

56th IISL COLLOQUIUM ON THE LAW OF OUTER SPACE (E7)
International Regulations of Space Communications: Current Issues (3)

Author: Prof. Douglas Vakoch

SETI Institute and California Institute of Integral Studies, United States, dvakoch@seti.org

INTERNATIONAL REGULATIONS OF TRANSMISSIONS TO EXTRATERRESTRIAL
INTELLIGENCE: ACTIVE SETI, RADAR ASTRONOMY, AND THE RADIO REGULATIONS

Abstract

For over a half century, astronomers have used radio telescopes to search for signals from technologies around other stars. The Search for Extraterrestrial Intelligence (SETI) has traditionally emphasized a passive search for such signals. In recent years, the prospect of Active SETI has been examined, in which humankind would transmit intentional signals to possible extraterrestrial civilizations. This paper explores the Radio Regulations (RR) relevant to SETI projects, reviewing the limited ways that the RR has protected Passive SETI to date and exploring possible protections of Active SETI that could be considered at future World Radio Conferences.

The Radiocommunication Sector of the International Telecommunication Union (ITU-R) is charged with ensuring the rational, equitable, efficient, and economical use of the radio spectrum. Within the ITU-R, Study Group 7 (Science Services) includes a Working Party (WP 7D) devoted to radio astronomy and radar astronomy; WP 7D is charged with addressing the spectrum requirements of radio and radar astronomy, including protection of these portions of the spectrum as well as sharing with other services.

When SETI projects first began in the 1960s, technological capabilities limited the range of frequencies that could be searched. As a result, searches were conducted at “magic frequencies” that were judged likely to be known and used by extraterrestrial astronomers as well as by humans. Consequently, SETI searches received some protection through the same regulations that protected other radio astronomical observations. With advances in computing power, contemporary SETI searches cover billions of frequency channels; for example, the SETI Institute’s Allen Telescope Array has antenna feeds sensitive to the full frequency range from 500 MHz to 11.2 GHz, with expansion to higher frequencies underway. While this telescope is capable of searching this full range of frequencies, radio frequency interference (RFI) make it impossible to survey some portions of the radio spectrum.

Currently there are no sections of the radio spectrum protected for Active SETI transmissions. This paper considers one promising possibility for Active SETI: sharing frequencies that are already reserved for radar astronomy. While there have been no ongoing Active SETI projects to date, several demonstrations have been conducted using radar astronomy facilities, such as the Arecibo Observatory in Puerto Rico and the Evpatoria Planetary Radar in the Ukraine. Sharing frequencies for Active SETI and radar astronomy could provide additional support for reserving these frequencies for scientific transmission projects in the future, as demands from competing services grow.