

Strengthening the Phalanx: Layered, Comprehensive, and Distributed Air and Missile Defense in the Indo-Pacific



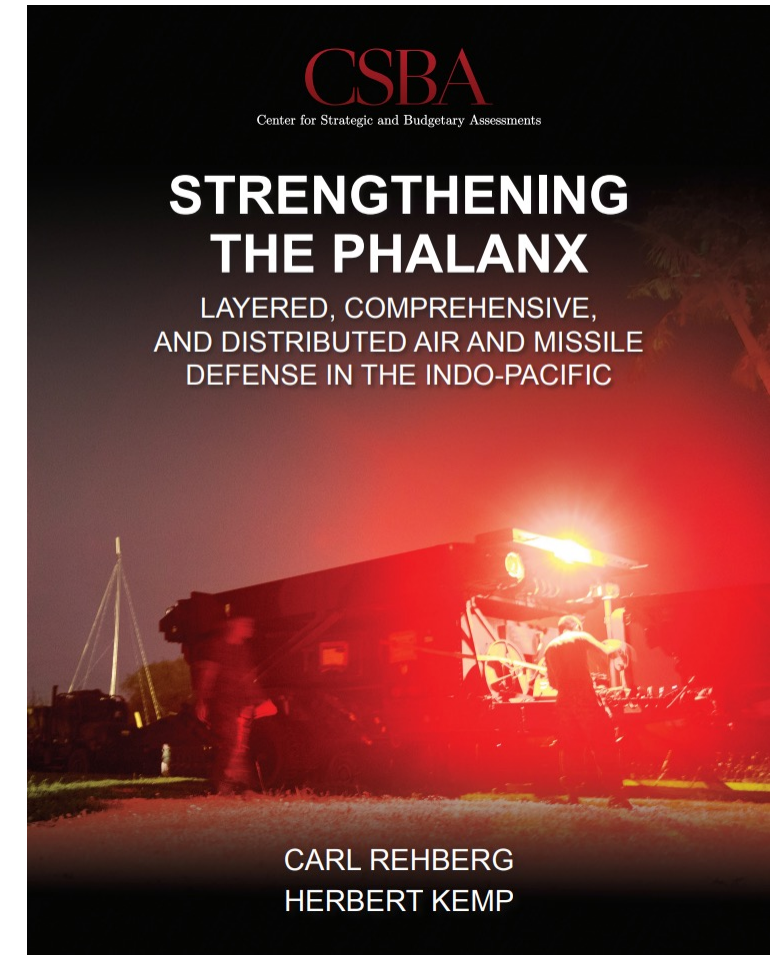
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June 18, 2024

CSBA

Center for Strategic and Budgetary Assessments

- Background
- Understanding the Challenge
- Current Theater Active Air and Missile Defenses
- Several Salvo Defense Concepts
- Defense of Guam (Guam Defense System) Concepts
- Conclusion and Recommendations
- Questions, Comments & Discussion



Background

- During a crisis/conflict, U.S. IAMD—needs mobilization--mostly from CONUS
- 2022 National Defense Strategy (NDS) consistent with 2018 NDS--U.S. military's overseas posture “from large, centralized, unhardened infrastructure to smaller, dispersed, resilient, adaptive basing that includes active and passive defenses.”
- 2022 MDR: “IAMD represents an effort to move beyond platform-specific missile defense toward a broader approach melding all missile defeat capabilities
- Defensive (or Active Defense)—kinetic, non-kinetic; air, sea, ground, space & cyber
- Layered IAMD—multiple, overlapping rings
- Comprehensive: right assets @ right location + effector variety + passive defenses
- Distributed:—dispersal, mobility or both; new technology/CONOPS enables--“any sensor, best shooter”

Understanding the Challenge

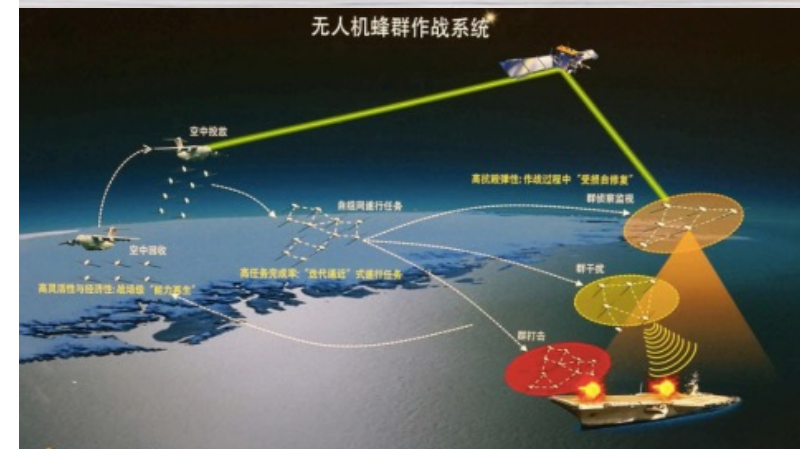


- We are in the era of salvo competitions: the dynamic between opponents who can strike and defend against strikes with precision.
- Both combatants seek advantages by continually increasing the size and survivability of their strikes and the capacity and lethality of their defenses.

Complexity of multiple threat types, multi-axis attacks, and large salvo sizes

Understanding the Challenge: PLA Capability & Capacity

- **PLA missile threats expanding in capability, numbers & types**
 - Chinese multi-axis air, surface, submarine launched ballistic & cruise missiles attack poses a complex defense problem
- **A future Chinese attack on Guam might include:**
 - H-6 strategic bombers w/cruise missiles, hypersonic missiles, or air launched ballistic missiles.
 - DF-26 road-mobile, dual-capable IRBM
 - DF-27—a new IRBM or ICBM (in development)
 - Missile systems equipped with HGVs
- **New UAS threats pose difficult challenges for defense**
 - Large numbers, low signatures & difficult to detect
 - UAS platforms vary in size, capability and function
 - Small UASs to large UAS platforms
 - “Mother Ship” type UAS--can carry multiple armed sUAS



A Depiction of the PLA's Future Swarm Combat System

Current Theater Active Air & Missile Defenses



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Missile Defense Agency (MDA)

- BMD successes with SM-3 Block IIA et al.
- Defense of Guam—Guam Defense System
- Hypersonic defense successes & the way forward

US Navy: Layered, Comprehensive & Distributed IAMD Exemplar

- 47 Aegis BMD Ships; New SPY-6 Radars + Aegis Baseline 10.0 Software Updates
- Aegis Ashore in Romania (operational 2016) & Poland (expected in 2024)

US Army and Marine Corps

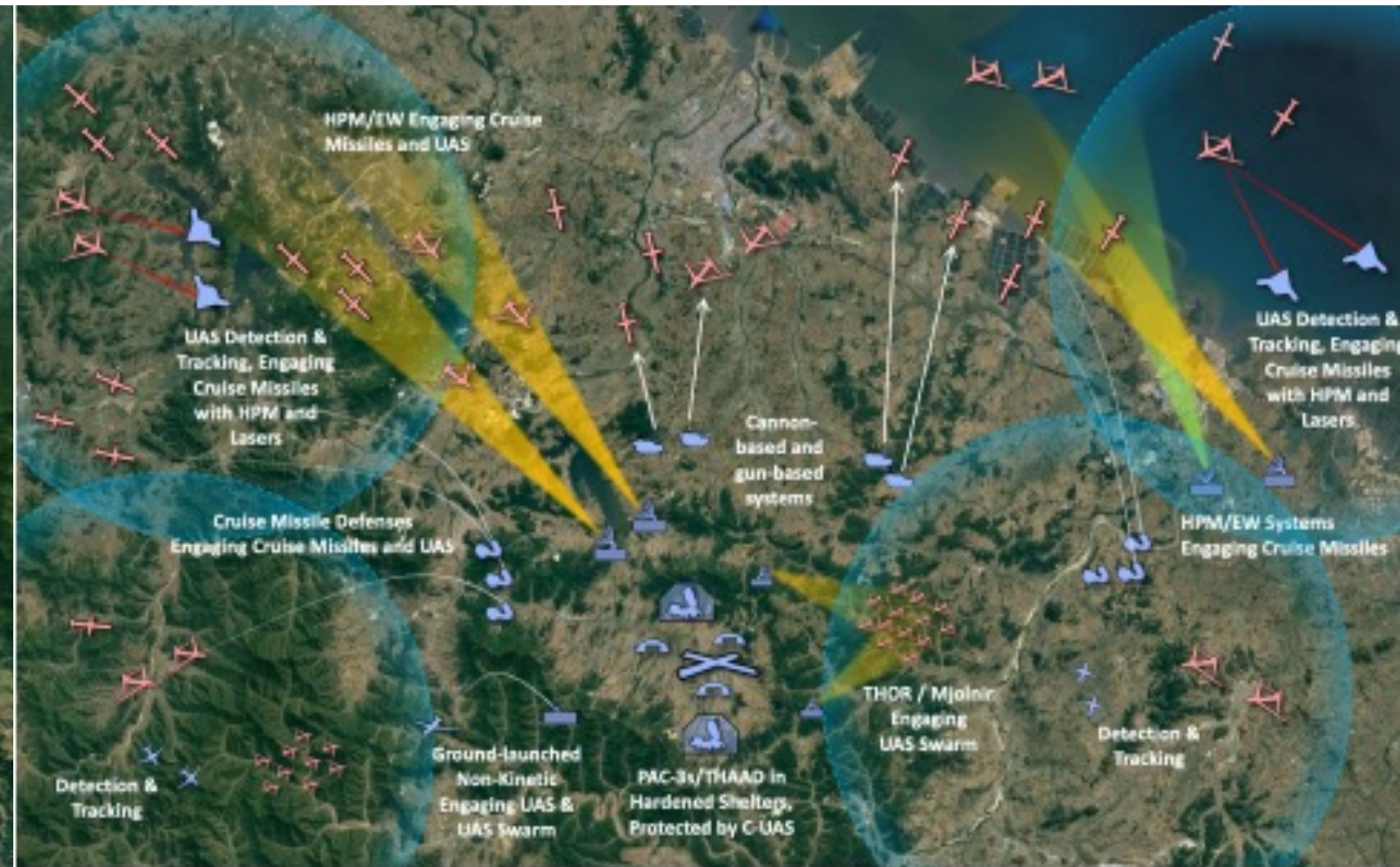
- Since 2018, USA made credible & evolutionary progress in IAMD
- 60 Batteries of Patriot Advanced Capability (PAC-3/MSE); 7 Batteries of THAAD; M-SHORAD moving forward
- IFPC 2-I program NOT progressed as quickly as intended—NO significant CMD capability until late 2020s
- Major progress on DE; work being done on HVPs, gun-based and cannon-based systems
- USMC's Ground Based Air Defense (GBAD) Medium Range Intercept Capability (MRIC): 3 Batteries by FY25-27

US Air Force & US Space Force

- USAF is “the only military service that lacks clear authority to develop and procure surface-based air and missile defense (AMD) to protect its own forces” since late 1950s—issues mitigated in 1980s—reemerged last decade



Illustration of a Potential Base “Outer” & “Inner” Defense Ring

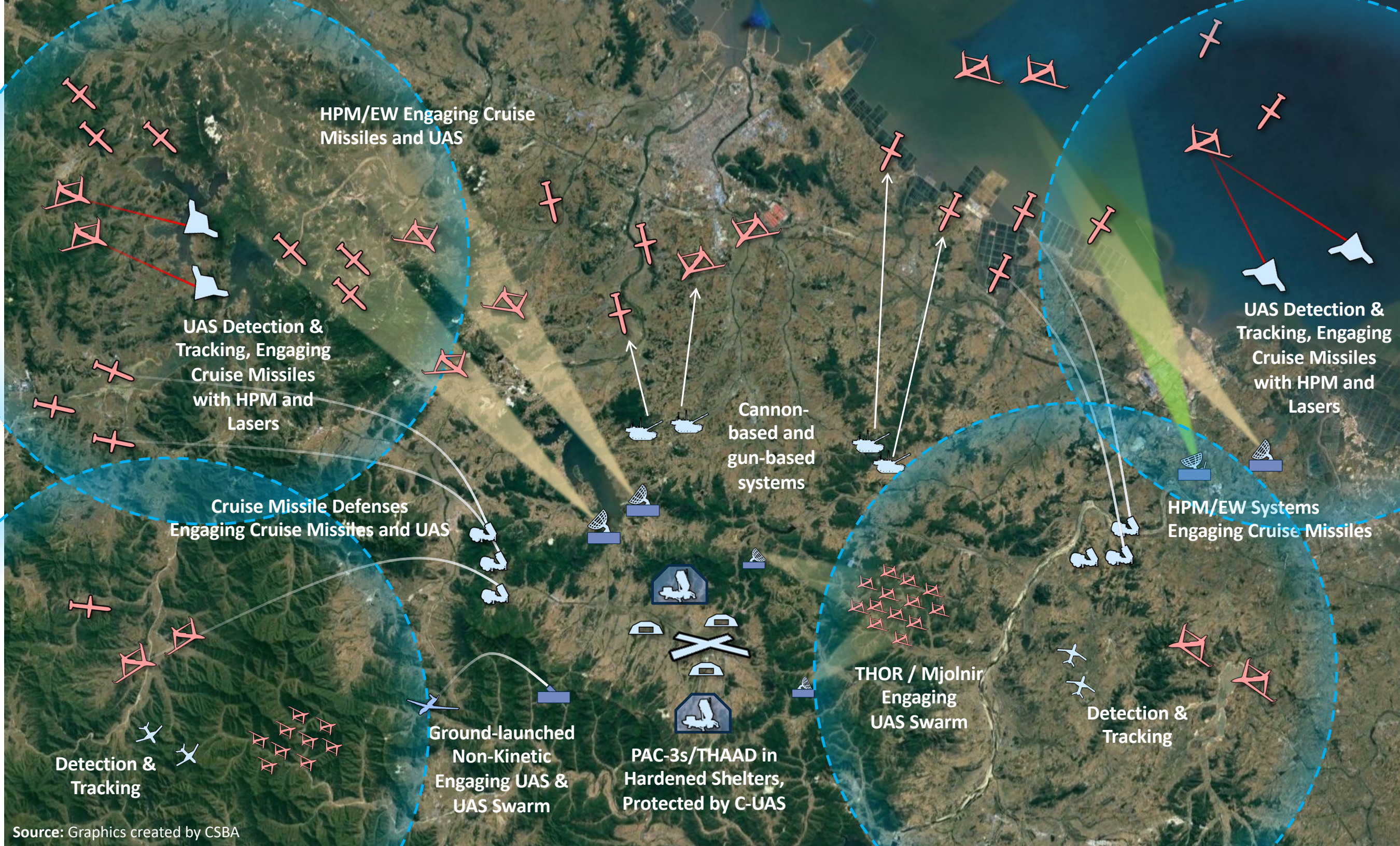


Source: Graphic created by CSBA.

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Illustrations for Representation of Concepts and Capabilities Only

Illustration of a potential base "inner" salvo defense

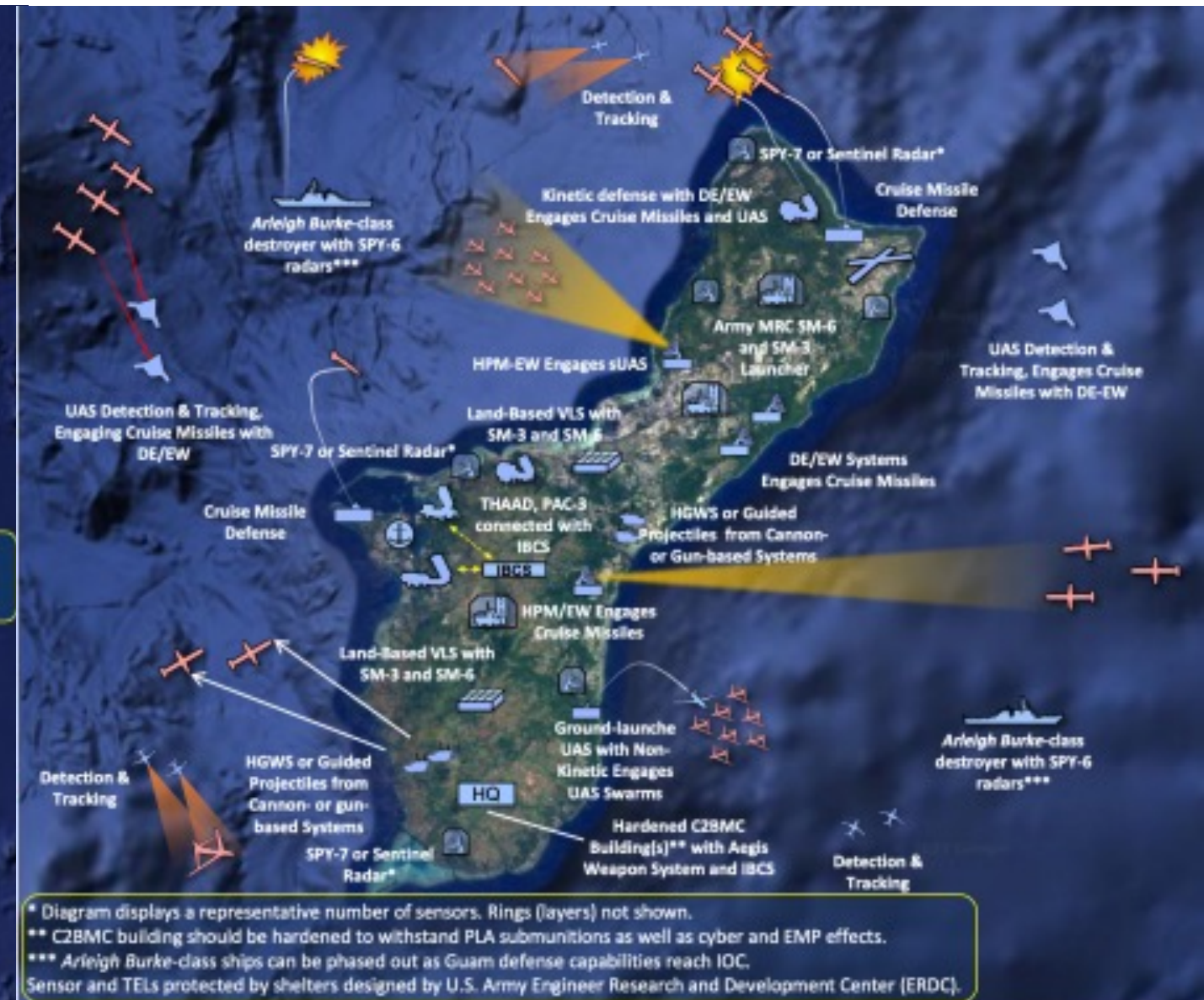
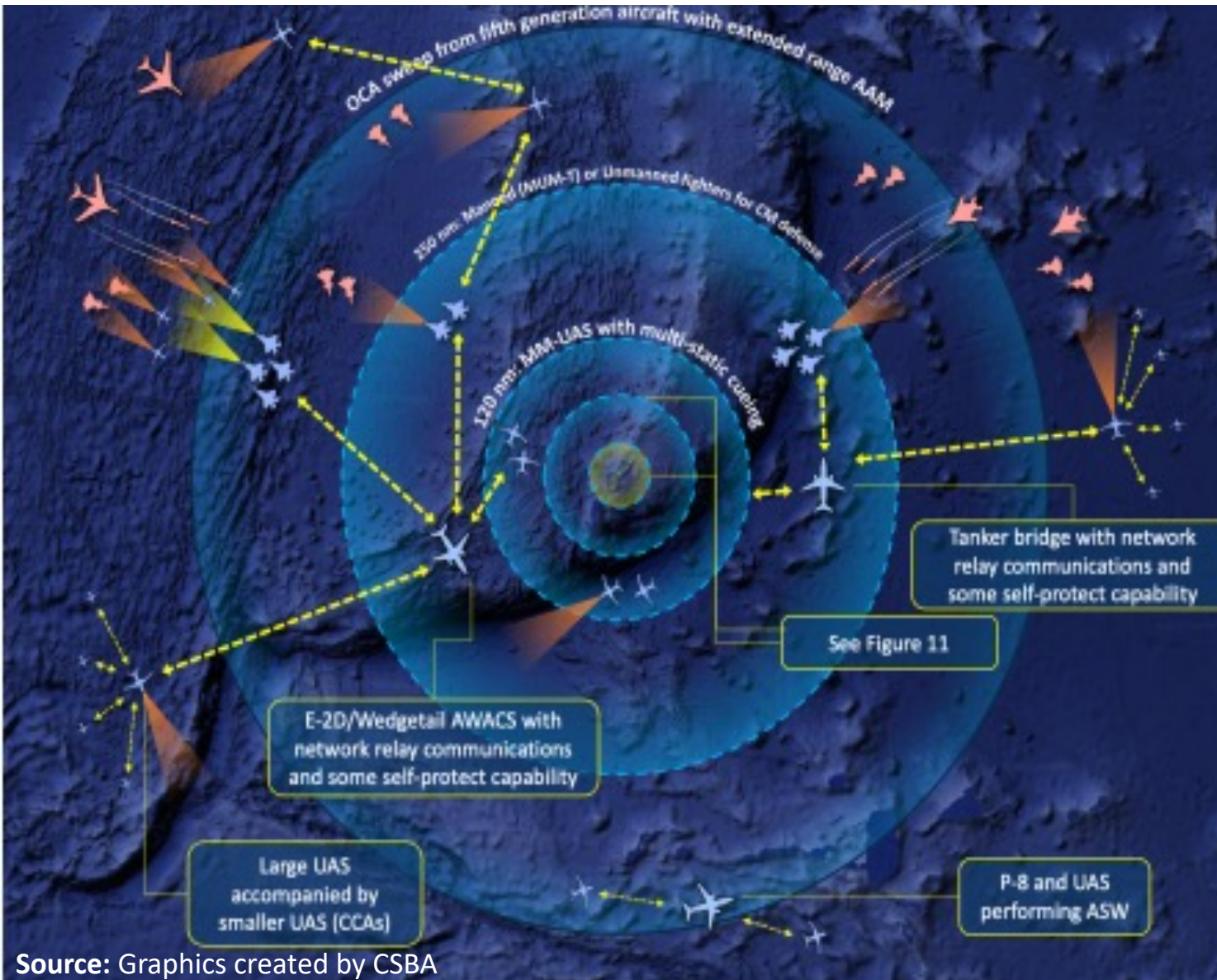


Source: Graphics created by CSBA

From Defense of Guam to Guam Defense System (GDS)

- ADM Davidson publicly advocated Aegis Ashore due to THAAD limitations & other issues
 - Plan for Guam was later revised due to fixed, ground-based limitations of Aegis Ashore & other issues
- Guam Defense System (GDS) remains critical due to strategic importance as a hub for maritime domain dominance, long-range strike efforts et al.
- GDS moved along in 2021 & 2022, but critical concerns emerged in 2023
 - 1) The timeline has slipped...one noted expert has stated that DoD has “settled on the most expensive, least efficient and slowest delivered possible plan.”
 - 2) Some key systems are in doubt—especially for cruise missile defense—dependent on IFPC 2-I
 - 3) Costs continue to rise & a lack of attention to personnel & infrastructure requirements (DOTMLF-P)

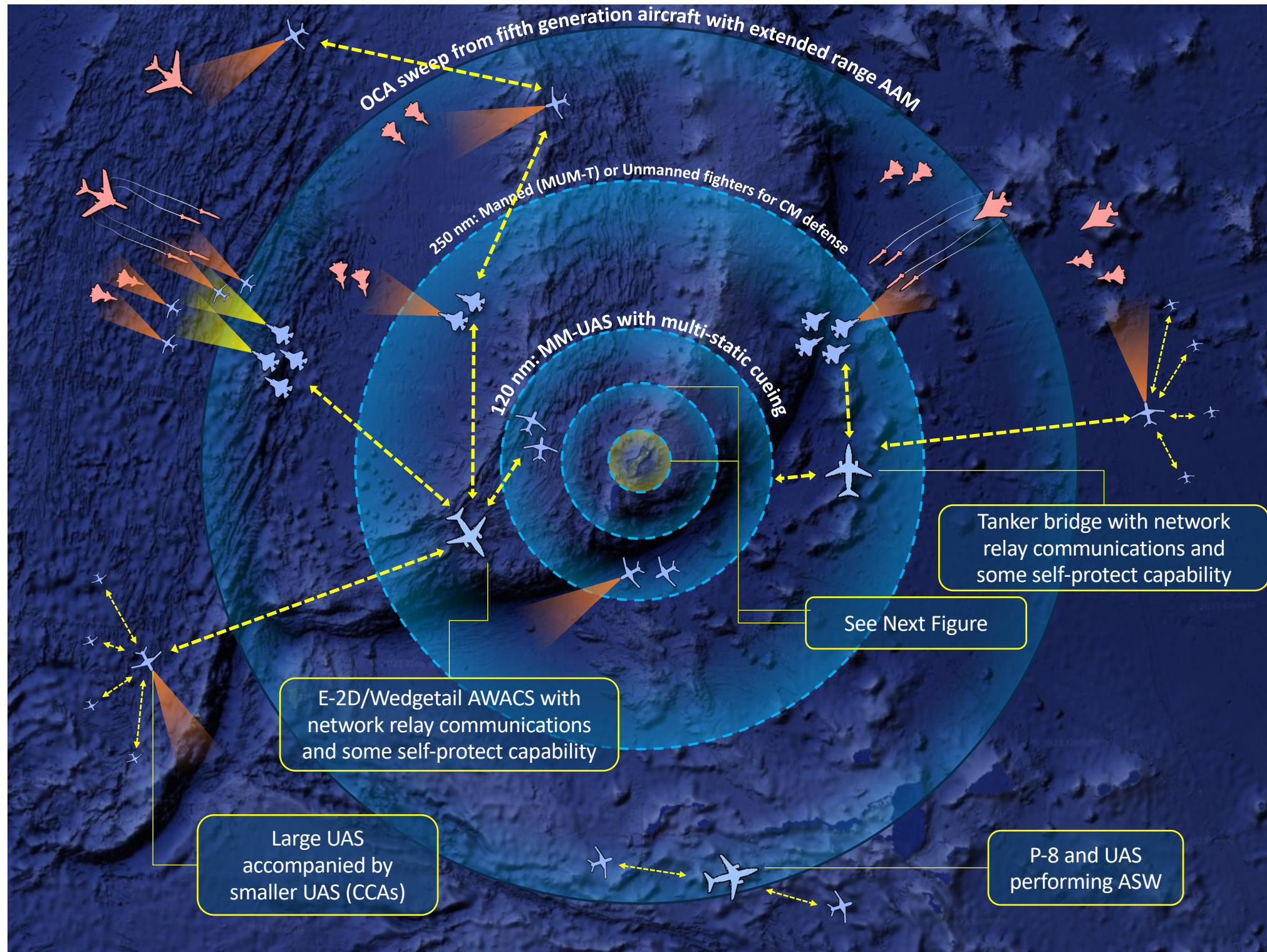
Illustration Of Potential Guam “Outer” “Inner” & “Close-in” Salvo Defense Rings



Source: Graphics created by CSBA

Illustrations for Representation of Concepts and Capabilities Only

Potential Guam "Outer" Salvo Defense Rings



Potential
Guam
“Inner” and
“Close-In”
Salvo Defense
Layers



* Diagram displays a representative number of sensors. Rings (layers) not shown.
 ** C2BMC building should be hardened to withstand PLA submunitions as well as cyber and EMP effects.
 *** *Arleigh Burke*-class ships can be phased out as Guam defense capabilities reach IOC.
 Sensor and TELs protected by shelters designed by U.S. Army Engineer Research and Development Center (ERDC).

A Way Forward for Guam's Defenses?

Do more timely, cost-effective and innovative solutions need exploration?

- Guam ARNG?
- USMC at Camp Blaz?
- Alternatives/new options for IFPC 2-1?
- Do some Guam projects need to be re-evaluated (e.g., RSAF fighters)?
- AAFB & Naval Base Guam (NBG) adjusted due to GDS?
 - Will Andersen AFB be a hub?
 - Will Naval Base Guam (NBG) expand?
 - Fighters, bombers, tankers, additional SSNs, support ships?
 - Aegis ship flexibility?

- Developing high-capacity, cost-effective active defenses protecting U.S. and Allies forward bases & forces are vital to detering great power aggression (e.g., *fait accompli*)
- The 2022 Missile Defense Review emphasized strategic competition with China & Russia
 - This should influence U.S. IAMD priorities and programs, but that is not yet evident
 - Right mix of active defenses, passive defenses, & attack operations critical w/ right posture & presence
- Existing capabilities & capacity to defeat large numbers of guided weapons is lacking, especially capabilities and capacity to counter non-ballistic threats—CMs, C-UAS, C-sUAS
 - The synergy of UAS, DE and lower cost kinetic weapons would help significantly
 - New cost-effective active & passive defenses, attack ops a must for salvo attacks/complex salvo attacks
- Concepts & capabilities in this report have shown several paths for layered, comprehensive, distributed IAMD w/ novel kinetic & non-kinetic capabilities to defeat salvo attacks

- **Continue fully supporting USINDOPACOM's #1 PDI goal—the Guam Defense System**
 - DoD, USINDOPACOM, and Congress should continue to support the Guam Defense System
 - DoD & Congress must **demand a timely implementable plan with needed capability, cost-effectiveness, minimal personnel & infrastructure**
 - Basic initial operating capabilities (for some threats) are on track for 2025, **but some planned capabilities are not executable, too costly, past needed timelines (i.e., DOTMLPF-P)**
 - A new Guam Master Plan **must de-conflict** with the other priority projects for Guam (e.g., RSAF)
- **Service integration for battle management command & control (BMC2) critical**
- **Field UAS with sensors to perform persistent detection/early warning of salvo attacks**
- **Develop [Select] Alternatives for IFPC 2-I for INDOPACOM ASAP**

- **Field lower-cost, short- to medium-range kinetic and non-kinetic sUAS defenses**
- **Prototype UAS with HELs & HPM/EW**
- **Acquire multiple types of HPM/EW defenses**
- **Responsibilities for IAMD defense inside & outside DoD must improve for effectiveness**
 - Both USA & USAF must step up & take actions
 - FY 2021 NDAA, Section 156— “JOINT STRATEGY FOR AIR BASE DEFENSE AGAINST MISSILE THREATS”
 - **Enhanced IAMD Integrated Test Bed for USINDOPACOM**

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Thank You!
Questions, Comments & Discussion

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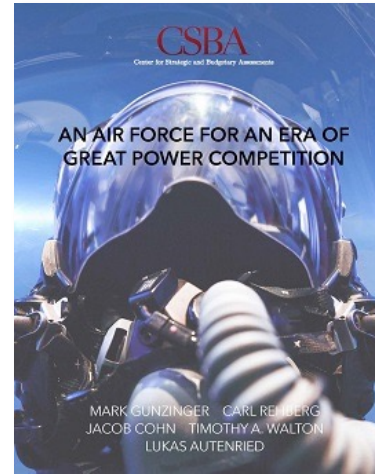
Previous Related CSBA Publications



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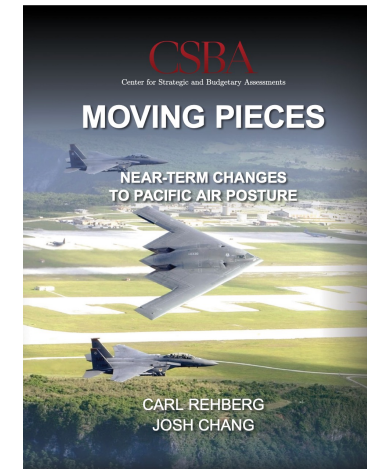
October 2018



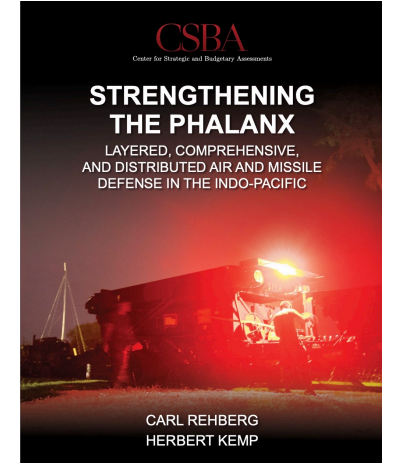
March 2019



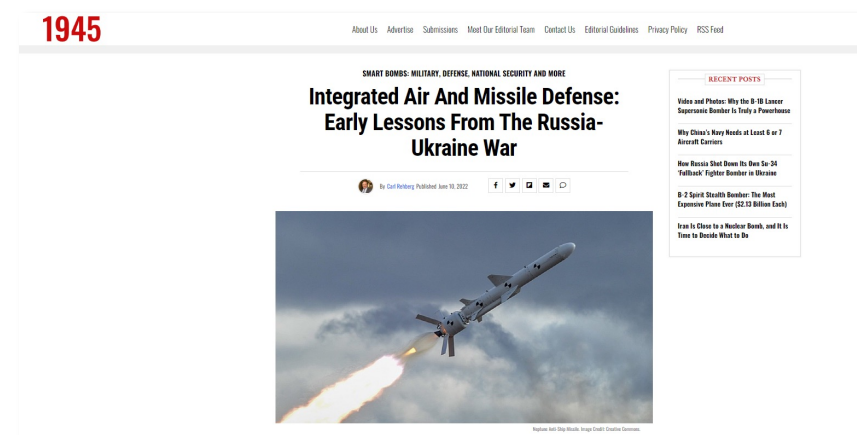
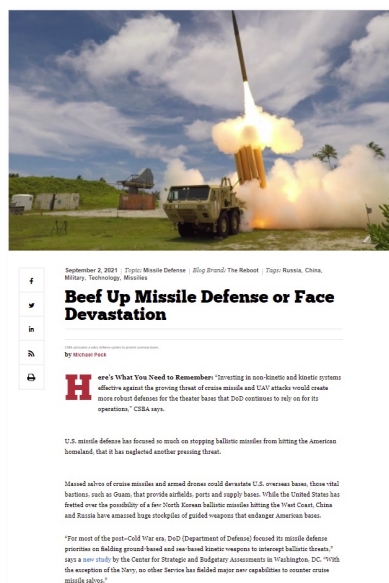
January 2020



November 2022



January 2024

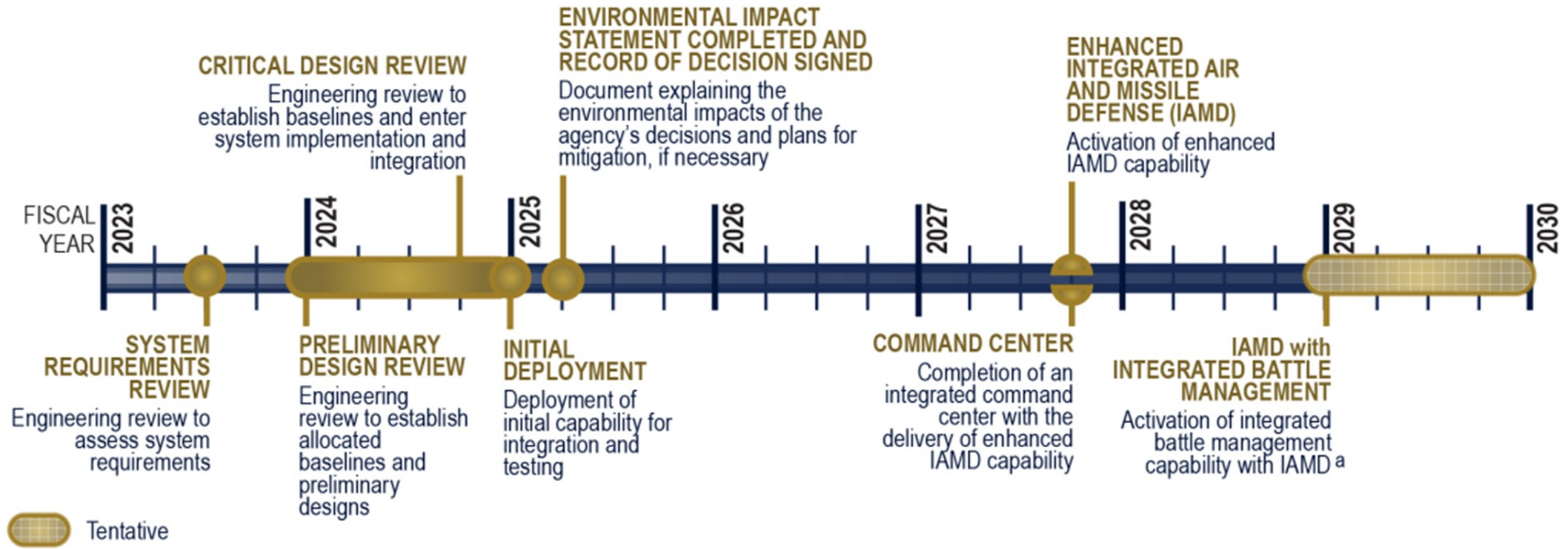


- **Disclaimer & Caveats: Initial, early/preliminary, using incomplete open-source information...**
- **Based on the number of CMs used—a USAF/US Army COE ERDC analysis and study is warranted for passive defenses to include hardening insights**
- **Active Defenses appear to have done better against the threat(s) than most going-in assumptions--so a renewed rationale for active defenses**
- **Huge rationale for cruise missile defense (CMD)**
 - **Has DoD & the US Army got “religion” yet on CMD? EUCOM & USINDOPACOM must prioritize ASAP!**
 - **The USAF & USMC should explore niche capabilities—esp. for dispersal bases (ACE & EABO)**
- **Little detailed open-source on UAS and C-UAS but the UAS-C-UAS competition continues**
 - **New initiatives for both need to be explored; M-SHORADs a prescient priority but others needed**
 - **DE Solutions critical for the UAS-C-UAS competition**
- **Renewed emphasis for the Air Force/US Army on posture—the right force structure at the right location(s) with the right mix of passive & active defenses with counterstrike**

SEC. 156. JOINT STRATEGY FOR AIR BASE DEFENSE AGAINST MISSILE THREATS.

- (a) STRATEGY REQUIRED.**—The Chief of Staff of the Air Force and the Chief of Staff of the Army shall jointly develop and carry out a strategy to address the defense of air bases and Pre-Positioned Sites outside the continental United States against current and emerging missile threats, as validated by the Defense Intelligence Agency.
- (b) CERTIFICATION AND STRATEGY.**—Not later than June 1, 2021, the Chief of Staff of the Air Force and the Chief of Staff of the Army shall jointly submit to the congressional defense committees the following: **(1)** A certification that the defense of air bases and Pre-Positioned Sites outside the continental United States against threats described in subsection (a) is being addressed jointly. **(2)** The strategy developed pursuant to subsection (a).

Guam Timeline



Source: GAO analysis of Missile Defense Agency data. | GAO-23-106011

^aThis event is not yet baselined and will not occur before the first quarter of fiscal year 2029.

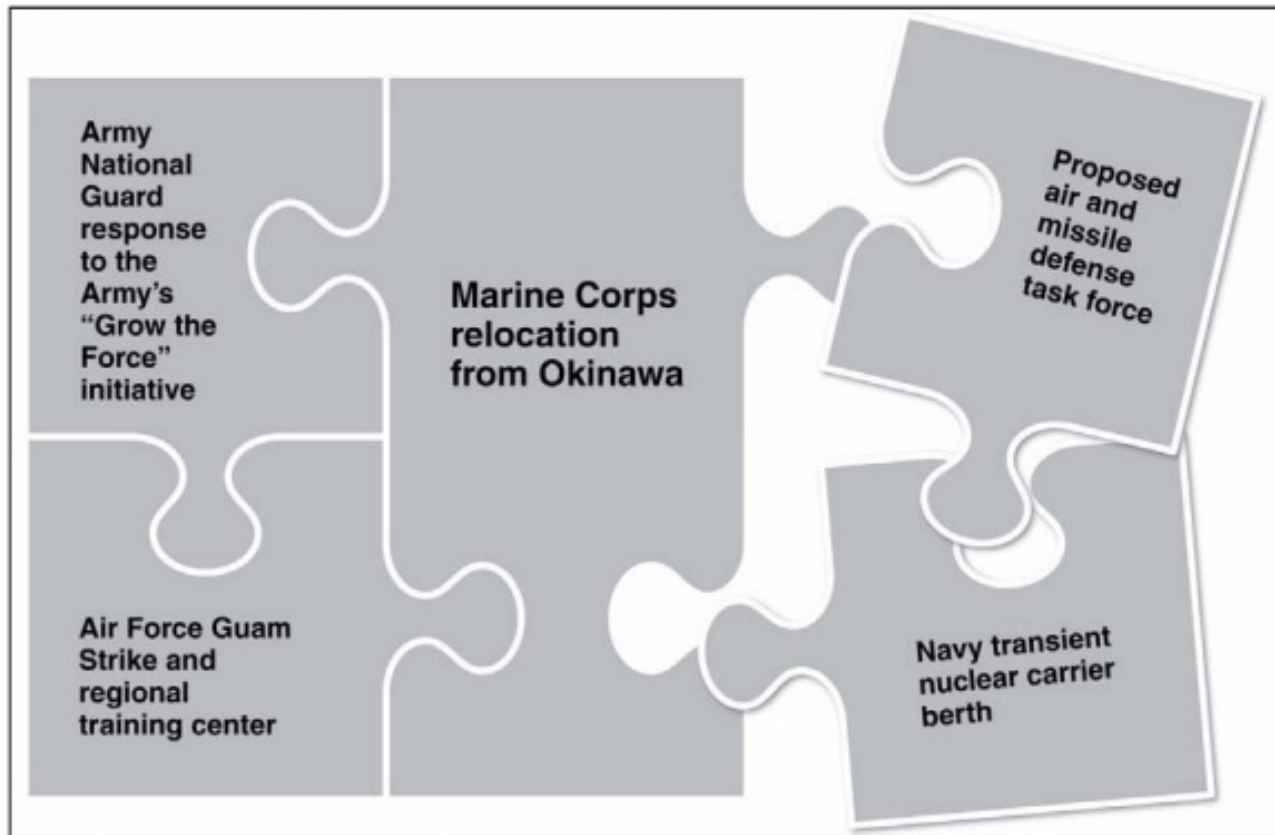
Illustration of a Potential Base “Close-In” Salvo Defense



Illustration for Representation of Concepts and Capabilities Only

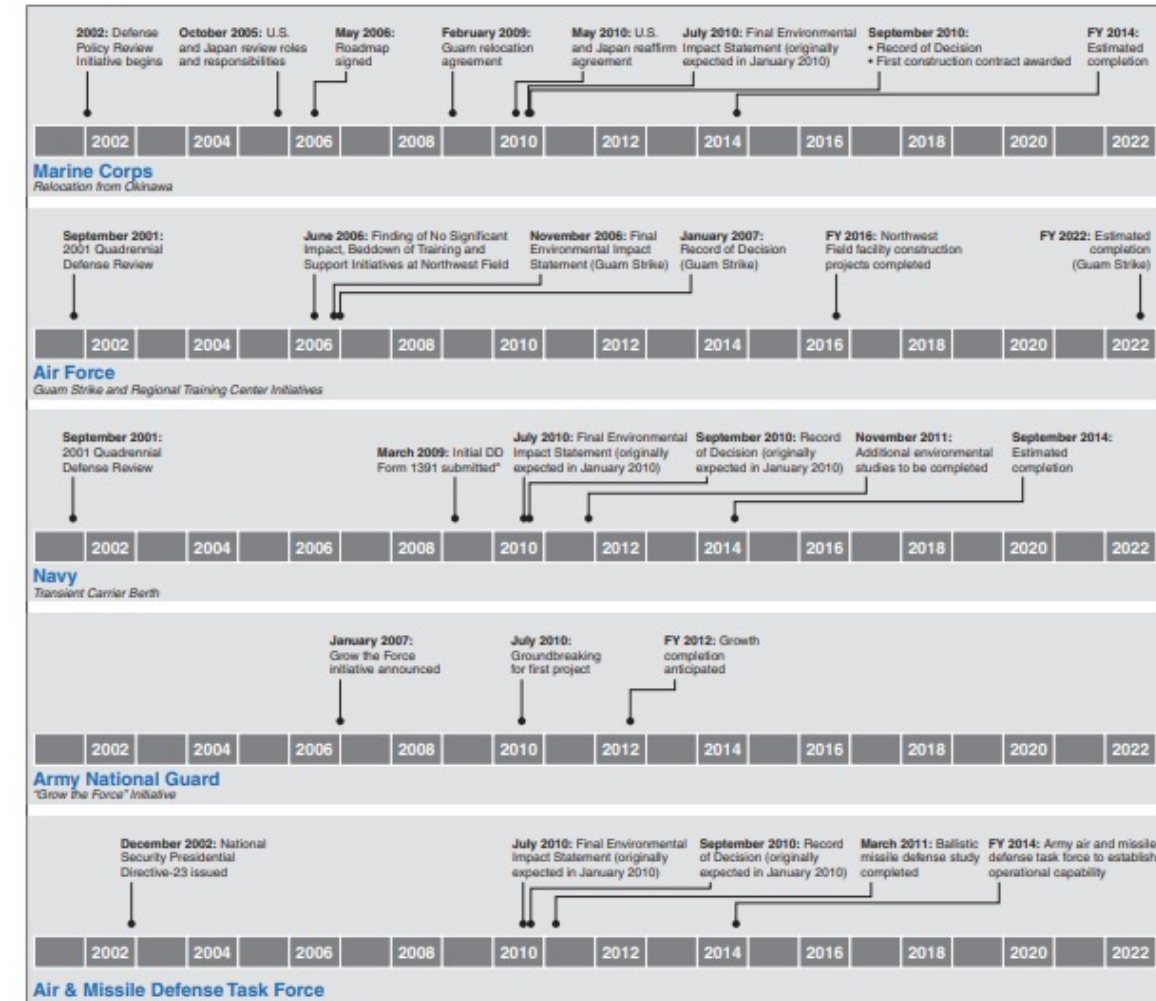
Guam Background

Figure 1: Five Components of the Military Buildup on Guam



Source: GAO analysis of DOD data as of April 2011.

Figure 2: DOD-Estimated Timelines for Each Component of the Military Buildup on Guam



Source: GAO analysis of DOD data.

*DOD Financial Management Regulation 7000.14-R, Volume 2B, Chapter 6 designates that a DD Form 1391, *Military Construction Project Data*, is used by DOD to submit requirements and justifications in support of funding requests to Congress for military construction projects.

Case Study 2: Guam



319th Reconnaissance Wing:
4th Reconnaissance Squadron
(RQ-4B Global Hawk)

Helicopter Sea Combat Squadron 25
(MH-60S Seahawk)

Agile Combat Employment
(Ad-hoc, Episodic deployments of
strategic bombers to Guam,
including B-1Bs, B-2s, and B-52Hs)

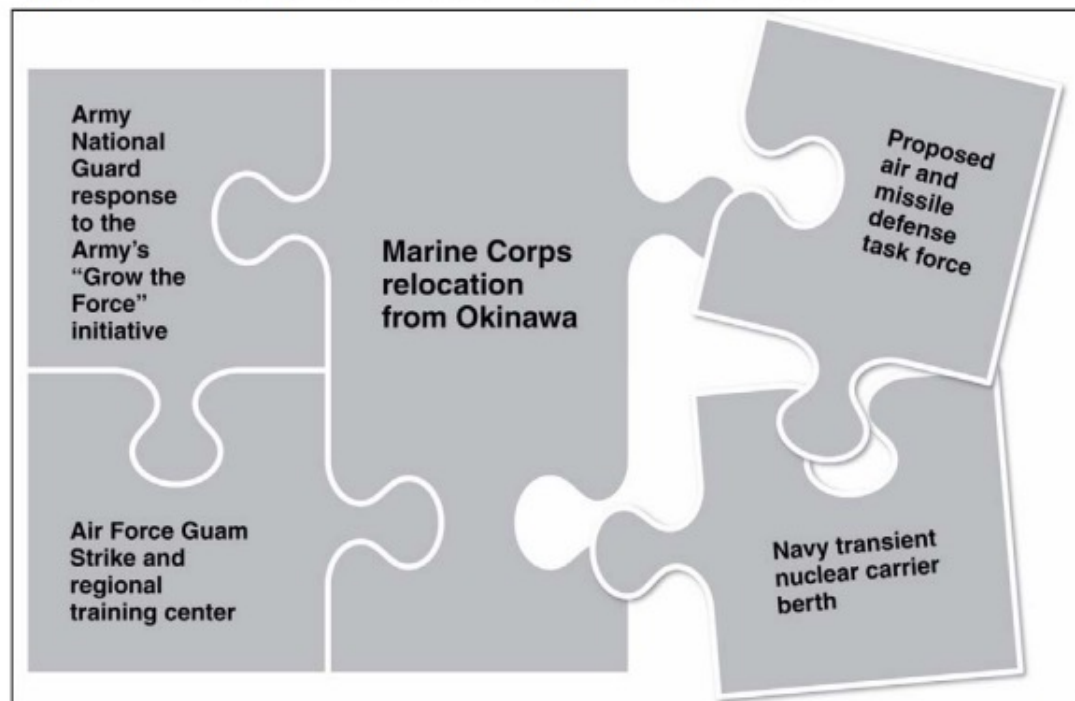


- **Guam is an important hub for counterstrike & power projection- an ideal operating location for other aircraft**
- **Guam sustained U.S. operations when needed throughout the region for decades**
 - Extensive aviation fuel storage & munitions storage areas
- **Guam still a major focus of DPRI with large number of USMC personnel & equipment starting to relocate there after years of MILCON**
- **PLA's development of long-range weapons such as the DF-26 intermediate-range ballistic missile (“Guam Killer”) and air-launched cruise missiles (ALCMs) such as the CJ-20 have placed Guam under increasing threat**
 - Guam is not only important b/c of military value--it is also a U.S. territory with U.S. citizens requiring protection

Case Study 2: Guam

- Air Force Guam Strike (GS) initiated after 2001 QDR; GS 2006 EIS, GS ROD Jan 2007
- RSAF planned to be located on the North Ramp where Air Force Guam Strike was planned
- RSAF fighter presence at AAFB provides training/cooperation for interoperability, etc.
- What are the opportunity costs & the implications for counterstrike, B-21, NGAD et al.?
- What is the right force structure at AAFB?

Figure 1: Five Components of the Military Buildup on Guam



Source: GAO analysis of DOD data as of April 2011.

