

SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)
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”WHAT IMPROVEMENTS TO THE DEEP SPACE NETWORK (DSN) ARE NEEDED TO SUPPORT MANNED MISSIONS TO MARS.”

Abstract

As we have seen in the news, events/conferences, or on social media that the rovers sent by NASA have reached the Mars surface and achieved the biggest achievement of the century. Everyone is curious to know more about the Mars mission. People want to know what the primary purpose behind this mission is; are we going to get any benefits, what are we trying to learn, is it worth to invest, and lots of questions like these. When discussing all the issues which were raised, as a telecommunication engineer, the first question in mind comes from the communication perspective with the planet Mars. As of now, the scientists are using Deep Space Network (DSN) Technology for the communication between Earth stations, Satellite around the planet Earth and Mars, and the Rovers on Mars surface. But is the technology good enough for future missions because of some limitations? If somebody can address the issues and able to get the answers, then it would be helpful for people, students, researchers and whoever is interested to know about the mission. Some of the issues are, the cost of the hardware required for DSN set up and its maintenance, bandwidth limitation, frequency limitation (transmitting and receiving frequency noise), other noise sources in the space which affect the signal quality (gravitational waves, high-frequency noise). Also, the power requirement and noise (thermal noise because of high power), data rate, propagation delay, endless and uniform connectivity, DSN Scheduling, etc. are few of the well-known issues now. The methodology used in the research is a focused group discussion where the specific questions will be posted on the public forums like Quora, ResearchGate, Reddit, Google Group, Facebook groups, etc. Once the response is received, it will be analyzed with the help of an expert working in this field. At the end of this research, the researcher should be able to answer as many issues as possible which are a crucial step for the sake of humankind. It is very necessary to solve all the problems related to the DSN technology before sending our people to the planet Mars to provide any type help to them in the case of an emergency.