

ARECIBO OBSERVATORY (AO)

Arecibo Funding

(Dollars in Millions)

FY 2022 Actual	FY 2023 Estimate	FY 2024 Request	Change over FY 2023 Estimate Base	
	Base		Amount	Percent
\$12.19	\$6.00	\$6.00	-	-

Brief Description

AO is a center for multidisciplinary research and education located near the town of Arecibo in western Puerto Rico on approximately 140 acres of NSF-owned land. Through FY 2023, AO is operated and managed by the University of Central Florida (UCF) and subrecipients, Yang Enterprises, Inc. (YEI) and Universidad Ana G. Méndez (UAGM), formerly Universidad Metropolitana, under a cooperative agreement with NSF that began on April 1, 2018. On December 1, 2020, AO's 305-meter telescope suffered an uncontrolled collapse of its suspended receiver platform after failure of several supporting cables. Emergency cleanup activities were completed in Spring 2022. At the end of the current award (FY 2023), NSF will fund site maintenance and support through a direct contract that will provide a foundation to sustain a variety of activities on the Arecibo site, including the potential Arecibo Center for STEM Education and Research (ACSER) and other potential awards for scientific and educational initiatives.

Meeting Scientific Community Needs

NSF remains focused on exploring how the AO site can catalyze and inspire STEM talent and innovation in Puerto Rico for decades to come. After extensive consideration, NSF has decided to engage a contractor to maintain the site on behalf of the Foundation to allow for maximum flexibility and enable the possibility of multiple users (or "tenants") on the site. NSF is proposing to prioritize investment in educational activities and research. These educational opportunities are identified in multiple community reports as well as in the CHIPS and Science Act of 2022 (P.L. 117-167), which highlights the need to "explore opportunities for strengthening and expanding the role of the Arecibo Observatory in Puerto Rico through education, outreach and diversity programs, and future research capabilities and technology at the site."

In October 2022 NSF released the ACSER solicitation that calls for proposals to establish a STEM education and research center to capitalize on the robust educational foundation established at the AO site. The solicitation calls for projects that create and implement inclusive and innovative education research, as well as workforce development initiatives across a broad range of STEM disciplines for students, teachers, researchers, local communities, and the public within and outside of Puerto Rico. The proposed ACSER would play a significant role in modeling and advancing equitable and inclusive STEM education and research, especially in Puerto Rico and for those individuals and communities underrepresented in STEM. While the proposed ACSER would not require an active physical science research program, such a research program could be incorporated in responses to the ACSER solicitation or in future proposals.

Status of the Facility

AO is currently operated under a cooperative agreement with UCF that was scheduled to end on March 31, 2023. After a careful review of the different options, NSF decided not to renew the cooperative agreement given that the terms of the award were based on operations of the 305-meter telescope, which is no longer functional. However, NSF extended the cooperative agreement to May 31, 2023 and plans to further extend it through September 30, 2023 to provide ample time to close out the current award and ensure a successful transition to the next phase of activity at the Arecibo site. NSF's engagement of a site contractor will ensure the continuity of site maintenance independent of the site use while other short-term opportunities are pursued and longer-term options are explored. NSF is working with the Small Business Administration to identify an appropriate contractor, preferably based in Puerto Rico, to take on the site maintenance role.

Beyond the potential ACSER initiative, NSF's new site maintenance contract provides a flexible foundation that can also support other potential awards for current and future uses of the site, allowing implementation of innovative ideas involving the existing infrastructure or new initiatives yet to be imagined. Future use of the infrastructure and research resources on the site can be proposed and will be evaluated through NSF's standard merit review processes.

NSF is collaborating with NASA on a study of next-generation radar needs, including concepts that could involve the future use of the AO site. The study will entail a comprehensive evaluation of the needs of NASA's planetary science division, including support for planetary defense activities, and the needs of the NSF research community for future planetary science studies that could benefit from radar technology. NSF anticipates this study to be completed by the end of FY 2023.

Governance Structure and Partnerships

NSF Governance Structure

As NSF transitions from the cooperative agreement to a site contract, oversight of the Arecibo site has shifted to a coordination group with representation from the EDU, GEO, and MPS directorates. This oversight group includes a Contracting Officer (CO) and Contracting Officer Representative (COR), together with a representative from the Large Facilities Office, who provides advice and assists with agency oversight and assurance. The group also receives support from staff in the Office of the General Counsel and the Office of Legislative and Public Affairs. The Chief Officer for Research Facilities also provides high-level guidance, support, and oversight. If awarded, EDU will provide award monitoring and evaluation of the proposed ACSER initiative.

External Governance Structure

In FY 2024, the Arecibo site will be maintained for NSF by a site contractor. The CO and COR will be the primary interfaces to the contractor on behalf of NSF. NSF will work with the contractor to establish organizational structures that ensure appropriate coordination of all ongoing activities on the site.

Partnerships and Other Funding Sources

NSF's use of a site contractor provides a flexible foundation for partnership activities at the Arecibo site. NSF will continue to explore partnerships to ensure maximal practical use of the site, especially in ways that support STEM education and research and further engagement with the Puerto Rican community.

Major Facilities

Funding

Total Obligations for Arecibo									
(Dollars in Millions)									
	FY 2022	FY 2023	FY 2024	ESTIMATES ¹					
	Actual	Estimate Base	Request	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	
Operations & Maintenance (MPS) ²	\$2.42	\$3.00	\$3.00	-	-	-	-	-	
Operations & Maintenance (GEO) ²	6.72	3.00	3.00	-	-	-	-	-	
Cleanup ³	3.05	-	-	-	-	-	-	-	
TOTAL	\$12.19	\$6.00	\$6.00	-	-	-	-	-	

¹ The current cooperative agreement ends on May 31, 2023; however an extension is planned through September 30, 2023. Beyond that NSF is negotiating a new contract for Site Maintenance.

² In FY 2024, NSF will transition from a cooperative agreement for operations of Arecibo Observatory to a contract for maintenance of the site.

³ Supplemental for emergency cleanup of the Arecibo site of \$3.05 million from GEO.

The FY 2024 Request of \$6.0 million includes support for the site maintenance contract and transition costs. Funding for the proposed ACSER initiative would come from EDU and is not shown in the table above. Based on historical cost data, we anticipate the site maintenance contract will require annual funding of approximately \$2.25 million, which will be divided equally between the MPS and GEO Directorates. Additional funds to cover potential transition costs are included in the FY 2024 Request. If awarded, EDU would fund the potential ACSER program at \$1.0 million annually for five years.

Reviews and Reports

In mid-2021, NSF organized the Arecibo Observatory Options Workshop to engage the community in exploring novel ideas for future scientific, educational, and cultural activities at Arecibo. This workshop focused on finding innovative ways to create or enhance opportunities for activities and public outreach at the site. Participants from universities, colleges, and non-academic organizations (such as museums) in Puerto Rico were particularly encouraged to contribute. Participants presented a variety of scientific options as well as some innovative and creative educational and STEM workforce development concepts.

The 2020 Decadal Survey of Astronomy and Astrophysics (Astro2020)¹, released in November 2021, pointed out that much of the radio astrophysics relevant to the Astro2020 goals that was lost because of the collapse of the 305-meter telescope can be recovered through additional investment in existing facilities, and through international partnerships. The report noted that "there is a groundswell of local support for efforts to preserve the site for educational and cultural activities even if not for research" and "Astro2020 supports its continuation as an important nexus for education, community, and developing a diversified STEM workforce."

¹ www.nationalacademies.org/our-work/decadal-survey-on-astronomy-and-astrophysics-2020-astro2020

Renewal/Recompetition/Disposition

After review of community input and extensive internal consideration, NSF decided not to renew the cooperative agreement with the current awardee, given that the terms of that award were based on operations of the 305-meter telescope, which collapsed in December 2020 and is no longer functional. Support for the site will transition to a contract that will maintain the site on behalf of NSF, providing a flexible foundation for future initiatives such as the potential ACSER center as well as other scientific research and educational efforts. This plan will ensure that the site of Arecibo Observatory will continue to be a vibrant center for multidisciplinary research and education.