

ARTES 4.0 Generic Programme Line Business Applications - Space Solutions

**“Space for Infrastructure – Water Management”**

**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

## 1. OVERVIEW

This document presents an overview of the “Space for Infrastructure”, under the 4th thematic area “Water Management”, 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.

This specific scheme of work concerns the thematic area of “Water Management”. Water management infrastructure refers to the physical structures and networks that are used not just for the distribution of water but also for waste management (i.e. sewage). Water is key to sustaining life on Earth and the distribution of it is a mandatory part of modern society. Waste management regards the collection and treatment of sewage. Not only does this increase the standard of living but also increases hygiene levels by almost eliminating the presence of waterborne diseases.

With water security coming under threat in many countries, water infrastructure operators are increasing their investment to secure their future water supply. Use cases that may be addressed include, for example, the estimation of future water usage, where, by predicting future demand, water authorities will be able to better plan the future infrastructure production needs, which will also improve the efficiency of water usage; increase the efficiencies in water treatments including for example wastewater infrastructure monitoring; preventive infrastructure maintenance to increase the grid capacity and allow for a more efficient system; support better informed water policy creation and information policy decisions and monitor water grid security and threats to infrastructure.

## 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 technology and data have a significant part to play in the development of potential services:

Satellite Communications (SatCom) enables the provision of ubiquitous connectivity to enhance the communication links, connectivity of IoT devices and support for remote locations. In addition, satellite communications can provide real-time, long-range communications with infrastructure monitoring systems (i.e. UAVs/robots/remote assets). Example applications include and are not limited to:

- Enabling real-time monitoring of water usage and can alert agencies to spikes in demand.
- Promotion of digital twin technologies
- Provision of warnings to both supplier and consumer to reduce water usage.
- Providing ubiquitous connectivity when the terrestrial network is not available. (i.e. disaster situations)
- By providing real-time communications and IoT, it can provide real-time data to grid managers, clearly showing where leaks are occurring.
- Real-time, long range communications with drones/UAVs used for monitoring.
- Promotion of integration of digital technologies and SatCom for grid security, monitoring security and water reserve levels.

Global Navigation Satellite Systems (GNSS) can be used to enable geo-referencing of in-situ data, as well as navigation and tracking (PNT) of vehicles, people and goods. 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 facilitate the automation of infrastructure maintenance through robotics or UAVs. Example applications include and are not limited to:

- Navigation of autonomous infrastructure maintenance vehicles. E.g. Drones/robots
- Geo-fencing assets of water/waste assets
- Maintenance data validation, ensuring traceability of the data.
- Provide advanced GIS for spatial information management, including utilization of SatEO data to monitor risk.

Satellite Earth Observation (satEO) (including next-generation nano-satellite and CubeSat networks) can be used in multiple ways including:

- Monitoring of the natural and environmental parameters, including pollution levels.
- Monitoring of installed infrastructure (dams, reservoirs, pipes, etc...)
- Monitoring of agricultural lands ensuring resilience against flood and drought
- Identification of patterns and trends that may be linked to infrastructure safety risks, and insights into how to best address them.
- Show small and large ground movements and how that will effect underground water infrastructure.
- Provide imagery enabling services such as mapping, risk detection, and situational awareness for policy enforcement issues.

## 5. SCOPE OF THE CALL

The proposals under this Call for Proposal shall address the water management 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 water management 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 thematic call for proposals 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 water management 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 water management 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 5<sup>th</sup> April 2024 until the 29<sup>th</sup> May 2024, 13:00 CET.

### 7.1. Timeline and Procedure

This thematic call’s sub-theme is open for a period of 8 weeks, where the Bidders can respond by submission of Pitches. The timeline is illustrated below.

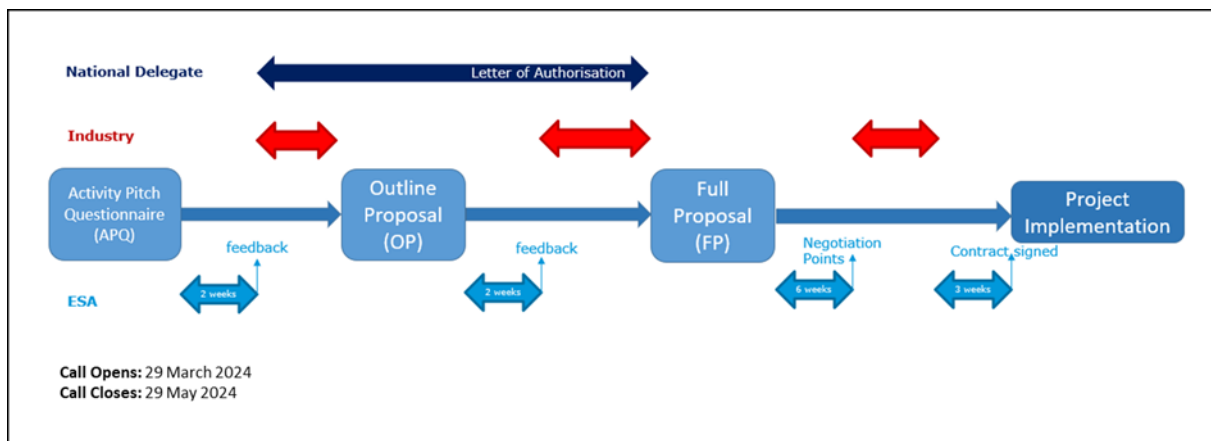


Figure 1: Procurement Approach and Timeline of the Thematic Call

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 with different ideas 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 submission or the deadline for submission of the Pitch (whichever comes first).

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.