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# History of the Navy UCLASS Program Requirements: In Brief

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## **Summary**

During its development, the U.S. Navy's Unmanned Carrier Launched Airborne Surveillance and Strike (UCLASS) aircraft and its predecessors have been proposed to fill a number of roles and operate in a variety of air defense environments. Over time, those requirements have evolved to encompass a less demanding set of capabilities than first envisioned. This report details the history of UCLASS requirements development through the program's evolution to its current stage.

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## Introduction

During its development, the U.S. Navy’s Unmanned Carrier Launched Airborne Surveillance and Strike (UCLASS) aircraft and its predecessors have been proposed to fill a number of roles and operate in a variety of air defense environments. The effort to choose among those roles and determine final requirements for the system has led to controversy and delay in executing the program. Members of Congress have proposed actions to resolve the requirements issue and allow the program to move ahead.

Prepared in response to a specific Congressional request, this report details the history of UCLASS requirements development through the program’s evolution to its current stage. It is based on available open-domain information, which may not agree in all particulars with Department of Defense (DOD) acquisition documents not available in the public domain.

## Summary of Changes in UCLASS Requirements

**Table 1** summarizes changes in UCLASS and predecessor program requirements over time.

**Table 1. Requirements for Navy UCAVs**

	<b>N-UCAV, 1999</b>	<b>J-UCAS, 2003</b>	<b>N-UCAS, 2006</b>	<b>UCLASS ICD, 2011</b>	<b>UCLASS RFP, 2013</b>
Suppression of Enemy Air Defenses (SEAD)		X	X	?	
Precision Strike		X	X	X	
Counter-terrorism					X
Intelligence, Surveillance & reconnaissance (ISR)	X	X	X	X	X
Electronic attack		X		?	
Environment	Protected airspace	Deep, denied enemy territory	High-threat areas	Highly contested	Uncontested, light strike permissive to low-end contested

**Source:** CRS from numerous sources cited elsewhere in this report.

**Notes:** A ? indicates capability that may be included, but for which CRS has not yet found a definitive open source.

## N-UCAV

In 1999, the Navy and the Defense Advanced Research Projects Agency (DARPA) began research into an unmanned combat air vehicle (UCAV).<sup>1</sup> At the same time, the Air Force and DARPA jointly undertook a separate UCAV project.

The Navy's UCAV (referred to variously as N-UCAV and UCAV-N) was designed to fit a relatively small niche. The Navy planned to continue using manned aircraft to suppress enemy air defenses (SEAD) and perform electronic attack. N-UCAV was thus intended "for reconnaissance missions, penetrating protected airspace to identify targets for the attack waves" consisting of manned aircraft.<sup>2</sup>

Although the program focused mostly on system studies, Northrop Grumman independently built a single X-47A air vehicle, which was tested under the N-UCAV program. First flight took place in February 2003.<sup>3</sup>

## J-UCAS

On December 31, 2002, the Office of the Secretary of Defense (OSD) issued a program decision memorandum adjusting future funding for both Navy and Air Force UCAV development and mandating the services merge their efforts into a joint program.<sup>4</sup> The Defense Department recognized the potential for significant synergy by combining the programs, and in 2003 "directed that the programs be consolidated into a joint demonstration program supporting both Navy and Air Force needs."<sup>5</sup>

The resulting Joint Unmanned Combat Air Systems (J-UCAS) program was a DARPA-Air Force-Navy effort to demonstrate the technical feasibility, military utility, and operational value of a networked system of high-performance, weaponized unmanned air vehicles. Missions included SEAD, electronic attack, precision strike, penetrating surveillance/reconnaissance, and persistent global attack. "The operational focus of this system is on those combat situations and

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<sup>1</sup> CRS Report RS21294, *Unmanned Vehicles for U.S. Naval Forces: Background and Issues for Congress*, by Ronald O'Rourke.

<sup>2</sup> Thomas P. Ehrhard, PhD, and Robert O. Work, *Range, Persistence, Stealth, and Networking: The Case for a Carrier-Based Unmanned Combat Air System*, Center for Strategic and Budgetary Assessments, Washington, DC, June 18, 2008, <http://csbaonline.org/publications/2008/06/range-persistence-stealth-and-networking-the-case-for-a-carrier-based-unmanned-combat-air-system/>.

<sup>3</sup> Defense Advanced Research Projects Agency, *J-UCAS Overview*, Washington, DC, November 2004, [http://archive.darpa.mil/j-ucas/J-UCAS\\_Overview.htm](http://archive.darpa.mil/j-ucas/J-UCAS_Overview.htm).

<sup>4</sup> Thomas P. Ehrhard, PhD, and Robert O. Work, *Range, Persistence, Stealth, and Networking: The Case for a Carrier-Based Unmanned Combat Air System*, Center for Strategic and Budgetary Assessments, Washington, DC, June 18, 2008, <http://csbaonline.org/publications/2008/06/range-persistence-stealth-and-networking-the-case-for-a-carrier-based-unmanned-combat-air-system/>; Dave Majumdar and Sam LaGrone, "UCLASS Timeline," *US Naval Institute News*, April 29, 2014.

<sup>5</sup> Defense Advanced Research Projects Agency, *J-UCAS Overview*, Washington, DC, November 2004, [http://archive.darpa.mil/j-ucas/J-UCAS\\_Overview.htm](http://archive.darpa.mil/j-ucas/J-UCAS_Overview.htm).

environments that involve deep, denied enemy territory and the requirement for a survivable, persisting combat presence ... operating and surviving in denied airspace.”<sup>6</sup>

## N-UCAS

Three years later, the 2006 Quadrennial Defense Review called for the J-UCAS to be terminated. Instead, the Air Force was to begin developing a new bomber, while the Navy was mandated 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.<sup>7</sup>

That follow-on effort became the Navy Unmanned Combat Air System (N-UCAS). Given the baseline of being able to operate from aircraft carriers, N-UCAS’s other requirements looked much like J-UCAS, with the desired ability to provide “persistent, penetrating surveillance, and penetrating strike capability in high threat areas”<sup>8</sup> “or suppress enemy air defenses.”<sup>9</sup>

## UCAS-D

In 2006, as part of the N-UCAS program, the Navy initiated the Unmanned Combat Air System Demonstration (UCAS-D) program, intended to demonstrate the technical feasibility of operating unmanned air combat systems from an aircraft carrier. In 2013, the Navy successfully launched and landed a UCAS-D on an aircraft carrier. However, as UCAS-D was a subset of N-UCAS, it did not have a separate set of requirements.

In total, the Navy invested more than \$1.4 billion in UCAS-D. In 2011, as UCAS-D efforts were ongoing, the Navy received approval from DOD to begin planning for the UCLASS acquisition program.<sup>10</sup>

## UCLASS RFI

N-UCAS had been a development program to determine how to make an unmanned vehicle take on many of the aspects of a manned fighter. UCLASS, the Unmanned Carrier-Launched Airborne Surveillance and Strike program, was the Navy’s way of turning what it had learned from N-UCAS into an operational platform “to address a capability gap in sea - based surveillance and

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<sup>6</sup> Ibid.

<sup>7</sup> Office of the Secretary of Defense, *Quadrennial Defense Review Report*, Washington, DC, February 6, 2006, p. 46, <http://www.defense.gov/qdr/report/Report20060203.pdf>.

<sup>8</sup> Naval Air Systems Command, *Fact Sheet: Unmanned Combat Air System Demonstration*, <http://www.navair.navy.mil/index.cfm?fuseaction=home.display&key=7468CDCC-8A55-4D30-95E3-761683359B26>.

<sup>9</sup> CRS Report RS21294, *Unmanned Vehicles for U.S. Naval Forces: Background and Issues for Congress*, by Ronald O'Rourke.

<sup>10</sup> U.S. Government Accountability Office, *UNMANNED CARRIER-BASED AIRCRAFT SYSTEM: Navy Needs to Demonstrate Match between Its Requirements and Available Resources*, GAO-15-374, May 2015, <http://www.gao.gov/assets/680/670010.pdf>.

to enhance the Navy's ability to operate in highly contested environments defended by measures such as integrated air defenses or anti - ship missiles."<sup>11</sup>

On June 9, 2011, the Joint Requirements Oversight Council (JROC) issued JROCM 087-11, a memorandum approving the UCLASS Initial Capabilities Document.<sup>12</sup> That document stated UCLASS was to be "a persistent, survivable carrier-based Intelligence, Surveillance, and Reconnaissance and precision strike asset."<sup>13</sup>

## **JROC Revises UCLASS Requirements**

In preparing for the FY2014 budget submission, the JROC revisited the UCLASS requirement. On December 19, 2012, the JROC published memoranda 086-12 and 196-12, which significantly altered "the requirements for UCLASS, heavily favoring permissive airspace intelligence, surveillance and reconnaissance (ISR) capabilities."<sup>14</sup>

The change in requirements appeared to be budget-driven. "The reduction in strike capability of the Navy's next generation carrier-based unmanned aerial vehicle was born of fiscal realities, said Dyke Weatherington, the Pentagon's director of unmanned warfare and intelligence, surveillance, and reconnaissance (ISR)."<sup>15</sup>

The Navy stated:

In support of affordability and adaptability directives, JROCMs 086-12 and 196-12 redefined the scope of JROCM 087-11 and affirmed the urgency for a platform that supports missions ranging from permissive counter-terrorism operations, to missions in low-end contested environments, to providing enabling capabilities for high-end denied operations, as well as supporting organic Naval missions.<sup>16</sup>

The Office of the Secretary of Defense stated:

In a December 2012 memorandum, the JROC emphasized affordability as the number one priority for the program. The CDD (Capability Development Document) established an affordability KPP (Key Performance Parameter) in which the recurring fly-away cost of the air vehicles to conduct one 600 nautical mile orbit shall not exceed \$150 million. Available funding to complete system development is also limited, pressuring industry to provide mature systems and emphasize cost during development.<sup>17</sup>

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<sup>11</sup> Ibid.

<sup>12</sup> Department of Defense, *Fiscal Year (FY) 2015 Budget Estimates: Research, Development, Test & Evaluation, Navy, Budget Activities 1, 2, and 3, PE0604404N*, Washington, DC, March 2014. Initial Capabilities Documents replaced what had been called Mission Need Statements, the basic definition of a system's desired capabilities.

<sup>13</sup> Ibid.

<sup>14</sup> Dave Majumdar and Sam LaGrone, "UCLASS Timeline," *US Naval Institute News*, April 29, 2014.

<sup>15</sup> Sam LaGrone, "AUVSI 2013: UCLASS Requirements Modified Due to Budget Pressure," *USNI News*, August 14, 2013.

<sup>16</sup> Department of Defense, *Fiscal Year (FY) 2015 Budget Estimates: Research, Development, Test & Evaluation, Navy, Budget Activities 1, 2, and 3, PE0604404N*, Washington, DC, March 2014.

<sup>17</sup> Stephen P. Welby, *Department of Defense Systems Engineering 2013 Annual Report*, Deputy Assistant Secretary of Defense (Systems Engineering), Washington, DC, March 2013, p. 101, <http://www.defenseinnovationmarketplace.mil/> (continued...)

## UCLASS Draft RFP

On April 17, 2014, the Navy issued a draft request for proposals (RFP) for the UCLASS system. The RFP reportedly held to the requirements that, in the Government Accountability Office (GAO)'s words, "emphasized affordability, timely fielding, and endurance, while deemphasizing the need to operate in highly contested environments."<sup>18</sup>

The UCLASS draft RFP is classified. However, "according to (Chief of Naval Research RADM Mathias) Winter, the broad overarching goals of the UCLASS program are to provide two intelligence, surveillance and reconnaissance orbits at 'tactically significant ranges' 24 hours a day, seven days a week over uncontested airspace."<sup>19</sup> The UCLASS would also have a light strike capability to eliminate targets of opportunity.

A press report stated:

"The plan here is to provide an early operational capability that will be verified and validated for a light strike permissive environment," (RADM Mathias) Winter said. "What we will ensure is that the design of the system does not preclude what we call capability growth to be able to operate in contested environments."<sup>20</sup>

UCLASS is still expected to grow into the missions required before the 2012 JROC memo. According to the Secretary of the Navy, "(t)he end state 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, electronic warfare, tanking, and maritime domain awareness."<sup>21</sup>

The timeline for procurement of UCLASS is unclear, and the GAO has noted that in part due to changes in requirements, UCLASS has experienced ongoing delays:

Since our last review in September 2013, the system's intended mission and required capabilities have come into question, delaying the Navy's UCLASS schedule. DOD has decided to conduct a review of its airborne surveillance systems and the future of the carrier air wing, and has as a result adjusted the program's schedule. The Navy's fiscal year 2016 budget documents reflect these changes, with award of the air system contract now expected to occur in fiscal year 2017, a delay of around 3 years. In addition the Navy now expects to achieve early operational capability—a UCLASS system on at least one aircraft carrier—no earlier than fiscal year 2022, a delay of around 2 years... The schedule in the Navy's budget documents show that a Milestone A review—the decision to begin technology maturation

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(...continued)

resources/SE-FY13-AnnualReport-25March2014-Final.pdf.

<sup>18</sup> U.S. Government Accountability Office, *UNMANNED CARRIER-BASED AIRCRAFT SYSTEM: Navy Needs to Demonstrate Match between Its Requirements and Available Resources*, GAO-15-374, May 2015, <http://www.gao.gov/assets/680/670010.pdf>.

<sup>19</sup> Dave Majumdar, "Navy Issues Restricted UCLASS Draft Request for Proposal," *USNI News*, April 17, 2014.

<sup>20</sup> Dave Majumdar, "Navy Shifts Plans to Acquire a Tougher UCLASS," *USNI News*, November 12, 2013.

<sup>21</sup> Ray Mabus, "Future Platforms: Unmanned Naval Operations," *War on the Rocks*, January 21, 2014.

and risk reduction efforts—is expected to occur in fiscal year 2017, a delay of around 3 years since our last review.<sup>22</sup>

As the UCLASS program continues to stretch out across multiple budget years, possibly including further JROC reviews, Quadrennial Defense Reviews, and other changes in DOD priorities, it is possible that requirements will evolve further.

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<sup>22</sup> U.S. Government Accountability Office, *UNMANNED CARRIER-BASED AIRCRAFT SYSTEM: Navy Needs to Demonstrate Match between Its Requirements and Available Resources*, GAO-15-374, May 2015, <http://www.gao.gov/assets/680/670010.pdf>.