

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

Author: Mr. Jason Hay

Bryce Space and Technology, United States, jason.hay@taurigroup.com

Ms. Elaine Gresham

Bryce Space and Technology, United States, elaine.gresham@taurgroup.com

Ms. Carie Mullins

Bryce Space and Technology, United States, carie.mullins@taurigroup.com

Ms. Rachael Graham

Bryce Space and Technology, United States, rachael.graham@taurigroup.com

Ms. Julie Williams-Byrd

NASA LaRC, United States, julie.a.williams-byrd@nasa.gov

Mr. John D. Reeves

NASA LaRC, United States, john.d.reeves@nasa.gov

INNOVATIVE TECHNOLOGIES FOR GLOBAL SPACE EXPLORATION

Abstract

Under the direction of NASA's Exploration Systems Mission Directorate (ESMD), Directorate Integration Office (DIO), The Tauri Group with NASA's Technology Assessment and Integration Team (TAIT) completed several studies and white papers that identify novel technologies for human exploration. These studies provide technical inputs to space exploration roadmaps, identify potential organizations for exploration partnerships, and detail crosscutting technologies that may meet some of NASA's critical needs. These studies are supported by a constantly updated and maintained relational database of more than 400 externally funded technologies relevant to current exploration challenges. The identified technologies can be integrated into existing and developing roadmaps to leverage external resources, thereby reducing the cost of space exploration. This approach to identifying potential spin-in technologies and partnerships could apply to other national space programs, as well as international and multi-government activities.

This paper highlights innovative technologies and potential partnerships from economic sectors that historically are less connected to space exploration. It includes breakthrough concepts that could have a significant impact on space exploration and discusses the role of breakthrough concepts in technology planning. Technologies and partnerships are from NASA's Technology Horizons and Technology Frontiers game-changing and breakthrough technology reports as well as the External Government Technology Dataset, briefly described in the paper. The paper highlights example novel technologies that could be spun-in from government and commercial sources—including virtual worlds, synthetic biology, human augmentation, and novel computing architectures. It will consider how these technologies can impact space exploration and will discuss ongoing activities for planning and preparing them.