

ANTARCTIC INFRASTRUCTURE MODERNIZATION FOR SCIENCE (AIMS) \$97,890,000

The Antarctic Infrastructure Modernization for Science construction project will be initiated in FY 2019 with an investment of \$103.70 million. The FY 2020 Budget Request amount is \$97.89 million, the second year in a multi-year funding profile. See Baseline History below for a discussion of the Total Project Cost.

**Requested Funding Requirements
for the Antarctic Infrastructure Modernization for Science Project**

(Dollars in Millions)

FY 2019 Estimate	FY 2020 Request	FY 2021 Estimate	FY 2022 Estimate	FY 2023 Estimate	Total Project Cost
\$103.70	\$97.89	\$90.00	\$90.00	\$28.81	\$410.40

In the FY 2019 Request, funding for AIMS was presented in the Office of Polar Programs within the R&RA account. However, in FY 2019 P.L. 116-6 appropriated \$103.70 within the MREFC account for AIMS. As such, the FY 2020 Budget Request presents funding for AIMS in the MREFC account.

The AIMS project will replace major facilities at McMurdo Station, Antarctica, one of three permanent stations that comprise the U.S. presence in Antarctica, to meet anticipated science support requirements for the next 35 to 50 years. The project will help ensure enduring U.S. leadership and influence in this strategic region. It will also support critical scientific research and capabilities such as nuclear test detection, earthquake monitoring, and real-time weather data collection for global forecasting.

McMurdo Station’s main purpose is to support both near- and deep-field science in Antarctica including activities at Amundsen-Scott South Pole Station. AIMS will enable faster, more streamlined logistical and science support by co-locating or consolidating field science support, warehousing, skilled trades work, and personnel and administrative support into more operational and energy efficient facilities. AIMS will also provide lodging replacement facilities, a vehicle equipment operations center, an emergency operations center, and necessary upgraded utilities to support these facilities.

FY 2019 funds were used for initial procurements of material that will be transported to McMurdo Station in early FY 2020, in preparation for the beginning of major AIMS construction. Site preparation work also is beginning in FY 2019. FY 2020 funds will be used to continue site preparation work for the backbone utilities and the initial buildings, continue to procure the first phases of construction materials and associated equipment, and begin construction. The AIMS Project is currently anticipated to take up to 10 years to complete.

Baseline History

In 2011, the Office of Science and Technology Policy and NSF convened a Blue Ribbon Panel (BRP) to evaluate the U.S. Antarctic Program (USAP) logistical enterprise. The BRP was asked to conduct a review of NSF facilities and operations supporting science in Antarctica and to ensure that it can support the scientific opportunities articulated by an earlier 2011 National Research Council report entitled *Future Science Opportunities in Antarctica and the Southern Ocean*. The BRP report made numerous recommendations regarding maintaining and enhancing the U.S.’s world-class science program in Antarctica.

NSF responded to the BRP report by immediately addressing issues of safety, implementing operational efficiencies which resulted in immediate return on investment, and developing long-term plans for each of the three year-round U.S. stations: Palmer, Amundsen-Scott South Pole, and McMurdo. The AIMS project

Major Research Equipment and Facilities Construction

is a pivotal component of the McMurdo Station Master Plan with a specific focus on the primary core functions of this critical logistics hub.

The AIMS project seeks to enhance operational support for science by improving operations efficiency, containing operating costs, and enhancing safety. The following major scope elements are targeted to achieve these goals:

- Construction of a Centralized Services Building that replaces and modernizes multiple existing facilities on station including centralized warehousing.
- Construction of an Emergency Operations Facility to replace the existing Fire Station, Medical Facilities, and Fitness and Skills Development Facilities.
- Construction of a consolidated Field Science Support Facility.
- Construction of an Industrial Trades Shop to consolidate existing facilities across the station.
- Construction of a Vehicle Equipment Operations Facility (VEOC) that facilitates maintenance and repair of both heavy and light equipment ranging from traverse tractors, cranes, loaders, and earth moving equipment to trucks, vans, snowmobiles, field generators, etc.
- Construction of one new lodging facility to ensure adequate bed space to support near term needs, including population surges from an influx of construction workers. Importantly, this facility is comprised primarily of single-occupancy rooms needed to promote safety and health. Shared rooms exacerbate sleep disturbance that can arise from widely varying work and travel schedules for the station workforce as well as scientists and promote the spread of contagious conditions such as colds and flu.
- Upgrade of utilities distribution networks for fire protection water, domestic water, heating, power, communications, and sanitary sewer.

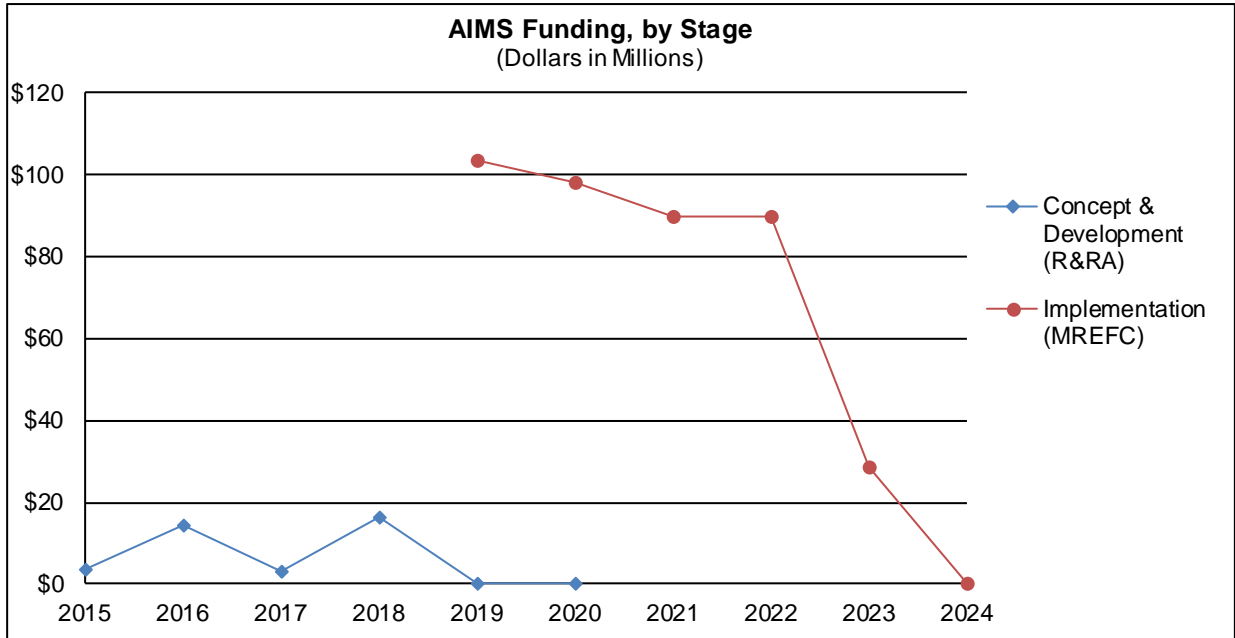
The Preliminary Design Review (PDR) held in December 2016 examined the baseline cost, scope, and schedule utilizing information and conditions available at that time. After an analysis of all information, the result of PDR, and an independent cost assessment, NSF estimated a Total Project Cost (TPC) of \$355.0 million for AIMS. The National Science Board authorized NSF to request funds for AIMS, and the estimated TPC of \$355.0 million was reflected in the FY 2019 Budget Request. During the two-year interval before the Final Design Review, significant unforeseen cost increases occurred that yielded initial estimates for a TPC as high as \$450 million. These potential increases were externally driven and largely due to two causes: (1) significantly increased civil construction costs, related to robust construction opportunities in the continental U.S. that are lower risk compared to AIMS, including responses to several major hurricane and flood events; and (2) substantial global increases in commodity prices. The prime Antarctic Support Contractor was directed by NSF to undertake a reassessment and value engineering process that evaluated several options, including a de-scoped project that would retain the \$355.0 million estimate. Holding to the previous cost estimate would severely impact the ability to support science from McMurdo Station, and compromise the health, safety, and efficiency that were integral parts of the AIMS design. However, significant savings were found by re-designing structures and eliminating features that were less critical to overall operational support, while retaining the major scope elements and required capabilities described above. These efforts resulted in a final TPC of \$410.40 million. An Independent Cost Estimate was conducted by the Army Corps of Engineers in accordance with NSF procedures. The TPC of \$410.40 million was authorized by the National Science Board in February 2019.

Total Funding Requirements for AIMS

(Dollars in Millions)

	Prior FY 2018	FY 2019	FY 2020	ESTIMATES					
	Years	Actual	Estimat	Request	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
R&RA:									
Development & Design	\$21.17	\$16.14	\$0.37	-	-	-	-	-	-
Subtotal, R&RA	\$21.17	\$16.14	\$0.37	-	-	-	-	-	-
MREFC:									
Implementation ¹	-	-	103.70	97.89	90.00	90.00	28.81	-	-
Subtotal, MREFC	-	-	\$103.70	\$97.89	\$90.00	\$90.00	\$28.81	-	-
TOTAL REQUIREMENTS	\$21.17	\$16.14	\$104.07	\$97.89	\$90.00	\$90.00	\$28.81	-	-

¹ FY 2019 Request funding was presented in the Office of Polar Programs within the R&RA account. However, in FY 2019 P.L. 116-6 appropriated \$103.70 million within the MREFC account for AIMS. As such, the FY 2020 Budget Request presents funding for AIMS in the MREFC account.



Note: Outyear (FY 2020 through FY 2024) Implementation funding reflects current estimates.

Management and Oversight

AIMS will be accomplished under the Federal Acquisition Regulations (FAR) via an existing contract to Leidos Innovations Corporation as the current Antarctic Support Contractor. The Office of Polar Programs will work in collaboration with the Division of Acquisition and Cooperative Support (DACCS) to use existing contract mechanisms (e.g., monthly program reviews, earned value reporting, award fee evaluation) to ensure rigorous management and oversight of this work. Appropriate NSF major facility oversight requirements will apply, including engagement of the Large Facilities Office (LFO) and use of Independent Cost Estimates, with due consideration of award through a FAR-based contract.

Reviews

- Conceptual Design Review (CDR): CDR was conducted March 31-April 2, 2015. The NSF program staff concurred with the external panel’s conclusion that the project execution plan and technical design

Major Research Equipment and Facilities Construction

- package met, and in some cases exceeded, the requirements of the Conceptual Design Phase.
- Preliminary Design Review (PDR): PDR was conducted December 2016. The external panel found that the project execution plan and the technical design package were both well-developed for the PDR phase and recommended that the project was ready to proceed to the Final Design Phase. Following NSF deliberations, the National Science Board passed a resolution (NSB-2017-20) authorizing NSF to include AIMS in a future budget request.
 - Final Design Review (FDR): FDR was conducted October 2018. The external panel found that the project execution plan was well-developed for the FDR and recommended that the project proceed to the construction stage. They also recommended that NSF attempt to retain all the major science-support capabilities in the original scope, in spite of the cost increase, in order to realize the long-term benefits needed by the USAP. An Independent Cost Estimate also was carried out as part of the FDR process.

Project Status

Leidos continues to advance the designs of AIMS and is in the process of preparing a final proposal for a contract modification anticipated in March 2019. On February 12, 2019 NSF received authorization from the National Science Board to proceed with construction.

Cost and Schedule

FY 2020 funds will be used to continue site preparation work for the backbone utilities and the initial buildings, continue to procure the first phases of construction materials, and begin construction. Construction will be phased to allow for minimal impact on science support during construction, as well as ensure continuity of operations in the event that subsequent funding is disrupted. The evolution of the Total Project Cost was discussed above. Although the actual execution of the entire AIMS Project is expected to take 8-10 years, the proposed appropriation profile is shorter in order to reduce risks (e.g., due to market conditions) and to facilitate the lengthy supply chain (see Risks section below).

Risks

The primary risks at this stage of the project (i.e., prior to contract award) are associated with the uncertainty in market conditions at the time of subsequent contract modifications, affecting labor and materials. During construction, a key risk is the lengthy supply chain required to get the necessary labor and materials to Antarctica when needed. NSF and Leidos have implemented a rigorous risk management approach which includes the identification of risks and mitigating actions.

Future Operations Costs

Implementing AIMS will provide a material reduction in the annual cost to maintain and operate McMurdo station including an estimated \$1.80 million in fuel and \$4.20 million in labor and other direct costs in comparison with FY 2018 operating costs. By consolidating the station footprint and using modern energy efficient designs, AIMS will save an estimated 494,000 gallons per year of fuel. Consolidated warehousing and co-located workcenters will permanently reduce the support labor requirement by 80 workers. The new layout will enable improved quality of support and increase the throughput of field science projects.