Space for smart and uncrewed shipping downstream services enabled by 5G and advanced PNT

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ESA SPACE SOLUTIONS

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.

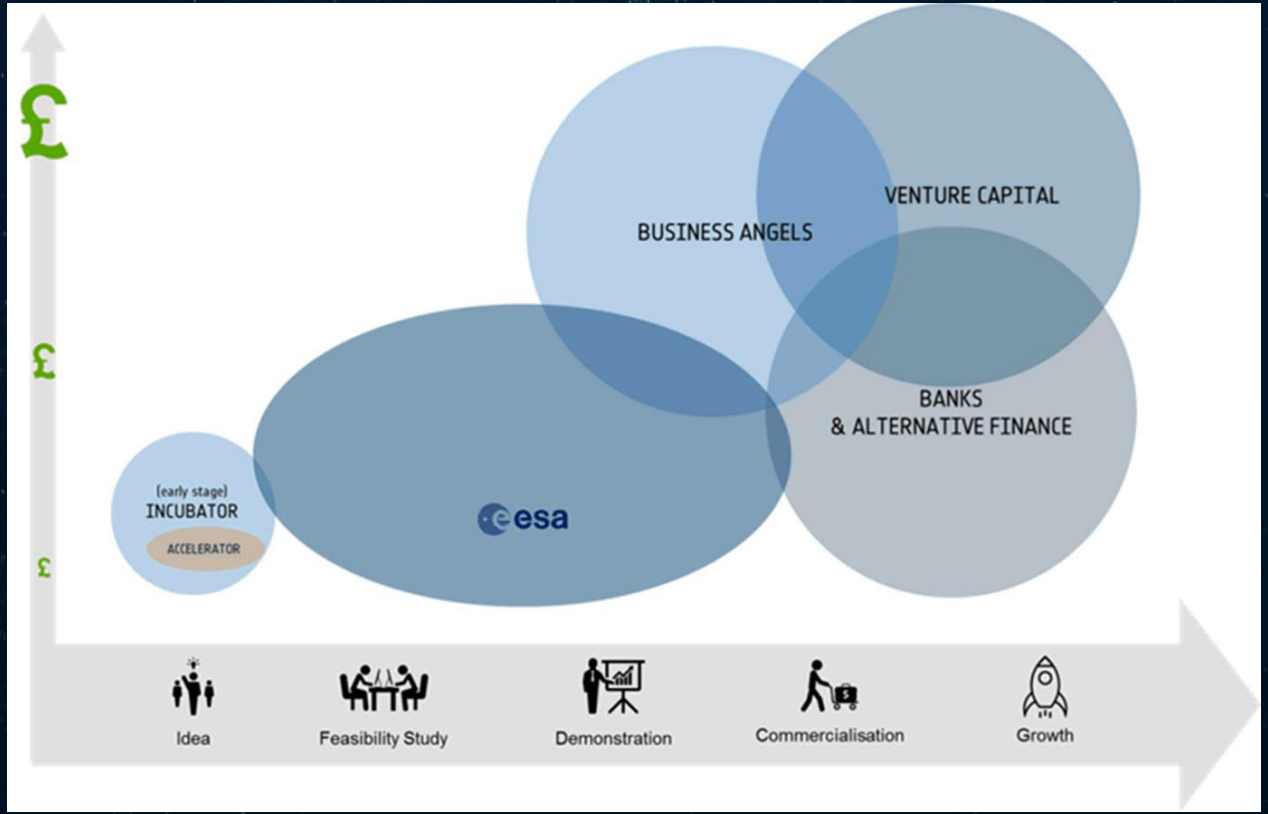
ESA Space Solutions

ESA Space Solutions provides multiple entry points: ESA Business Incubation Centres (BIC), ESA Technology Transfer and ESA Business Applications programme.

The **ESA BICs** help start-ups or young companies to develop and idea.

ESA Technology Transfer programme supports identifying suitable space technologies to meet the needs of non-space applications

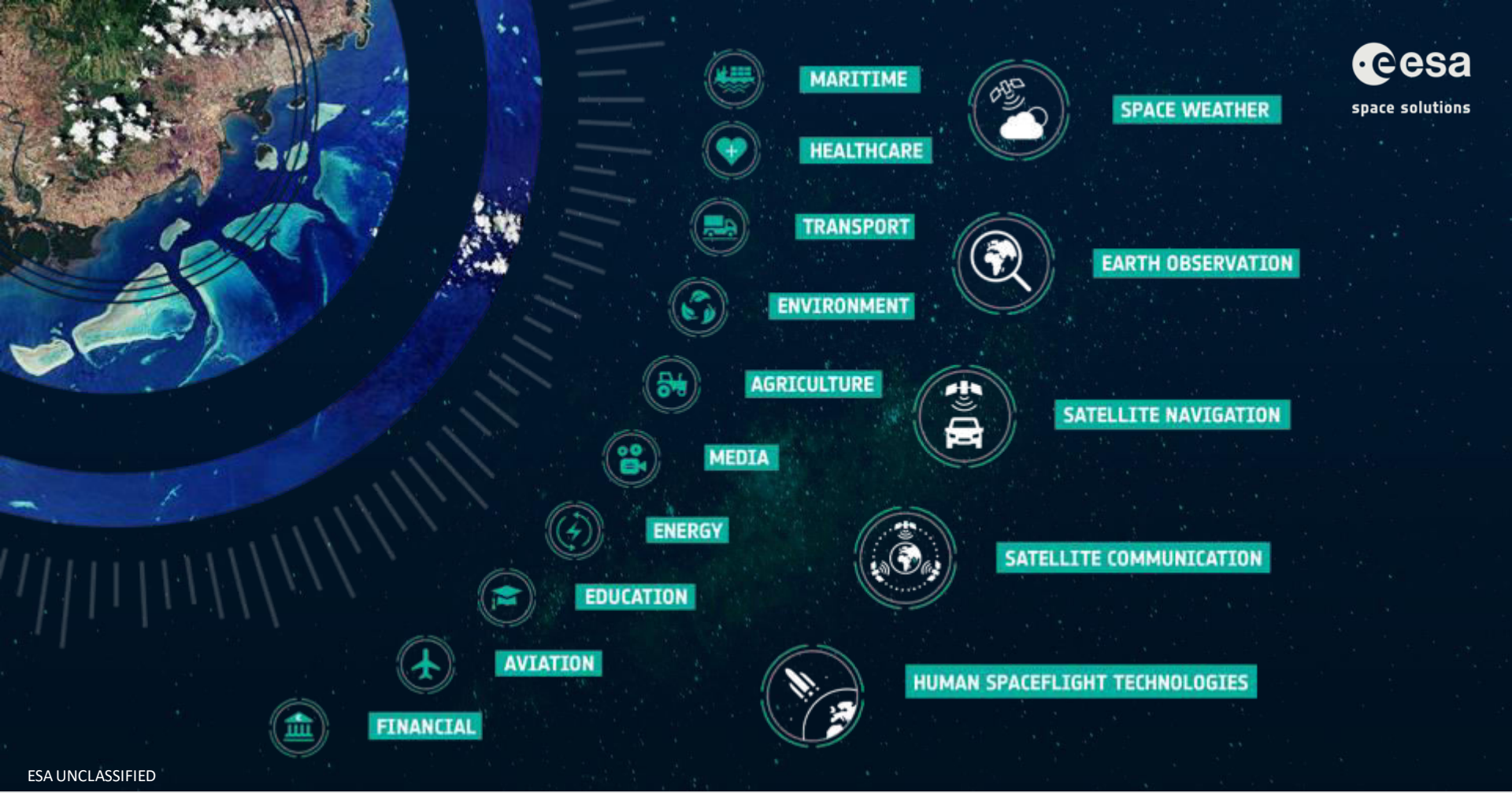
ESA Business Applications supports the development of sustainable services utilising space assets.



ESA SPACE SOLUTIONS OFFERS

esa space solutions

- 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 for smart and uncrewed shipping
downstream services enabled by 5G and advanced PNT

"Space for smart and uncrewed shipping"

Announcement of Opportunity (AO) aims to support the development of space based downstream services and solutions relying on advanced technologies such as 5G and PNT (Positioning, Navigation and Timing) in the smart and uncrewed shipping domain.

Sub-themes:

- Towards Shipping 4.0
- Monitoring of coastal areas
- Maritime surveillance
- Environmental sustainability

AO Launch planned March 2021

Towards Shipping 4.0: Digitalization at Sea and Ports

Possible applications include:

Digitalization of maritime services and data platforms at sea and ports

- Near real-time monitoring of port capacities and capacity-oriented statistical analysis of container ports, with the help of frequently updated high-resolution EO imagery that is interpreted by machine learning, to identify the number of shipping containers in the picture and used as input to statistical algorithms.

- Predictive and digital maintenance solutions
- Support to efficient remote operations at sea
  - Real-time monitoring of cargo in individual containers, using cargo-specific sensors (temperature, humidity, motion, etc.) exploiting as example on blockchain-protected satellite link to transmit their data

Towards Shipping 4.0: Digitalization at Sea and Ports

Possible applications include:

- Uncrewed shipping for inland waters and short term shipping
- Safe autonomous navigation and operations
  - Remote monitoring and operation of autonomous vessels, by combining blockchain-secured 5G with satellite links as well as using satellite positioning to achieve accurate and reliable navigation. Correspondingly, prevention of ship collisions in densely trafficked shipping lanes, by continuously monitoring the position and course of vessels, and externally inducing course corrections if necessary.

Monitoring of coastal areas

Possible applications include:

- Detection and monitoring of threatened coastal areas
- Monitoring land and water infrastructure in coastal areas
- Mitigating climate change impact risks along coastlines

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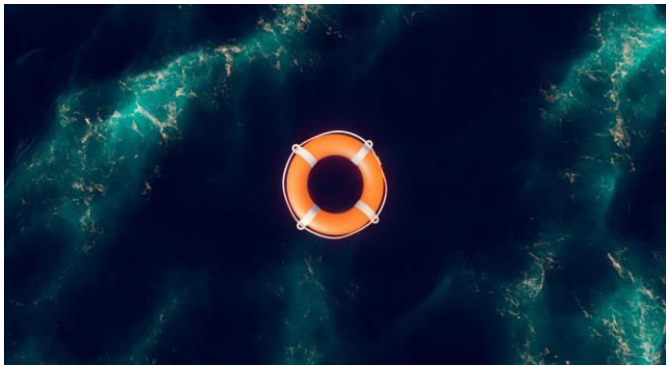
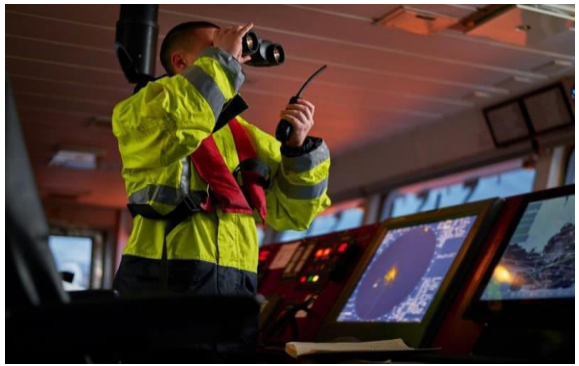
Maritime Surveillance

Possible applications include:

- Surveillance of maritime traffic
- Detection of illegal actions related to illegal fisheries
- Detection of oil-spilling and environmental pollution





Environmental Sustainability

Possible applications include:

- Impact of weather and current data on navigational footprint
- Reduction of emissions and environmental footprint of maritime transport
- Monitoring of marine-protected areas – preservation of biodiversity

5G and Space for Smart and uncrewed Shipping

Role of 5G

- Provision of low latency, high reliability data to support autonomous shipping
- Provision of high throughput data for remote piloting through travel corridors requiring it
- Support to port operations/logistics and surveillance through digital twins, massive IoT device (sensors, cameras…) network connectivity
- Support to port operations through robotics, automation and remote control
- Cargo/goods tracking and state monitoring
- High throughput data for AR/Immersive Reality construction support and/or maintenance

- For more information, please visit :

business.esa.int

THANK YOU!

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