

Epilogue

Chapter Twenty

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Epilogue

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While it is customary to end reports with findings or conclusions, such an ending would be out of place here. Findings or conclusions should be reserved for the end of a journey. Instead, we are at the beginning. The preceding chapters are the first of many steps to develop the concepts, approaches, and tools needed to help the U.S. Department of Defense (DoD) and National Security Enterprise (NSE) navigate undergoverned spaces (UGS) in ways that are built on robust theoretical and empirical foundations. Therefore, instead of conclusions, we end with a few themes that we believe provide promising pathways for future progress.

UGS Will Remain a Strategic Challenge

UGS will endure as a strategic challenge that DoD and the NSE must face, regardless of whether the United States prioritizes counterterrorism, confrontation of regional powers, or long-term competition with global rivals. UGS represent areas in which nonstate threats can emerge, regional conflicts can spark into proxy wars, and great powers can shift the status quo to their benefit. Thus, although the strategic goals and motives for intervention may differ, the need to make sense of and successfully act in these spaces is critical.

Today, much of the focus on UGS is driven by the strategic demands of great-power competition in U.S. strategy. Here, UGS are important as an *arena* for competition, which can manifest in such ways as proxy warfare, gray-zone activities, or competitive rulemaking. At the same time, actors ranging from subnational political organizations to multinational firms are also acting in these spaces to secure their own interests. This creates an environment in which multiple actors could be both cooperating and competing across overlapping issue areas, generating a complex adaptive environment that requires greater demands for understanding and for nuanced action in pursuit of the national interest.

DoD and NSE Structures and Decisionmaking Processes Are Poorly Suited for Meeting UGS Challenges

Despite the historical importance of UGS, DoD and the NSE have struggled to understand and to act productively in these environments. In many cases, UGS-related issues fall between the seams in structures and processes. For example, effective action in these environments often requires the synchronization of instruments of national power that are divided between different organizations, thus making coordination difficult, slow, and prone to confusion. Similarly, the need to act on different timescales—moving quickly to adapt to new conditions while also needing to assess the impact of activities over years and even decades—challenges processes.

These barriers to successful engagement are known to practitioners but have persisted because of the perception that they serve other, higher-priority needs, particularly in DoD. Without change to these key processes, those seeking to manage complex adaptive environments with competitive ambiguity will continue to face an uphill battle.

Long-Term Competition in UGS Requires New Concepts and Approaches That Integrate Research, Analysis, Operations, and Strategy

To better position the U.S. government to manage UGS, new approaches are needed. One way to conceptualize the needed change is to envision a shift from a finite to an infinite game. Traditional military thinking imagines politics and security as a series of contests conducted between defined competitors at bounded points in space and time. However, such a vision obscures the requirements and opportunities presented by infinite games, in which objectives are not to achieve an unambiguous victory over a competitor but rather to endure for as long as possible. Given this difference, a set of alternative premises about surprise, death versus defeat, and power versus strength arise that provide alternative concepts for motivating actions and measuring their success or failure.

New concepts motivated by learning and adaptation, such as the Act-Sense-Decide-Adapt (ASDA) cycle, offer an opportunity to envision national security as a learning process within infinite games—while still admitting the prospect of finite games being played within them. In doing so, engagements might not build toward conflict but rather support the discovery of interests that could give rise to enduring mutualism and encourage institutions and norms that could enable stable and prosperous relations to emerge. Put differently, such an approach broadens the aperture of possibilities that decisionmakers should consider, including more and perhaps more-advantageous courses of action than are provided by traditional assessments.

This type of approach also offers a blueprint for the integration of research, analysis, operations, and strategy. The ASDA cycle argues that knowledge must be continuously pursued and aggregated to test, refine, and challenge beliefs and models that motivate action and evaluate options. Moreover, successful engagements, particularly those that develop robust

governance institutions, may not simply demand changes in approaches but may admit the possibility of evolving preferences and goals. Thus, not only should the ways and means of operations change, but the very ends being pursued by strategy might change as well.

Investments in the Social Sciences Are Needed

Throughout this report, we have seen that challenges posed by UGS were intimately connected with human decisionmaking, behavior, and interaction. These are areas of inquiry in which the social sciences are crucial for gaining a solid empirical understanding; however, the state of these fields is insufficient to meet the requirements of decisionmakers who need to understand and engage in UGS. Two classes of interrelated investments are needed and can be placed into context within the workings of the ASDA cycle.

First, better models of humans and systems of humans are needed to advance the state of the art regarding the Sensing phase of the ASDA cycle. For sensing to assist a decisionmaker's understanding of the world, new techniques for collecting and connecting data and theory are needed—particularly at granular levels and frequencies that exist beneath the administration of formal governance institutions. Equally important is the need for theories that admit more complexity than contemporary approaches offer—in terms of heterogeneity of actors, their goals and behaviors, and their interdependency. Such work will also require a change from studying the rare and unusual to collecting and analyzing baseline information as a way to contextualize extraordinary moments. As new tools are developed, they will help make sense of the links between probing actions and observed changes in the environment, ultimately bringing new information into decisionmaking processes.

Second, research into the social sciences is needed to benefit the decisionmaking step of the ASDA cycle, thus continuing the earlier steps of data collection and assessment by converting analytic outputs into decision-relevant inputs. Here, the challenges are how to design decisionmaking processes and establish criteria for evaluating policy options based on robustness, resilience, and the ability to adapt to perpetual novelty. On this matter, answers are needed for questions about how to render decisionmaking more open to multiple stakeholders, reduce bureaucratic barriers within organizations, and maintain conceptual and resource commitments to continual exploration.

Collectively, advances in how social systems are understood and how such knowledge can be employed to greater effect in the pursuit of national security would enhance long-term competitiveness and U.S. ability to engage and adapt in UGS of all kinds.

UGS Will Require New Tools and Rationales for Policymaking

Contributors to this report identified characteristics of promising policy analytic tools and rationales for engaging in UGS and long-term competition more broadly. First, tools should assist in the development of options that do more to explore what is possible than conven-

tional planning tools that emphasize the exploitation of what is already known. Actions, particularly small ones, may be justified given the value of information they provide (successful probes), even if they are not understood as the most efficient path toward a goal.

Analytic tools should seek robust and resilient options rather than optimal ones. Such a shift admits to the immutable presence of uncertainty in multiple dimensions: the state of the world (parameters), the causal or relational structure of the world (model), and the value of different outcomes that may result (preferences).¹ Some sensitivities to these uncertainties are the need to model and evaluate data at multiple temporal and spatial scales and the need to consider alternative boundary conditions on system participants and other scoping conditions (e.g., available resource goals and policy priorities). It also requires the ability to mix multiple methods (e.g., data analytics, field surveys, case studies, human played games, and formal modeling and simulation) to create alternative competing analyses and integrated and federated studies.

In total, future analytic processes and products should be strengthened by their openness and ability to accept inputs from multiple stakeholders while finding a basis for motivating collective action among those stakeholders. This is particularly important in the context of UGS, given that these are domains in which a single decisionmaker or actor, without the cooperation of others, lacks the power to effectively control events and dictate outcomes.

Artificial Intelligence Will Be Important and Limited

The advances in artificial intelligence (AI) remain impressive but narrow. AI systems have proven to be adept at performing well-defined tasks, and many impressive results have emerged from the application to competitive games in which AI systems have displayed superhuman performance. Yet significant gaps remain in terms of harnessing computational power to understand strategic interaction and open-ended systems in which the space of possible interactions are massive, the results of interdependent choices are non-zero sum, and the conditions that bound choices and criteria from evaluating outcomes are perpetually altered. These higher-order features of complexity are likely to remain stubborn boundaries for AI.

Within the context of the ASDA cycle's phases, whenever problems are well specified, AI will play an important role. These most likely will occur during phases in which probing actions and the sensing of their effects will reward acting at speeds or scales that strain human decisionmaking and organizations. Alternatively, within the Decide and Adapt phases, information is interpreted, models are developed and discarded, preferences are explored, and

¹ For examples of work on decisionmaking under uncertainty of these kinds see Francis X. Diebold, Neil A. Doherty, and Richard J. Herring, eds., *The Known, the Unknown, and the Unknowable in Financial Risk Management: Measurement and Theory Advancing Practice*, Princeton, N.J.: Princeton University Press, 2010; Vincent A. W. J. Marchau, Warren E. Walker, Pieter J. T. M. Bloemen, and Steven W. Popper, eds., *Decision Making Under Deep Uncertainty: From Theory to Practice*, Cham, Switzerland: Springer, 2019.

new forms of organization and operations are considered. In these phases, computation may play significant roles, but the types of autonomy in decisionmaking and action achievable in other phases may give way to interactive systems, placing greater stress on the shared ability of humans and machines to handle uncertainty and ambiguity.

Research and Analysis to Support UGS Will Need More-Robust Infrastructure and Organizations

Engaging in UGS will require support from an adaptive planning capability, such as the ASDA cycle, and will demand analytical and data collection capabilities with considerably higher capacity and flexibility than existing infrastructure and tools offer today. The potential for rapid and continuous change in strategy and operations might require new ways to couple research and analysis with the decisions they inform and the capabilities that decisionmakers desire. Here, robust investments in research infrastructure could bridge the gap between the stability of resourcing and focus needed to develop and accumulate basic research and the ability to pivot rapidly toward prospective applications to keep pace with continuously shifting policy and operational needs.

Ironically, new approaches may revisit older visions of grappling with complexity in science. Specifically, when imagining approaches for coping with organized complexity, Warren Weaver drew inspiration from the interdisciplinary operations analysis teams of World War II that brought together mathematicians, physicists, and engineers with physiologists, biochemists, psychologists, and social scientists.² Connecting interdisciplinary research teams with operations exposed researchers to the practical problems for which there existed a demand for new solutions; it also allowed operators to better understand and appreciate how research processes and teams could be tailored to their needs. As Weaver noted, this should not be a template for all of science but would constitute an important step in aligning decisionmakers with operations and research communities—a set of relationships that will be strained—as the demands to adapt at faster rates and with greater magnitudes of change intensify in UGS.

Concluding Thoughts

We hope that the chapters in this report start a larger dialogue among scientists, technologists, and policymakers working at the interface between governance and national security. We believe UGS, while likely to remain an amorphous concept, present an opportunity to foster productive debate and assist in identifying threats, risks, and opportunities across increasingly heterogeneous and interdependent domains of competition.

² Warren Weaver, “Science and Complexity,” *American Scientist*, Vol. 36, No. 4, October 1948, pp. 541–542.

Abbreviations

AI	artificial intelligence
ASDA	Act-Sense-Decide-Adapt
DoD	U.S. Department of Defense
NSE	National Security Enterprise
UGS	undergoverned spaces

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