Paper ID: 21766
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27th SYMPOSIUM ON SPACE POLICY, REGULATIONS AND ECONOMICS (E3)
International Space Exploration Policies and Programmes (2)

Author: Dr. Scott Pace
Space Policy Institute, George Washington University, United States

BUILDING A STRATEGIC FRAMEWORK FOR HUMAN SPACE FLIGHT

Abstract

This paper describes the most recent U.S. space transportation and exploration policies and their relationship to the work of the International Space Exploration Coordination Group (ISECG). It argues that the United States is currently pursuing its civil, commercial, and national security space objectives separately and missing opportunities foster greater international cooperation in space that would support its national interests. The United States and its potential international partners need to build a strategic framework for human space flight that recognizes the political, economic, and technical constraints facing all spacefaring nations.

Human missions to the vicinity of Mars, cis-lunar space, and the surfaces of the Moon, Mars, and asteroids have varying degrees of technical, political, and budgetary difficulty. There is a common criticism that "dates and destinations" are not appropriate to post-Cold War space explorations. At same time, "flexible paths" that offer multiple options do not provide the clarity and stability necessary for effective program management. A primary challenge to creating a practical and sustainable program of human space exploration is not a lack of ambitious goals but the difficulties in organizing a practical sequence of projects.

The paper concludes by proposing a synthesis of major architectural elements, destinations, and national policy objectives into a sustained effort of human space exploration beyond low Earth orbit. The United States is building the Space Launch System and Orion spacecraft and considering an Asteroid Retrieval Mission (ARM). International consensus through the ISECG has coalesced around cis-lunar operations as the next logical step beyond the International Space Station. Private advocates have identified unique planetary alignment opportunities in 2018 and 2021 for a human round-trip mission to the vicinity of Mars. A sequence of affordable human space exploration missions could begin with SLS/Orion flights tests to cis-lunar space, followed by a manned (or unmanned) mission to Mars taking advantage of the 2021 planetary alignment and the SLS, and then a series of lunar missions in the mid-2020s. The development of a lunar lander can be delayed to avoid overloading exploration budgets. The international community would have cooperative opportunities in the vicinity of the Moon as the International Space Station ends it operational life. An asteroid retrieval mission could be added as funds and interest allowed, but primary attention would be on lunar operations and building the capabilities necessary for human missions to Mars in the 2030s.