

MITCHELL INSTITUTE
for Aerospace Studies



Fighting the Air Base

**Ensuring Decisive Combat Sortie Generation
Under Enemy Fire**

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Bottom Line Up-Front

The Air Force must remain a relevant “inside force” capable of fighting alongside America’s allies and partners

- Limited utility of long-range strike; volume of shorter-range combat aircraft required to create necessary attack density in a large-scale conflict
- U.S. military must field cost-effective air & missile defense solutions to ensure required sorties

Neither Congress nor the Department of Defense have adequately funded air base defense

- Without adequate air base defense, the Air Force may be unable to generate combat airpower, imperiling deterrence and threatening a joint force win in a near peer conflict

A combination of defensive capabilities is required to defeat sophisticated threats

1. Combat aircraft **dispersal** under the Air Force Agile Combat Employment (ACE) concept;
2. Diverse, layered arsenal of **active defenses** that includes kinetic and non-kinetic effectors; and
3. Robust air base **passive defenses**, including early warning, threat tracking, hardening, and substantial reconstitution capabilities, especially rapid runway repair



Fighting the Airbase: Key Points

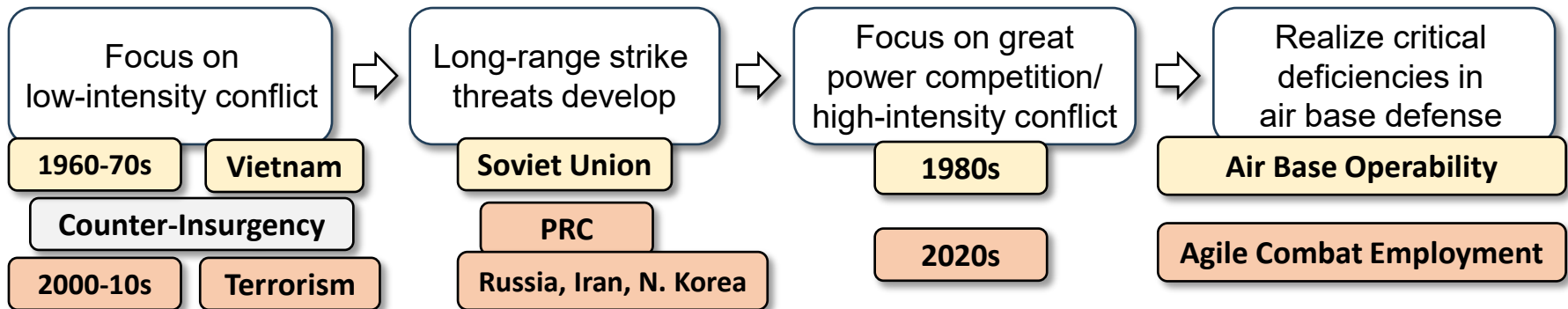
- Threat: Sustained, complex, integrated air & missile attacks
 - Simultaneous strikes by ballistic missiles, hypersonic weapons, cruise missiles, armed drones
- Without air base defense, Air Force may be forced to retreat to rear areas to “fight our way in” from far-flung bases to operationally relevant battlespace
- Without air base defense, adversaries may perceive opportunities; deterrence may fail
- Analysis demonstrates that a **combination** of aircraft **dispersal**, integrated **active and passive defensive measures**, and **reconstitution capabilities** will allow the U.S. Air Force generate required combat sorties under sustained enemy fire
- Solutions for air base defense capabilities *and capacities* are immediately required
 - Congress and DOD must define roles and responsibilities for air base defense among military services
 - Budget plus-ups required to institute comprehensive air base defense capabilities



Present Day Parallels to the Cold War

“The increasing vulnerability of the present basing posture could cause the U.S. Air Force to lose a war. No matter what the number and quality of aircraft, extent of preparations, sufficiency of logistics, brilliance of commanders, or skill and courage of its people, if the Air Force cannot mount sufficient mission-capable sorties, it cannot fulfill its responsibilities in war.”

- U.S. Air Force Scientific Advisory Board
Report of the Ad Hoc Committee on Airbase Performance,
November **1987**





Threats are serious, but *not* overwhelming

China

PLA Rocket Force Ballistic Missile Inventory

- SRBMs range-limited, targeting Taiwan
- MRBMs (DF-17)
 - Net increase, but...
 - Some replacing older SRBMs targeting Taiwan
- IRBMs (DF-26)
 - Net increase, but...
 - Some ASBMs
 - Some nuclear-capable
- ~300 conventional ballistic missile/HGV launchers (with limited re-loads) threatening air bases... and *many other* U.S./allied targets

Missile Name	Type	Number of Launchers		Warhead	Max Range	3/4 Max Range
		2022	2028			
DF-11 (CSS-7)	SRBM	54-72	27-36	500 kg (1,100 lbs)	600 km (324 NM)	450 km (243 NM)
DF-15 (CSS-6)	SRBM	54-72	27-36	500 kg (1,100 lbs)	900 km (486 NM)	675 km (365 NM)
DF-16 (CSS-11)	SRBM	54-72	54-72	1,000 kg (2,200 lbs)	1000 km (540 NM)	750 km (405 NM)
DF-17 (CSS-22)	MRBM (HGV)	27-36	108-144	UNK	2,000 km (1,080 NM)	1,500 km (810 NM)
DF-21A (CSS-5)	MRBM	12	0	600 kg (1,300 lbs)	2,150 km (1,160 NM)	1,600 km (864 NM)
DF-21D (CSS-5 Mod 5)	ASBM	48	48	600 kg (1,300 lbs)	2,150 km (1,160 NM)	1,600 km (864 NM)
DF-26 (CSS-18)	IRBM/ ASBM	216	252	1,500 kg (3,300 lbs)	4,000 km (2,160 NM)	3,000 km (1,620 NM)

PLA must spread a relatively small number of high-end missile threats across an expansive battlespace



Threats are serious, but *not* overwhelming

China: PLA Cruise Missile/Drone Inventory

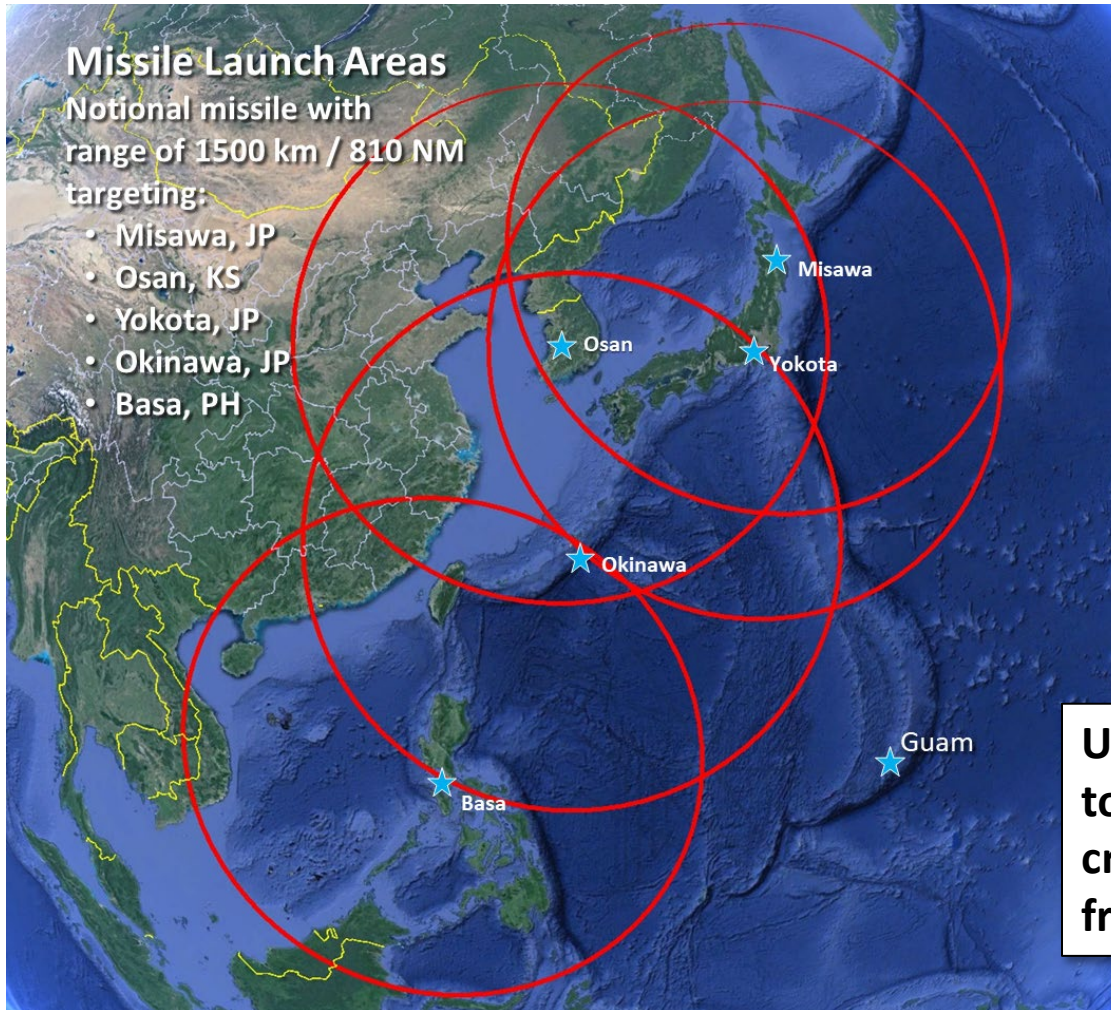
Missile Name	Type	Number of Launchers		Warhead	Max Range	3/4 Max Range
		2022	2028			
DF-10	GLCM	54-72 (Dual TEL)	54-72 (Dual TEL)	400 kg (882 lbs)	2,000 km (1,080 NM)	1,500 km (810 NM)
DF-100	GLCM	24 (Triple TEL)	24-48 (Triple TEL)	500 kg (1,100 lbs)	2,000 km (1,080 NM)	1,500 km (810 NM)
Missile/Drone Name	Type	Launch Platform		Warhead/Payload	Max Range (one-way)	3/4 Max Range
ASN-301	GLCM loitering	Canister ground-launched		32 kg (70 lbs)	500 km (270 NM)	375 km (202 NM)
YJ-63	ALCM	Bomber		500kg (1,100 lbs)	200 km (108 NM)	150 km (81 NM)
AKF98A	ALCM (Like U.S. JASSM)	Fighter		UNK	UNK	UNK
AKF088C (TL-30)	ALCM loitering	Fighter / bomber		UNK	280 km (150 NM)	210 km (113 NM)
YJ-18B	LACM	Ship / submarine		150-300 kg (330-660 lbs)	540 km (292 NM)	405 km (219 NM)
CJ-10 / CJ-20	ALCM	Bomber		400 kg (882 lbs)	2,000 km (1,080 NM)	1,500 km (810 NM)
Q-5	UCAV (2 nd Gen Fighter)	Air base		1,500 kg (3,300 lbs)	2,000 km (1,080 NM)	1,500 km (810 NM)
J-6	UCAV (2 nd Gen Fighter)	Air base		500 kg (1,100 lbs)	1,690 km (912 NM)	1,268 km (685 NM)
J-7	UCAV (3 rd Gen Fighter)	Air base		1,500 kg (3,300 lbs)	2,200 km (1,188 NM)	1,650 km (891 NM)
J-8	UCAV (3 rd Gen Fighter)	Air base		4,500 kg (9,900 lbs)	2,200 km (1,188 NM)	1,650 km (891 NM)

- PLA threats to air bases will necessarily include significant mix of cruise missiles and drones
- Existing U.S. air defense systems are challenged by different threats approaching from different directions, at different altitudes, and at different speeds

*Complex adversary threats require **diverse, layered air defenses***



Threats are serious, but *not* overwhelming

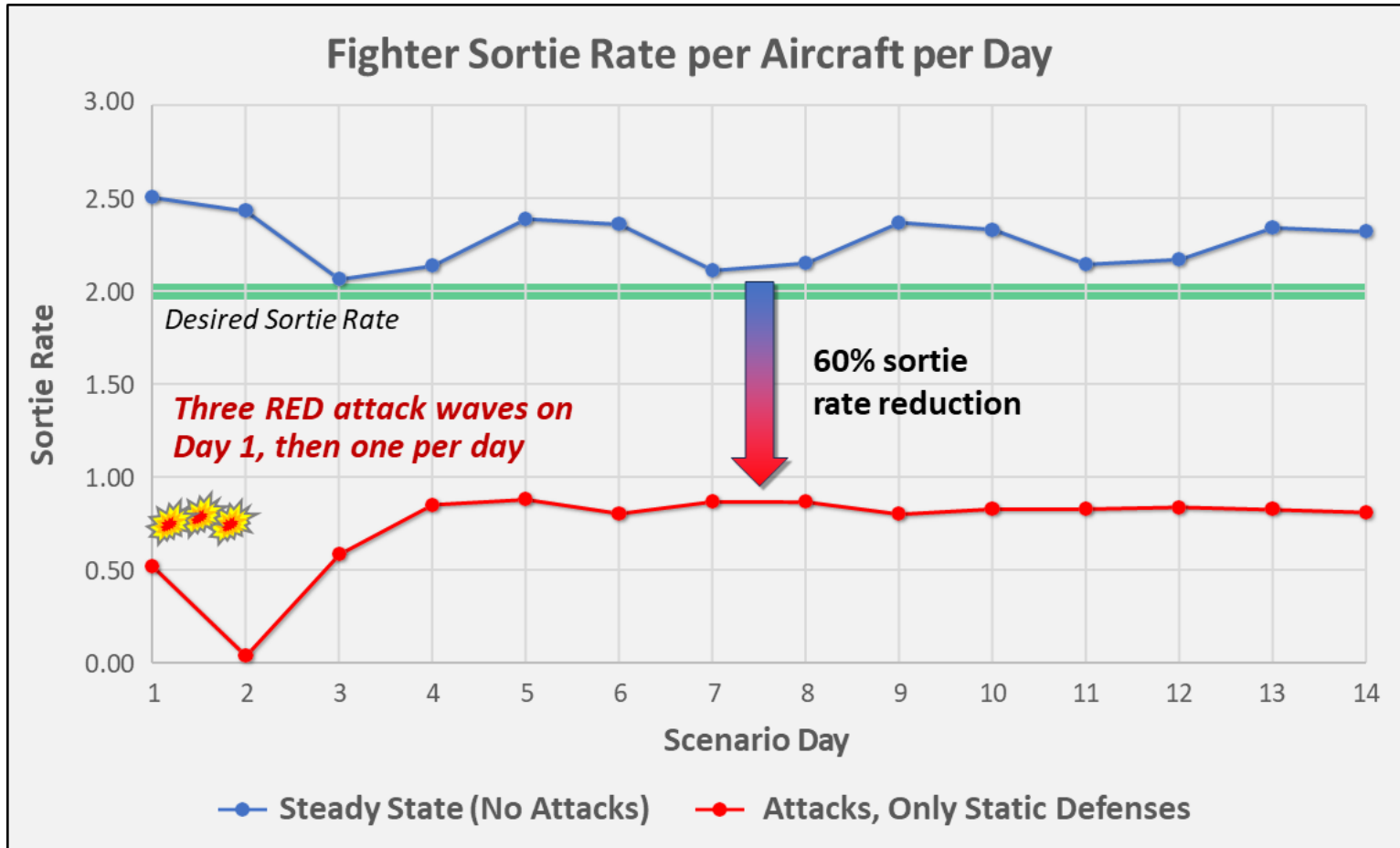


- ~300 conventional ballistic missile/HGV launchers threatening air bases... and *many other* U.S. & allied targets
- PLA missile launchers are mobile, but cannot be in different parts of China at the same time

U.S./allied aircraft may disperse to air bases along First Island Chain creating a 2000-3000 nautical mile front to diffuse threat density



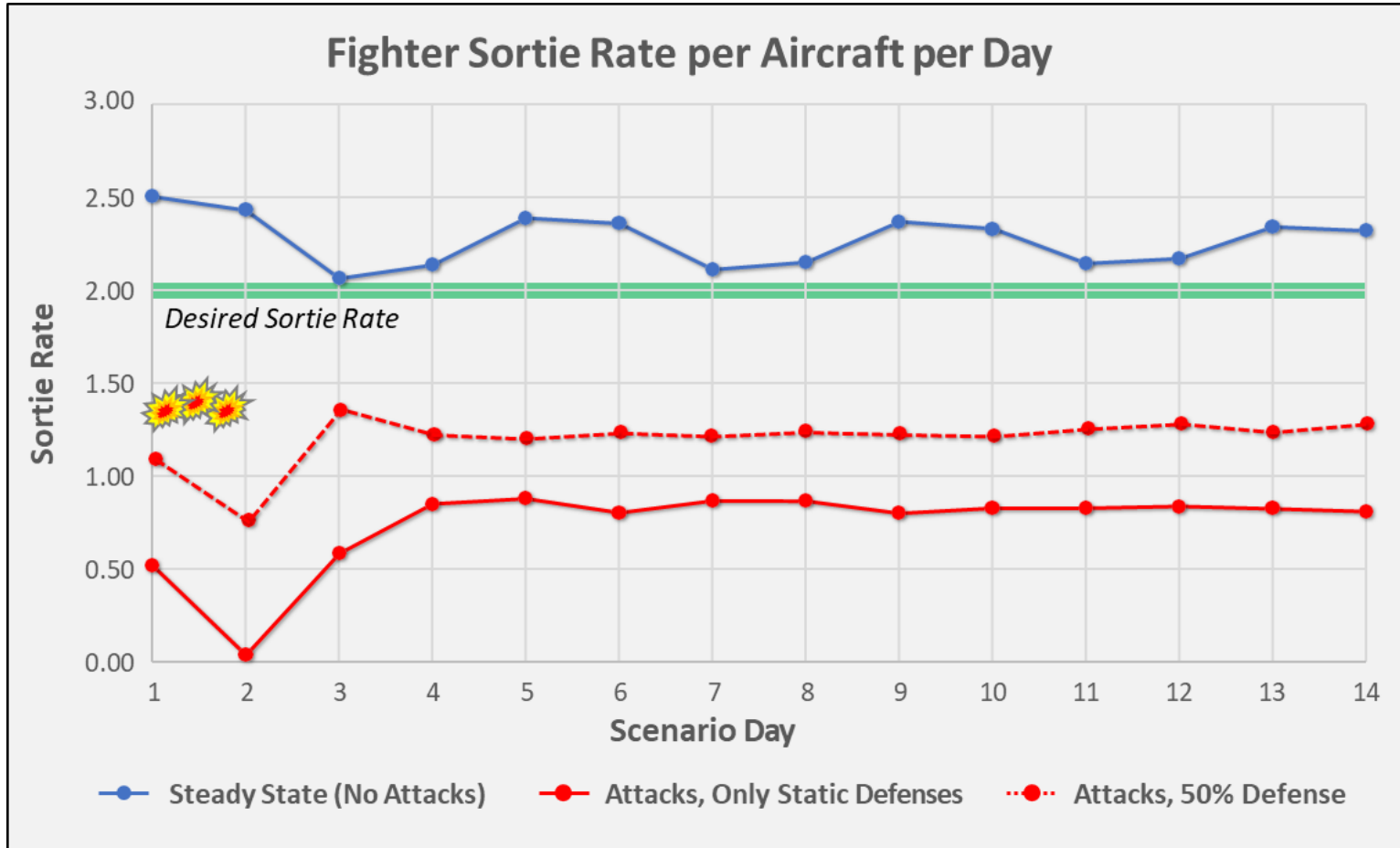
Sustaining Air Base Operations Under Attack



BLUE fighter daily sortie rates while under attack by RED missile forces (red line), assuming four rapid runway repair teams are available at each fighter air base, no missile defenses, and no dispersal.



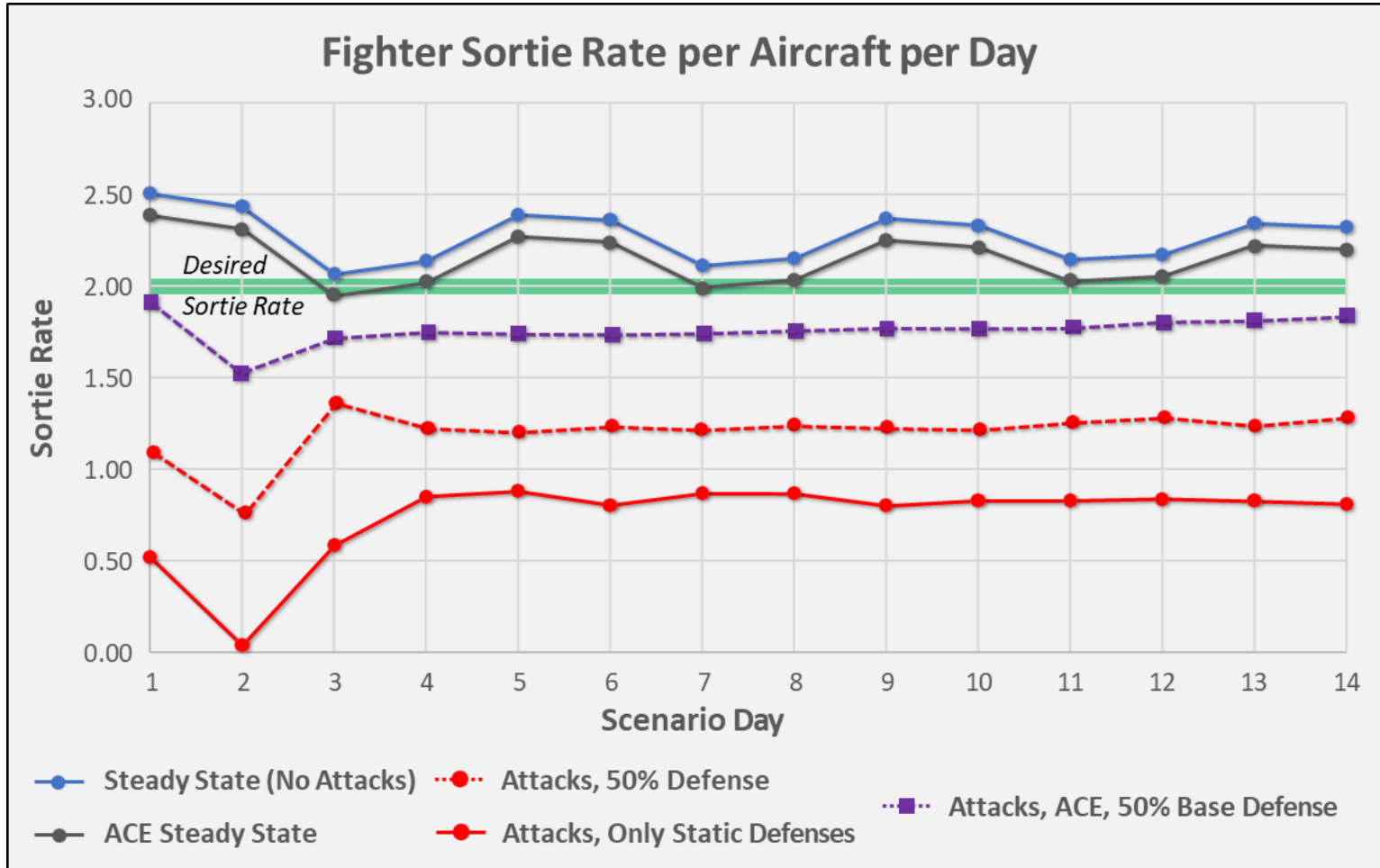
Sustaining Air Base Operations Under Attack



Active and passive missile defenses **defeating 50% of incoming threats** combined with rapid runway repair increased BLUE fighter sortie generation rates (dashed red line) while air bases under attack.



Sustaining Air Base Operations Under Attack

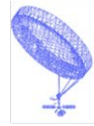


BLUE fighter sortie rates while under attack assuming 50% effective air base defenses, ACE dispersal, and rapid runway repair at each hub and spoke operating location.



Air Base Defense Operational Concept

A combination of diverse, layered capabilities is required for air base defense



Space-Based Early Warning & Tracking

Ballistic & Hypersonic Missile Engagement

Intermediate-Range Engagement

Short-Range Engagement

Early-Warning UAV/UCAV



Fighter



UCAV



AEW&C



Air Base

Theater Air Defense

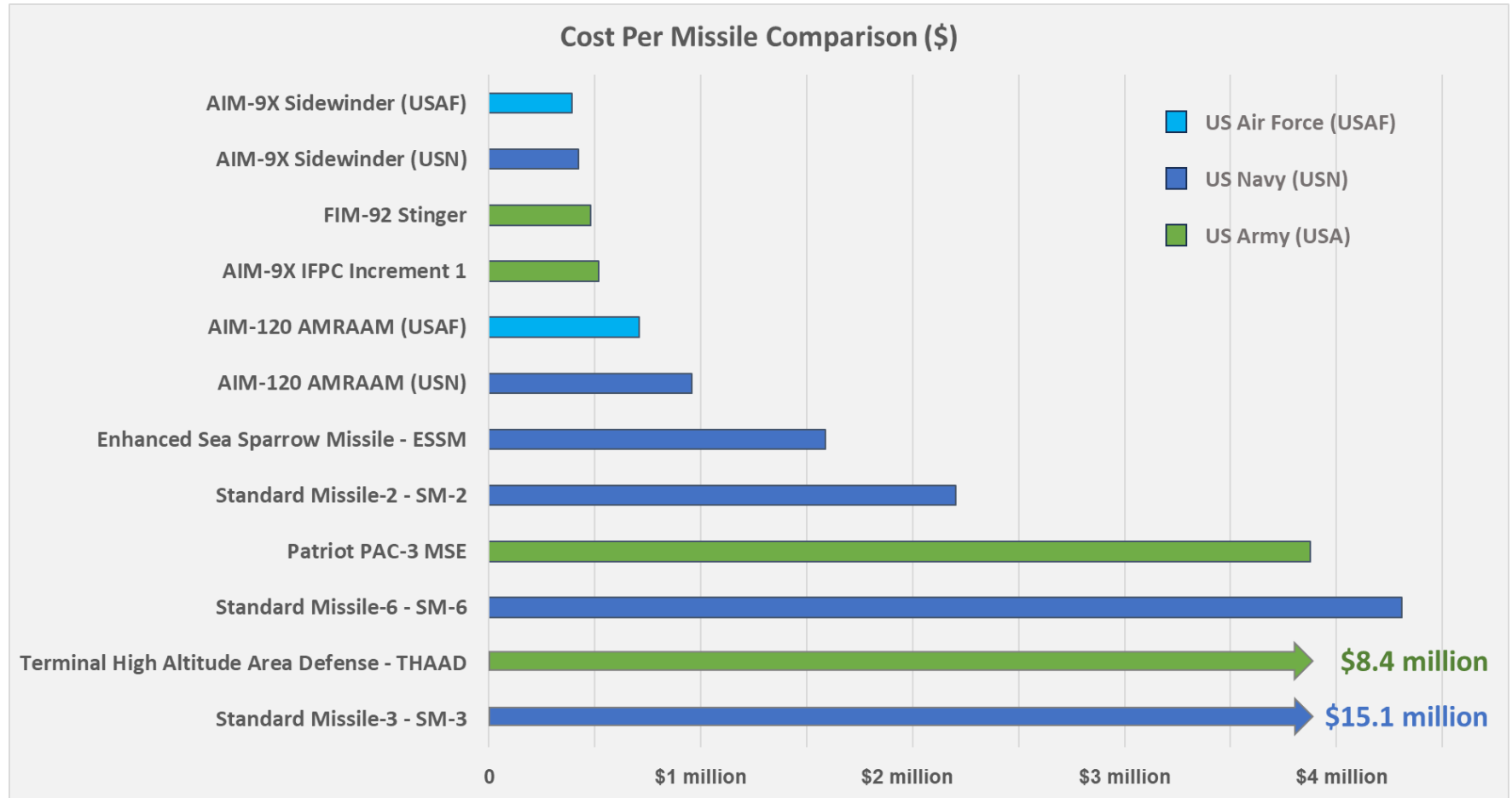


Ranges/altitudes not to scale

- Space & airborne assets provide early warning, extend defensive perimeter
- Theater air defense (not collocated with air base) reserved for high-end missile threats
- Intermediate- and short-range effectors create increasingly dense kill-web of terminal defenses
- Passive air base defenses (hardening, decoys, reconstitution, etc.) mitigate attack damage



High-cost/high-end defenses should be reserved for high-end threats



The U.S. will likely have to fight with the missile inventory and industrial capacity it has on hand. Effective, sustainable air base defense requires cost-effective solutions.



Fighting the Air Base: Recommendations

	Congress	DOD	USA	USN/USMC	USAF/USSF	
\$	●					Remove or significantly modify defense budget caps to fund a dedicated air base defense program
	●	●	●	●		Reestablish inter-service agreements on air base defense
\$		●	●	●	●	Significantly increase investments in cost-effective air base air defense sensor and C2 capabilities, potentially by leveraging existing systems
\$		●	●	●	●	Significantly increase investments in a diverse arsenal of integrated active defense capabilities, especially cost-effective short-range defenses
					●	Continue to develop, codify, and implement Agile Combat Employment (ACE) concept
\$					●	Fund, build, and deploy substantial passive air base defenses
\$					●	Invest in rapid runway repair and air base reconstitution capabilities
\$					●	Invest in space and airborne early warning as well as long-range airborne kinetic and non-kinetic capabilities for air base defense
					●	Pursue additional studies, modeling, experimentation, and air base defense



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