SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2) Advanced Technologies for Space Communications and Navigation (3)

Author: Ms. Divya Shankar

Nitte Meenakshi Institute of Technology, India, divya.outerspace@gmail.com

DESIGN APPROACHES FOR INTERSTELLAR COMMUNICATION

Abstract

The prime purpose of sending a probe to another star is to collect data and send this data back to Earth for interpretation and analysis. This presents some difficult technical challenges, with several potential technology choices for implementing the communication system.

This paper considers various technologies that can be used for interstellar communication, drawing comparisons with Voyager, Pioneer and New Horizons, which have demonstrated interplanetary communication. Microwave and optical systems are analyzed for a multi-light year link, with a brief description of the components that make up the transmitter and receiver. A link budget analysis is performed for both the probe-to-Earth link, and also between the probe and any sub-probes that are launched in the destination star system. This analysis demonstrates that optical communication systems have many desirable parameters compared to microwave systems. The initial subsystem design considerations for an optical communication system are presented. The use of repeaters and the technology of gravitational lensing are presented.

This paper is a submission of the Project Icarus Study Group.