Scientists suggest protocol for messaging to aliens

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The Arecibo Observatory in Arecibo, Puerto Rico. NAIC - Arecibo Observatory, a facility of the NSF

(PhysOrg.com) -- In 1974, humans broadcast the first message targeted at extraterrestrial life using the Arecibo radio telescope in Puerto Rico. The message, which was aimed at the globular star cluster M13 located 25,000 light years away, consisted of binary digits that encoded information about our DNA, as well as graphics of a human, our Solar System, and the Arecibo telescope. Since then, humans have sent three other messages to nearby stars and planets (20-69 light-years away). These messages have become more complex and anthropocentric, with music, photographs, and drawings submitted by the public.

Now a team of scientists, Dimitra Atri from the University of Kansas, Julia DeMarines from the International Space University in France, and Jacob Haqq-Misra from Pennsylvania State University, has proposed that future attempts of messaging to extraterrestrial intelligence (METI) should follow a standard protocol to maximize communication effectiveness. They think that some of the content of past METI broadcasts, which contain sights and sounds, would likely go unnoticed by extraterrestrials who do not have visual or auditory perception (like some organisms on Earth). Instead, the researchers argue that short, simple messages with minimal anthropocentrism, and which rely on simple physical or mathematical language, have the best chance of success.

In their study, which will be published in a future issue of *Space Policy*, the researchers say that a METI protocol should provide constraints and guidelines for factors such as signal encoding, message length, information content, anthropocentrism, transmission method, and transmission periodicity. Currently, there are three antennas that have the capability of transmitting messages to planets anywhere in our galaxy; these telescopes are located in Arecibo, Puerto Rico; Goldstone, California, US; and Evpatoria, Crimea, Ukraine.

The researchers acknowledge the argument of some critics that broadcasting our presence to extraterrestrials is a security risk, since an advanced civilization would likely possess the capability to destroy us. But they note that Earth has been emitting electromagnetic signals into space for nearly 100 years due to the unintended leakage from TVs, telecommunications, and aviation. As the researchers explain, any civilization capable of radio transmission that lies within a radius of 100 light-years could detect our TV and radio, and would already know we're here.

The scientists also emphasize that searching for and attempting to

communicate with extraterrestrials is as much about understanding ourselves as it is about finding aliens. Once a protocol is developed, the researchers hope to test it in different human cultures throughout the world in order to minimize cultural bias and make the message as universal as possible. The researchers also plan to create an interactive website at which users can create, send, and decrypt messages to each other that follow the protocol. The researchers explain that, even if most of these messages are never sent into space, they will still allow people from different cultures to better appreciate our human diversity.

"In the next few weeks, we will be collaborating with mathematicians and radio astronomers to come up with both the content and mode of communication of the message," Atri said. "As suggested in the paper, it will not be anthropocentric like previous attempts. Once our collaboration comes up with a protocol, we will create an interactive website to test it globally. Anyone with internet access will be able to suggest his/her own message within the protocol guidelines based on scientific principles. We are also open to suggestions from both the scientific community and the general public for improvements in the protocol. It will be a community effort."

More information: Dimitra Atri, Julia DeMarines, and Jacob Haqq-Misra. "A Protocol for Messaging to Extraterrestrial Intelligence." arXiv:1101.4968v2 [physics.pop-ph] arxiv.org/abs/1101.4968