

AIR FORCE PROGRAMS

National Airspace System (NAS)

The National Airspace System (NAS) program will replace three types of Air Traffic Control and Landing System (ATCALs) equipment used to support the radar approach control mission. NAS includes voice switches, approach control and control tower automation, and airport surveillance radars. When fully fielded, the Department of Defense (DoD) NAS program upgrade will include the following four programs:

Voice Communications Switching System (VCSS) is the communications component of the NAS modernization program. VCSS is being procured to replace existing analog voice systems approaching the end of their economic and technical life cycle. VCSS is designed to provide highly reliable, state-of-the-art air-to-ground, ground-to-ground, and intercom communications for controllers of military and civil air traffic.

DoD Advanced Automation System (DAAS) receives and processes primary and secondary radar data, flight plan information, weather, airport environmental data, and administrative information (such as Notices to Airmen).

Digital Airport Surveillance Radar (DASR) consists of integrated primary and secondary radar subsystems to provide accurate target data to the local air traffic control facilities. The DASR should have improved target detection and accuracy, clutter rejection, aircraft identification accuracy, altitude data, and weather capability.

Military Airspace Management System (MAMS) will schedule, track, and document utilization of special use airspace in a non-real-time manner, as well as interoperate with the Federal Aviation Administration (FAA). Scheduling agencies will access the MAMS central web site using desktop computers with Internet access.

The ATCALs equipment to be replaced has limited interoperability and excessive cost growth for operations and support. The FAA has undertaken a massive upgrade of the nation's air traffic control system infrastructure by replacing analog systems with state-of-the-art digital technology. Most DoD systems are currently analog and will not easily or economically interface with the new generation FAA equipment. Without the added capability, DoD will be unable to continue providing efficient and reliable service to all air traffic system users, military or civilian.

Furthermore, DoD NAS cost and operational effectiveness analyses indicate that DoD will experience excessive operations and support costs if the DoD air traffic control equipment is not replaced.

The FAA is the lead organization for VCSS and DAAS testing; with the Air Force serving as DoD lead for DASR testing and sole test agency for MAMS. DoD is working with the FAA through an interagency agreement for all VCSS, DAAS, and DASR test activities.

VCSS DoD Multi-service Operational Test and Evaluation (MOT&E) occurred throughout 1999. The VCSS was found operationally effective; however, it was rated not operationally suitable because of interrelated issues concerning parts reliability, maintainability, depot-level support, spare parts provisioning, and technical documentation. DOT&E reviewed corrective actions taken after MOT&E and found them adequate to rectify the suitability shortcomings. The full-rate production decision was executed in November 1999.



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AIR FORCE PROGRAMS

MAMS was taken out of development to sustainment on October 1, 2000. Since then, three software versions have been released – one major release, and two minor releases.

DAAS and DASR underwent combined Developmental Test/Operational Test from October 1999 to January 2000 at Eglin Air Force Base. Deficiencies were documented, some of which needed to be resolved before the start of the MOT&E, and others that needed to be resolved before full system fielding. Regression testing began in April 2000 at Eglin Air Force Base; and in June 2000, all deficiencies critical to the MOT&E were either verified as fixed or were downgraded in severity.

DAAS and DASR began parallel MOT&E at Eglin Air Force Base in June 2000 in support of the NAS Milestone III decision. As a result of DAAS and DASR deficiencies (15 Category 1 deficiencies; six DAAS and nine DASR) documented during the MOT&E, the Air Force Operational Test and Evaluation Center (AFOTEC) agreed to stop the MOT&E in October 2000 to allow the Air Force and Raytheon to make changes in the software that drives the digital radar and automation systems.

MOT&E resumed in March 2001 at Eglin Air Force Base and continued through mid-April 2001. AFOTEC released its interim summary report in June 2001. While the DAAS was found operationally effective and operationally suitable, the DASR was found not operationally effective and potentially operationally suitable. Nine Category 1 deficiencies were associated with the DASR. Major areas of concern included the lack of management of false targets, probability of detection, susceptibility of interference, and the performance of the weather channel.

Based on AFOTEC's conclusions in the interim summary report, the NAS Program Office requested that AFOTEC release its final report on the DAAS. AFOTEC complied with the request and published a final MOT&E report on the DAAS in May 2002 with the understanding that during subsequent DASR MOT&E (MOT&E 2) the DAAS would be examined from a NAS system-of-systems perspective.

TEST & EVALUATION ACTIVITY

- DOT&E approved the test concept for MOT&E 2 which called for resolving Operational Requirements Document (ORD) parameters during Developmental Test/Operational Test preceding MOT&E 2.
- Developmental Test/Operational Test data were collected largely from flight tests run in the summer of 2002:
- Some ORD parameters were not adequately resolved during the scheduled DT/OT period and logistics supportability issues were outstanding.
- MOT&E 2 began late in July 2002 with assurance from the NAS program office that corrective actions were in place to complete the Developmental Test/Operational Test data collection and to resolve open issues with logistics supportability.
- Adequate data are being collected to determine the operational effectiveness and operational suitability of the DASR.
- MOT&E 2 ended on September 6, 2002.

TEST & EVALUATION ASSESSMENT

DOT&E shares concerns with AFOTEC over the immaturity of the DASR configurations that have been presented for Operational Test. After each test period, critical deficiencies were identified and the program office implemented plans to fix, regression test, and re-test operationally. During each test event, similar or additional deficiencies were documented.

DOT&E expressed concern with not completing the Developmental Test/Operational Test flight tests, data collection, and analysis before entering MOT&E 2. DOT&E felt the risk in not adequately characterizing the performance of the DASR prior to starting MOT&E 2 was more than minimal. At the end of MOT&E 2, there were still five Category 1 deficiencies and 185 Category 2 deficiencies identified and unresolved against the DAAS and DASR systems. DOT&E will publish one Beyond Low-Rate Initial Production report on the NAS after all system-level testing is complete. The NAS program office had planned for a Milestone III decision in January 2003; the Air Force is currently reviewing MOT&E 2 results to determine if a production decision is warranted.

AIR FORCE PROGRAMS

The DASR system under test at Eglin does not contain several Engineering Change Proposals (ECPs) that are planned but not yet government approved for the DASR systems to be fielded in DoD. DOT&E reviewed test data from the FAA ECP-equipped DASR test site at Stockton, California, in an effort to determine if the ECPs would affect system performance and therefore call into question MOT&E test results obtained from Eglin. The results did not clearly indicate that the ECPs would have any operational effect on DASR performance.

Additionally, the DAAS system under test at Eglin will not be what is ultimately fielded at the majority of DoD sites. An updated DAAS system, called FS-2, with presentation symbology more similar to current FAA systems will eventually be fielded in DoD.

In light of the potential changes to DAAS and DASR between MOT&E testing and ultimate fielding, DOT&E recommends Follow-on Operational Testing be conducted on both updated systems prior to full-scale DoD fielding.

