WELCOME TO THE WEBINAR!

Before we start...

- Due to the number of attendees, please keep your microphones muted at all times and switch off the webcam function.
- You can use the conversation function anytime to submit your questions. They will be addressed during the Q&A at the end of the webinar.

AGENDA

- ESA and ESA Space solutions

- ESA ARTES 4.0 Space Systems for Safety and Security (4S) Strategic Programme Line

- 4S Announcement of Opportunity "Space Applications supporting Digital transformation in Public Safety"
  - Background and Objectives
    - Guest Speaker S. Sanna (ADL S.R.L.): Overview of results 4S User Study Public safety
  - Areas of application, Activities, Funding

- How to apply?

- Open Questions & Answers session

THE EUROPEAN SPACE AGENCY

Purpose of ESA

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

Facts and figures

- Over 50 years of experience

- 22 Member States

- 8 sites across Europe and a spaceport in French Guiana

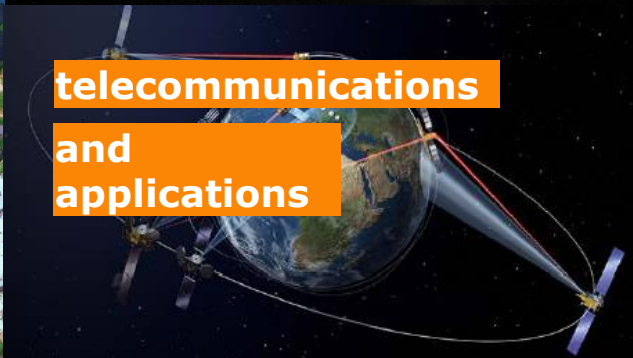- Over 80 satellites designed, tested and operated in flight

ESA SPACE SOLUTIONS

The largest space innovation network in the world

- ESA Space Solutions is the go-to place for great business ideas involving space in all areas of society and economy.

- ESA Business Applications is part of ESA Space Solutions that supports the development of sustainable services utilising space assets.

- Supporting European start-ups and SMEs to develop businesses using space technology and data.

- Offering funding, business and technical support to help to generate socio-economic benefits.

LEGEND
- ESA Business Incubation Centre
- Prime ESA BIC location

French Guiana

Azores

Madeira

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

European Space Agency

MARITIME

HEALTHCARE

TRANSPORT

ENVIRONMENT

AGRICULTURE

MEDIA

ENERGY

EDUCATION

AVIATION

FINANCIAL

SPACE WEATHER

EARTH OBSERVATION

SATELLITE NAVIGATION

SATELLITE COMMUNICATION

HUMAN SPACEFLIGHT TECHNOLOGIES

Project web pages:
business.esa.int/projects

esa
space solutions

ESA UNCLASSIFIED

European Space Agency

Space Systems for Safety and Security (4S)

Space Systems for Safety and Security - 4S

ARTES

Act on Offer - Boost industry innovation, competitiveness and ability to timely deliver

Act on Demand – Support public organisations to trigger and implement their initiatives

4S

Next Generation
Space Systems
for Safety and Security

for

TRUST
in our DIGITAL infrastructure
Even in times of crisis or disaster

SECURE
COMMUNICATIONS

RESILIENT DIGITAL
INFRASTRUCTURE

SOVEREIGN SYSTEM
DESIGN – MANUFACTURING
- OPERATIONS

What is Digital Transformation?

A definition

https://enterprisersproject.com/article/2020/9/digital-transformation-strategy-7-items-rethink

- Digital Transformation is defined in ESA's Digital Agenda for Space (EDAS) as "the change of business by altering the business strategy, operations, products and objectives through adopting digital technologies. This in turn shall accelerate growth of the business and enable new types of innovation and creativity."

- This transformation, driven by the increase in using digital technologies across Industry 4.0, such as Artificial Intelligence, Simulation, Cloud, Internet of Things (IoT), Big Data Analytics, and AR/VR, is also very much central to Space 4.0.
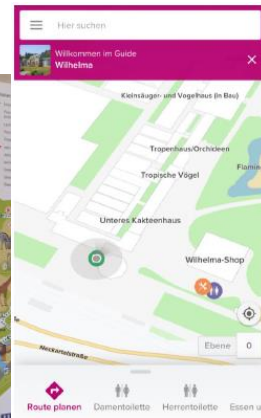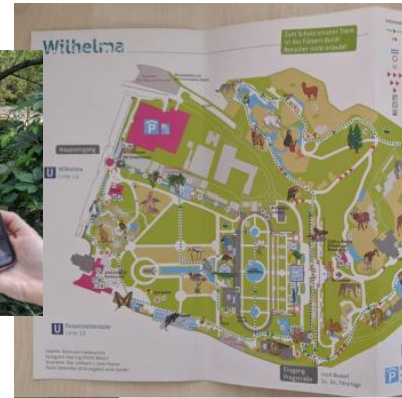
Example: Digital transformation in zoos (ConnieAI)

Digitalisation, Connectivity & Sustainability

Satellites will play a critical role as part of the 5G and 6G seamless networks, to fuel the lucrative 5G and 6G economy.

The New era of Digitalisation and Connectivity will transform the way we interact, produce, live and work.
5G & 6G will enable a large-scale Digital Transformation of Traditional Industry Sectors which are not digitalised yet. Satellites will play a critical role as part of the 5G and 6G seamless networks for truly global coverage and new connectivity networks will be designed to be Environmentally Sustainable

Space Applications supporting Digital transformation in Public Safety

Background: Digital Transformation is the change of business by altering the business strategy, operations, products and objectives through adopting digital technologies. This trend has been accelerated by the ongoing COVID-19 pandemic which created unforeseen challenges for public safety stakeholders.

Telecommunications together with its space component, is expected to play a major role in the Digital Transformation taking shape within the public safety domain because it can offer the secure and reliable connectivity required for safety related communications, with a wide coverage including remote locations, or to increase network resilience when used as a redundant system to terrestrial networks.

Foster the development and showcase of innovative applications enabled by secure satellite telecommunications (possibly complemented with other space assets) to support Digital transformation in Public Safety.

Demonstrate the key benefits enhanced secure communications can bring in combination with the ongoing digital transformation which has allowed opening up new opportunities for the public safety sector

Involved stakeholders

PSCEurope
Public Safety Communication Europe

PSCE network
+
Others to be confirmed

Public safety stakeholders to be involved

Fire Brigades

Law Enforcement

Emergency Services

Civil protection

4S User Studies- Objectives revisited

✓ **Engage with representative stakeholders and users to identify with them trends, gaps, limitations, needs, expected evolutions, etc. of their sectors & select a list of promising applications**

Ensure Safe and Secure Transportation
- aviation
- maritime
- road/land
- rail
- manned
- unmanned

Utilities (Energy, water, telecom)

Finance

Health

Infrastructures monitoring

Logistics

Protection of Critical infrastructures & Essential services

Support Public Safety & Law enforcement

Emergency Services
Civil protection

Maritime surveillance
Border surveillance

And others...

Follow-up: Demo Projects for early to pre-operational services demonstration towards user communities

- 4S User studies were initiated in 2020
- completed in 2021

ESA UNCLASSIFIED

Guest speaker

Stefano Sanna (ADL S.R.L.)

European Space Agency

FIRST RESPONDERS APPLICATIONS SATELLITE TECHNOLOGY (FAST)

Satellite applications for Public Safety

Emerging safety and efficiency needs are driving demand for security and connectivity in the Public Safety sector

Increasing need for safety and efficiency…

1 Ensure safety and security of operations

2 Increasing need for information from the field

3 Increasing cross-border cooperation

… generate demand for security & connectivity…

🌐 **Ubiquitous coverage**

👍 **Highest reliability**

⬆⬇ **Low latency & high capacity**

☁ **Cloud platforms**

🔒 **Cybersecurity**

…with impact on the Public Safety sector

- Assessed how SatCom technology can support operations and coordination during public emergencies, crisis management and disasters

- Collected the needs of three vertical: Law Enforcement, Fire Brigades, and Emergency Services

We collaborated with the **European Space Agency** in the technological and business assessment of new applications leveraging satellite communication in these domains

The study, after a consultation with the end-users, focused on three applications on which satellite could have a relevant role

Application selected

Connected vehicles

- Smart connected vehicles enabling fleet management and optimized routing during interventions based on hybrid connectivity (cellular, satellite)

On demand monitoring of impacted areas based on UAV

- UAV Command and Control link for monitoring activity in BVLOS and payload data communication link (e.g. HD cameras, Thermal cameras, smoke detectors)

On field broadband connectivity

- Adoption of vehicles (Cell of wheels) or drones (Cell of wings) capable to restore broadband connectivity
- Adoption of portable devices capable to provide broadband connectivity to nearby devices

The three applications are impacted by multiple macro trends

Application	UAV	IoT	Wearables	Broadband communication systems	Analytics & data science	Robots
Connected vehicles	-	✓	-	-	✓	-
On demand monitoring of impacted areas based on UAV	✓	✓	-	✓	✓	✓
On field broadband connectivity	✓	-	-	✓	-	-

The use of SatCom will bring benefits in terms of cost savings, operational, safety and quality of service improvements

Application	Benefit	Key elements
Connected Vehicles		• Reduction of intervention time due to optimized routing • Boost of safety of the officers due to alert notifications • Predictive maintenance will reduce the number of vehicle failures events
On demand monitoring of impacted areas based on UAV		• Improvement of the quality of the service offered • The exploitation of UAVs will lead to increased efficiency, covering a wider area in a faster way versus land vehicles • Increase the safety of the operations, keeping out of danger the officers
On field broadband connectivity		• Support operations in remote or distressed areas by enabling officers to communicate • Increased safety during operations and greater coordination both between officers and with the control center

Performance Improvement · Savings · Safety improvements · Quality improvements

The integration of Terrestrial and NTN is a crucial development for emerging applications in the public safety sector

Application	SatCom Role	Key elements
Connected Vehicles		• Satellite can provide narrowband IoT hybrid connectivity
On demand monitoring of impacted areas based on UAV		• Satellite can be adopted primary link for BVLOS Autonomous Flight in either C2 and Payload Download use cases
On field broadband connectivity		• Satellite provides a primary link in case of emergency situations in order to restore the communication in the distressed area

Primary   Hybrid   Complementary   Back-up

Connected vehicles and BVLOS UAVs are still under development, while on field broadband connectivity is already mature

Application	Technology development	Market readiness	Satellite positioning
Connected Vehicles	*Improvements in terminal SWAP and cost of capacity*	*Willingness to integrate application into operational procedures*	*Satellite plays a hybrid role by providing communication in rural areas*
On demand monitoring of impacted areas based on UAV	*Autonomous UAVs and light weight terminals to be developed*	*High cost of adoption and regulatory issues*	*The satellite link is an enabler for BVLOS autonomous flight*
On field broadband connectivity	*Improvement in bandwidth and cost of capacity required*	*High cost of connectivity*	*Satellite is the main solution to restore connectivity in emergency*

Legend: Low ○ ⟶ ● High

Our proposed recommendation for the SatCom sector

1 **Aggressively seek cost reduction of SatCom link**
Industry should push hardly to reduce the cost of capacity per Mbps in order to win new clients but also to enable complex and advanced applications that require ubiquitous and continuous data usage

2 **User Terminal to be designed for specific end-user needs and at lower cost**
User Terminal is a key element for SatCom market penetration, smaller and low power devices are needed to unlock the addressable use cases with the minimal end-user capex

3 **Integrate the SatCom offering with the terrestrial networks**
Hybrid multilink systems are an imperative to increase satellite penetration in the market. Work side by side to make the whole communication system seamless and coupled with terrestrial networks

4 **Make the satellite eco-system more interoperable**
Communications protocols and standards should be more integrated and interoperable among different constellations as global end-user could use several services

5 **Iteratively engage end-user to stimulate awareness for the SatCom**
Several safety critical services could be widely covered by the Satellite, even with current space assets, end-users should open to dialogue with SatCom sector in defining operating requirements

ARTHUR D LITTLE

THE DIFFERENCE

Call for Proposals for Demonstration Projects

WHAT ARE WE LOOKING FOR?

1. **Address one (or more) application area(s) and propose to design, develop and demonstrate one (or more) service(s) relevant for this (these) areas.** Other applications areas may be proposed by Tenderers, if identified by representative stakeholders of relevance for their operations
2. **Be customer/user driven** (i.e., involve in the project representatives from users' communities)
3. **Shall set-up a pilot trial/demonstration** to verify and deploy in a pre-operational environment the proposed service(s) with the involvement of the engaged users/customers
4. Prove the **benefit of including safe and secure satellite telecommunications** systems for the proposed service(s).
5. **Include the potential service provider** as part of the tendering team

European Space Agency

Use Case Examples
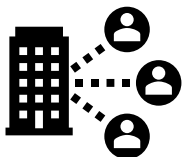
"New normal" ways of secure working including secure remote access for teleworking and creation of new opportunities for cross-agency collaboration e.g. enabled by connecting shared databases through digitalisation

Secure SatCom supported communication systems connecting frontline responders to provide extensive coverage, high resilience, security and public safety functionality

Internet of Things (IoT) providing connected devices for on field monitoring and connected vehicles, e.g. enabling fleet management and optimised routing during interventions based on hybrid connectivity (cellular, satellite).

Broadband communication systems providing on field broadband connectivity, for instance provided by vehicles (Cell of Wheels) or drones (Cell of Wings) capable to restore broadband connectivity or by portable devices capable to provide broadband connectivity to nearby devices.

On demand monitoring of impacted areas based on UAV providing increased efficiency, covering a wider area in a faster way versus traditional land vehicles, providing increased safety and providing vital information concerning the operations

Treating location data in full compliance with GDPR. People's precise geographic coordinates denote a great lot of personal data. This issue is particularly important in disaster management, where finding the right balance between location precisions and being still GDPR compliant should be addressed for making location data and personal privacy becomes sound from end-users and disaster manager perspectives.

How to apply?

FUNDING

	Non-SME*	SME*	Universities & Research Institutes**
Demo Project	Up to 50%	Up to 80%	Up to 80%

*SME's are fulfilling the criteria defined in the European Commission Recommendation of 6 May 2003 (2003/361/EC) or as updated .

** with no commercial interest in product/service. The funding of Universities or Research Institutes shall not exceed 30% of the total allowable cost

ESA will bear up to the above defined percentage of the acceptable project cost, and the remainder has to be financed by industry, institutions and users participating in the activity, and may be in cash or in-kind.

The applicable funding level of the individual prime- or subcontractors is subject to authorisation by the involved National Delegation(s).

Where to find the information

business.esa.int

- Scroll down to the part "Featured Opportunities" to see all activities currently open or in preparation

Featured opportunities

SPACE AND DIGITAL TRANSFORMATION FOR GREEN ENERGY UTILITIES

SPACE APPLICATIONS SUPPORTING DIGITAL TRANSFORMATION IN PUBLIC SAFETY

5G/6G SERVICES

CARBON CAPTURE, STORAGE, AND SEQUESTRATION

EDGE INTELLIGENCE

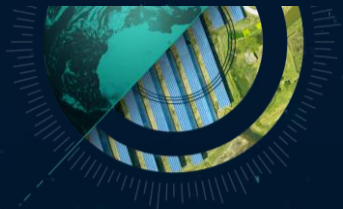CASE: COMMERCIAL APPLICATIONS ENABLED BY SPACE ENVIRONMENTS

Where to find the information

business.esa.int

- Scroll down to the part
  "Featured Opportunities"
  to see all activities currently open or in preparation

- Opening and closing dates for Outline proposal submission

- Outline proposal template

- Call scope document

Space Applications Supporting Digital Transformation in Public Safety

OPPORTUNITY	Intended Tender
ACTIVITY	Demonstration Project
OPENING DATE	01 March 2022
CLOSING DATE	01 November 2022

Image credit: SanchaiRat

OPENING DATE: TBC SOON. CLOSING DATE IS TENTATIVE

OPENING DATE: TBC SOON. CLOSING DATE IS TENTATIVE

European Space Agency
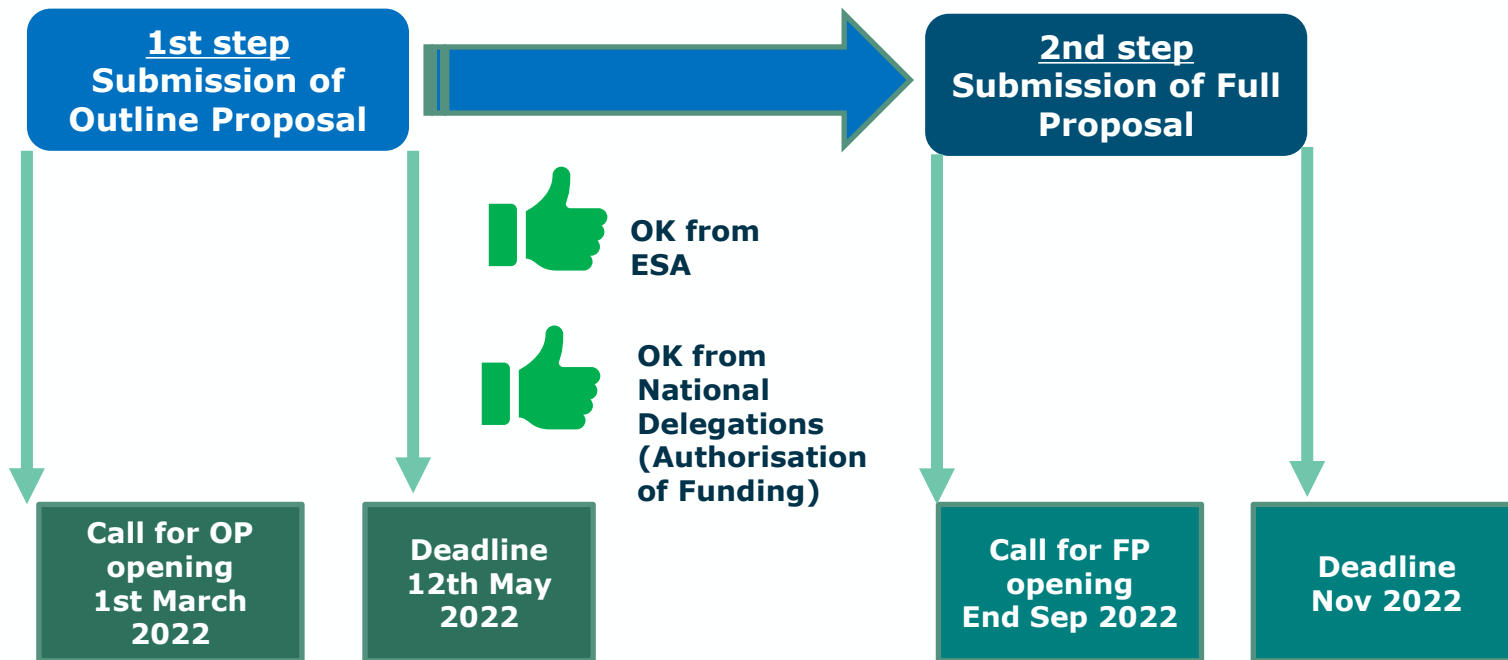
ELIGIBILITY

Funded participation to 4S Strategic Programme Line is open to any company and/or organisation residing in the following Member States:

Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Spain, Switzerland, and the United Kingdom

1. Registration (minimum 'light registration') on ESA-STAR Registration (https://esastar-emr.sso.esa.int)
2. Download the documentation associated to this Announcement of Opportunity [=> esa star ref]
3. Prepare your Outline Proposal using the template provided
4. Submit your Outline Proposal to ESA via web submission form and to your ESA National Delegation(s)*.
5. The Tenderers whose Outline Proposal is positively evaluated, will be invited by the Agency to prepare a Full Proposal.

- **Provide esa-star link:**
- **OP Submit**
- **Company Name***
- **Company Country***
  - Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Spain, Switzerland, and the United Kingdom
- **Contact Name***
- **Contact Email****
- **Title of your Outline Proposal**
- **ESA Opportunity**
  - 4S
- **OP Attachment***
  - One file only.
  - 10 MB limit.
- **Allowed types: pdf, doc, docx**

Submit

*The contacts of the National Delegations can be found at https://artes.esa.int/national-delegations

European Space Agency

1. Project summary and Rationale
   - Background, The team, experience and connections
   - Including participating entities to the demonstration trials
   - Service description, Space Assets

2. Business Plan
   - Customer segments
   - Value proposition, revenue streams
   - Key resources and dependencies, Key activities, Key partners
   - Cost structure, competitors

3. System and Implementation aspects
   - User requirements
   - System/ service architecture
   - Implementation approach, Starting point prior to start, risks

4. Financial, Management Administrative
   - Key activities, cost & duration, key resources, risks

Deadline: 12/05/2022 (TBC)

- There is a Template
- Be concise and factual
- Read the documentation!!

The bidder shall confirm that the Outline Proposal has been sent to the National Delegation.

Submit on web form

European Space Agency

→ Thank you for your attention

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Open Questions &

Answers Session

European Space Agency