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DEVELOPMENT (D3)Strategies & Architectures as the Framework for Future Building Blocks in Space Exploration and
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FUTURE FRONTIERS: ENABLING HUMAN EXPANSION ACROSS THE SOLAR SYSTEM

Abstract

Humanity's exploration of the solar system started 60 years ago. We have sent our robotic explorers from inside the orbit of Mercury out past Pluto and into the Kuiper belt. During this journey we have discovered that our solar neighborhood is filled with a vast array of useful and valuable resources which, along with the technology we have developed over the last half century, offers us the opportunity to take the next step beyond exploration, the development and settlement of our Solar System starting with the Moon.

The Moon has become the renewed target for space exploration and both the US and China have well focused lunar programs not only to continue exploring the Moon but to also mine it starting with ice that is now known to be present in large quantities on both poles. But as we make this transition from space exploration to development and then to settlement a number of questions arise: what is the best way to development space? who should lead it? what are the new roles for industry and for governments? and most important of all, where will the money come from to pay for it?

This paper will explore lessons learned from the development of previous frontiers as well as how new technology and the use of public/private partnerships can dramatically speed up this next stage of space development while also dramatically reducing the cost. The role that the Apollo program played in inspiring entrepreneurs such as Jeff Bezos, Elon Musk, Richard Branson, Paul Allen and many others will also be examined as well as how this model of investing for passion and for social benefit rather than just for pure profit may be the key to space development and settlement.

Finally, the model for a bold first step in space development, Lunar University - the first institution of higher learning on another world, will be presented. This model will include a description of the early steps that can be taken here on Earth, how existing technology and expertise can be leveraged and how small teams of the best and the brightest from around the world will be assembled and empowered to solve the many challenges that will have to be met to enable a permanent human presence on the Moon.