

## HUMAN EXPLORATION OF THE SOLAR SYSTEM SYMPOSIUM (A5)

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SYNERGIES OF ROBOTIC ASTEROID REDIRECTION TECHNOLOGIES AND HUMAN SPACE  
EXPLORATION**Abstract**

In 2011 the Keck Institute for Space Studies at the California Institute of Technology examined the feasibility of an Asteroid Retrieval Mission with the goal of rendezvousing with, capturing, and redirecting to a stable lunar orbit an entire small near-Earth asteroid [1]. This concept is now under consideration for implementation by NASA [2,3]. KISS has continued their support of this concept through the examination of mission architectures that look more broadly at how asteroid retrieval technology could be used to extend human activities beyond cislunar space.

Since the development of the asteroid retrieval mission concept a number of ideas have been brought forward for applications of this capability to other important space activities including planetary defense, deep-space human space transportation, commercial exploitation, and science investigations. Consideration of these and other applications is important because the asteroid retrieval technology represents a new and exciting capability for humanity, the implications of which are only just now being developed. The asteroid retrieval mission concept is envisioned as a supporting step in the long-range human exploration program for missions beyond the Moon and eventually to Mars. Broader consideration of the technologies and opportunities inherent with asteroid retrieval would help put the first proposed asteroid retrieval mission in context as an essential step in expanding human presence beyond low Earth orbit. A KISS workshop held in April 2014 brought together experts from around the world to identify potential applications of asteroid retrieval technology. This paper describes the output from that workshop.

References [1] J. Brophy et al., "Asteroid Retrieval Feasibility Study," Keck Institute for Space Studies Report, April 2012. [2] B. Muirhead, J. Brophy "Asteroid Redirect Robotic Mission Feasibility Study," presented at IEEE Aerospace Conference, Big Sky, Montana, March 2014. [3] P. Abell, et al., "NASA's Asteroid Redirect Mission: Overview and Status, presented at the 40th COSPAR Scientific Assembly, Moscow, Russia, August 2014.