

# Engineer Research and Development Center

Construction Engineering Research Laboratory

Commercial Solutions Openings (CSO)

Solicitation Number: W9132T24SC001

## SECTION A: Introduction

The Engineer Research and Development Center (ERDC), Construction Engineering Research Laboratory (CERL) is issuing a Commercial Solutions Opening (CSO) pursuant to DFARS 212.70. Under a CSO, the ERDC-CERL may competitively award proposals received in response to a general solicitation, similar to a Broad Agency Announcement (BAA), to acquire innovative commercial items, technologies, and services based on a review of proposals 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 Areas of Interest that describe aspects of the CERL mission, however more specific individual program requirements may be amended in the future. The Areas of Interest 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, detail the specific evaluation criteria to be used, provide a funding profile, and will stipulate a specific due date for solutions.

The CERL supports the full R&D lifecycle from basic research through Army implementation and subsequent support to ensure effective adoption and utilization of products arising from R&D investments. The CERL focuses on operational science and engineering to integrate solutions within the Army and DoD. Efforts concentrate on the tools, processes, and technologies associated with planning, design, construction, operations, maintenance, and management for Army (and other services).

The CERL intends to obtain “innovative” solutions that fulfill requirements, close capability gaps, or provide potential technology advancements. Solutions may include existing technologies or procedures that are not currently in use that would enhance or streamline their mission capabilities.

“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.

This request for solution briefs under the published areas of interest is conducted as a multiple-step process:

**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 Areas of Interest 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: Instructions for Preparation and Submission of Area of Interest Solutions**

The following section outlines the solution submission requirements and timelines.

All resultant contracts (whether from an area of interest solution submission or from an individual program requirement) will be firm-fixed price. All items, technologies, and services (including research and development) procured via this CSO are treated as commercial. The Contracting Officer must determine the price fair and reasonable prior to award. CERL 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); the government reserves the right to award prototype agreements (e.g. Other Transaction Agreements), in accordance with 10 U.S.C. §2371b, if deemed appropriate and in the government's best interest.

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

<b>Solution Volume/Section</b>	<b>Requirements/Limitations</b>
<b>COVER LETTER</b> Must Include: <ol style="list-style-type: none"> <li>Area of Interest for which solution is submitted</li> <li>Solution Team Member Names</li> <li>Solution "Validity" Date</li> <li>Authorized Offeror Representative or Point of Contact(s)</li> <li>An overview of the company, as it relates to the Area of Interest under which the proposed solution is submitted</li> <li>Suggested relevant NAICS code and description</li> </ol>	<ul style="list-style-type: none"> <li>Maximum of 2 pages when printed.</li> </ul>
<b>VOLUME I – TECHNICAL</b>	<ul style="list-style-type: none"> <li>Solution brief shall not exceed 5 pages when printed</li> <li>Pitch/Slide deck shall not exceed 15 Slides</li> <li>OPTIONAL: Up to five-minute video clip to narrate or demonstrate the proposed Solution</li> </ul>
<b>VOLUME II – PRICE</b>  Must include: <ol style="list-style-type: none"> <li>Proposed price(s)</li> </ol>	<ul style="list-style-type: none"> <li>No page limit</li> <li>Flexible quantities or pricing options should be provided to maximize the ERDC-CERL's ability to award with</li> </ul>

ii. Proposed Delivery Date or Period of Performance (suggest structuring as # of months after award as opposed to hard start and stop dates)	available funding. • Awards for supplies will be delivered Freight on Board (FOB) Destination
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**\*\*Note: Submitted documents shall not contain any classified data or sensitive information and proprietary information shall be clearly marked.\*\***

**\*\*Note:** All prices shall be valid for a minimum of 90 days after response date.

To limit confusion, all proposal volumes must use the following naming convention:

- *Solution-CoverLetter-<CompanyName>.pdf*
- *Solution-Brief-<CompanyName>.pdf*
- *Solution-PitchDeck-<CompanyName>.pdf*
- *Solution-Price-<CompanyName>.pdf*

## Technical Volume

The technical volume shall include a solution brief, a pitch/slide deck, and an OPTIONAL video clip to narrate or demonstrate the proposed solution that is no longer than 5 minutes in length. The technical volume will be reviewed holistically and there are no set format requirements for these documents. It is recommended (but not required) that more detailed information is included in the solution brief and higher-level information is included in the pitch deck.

The technical volume should address the technical importance to agency program factors: how the proposed solution is innovative and the feasibility of the solution solving the agency's challenge(s), including examples demonstrating possible application of the proposed innovation or existing use of the solution in the commercial marketplace.

The quality of the video submissions will not factor into the government's feedback. The government encourages low-cost video production, such as cell phone videos.

**Video Submission Instructions** – If you choose to submit a video as part of the technical volume, video submissions must be posted to a video hosting website that is accessible for the government. Videos may be marked public or private. The vendor must provide a link and password (if marked private) for the government to access the video submission. The government will not provide access to the vendor's video outside of the government evaluation team without the permission of the vendor. Do not provide a shortened URL, such as YouTube.

## Technology Concept and Company Capability

Offerors shall provide the following information in sufficient detail to allow the Government to assess their capability to support the proposed solution.

- Offerors shall describe the unique aspects of their proposed solution as it “relates” to the Area of Interest.
- The proposed solution shall not repeat the Areas of Interest/Topics or contain the contents of the solution brief pasted into slides, but rather provide convincing evidence that the proposed solution will meet the Government's need.

The following examples of convincing evidence are strongly encouraged –

- a. 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.

- b. Summary of product commercialization currently used in the open market.
- c. Pictures, diagrams, models, or figures to depict the essence of the proposed solution.

### **SAM Registration**

It is critical that offerors are registered in the System for Award Management (SAM), <https://sam.gov/>; you 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 that your address from the solution matches your registration in SAM.

- When registering in SAM.gov, be sure to select 'YES' to the question 'Do you wish to bid on contracts?' in order to be able to compete for this CSO. Also be sure to complete both the FAR and DFARS portions of the representations and certifications section of the SAM registration. If you are only registered to compete for grants, you will be ineligible for award.
- Please double check your CAGE code and UEI number to be sure they line up, if they are not correct at the time of submission, you may be considered ineligible for award.

### **Ask Me Anything (AMA)**

Due to the large amount of expected interest in this CSO, and to maintain a written record of questions, the CERL 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.

### **Solution Submission**

For your solution to be evaluated for a possible contract award, it must be submitted via the electronic form; submissions will be accepted through **5PM CST, 31 October 2024**. A hardcopy will not be accepted. Offerors may submit solution amendments any time prior to the deadline.

Amended proposals will be considered a complete replacement of any previously submitted content. Please ensure that the email address listed in your proposal is current and accurate. Please contact us by emailing [info@erdcerx.org](mailto:info@erdcerx.org) to share details of changed email address and/or company points of contact after proposal submission.

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

**\*\*Notes:** Offerors are responsible for ensuring that **ALL Amendments** to this solicitation are reviewed carefully prior to submitting a proposal.

## **SECTION C: Procedures and Criteria for Selecting Solutions**

ERDC-CERL will generally utilize a one-step evaluation process, and in some rare cases may request a second step that would require a virtual or in-person pitch or demonstration.

### **ONE-STEP CSO Evaluation Process – Direct Award (No Live Demo)**

**Evaluation of offeror's proposed solution:** The CERL technical team will conduct its evaluation based on three factors: technical, importance to agency programs, and funds availability.

- The **technical factor** will assess how innovative the solution is (as defined in this announcement) and the feasibility of the solution solving the agency's challenges.
- The **importance to agency programs factor** will assess the solution's potential to enhance the mission effectiveness of the agency.
- The **funds availability factor** will assess the availability of funding to procure the solution.

**The government may not have funds available for every proposal that is deemed 'selectable' as it relates to the 'technical' and 'importance to agency program' factors. In the event there are insufficient funds to fund all 'selectable' proposals, the government has broad discretion in selecting the proposals it chooses to fund.**

**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 CERL 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 items.

Based on the results of the evaluations, the CERL may select offerors for direct award. An award notification will be sent out, which shall include a request for further details or documents prior to award (i.e., contractor self-developed Performance Work Statement (PWS), 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, deliverables, data rights, and necessary terms and conditions for the award.

**NOTE:** PWS shall not contain classified data or sensitive information. Proprietary information shall be clearly marked.

**TWO-STEP CSO Evaluation Process (If applicable)** – CERL reserves the right to request a virtual or in-person demonstration.

**Step One: Evaluation of offerors' proposed solutions:** The evaluation criteria for a two-step process is the same as the one-step process: technical, importance to agency programs, and funds availability. Price reasonableness determination is also the same.

**Step Two: Virtual or In-Person Demonstration:** Offerors invited to participate in a two-step CSO Evaluation Process (Demo Day) will receive an invitation that will provide all the details for the demonstration session, request for additional information, as well as the time and date that the demo will be conducted. Offerors selected for Demo Day will have an opportunity to demonstrate (Virtually or In-Person) their solution to evaluators. The demonstrations will be evaluated using the same factors as the initial evaluation: technical, importance to agency programs, and funds availability.

After offerors demonstrate their solution to evaluators, to the greatest extent practicable, offerors will be notified if they were selected for an award immediately following their demo. Same as in the one-step

process, offerors proposing service-based solutions will be required to provide a contractor self-developed PWS prior to award.

**Note:** The CERL reserves the right to award to an offeror even if they are unable to demonstrate due to unexpected circumstances or circumstances beyond its control.

### ***Site Visits/Product Demonstration***

Site visits may be conducted at the discretion of the contracting officer throughout the solicitation and solution submittal/evaluation process. The purpose of the site visit is to:

- i. Allow contractors and government to discuss their concerns while observing the product demonstration.
- ii. Allow the government to determine whether the products can satisfy its needs as identified in the Area of Interest/Solicitation.

The site visit shall not be construed as a guarantee for award, and the government shall not bear any of the contractor's costs for the site visit.

**Note:** During any step of the CSO, the CERL may send questions or comments for the offerors to address via email or during Demo Day.

## **SECTION D: Areas of Interest and Individual Program Requirements**

***See Areas of Interest and specific Individual Program Requirements for this CSO by visiting <https://www.erdcerx.org/construction-engineering-research-laboratory-cso/>***

**Note:** The Areas of Interest and Specific Individual Program Requirements are subject to change at any time during the open continuous period. Revisions or additions of Areas of Interest may be made on a monthly, quarterly, or as needed basis.

## **SECTION E: 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 / DFARS 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.

# AREAS OF INTEREST

## W9132T24SC001

### 1. MATERIALS AND STRUCTURES AREAS

#### A. TITLE: Sustainable Engineered Wood / Mass Timber / Bio-Structural Building Solutions

Technology Area(s): engineered wood, mass timber, bio-adhesives, green building, LEED, re-deployable fasteners, prefabricated panels, GHG reduction, modular buildings, hybrid structures, recycled/repurposed materials, energy efficiency.

Overview: Structural building materials derived from nonrenewable, unsustainable resources are damaging to the planet via energy-intensive manufacturing processes and lifecycle GHG emissions. Therefore, ERDC seeks to utilize sustainable building solutions like engineered wood and mass timber for standardization (via Unified Facilities Guides and Specifications) in Military Construction (MILCON). Selected materials and systems will be assessed via cradle-to-grave Life Cycle Cost Analyses (LCCAs) assessing production emissions, energy requirements, design, cost, transportation, labor, and construction metrics. The building solution will advance sustainable bio-structural material selection, design, construction, and specification to minimize the overall environmental impact (GHG emissions) of a building at a competitive cost to traditional materials.

The solution may address one or multiple aspects of this research area including, but not limited to, modular structures, design-for-disassembly, structural insulated panels (SIPs), re-deployable connections, hand-tool minimization, physical security and energy absorption / cyclic loading optimization, material (wood, glue) and process decarbonization / optimization, building envelope improvement, GHG and embodied carbon reduction, etc. Applicants are encouraged to submit evidence of their innovations performing a demonstration at full scale.

A resulting feasibility and LCCA will occur and be weighed according to completion of task activities and objectives. Furthermore, success will be based upon comparative metrics to traditional materials regarding up-front costs, transportation, weight, container fit, reduction in assembly/disassembly times, and improved person-portability resulting from the innate advantage of lighter bio-based building products.

#### B. TITLE: Bio-Based Building Insulating / Finishing Solutions

Technology Area(s): insulation, building envelope, sustainable biomaterials, renewable natural fibers, mycelium, R-value, heat flux, energy savings, rigid board, modular components, rot resistance; waterproofing; moisture barriers; fireproofing; low-GHG; regenerative; weatherproofing.

Overview: Building insulating and finishing materials derived from nonrenewable, unsustainable resources are damaging to the planet via energy-intensive manufacturing processes and lifecycle GHG emissions. Therefore, ERDC seeks to utilize sustainable bio-derived building insulating and finishing solutions for standardization (via Unified Facilities Guides and Specifications) in Military Construction (MILCON). Selected materials and systems will be assessed via cradle-to-grave Life Cycle Cost Analyses (LCCAs) assessing production emissions, energy requirements, design, cost, transportation, labor, and construction metrics. The building solution will advance sustainable bio-finishing material selection,

design, construction, and specification to minimize the overall environmental impact (GHG emissions) of a building at a competitive cost to traditional materials.

The solution may address one or multiple aspects of this research area including, but not limited to, modular insulating components, design-for-disassembly, insulated wall section, structural insulated panels (SIPs), hand-tool minimization, person-portability, hygrothermal optimization, waste raw material innovation, building envelope improvement, GHG and embodied carbon reduction, fire resistance, etc. Applicants are encouraged to submit evidence of their innovations performing a demonstration at full scale.

A resulting feasibility and LCCA will occur and be weighed according to completion of task activities and objectives. Furthermore, success will be based upon comparative metrics to traditional materials regarding up-front costs, transportation, weight, container fit, reduction in assembly/disassembly times, and improved person-portability resulting from the innate advantage of lighter bio-based building products.

## **2. INSTALLATION ENERGY AREAS**

### **A. TITLE: Installation Energy and Water Efficiency and Security**

Products/methods/techniques that will improve overall energy efficiency or reduce reliance on non-renewable energy sources are of interest. These include but are not limited to: combined heat and power generation, fuel cells, reformers, low Nox boilers/burners, natural gas and adsorption cooling, compressed air systems, distributed generation (wind, solar, hydropower), waste to energy, geothermal, and other high efficiency heating/ventilating/and air-conditioning systems. Further, novel processes that improve product development and deployment. Similarly, products/methods/techniques that address water efficiency and security are of interest. This may include but not limited to: potable water treatment and delivery systems, potable water storage, potable water metering and monitoring, gray water reuse, water recycling, rainwater harvesting, advanced wastewater treatment, anaerobic digestion, digital twins, and wastewater to energy.

Solutions are sought which address the need for improved energy and water efficiency and improved energy and water security. ERDC desires solutions that will improve the robustness of energy and water production and delivery systems whereby the risk of loss of energy and water services due to economic dislocations, depletion of natural resources, natural or man-made disasters is reduced. Further, solutions are encouraged that address products/ methods/techniques which will facilitate cost effective, reliable, and sustainable utility support to deployed forces in underdeveloped regions of the world. In addition to specific technologies, ERDC is interested in novel processes that improve product development and deployment.

## **3. WARFIGHTER AREAS**

### **A. TITLE: Advanced Methods and Designs for Additive Construction**

Technology Area(s): additive construction, deployable 3D printers, 3D printing, autonomous material processing and delivery, autonomous construction accessory equipment, materials (polymers, concrete/composites, metals, etc), indigenous materials, design methods, software, infrastructure.

ERDC seeks to develop, improve, and deliver additive construction capabilities in support of both military and civilian mission sets of the U.S. Army Corps of Engineers. ERDC is conducting research in



the broad area of additive construction including but not limited to deployed force infrastructure and use on installations. The primary focus is to advance construction, materials, design, and technology development to minimize logistics, materials, labor, cost, manpower, and time for construction. The solution may address a wide breadth of areas under Additive Construction including software, user interface, simulation, integration, equipment (printers and accessory pieces of equipment including pumps, mixers, or extruders), materials, testing, training & documentation, and design. The solution could include stationary builds, repair, and/or modular structures for operating environments. The solution should be able to operate in environments that are challenging and to print on unprepared or minimally prepared surfaces. Deployable and ruggedized solutions are preferred.

The solution may address one or multiple aspects of this research area including, but not limited to, containerized large/construction-scale polymer/composite printing systems capable of producing full-scale components, combination additive/subtractive manufacturing systems (including for concrete), composite materials incorporating green/recycled/indigenous materials to create structures capable of withstanding realistic structural and environmental loads, upgraded concrete mixers/pumps/extruders designed specifically for field operations & additive construction, autonomous reinforcement creation/placement, and innovative digital designs of additively constructed infrastructure for adding to a government repository. Applicants are encouraged to submit evidence of their innovations performing a demonstration at full scale.

#### **B. TITLE: Robotics for Engineering Operations**

Technology Area(s): autonomous controls, autonomous terrain shaping operations, robotic repair, field robotics, non-destructive testing/inspection, infrastructure, near real-time mapping (Engineer reconnaissance)

Description: ERDC seeks to develop and deliver unmanned/robotic capabilities in support of both military and civilian mission sets of the U.S. Army Corps of Engineers. ERDC is conducting research in the broad area of robotic engineering support in challenging and highly dynamic operating environments. In the military domain, solutions should enable Army Engineers to autonomously perform terrain shaping missions by integrating solutions into existing/standard, commercial off-the-shelf platforms, and equipment. The primary focus is to expand the Engineer's capabilities and capacity using unmanned systems. The solution should be able to operate in environments with challenging, unprepared terrain. In the civilian mission set, solutions should enable remote or autonomous non-destructive testing and inspection of large infrastructure in dangerous and challenging environments. Solutions should be suited for both land and water environments and have the ability to operate in confined spaces. New technologies and capabilities will allow for inspections and repairs to be conducted rapidly, minimize project outages, reduce labor burden, and increase safety for personnel.

ERDC prefers autonomous ground vehicle solutions that allow for real-time teleoperation as a fallback/safety method of control, allow for operations in a non-assured radio communication state (confined space, radio signal obstruction/attenuation), operate in Global Navigation Satellite System (GNSS)-denied environments, and interface with the robot operating system (ROS). The solution may address one or multiple aspects of this research area to include near real-time mapping for Engineer reconnaissance and autonomous task planning, novel localization techniques, autonomous control of equipment and implements, nondestructive evaluation and sensing systems through autonomous manipulation, algorithms for evaluation and interpretation of inspections to support decision-makers, and mission planning and control tools for coordinating mission tasks among multiple pieces of equipment.

#### **4. OPERATIONAL ENERGY AREAS**

#### **A. TITLE: Operational Energy**

Technology Area(s): hybrid power, metering and monitoring, invertors, energy storage, renewable energy, energy management systems, cloud infrastructure, coating technologies for power systems, power generation, design methods, software

ERDC seeks to develop, improve, and deliver operational energy capabilities in support of both military and civilian mission sets of the U.S. Army Corps of Engineers. ERDC is conducting research in the broad area of operational energy in challenging and highly dynamic operating environments. This research would identify new opportunities for contingency base camp operational energy reduction (demand-side management) achieved through new and innovative technologies, improved system or operational modifications. This research would also identify new and innovative opportunities for improved power generation, to include renewables and energy storage (supply-side management). In addition, technologies considered should be able to withstand the harsh, demanding, and austere conditions of an operational environment. The solution should be compatible with US power requirements as well as NATO standards. The research would provide results on the latest base camp operational energy technologies or operational changes and quantify the associated cost/benefits for any proposed change. Deployable, mobile, and ruggedized solutions are preferred.

The solution may address one or multiple aspects of this research area with a focus on reducing reliance on vulnerable resupply operations (both fuel and water) — this enables greater operational freedom of action and reduces the Soldier and system burden at the tactical edge; reducing the Warfighter's individual carry load; conserving resources.

### **5. TRAINING LANDS AND HERITAGE BRANCH AREAS**

#### **A. TITLE: Natural Infrastructure Condition Assessment and Lifecycle Management Optimization**

Technology Area(s): Natural Lands Assessment and Management, Advanced/Remote Plant Community Identification, Structure and Dynamics Assessment. Rapid Soil Property Assessment and Characterization. Sensor Analytics, Ecological and Anthropogenic change detection, forecasting, and projection. Decision support for both military training/testing lands and potential theaters of operation.

Overview: Methods/techniques/tools are needed to rapidly and accurately characterize the configuration, structure, and condition of Natural Infrastructure required for military operations and sustainment of those operations. Better data and knowledge of the current and future projected state of these assets will inform improved decision-making regarding utilization, sustainment, and/or restoration. As more data are being collected, it is important to consider how these data can be collected, stored, processed, aggregated, analyzed, and connected with other data, systems, and processes to deliver accurate representations of military training/testing lands and terrain within operational theatres of operation.

Solutions are sought which address the need for efficient and targeted data collection, condition assessment, and the interpretation of plant and soils data. Also of interest are methods that seek to quantitatively measure and track condition, functionality, and other key indicators of the environment that impact military objectives. Solutions may also consider how these metrics are forecasted to change over time due to age, use, management, degradation, climate, other environmental impacts, and policy-related drivers. Finally, of particular interest are overarching processes and novel approaches for identifying, prioritizing, and allocating resources to inspect, maintain, and/or repair natural infrastructure assets to

optimally achieve desired condition and quality standards, performance targets, and acceptable risk profiles across the Federal government's portfolio of real property assets.

## **6. SUSTAINMENT MANAGEMENT SYSTEM AREAS**

### **A. TITLE: Facility and Infrastructure Lifecycle Investment Optimization**

Technology Area(s): Asset management, condition assessment, performance measurement, Building Information Models, digital planning, Building Sensor Analytics, degradation forecasting, risk-based decision making, facility investment optimization, process engineering.

Overview: Methods/techniques/tools are needed to digitally characterize the configuration, condition, and performance of facilities and supporting infrastructure. Better data and knowledge of the current and future projected state of these assets will inform improved investment decision-making regarding sustainment, restoration and modernization and eventual recapitalization. As more data are being collected for our facilities, it is important to consider how these data can be stored, processed, aggregated, analyzed, and connected with other data, systems, and processes to deliver a real property portfolio that maximizes overall performance to achieve mission with optimal cost effectiveness.

Solutions are sought which address the need for efficient and targeted data collection, condition assessment, and the interpretation of real-time sensor data. Also of interest are methods that seek to quantitatively measure and track condition, functionality, service life, and other key indicators of performance, as well as approaches for expressing the relative importance of facilities, systems, and components. Solutions may also consider how these metrics are forecasted to change over time due to age, use, degradation, climate and environmental impacts, and even policy-related drivers. Finally, of particular interest are overarching processes for identifying, prioritizing, and allocating resources to inspection, maintain, repair, replace, and modernize these real property assets to optimally achieve desired condition and quality standards, performance targets, and acceptable risk profiles across the federal government's portfolio of facilities.