MITRE's Response to the NSTC RFI on Arctic R&D

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MITRE has significant experience working in the Arctic research & development (R&D) domain, particularly with communications-related research and testing, but also in supporting federal agencies with their Arctic strategies. Our feedback to this draft strategy leverages the data and experiences from those activities.

Answers to Questions Posed in the RFI

1. Which objectives and/or deliverables of the 2022-24 implementation plan should be continued in 2025-26? Should any of these be adjusted?

Priority Area 1 (Community Resilience and Health)

The following objectives should be adjusted:

- Enhance partnerships with local and Indigenous communities and organizations. This includes organizations like the Alaska Native Tribal Health Consortium, Ilisagivik College, and Ukpeagivik Iñupiat Corporation. The goal is to expand the distribution of research findings and promote learning from Indigenous knowledge. This adjustment pertains to Objectives 1.1.3, 1.2.7, 1.2.8, 3.1.1, 4.2, EDU 1.2 and 1.3, MOMP 2.3 and 3.2, and PILR 1, 2, and 3.
- Strengthen international Arctic partnerships and improve the collection of infectious disease data. This includes data on zoonotic disease threats among Arctic Nations. The International Circumpolar Surveillance network, led by the U.S. Centers for Disease Control and Prevention Arctic Investigations Program, could be an effective platform for accomplishing this. In reference to Objective 1.1.4, which involves conducting research to support understanding of emerging health threats, it is important to note that the National One Health Framework Draft was published for public comment in the Federal Register in September 2023. However, the final version of this document could not be located following the conclusion of the public comment period. Therefore, it is suggested that the deliverables be updated to reflect the final version of the National One Health Framework, if available, to ensure the most recent and relevant guidance is incorporated into the

research and actions outlined in the implementation plan. This adjustment is related to Objectives 1.1.2 and 1.1.4.

Priority Area 2 (Arctic Systems Interactions)

MITRE recommends that all three objectives be continued as they are crucial for understanding the Arctic environment, its systems, and their interactions. To further enhance these objectives, MITRE suggests introducing an overarching deliverable. This deliverable would aim to consolidate existing data silos, thereby enabling the integration of data and data models to inform predictive simulations. This can be achieved by developing a data environment that allows research access to all data sets, creating a platform for models to be shared across research initiatives, and establishing policies across agencies to ensure data sharing and validation.

Priority Area 3 (Sustainable Economies and Livelihoods)

MITRE recommends retaining Objective 3.1 but suggests expanding its scope by adding the following deliverables:

- Conduct research to identify threats posed by climate change to Arctic infrastructure in rural communities. This research should aim to develop predictive capabilities to determine when these threats could destabilize existing systems and impact livelihoods.
- Investigate the feasibility of alternative infrastructure for use and implementation in the Arctic. The infrastructure systems considered in the research should include, but not be limited to, construction, communications, power/energy, and water.

Priority Area 4 (Risk Management and Hazard Mitigation)

MITRE recommends the following adjustments:

- For Objective 4.1, which focuses on collaborative agencies, specifically include the Federal Emergency Management Agency. This would enhance the coordination and effectiveness of risk management and hazard mitigation efforts.
- Introduce a new deliverable that showcases the use of new data sets to improve response times, facilitate time-sensitive decision making, and enhance recovery efforts. This could be demonstrated through simulations or test/exercise events, providing practical, real-world contexts for evaluating the effectiveness of these data sets.

Foundational Activity: Data Management

MITRE recommends the continuation of this activity with an emphasis on developing new data architectures. The focus should be on enhancing interoperability, access, and dissemination of data products. This includes continuing efforts to consolidate historical (and sometimes dormant) data sets across various sectors including industry, academia, government, and even international boundaries. This approach will foster better collaboration and utilization of existing data resources.

Foundational Activity: Monitoring, Observing, Modeling, and Prediction (MOMP)

MITRE recommends the continuation and expansion of this activity in future iterations of the implementation plan. Given the rapid changes in the Arctic, the implementation plan for MOMP needs to be ambitious and significantly enhance new MOMP capabilities. This includes a greater focus on collecting large data sets in areas where data is sparse and expanding simulation capabilities with new graphics processing unit/high performance computing technologies.

Additionally, while the current implementation plan identifies an objective about data observation gaps, MITRE suggests placing more emphasis on developing swift and efficient technological solutions once these gaps are identified. This proactive approach will ensure that gaps in data observation are promptly addressed, thereby enhancing the overall effectiveness of Arctic research efforts.

3. What objectives and/or deliverables should be added to this new implementation plan?

Priority Area 1 (Community Resilience and Health)

MITRE recommends adding the following elements, as highlighted in a report for the U.S. Arctic Research Program:¹

- Investigate workforce recruitment and retention in rural communities, particularly in the health professions. The usual challenges of recruitment and retention have been intensified by an aging workforce, excessive workloads, and the impact of COVID-19. Information on how to best cultivate and retain a local workforce should inform regional workforce development strategies. This addition is relevant to all objectives as it addresses a critical need for maintaining community resilience and health capacity.
- Include the Indian Health Service. Its Division of Environmental Health Services, Office of Environmental Health & Engineering² collaborates with American Indian and Alaska Native tribal governments to eliminate and mitigate environmentally related diseases and hazards, and to enhance community resilience. This addition is related to Objectives 1.1.2, 1.1.3, 1.1.5, 1.3.2, and 1.3.3.

Priority Area 2 (Arctic System Interaction)

MITRE recommends adding the following elements:

• Enhance data accessibility and standardization: Improve data access by standardizing the data interface across agencies. This standardization would facilitate easy access to data using modern tools, promoting better collaboration across industry, academia, and government. MITRE also suggests establishing and maintaining data access channels that connect data providers to consumers. These channels should include security measures that

¹ Report on the Goal and Objectives for Arctic Research 2023-2024. 2023. United States Arctic Research Commission, <u>https://www.arctic.gov/uploads/assets/arctic-research-2023-2024.pdf</u>.

² Indian Health Service. 2024. U.S. Department of Health and Human Services, <u>https://www.ihs.gov/oehe/</u>. Last accessed: May 30, 2024.

don't require providers to consolidate data, provide consumers with ready access to both raw data and key metadata, and track and propagate changes in query protocols to ensure seamless consumer access through providers' system changes. Additionally, MITRE recommends providing support, such as funding opportunities, standards, and equipment, to research teams to host data collected in the Arctic region that has not already been hosted on a public-facing resource.

• Create a resilient, interoperable, and flexible platform that allows for continuous upgrades and integration between measurement systems. This will ensure that the platform remains up to date and can effectively handle the integration of various measurement systems.

Priority Area 4 (Risk Management and Hazard Mitigation)

MITRE recommends the following additions:

- Include an objective for collaboration across R&D stakeholders to ensure that collaboration funds are not being duplicated and that there is an opportunity to maximize research. If this is already being done, it should be explicitly mentioned in the implementation plan for clarity and transparency.
- For Objective 1.2.4, which is yet to be initiated and involves the investigation and reporting of unusual mortality events among marine mammals in the Bering, Chukchi, and Beaufort seas, MITRE suggests collaboration with existing research and federal stakeholders. For instance, the National Oceanic and Atmospheric Administration (NOAA) Fisheries already conducts studies and provides reports on unusual mortality events. However, it's noteworthy that while the NOAA Fisheries website³ was updated on 1/11/24, it doesn't display data for the years 2023 and 2024. Therefore, MITRE recommends that the Interagency Arctic Research Policy Committee collaborate with NOAA Fisheries and other relevant stakeholders to ensure the utilization of the most recent and comprehensive data for their research and reporting.
- Implement an enterprise data environment for the many data sources that exist in the scientific and research communities. This would improve progress on deliverables by allowing many stakeholders to use consistent data sources across research efforts and deliverables. Often, data sets are being used only for one specific objective or domain deliverable, but there is value in using these data sets across other objectives and domains.

Foundational Activity: Data Management

MITRE recommends adding the following objectives:

- Increase collaboration across international stakeholders to consolidate overlapping and often vast data sets across the Arctic region. The deliverable for this objective would be the development of an international council for Arctic-related data, complete with data sharing agreements between participating Arctic nations.
- Enhance access across industry, academia, and government data stakeholders to the wealth of both historical and future data sets. The deliverable for this objective would be the

³ Understanding Marine Mammal Unusual Mortality Events. 2024. National Oceanic and Atmospheric Administration, <u>https://www.fisheries.noaa.gov/insight/understanding-marine-mammal-unusual-mortality-events</u>. Last updated May 24, 2024.

development of an Arctic data council across industry, academia, and government, with agreeable data use agreements across sectors.

• Improve data interoperability, standards, and dissemination. This objective would enhance the ability for current and future data collection systems to work across the Arctic observing networks in a more open and efficient way. The deliverable for this objective would be a data architecture and standards plan developed and implemented across the entire Arctic observing enterprise.

Foundational Activity: MOMP

MITRE recommends adding the following objectives:

- Develop cost-effective monitoring technologies to expand observation capabilities in this sparse data environment. The deliverable for this objective would be the creation of new technologies across various fields such as environmental science, biologics, acoustics, optics, unmanned platforms, remote sensing, and social sciences systems. These technologies would further develop a baseline of conditions in the Arctic region.
- Uncover existing historical orphaned data sets across industry, academia, and government. There is a wealth of data already collected in the region that needs to be unearthed to aid in understanding the historical state of the ecosystem. The deliverable for this objective would be a call to national and international institutions to provide access to these existing historical orphaned data sets.
- Leverage new scalable GPU capabilities to achieve better model integration. The deliverable for this objective would be a plan to scale and provide access to novel GPU compute systems to propagate artificial intelligence and machine learning capabilities across the ecosystem. This would enhance the ability to analyze and interpret complex Arctic data.

4. If you have other feedback about either the 2022-24 or 2025-26 implementation plan, please include it here.

<u>Emphasize Simulation Alongside Modeling</u>: MITRE recommends that while the current plan focuses on building models, efforts should also be made to implement data sets into simulations. This approach could help in predicting and preventing critical environmental events, thereby enhancing the effectiveness of the implementation plan

<u>Establish Arctic Marine Forecasts</u>: MITRE suggests prioritizing the establishment of Arctic marine forecasts. This involves connecting atmospheric drivers with oceanographic dynamics and tracking feedback mechanisms. Additionally, forecasting the effects on Arctic ecosystems and their impacts on Arctic communities, national commerce, and security is also crucial.

<u>Incorporate Health-Related Aspects</u>: The current plan could benefit from a stronger focus on health, particularly mental health. MITRE recommends exploring further the impacts of environmental securities on remote communities and the effects of climate change on health.

<u>Define Geographical Scope</u>: For clarity and precision, MITRE recommends providing a clear scoping of the geographical areas that the objectives consider. This is particularly relevant when the Research Plan refers to the "Whole of Arctic," especially in relation to mapping.

<u>Streamline R&D Communities</u>: To maximize the value of R&D resources, MITRE suggests streamlining the R&D communities across stakeholders. This could be included as a Collaboration Objective in the next implementation plan.

<u>Reorganize Topical Threads Under Environmental Security and Health</u>: MITRE recommends that the next implementation plan consider reorganizing the topical threads under Environmental Security and adding one for Health. This would align the plan with the major impacts of climate change.

<u>Better Connect the National Arctic Strategy to the Research Plan</u>: MITRE recommends strengthening the ties between the National Arctic Strategy and the Research Plan, and integrating these with the implementation plan. This would ensure alignment and synergy across different strategic initiatives and foster collaboration among various stakeholders.

<u>Include Progress Overview and Risk Section</u>: MITRE suggests that the implementation plan include an overview of the progress on objectives and deliverables from the previous plan. Additionally, a section on risks could aid in highlighting lessons learned from the data collected over the period, thereby informing future planning and implementation efforts.