Material, Digital, and Geographical Security: A Focused National Strategy for America's Future

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To begin, it would not be an unfair assertion to say that the architecture of global power stands at an inflection point, characterized by the fragmentation of the post-Cold War security order and the emergence of a complex competitive landscape that transcends traditional geopolitical boundaries. As such, today's United States of America confronts a security environment in which material resource access, digital infrastructure integrity, and geographical domain contestation converge to form a tripartite challenge of unprecedented complexity. This National Security Strategy will aim to interrogates the multidimensional vulnerabilities that emerge from America's position within global critical mineral supply networks, the concentrated geography of advanced semiconductor fabrication, and the accelerating competition for positional advantage in a transforming Arctic region. I would like to emphasize that these are fundamental structural vulnerabilities that necessitate a comprehensive reconfiguration of America's strategic priorities and security architecture. In the mineral domain, our defense systems, clean energy technologies, and advanced computing capabilities rely extensively on rare earth elements and other critical minerals for which we have developed dangerous dependencies. The Department of Defense has already identified this reliance on foreign processing capacity as a significant national security vulnerability that adversarial powers have demonstrated both willingness and capability to exploit through export restrictions and supply chain manipulation. The digital domain presents equally significant concerns. The semiconductor manufacturing ecosystem (think TSMC, ASML etc), particularly for the most advanced logic chips that power our military systems, artificial intelligence capabilities, and critical infrastructure, has become increasingly concentrated outside our

borders. This concentration creates a dual security and technological junction wherein computational capabilities essential to national defense are subject to geopolitical risks beyond our direct control. The technological sovereignty of the United States, long taken for granted, now requires deliberate strategy and investment to maintain. Simultaneously, climatic transformation of the Arctic has accelerated access to previously inaccessible resources while creating new maritime passages with significant implications for global commerce and military mobility. The Department of Defense's Arctic Strategy[1] recognizes this region as increasingly vital for power projection, alliance cohesion, and resource security. As competing powers expand their Arctic presence and capabilities, the United States must develop a comprehensive approach to secure its interests in this strategically evolving domain.

Furthermore, I'd like to note that we are seeing an unprecedented historical shift in how global power works. The old rules are changing. Countries that used to work together now compete more openly. And this competition is not just about military strength anymore. China and Russia are challenging us across all three domains - materials, technology, and geography. They are playing a different game than we are. China now controls most rare earth processing in the world. They are making rapid progress in advanced computing. And they have declared themselves a "near-Arctic state" even though they have no Arctic territory. This gives them a presence in all three of our critical domains. Russia already controls vast Arctic territory. They have massively expanded their military presence there.

[1] "DoD Announces Publication of 2024 Arctic Strategy." U.S. Department of Defense, 22 July 2024, www.defense.gov/News/Releases/Release/Article/3846206/dod-announces-publication-of-2024-arctic-strategy/.

In 2024, they conducted their largest Arctic military exercises in decades. They have deployed advanced missile systems that can threaten shipping and air traffic across the region. The traditional national security framework, primarily focused on conventional military capabilities and diplomatic influence, is insufficient to address these complex, interconnected challenges. This strategy therefore advances a more comprehensive security architecture that integrates resource security, technological sovereignty, and geographical access as essential elements of national power. By recognizing these domains not as discrete challenges but as an integrated security landscape, we can and must develop coordinated responses that leverage America's strengths while addressing systemic vulnerabilities.

To expand on the mineral domain, we must understand that the entire world runs on minerals! Our military systems, clean energy technologies, and advanced electronics all rely on rare earth elements and other critical minerals. Every F-35 fighter jet needs nearly 920[2] pounds of rare earth materials. Each Virginia-class submarine requires specialized elements for its sonar systems and electronic warfare capabilities. Our missile guidance systems, radar technologies, and night vision equipment all depend on these materials. But we face a dangerous problem. China processes about 85%[3] of the world's rare earth elements. They have built this position over decades through strategic investments while

[2] Sevastopulo, Demetri, et al. “China Targets Rare Earth Export Curbs to Hobble US Defence Industry.” Financial Times, 16 Feb. 2021.
[3] Bore, Obert. “China’s Export Restrictions on Rare Earths: What It Means for Producer Countries.” The China-Global South Project, 18 Apr. 2025, https://chinaglobalsouth.com/analysis/chinas-export-restrictions-on-rare-earths-what-it-means-for-producer-countries/.

we focused elsewhere. In April 2025[4], they showed how serious this threat is by restricting exports of seven critical elements needed for defense systems. We have become too dependent on a strategic competitor for materials that our military and economy can't function without. We still have options. America has significant deposits of these materials in places like Mountain Pass, California, Bear Lodge, Wyoming, and Bokan Mountain, Alaska. We once led in mining and processing these elements. With the right investments and policies, we can do it again. Some steps are already underway. The CHIPS Act and recent executive orders for critical minerals are starting to address the problem. But we need to move faster. Countries like Australia, Canada, and Japan are working to build alternative supply chains. As such, we should partner and establish joint ventures with them while developing our own capabilities. It should be made clear that this isn't solely about the materials themselves (though that is a major and pressing factor) but it is about the processing knowledge and manufacturing capacity that turns raw minerals into usable components. China has systematically acquired this expertise, and we need to rebuild it. Our universities, national labs, and private companies must work together to develop innovative technologies that can process these materials efficiently and cleanly. Every new weapons system, renewable energy technology, and advanced computing platform increases our need for these materials. We can't build a secure future on an insecure foundation of critical minerals controlled by strategic competitors.

[4] Baskaran, Gracelin, and Meredith Schwartz. The Consequences of China's New Rare Earths Export Restrictions. Apr. 2025. www.csis.org, https://www.csis.org/analysis/consequences-chinas-new-rare-earths-export-restrictions.

Moving to the digital domain, it should be noted that our digital infrastructure is at significant risk. Most advanced computer chips are now made outside the United States. Taiwan makes about 90% of the most advanced chips we need (CSIS, 2025). This creates a serious security problem. These chips run everything important in America. They power our missile systems, radar networks, and communications equipment. They are essential for artificial intelligence, which is becoming central to our national defense. The computers that control our power grid, water systems, and transportation networks all depend on these chips. But we do not control their production anymore. In 1990, American companies made 37% of the world's semiconductors. Today, that number has fallen to just 12%[5]. We have outsourced our technological foundation to other countries, particularly Taiwan. This puts us in a dangerous position. The risks aren't just about physical supply chains. Cyber threats make this problem worse. Foreign governments and hackers constantly target chip design firms to steal intellectual property. They also attack the software that runs on these chips. The SolarWinds attack in 2020 showed how vulnerable our networks are when compromised software spreads throughout our systems. Modern cyber attacks can now target the chips themselves. Researchers have found ways to insert "hardware trojans" during the manufacturing process that are almost impossible to detect. These can create backdoors for spying or sabotage. When chips are made overseas, ensuring they are secure becomes much harder. Military systems face special risks. Defense contractors need trusted chips for weapon systems. Any compromise could

[5] Onshoring Semiconductor Production: National Security Versus Economic Efficiency | Council on Foreign Relations. https://www.cfr.org/article/onshoring-semiconductor-production-national-security-versus-economic-efficiency. Accessed 5 May 2025.

disable critical capabilities during a conflict. The Department of Defense has identified semiconductor security as a top priority for precisely this reason. We have started to address this problem. The CHIPS Act provides funding to rebuild domestic manufacturing. TSMC, the Taiwanese chip giant, is building new factories in Arizona that will be operational by late 2024[6]. But these will still only produce a small fraction of what we need. True security requires more than just new factories. We need to rebuild the entire ecosystem - from chip design to manufacturing to testing. This means investing in workforce development, research facilities, and secure supply chains for the materials needed to make chips. We also need stronger cyber defenses throughout the semiconductor supply chain. This includes better screening for hardware trojans, secure design processes, and protection against intellectual property theft. The National Institute of Standards and Technology has developed frameworks for this, but implementation remains inconsistent. The digital foundation of American power depends on addressing these connected challenges. Both our physical access to advanced chips and our ability to ensure they are free from compromise are essential for national security in the digital age.

Finally, The Arctic is changing fast. Ice is melting, opening new shipping routes and access to resources. This creates both opportunities and challenges for America. The region contains about 30% of the world's undiscovered natural gas and 13% of its oil. It also has big deposits of the rare earth elements and critical minerals we need for advanced

[6] https://pr.tsmc.com/english/news/3210

technology[7]. As ice melts, these resources become easier to reach. As mentioned, Russia is moving aggressively in the Arctic[8]. They have built or reactivated at least 13 military bases above the Arctic Circle. In 2024, they conducted their largest Arctic military exercises in decades. They've installed advanced missile systems that can threaten ships and planes across the region. Millions are being invested in Arctic research, infrastructure, and partnerships. They want access to shipping routes that could cut travel time between Asia and Europe by 10-15 days. The Department of Defense released its Arctic Strategy in 2024. It focuses on enhancing our capabilities, building partnerships with allies, and getting better at operating in harsh Arctic conditions. But we're still playing catch-up. We have limited icebreaking capacity compared to Russia. Our military hasn't focused enough on cold-weather operations. And our infrastructure in Alaska needs major investment. Our response has been too slow. Russia has over 50 icebreakers. We have two, and they're aging. Our military hasn't focused enough on cold-weather operations. Our infrastructure in Alaska needs major investment. This matters beyond just the Arctic itself. The minerals there could reduce our dependence on China. The shipping routes affect global trade patterns. And as an Arctic nation ourselves, we have direct security interests at stake. Climate change is opening the region faster than expected. The old Arctic, often characterized as remote, frozen, and quiet is steadily disappearing. The new Arctic will be

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[7] Analytics, F. P. “Resource Competition in the Arctic.” Foreign Policy, 6 May 2025, https://foreignpolicy.com/2020/10/13/arctic-competition-resources-governance-critical-minerals-shipping-climate-change-power-map/.

[8] Murkins, Sydney. “The Future Battlefield Is Melting: An Argument for Why the U.S. Must Adopt a More Proactive Arctic Strategy.” The Arctic Institute - Center for Circumpolar Security Studies, 3 Dec. 2024, https://www.thearcticinstitute.org/future-battlefield-melting-argument-us-must-adopt-more-proactive-arctic-strategy/.

busier, more contested, and more economically important. We need a comprehensive Arctic strategy that connects to our other security priorities. When we strengthen our position through better capabilities, Arctic partnerships, and responsible resource development, we are not just securing one region. We are securing the future.

Our security isn't what it used to be. The old ways of thinking about national defense don't work anymore. For decades, we focused on military strength and diplomatic influence. But now our biggest vulnerabilities are different. We depend too much on other countries for critical minerals. Our advanced chips are mostly made overseas. And we're falling behind in the Arctic. These problems are connected. We need rare earth elements to make advanced technology. We need advanced technology to maintain our military edge. And we need a strong position in the Arctic to secure access to resources and shipping routes. Our competitors understand this. China and Russia are playing the long game. They're building positions across all three domains - materials, technology, and geography. They see the connections even if we haven't always recognized them. This strategy lays out a path forward. We need to secure our supply chains for critical materials. We need to rebuild our capacity to make advanced technology at home. And we need to strengthen our position in the Arctic. None of this will be easy or quick. But America has faced big challenges before. After World War II, we built institutions that shaped the world for decades. After Sputnik, we mobilized our scientific and educational resources to win the space race. After the Cold War, we led the creation of a new international order. Now we face a different kind of challenge. It's less visible but just as important. The materials, technologies, and geographical positions that will shape the future are at stake. By seeing

these connected challenges clearly and addressing them together, we can secure America's future in an increasingly competitive world. Our prosperity, our security, and our values all depend on getting this right.