By Dr. H. Paul Shuch,* N6TX

DR. SETI'S STARSHIP

Searching For The Ultimate DX

A Fork in the Road

Before its funding was terminated by Congress in 1993, NASA's two-tined SETI (Search for Extra-Terrestrial Intelligence) program relied on a pair of distinct but complementary research elements: a targeted search of nearby Sun-like stars, and an all-sky survey for interesting signals of unknown origin.

The former, which involves aiming at likely candidate stars for long periods of time, is well suited to large, steerable dishes with their narrow beamwidths and high sensitivities. Frank Drake's *Project Ozma* effort of 1960, which we discussed in the summer issue of *CQ VHF*, was a targeted search, concentrating on two nearby sun-like stars for evidence of technological life.

It was a sensible way to launch modern SETI. After all, if we guess right as to which stars constitute likely candidates, the targeted search will provide us with the greatest likelihood of immediate success. However, we know of only a limited number of relatively nearby candidate stars. Thus, concentrating our search in their direction may cause us to miss an equally good star of which we happen to be unaware.

An all-sky survey, on the other hand, makes no *a priori* assumptions as to the most likely direction to explore. The sky survey seeks to sweep out the entire sky as seen from a given location. No antenna tracking is required because it is the entire sky, rather than individual stars, which we scan. While target-search antennas must constantly be moved, sky-survey radio telescopes are operated in what is called *drift-scan*, or *meridian transit* mode. It is the Earth's rotation which turns them.

The best known of all the all-sky surveys was conducted for a quarter of a century from the Big Ear radio telescope, built by the late Dr. John Kraus, W8JK, at the Ohio State University radio observatory. That telescope sadly is gone now, an historical loss which will be the subject of a future column.

NASA's late targeted search was resurrected by the non-profit California-based SETI Institute (a group of professional radio astronomers, not to be confused with the 1300 radio amateurs in 60 countries who make up the grass-roots SETI League). Their *Project Phoenix* search hires time on some of the world's finest radio telescopes, such as the 305-meter diameter Arecibo dish in Puerto Rico, and the 76-meter wide Sir Bernard Lovell telescope at Jodrell Bank, Cheshire, UK. With them, our colleagues survey the 1000 nearest Sun-like stars, all within about 200 light years of Earth. If we have nearby neighbors, *Project Phoenix* is likely to detect their radio pollution. However, because large antennas have quite narrow beamwidth, they see only a small portion of the sky (perhaps one part in a million) at a given time. Despite their super sensitivity, their narrow beamwidth could cause them to miss the mark.

That's where amateur radio astronomers, with their modest systems in the back garden, can make all the difference. The sky-survey component is best performed with antennas of moderate size. Smaller antennas can see more sky within their beam patterns, but have less gain. We achieve reasonable sensitivities through digital signal processing, but the antennas need to scan for extremely long periods of time. The sky-survey approach thus seems ideally suited to the community of radio amateurs and microwave experimenters. This is the area in which The SETI League is concentrating its efforts, through our own *Project Argus* all-sky survey.

Small amateur radio telescopes such as this one are springing up in backyard gardens all around the world as part of the Project Argus all-sky survey for signals of intelligent extra-terrestrial origin. (SETI League photo)

The two strategies, targeted search and all-sky survey, are entirely complementary. The former stands the best chance of detecting incidental radiation from other radio-using civilizations inhabiting nearby worlds. The latter is ideal for detecting powerful beacons being transmitted by advanced civilizations in distant corners of the galaxy. Between them, the two tines stand the greatest chance of catching that elusive fish in the cosmic pond. While the professionals continue to train their great telescopes on specific targets, hundreds of amateur astronomers around the world together are seeing in all directions at once, so that no direction on the sky shall evade our gaze.

It doesn't take a rocket scientist. You too can make a difference by becoming a part of *Project Argus*, the reincarnation of NASA's all-sky survey component. For more information on how you can become involved, please contact me at my e-mail or postal address listed with this column.

To paraphrase the American poet Robert Frost . . .

Two paths to the stars diverged, and I—
I chose the one that NASA let die,
And that may make all the difference.

73, Paul, N6TX

*Executive Director, The SETI League, Inc.,
<www.setileague.org>
e-mail: <n6tx@setileague.org>