MITCHELL INSTITUTE
for Aerospace Studies

Rebuilding America's Air Force

Balancing the Air Force's Combat Forces for Peer Conflict

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Why this wargame?

The challenge:

- **Smallest and oldest U.S. Air Force ever.** Decades of underfunding greatly reduced the USAF's combat forces and allowed China to outpace the U.S. in some technologies.
- **Increasing risk of a peer conflict.** The Air Force's shortfalls have eroded deterrence and increased risk of a conflict with China that would have devastating consequences.
- **Historic opportunity to rebuild the Air Force.** There is a generational opportunity to rebuild the USAF to restore deterrence and prepare for peer conflict.

Inform the development of a USAF force design capable of:

1. **Defeating a PLA joint island landing campaign (JILC)** in a defense of Taiwan scenario.
2. **Denying operational sanctuaries** to the PLA and collapsing its ability to launch effective long-range air and missile attacks against allied forces and bases in the Pacific.
3. **Completing resilient kill chains at scale** to create war-winning effects against the PLA in high threat density operational environments.
4. **Fighting a protracted conflict with China** while simultaneously defending the U.S. homeland, supporting the defense of America's Pacific allies, and deterring elsewhere.

Wargame approach: Ramped-up operational demand for USAF forces over three game moves

Move 1 Objectives → Move 2 Objectives → Move 3 Objectives

Deter and prepare to blunt a PLA assault on Taiwan

- **Two teams of U.S.-allied airpower experts** acted as air campaign planning teams
- The two planning teams individually developed:
  1. A CONOPs to deter and prepare to blunt
  2. A request for USAF forces
  3. Theater posture
  4. Targeting priorities to blunt a PLA JILC

Counter a landing campaign, conduct strategic attacks

- **A "red" team of China experts launched a JILC** and conducted counter-intervention operations
- The two planning teams modified their CONOPs, theater force postures, targeting priorities, and other plans to defeat the JILC and conduct strategic attacks to collapse the PLA's missile offensive

Fight a protracted conflict against the PLA

- **The red team adopted a warfighting strategy to exhaust U.S. forces** and to inflict defeat
- The two planning teams assessed their remaining air forces (including munitions) and revised their campaign plans for protracted conflict
- The teams also assessed their capability and capacity shortfalls

The two air campaign planning teams were given different 2035 USAF force mixes

	Team Doolittle's Force: Constrained Modernization			Team Mitchell's 2035 Force: Accelerated Modernization		
Fighters	**TAI**	**Combat-coded available to team**	**Comments**	**TAI**	**Combat-coded available to team**	**Comments**
F-15E	110	54	• Invested in SLEP • Additional withheld for homeland defense	110	54	• Additional withheld for homeland defense
F-15EX	100	66	• Additional withheld for homeland defense	224	144	• Accelerated F-15EX acquisition
F-16	600	240	• Additional withheld for homeland defense and deterrence in other theaters	360	0	• Additional withheld for homeland defense and theater deterrence • Traded some F-16 modernization and sustainment funding to accelerate F-47, CCA acquisition
F-22	160	112	• Bought back Block 20s	130	62	• Divested Block 20s
F-35A	900	380	• Additional F-35 withheld for deterrence in other theaters	900	380	• Additional F-35 withheld for deterrence in other theaters
F-47	6	0	• Not yet IOC	54	40	• Accelerated acquisition rate
Total	**1,876**	**852**	**Available mix: 492 LO, 360 non-LO fighters**	**1,798**	**680**	**Available mix: 482 LO, 198 non-LO fighters**

Total fighter inventory sizes were roughly the same for both teams, but their capability mixes were different to allow the teams to compare their advantages and disadvantages

Mitchell's force will only become a reality <u>if the USAF receives additional resources</u> to modernize and rebuild its forces to defend the homeland and defeat aggression

Differences were designed to help the teams compare the operational effectiveness of their forces

	Team Doolittle's Force: Constrained Modernization			Team Mitchell's 2035 Force: Accelerated Modernization		
Bombers	**TAI**	**Combat-coded available to team**	**Comments**	**TAI**	**Combat-coded available to team**	**Comments**
B-52J	76	50	• 8 B-52Js were withheld for nuclear deterrence	76	50	• 8 B-52Js were withheld for nuclear deterrence
B-1B	36	20	• B-1s were bought back	0	0	
B-2	0	0		18	8	• B-2s bought back and 8 were withheld for nuclear deterrence
B-21	45	28	• 8 B-21s were withheld for nuclear deterrence	100	85	• Accelerated B-21 acquisition
Total	**157**	**98**	**Available mix: 28 LO, 70 non-LO bombers**	**194**	**143**	**Available mix: 93 LO, 50 non-LO bombers**

- Team Doolittle's **lack of F-47s and fewer B-21s meant it would have to conduct more of its counterair, strikes, and other missions from stand-off distances** compared to Team Mitchell
- These differences were **intended to increase Doolittle's dependence on Battle Management/C4ISR networks** to complete their planned air-to-air/air-to surface kill chains over long ranges

The two notional forces included different mixes of CCA, AEW&C, ISR, and EW aircraft

	Team Doolittle's Force: Constrained Modernization			Team Mitchell's 2035 Force: Accelerated Modernization		
AEW&C, ISR	**TAI**	**Combat-coded Available to Team**	**Comments**	**TAI**	**Combat-coded Available to Team**	**Comments**
E-3G	0	0		0	0	
E-7	10	6	• Additional E-7 withheld for homeland defense	35	25	• Accelerated acquisition, additional E-7 withheld for homeland defense
MQ-9A	200	100	• Bought back for theater airbase defense and homeland defense	100	0	• Bought back for homeland defense
RQ-4B	7	5	• Bought back for ISR missions along the 1st island chain	0	0	
E-11A	5	3		5	3	
Electronic Attack	**TAI**	**Combat-coded Available to Team**	**Comments**	**TAI**	**Combat-coded Available to Team**	**Comments**
EA-37B	15	10		20	14	• Accelerated acquisition
CCA	**TAI**	**Combat-coded Available to Team**	**Comments**	**TAI**	**Combat-coded Available to Team**	**Comments**
Increment 1	360	300		540	480	
Increment 2	265	200		350	275	
Total CCA	**673**	**500**		**890**	**755**	

"Increment 1" CCA was a notional recoverable aircraft, and the "Increment 2" CCA was a notional expendable air/ground-launched aircraft

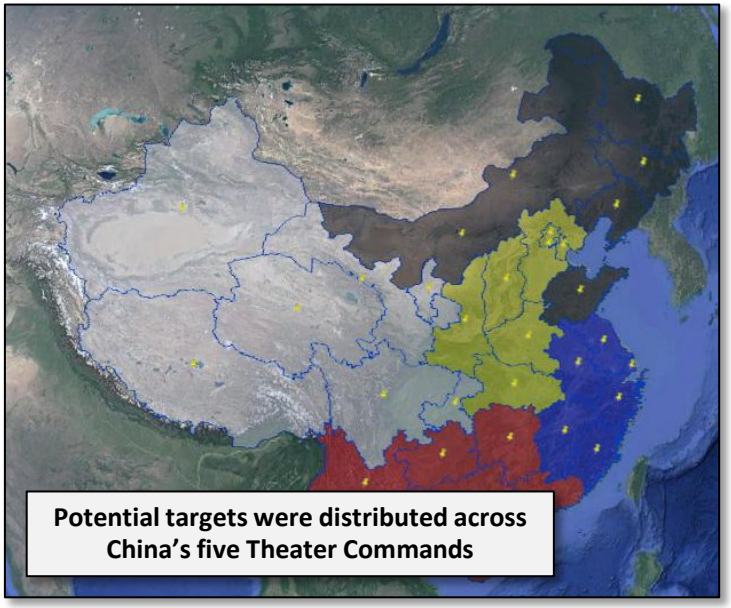
Move 1: Teams planned to deter China and prepare to counter a PLA joint island landing campaign

Notional Counter-JILC Target Categories	Notional PLA JILC Forces	Comments
SAM sites (coastal, includes SCS islands)	**88**	Deployed along China's coastline and South China Sea (SCS) islands to counter U.S. air threats and cover JILC operations
C4ISR long-range ground sensors (coastal, includes SCS islands)	**202**	Coastal long-range early warning sites, including over-the-horizon radars and large phased array radars
C4ISR HQ facilities (coastal)	**10**	Includes coastal PLA Air Force HQs, regional HQs, etc.
Naval facilities (coastal, include SCS islands)	**30**	Includes ports for marshalling amphibs, attack submarine bases, etc.
Fighter aircraft + UCAV (airborne, assume 2.0 sorties/day)	**160-440**	Includes airborne fighters and UCAV forming outer defenses and airborne fighters supporting assault
Bomber aircraft (airborne, assume 1.5 sorties/day)	**12-90**	Airborne bombers equipped with ASCMs and LACMs
HVAA (airborne, assume 1.0 sorties/day)	**16**	Airborne KJ-3000/700/600/500, Y-9 SMA, including outer defenses and in direct support of Taiwan assault forces
SAGs (6 x combatants)	**10 SAGs** (60 ships)	6 x CG/DDG/FFG per SAG operating around Taiwan and deployed to extend the PLA's air and sea control coverage
Amphibious assault ships	**20**	LHD and LPD, did not include LST, LSM, LCU, etc.
RO/RO ships	**80**	Includes ferries, vehicle carriers, large deck cargo ships
Carrier strike groups (CV/CVN + 6 ships)	**3 CSGs** (3 CV/CVN + 18 ships)	Assume there will be Type 003 or 004 plus 6 x CG/DDG/FFG per carrier strike group

Game Move 2: Teams were tasked to prioritize their strategic attacks by target categories and locations

Target Categories

- **SAM sites** (examples: HQ-9, S-300 variants...)
- **Long-range ground sensors** (includes OTH radars)
- **Fighter bases** (examples: Suixi, Huiyang, Foshan, Mengzi...)
- **Bomber bases** (ex: Leiyang, Shadong, Anqing, Wugong...)
- **Other airbases** (AEWC, tanker, transport aircraft bases)
- **Missile sites** (ballistic/cruise missile facilities, launchers…)
- **C4ISR HQ facilities** (PLA AF HQs, regional HQs, etc.)
- **Key military-industrial production** (includes missile production)
- **Space ASAT & SSA sites** (includes ground space C2, space launch facilities...)
- **Naval facilities** (includes ports for marshalling amphibs, submarine bases, naval forces repair sites)

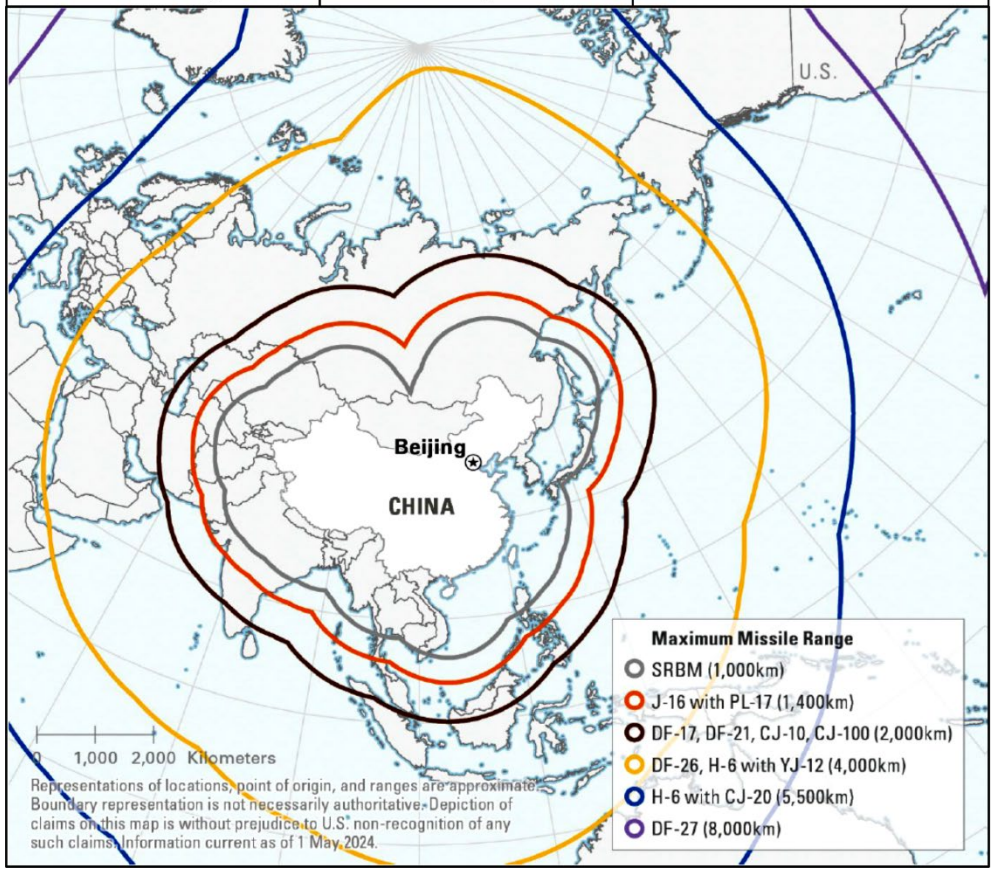


Potential targets were distributed across China's five Theater Commands

Targets for gameplay were derived from unclassified sources and included conventional counter-force targets only

Insight: The U.S. Air Force is at risk of losing its ability to fight alongside our Pacific allies

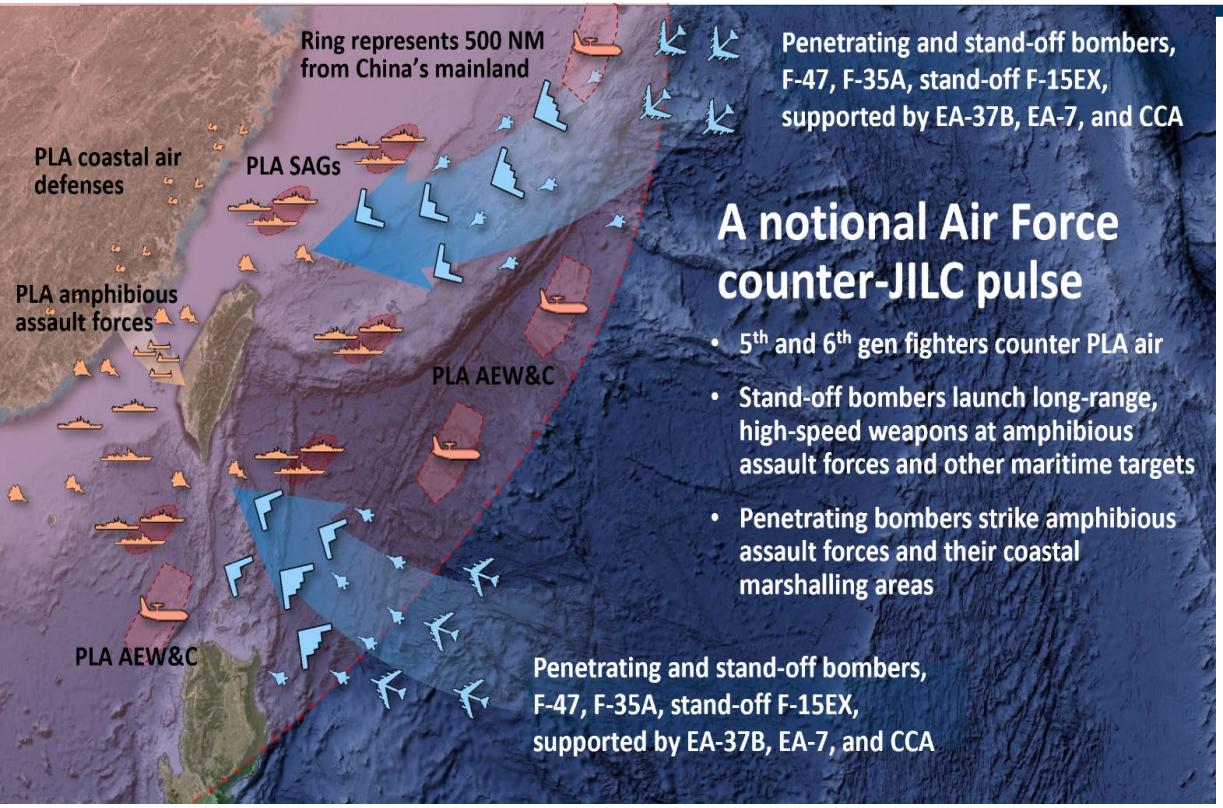
Type of Ballistic Missile	Estimated Missile Range (km)	Estimated Missile Inventory (2025)
Intercontinental-Range	Greater than 5,500	400
Intermediate-Range	3,000-5,500	550
Medium-Range	1,000-3,000	1,300
Short-Range	300-1,000	900



- **PLA missile attacks could result in unacceptable Air Force attrition rates on the ground** since its Pacific airbases lack effective missile defenses
- **Moving large numbers of USAF forces to operating locations beyond the second island chain is <u>not</u> the answer**
  - Would reduce the PLA's salvo densities, but would also cut the USAF's sortie rates

U.S. Airbase Location	Estimated USAF Sorties per Day
From the U.S. mainland and Alaska	0.34
Hawaii	0.34
Wake, Kwajalein	0.50
Diego Garcia	0.75
Northern Australia	0.75
Guam, Mariana Islands	0.75
1st island chain fighters and CCA	2.00
1st island chain bombers and other aircraft	1.00

Insight: Pulsing the Air Force's counter-JILC strikes would create opportunities for the PLA



- **Pulsing is the result of combat capacity shortfalls** created by the USAF's lack of long-range, penetrating fighters and bombers and the need to posture forces beyond the 1st island chain to reduce attrition from PLA missile attacks
- **This creates windows of time between pulses for the PLA** to continue its offensive and reset its forces to counter the next Air Force surge

- **CCA and other uninhabited aircraft promise to increase the USAF's ability to maintain continuous pressure on the PLA,** but should operate from the 1st island chain as close as possible to the battlespace and must not replace requirements for 5th generation and beyond piloted aircraft
- **Bottom line, the USAF must have <u>more combat capacity</u>** to simultaneously conduct counterair ops, strikes, and other missions over long ranges—including into mainland China—to defeat a JILC

Insight: A war-winning campaign must include strategic attacks to deny sanctuaries and create other effects

- **A U.S. warfighting strategy of denial is not enough.** Limiting a defense of Taiwan campaign to interdicting JILC forces will cede the initiative and increase risk of a war of attrition
- **Failing to deny sanctuaries is a prescription for defeat.** Would allow China to launch air and missile attacks nearly unopposed and move forces from its interior to reinforce its JILC
- **Air and missile defenses alone will not be enough.** Defensive operations alone cannot counter the PLA's air and missile salvos against U.S. and allied forces and bases

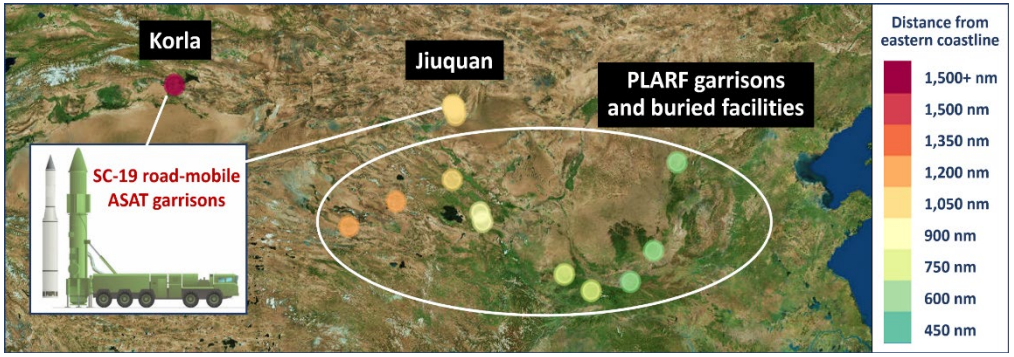
- **Must also conduct strategic attacks** against China's centers of gravity, including targets on the mainland, to:
  - Deny sanctuaries to the PLA
  - Collapse the PLA's air, missile, and counterspace offensive operations
  - Impose costs and maintain escalation dominance

The USAF is the only service that can deny sanctuaries to the PLA

Insight: Overbalancing toward stand-off kill chains would reduce the Air Force's resiliency in peer conflicts

Long-range weapons have operational limitations and are more costly

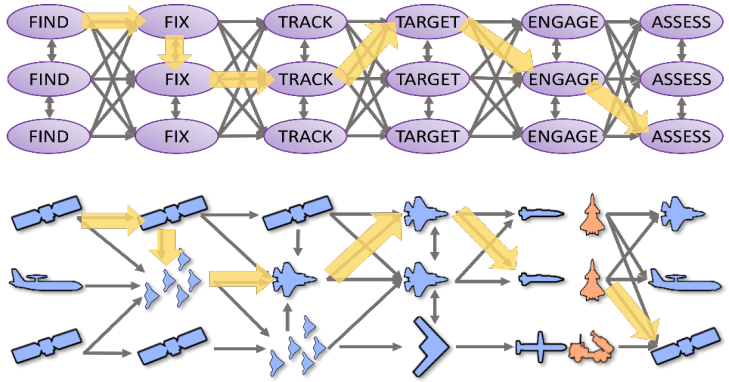
- Most current weapons launched from stand-off distances (e.g., 600-plus NM from China's coastline) cannot reach many deep inland targets
- Longer weapon flight times provide more time and opportunities for the PLA to counter attacks
- Designing weapons to fly longer ranges has tradeoffs like smaller warheads, less end-game maneuvering
- Weapons are typically more costly than PGMs that can be delivered by penetrating aircraft



China uses its landmass to counter stand-off strikes

Long-range kill chains require a complex system of systems

- Airborne and space-based sensors to provide target cues for long-range shooters
- Long-range comms can create latency that reduces kill chain effectiveness
- Multiple, complex kill chain dependencies can increase an adversary's counter-C4ISR-T opportunities



PLA is prepared to attack U.S. C4ISR-T networks

Insight: The Air Force's next-generation family of systems will be critical to victory

F-47s and B-21s

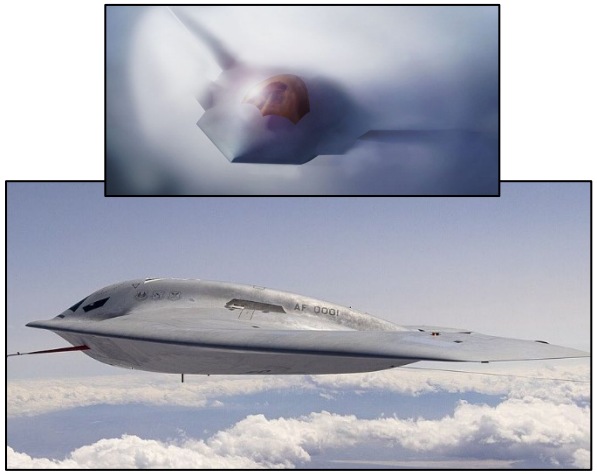
- Team Mitchell was willing to strike targets anywhere in the battlespace, including deep inland, using their B-21s and F-47s
- Team Doolittle focused on countering the JILC because of its much smaller B-21 inventory and lack of F-47s

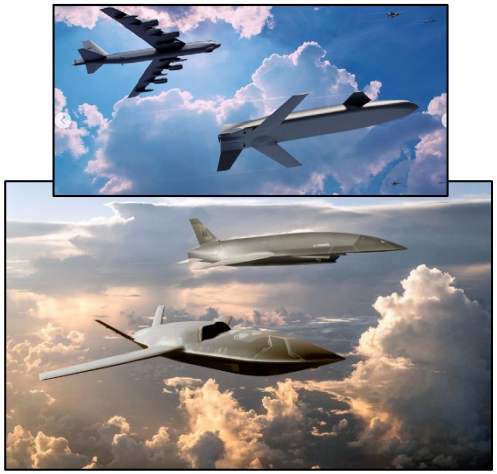
CCA

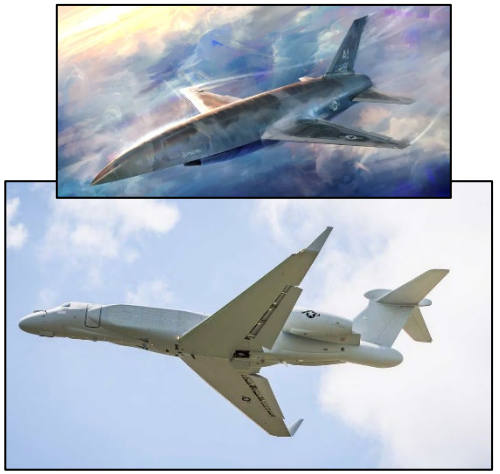
- Both teams used CCA and other uncrewed aircraft to help fill the gap between their counter-JILC pulses
- Both teams determined their **CCA were additive force multipliers** that did not replace requirements for next-gen piloted aircraft

EMS Warfare

- All teams conducted operations (including counterspace) to dominate the EMS
- Used CCA with EW systems, EA-37B, EW-capable 5th generation and beyond fighters and bombers







Insight: Must also increase the USAF's capacity to conduct long-range, penetrating combat missions

Wargame Operational Stressors	Team Doolittle (some modernization)	Team Mitchell (modernized/rebalanced force)
Counter-JILC	Counter-JILC failed due to insufficient next-generation forces	Counter-JILC may have succeeded but by the thinnest of margins
Strategic Attacks	Team decided to prioritize countering the JILC and did not conduct strategic attacks due to their sortie capacity and survivability limitations	Conducted strategic attacks but the team's ability to sustain strategic attack tempo limited by insufficient capacity
Protracted Conflict	Lacked combat capacity (including insufficient PGMs) and the right mix of capabilities	The team's force mix was right, but it also lacked capacity for protracted warfare, including replacements for combat losses

Both teams sought to achieve air superiority — not "air denial" – as a prerequisite for combined campaign success

Wargame recommendations

1. **Break the tyranny of pulsing the Air Force's combat operations.** Increase the USAF's combat capacity and augment its forces with UAVs capable of operating from the 1st island chain to maintain continuous pressure on the PLA

2. **Accelerate the F-47 to increase the USAF's lethality & survivability**. Accelerate development as feasible and acquire at least 300 F-47s; continuing to undersize the nation's premier air dominance force will further erode deterrence and increase the risk of failure in a peer conflict

3. **Accelerate B-21 acquisition to restore deterrence in the mid-term.** Acquire at least 200 B-21s to create a family of systems to counter airborne, maritime, ground mobile, or hardened and deeply buried targets at sea and anywhere in China.

4. **Take full advantage of the force multiplying potential of CCA.** Field a substantial force of CCA if they after comprehensive development and testing. CCA variants should be designed to deliver air-to-air and air-to-surface weapons, conduct electronic warfare, and perform other missions that increase the USAF's lethality, survivability, and combat mass in contested areas

Wargame recommendations (2)

5. **Enable the Air Force's non-stealthy combat aircraft for peer conflict.** Moderately increase the Air Force's long-range kill chain capacity to expand options to use its non-stealthy aircraft for strikes, counterair missions, and other operations from survivable stand-off ranges

6. **Create a mix of Air Force organic and distributed kill chains that increase its combat resiliency.** Excessive reliance on long-range kill chains for peer conflict would risk creating a more fragile USAF force design

7. **Counter air and missile threats to the USAF's theater bases and forces.** Increase the USAF's capacity to attack the PLA's long-range strike kill chains and acquire airbase missile defenses to enable the Air Force to generate required combat sorties from the 1st island chain while under attack

8. **Develop a resilient, layered system of systems for contested area ISR.** Create a layered, multi-domain system of systems for ISR that includes penetrating aircraft; excessive dependence on space-based AMTI and GMTI would increase incentives for the PLA attack them, reducing U.S. combat effectiveness

Wargame recommendations (3)

9. **Reaffirm that strategic attack remains a core USAF requirement and prioritize rebuilding its capacity to strike China's centers of gravity.** Long-range airpower's unmatched ability to conduct strategic attacks must remain a leading requirement for the USAF's force design priorities; the Air Force should also develop a better understanding of *how* it should prioritize strategic attack targets to achieve the greatest effects against China.

10. **Develop a better understanding of the PLA's C4ISR-T vulnerabilities**. Countering the PLA's C4ISR-T networks will be key to offsetting its combat capacity advantages; this will require kinetic and non-kinetic—including cyber and EW—attacks against key nodes and links in the PLA's C4ISR-T system of systems

11. **Increase the Air Force's resiliency for protracted high-end conflict.** Rebuild the USAF's combat capacity to engage in protracted warfare against a peer adversary and absorb combat losses in high-intensity conflicts

Recommendation: Prioritize and shift resources to rebuild the Air Force for peer conflict

A U.S. campaign to defeat a PLA offensive will predominately occur in the air, space, maritime, and cyberspace, and EMS domains. Congress and DoD/W should shift resources toward the Department of the Air Force by trading-off forces and capabilities that are less relevant to a conflict with China in the Pacific. These resources should include additional funding to allow the Air Force to fully implement ACE across its first and second island chain airbases and distributed operating locations in the Pacific.

The Air Force *MUST* grow its combat forces for long-range, penetrating combat missions that no other service can perform

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