

Summary of “Advanced Space Technologies: Challenges and Opportunities for U.S. National Security”

Today, U.S. companies find themselves fulfilling roles that were historically the domain of the government and taking on missions that even the government has yet to embrace. From exploration systems to in-space manufacturing to satellite refueling, companies are deploying new systems for novel applications at a rapid pace and lower price.

In our analysis of **91 American advanced space technology companies**, we found:

- The number of newly founded advanced space technology companies grew fastest in 2021 after years of steady expansion.
- More than half of these companies work in areas where the government has limited services:
 - 40 percent work on **in-space servicing** and related technologies
 - 16 percent work on in-space manufacturing.
 - A further 40 percent are focused on space exploration and science
 - Less than 10 percent of these companies exist to **surveil space** from the ground or to provide navigation and timing services, areas where the U.S. government currently invests billions

Challenges

In emerging mission areas with unproven technology, the **profitability** challenge is great. This, coupled with loosened but still **restrictive limits on exporting** U.S. technology abroad and the government provision of free-to-the-public services such as GPS and SSA, means that new firms may face an uphill struggle for survival even with valuable products.

Opportunities

Government money and attention could support American space companies in **seizing a first-mover advantage** for the nation compared to unfriendly states. Encouraging **technology and knowledge transfer** across multiple advanced technology areas may also accelerate commercial, technological, and economic developments.

Recommendations:

1. Federal agencies should invest in hedge portfolios for advanced technology missions with national security applications and outsize risks if the United States cedes leadership.
2. The U.S. government should act as an anchor tenant by purchasing and investing in research for commercial services in selected advanced technologies for which the U.S. government does not currently field a solution at scale.
3. The U.S. should continue to purchase services and make targeted investments in advanced technology areas where it is the dominant service provider in government systems.
4. The State Department should harmonize export controls with allied nations actively building similar technology.

For more information:

- Download the report: <https://cset.georgetown.edu/publication/advanced-space-technologies/>
- Contact us: cset@georgetown.edu