Sovereignty on Mars: Pragmatic Solutions, Idealistic Models, and Historical Analogs

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Abstract

Several government and commercial space agencies have begun to develop human missions to Mars, which includes plans for long-term settlement. The technological capabilities to develop a space economy and eventually inhabit space are already raising challenges to terrestrial models of governance. The only limit on sovereign expansion in space recognized under conventional international law is the non-appropriation principle from Article II the Outer Space Treaty, which disallows sovereign claims or other appropriation of celestial bodies. But some legislative bodies have already authorized asteroid mining, which challenges the interpretation of Article II. The Moon Agreement recently entered into force but has not been ratified by any major spacefaring states, so its effect on regulating the emerging space economy remains uncertain. Historical examples of cooperative sovereignty provide other potential models of sovereignty that could apply to space, such as the Convention on the Law of the Sea and the Antarctic Treaty System. Other historical and contemporary examples of shared sovereignty or sovereignty conflicts on Earth also provide analogs for exploring possible models of, or limitations to, future governance on Mars. It can be valuable to consider both idealistic and pragmatic models of Martian governance, as the topic of space settlement provides a robust framework for thought experiments in ethics. But any models for sovereignty in space should be evaluated based on technical viability, political feasibility, and long-term sustainability, as the physical impositions of the space environment will demand such hard constraints.

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Keywords: Mars settlement, space colonization, governance, international law

Soberanía en Marte: Soluciones pragmáticas, modelos idealistas y analogías históricas

Resumen

Varias agencias espaciales gubernamentales y comerciales han comenzado a desarrollar misiones tripuladas a Marte, lo que incluye planes para asentamientos a largo plazo. Las capacidades tecnológicas para desarrollar una economía espacial y, eventualmente, habitar el espacio ya plantean desafíos a los modelos terrestres de gobernanza. El único límite a la expansión soberana en el espacio reconocido por el derecho internacional convencional es el principio de no apropiación del Artículo II del Tratado del Espacio Ultraterrestre, que prohíbe las reclamaciones soberanas u otra apropiación de cuerpos celestes. Sin embargo, algunos organismos legislativos ya han autorizado la minería de asteroides, lo que cuestiona la interpretación del Artículo II. El Acuerdo sobre la Luna entró en vigor recientemente, pero no ha sido ratificado por ningún estado espacial importante, por lo que su efecto en la regulación de la economía espacial emergente sigue siendo incierto. Los ejemplos históricos de soberanía cooperativa ofrecen otros modelos potenciales de soberanía que podrían aplicarse al espacio, como la Convención sobre el Derecho del Mar y el Sistema del Tratado Antártico. Otros ejemplos históricos y contemporáneos de soberanía compartida o conflictos de soberanía en la Tierra también ofrecen analogías para explorar posibles modelos o limitaciones de la futura gobernanza en Marte. Puede ser valioso considerar modelos idealistas y pragmáticos de gobernanza marciana, ya que el tema de la colonización espacial proporciona un marco sólido para experimentos mentales en ética. Sin embargo, cualquier modelo de soberanía en el espacio debe evaluarse con base en su viabilidad técnica, factibilidad política y sostenibilidad a largo plazo, ya que las imposiciones físicas del entorno espacial exigirán restricciones muy estrictas.

Palabras clave: Asentamiento en Marte, colonización espacial, gobernanza, derecho internacional

火星主权：务实的解决方案、理想主义的模型与历史类比

摘要

一些政府机构和商业航天机构已经开始开发载人火星任务，其中包括长期定居计划。发展太空经济并最终在太空居住的技术能力已经对陆地治理模式提出了挑战。传统国际法所承认的太空主权扩张的唯一限制是《外层空间条约》第二条中的非占有原则，该原则不允许主权主张或以其他方式占有天体。但一些立法机构已经批准小行星采矿，这对第二条的解释提出了挑战。《月球协议》近期生效，但尚未得到任何主要航天国家的批准，因此其对“监管新兴太空经济”的影响仍不明确。合作主权的历史例子提供了可能适用于太空的其他主权模式，例如《海洋法公约》和《南极条约体系》。关于地球共同主权或主权冲突的其他历史案例和当代案例也为探索火星未来治理的可能模式或局限性提供了类比。考虑火星治理的理想模式和务实模式都很有价值，因为太空定居这一主题为伦理思想实验提供了一个强大的框架。然而，任何太空主权模式都应根据技术可行性、政治可行性和长期可持续性进行评估，因为太空环境的物理影响将需要如此严格的限制。

关键词：火星定居，太空殖民，治理，国际法

Introduction

This paper presents an overview of approaches to sovereignty on Mars. Ongoing discussions in academic, government, and commercial domains are considering not only the idea of sending humans to explore space but also the eventual goal of long-duration living in space. The ideas in this paper provide a summary of some of the ideas from my recent book *Sovereign Mars: Transforming Our Values through Space Settlement* (Haqq-Misra, 2022), and interested readers are encouraged to examine this book for a more in-depth treatment of these topics and others relating to interplanetary sovereignty.

When we look up at the night sky, Mars is visible to us as a point of light. This view of the planets from Earth may be familiar to us, but it is important to recognize that for most of human history, Mars was not considered as a place that one could travel to. Ancient astronomers recognized planets as “wandering stars” with unique motion compared to the other fixed stars in the sky, but it would not be until

much later advances in astronomy that Mars and the other planets were recognized as physical places that were distinct from the stars. By the late 1950s, astronomers had the ability to image the surface of Mars using Earth-based telescopes, which revealed features of the red planet's surface topography, polar ice caps, and clouds. Mars was now recognized as a place, but it was not a place that humans were planning to go: no spacecraft had yet been sent to Mars, and there was little serious discussion about sending people to Mars—let alone long-duration habitation.

This all changed with the nuclear arms race that become the Cold War. The bombs dropped on Hiroshima and Nagasaki demonstrated the horrific power of nuclear weapons, but the Cold War that resulted between the United States and the Soviet Union was an arms race for who could have the greatest stockpile of nuclear weapons and the greatest tactical advantages. This was juxtaposed with a space race that ultimately led to the United States landing the first people on the moon. These two things are not merely coincidental: after the Nuclear Test Ban Treaty of 1963, the space programs of the two nuclear powers accelerated in way that utilized space as an arena for visible displays of each nation's rocketry technology. With the atmosphere off-limits for nuclear detonations, the escalating Cold War expanded into space, with the United States and Soviet Union comparing for missile dominance. Space became a place for demonstrating the sophistication of each nation's rocketry; the presence of a scientific payload on a given rocket was of little relevance because the payload could in principle be exchanged for something else—such as a nuclear warhead.

The functional form of an intercontinental ballistic missile (such as those manufactured by Boeing for the US Air Force) is essentially identical to that of a commercial rocket (such as those manufactured by the SpaceX corporation), with the only difference being the choice of payload. The emergence of commercial space agencies such as SpaceX has decoupled rocketry from nuclear technology; given the reality that we live in a world of nation-states competing for nuclear dominance, this decoupling is a positive step toward avoid global nuclear war. The connection between rockets and nuclear weapons still persists, but the Cold War has now evolved into a surrogate form that focuses on scientific exploration and commercialization of space, with the underlying militaristic justifications unspoken but still present. Mars exploration today remains connected to this Cold War legacy, providing a win-win situation between the competition of sovereign states for nuclear dominance and the objectives of the scientific community. Putting a spacecraft on Mars fulfills just as many political goals as scientific goals, and these political goals will likely remain the underlying driver for nation-states to continue investing in space technology.

Space Treaties

The Outer Space Treaty of 1967 (OST, formally the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies) emerged in the context of the Cold War competition between the United States and the Soviet Union for missile dominance of space. The launch of the two Sputnik satellites by the Soviet Union in 1957, and the response launch of the Explorer 1 satellite by the United States in 1958, served as demonstrations of the sophistication of each nation's rocketry. These technological feats complemented other tensions between the two nuclear powers, including espionage satellites in space, the Vietnam War, the spread of Communism in Latin America, and other political events (further discussed in Chapter 2 of *Sovereign Mars*) that were interwoven with this public-facing space race. (For a more detailed discussion of the OST, see Chapter 3 of *Sovereign Mars* as well as the discussion by Haqq-Misra, 2024.)

One of the motivations for the OST was the fear that one of these nuclear powers would expand into space, claim space as its sovereign territory, and perhaps even claim the moon as the 51st state or another republic of the Soviet Union. Article I of the OST addresses this fear by declaring "the exploration and use of outer space" as "the province of all mankind;" Article I says nothing about space "belonging" to everyone and only stipulates that the activities of exploration and use can be pursued freely and equally by any nation that desires to do so. Article II prohibits nations from extending their territory into space by declaring that "outer space ... is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means." The United States Congress was attentive to this requirement when it authorized the Apollo astronauts to plant a flag on the moon and noted in public statements that this was merely a symbol of national celebration rather than an attempt to exert sovereign claims on the moon. Article IV of the OST requires that nuclear weapons stay on Earth by stating that the parties to the treaties agree "not to place in orbit around the Earth any objects carrying nuclear weapons or other kinds of weapons of mass destruction." This does not necessarily prevent other weapons from being placed into space; astronauts have routinely carried utility knives, and Soviet cosmonauts were even issued pistols for defensive use against wildlife when landing in Siberia and awaiting rescue. Another important provision of the OST is Article VIII, which states that "ownership of objects launched into outer space ... is not affected by their presence in our space or on a celestial body or by their return to the Earth." These requirements are further elaborated in the Registration Convention of 1974 (formally the Convention on Registration of Objects Launched into Outer Space), which formalizes the process of registration. Under Article VIII, a space agency that were to land on the moon or Mars and build something there, then the struc-

ture would retain its original owner, even though the ground that it rests upon cannot be claimed as sovereign territory under Article II.

The OST has wide acceptance to the extent that some (but not all) legal scholars consider it to be customary international law, but nevertheless the OST has been ratified by 115 parties that includes all countries with nuclear capabilities. The OST is one of the primary, if not the only, legally binding form of international law that applies to sovereignty in space. The space race is really a nuclear race in disguise—a surrogate Cold War or arms race—where the nuclear payload has been exchanged with a scientific payload. This is admittedly an improvement, but the connection between scientific and military launch capabilities is well-understood by the nuclear nations. Launch capability itself can apply to scientific missions, telecommunication satellites, and missiles all the same. Countries like North Korea and Pakistan, which have nuclear capabilities but lack full space launch technology, illustrate that nuclear technology remains a valuable bargaining tool in the geopolitical arena today. These countries are unlikely to dictate space policy, but other nations may likewise strive toward nuclear technology in tandem with space launch capabilities in order to increase their global political influence.

The Moon Agreement of 1979 (formally the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies) attempted to prescribe additional requirements for the sharing of space and its resources, which has only been ratified by a handful of nations—none of which have independent launch capabilities. Article 11 of the Moon Agreement declares "the Moon and its natural resources as the common heritage of mankind," connoting a sense of common ownership and requiring "equitable sharing" of any resources derived from the moon. Article 11 further requires the establishment of "an international regime ... to govern the exploitation of the natural resources of the moon" and adjudicate the redistribution of any resources. Although the Moon Agreement is technically in force today and is binding to any states that have ratified it, the lack of participation by spacefaring nations has resulted in the Moon Agreement being largely ineffective and considered by many (but not all) legal scholars to be a dead treaty.

Cooperative Sovereignty in Space

Other examples of cooperative sovereignty on Earth can provide examples of legal frameworks that might be adaptable to the era of space commerce and private space agencies, which were not of primary concern during the drafting of the OST in the Cold War era. Existing models of nations working together in ways that do not necessarily cede their sovereignty but still recognizes situations that would otherwise lead to problems of encroaching sovereignty. This section gives a brief overview of some examples of cooperative sovereignty, with a more

detailed discussion provided in Chapter 4, 5, and 6 of *Sovereign Mars*.

The Law of the Sea (formally United Nations Convention on the Law of the Sea) entered into force in 1994 and has been ratified by most nations, with notable exceptions being the United States, Venezuela, Turkey, and Israel (along with a handful of landlocked countries). The primary objection of these four countries was the requirement for equitable sharing of proceeds from deep sea mining, under the jurisdiction of the International Seabed Authority. The United States nevertheless abides by most of the other provisions of the Law of the Sea, but the objection to mandatory equitable sharing remains a persistent theme and a requirement that is unlikely to gain universal participation. Provisions of the Law of the Sea that are more globally recognized include a delineation of a nation's coast into several regions: a territorial sea 12 nautical miles from shore where sovereignty can be applied as on land; a contiguous zone 12 nautical miles further where military operations can be conducted but sovereignty cannot be claimed; and an exclusive economic zone (EEZ) 200 nautical miles from shore where a nation reserves exclusive rights for activities such as fishing, mining, and science, although other nations must be allowed right of passage through this zone. Beyond the EEZ is the high seas, which is open to all nations. Such a model could conceivably be applied to a settlement on Mars, particularly the idea of a contiguous zone for defense or safety and an EEZ to allow for limited exclusive rights to resource extraction, with the Martian frontier beyond remaining open to all. Such a practice would not necessarily require a new treaty and could instead arise as common practices or through local agreements; the Law of the Sea itself evolved in this way, as a result of local agreements and common practices, and in many ways the codified version of the Law of the Sea today was a recognition and standardization of these common practices, rather than an invention of brand-new policies. This approach still includes the potential for exploitation (for example, France and the United States hold the largest EEZ area from occupation of small islands) or non-compliance (for example, China routinely violates the EEZ of the Philippines in the South China Sea), but this system still remains a largely functional example of cooperative sovereignty on Earth that could serve as a model for the emergence of cooperative policies in space.

The Antarctic Treaty System is another example of cooperative sovereignty that was established outside the jurisdiction of the United Nations, which was led by nations that had previously exerted claims (or reserved the right to do so later) to sovereignty over Antarctic territory. Today, participation in the Antarctic Treaty System requires a country to have an active scientific presence in Antarctica, whether through the establishment of an Antarctic research station or collaboration with another nation. South Africa remains the only nation in Africa that is party to the treaty, perhaps in part due to this requirement. If a similar require-

ment were to be applied to Mars, then an analogous situation could arise in which participation int he governing framework is limited to those nations that are able to engage in research on Mars. Prior sovereign claims have been suspended under the Antarctic Treaty, but some nations still attempt to exert control over their claimed sections of the continent, if only symbolically. An interesting case involves the efforts of Australia to exerts sovereignty over its claimed parts of Antarctica, which even reached the Federal Court of Australia in an effort to contest Japan's whaling activities in what Australia considered to be the EEZ of its Australian Antarctic Territory. Japan refused to recognize Australia's sovereignty over these waters and did not appear in Australian court, but Australia nevertheless proceeded with a court ruling that Japan violated its sovereignty in Antarctica. Although Antarctica today functions largely as a scientific oasis open for participation by any nation, much of this scientific activity remains in service to national interests in maintaining the possibility of exerting such sovereign claims in the future. Similar attempts at asserting sovereign claims, even if only symbolically, could conceivably emerge during the process of Mars settlement, even if the stated goals of such missions are purely scientific.

A model like the national parks system could also provide an example for preservation on Mars, in an effort to protect limited regions of the planet from development, exploitation, or contamination. This could include the historical sites of the Viking lander missions, geologic sites like Olympus Mons and the Valles Marineris, or regions of the surface that are of scientific interest in the search for extraterrestrial life. In some cases, such "planetary parks" might even restrict the use of rovers, spacecraft, and other intrusive technology in order to avoid further disruption of select pristine Martian environments.

Idealism and Pragmatism

Drawing on the lessons from cooperative sovereignty on Earth, a more radical idea is to let the Martians own Mars—that is, people who relocate from Earth to permanently live on Mars. This could give rise to the concept of "planetary citizenship" in a way that allows civilization on Mars to develop in ways that are not necessarily tightly coupled to geopolitics on Earth. The Sovereign Mars model outlines five requirements that could enable this idealistic approach: 1) each person gets one planetary citizenship as either earthlings or Martians; 2) a person can only gain money and power on their home planet; earthlings can perform science on Mars only if the Martians agree; 4) only Martians can decide how to use land on Mars; 5) earthlings may give gifts to Martians, but may not make any demands. The rationale and implications of these five provisions is discussed further in Chapter 8 of *Sovereign Mars*. This model is admittedly idealistic, and may not ever be actually implemented, but this serves as an example of the kind of provisions that could allow the settlement of Mars to develop as a second experiment in human civilization.

Pragmatic models of governance are the most likely to emerge and succeed on Mars, and historical examples of cooperative sovereignty provide some guidance for how to evaluate the pragmatism of a given idea. A working hypothesis developed in *Sovereign Mars* (Chapter 6; see also Haqq-Misra, 2024) considers three pragmatic constraints. First is "no world space agency," as spacefaring states will be unlikely to relinquish jurisdiction over space activities to any new international authorities. Second is "no redistribution," as mandatory equitable sharing will be unlikely to gain complete participation by all spacefaring states. Third is "no new space treaties," as non-participation by even a few spacefaring states will render new treaties ineffective as sources of international law. These constraints remain a hypothesis, and could be demonstrated to be false with future developments, but they are consistent with the pragmatic realities of geopolitics today.

The space environment itself is harsh, and surviving for intergenerational timescales on Mars will be a daunting challenge, so even the most idealistic models of governance must face three hard constraints imposed by physical and political realities (discussed in Chapter 10 of *Sovereign Mars* and further by Haqq-Misra, 2024). The first hard constraint is "technical feasibility," as any hypothetical governance model for Mars should be technically viable and consider all necessary infrastructure management. The second hard constraint is "political feasibility," as any Mars governance model should account for the existence and momentum of existing stakeholders, even if major changes occur in the future. The third hard constraint is "sustainability," as any governance model for Mars must ensure long-term viability and manage all resources and population with the available carrying capacity.

Any approach that humanity takes toward establishing long-duration settlements on Mars will inevitably challenge our notions of governance and drive innovation in ways that cannot be easily anticipated. Mars holds the potential for both personal and societal transformation (discussed in Chapter 7 of *Sovereign Mars*), which could fundamentally alter long-standing preferences and reveal new insights into what it means to be human.

References

Haqq-Misra, J. (2022). *Sovereign Mars: Transforming our values through space settlement*. University Press of Kansas.

Haqq-Misra, J. (2024). Constraints on interstellar sovereignty. *Journal of the British Interplanetary Society, 77*(5), 167-174. https://doi.org/10.59332/jbis-077-05-0167