

Chapter 1

CREATING REGIMES FOR “THE FINAL FRONTIER”

When the USSR launched Sputnik into earth orbit on October 4, 1957, it took the first step in realizing the human dream of reaching outer space. Previously abstract speculations began to acquire material reality and posed new questions for the international community. Just as the development of aviation at the start of the twentieth century required working out common rules for new human uses of the air, successful launches of satellites and other spacecraft at midcentury required developing common rules for use of another—far larger—physical realm. This desire for common rules, for developing a system of governance for human activity in outer space, could have been supplied in either of two ways. Common rules could have evolved piecemeal, through a process of action and reaction leading to convergence on particular modes of conduct. Such processes were familiar in international history, as either tacit “understandings” developed when governments wished to avoid conveying a strong sense of promise regarding their future conduct, or as rules of customary international law when they did. Alternatively, common rules could have been established through negotiation of explicit multilateral agreements.

Most governments regarded waiting for convergence as undesirable, partly because they believed it would come too slowly and partly because tacit understandings would allow the governments with active space programs greater influence over the shape of governance than they would enjoy under a set of explicit agreed rules. The strength of these concerns is hard to recollect half a century later because the level of actual human activity in outer space remains quite modest. However, the writings of space enthusiasts seeking to increase interest in and support for ambitious national space programs, and the well-established science fiction tradition of imagining whole civilizations on other planets, encouraged imaginative leaps by governments and citizens alike that led them to expect a rapid increase of space activity.

Governments’ desire to establish regimes quickly was tempered by realization that the characteristics of outer space and of space activity were largely unknown. Coping with the unknown led governments to adopt a two-phase negotiating method very similar to that used in many later international agreements on environmental issues. In the first phase, governments developed an understanding of the basic contours of space activity and established a broad set of principles to guide formulation of more specific rules for particular activities. The 1967 Outer Space Treaty is thus broadly comparable to the “framework treaties” on

environmental matters, which define an environmental problem, commit governments to addressing it, and establish various mechanisms of joint knowledge-acquisition and rule-making for developing policies aimed at ending, abating, or managing that problem. Just as governments later supplement the framework treaty with protocols or other ancillary agreements specifying the particular policy measures to be adopted, the Outer Space Treaty has been supplemented by a set of more specific agreements relating to particular forms of space activity.

ACTORS, SOCIAL STRUCTURES, AND INTERACTION

Neither a generally shared desire for common rules nor the commonplace observation that international agreements reflect what the governments of most powerful states prefer fully explains the particular set of substantive rules included in any international agreement. Understanding why one set of substantive rules is adopted rather than another requires understanding how governments develop preferences among the various rules that might be adopted. This means looking closely at the processes of interaction through which agreements develop.

Establishing sets of common substantive rules, whether through tacit convergence or elaboration of explicit agreements, is a form of interaction among actors operating within a context established by the prevailing political and social structure. Social science theories of interaction can be arrayed on a spectrum running from highly structuralist on one end to highly atomist on the other. At the highly structuralist end, actors' beliefs, choices, and behaviors are treated as the products of "deeper" structural forces operating regardless of actor intentions and pushing actors towards particular outcomes. For neorealists, the "deeper" force is the exigencies of survival in a highly competitive armed anarchy.¹ For world-system theorists and other economic structuralists the "deeper" force is a state's position in the economic system of global capitalism.² For some postmodernists, the "deeper" force is language or discourses shaping what can be thought.³ At the highly atomist end, exemplified in some formulations of collective action and public choice theory,⁴ social structures are treated as having no strong effect, while actors' ability to persuade, induce, or coerce one another into some result produces the outcome. Arrayed along the large middle portion of the spectrum are a range of theories attributing causal significance to both social structures and actor strivings in varying proportions.⁵ In recent years, the weight of opinion has shifted from the structuralist end of the spectrum towards the middle where actors are treated as conscious, goal-setting, and goal-seeking entities interacting within more or less tightly limiting contexts that channel but do not fully determine outcomes. Theorizing has thus shifted from an "either-or" to a "both-and" stance.

However, this broad agreement that both structures and actors matter has not been accompanied by consensus on how actors develop beliefs, formulate

goals, make choices, and interact with one another. At present two very contrasting accounts of how actors proceed enjoy wide support among students of international relations. Rational choice theory starts from two methodological individualist assumptions that place it towards the atomist end of the spectrum of theorizing. First, it treats social institutions as providing a "thin" context in which actors operate as arm's length bargainers involved in one transaction at a time.⁶ Second, it treats the motivations of actors as arising from internal impulses that exist independently of their membership in any social system. Actors are treated as egoistic utility maximizers concerned primarily with material considerations, who refer to those material interests for guidance in their definitions of preferences, choices, and actions consistently across interactions. In short, the primary question actors ask themselves is "what do I want?"⁷ The contrasting social practices approach lies more towards the structuralist end of the spectrum in positing that actors learn their purposes and goals from membership in a society where they are socialized into and perform particular roles.⁸ Adopting the perspectives and aspirations appropriate to their role guides them in identification of their own preferences and the range of acceptable choices and behaviors. This methodologically holist approach regards actors as products of their wider society rather than as social atoms coming together only for incidental interchanges, and social norms as strong connectors rather than as incidental results of self-interest seeking among interacting egoists.⁹ In social practices accounts, then, the primary question actors ask themselves is "what am I?"

Though rational choice and social practices accounts are frequently seen as rival explanations of actor conduct,¹⁰ they do share one important feature. Theorists of both persuasions tend to assume that actors can move quite smoothly and rapidly from understanding their own interests or identities to interacting effectively with others because they spontaneously converge on a common conception of the interaction at hand. In rational choice accounts, this convergence occurs as actors all perceive the pattern of shared and divergent interests they bring to the interaction and therefore the contours of the "game" in which they will be involved. In social practices accounts, this convergence occurs because actors all agree that the same social norms and consequent logic of appropriateness will guide their conduct towards one another. Yet understanding how this convergence occurs is important because this is where the process of moving from a vague desire for common rules to adoption of a particular set of substantive prescription for conduct begins.

In both theories, then, actors appreciate any situation they face in much the same way, either by pursuing utility maximization or by following the prescribed social norms. Both ignore the strands of social science theorizing that argue actors are actually sensitive to the type of interaction they are about to enter. This is the basis of the political science argument that in both domestic¹¹ and international¹² politics, the course of interaction is shaped by actors' beliefs about the

character of the issue or problem being addressed. Similarly, both symbolic interactionist sociology,¹³ and self-categorization theory in psychology¹⁴ posit that actors orient themselves towards others and identify the contours of the interaction in which they are or will be engaged by identifying the character of the situation they face. In all of these conceptions, actors ask “what am I (or will I be) doing?” before considering the “what do I want?” emphasized in rational choice accounts or the “what am I?” emphasized in social practices accounts.

Paying more systematic attention to how the answer to “what am I doing?” shapes actor convergence on a common conception of their interaction permits taking up the additional symbolic interactionist insight that actors have multiple interests and identities which receive different degrees of emphasis at different times. Which interests or identities come to the fore and which recede into the background depends, in the symbolic interactionist view, on the character of the interaction at hand, because the interaction provides cues about how actors should present themselves. This insight is particularly important when dealing with composite actors like states in the international system. States consist of a collection of member-actors—including political leaders, government agencies, economic or other interest groups, identity-based groups, and social movements—having interests and identities that they seek to advance by securing enough influence to guide state policy towards emphasizing state interests and identities compatible with their own.

Emphasizing how actors perceive their situation necessarily draws attention to processes of individual and collective cognition. The literatures on problem definition,¹⁵ cognitive framing,¹⁶ prenegotiation,¹⁷ and naturalistic decision making¹⁸ all point out that actor’s definitions of the situation at hand affect their perceptions of the interests or identities they have at stake, the likely character of interaction with others, and the relative desirability of the possible outcomes. They also emphasize that individual and group cognition is a dynamic mechanism by highlighting the cognitive processes through which situation definitions can be harmonized among actors holding initially divergent ones, or be changed over time even among a set of actors who initially shared a common situation definition. This formation and re-formation of situation definitions, then, is one of the dynamic links between actors and social structures.

The situation definition answering the question “what am I doing?” simultaneously establishes three basic contours of the coming interaction. First, it identifies the type of issue or problem being addressed, assigning it to some particular policy realm, and thereby indicating which sets of causal and normative beliefs are relevant to comprehending the matter at hand. These foregrounded causal and normative beliefs become the starting points for developing both sincere positions on the issue and “strategic communications” most likely to persuade others to adopt similar conclusions about how to deal with the issue or problem.¹⁹ Second, the situation definition conveys a broad sense of the set of

policy means most appropriate for dealing with the issue or problem at hand, bounding the range of plausible policy choice. Third, by defining the sorts of authority, capability, experience, or expertise relevant to addressing the issue or problem, the situation definition indicates which persons, groups, or organizations have strong or weak claims to be included in the policy-making process. Thus, situation definitions include more than the beliefs about and perceptions of a particular policy question emphasized in the literature on problem definitions or frames; they also suggest who, using what means, is relevant to addressing it.

Except in the ongoing debate about the causes or implications of the end of the cold war, international relations theorists have paid little attention to situation definitions. This is not surprising; the influence of situation definitions is far less visible in "normal times" when they are stable and widely shared. Analysts who focus on "normal times" can treat them as operating much like the "focal points" of coordination,²⁰ or the "scripts" of cognitive science²¹ that permit actors to converge so rapidly on a common understanding of what is happening and a mutual appreciation of each others' goals and actions that the process of interaction seems to be engaged automatically. Yet the cognitive science literature indicates that situation definitions are central to interaction even in "normal times" when social structures are stable.

Examining the early development of international regimes for outer space provides a good opportunity to trace the influence of situation definitions on international interaction in "normal times" for two reasons. First, several factors generally regarded as having considerable influence on the process and outcome of negotiations were largely stable during this period, making it easier to trace the influence of situation definitions. Second, the newness of space activity meant that governments could not simply take up some preexisting situation definition; they had to devote some amount of attention to developing one.

Three factors generally viewed as having considerable impact on processes and outcomes in world politics—the general institutions and practices of the international system, the procedural norms and rules used to structure a particular negotiation, and the distribution of capability among the states participating in the negotiations—were quite constant. The general institutions of the international system as a whole underwent relatively little variation between 1957 and 1988. The initially European Westphalian system of independent territorial states had become global and now included intergovernmental organizations providing almost all-inclusive negotiating forums. Within this stability of basic institutions and practices there were some shifts in the inflection of relations among states. The intensity of cold war conflict between East and West had decreased some in the mid-1950s, decreased further in the mid-1960s, reintensified in the late-1970s, and decreased again after 1986. Economic and social interconnection between the domestic societies of states increased during this time, though unevenly because dictatorial governments could often isolate their countries

from transnational interactions. By the mid-1960s, East-West competition was supplemented by the “South-North” contentions between developing and industrial states. However, these inflections did not affect the fact that bargaining proceeded in a very “thin” institutional context allowing actors to proceed egoistically and employ sharp tactics. Though there were enough differences in membership and voting rules to encourage some forum-shifting on certain issues, the various United Nations (UN) bodies where outer space issues were discussed all operated according to similar practices of multilateral diplomacy. The distribution of capability on space issues also remained highly uneven. Other states had begun undertaking space activity by 1988, but the United States and the Soviet Union maintained such a commanding lead in space technology throughout the period that the issue-specific distribution of capability remained far more bipolar on space activity than on any other sort of international interaction.

The very newness of space activity meant that governments could not just converge unconsciously on some common situation definition. The lack of extensive experience with space activity meant situation definitions had to be created, and this involved more or less extensive discussion of how the issues should be defined. The forms of reasoning they applied, the way they reasoned to particular situation definitions, and the impact of those situation definitions on the course of negotiations can be traced in some detail through contemporaneous documents. Space regime negotiations occurred primarily in UN forums which combined the public formality of “parliamentary diplomacy” in open meetings with behind-the-scenes discussions in closed meetings, hallways, and informal gathering places. What is omitted or obscured in the meeting records is often revealed either in national policy debates or in the extensive legal and policy literature—much of it contributed by individuals directly involved in the negotiations—that preceded, accompanied, and followed the conclusion of each space treaty. The ability to trace the construction and impact of situation definitions is reinforced by the largely tacit consensus against attempting to write rules for every form of space activity in one comprehensive agreement. This decision meant there would be several distinct negotiations, each involving its own process of establishing and operating from a separate situation definition.

Studies of human cognition have identified several forms of human reasoning that can be used to develop the shared situation definitions needed for effective interaction. Induction and deduction, though prominent in analytical reasoning, tend to be less useful in formulating situation definitions or developing other forms of knowledge when actors who need to address some question or problem quickly possess only fragmentary information about it. Inductive reasoning, which relies on a “bottom-up” generation of organizing concepts from a large set of particular observations, is hobbled by the lack of prior experience.

Deductive reasoning, which depends on having a clear conception of a problem or issue for "top down" generation of rules for behavior from general assumptions and postulates about the relationships of various factors involved in the situation, is hobbled by the lack of a sufficiently clear theory establishing the assumptions and postulates. In situations of limited knowledge, actors are more likely to rely on the more suggestive modes of reasoning by metaphor or analogy. Both modes are similar in projecting from the familiar to the unfamiliar, with metaphor operating more loosely as an orienting device and analogy operating in more concrete fashion by suggesting that particular causal or evaluative beliefs valid for the familiar also apply to the unfamiliar.²² In the outer space negotiations, the more concrete nature of analogies and the high familiarity of the participants with reasoning by analogy led to favoring analogy over metaphor.

Analogies facilitate transferring knowledge from the familiar to the unfamiliar in either of two ways. In the simpler form of transfer, the unfamiliar is a relatively concrete event or behavior that appears to be sufficiently like other familiar events or behaviors to count as another instance of the same type of event or behavior. Once that claim is accepted, the unfamiliar instance is classified under the type and treated according to the existing understandings about that type. Thus, for example, the atom bomb was a new destructive device widely regarded by strategists as having the potential to transform warfare; yet international lawyers immediately identified it as a weapon and regarded it as covered by the laws of warfare regarding weapons. In the more complex form of analogical transfer, the unfamiliar event or thing cannot be equated to a concrete example of a known type but is regarded as sufficiently similar in some respect to permit using knowledge of the familiar to develop an understanding of the new type exemplified by the unfamiliar.

Both forms of analogical reasoning were invoked in development of international regimes for outer space activity. Outer space itself was a new physical realm where human activity could occur different enough from "air," "sea," and "land" to need a locational classification of its own. Only when that was worked out could basic rules distributing regulatory authority, access, and use rights be established. In contrast, particular forms of space activity appeared to have strong similarities with certain forms of activity on Earth. Governments could thus draw directly on knowledge of and rules regarding the cognate earthly activity when designing the rules for particular forms of space activity. Thus, the preliminary phase of establishing a locational classification of "outer space" and the norms defining patterns of authority, access, and use rights featured a considerable amount of complex analogical reasoning while creation of international regimes for particular forms of space activity relied mainly on direct transfers of ideas from similar types of earthly activity.

SITUATION DEFINITIONS AND INTERACTION

Investigating the impact of situation definitions on regime-formation involves focusing on political processes. Like other forms of collective decision-making, regime-formation can be regarded as having distinct phases of agenda-setting, debate, decision, implementation, and review in which a question or problem is identified as a matter of collective concern, ways of addressing it are proposed and debated, a collective choice among proposed approaches is made, that choice put into practice, and the results of putting it into practice assessed.²³ When a widely shared situation definition already exists, it affects the prospects of getting some issue or problem on the agenda and of adopting each proposed approach to managing or solving it. When one does not, the process of working one out is necessarily prior to focused debate about the issue or problem and choice among proposed regimes because regime formation cannot proceed very far if actors cannot identify what they have at stake or what proposals would best secure their preferences.

An agreed situation definition also affects the processes of deliberation and decision among governments by identifying the types of knowledge relevant to and the sorts of actors regarded as deserving a significant say in decision making. Contemporary governments are large organizations dividing an array of tasks among several individual officeholders or agencies. Over time, the officeholders and agencies develop a strong sense of the division of labor among themselves, a sense often reinforced by constitutions, laws, and traditional usages. Thus, ministries of economics or the treasury expect to have a leading role in trade negotiations, and general staffs a major say in alliance negotiations.

Proposed situation definitions are the product of individual actors' cognition. Widely shared situation definitions are "social facts" understood individually but simultaneously by many actors and therefore providing a shared basis for interaction. This parallelism of cognition makes the shared situation what some cognitive theorists call a "social" or a "group" cognition, a common possession of many minds that persists and continues to guide the group as long as most group members continue to treat it as a "fact" not subject to immediate revision.²⁴ Though most of the social cognition literature focuses on sets of individuals,²⁵ conventional references to "the international community" and English School conceptions of "international society"²⁶ support the idea of treating governments as individual actors involved in group cognition, with the proviso that the process of interactor cognition among them can involve making appeals to identifiable coalitions within other governments or to social actors in a state able to influence their government as well as to other governments as a whole.

Developing group cognitions, whether in the form of "mental models" that interpret how some aspect of the social or physical environment operates, "prescriptions" that suggest appropriate action in particular circumstances, "ide-

ologies" that combine a mental model with notions of how the environment should be changed to improve human life, or "situation definitions" that identify the main features of a problem or issue,²⁷ involves actors working together. Each actor's own cognitive processes result from an intersection of external "incentive-altering" influences (including institutions, social norms, and appreciations of the physical universe) and "brain-based" factors (like emotional states and prior knowledge)²⁸ as affected by interacting with others in some joint problem solving or knowledge-generating effort.²⁹ The group effort does not replace individual cognitive activity; each member of the group still thinks on its own. It does, however, foster shared beliefs and can build a sense of group efficacy.³⁰ There is, however, no guarantee that the sense of group efficacy will be positive, or that group efforts will produce better results than individual cognition. There is considerable evidence that groups never manage to pool all the information available to individual members. Information shared early in the process is likely to carry greater weight, particularly if it supports the initial preferences individual members brought to the group effort.³¹ The more like-minded the individual members are at the start, the higher the likelihood that they will fall into pathological forms of "groupthink"³² severely limiting information search or will adopt more extreme versions of their initial views through exposure to additional arguments in favor of those views.³³ Yet under other circumstances group cognition can improve upon individual cognition by summoning the information-processing capacities of several actors at once and exposing each to counterarguments.

The debate and decision phases of international regime-formation occur at two levels simultaneously. First, individual actors must perceive the situation, consider possible actions, choose among them, and act to attain goals. The centrality of goal definition in this process is widely acknowledged; thus the term "preference formation" seems to be an appropriate summary of the within-actor activity. Second, the set of interacting actors must develop shared intersubjective meanings, knowledge, and beliefs about the matter or question at hand, and make collective choices through strategic interaction and/or joint deliberation; here the term "preference aggregation" is used to denote this among-actor activity.

In preference formation individual governments develop their own views by drawing on their own conceptions of what interests or identities are at stake and follow their established political routines allocating decision-making influence among internal actors. Preference formation about international regimes requires each government to answer two distinct but linked questions—should a regime exist? and, if so, what substantive and procedural rules should it contain? The link between the questions is closest when a government rejects the need for a regime because that conclusion entails rejecting all proposed regime components. The link is also close when a government believes that accepting any regime, whatever the content, would put it in a better situation than staying in the

current regime or nonregime status quo. In all other circumstances, reactions to the likely content affect reactions to the question of whether a regime should exist. However, belief that exclusion from a regime-in-formation will be costly can override objections to the proposed content, particularly for governments that believe working from within will offer some prospect of affecting the regime's application and future evolution.³⁴

Preference aggregation involves individual governments interacting in various ways, using the means of pressure, exchange, and persuasion available to them. Each government hopes to secure broad assent to its most-preferred outcome but is aware that it may have to settle for a less-desired one depending on how preferences are distributed among the other governments or coalitions of other governments involved in the interaction. Focusing primarily on pressure and exchange encourages conceiving of preference aggregation as a process of one actor using external leverage to affect another actor's choices and behaviors. Persuasion, in contrast, is a process of "bringing the other around" by getting it to alter the cognitions that inform its choices and behaviors.

This distinction between preference formation and preference aggregation might suggest that they form a "two-step" in which governments first determine what they want and then try to secure it. The reality is more complex for three reasons. First, preference formation occurs in a social context in which already-established social institutions, shared problem definitions, and other shared meanings, knowledge, and beliefs shape governments' understandings of themselves, their interests, and the process of interaction. This has been acknowledged most explicitly in the constructivist emphasis on socialization of actors into shared understandings for definition not only of current preferences, but also of the underlying interests and conceptions of self that guide their formation,³⁵ and in the postmodernist emphasis on "discourses" as shapers of individual and collective beliefs and action possibilities.³⁶ Second, governments' identification of their own preferences is itself affected by their estimate of what is likely to happen during interaction, a point most clearly acknowledged and analyzed in rational choice treatments of the impact of expected utilities and shadows of the future in ranking possible outcomes and choosing interaction strategies. Third, preference aggregation is affected by the degree to which individual preferences diverge or converge initially and over time, and the ways actors carry out their interactions. This is acknowledged in the rational choice discussion of different game structures, which are defined by divergence and convergence of preferences held by the players,³⁷ the classical realists' exploration of the impact of "revolutionary states" refusing to follow established practices,³⁸ and the evolutionary theorists' emphasis on systems "tipping" in different directions as particular types of actor or action strategy become more or less prevalent in a social system.³⁹

Preference formation and preference aggregation feed into each other particularly strongly when the individual actors are themselves aggregates rather than single individuals. In contending over definitions of state preferences, domestic actors keep in mind that their state will be interacting with other states in the context of an international system having particular characteristics; in contending over preference aggregation, governments (and other political actors) keep in mind that influencing domestic actors in another state can lead to shifts in the domestic balance of influence that produce changes in that other state's preferences.

Shared situation definitions are necessary to establishing viable international regimes, but are not sufficient. They guide but do not fully determine preference-formation and preference-aggregation processes. In particular, situation definitions seldom restrict actors to one means of interaction with each other and they certainly do not determine by themselves how particular actors fare in their efforts to secure outcomes as close as possible to their first preference. Thus, understanding the full dimensions of establishing both basic presuppositions of governance and the more detailed regulations for particular activities requires paying attention to the other aspects of interaction.

The means of interaction available to actors can be classified into three broad types: pressure, exchange, and persuasion. Pressure, whether in the form of deprivations (coercion) or rewards (inducement), involves actors' use of threats, promises, or unilateral moves that limit remaining choices to alter others' behavior. Pressure is a device for affecting other actors' immediate ranking of outcomes, and occasionally their set of preferences by removing some choices from consideration, but usually leaves in place the conceptions of interests and identities that underlie those preferences. Exchange involves actors in swapping material possessions, political support, or some combination of the two for mutual gain; each actor involved offers some of what it has in abundance for something it has in dearth. Actors using exchange typically focus on current preferences rather than underlying interests or identities in pursuing "win-win" situations of mutual gain compared to the pre-exchange status quo. Persuasion involves actors in offering arguments aimed at affecting others' reasoning. Actors using persuasion seek to alter others' preferences now and in the future by altering their conceptions of their own interests or identities or both. Persuasion may be oriented towards the present or immediate future, but is often a longer-term effort to shift preferences through changing conceptions of interest or identity.

There is enough readily observable use of power to create pressures on other actors in international relations (as in politics generally) that accounts attaching primacy to exchange or persuasion serve more as images of logically possible modes of interaction than as descriptive claims about how international politics actually operates. Yet even realists concede that governments and other

actors do not rely on pressure alone; as indicated in E. H. Carr's claim that focusing only on power is as great an error as the idealism he subjected to such withering criticism, Hans Morgenthau's concern with beliefs and normative standards, and Arnold Wolfers's emphasis on the significance of "milieu goals," regarding the shape of the international order.⁴⁰ Thus, power-only notions of international interaction actually share the logically possible but seldom observed character of exchange-only and persuasion-only conceptions.

The existence of three distinct modes of interaction suggests conceiving of a triangular geometry among them, with the notional pure types at the points of angles and the space within the lines connecting the three outer points used to indicate the various mixes that actually occur. The precise mix varies with the relationships between the actors, with comembers of a "security community,"⁴¹ democracies identifying each other as such,⁴² or states otherwise enjoying a friendly relationship less likely to use armed force against one another and more likely to use exchange or persuasion. The choice of interaction mode also varies by the situation. Particularly but not only in the twentieth century, the development of international law has involved efforts to establish normative standards restricting the occasions on which threats or use of armed force are accepted as appropriate. The post-1945 development of multilateral institutions has been accompanied by an emphasis on persuasion and exchange, though applying forms of pressure other than armed force continues to feature in all international negotiations.

The rapid consensus among governments that the new outer space issues should be handled in United Nations forums—the General Assembly for most issues and International Telecommunications Union (ITU) Radio Conferences for space uses of radio frequency spectrum—committed governments to a process of negotiation that had two effects on debate and decision. First, it created a separation between the "decision process" and the "basic process"⁴³ with a disjuncture between influence over decision making stemming from UN forums' procedures and consensus rules and influence over the substance of rules for space activity stemming from ability to aid or hinder implementation of whatever rules were decided upon in the UN forum. Second, it affected the balance among the three types of interaction and influenced the selection of persons who would be in charge of actual negotiations. Persuasion and exchange (in the form of logrolling or splitting differences) would come to the fore; pressure would recede and most often take the forms of unilateral creation of outcomes to which others would have to respond, implicit vetoes based on others' appreciation that no effective rules could be created without powerful actors' support, or use of opportunities to stall agreements offered by the forum's rules of procedure. The decision to divide the initial phases of discussion in the General Assembly's space committee between a scientific and technical subcommittee charged with developing common knowledge about space, space technology, and the practical

possibilities of space activity, and a legal subcommittee charged with drafting multilateral agreements for regulation of space activity ensured that international lawyers would have a prominent place in the regime discussions. Lawyers specializing in radio and telecommunications regulation were also prominent participants in the ITU Radio Conferences. The lawyers never monopolized the process; political leaders, diplomatic generalists, space program administrators, military commanders, and executives of for-profit enterprises also had a hand in both national preference formation and multilateral preference aggregation. Yet the lawyers' strong presence gave the multilateral negotiations a particular cast that had an impact on both the process of developing shared situation definitions and carrying out interaction within their terms.

Accepting that pressure, exchange, and persuasion operate simultaneously commits the analyst to identifying how each operates and how their influences intertwine in the preference-formation and preference-aggregation processes. This begins by following James G. March in rejecting the possibility of using "basic force models" to understand interaction in favor of "force-engagement models" acknowledging both material and ideational influences on choice and action.⁴⁴ Force engagement models highlight two broad connections between power and persuasion. First, the way a particular actor uses its own capabilities at a particular moment is shaped by the purpose it hopes to advance,⁴⁵ with the guiding definition of purpose itself affected by intersubjectively shared beliefs, meanings, conceptions, and social institutions as well as by the actor's own individual mental appreciations. Second, the ways others react to an actor's use of its capabilities is shaped by how far they already agree with, tolerate, or can be persuaded into endorsing or tolerating that purpose.

Thus, force-engagement models promote a conception of coalition-building in which pressure (whether by inducement or intimidation) is only one route to success. More durable success involves finding coalition partners favoring a similar definition of the desired outcome and willing to use what power they have to help realize it. In a centralized polity, prevailing coalitions have the benefit of control over a core administrative structure; in a field of minimal institutions like the international system prevailing coalitions must rely on their own resources for implementation. This coexistence of pressure, exchange, and persuasion supports the claims of international relations theorists focusing on persuasion that the international system, while not functioning like a Habermasian ideal speech situation, does provide occasions when "communicative action," "argument," or "deliberation" plays a significant role in international politics.⁴⁶

Establishing new patterns of international governance is thus a multilayered process. Individual actor and among-actor cognitive processes are central to international politics. Individual actors guided by conceptions of the problem at hand and the possibilities open to them now and later work out their preferences, make choices, and interact with others also engaged in working out preferences

and choosing to produce outcomes using their own skills and other resources, all operating within more or less confining limits established by physical realities and social institutions. Thus, comprehending whether an international regime gets established on a particular matter at a particular time and the substantive content of the international regime established requires understanding how actors identify problems and possible solutions, perceive their own interests, formulate their preferences among possible solutions, and anticipate the results of interaction. All these activities are filtered through previously existing or newly established intersubjectively shared ideas, beliefs, languages, and situation definitions that permit mutual comprehension and interaction among actors. At the same time, interaction and outcomes also depend on the distribution of capability among actors and coalitions, and the influence of international system-level institutions in channeling interactions into particular patterns.

THE PATTERNS OF SPACE ACTIVITY, 1957–1988

Human activity in outer space developed so recently because it is difficult to put objects or people into space, keep them there safely, and (when desired) return them to Earth in one piece.⁴⁷ The difficulty of entering space depends in part on the sort of mission involved. Placing a satellite or spacecraft in near-circular orbits about 150 km above sea level—the minimum altitude for avoiding atmospheric drag strong enough to pull an object in circular orbit to Earth within days—requires giving it a speed of 7.8 km/second (28,080 km/hour) while placing a robot probe or spacecraft into a trajectory towards other natural bodies in space like the Moon or a planet requires attaining escape velocity of 11 km/second (39,600 km/hour) and steering it to the destination. That rocket engine technology could provide the necessary speed was demonstrated mathematically in 1925, and German rockets reached the edge of space during World War II. The steering problem was more complicated, because it involved the mathematical “problem of three bodies”—calculating the path a vehicle leaving one moving object should take to arrive at another moving object. Mathematicians still regarded this problem as unsolvable in the 1940s, and rocketeers realized that until it could be solved or worked around, effective space activity would be confined to placing objects in Earth orbit. Early Moon missions (such as the Soviet Luniks in 1959) involved strong elements of luck. Steering space objects became far more effective in the early 1960s first when computers were used to provide midcourse alterations to initial approximations of the flight plan and then when mathematicians solved the “three body problem” using the newly developed tools of vector analysis.⁴⁸ Yet even with advances in rocket engine power, reliability, and steering, launches are not yet the routine activity comparable to civil aviation basic to dreams of interplanetary travel or settlement. Each launch takes

considerable preparation; the risk of launch failure remains high—as spacefarers using U.S.-made Delta III, Russian-made Proton, and Japanese-made H2 rockets all found to their dismay in late 1999.⁴⁹

Staying in space safely is at least as hard because people and objects must be protected against several hazards. Satellites, spacecraft, and astronauts working outside their craft must all be equipped to function in a near vacuum. They must also deal with extreme temperatures: high heat when exposed to the Sun near Earth and deep cold when in shadows or far from the Sun. The sun-facing side of a satellite in geostationary orbit can reach a temperature of 150 degrees C while the other side is exposed to temperatures of –200 degrees C. Temperatures in near earth orbit are comparable, and anything operating at altitudes between 600 and 1000 km above sea level must also deal with the charged particles of the Earth's magnetosphere. The magnetosphere is a boon to life on the surface since it protects Earth from the solar wind (charged particles emitted from the Sun as it burns), but the charged particles it catches travel at speeds of 500–2000 km/second. Severe radiation also exists in the Van Allen belts which arc outward over the temperate and tropical areas of Earth and rise 500–64000 km above sea level at their widest extent. Very low satellites avoid both magnetosphere and Van Allen belts, but most pass through them for all or part of their orbit. The geostationary orbital band favored for communications satellites and some remote sensing and reconnaissance satellites lies in the upper Van Allen belt, necessitating extensive forms of radiation shielding and electrostatic charge dispersal that add considerably to construction costs.

Returning from space involves meeting a third set of physical challenges: entering the Earth's atmosphere at just the right angle and speed and dissipating the high heat generated when fast moving objects meet atmospheric drag. Angle of approach is critical: at too shallow an angle the spacecraft bounces back into space while at too deep an angle it burns up. Even at the correct angle, the heat is formidable: U.S. space shuttles carry insulation on their nose and wing leading edges capable of withstanding more than the 1260 degrees C (2300 degrees F) temperature they usually meet on reentry, and a broken wing tile doomed the Shuttle Columbia in February 2003.

All these features make large-scale space activity a multimillion dollar enterprise within reach only for the largest private corporations and the governments of major states. University-based and amateur groups have built small satellites, but get them into orbit by "piggybacking" on someone else's launch. Governments have been and remain the most active sponsors of space activity, engaged in exploring space primarily with robot probes, using satellites for military reconnaissance, weather observation, mapping, land use surveys, and environmental monitoring, and actively contemplating other military possibilities. Despite speculations about the potential of mining the Moon or asteroids and of

setting up certain forms of manufacturing in space, provision of telecommunications and broadcasting by satellite was (and remains) the only commercially viable space activity. Efforts to turn satellite remote sensing into a commercial or quasi-commercial undertaking began in the 1980s, but largely failed later though a few private operators did find niche markets in providing high resolution data. Private firms entered space activity in the 1960s as contractors, building satellites, and other equipment; in the 1970s private firms also provided most of the data enhancement and analysis adding value to remote sensing imagery.

In strong contrast to the visions of space enthusiasts, the direct human presence in space was very limited. Six parties of U.S. astronauts each briefly visited the Moon in 1969–72, but humans have not left near earth orbit since. Relays of Soviet cosmonauts, joined by occasional others, occupied the Salyut and Mir stations continuously after 1974; a succession of U.S. crews, also joined by others, flew shorter-duration space shuttle missions starting in 1981. “Human presence” was manifested primarily through placing satellites in orbit around Earth and sending occasional robot probes towards other parts of the solar system. Low earth orbits (LEOs), roughly circular orbits up to 5000 km above sea level with an orbital period (the time required for one complete circuit of Earth) of ninety minutes to a few hours are used for mobile communications relay, and certain remote sensing, reconnaissance, and weather observation satellites. The relays are placed on orbits taking them over the more densely inhabited areas of Earth; the others are usually placed in polar orbit (orbits perpendicular to the equator) because these afford the best vantage point for data collection. Satellites used for communication relays or broadcasting to the far north or south—areas between sixty degrees north or south latitude and the Poles—are placed in highly elliptical “molniya” orbits inclined 63.4 degrees from the Equator with an apogee of about 40,000 km above sea level, a perigee of about 500 km, and an orbital period of twelve hours.⁵⁰ Satellites placed in these orbits are visible above the horizon on the apogee side of the equator for eleven hours and on the perigee side for one hour; operators providing global services use four in the same orbital track to assure continuous service. Most communications relay and broadcasting satellites, as well as some weather observation satellites, are placed in geostationary orbit, a circular orbit at 37,500 km above sea level directly above the equator having an orbital period of twenty-four hours. The satellite thus appears to hang over the same spot, permitting continuous observation of or service to a circular portion of Earth having a radius of approximately 6,675 km from the equatorial spot.⁵¹ There is a smaller cluster of satellites, some remote sensing or reconnaissance satellites on polar orbit and location-finding systems on other orbits, in the “semi-synchronous” circular orbit having an altitude of 20,000 km and an orbital period of twelve hours. A yet smaller cluster, including the United States’s nuclear blast detectors, have been placed in “super-synchronous orbit” more than 37,500 km above sea level.

Space activity began in the late 1950s as the exclusive preserve of two governments—the Soviet Union and the United States. By the late 1980s the diplomatic terminology, denoting different levels of space activity, had evolved to reflect the wider range of space efforts that had developed in the meantime. The term “spacepower” was applied to governments capable of designing, constructing, launching and operating “heavy payloads” weighing 500 kg or more.⁵² This group included the Soviet Union and the United States joined by France (1965), Japan (1970), China (1970), the United Kingdom (1971), and India (1980). The British and French have merged their activities with the European Space Agency, as have the Germans, but all three could rapidly develop individual launch capacity if they wished. A larger number of governments launched small rockets and payloads into space, but lacked the ability or the resources to undertake a national heavy launch program.

A binary distinction between “spacepowers” and “non-spacepowers” fails to capture the variation of involvement in space activity among governments lacking ability to launch heavy payloads. Some of these governments had developed national space programs significant enough to give them a distinct voice in negotiations by 1988. The more active designed, constructed, and operated their own large satellites but contracted out launching to one of the spacepowers. Australia, Brazil, Canada, Germany, and Italy had all become “builder-operators” by 1988. Another group of states including Argentina, Indonesia, Mexico, and the Philippines became “operators”—they bought satellites from the major North American or European builders, commissioned launches from one of the space powers, and then took over operation once the satellite was in orbit.

Most governments participated in space activity as members of one or more intergovernmental consortia. The European Space Agency gave the smaller European states a way to participate in group space efforts. Intercosmos provided a forum for coordinating Soviet bloc space efforts but never became a launcher, builder-operator, or operator in its own right. The international communications satellite consortia—Intelsat and Inmarsat with their near-global memberships—Intersputnik, Eutelsat, and Arabsat with their regional ones—were operators contracting out the construction and launch of their satellites. Member governments were partly shareholders in the venture and partly users enjoying access to satellite telecommunication relays or broadcasts for themselves or their populations.

In the period under study, private firms remained on the fringes. In Western countries, they were prominent from the start as rocket, satellite, and space vehicle builders delivering their products to national governments or intergovernmental consortia. The Soviet bloc relied primarily on Soviet state enterprises for these products, and used its influence to limit the extent to which private firms acquired rights under outer space regimes. Even in the West, private firms did not undertake continuous independent space activity until the 1970s when the U.S. government authorized NASA to launch privately owned communications relay

and broadcast satellites.⁵³ Other governments also permitted private firm activity in the 1980s, leading to creation of a number of privately owned regional and global satellite networks. The French government organized its satellite remote sensing operations as a public-private partnership from the start. The U.S. government moved in that direction in 1986–92 though reversed itself when the market for images proved thinner than expected and returned remote sensing to government operation. A number of private firms made initial steps towards developing independent launch capacity in the 1980s, but none actually emerged as launch contractors until the 1990s.

Governments have had the greatest impact on the development of international regimes for space activity not only because they have been the most active users of space, but also because they jealously maintain their place as the primary actors in world politics. They insist on their status as the sole voting participants in any negotiation of formal international regimes. Ability to operate in space has given spacepower, builder-operator, and operator governments the most impact since they can make or break any proposed regime. Yet other governments and other sorts of actors also have interests at stake. Private firms hoping to operate in space need regimes that permit them to do so; private equipment makers, not desiring to venture into space themselves but dependent on demand for their products, want rules that encourage space activity. Clear stakes are also held by the many governments of the world which lack the resources and/or the desire to develop any level of national space program because they possess receiving stations for weather observation data and they or their nationals use the services provided by communications, broadcast, and location-finding satellites. Borrowing terms from the computer world, governments of “system user” states have interests and preferences regarding the development of outer space activity and perspectives on what sort of international regimes would promote desirable patterns of activity distinct from those of the “system operators.”

PLAN OF THE STUDY

Chapter 2 lays out the institutional characteristics that were common across all the space negotiations studied: the basic organization and norms of the international system and the nature of the multilateral forums chosen for addressing the issue.

Chapter 3 covers the decade-long process, culminating in adoption of the 1967 Outer Space Treaty, by which governments agreed to the basic principles and norms of space activity. Ninety-eight states are currently parties, including all with ability to undertake space activity, making the Outer Space Treaty the common foundation of current outer space law. The first part of the chapter focuses on use of the more complex form of reasoning by analogy through which governments agreed to classify outer space as a common area with an open

access rule. The second reveals some of the limits of creating common definitions with reasoning by analogy by tracing the complicated set of reasons why governments have not yet settled on an explicit definition of the boundary between air and outer space.

Chapters 4 and 5 cover discussions regarding regimes addressing three of the immediate implications of any form of space activity: rescue of astronauts, registration of objects launched into space, and liability to provide compensation for damage caused by launchers, satellites, spacecraft, and other space objects that fall back to Earth. All three could be treated as instances of problems familiar from maritime and aerial navigation, which greatly assisted negotiation of international regimes codified in formal multilateral treaties by the UN General Assembly's Committee on the Peaceful Uses of Outer Space.

Chapter 6 deals with the most divisive of space issues: regulation of military activity. Here, too, the simpler form of reasoning by analogy was applied, a process strongly encouraged by superpower perceptions of close relation between military activity in near earth space and military activity on Earth. Chapter 6 focuses primarily on the initial round of negotiations regarding military activity in space, and traces the bifurcation of rules—not meriting the appellation "regime" in some eyes since they conform so closely with the superpowers' existing preferences—establishing a nonmilitarization regime for natural celestial bodies and distant space plus a set of modest arms control measures for near earth space.

Chapter 7 focuses on negotiation of 1979 Moon Treaty. The initial impulse for negotiations stemmed from superpower desire to avoid politico-military conflicts regarding the Moon, but discussions were soon dominated by the Group of 77 effort to extend the "common heritage of mankind" principle and associated notions of managing resource activity through a global intergovernmental organization to the Moon and other natural bodies in space. This focus on the presence of resources to justify an expansion of the common heritage idea to other geographical areas made this one of the most clearly South-North contentions of all the space negotiations. Though a multilateral treaty was written, it enjoys too little acceptance to be the basis of an effective international regime.

Chapter 8 addresses the most economically significant form of space activity: use of Earth-orbiting satellites as telecommunications relays and broadcasting platforms. It traces development of the basic norms and procedures for allocating the radio frequencies and geostationary orbital locations needed for using satellites in this way. Simple use of analogy encouraged confiding this issue to the International Telecommunications Union since it was already the forum for coordinating other uses of radio frequency spectrum. Though involving considerable argument regarding access norms that took on strong South-North overtones, the technical character of ITU forums imparted a different dynamic to negotiations than would have occurred in a more "political" body, a

difference that becomes clearer through comparison with the discussions of the geostationary orbit in the Outer Space Committee.

Chapter 9 draws on all of the individual analyses to offer broader observations about the processes of situation definition and the impact of international institutions, situation definitions, the distribution of capability, governments' individual definitions of preference on the course of regime formation.