

# The Justification for Human Space Development and Habitation Beyond Low Earth Orbit: An Invitation for an Open National and Global Dialogue

John W. Robinson\*

## Introduction

The United States Space program is in serious trouble and lacks the necessary focus to explore and habitate Space in order to ensure the survival of the Human species. We are rapidly destroying our country's Space infrastructure, which took more than a half century to develop. It will require an enormous cost and of course time to recover our lost capabilities and skills. Mankind is losing valuable time needed for planning the habitation of Space beyond low Earth orbit, as the Earth becomes ever less capable of supporting Human population growth. In fact, we may already be in trouble for lack of a comprehensive vision encompassing this need. The present country's leadership has not adequately provided a compelling long-term objective with a workable, affordable road-map—one that is needed to enlist the support of the American people.

By way of an invitation for an open national and global dialogue, this article<sup>1</sup> will increase public awareness of the importance of the exploration of Space. It provides the following long-term compelling objectives and a rationale for habitation beyond low Earth orbit.

## Reasons for Development of Space Beyond Low Earth Orbit

### 1. Survival of the Species

Space exploration is critical and necessary for the survival of the Human species and should be a global undertaking. The Earth has limited resources required to support life as we know it. This, along with ever-increasing internal global threats, as well as possible external threats, could conceivably make the Earth largely uninhabitable in the foreseeable future. Therefore, Space development and Human habitation beyond low Earth orbit is urgently needed to extend life beyond the bonds of Earth. A few compelling issues are: 1) cooperation on a global level is essential; 2) by cooperating, we will learn to work together in peace for mankind; and, 3) by opening the Space frontier and its vast resources to sustain us, we will help us to optimize diminishing resources on the Earth, and thus help reduce world conflicts and possibly wars.

It is the Space Propulsion Synergy Team's<sup>2</sup> position that mankind should develop habitats beyond the Earth to help facilitate Human survival in the event of a major catastrophe on the Earth. Examples of this happening in the past are the extinction of the dinosaurs and our regularly recurring ice ages. Asteroid impacts and a possible runaway greenhouse effect in our atmosphere are serious concerns. It is also projected that limits related to Human population growth for the Earth are accelerating and will become quite acute in approximately 30-40 years. As resources are consumed, the costs of replacements and alternatives become higher, and may thus go beyond the reach of the average person. A strong global Space infrastructure will lead to a robust affordable Space transportation system, manned habitats in Space, the establishment of a colony on the Moon, and even the terraforming of planets.

We are aware that the future of our species rests in the hands of the global population which can be encouraged to learn to understand how important and urgent the exploration of Space is to our species' survival.

### 2. National Security and Prestige

National security is always a concern. Modern technology (GPS, imaging, etc.) from Earth orbit has provided a significant capability for observing operations around the world. In order to undertake new ventures in Space with international co-operation and shared oversight, our country must maintain a prestigious leadership position in Space achievements and be active in the governing bodies that establish international laws and manage global efforts involving Space exploration.

### 3. Stimulation of Interest in Science, Technology, Engineering, and Mathematics (STEM)

The United States must provide a climate of interest and opportunity for our young people to pursue science, technology, engineering, and mathematics (STEM initiatives) in their education. Science and engineering college and university graduates are required to fill the needs generated when our experienced specialists retire and pass on. Stimulation of graduates in all these disciplines is required to fill the evolving objective(s), needs, and the implementa-

\*Chairman, Space Propulsion Synergy Team.

tion of efforts in this proposal. Engineers, scientists, mathematicians, etc., must have a working familiarity with the principles and considerations of all involved disciplines and sub-disciplines. Our journey into Space should provide a stable and sustainable climate to fill this need. Many of our present specialists were stimulated and/or encouraged to enter their fields from their Saturn/Apollo Program experiences, during which Humans once proudly walked on the Moon.

#### 4. Maintenance of Critical Skills

We are presently in a transition period in this country, during which the skills required to accomplish advanced scientific and engineering work are rapidly decreasing and being lost for lack of near-term opportunities, as well as premature termination of important National capabilities. Due to the poor economic climate in our country and the closing down of many important programs, many highly skilled and experienced personnel are being terminated from employment in Space activities. They are being asked to retrain for other fields/opportunities, if they can locate ones that can utilize their skills.

#### 5. Economic Growth

Past technologically advanced programs have demonstrated great economic growth and considerable opportunities for our citizens as they were developed. The Saturn/Apollo Programs allowed the development of significant new technologies, including the development of computers and the field of microelectronics. The entire world has experienced great economic growth from these technologies, and is still experiencing the benefits of many new products (i.e., cell phones/iPads, live information feeds from satellites, etc.). Economic growth offers a motivation for competitiveness necessary for our species to evolve/migrate/adapt/evolve/migrate/adapt, ad infinitum. The fruits of basic research and follow-up applied research will generate considerable employment for our country's increasing population. This is yet another facilitator in critical aspects of migration by a culture, society, and civilization for species/genome survival purposes.

#### 6. Space Industrialization

Private investors are considering the capture of an asteroid and moving it into orbit around the Moon to allow the harvesting of precious metals for use on the Earth. The profit motive for this is driving investment growth in this country. New products can and will be developed within Space and brought back to Earth. This will help to facilitate Space migration, settlement of Space, and species survival, while improving life on Earth.

### Conclusions and Summary

The development of Space and Human habitation of Space beyond low Earth orbit is urgently needed to extend life beyond the bonds of Earth and to increase the likelihood of survival of the Human species. Economic growth resulting from developing Space transportation systems and the exploitation of resources in Space that are needed for exploration and habitation of Space will commercialize Space and globally provide countless critically-needed jobs.

The above rationale certainly justifies support for advancing the United States Space program, but emphatically also justifies doing so within a global context. The next step is to work towards convincing national and international representatives of all involved disciplines/sub-disciplines, while also working towards convincing the general global population, that survival of modern Humans and their descendants through Space exploration and settlement of Space is an imperative and that our success or failure in this regard is a pressing concern in terms of potential and looming natural and Human-generated catastrophes.

### Recommendations

The Space Propulsion Synergy Team is hereby extending a cordial invitation for an open and formal national and global dialogue about the importance of Space development and Human habitation beyond low-Earth orbit. We urgently need a long-range roadmap and sustained and integrated national and international efforts for achieving these important goals. Followup articles from all disciplines with interests in these goals are hereby encouraged for the purpose of elucidating and refining our options, as we collectively move in this direction.

### Endnotes

<sup>1</sup> This article is adapted from a whitepaper distributed by the Space Propulsion Synergy Team to members of the United States Congress and others during October and November, 2012.

<sup>2</sup> The Space Propulsion Synergy Team (<http://spacepropulsion.us>) was formed in 1991, established by NASA, and is a team of national propulsion multidiscipline experts (research and technology, concept and design development, testing and operations, and program management) with extensive experienced contractor, government and academic experts assembled to "bridge the communication gap" between technology developers and users.