

ARTES 4.0 Generic Programme Line Business Applications - Space Solutions

**“Space for Infrastructure – Energy”**

**THEMATIC CALL FOR PROPOSALS**

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## Table of ACRONYMS

AI	Artificial Intelligence
APQ	Activity Pitch Questionnaire
AoF	Authorisation of Funding
ARTES	Advanced Research in Telecommunications Systems
BASS	Business Applications and Space Solutions
DG	Director General
ESA	European Space Agency
FP	Full Proposal
IoT	Internet of Things
ML	Machine Learning
OP	Outline Proposal
OSIP	Open Space Innovation Platform
SME	Small and Medium sized Enterprise
TIA	Directorate of Telecommunications and Integrated Applications

## 1. OVERVIEW

This document presents an overview of the “Space for Infrastructure”, under the 2<sup>nd</sup> thematic area “Energy”, thematic call for proposals issued under the ARTES BASS, 5G and 4S programme lines. The call offers the opportunity to companies to bring forward their business propositions, which shall leverage on space and advanced digital technologies for delivering sustainable solutions.

## 2. BACKGROUND AND RATIONALE

Infrastructure underpins both national economies and citizens’ quality of life. It consists of the physical infrastructure needed, for example, to power homes and businesses, to supply the water that people need, but also includes the digital infrastructure needed to efficiently manage the transport of goods, exchange ideas, and stay in touch with family members and friends. Infrastructure networks account for a substantial proportion of both government and private sector investment, and given its scale, it is critical that such investment is deployed effectively.

A properly functioning and accessible infrastructure is vital for the sustainable economic development of each country. The facilities and services enabled by the infrastructure need to be available, accessible, inclusive, and beneficial to all. For example, providing dependable low-emission energy and distribution is required to achieve the net-zero targets, and it is widely recognised as being a key contributor to improving livelihoods and economic productivity. A secure and adequate energy supply is an indispensable condition for the society and provision of the services essential for production, communication, and exchange.

This specific scheme of work concerns the thematic area of “Energy”. Energy infrastructure refers to the physical structures and networks that are used to transport and store energy. This includes power plants, transmission lines, pipelines, energy storage facilities, and other related infrastructure.

These structures are essential for the efficient and reliable delivery of energy to consumers. The interconnection of geographically dispersed energy assets is a key requirement to sustain the uptake of renewable energy sources, such as wind and solar energy. The infrastructure must be designed, installed and operated in a way that is safe, dependable and efficient. It also must be able to manage the increasing and variable demand for energy and be able to adapt to changing energy sources and technologies. Satellite imagery can be used to monitor energy infrastructure, such as power lines, pipelines, and oil and gas wells. This can help to detect and prevent potential structural problems before they occur. Additionally, satellite-based sensors can be used to measure energy consumption in remote areas, allowing for more efficient energy management. Uncrewed solutions including robots and drones hold an enormous potential to improve efficiency and reduce human risks during installation and operation of (renewable) energy plants in remote areas, as well as during the decommissioning phase.

Safety and protection of critical energy infrastructure, including generation (power plant), transmission and distribution (e.g. energy networks, underwater offshore cables) assets has gained significant momentum and requires a combination of in-situ sensors and large-scale observation tools to ensure continuous and reliable monitoring.

### 3. OBJECTIVES OF THE CALL

The objectives of this specific subtheme are to:

- Support the infrastructure sector by stimulating the emergence of innovative space applications and services with high market potential, addressing the typical phases of infrastructure projects including planning, construction, operation and decommissioning/repurposing.
- Improve efficiency in the selected domains within the infrastructure sector through allowing lower costs, better capacity management, increased output while reducing environmental footprint.
- Increase the resilience of the infrastructure with more accurate resilience models and reducing the impact of disruptive events.

### 4. SPACE ASSETS

Satellite technologies and data have a significant role to play within prospective services:

- **Satellite Communications (SatCom)** enables the provision of ubiquitous connectivity to enhance the communication links, connectivity of IoT devices, support of remote locations. In addition, satellite communications can provide real-time, long-range communications with infrastructure monitoring systems (i.e. UAVs/robots) enabling remote operation and therefore a higher level of productivity. Moreover, satellite communications can be used to provide high-speed internet access to remote areas, video conferencing, and in general can be used to facilitate the sharing of information and to provide access to educational resources.
- **Global Navigation Satellite Systems (GNSS)** can be used to enable georeferencing of in-situ data, as well as navigation and tracking of vehicles, people and goods; PNT underpins a wide range of services. GNSS-based technologies can be used for time-stamping reference system information, ensuring the traceability of the data. For example, GNSS allows the tracking and navigation of uncrewed vehicles and can help enabling the automation of energy infrastructure maintenance through robotics or UAVs.
- **Satellite Earth Observation (satEO)** (including next-generation nano satellite and CubeSat networks) can be used for the monitoring of the status of the working sites, the planning, construction and maintenance of the infrastructure, collecting information on geographical and environmental parameters for the sustainability analysis, integration of environmental data; identification of patterns and trends that may be linked to infrastructure safety risks, and provide insights into how to best address them.
- **High-altitude platform systems (HAPS)** can provide an information layer complementing high-resolution in-situ monitoring and large-scale satellite Earth

Observation data. HAPS could also provide connectivity and sensors in remote locations.

- **Drones and other autonomous vehicles** can provide very high-resolution data for detailed analysis of specific areas of interest and for gathering information from areas at risk, e.g. industrial plants following an emergency.
- **Digital tools** such as artificial intelligence (AI) and digital twins offer significant opportunities to collect, process and better present data and enabling better grid management and intermodal integration.

## 5. SCOPE OF THE CALL

The proposals under this Call for Proposal shall address the energy infrastructure domain with innovative user-driven integrated downstream services which rely on advanced technologies and space data.

The Bidder shall involve in the project representatives from user communities, which shall take part in the pilot.

The Bidder shall either address the use cases included in the Annexes ([available on the website](#)) or address other use cases and requirements related to energy infrastructure provided by other customers / users directly involved by the Bidder. In the latter case, support of those potential customers shall be evidenced in letters of interest to be attached to the Outline Proposal.

The service provider shall be identified and possibly be part of the bidding team to ensure the commercial operational roll-out of the proposed service following completion of the project.

This Announcement of Opportunity covers two types of activities:

1. **Feasibility Studies**, which provide the preparatory framework to identify, analyse and define new potentially sustainable services.

The applications and/or services covered by the proposed Feasibility Studies have to:

- Be customer/user driven and present a strong sustainability potential.
- Propose a service demonstrating the benefits of the utilisation of integrated space assets .
- Include a viability analysis .
- Aim to evolve the targeted applications and services to marketability and operational roll-out, potentially through a Demonstration Project after successful completion of the feasibility study.
- Address at least one of the thematic areas described in section 3 or other(s) defined by the Bidder.
- The Bidder shall either address the use cases of one or more stakeholders involved by ESA and included in the annexes or address other use cases and requirements related to energy infrastructure provided by other customers / users directly involved by the Bidder. In the latter case, support of those potential customers shall be evidenced in letters of interest to be attached to

the Outline Proposal.

2. **Demonstration Projects**, dedicated to the implementation and demonstration of pre-operational services.

The applications and/or services covered by the proposed Demonstration Projects have to:

- Be customer/user driven (including user involvement and active participation in the project).
- Propose a service demonstrating the benefits from the utilisation of space assets with clear potential to become sustainable.
- Address at least one amongst the thematic areas described in section 3, covering one or more of the mentioned applications or other(s) defined by the Bidder.
- Provide a measurable socio-economic impact.
- The Bidder shall involve in the project representatives from users communities, which shall take part in the pilot.
- The Bidder shall either address the use cases of one or more stakeholders involved by ESA and included in Annex A or address other use cases and requirements related to energy infrastructure provided by other customers / users directly involved by the Bidder. In the latter case, support of those potential customers shall be evidenced in letters of interest to be attached to the Outline Proposal.

## 6. PROCUREMENT APPROACH

The proposals submitted in reply to the call shall be implemented in the context of ESA BASS, 5G and 4S programme lines of ARTES in coordination with National Delegations.

The Bidder shall submit first an Activity Pitch Questionnaire, and following evaluation, may be invited to submit the Outline and Full Proposal. The Activity Pitch Questionnaire (APQ) template provided by ESA shall be used. This is considered as entry point for companies to submit their idea, providing a simplified and single point of access to the ESA ARTES framework.

The price of activities carried out in a given State are charged against the contribution of that State in the programme. A letter of Authorisation of Funding (AoF) from the relevant National Delegation is therefore required as part of the Full Proposal. The Bidder is however advised to inform the relevant National Delegation(s) when submitting the Pitch. The coordinates of the National Delegates can be found here: <https://artes.esa.int/national-delegations>.

The Agency will admit for evaluation only (Outline and Full) proposals from a bidding team composed of a company and/or organisation - be it as Prime or Subcontractor - residing in any of those states that subscribe to the Programme under which you wish to submit your proposal:

- I. **for the ARTES 4.0 BASS Generic Programme Line - Component A: Business**

Applications. To date, Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Lithuania, Luxembourg, the Netherlands, Norway, Poland, Portugal, Romania, Slovenia, Sweden, Switzerland and the United Kingdom have subscribed.

- II. **for the ARTES 4.0 5G Strategic Programme Line:** Austria, Belgium, Finland, Germany, Greece, Hungary, Ireland, Italy, Luxemburg, Netherlands, Norway, Portugal, Romania, Spain, Sweden, Switzerland, the United Kingdom and Canada have subscribed.
- III. **for the ARTES 4.0 4S Strategic Programme Line:** Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxemburg, The Netherlands, Norway, Poland, Portugal, Romania, Spain, Switzerland, the United Kingdom and Canada have subscribed.

## 7. PROCESS AND SCHEDULE

It is planned for the call for proposals to be opened on 30<sup>th</sup> October 2023 until the 5<sup>th</sup> January 2024, 13:00 CET.

### 7.1. Timeline and Procedure

This thematic call's sub-theme is open for a period of 9 weeks, where the Bidders can respond by submission of Pitches. The timeline is illustrated below.

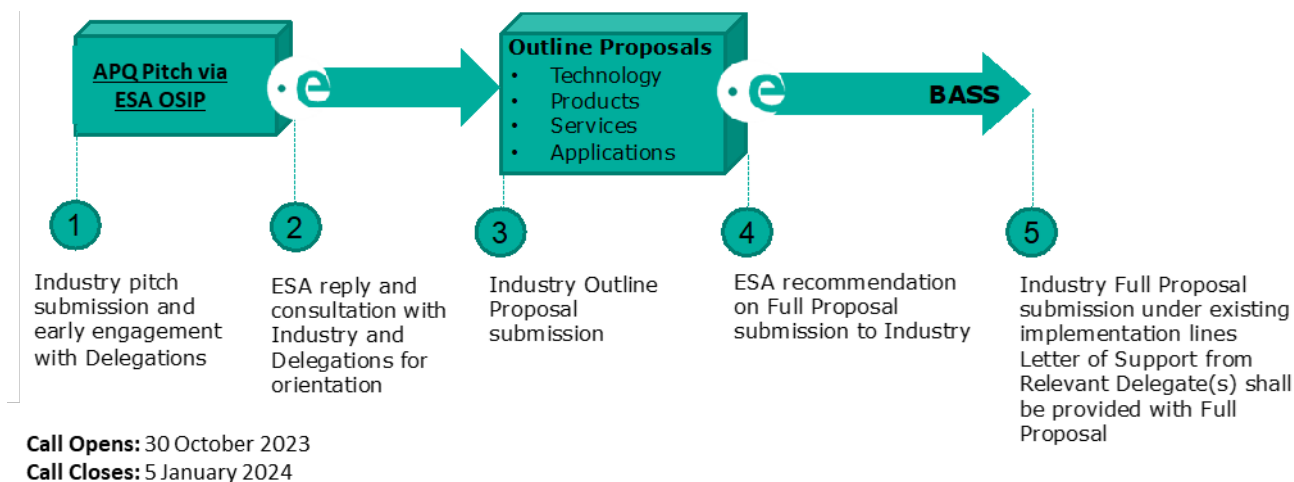


Figure 1: Procurement Approach and Timeline of the Thematic Call

The Call is planned to be implemented according to the following stepwise approach:

In **Step 1**, the interested Bidders are requested to submit their proposal(s) based on a short Pitch template made available by ESA that can be downloaded from the Thematic Call website. The pitch should provide the initial idea of what the Bidder would like to propose, elaborated on the basis of the thematic areas and either the use cases proposed by ESA's partners or others selected by the Bidder.



Should the bidder wish to cooperate with any of the listed partners in the annexes, they shall give to the Agency the authorisation to distribute the activity pitch questionnaire to these stakeholders by explicitly stating it in the Activity Pitch Questionnaire. Subject to such authorisation, the Agency will follow up distributing the APQ to the bidder's authorised stakeholder(s) and liaise with them to facilitate interactions with the Bidder.

The Bidder shall not contact any of the stakeholders listed in [annexes](#).

**The Bidder shall NOT involve any of the stakeholders mentioned in the annexes in the bidding consortium neither as subcontractor nor as external service (including consultancy).**

The completed Activity Pitch Questionnaire (APQ) shall be uploaded using the online web submitter, ESA's open space innovation platform (OSIP) in the channel named ["APQ for ARTES Downstream Business Applications"](#)

Multiple Pitches can be submitted.

It is strongly recommended that the interested Bidder liaises since the beginning with the relevant ESA Member States Delegates.

In **Step 2**, following an assessment of the Pitch by ESA, ESA will provide feedback to the company, aiming to provide a reply within 10 working days following the deadline for submission of the Pitch.

It is recognised that some interactions with the Bidder may be required and ESA may therefore consult with the Bidder and may offer support in providing further clarifications, aimed at better shaping the Outline Proposal(s). Dialogue sessions may be organised individually with potential partners prior to Step 3.

ESA might also consult when necessary, with the relevant National Delegation(s) for orientation and will provide key information (e.g. title, cost, price, subcontractor) to the relevant National Delegation(s).

Subject to a positive evaluation of the Pitch and the Bidder having informed the National Delegation(s), the Bidder will be notified by ESA and invited to submit an Outline Proposal.

In **Step 3**, the Bidder will submit the Outline Proposal, based on a template provided by ESA, with letter(s) of interest from users/stakeholders. The Outline Proposal is expanding the Pitch with a more extensive level of details. The outline proposal will be submitted on the OSIP platform under the channel ["Outline Proposal for ARTES Downstream Business Applications – Feasibility Studies/Demonstration Projects"](#).

In **Step 4**, subject to a positive assessment from ESA and in-principle support from the National Delegations, the Bidder will be invited to submit a Full Proposal on ESA-STAR in accordance with BASS programme line.

In **Step 5**, the Bidder will submit a Full Proposal with the Authorisation of Funding (AoF) from the relevant National Delegation(s). Following a positive assessment by ESA the proposed activity will be approved for implementation.

## 7.2. Evaluation Criteria

The evaluation process is non-competitive, as each proposal will be assessed individually

on its own merits, according to the evaluation criteria applicable for [CALL FOR PROPOSALS FOR DOWNSTREAM APPLICATIONS IN ARTES 4.0](#) (esa star ref.: 1-10494).

More information for the assessment of the APQ and outline proposal stages can be found on the OSIP page [“APQ for ARTES Downstream Business Applications”](#).

More information on the evaluation criteria for the final proposals can be found within the document “Appendix 1 to AO/1-10494/20/NL/CLP (Issue 2.2)” which can be found on ESA-STAR and the [activity webpage](#).

## 8. GENERAL CONDITIONS

The submissions and all correspondence relating to it shall be in English.

The tender shall not contain any Classified Information, whether in the Pitch, Outline Proposal or in the Full Proposal.

To avoid any confusion with Classified security markings, the unclassified protective marking used by the Tenderer in the proposal shall not contain the terms: "Restricted", "Confidential", or "Secret".

However, should the Tenderer consider necessary to include Classified Information in the tender, the Tenderer shall inform beforehand the ESA Security Officer.

The Tenderers are informed that Classified Information can be shared with ESA only in compliance with the Project Security Instruction (PSI) duly established by the Agency beforehand and subject to the approval by the ESA Member States.

The Agency will treat commercially sensitive or proprietary information confidentially and solely for the purpose of the assessment of the response.

Expenses incurred in the preparation and dispatch of the response to the announcement will not be reimbursed. This includes any expenses connected with a potential dialogue phase.

The announcement does not bind the Agency in any way to place a contract. The Agency reserves the right to issue amendments to the announcement.