Chapter 3:

International Relations Theory and Spacepower

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The traditional focus of international relations (IR) theory has been peace and war, cooperation and competition, among the political units into which the world is divided—principally states, but also increasingly nonstate actors in the 21st century. Until the advent of technologies for air- and spacepower, all interaction took place on the Earth's surface. With the development of manned flight, followed by our ability to venture into space, international relations expanded to include the new dimension provided by the air and space environment. Just as terrestrial geography framed the historic setting for international relations, space is already being factored more fully into 21st-century IR theory, especially as rivalries on Earth, together with perceived requirements for cooperation, are projected into space. The foundations for the explicit consideration of space exist in IR theory. In all likelihood, new theories eventually will emerge to take account of the novel features of space as we come to know more about this environment. For the moment, however, we will think about space with our theories about Earth-bound political relationships as our essential point of departure. Just as we have extended Eurocentric IR theory to the global setting of the 21st century, such theories will be tested in space. Because all IR theories either *describe* or *prescribe* interactions and relationships, space becomes yet another arena in which to theorize about the behavior of the world's political units. The assumption that theories developed for Earth-bound relationships apply in space will be reinforced, modified, or rejected as we come to know more about human interaction in space. We may theorize about IR theory as it applies to the relationships between entities in space as well as how space affects the relationship between political units on Earth. We may also speculate about the extent to which space would eliminate or mitigate conflicts or promote cooperation between formerly hostile Earthly units if they found it necessary to confront an extraterrestrial foe. Such issues open other areas for speculation and discussion, including the potential implications of IR theory as space becomes an arena in which Earthly units attempt to enhance their position on Earth and eventually to establish themselves more extensively in space.

We need not live in fantasyland to think about the extension of Earthly life to space. This could include orbiting space stations building on the achievements of recent decades as well as colonies of people whose forebears originated on Earth but who have established themselves far from Earth. The need for IR theory about space could also arise from the development of transportation and communication routes among space colonies and space stations, and between peoples living on asteroids and the Moon as well as other planets. We may think of asteroids as either fragmenting objects that could destroy or alter Earth or as a basis for extending man's reach into space. As Martin Ira Glassner points out, such activities in space environments "will inevitably generate questions of nationality and nationalism and sovereignty, of ownership and use of resources, of the

distribution of costs and benefits, of social stratification and cultural differences, of law and loyalties and rivalries and politics, of frontiers and boundaries and power, and perhaps of colonial empires and wars of independence."[1] This will provide a fertile environment for theorizing about existing and potential political relationships. We will come to understand more fully the extent to which Earthly theories can be projected onto space or the need to evolve entirely new ways of thinking about space. Because space is not the exclusive domain of governments, theories will include private sector entities as well. In this respect, the present IR theory emphasis on states as well as actors other than states has direct applicability.

Colonization of the Moon, asteroids, and planets would present humans with challenges to survival in space not encountered on Earth. We would greatly enhance scientific knowledge in a setting with greater or lesser levels of gravity and potentially lethal cosmic ray exposure, to mention only the most obvious differences with Earthly life. At the same time, we would face far different circumstances related to political and social relationships. For example, the challenges to survival would probably be so great that the rights of the individual might be sacrificed to the needs of the collective, or rugged individualism and self-reliance would be essential. Space colonies would be dependent for a time on their mother country on Earth but increasingly would be compelled by vast distances and time measured by years from Earth to fend for themselves. Barring dramatic technological advances that compress such travel time, the interactive capability of space colonies, whether with each other or with Earth, would be extremely limited. A premium would be placed on independence, and leadership would be measured by the ability to adapt to new and harsh circumstances.

There are many other unknowns concerning political and social relationships in space. We literally do not know what we do not know. Would Earthly religions be strengthened or weakened by space knowledge? It cannot be known in advance whether space colonization would reinforce existing social science theory about the behavior of individuals or groups with each other or lead to dramatic differences. For example, under what conditions in space would there be a propensity for greater conflict or for greater cooperation? In the absence of such experience in space, we have little choice but to extrapolate from existing IR theory to help us understand such relationships in space. In any event, the testing of theory about interaction of humans in space lies in the future. Our more immediate goal is to gain a greater understanding of how IR theory can (and does) inform our thinking about the near-term space issues, notably how space shapes the power of Earthly states, while we also speculate about the longer term issue of social science theory and relationships within and between groups in space. Thus, we think first about the extension of capabilities of states into space as a basis for enhancing their position on Earth and only subsequently about how sociopolitical relationships might evolve between space-based entities far from Earth.

The huge expanse of space provides a rich basis for theory development about relations between the Earth and the other bodies of the solar system and ultimately perhaps between these entities themselves. If social science theorizing is based on our images about the world surrounding us, how we imagine, or develop images about, the evolution

of such relationships can only give new meaning to the word *imagination* as a basis for future IR theory. What is unique about space is the fact that we are dealing with infinity. Whereas the terrestrial land mass and the seas have knowable finite bounds, we literally do not know where space ends or understand the implications of infinity for how we theorize about space. In its space dimension, IR theory will evolve as emerging and future technologies permit the more extensive exploration, and perhaps even the colonization, of parts of the solar system and the exploitation of its natural resources, beginning with the Moon and ultimately extending beyond our solar system. As in the case of Earth-bound geopolitical theorizing, the significance of space will be determined by technologies that facilitate the movement of people, resources, and other capabilities. Those technologies may be developed as a result of our assumptions about the geopolitical or strategic significance of space extrapolated from IR theory and the requirements that are set forth in our space-power strategy.

From IR theory we derive the notion, building on geography, that a new arena becomes first an adjunct to the security and well-being of the primary unit and, later, a setting to be controlled for its own sake. Airpower was first envisaged as a basis for enhancing ground operations but subsequently became an arena that had to be defended for its own sake because of the deployment of vulnerable assets such as heavy bombers. As technologies become more widely available, they are acquired by increasing numbers of actors. Such technologies proliferate from the core to the periphery, from the most advanced states to others. Space becomes first an environment for superpower competition, as during the Cold War, to be followed by larger numbers of states developing space programs. At least 35 countries now have space research programs that are designed to either augment existing space capabilities or lead to deployments in space. Others are likely to emerge in the decades ahead.

IR theory has long emphasized power relationships, including the extent to which power is the most important variable for understanding the behavior of the political units into which the world is divided. The theory addresses questions such as: How pervasive is the quest for power, and how should power be defined? Given its centrality to IR theory, power in the form of spacepower represents a logical extension of this concept. Spacepower consists of capabilities whose most basic purpose is to control and regulate the use of space. This includes the ability, in the words of the 2006 U.S. National Space Policy, to maintain "freedom of action in space" as vital to national interests. According to the National Space Policy, "United States national security is critically dependent upon space capabilities, and this dependence will grow."

All Presidents since Dwight Eisenhower have stated that preserving freedom of passage in space is a vital U.S. interest that should be protected for all of humankind. Freedom of passage through space represents a norm embodied in the 1967 Outer Space Treaty. This is analogous to sea control, which encompasses freedom of passage in peacetime and the ability to deny an enemy the use of the seas during wartime. In the future, the interests of space powers will be in assuring safe passage for themselves and for their allies, while denying such access to their enemies. In practice, this means that, like the seas, space will become an arena for both competition and cooperation as political issues, including

security, are extended from their terrestrial environment into space. Because IR theory has both a descriptive and prescriptive focus on competition and cooperation, it inevitably becomes the basis for speculation and theorization about such relationships in space, including spacepower.

Definitions of spacepower focus on the ability, as Colin Gray points out, to use space and to deny its use to enemies.[2] Spacepower is a multifaceted concept that, like power in IR theory, is "complex, indeterminate, and intangible," as Peter L. Hays put it.[3] Spacepower includes the possession of capabilities to conduct military operations in and from space and to utilize space for commercial and other peaceful purposes. Such capabilities have been increasing in the decades since the first German V2 rockets passed through the outer edge of space en route to their targets in England in the final months of World War II and the Soviets launched the first *Sputnik* in 1957. These events made space a military arena. In recent decades, space has become an essential setting for precision, stealth, command and control, intelligence collection, and maneuverability of weapons systems. In addition to its military uses, space has also become indispensable to civilian communications and a host of other commercial applications. Strategies for dissuasion and deterrence in the 21st century depend heavily on the deployment of capabilities in space. As a concept, spacepower broadens the domain of IR theory from the traditional horizontal geographical configuration of the Earth divided into land and the seas to include the vertical dimension that extends from airspace to outer space.

Because spacepower enables and enhances a state's ability to achieve national security, IR theory will be deficient if it does not give space more prominent consideration. In the decades ahead, spacepower theory and IR theory will draw symbiotically on each other. It is increasingly impossible to envisage one without the other. Space is an arena in which competition and cooperation are already set forth in terms and issues reminiscent of Earth-bound phenomena. Spacepower includes assumptions drawn from IR theory. Our theories about the political behavior of states and other entities in space are extensions of our hypotheses about terrestrial power. To the extent that our theories emphasize competition on Earth, we theorize in similar fashion about such interactions in the domain of space. If we emphasize the need for regimes to codify and regulate Earth-bound relationships, we extend such thinking to the dimension represented by space. Indeed, the ongoing debates about space, including its militarization and weaponization, have direct reference points to IR theory. The inclusion of space in IR theory will evolve as we incorporate space into national security because IR theory, like social science theory in general, is contextual. As E.H. Carr has written: "Purpose, whether we are conscious of it or not, is a condition of thought; and thinking for thinking's sake is as abnormal and barren as the miser's accumulation of money for its own sake."[4] We theorize, or speculate, about relationships among the variables that constitute the world that exists at any time.

However, states in some instances work with other states to develop cooperative arrangements that govern their relationships. It is to be expected that they would undertake efforts to regulate their operations in space as they do on Earth by developing legal and political regimes based on normative standards. Cooperative arrangements are

already deemed necessary to prevent the stationing of weapons of mass destruction in space. It is the goal of our adversaries to place limits on U.S. terrestrial activities, and it would be unusual to expect them to try to do otherwise in space. Space becomes another arena for states to attempt to limit the activities of other states and to develop "rules of the road" favorable to their interests and activities. Thus, we have the basis for theory that *prescribes* how political entities in space should possibly interact with each other, including the kinds of regimes and regulations states may seek to develop in space.

At this early stage in space, we have already devoted extensive intellectual energy to prescribing how such entities *should* relate to each other. According to E.H. Carr, because "purpose, or teleology, precedes and conditions thought, at the beginning of the establishment of a new field of inquiry the element of wish is overwhelmingly strong."[5] This leads to normative thinking about how we would like human behavior to evolve in space. Carr was describing IR theory as it developed in the early decades of the 20th century. However, IR theory was erected on a rich base of historical experience dating from the Westphalian state system that had arisen in the mid-17th century. There is as yet no comparable basis for developing and testing theories about political relationships in space. With this important caveat in mind, we turn first to IR theory and spacepower in its geopolitical, or geostrategic, setting and then to other efforts, existing and potential, to theorize about space and to link IR theory to spacepower. Subsequent sections deal with geopolitics, realist theory, liberal theory, and constructivism.

Geopolitics and IR Theory

The process of theorizing about space is most advanced in the area of the geopolitics of the domain. This is a derivative of classical geopolitical theory. According to Everett C. Dolman, geopolitical theory developed for the Earth and its geographical setting can be transferred to outer space with the "strategic application of new and emerging technologies within a framework of geographic, topographic, and positional knowledge."[6] He has developed a construct that he terms *Astropolitik*, defined as "the extension of primarily nineteenth- and twentieth-century theories of global geopolitics into the vast context of the human conquest of outer space."[7] Although space has a unique geography, strategic principles that govern terrestrial geopolitical relationships nevertheless can be applied. States have behavioral characteristics, notably a quest for national security, that exist on Earth but that may also govern state behavior in space, thus opening the way for consideration of those theories about national interest as states acquire interests and capabilities in space. Dolman suggests that geopolitical analysis can be folded into the realist image of interstate competition extended into space.

Geopolitical theory represents a rich and enduring part of the literature of IR theory. In fact, all IR theory is based on environing factors that are physical (geography) and nonphysical (social or cultural), as Harold and Margaret Sprout have pointed out.[8] As the Sprouts recognized, all human behavior takes place in a geographic setting whose features shape what humans do or cannot do. Although geography pertains to the mapping of the Earth's surface, its physical differentiation has important implications for the behavior of the units that inhabit the various parts of the world, for example, as land

or sea powers and now space powers. Thus, geography is crucially important. However, the significance of specific aspects of geography, or geographic location, changes as technology changes. For example, technology has exerted a direct influence on how wars are fought and how commercial activity has developed. As the seas became the dominant medium for the movement of trade and commerce, port cities developed. As land transportation evolved, junctions and highway intersections shaped land values. As resource needs changed, the importance of the geographical locations of resources such as reserves of coal or oil rose. If vitally important natural resources are found in abundance in certain locations in space, their geopolitical importance will be enhanced. The exploitation of such resources may become the basis for international cooperation or competition in order to secure or preserve access.

Central in the writings of classical geopolitical theorists such as Alfred Thayer Mahan and Sir Halford Mackinder is the direct relationship between technology and power projection. As long as technology favored the extension of power over the oceans (Mahan), those states most fully able to build and deploy naval forces were preeminent. The advent of the technological means for rapid movement of large forces over land (Mackinder), and subsequently for flight through the Earth's atmosphere, transformed not only the ways in which war could be waged, but also the hierarchy of states with the necessary capabilities. Thus, there was a close relationship between technology and the utilization, both for military and civilian purposes, of the Earth's surfaces— maritime and land—as well as the surrounding atmosphere and exosphere. Such a frame of reference emerges from the analysis of historic technological-strategic-economic relationships. Similarly, the existence of technologies for the transport of formerly Earth-bound objects into outer space has implications for both military and civilian activities at least as great as those changes that accompanied the great technological innovations of the past.

Historically, geopolitical theorists tell us, technology has had the effect of altering the significance of specific spatial relationships. The advent of the airplane, and subsequently the means to penetrate outer space, provided a whole new dimension to geopolitics. As long as human activities were restricted to the Earth's surface, they were subject to constraints imposed by the terrain. Although the seas are uniform in character, human mobility via the oceans is limited by the coastlines that surround them. No such constraints exist above the Earth's surface, in airspace or in outer space. In this environment, the possibilities of unprecedented mobility and speed enable states to seek either to protect their interests or project their power. For such purposes, they may exploit opportunities for surveillance, reconnaissance, and verification, as well as the potential afforded by space as an arena for offensive and defensive operations.

Just as geopolitical theorists have set forth their ideas about the political significance of specific geographical features, comparable efforts have been made to address "geography" in space. Writing on the geopolitics of space focuses on gravity and orbits. Gravity is said to be the most important factor in the topography of space because it shapes the "hills and valleys" of space, which are known as *gravity wells*. A simple astropolitical (geopolitical) proposition has been set forth: the more massive the body, such as a planet or moon, the deeper the gravity well. The expenditure of energy in travel

from one point to another in space is less dependent on distance than on the effort expended to break out of gravitational pull to get from one point to another. The geographical regions of space have been divided into near Earth orbit, extending about 22,300 miles from the Earth's surface; cislunar space, extending from geosynchronous orbit to the Moon's orbit and including the geopolitically important Lagrange libration points, discussed below; and translinear space, extending from an orbit beyond the Moon, where the gravitational pull of the Sun becomes greater than that of the Earth, to the edge of the solar system.[9]

As with the Earth, an understanding of the geopolitics of space emerges initially from efforts to delineate the physical dimensions of the space environment. We need not review in great detail the literature on this important topic. What should be immediately obvious, however, is the limited applicability of the national sovereignty concept that governs nation-state relationships on Earth. The farther one ventures into space, the more difficult it becomes to determine what is above any one point on Earth. States can assert exclusive jurisdiction within their airspace because it lies in close proximity to their sovereign territory and they are more likely to have the means to enforce their claim to exclusive jurisdiction. Of course, this calculation could be changed by the development and deployment of capabilities constituting spacepower. The Earth and its atmosphere have been likened to the coastal areas of the seas on Earth. The high sea of Earth space is accessible only after we are able to break through the Earth's atmosphere or, in the case of the high seas, to pass beyond the coastal waters.

Earth space is the environment in which reconnaissance and navigation satellites currently operate. It is the setting in which space-based military systems, including space-based missile defense, would be deployed. Beyond this segment of space lies the lunar region encompassing the Moon's orbit. It is of special importance because it contains the Lagrange libration points where the gravitational effects of the Earth and Moon would cancel each other out. As Marc Vaucher pointed out in a seminal paper on the geopolitics of space, the military and commercial importance of these points is vast.[10] They are at the top of the gravity well of cislunar space, meaning that structures placed there could remain permanently in place. Because of the effects of the Sun, however, only two of the five Lagrange libration points (L4 and L5) are regarded as stable.

Finally, as we venture from lunar space, we would enter the solar space that lies beyond the Moon's orbit, encompasses the planets and asteroids of the solar system, and exists within the gravity well of the Sun. As already noted, the asteroids are feared as objects that could eventually collide with the Earth and end life as we know it. Alternatively, they could represent the new frontier of space exploration. In this latter case, asteroids become the basis for stations in space en route to the Moon or from Earth or Moon to other planets. Asteroids are said to acquire geostrategic importance as their potential for enhancing space travel increases.

Realist Theory and Spacepower

In order to understand its implications for spacepower, realist theory can be examined in each of its three major variations. These include *classical* realist theory as set forth by Hans Morgenthau;[11] *structural* realist theory developed by Kenneth Waltz;[12] and *neoclassical* realist theory.[13] What has made realist theory as a whole such a prominent part of the IR theory landscape is its multidimensionality, including hypotheses that can be generated at each of the levels of analysis of IR theorizing: the international system, the units that comprise the international system, and the behavioral characteristics of the units themselves. Among the key variables of realist theory, in addition to power, is the concept of competing national interests in a world of anarchy, with states comprising an international system that requires them to rely extensively on their own means of survival or to join alliances or coalitions with others sharing their interests. Although realist theory does not (yet) contain an extensive emphasis on space, it is possible to derive from its variants numerous ideas as a basis for further IR theory development. We begin with national interest.

According to classical realist theory, the territorial state pursues national interest, which is defined by a variety of factors such as geography, ideology, resources, and capabilities based on the need to ensure its survival in a world of anarchy. Because international politics is a struggle for power, it can easily be inferred that spacepower is a manifestation of such a struggle. With the advent of space technologies, national interest now includes space. If international rivalries on Earth are being projected into space, theories about how states deal with them on Earth can also be extended into space. Because technologically advanced states are heavily dependent on space-based assets, the ability to defend or destroy such assets becomes a key national security concern, as in the case of the United States. Although states are the current entities that may threaten the space capabilities of other states, not-so-distant future challenges may come from terrorist groups capable, for example, of launching an electromagnetic pulse attack that would destroy or disable vital electronic infrastructures, including telecommunications, transportation, and banking and other financial infrastructures, and food production and distribution systems.[14] Such a threat would arise from a nuclear weapon detonated 80 to 400 kilometers above the Earth's surface directly over the United States or adjacent to its territory. However, those entities best able to safeguard their Earth-bound interests through the exploitation of new technologies are also likely to be able to utilize space for that purpose.

Space is a new frontier that will be exploited as part of an inevitable and enduring struggle for power. This is the obvious lens through which adherents of the realist theory would view space. More than 40 years ago, President John F. Kennedy expressed this idea when he declared, "The exploration of space will go ahead, whether we join in it or not, and it is one of the great adventures of all time, and no nation which expects to be the leader of other nations can expect to stay behind in the race for space."[15] In the absence of space leadership, states will lose preeminence on Earth. In recognition of this essential fact, competition in space began as soon as technologies became feasible. During the Cold War, the Soviet Union challenged the United States in space. Such statements are fully in keeping with classical realist theory.

In the 21st century, the United States faces increasing numbers of states whose power and prestige will be enhanced by their space programs. Therefore, with the advent of space technologies, a new dimension has been added to the national interest concept of realist theory. The fact that several states have developed national space programs highlights the relevance of realist theory in helping to explain why states acquire those programs. As already noted, space has begun to be utilized in support of the national interest. That the competition characteristic of terrestrial political relationships would be extended to space as soon as technologies for this purpose became feasible is implicit in realist theory. This includes the ballistic missiles dating from World War II and satellites that had their origins in the national security needs for reconnaissance, surveillance, and communications during the Cold War. The U.S.-Soviet competition included an increasingly important space component that would only have grown more intense if the rivalry had gone on for many more years. The dependence of technologically advanced states on space, together with their resulting vulnerability to attack in and from space, contributes to the relevance of realist theory to the analysis of space and national security.

Realist theory also contains the assumption that states rely ultimately on themselves for survival in the anarchical world of international politics. As sovereign entities, states (more accurately, their decisionmakers) determine for themselves how they will ensure their survival based on perceptions of national interest. Central to such theory is independence, including capabilities that increase the latitude available to states to help themselves to survive without outside assistance. Such theory may describe well the problems that entities in space will confront, perhaps only mitigated by vast distances separating them from each other and minimizing the contact that is essential for conflict, while also rendering impossible substantial levels of outside help. What is assumed in realist theory about self-help on Earth may be amply magnified in space if and when its colonization moves forward. Nevertheless, the vast distances that separate entities in space may drastically limit the possibility of armed conflict, as we have known it on Earth, between space-based entities on distant planets or asteroids. Even to begin to speculate about such behavior is to demonstrate the great latitude for divergent perspectives about conflict and cooperation.

Because national interest can best be understood within a geographical setting, the political dimension of geography is integral to realist theory. It has been noted that IR theorizing about spacepower begins with space-related geopolitical analysis that cannot be separated from national interest. Realist theory thus provides insights into the basis for national space policies. According to realist theory, states that are able to develop vast terrestrial capabilities are likely to extend their reach into space as technologies for this purpose become available. The private sector becomes a vital source of innovation in the most advanced economies. Because developed states, and especially the United States, have greater technological capabilities to operate in space, they are likely to favor a substantial role for the private sector, together with international regimes that regulate the use of space and protect the ability of public and private sector entities to operate there. Developing countries that cannot afford to divert resources to space or simply lack such capabilities are more likely to favor the extension of the common heritage principle to space while attempting to place drastic limits on developed countries and perhaps calling

for mandatory transfers of space technology to developing countries. Such countries view space through a different prism of national interest, seeking to restrict or retard more developed states from exercising full control or from maximizing spacepower. Such behavior on the part of states large and small with regard to space issues is in keeping with realist theory. Each state operates according to perceptions of national interest.

Structural realist theory offers other insights into future space relationships. According to Kenneth Waltz, the international structure shapes the options available to units (in this case, states). In particular, the international structure is key to understanding unit-level behavior. *Structure* is defined as the type and number of units and their respective capabilities. The type and number of states have changed dramatically over time. New technologies have conferred unprecedented capabilities, including interactive capacity, on the states comprising the international system. Levels of interdependence have increased greatly. The foreign policy options available to states differ between bipolar and multipolar international systems. Structure shapes how states align with or against each other. We have already begun to consider the structural characteristics of space if we assume that the planets and their lunar satellites constitute the principal units. The geography of space, including where units are strategically situated, provides an important basis for theorizing about their relative importance, first, to states and other units on Earth and, eventually, perhaps with each other. The physical sciences, including astronomy, have already provided vast knowledge about how these units of the solar system relate to each other and to the Sun. IR theories will be enriched as we move into space and develop political relationships that become the basis for theorizing about the sociopolitical entities that will comprise space-based actors. Earlier, the suggestion was made that the unique characteristics of space, including distances and other features, will shape interactive patterns within and among space-based political units. Space colonies may have to operate with great independence because they cannot rely on a Mother Earth that would be possibly light years distant. If such assertions are true, they provide insights into how structure, extrapolated from structural realist theory, would shape unit behavior in space. Perhaps this would resemble in some ways the extremely limited preindustrial interactive capacity on Earth when communications between widely separated groups were few and often nonexistent.

Compared to present terrestrial international structures, space structures are likely to remain at a very rudimentary level. As technology develops, however, it is not fanciful to anticipate that parts of the solar system will be linked in unprecedented fashion as the ability to project spacepower rises, thus giving new meaning to space structure. Like the proliferation of capabilities leading to new power centers and globalization on Earth, it is possible to envisage such an analogy in space someday. This might include space stations or capabilities in space controlled from Earth. It might also encompass space colonization and the creation of new interactive capacity and patterns in space such as those that take place among Earth-based units. In the absence of colonization from Earth as took place in the age of European expansion, structural analogies in outer space are obviously premature.

However, a major theme of this chapter is that space exploration and exploitation will create interactive patterns that in themselves become the basis for theory and its testing. What constitutes those capabilities and how they are distributed among political units will be essential to understanding space structures. This may eventually become another level of analysis supplementing the existing levels for understanding the source of unit behavior. For example, as already discussed, we have begun to factor space into IR theory about power relationships. Space control is held by many to be indispensable to power on Earth. The extent to which options available to states at one or more levels are shaped by spacepower providing for space control contributes to space as an increasingly important level of analysis in itself. According to such theory, spacepower becomes the essential basis for Earthpower. If entities are to be dominant on Earth, they must control space. If space control shapes the foreign policy options available to states on Earth, then such theorizing about space replaces or supplements the international system level as the key echelon of analysis if we move beyond the structural realist theory of Kenneth Waltz.

Structural realist theory attaches great importance to the numbers and types of actors, the distribution of capabilities among them, and their interactive capabilities. For example, to think about globalization today is to understand the growing importance of telecommunications, including the Internet and broadband. Only recently has the Earth been wired for instantaneous communications. Interactive capacity translates into greater interaction that, in turn, creates systemic relationships leading to higher levels of specialization and interdependence. Systems as the outgrowth of structures represent a major focal point of IR theory. Astronomers have accumulated great knowledge about the behavior of the units comprising the solar system, including how such units relate to each other and how they are arranged in the solar system. Our theories about the social-political behavior of such units will evolve as social or political systems. This means that space first will affect interactive patterns, as we already see, of Earthly units with each other. Subsequently, the space-based interactive patterns that will become the object of theorizing are likely to differ dramatically from those on Earth because of factors such as vast distances measured in light years. The social-political solar system will remain far more primitive in its development than Earthly international systems, barring major advances in space technologies. Nevertheless, it is possible to make use of IR theory focused on structure and system to speculate about such space relationships.

Neoclassical realist theory also provides a basis for discussing space-power and IR theory. The effort to refine neorealist theory includes an understanding of the conditions under which states choose whether competition or cooperation is the preferred option. Although its overall power and the place of the state in the international system decisively shape actor choices, foreign policy, potentially including spacepower, is the result of choices based on perceptions, values, and other domestic-level factors. Thus, the neoclassical realist literature brings together international systems and unit-level variables based on the assumption that foreign policy is the result of complex patterns of interaction within and between both levels. Neoclassical realist theory rethinks power in its offensive and defensive components, including the circumstances under which states seek security in an anarchic setting by developing military forces to deter or defend against an adversary as well as the level and types of capabilities that are deemed

sufficient to ensure one state's security without threatening the other side's ability to deter or defend. Such issues are easily identifiable in discussions about spacepower.

A variant of neoclassical realist theory, called contingent-realist theory, emphasizes what is termed the *offense-defense balance*, defined as the ratio of the cost of offensive forces to the cost of defensive capabilities. Contingent-realist theory provides a theoretical basis for examining when and how states, in a self-help system, decide to cooperate as a means of resolving the security dilemma. Entirely consistent with such IR theory, space affords yet another setting for states to develop cooperative or competitive relationships. To the extent that domestic preferences shape the foreign policy of democratic states, we also come close to democratic peace theory. Domestic factors help mold foreign policy preferences, including support for cooperation or competition. Such neoclassical realist thought leads logically to a discussion about, and possible integration of, other IR theories into theory about space, including neoliberal and especially democratic peace theory.

Neoliberal Theories and Space

Just as space can be viewed as an area for competition, so can it also be the basis for cooperation. Such an assertion opens for consideration a spectrum of IR theory beyond neoclassical realist theory to be applied to our thinking about space. For example, democratic peace theory (DPT) posits that states defined as liberal democracies do not go to war with other liberal democracies. Such states are more likely to cooperate with each other in space activities than they are with totalitarian governments in space or in other endeavors—although the United States and the Soviet Union developed cooperative relationships with each other during the Cold War. Liberal democracies in disputes with other liberal democracies are likely to resolve their disagreements by means other than armed conflict. It is primarily in democracies that debates about the militarization and weaponization of space take place. Presumably, democracies that provide the basis for colonization or other interactive patterns in space would carry with them the values that could shape their behavior in space, just as the seeds of American democracy were planted by the British colonists who settled in the New World. Could we conceive of the colonization of space leading to forms of government pitting democratic colonies against those from nondemocratic states on Earth? Such is the logic of DPT extended into space. However, it is plausible to suggest that the rigors of space will test Earthly values in environments drastically different than those that exist on Earth, necessitating dramatic changes in political and social relationships. Such a suggestion is fully in keeping with the assumption that environing factors shape the options available to humans, whether on Earth or in space, just as humans make concerted efforts to alter the environment to meet their needs. The interactive process between humans and their environment has provided an enduring focal point for IR theory and other social science theory.

As they develop a presence in space as an adjunct to their terrestrial interests, democracies and other states have already begun to form regimes that codify normative standards designed to facilitate cooperation based on agreed procedures and processes as well as common interests and shared values about space-related activities. Those regimes

may be formal or informal. Formal regimes may be the result of legislation by international organizations that are themselves established by democracies and other states having an interest in such arrangements. Such formal regimes may possess governing councils and bureaucratic structures. In contrast, informal regimes may be based simply on consensus about objectives and the interests of the participants. Therefore, it is possible to envisage regimes in space or on space issues based on a convergence of interests in keeping with realist theory or as the outgrowth of the cooperative values of democracies.

The liberal world vision holds that states and their actors engage in mutually rewarding exchanges, including trade based on specialization and comparative advantage. Cooperation benefits states as well as individuals and groups that become increasingly interdependent. Order emerges as self-interested units in an anarchic setting cooperate for mutual benefit. In other words, cooperation may be based on national interests, an idea that is compatible with realist theory. Liberal theory holds that cooperation in one sector may produce satisfaction that enhances incentives to collaborate in additional sectors, leading to what Ernst Haas termed "spillover" or the "expansive logic of sector integration."[16] Just as advances in technology have led to the emergence of a single global system and international society, neoliberal theory posits that the extension of man's reach into the solar system and ultimately the broader universe will enhance the need for cooperation. Both as an expression of the values of a liberal democracy set forth in DPT and as a matter of self interest, cooperation becomes an essential part of liberal IR theory about space relationships. We do not currently know whether outer space will reinforce the competitive dimension or create the need for greater cooperation within and among the emerging entities that will populate space. We may hypothesize that the demands of life in outer space may enhance the need for cooperation, but we may also consider the pursuit of clashing interests between contending groups for control of key space geopolitical positions and assets. The answer to such questions, of course, holds important implications for the relevance of one IR theory or another to space. At this point in time, however, neoliberal theory, like realist theory, has much to offer as we speculate about space relationships.

Constructivism

Another approach (and a fertile one) to theorizing about space flows from constructivism. Whereas much of IR theory usually focuses on relationships among structures that shape the behavior of units or agents, and how interactive capacity leads to interactive patterns (systems), constructivism views the world in a fundamentally different way. In the constructivist image, the building blocks of international society can be best understood by analysis of rules, practices, agents, statements, social arrangements, and relationships. Constructivism is not a theory, but instead an ontology, an understanding of the nature of being, a way of looking at the world. The world is constantly being "constructed" and therefore changed as new geopolitical, geoeconomic, or geostrategic changes take place. Such changes occur in a setting in which a "vast part of the planet [is] also changing 'internal' ways of running [its] political, economic, and social affairs. No part of the world can avoid these changes or their consequences; the entire world is continuously 'under

construction.'"[17] What this means is that theories based on phenomena such as states, balances of power, anarchy, or national interest are inadequate, if not misleading, because they are abstractions that are "constructed" in our minds rather than being objects having concrete reality. Instead, human relationships are inherently social in that they are defined by the social arrangements made by individuals or groups who are endowed with free will. What is acceptable in the form of human behavior at one point in time may not be acceptable in a subsequent phase. For example, the role of women in Western society has been altered dramatically in the past century. Practices that were once commonplace are no longer deemed acceptable. People are constantly changing and redefining their relationships based on the practices and rules that they create. Therefore, they are free of the material inanimate factor termed *structure*. Translated into IR theory and space, this means that we have the ability to create, or construct, the types of arrangements that we may wish to have for space. What is important is how we think about and construct "rules rather than imaginary, artificially unified entities such as states or structures. Rules have ontological substance; they are there for anybody to see."[18]

Rules of behavior are the result of a changing intersubjective consensus that arises over time from discussions, thought, and action. Just as geopolitics addresses the physical environment, constructivism deals with the ideational setting. What we have, according to Nicholas Onuf, a leader in constructivist thought, is a continuous "two way process" in which "people make society, and society makes people."[19] As a result of such interaction, we develop rules of behavior within institutions and elsewhere. In other words, we construct reality as well as our respective individual, group, and national identities. It is not a great leap in logic to consider space as an arena in which rules of behavior, first derived from Earthly experience and subsequently evolving in light of new factors, lead to the construction of newer rules governing behavior as well as identities. According to constructivism, new values and expectations are created that become embedded in growing numbers of people and spread to broader epistemic communities, defined as elites with a shared understanding of a particular subject. Presumably, the organizers of this project and its participants fall within this category as they develop an ideational basis for thinking about and developing strategies for spacepower. Such epistemic communities create a strategy for achieving their goals and play a major innovative role. For the constructivist, the essential issue is how such a process will play itself out in sectors of importance such as space. Whoever constructs rules of behavior that can be applied to space will determine what those rules are, at least to the extent that we are dealing with political/ social relationships.

Conclusion

This chapter has briefly surveyed four major perspectives or IR theories. Greater depth and analysis are required to encompass the more extensive IR theory. This includes theories of conflict and war, deterrence and dissuasion, cooperation, integration, and political community. To what extent, for example, will the clashes that take place on Earth have counterparts in space, and what can conflict theory suggest to us about their parameters? By the same token, what can be hypothesized about the forces making for greater community and integration, including nationalism and identity, that would have

direct relevance to space? Although we can only speculate about the answers to such questions, IR theory provides a useful point of departure for such an exercise.

IR theory rests on contending and contrasting assumptions about relationships between international units, including states and other actors. Even having far less knowledge of space than we have about the Earth, we have already begun to transfer beliefs about Earth-bound interactions into our thinking about the behavior of states in space. However, space has already become an arena for competition and cooperation. IR theory offers alternative explanations about international competition and cooperation. The emphasis that we place on competition or cooperation may depend on the IR theory or theories on which we choose to rely. This we already do in the case of terrestrial international relationships. To the extent that we envisage space as an arena for growing competition based on an inevitable quest for power, we will be drawn to realist theory. If we emphasize the cooperative dimension, we will likely embrace assumptions derived from liberal theory. Because the stakes are immense, how we theorize about space, drawing on existing and yet-to-be-developed IR and other social science theories, will have major implications for strategies and policies. Because no single IR theory capable of describing, explaining, or prescribing political behavior on Earth exists, we cannot expect to find otherwise in space. Therefore, it is important to recognize the inherent limitations in extrapolating from Earthly IR theory to space, while also drawing wherever possible on such theory as we probe farther into space.

Notes

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3. Peter L. Hays, *United States Military Space: Into the Twenty-first Century* (Maxwell Air Force Base, AL: Air University Press, 2002).
4. E.H. Carr, *The Twenty Years' Crisis 1919–1939: An Introduction to the Study of International Relations* (New York: Palgrave, 2001), 4.
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8. Harold and Margaret Sprout, *The Ecological Perspective on Human Affairs with Special Reference to International Politics* (Princeton: Princeton University Press, 1965), 27.
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10. Ibid., 32–46.
11. See especially Hans Morgenthau, *Politics among Nations: The Struggle for Power and Peace* (New York: Alfred A. Knopf, 1960), 3–15.
12. Kenneth M. Waltz, *Theory of International Politics* (Reading, MA: Addison-Wesley, 1979).

13. See, for example, Gideon Rose, "Neoclassical Realism and Theories of Foreign Policy," *World Politics* (October 1998), 144–172. See also Fareed Zakaria, "Realism and Domestic Politics," *International Security* 17, no. 1 (Summer 1997), 162–183; Charles L. Glaser, "Realists as Optimists: Cooperation as Self-Help," *International Security* 19, no. 3 (Winter 1994/1995), 50–90.
14. This type of threat is described and discussed in the *Report of the Commission to Assess the Threat to the United States from Electromagnetic Pulse (EMP) Attack*, vol. 1, Executive Report (2004).
15. John F. Kennedy, address at Rice University on the Nation's Space Effort, Houston, Texas, September 12, 1962, available at <www.jfklibrary.org/Historical+Resources/Archives/Reference+Desk/Speeches/JFK/003POF03SpaceEffort09121962.htm>.
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