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SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND  
DEVELOPMENT (D3)Systems and Infrastructures to Implement Future Building Blocks in Space Exploration and Development  
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## IMPROVING COMMUNICATION FOR SPACE EXPLORATION MISSIONS TO MARS

**Abstract**

Currently, space agencies around the globe are focusing their exploration programs on the Moon, Near-Earth Objects (NEOs, such as asteroids) and Mars. However, one of the main difficulties in attempting such journeys lies in maintaining communications with the distant spacecraft. Communication systems are indispensable in enabling space exploration by providing a means of navigating and controlling the spacecraft. They are also essential for downloading data from scientific instruments. The issue of communication for space exploration was addressed by the 2012 Space Generation Congress (SGC) Exploration Working Group composed of 25 students and young professionals of the space industry with variety of backgrounds from 16 different countries. The main objective of the 2012 SGC Exploration Working Group was to analyze the current situation in space communications and to draw recommendations for improving existing capabilities, as well as future systems.

After analyzing the different issues with communication in the space exploration context and the different destinations for space explorations missions, the working group chose to focus on providing solutions to improve communication for Mars exploration missions. This paper outlines the findings and recommendations by the Working Group which focus on improving both regulatory and technological aspects of space communication and highlight the importance of international collaboration in solving these issues.