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SETI

THE SEARCH FOR EXTRATERRESTRIAL INTELLIGENCE

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Abstract

The rationale for SETI is based on three arguments. First, there may be a plurality of inhabited worlds in the universe. Second, we now have sophisticated radiotechnology which may allow us to detect signals transmitted by extraterrestrial civilizations. Third, even if the probabilities of detection are low, the extraordinary value of an unambiguous positive result justifies spending on SETI some tiny fraction of the gross national product of the planet Earth.

Some sixty SETI searches have been carried out over the last thirty years, nearly all in the microwave region of the spectrum. Most have been carried out as small scale ventures with signal detection instrumentation of very limited capability. This is about to change. NASA will soon begin an enormously more comprehensive search as part of its Exobiology Program, which seeks to understand the origin, evolution and distribution of life in the universe.

The NASA SETI Microwave Observing Project is designed to investigate the hypothesis that life, including intelligent life, may be widespread in this galaxy. A promising and technically feasible method of discovering extraterrestrial life is the detection of microwave signals that are transmitted by extraterrestrial civilizations. The Microwave Observing Project will carry out, through the decade of the 1990's, a systematic search of the terrestrial microwave window (1-10 GHz), where emissions from natural sources and background are least. The Targeted Search will examine some 800 nearby sun-like

stars at high sensitivity. The Sky Survey will slowly sweep the entire sky at a lower sensitivity. Existing ground-based radiotelescopes equipped with special signal processors will provide search systems very sensitive to an extended class of signals that are concentrated in frequency and time and that, as far as we know, are not produced by astrophysical processes. The search systems will use high speed digital processors capable of searching wide radio frequency bandwidths with very high spectral resolution: the Targeted Search system has a 10 MHz input resolved to about 1 Hz, and the Sky Survey system a 300 MHz input resolved to about 30Hz. The systems will also employ real-time signal recognition and near real-time signal verification. They will discriminate against radiofrequency interference and provide fully automated operation through the first stage of routing signal verification. The SETI Microwave Observing Project will begin searching on October 12, 1992, and will continue for about ten years. The Project is led by the NASA Ames Research Center and will be conducted by Ames, the Jet Propulsion Laboratory, and investigators from the scientific community.

In its first few minutes of operation the new NASA endeavor will cover more astronomical search space than all previous sixty searches combined. We are testing a hypothesis. That is the purpose of SETI. If we detect a signal, we will know for the first time that we are not alone, and that biology and intelligence abound in the universe.

SETI is also exploration. The tools that are being developed and used for microwave searches open up new dimensions of search space. A frequent consequence of exploration is the discovery of things that were not predicted. We should expect the unexpected.