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Contribution of Space Activities to Solving Global Societal Issues (2)

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THRIVING IN AND FROM SPACE FOR ALL HUMANKIND

Abstract

During the more than 55 years of human spaceflight and the past 18-years of humans continuously working and living in space, many capabilities and technologies have been advanced and developed. As we celebrate the 50th anniversary of the Apollo program, the U.S. and many of our international partners are now focusing on long duration human exploration of the Moon and its vicinity. This paper will explore areas of our lives that have been profoundly impacted by the human spaceflight program and ways in which space technologies are helping address societal needs.

As NASA continues its quest to extend humankind's knowledge, discovery, and presence in space, we are faced with vexing human health and technology challenges. Is there a subset of human spaceflight challenges that could also address significant global sustainability challenges? If we were able to provide 1,000 days of clean water for a deep space crewed mission, how could we use that ability to solve the human crisis for clean water around the world? What would the future look like if a diverse community of passionate innovators, engineers, and entrepreneurs from various industry sectors, academia, and Government focused on leaping forward in creating dual-purpose solutions? This paper will explore possible models to more effectively capitalize on the nexus between the needs for advancements in space and on Earth.

As we focus on Earth's needs and the opportunities in space, there is tremendous promise for our future in both places. Advances in miniaturizing electronics, renewable energy, reusable space launch systems, lightweight materials, in-situ resource utilization, and in-space manufacturing continue to reshape our vision of what is possible. All of these improvements decrease the amount of mass we need to launch from Earth and decrease the cost of access to space. The U.S. Presidential Directive to establish a clear and streamlined regulatory environment for space launch, reentry, and exploratory activities is beginning to pave the way for the improved clarity and stability needed for an even greater investment in space. These tremendous advances being made to the human spaceflight ecosystem, as well as shifts toward greater utilization of public-private partnerships and greater corporate commitment to sustainability, make the present the perfect time for us to work collaboratively to ensure we thrive in and from space and bring even greater benefits to all humankind.