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COMPARING FUTURE OPTIONS FOR HUMAN SPACE FLIGHT

**Abstract**

The paper presents three arguments for articulating a new objective for government-funded human space flight: (1) the traditional objective is no longer viable for today's world; (2) two dramatically different alternatives exist; (3) when compared, either would likely make human space flight more central to human society.

The sociological sustainability of the traditional goal of U.S.-funded human space flight, summarized as "boots on planets," is challenged. This goal has not changed over more than half a century, but its justifiability has diminished for today's complex world where non-space technology frontiers dominate, robotic space capability improves continuously, and public attention evolves quickly. The growing misalignment between traditional expectations and current relevance bodes ill for sustained political or popular support, let alone significant increases in investment. A reasonable question arises: is there something better for government-funded human space flight programs to do?

Two viable alternatives, each leading to a distinct "future world," are proffered: 1. Invest to accelerate development of a commercial space travel industry. This would result in hundreds of thousands of people traveling into Earth orbit every year, rather than six government astronauts walking on the Moon. Key investments include high-reliability, economical launch; high-dependability life support systems; large-volume space habitats with big windows and radiation protection; and approaches for fresh food, surgery, sports and public entertainment – in short, the elements of normal human architecture. 2. Invest to develop a commercial industry that supplies Earth with clean energy from space. Space has inexhaustible, continuous solar energy, which can be captured and beamed down to Earth's surface for use without ecological damage. This would lead to independence from fossil fuel supplies and the renovation of our energy economy. Key investments include high-reliability, economical launch; very large space platforms; high-efficiency solar power conversion and transmission; and a modernized energy grid on Earth.

The three options are compared and contrasted according to sociologically and technologically significant measures: capacity for public interest; relevance to modern societal needs; development of advanced technologies; ability to inspire; fundamental sociological impact; utilization of existing talent and creation of new industries; and practicality of transitioning from the status quo.

The conclusion is that both alternative goals are more likely than the traditional vision to "fit" modern expectations and therefore to be financially and politically sustainable.