
U.S. Missile Defense and National Security depend on Spectrum Sharing

To rapidly achieve an effective ballistic missile defense, the U.S. must deploy widespread sensing, tracking, and communications systems comprised of existing technologies which operate in valuable spectrum bands currently targeted for shared use. To balance commercial and defense needs across these spectrum bands, it is essential to initiate rapid funding for prototyping and development of spectrum-sharing technologies.

Today, insufficient research and development, prototyping, and prototype-to-production efforts are hindering progress in spectrum sharing. At the same time, increasing deployment of both commercial cellular systems (e.g., 5G) and military systems (e.g., an "Iron Dome"-like missile defense system) are intensifying demands on finite spectrum resources. Many of the systems contemplated for a ballistic missile defense program currently operate in congested bands that are targeted for commercial use as well. In particular, the 3 GHz band is uniquely well suited for all-weather "volume search" radars not easily duplicated in other bands, but it has also been a cornerstone of 5G networks in the U.S.

The National Spectrum Consortium (NSC) has been at the forefront of spectrum-sharing technology development, and its Other Transaction Authority (OTA) is the ideal tool for accelerating progress. **To field an effective domestic missile defense capability, Congress must act immediately to provide funding for spectrum-sharing R&D and prototyping to drive innovation, enhance national security, and foster seamless coexistence between commercial and defense operations.**

The Strategic Landscape

The U.S. faces one of the most complex threat environments since World War II. Adversaries are actively working to undermine U.S. global leadership and national security while advancing their economic and military capabilities. The modernization of America's telecommunications infrastructure and defense capabilities is paramount to maintaining *both* economic and national security leadership.

The White House has declared that a key component of this modernization on the military side is developing a robust missile defense system inspired by Israel's highly successful Iron Dome. The Iron Dome has intercepted over 5,000 rockets with a 90% success rate, and the U.S. is now pursuing its own advanced missile defense initiative, dubbed the "Golden Dome," designed to counter ballistic, hypersonic, and cruise missile threats.

Meanwhile on the commercial side, the continued evolution of wireless communications means public and private 5G networks have become essential for a myriad of uses. Wireless technologies touch every aspect of modern life.

The Role of Spectrum in Missile Defense

U.S. missile defense relies heavily on radar, communication systems, and sensors that operate using specific radio frequency bands. In addition to space-based capabilities, the executive order calling for an Iron Dome for America¹ specifically calls for "[d]eployment of underlayer and terminal-phase intercept capabilities postured to defeat a countervalue attack." These defense systems depend upon sea- and ground-based radars, including those aboard Navy destroyers (Arleigh Burke-class) and the Aegis Combat System, which use specific spectrum bands to detect and track incoming missile threats, protect the homeland, and ensure the security of military forces worldwide.

Developing a robust missile defense system similar to Israel's "Iron Dome" requires various interconnected components: advanced radar and detection technologies to identify threats; sophisticated command-and-control systems to quickly analyze information and coordinate defensive responses; interceptor missiles designed to destroy enemy projectiles before they reach their targets; satellite-based systems capable of detecting missiles even before they enter the atmosphere; and electronic warfare and cyber defense systems that can disrupt or disable enemy communications and guidance systems.

¹ <https://www.whitehouse.gov/presidential-actions/2025/01/the-iron-dome-for-america/>

Each of these essential defense components depends on reliable access to specific spectrum bands selected for their unique properties. Reallocating from these critical frequency bands could severely disrupt national defense capabilities if done improperly. Government estimates indicate that shifting defense operations out of their current spectrum bands would come with a significant price tag. Therefore, it is vital to find ways for commercial networks and defense systems to achieve coexistence.

The Urgency of Spectrum Sharing and the Path Forward

General Guillot, Commander of U.S. Northern Command (NORTHCOM), has warned that an Iron Dome-like system in the U.S. would be unworkable without adequate spectrum. The U.S. cannot afford delays in developing spectrum-sharing solutions to accommodate both defense and commercial operations. **Congress should immediately fund a \$1 billion rapid prototyping program through Research and Engineering (R&E) that would:**

1. Advance U.S. Leadership in Spectrum Sharing Technology – Invest in R&D across all critical spectrum bands to enable coexistence between commercial and defense systems.
2. Enable rapid prototyping and demonstration of these technologies for use in deploying a missile defense shield in the continental United States without interfering with existing military and commercial systems. Specifically, this program would consist of:
 - Prototypes to improve the spectrum agility of existing DoD systems vis-a-vis other spectrum users
 - of spectrum sharing technologies that can manage and mitigate interference and more efficiently and dynamically share spectrum among and across military and commercial users
 - Integration of sensing and communications functions
 - A prototype-to-production fund to rapidly scale and demonstrate promising solutions in the first two categories
3. Create a reference architecture for federal spectrum sharing and a clear, consensus definition of interference cases between critical DoD systems and commercial systems for use in evaluating future spectrum conflicts; an architecture should also account for future entrants into premium bands.

While this project is primarily focused on DoD systems, the insights gained through this public-private partnership will provide significant value for future spectrum bands and operational scenarios beyond the initial participants.

National Spectrum Consortium's Role

The NSC is uniquely positioned to drive this effort with over 300 members spanning industry, academia, and government. Our members include the widest range of those companies working at the forefront of spectrum-related technologies, including members of the defense industrial base such as Lockheed, RTX, Anduril, and Palantir, as well as communications companies such as Verizon, AT&T, Comcast, Charter, and T-Mobile. In addition, over 65 percent of the NSC membership are small, non-traditional defense suppliers, startups, and academic research organizations, all of which bring new ideas and fresh perspective to this often-contentious issue. Working in partnership with OUSD(R&E), NSC's OTA agreements enable rapid prototyping and experimentation, providing a pathway to develop and test the necessary spectrum-sharing technologies without bureaucratic delays. The NSC has a proven track record of delivering and transitioning successful prototype solutions that represent the 'best value' to the Government.

To maintain military and economic superiority, the U.S. must act decisively on spectrum-sharing R&D. Policymakers must prioritize innovative spectrum-sharing strategies that strengthen national security while fostering commercial advancements in telecommunications. Failure to act now risks leaving the U.S. vulnerable to emerging missile threats while stalling critical 5G advancements.

The National Spectrum Consortium stands ready to collaborate with Congress and the administration to implement a strategic, forward-thinking spectrum policy that ensures the United States remains secure and technologically dominant in the face of global threats.