

SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)
Near-Earth and Interplanetary Communications (1)

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INTERSTELLAR COMMUNICATION TECHNIQUES FOR LONG RANGE MISSION SPACECRAFT

Abstract

We are presently on the verge of expanding our technology in the outer solar system environment. Voyager 1 has landed its first step outside the heliosphere. Data transfer at large distances of astronomical units and light years is a challenging matter of research and a key issue of the interstellar communication. If robotic instruments are sent aboard interstellar spaceflights, managing them from earth with a definite time lag is a puzzle of its own kind. However artificial intelligence can come out to as a great tool in the future for missions beyond and far from the solar system. For such interstellar medium missions, we need to develop appropriate technology to recover the data from Earth from very large astronomical distances. Assuming that such high velocity unmanned robotic spacecrafts are a nearby possibility, we look into this problem in detail and try to explore the related fields which can help in upgrading the present level of interplanetary space communication. Data transfer has to be efficient with a minimum amount of data loss in travelling long distance in the space particularly the interstellar medium. Properties of interstellar medium can be studied closely in such missions that will carry advanced space based sensors, detectors and scientific instruments for taking measurements during the mission. Such a data can be analyzed by onboard computers and also be sent to earth with minimum possible attenuation due to the effect of large distances in the interstellar medium. Advanced data encryption methods and holographic techniques can be studied in details to shortlist the advanced onboard data-sending instruments technology. This paper discusses these in detail and the inception of appropriate protocols for dealing with these issues.