification, GHG emissions verification);

International interoperability Support to the development of interoperability solutions at international level;

Development of tools Support to the development of customised/tailormade tools, such as the Green Transition Information Factory (GTIF), and identification of methodology and funding opportunities in order to scale them across Europe;

Training technical support and training for national, regional and local authorities in order to use space tools;

Evaluation support Analysis of lessons learned and contribution to the improvement and update of technical specifications or legislation.

3.3.2 Specific cooperation activities and related methodology

In this domain, CLIMA and ESA intend to explore:

Scale up Identifying and exploring cooperation opportunities for the development and scale up of space-based solutions supporting climate action (adaptation and mitigation);

Projects Earth Observation projects for various sectors, with example activities such as optimisation of manufacturing/production locations and supply chain structuring, identification of hot-spots for methane leakage in gas pipeline networks, optimising renewable energy generation site location and infrastructure operations, enabling remote monitoring of deep water offshore structures for new aquaculture methods, supporting tourism industry developments, large-scale infrastructure developments (e.g., ports, road/rail networks) optimised for evolving climatic conditions;

Incubators Developing “incubators” for SME innovative products in support of climate action on land, in particular carbon removal certification and advanced methods for monitoring carbon (soil, biomass) and links to biodiversity;

Support to local actors Assistance to cities and regional authorities to use space technologies for climate change adaptation and mitigation (e.g. Covenant of Mayors, Horizon Europe Cities and Adaptation Missions, etc.);

Decarbonisation and climate resilience Assisting industry with physical risk assessments and decarbonisation solutions in different market sectors (energy, transport, agriculture, manufacturing, construction etc);

Technical advice Supporting public stakeholders and industry to adopt innovative working practices leveraging collaborative environments for data and algorithm sharing.



Space bends the Curve

- **Co-governed & independent non-profit partnership of Green Transition actors**
- Engaging governments, businesses, multilateral institutions, civil society groups, end users and citizens
- Developing practical space-based solutions supporting Carbon Neutrality and greening of society by 2050.
- Partnering with stakeholders and users, aggregating the priorities of Green Transition sectors and seed solutions that address real needs.
- Accelerating the use of space by mobilizing resources and scaling solutions to full sectorial and global levels.

DRIVEN by the GREEN TRANSITION

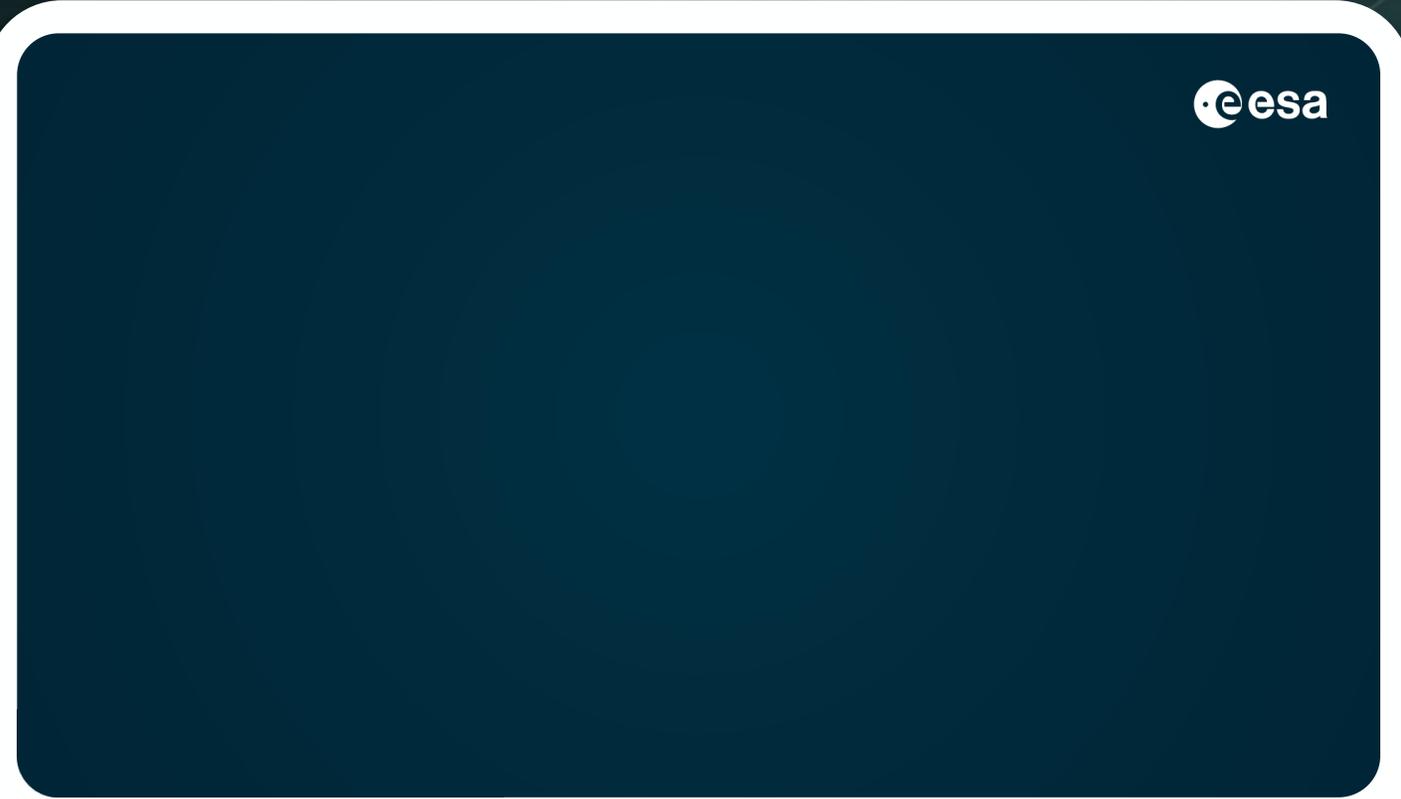


leveraging 50 years of public and private investment in space



Space plays a significant role

Still far below strategic and societal potential



ENERGY TRANSITION



MOBILITY TRANSITION



SUSTAINABLE CITIES



CARBON ACCOUNTING



EO ADAPTATION SERVICES

Action for impact towards 2030 (e.g. fit for '55) and 2050 (global net-zero)



2023

Developing upstream technologies and downstream services

2024

Upscaling through partnerships

2030

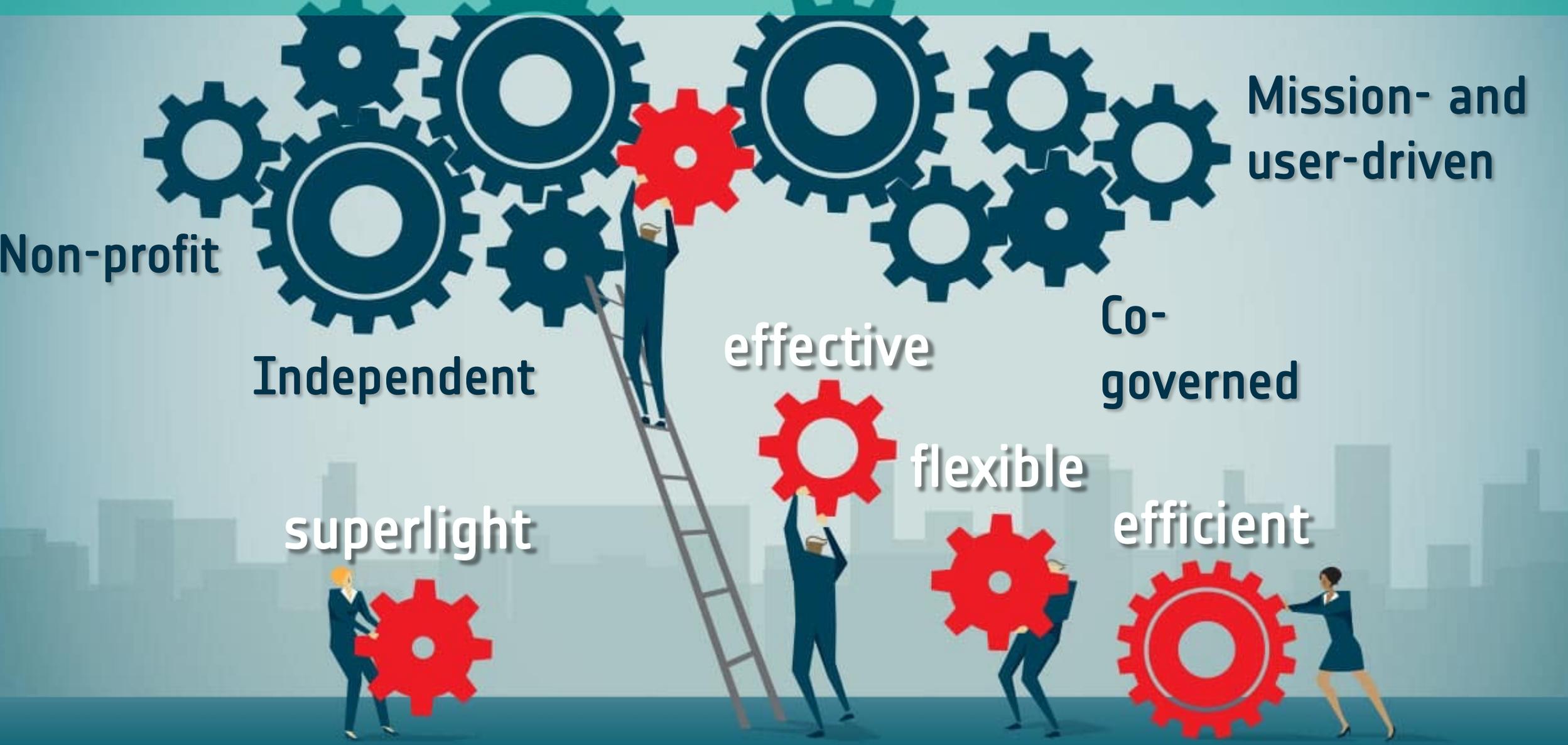
Benefiting billions of users via multiple operational systems

2050

Achieving net-zero carbon emissions



OPEN COLLABORATIVE FRAMEWORK



Mission- and user-driven

Non-profit

Independent

effective

Co-governed

superlight

flexible

efficient



CONCEPT OF ACTION



INFORM STRATEGY | FOSTER SYNERGY

PATHFINDER

Identify priorities and opportunities



SEED

Develop & demonstrate new solutions



SCALE

Create impact

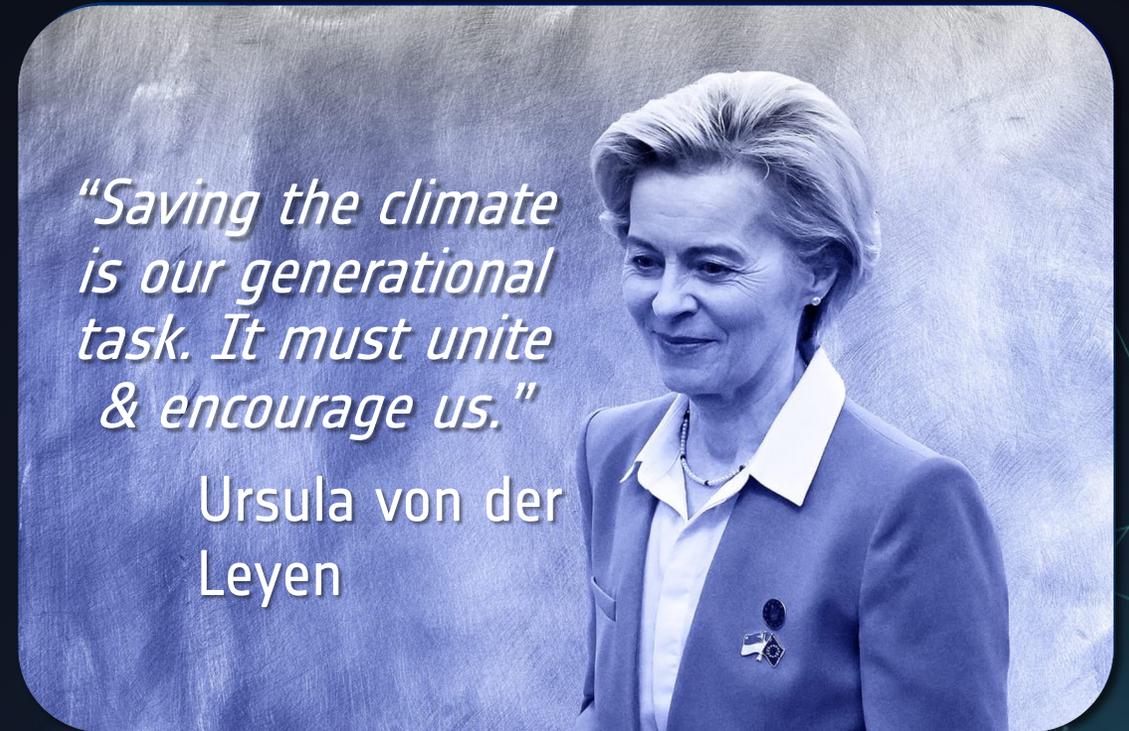


WHAT NEXT?



"We are on a highway to climate hell with our foot on the accelerator"

António Guterres



"Saving the climate is our generational task. It must unite & encourage us."

Ursula von der Leyen

We have a moral imperative to leverage 50+ years of public funding and private investment in space to address the greatest challenge of humanity.

We have an obligation to
ACT NOW

Take-home messages

- **Space Summit 2023** set new priorities for European space endeavour (**green and sustainable future**, launchers, exploration)
- **Policy** based **Green Deal** and general geopolitical context (triple crisis related → green/digital solutions) will **strongly drive** EO programme **strategy and content**
- **Accelerators** established as a new means to leverage on decades of public investments through scaling and multiplication by non-space public and private actors

Take-home messages (cont'd)

- ESA aims to realise the **full potential** of **space solutions** for society
- Earth Observation (EO) → Earth **Action (EA)**
- EOP programme structure likely to change → **simplification** (major activity for ESA in 2024)
- Goal: embed all EO/EA activities in a single **strategic framework** – written in a plain language
- Fostering a **green** & circular **economy** through meaningful commercialisation stimuli and investment

EARTH ACTION FOR GOOD

#SpaceAmbition

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