Engineer Research and Development Center

Civil Works Strategic Focus Areas
Commercial Solutions Openings (CSO)
Solicitation Number: W912HZ23SC001

SECTION A: INTRODUCTION

The Engineer Research and Development Center (ERDC) is issuing a Commercial Solutions Opening (CSO) authorized by the Department of Defense (DoD) Class Deviation 2022-O0007. Under a CSO, the ERDC may competitively award proposals received in response to a general solicitation, similar to a Broad Agency Announcement (BAA), to acquire innovative commercial products, technologies, or services based on a review of solutions by scientific, technological, or other subject matter expert peers within the ERDC. Under this CSO, all products, technologies, and services shall be treated as commercial items; products, technologies, and services do not have to be "commercially available" to be submitted in response to this solicitation. If the solution meets the requirements of the regulation, the solution is *treated* as commercial whereby the Contracting Officer will utilize commercial procedures to develop and execute the resultant award.

This CSO contains broadly defined Strategic Focus Areas, however more specific individual program requirements may be amended in the future. The Strategic Focus Areas are intentionally broad in nature, generally have no known funding specifically available, and will be posted under this CSO on an open-continuous basis for one (1) year from the date of original posting. Any specific individual program requirements that are posted under the authority of this CSO, will describe the desired end result, offer additional context for the needs that seek solutions, provide a funding profile, and will stipulate a specific due date for solutions.

The USACE, and its Civil Works mission areas of commercial navigation, flood and coastal storm risk management, and aquatic ecosystem restoration, will play an essential role in energizing the US economy as we recover from recent crises and prepare for the future challenges facing our Nation. Investments in Civil Works are critical in generating near- and long-term benefits for securing our communities, supporting and growing our economy, creating jobs, and enhancing broader societal impacts such as improved public health, National security, recreation and tourism.

The ERDC executes research and development (R&D) projects on behalf of the Assistant Secretary of the Army for Civil Works, US Army Corps of Engineers, and various other government organizations. These R&D projects align with the following USACE Civil Works Strategic Focus Areas:

- Infrastructure: Building Smarter, Longer Lasting Infrastructure
- Ecosystems: Measuring, Predicting, and Managing Species and Ecosystem Restoration Activities
- Sediment Management: Maximizing Beneficial Use of Sediments
- Water Modeling: Effectively and Efficiently Managing Water Before, During, and After it Hits the Ground
- Crisis Mitigation: Proactively Saving Lives and Communities
- AI, Robotics and Data: Leveraging Robotics, Artificial Intelligence, and Data as a Force Multiplier

The ERDC seeks to obtain innovative solutions that progress research and development efforts or advance civil works science and engineering capabilities. Solutions may include existing technologies or procedures that are not currently in use that would enhance or streamline mission capabilities. Solutions

should support the vision for technology and innovation in each strategic focus area and provide high impact across the Corps of Engineers Civil Works mission areas including: Flood Risk Management, Inland and Coastal Navigation, and Aquatic Ecosystem Restoration.

This request for solution briefs is a two-step project announcement:

Step 1: This announcement is being issued to solicit solution briefs ONLY. The purpose of the solution brief submissions is to identify potential partners that may have promising solutions relative to the Strategic Focus Areas specified herein. An offeror that describes a promising solution may be asked questions regarding their solution via email or requested to virtually attend a solution pitch with the Government project team. The Government reserves the right to move straight to Request for Proposal (RFP) based on solution brief only. Further, an offeror's inability to accept an invitation to provide a solution pitch does not preclude them from receiving an RFP.

Step 2: If a solution is selected and funding is available, the Government will issue an RFP. If a solution is selected and funding is not available, the Government may request that the solution be maintained in the electronic library for consideration and subsequent funding availability up to three years after submission. If a solution is not selected, the offeror will be notified generally within 30 days of submission.

SECTION B: SOLUTION BRIEF PREPARATION AND SUBMISSION

NOTE: The Government reserves the right to not select a solution if it omits any of the required information below.

DO NOT INCLUDE CLASSIFIED OR PROPRIETARY INFORMATION

1. **GENERAL FORMATTING REQUIREMENTS:** Solution briefs shall be **no more than three pages** and submitted electronically. All submissions must be clear, legible, and conform to the following general formatting guidelines:
    - Paper: Pages shall be 8.5 x 11 inches, single sided, with each page numbered "X of Y pages."
    - Margins: Minimum of 1 inch on all sides.
    - Type Font: 12 point Times New Roman, single spaced.
    - Acronyms: Spell out all acronyms the first time they are used. One page of the proposal body is allocated to spell out acronyms, abbreviations and symbols.
    - Language: English.
    - Electronic file format: PDF, compatible with current Adobe Acrobat Reader. File size less than 20 MB.

2. **TECHNICAL REQUIREMENTS**:
    - Proposed solution and mission impact
    - Overview of the concept in alignment with one of the Strategic Focus Areas. The proposed solution shall not simply repeat the Strategic Focus Area but rather provide convincing evidence that the proposed solution or potential capability fulfill a Government requirement, close capability gaps, or provide technological advancements. The following examples of convincing evidence are strongly encouraged –

- Authentic company URL or web address. Note: The Government may elect to use the information provided as part of its continuous market research. However, the government is not obligated to use the URL or web address as part of its evaluation process to determine the Selectee or Awardee.
- Summary of product commercialization currently used in the open market.
- Pictures, diagrams, models, or figures to depict the essence of the proposed solution.

- Describe how the proposed solution is "innovative" and the feasibility of the solution solving an agency challenge, including examples demonstrating possible application of the proposed innovation or existing use of the solution in the commercial marketplace.

  "Innovative" is defined as any technology, process, or method, including research and development, that is new as of the date of submission of a proposal, or any application that is new as of the date of submission of a proposal of a technology, process, or method existing as of such date.

3. **ROUGH ORDER MAGNITUDE (ROM)** – Estimated price ONLY. Further details will be requested for full proposal if selected.

4. **SUBMISSION**

   SAM Registration: It is critical that offerors are registered in the System for Award Management (SAM), https://sam.gov/ ; offerors will not be eligible for an award if not registered in SAM. Additionally, entities are required to be registered to receive contracts (not just grants) and the address from the solution must match the registration information in SAM.

   For a solution to be evaluated for possible selection, it must be submitted via the electronic form; submissions will be accepted through **5PM EST, 22 May 2024** A hardcopy will not be accepted. Offerors may submit solution amendments any time prior to the deadline.

   When a submission is made, a confirmation email will be sent by the ERDCWERX portal to the email address supplied in the submission form.

   Please ensure that the email address listed in your proposal is current and accurate. Please contact us by emailing info@erdcwerx.org to share details of changed email address and/or company points of contact after proposal submission.

   Due to the large amount of expected interest in this CSO, and to maintain a written record of questions, the ERDC will be accepting individual questions through the ERDCWERX portal by using their Question Submission Form. The questions and answers will be published and regularly updated on the ERDCWERX Frequently Asked Questions (FAQ) page.

5. **SELECTION**

   Solutions received in response to this announcement will be selected based upon an initial review of how innovative and feasible the solution is at solving an agency challenge, the potential to enhance the mission effectiveness of the agency, and funding availability.

   If a solution is selected and funding is available, an RFP will be issued by the Contracting Officer, which shall include a request for further details or documents prior to award (i.e., contractor self-developed Performance Work Statement (PWS) or Scope of Work (SOW), delivery details… etc.). A PWS is similar to a Service Level Agreement (SLA) used in the commercial marketplace. The PWS shall detail the proposed work to be completed during the period of performance, deliverables, etc. As many solutions will likely be performed/provided at military installations, the Government will provide the applicable security requirements to be included in any award. As appropriate, the

Government may engage in a collaborative process to develop the PWS/SOW, deliverables, data rights, and necessary terms and conditions for the award.

The government reserves the right to select none of the submissions.

SECTION C: PROPOSAL EVALUATION

Proposals received in response to an RFP will be evaluated in accordance with the following evaluation criteria by scientific, technological, and/or other subject matter experts:

- **Technical requirements** will assess how innovative the solution is (as defined in this announcement) and the feasibility of the solution solving the agency's challenges.
- **Importance to agency programs** will assess the solution's potential to enhance the mission effectiveness of the agency.
- **Funds availability** will assess the availability of funding to procure the solution.

Price Reasonableness Determination: Price shall be considered to the extent appropriate, but at a minimum, the Contracting Officer will use market research as the primary method to determine that the price is fair and reasonable. The Government may elect to use external market research in the evaluation of the proposal. The ERDC must determine the price fair and reasonable prior to award using the procedures at DFARS subpart 212.209. In some circumstances, the Contracting Officer may request information from the offeror regarding recent purchase prices paid by the Government and/or commercial customers for the same or similar commercial items.

SECTION D: AWARD

All resultant contracts will be firm-fixed price. All items, technologies, and services (including research and development) procured via this CSO are treated as commercial. ERDC is conducting this CSO on a full and open basis and intends to award contracts in accordance with FAR part 12 and the FAR part that is deemed most appropriate for the solution proposed (i.e., FAR part 13, 15, and/or 35).

FAR / DFAR clauses will be integrated into contracts on a case-by-case basis based on proposed scope.

Additional terms and conditions may be required as circumstances necessitate; examples of such would be data rights, security, R&D, educational institutions, etc.

The government does not plan to engage in the debrief process outlined in FAR part 15 but will provide feedback to unsuccessful offerors as appropriate and at its discretion.

Award may be made using any appropriate vehicle (e.g., FAR-based contracts and Other Transactions) in accordance with applicable authorities that are effective at the time of the award.

SECTION E: STRATEGIC FOCUS AREAS

Note: The Strategic Focus Areas and Specific Individual Program Requirements are subject to change at any time during the open continuous period. Revisions or additions may be made on an as needed basis.

This Civil Works R&D area proposes the development of a strategic program focused on addressing the Corps' unique grand challenges while requiring significant innovation in six focus areas that integrate advancements in the Corps' Civil Works mission. Strategic Focus Areas (SFAs) are long-range priorities that are identified and adopted by USACE leadership as priorities for innovation and solutions to big problems impacting USACE Civil Works Mission delivery. These SFAs are identified as major science and technology areas requiring attention and investment. The following provides a synopsis of the technical thrusts within each SFA.

Infrastructure – NextGen Water Resources Infrastructure

The NextGen Water Resources Infrastructure strategic focus area is driven by provisions in recent Water Resources Development Acts (WRDAs) on innovative materials, corrosion prevention, modeling technologies, and resilience that are not addressed in the current Civil Works R&D programs. Results are essential in addressing USACE asset management challenges with its existing inventory of aging infrastructure and ensuring improved reliability and resilience of new infrastructure. Targeted strategic capabilities for this focus area are:

- Robust and Quantitative Understanding of Existing Conditions: advanced Non-Destructive Evaluation (NDE) methods, geophysical characterization, aging processes and synergies, health monitoring systems, advanced digital twins, and related modeling and analysis
- Risk Quantification and Decision-Support: asset monitoring for reliability-centered maintenance, infrastructure technology transition and guidance modernization
- Technologies for Resilience and Reliability: advanced materials, repair and retrofit methods, innovative design and construction approaches, modernizing aging infrastructure with green materials and autonomous operations / control capabilities, automated QA/QC tools, and in-situ robotic repair technologies
- Infrastructure Performance Forecasting: cross cutting S&T for improved risk quantification and forecasting, advanced decision support for asset management, and risk communication tools for Planning, Engineering and Design (PED), Construction, and Operations & Maintenance (O&M)

Water Modeling - Comprehensive Water Risk Management

Comprehensive Water Risk Management will bridge knowledge gaps between weather, water systems, and their impacts with a continental-scale capability to manage hydro-terrestrial risk. Quantifying the hydro-terrestrial system is not only key to flood risk reduction but is required for efficient and effective execution of the navigation and environmental missions of the Corps, and to understand the impacts on social and environmental justice. The purpose of this program is to discover, develop, and deliver a framework to improve our understanding and prediction of the risks associated with multi-hazard scenarios. This comprehensive data-simulation framework must be coordinated across Government agencies and will be complimentary to the Corps Water Management System, covering a broader range of processes, geography, and time frames to streamline analyses and reduce uncertainties, including assessment on social, environmental, and economic benefits. Targeted strategic capabilities for this focus area are:

- Integrated Earth Observations: remote and in situ sensing of atmospheric, ocean and land surface data assimilated in real time, and continuous assimilation of data for model validation
- Risk-Informed Decision Support: efficient ensemble approaches to quantify uncertainty, hazard assessment tools for risk-based project design and operation over seasonal projections, including Forecast Informed Reservoir Operations and National Storm Hazards Database
- National Simulation Framework: Real-time High-Resolution National hydro-terrestrial simulation framework for community resilience, including a common operating framework to evaluate comprehensive flood hazards, providing a driver for sediment, ecosystem infrastructure, and crisis assessments
- Support for Social Benefits and Environmental Justice: assessment of alternatives to mitigate adverse societal impacts from water hazards, and quantification of environmental justice benefits over seasonal projections

Sediment Management - Innovation in Sediment Management

Innovation in Sediment Management is focused on technology discovery, development, and delivery at field-scale of innovative solutions for efficiently and sustainably managing sediment. Solutions to be developed include modeling and simulation focused on integrated tools to forecast life-cycle dynamics of sediment systems, mapping and modeling tools to identify and focus pollutant management at upstream sources, development of novel approaches for beneficial use, next-generation dredging and construction technologies that make use of autonomous systems, and advanced near-real-time modeling and sensing capabilities to support SMART (Specific, Measurable, Attainable, Risk Informed, Timely) planning and efficient operations. Targeted strategic capabilities for this focus area are:

- Public-Private Partnerships For Dredging Innovation and Agency Conservation
- Sustainable Sediment Engineering, Operations and Management
- Innovative and Leap-Ahead Construction and Operations Technologies
- Engineering With Nature® Solutions for Multi-Purpose Value, including engineering guidance for Natural and Nature-Based Infrastructure and best practices for sustainable management
- Next Generation Dredging: sensors for onsite and remote monitoring of dredging processes, including a national physical modeling facility to test new construction and nature-based solutions and optimize dredging and placement operations

Ecosystems - Sustainable Species Management

Invasive and nuisance species, along with threatened and endangered (T&E) species, represent a significant challenge to our nation's resources and economy. This focus area provides the USACE with strategic technologies to prevent, detect, and manage sustainable species with the long- term goal of rapid reduction of Invasive and Nuisance Species (INS, e.g., Asian carp, Harmful Algal Blooms) and enhanced recovery of Threatened and Endangered (T&E) species (e.g., sturgeon) for ecosystem restoration. Targeted strategic capabilities for this focus area are:

- Detection and Sensing invasive and T&E Species: innovative sensors and advanced monitoring of species movement, including unmanned species detection, real time monitoring; quantifying species movement; and identifying and responding to recovery plans

- Prevent Introduction and Spread of invasive species: accurately evaluating ecosystem function and sustainability, understanding species response to ecosystem conditions, pin-pointing ecosystem vulnerability and the potential for T&E species habitat, and rapidly improving predictions, reduce uncertainty, prevent new introductions through next-generation ecological modeling
- Management to Increase USACE Mission Readiness: rapid biological, chemical, mechanical, and physical control technology; advanced tools for rapid sustainable species; establishment of best management practices; all to rapidly evaluate treatment alternatives and trade-offs, including issues such as invasive carp and Harmful Algal Blooms

Crisis Mitigation - Crisis Mitigation, Response, and Recovery

Crisis Mitigation Response and Recovery will develop technologies that enable USACE to sustain infrastructure performance and operations through combinations of known and unknown pressures and events in order to enhance the long-term resilience of our systems. The effort will focus on developing modeling and analytics to forecast infrastructure response that will enable "war-gaming" performance, recovery, and resilience under diverse events along with rapid data collection and decision support tools for USACE and interagency mission requirements. Targeted strategic capabilities for this focus area are:

- Communication and Response Technologies: tools and approaches for advanced real-time risk communication and dissemination, logistics for materiel solutions and transportation networks
- Multi-Hazard Crisis Modeling Capabilities: advanced multi-hazard modeling tools that provide broad and quantitative impacts beyond project scale including infrastructure, environment, and socio-cultural issues, e.g., Post-Wildfire Risk Management; and war-gaming complex scenarios
- Advanced Reconnaissance Technologies: unmanned and autonomous systems for reconnaissance and advanced data collection systems linked to geospatial tools and enterprise and interagency databases
- Risk Science and Decision Support: integration of data and models for robust data-driven optimized decision support tools, including engineering to support public health and integration of equity, social factors and economics

AI, Robotics and Data - Innovative Applications of Big Data, Artificial Intelligence, and Autonomy

Technologies will be developed to fully utilize data science and advanced computing techniques to address Civil Works challenges. Solutions include the use of Artificial Intelligence and Machine Learning (AI/ML) capabilities, computing on the edge, and high-performance computing to incorporate data analytics into operational decisions across the Corps. This focus area will enable USACE with cross-cutting data science tools for data engineering, data analysis, and data visualization that will support the other five strategic focus areas. Targeted strategic capabilities for this focus area are:

- Sensor Integration and Big Data Discovery: automated data collection, harvesting and mining from sensors and systems; assimilating structured and unstructured data
- Model Integration Framework: Modelling framework to link and integrate disparate models, automated approaches for digital twin initialization, calibration, and validation
- Tradespace Analytics and Design: Trade-space analytics for design and operational optimization to allow for comparisons for alternatives, automated approaches to streamline computational tools for end users to significantly improve efficiency and provide a simplified user interface

- Rapid High-Fidelity Decision-Support: Develop reduced order models from high fidelity models to provide results at a fraction of computation time, AI infused algorithms for forecasting and decision support, including advanced cyber threat protection and operational technology