THE FISHERHAVEN ASTRONOMER

**THE SEARCH FOR EXTRATERRESTRIAL INTELLIGENCE**

**(SETI)**

As long ago as 1896, Nikola Tesla considered the possibility that radio reception could provide us with the proof that Extraterrestrial Intelligence does exist in our solar system. Tesla’s claims that he may have picked up signals from Mars from his experimental station in Colorado Springs, were later disproved. However, the idea that mankind may well be able to receive signals from outer space persisted and in the early 1900s, Marconi also believed that his radio station may have received signals from Mars.

In August 1924, Mars closed to a mere 56 million kilometres from Earth and, in America, a radio receiver was hoisted by an airship to three kilometres above the ground. Further measures to assist in receiving signals from Mars included a radio silence period which was declared for five minutes on every hour. The attempts were unsuccessful.

In 1960, an American astronomer Frank Drake, carried out a major SETI experiment by means of a large radio telescope. He found no signals. Since then, scientists, including scientists from the Soviet Union, had a growing interest in SETI and many radio telescopes were used to scan the universe for radio signals that could originate from intelligence not of this Earth. In 1966 a best-seller by the astronomer Carl Sagan, named *Intelligent Life in the Universe*, kindled more interest. In 1971, NASA (National aeronautics and Space Administration) funded a SETI study involving Frank Drake (why is Drake important? He formulated the so-called *Drake Equation* that is a probability based argument which is used to estimate the number of active communicative extraterrestrial civilizations that could exist in our galaxy), and others. The outcome of the study was that an Earth-based radio telescope consisting of 1,500 dishes should be built to carry this search. The cost was determined to be U$10 billion and the project was terminated.

Come 1988, for the first time ever, a planet beyond our solar system was detected. This planet was confirmed in 1992. Such planets are called “extrasolar planets” (“exoplanets” for short). Earth bound detection of planets is extremely difficult and in 2009, NASA launched the “Kepler” space observatory with the purpose of detecting earth-sized exoplanets. *Kepler* has been most successful and by 1 June 2017, a total of 3,610 exoplanets in 2,704 planetary systems have been detected and confirmed. *Kepler* has also detected a few thousand of “candidate exoplanets” that still have to be confirmed. Astronomers say that about one in every five Sun-like stars (similar in characteristics to our Sun) have an “Earth-sized planet” in its habitable zone (Note: The *habitable zone* around a star is that group of orbits that can support liquid water under an atmospheric pressure similar to that of the Earth). It is now accepted that our galaxy (the Milky Way) has some 200 billion stars and it is, therefore, reasoned that there may be 11 billion potentially habitable planets similar in size to the Earth.

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| This vast number of potentially habitable stars have raised a new level of enthusiasm in the search for extraterrestrial intelligence. In 2015, a new program called the *Breakthrough Initiatives* was founded and funded by the Russian capitalist and scientist, *Yuri Borisovich Milner*, who made U$ 100 million available for this purpose. *Breakthrough Listen* is a 10 year initiative that has as its aim to search over 1 million stars for artificial radio or laser transmissions. Radio telescopes like that at Green Bank in West Virginia (the largest steerable radio telescope in the world) and the Parkes Observatory in New South Wales, Australia. Laser transmissions will be searched for by the *Automated Planet Finder*, a fully robotic telescope situated at the summit of Mount Hamilton in California, USA.  *Breakthrough Message* is an initiative to study the ethics of sending messages into deep space. It has launched a competition to design a digital message that could be transmitted from Earth to an extraterrestrial civilization. | Green Bank radio telescope  (Wikipedia) |

*Breakthrough Starshot* is an initiative to develop a fleet of minute sail robotic spacecraft that could make a journey from Earth to the star *Alpha Centauri* at a speed approximating 20% of the speed of light. The fleet would consist of 1,000 small spacecraft. Each spacecraft would be about centimetre-sized (similar to as postage stamp) and will have four cameras as well as a compact laser communications system to report back to earth. At the projected speed of these craft it should take them 20 years to reach *Alpha Centauri* and about four years for their message to reach the Earth. En route they would fly by the star *Proxima Centauri* and its planets, one of which is earth-sized. These *nanocraft* would be propelled (pushed) by a number of ground-based lasers with a power output of up to 100 gigawatts.

*Breakthrough Watch* is an astronomical initiative to develop Earth- and space-based systems that will be able to find Earth-like planets within a distance of 20 light years from our solar system, as well as to develop a way of determining whether these planets harbour life.

During the 2015 public launch of the *Breakthrough Initiatives*, the renowned physicist Stephen Hawking said: “In an infinite Universe, there must be other life, there is no bigger question, It is time to find the answer.”

[ Source: Wikipedia]