SMDWG Nov 2025 Meeting White Paper

Remarks by the Honorable Mike Griffin to the Space & Missile Defense Working Group (SMDWG) on November 20th, 2025 - https://www.ndiatennvalley.org/smdwg. A video recording of the meeting is available on YouTube - https://youtu.be/Ehd0tCFHHxQ

A Strategic Reassessment of U.S. Missile Defense: Architecture, Technology, and Policy

1.0 Introduction: Confronting a New Era of Missile Threats

The United States confronts a strategic environment in which adversaries, principally Russia and China, possess advanced missile capabilities and, as they remind us weekly, "do not wish us well." In this reality, the development and deployment of a robust missile defense system is not a matter of choice but a national imperative. For decades, the nation has pursued this goal, yet the current strategic path demands urgent re-evaluation. As an engineer who has spent over 40 years on this problem, I have no time or patience for approaches driven by political expediency rather than technical reality.

The core thesis of this paper is that a relentless focus on combat effectivity, informed by engineering and statistical fact, must supplant technically flawed strategies. A system that looks impressive on paper but has a low probability of success in an actual engagement is a dangerous liability. This analysis will cut through prevailing narratives to examine the foundational choices facing the nation. It will explore the critical debate between boost-phase and midcourse intercept, the strategic implications of ground versus space basing, the overriding importance of command and control, and the role of policy and the industrial base in shaping a viable defense posture. To begin, we must first dissect the prevailing, yet problematic, strategy that currently commands national attention and resources.

2.0 The Flawed Calculus of Boost-Phase Intercept

The effectiveness of any missile defense system is fundamentally determined by the phase of flight in which it is designed to engage a threat. The current U.S. focus, reflected in recent executive orders and acquisition efforts, is heavily weighted toward boost-phase intercept from a space-based constellation. A critical analysis of this approach reveals it to be a strategic misstep, founded on a statistically improbable and technically inefficient premise.

This concept may have held some merit against the threats of a bygone era, such as the slow-burning, liquid-fueled Soviet SS-18s with flight times of many minutes. However, against modern, fast-burning solid-rocket ICBMs, the strategy is statistically infeasible. The powered flight times of these boosters are so short that for any reasonably sized interceptor constellation, the probability of having an asset within engagement range is exceedingly low. Even with favorable assumptions, there is at best a "few percent chance" of being positioned for a shot. The reality is that a space-based interceptor constellation will, by necessity, be engaging targets in their midcourse phase the vast majority of the time.

This statistical fact has profound implications for interceptor design. Optimizing a system for the low-probability boost-phase scenario forces engineering compromises that make it ill-suited for the far more common midcourse engagement. The technical requirements for the two missions are fundamentally different, as outlined below.

A Tale of Two Targets: Why a Boost-Phase Interceptor is Wrong for the Midcourse Mission	
Boost-Phase Target	**Midcourse Target**
A bright, 5,000°F accelerating target against the Earth.	A room-temperature, non-accelerating object against a dark sky.
Requires a shortwave infrared (SWIR) sensor.	Requires a medium-wave or long-wave infrared (MWIR/LWIR) sensor.
Demands complex guidance laws to hit an accelerating target.	Utilizes simpler guidance for a target on a ballistic trajectory.
The optimal weapon is a "singlet interceptor," analogous to a "30-06 rifle" for a single, high-value target.	The optimal weapon must address a "threat cloud" of multiple objects, requiring a "buckshot" approach.

To invest national resources in developing an interceptor optimized for the boost-phase mission is to build a system not tailored for the engagement it is most likely to face. This focus actively reduces the overall combat effectiveness of the entire architecture. A pragmatic strategy begins by accepting statistical reality and designing for the midcourse phase, where the opportunity for engagement is greatest.

3.0 The Pragmatic Imperative: Designing for Midcourse Engagement

Given that any interceptor constellation will overwhelmingly encounter its targets during the midcourse phase, the entire defense architecture must be optimized for this reality. This phase, lasting 15 to 25 minutes for long-range threats, offers the longest and most strategically valuable window for engagement. Reorienting the national effort to master this phase is the most direct path to a credible missile defense shield.

The primary technical challenge of midcourse intercept is not hitting the target—a non-accelerating object in the vacuum of space is a relatively simple intercept problem—but **discrimination**. After booster burnout, a sophisticated adversary's payload will not be a single object. It will be a "threat cloud" containing the actual re-entry vehicles (RVs) alongside a multitude of decoys, burnt-out stages, and other "ash and trash." The fundamental problem is distinguishing the lethal RVs from the clutter.

The optimal interceptor for this challenge is not the "rifle shot" of a singlet kill vehicle, but the "buckshot" of a **multi-kill vehicle** approach. This concept envisions a single interceptor deploying several smaller, coordinated kill vehicles. Key attributes include:

- **Multiple Kill Vehicles:** A single launch can engage multiple objects within the threat cloud.
- **High Divert Capability:** While the main interceptor provides the axial velocity, the smaller kill vehicles require excellent maneuverability to engage dispersed targets.
- **Intelligent Coordination:** The kill vehicles must communicate to avoid redundant targeting, ensuring they engage a spread of the highest-probability targets rather than all focusing on a single perceived threat.

Designing for the midcourse problem is a fundamentally different engineering task than pursuing the boost-phase mission. By accepting the statistical inevitability of midcourse engagement and dedicating resources to solving the discrimination challenge with multi-kill vehicle technology, the United States can build a system with genuine combat effectiveness. This clarifies the technical requirements for the interceptor, which then leads to the strategic question of where to base these assets.

4.0 The Basing Dilemma: An Unbiased Analysis of Ground vs. Space

The debate over missile defense is too often framed as a choice between two different types of intercept—boost-phase versus midcourse. This is a false dichotomy. As established, any viable system will be a midcourse system. The true strategic choice, therefore, is not between different missions but between different basing modes for the *same* mission. As the interceptor itself "doesn't know where it came from" once launched—how do it know, as the old joke about the thermos bottle goes—the core question is whether it is more effective to deploy a midcourse interceptor fleet from the ground or from space.

Astoundingly, after more than 40 years of national investment, no truly unbiased cost study has been conducted to inform this critical decision. There is an urgent need for a rigorous analysis comparing the lifecycle costs of deploying thousands of interceptors—for example, 4,400—in ground-based silos versus in an orbital constellation. While placing assets in space is expensive, maintaining thousands of ground-based interceptors for decades is not cheap either. Without this foundational data, any decision is based on assumption, not analysis.

Beyond cost, the basing decision carries profound implications for **warfighting resilience**. A purely ground-based architecture of fixed silos presents known, static targets for an adversary. A diversified architecture including space-based assets introduces a dynamic, more survivable element. This resilience complicates an adversary's calculus and enhances the survivability of the entire defense shield. As a matter of strategic priority, "I personally as a taxpayer... would be willing to pay some extra money to have the warfighting resilience of space and groundbasing." The question is not simply what is cheapest, but what provides the most effective defense. Having addressed the *what* (midcourse interceptor) and the *where* (ground, space, or a mix), we must now turn to the invisible architecture that controls it all.

5.0 The Decisive Factor: Command and Control in the Hypersonic Age

While debates over interceptors and basing modes dominate public discussion, the most significant and largely unaddressed technical barrier to effective missile defense is the command and control (C2) architecture. As senior military leaders like General Guetlein have correctly assessed, C2 is the "number one problem." The most advanced interceptors are useless without a C2 system capable of operating at machine speed across vast distances. We know how to have bullets hit bullets; the challenge is orchestrating that capability at scale in a high-threat environment.

The modern C2 challenge is best understood through the required four-part, distributed, autonomous kill chain. This architecture must seamlessly connect:

- **Sensors** in one location providing targeting information.
- **Distributed, autonomous fire control** in another location, not a centralized bunker.
- **Interceptor cueing** from a third location.
- **Target defense** in a fourth location, protecting assets thousands of miles away.

The emergence of hypersonic weapons magnifies this challenge exponentially. China has systematically developed hypersonic capabilities to create a "keep out zone" in the Western Pacific, leaving the United States "20 years behind." Defending against these high-speed, maneuvering threats renders ground-based radar networks insufficient; when asked where in the vast Indo-Pacific we should put the radars, the only logical answer is there is no answer.

The problem can only be solved from space. Furthermore, the maneuverability of these weapons compresses decision timelines, reducing the allowable C2 latency to a mere **5 to 10 seconds**.

Until this distributed, low-latency C2 problem is solved, "we can't defend a carrier battle group." The combat effectiveness of any interceptor constellation—ground or space-based—remains severely limited. Investing billions in new interceptors without first mastering the C2 architecture to control them is a recipe for strategic failure.

6.0 Policy, Politics, and the Industrial Base: From Theory to Reality

Technical solutions are developed and deployed within a complex ecosystem of national policy, political will, and industrial capability. These non-technical factors ultimately determine what is feasible.

First, any plan for a space-based defensive layer must confront the political reality that the U.S. political process will likely not permit the nation to be the first to deploy weaponry in space. This constraint must inform investment. Rather than dedicating primary funding to a system that may never be approved, a more prudent approach is to prioritize resources on things we *will* be allowed to do: significantly augmenting our proven ground- and sea-based defenses. As I have stated before, "you can't buy enough SM-3s to suit me," and the same urgency applies to the Next Generation Interceptor (NGI), THAAD, and Patriot replacement systems.

Second, for any defense policy to be durable, it must be codified into law. Executive orders are transient. Enduring national security policy requires the stability of legislation, which provides the long-term signals necessary for government and industry to make multi-decade investments.

Finally, the defense industrial base must reclaim its role as an expert partner. A friend once noted, "if the government put out a requirement for the Starship Enterprise... the primes would bid on it." This culture of compliance over candor is a strategic vulnerability. There is a pressing need for prime contractors to visit the "rent a spine store" and push back against technically infeasible or statistically improbable requirements. The role of industry should be to provide a "powerful voice on what ought to be built and what ought not to be built." This requires a shift back toward a genuine free-market approach to defense acquisition, reminiscent of the flyoffs between the F-16 and F-20 Tiger Shark, where companies competed with their own capital. We must decide if we want a free-market defense industrial base or simply a more efficient state-run enterprise.

7.0 Conclusion: Charting a Course for an Effective Missile Defense Future

This analysis has demonstrated that the current U.S. focus on a space-based, boost-phase missile defense system is statistically and technically unsound, risking national treasure on a system ill-suited for the most probable engagement scenarios. As an engineer, I believe we must ground our strategy in reality. The true challenges lie in mastering midcourse discrimination and engineering a scalable, low-latency command and control architecture capable of functioning in the hypersonic age.

To that end, policymakers and defense industry leaders should adopt the following recommendations:

1. **Reorient Strategy to Midcourse Engagement:** Mandate that all future interceptor development, for both space and ground basing, be optimized for solving the midcourse discrimination problem. Prioritize the development and maturation of multi-kill vehicle technology as the primary solution for defeating complex threat clouds.
2. **Commission an Unbiased Basing Study:** Initiate a comprehensive and objective cost-benefit analysis of deploying a large-scale constellation of midcourse interceptors (e.g., thousands of units) from the ground versus from space. This study must inform a resilient, mixed-basing strategy that balances cost, survivability, and warfighting effectiveness.
3. **Prioritize Command and Control as the #1 Challenge:** Elevate the development of a distributed, autonomous, low-latency C2 architecture to the highest national priority. This effort must be resourced with an urgency that reflects its status as the single greatest barrier to defending against peer adversary attacks, especially hypersonic threats.
4. **Strengthen and Augment Proven Ground-Based Systems:** In parallel with future development, immediately increase investment in the production and global dispersal of existing, effective systems. This includes accelerating NGI and procuring additional SM-3, THAAD, and next-generation lower-tier interceptors to bolster defenses in the near term.
5. **Foster an Industrial Base of Candor and Innovation:** Implement acquisition reforms that reward technically honest assessments from industry. Encourage a more competitive, free-market approach that incentivizes companies to push back on unworkable requirements and offer innovative, effective solutions grounded in sound engineering.

The threats facing the United States are real and growing. Securing the nation against missile attack requires a strategy rooted in the unyielding laws of physics and statistics. By aligning our missile defense posture with engineering reality, we can move from pursuing an ineffective concept to building a credible shield that will protect the nation and its allies in an increasingly dangerous world.