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Author: Mr. Prasad Falke
International Amateur Radio Union, United States

DEEP SPACE MISSION UTILIZATION TO LAUNCH THE SMALLSAT NETWORK TO ADDRESS
COMMUNICATION NEEDS.

Abstract

After SpaceX Falcon Heavy launch in February this year, everyone raised their eyes for a human mission to the Mars in next decade. When the others were celebrating, the scientists still worked on to fix the communication needs. With no reliable communication, there is a high possibility by the government(s) to not to sanction any mission which may jeopardize the lives. The communication between Earth and other planets is already delayed; for Mars, it is from 4 to 24 minutes one way with more time to process and interpret the signal. During Solar Conjunction or other unexpected events, the communication may get lost and cause severe issues to the mission.

To avoid such a communication loss, there are anticipated ways to plan and execute. For instance, use of SmallSat (Small Satellite) network in the deep space may help to maintain the reliable communication, this way, the connectivity can be managed irrespective of the expected/unexpected interruptions in the space. The advantages of Small Satellite network over traditional satellite system are extraordinary; low power, reduced cost, easy and less assembly time, and flexible launch with other payloads. The SmallSat comes in a different size and specifications depending on the requirement, the weight varies from 0.01 kilogram to 180 kilograms, so this can be designed by a school or university and not necessarily by the commercial satellite companies. As a result, the cost will get reduced by a considerable margin, and the dependency on the government budget will be under control. With 25 years of space life, the small satellites will help the Deep Space Network (DSN) to exchange the signals with other spacecraft/rovers through them, and the transmission/reception strength will improve.

The solution can be implemented by including several SmallSats along with the actual payload when launched; the satellites can be dropped on the way in the deep space. The Mars 2020 mission can be an excellent example for the same purpose; it will not only help to establish the connection but can be used as a repeater system once the rover reaches the Martian surface. The proactive solution would help the future robotic missions to understand the complexity in communicating back and forth and can save lots of efforts for the human mission. As NASA already confirmed the use of Small Satellite network for the future needs, it can help to solve unanswered questions in the deep space.