

Technology Roadmaps for Space Exploration (09)
Technology Development Concepts (2)

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CASE STUDIES FOR LOW COST INTERPLANETARY AUGMENTATION NANOSPACECRAFT
MISSIONS**Abstract**

Interplanetary missions to the Solar System, specially targeting Earth-Moon-Mars system, are having a great impact in the study of the planets environment sending large quantities of valuable information to Earth. In addition, robotic missions increase the amount of scientific data to be sent back to the primary spacecraft and then relayed to Earth. Alternative nanosatellite missions will help to improve the data acquisition time from robotic missions, increase environment science payloads data and enlarge storage capacity in orbit. This paper investigates the use of nanospacecraft in the role of augmenting relay communications to Earth for primary missions. In particular, this paper discusses a number of lunar and interplanetary current missions and future roadmap concepts, and sets different case studies deriving high level mission requirements, and then investigating the adaptation of existing micro and nanosatellite technologies and systems approaches for the purpose of flagship mission low cost augmentation. The possible mission enhancements will be discussed in terms of the improved mission robustness, enhanced science return, additional applications enabled and the potential to reduce the cost of the primary spacecraft. Diverse subsystems such as flight dynamics, propulsion, reliable and robust command and data handling, and prospective payloads for augmentation nanospacecraft are considered key areas of investigation.