

Reconfigurable Power-Aware EVA Radio

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Identification and Significance of Innovation

Advanced Extra Vehicular Activity (EVA) radio system is a pivotal technology for the successful support of the International Space Station beyond 2020 and future human space exploration missions. It facilitates surface operations, enables crew mobility, and supports point to multi-point communications across rovers, Lander, habitat, and other astronauts. Driven by Communications, Command, Control, and Information interoperability, tight power budgets, and extreme miniaturization, this mobile radio platform must be power efficient and highly adaptive.

Estimated TRL (1 – 9) at beginning and end of contract: 1 to 3

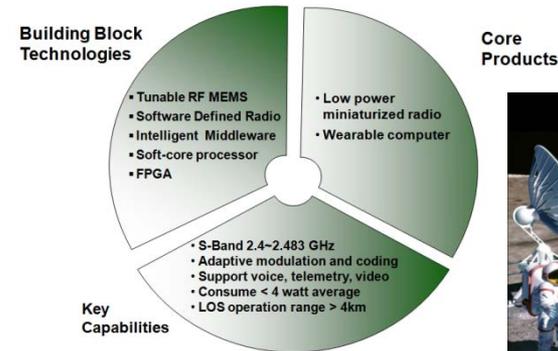
Technical Objectives and Work Plan

Objectives:

achieve extreme miniaturization and reconfigurability using state-of-the-art RF micro-electromechanical systems (MEMS) and software defined radio (SDR) technologies; and low power design using hardware, middleware and system level power saving techniques.

Tasks:

- Task 1: Kickoff meeting and requirements Analysis and Design
- Task 2: Design and develop the Software Defined Radio
- Task 3: Conduct system-level simulations and limited measurements to assess impact of vibration on high-Q MEMS tunable filters
- Task 4: Design and develop middleware that use Adaptive Modulation and Coding techniques
- Task 5: Evaluate and estimate the proposed radio performance and characteristics



NASA and Non-NASA Applications

The technology developed in this SBIR effort can benefit many NASA applications, including communication between rovers and spacecraft, astronaut EVA communication networks, space port communications, and asset tracking. This adaptive radios developed is also suitable for commercial and military telecommunication. The proposed reconfigurable software defined radio with tunable filter can prolong the lifespan of the wireless products, reduce the development cost, and reduce electronic waste. The power aware feature of the proposed radio can extend the battery life of many wireless connected devices.

Firm Contacts

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