NASA SBIR 2022 Phase I Solicitation

S11.06  Earth Science Decision Support Tools Focused on the Mitigation of Climate Change Impacts

Lead Center: GSFC

Participating Center(s): ARC, JPL, LaRC, MSFC

Scope Title

Earth Science Decision Support Tools Focused on the Mitigation of Climate Change Impacts

Scope Description

The NASA Earth Science (http://science.nasa.gov/earth-science/) and Applied Sciences (http://appliedsciences.nasa.gov/) programs seek innovative and unique approaches to increase the utilization and extend the benefit of Earth Science research data to better meet societal needs. The focus of this subtopic is to develop digital tools for non-expert end users who are not scientists. These users need analytical tools to make decisions in the context of climate change, specifically related to wildfire mitigation and water management. Tools must be intuitive, and results must be reliable and not subject to misinterpretation. Innovative solutions could range from simple, intuitive mobile applications to dashboard tools that integrate NASA science data with domain-specific contextual data, to sophisticated decision-support software that merges deep analysis with powerful prediction capabilities to provide insights and the ability to explore "what-if" scenarios.

This subtopic develops core capabilities that can be integrated to build remote-sensing-driven decision support tools (DSTs) customized to the requirements of different users in varied fields who are grappling with current and anticipated impacts from wildfires and inadequacy of fresh water. Proven development and commercialization strategies should be used to meet these objectives. The goal of this solicitation is to directly link what is being done at NASA with the end-user community to support decision making. Responsive proposals must include a clear identification of tools that will be used and a clear end-user or business application to which the tools, systems, and so forth are intended to support. Proposals should explain how the proposed capabilities will address an end-user need, business opportunity, or gap area in decision support capabilities. Proposals should also outline existing capabilities, including software, models, and data that are already implemented at NASA or through related NASA activities, and describe how the proposed activities may leverage, complement, or expand from the existing infrastructure. Proposals should discuss the level of computing resources required for their methods as well as the plan to ensure availability of the resources needed.

Expected TRL or TRL Range at completion of the Project

3 to 5

Primary Technology Taxonomy

Level 1
Desired Deliverables of Phase I and Phase II

- Research
- Analysis
- Prototype
- Software

Desired Deliverables Description

Research proposed to this subtopic should demonstrate technical feasibility during Phase I, and in partnership with commercial customers (to include other Federal Agencies and state and local governments), show a path toward a Phase II prototype demonstration with significant communication with commercial stakeholders to increase the potential for nongovernmental market penetration.

State of the Art and Critical Gaps

Currently, creating DSTs that effectively utilize remote-sensing data requires significant efforts by experts in multiple domains. NASA Earth science data, while accessible, is massive in breadth and scope—a true “Big Data” problem. However, the formatting of the data is not easily accessed or readily usable beyond remote sensing experts and the research community, suggesting that application by commercial users is even more challenging. Although the data have commercial use, they are underutilized because of accessibility and translation issues. This creates a barrier to the widespread use of Earth observations by state and local governments, businesses, and the public. This subtopic aims to democratize the creation of Earth-science-driven DSTs related to fire mitigation and freshwater management and encourage DST development that significantly increases the return on investment for Earth science missions.

Relevance / Science Traceability

NASA Mandate 51 USC Section 60506: ensure the availability and widest possible use of accurate and current data on global warming; also, use practical benefits for society as an important measure of success.

From the 2018 Earth Science Decadal Survey: “While some discoveries are grounded entirely on observations from space, many more depend on combining information from a range of sources, including field campaigns, laboratory experiments, computer modeling, and theoretical studies...Science based on integrating information from several approaches can lead to products where the insights from the whole are much greater than the sum of the parts...”

References

Proposed decision support tools should leverage NASA’s rich Earth science data:

- Earth data: https://earthdata.nasa.gov/
- Earth Science Applied Sciences—Perspective: https://appliedsciences.nasa.gov/