SPACE AGENDA 2025

STRENGTHENING A SOLID FOUNDATION: U.S. ADVANTAGES FROM COMMERCIAL SPACE

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Executive Summary

The commercial space economy is growing and increasingly driving new space-based capabilities. U.S. government (USG) actions, during the Cold War and after, created a vibrant commercial space industry that still leads internationally. However, the space domain is undergoing rapid changes and great power competitors seek to overtake the United States and/or threaten the nation's space capabilities. This chapter describes the current competitive state:

- Revenue from commercial space activity exceeds global government space spending, though it is still sustained by government demand
- The U.S. industry is leading in global market share
- Commercial innovations underpin/drive many new space capabilities
- The People's Republic of China (China) is fusing its military and civil efforts to rapidly grow its domestic space capability
- The Russian space industry is in comparative decline, and Russia may seek asymmetric advantages
- The European Union competes for a global market share and is generally a security ally

Using a strategic planning framework, this chapter examines several current or potential USG strategic actions. The analysis explains the value of leveraging the domestic commercial industry for national security. Strategic actions the United States might take that build on existing strengths, like domestic capacity and innovation pipelines, appear particularly advantageous going forward. The U.S. Space Force's commercial space strategy, for example, can create a positive feedback loop likely to outcompete rivals. Potential actions to reform import and/or export controls require more careful consideration; depending on how they are implemented, they can either strengthen or weaken the current U.S. position. The framework and initial analysis provide a starting point for more robust strategic planning to sustain future U.S. leadership in space.

Introduction

Space capabilities in the United States today are created primarily by the labors of the private sector, even if substantially funded by the government. While the share of government space funding that goes to private contractors has declined since the 1990s, the private sector role has expanded beyond just contracted research and production to include private sector-led capabilities developed and sold on a commercial basis to both government and private customers. As a result, private industry investments are growing drivers of new space capabilities. While total private financing for space activities is volatile, the long-term trend suggests that in this new Space Age, commercial capacity and innovation will be linchpins of enduring U.S. space power.

Seeing this trend, in 2014, the People's Republic of China (China) began fostering private space companies, including to fulfill military contracts.[1] Other militaries, including Russia's, have moved beyond dual use to direct buys of commercial space capability.[2] Based on recent public assessments, Russia[3] and China[4] recognize and are looking to counter the United States' commercial space industry advantage,[5] while the U.S. government (USG) is looking for opportunities to increase it.[6]

This chapter will use a long-standing strategic planning framework to explain the importance of several current USG strategic actions in the context of great power competition in the space domain. Starting from a deeper understanding of the growing importance of commercial space capability and U.S. competitor responses to that condition, the framework creates a context for evaluating the utility of USG actions. In this chapter, only an initial analysis is made. Future work should evaluate a broader set of competitive factors and alternative actions and regularly monitor for critical changes in the circumstances assessed.

Current U.S. Space Leadership by the Numbers

Estimates for the size of the global space economy in 2023 range from $400 billion to $630 billion.[7] To be clear, global government spending on space capability still underpins the space economy. The data and trends show that the commercial markets expanded from that base are an accelerating force. The United States captures the single largest share of the global space market, which, in one previous estimate for 2023, was 37 percent ($148 billion).[8] Among other areas, U.S. industry leads in revenue from:

- Manufacturing of spacecraft (46 percent of global market)
- Launch services (54 percent of global market)
- Ground equipment (32 percent of global market for antennas, networking, system operations, user equipment, and 2 of the 5 leading equipment makers)[9]

How Did the United States Get Here?

Prior USG policies and funding fostered the U.S. space industry leadership. High levels of investment in the context of Cold War competition left the United States in a strong global position after the collapse of the USSR. Through the 1990s, the USG continued to be a heavy space buyer, mostly from domestic sources. Meanwhile, a second factor was at work: the USG increasingly pursued policies that expanded the domestic space industry and markets, likewise encouraging robust private investment. While companies seeking to go further and faster were often dissatisfied with USG positions and processes, some key USG decisions include the licensing of radio-frequency (satellite) spectrum to commercial entities, competitive (at least dual source) national security launch, public provision of Global Positioning System (GPS) signals,

relaxation of remote-sensing rules, commercial crew and cargo contracts, and research/development contracts to diverse suppliers (especially using flexible contracts* such as Other Transaction Authorities[10]).

Threat, Opportunity, Weakness, Strength (TOWS): A Framework for Analysis of Future Strategies

Given the ongoing growth of the global space economy and the success of the United States so far, both competitors and allies are reacting by taking strategic actions to improve their domestic space capability. This includes smaller nations outside the G20.[11] The USG would be unwise to rest on its laurels and should develop a forward-looking strategy to maintain its advantages.

In that U.S. endeavor, a simplified TOWS analysis can aid strategic planning. As proposed in 1982,[12] the TOWS approach looks at how extrinsic factors can be addressed by intrinsic (existing) strengths or weaknesses. Figure 1 illustrates how a TOWS matrix is used to identify potential actions. A strategy is built selecting several actions, not a single entry nor using only one quadrant. Some readers might be more familiar with Strengths, Weakness, Opportunities, Threats (SWOT).† Beyond putting intrinsic factors first, SWOT analyses tend to focus on identifying and categorizing factors of importance for a strategy without considering the dynamic interaction of internal decisions and external conditions (or decisions).[13] The TOWS approach illustrated here, derived from the 1982 paper, moves from brainstorming to a structured analysis.

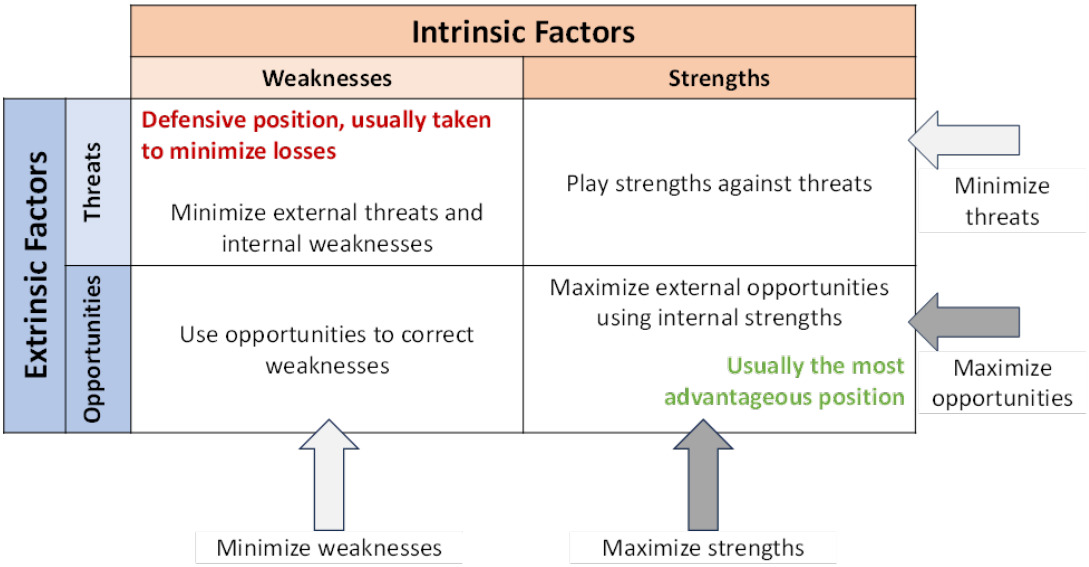

Figure 1: The general structure of a TOWS analysis.

It should be emphasized that TOWS is useful for analyzing options at a moment in time. The transforming space domain is characterized by volatility, uncertainty, complexity, and ambiguity. Additional tools, such as foresighting, should be used to know when a TOWS analysis needs to be reevaluated.[14]

Development of a fulsome U.S. competitive strategy is beyond the scope of this chapter, but it is feasible to look at a few current or potential U.S. strategic actions. Generally, the most advantageous actions are found in the lower right quadrant of Figure 1 (maximizing strengths and opportunities) and the least advantageous in the upper left (minimizing weaknesses and

*From the DOD guidebook on the subject (2023): "The OT authorities were created to give DoD the flexibility necessary to adopt and incorporate business practices that reflect commercial industry standards and best practices into its award instruments. When leveraged appropriately, OTs provide the Government with access to state-of-the-art technology solutions from traditional and non-traditional defense contractors (NDCs)."

†Strengths, Weakness, Opportunities, Threats (SWOT) is a reordering of the same items evaluated in a TOWS matrix.

threats). This chapter will review at least one action in each quadrant, beginning with the most advantageous, as shown in Table 1.

Table 1. Strategic Actions Considered Herein

		Intrinsic Factors	
		Weaknesses	**Strengths**
Extrinsic Factors	**Threats**	• **Possible Action F**: tighten controls to mitigate innovation theft and supply chain threats [minimize T, minimize W]	• **Current Action D**: deter by increasing combat readiness • **Possible Action E**: intermingle global supply chains with foreign competitors [minimize T, maximize S]
	Opportunities	• **Current Action C**: improve acquisition processes to better leverage commercial capacity [maximize O, minimize W]	• **Current Action A**: accelerate use of commercial solutions by USG • **Current Action B**: expand use of modular open systems approaches (MOSAs) for space [maximize O, maximize S]

A full analysis of these actions, including their placement in Table 1, requires an enumeration of the TOWS factors. For the purposes of an initial analysis, two U.S. strengths are critical and have already been mentioned: U.S. firms globally lead in space innovation and the U.S. space industry leads in production capacity. One opportunity has also been mentioned: growth in global, commercial space demand. Validating those factors and identifying other important factors requires a more detailed assessment of the global landscape.

Opportunities Created by the Growing Commercial Space Industry

Today, commercial space activity generates more revenue ($261 billion from satellite services and consumer equipment) than twice the global government space spending combined ($114 billion).[15] Private investment in space has accelerated; venture capital investments across the space sector ($30 billion within the United States since 2021)[16] are outstripping USG space technology investments. And increasingly, engineers are introducing non-space innovations to spacecraft, such as graphics processing units, lithium-ion batteries, and 3D-printed parts.

The growth of the commercial space industry was driven by the creation of markets and provision of value-added services. The first commercial space activity was Intelsat 1, which launched in 1965[17] and created a global telecommunications market in the space domain (though Intelsat remained owned, managed, and subsidized by governments until 2001).[18] Fully commercial satellite operators arrived in the 1980s, with PanAmSat in 1984 being the first fully commercial satellite telecommunications provider. Orbital Sciences, now Northrop Grumman, launched the "world's first privately developed space launch vehicle" in 1990.[19] And the first non-communications commercial spacecraft, IKONOS, launched in 1999.[20] Today, mobile wireless devices using satellite position and timing services are pervasive, and commercial space services have become central to the ongoing conflict in Ukraine.[21]

The accelerating importance of commercial space capabilities can be summarized by looking at changes in space activities over time, as shown in Figure 2, using the three "ages" articulated by former U.S. Space Command Deputy Commander Lt. Gen. John Shaw.[22] The first age roughly corresponds to the Cold War period (1957 to 1991). The second age saw large growth in satellite communications revenue and U.S. space agencies initiating use of commercial fiber networks. Today, a third age has begun, wherein commercial enterprises lead throughout space system lifecycles. The size of the circles roughly corresponds to the size of the global space market, adjusted for dollar inflation.[23]

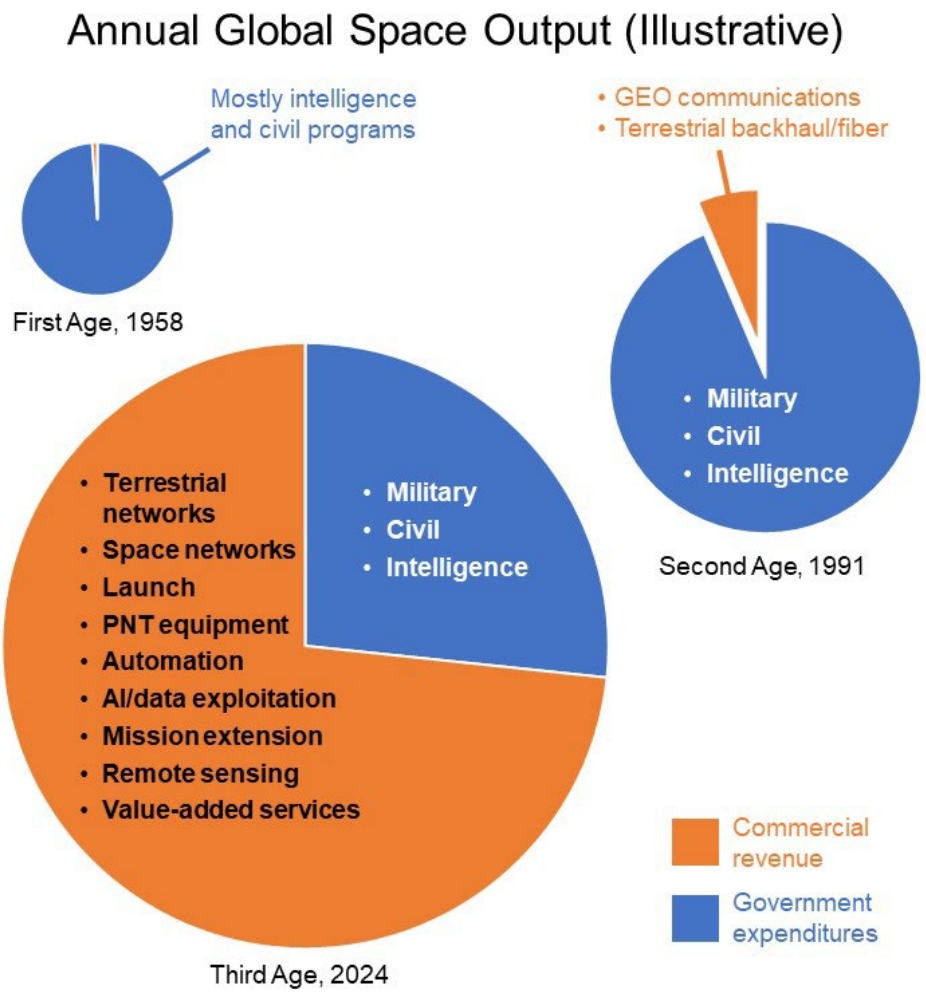

Figure 2: Rough illustration of changes in global space activity.

Figure 2 also provides a visual validation of two key opportunities: first, that the global space demand for commercial space capability is significant and growing, and second, that the growth was in part created by commercial innovations satisfying government needs. The accelerating trend is to be expected as growing demand fuels more innovation. Consider, for example, that commercial tools for cyber monitoring are state-of-the-art, Intelsat has bought the first orbital mission extension service from SpaceLogistics LLC, and private/venture capital is speculating on future markets from mining to disposal services.

In this context, the U.S. Space Force's strategy is to "wherever possible, … leverage the use of commercial space solutions and integrate them into its architectures and force offerings,"[24] including to create decision-quality operational planning products for combatant commands.[25] This is what was referred to as Action A, an accelerating use of commercial production, services, and innovation in USG space activities. Similar actions are seen in NASA's ongoing commercial crew and cargo procurement programs, and the National Reconnaissance Office's (NRO's) Electro-Optical Commercial Layer contracts. These actions play foremost to the opportunity presented by ongoing growth of the commercial space industry, enticing further private investment. They also leverage commercial progress up the value chain, including innovations created by commercial interests. Using these opportunities to increasingly satisfy USG space needs further incentivizes domestic commercial innovation and strengthens the United States' ability to outproduce competitors, creating a positive feedback loop.

USG Challenges in Leveraging Commercial Opportunities

Despite success in building up the world's leading space industry, the USG occasionally struggles to leverage commercial opportunities. Obviously, there are many space-based capabilities for which governments are the only consumers; for example, there is no commercial market for nuclear attack warning sensors or survivable communication systems. Conversely, the commercial space industry will not idly innovate solutions for which the government has not signaled a need. Historically, the USG has had to direct many developments and establish elaborate monitoring and contracting processes to sustain a competitive supplier base. But, even when commercial solutions might directly suffice, the USG is known for effecting slow budget, planning, and development processes that can challenge even established USG suppliers.[26] These challenges can be weaknesses in international competition.

There are several USG actions underway attempting to better leverage opportunities. One such action is expanded use of the modular open systems approach (MOSA) for space procurements (see Table 1, Action B). In 2019, each of the service secretaries identified MOSA use as a warfighting imperative.[27] It has been challenging to adopt the MOSA in the space domain, but the Space Development Agency's (SDA's) acquisition plan is an active example. The SDA's spirals are incremental developments, with its cycles moving faster than several USG planning processes. To shape development and sustain competition, the SDA manages interoperability standards across its procurements to create interchangeable architecture modules: tranches of spacecraft that can fuse data into ground support systems or end users.[28] The MOSA also eases the path for inserting new innovations, whether developed directly by the SDA or coming from elsewhere. In this way, the SDA's MOSA harnesses growing commercial opportunities and the strength of the U.S. commercial space sector while working within (and/or despite) existing weaknesses.

The USG is also acting to directly reduce weaknesses. For example, the Office of the Assistant Secretary of the Air Force for Space Acquisition and Integration has published space acquisition tenets[29] to mitigate weaknesses in current U.S. Space Force practice (Action C). While the tenets do not specifically call for usage of commercial capability, they include use of existing technology, shorter development timelines, effective contracting, avoiding overclassification, and holding industry accountable for the contract. Those first two items are enabled by commercial opportunities and strengths; the other items seek to correct slow or inefficient USG activities.[30]

International Responses

How China Is Responding to the New Space Age. Seeing the strategically significant results of U.S. actions to improve and leverage the U.S. domestic space industry, China is working to build its own commercial capability. In 2017, the People's Republic of China State Council made the strategy explicit, identifying a need to "accelerate the overall planning of space infrastructure according to the needs of the military and civilian sectors."[31] Reportedly, "[Chinese] State-media often cites data showing that in the United States 85% of the military's core technology comes from the private sector and 80% of firms that supply the U.S. military also sell commercially."[32]

The U.S.–China Economic and Security Review Commission assessed in 2019 that "China seeks to become a peer in technology and status of the United States in space."[33] Further, the Commission points to sources arguing that China's 2014 decision to open its space industry to the private sector was "part of Beijing's push for military–civilian fusion, a strategy to leverage key dual-use industries such as aerospace, aviation, and automation to give China an edge in its competition with the United States." The 2020 Commission report highlighted that, "As a reflection of China's military–civil fusion policy, PLA [People's Liberation Army] end users work closely with SASTIND [State Administration of Science, Technology and Industry for National Defense] and defense industrial enterprises in managing space systems RD&A." China's consolidated military space organization "rely upon state-owned defense industrial establishments for research, development, and manufacturing of space systems."

China's strategy is not just about using commercial companies to build dual-use capability in case of a conflict. China's strategy also leverages governmental capabilities to open the door to commercial investment as part of its broader geopolitical strategy. The BeiDou Navigation Satellite System, for example, is an integral part of its Belt and Road Initiative of international outreach and market development. China has regularly sought to partner with other nations on civil/crewed space projects. China's national security has directly benefited from the growth and success of companies like Huawei and ZTE Corporation.

China still has a way to go in its military–civil fusion. In a survey of China's nascent commercial space industry, the Institute for Defense Analysis found, "When queried about their future, the companies in the database indicated a desire to be Chinese versions of American space companies. They believe their customers will be those that American companies cannot serve or are not interested in serving."[34] The same report notes, "Most companies do not even have business plans or a strong sense of who their customers might eventually be." However, a Council on Foreign Relations author observes, "Chinese leadership has long used market forces to reform state-owned defense conglomerates with mixed results… Nevertheless, China's leadership has marshaled an enormous amount of organizational energy to turn China's military into a technologically advanced fighting force through civil–military fusion—it would be unwise to write this effort off."[35] A 2023 report to Congress stated, "China is already a world leader in missile and space technologies, and tighter U.S. export controls are unlikely to have an effect on future Chinese innovation in these areas."[36]

China's response highlights one key threat for a TOWS analysis (see Table 1): competitors are growing their domestic space capabilities, and they will seek to exploit global commercial space opportunities. It also suggests another competitor threat: increasingly effective attack vectors against U.S. space capability (non-lethal, lethal remote, kinetic, nuclear, and cyber). China's civil-military fusion strategy could be considered a third threat: competitors using centrally managed space development and planning. This third threat is notable when contrasted with the United States' strength in using competitive market forces to obtain innovation.

How Russia Is Responding to the New Space Age. In stark contrast with China, Russia's strategy for benefiting from domestic space activities and countering the United States' commercial space industry advantage is unclear. One prominent Russian researcher believes, "Russia has inevitably chosen an asymmetric approach to countering U.S. space capabilities."[37] Russian domestic space capability is in decline. During the decades of the Cold War, the Soviet Union regularly launched more than 100 spacecraft a year.[38] But in 2023, Russia launched only 19 spacecraft in total (across all orbits and missions). More recently, Russia was the global leader in space launch capability;[39] today, Western sanctions for Russia's invasion of Ukraine have left Russia out of Western launch contracts, and other nations are increasingly flying on native or non-Russian vehicles.

Russia reorganized its space industry with the re-creation of ROSCOSMOS in 2015, in what some consider a widescale nationalization.[40] Russia's space economy appeared profitable on the basis of launch sales alone prior to 2014, but ROSCOSMOS has had a net loss of $1.6 billion from that reorganization through 2023.[41] Apparently feeling the initial nationalization was insufficient, the agency's director in 2022 called for further national control and ownership of critical satellite component manufacturers.[42] Later that same year, the director was replaced with a deputy from the Ministry of Defense, annual budget reductions of more than 10 percent were introduced, and "funding for scientific research and development was zeroed out entirely."[43] A 2023 assessment concluded that Western sanctions (financial and technical) were further eroding Russian domestic space capability, leading to "a quicker shift towards self-isolation" and "deeper and more integrated incorporation [of its space industry] into the military program."[44, 45]

Russia retains deep technical capability in space, a legacy of its Cold War prowess and ongoing strategic investment synergy with nuclear and tactical force needs (i.e., technology and production for Russian missiles, drones, or terrestrial electronic warfare has high crossover with that needed for space systems). Russia is engaged in several international partnerships leveraging those strengths. For example, in 2019, President Vladimir Putin announced that Russia was

assisting the Chinese in developing early missile warning systems, including a $60 million software contract.[46] Russian leadership statements on the need to improve domestic space supply chains and organization of its industry under ROSCOSMOS' leadership suggest that Russia is focused on leveraging its legacy space strengths with a *limited* commercial market.

If this chapter is correct in its assessment that integrating commercial innovation forces is a technology-accelerating approach, Russia is likely to fall further behind each year. Nonetheless, Russia can clearly threaten U.S. space capability, and it clearly believes that central organization of its space industry under ROSCOSMOS has advantages.

European Responses to the New Space Age. A look at the United States' allies in Europe provides further insight. In the 1980s, the European Space Agency coordinated investments that helped create globally competitive space and launch system prime contractors. Today these contractors directly compete with manufacturers in the United States, Russia, China, Japan, India, and a growing number of other nations. European manufacturers are global leaders in some technology sectors. In 2019, the European Investment Bank published a report on the future of the European space sector, which argued for "fostering investments and an entrepreneurial space ecosystem in Europe."[47] Among other steps, the report focused on market demand and recommended deployment of "innovative pull mechanisms from the public sector," (i.e., following the United States' lead of leveraging commercial capability for government space needs). In 2020, the European Space Policy Institute (ESPI) largely matched those recommendations in assessing Europe's strategy in a global context.[48] Notably, the ESPI report identifies three goals that collectively emphasize the importance of Europe's commercial space capability: "maximise the integration of space into European society and economy … foster a globally competitive European space sector… ensure European autonomy in accessing and using space." That third goal ties commercial space capability back into national security. Most significantly, the 2023 "European Union (EU) Space Strategy for Security and Defense" states:

> "The European Commission will stimulate New Space to scale up in the EU with the support of the CASSINI programme‡. This will include a more systematic development of anchor-customer contracts, further mobilization of grants-loans-equity with the support of the European Innovation Council, the European Investment Bank, the European Investment Fund, synergies with the EU Defence Innovation Scheme, and the organisation of space/defence hackathons and challenges on a yearly basis. The Commission will incentivize more collaborative work between space, security and defence start-ups in the areas of research and development."[49]

The European example further validates the threat of direct competition for leadership. Europe is already a peer competitor in the global space economy. Adding information for the lower half of Table 1, U.S. allies also see opportunities created by space demand growth and by commercial innovation. The short discussion above also identifies a third opportunity: as "compete-mates" (market competitors but security allies), allied space capability is growing, and they are willing partners in addressing shared security concerns.

How Do Current U.S. Actions Address Competitive Threats?

Central to understanding Chinese, Russian, and European responses to the third Space Age has been a comparative evaluation of the U.S. commercial space sector against those nations' commercial space sectors. This emphasizes the identified U.S. strengths of domestic commercial innovation and leading production capacity, but also identifies several threats to ongoing U.S. leadership. The global space economy also provides opportunities for the United States to become

‡CASSINI is the European Commission's 2021 to 2027 initiative to support entrepreneurs, startups, and subject matter experts in the space industry, including New Space.

stronger but alternatively, to be surpassed by its competitors. Actions A, B, and C focused on seizing opportunities, but the United States is also taking actions against competitive threats.

Most apparent, the United States seeks to deter competitor aggression by increasing combat readiness of U.S. military systems (Action D). Based on both dollars appropriated[50] and rhetoric from national security leadership, this appears to be the main thrust of the USG's current strategy. Within combat readiness, one could separately consider U.S. system resilience and U.S. counterspace capability. In either case, the United States' current strong, innovative commercial space industry is providing advantages from reliable low-cost launch capacity to innovative data processing and network resilience. However, combat-ready space systems must incorporate elements that are not of commercial interest. Thus, to keep the United States' strengths in play, preferred resilience strategies[51] for space have been disaggregation, distribution, diversification, and proliferation through inclusion of dual-use capability.

To mitigate competitive space threats, the USG has long pursued export controls. The TOWS framework suggests two divergent paths forward in this regard. One path could be to continue with a focus on competitive threats, from import (supply chain) attack vectors to export of capability, shoring up U.S. weaknesses to those threats (Action F). The alternative path (Action E) could be to lean into domestic strengths by *relaxing* import/export restrictions. This novel, alternative action might seem infeasible to casual observers of U.S. foreign relations in recent years. Over the last decade, U.S. administrations have consistently tightened restrictions on trade with both China and Russia, especially for high technology and space equipment. However, decisions focused merely on rising competitive threats ignore domestic strengths that can undermine competitors and/or strengths that can be weakened by a purely reactionary strategy. For example, a recent article in *International Security* argues, "Structural incentives to cut off a rising power's access to global supply chains can trigger a process that ultimately accelerates the dominant power's decline overtime."[52]

Given that the United States' current space capabilities are often superior, especially in the commercial sector, availability of U.S. products could undermine competitor commercial development strategies. And while U.S. exports could help competitors rapidly copy/match U.S. capabilities, they can also be targeted (and monitored) to specific ends. Copying globally available capability keeps competitors constantly one step behind the United States, while the nation's innovation engine is primed by expanded demand. Specifically, if targeted in areas where technology is globally mature but Chinese competitiveness lags, the action could protect critical U.S. capability while undercutting Chinese private/local production investment, creating dependencies and/or disrupting China's development. Pursuing Action E would require significant changes to export/import regulations and law (e.g., the Wolf Amendment), which themselves are often identified as a U.S. competitive weakness. Steps in this direction are already underway. In October 2024, building upon responses to proposed rule-making announcements in 2019, the Commerce Department's Bureau of Industry and Security announced completion of a rule-making action reducing export controls on space technology for the closest U.S. allies, as well as preliminary action to relax rules for a much broader range of countries and the movement of responsibility for many space-related technologies from the State Department to the Commerce Department. Action E can also be an effective competitive strategy on its own. In the development of "5G" communication technology, China appears on a course much like Action E.[53] Circumstances seem well aligned for the United States to pursue a similar path in the space domain.

Other Considerations

The discussion to this point has primarily used the TOWS matrix as a framework, or lens, through which to understand the interaction of USG actions with their strategic context. A few actions have been characterized with broad strokes, but their analysis is limited to only a few, first-order considerations. The framework provides for a more thorough evaluation through consideration of additional TOWS factors and by consideration of the interplay of multiple potential actions. Moreover—volatility, uncertainty, complexity, and ambiguities (VUCA) are inherent in this dawning third Space Age. The VUCA aspects can be addressed by repeating the analyses over a range of factors and using tools like foresighting to identify and monitor conditions that necessitate reconsideration.

Conclusion

The United States' commercial strengths and opportunities are a significant advantage economically and in great power competition in the space domain. Prior decisions by USG space agencies have placed the U.S. industry in a leadership position today. And because of ongoing commercial space economy growth, industry can be expected to drive many new capabilities and underpin or provide dual-use national space power. Strategic actions that the United States might take that build on its existing strengths, such as domestic capacity and innovation pipelines, appear particularly advantageous going forward. There is a mix of actions that the United States can take that both leverage opportunities and are directly aimed at competitive threats or apparent weaknesses.

The United States' great power competitors are clearly aware of the advantages the United States already has in space. They seek to counter them while building up their own industry. A few current U.S. actions were evaluated using a simple framework (TOWS), which also aids in identifying other options. Three current actions all play to U.S. strengths: (Action A) increasing commercial usage/integration; (Action B) applying MOSA; and (Action D) deterrence through building resilient and counterspace systems. A fourth current action (Action C), described as improving acquisition practices, seeks to minimize USG weaknesses. A novel action (Action E) would be to target expansion of U.S. space industry into foreign markets, especially in China. This could play to U.S. strengths and opportunities and potentially undermine several of their threat vectors. In contrast to Action E, a sixth (Action F) was considered to further tighten import and export regulations, focused on perceived U.S. weaknesses.

Further strategic actions, or the same actions in more detail, could be considered and in combination with each other. This chapter provides only an initial analysis. Adding more TOWS factors and expanding the evaluation of competitive actions would yield a fulsome strategy. Any strategy should be paired with ongoing foresighting to ensure that the analysis remains relevant in today's rapidly changing space domain and global competitive environment.

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[15] https://sia.org/news-resources/state-of-the-satellite-industry-report/ . Note, revenue and spending are two sides of an economic transaction. The revenue numbers from SIA include revenue from government spending, which is why it is notable that the total revenue is now more than twice government spending. That shows non-government revenue sources are greater than government sources.
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This paper was published as a chapter of *Space Agenda 2025*, with Angie Bukley, Colleen Stover, and Victoria Woodburn serving as editors in chief. *Space Agenda 2025* is an effort by the Center for Space Policy and Strategy (CSPS) at The Aerospace Corporation to highlight and provide insights into some of the major space challenges facing policymakers. You can find the complete list of individual *Space Agenda 2025* papers at http://csps.aerospace.org/SA2025, as well as download the combined set of 16 chapters in the *Space Agenda 2025 Compendium* at https://csps.aerospace.org/papers/space-agenda-2025-compendium, all available to you with our compliments.

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