

PROGRAMMATIC AGREEMENT  
AMONG  
THE NATIONAL SCIENCE FOUNDATION,  
THE ADVISORY COUNCIL ON HISTORIC PRESERVATION, AND  
THE PUERTO RICO STATE HISTORIC PRESERVATION OFFICER  
REGARDING  
POTENTIAL CHANGES TO  
ARECIBO OBSERVATORY OPERATIONS  
IN THE VICINITY OF ARECIBO, PUERTO RICO

**WHEREAS**, the Arecibo Observatory site (AO site) is a federal facility owned and primarily funded by the National Science Foundation (NSF), a federal agency. As of the date of this agreement, University of Central Florida (UCF) receives funding from NSF via a Cooperative Agreement to operate and maintain the AO site for the benefit of research communities;

**WHEREAS**, the AO site was listed in the National Register of Historic Places (NRHP) in 2008 as the National Astronomy and Ionosphere Center (NAIC) Historic District for national significance under Criterion A because of its contribution to the history of the science of ionosphere studies and the development of radio and radar astronomy in the United States, and under Criterion C because it represents a significant work of engineering;

**WHEREAS**, NSF conducted an intensive building survey in June 2018 to evaluate buildings, structures, and objects that were not evaluated as a part of the 2008 NRHP nomination or that were constructed between 2008 and 2015;

**WHEREAS**, the NRHP Registration Form, as updated in 2020 and based on the 2018 building survey, describes 30 buildings, one site, and three structures, of which thirteen buildings and two structures have been identified as contributing resources to the NAIC Historic District based on consultation with the Puerto Rico State Historic Preservation Officer (PR SHPO) and are therefore considered to be historic properties (see Attachment A for a map of the historic district and Attachment B for a list of contributing resources); 17 buildings, one site, and one structure were evaluated and determined not to be contributing to the NAIC Historic District and are therefore not considered to be historic properties;

**WHEREAS**, NSF acknowledges that the AO site holds significant cultural importance to the people of Puerto Rico as a source of inspiration and pride; in addition, it is culturally and scientifically iconic, both nationally and internationally;

**WHEREAS**, this Programmatic Agreement (PA) supercedes the 2017 Programmatic Agreement, as described below and as shown in full in Attachment C; this PA has been prepared in compliance with Section 106 (54 U.S.C. Section § 306108) of the National Historic Preservation Act of 1966, as amended (54 U.S.C. §§ 300101 *et seq.*) (NHPA) and the NHPA's implementing regulations, "Protection of Historic Properties" (Title 36 *Code of Federal Regulations* [C.F.R.] Part 800), and references and technical terms related to the NHPA are included in Attachment D;

**WHEREAS**, during 2006-2015, NSF considered potential operational changes and reduction in funding of the AO site based on the results of formal processes within the scientific community (e.g., decadal surveys, senior-level reviews, and other advisory committees subject to the Federal Advisory Committee Act), with details of this process documented in the 2017 Programmatic Agreement (Attachment C);

**WHEREAS**, based on the input NSF relied upon from the scientific community, NSF developed preliminary alternatives to address changes to operations from reduced NSF funding for the AO site. Because such changes would be driven by the requirements of any NSF award to fund operations, or, alternatively, could involve a transfer of property out of federal control, the proposed changes to operations at the AO site constituted a federal undertaking subject to Section 106 of the NHPA the NHPA's implementing regulations, "Protection of Historic Properties" (36 C.F.R. Part 800);

**WHEREAS**, during 2016-2017, NSF conducted a National Environmental Policy Act (NEPA) review that evaluated five possible Action Alternatives for consideration: Alternative 1 – *Collaboration with Interested Parties for Continued Science-focused Operations with Reduced NSF Funding*, Alternative 2 – *Collaboration with Interested Parties for Transition to Education-focused Operations*, Alternative 3 – *Mothballing Facilities*, Alternative 4 – *Partial Demolition and Site Restoration*, and Alternative 5 – *Complete Demolition and Site Restoration*; details of this process are documented in the 2017 Programmatic Agreement (Attachment C);

**WHEREAS**, on July 5, 2016, NSF initiated its Section 106 consultation process pursuant to the NHPA; NSF conducted its Section 106 consultation process concurrently with, but separate from, its NEPA review process;

**WHEREAS**, because of the presence of the NAIC Historic District, NSF determined, in consultation with PR SHPO and the Advisory Council on Historic Preservation (ACHP), that all five Action Alternatives, including the Preferred Alternative, have the potential to result in adverse effects on historic properties due to the potential demolition or mothballing of some components of the NAIC Historic District under all five Action Alternatives; for Alternatives 1 and 2, under which NSF would retain or transfer ownership, depending, in part, on the needs of any new collaborator(s), any transfer of ownership from NSF to a nonfederal entity would also have the potential for adverse effects since the federal consultation process under Section 106 would no longer be applicable to future actions by such a new owner;

**WHEREAS**, NSF, in consultation with the PR SHPO, initiated the Section 106 consultation process and established that the area of potential effects (APE) (as defined at 36 C.F.R. § 800.16(d)) includes the AO site (see Attachment A);

**WHEREAS**, during 2016-2017, NSF assessed effects on historic properties under Alternatives 1-5, and the PR SHPO concurred with the findings on December 12, 2016; all five Action Alternatives met the criteria for adverse effect;

**WHEREAS**, NSF identified Alternative 1 as NSF's Preferred Alternative in its NEPA process, recognizing that Alternative 1 could only be implemented if a collaborator(s) were to come forward with viable plans to provide additional non-NSF funding in support of their science-focused operations; because Alternative 1 was identified as NSF's Preferred Alternative, NSF, PR SHPO, and the ACHP agreed that resolution of adverse effects (the final step of the Section 106 process), would be limited to consideration of Alternative 1;

**WHEREAS**, in 2017, NSF, PR SHPO, and the ACHP executed the 2017 Programmatic Agreement ensuring that, if Alternative 1 (*Collaboration with Interested Parties for Continued Science-focused Operations with Reduced NSF Funding*) were selected, NSF would implement defined Stipulations to address adverse effects of the proposed undertaking on historic properties under Alternative 1 and that the Stipulations would govern the undertaking and all of its parts (see the 2017 Programmatic Agreement in Attachment C); further, the 2017 Programmatic Agreement provided that if implementation of Alternative 1 was not ultimately feasible, NSF must resume Section 106 consultation focusing on Alternatives 2-5;

**WHEREAS**, on November 15, 2017, NSF executed a Record of Decision selecting Alternative I, and NSF implemented Alternative 1, with UCF as the collaborator, during 2018-2023;

**WHEREAS**, during 2018-2020, NSF implemented the Stipulations of the 2017 Programmatic Agreement, including: Stipulation I.A.3., which required NSF to survey the property to evaluate the eligibility of any buildings or structures that were not previously surveyed during preparation of the 2008 National Register registration form and to provide an update to the National Register, as appropriate (addendum to the National Register accepted on October 26, 2020); Stipulation I.A.4., which required NSF to prepare an NAIC Historic District Preservation and Management Plan, consistent with the above, and to implement the Plan; Stipulation I.A.8., which required NSF to require any operator to adhere to preservation provisions, including implementation of the Historic Preservation and Management Plan, training based on this Plan, and to maintain reasonable public access;

**WHEREAS**, on August 10, 2020, a cable supporting the instrument platform of the 305-meter telescope failed; in response, UCF engaged Thornton Tomasetti to be the Engineer of Record for the necessary repairs to stabilize the structure; on November 6, 2020, a second cable failed, and, due to there being no identified safe way to repair the structure, NSF adopted Thornton Tomasetti's recommendation to decommission the telescope; on November 19, 2020, NSF reached out to the PR SHPO and ACHP to schedule a meeting to discuss the situation and any Section 106 implications; and the meeting with PR SHPO and ACHP was ultimately scheduled for December 1, 2020;

**WHEREAS**, on December 1, 2020, the instrument platform and portions of its supporting towers collapsed on their own when additional cables failed; Thornton Tomasetti was retained to perform a forensic investigation of the cable failures and telescope collapse, as well as to conduct emergency clean-up activities, with UCF and NSF; NSF provided initial notifications to PR SHPO, ACHP, NPS and environmental agencies with regard to the collapse;

**WHEREAS**, on December 7, 2020, NSF hosted a visit to the AO site for PR SHPO staff;

**WHEREAS**, on January 27, 2021, NSF provided the PR SHPO with a written update on unanticipated effects at the AO site and notification of a screening process (including coordination with the Smithsonian Institution) for items of potential historical importance in the debris;

**WHEREAS**, on March 10, 2021, NSF issued a Dear Colleague Letter: Intent to support a Workshop to Explore Novel Ideas for Future Scientific, Educational, and Cultural Activities with the Arecibo Observatory (NSF 21-055);

**WHEREAS**, on March 29, 2021, PR SHPO provided a written response to NSF's January letter, indicating that emergency clean-up may be guided by 36 C.F.R. § 800.12, but that clean-up operations beyond those necessary to the immediate emergency should undergo normal Section 106 consultation;

**WHEREAS**, on April 29, 2021, NSF provided a written update to PR SHPO, including a response to the PR SHPO's March letter;

**WHEREAS**, in April-June 2021, NSF hosted the Workshop to Explore Novel Ideas for Future Scientific, Educational, and Cultural Activities with the Arecibo Observatory;

**WHEREAS**, on June 3, 2021, NSF and UCF provided, via a virtual meeting, updates on the emergency clean-up activities to ACHP, PR SHPO, and other interested members of the public; both the SHPO and ACHP agreed with the approach that NSF had been taking and that UCF had been implementing;

**WHEREAS**, on December 7, 2021, NSF, Jacobs Engineering, and Thornton Tomasetti provided an update, via a virtual meeting, to the PR SHPO, the ACHP, and interested parties to describe the completion of the emergency clean-up activities; ultimately, 14,000 damaged panels out of the 39,000 total panels and their supporting structure (approximately 35%) were removed but not replaced, and 225 feet of the concrete rim wall was repaired; the three towers, each of which lost the top portion during the collapse, were stabilized and appropriate repairs were made (scaffolding was erected, cracked and loose concrete was removed, structural testing was performed, and the tops of the towers were leveled and sealed to protect them from water intrusion); a hurricane-proof temporary roof was placed on the damaged Learning Center and permanent repairs in alignment with the original design were implemented; minor repairs to the Science and Visitor Center were completed; the Cable Car House had sustained damage, but the contributing portion of this structure was retained with minor repairs and stabilization;

**WHEREAS**, in 2022, NSF determined that since the 305-meter telescope is no longer operational, and consistent with what was learned during the 2021 workshop, it would be appropriate to consider a new model that would allow for multiple uses of the AO site, including enhanced STEM education and outreach with some targeted science operations on the site for which NSF would maintain the Puerto Rico Coordination Zone established by the Federal Communications Commission (FCC), which requires applicants for new and modified radio facilities below 15 GHz to provide notification of their proposed operations to the AO site at the time their applications are submitted to the FCC (47 C.F.R. § 1.924); to this end and to help determine the viability of this option, NSF issued a solicitation for the proposed Arecibo Center for STEM Education and Research (ACSER) on October 13, 2022, which had a proposal deadline of February 28, 2023;

**WHEREAS**, under this proposed new model, NSF would maintain the 12-meter telescope on the AO site in a safe stowage status such that it could be put into operation if there is a successful proposal from NSF's merit review process, including a team with the appropriate level of personnel effort and expertise to use it;

**WHEREAS**, this proposed new model generally fits into the description of Alternative 2, as defined in NSF's 2017 NEPA process, with future operations involving a variety of education-focused activities, with the potential for continued use of existing facilities to support astronomical or atmospheric science; under this Alternative, NSF could transfer or retain the property, although NSF has no plans to transfer the property at this time;

**WHEREAS**, this proposed shift to Alternative 2 requires NSF to resume consultation under Section 106 per Stipulation III of the 2017 Programmatic Agreement;

**WHEREAS**, on February 3, 2023, NSF provided PR SHPO and the ACHP with an update regarding the proposed transition to Alternative 2 and, on March 30, 2023, sent a letter to the PR SHPO initiating the renewed Section 106 consultation, confirming the APE and the recently updated list of historic properties, and identifying potential adverse effects under Alternative 2 consistent with the 2016 assessment of effects and PR SHPO response dated December 12, 2016; the letter was also provided to the ACHP and interested members of the public (Justin Walsh, Beth O'Leary, Holly Norton, and Wayne Donaldson) who are collectively referred to herein as the "Archaeology Working Group" or "Consulting Parties;"



**WHEREAS**, if implementation of Alternative 2 is ultimately not feasible, NSF will initiate Section 106 consultation on a new undertaking;

**WHEREAS**, if NSF ultimately issues a decision to implement Alternative 2, NSF may require use of all or a portion of the AO site;

**WHEREAS**, on May 3, 2023, NSF held a virtual consultation meeting with representatives from the PR SHPO, ACHP, and the Archaeology Working Group; additional Section 106 consultation meetings were held on June 7, 2023, June 30, 2023, August 8, 2023, August 10, 2023, and August 14, 2023; and

**WHEREAS**, NSF has determined, in consultation with PR SHPO and the ACHP, that circumstances are present that warrant the development of this PA, in accordance with 36 C.F.R. § 800.14(b)(1)(ii),

**NOW, THEREFORE**, NSF, PR SHPO, and the ACHP agree that NSF will ensure that, if Alternative 2 (*Collaboration with Interested Parties for Transition to Education-focused Operations*) is selected by NSF, the following Stipulations are implemented to address adverse effects of the proposed undertaking on historic properties under Alternative 2 and agree that these Stipulations will govern the undertaking and all of its parts.

## STIPULATIONS

NSF will ensure that the following measures are carried out:

The following Stipulations address adverse effects to historic properties associated with implementation of Alternative 2 under the following two scenarios: a) NSF retains ownership of the AO site (Stipulation **I.A.**, below); and b) Proposed NSF transfer of ownership of the AO site to a non-federal entity (Stipulation **I.B.**, below).

### I. PRESERVATION PROVISIONS

**A. NSF Retains Ownership of the AO site.** In the event NSF retains ownership of the AO site and a new collaborator(s) begins education-focused operations at and management of the AO site, the following provisions shall apply:

- 1. 305-meter Telescope Preservation Options Study.** Within twelve months of selection of a new collaborator(s), NSF will conduct a study, by qualified professionals, to review options for preservation of the remaining components of the 305-meter telescope (e.g., the towers, rim wall, the dish, the cable car house, and the salvaged items stored onsite), including appropriate documentation (such as the story of the collapse of the platform and partial damage of the dish and the impact of this on the AO Site). NSF will provide a draft of this study to the ACHP, PR SHPO, and the Archaeology Working Group and provide for a 90-day review period for any comments. Following the completion of the study, NSF will determine what is feasible for implementation and notify the ACHP, PR SHPO, and the Archaeology Working Group about which option has been selected for implementation, however, if feasible, NSF will select and implement an option that retains the components for visual and historical interest. If NSF seeks to implement an option that would involve physical removal of a remaining component of the 305-meter telescope that contributes to the significance of the historic property, NSF will provide a justification for why retention of such components

is not feasible and conduct a Section 106 consultation to evaluate the proposed action as a new undertaking and amend this PA upon completion of that consultation as appropriate. Until an option has been selected and implemented, NSF will control vegetation around existing structures to the extent that it is safe to do so.

- 2. Update to the NAIC Historic District Preservation and Management Plan.** Within six months following the completion of Stipulation **I.A.1.**, above, NSF will update the NAIC Preservation Principles and Management Strategies to reflect the option selected by NSF for preservation of the remains of the 305-meter telescope, towers, rim wall, and Cable Car House. Such revised NAIC Preservation Principles and Management Strategies shall not interfere with the ability of the collaborator(s) to conduct education-focused operations and the potential continued use of facilities to support astronomical or atmospheric science at the AO site while preserving its historic integrity.
- 3. Training.** NSF will ensure that the key facility staff of the collaborator(s) will receive an initial, one-time historic preservation awareness training to encourage awareness of the historic and cultural significance of the AO site and to minimize the potential for adverse effects to historic properties. Such training, which will be funded by NSF, will be updated to address the option selected by NSF (in consultation with the ACHP, PR SHPO, and the Archaeology Working Group) for preservation of the remains of the 305-meter telescope, towers, rim wall, and Cable Car House and any other updates made to the NAIC Historic District Preservation and Management Plan. The training will be administered by a qualified historic preservation professional who is familiar with and knowledgeable about the AO site and its importance to Puerto Rico and the local community, and will occur within 18 months (or as soon as practicable thereafter) of any new award. NSF will provide PR SHPO an opportunity to comment on the updates to the content of such training.
- 4. Public Access.** The collaborator(s) will allow reasonable public access to the AO site provided that such access does not unduly interfere with the collaborator's use of the property for education-focused operations and the potential continued use of facilities to support astronomical or atmospheric science, and is consistent with health, safety, and security guidelines.
- 5. Use of Historic Properties (inclusive of all resources contributing to the NAIC Historic District other than the remaining components of the 305-meter telescope).** NSF will make every effort to avoid adverse effects on contributing buildings by requiring the collaborator(s) to prioritize and make all reasonable efforts to use as many contributing buildings as practicable, provided that such use facilitates the support of education-focused operations. If the collaborator(s) identifies a contributing building(s) or structure(s) that is no longer needed to support education-focused operations and recommends demolition, NSF will first consider mothballing in accordance with Preservation Brief 31: Mothballing Historic Buildings, issued by the U.S. Department of the Interior, National Park Service, for possible future use, prior to demolition. All mothballed buildings will also be subject to the following maintenance schedule, which will allow such buildings or structures to be returned to active use within 120 days:
  - a. Inspections of the interior of the building or structure.** Conduct quarterly inspections of the interior of each mothballed building or structure to check for pests, signs of moisture, and to adjust ventilation or air conditioning as needed to avoid mold growth.

- b. **Gutters, storm drains, and crawl spaces.** Check and clean out gutters and storm drains every six months (or in accordance with the same schedule followed for the rest of the campus), and check any crawl spaces for pests.
- c. **Painting and inspections of the exterior of the building or structure.** Clean and paint the exterior of each mothballed building or structure as needed every 12 months (or in accordance with the same schedule followed for the rest of the campus), conduct pest inspections/treatment, and update the building or structure file.

If, following the maintenance schedule set forth above, it is determined that repairs, pest control, or mold abatement are needed to maintain a building or structure in a condition where it can be put back into service, NSF will determine whether such building or structure should be repaired/treated or demolished. NSF shall make its determination on whether to repair/treat or demolish such building or structure based on the the following factors: a) the likelihood that the building or structure will be used within the next five years; b) the extent of the repairs/treatment needed to place the building or structure back into service; and c) the availability of funds to carry out such repairs/treatment. If a decision is made to carry-out the repairs/treatment, then such repairs/treatment shall be made in accordance with the NAIC Historic District Preservation Principles and Management Strategies. If a decision is made to reject the repairs/treatment, such building or structure shall be demolished in accordance with the provisions set forth herein.

- 6. **Demolition of historic properties.** If the collaborator(s) identifies a contributing building(s) or structure(s) that is no longer needed to support education-focused operations and recommends demolition, NSF shall determine whether mothballing such building(s) or structure(s) is warranted or whether demolition is appropriate. NSF shall base its determination on the following factors: a) the likelihood that the building or structure will be used within the next five years; b) the condition of the building or structure and whether repairs are needed; and c) the availability and appropriateness of using funds to continue maintenance and inspection of the building or structure. If NSF determines that demolition is warranted, NSF will notify the PR SHPO, in writing, of its decision to demolish such building or structure, including an explanation of the basis for its decision, and a request for the PR SHPO's recommendation regarding the appropriate method of documentation to be prepared prior to any NSF-approved demolition. Such recommendation by the PR SHPO for pre-demolition documentation could include the following::
  - a. **HABS/HAER documentation.** For such building(s)/structure(s) identified as contributing to the NAIC Historic District, NSF will ensure that any such contributing resource(s) is documented in accordance with National Park Service (NPS) Historic American Buildings Survey (HABS) and Historic American Engineering Record (HAER) standards prior to demolition;
  - b. **Other option for documentation.** A different option for documenting the contributing resource(s) (such as an amendment to the National Register nomination, a virtual resource, or other documentation) is recommended for NSF's consideration; or
  - d. **No additional documentation.** The resource(s) does not require additional documentation beyond the National Register Nomination.

If documentation is prepared pursuant to this provision, NSF will ensure that such documentation is made available via the NSF website so that it is easily accessible by members of the public.

- 7. Demolition of non-historic properties (non-contributing resources).** For any building(s)/structure(s) that is identified as non-contributing to the NAIC Historic District and is determined by NSF to warrant demolition, no documentation will be required.
  - 8. Support of National Historic Landmark Nomination.** If PR SHPO nominates the Arecibo site as a National Historic Landmark, a designation that it currently does not have, NSF will support that nomination, subject to the consent of the collaborator(s).
  - 9. New Construction.** If the collaborator(s) identifies new construction or other changes needed to the NAIC Historic District, NSF will conduct, as appropriate, a new Section 106 consultation prior to any NSF-approved new construction or modifications. In addition, if such proposed construction involves the disturbance of previously undisturbed land, NSF will evaluate whether there is a potential for impacts to archaeological resources; if there is a potential for such impacts, NSF will conduct an archaeological survey of such undisturbed land.
- B. Proposed NSF Transfer of Ownership of the AO Site to a Non-Federal Entity.** In the event NSF proposes to transfer ownership of the AO site to a non-federal entity, NSF will conduct a new Section 106 consultation prior to any NSF-approved transfer.
- C. Alternative 2 Is Selected by NSF in its Record of Decision and Implementation Is Not Feasible.** In the event NSF issues an award to a collaborator(s) in accordance with Alternative 2 and implantation of it is not feasible, NSF will notify PR SHPO, the ACHP, and the Archaeology Working Group and will initiate Section 106 consultation on a new undertaking.

## **II. DOCUMENTATION OF ACTIONS DEMONSTRATING COMPLIANCE WITH THIS PA**

So long as NSF remains the owner of the AO site and provided that this PA remains in effect, NSF will submit updates annually, beginning six months following the effective date of this PA, regarding the progress of compliance with this PA to PR SHPO and the ACHP. If PR SHPO has any concerns regarding the implementation of this PA, Section **VII. Dispute Resolution**, herein, may be used to address those concerns.

## **III. DELAYED TRANSFER OF OWNERSHIP**

In the event NSF issues an award to a collaborator(s) to manage and operate the AO site, and plans to transfer ownership of the AO site to such collaborator(s) (a non-federal entity), NSF would continue to implement Stipulation **I.A.** until the new Section 106 consultation on the transfer of the property is completed pursuant to Stipulation **I.B.**.

#### **IV. UNANTICIPATED EFFECTS**

If unanticipated effects on historic properties occur during implementation of the undertaking under Stipulation **I.A.**, NSF will, in compliance with 36 C.F.R. § 800.13(b)(3), determine actions that it can take to resolve potential adverse effects and notify via phone and email PR SHPO and the Archaeology Working Group, as appropriate, within 48 hours of NSF's awareness of the effects. The notification will describe the eligibility of the property and proposed actions to resolve any adverse effects. PR SHPO and the Archaeology Working Group will respond with any comments within 48 hours of the notification by phone or email. NSF will take into account the PR SHPO's and Archaeology Working Group's recommendations regarding NRHP eligibility and proposed actions, and then carry out appropriate actions. NSF will provide PR SHPO and the Archaeology Working Group, as appropriate, with a report of the actions when they are completed.

#### **V. POST-AGREEMENT DISCOVERIES**

All unanticipated discoveries of historic properties and human or burial remains within the APE revealed during any activity associated with implementation of the proposed undertaking under Stipulation **I.A.**, will be addressed in the following manner:

- A.** The collaborator(s), or contractor working on behalf of the collaborator(s) or NSF, carrying out such activity will promptly notify NSF, who will notify PR SHPO of the discovery.
- B.** If NSF determines, in consultation with PR SHPO, that the discovery is eligible for listing in the NRHP, NSF will initiate consultation with the PR SHPO and the Archaeology Working Group to draft a plan with measures that will avoid, minimize, and/or mitigate adverse effects. If agreement is reached regarding such a plan, NSF will implement the plan. If the discovery is made while carrying out ground disturbing activities (if any), such activities in the affected area must cease until the discovery process in this Stipulation has been concluded either through a finding that the property is not eligible for listing in the NRHP or through finalization of the plan referenced herein.
- C.** If NSF, the PR SHPO, and the Archaeology Working Group cannot reach agreement regarding the development of a treatment or mitigation plan, then the matter will be referred to the ACHP for guidance. NSF will address the ACHP's guidance in reaching a final decision regarding implementation of the plan.
- D.** If any previously unidentified human or burial remains are discovered during implementation of the undertaking, the collaborator(s), or contractor working on behalf of the collaborator(s) or NSF, will immediately cease any demolition work and adhere to applicable state and federal laws regarding the treatment of human or burial remains.

#### **VI. REPORTING**

- A.** To keep the public, the PR SHPO, and the Archaeology Working Group apprised of the status of the implementation of the Stipulations in this PA, NSF will maintain a status report on the NSF website with relevant information.
- B.** NSF will invite the Signatories to this PA and the Archaeology Working Group to an annual meeting to report on the status of PA implementation. Meetings or conference calls regarding the undertaking and/or implementation of the Stipulations in this PA may be requested at any time by the Signatories for the duration of this PA.

## **VII. DISPUTE RESOLUTION**

### **A. Signatories**

In the event one of the Signatories objects to the manner in which any term of this PA is implemented, the following dispute resolution process will be followed:

1. The objecting Signatory will notify all other Signatories to this PA, in writing, of the objection or disagreement, request written comments on the objection or disagreement within ten (10) business days following receipt of such notification, and then proceed to consult with the Signatories to resolve the objection. If at any time during consultation, NSF determines that the objection or disagreement cannot be resolved through consultation, NSF will forward all documentation relevant to the dispute to PR SHPO, or if the objection is raised by PR SHPO, NSF will forward all documentation relevant to the dispute to the ACHP. Within 30 days after receipt of all pertinent documentation, PR SHPO or, as appropriate, the ACHP, will provide NSF with comments and recommendations, which NSF will take into account in reaching a final decision regarding the dispute. Any comment provided by PR SHPO or, as appropriate, the ACHP, will be understood to pertain only to the subject of the dispute. All other actions under this PA that are not the subject of the dispute will remain unchanged.
2. If a Signatory asserts that the dispute warrants a cessation of work, NSF or its collaborator(s), or a contractor working on behalf of NSF or its collaborator(s), will be required to cease work on the proposed undertaking while the dispute is being reviewed.

### **B. Continued Participation by the Public and Concurring Parties**

At any time during the implementation of the Stipulations set forth in this PA, any member of the public, including the Archaeology Working Group (if it has decided not to sign this PA as a Concurring Party), may continue to participate in the Section 106 consultation process as follows:

1. Any member of the public may raise an objection to NSF pertaining to the treatment of an historic property associated with implementation of the proposed undertaking. In the event such an objection is raised, NSF will consult with PR SHPO regarding the objection, and following such consultation, will provide the objecting member of the public with a decision on the objection.
2. The Archaeology Working Group, if it becomes a Concurring Party to this PA, may raise an objection to NSF and PR SHPO pertaining to the treatment of an historic property associated with implementation of the proposed undertaking. In the event such an objection is raised by the Archaeology Working Group (as a Concurring Party), NSF and PR SHPO will consult regarding how to resolve the objection. If NSF and PR SHPO are unable to resolve the objection, they will consult with the ACHP. NSF will consider any recommendation on the objection provided by the ACHP before making a final decision on the matter. NSF will communicate such a final decision to the Archaeology Working Group and PR SHPO. If any new undertaking is proposed by NSF, the Archaeology Working Group shall, as appropriate, be invited to participate in the Section 106 consultation process for that undertaking as a Consulting Party.

If an objection is made pursuant to either Stipulation **VII.B.1.** or **VII.B.2.**, NSF, in consultation with PR SHPO, will determine whether the objection warrants a cessation of work (if any) on the proposed undertaking while the objection is being reviewed.

## **VIII. PROFESSIONAL QUALIFICATIONS**

All historic preservation work carried out pursuant to this PA will be performed by (or under the direct supervision of) personnel with the applicable professional qualification standards set forth in the *Secretary of the Interior's Historic Preservation Professional Qualification Standards* proposed revised standards published in the Federal Register, 62 Fed. Reg. 33708 (June 20, 1997).

## **IX. PRINCIPLES AND STANDARDS**

The Signatories agree that the development of the preservation options referred to in Stipulation **I.A.** will be conducted in a manner consistent with the principles and standards contained in the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (36 CFR Part 68), *Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation* (1983, as amended), *Recommended Approach for Consultation on Recovery of Significant Information from Archaeological Sites* (ACHP, May 18, 1999, 64 Fed. Reg. 27085-27087), and any Puerto Rico guidelines, as appropriate.

## **X. ELECTRONIC COPIES**

NSF will provide PR SHPO, the ACHP, and each member of the Archaeology Working Group with one legible, full-color, electronic copy of the fully executed PA and its Attachments no more than 30 days after execution.

## **XI. AMENDMENT**

Any Signatory may request that this PA be amended by informing NSF in writing of the reason for the request and the proposed amendment language. After receiving the request, NSF will notify PR SHPO, the ACHP, and the Archaeology Working Group of the proposed amendment and consult to reach agreement. The amendment will be effective on the date a copy signed by all the Signatories is filed by NSF with the ACHP.

## **XII. EXPIRATION**

This PA will expire 15 years from the Effective Date of this PA as defined in Stipulation **XV.**, herein. Prior to such expiration date, NSF may consult with PR SHPO and the ACHP to reconsider the terms of this PA and amend it in accordance with Stipulation **XI.**

## **XIII. COMPLIANCE WITH APPLICABLE LAW AND ANTI-DEFICIENCY ACT PROVISION**

This PA will be carried out consistent with all applicable federal and state laws. No provision of this PA will be implemented in a manner that would violate the Anti-Deficiency Act. NSF shall make reasonable and good faith efforts to secure the necessary funds to implement this PA in its entirety. All obligations on the part of NSF will be subject to the availability and allocation of appropriated funds for such purposes. Nothing in this PA may be construed to obligate NSF to any current or future expenditure of resources in advance of the availability of appropriations. Should NSF be unable to fulfill the terms of this PA due to

funding constraints or priorities, NSF will immediately notify and consult with PR SHPO and the ACHP to determine whether to amend or terminate this PA pending the availability of resources.

#### **XIV. TERMINATION**

If any Signatory to this PA determines that the terms of this PA will not or cannot be carried out, that Signatory will immediately consult with the other Signatories to develop an amendment to this PA pursuant to Section **XI.**, above. If this PA is not amended following that consultation, then it may be terminated by any Signatory through written notice to the other Signatories. Within 30 days following any such termination and prior to work continuing on the undertaking, NSF will notify PR SHPO and the ACHP whether it will initiate consultation to execute a new Programmatic Agreement under 36 C.F.R. § 800.14(b)(3) or request and consider the comments of the ACHP under 36 C.F.R. § 800.7 and proceed accordingly.

#### **XV. EFFECTIVE DATE**

This PA will be executed in counterparts, with a separate page for each Signatory, and NSF will ensure that each Signatory is provided with a fully executed copy. This PA will become effective upon obtaining the signatures of NSF, PR SHPO, and the ACHP.

**EXECUTION** of this PA by NSF, PR SHPO, and the ACHP evidences that NSF has taken into account the effects of this proposed undertaking on historic properties, and has afforded the ACHP an opportunity to comment on the proposed undertaking.



**SIGNATORY PAGE**

**PROGRAMMATIC AGREEMENT  
AMONG  
THE NATIONAL SCIENCE FOUNDATION,  
THE ADVISORY COUNCIL ON HISTORIC PRESERVATION, AND  
THE PUERTO RICO STATE HISTORIC PRESERVATION OFFICER  
REGARDING  
POTENTIAL CHANGES TO  
ARECIBO OBSERVATORY OPERATIONS  
IN THE VICINITY OF ARECIBO, PUERTO RICO**

Signatory:

National Science Foundation

**Smith, Robert C.** Digitally signed by Smith, Robert C.  
Date: 2023.09.05 15:04:35 -04'00'

Date

Robert C. Smith, Ph.D., Division Director (Interim),  
Division of Astronomical Sciences

**JOLENE K JESSE** Digitally signed by JOLENE K  
JESSE  
Date: 2023.09.05 09:56:21 -04'00'

Date

Jolene K. Jesse, Ph.D., Acting Division Director  
Division of Research on Learning in Formal and Informal Settings

**ZHUANGREN  
LIU (affiliate)** Digitally signed by  
ZHUANGREN LIU (affiliate) on behalf of  
Date: 2023.09.05 16:43:21 Anne M. Johansen  
-04'00'

Date

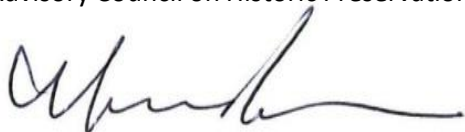
Anne M. Johansen, Division Director  
Division of Atmospheric and Geospace Sciences (GEO/AGS)

**SIGNATORY PAGE**

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IN THE VICINITY OF ARECIBO, PUERTO RICO

Signatory:

Advisory Council on Historic Preservation



---

Reid J. Nelson, Executive Director

Date 9.19.2023

**SIGNATORY PAGE**

PROGRAMMATIC AGREEMENT  
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ARECIBO OBSERVATORY OPERATIONS  
IN THE VICINITY OF ARECIBO, PUERTO RICO

Signatory:

Puerto Rico State Historic Preservation Office



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Carlos Rubio Cancela, Executive Director

Date August 21, 2023

**CONCURRING PARTY SIGNATURE PAGE**


PROGRAMMATIC AGREEMENT  
AMONG  
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THE ADVISORY COUNCIL ON HISTORIC PRESERVATION, AND  
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REGARDING  
POTENTIAL CHANGES TO  
ARECIBO OBSERVATORY OPERATIONS  
IN THE VICINITY OF ARECIBO, PUERTO RICO

Concurring Party:

Archaeology Working Group

\_\_\_\_\_ Date \_\_\_\_\_  
Milford Wayne Donaldson, FAIA

\_\_\_\_\_ Date \_\_\_\_\_  
Holly Norton, Ph.D.

 Ph.D. \_\_\_\_\_ Date 20 Aug 2023  
Beth O'Leary, Ph.D.

\_\_\_\_\_ Date \_\_\_\_\_  
Justin St. P. Walsh, Ph.D., RPA

**CONCURRING PARTY SIGNATURE PAGE**

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IN THE VICINITY OF ARECIBO, PUERTO RICO

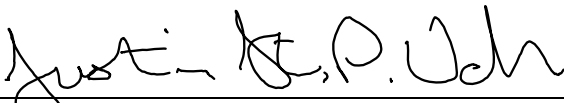
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Archaeology Working Group

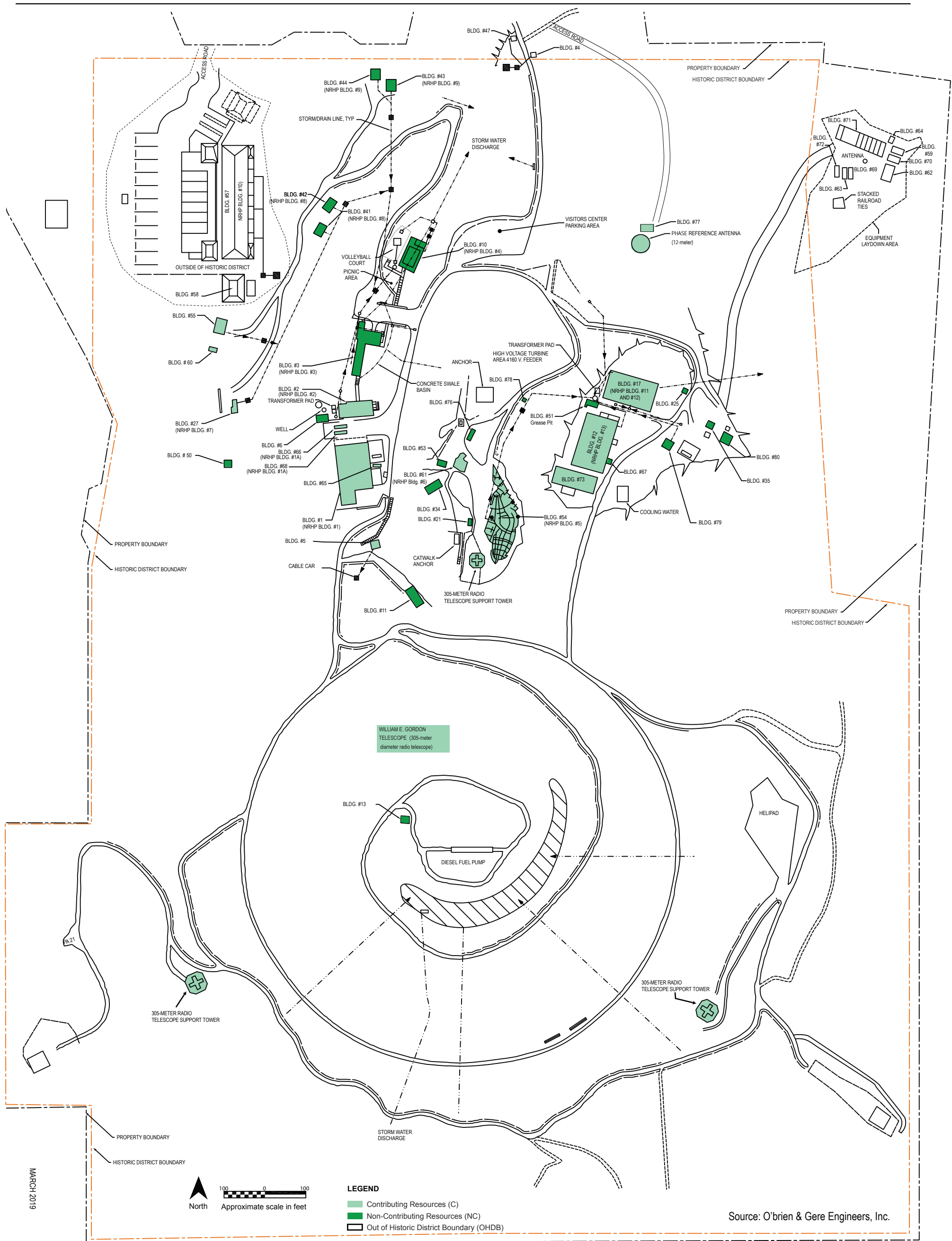
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\_\_\_\_\_ Date \_\_\_\_\_  
Holly Norton, Ph.D.

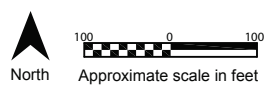
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Beth O'Leary, Ph.D.

 \_\_\_\_\_ Date 19 AUGUST 2023  
Justin St. P. Walsh, Ph.D., RPA

Attachment A  
NAIC Historic District Map



MARCH 2019



- LEGEND**
- Contributing Resources (C)
  - Non-Contributing Resources (NC)
  - Out of Historic District Boundary (OHDB)

Source: O'Brien & Gere Engineers, Inc.

<b>BUILDING NO. DESCRIPTION</b>			
WILLIAM E. GORDON TELESCOPE AND SUPPORT TOWERS (305M diameter radio telescope) (1963) - C	27. OPTICAL LABS (1985/1997) - C	60. ANT. RECE. TESTING BLDG. (ca. 1995) - C	78. COFFEE HUT (2002) - NC
1. OPERATIONS BUILDING (1963) - C	34. HIGH VOLTAGE POWER SUPPLY BLDG. (1973) - NC	61. LEARNING CENTER (2001) - C	79. ENGINEERING OFFICE BUILDING (2010) - NC
2. ADMINISTRATION BUILDING (1963) - C	35. CUMMINGS GENERATOR CONTROL BLDG. (2010) - NC	62. HFF STORAGE TRAILER (2007) - OHDB	80. CUMMINGS DIESEL GENERATOR BUILDING (2010) - NC
3. VISITING SCIENTIST QUARTERS AND CAFETERIA (1963) - NC	41. WEST HILL V.S.Q. BACHELOR UNIT NO. 1 (ca. 1970s) - NC	63. IONOSONDE TRAILER (2007) - OHDB	
4. ENTRANCE GUARD HOUSE (1963) - OHDB	42. WEST HILL V.S.Q. BACHELOR UNIT NO. 2 (ca. 1970s) - NC	64. ELECTRONIC TRAILER (1990) - OHDB	
5. CABLE CAR HOUSE (1963) - C	43. WEST HILL V.S.Q. FAMILY UNIT NO. 1 (ca. 1970s) - NC	65. SHIELDED TRAILER (1983) - C	
6. PUMP HOUSE/WATER TREATMENT BLDG. (1963) - NC	44. WEST HILL V.S.Q. FAMILY UNIT NO. 2 (ca. 1970s) - NC	66. ATMOSPHERIC SCIENCE TRAILER (n.d.) - C	
10. SWIMMING POOL/RESTROOMS (ca. 1965) - NC	47. MAIN GATE RESTROOM (1963) - OHDB	67. CRYOGENICS LAB TRAILER (1967) - NC	
11. LEWIS BUILDING-RIGGING LOFT (ca. 1965) - NC	50. INTERFERENCE MONITORING SHACK (1992) - NC	68. SCIENTIFIC OFFICES TRAILER (n.d.) - C	
12. MAINTENANCE BUILDING (1967) - C	51. GREASE PIT (n.d.) - NC	69. ELECTRONIC TRAILER (WAVEGUIDE) (2007) - OHDB	
13. BOWL SHACK (1963) - NC	53. EMERGENCY GENERATOR BLDG. (1993) - NC	70. COMPUTER TRAILER (2005) - OHDB	
17. WAREHOUSE (1967) - C	54. VISITOR CENTER BLDG. (2001) - C	71. ELECTRONICS CABLE TRAILER (2005) - OHDB	
21. ANTENNA TESTING RANGE (ca. 1985) - NC	55. LIDAR LABORATORY BLDG. (1996) - C	72. ELECTRONIC TRAILER (CRYOGENICS) (2005) - OHDB	
25. PAINT STORAGE BUILDING (ca. 2010) - NC	57. NORTH V.S.Q. BLDG. (2002) - OHDB	73. HF TRANSMITTER BUILDING (2009) - C	
	58. NORTH V.S.Q. UTILITY BLDG. (2002) - OHDB	76. INSPIRATION FOR SCIENCE TRAILER (2016) - NC	
	59. VISITOR CENTER TRAILER (2016) - OHDB	77. PHASE REFERENCE ANTENNA (12M) AND BUILDING 77 (2010) - C	

**Figure 1**  
National Astronomy and Ionosphere Center Historic District  
Arecibo Observatory, Puerto Rico



Attachment B  
Table of Historic Properties in  
NAIC Historic District



**United States Department of the Interior  
National Park Service**

**National Register of Historic Places  
Continuation Sheet**

National Astronomy and Ionosphere Center
Name of Property
Arecibo, Puerto Rico
County and State
070000525
NR Reference Number

Table 1. NAIC Contributing Resources

Building Number [2008 Nomination]	Resource Name	Year of Construction	Location (UTM) 19 Q
N/A [N/A]	William E. Gordon Telescope and Support Towers T4, T8, and T12 (305-meter-diameter radio telescope and three support towers)	1963	737295.58 m E 2029601.43 m N
Building 1 [Building 1]	Operations Building	1963 (addition in 1983)	737395.87 m E 2030000.43 m N
Building 2 [Building 2]	Administration Building	1963 (addition in 1997)	737402.22 m E 2030059.99 m N
Building 5*	Cable Car House	1963	737414.69 m E 2029968.81 m N
Building 12 [Building 13]	Maintenance Building	1967	737579.51 m E 2030034.27 m N
Building 17 [Buildings 11 and 12]	Warehouse and Business/Purchasing	1967	737619.95 m E 2030067.19 m N
Building 27 [Building 7]	Photometry Shack and Optical Lab	1985/1997	737335.67 m E 2030029.00 m N
Building 54 [Building 5]	Visitor Center (Fundación Angel Ramos Visitor and Educational Facility)	2001 (addition 2015)	737510.00 m E 2029968.58 m N
Building 55	LIDAR Laboratory Building	1996	737322.75 m E 2030065.49 m N
Building 60	Antenna Testing Range Building	circa 1995	737316.53 m E 2030040.89 m N
Building 61 [Building 6]	Learning Center	2001	737486.00 m E 2029999.00 m N
Building 65	Shielded Trailer	1983	737422.26 m E 2030022.46 m N
Buildings 66 and 68 [Building 1A]	Atmospheric Science Trailer, and Visiting Science Trailer (counted as one building)		737389.00 m E 2030044.00 m N
Building 73	HF Transmitter Building	2009	737574.41 m E 2030011.37 m N
Building 77	Phase Reference Antenna (12-meter) and Building (counted as one structure)	2010	737597.47 m E 2030187.28 m N

\*Shaded row indicates newly determined contributing resource.

Attachment C  
2017 Programmatic  
Agreement

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PROGRAMMATIC AGREEMENT  
 AMONG  
 THE NATIONAL SCIENCE FOUNDATION,  
 THE ADVISORY COUNCIL ON HISTORIC PRESERVATION, AND  
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 REGARDING  
 POTENTIAL CHANGES TO  
 ARECIBO OBSERVATORY OPERATIONS  
 IN THE VICINITY OF ARECIBO, PUERTO RICO

**WHEREAS**, the Arecibo Observatory is a federal facility owned and funded by the National Science Foundation (NSF), a federal agency. As of the date of this agreement, SRI International with Universities Space Research Association (USRA) and Universidad Metropolitana (UMET) receives funding from NSF via a Cooperative Agreement to operate and maintain the Arecibo Observatory for the benefit of research communities;

**WHEREAS**, the Arecibo Observatory was listed in the National Register of Historic Places (NRHP) in 2008 as the National Astronomy and Ionosphere Center (NAIC) Historic District for national significance under Criterion A because of its contribution to the history of the science of ionosphere studies and the development of radio and radar astronomy in the United States, and under Criterion C because it represents a significant work of engineering;

**WHEREAS**, the NRHP Registration Form describes 13 buildings and a structure, of which eight buildings and one structure have been identified as contributing resources to the NAIC Historic District based on consultation with the Puerto Rico State Historic Preservation Officer (PR SHPO) (see Attachment A for a map of the historic district and Attachment B for a list of contributing resources);

**WHEREAS**, NSF acknowledges that the Arecibo Observatory holds significant cultural importance to the people of Puerto Rico as a source of inspiration and pride; in addition, it is culturally and scientifically iconic, both nationally and internationally;

**WHEREAS**, NSF relies on formal processes within the scientific community (e.g., decadal surveys, senior-level reviews, and other advisory committees subject to the Federal Advisory Committee Act), to provide input on science priorities, and these formal reviews have repeatedly recommended divestment from Arecibo Observatory. The Portfolio Review Committee, a subcommittee of NSF Mathematical and Physical Sciences Advisory Committee composed solely of external members of the scientific community, was charged with recommending a balanced portfolio to maximize the science recommended by National Academy of Sciences surveys of the field, which are carried out every decade. To enable NSF to better address decadal survey science, the resulting Portfolio Review Committee Report (NSF AST, 2012), released in August 2012, recommended the divestment of a number of telescopes from the federal portfolio. With respect to the Arecibo Observatory, the report recommended NSF reevaluate its participation in Arecibo in consideration of the science opportunities and budget forecasts. This followed a recommendation made by the Division of Astronomical Sciences Senior Review Committee in 2006 (NSF AST, 2006), that the NAIC should seek partners to contribute personnel or financial support to the operation of Arecibo by 2011 or else these facilities should be closed. The National Academy of Sciences Mid-Decadal review (NASEM, 2016) in August 2016 reiterated these earlier recommendations. The Geospace Section of the NSF Division of Atmospheric and Geospace Sciences in the Directorate for Geosciences (GEO) was an early co-funder of Arecibo Observatory operations and now provides approximately half of the current NSF funding for Arecibo. In 2016, a subcommittee of the GEO Advisory Committee concluded its own community-based portfolio review, which recommended a significant funding reduction (NSF AGS, 2016a). This finding was reinforced by a National Academy of Sciences review in early 2017;

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**WHEREAS**, some members of the public have submitted additional perspectives from the scientific community that expressed support for continued operations at Arecibo Observatory;

**WHEREAS**, in the fall of 2015, NSF sought viable concepts of operation from the scientific community via a Dear Colleague Letter (Ulvestad and Shepson, 2015);

**WHEREAS**, based on the input NSF relied upon from the scientific community, NSF developed preliminary alternatives to address changes to operations from reduced NSF funding for Arecibo Observatory. The proposed changes to Arecibo Observatory operations constitute a federal undertaking subject to Section 106 (54 U.S.C. Section [§] 306108) of the National Historic Preservation Act of 1966, as amended (54 U.S.C. § 300101 *et seq.*) (NHPA) and the NHPA's implementing regulations, "Protection of Historic Properties" (Title 36 *Code of Federal Regulations* [C.F.R.] Part 800).

**WHEREAS**, this Programmatic Agreement (PA) has been prepared in compliance with 36 CFR 800.14(b)(1)(ii) of Section 106 of the NHPA, and technical terms related to the NHPA are included in Attachment C, "References and Definitions," along with references for citations in the PA and links to those references;

**WHEREAS**, NSF's preliminary alternatives were published in the *Federal Register* on May 23, 2016, as part of NSF's scoping process under the National Environmental Policy Act (42 United States Code [U.S.C.] §§ 4321, *et seq.*) (NEPA). The *Federal Register* notice also stated NSF's intention to initiate consultation under Section 106 of the NHPA and to evaluate potential effects to the Arecibo Observatory, and provided dates to specifically initiate public involvement under Section 106 per 36 CFR 800.2(d). Letters to potentially interested parties, agencies, and Puerto Rican elected officials were also sent. Notification of NSF's NEPA and Section 106 processes was also given through social media announcements, website updates on the NSF Division of Astronomical Sciences website, scientific digests and blogs, and newspaper public notices (in both English and Spanish). Public meetings were held in Arecibo and San Juan, Puerto Rico on June 7 and 8, 2016, to discuss the preliminary alternatives and NSF's compliance with both NEPA and the NHPA, seek input from the public on the preliminary alternatives, and identify consulting parties to participate in NSF's Section 106 consultation process under the NHPA. Six individuals informed NSF that they wished to participate in NSF's Section 106 consultation process as consulting parties at that time;

**WHEREAS**, the proposed action under NEPA review specifically includes five possible Action Alternatives for consideration: Alternative 1 – *Collaboration with Interested Parties for Continued Science-focused Operations with Reduced NSF Funding*, Alternative 2 – *Collaboration with Interested Parties for Transition to Education-focused Operations*, Alternative 3 – *Mothballing Facilities*, Alternative 4 – *Partial Demolition and Site Restoration*, and Alternative 5 – *Complete Demolition and Site Restoration*;

**WHEREAS**, on July 5, 2016, NSF initiated its Section 106 consultation process pursuant to the NHPA; NSF has conducted its Section 106 consultation process concurrently with, but separate from, its NEPA review process;

**WHEREAS**, because of the presence of the NAIC Historic District, NSF has determined, in consultation with PR SHPO and the Advisory Council on Historic Preservation (ACHP), that all five Action Alternatives, including the Preferred Alternative, have the potential to result in adverse effects on historic properties due to the potential demolition or mothballing of some components of the NAIC Historic District under all five Action Alternatives;

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**WHEREAS**, NSF has identified Alternative 1 as NSF's Preferred Alternative in its NEPA process and recognizes that Alternative 1 can only be implemented if a collaborator(s) comes forward with viable plans to provide additional non-NSF funding in support of their science-focused operations; because Alternative 1 has been identified as NSF's Preferred Alternative, this PA addresses potential adverse effects only from Alternative 1; if implementation of Alternative 1 is ultimately not feasible, NSF will resume Section 106 consultation focusing on Alternatives 2-5;

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**WHEREAS**, on September 30, 2016, NSF provided to the scientific community its intent to release a solicitation regarding future continued operations of the Arecibo Observatory via a Dear Colleague Letter (Ulvestad and Shepson, 2016);

**WHEREAS**, NSF, in consultation with the PR SHPO, has established that the area of potential effects (APE) (as defined at 36 C.F.R. § 800.16(d)) includes the Arecibo Observatory (see Attachment D);

**WHEREAS**, on October 19, 2016, NSF provided to PR SHPO a letter setting forth NSF's assessment of effects and attached the document, "Proposed Changes to Arecibo Observatory Operations: Historic Properties Assessment of Effects," which was also sent to the Consulting Parties;

**WHEREAS**, on November 17, 2016, NSF held a consultation meeting in San Juan, Puerto Rico, with the Consulting Parties pursuant to Section 106 of the NHPA and also invited the public. At that meeting four more individuals informed NSF that they wished to participate in NSF's Section 106 consultation process as Consulting Parties. Subsequently on June 28, 2017, an additional individual requested to be a Consulting Party. The following individuals, whose affiliations are noted in the accompanying parenthetical, are collectively referred to herein as "Consulting Parties" – Anthony van Eyken, Ph.D. (SRI International), Brett Isham, Ph.D. (Interamerican University-Bayamon), Xavier Siemens, Ph.D. (American Nanohertz Observatory for Gravitational Waves), Nicholas White, Ph.D. (Universities Space Research Association), Qihou Zhou, Ph.D. (Miami University), Ms. Luisa Zambrano-Marin (Arecibo Observatory), Daniel R. Altschuler, Ph.D. (University of Puerto Rico), Mr. Miguel Babilonia (Puerto Rican Karzo Speleological Research Foundation (FIEKP)), Carmen Pantoja, Ph.D. (University of Puerto Rico), Joan Schmelz, Ph.D. (Universities Space Research Association), and Mr. Ramon Lugo (University of Central Florida);

**WHEREAS**, on January 25, 2017, NSF released a solicitation requesting proposals to manage and operate the Arecibo Observatory in a reduced funding environment (NSF, 2017); this solicitation, including review of any proposals received, proceeded in parallel with, and separate from, NSF's Section 106 consultation process;

**WHEREAS**, NSF provided updates to the scientific community on divestment of Arecibo Observatory via a Dear Colleague Letter in April, 2017 (Gaume and Ulvestad, 2017);

**WHEREAS**, the majority of Consulting Parties and members of the public who submitted comments during the Section 106 and NEPA processes described the cultural and scientific importance of Arecibo Observatory and emphasized a strong preference for continued science-focused operations, which is consistent with Alternative 1, NSF's Preferred Alternative;

**WHEREAS**, under Alternative 1, any new collaborator(s) must retain the following contributing resources: the 305-meter Reflector (including the Support Towers), NRHP Building #1 (Visitors Offices, Electronics/Digital Lab, Control Room/Operators Office, Facilities/Maintenance (2<sup>nd</sup> level)), NRHP Building #5 (Visitors Center), NRHP Building #6 (Learning Center), NRHP Building #7 (Atmospheric and Optical Labs), and NRHP Building #13 (Machine Shop). The following contributing resources may be retained or demolished depending on the needs of any collaborator(s): NRHP Building #1A (Visitors Offices, Electronics/Digital Lab, Control Room/Operators Office, Facilities/Maintenance (2<sup>nd</sup> level); and Safety/Security Office, PC Network Office, Visiting Scientists Offices), NRHP Building #2 (1st floor: Scientific Services, Human Resources, TV/Conference Room; 2<sup>nd</sup> floor: Director and Administration, Library, Mail Room; 3<sup>rd</sup> floor: Palomar Room, Scientific Staff Offices; 4<sup>th</sup> floor: Scientific Staff Offices), and NRHP Buildings #11 and #12 (Warehouse and Business/Purchasing) (see Attachment E);

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**WHEREAS**, under Alternative 1, an additional 17 buildings that have not been designated as either contributing or non-contributing, and are therefore considered to be unevaluated, may be retained or demolished depending on the needs of any collaborator(s) (see Attachment E);

**WHEREAS**, under Alternative 1, NSF may retain or transfer ownership, depending, in part, on the needs of any new collaborator(s);



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**WHEREAS**, NSF has consulted with PR SHPO and the ACHP and determined that, under Alternative 1, adverse effects to historic properties would result if contributing resources of the NAIC Historic District were demolished, as this would be a permanent removal of historic fabric, or if ownership was transferred from NSF to a nonfederal entity, as the federal consultation process under Section 106 would no longer be applicable to future actions by such a new owner;

**WHEREAS**, in accordance with 36 C.F.R. § 800.6(a)(1)(i)(C), NSF has provided the ACHP the required documentation and invited it to participate in this PA; the ACHP notified NSF that it would participate in the consultation via a letter dated May 30, 2017;

**WHEREAS**, NSF has consulted with PR SHPO, the ACHP, and Consulting Parties on ways to avoid, minimize, and/or mitigate the adverse effects that the proposed undertaking could have on historic properties pursuant to the regulations implementing Section 106 of the NHPA, 36 C.F.R. Part 800;

**WHEREAS**, NSF provided the public an opportunity to express their views on resolving potential adverse effects during a telephonic consultation meeting on June 21, 2017, a public meeting on July 6, 2017, a 30-day public comment period on a draft PA commencing on June 23, 2017, and a telephonic consultation meeting on July 13, 2017; a revised draft PA, incorporating comments made during the July 6, 2017 and July 13 consultation meetings and comments received during the public comment period, was prepared and distributed to the Consulting Parties and the public on August 17, 2017 for review and comment; notification for public involvement opportunities was provided via email to potentially interested parties, updates to the NSF Division of Astronomical Sciences website, and notices in *El Nuevo Dia* newspaper on June 28, 2017, and *El Norte* newspaper on July 6, 2017; the draft PA was emailed to the Consulting Parties and other interested members of the public, posted to the AST website, and provided (hard copies) to the following libraries: Biblioteca Electrónica Pública Municipal Nicolás Nadal Barreto and the Archivo General y Biblioteca Nacional de Puerto Rico;

**WHEREAS**, NSF has determined, in consultation with PR SHPO and the ACHP, that circumstances are present (undetermined result of the solicitation and uncertainty regarding the specific needs of any new collaborator) that warrant the development of a PA, in accordance with 36 C.F.R. § 800.14(b)(1)ii), is appropriate;

**WHEREAS**, during the review of the final draft of this PA, Hurricanes Irma (September 6, 2017) and Maria (September 20, 2017) struck the Commonwealth of Puerto Rico resulting in catastrophic damage, including the loss of electrical power and telecommunications. Some damage to the Arecibo Observatory was sustained during Hurricane Maria. Because, as of October 11, 2017, 80% of the island did not have access to consistent and reliable communications, NSF was unable to communicate with the Consulting Parties located in Puerto Rico; therefore, NSF consulted with the ACHP to determine next steps for finalizing this PA.

**WHEREAS**, in accordance with an October 6, 2017 notification from the ACHP to Federal Preservation Officers regarding post-hurricane Section 106 consultations and related matters, the ACHP concluded and communicated to NSF that it would increase its involvement to facilitate the finalization of this PA;

**WHEREAS**, to keep the Consulting Parties informed and to communicate the process for implementing the stipulations in this PA, NSF has committed to provide the Consulting Parties with a final copy of this PA for their records;

**WHEREAS**, PR SHPO, the ACHP, and the Consulting Parties participated in the development of this PA; PR SHPO and ACHP are signatories herein; despite the logistical challenges resulting from Hurricanes Irma and Maria, the Consulting Parties have been asked, if available, to execute this PA as Concurring Parties;

**WHEREAS**, because the Director of the Arecibo Observatory, Francisco Córdova, oversees the operations and administration of the Arecibo Observatory and because he has actively participated in NSF's Section 106

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consultation process, NSF invites Director Francisco Córdova to sign this PA as an Invited Signatory to demonstrate his awareness of the terms of this PA;

WHEREAS, if provided supplemental appropriations for hurricane relief and if feasible, NSF intends to fund the repairs of the Arecibo Observatory to its pre-hurricane condition; and

NOW, THEREFORE, NSF, PR SHPO, and the ACHP agree that NSF will ensure that, if Alternative 1 (*Collaboration with Interested Parties for Continued Science-focused Operations with Reduced NSF Funding*) is selected, the following Stipulations are implemented to address adverse effects of the proposed undertaking on historic properties under Alternative 1 and agree that these Stipulations will govern the undertaking and all of its parts,

**STIPULATIONS**

NSF will ensure that the following measures are carried out:

The following Stipulations address adverse effects to historic properties associated with implementation of Alternative 1 under the following two scenarios: a) NSF retains ownership of Arecibo Observatory with reduced NSF funding (Stipulation I.A., below); and b) NSF transfers ownership of Arecibo Observatory to a non-federal entity (Stipulation I.B., below).

**I. Preservation Provisions**

A. **NSF Retains Ownership of Arecibo Observatory.** In the event NSF retains ownership of Arecibo Observatory and a new collaborator(s) begins operations at and management of Arecibo Observatory with reduced NSF funding, the following provisions shall apply:

1. **Avoidance of Adverse Effects.** NSF will make every effort to avoid adverse effects on contributing buildings by encouraging any collaborator(s) to use as many contributing buildings as practicable, provided that such use facilitates science-focused operations. If the collaborator(s) recommends demolition, NSF will consider mothballing in accordance with Preservation Brief 31: *Mothballing Historic Buildings*, issued by the U.S. Department of the Interior, National Park Service, for possible future use prior to demolition.
2. **Support of National Historic Landmark Nomination.** If PR SHPO nominates Arecibo Observatory as a National Historic Landmark, a designation that it currently does not have, NSF will support that nomination, subject to the consent of the collaborator(s).
3. **Survey.** NSF will conduct a survey of the NAIC Historic District to evaluate the eligibility of any buildings or structures that were not previously surveyed during preparation of the 2008 NRHP nomination, and also those built between 2008 and 2015. NSF will invite PR SHPO staff to participate in the survey. If additional contributing resources are identified, NSF, in consultation with PR SHPO, will prepare and submit an updated NRHP nomination form to include them in the NAIC Historic District.
4. **Preparation of a NAIC Historic District Preservation and Management Plan.** NSF, in consultation with the ACHP, PR SHPO, and the collaborator(s), will prepare a NAIC Historic District Preservation and Management Plan, consistent with the results of the survey completed in Stipulation I.A.3. and with *The*

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*Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring & Reconstructing Historic Buildings (2017)*, as appropriate. The plan will define roles for NSF, as the federal owner of the historic district, and for the collaborator(s) as operator of the historic property. NSF will implement applicable measures of the plan, as appropriate (see also Stipulation 1.A.8.b. for collaborator(s) implementation).

5. **Required Documentation Prior to Demolition of any Building/Structure Listed on Attachment E.** If the collaborator(s) identifies a building(s) or structure(s) listed on Attachment E that is no longer needed to support science-focused operations and recommends demolition, NSF will first consider mothballing for possible future use. In the case that demolition is to occur, NSF will ensure that the appropriate documentation is prepared prior to any NSF-approved demolition as follows:
  - a. For those buildings/structures identified as contributing to the NAIC Historic District (including any newly identified contributing resources resulting from the survey described in Stipulation I.A.3., above), NSF will ensure that any such contributing resources are documented in accordance with National Park Service (NPS) Historic American Buildings Survey (HABS) and Historic American Engineering Record (HAER) standards prior to demolition, unless PR SHPO recommends against such HABS/HAER documentation.
  - b. For those buildings/structures that are identified as non-contributing to the NAIC Historic District (as updated by the survey conducted pursuant to Stipulation I.A.3., above), no additional documentation will be required.
6. **Process Required Prior to Demolition of any Building/Structure Not Listed on Attachment E.** If the collaborator(s) identifies a building(s) or structure(s) not listed on Attachment E that is no longer needed to support science-focused operations and recommends demolition, NSF will conduct, as appropriate, a new Section 106 consultation prior to any NSF-approved demolition.
7. **New Construction.** If the collaborator(s) identifies new construction or other changes needed to the NAIC Historic District, NSF will conduct, as appropriate, a new Section 106 consultation prior to any NSF-approved new construction or modifications.
8. **Preservation Provisions.** NSF will require that any collaborator(s) adhere to the following preservation provisions:
  - a. **Training.** Key facility staff of the collaborator(s) will attend historic preservation awareness training to encourage awareness of the historic and cultural significance of Arecibo Observatory and to minimize the potential for adverse effects to historic properties. Such training, which will be provided by NSF via a qualified historic preservation professional who is familiar with and knowledgeable about the Arecibo Observatory and its importance to Puerto Rico and the local community, will occur within 180 days (or as soon as practicable thereafter) of the commencement of operations by the collaborator(s). The training will address applicable elements of the

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NAIC Historic District Preservation and Management Plan described in Stipulation I.A.4. NSF will provide PR SHPO an opportunity to comment on the content of such training.

- b. **NAIC Historic District Preservation and Management Plan.** The collaborator(s) will incorporate, where practicable, appropriate elements of the NAIC Historic District Preservation and Management Plan (see Stipulation 1.A.3) into the management and operations of Arecibo Observatory in a manner that does not interfere with the ability of the collaborator(s) to conduct science-focused operations at Arecibo Observatory.
  - c. **Public Access.** The collaborator(s) will allow reasonable public access to the Arecibo Observatory site provided that such access does not unduly interfere with the collaborator's use of the property for science-focused operations and is consistent with health, safety, and security guidelines.
- B. **NSF Transfers Ownership of Arecibo Observatory.** In the event NSF issues an award to a collaborator to operate and manage Arecibo Observatory with reduced NSF funding, and that award includes provisions reflecting the collaborator's intent to seek a transfer of ownership of Arecibo Observatory from NSF to the collaborator, the following provisions shall apply:
1. **Survey.** Prior to the transfer, NSF will conduct a survey of the NAIC Historic District to evaluate the eligibility of any buildings or structures that were not previously surveyed during preparation of the 2008 NRHP nomination, and also those built between 2008 and 2015. NSF will invite PR SHPO staff to participate in the survey. If additional contributing resources are identified, NSF, in consultation with PR SHPO, will prepare and submit an updated NRHP nomination form to include them in the NAIC Historic District. This provision shall not apply, however, if a survey has already been conducted pursuant to Stipulation I.A.3.
  2. **Required Documentation.** Prior to transfer, or as soon as practicable thereafter, NSF will ensure that all contributing resources (including those identified in the survey conducted pursuant to Stipulation I.B.2., above) are documented in accordance with NPS HABS/HAER standards unless PR SHPO recommends against such HABS/HAER documentation.
  3. **Training.** NSF will ensure that the key facility staff of any new owner will receive an initial, one-time historic preservation awareness training to encourage awareness of the historic and cultural significance of Arecibo Observatory and to minimize the potential for adverse effects to historic properties. Such training, which will be funded by NSF, will be administered by a qualified historic preservation professional who is familiar with and knowledgeable about the Arecibo Observatory and its importance to Puerto Rico and the local community, and will occur within 180 days (or as soon as practicable thereafter) of the transfer. NSF will provide PR SHPO an opportunity to comment on the content of such training.
  4. **Consultation on Preservation Principles and Management Strategies for the**

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**new Collaborator(s).** Within nine months of selection of a new collaborator(s), NSF will consult with the ACHP, PR SHPO, and the new collaborator(s) to discuss the development and implementation of future preservation principles and management strategies that permit continued science-focused operations at Arecibo Observatory while preserving its historic integrity.

5. **Public Access.** NSF will encourage the collaborator(s) to allow reasonable public access to the Arecibo Observatory site provided that such access does not unduly interfere with the collaborator's use of the property for science-focused operations and is consistent with health, safety, and security guidelines.
6. **NSF-Funded Program for the Visually- and Hearing-Impaired.** Within one year of the transfer of Arecibo Observatory to a new owner, NSF will fund the development and installation of a program for the visually- and hearing-impaired in the Arecibo Observatory Visitor's Center. The purpose of this program is to help convey the cultural and scientific significance of Arecibo Observatory to a broader audience. The cost for the program will not exceed \$50,000. Signatories to this PA will have a 30-day period to review a written draft of the proposed program and its components, and NSF will consider any comments received before developing and installing the final program.

**C. Documentation of Actions Demonstrating Compliance with this PA**

So long as NSF remains the owner of Arecibo Observatory and provided this PA remains in effect, NSF will submit updates every six months, beginning with six months following the effective date of this PA, regarding the progress of compliance with this PA to PR SHPO and the ACHP. If PR SHPO has any concerns regarding the implementation of this PA, Section VII. Dispute Resolution, herein, may be used to address those concerns.

**II. DELAYED TRANSFER OF OWNERSHIP**

In the event NSF issues an award to a collaborator(s) to manage and operate Arecibo Observatory, and plans to transfer ownership of Arecibo Observatory to the collaborator(s) (a non-federal entity), only Stipulation I.B., above, shall apply, notwithstanding any limited temporal delay.

**III. ALTERNATIVE 1 is selected by NSF in its Record of Decision and Implementation is not feasible**

If Alternative 1 is selected by NSF in its Record of Decision and implementation is not feasible, NSF will notify PR SHPO, the ACHP, and Consulting Parties and will resume Section 106 consultation on Alternatives 2-5 and seek to amend this PA.

**IV. UNANTICIPATED EFFECTS**

If unanticipated effects on historic properties occur during implementation of the undertaking under Stipulation I.A., NSF will, in compliance with 36 C.F.R. § 800.13(b)(3), determine actions that it can take to resolve potential adverse effects and notify via phone and email PR SHPO and other Consulting Parties, as appropriate, within 48 hours of NSF's awareness of the effects. The notification will describe the eligibility of the property and proposed actions to resolve any adverse effects. PR SHPO and other Consulting Parties will respond with any comments within 48 hours of the notification by phone or email. NSF will take into account the Consulting Parties' recommendations regarding NRHP eligibility and proposed actions, and then carry out appropriate actions. NSF will provide PR SHPO and other Consulting Parties, as appropriate, with a report of the actions when they are completed. This Stipulation (Stipulation IV.) shall not apply if NSF is no longer the owner of Arecibo Observatory.

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**V. POST-AGREEMENT DISCOVERIES**

If NSF continues to own Arecibo Observatory and it is managed by a collaborator(s), all unanticipated discoveries of historic properties and human or burial remains within the APE revealed during any activity associated with implementation of the proposed undertaking under Stipulation I.A., the proposed undertaking will be addressed in the following manner:

- A. The contractor/collaborator(s) carrying out any such demolition will promptly notify NSF, who will notify PR SHPO of the discovery.
- B. If NSF determines, in consultation with PR SHPO, that the discovery is eligible for listing in the NRHP, NSF will initiate consultation with the Consulting Parties to draft a plan with measures that will avoid, minimize, and/or mitigate adverse effects. If agreement is reached regarding such a plan, NSF will implement the plan. If the discovery is made during demolition activities (if any), demolition in the affected area must cease until the discovery process in this Stipulation has been concluded either through a finding that the property is not eligible for listing in the NRHP or through finalization of the plan referenced herein.
- C. If the Consulting Parties cannot reach agreement regarding the development of a treatment or mitigation plan, then the matter will be referred to the ACHP for guidance. NSF will address the ACHP's guidance in reaching a final decision regarding implementation of the plan.
- D. If any previously unidentified human or burial remains are discovered during implementation of the undertaking, the contractor/collaborator(s) will immediately cease any demolition work and adhere to applicable state and federal laws regarding the treatment of human or burial remains.

**VI. REPORTING**

- A. To keep the public and Consulting Parties apprised of the status of the implementation of the Stipulations in this PA, NSF will maintain a status report on the NSF Division of Astronomical Sciences website with relevant information.
- B. Meetings or conference calls regarding the undertaking and/or implementation of the Stipulations in this PA may be requested at any time by the Signatories for the duration of this PA.
- C. If Arecibo Observatory is transferred out of NSF ownership, the terms of this Stipulation shall not apply after transfer.

**VII. DISPUTE RESOLUTION**

**A. Signatories**

In the event one of the Signatories objects to the manner in which any term of this PA is implemented, the following dispute resolution process will be followed:

- 1. The objecting Signatory will notify all other Signatories to this PA, in writing, of the objection or disagreement, request written comments on the objection or disagreement within ten (10) business days following receipt of such notification, and then proceed to consult with the Signatories to resolve the objection. If at any time during consultation, NSF determines that the objection or disagreement cannot be resolved through consultation, NSF will forward all documentation relevant to the dispute to PR SHPO, or if the objection is raised by PR SHPO, NSF will forward all documentation relevant to the dispute to the ACHP. Within 30 days after receipt of all pertinent documentation, PR SHPO or, as appropriate, the ACHP, will provide NSF with comments and recommendations, which NSF will take into account in reaching a final decision regarding the dispute. Any comment provided by PR SHPO or, as

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appropriate, the ACHP, will be understood to pertain only to the subject of the dispute. All other actions under this PA that are not the subject of the dispute will remain unchanged.

2. Unless all Signatories agree that the dispute warrants a cessation of work, neither NSF nor its collaborator(s) will be required to cease work on the proposed undertaking while the dispute is being reviewed.

**B. Continued Participation by the Public and Concurring Parties**

At any time during the Implementation of the Stipulations set forth in this PA, any member of the public, including any Consulting Party who has decided not to sign this PA as a Concurring Party, and any Concurring Party may continue to participate in the Section 106 consultation process as follows:

1. Any member of the public may raise an objection to NSF pertaining to the treatment of an historic property associated with Implementation of the proposed undertaking, provided that title to Arecibo Observatory is retained by NSF. In the event such an objection is raised, NSF will consult with PR SHPO regarding the objection, and following such consultation, will provide the objecting member of the public with a decision on the objection.
2. Any Concurring Party may raise an objection to NSF and PR SHPO pertaining to the treatment of an historic property associated with Implementation of the proposed undertaking. In the event such an objection is raised by a Concurring Party, NSF and PR SHPO will consult regarding how to resolve the objection. If NSF and PR SHPO are unable to resolve the objection, they will consult with the ACHP. NSF will consider any recommendation on the objection provided by the ACHP before making a final decision on the matter. NSF will communicate such a final decision to the objecting Concurring Party and PR SHPO.

If an objection is made pursuant to either Stipulation VII.B.1. or VII.B.2., NSF, in consultation with PR SHPO, will determine whether the objection warrants a cessation of work (if any) on the proposed undertaking while the objection is being reviewed.

- C. This Stipulation (Stipulation VII.) shall not apply if NSF is no longer the owner of Arecibo Observatory.

**VIII. PROFESSIONAL QUALIFICATIONS**

All work carried out pursuant to this PA will be developed and/or implemented by or under the direct supervision of a person or persons meeting or exceeding the minimum professional qualifications, appropriate to the affected resource(s), listed in the *Secretary of the Interior's Professional Qualification Standards* (36 CFR Part 61, Appendix A) and amended in 1992.

**IX. PRINCIPLES AND STANDARDS**

The Signatories agree that the surveys referred to in Stipulations I.A.3. and I.B.1. will be conducted in a manner consistent with the principles and standards contained in the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (36 CFR Part 68), *Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation* (1983, as amended), *Recommended Approach for Consultation on Recovery of Significant Information from Archaeological Sites* (ACHP, May 18, 1999, 64 FR 27085-27087), and any Puerto Rico guidelines, as appropriate.

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**X. ELECTRONIC COPIES**

NSF will provide PR SHPO, the ACHP, and each Consulting Party with one legible, full-color, electronic copy of the fully executed PA and its Attachments no more than 30 days after execution. If the electronic copy is too large to send via email, NSF will provide each Consulting Party with a copy of the executed PA via a CD.

**XI. AMENDMENT**

Any Signatory may request that this PA be amended by informing NSF in writing of the reason for the request and the proposed amendment language. After receiving the request, NSF will notify all Consulting Parties of the proposed amendment and consult to reach agreement. The amendment will be effective on the date a copy signed by all the Signatories and Invited Signatories is filed by NSF with the ACHP.

**XII. EXPIRATION**

If NSF retains ownership of Arecibo Observatory, this PA will expire ten years from the Effective Date of this PA as defined in Stipulation XV., herein. If ownership of Arecibo Observatory is transferred to a non-federal entity, upon completion of the terms in Stipulation I.B., this PA shall expire. Prior to such expiration date, NSF may consult with PR SHPO and the ACHP to reconsider the terms of this PA and amend it in accordance with Stipulation XI. If unresolved issues remain within two years of the expiration date of this PA, NSF will, at that time, consult with PR SHPO and the ACHP regarding the progress of implementation of this PA and consider the appropriateness of developing a subsequent agreement or amendment to the PA.

**XIII. COMPLIANCE WITH APPLICABLE LAW AND ANTI-DEFICIENCY ACT PROVISION**

This PA will be carried out consistent with all applicable federal and state laws. No provision of this PA will be implemented in a manner that would violate the Anti-Deficiency Act. NSF shall make reasonable and good faith efforts to secure the necessary funds to implement this PA in its entirety. All obligations on the part of NSF will be subject to the availability and allocation of appropriated funds for such purposes. Nothing in this PA may be construed to obligate NSF to any current or future expenditure of resources in advance of the availability of appropriations. Should NSF be unable to fulfill the terms of this PA due to funding constraints or priorities, NSF will immediately notify and consult with PR SHPO and the ACHP to determine whether to amend or terminate this PA pending the availability of resources.

**XIV. TERMINATION**

If any Signatory to this PA determines that the terms of this PA will not or cannot be carried out, that Signatory will immediately consult with the other Signatories to develop an amendment to this PA pursuant to Section XI., above. If this PA is not amended following that consultation, then it may be terminated by any Signatory through written notice to the other Signatories. Within 30 days following any such termination and prior to work continuing on the undertaking, NSF will notify PR SHPO and the ACHP whether it will initiate consultation to execute a new PA under 36 C.F.R. § 800.14(b)(1)(ii) or request and consider the comments of the ACHP under 36 C.F.R. § 800.7 and proceed accordingly.

**XV. EFFECTIVE DATE**

This PA will be executed in counterparts, with a separate page for each Signatory, and NSF will ensure that each Signatory is provided with a fully executed copy. This PA will become effective upon obtaining the signatures of NSF, PR SHPO, and the ACHP.

Execution of this PA by NSF, PR SHPO, and the ACHP evidences that NSF has taken into account the effects of this proposed undertaking on historic properties, and has afforded the ACHP an opportunity to comment on the proposed undertaking.

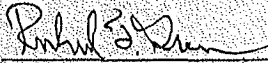
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**SIGNATORY PAGE**

**PROGRAMMATIC AGREEMENT  
AMONG  
THE NATIONAL SCIENCE FOUNDATION,  
THE ADVISORY COUNCIL ON HISTORIC PRESERVATION, AND  
THE PUERTO RICO STATE HISTORIC PRESERVATION OFFICER  
REGARDING  
POTENTIAL CHANGES TO  
ARECIBO OBSERVATORY OPERATIONS  
IN THE VICINITY OF ARECIBO, PUERTO RICO**

Signatory:

National Science Foundation



Richard F. Green, Ph.D., Division Director, Astronomical Sciences

Date 15 Nov, 2017

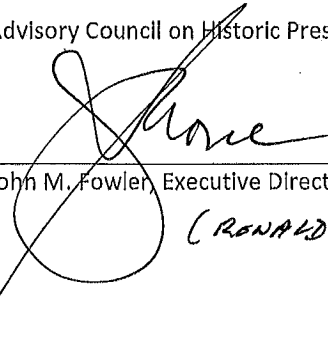


**SIGNATORY PAGE**

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REGARDING  
POTENTIAL CHANGES TO  
ARECIBO OBSERVATORY OPERATIONS  
IN THE VICINITY OF ARECIBO, PUERTO RICO

Signatory:

Advisory Council on Historic Preservation

  
\_\_\_\_\_  
John M. Fowler, Executive Director  
(RONALD D. ANZALONE, ACTG.)

Date

11/15/2017

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**SIGNATORY PAGE**

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POTENTIAL CHANGES TO  
ARECIBO OBSERVATORY OPERATIONS  
IN THE VICINITY OF ARECIBO, PUERTO RICO

Signatory:

Puerto Rico State Historic Preservation Office



Carlos Rubio Cancela, Executive Director

Date

November 14, 2017





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**INVITED SIGNATORY PAGE**  
PROGRAMMATIC AGREEMENT  
AMONG  
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ARECIBO OBSERVATORY OPERATIONS  
IN THE VICINITY OF ARECIBO, PUERTO RICO

Invited Signatory:

Arecibo Observatory



Francisco Córdova, Director

Date

11/13/17



**CONCURRING PARTY SIGNATURE PAGE**

PROGRAMMATIC AGREEMENT  
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IN THE VICINITY OF ARECIBO, PUERTO RICO

Concurring Party:

SRI International

\_\_\_\_\_  
Anthony van Eyken, Ph.D.

Date \_\_\_\_\_

**CONCURRING PARTY SIGNATURE PAGE**

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IN THE VICINITY OF ARECIBO, PUERTO RICO**

Concurring Party:

Interamerican University-Bayamon

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Brett Isham, Ph.D.

\_\_\_\_\_  
Date

**CONCURRING PARTY SIGNATURE PAGE**

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ARECIBO OBSERVATORY OPERATIONS  
IN THE VICINITY OF ARECIBO, PUERTO RICO**

Concurring Party:

Miami University

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Qihou Zhou, Ph.D.

\_\_\_\_\_  
Date

**CONCURRING PARTY SIGNATURE PAGE**

**PROGRAMMATIC AGREEMENT  
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ARECIBO OBSERVATORY OPERATIONS  
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Concurring Party:

Universities Space Research Association

Date

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Nicholas White, Ph.D.



**CONCURRING PARTY SIGNATURE PAGE**

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ARECIBO OBSERVATORY OPERATIONS  
IN THE VICINITY OF ARECIBO, PUERTO RICO

Concurring Party:

American Nanohertz Observatory for Gravitational Waves

\_\_\_\_\_  
Xavier Siemens, Ph.D.

Date \_\_\_\_\_

**CONCURRING PARTY SIGNATURE PAGE**

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IN THE VICINITY OF ARECIBO, PUERTO RICO**

**Concurring Party:**

\_\_\_\_\_  
**Ms. Luisa Zambrano-Marín**

**Date** \_\_\_\_\_

**CONCURRING PARTY SIGNATURE PAGE**

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IN THE VICINITY OF ARECIBO, PUERTO RICO**

**Concurring Party:**

\_\_\_\_\_ **Carmen Pantoja, Ph.D.**

**Date** \_\_\_\_\_



**CONCURRING PARTY SIGNATURE PAGE**

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**Concurring Party:**

**Puerto Rican Karzo Speleological Research Foundation (FIEKP)**

\_\_\_\_\_

**Mr. Miguel Babilonia**

Date \_\_\_\_\_

**CONCURRING PARTY SIGNATURE PAGE**

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IN THE VICINITY OF ARECIBO, PUERTO RICO**

Concurring Party:

Universities Space Research Association

\_\_\_\_\_  
Joan Schmelz, Ph.D.

Date \_\_\_\_\_

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ARECIBO OBSERVATORY OPERATIONS  
IN THE VICINITY OF ARECIBO, PUERTO RICO

Concurring Party:

University of Central Florida

\_\_\_\_\_  
Mr. Ramon Lugo

Date \_\_\_\_\_

**CONCURRING PARTY SIGNATURE PAGE**

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ARECIBO OBSERVATORY OPERATIONS  
IN THE VICINITY OF ARECIBO, PUERTO RICO**

**Concurring Party:**

**University of Puerto Rico**

\_\_\_\_\_  
**Daniel R. Altschuler, Ph.D.**

Date \_\_\_\_\_

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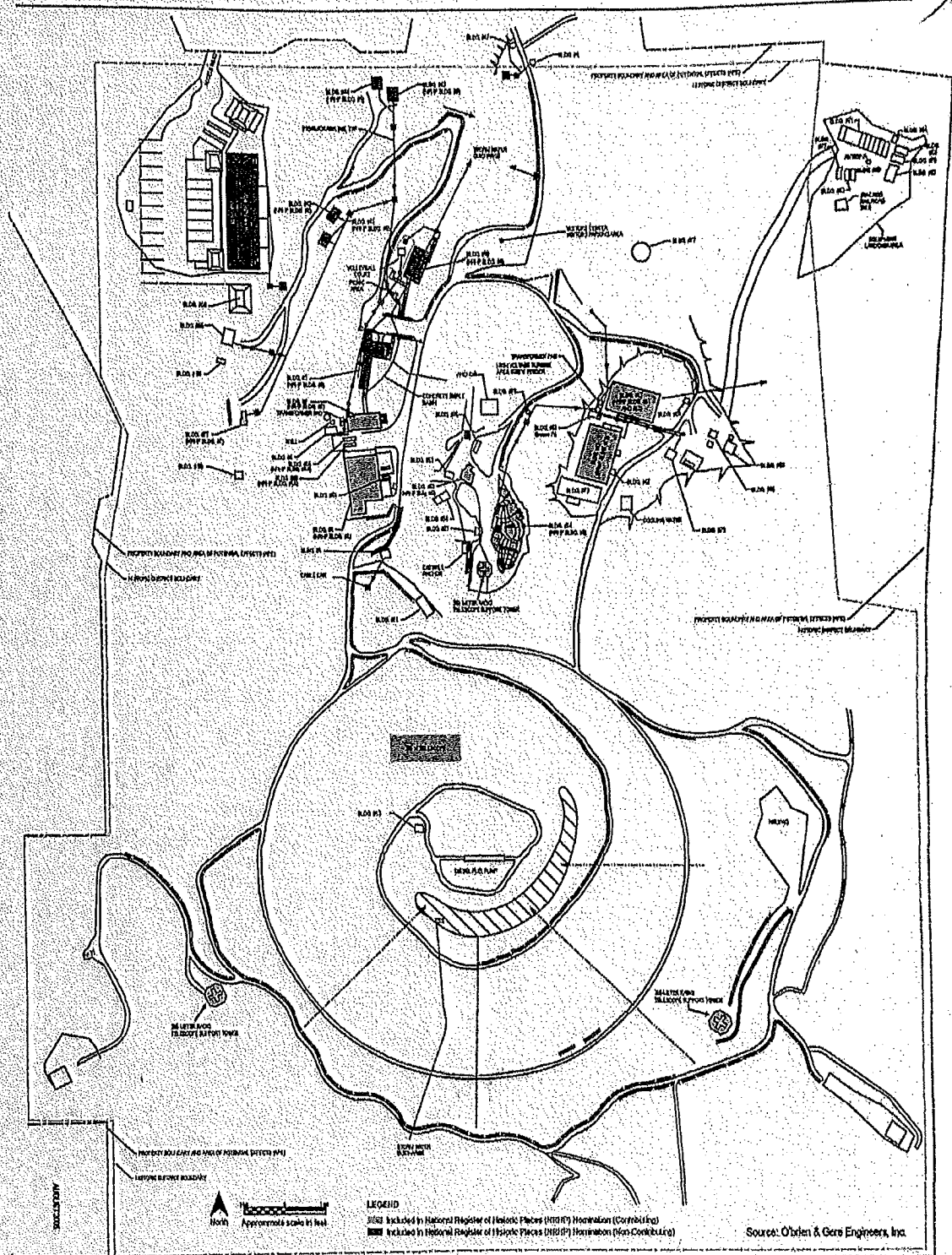
Attachment A  
NAIC Historic District Map

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BUILDING NO.	DESCRIPTION
1	OPERATIONS BUILDING (RRP BLDG #1) (1963)
2	ADMINISTRATION BUILDING (RRP BLDG #2) (1963)
3	VISITOR SCIENTIST QUARTERS AND CAFETERIA (RRP BLDG #3) (1963)
4	ENTRANCE GARAGE HOUSE (1963)
5	CABLE CAR HOUSE (1963)
6	PUMP HOUSE WATER TREATMENT BLDG (1963)
10	BATHING POOL RESTROOMS (RRP BLDG #10) (1964)
11	LEWIS BUNKER ROOMING (OFF. BLDG) (1964)
12	MAINTENANCE SHOP (RRP BLDG #12) (1964)
13	DOVA SHACK (1963)
17	WAREHOUSE (RRP BLDG #17) (1964)
21	AUTOMATIC TESTING RANGE
27	PART STORAGE BUILDING (1964)
31	OPTICAL LABS (RRP BLDG #31) (1965/1967)
34	HIGH VOLTAGE POWER SUPPLY BLDG (1977)
35	CUMMINGS GENERATOR CONTROL BLDG (2016)
41	WEST HILL V.S.O. BACHELOR UNIT 1 (RRP BLDG #41) (1960)
42	WEST HILL V.S.O. BACHELOR UNIT 2 (RRP BLDG #42) (1960)
43	WEST HILL V.S.O. FAMILY UNIT 1 (RRP BLDG #43) (1960)
44	WEST HILL V.S.O. FAMILY UNIT 2 (RRP BLDG #44) (1960)
47	MAIN GATE RESTROOM (1963)
50	WATER URINE LACTATOR'S SHACK
51	GREASE PIT
53	EMERGENCY GENERATOR BLDG
54	VISITOR CENTER BLDG (RRP BLDG #54) (1967)
55	LABORATORY BLDG (1966)
57	NORTH V.S.O. BLDG (VOLUME #1) (2002)
58	NORTH V.S.O. UTILITY BLDG (2002)
59	VISITOR CENTER TRAILER
60	AIR RECL. TENTED BLDG (1966)
61	LEARNING CENTER (RRP BLDG #61) (2001)
62	IFF STORAGE TRAILER
63	EXHIBITION TRAILER
64	ELECTRICAL TRAILER
65	SHEDDED TRAILER (1983)
66	ATMOSPHERIC SCIENCE TRAILER (RRP BLDG #11)
67	CHYODEN'S LAB TRAILER (1997)
68	SCIENTIFIC OFFICES TRAILER (RRP BLDG #14)
69	ELECTRICAL TRAILER (AMVEGLOD)
70	COMPUTER TRAILER
71	ELECTRONICS GEAR TRAILER
72	ELECTRICAL TRAILER (CHYODEN)
73	IFF TRANSMITTER BUILDING (2005)
74	REPERATION FOR SCIENCE TRAILER (2004)
77	PHASE REFERENCE ANTENNA (1964/2019)
78	COFFEE HUT (2004)
79	ENGINEERING OFFICE BLDG (2004)
80	CUMMINGS DIESEL GENERATOR (1966/2019)

Source: O'Brien & Gere Engineers, Inc.

Architectural Resources and  
 Historic Properties within the APE  
 Arecibo Observatory  
 Puerto Rico

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Attachment B  
Table of Historic Properties in  
NAIC Historic District

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### Contributing Resources to the National Astronomy and Ionosphere Center Historic District

Structure/Building Number	Building Name	Year of Construction
National Register of Historic Places designation (NRHP)*: N/A	305-meter Reflector	1963
Arecibo Observatory designation (AO): N/A	305-meter Radio Telescope and Support Towers	
NRHP: Buildings #1 and #1A	Visitors Offices, Electronics/Digital Lab, Control Room/Operators Office, Facilities/Maintenance (2 <sup>nd</sup> level); and Safety/Security Office, PC Network Office, Visiting Scientists Offices	1963 (addition in 1983) Year of construction for trailers unknown.
AO: Building #1 (and Trailers #66 and #68)	Operations Building (with Atmospheric Science Traller and Scientific Offices Traller)	
NRHP: Building #2	1st floor: Scientific Services, Human Resources, TV/Conference Room; 2 <sup>nd</sup> floor: Director and Administration, Library, Mail Room; 3 <sup>rd</sup> floor: Palomar Room, Scientific Staff Offices; 4 <sup>th</sup> floor: Scientific Staff Offices	1963
AO: Building #2	Administration Building	
NRHP: Building #5	Visitors Center	
AO: Building #54	Visitor Center Building (Fundación Angel Ramos Visitor and Educational Facility)	1997 (addition 2015)
NRHP: Building #6	Learning Center	2001
AO: Building #61	Learning Center	
NRHP: Building #7	Atmospheric and Optical Labs	1985/1997
AO: Building #27	Optical Labs	
NRHP: Buildings #11 and #12	Warehouse and Business/Purchasing	1967
AO: Building #17	Warehouse	
NRHP: Building #13	Machine Shop	1967
AO: Building #12	Maintenance Shops	

\* The National Register of Historic Places Registration Form, which was completed in 2007, provides building numbers and names that do not always correspond to the current Arecibo Observatory facility designations. For this reason, the current NRHP Registration Form building designations are provided along with the Arecibo Observatory designations that are provided in Attachment A. Also note that the Registration Form does not indicate which of the 13 described buildings/structures are contributing resources to the NAIC Historic District. The above 8 buildings/structures were identified as contributing resources based on correspondence with the Puerto Rico SHPO on May 20, 2016.

ATTACHMENT B

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# Attachment C References and Definitions

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Gaume, Ralph A. and James S. Ulvestad. 2017. National Science Foundation NSF 17-079 Dear Colleague Letter: MPS-AST Facility Divestment Activity. April 27. <https://www.nsf.gov/pubs/2017/nsf17079/nsf17079.isp>

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National Science Foundation (NSF) Division of Atmospheric and Geospace Science (AGS). 2016. *Investments in Critical Capabilities for Geospace Science 2016 to 2025 - A Portfolio Review of the Geospace Section of the Division of Atmospheric and Geospace Science*. Prepared by the Portfolio Review Committee: Daniel N. Baker, Jorge Chau, Christina Cohen, Sarah Gibson, Joseph Huba, Mona Kessel, Delores Knipp, Louis Lanzerotti, William Lotko (Chair), Patricia Reiff, Alan Rodger, Joshua Semeter (GEO/Advisory Committee Liaison), Howard Singer. April 14. <https://www.nsf.gov/geo/adgeo/geospace-review/geospace-portfolio-review-final-rpt-2016.pdf>

Ulvestad, James S. and Paul B. Shepson. 2015. National Science Foundation NSF 16-005 Dear Colleague Letter: Concepts for Future Operation of the Arecibo Observatory. October 26. <https://www.nsf.gov/pubs/2016/nsf16005/nsf16005.pdf>

Ulvestad, James S. and Paul B. Shepson. 2016. National Science Foundation NSF 16-144 Dear Colleague Letter: Intent to Release a Solicitation Regarding Future Continued Operations of the Arecibo Observatory. September 30. <https://www.nsf.gov/pubs/2016/nsf16144/nsf16144.isp>

**PA Definitions:**

**Adverse Effect:** a change to the characteristics that qualify a historic property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association (36 CFR 800.5(a)).

**Area of Potential Effects (APE):** the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking (36 CFR 800.16(d)). It is important to understand that the effects

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pertain to the effects on physical historic properties (eligible for or listed in the National Register of Historic Places [NRHP]) in a specific area.

**Concurring Party:** Any consulting party that has been invited by the federal agency (NSF) to concur in the PA. Concurring parties have the same rights with regard to seeking amendment or termination of the PA as other signatories. The refusal of any party invited to concur in the PA does not invalidate the document (36 CFR 800.16(d)).

**Consultation:** the process of seeking, discussing, and considering the views of other participants, and, where feasible, seeking agreement with them regarding matters arising in the Section 106 process (36 CFR 800.16(f)).

**Consulting Party:** Section 106 term that refers to organizations and/or individuals with a demonstrated interest in the undertaking due to the nature of their legal or economic relation to the undertaking or affected properties, or their concern with the undertaking's effects on historic properties. The participation of consulting parties is subject to approval by the federal agency (in this case, NSF). Consulting parties are actively informed of and able to participate in the Section 106 process, including consultation meetings. The views of consulting parties are actively sought by NSF during the Section 106 consultation process. (36 CFR 800.2(c)(5))

**Effect:** an alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the NRHP (36 CFR 800.16(i)).

**Historic Property:** Any resource, such as a building, structure, or historic district, included in or eligible for inclusion in the NRHP, maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the NRHP criteria (36 CFR 800.16(l)).

**Invited Signatory:** Any party that is assigned a responsibility under the PA and is invited by the federal agency (NSF) to sign the PA. Any invited signatory that signs the PA has the same rights with regard to seeking amendment or termination of the PA as other signatories. The refusal of any party invited to become a signatory to a PA does not invalidate the document (36 CFR 800.6(c)(2)).

**Signatory:** Signatories include the federal agency (NSF), PR SHPO, and ACHP, and they have the sole authority to execute, amend, or terminate the PA (36 CFR 800.6(c)(1)).

**Programmatic Agreement (PA):** A document that records the terms and conditions agreed upon to resolve the potential adverse effects of a federal agency program or complex undertaking. For this undertaking, a PA is used to document the ways in which adverse effects are addressed because the result of the 2017 solicitation for new collaborators is undetermined and the needs of any new collaborator(s) are unknown (36 CFR 800.14(b)).

**Undertaking:** A project, activity, or program funded in whole or in part by a federal agency (36 CFR 800.16(y)).

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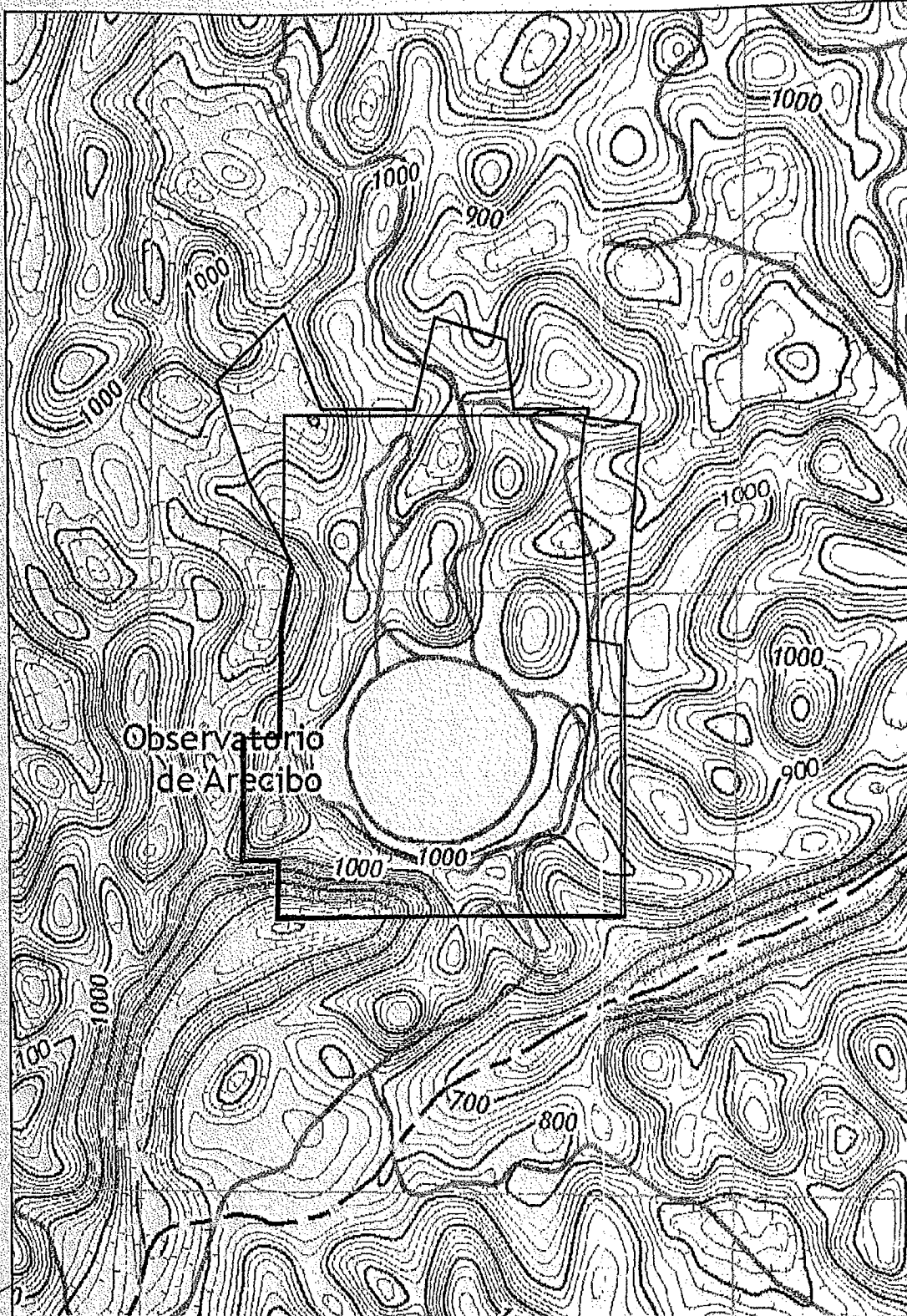
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Attachment D  
Area of Potential Effects

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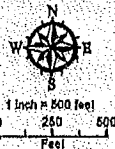
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-  Property Boundary and Area of Potential Effects (APE)
-  Historic District Boundary

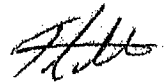


Cultural Resources Area of Potential Effects  
 Arecibo Observatory  
 Puerto Rico

USGS Topographic Quads Bayaney NE (2013) and  
 Utuado NW (2013)

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## Attachment E

Buildings and structures that may be retained or demolished based on the needs of any collaborator(s) under Alternative 1- *Collaboration with Interested Parties for Continued Science-focused Operations*





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**Buildings and structures that may be retained or demolished based on the needs of any collaborator(s) under Alternative 1, Collaboration with Interested Parties for Continued Science-focused Operations**

Structure/Building Number	Building Name	Year of Construction, if known
National Register of Historic Places designation (NRHP)*: #1A	Visitors Offices, Electronics/Digital Lab, Control Room/Operators Office, Facilities/Maintenance (2 <sup>nd</sup> level); and Safety/Security Office, PC Network Office, Visiting Scientists Offices	1963 (addition in 1983) Year of construction for trailers unknown.
Arecibo Observatory designation (AO): Trailers #66 and #68	Atmospheric Science Trailer and Scientific Offices Trailer	
NRHP: Building #2	1st floor: Scientific Services, Human Resources, TV/Conference Room; 2 <sup>nd</sup> floor: Director and Administration, Library, Mail Room; 3 <sup>rd</sup> floor: Palomar Room, Scientific Staff Offices; 4 <sup>th</sup> floor: Scientific Staff Offices	1963
AO: Building #2	Administration Building	
NRHP: Buildings #11 and #12	Warehouse and Business/Purchasing	1967
AO: Building #17	Warehouse	
NRHP: #4	Recreation Area	
AO: #10	Swimming Pool/Restrooms (with additional recreation areas)	mid 1960s
NRHP: #8 (B1-B2)	VSO Bachelor Units (B1-B2)	1990s
AO: #41	West Hill V.S.O. Bachelor Unit 1	
NRHP: #8 (B3-B4)	VSO Bachelor Units (B3-B4)	1990s
AO: #42	West Hill V.S.O. Bachelor Unit 2	
NRHP: #9 (F1)	VSO Family Units F1	1990s
AO: #43	West Hill V.S.O. Family Unit 1	
NRHP: #9 (F2)	VSO Family Units F2	1990s
AO: #44	West Hill V.S.O. Family Unit 2	
NRHP: N/A	N/A	
AO: #11	Lewis Building-Rigging Loft	mid 1960s
NRHP: N/A	N/A	
AO: #13	Bowl Shack	1963
NRHP: N/A	N/A	
AO: #21	Antenna Testing Range	
NRHP: N/A	N/A	
AO: #25	Paint Storage Building	2010
NRHP: N/A	N/A	
AO: #34	High Voltage Power Supply Building	1973




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NRHP: N/A	N/A	Late 1990s
AO: #60	Antenna Receiving Testing Building	
NRHP: N/A	N/A	1983
AO: #65	Shielded Trailer	
NRHP: N/A	N/A	2000s
AO: #73	HF Transmitter Building	
NRHP: N/A	N/A	2000s
AO: #78	Coffee Hut	
NRHP: N/A	N/A	
AO: #62	HFF Storage Trailer	
NRHP: N/A	N/A	
AO: #71	Electronics Cable Trailer	
NRHP: N/A	N/A	
AO: #64	Electronic Trailer	
NRHP: N/A	N/A	
AO: #59	Visitor Center Trailer	
NRHP: N/A	N/A	
AO: #70	Computer Trailer	
NRHP: N/A	N/A	
AO: #63	Ionosonde Trailer	
NRHP: N/A	N/A	
AO: #69	Electronic Trailer (Waveguide)	
NRHP: N/A	N/A	
AO: #72	Electronic Trailer (Cryogenics)	

**Key:**

-  **Contributing Resources:** described in the National Register of Historic Places Registration Form, which was completed in 2007, and identified as contributing to the NAIC Historic District Historic District based on correspondence with the Puerto Rico SHPO on May 20, 2016.
-  **Non-Contributing Resources:** described in the National Register of Historic Places Registration Form, which was completed in 2007, and identified as non-contributing to the NAIC Historic District Historic District based on correspondence with the Puerto Rico SHPO on May 20, 2016.
-  **Unevaluated:** buildings/structures not designated as contributing or non-contributing resources and considered to be unevaluated at this time.

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*\* The National Register of Historic Places Registration Form provides building numbers and names that do not always correspond to the current Arecibo Observatory facility designations. For this reason, the current NRHP Registration Form building designations are provided along with the Arecibo Observatory designations that are provided in Attachment A.*

Attachment D  
References and  
Definitions

## PA References:

Jacobs Engineering, Inc. 2018. Arecibo Observatory Historic Property Survey Report. Prepared for the National Science Foundation.

Jacobs Engineering, Inc. 2020. Preservation Principles and Management Plan, Arecibo Observatory, Puerto Rico. Prepared for the National Science Foundation.

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National Science Foundation (NSF). 2017. Programmatic Agreement between National Science Foundation, the Advisory Council on Historic Preservation, and the Puerto Rico State Historic Preservation Officer. November 13.

[www.nsf.gov/mps/ast/env\\_impact\\_reviews/arecibo/section106/arecibo\\_section106.jsp](http://www.nsf.gov/mps/ast/env_impact_reviews/arecibo/section106/arecibo_section106.jsp)

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Wobig, Jessica R. 2019. Amendment to the National Astronomy and Ionosphere Center Historic District. National Register of Historic Places Continuation Sheet (National Register Registration Form Addendum). National Register Reference Number 070000525. Prepared for Caroline M. Blanco, Federal Preservation Officer, National Science Foundation.

[www.nsf.gov/mps/ast/env\\_impact\\_reviews/arecibo/section106/PR\\_Arecibo\\_County\\_NAIC\\_Historic\\_District\\_form.pdf](http://www.nsf.gov/mps/ast/env_impact_reviews/arecibo/section106/PR_Arecibo_County_NAIC_Historic_District_form.pdf)

## PA Definitions:

**Adverse Effect:** a change to the characteristics that qualify a historic property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association (36 CFR 800.5(a)).

**Area of Potential Effects (APE):** the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking (36 CFR 800.16(d)). It is important to understand that the effects pertain to the effects on physical historic properties (eligible for or listed in the National Register of Historic Places [NRHP]) in a specific area.

**Concurring Party:** Any consulting party that has been invited by the federal agency (NSF) to concur in the PA. Concurring parties have the same rights with regard to seeking amendment or termination of the PA as other signatories. The refusal of any party invited to concur in the PA does not invalidate the document (36 CFR 800.16(d)).

**Consultation:** the process of seeking, discussing, and considering the views of other participants, and, where feasible, seeking agreement with them regarding matters arising in the Section 106 process (36 CFR 800.16(f)).

**Consulting Party:** Section 106 term that refers to organizations and/or individuals with a demonstrated interest in the undertaking due to the nature of their legal or economic relation to the undertaking or affected properties, or their concern with the undertaking's effects on historic properties. The participation of consulting parties is subject to approval by the federal agency (in this case, NSF).

Consulting parties are actively informed of and able to participate in the Section 106 process, including consultation meetings. The views of consulting parties are actively sought by NSF during the Section 106 consultation process. (36 CFR 800.2(c)(5))

**Effect:** an alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the NRHP (36 CFR 800.16(i)).

**Historic Property:** Any resource, such as a building, structure, or historic district, included in or eligible for inclusion in the NRHP, maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the NRHP criteria (36 CFR 800.16(l)).

**Intensive Building Survey:** defined by the National Park Service as a precise evaluation of all potential historic properties in a defined survey area (NPS, 1985). This type of survey includes research and field evaluations of potential historic properties to determine whether the resources meet the definition of a historic property according to the NHPA.

**Signatory:** Signatories include the federal agency (NSF), PR SHPO, and ACHP, and they have the sole authority to execute, amend, or terminate the PA (36 CFR 800.6(c)(1)).

**Programmatic Agreement (PA):** A document that records the terms and conditions agreed upon to resolve the potential adverse effects of a federal agency program or complex undertaking. For this undertaking, a PA is used to document the ways in which adverse effects are addressed because the result of the 2017 solicitation for new collaborators is undetermined and the needs of any new collaborator(s) are unknown (36 CFR 800.14(b)).

**Undertaking:** A project, activity, or program funded in whole or in part by a federal agency (36 CFR 800.16(y)).