Arecibo Science Advocacy Partnership

Board Policy Statement: 1st December 2021

Arecibo: Assessing the Loss of the Telescope and Potential Future for the Observatory

Over the last six decades the Arecibo Observatory with its 305-meter (1000-foot) telescope has been among the most productive and admired US science facilities, and its location in Puerto Rico has given it a particular visibility and prestige internationally. It has facilitated community engagement in three key areas of radio science: astronomy, planetary radar, and atmospheric science. This synthesis of science, methods, facilities, and communities have given Arecibo Observatory a unique significance, strength, and depth of accomplishment. This multi-disciplinary and multi-community character has proven difficult for other US science institutions to evaluate overall, and partial assessments and viewpoints remain an obstacle for the Observatory.

The loss of the Arecibo 305-meter telescope on December 1, 2020 leaves the three communities without the principal instrument for conducting their science. While other instruments and facilities are available, no US instrument provides even a fraction of Arecibo's capabilities, and other facilities and instruments are already in major use by their own communities. Thus the loss of the Arecibo instrument not only threatens the scientific progress of its user communities but also the research and educational activities that sustain those communities—as well as sustain their members, who will need to find other research or employment. The loss of its community would further slow progress were a replacement instrument to become available.

The loss of this telescope is not only a threat to US science but a threat to US scientific prestige. US prestige in radio astronomy is, for example, under immediate threat by the FAST telescope in southern China. Compared to the 305-meter Arecibo instrument, it has similar sensitivity and somewhat more sky coverage, but with major drawbacks: It has no radars, making it useless for Arecibo-like planetary and atmospheric studies, and its sensitivity is in a narrower frequency band. In addition, it is available to US users only on a limited, partial, and uncertain basis.

The disciplinary science panel of the recent National Academies Decadal Survey on Astronomy and Astrophysics (Astro2020) found Arecibo "irreplaceable" for addressing the science question "what are the mass and spin distributions of neutron stars and stellar black holes", found it offering unique capabilities relative to other US facilities for addressing three other science questions, and having a supporting role in addressing ten further science questions. Assessments from the other two disciplinary decadal surveys are not yet available.

Another key Astro2020 goal was to enhance community engagement with astronomy. Arecibo's Ángel Ramos Foundation Visitor Center "has been a model for this" with its outreach to hundreds of thousands of Puerto Ricans and visitors, its "promotion of demographic diversity in STEM" and "its impact on post-secondary education." A community of Puerto Rican radio scientists now pursue professions on the island and abroad. Mainland faculty who have brought students to Arecibo have found it a "beacon of inspiration", and PhDs in many thousands have depended on its science.

The Arecibo Science Advocacy Partnership supports a full and comprehensive evaluation of the significance and potential future accomplishments of the Arecibo Observatory. It supports the design, construction and secure future operation of a major new, modernized Arecibo telescope that will serve its three radio science communities on the island and the mainland for decades to come.

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Arecibo from Earth orbit ©DigitalGlobe
…Unique in the Solar System, and a beacon in our region of the Galaxy…