



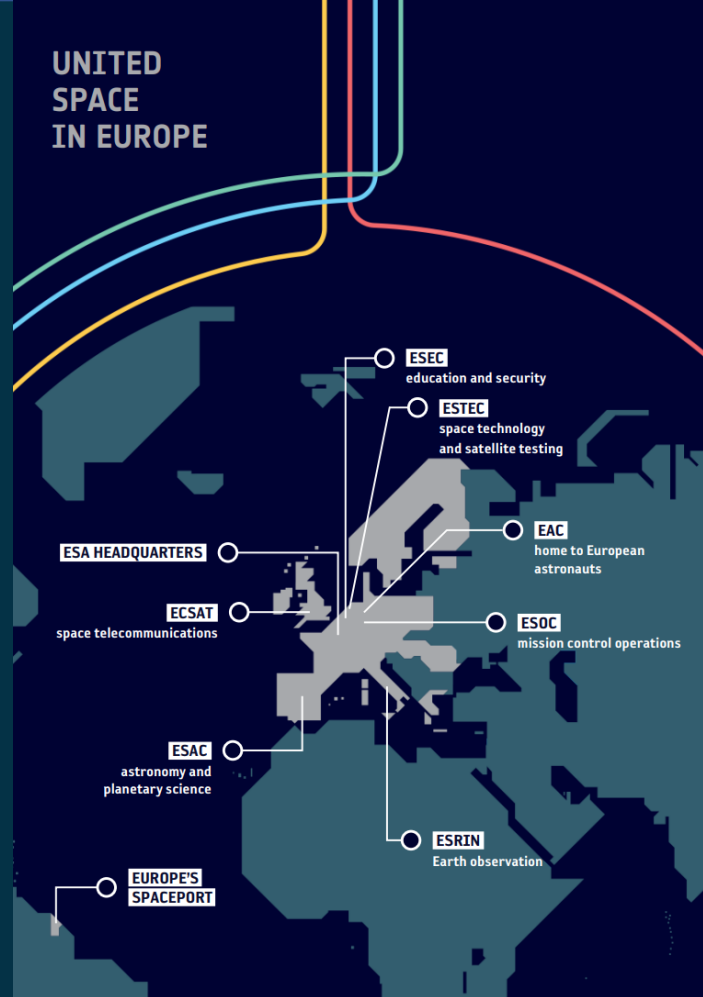
Space for Green Construction

European Space Agency

- Europe's gateway to space
- Peaceful exploration and use of space for the benefit of everyone
- Established in 1975 - over 50 years of experience
- 22 Member States + 9 Associate & Cooperating States
- 8 sites across Europe and a spaceport in French Guiana
- Promote European scientific and industrial interests in space

UNITED
SPACE
IN EUROPE

esa
space solutions



ESA UNCLASSIFIED



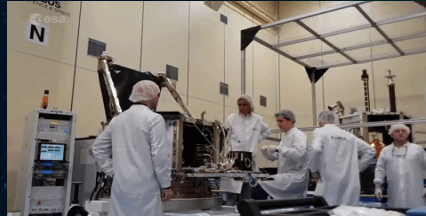
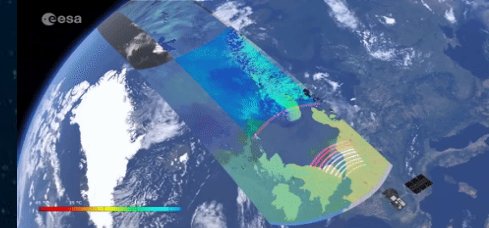
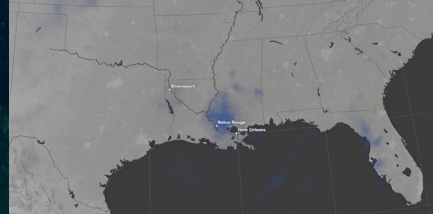
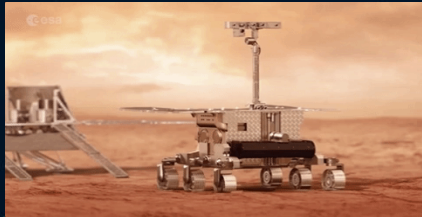
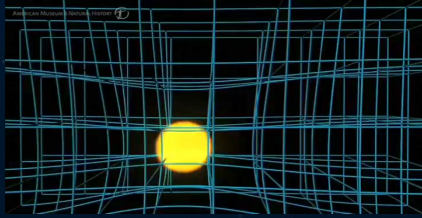
European Space Agency

Science and Exploration

Enabling and Support

Safety and Security

Applications



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→ ESA SPACE SOLUTIONS

The largest space innovation network in the world

- The go-to place for great business involving space to improve everyday life.
- Supporting European start-ups and SMEs to develop businesses using space technology and data.
- Offering funding, business and technical support to help to generate successful business and create jobs.





ESA SPACE SOLUTIONS OFFERS



Zero-equity funding (from
€50k to €2M+ per activity)



A personalised ESA
consultant



Technical support and
commercial guidance



Tailored project
management support



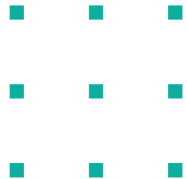
Access to our international
network of ESA and partners



Access to our network
of investors



Credibility of the
ESA brand



Space Technology

Earth Observation



Satellite Navigation



Satellite Communication



Spaceflight Technologies



Space Weather



Users & Markets

Maritime



Environment



Financial



Education



Energy



Agriculture



Healthcare



Transport



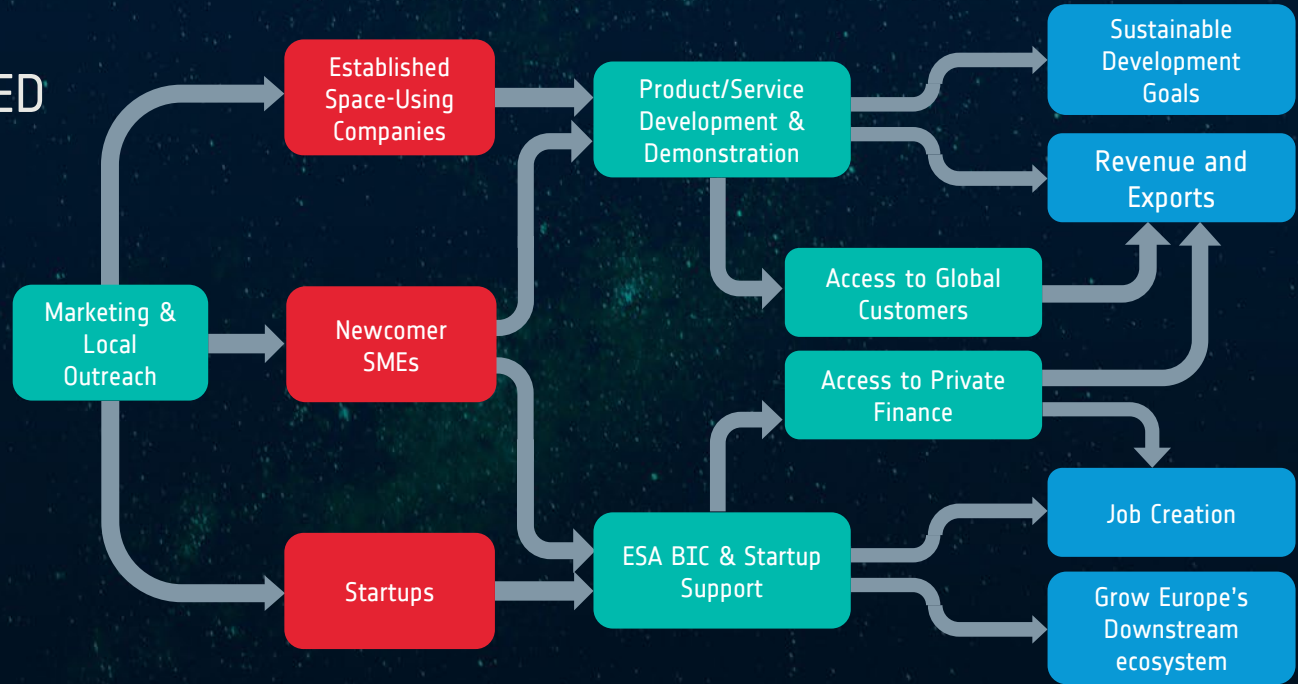
Media



Aviation



A FULLY INTEGRATED TOOLKIT FOR DOWNSTREAM BUSINESSES





Space for Green Construction

Space for Green Construction

- Overarching Theme and Objectives
- Topics of Relevance
- Value of Space
- Examples (ESA BASS)
- Stakeholder Involvement / MoI
- Next Steps



Overarching Theme and Objectives

Space for Green Construction is a Feasibility Study ITT (Invitation to Tender) in which companies are expected to submit proposals for commercially sustainable services addressing the objectives of the relevant statement of work. The studies themselves are expected to evaluate the economic and technical viability of the service proposed and derive evidence as such (in the form of a business plan and technical indications that the solution is feasible). Services proving viable are expected to be developed and demonstrated in a possible follow-up demonstration project with customers trialling the solution before taking the service to market. ESA supports the implementation of both studies and demonstration projects with zero-equity funding and broader support with the expectation of a return to ESA member states. This is by way of new commercially sustainable services (and associated revenues, jobs, sustainable development, other less tangible value...) created in their home nations.



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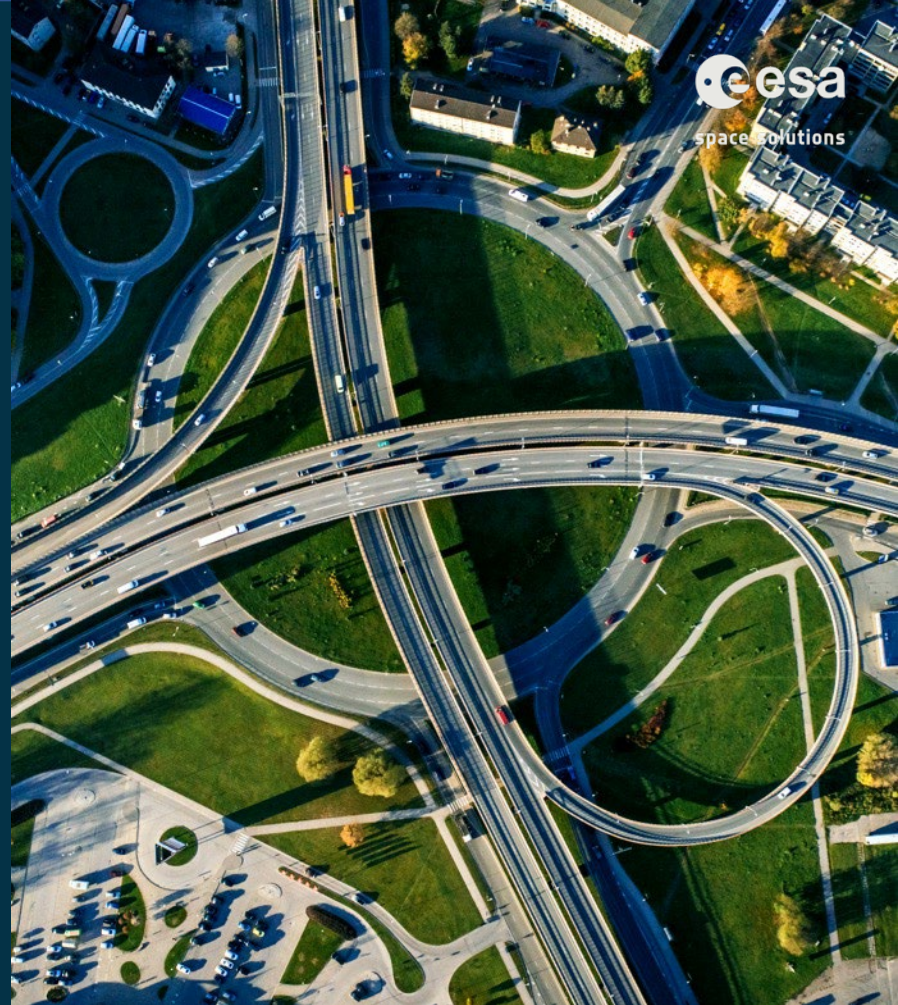
European Space Agency

Overarching Theme and Objectives

Space for Green Construction

Space for Green Construction will support the study and development of space-enabled commercial services aiming to **improve environmental sustainability across the construction lifecycle** of “built” or “hard” infrastructure.

Such infrastructure refers to the physical infrastructure of buildings, monuments, roads, bridges, tunnels, mines and quarries, dams and reservoirs, railways, ports, offshore structures and beyond.



Overarching Theme and Objectives

Commercially sustainable services to help reduce emissions and waste across the construction lifecycle:

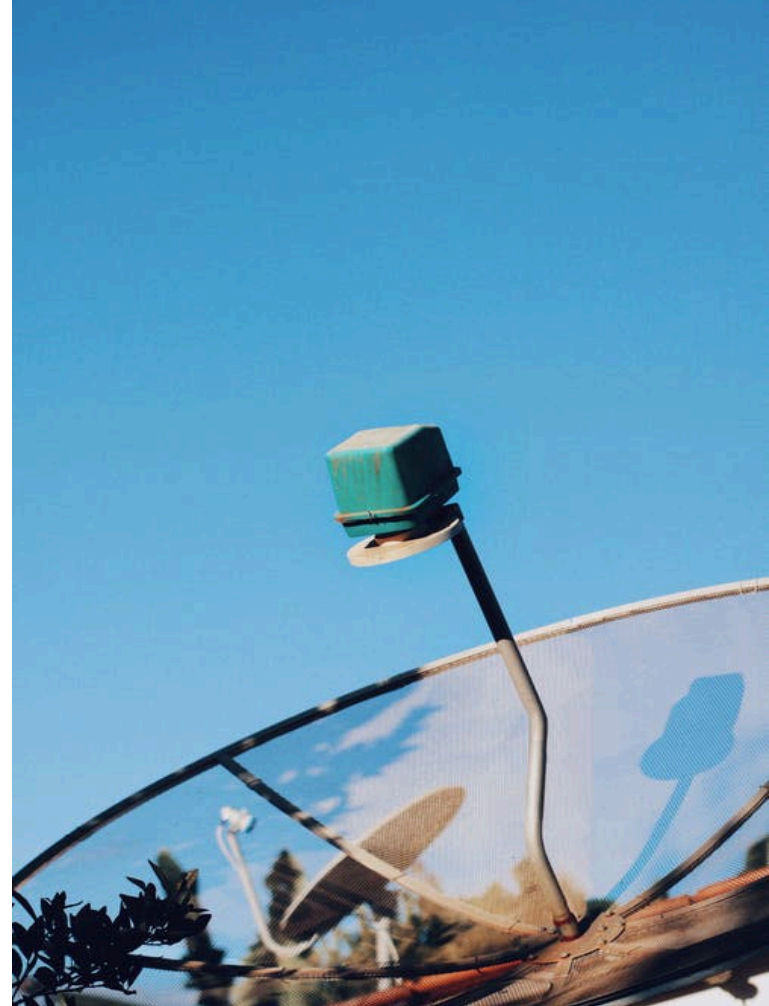
- Design, Produce, Construct
- Operational Use (excluding services enabled by the infrastructure, and operational energy use).
- End-of-Life
- Beyond-the-Lifecycle



Design, Produce, Construct

This topic invites solutions supporting sustainable practices (and ensuing outcomes) in the design, production and construction stages of the construction lifecycle. This refers to services improving sustainability in/through:

- Aids to structural design (data provision, simulation...)
- Enhanced knowledge for site selection.
- Designs for obsolescence and circular economy.
- Construction methodology, material and component selection and sourcing...
- Extraction, production and transportation of common construction materials (steel, concrete, asphalt...)
- Insights and support to material supply and demand.
- Pre-fabrication and modular construction, integration of robotics, remote machine control...
- Construction activity monitoring, optimisation, oversight...
- ...



Operational Use

This topic refers to the use, maintenance, repair, refurbishment and replacement of assets pertaining to the infrastructure. This use-case focuses on the sustainability, upkeep and revitalisation of the infrastructure in question. Services could relate to:

- Real-time insights into structural integrity and health.
- Dynamic models and visualisations of infrastructure to aid maintenance and re-work efforts.
- Monitoring and reduction of emissions and environmental impact of infrastructures.
- ...



End-of-Life

This topic refers to end of the useful life of the infrastructure when followed by re-purposing, refurbishment, deconstruction or demolition and disposal of the constituent assets. Sustainability improvements in this stage should be pursued:

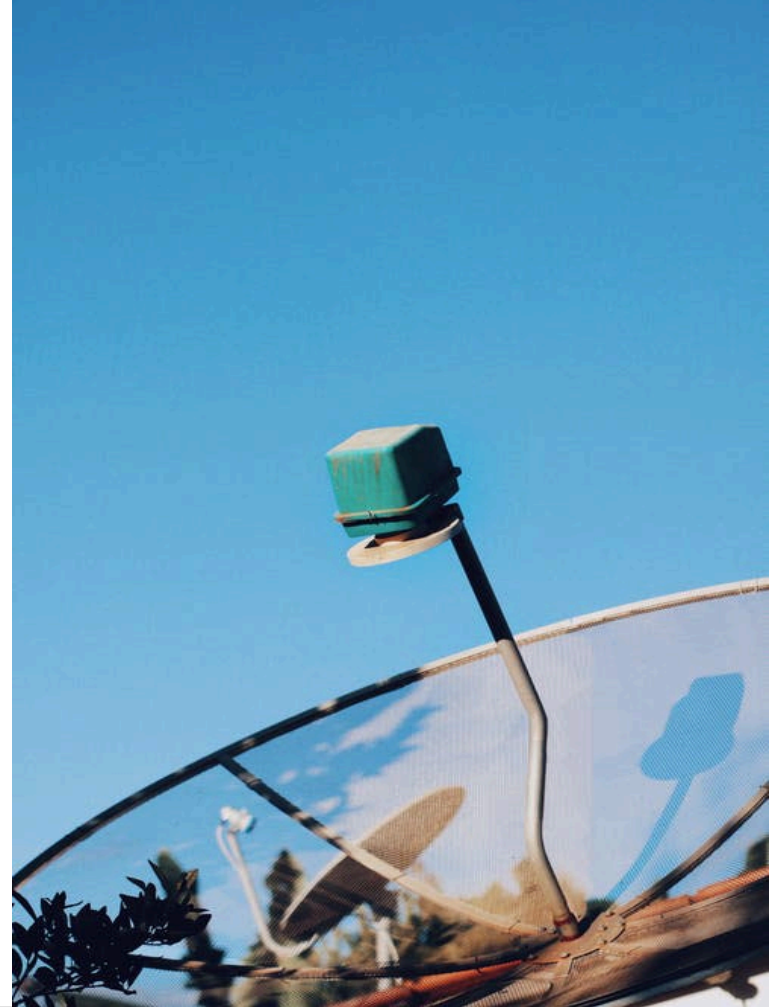
- Monitor and reduce emissions and waste in the demolition process.
- Facilitation of deconstruction.
- Analytics in support of re-purposing.
- Support to waste management during decommissioning.
- Landfill monitoring, management and improvement to sustainability.
- ...



Beyond-the-Lifecycle

Beyond-the-lifecycle comprises greenhouse gas emissions savings and waste prevention stemming from circular economy activities including reuse, recycling and recovery of infrastructure assets.

- Novel business models supporting circular construction marketplaces and material and component reuse.
- Identification and mapping of infrastructure, materials and components.
- Support establishment of materials passports.
- Construction supply chain tracking, optimisation and integration.
- ...



SatNav

- Tracking of machinery, vehicles, people, storage containers
- Geo- and time-stamping of data from drones, IoT sensors...
- Site surveys / measurements
- Machine control (graders, dozers, excavators...) and navigation of robotics

SatEO

- Mapping information, boundary/feature delineation and change detection
- Air quality measurements
- Flood and land subsidence risk
- Soil quality and land characterization
- Heat signatures and fire detection
- Weather forecasting
- Digital elevation/surface models and topography measurements

SatCom

- Connectivity for remote construction sites (e.g. offshore, rural/remote areas...)
- Back-up connectivity to terrestrial communications


Human Spaceflight...

- Technologies designed for use in space – advanced materials, additive manufacturing, robotics, clean energy technology, repair and recycling technologies...

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Possible Stakeholder Involvement and Benefits

- Support on requirements / theme definition 
- Promotion of the initiative to prospective bidders
- Review proposals for activities of interest
- Offer follow-up support to high-potential activities...
- Incorporate results of projects into future work / standards
- Support successful bidders' activities with assets, expertise, testbeds, facilities... to support demonstrations.
- Guide industry studies and development on topics of interest
- Visibility and overview of market and ideas relevant to topics of interest
- Guide companies during project/study implementation
- Visibility over outputs, insights and results of studies/projects
- Collaborate with ESA through joint promotion, webinars, future initiatives
- Support sustainability in the construction sector



ESA BASS Example Activities (Spanning Construction and Smart Cities)




Activity	Content	Link
Space for Buildings (Feasibility Study)	Real-time insights into the pollution levels in and around buildings.	Space For Buildings ESA Business Applications
ConsTrack - Taking Stock of the Construction Industry (Demo Project)	Oversight of and insights into construction activities at the macro-scale.	ESA Business Applications ConsTrack ESA Business Applications
Buildspot (Demo Project)	Operational tool based on satellite imagery to detect, monitor construction sites and quantify urban areas	Buildspot ESA Business Applications
Optimal Cities (Kick-Start Activity)	GIS-based tool to support users in visualizing the “health” of cities (in terms of various parameters including green space, air quality, availability of amenities...). (GIS – Geographical Information System)	OPTIMAL CITIES ESA Business Applications
Orbital Assets (Kick-Start Activity)	Insights on building components and material type, including through analysis of colour, texture, typology, age, location, etc. and assessments of building health and condition to support a circular construction economy.	Orbital Assets ESA Business Applications
Climate-Proofing of Buildings (Feasibility Study)	Combination of geographical and meteorological information with advanced machine learning algorithms to provide users with site-specific climate data.	Climate-proofing of buildings ESA Business Applications



Activity	Content	Link
Mylo (Demo Project)	mylo provides a cloud hosted SaaS (Software as a Service) application for construction companies to manage the project delivery process.	mylo ESA Business Applications
inSAR4insurance (Kick-Start Activity)	Application providing insights into ground stability of the client's area of interest, assessing not only the risk of the territory to move or fail, but the long-term trend of such movements and related statistical information.	inSAR4insurance ESA Business Applications
Building Stock Monitor Service (Kick-Start Activity)	Building Stock Monitor Service is a service to aid municipalities with monitoring the entire building stock within their geographical borders.	Building Stock Monitor Service ESA Business Applications
Virtual Post-It	The Virtual Post-It solution will allow construction foremen and technical building inspectors to create GNSS-anchored, interpersonal digital error messages or “virtual post-its” during the review of construction work. Such GNSS-anchored digital error messages are thus linked to the location of rework in 3D space until the requested rework has been completed. (GNSS – Global Navigation Satellite System)	Virtual Post-It ESA Business Applications

Next Steps

1. Stakeholder involvement consolidation
2. Requirements / Needs gathering 
3. MoIs (as applicable)
4. Finalise tender materials / internal approval
5. Promotion
 1. ESA Webinars
 2. Other Events
6. Timeline for Call
 1. Opening Date - 31st October 2022
 2. Closing Date – 31th February 2023

