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Concepts, Technologies, Infrastructures and Systems for the Exploration and Utilisation of Space (2)

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RAPID PROTOTYPING OF ADVANCED EXPLORATION SYSTEMS

Abstract

NASA faces challenges in continuing the development of advanced systems for human spaceflight with limited budgets. New approaches are needed to improve affordability. By using small, focused "skunkworks" projects to rapidly develop and test prototype systems in house, NASA can sharply reduce lifecycle costs, minimize the risk of incorporating new technologies into system designs, and effectively use its workforce. With this approach, NASA engineers and technologists gain hands-on experience with hardware, instead of just providing contractual oversight.

NASA's Advanced Exploration Systems (AES) program is pioneering new approaches for rapidly developing prototype systems, demonstrating key capabilities, and validating operational concepts for future human missions beyond Earth orbit. AES activities are uniquely related to crew safety, and strongly coupled to future vehicle development. The AES program consists of a small set of skunkworks-like projects. These projects target high-priority capabilities for human exploration such as advanced life support, deep space habitation, crew mobility, and extra-vehicular activity (EVA) systems. The prototype systems developed in the AES program will be demonstrated in ground-based test beds, field tests, underwater tests, and ISS flight experiments. An overview of the AES projects and the innovative approaches, partnerships, and management practices used for rapid prototyping will be presented.