

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

### Executive Summary

- The Air Operations Center – Weapon System (AOC-WS) 10.1 is a system-of-systems that contains numerous third-party software applications, including the Global Command and Control System – Joint (GCCS-J), Theater Battle Management Core Systems – Force Level (TBMCS-FL), Master Air Attack Plan Toolkit (MAAPTK), and Joint Automated Deep Operations Coordination System (JADOCS).
- The Air Force tests AOC-WS 10.1 software upgrades during Recurring Events (REs) and refers to each software upgrade by the event during which it was tested. For example, AOC-WS 10.1 RE11 is the software upgrade that was tested during RE11.
- The Air Force conducted operational testing of RE11 in March 2012 using older servers due to a short timeline to integrate newer servers for test.
- The 605th Test and Evaluation Squadron (TES) conducted a regression test in May 2012 on newer, more powerful servers. This test included additional software fixes to GCCS-J provided by the Defense Information Systems Agency (DISA).
- From July through September 2012, the Air Force conducted a third phase of RE11 operational testing at the 613th AOC, Hickam AFB, Hawaii.
- Using RE11, operators can successfully execute all critical missions and produce threshold or larger-sized target lists and Air Tasking Orders on schedule. The Common Operational Picture exceeded the AOC requirement for updating and displaying the threshold number of tracks in near real-time.
- RE11 demonstrated interoperability with other mission-critical systems. Operational testing showed that RE11 addresses the significant legacy RE10 and GCCS-J deficiencies identified from previous testing. RE11 provides a significant improvement to AOCs both in internal functionality, as well as in interoperability with Combatant Commands.
- The 605th TES is still evaluating RE11's operational suitability; however, data collected to date indicate the need for some improvement. RE11 requires significant manpower to maintain the security posture of the system. Each operational AOC has site-unique requirements that each unit must incorporate into RE11. The AOC-WS Help Desk is working to adapt their enabling concept to include the enhanced capabilities in RE11.
- Users find training acceptable, and the overall system availability is acceptable. Information Assurance risk is acceptable, and the system has obtained an Authority to Operate.

### System

- The AOC-WS is the senior command and control element of the U.S. Air Force's Theater Air Control System and



- provides operational-level command and control of air, space, and cyberspace operations, as well as joint and combined air, space, and cyberspace operations. Capabilities include command and control of joint theater air and missile defense; time-sensitive targeting; and intelligence, surveillance, and reconnaissance management.
- The AOC-WS 10.1 (AN/USQ-163 Falconer) is a system-of-systems that contains numerous third-party-developed software applications and commercial off-the-shelf products. Each third-party system integrated into the AOC-WS provides its own programmatic documentation.
  - The AOC-WS consists of:
    - Commercial off-the-shelf hardware
    - Separate third-party software applications (GCCS-J, TBMCS-FL, MAAPTK, and JADOCS), from which the AOC-WS draws its capabilities
    - Additional third-party systems that accept, process, correlate, and fuse command and control data from multiple sources and share them through multiple communications systems
  - AOC-WS 10.1 operates on several different local area networks (LANs), including Secret Internet Protocol Router Network, Joint Worldwide Intelligence Communications System, and a coalition LAN, when required. The LANs connect the core operating system and primary applications to joint and coalition partners supporting the applicable area of operation. Users can assess web-based applications through the Defense Information Systems Network.
  - The Air Force tests AOC-WS 10.1 software upgrades during REs. The Air Force refers to each software upgrade by the event during which it was tested. For example, AOC-WS 10.1 RE11 is the software upgrade that was tested during RE11.
  - The future AOC-WS 10.2 will be the first increment for modernization.

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## Mission

The Commander, Air Force Forces, or the Joint/Combined Forces Air Component Commander use the AOC-WS to exercise control of joint (or combined) air forces including planning, directing, and assessing air, space, and cyberspace operations to meet operational objectives and guidance.

## Major Contractors

- AOC-WS 10.1 Production Center: Jacobs Technology Inc., Engineering and Technology Acquisition Support Services – Hampton, Virginia
- AOC-WS 10.2 Modernization: Northrop Grumman Corporation – Hampton, Virginia

## Activity

- The Air Force has developed an RE test cycle for major AOC-WS 10.1 upgrades, along with lower-level testing events to sustain interoperability and Information Assurance, and to provide low-risk upgrades to third-party systems as required. DOT&E approved an update to the program's Test and Evaluation Master Plan in December 2011, and approved an overarching operational test plan for all AOC-WS 10.1 testing in February 2012.
- The Air Force conducted developmental testing of RE11 in January 2012 and made several fixes to mission-critical problems. The Air Force conducted a subsequent regression test in February 2012.
- RE11 introduced GCCS-J Integrated Imagery and Intelligence as the intelligence and targeting capability provider for AOC-WS and upgraded TBMCS-FL with Maintenance Release 2 to migrate to current Modernized Integrated DataBase (MIDB) 2.1. Without the TBMCS-FL and GCCS-J upgrades, the AOC-WS is restricted to using a less-capable MIDB 2.0.
- Air Combat Command (ACC) conducted a risk analysis of the 11 open Category I test problem reports following the developmental and regression test. ACC determined the best course of action to meet current operational need was to proceed to operational testing and fielding of RE11.
- ACC developed a plan of action and milestones to address the 11 open Category I deficiencies at the time of operational test initiation. This decision was to be revisited if any additional Category I problems were discovered during operational test.
- The Air Force conducted operational testing of RE11 in March 2012. The AOC-WS Program Office had addressed 4 of the 11 open Category I problem reports by the start of the operational test. The GCCS-J portion of this testing was conducted on older servers; previous testing has shown that these servers have insufficient computing power. The newer, more powerful servers were not available in time to meet the initial integration and test schedule.
- The 605th Test and Evaluation Squadron conducted regression testing of RE11 in May 2012 using newer, more powerful servers to host the GCCS-J software. DISA had also provided several fixes to GCCS-J in the form of an Update 1 software release.
- The Air Force conducted a third phase of operational testing of RE11 at the 613th AOC, Hickam AFB, Hawaii, July through September 2012. This testing focused on the ability of the install team to correctly upgrade and configure the AOC from

legacy RE10 to RE11, and perform backup and recovery actions on RE11.

- DISA provided additional fixes to GCCS-J to the Air Force for incorporation into the next upgrade (RE12), currently scheduled for developmental and operational testing in December 2012.
- The Air Force conducted all RE11 testing in accordance with the DOT&E-approved test plan.

## Assessment

- The Air Force adequately tested RE11 through a combination of developmental and operational testing.
- RE11 can successfully execute all critical missions and produce threshold or larger-sized target lists and Air Tasking Orders on schedule. The Common Operational Picture was able to exceed the AOC requirement for updating and displaying the threshold number of tracks in near real-time.
- RE11 demonstrated interoperability with other mission-critical systems. Operational testing showed that RE11 could address the significant AOC-WS and GCCS-J deficiencies identified from previous testing.
- Users successfully demonstrated the ability to transfer Joint Forces Air Component Command responsibilities. Users encountered three Category I critical deficiencies with third-party software systems that are used within RE11, but these problems did not prevent mission accomplishment. ACC accepted these limitations while encouraging prompt resolution of these problems. RE11 provides a significant improvement to AOCs, in both internal functionality as well as their ability to interoperate with their respective Combatant Commands.
- The 605th TES is still evaluating RE11's operational suitability; however, data collected to date indicate the need for some improvement. RE11 requires significant manpower to maintain the security posture of the system on a recurring basis and the AOC-WS password change procedures are complex and inordinately lengthy. The GCCS-J backup and recovery, and server password change procedures for the newer servers are deficient. System administrators require extensive training in order to competently manage the system. Each operational AOC has site-unique requirements that must be incorporated into RE11. The AOC-WS Help Desk is working to adapt their enabling concept to include the enhanced capabilities in RE11. Users find training acceptable and the overall system availability meets requirements. Information Assurance risk

is acceptable, and the system has obtained an Authority to Operate.

- The key to successful testing and fielding of RE11 has been closer collaboration between the AOC-WS Program Office and DISA to ensure GCCS-J meets the operational needs of the AOCs. As a result of AOC-WS tester involvement in GCCS-J testing, the AOC-WS testers identified critical problems early for corrective action.
- The high-priority fixes DISA provided to GCCS-J in Update 1 improved data exchange between GCCS-J and RE11.

## Recommendations

- Status of Previous Recommendations. The Air Force is adequately addressing previous recommendations. Two of the FY11 recommendations are long-term improvements that are currently being worked and still need continued effort.
  1. Coordinate with third-party programs to ensure that critical AOC-WS third-party systems (such as GCCS-J) have testable requirements that meet AOC-WS requirements. Requirements should be properly vetted within the appropriate user and program communities for schedule and funding priority.

2. Ensure the AOC-WS users and test community continue to actively participate in GCCS-J developmental and operational testing and collaborate to develop a capability to adequately test GCCS-J to AOC-WS threshold stress levels.
- FY12 Recommendations.
    1. The Air Force should address suitability concerns with RE11, especially enabling system managers to more easily maintain the security posture of the RE11.
    2. Per the recommendation from DOT&E's Information Assurance/Interoperability assessment memorandum to the Director of Operations (J3), Joint Staff, the Joint Staff should establish or identify a systems integration group for command and control systems. These command and control systems will be responsible for providing comprehensive oversight/management of joint command and control systems and mission-critical interfaces, with particular emphasis on joint data fusion and operations centers, such as the AOC. Systems that should be addressed include, but are not limited to, GCCS-J, MIDB, TBMCS-FL, JADOCS, Joint Targeting Toolbox, and AOC-WS.

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