

Technology Roadmaps for Space Exploration (09)  
Enabling Technologies for Exploration (3)

Author: Dr. Carolyn Mercer

National Aeronautics and Space Administration (NASA), United States, cmercer@nasa.gov

Ms. Julie Williams-Byrd

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

Mr. Scott Vangen

NASA John F. Kennedy Space Center, United States, scott.vangen-1@nasa.gov

Ms. Jonette Stecklein

NASA, United States, jonette.m.stecklein@nasa.gov

Dr. Shamim Rahman

National Aeronautics and Space Administration (NASA), Stennis Space Center, United States,  
Shamim.A.Rahman@NASA.gov

Dr. Dianne Wiley

National Aeronautics and Space Administration (NASA), United States, dianne.s.wiley@nasa.gov

Dr. David Korsmeyer

National Aeronautics and Space Administration (NASA), United States, david.korsmeyer@nasa.gov

Dr. Craig Kundrot

United States, Craig.E.Kundrot@nasa.gov

Dr. Tibor S. Balint

Royal College of Art, United States, tibor.s.balint@nasa.gov

Mr. Leslie Alexander

NASA Marshall Space Flight Center, United States, Leslie.Alexander-1@nasa.gov

Mr. Matthew Rosenthal

Booz Allen Hamilton, United States, rosenthal\_matthew@bah.com

Mr. David Alfano

NASA Ames Research Center, United States, David.D.Alfano@nasa.gov

## CRITICAL TECHNOLOGY DETERMINATION FOR FUTURE HUMAN SPACE FLIGHT

**Abstract**

As NASA prepares to extend human presence throughout the solar system, technical capabilities must be developed to enable long duration flights to destinations such as near Earth asteroids, Mars, and extended stays on the Moon. As part of the NASA Human Spaceflight Architecture Team, a technology development assessment team has identified a suite of critical technologies needed to support this broad range of missions. Dialog between mission planners, vehicle developers, and technologists were used to identify a minimum but sufficient set of technologies, noting that needs are created by specific mission architecture requirements, yet specific designs are enabled by technologies. Further consideration was given to the re-use of underlying technologies to cover multiple missions to effectively use scarce resources. This suite of critical technologies is expected to provide the needed base capability to enable a variety of possible destinations and missions.

This presentation describes the methodology used to provide an architecture driven technology development assessment (“technology pull”), including technology advancement needs identified by trade

studies encompassing a spectrum of flight elements and destination design reference missions.