NASA IN THE SEARCH FOR ALIEN TECHNOSIGNATURES

After some prompting by Congress, NASA is again getting involved in SETI. Last week, it held a Technosignatures Workshop in Houston, exploring new ways scientists could seek intelligent aliens. Here's a buzzword you might or might not have heard before: technosignatures. SETI pioneer **Jill Tarter** has proposed that the search for extraterrestrial intelligence (SETI) be renamed the search for technosignatures. Although the question of whether we're alone in the universe is one of humanity's oldest (are there "others" who share the universe with us or are we all alone?), most searches for advanced alien life have sought radio waves of artificial origin. More recently, astronomers have suggested looking for visible laser pulses; this is called optical SETI. And there've been some exotic ideas, like the possibility that an advanced civilization might use neutron star mergers to signal across the cosmos.

But do we really know what to look for, from an alien civilization that might be millions of years ahead of us? NASA focused on that question last week (September 26-28, 2018), by hosting a NASA Technosignatures Workshop in Houston, Texas.

Technosignatures are any signs of advanced technology in any one of various plausible forms. They're analogous to biosignatures, which could be any element, isotope, molecule, or phenomenon that provides unmistakeable scientific evidence of past or present life on another world, whether intelligent or not. Technosignatures encompass a much larger conception of alien technology than just intelligent radio or light signals. They could also include such things as massive artificial structures or a planet's atmosphere full of pollutants. In this way, the search for technosignatures extends beyond the more familiar SETI-type scenarios of looking for radio or light signals.

Traditional SETI effort have used radio telescopes such as the Allen Telescope Array in California

The workshop was formed after Congress expressed a renewed interest in looking for intelligent alien life last April, urging NASA to expand on its search for technosignatures. The three main facets of the workshop included assessing the current state of the field of research, the most promising avenues of research in technosignatures and where investments could be made to advance the science. Another goal was to determine how NASA could best support the endeavor through partnerships with both private and philanthropic organizations. The workshop had four main specific objectives:

1. Define the current state of the technosignature field. What experiments have occurred? What is the state-of-the-art for technosignature detection? What limits do we currently have on technosignatures?
2. Understand the advances coming near-term in the technosignature field. What assets are in place that can be applied to the search for technosignatures? What planned and funded projects will advance the state-of-the-art in future years, and what is the nature of that advancement?
3. Understand the future potential of the technosignature field. What new surveys, new instruments, technology development, new data-mining algorithms, new theory and modeling, etc., would be important for future advances in the field?
4. What role can NASA partnerships with the private sector and philanthropic organizations play in advancing our understanding of the technosignatures field?

The NASA Technosignatures Workshop was recommended by Congress back in April 2018 as means for NASA to expand its search for evidence of alien civilizations. There may be many ways that an alien civilization, especially one more advanced than us, could affect or alter its environment. Searches for alternative evidence such as this have been done to some extent, but primarily only in the private and philanthropic sectors, not NASA. SETI itself used to be a NASA program until budget cuts ended it in 1993. SETI is now a privately-funded venture. NASA shifted its focus to understanding the origin of life itself, and the potential habitability of other bodies in our solar system and galaxy. This is especially true with its Mars rover missions in recent years, looking for evidence of past habitability, but not life itself. What about a technological civilization existing on Earth itself before humans? AK, with EarthSky and Wikipedia Notes