

**SUSTAINABLE POLICY SOLUTIONS FOR SPACE SETTLEMENT.** J. Haqq-Misra, Blue Marble Space Institute of Science, 1001 4th Ave Suite 3201, Seattle WA 98154, jacob@bmsis.org.

**Introduction:** Elon Musk’s ambitious plan for sending humans to Mars is becoming increasingly technologically feasible. Efforts by SpaceX, Deep Space Industries, Planetary Resources, and other private space corporations now fall in rank with government space agencies such as NASA, ESA, JAXA, IRSO, RFSA, and CNSA. Many of these private and government entities are developing successive plans to visit asteroids or Mars in the coming decades, which are beginning to show prospects for economic gain in addition to scientific return. These recent developments all suggest that Musk’s vision of our civilization becoming a ‘multiplanetary species’ could be realized in the coming century.

Technological advances that will allow humans to settle on another planet or extract resources from planetary bodies must be matched by parallel advances in our civilizational ethics. The ‘problem of the commons’ articulated by ecologist Garret Hardin [1] and others (e.g. [2]) is at the root of many of our systemic global problems. Hardin argues that solving the population crisis “requires a fundamental extension in morality,” while similar arguments can be made about failed efforts to address climate change, poverty, and other sustainability issues on a global scale. The lack of moral progress risks the danger of perpetuating this problem of the commons and other harmful colonial attitudes as our civilization ventures in to space. We need to invest in developing our ethics in tandem with our technology prior to the establishment of space settlements.

Space settlement itself provides a rich source of transformative experiences that hold the potential to radically alter our personal and collective morality. Transformative experiences have guided the development of civilization and led humanity toward new ways of thinking, often by forcing us to confront the nebulous boundary between self and environment [3,4,5]. Transformative events challenge our core preferences and force us to conceptualize new perspectives that would have been otherwise impossible. The first step of a human on Martian soil will carry incalculable transformative value, as will the first arrival of a mining team on a nearby asteroid. Although we cannot predict the mode of transformation that will occur when humans settle on Mars, we can learn from our own history in order to maximize the transformative potential of space settlement.

Indeed, history is rife with examples that show the destructive patterns that emerge from colonialism, and

an unabated program of space colonization risks the loss of any transformative potential. International agreements, such as the Outer Space Treaty of 1967, remain silent or ambiguous on issues pertaining to sovereignty and land use for space settlement. The need for new international agreements pertaining to space policy stems from the origin of the Outer Space Treaty in a Cold War era rife with paranoia for military and espionage dominance of low-Earth orbit [6,7]. Contemporary ambitions for human space exploration from private and national agencies are conceivably at odds with international agreements that were drafted in a time before humans had even set foot on the moon.

Rather than repeat colonial patterns of history, I suggest that the goal of space settlement should be to strive after new experiments in civilization that will provide inspiration for new modes of valuation. Here I describe two policy solutions for space settlement: bounded first possession with planetary parks [8] and a sovereign or ‘liberated’ Mars [9]. I discuss the strengths and weaknesses of these ideas in light of existing international agreements and provide a direction for further research on space settlement policy.

#### **Bounded First Possession with Planetary Parks:**

The policy for space settlement developed by Bruhns & Haqq-Misra [8] draws upon the first possession principles suggested by [10] and the planetary parks system suggested by Cockell & Horneck [11,12]. A ‘bounded first possession with planetary parks’ approach to Mars settlement would allow space agencies to make bounded claims on a planetary surface with limited claim to ‘exclusive economic zones’ based upon first arrival, with inspiration from the successful aspects of the Law of the Seas. A planetary park system would also be established by the global intellectual community to protect select nature reserve and heritage sites, which would be reviewed in a process similar to NASA’s decadal survey. This approach would allow for both commercial and national use of space resources while still maintaining the spirit of the Outer Space Treaty that prevents national appropriation of celestial bodies.

Drawing upon successful and unsuccessful examples of cooperative sovereignty [13] from history, we find that international agreements with required equitable sharing and new forms of strong central authority will likely fail when applied to space settlement. (The Moon Treaty of 1979 is an example of one such failed attempt.) This suggests that a ‘World Space Agency’ model (e.g. [14,15]) may be an inadequate solution for

space settlement today. We instead suggest a weak coordinating administrative body dubbed the ‘Mars Secretariat’ and modeled after the Antarctic Treaty Secretariat that exists today. A Mars Secretariat would provide administrative support and a mode of conflict resolution for national and corporate settlements.

A model of bounded first possession with planetary parks remains technically consistent with the Outer Space Treaty by drawing a distinction between ‘appropriation’ of celestial bodies (which is forbidden) and ‘exclusive economic zones.’ But further discussion of this policy in the context of international agreements, including the possibility of amendment of the Outer Space Treaty, needs to be examined in greater detail.

**The Sovereign Mars Approach:** The idea developed by Haqq-Misra [9] provides a more idealistic policy for Mars settlement that seeks to establish Mars as a sovereign entity prior to the arrival of the first humans. This suggestion to ‘liberate Mars’ in advance of settlement is effectively a prescription for artificially constructing a nation-state by design. Settlements on Mars will exhibit their own unique populations, territory, and governance, thereby satisfying three of the four conditions for statehood. The sovereign Mars approach suggests that designing Mars as sovereign would retain the greatest transformative potential for space settlement.

Under the provisions of a sovereign Mars, Humans arriving on Mars would embrace a planetary citizenship as martians and relinquish their status as earthlings. Property and other power tied to Earth must also be relinquished, and no entity on Earth may exert any influence on the development of civilization on Mars (aside from the pursuit of mutual scientific endeavors between martians and earthlings). The use of land is determined exclusively by the resident martians, and any objects brought from Earth to Mars become permanent fixtures of the martian civilization. The goal of a sovereign or liberated Mars would be to establish a second instance of civilization that can avoid some of the pitfalls of colonialism from history. This would allow for new experiments in governance, economics, artistic expression, community, culture, spirituality, and other aspects of human life.

The Sovereign Mars model remains consistent with the Outer Space Treaty as written today. Allowing humans to develop Mars as an independent sovereign entity would remain consistent with the Treaty’s provision against appropriation as well as the requirement that space be the province of all humankind. However, there is limited historical precedent for abandoning one’s national citizenship entirely; further work remains on defining a process by which planetary citizenship can be defined and recognized. Additionally,

the success of a sovereign Mars will require tremendous financial foresight by a donor or group willing to invest in the distant future of humanity. Further work should also examine the concept of ‘deep altruism’ that could allow such a bold endeavor to succeed.

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