



Alliance Requirements Roadmap Series

**The Promise of Unmanned Systems
in the Asia-Pacific**

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ABOUT THE AUTHOR

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The views expressed in this report are personal and the author's alone. They are solely responsible for any errors in fact, analysis, or omission.

ABOUT THIS SERIES

To build a foundation of subject matter expertise for our study, "Dynamic Balance: An Alliance Requirements Roadmap for the Asia-Pacific Region," CNAS commissioned this Alliance Requirements Roadmap essay series from experts in third offset strategic thinking, Asian-Pacific maritime security issues, and on partner countries in Asia. These essays were the focus of a December 2015 experts' workshop, where CNAS investigators and leaders in the field discussed in depth the tools the United States, Japan, and its regional partners would need to best shape the future security environment of the Asia-Pacific. These conference papers were crucial to our analysis and have done much to shape the study's findings.

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ABOUT THE ASIA-PACIFIC SECURITY PROGRAM

The Asia-Pacific Security program seeks to inform the exercise of U.S. leadership in Asia by analyzing how the United States can rebalance its priorities; shape a rules-based regional order; modernize traditional alliances; build the capacity of new partners; and strengthen multilateral institutions. From exploring rising maritime tensions in the region to crafting ways to renew key alliances and partnerships to articulating strategies to extend and enhance America's influence, the program leverages the diverse experience and background of its team, deep relationships in the region and in Washington, and CNAS' convening power to shape and elevate the conversation on U.S. policy across a changing Asia.

Unmanned systems are rapidly proliferating throughout the world with significant implications for international security and strategic stability. Today, more than 90 countries and non-state actors operate unmanned aerial vehicles (UAVs) – a rapidly rising number. In Asia, the proliferation of these systems is particularly advanced, with approximately 15 countries operating UAVs.¹ Some, including South Korea, China, and India, additionally employ other types of unmanned systems, such as sentry robots or unmanned ground vehicles.²

This regional proliferation occurs against the backdrop of China's aggressive program of military modernization as well as its acquisition of increasingly sophisticated anti-access/area denial (A2/AD) capabilities (e.g., advanced air defense systems, antiship cruise and ballistic missiles, and submarines) designed to force China's competitors to operate at greater ranges, further from its ever-expanding shores.³ Indeed, as China continues its island-building campaign in the South China Sea, it will significantly extend the reach of its A2/AD platforms – potentially enabling it to reach targets as far as Australia. In the event of a conflict, these capabilities could be leveraged to push U.S. aircraft carriers beyond the range of their tactical aircraft and could similarly constrain allied operations throughout the region.

To a certain extent, the characteristics of unmanned systems (particularly UAVs) enable them to both mitigate the tyranny of distance inherent in the vast expanse of the Asia-Pacific and assume greater risk inside the dense threat envelope created by Chinese A2/AD capabilities. Because they are not constrained by the limitations of human operators, unmanned systems can conduct missions for substantially longer periods of time – and often at far greater ranges – than their manned counterparts. In addition, their increased expendability expands the menu of viable mission sets and provides states with a greater degree of operational flexibility within a high-threat A2/AD environment.⁴

In combination, these characteristics allow unmanned systems to play a critical role in maintaining domain awareness in the Asia-Pacific. For example, the RQ-4 Global Hawk – operated by the U.S. Air Force and approved for export to Japan and South Korea – has an endurance of over 32 hours, including an on-station endurance of 24 hours at 1,200 nautical miles (nm).⁵ In addition, it is

¹ This number includes China, Taiwan, North Korea, South Korea, Japan, India, Pakistan, Sri Lanka, Thailand, Malaysia, Singapore, Philippines, Indonesia, Australia, New Zealand, and Vietnam. Michael C. Horowitz and Matthew Fuhrmann, "Droning On: Explaining the Proliferation of Unmanned Aerial Vehicles," (October 1, 2015) http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2514339.

² See, for example, Mark Prigg, "Who goes there? Samsung unveils robot sentry that can kill from two miles away," *The Daily Mail*, September 15, 2014, www.dailymail.co.uk/sciencetech/article-2756847/Who-goes-Samsung-reveals-robot-sentry-set-eye-North-Korea.html; Jeffrey Lin and P.W. Singer, "China's New Military Robots Pack More Robots Inside (Starcraft-style)," PopSci.com, November 11, 2014, www.popsci.com/blog-network/eastern-arsenal/chinas-new-military-robots-pack-more-robots-inside-starcraft-style; and Prasad Kulkarni, "Daksh could be useful in Mumbai operations," *The Times of India*, November 28, 2008, <http://timesofindia.indiatimes.com/city/pune/Daksh-could-be-useful-in-Mumbai-operations/articleshow/3766844.cms?referral=PM>.

³ See U.S. Department of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2015* (April 7, 2015) www.defense.gov/Portals/1/Documents/pubs/2015_China_Military_Power_Report.pdf.

⁴ For an in-depth discussion of the benefits of unmanned systems, see Paul Scharre, "Robotics on the Battlefield: Part I: Range, Persistence, and Daring," (Center for a New American Security, May 2014) www.cnas.org/sites/default/files/publications-pdf/CNAS_RoboticsOnTheBattlefield_Scharre.pdf.

⁵ Northrop Grumman, "RQ-4 Block 40 Global Hawk: Data Sheet," www.northropgrumman.com/Capabilities/GlobalHawk/Documents/Datasheet_GH_Block_40.pdf.

equipped with both Ground Moving Target Indicator radar that can autonomously identify the movement of targets at sea and Battle Management Command and Control that can cue weapon systems engaged in an attack.⁶ Global Hawk operations in the Asia-Pacific will thus enhance intelligence, surveillance, and reconnaissance (ISR) capabilities while also providing increased opportunities for burden sharing between the United States and its allies and partners.

The U.S. Navy is also developing a version of the Global Hawk, the MQ-4C Triton, that is optimized for a maritime environment.⁷ With an endurance of 24 hours and a range of 8,200 nm, the Triton provides a persistent, broad area maritime surveillance (BAMS) capability.⁸ The Triton's 360-degree-view advanced radar and sensor suite monitors a radius of over 2,000 nm, while its software autonomously tracks and collects intelligence on ships within the system's purview, recording speed, location, and other identifying details.⁹ Using its Automatic Identification System, the Triton can additionally classify targets and capture high-definition images and video of ships of interest. This information package can then be transmitted to a human operator for review.

While systems like the Global Hawk and Triton significantly enhance ISR capabilities in peacetime, as with non-stealthy manned assets, they could be vulnerable in a conflict. Indeed, China has previously targeted U.S. RQ-4 Global Hawks with electronic jamming and could shoot these systems down if Beijing deemed them a threat.¹⁰ For this reason, the United States must field stealthy high-altitude, long-endurance (HALE) systems that could continue to provide BAMS in a wartime environment. Although little is known about the United States' stealthy unmanned ISR platforms, defense officials have acknowledged the existence of two: the RQ-170 Sentinel and the longer-range RQ-180. Open source reporting suggests that the RQ-180, which was scheduled to become operational in 2015, is comparable in endurance and capabilities to the Global Hawk.¹¹ If accurate, this system could maintain situational awareness for the United States and its allies and partners, even in the event of a conflict.

Similarly, stealthy unmanned systems have the potential to preserve the efficacy of legacy platforms – including aircraft carriers and their associated fighter aircraft – that are growing increasingly vulnerable to long-range A2/AD capabilities.¹² Indeed, while current U.S. carrier-based fighter aircraft have an unrefueled combat radius of no more than approximately 600 nm, China's DF-21D antiship ballistic missile (ASBM) has a range of around 810 nm; its nascent DF-26 ASBM has a range of 1,620–2,160 nm. Thus, in the event of a conflict, China could force the United States to either operate its carriers beyond the range of their respective air wings or assume a high and potentially unacceptable degree of risk in blood and treasure.

⁶ Ibid.

⁷ The Triton is slated to be deployed to Guam in 2017.

⁸ Northrop Grumman, "MQ-4C Triton: Data Sheet,"

www.northropgrumman.com/Capabilities/Triton/Documents/pageDocuments/Triton_data_sheet.pdf.

⁹ Ibid.

¹⁰ Bill Gertz, "Inside the Ring: China Targets Global Hawk Drone," *The Washington Times*, December 11, 2013,

www.washingtontimes.com/news/2013/dec/11/inside-the-ring-china-targets-global-hawk-drone/?page=all.

¹¹ Amy Butler and Bill Sweetman, "Secret New UAS Shows Stealth, Efficiency Advances," *Aviation Week*, December 6, 2013, <http://aviationweek.com/defense/secret-new-uas-shows-stealth-efficiency-advances>.

¹² For an in-depth discussion of the proliferation of Chinese A2/AD capabilities and their implications for the U.S. military, see Kelley Saylor, "Red Alert: The Growing Threat to U.S. Aircraft Carriers," (Center for a New American Security, February 2016) www.cnas.org/sites/default/files/publications-pdf/CNASReport-CarrierThreat-160217.pdf.

Unmanned systems provide one possible option for addressing this problem. With its X-47B UAV prototype, the U.S. Navy has demonstrated a stealthy, carrier-based penetrating strike capability. If Navy requirements for the unmanned carrier-based follow-on program are adjusted to include a robust strike capability, the system could significantly extend the range of the carrier air wing, such that the carrier could operate beyond the 1,000–1,500 nm distance at which the threat landscape is most intense. This would in turn provide a day one capability that could assist in softening the threat environment and opening access for carrier-based tactical fighters and legacy aircraft.

In addition to such development programs, a number of technologies could further enhance the capabilities of the United States and its allies and partners in the Asia-Pacific. First, the development of inertial navigation systems, which enable autonomous flight by using internal sensors to calculate the UAV's position in space, could dramatically improve the resiliency of allied UAV operations by neutralizing the threat posed by adversary jamming capabilities (i.e., allowing the system to continue operations in a communications-denied environment). Second, mature collaborative learning capabilities could mitigate China's cost imposition strategy by allowing multiple drones to autonomously coordinate amongst disparate targeting sets, abandoning those targets that have already been neutralized to prioritize and mass force against remaining targets.¹³ If sufficiently expendable, such systems could be deployed in a saturation attack against adversary A2/AD systems or could alternatively create regional A2/AD bubbles – in which an adversary would be denied access to airspace – for the United States and its allies and partners. Furthermore, swarming technologies and tactics could also be applied to expendable unmanned surface assets, adding an additional layer to regional defense.¹⁴

For its part, China is also making significant investments in unmanned systems, with plans to procure over 41,000 UAVs between 2014 and 2023, at a cost of approximately \$10.5 billion.¹⁵ While the majority of these systems are likely to be low- to mid-end systems used for tactical ISR, China is also developing relatively sophisticated HALE systems, such as the Divine Eagle and the Soar Dragon, that could be used in support of Beijing's emerging reconnaissance strike complex. In particular, the design characteristics of the Soar Dragon suggest that it could assist in over-the-horizon targeting for anti-ship cruise and ballistic missiles, thus providing a critical enabler for China's long-range A2/AD capabilities.¹⁶ In the event of a conflict, China could additionally deploy a large number of its UAVs in a saturation attack against U.S. or allied surface assets. An attack of this nature could potentially overwhelm defensive systems, resulting in either the degradation or neutralization of the vessel.

¹³ Dominic Basulto, "CICADAs, LOCUSTs and the new innovation of military infestations," *The Washington Post*, May 20, 2015, <https://www.washingtonpost.com/news/innovations/wp/2015/05/20/cicadas-locusts-and-the-new-innovation-of-military-infestations>.

¹⁴ For more on swarming tactics and their implications, see Paul Scharre, "Robotics on the Battlefield Part II: The Coming Swarm," (Center for A New American Security, October 2014) www.cnas.org/sites/default/files/publications-pdf/CNAS_TheComingSwarm_Scharre.pdf.

¹⁵ U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China 2015*

¹⁶ Bill Sweetman, "New Chinese UAVs Could Support Anti-Carrier Missile," *Aviation Week & Space Technology*, September 24, 2015, <http://aviationweek.com/technology/new-chinese-uavs-could-support-anti-carrier-missile>.

While allied unmanned systems could significantly enhance access to and awareness within this expanding A2/AD environment, the United States has traditionally been loath to approve the export licenses and technology transfer agreements that could bolster broader collaboration and strengthen interoperability. This has particularly been the case for high-end, restricted technologies and platforms such as stealth enablers and armed UAVs. And with some exceptions, notably including South Korea and India, most U.S. allies and partners in the region are either unwilling or unable to indigenously develop stealthy unmanned combat systems or others that could be survivable within a wartime A2/AD environment.¹⁷

Although the Obama administration's 2015 UAV export policy was ostensibly intended to mitigate this challenge, it has in some ways increased the difficulty of exporting high-end systems by not only reinforcing the United States' commitment to Missile Control Technology Regime restrictions (i.e., subjecting advanced UAVs to a "strong presumption of denial" for export) but also generating additional requirements for proper-use agreements and end-use monitoring.¹⁸ Despite these restrictions, a handful of formal U.S. alliance members in the Asia-Pacific – including Australia (MQ-9 Reaper) and South Korea and Japan (RQ-4 Global Hawk) – have been cleared to import a small number of high-end (albeit non-stealthy) U.S. systems.¹⁹ It appears unlikely, however, that under the current policy, exports of these systems will be approved much beyond this limited grouping.

Thus, most U.S. allies and partners in the Asia-Pacific will be limited to operating non-stealthy, unarmed tactical UAVs for the time being. While such systems could contribute to peacetime situational awareness and could additionally have wartime utility if deployed in sufficient mass to complicate adversary targeting decisions, they would be highly vulnerable in the event of a conflict. For this reason, the United States should move to align export restrictions for both armed and stealthy unmanned systems with those of their manned counterparts, substantially broadening the number and types of platforms available to U.S. allies and partners, expanding opportunities for burden-sharing, and increasing interoperability in peacetime and wartime alike.²⁰ In the near term, however, the United States is likely to remain the primary security provider in the Asia-Pacific, with U.S. forward deployed ISR UAVs and, in particular, stealth assets, providing a significant contribution to regional stability as well as the reassurance of regional allies and partners.

¹⁷ See Erik Slavin, "Stealth drones are in South Korea's future defense plans," *Stars and Stripes*, December 7, 2015, www.stripes.com/news/stealth-drones-are-in-south-korea-s-future-defense-plans-1.382457; and Rajat Pandit, "India set to develop own stealth combat drones," *Times of India*, December 14, 2015, <http://timesofindia.indiatimes.com/india/India-set-to-develop-own-stealth-combat-drones/articleshow/50165296.cms>.

¹⁸ See U.S. Department of State, "U.S. Export Policy for Military Unmanned Aerial Systems," February 17, 2015, www.state.gov/r/pa/prs/ps/2015/02/237541.htm.

¹⁹ Dion Nissenbaum, "U.S. to Allow Sale of Armed Drones to Some Allies," *The Wall Street Journal*, February 18, 2015, www.wsj.com/articles/u-s-to-allow-sale-of-armed-drones-to-some-allies-1424205606.

²⁰ At a minimum, U.S. drone export policy should be amended to allow partners of the F-35 program – the United States' 5th-generation fighter aircraft – to import unmanned stealth assets if so desired. Asia-Pacific partners on the F-35 program include Australia, Japan, and South Korea. Similarly, operators of U.S. 4th-generation aircraft – additionally including Taiwan, Thailand, Singapore, and Indonesia – should be eligible to import armed, non-stealthy unmanned systems.