

# Air Operations Center – Weapon System (AOC-WS)



DOT&E has determined that annual functional and cyber survivability OT&E events, at a fielded Air Operations Center (AOC) site, are required to assess progress toward Block 20 system maturity, and to characterize the risks to the warfighter as the hybrid system evolves from the AOC–Weapons System (AOC-WS) 10.1 increment to the intended Block 20 end state. The Air Force delivered two capability modernization upgrades in FY23 to the fielded AOC-WS 10.1 increment. The Air Force found that AOC-WS 10.1 Agile Release Event (ARE) 23-04 was operationally effective and suitable and 23-08 needs regression testing to determine operational effectiveness and suitability; however, DOT&E will not provide an independent assessment based on the relatively minor capability delivery of the AREs. The Air Force continues to develop and deploy AOC-WS Block 20 software and has decided to delay operational testing until improved capabilities are released.

## SYSTEM DESCRIPTION

The AOC-WS is a system of systems that incorporates numerous third party, commercial off-the-shelf, and Agile-developed software applications. The AOC-WS consists of two instantiations:

- The AOC-WS 10.1 increment (AN/USQ-163 Falconer) is the currently fielded backbone system for the AOC.
- AOC-WS Block 20 consists of software-based upgrades that are delivered incrementally to enhance warfighter capability.

The Air Force continues to provide upgrades to sustain the fielded AOC-WS 10.1 increment, while developing and fielding software capabilities through the AOC-WS Block 20. As the Air Force develops more Block 20 capabilities, the AOC-WS will transition from the fielded 10.1 increment to a hybrid configuration of the two instantiations. Ultimately, the Air Force intends to modernize AOC-WS 10.1 capabilities with Block 20 as the delivered software capabilities mature.

## MISSION

The AOC-WS provides the Commander, Air Force Forces, or the Joint/Combined Forces Air Component Commander, the capability to exercise command and control of joint (or combined) air forces. This includes planning, directing, and assessing air, space, and cyberspace operations; air defense; airspace control; and

coordination of space and mission support operations not resident within the theater of operations.

## PROGRAM

The AOC-WS 10.1 increment began as an Acquisition Category III program when it entered sustainment in FY12. Block 20 began as a Defense Innovation Unit Experimental Pathfinder effort in 2017 and transitioned to six Middle Tier of Acquisition programs in FY19. In October 2021, the Assistant Secretary of the Air Force for Acquisition, Technology and Logistics designated both AOC-WS 10.1 and Block 20 as software acquisition pathway (SWP) programs, merged them, and authorized them to enter the execution phase of development. To comply with DoD Instruction 5000.87, the programs require a DOT&E-approved test strategy prior to entry into the execution phase of development. AOC-WS 10.1 has a DOT&E-approved test strategy, but there is still no DOT&E-approved test and evaluation master plan or test strategy that covers Block 20.

The Air Force submitted a revised test strategy for the merged AOC-WS 10.1 and Block 20 program in June 2023, which DOT&E returned with critical comments, including concerns about the roles, responsibilities, and authorities for the two independent Air Force operational test organizations that will both be testing AOC-WS. The program office continues to deliver incremental capability updates and maintenance software revisions to AOC-WS 10.1 via periodic

AREs. The Air Force delivered and fielded ARE 23-04 in FY23 based on results from operational testing at the Ryan Center, Joint Base Langley-Eustis, Virginia.

To address one of DOT&E's critical comments discussed above, the Air Force submitted a revised 10.1 Overarching Test Plan in August 2023, which DOT&E approved with caveats. Block 20 capabilities are developed and fielded following Agile software development and continuous integration and deployment principles. Block 20 continues to undergo iterative development following the deployment of a Minimum Viable Capability Release; however, no dedicated OT&E was conducted in FY23.

DOT&E has determined that annual, independent, dedicated OT&E of both AOC-WS 10.1 and Block 20 efforts are required to assess the evolving hybrid system and Block 20's progress toward system maturity, which could be satisfied by a single test at an operational site that has both AOC-WS 10.1 and Block 20. However, AOC-WS 10.1 is the only configuration currently ready for operational testing; Block 20 will begin operational test once the capabilities are ready.

### » MAJOR CONTRACTORS

- RTX (formerly Raytheon Technologies) – Dulles, Virginia
- Science Applications International Corporation, Inc. – Reston, Virginia



## TEST ADEQUACY

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The Air Force is conducting planned system upgrades via AREs, in accordance with the DOT&E-approved test strategy. DOT&E monitors the releases, observes the testing, and reports on more significant capability releases. The Air Force conducted integrated tests on AOC-WS 10.1 upgrades, ARE 23-04 and ARE 23-08, in accordance with a DOT&E-approved test plan, and DOT&E observed testing of both upgrades. ARE 23-04 underwent integrated testing in April 2023 and was subsequently deployed to the field. The integrated test of ARE 23-08 required additional testing of both functionality and deployability, which began in October 2023 and is expected to complete in FY24.

The Air Force is planning a Block 20 software supply chain test in FY24.

Following DOT&E approval of the test plan, the Air Force plans to conduct a cooperative vulnerability and penetration assessment (CVPA) at a functional AOC-WS in FY24. This test is consistent with DOT&E's determination that CVPAs are required annually to characterize the risk of the evolving system. The Air Force intends to submit a test plan for an AA at a functional AOC-WS site in FY24.

The Air Force did not conduct operational testing of Block 20 in FY23. Air Force operational testers observed three program office-led usability assessments (UAs) of Block 20 at operational AOC sites.

However, none of these events were intended to provide adequate data to draw OT&E conclusions. Block 20 capabilities continue to be deployed incrementally through an Agile release capabilities model. Capabilities are released to the field, then feedback is obtained from the users, and the capability is refined to fit warfighter needs. DOT&E has determined that annual operational assessments are required to monitor progress toward meeting Air Combat Command's Capability Needs Statements, replacing AOC-WS 10.1, and assessing the evolving risk that is being imposed on the warfighters; each operational assessment will be followed by a DOT&E report.

## PERFORMANCE

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DOT&E published a classified report on AOC-WS 10.1 in May 2019. Due to the minor nature of the AREs since then, DOT&E has not issued a follow-on assessment.

### » EFFECTIVENESS

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The Air Force found that AOC-WS 10.1 ARE 23-04 is operationally effective and ARE 23-08 needs regression testing to determine effectiveness. The Air Force conducted capability/limitation assessments, provided operational progress report observations on operational effectiveness, and completed formal reports on the Block 20 MVCR, but the data were insufficient for DOT&E to evaluate and comment on its effectiveness.

### » SUITABILITY

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The Air Force found that AOC-WS 10.1 ARE 23-04 is operationally suitable. The test data from ARE 23-08 are still being analyzed to determine operational suitability. Since there has been no operational suitability testing of Block 20, there are insufficient data for DOT&E to evaluate the sustainment, maintenance, and training processes.

### » SURVIVABILITY

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DOT&E still does not have sufficient data on the survivability of the AOC-WS 10.1, Block 20, or the hybrid configuration. Moreover, the Air Force has not provided sufficient data on a critical portion of the software supply chain and the unclassified development environments to enable adequate OT&E planning. The AA planned for FY24, primarily focusing on AOC-WS 10.1, in conjunction with the CVPA planned for FY24, should provide adequate data to support conclusions about AOC-WS 10.1 survivability. DOT&E intends to submit a cyber survivability assessment following the completion of testing.

## RECOMMENDATIONS

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The Air Force should:

1. As recommended in the FY22 Annual Report, provide an updated Block 20 acquisition strategy with product roadmaps that identify when capabilities under development are expected to be sufficiently

mature for operational testing; sufficient lead time is necessary for test planning and to comply with DoD policy for SWP programs.

2. Complete the revision of the consolidated test strategy covering 10.1 and Block 20 that provides for adequate, periodic evaluations of operational effectiveness, operational suitability, and cyber survivability.
3. As recommended in the FY22 Annual Report, conduct a cyber survivability assessment of the Block 20 software supply chain to include the unclassified development environment and distribution environments, and to adequately inform subsequent OT&E.
4. Complete the AA at a fielded AOC to characterize the mission survivability of the system in a realistic, cyber-contested environment.
5. As recommended in the FY22 Annual Report, implement a solution to meet the long-standing requirement to collect and report stability, reliability, availability, and maintainability data for the AOC-WS.