

Space as the 17th Critical Infrastructure Sector:

A Policy Framework for Securing America's Space Industrial Base

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ABSTRACT

This paper argues for designating space as the 17th critical infrastructure sector under Presidential Policy Directive 21 (PPD-21). Drawing on 2025 aerospace industrial base data, satellite market analysis, and a supply chain case study of the Neuman-B 6U SpaceDrone, we demonstrate that U.S. aerospace industrial capacity supports 100% domestic sourcing for strategic space systems. The United States controls 75.12% of global aerospace contractors (5,680 firms), concentrated in California, Florida, and Texas. Over 6,000 communications satellites underpin telecommunications infrastructure, while GPS enables \$1.4 trillion in annual economic activity. Yet space remains undesignated as critical infrastructure, lacking coordinated federal protection. Policy recommendations include formal designation through H.R. 1185, phased domestic content requirements, strategic cluster investment, and measures to counter Chinese aerospace expansion.

Keywords: *critical infrastructure, space policy, aerospace industrial base, PPD-21, domestic sourcing, supply chain security*

1. Introduction

Space systems have become foundational infrastructure for modern societies, yet policy frameworks have not kept pace with this reality. Presidential Policy Directive 21 (PPD-21), issued in 2013, identifies 16 critical infrastructure sectors requiring coordinated federal protection. Space is conspicuously absent from this list despite underpinning virtually every designated sector.

This paper addresses two interconnected questions: First, does space meet the criteria for critical infrastructure designation? Second, does the United States possess sufficient domestic industrial capacity to secure space systems through domestic sourcing requirements? We answer both questions affirmatively, drawing on 2025 aerospace industrial base data, satellite market analysis, and an original supply chain case study.

2. Literature Review

Scholarship on critical infrastructure protection emphasizes the interdependencies between sectors and the risks of cascading failures (Rinaldi et al., 2001; Moteff & Parfomak, 2004). Space systems create particularly extensive interdependencies due to their role in timing, positioning, and communication across multiple sectors.

Industrial policy literature highlights the role of government procurement in sustaining strategic manufacturing capabilities (Mazzucato, 2018; Dezenski & Austin, 2020). The aerospace sector exemplifies this dynamic, with decades of NASA and DoD investment creating supplier ecosystems that commercial applications now leverage.

Recent policy analysis has focused on space system vulnerabilities, including anti-satellite weapons, supply chain dependencies, and spectrum congestion (Weeden & Samson, 2021; Congressional Research Service, 2023). However, systematic analysis linking aerospace industrial base capacity to policy options remains limited.

3. Methodology

This study employs mixed methods combining quantitative industrial base analysis with a qualitative supply chain case study. Primary data on the global aerospace contractor landscape derives from the 2025 aerospace contractor database. Satellite market composition draws from the Union of Concerned Scientists database. Economic impact estimates reference RTI International's GPS economic assessment commissioned by NIST.

The case study methodology follows established supply chain mapping protocols, documenting suppliers for all 18 component categories in the Neuman-B 6U SpaceDrone, including geographic location, government heritage, and cost structure.

4. Results

4.1 Space Dependencies in Critical Infrastructure

Analysis confirms extensive space dependencies across all 16 existing critical infrastructure sectors. The Communications Sector relies on over 6,000 operational communications satellites. The Transportation Sector depends on GPS for aviation, maritime, and surface navigation. The Financial Services Sector requires GPS timing for transaction synchronization. GPS alone enables an estimated \$1.4 trillion in annual U.S. economic activity.

4.2 U.S. Aerospace Industrial Capacity

The United States accounts for 75.12% of worldwide aerospace contractors (5,680 of 7,559 total firms). China represents 8.33% (631 firms) while Russia accounts for 2.31% (175

firms). Geographic concentration centers on California (297 firms), Florida (158 firms), and Texas (108 firms).

4.3 Supply Chain Validation

The Neuman-B case study demonstrates that all 18 component categories required for deep space operations can be sourced domestically from 33 U.S. suppliers across 11 states. Unit cost of \$264,500 represents a 10× reduction from traditional flagship mission approaches. All suppliers possess NASA, DoD, or NRO flight-proven heritage.

5. Discussion

These findings support space designation as critical infrastructure on both dependency and capacity grounds. Space systems meet standard critical infrastructure criteria given their foundational role in multiple sectors. Simultaneously, the 9:1 U.S. advantage in aerospace contractor counts provides industrial depth for domestic sourcing requirements without cost penalty.

Limitations include focus on contractor counts rather than output capacity; Chinese state consolidation may achieve higher per-firm production. The Neuman-B case study, while detailed, represents a single platform; generalizability requires additional analysis.

6. Policy Recommendations

Based on these findings, we recommend: (1) Congressional passage of H.R. 1185 designating space as the 17th critical infrastructure sector; (2) Phased domestic content requirements for national security space acquisitions, beginning at 55% and escalating to 75% over five years; (3) Strategic investment in aerospace manufacturing clusters; and (4) Accelerated commercial space integration to maintain competitive advantage against Chinese expansion.

7. Conclusion

Space infrastructure has become indispensable to American economic prosperity and national security. This paper demonstrates that space meets critical infrastructure criteria while U.S. aerospace industrial capacity supports domestic sourcing policies. Policy action through H.R. 1185 and associated measures would translate industrial capacity into supply chain security, protecting the invisible foundation of the American economy.

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