“DIGITISING WATER RESILIENCE - ACTING ON WATER STRESS IN BASINS” THEMATIC CALL

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1. INTRODUCTION

This document presents an overview of the Thematic Call “Digitising Water Resilience - Acting on Water Stress in Basins” issued under the ARTES BASS, 4S and 5G Programme lines.

2. BACKGROUND AND RATIONALE

The world’s 100 most-populated river basins are indispensable resources for billions of people, companies, farms, and ecosystems[1]. But over the next decade, the world will experience a 56 percent shortfall in freshwater supply[2]. Climate change is greatly exacerbating this water crisis; unless urgent action is taken, severe impacts – like intensified floods and prolonged droughts – will only worsen in the coming years. ESA has partnered with the CEO Water Mandate and 30+ members of the Water Resilience Coalition (WRC) to address the global water crisis in its three dimensions: availability, quality, and accessibility.

3. OBJECTIVES OF THE THEMATIC CALL

The intended Thematic Call aims at supporting new space-based services that improve the status of water-stressed basins by digitising, monitoring, and acting on water resilience.

The main objectives of the call are to:

- Catalyse the ability to digitally identify current sources of water stress (availability, quality, accessibility)
- Digitally monitor the progress of water basin health towards water resilience
- Enable companies to digitally monitor the impact of their commitments and investments into net positive impact on water access, availability, and quality, relative to their footprints, within all water-stressed basins where they operate

[1] https://www.wri.org/insights/worlds-18-most-water-stressed-rivers
[2] CEO Water Mandate: https://ceowatermandate.org/resilience/

- Provide transparency and accountability on the actions companies are taking, together with water basin stakeholders, to reduce water stress and build resilience, to achieve sustainable development goal 6: universal access to safely managed water and sanitation; improved water quality; and more efficient water use.

4. TOPICS OF INTEREST

Two key topics of interest have been identified.

4.1. Improving Water Sustainability in Businesses

Every part of society relies on water in some way. We use freshwater in agriculture (which accounts for 70 percent of the withdrawals), industry (19 percent), and households (11 percent). These percentages vary widely across the globe. A company's water footprint can be seen in key areas of its value chain: raw materials, suppliers, direct operations, and product use. Therefore, businesses can play a leading role in mitigating water issues by innovating in three spheres of influence: direct operations, supply chain, and wider basin health. Proposed studies should aim to develop services that relate to water sustainability in these three spheres, helping business to reduce their water footprint, improve resource efficiency and achieve net positive water impact targets.

4.2. Digitising Water Basins to Monitor and Act on Water Resilience

There is a clear demand for digitisation and best-in-class monitoring technologies to provide the assessment of current water basin health, and continuous monitoring of the impacts of interventions. Users and customers need tools to measure the impact of water resilience solutions to guide decision making for future investments. To digitise water basins, several challenges must be overcome.

Current data on basins can be:

- Incomplete, with limited datasets
- Inconsistent, with different data being collected at basins
- Dispersed, with data scattered across multiple platforms, and

- Outdated, with databases needing the next generation of information to assess water resilience.

Bidders applying for this opportunity should therefore:

i. Use space and digital technologies to visualise the current baseline of water stress at priority basins.
ii. Identify large-scale monitoring solutions for the future. Prospective solutions could involve innovative technologies such as high-altitude platform systems (HAPS) and internet of things (IoT) satcom constellations. These new efforts could be supported by public-private partnership models.
iii. Establish a mid-to-long-term roadmap for the solution roll-out and future technology evolution.
iv. Develop a 'proof of concept' to ensure technical validity.
v. Seek to resolve water sustainability issues in businesses by planning and executing changes in their value chains.

Ultimately, bidding teams should endeavour to have an innovative service that effectively monitors, evaluates, and enables action on water resilience information across 100+ basins by 2030.

5. SPACE ASSETS

Improving the status water-stressed basins is no mean feat. Large-scale solutions are needed to accomplish this goal and progress conventional water and wastewater systems into instrumented, interconnected, and intelligent systems.

Satellite technologies and data have an important role to play within prospective services:

- Satellite Communications (satcom) can connect data being captured in basins to decision-makers more efficiently (IoT). Additionally, satcom can be used as a means for primary or back-up communications in Beyond Visual Line of Sight (BVLOS) autonomous vehicle operations.

- Satellite Earth Observation data (including next generation nano satellite and cubesat networks) to support basin diagnostics and monitor progress on water security and resilience in basins
- Satellite Navigation can be used to enable geo-referencing of in-situ data, as well as navigation and tracking of autonomous vehicles
- High-altitude platform systems (HAPS) can provide an information layer complementing high resolution in-situ monitoring and large-scale satellite Earth Observation data. The integration of these data sets would eventually offer a complete, accurate and unified picture of water basin conditions. HAPS could also provide connectivity for connected autonomous vehicles (including command and control links, broadband payload data communications and inter-vehicle links to swarms of unmanned vehicles) and sensors in remote locations.

In addition to space assets other innovative technologies can be used if relevant to the identified use cases. These could include:

- Drones and other autonomous vehicles, such as unmanned surface and underwater vehicles, which could be equipped with bespoke water monitoring payloads to provide very high-resolution data for detailed analysis of specific areas of interest.
- Artificial intelligence (AI) and digital twins, which could offer significant opportunities to collect, process and better present data, helping to improve water quantity and quality, as well as water sanitation, hygiene, and access systems.

6. SCOPE OF THE THEMATIC CALL

This Thematic Call will support Feasibility Studies.

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

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

- 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 4 or other(s) defined by the Bidder.

Feasibility Studies should start in 2023 and run for one year. During this period, bidding teams can work alongside the CEO Water Mandate and members of the Water Resilience Coalition (WRC) to:

- Gather and align water resilience-specific needs and requirements with best-in-class digital technologies to refine system designs.
- Build digital technology capabilities for water resilience monitoring - including next generation indicators of water stress, climate impact and progress towards water resilience - into monitoring designs and services.
- Test digitised water resilience monitoring solutions in two priority basins starting in 2023
- Create a roadmap for the roll out of future large-scale digital water resilience monitoring services, with multinational corporations and international organisations.
- Access additional expertise from WRC water resilience experts and member companies - and potentially additional opportunities for support via corporate open innovation platforms. A full list of WRC members is available here: https://ceowatermandate.org/resilience/
- Link to the Water Action Hub to access a broader global network of potential partners and collaborators on water sustainability and climate resilience: https://wateractionhub.org

Once feasibility studies have been completed, teams will have the opportunity to progress to the scale up phase: implementing water resilience monitoring services and trialling them

across multiple water stressed basins (Demonstration Project). Note: The scale-up / Demonstration phase is outside the scope of this call, but the intention is for teams to run demonstration projects to prove that they can operate their service at scale across several basins.

Ultimately, teams should endeavour to have an innovative service that effectively monitors, evaluates, and enables action on water resilience information across 100+ basins by 2030.

Please see the Figure 1 (below) for more information. Step One falls under the scope of this Thematic Call. Steps Two and Three are beyond the scope of this Thematic Call but show the long-term vision.

Figure 1. This Thematic Call is part of a long-term plan to roll out digital water resilience monitoring services that improve the status of 100 priority water-stressed basins by 2030. This Thematic Call Covers Step One. Step Two and Step 3 are beyond the scope of this Thematic Call.

The specific scope of the activities presented in response to this Thematic Call “Digitising Water Resilience - Acting on Water Stress in Basins” should be defined by the Tenderer, but must:

1. be in line with the objectives set forth in Section 3
2. address one or more of the topics identified in Section 4
3. be instrumental to pursue in an effective and sustainable manner the objectives of BASS Programme as outlined in section 1.

The Bidder should engage with and involve relevant user communities and potential customers. Support from these potential users and customers should be evidenced in letters of interest to be attached to the Outline Proposal. Users/potential customers outside of Europe can be proposed.

7. PROCUREMENT APPROACH

To apply for this opportunity, the Bidding Team should prepare a Video Pitch and Pitch Form via the ‘How to Apply’ section on this webpage: https://business.esa.int/funding/invitation-to-tender/digitising-water-resilience-acting-water-stress-basins.

Following evaluation of the pitch, the Bidding Team may be invited to submit the Outline and Full Proposal.

The price of activities carried out in each 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 Video Pitch and Pitch Form.

The proposals submitted in reply to the Thematic Call shall be implemented in the context of ESA BASS GPL or the 4S SPL or the 5G SPL of ARTES: Tenderers may indicate in the cover letter of their proposal which Programme Line they address and justify this preference. Further information is included in the Letter of Invitation of the Standard Call for Proposal AO/1-10494, to which frame this Thematic Call refers.

The Agency will admit for evaluation only proposals from a bidding team composed of an economic operator - being a Prime or Subcontractor - residing in any of those States that have subscribed to BASS, 4S SPL or 5G SPL, as specified in the procurement rules of the CALL FOR PROPOSALS FOR DOWNSTREAM APPLICATIONS IN ARTES 4.0 (esa star ref.: 1-10494). The coordinates of the National Delegates can be found here: https://artes.esa.int/national-delegations.

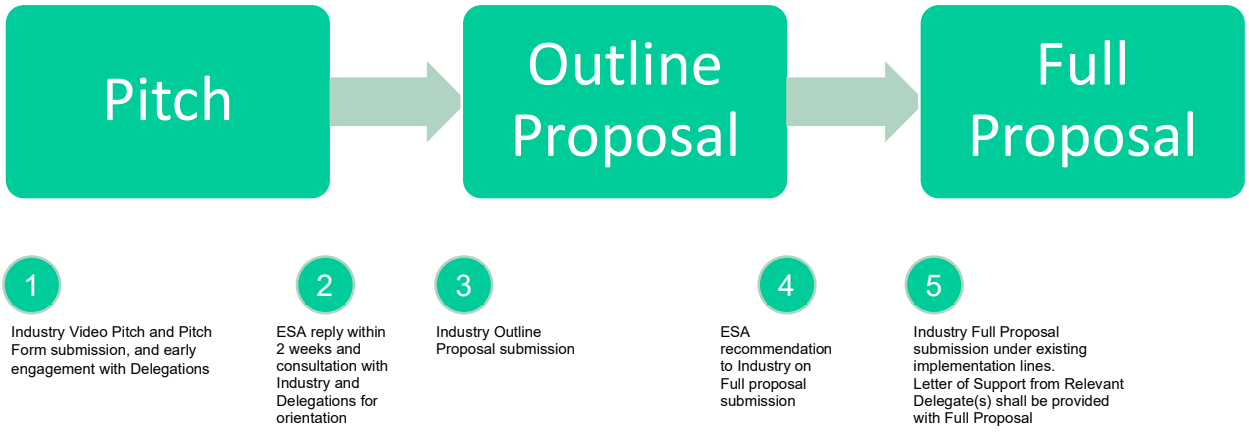
8. PROCESS AND SCHEDULE

It is planned for the Thematic Call to be opened on 01 November 2022 until 31 March 2023.

8.1. Timeline and Procedure

The Thematic Call will include support Feasibility Studies.
The Thematic Call is open from 01 November 2022 for a period of 5 months, where Tenderers can respond by submitting a Video Pitch and Pitch Form anytime.

The timeline is illustrated below



The Thematic Call is planned to be implemented according to the following stepwise approach: In **Step 1**, the interested Bidders are requested to submit a Video Pitch and Pitch form via the Thematic Call website (https://business.esa.int/funding/invitation-to-tender/digitising-water-

resilience-acting-water-stress-basins). The pitch should describe the key aspects of the idea. The Bidder can opt in or out of sharing the Video Pitch and Pitch form with CEO Water Mandate and WRC member companies.

It is strongly recommended that the interested Bidder liaises with the relevant National Delegate at this stage. Contact details of the National Delegates can be found here: https://business.esa.int/national-delegations

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. 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.

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 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.

8.2. 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).

8.3. 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 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 Thematic Call will not be reimbursed. This includes any expenses connected with a potential dialogue phase.
- The Thematic Call does not bind the Agency in any way to place a contract. The Agency reserves the right to issue amendments to the Thematic Call.