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Considerations for the Next National Space Policy

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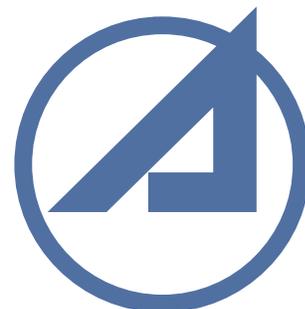
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Foreword

Over the past four decades, presidential directives on national space policy, with the intent of providing overarching guidance on civil, commercial, and national security space, have become standard. If the Trump administration chooses to continue this practice, the resulting directive undoubtedly will include re-articulation of many long-held national policy positions. It could also be an opportunity to set new directions and settle unanswered questions. This paper explores some of the possibilities for change.

Background

U.S. national space policy (NSP)—top-level guidance addressed in a reasonably comprehensive manner—originated in the Dwight Eisenhower administration in the late 1950s.¹ Subsequent administrations over the next two decades did not pursue broad space policy documents, preferring instead to touch on specific space-related issues in short (typically one- or two-page) National Security Action Memoranda (under John F. Kennedy² and Lyndon Johnson³) and National Security Decision Memoranda (under Richard Nixon⁴ and Gerald Ford⁵).

The administration of Jimmy Carter marked a return to a more inclusive NSP. Carter signed a Presidential Directive (PD) on National Space Policy in 1978.⁶ This occurred shortly after a PD on space nuclear power systems⁷ and was followed by two PDs covering civil space policy⁸ and remote sensing policy⁹ (all three of which were signed by National Security Advisor Zbigniew Brzezinski rather than President Carter). Since then, each occupant of the White House has issued a national space policy directive.¹⁰ Additionally, each one has issued targeted national policies addressing activities such as space transportation, commerce, commercial remote sensing, navigation, and exploration.

If the Trump administration chooses to continue the practice of putting its stamp on space policy, it can take a similar path as its predecessors or devise a different

approach. Possible incentives for doing the latter include the growth and diversification of the U.S. space enterprise and the global proliferation of space capabilities, which make it difficult and unwieldy to create a single policy document that is truly comprehensive. With this in mind, this paper does not attempt to present a comprehensive treatment of the possible content of a new NSP. Rather, it addresses selected issues that could reach key decision points within a decade, perhaps even within one presidential term.

Continuity or Redirection?

Analysis of the NSPs of the past four decades reveals more continuity than change. Certain basic space policy tenets have been in place since the early days of the space age and are widely accepted as noncontroversial, such as the commitment to explore and use space for peaceful purposes, the importance of scientific discovery, the desirability of international cooperation, and the rejection of claims of sovereignty in space.* Consistently, U.S. presidents have called upon the country to be a leader in space science, applications, security, and commerce. The differences across the presidencies have been mainly in tone and emphasis rather than substantive content.

*The prohibition on claims of sovereignty in space, currently a treaty obligation for the U.S. and all other major spacefaring countries, has come into question regarding its appropriateness and desirability in a future that includes extraterrestrial resource mining.

At a minimum, the president can promulgate a revised national space policy through rhetoric and, more importantly, through budget requests. To give more emphasis and clarity to the policy, the administration could issue an executive order or, as has been typical, a presidential directive. Such a document could be as simple as an articulation of principles and goals, which has been presented in just a page or two in previous administrations' directives. Using this approach, specific objectives and their implementation would be left to subsequent targeted issuances and to agency planning and execution. However, the common practice in NSPs has been to state, at least in summary form, the objectives for the civil, commercial, and national security space sectors, as well as those applicable across sectors. Each administration's NSP has been supplemented by targeted directives, which sometimes have preceded the issuance of the NSP and other times have followed it.

Whatever the chosen format, the U.S. space community will be primarily interested in the content. Many in the community, including members of relevant congressional committees, are urging continuity of policies and programs, preferring stability and predictability over the disruptions that often accompany a change in administration. On the other hand, there is also the sense that new leadership offers an opportunity to update, refine, or reconsider existing efforts.

The following sections offer points to consider in the development of a new NSP. Rather than addressing enduring themes, the discussion focuses on selected areas in which the administration could decide to inject substantive new guidance alongside its efforts to maintain continuity in the U.S. space enterprise.

Principles, Goals, and “The Big Picture”

In keeping with long-established policy, the NSP released in June 2010 reiterated the principles of peaceful exploration and use of space by all, the rejection of claims of sovereignty in space, and the inherent right of

self-defense. But the document elevated two principles to the top of the list: space sustainability (taking greater care to mitigate orbital debris, sharing more data on space traffic, and taking a cautious approach to development of offensive and defensive space systems) and encouragement and facilitation of the U.S. commercial space sector. The policy sought to reinforce these prin-

ciples while emphasizing the need to “increase assurance and resilience of mission-essential functions.”

Any new policy pronouncements are likely to continue favorable treatment of space commerce, which contributes to the top-priority goal of economic growth. The priority of

space sustainability is less certain, and depends on the new administration's interpretation of the concept. If it is seen as improving the operational environment for commerce and national security, it will likely be viewed positively, but if it is seen as a regulatory or arms control activity, it may be treated less favorably.

All of the principles articulated in NSPs to date can be viewed as the support structure for a top-level vision of humanity's role in the exploration, use, and development of space. However, no compelling and enduring vision has emerged from this process. For example, no NSP to date has declared the goal of establishing humankind as a multiplanet species, or the goal of integrating the material and energy resources of space into Earth's economy. Reluctance to go too far is likely driven by the politics of the here-and-now, the limits on budgets, and the risks to credibility if the vision is too ambitious (or to some observers, too fanciful). Goals that are too far in the future and have diffuse benefits—and often, identifiable near-term costs—do not inspire the expenditure of political capital by high-level decisionmakers. But despite the incentives to hedge on long-term vision, U.S. decisionmakers are likely to be faced with inflection points that could manifest themselves in the next decade that would profoundly affect the nation's space policy, strategy, and programs.

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Thus far, the development of space applications has been part of a search for solutions to a variety of challenges: political and military tensions between nations, the need for faster and more comprehensive communications and navigation, monitoring of the destructive forces of nature, and measurement of natural and man-made effects on the planet. These challenges have been met using disposable space systems that collect, process, and transmit data (communications, imagery, etc.). The next step in addressing these and other challenges involves manipulation of objects in space—building systems and structures rather than just deploying them, maintaining and refueling orbital hardware rather than just discarding it, and manufacturing products rather than just collecting and transmitting data. Around the world, government and industry R&D is underway on these next-generation capabilities, and business plans have been announced, indicating that the first inflection point is imminent: a new paradigm for space operations that may take shape in just a few years.

The second inflection point comes after enduring operations are established on the moon. Early facilities may be the lunar equivalent of Antarctic research stations. At that stage, sustainment may resemble

a longer-distance version of what we do today to operate the International Space Station. For initial small outposts, the extraction, processing, and use of extra-terrestrial resources will be a research project that may yield some small-scale benefits as a by-product. But cultivation of space resources transforms from a nice-to-have experimental function to an absolutely critical capability if a commitment is made to build a greater number of larger facilities, accommodate more people and equipment, and accomplish a broader range of ongoing objectives in cislunar space (that is, between the moon and Earth). Efficient resource exploitation would be a key requirement if the U.S. decides to “incorporate the solar system in our economic sphere,” as John Marburger, science advisor to George W. Bush, suggested more than a decade ago.¹¹

The third inflection point coming into view is dependent on the strategic planning decisions of the U.S. and other major spacefarers, and how they play out in the international community. For example, if the U.S. chooses a destination-driven path that leads to Mars, but other countries and nongovernment entities devote their resources to developing the moon and cislunar space, who will derive the most long-term benefit? If successful, U.S. humans-to-Mars efforts would make history, but what would be the opportunity cost? Real-world strategies may not offer such stark contrasts, but this scenario highlights the need to think through the implications of alternative courses of action.

The Civil/Commercial Interface

Space commerce was first recognized in national policy as a distinct sector of the U.S. space community in the late 1980s, although it had been around for many years

by that time. Since then, one of the most important lessons for space policy has been the high degree of interdependence among the supposedly distinct sectors.

It is important to keep in mind that NASA was established to do pioneering scientific and technical research, and then hand off the results

to others at the appropriate stage of development. This is what happened in the space agency’s early years with communications satellites and later with launch services. Human spaceflight has taken a bit longer, but that too is beginning to migrate to the commercial sector.

Space commerce has evolved on many fronts throughout the post-Apollo era and has accelerated in the past decade. This momentum could continue regardless of the level of White House attention. It could move forward even more dramatically if the administration perceived space commerce to be a significant contributor to national interests, such as economic growth and prestige, and acted to encourage and facilitate that contribution. The U.S. government should not be expected to fund, develop, and operate all the research projects, services, and infrastructure needed to support the

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nation's long-term ambitions in space, so the resources of the private sector must be brought into the mix. This implies a high priority for public-private partnerships in space exploration and development and an NSP that enables mutually supportive and overlapping activities for the civil and commercial sectors.

As noted in the previous section, on-orbit servicing and use of extraterrestrial resources may become critical capabilities soon enough to justify planning for them today. History has shown us that humans in search of knowledge, raw materials, and energy have explored the most hazardous environments on Earth, including the ocean floor, the polar regions, treacherous terrain, and underground mines. Valuable discoveries have spawned economic booms and determined human migration and settlement patterns. Someday, this may be repeated in space because the resources of the solar system are abundant beyond our foreseeable ability to fully exploit them. The feasibility of such an outcome will be enhanced if the public and private sectors work in concert.

The NSP released in June 2010 included a statement in its Civil Space Guidelines that opened a door to the next steps in solar system exploration and development by directing NASA to:

Pursue capabilities, in cooperation with other departments, agencies, and commercial partners, to detect, track, catalog, and characterize near-Earth objects to **reduce the risk of harm to humans from an unexpected impact on our planet and to identify potentially resource-rich planetary objects** [emphasis added].¹²

This was the first time that a presidential policy assigned significant responsibilities to an agency regarding planetary defense and acknowledged the intent to seek out space resources. More recently, a provision in a 2015 federal statute could signal another early step toward solar system development:

Asteroid resource and space resource rights. A United States citizen engaged in commercial recovery of an asteroid resource or a space resource under this chapter shall be entitled to any asteroid resource or space resource obtained, including to possess, own, transport, use, and sell the asteroid resource or space resource obtained in accordance with applicable law, including the international obligations of the United States.¹³

The Trump administration could consider these two statements as precursors to policies it may choose to introduce in the next NSP to promote the next steps in the exploration and development of space with public-private partnerships as a key element.

National Security Space

Numerous issues are vying for priority in the security sector, many of which are shared with the other space sectors. Examples—some of which have been around for a long time—include:

- ◆ **Integration of commercial capabilities into national security space architecture.** What role should commercial satellite communications services play in the military satellite communications architecture? How should small satellites, ridesharing and hosted payloads, and other resiliency and capability-enhancing measures be accommodated in new space system designs?
- ◆ **Access to space.** How can launch costs be reduced while maintaining or improving reliability, safety, and flexibility?
- ◆ **Proximity operations.** Potential proliferation of proximity ops will change the operational environment in ways that bring both benefits and risks. What are the implications and possible responses?
- ◆ **Space industrial base.** How can sufficient U.S. expertise and capacity be maintained?

A presidential directive may not be able to resolve these issues on its own, since it is top-level guidance and is not intended to get into the specifics of implementation strategy. Issues tend to evolve over extended periods through the interactions of a broad array of stakeholders. They are driven by events, changes in the operational environment, and advances in technology. Sometimes, issues drive organizational and cultural change. In considering the imperatives of the next NSP, two security-related challenges stand out that may reach decision points within the current presidential administration: next steps in space traffic management and comprehensive planning for space protection.

The U.S. Air Force has been providing space tracking services to commercial and foreign entities for many years. However, the growth of space traffic is taxing resources that should be devoted to military missions, not to operating a traffic management system for all the

world's space operators. A shift of this responsibility away from the military has been anticipated for a long time, but a decision on a new course of action, and the role that commercial and foreign surveillance assets will play, may now be on the near horizon. In choosing its path, the U.S. will want to achieve specific objectives, likely to include the following:

- more accurate, comprehensive, and timely space situational awareness;
- coverage of civil, commercial, and foreign space operator needs that does not unduly burden the manpower and budget of the U.S. Space Surveillance System; and
- global acceptance of U.S. standards for surveillance operations and data formats.

There are also some things the U.S. should seek to avoid:

- collisions or near-misses that disrupt satellite operations;
- excessive operator intervention and use of onboard resources for avoidance maneuvers; and
- isolation from a growing world community of space surveillance operators, resulting in competitors rather than partners.

The need for protection from evolving space threats has prompted considerable writing, discussion, and action. Previous space policy and relevant guidance at the agency level emphasized the need to identify and characterize current and future threats; develop capabilities, plans, and options to deal with the threats; cooperate with commercial and foreign entities in crafting responses; and in general, develop resilient systems to assure critical national security space-enabled missions. Programs are underway aimed at protecting government space assets, but greater coordination of efforts across agencies may be warranted. Also, there are questions yet to be answered regarding commercial and foreign assets that support U.S. interests, which are an important part of the mix of capabilities. Exactly what should be protected? By what means? How much should be invested in protection measures, and who will pay for them? Answers to these and related questions are likely to be needed sooner rather than later.

Keeping up with the Pace of Change

Space is a dynamic area, which is one of the reasons why it retains its fascination for those who observe it and devote their careers to it. But that dynamism highlights the fact that policy tends to lag behind technology and practice. In the mere seven years since the issuance of the last NSP, more than enough has happened to warrant an update. If the Trump administration chooses to pursue a new policy, it would be wise to do more than just catch up to today—it should look ahead to tomorrow as well.

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