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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 (2)

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TECHNOLOGY DEVELOPMENT FOR ENABLING IN-SPACE INFRASTRUCTURE

Abstract

Expanding our economic sphere beyond the Earth will bring humanity greater prosperity and security. There are many historical examples of how investments in infrastructure have led to booms in economic growth, including the railroads, the interstate highway system, the electric power grid, and the Internet. In-space infrastructure consists of the systems and services operating in the Earth's neighborhood to facilitate commerce and human exploration. The types of in-space infrastructure that are likely to provide the greatest return on investment will probably be similar to the historical examples, which fall into the broad categories of transportation, communications, and power distribution. There may also be unique infrastructure needs for space such as in-situ resource utilization, satellite servicing, and orbital debris removal. A strategy of near-term technology investments that will begin to build the foundations for this infrastructure is proposed. NASA projects that are developing technologies for reusable in-space transportation systems, cryogenic propellant depots, high data rate communications, solar and nuclear power systems, lunar and asteroid resource prospecting, and satellite servicing are discussed.