Aim Higher: Elevating the Debate Over Unmanned Carrier Aviation

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Thank you Chairman Forbes and Ranking Member McIntyre for the opportunity to testify and submit this written statement for the record.

The issue of when and how the U.S. Armed Forces fully integrates unmanned and increasingly autonomous global surveillance and strike platforms into its inventory is one of the most important issues facing the Department of Defense. I am concerned that DOD is not aiming high enough to ensure the United States retains its hard won military-technical dominance in the very challenging period ahead.

We are in the opening phases of a discontinuous shift in military affairs, one in which the transition to a world where many nations will have access to unmanned and increasingly autonomous systems will cause major disruptions in the military balance of power.[1] This emerging war fighting regime will evolve during an era in which the United States will face intense, asymmetric military-technical competition from rising powers and even non-state actors aiming to exploit the Achilles Heel of U.S. defense strategy—our utter dependence on extended mobilization times and permissive operating environments. As a strategic matter, it is critical that the Department of Defense lead, not follow, in terms of technical, conceptual, and operational innovation. Budgets are tight and resources scarce, but we must think big, act boldly, and aim for nothing less than technological dominance in the decade ahead. To do anything less is to court the erosion of U.S. military power and a decline in our ability to shape the future.

Therefore, the question of how the U.S. Navy approaches the unmanned carrier-launched airborne surveillance and strike (UCLASS) program is not simply a debate about particular platforms and specific requirements, it is fundamentally a debate about long-term strategy – about how the United States retains a hard won technological edge in the disruptive early phases of a robotics revolution that is changing the world.

[1] See Robert O. Work and Shawn Brimley, 20YY: Preparing for War in the Robotic Age (Washington DC: Center for a New American Security, January 2014).
[2] See Andrew Erikson and David Yang, "On the Verge of a Game Changer," Proceedings of the U.S. Naval Institute (May 2009). See also Gormley, Erickson, Yuan, A Low-Visibility Force Multiplier: Assessing China's Cruise Missile

A Matter of Strategy

Requirements for military systems must flow from strategy. The primary strategic driver for U.S. power projection requirements is the evolving military competition in Asia. Since the end of World War II, the United States has acted as the ultimate guarantor of regional peace and security in Asia – sustaining a network of treaty allies and close partners to ensure a regional order commensurate with U.S. interests prevails. This order is straining under the weight of China's rise, manifesting in part by its increasingly bellicose and hostile behavior towards its neighbors, coupled with its major investments in modern military technology designed to exploit the vulnerabilities inherent in U.S. power projection strategy and capabilities. There are other actors that could pose quite plausible challenges to the U.S. Joint Force, but I believe China constitutes the clear "pacing threat" to which force planners must focus attention.

Given China's behavior, America's allies and partners in Asia are looking to us to maintain order. To do so the United States must maintain a credible conventional military deterrent in Asia. This requires that U.S. power projection capabilities and concepts can prevail across a range of plausible contingencies against China, any one of which requires the ability to penetrate their increasingly robust "anti-access / area-denial" (A2/AD) network, which includes advanced integrated air defense systems, fifth generation fighter aircraft, robust submarine forces, and increasingly precise long range anti-ship ballistic and cruise missiles.

All elements of China's A2/AD network are cause for concern, but it is their long range anti-ship ballistic missiles that most complicate naval airborne power projection. A good example is China's DF-21D missile, one that some analysts term a game-changing "carrier-killer" due to its ability to fly beyond the unrefueled range of a U.S. carrier's strike aircraft.[2] If the Navy fails to develop an answer for this Chinese weapon, the U.S. aircraft carrier may very well fade into irrelevance, as a commander-in-chief is unlikely to send in a Carrier Strike Group so easily targeted by an adversary's long-range missiles until the threat is significantly degraded. If the Navy needs to invent new weapons to eliminate the threat of long-range missiles, or if these missiles must be taken out before the carrier can come within an operationally meaningful distance from an adversary, it becomes harder to justify spending tens of billions of dollars on aircraft carriers at all. Given the value and prestige of aircraft carriers ($11 billion apiece for the

[2] See Andrew Erikson and David Yang, "On the Verge of a Game Changer," Proceedings of the U.S. Naval Institute (May 2009). See also Gormley, Erickson, Yuan, A Low-Visibility Force Multiplier: Assessing China's Cruise Missile Ambitions (Washington DC: National Defense University Press, 2014).

next-generation Ford-class) coupled with their planned 50-year lifespan, keeping them relevant for the conflicts of the future is critical.[3]

The primary way to keep the U.S. aircraft carrier relevant to future conflicts is to ensure that its embarked air wing has, in aggregate, sufficient stealth and strike power to penetrate adversary airspace and find and engage the full range of target types (fixed, mobile, re-locatable) – and do so while the carrier stays at a safe operating distance from the worst of an adversary's anti-ship ballistic and cruise missiles inventory. Thus we need the ability to operate stealthy strike aircraft at very long ranges from U.S. aircraft carriers.

The need to operate carrier strike aircraft at longer ranges is not a new development. The Defense Department's 2006 Quadrennial Defense Review required the Navy to "develop an unmanned longer-range carrier-based aircraft capable of being air-refueled to provide greater standoff capability, to expand payload and launch options, and to increase naval reach and persistence."[4] The case was reinforced in a 2008 paper by (now) Deputy Defense Secretary Robert Work and Thomas Ehrhard, who argued that an unmanned, carrier-based strike system was the only way to "provide the Navy's future carrier air wings with the organic, extended-range, survivable, and persistent surveillance-strike capability needed to meet a number of emerging 21st century security challenges."[5]

Prioritizing the introduction of unmanned strike aircraft into the carrier air wing is necessary not only to keep the carrier relevant in plausible high-end contingencies, but to unlock the benefits of unmanned technology. The ability to deploy unmanned systems with air-to-air refueling capability would dramatically extend the endurance of the air wing, making possible 30 to 40 hours of continuous operations compared to the 10 to 14 hours for a manned aircraft.[6]

A key priority for defense planners must be to ensure U.S. aircraft carriers can project power from the sea onto land anywhere in the world. In order to perform this mission in the future, the carrier air wing must be able to strike effectively over ranges much larger than the radius of an adversary's anti-ship missiles. If we can't do this, the nation's aircraft carriers, and the hundreds

[3] This argument is more fully explored in Shawn Brimley, "Congress's Chance to Fix Aircraft Carrier Drones," Defense One (May 4, 2014). A more ambitious argument favoring moving away from large-deck aircraft carriers altogether can be found in Henry J. Hendrix, At What Cost a Carrier? (Washington DC: Center for a New American Security, March 2013).
[4] Department of Defense, Quadrennial Defense Review (Washington DC, 2006): p. 46.
[5] Robert Work and Thomas Ehrhard, Range, Persistence, Stealth, and Networking: The Case for a Carrier-Based Unmanned Combat Air System, (Washington DC: Center for Strategic and Budgetary Assessments, 2008): p.7.
[6] This idea is explored in greater depth in Work & Ehrhard and also Paul Scharre, Robotics on the Battlefield (Washington DC: Center for a New American Security, 2014): p.19-22.

of billions they have cost to procure and operate, will likely fade into irrelevancy—perhaps sooner rather than later. That is a completely unacceptable outcome given the centrality of maritime power projection to U.S. national security strategy.

A Matter of Mission

The reason advocates of a more ambitious carrier-based unmanned aircraft system have been speaking out in recent months is due to indications that the Navy is not taking the imperative to ensure carrier-based long-range strike all that seriously.[7] It is a mission that must be fully resourced if carriers are to remain the nation's capitol ship and a major pillar of our forward deployed conventional deterrent.

There have been a series of directions given to the U.S. Navy articulating priorities for carrier-based unmanned systems. As recently as January 2014, Secretary of the Navy Ray Mabus wrote:

> "The end state [for UCLASS] is an autonomous aircraft capable of precision strike in a contested environment, and it is expected to grow and expand its missions so that it is capable of extended range intelligence, surveillance and reconnaissance (ISR), electronic warfare, tanking, and maritime domain awareness. It will be a warfighting machine that complements and enhances the capabilities already resident in our carrier strike groups."[8]

While elements of the recent draft request for proposals (RFP) for UCLASS are classified, reporting indicates that the RFP essentially biased toward establishing an unmanned ISR aircraft for the carrier, albeit one with a light strike capability and a moderate level of stealth capability (although reportedly not enough stealth for truly penetrating, persistent surveillance-strike operations).[9] I believe that the UCLASS program ought to be geared more toward being a full-spectrum "warfighting machine," with enough stealth and strike power to be able to, as the 2012 Defense Strategic Guidance articulated with respect to the Joint Force, "operate effectively in

[7] See Mark Gunzinger and Bryan Clark, "The Next Carrier Air Wing," Defense News (February 24, 2014), Paul Scharre, "Is the DOD Innovating? How the New Budget Stacks Up," War on the Rocks (March 17, 2014), Shawn Brimley, "Congress' Chance to Fix Aircraft Carrier Drones," Defense One (May 4, 2014), Bryan McGrath, "HASC Send Strong Message on UCLASS," Information Dissemination (April 30, 2014).
[8] Ray Mabus, "Future Platforms: Unmanned Naval Operations," War on the Rocks (January 21, 2014). Emphasis added. The key term here is "contested environment."
[9] See Dave Majumdar, "Navy Issues Restricted UCLASS Draft Request for Proposal," USNI News (April 17, 2014). Also see Sam LaGrone, "Navy Docs Reveal UCLASS Minimum Ranges and Maximum Costs," USNI News (June 26, 2013).

anti-access and area denial (A2/AD) environments.[10] In this respect the actions of this committee to hold funding for UCLASS until the Secretary of Defense certifies requirements were justified.

Charitably, there are probably those who believe that the best way to integrate unmanned systems onto aircraft carriers is to make the transition as least disruptive as possible – both in terms of competition for missions, cost, and integration. I think it is fair to suggest that integrating an unmanned system designed for strike operations would be more difficult than one designed primarily for organic ISR on a 12-hour surveillance cycle.

But prioritizing the mission of organic ISR support to carrier operations seems odd, given the ability of other Navy platforms to perform this mission, including the P-8 Poseidon, the MQ-4C Triton, the MQ-8C Fire Scout, and the E-2D Advanced Hawkeye. It may be that an unmanned carrier-based ISR platform could provide some additional surveillance capability into this mix, but weighed against the primary mission of projecting meaningful offensive striking power against the nation's adversaries, using UCLASS to add more ISR for the carrier represents a significant missed opportunity.

It is also possible that those steering the requirements process inside the Pentagon felt that the Navy needed to better ensure that the aircraft carrier could help contribute to filling a robust demand for counterterrorism strike missions given the gradual drawdown in Afghanistan.[11] But parking an aircraft carrier, the capital ship of the U.S. Navy, off the coast of places like Yemen or Pakistan to deploy unmanned aircraft in a light strike counterterrorism role in uncontested or lightly contested airspace is probably not an optimal solution given the need to maintain a robust conventional deterrent and power projection capability for plausible high-end contingencies in Asia or the Middle East. Such a view would be the product of absolute worst-case assessments of future access-agreements for land-based unmanned systems—a scenario that seems implausible given the breadth of current access in the Middle East and Central Asia, and the depth of longer-ranged land-based options for unmanned aircraft at U.S. disposal.

A Matter of Timing

As described above, there are essentially two competing ideas for UCLASS: a semi-stealthy aircraft with sufficient endurance to operate off-cycle with normal carrier air wing operations to provide intelligence, surveillance, and reconnaissance (ISR) and light strike in lightly contested

[10] See the January 2012 Defense Strategic Guidance, which directed DOD to "invest as required to ensure its ability to operate effectively in anti-access and area denial (A2/AD) environments."
[11] See Dave Majumdar and Sam LaGrone, "House Committee Seeks to Stall UCLASS Program Pending New Pentagon Unmanned Aviation Study," USNI News (April 29, 2014).

environments; and a more capable aircraft with air-to-air refueling capability designed to operate in denied airspace for penetrating surveillance and strike missions.

It is probably true that a less ambitious ISR program that doesn't require true integration into the manned air wing would be less expensive and less disruptive to traditional concepts of operation. It might even be possible to field a less capable system earlier, though the recent successful tests of the X-47B—an operational class prototype of a stealthy, air-refuelable, large-payload UAS—would seem to undermine this assertion.[12]

But taking several years to procure a carrier-based unmanned ISR system before undertaking a more ambitious strike system would essentially preclude any real development of an unmanned combat aircraft system (UCAS) for at least a decade. Given the pace of technological diffusion and the rapidity of China's military modernization, waiting a decade before fielding a system that can enhance the striking power of U.S. aircraft carriers seems particularly unwise—especially when all of the Navy's carrier-based unmanned aircraft developmental efforts to date have been aimed at reducing technical risk on just this class of system.

Rather than wait until the late-2020s to introduce unmanned strike aircraft into the carrier air wing, DOD should tackle this ambitious challenge now. We simply do not have time to wait. It is not as though advocates of procuring a more capable system are embracing a fantasy divorced from what is technically possible—the successful testing of the X-47B proves that the United States is on the cusp of achieving this kind of capability. To essentially turn away from the promise of a real carrier-based unmanned combat aircraft and go down a decade-long UCLASS cul-de-sac comes close to defense strategy malpractice.

A Matter of Innovation

The history of military innovation is also one of military culture, traditions, and legacy. These are powerful and important features of modern militaries and should not be discounted or necessarily dismissed outright. But civilian policymakers in the executive and congressional branches should be cognizant that sometimes new technologies or innovative concepts of operation that might threaten traditional approaches produce antibodies that can stymie innovation and ultimately pose the very real risk that tomorrow's military will not be in a position to fight and win the nation's wars. Consider if elements of the U.S. Army had been successful in preventing the adoption of the tank in favor of horses? What would have been the result if elements in the U.S. Navy had been successful in preventing the adoption of steam-

[12] The X-47B not only demonstrated that it is possible to launch and recover an unmanned carrier-based aircraft, but also that a tailless flying wing with stealthy characteristics could operate from a carrier.

powered ships? How might history have evolved if the U.S. Army had been successful in resisting the emergence of air power?[13] We stand today at a similar strategic crossroads in the introduction of unmanned systems into the Joint Force. To pass up this opportunity by aiming for a less capable unmanned carrier aircraft when the technology exists for something more capable and strategically relevant is to put future American military dominance at risk.

One way to interpret the obstacles that have been consistently placed in front of the various unmanned programs over the past decade is a general resistance to the prospect of unmanned aircraft gradually crowding out the traditional role of manned strike aircraft. This concern is overblown, as the carrier air wing will continue to be dominated by manned aircraft for the foreseeable future. What is more likely over the mid- to long-term is manned and unmanned aircraft will work together and manned-unmanned teams will evolve that employ any number of creative concepts of operation that leverage the unique abilities of both.[14] We see early indications of this kind of approach in how the U.S. Navy is planning to operate the manned P-8 Poseidon and the unmanned MQ-4C Triton.

Unmanned Carrier Aviation as a Pillar of a 21st Century Offset Strategy

Military culture can sometimes stifle innovation, but the U.S. military has also risen to the challenge many times before. Perhaps the most successful military-technical defense strategy ever developed by the United States was the "offset strategy" developed in the latter decades of the Cold War.

During the late 1970s, Pentagon strategists struggled to maintain plausible conventional deterrence against a Soviet force that enjoyed a massive numerical advantage. Secretary of Defense Harold Brown and his then-Under Secretary of Defense William Perry developed a new technology strategy to address this dilemma. As Secretary Perry describes it, they faced the need to "develop high-technology systems that could give our military forces a qualitative advantage able to offset the quantitative advantage of the Soviet forces. Not surprisingly, this approach was called the 'Offset Strategy'."[15]

[13] See Williamson Murray and Allan Millet (eds), Military Innovation in the Interwar Period (New York: Cambridge University Press, 1996), and Carl Builder, The Masks of War: American Military Styles in Strategy and Analysis (Baltimore: Johns Hopkins University Press, 1989).
[14] For more on this see Paul Scharre, Robotics on the Battlefield: Range, Persistence and Daring (Washington DC: Center for a New American Security, 2014).
[15] William J. Perry, "Technology and National Security: Risks and Responsibilities," Speech to France-Stanford Center for Interdisciplinary Studies, April 7, 2003. Also see Ashton Carter, "Keeping the Technical Edge," in Carter and John White (eds), Keeping the Edge: Managing Defense for the Future (Cambridge, MA: Harvard University Press, September 2000).

The strategy centered on investing in several disruptive technologies that today seem prescient but at the time were anything but certain. By investing in stealth aircraft, precision weapons, advanced satellites, computer networking and other technologies, we developed the ability to coordinate precision strikes over long distances and, by doing so, undermined the Soviet military's numerical advantage. This was a major reason why Moscow was forced to nearly bankrupt itself in the attempt to develop countermeasures. Quintessentially asymmetric, the "offset strategy"— the concepts of operations and technologies developed—constitutes perhaps the most impressive defense investment strategy ever developed by the United States.

The United States has essentially been dining out on the Cold War offset strategy for a quarter-century—from the 1991 Gulf War to the present. Given the pace and scale of the military-technical challenges developing in the international system, the Department of Defense must get more ambitious and aggressive in ensuring that America's military-technical dominance persists.

We should see the debate regarding unmanned carrier-based aircraft in this strategic light—as a core feature in what we might term a new "offset strategy" that would include unmanned and increasingly autonomous systems; directed energy and electric weapons; robust cyberwarfare capabilities; advanced protected communications; and other game-changing systems. These constitute emerging defense investment 'vectors' in which the United States must lead, not follow, both to ensure a first-mover technical advantage, but learn to field and employ these technologies in operationally meaningful ways.[16]

Congress must ensure that DOD sustains its military technological dominance, as our military competitors will not hesitate to overtake us. A leading indicator of the seriousness with which the United States approaches this strategic imperative is the shape of the Navy's UCLASS program. It is a debate in which the more ambitious and more aggressive approach is the right one.

The stakes are high. If the United States fields a carrier-based unmanned combat air system within the next decade, it will go a very long way toward ensuring that tomorrow's adversaries fear the U.S. aircraft carrier and the long-range combat strike power it can unleash, and it will set the Department of Defense on the right path toward securing America's military-technical dominance for the next generation. Congress must ensure the Department of Defense aims high enough to meet these two strategic imperatives.

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[16] For a more detailed exploration of what kinds of future military capabilities could underwrite a new "offset strategy" to ensure U.S. military-technical dominance, see Robert O. Work and Shawn Brimley, 20YY: Preparing for War in the Robotic Age (Washington DC: Center for a New American Security, January 2014).

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