E-3 Airborne Warning and Control System (AWACS)

The E-3 AWACS is a commercial Boeing 707-320C airframe modified with an AN/APY-1 or AN/APY-2 radar. It is equipped with generalized and specialized mission computers, multipurpose displays, and clear and secure multiple-voice and data link communications. The United States has 33 E-3s assigned to Pacific Air Forces and Air Combat Command. AWACS has been employed in support of joint and multi-national operations around the world. NATO, United Kingdom, France, and Saudi Arabia also operate variants of the E-3. Finally, Japan operates a variant of the E-3 installed on a 767.

Block 40/45 will replace the aging AWACS computer system and the operator terminals with a network of commercial-off-the-shelf (COTS) operator workstations linked to several COTS computers. A Gigabit Ethernet Local Area Network that adds digital communications for control of the radios, and for internal communications, will connect these computers. Block 40/45 will improve E-3 reliability and availability, providing theater commanders significantly enhanced surveillance and control capabilities while contributing to information superiority needed to control the battlespace.

The Air Force is currently studying alternatives for the Block 40/45 AWACS upgrade. This upgrade will enable the Air Force to incorporate several necessary improvements to AWACS functionality including multi-source integration, increased electronic support measures system memory, integration of the Intelligence Broadcast System, and data link infrastructure. These improvements will be achieved by new tracking algorithms, software control of the communications subsystem, improved human-machine interfaces, and reduced data link latency. The Block upgrade, which supports continued improvements to E-3 information correlation functions that will enable the E-3 to support the Single Integrated Air Picture, will extend AWACS capabilities through the 2025-2035 timeframe.

TEST & EVALUATION ACTIVITIES

The United States Air Force has established a Block 40/45 Test and Evaluation Working Group Integrated Product Team that has produced a draft Test and Evaluation Master Plan.

TEST & EVALUATION ASSESSMENT

Rehosted radar software led to problems during the E-3 Radar System Improvement Program (RSIP). The problems were due to inadequate protection of aircraft radar hardware under certain operating conditions and degradation of the long-range detection and tracking performance of the Beyond-the-Horizon radar. Both issues have been corrected, and steps were taken in both the ground and air test procedures to prevent recurrences. However, numerous in-flight failures of software routines, which resulted in low Mean Time Between Failure, remain a concern for RSIP, now nearing completion of fielding. The Block 40/45 program will require rehosting significantly more software. DOT&E will work with the Air Force Operational Test and Evaluation Center and the 40/45 program to prevent a repetition of the types of problems experienced with the RSIP program.

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