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Airport Movement Area Safety System (AMASS) Operational Test, Final Report

Dan Dellmyer

December 2000

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16. Abstract This final report documents the tests results on the Airport Movement Area Safety System (AMASS) Air Traffic (AT) Operational Testing conducted at Atlanta, GA and Detroit, MI International Airports. The purpose of the AMASS Operational Test (OT) was to verify the Critical Operational Issues (COI). The AMASS is a runway collision alert system that provides tower air traffic controllers with automated conflict warnings and alerts to reduce the risks of runway collisions. The AMASS system provides tower controllers with both aural and visual alerts. The AMASS system receives raw video from the Airport Surface Detection Equipment-3 (ASDE-3) and airborne approach targets from the Terminal Automation Interface Unit (TAIU). The TAIU receives target data from the Surveillance Communications Interface Processor (SCIP) and aircraft tag data from the Automated Radar Tracking System (ARTS). It tracks this data and sends appropriate position, vector, and a predicted approach runway to AMASS. Targets are then processed by the AMASS Safety Logic to determine if any targets have the potential to create a hazardous situation. The Operational Testing on the AMASS COIs questions has been evaluated/assessed, resulting in no high issues. The Airway Facilities (AF)/AT OT Test Team members felt that the AMASS system has shown dramatic improvements and is currently operationally ready.					
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EXECUTIVE SUMMARY

The Operational Test (OT) for the Airport Area Movement Safety System (AMASS) was split into two testing phases, Airway Facilities (AF) OT and Air Traffic (AT) OT. The AF OT testing was conducted at Detroit Metropolitan Wayne Airport (DTW) on April 20 through 29, 1999. The AT OT testing was conducted at William B. Hartsfield Atlanta Airport (ATL) on July 18 through August 20, 1999. Any open issues that resulted from the AF and AT OT testing were verified during AF and AT regression testing. The AF OT regression testing was conducted at DTW and was held on February 22 and 23, 2000. The AT OT regression testing was conducted at ATL on June 1 through 23, 2000.

The Operational Testing on the AMASS Critical Operational Issues (COI) questions have been evaluated/assessed, resulting in no high issues. The following medium issues are associated with COI listed below:

COI 1: Does the AMASS provide the controller with alerts on potential runway collisions?

AT Issue 8: (Medium) AMASS is currently limited to 12,000 feet of movement area coverage from the antenna.

Resolution: Modify AMASS to support the full Airport Surface Detection Equipment-3 (ASDE-3) range coverage of up to 24,000 feet (System Trouble Report (STR) has been written).

Status: This problem will be fixed prior to Dallas Fort Worth International Airport (DFW) and Denver International Airport (DEN) going Operational Readiness Declaration.

COI 2: Is the AMASS site adaptable (e.g., eliminate unwanted alerts due to: multipath, sequential alerts, etc.)?

By implementing key software fixes the false alert rate was reduced from over 60 per month to approximately 4 per month. The nuisance alert rate that coincided with the AMASS final parameter set was approximately two per month.

AF Issue 2: (Medium) Line Replacement Unit (LRU) replacement from the front of the cabinet for the Central Processing Unit (CPU) is very difficult. Cable dressing complicated the removal/replacement procedures, with cable ties having to be cut to facilitate removal of equipment.

Resolution: Modify AMASS equipment to support LRU replacement from the front of the cabinet.

Status: STR has been written.

COI 3: Does the AMASS provide the controls and displays necessary for the controller/supervisor to perform the assigned duties?

AT Issue 6a: (Medium) AT Training should include a clear and concise presentation on the AMASS Alert Scenarios.

Resolution: Provide a video demonstrating each AMASS alert scenario on the potential collisions.

Status: Currently the training does provide slides on each alert scenario, but the OT test team members want to see a video demonstration on each AMASS alert scenario (Visual Aid on the general timing and distance of each alert scenario).

AT Issue 7b: (Medium) The AT Users Manual provides too much information for use by a controller on a day-to-day basis.

Resolution: Include a Quick Reference Card to summarize the AMASS commands (in addition to the planned Mini-Display Control Unit (DCU) keypad template.)

Status: AMASS Work Group has this issue and is in the process of deciding whether or not to develop a quick reference card.

COI 4: Does the AMASS provide the controller the capability to inhibit/re-inhibit specific targets from activating alerts?

No concerns/issues were expressed with the inhibit/re-inhibit functionality.

COI 5: Does the AMASS degrade any other FAA system to which it is interfaced?

AF Issue 10: (Medium) AMASS is generating a video stitching on the ASDE-3 Display.

Resolution: Modify the AMASS equipment to resolve the video timing issue.

Status: A screen refresh removes the video stitching; this problem will be fixed (STR has been written).

The AF/AT OT Test Team members felt that the AMASS system has shown dramatic improvements and is currently operationally ready.

1. INTRODUCTION.

1.1 PURPOSE.

The purpose of Airport Movement Area Safety System (AMASS) Operational Testing was to verify that the AMASS satisfies the five following Critical Operational Issues (COI) defined in the AMASS Operational Requirements Document (ORD):

- COI-1:** Does the AMASS provide the controller with alerts on potential runway collisions?
- COI-2:** Is the AMASS site adaptable (e.g., eliminate unwanted alerts due to: multipath, sequential alerts, etc.)?
- COI-3:** Does the AMASS provide the controls and displays necessary for the controller/supervisor to perform the assigned duties?
- COI-4:** Does the AMASS provide the controller the capability to inhibit/re-inhibit specific targets from activating alerts?
- COI-5:** Does the AMASS degrade any other Federal Aviation Administration (FAA) system to which it is interfaced?

To accomplish the above task, the AMASS Operational Test (OT) Plan allocated each individual AMASS ORD requirement to one or more of the five COIs as Measures of Performance (MOP). A success criteria, or Minimum Acceptable Operating Requirement (MAOR), was then derived from each MOP. The AMASS Operational Test Plan then allocated each MOP/MAOR pair to either the Airways Facilities (AF) OT effort or the Air Traffic (AT) OT effort. Each MOP/MAOR pair allocated to the AT/AF OT effort was then further allocated to one or more of the three planned AT/AF OT test procedures.

1.2 SCOPE.

This report discusses the results of the AMASS OT testing; the OT testing was split into two testing phases, an AF and AT. The AF OT testing was conducted at Detroit Metropolitan Wayne Airport (DTW) on April 20 through 29, 1999. The AT OT testing was conducted at William B. Hartsfield Atlanta Airport (ATL) on July 18 through August 20, 1999. The open issues that resulted from the AF and AT OT testing were verified during an AF and AT regression testing. The AF OT regression testing was conducted at DTW and was held on February 22 and 23, 2000. The AT OT regression testing was conducted at ATL on June 1 through 23, 2000.

2. REFERENCE DOCUMENTS.

The following documents are referred in this test report or provide useful information:

- a. AMASS Operational Test Plan, dated March 1999
- b. AMASS AF OT Test Procedures, dated March 1999
- c. AF OT Quick Look Report, dated April 1999
- d. AF OT Regression Quick Look Report, dated February 16, 2000,
Report Number: DOT/FAA/CT/ACT300-00-02
- e. AMASS OT AT Test Procedures, dated May 1999
- f. AT OT Quick Look Report, dated June 1999
- g. AMASS OT AT Regression Test Plan/Procedures, dated June 12, 2000
- h. AT OT Regression Quick Look Report, dated June 23, 2000,
Report Number: DOT/FAA/CT/ACT300-00-01

3. AMASS SYSTEM DESCRIPTION.

3.1 MISSION REVIEW.

The AMASS is a runway collision alert system that provides tower air traffic controllers with automated conflict warnings and alerts to reduce the risks of runway collisions. The AMASS system provides tower controllers with both aural and visual alerts.

3.2 AMASS SYSTEM DESCRIPTION.

The AMASS system receives raw video from the Airport Surface Detection Equipment-3 (ASDE-3) and airborne approach targets from the Terminal Automation Interface Unit (TAIU). The TAIU receives target data from the Surveillance Communications Interface Processor (SCIP) and aircraft tag data from the Automated Radar Tracking System (ARTS). It tracks this data and sends appropriate position, vector, and a predicted approach runway to AMASS. Targets are then processed by the AMASS Safety Logic to determine if any targets have the potential to create a hazardous situation. When it is determined there is a possible hazardous situation, AMASS will deliver an aural alert, a visual text message, and highlight the targets in potential conflict.

3.3 TEST SYSTEM CONFIGURATION.

AT Operational Testing

The AMASS was tested with full functionality except for the Pre-Product Improvements. The AMASS system relies on the ASDE-3/TAIU configuration, local airport operations, and external equipment interfaces. All the AMASS alerts were tested in the factory, but only a subset was optimized for the various sites. The test was conducted using the AMASS software Build 2.0 and included local site adaptation parameters at ATL. The TAIU software was Build 2.0 and ASDE-3 software Build 611.3.

The airport configuration at ATL consisted of four parallel runways. The ASDE-3 antenna is located on top of the tower cab. The ASDE-3/AMASS is configured as a seven-channel system. The ATL Terminal Radar Approach Control Facility (TRACON) is co-located at the airport and also the ARTS IIIA. Terminal Surveillance data is provided by ASR-9 located at the airport. The AMASS TAIU is located at the TRACON.

AF Operational Testing

The AMASS was tested with full maintenance functionality. The AMASS system relies on the ASDE-3 RMS interface. The test was conducted using the AMASS software Build 1.0 and included local site adaptation parameters at DTW. The TAIU software was Build 1.0 and ASDE-3 software Build 611.3.

The DTW ASDE-3 antenna is located on top of the tower cab. The ASDE-3/AMASS is configured as a five-channel system. The DTW TRACON is co-located at the airport and also the ARTS IIIA. Terminal Surveillance data is provided by ASR-9 located at the airport. The AMASS TAIU is located at the TRACON.

3.4 INTERFACES.

The AMASS external interfaces consist of the ASDE-3, and the TAIU. The TAIU interfaces with the SCIP, and the ARTS IIIA.

The ASDE-3 provides radar target data on objects up to the tower height, and 24,000 feet horizontal. The ASDE-3 also provides the display/control functions, and the RMS interface to the AMASS via serial lines. For airborne-approach aircraft, surveillance radar data is received from the SCIP via the AMASS TAIU and transmitted to the AMASS cabinet by serial modems. The TAIU also interfaces with the ARTS IIIA to receive flight plan information.

Only the ARTS IIIA, ARTS IIIE, and ARTS IIE interfaces are currently developed. The remaining automation interfaces such as Enroute Automated Radar Tracking System (μ EARTS), and Standard Terminal Automation Replacement System (STARS) have yet to be developed for the TAIU. These preplanned interface improvements, along with flight plan functionality, including the use of aircraft tag data, were not evaluated during this Operational Testing.

4. TEST AND EVALUATION DESCRIPTION.

The OT testing was split into two testing phases; AF and AT. The AT OT testing was broken down into three testing events; Developmental Test (DT) Data Review, AMASS Parameter Test, and the Normal Operations Test. The AF OT testing was broken down into two testing events; DT Data Review, and the System Maintenance Activities Test. The following sections discuss the test events/results of the AMASS AT/AF OT testing.

4.1 AT OT, DT DATA REVIEW.

4.1.1 Test Event Description.

The AT DT Data Review was performed at the Technical Center. The DT Data Review consisted of a desk audit of the contractor performed Development Test and Site Acceptance Test reports, System Trouble Reports (STR), the AMASS ORD and the AMASS Specification (FAA-E-2869), the AMASS AT training course, document reviews and formal contractual approvals. This review evaluated whether each of the MOPs, identified in the DT procedure, had been satisfactorily tested and whether the results met the corresponding success criteria (MAORs).

4.1.2 Results/Discussion.

All the MOPs/MAORs passed except for MOP/MOAR 1-26 listed below. Appendix A to this report includes the MOP/MAOR Result Matrix.

MOP-1.26:

Clutter Map. AMASS shall maintain a clutter map to aid in the removal of static or slowly varying clutter.

MAOR-1.26:

An AMAS clutter map must be maintained to aid in the removal of static or slowly varying clutter.

MOP/MOAR 1-26 is failed because AMASS Clutter Map is limited to 12,000 feet of movement area coverage where the ASDE-3 area coverage is 24,000 feet. Norden will modify the AMASS system to support the full ASDE-3 range coverage (STR has been written). This issue (AT Issue #8, appendix B) was classified as a Medium and will be fixed prior to Dallas Fort Worth Airport (DFW) and Denver International Airport (DEN) going Operational Readiness Declaration.

Appendix B to this report includes the AT Issue Matrix.

4.2 AT OT, AMASS PARAMETER TESTING.

The purpose of the AMASS Parameters Testing was to determine if the AMASS could be adapted to allow for the implementation of the alert set and parameterization concept desired by the AMASS Working Group (AWG). This test event was divided into three sub-tests; the AMASS Parameter Study (APS), the Operational Events Test (OET) and the Operational Usage Test (OUT). These test events were conducted at the Technical Center using the ACT-310 AMASS laboratory facilities.

4.2.1 AMASS Parameter Study (APS).

4.2.1.1 Test Event Description.

The purpose of the APS sub-test was to determine if the AMASS is sufficiently adaptable to minimize false and nuisance alerts and to develop an initial alert set based on parameterization concept provided by the AMASS Working Group.

4.2.1.2 Data Collection/Analysis.

The process began with the collection of AMASS data at San Francisco International Airport (SFO), ATL, and DTW. More than 1000 hours of AMASS data was recorded in SFO and ATL, and was sent to the Technical Center for analysis. Additionally, approximately 500 hours of usable data were collected in DTW. Data were collected for AMASS using both the STANDBY and ONLINE ASDE-3 transmitters. In addition, both encoder A and B were exercised during data collection.

The analysis consisted of replaying the recorded data utilizing the playback feature of the AMASS. This feature allows for data to be played using different alert sets, time/distance alert parameters, airport configurations, and multipath parameters. The initial analysis of the data received from Atlanta began with an alert and parameter set that was conservative. Alert listings were generated and analyzed to determine the number of false alerts (primarily due to false targets) and real alerts. Once this analysis was completed, the AMASS parameters were modified in an attempt to reduce the number of nuisance alerts that did not meet the guidelines set forth in the AMASS Working Group. This process was repeated through four subsequently tighter alert sets until the parameterization of the AMASS alert set was optimized to minimize nuisance alerts.

4.2.1.3 Results/Discussion.

All the MOPs/MOARs (appendix C) in this sub-test passed with no open issues.

The init adaptation test had six STRs written to lower the false alert rate. The main issues found during this test are:

- a. (Issue #1e, appendix B) False tracks can reach real track status on a taxiway and then move across the grass and onto runway surfaces resulting in false alerts.
- b. (Issue #1d, appendix B) AMASS generates false tracks and false alerts in heavy rain.
- c. (Issue #1a, appendix B) Long-term false tracks on a runway surface will transition to “real” track status within 4 minutes.

These issues listed above were verified/passed during the AT OT regression-testing period. The false alert rate was reduced from over 60 per month to approximately 4 per month. The nuisance alert rate that coincided with the final parameter set was approximately two per month. The final alert parameter study was presented to the AMASS Work Group on June 23, 2000, at the OT Regression testing phase, and the final parameter listing is contained in appendix D.

4.2.2 Operational Events Test (OET).

4.2.2.1 Test Event Description.

The purpose of the OET sub-test was to demonstrate the AMASS response to each alert situation included in the core alert set. The OET sub-test utilized the data collected and analyzed during the APS sub-test to develop specific scenarios for each alert cell that was identified in the AWG alert set. Twenty-eight test cases, comprised of one or more iterations, were developed.

4.2.2.2 Data Collection/Analysis.

AT controllers were asked to view each alert scenario and record how the AMASS response to the situation presented would affect their ability to perform their assigned duties when following the Draft ATC AMASS Operational Procedures. The test team responses were then transcribed and reviewed (appendix E). Test team discussions were held to review the composite results. The feedback received on the questionnaires and in the discussion sessions were then used to determine if any further modifications to the initial parameterization concept were necessary prior to the conclusion of the test and in preparation for OT at ATL.

4.2.2.3 Results/Discussion.

The execution of the OET sub-test resulted in minor modifications to the time/distance parameterization of AMASS. All the MOPs/MOARs (appendix F) in this sub-test have passed with no open issues.

One of the main issues found during this test relates to taxiing aircraft across/off the runway surfaces, which sometimes can cause alerts because these tracks do not include a projection vector. The AMASS system was modified to use a projection vector which reduced the number of nuisance alerts. These issues were verified and closed at the OT regression-testing period.

4.2.3 Operational Usage Test (OUT) Sub-Test.

4.2.3.1 Test Event Description.

The purpose of the Operational Usage Test (OUT) was to examine the AT training, documentation, and usage of the AMASS User Interface.

4.2.3.2 Data Collection/Analysis.

The OUT sub-test was performed after the initial AT OT training introduction was given and after the test team members had an opportunity to use the AMASS user interface. A questionnaire (appendix G) was given to each test team and a discussion session was held to review the answers and any issues.

4.2.3.3 Results/Discussion.

All the MOPs/MOARs (appendix H) in this sub-test were passed during the AT OT regression-testing period.

Several issues were generated during this testing phase. The two issues that remain open are the following:

- a. (Issue #6b, Medium, appendix B) AT Training should include a clear and concise presentation (video demonstration) on the AMASS Alerts.
- b. (Issue #7b, Medium, appendix B), the test team members felt that the AT User's Manual was too cumbersome for day-to-day use and that a Quick Reference Card should be included in the manual.

4.3 OPERATIONAL TESTING AT ATL.

The purpose of performing operational testing at the ATL was to expose the test team members to AMASS operations in an operational setting. The operational testing was divided into two sub-tests; the OET and OUT.

4.3.1 Operational Events Test (OET) Sub-Test.

4.3.1.1 Test Event Description.

The OET sub-test consisted of injecting synthetic targets against Targets of Opportunity to create each alert scenario script. The OT Test Team members would evaluate each alert scenario script in the Tower Cab.

4.3.1.2 Data Collection/Analysis.

The test team was asked to view each alert scenario and record how the AMASS response to the situation presented would affect their ability to perform their assigned duties when following the Draft ATC AMASS Operational Procedures. The feedback received on the questionnaires (appendix I) and in the discussion sessions were then used to determine if any further modifications to the AMASS parameters were necessary prior to the conclusion of the test.

4.3.1.3 Results/Discussion.

The execution of the OET sub-test resulted in minor modifications to the time/distance parameterization of AMASS. All open issues in this sub-test have passed and was verified during the AT OT regression-testing period.

One of the issues during this test was the TAIU might not provide the first update for a new target under track until up to 4 seconds after entering the runway approach zone. The TAIU was fixed to provide the first update within 1 second after entering the runway approach zone. This issue was verified and retested at the AT OT regression-testing period.

4.3.2 Operational Usage Test (OUT) Sub-Test.

4.3.2.1 Test Event Description.

The purpose of this OUT sub-test was to examine the training, documentation, and usage of the AMASS User Interface in an operational setting.

4.3.2.2 Data Collection/Analysis.

Test team members were given the opportunity to use the AT User's Manual and AMASS User Interface to perform the three AMASS operations prior to completing the questionnaires (appendices J and K) which included selecting operational configurations, opening/closing runways, and adjusting the alert speaker volume. The AT Test Team members had formal AMASS AT training prior to going to ATL.

4.3.2.3 Results/Discussion.

All open issues in this sub-test passed and were verified during the AT OT regression-testing period except for issues 6b and 7b (refer to section 4.2.3.3).

4.4 AF OT, DT DATA REVIEW.

4.4.1 Test Event Description.

The AF DT Data Review was performed at the Technical Center. The DT Data Review consisted of a desk audit of the contractor-performed Development Test and Site Acceptance Test reports, STRs, the AMASS ORD and the AMASS Specification (FAA-E-2869), the AMASS AT training course, document reviews, and formal contractual approvals. This review evaluated whether each of the MOPs identified in the DT procedure had been satisfactorily tested and whether the results met the corresponding success criteria (MAORs).

4.4.2 Results/Discussion.

All the MOPs/MAORs have passed. Appendix L to this report includes the MOP/MAOR Result Matrix.

4.5 MAINTENANCE ACTIVITIES TEST.

4.5.1 Test Event Description.

The AMASS AF Operational Testing took place April 20 through 29, 1999, at DTW. This test was concerned with determining whether the AMASS (including contractor provided training and documentation) is effective and suitable for inclusion into the National Airspace System (NAS) from a maintenance perspective. The evaluation approach used was to perform a series of test procedures with test teams comprised of representative users from AF field organizations. Three AF technicians were in attendance representing Central, Great Lakes, and Southern regions. The test team members were presented with a series of test procedures, each having a defined objective. After each test procedure was performed, the test team members filled out a series of questionnaires.

Three types of testing were conducted at the DTW. These were:

- a. System Corrective Actions Test
- b. System Maintenance Activities Test
- c. NAS Integration and Degraded Operations Test

The AF System Corrective Actions Test verified that AF Technicians have the tools, training, and documentation necessary to maintain the AMASS to the Line Replacement Unit (LRU) level. This test was performed using AF Technicians to detect, isolate, and correct faults inserted into the system by the test engineers. Opinions were collected from the AF Technicians as to the correctness and completeness of the provided materials to accomplish the assigned tasks at the end of each test script.

The System Maintenance Activities Test verified that the AF Technicians have the tools, training, and documentation necessary to ensure the AMASS system is operating correctly on a day-to-day basis. This includes the documentation, procedures, and test equipment necessary to certify the system for use on a day-to-day basis. It also includes a verification of the logistics support system in place to support the AMASS system throughout its life cycle. This includes logistical support as it relates to the LRU, consumables, software maintenance, site adaptation and optimization, and other logistical support activities included in the AMASS Maintenance concept. This test used AF Technicians to perform the specified maintenance activities included in the Maintenance Handbook. They were asked to provide feedback on the acceptability of the provided training, equipment, and related materials.

The AMASS NAS Integration and Degraded Operations Test verified, from an AF perspective, that the requirements associated with the three interfaces to the systems are already established in the NAS system. These interfaces are: the AMASS/TAIU, the AMASS/ASDE-3 display subsystem, and the AMASS/ASDE-3 Remote Maintenance Monitoring (RMS) Subsystem. The test also verified the ability of the AMASS to continue to perform the assigned mission when the AMASS system is not operating at 100 percent. This testing took place from two perspectives. First, it focused on the ability of the AMASS to continue operating when one of its subsystem has failed. Failures included both AMASS implemented interface failures and core LRU failures. Secondly, the ability of the AMASS to continue to perform its mission when the ASDE-3 is operating in various degraded states. (This section was verified using Maintenance Demo held at Norden.)

Dimensions International, developers of the TAIU, provided the TAIU operation and familiarization training as well as the preventive maintenance procedure overview. The training was extremely useful, as none of the technicians were familiar with the TAIU system before arrival. The technicians cited the TAIU users and troubleshooting manuals, as being acceptable, although clarification is required in many areas. Many of the concerns arose over the areas of logistic and second level support. Detailed training at each site, as proposed, will remedy these concerns. Appendix M to this report includes the composite AF questionnaires (February 1999).

4.5.2 Results/Discussion.

In April 1999, the major issue was that the AMASS manuals were inadequate in performing LRU replacement and general maintenance procedures on the AMASS system. AOS discussed system certification issues with the test participants at length, and began development of certification procedures.

All open issues except for issue #2 and #10 were verified and passed during the regression testing at DTW the week of June 18, 2000. The AF technicians performed certification procedures and reviewed the change pages to the Maintenance manual. The AMASS manuals were improved but additional comments were generated by the AF technicians and were incorporated. The technicians followed the certification procedures step-by-step. There are some

discrepancies that need to be corrected, but the technicians feel they can certify the AMASS and TAIU.

Issue #2 remains open because the LRU replacement from the front of the cabinet for the Central Processor Unit (CPU) is very difficult. Cable dressing complicated the removal/replacement procedures, with cable ties having to be cut to facilitate removal of equipment. This issue (appendix N) was classified as a Medium. Issue #10 is open because AMASS is generating a video stitching on the ASDE-3 Display. This issue was classified as a medium because the video stitching occurs only on a few displays and can take hours and even days to become visible; also any type of screen refresh on the display removes the video stitching.

Appendix N to this report includes the AF Issue Matrix.

Appendix O to this report includes the AF Regression Test comments to the AMASS manuals.

5. ISSUE ASSESSMENT.

The OT test team analyzed the correlated test data to determine if operational issues existed and if so, assessed the operational impact. Each issue was identified a criticality which has been defined as follows:

- a. High - A problem that will prevent, degrade, or interrupt operational service or jeopardize safety, and has no acceptable work-around.
- b. Medium – To prevent, degrade, or interrupt operational service or jeopardize safety, but has an acceptable work-around.
- c. Low - The issue constitutes an improvement to the operational use of AMASS and can be resolved through post-commissioning modifications.

6. COI RESULTS.

The evaluation results specific to each COI are presented in the following subsections and categorized by the MOP/MAOR. All the MOPs/MAORs are listed in appendices A and L.

6.1 COI 1:

Does the AMASS provide the controller with alerts on potential runway collisions?

6.1.1 COI 1 Results.

The following issue is associated with this COI:

AT Issue 8: (Medium) AMASS is currently limited to 12,000 feet of movement area coverage from the antenna.

Resolution: Modify AMASS to support the full ASDE-3 range coverage of up to 24,000 feet (STR has been written).

Status: This problem will be fixed prior to DFW and DEN going Operational Readiness Declaration.

6.2 COI 2:

Is the AMASS site adaptable (e.g., eliminate unwanted alerts due to: multipath, sequential alerts, etc.)?

6.2.1 COI 2 Results.

The following issues are associated with this COI:

AF Issue 2: (Medium) LRU replacement from the front of the cabinet for the CPU is very difficult. Cable dressing complicated the removal/replacement procedures, with cable ties having to be cut to facilitate removal of equipment.

Resolution: Modify AMASS equipment to support LRU replacement from the front of the cabinet.

Status: STR has been written.

6.3 COI 3:

Does the AMASS provide the controls and displays necessary for the controller/supervisor to perform the assigned duties?

6.3.1 COI 3 Results.

The following issues are associated with this COI:

AT Issue 6a: (Medium) AT Training should include a clear and concise presentation on the AMASS Alert Scenarios.

Resolution: Provide a video demonstrating each AMASS alert scenario on the potential collisions.

Status: Currently the training does provide slides on each alert scenario, but the OT test team members want to see a video demonstration on each AMASS alert scenario (Visual Aid on the general timing and distance of each alert scenario).

AT Issue 7b: (Medium) The AT Users Manual provides too much information for use by a controller on a day-to-day basis.

Resolution: Include a Quick Reference Card to summarize the AMASS commands (in addition to the planned Mini-Display Control Unit (DCU) keypad template.)

Status: AMASS Work Group has this issue and is in the process of deciding whether or not to develop a quick reference card.

6.4 COI 4:

Does the AMASS provide the controller the capability to inhibit/re-inhibit specific targets from activating alerts?

6.4.1 COI 4 Results.

No concerns/issues were expressed with the inhibit/re-inhibit functionality.

6.5 COI 5:

Does the AMASS degrade any other FAA system to which it is interfaced?

6.5.1 COI 5 Results.

The following issues are associated with this COI:

AF Issue 10: (Medium) AMASS is generating a video stitching on the ASDE-3 Display.

Resolution: Modify the AMASS equipment to resolve the video timing issue.

Status: A screen refresh removes the video stitching; this problem will be fixed (STR has been written).

7. CONCLUSIONS.

The Air Traffic (AT) regression testing closed 30 out of 37 issues with no high issues. The remaining seven open issues contain only three medium and four low priority issues. The medium issues are in section 6. with a current status. The Low issues have been passed onto

Airway Operational Support (AOS) for future improvements to the Airport Movement Area Safety System (AMASS).

The Airway Facilities (AF) regression testing closed 17 out of 19 issues with no high issues. The remaining two open issues are classified as medium. The medium issues are in section 6. with a current status.

The Operational Testing on the AMASS Critical Operational Issues (COI) questions have been evaluated/assessed, resulting in no high issues. The AF/AT Operational Test Team members felt that the AMASS system has shown dramatic improvements and is currently operationally ready.

8. RECOMMENDATIONS.

Implement a System burn in period (~30 days) at each site to verify system adaptation/optimization and to verify system performance such as false/nuisance alert rate in each new environment.

9. ACRONYMS.

AMASS	Airport Area Movement Safety System
AF	Airway Facilities
AOS	Airway Operational Support
APS	AMASS Parameter Study
ARTS	Automated Radar Tracking System
ASDE-3	Airport Surface Detection Equipment-3
AT	Air Traffic
ATL	William B. Hartsfield Atlanta Airport
AWG	AMASS Working Group
COI	Critical Operational Issues
DCU	Display Control Unit
DEN	Denver International Airport
DFW	Dallas Fort Worth International Airport
DT	Developmental Test
DTW	Detroit Metropolitan Wayne Airport
FAA	Federal Aviation Administration
LRU	Line Replacement Unit
MAOR	Minimum Acceptable Operating Requirement
MOP	Measures of Performance
NAS	National Airspace System
OET	Operational Events Test
ORD	Operational Requirements Document
OT	Operational Test
OUT	Operational Usage Test
RMS	Remote Maintenance Monitoring
SCIP	Surveillance Communications Interface Processor
SFO	San Francisco International Airport
STARS	Standard Terminal Automation Replacement System
STR	System Trouble Report
TAIU	Terminal Automation Interface Unit
TRACON	Terminal Radar Approach Control Facility
μEARTS	Enroute Automated Radar Tracking System

APPENDIX A

AT OT, MOP/MAOR Result Matrix

TEST DATA LOG.

TEST DATE(S): 7/19/99 THROUGH 7/30/99

Test Coordinator: Chuck Dudas

Test Engineer: Jeff Livings

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-1.1: (from TEMP MOP 3.6) The following list of 26 alerts are included in the design of the AMASS: 1. Opposite direction on taxiway. 2. Opposite direction taxi on runway. 3. Opposite direction departure on runway. 4. Stopped target on runway. 5. Opposite direction landing on runway. 6. Opposite direction departure on taxiway. 7. Departure with stopped target 8. Landing and arrival with stopped target. 9. Departure chasing a departure. 10. Departure chasing a taxi. 11. Departure chasing a landing. 12. Landing chasing a departure. 13. Landing chasing a landing. 14. Landing chasing a taxi. 15. Departure head-on departure. 16. Departure head-on landing. 17. Departure head-on taxi. 18. Landing head-on taxi. 19. Landing head-on departure. 20. Landing head-on landing. 21. Arrival chasing a departure. 22. Arrival chasing a landing. 23. Arrival chasing a taxi. 24. Arrival head-on departure. 25. Arrival head-on landing. 26. Arrival head-on taxi.	MAOR-1.1: Each of the 26 alerts listed in MOP-1.1 are included in the design of the AMASS.	PASS			
MOP-1.2: Source: Derived from COI-1 Types of alerts not listed in MOP-1a, but included in the design of AMASS must meet the same requirements.	MAOR-1.2: Alerts not listed in MOP-1.1 but included in the design of AMASS must satisfy MAOR-1.3 through MAOR-1.??.	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-1.3: Source: ORD 3.f.(1)(a).\$1 All single track alerts shall be "Cautions" and ...	MAOR-1.3: Alerts 1 through 6 of MOP-1.1 should generate audible and visual cautions.	PASS			
MOP-1.4: Source: ORD 3.f.(1)(a).\$2 ... all paired track alerts shall be "Warnings".	MAOR-1.4: Alerts 6 through 26 of MOP-1.1 should generate audible and visual warnings.	PASS			
MOP-1.5: Source: ORD 3.f.(1)(d).\$1 Alert message processing shall issue one and only one voice warning alert message per paired tracks.	MAOR-1.5: One voice warning is generated for Alerts 7 through 26 of MOP 1.1.	PASS			
MOP-1.6: Source: ORD 3.f.(1)(d).\$3 Displayed text messages shall continue to be updated, thus ensuring that the current warning condition is displayed.	MAOR-1.6: The current warning condition must be displayed.	PASS			
MOP-1.7: Source: ORD 3.j.(1).\$1 AMASS shall provide target extent data processing.	MAOR-1.6: Target extent data processing is performed by AMASS.	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-1.8: Source: ORD 3.j.(1).\$2 If the nose or tail of a target as determined by the target extent data combined with the direction of travel indicates that the target is "hanging over" onto an intersecting runway or in the area between the "clear of runway" hold short line and the runway, the target shall be considered to be "on the runway".	MAOR-1.8: If any part of an aircraft is past the hold short line, runway alerts are issued.	PASS			
MOP-1.9: Source: ORD 3.j.(2) The intersection data in the data base configurations for each intersection shall reflect site-specific runway hold short line information.	MAOR-1.9: Hold Short Line information is included in the site-specific data.	PASS			
MOP-1.10: Source: ORD 3.1.(1) AMASS shall maintain tracks of targets on closed runways, but some alerts shall be inhibited for tracks on closed runways in the following situations:	MAOR-1.10: Targets on closed runways are tracked.	PASS			
MOP-1.11: Source: ORD 3.1.(1).(a) Alerts for all single-track caution cells for tracks on closed runways shall be inhibited except for specific arrivals.	MAOR-1.11: Single-track caution alerts for tracks on closed runways are not issued except for specific arrivals.	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-1.12: Source: ORD 3.1.(1).(b) Two-track conflict alerts shall be inhibited when both tracks are on the same or different closed runways.	MAOR-1.12: Two-track alerts are not generated on closed runways.	PASS			
MOP-1.13: Source: ORD 3.1.(2).(a) When a runway is closed, an alert shall be generated for an arrival track approaching that runway.	MAOR-1.13: Landing on a closed runway does generate an alert.	PASS			
MOP-1.14: Source: ORD 3.m.(3).\$3 An arrival indicator line shall be displayed only when an alert involving an arrival track occurs.	MAOR-1.14.1: Arrival Indicator lines are not displayed when non-arrival alerts occur. MAOR-1.14.2: : Arrival Indicator lines are displayed when arrival alerts occur.	PASS			
MOP-1.15: Source: ORD 3.r.(1).\$1 Tracking. The AMASS shall acquire and maintain track on at least 200 valid targets detected by the ASDE-3.	MAOR-1.15: AMASS can track at least 200 valid ASDE-3 targets.	PASS			
MOP-1.16: Source: ORD 3.r.(1).\$2 The probability that any aircraft is correctly in track shall be at least 99.9 percent.	MAOR-1.16: AMASS Probability of track is greater than 99.9.	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-1.17: Source: ORD 3.r.(1).\$3 A coasted track shall be counted as a tracking failure if the distance between the coasted track position and the actual target position exceeds 20 meters.	MAOR-1.17: Coasted tracks not within 20 meters of actual track will reduce Probability of track.	PASS			
MOP-1.18: Source: ORD 3.r.(2).(a).\$1 ASDE-3. The AMASS shall be capable of processing ASDE-3 surveillance data and displaying AMASS data on each ASDE-3 radar display once per scan without delaying the processing and display of the ASDE-3 data.	MAOR-1.18: AMASS data is displayed on ASDE-3 display once per scan without delaying the processing and display of the ASDE-3 data.	PASS			
MOP-1.19: Source: ORD 3.r.(2).(a).\$2 AMASS shall accommodate target data from either channel of the ASDE-3.	MAOR-1.19: AMASS accommodates data from either ASDE-3 channel.	PASS			
MOP-1.20: Source: ORD 3.r.(2).(b) TAIU. The arrival track position data shall be accepted and processed by AMASS within 0.5 second of receipt.	MAOR-1.20: AMASS will process TAIU data within 0.5 seconds of receipt.	PASS			
MOP-1.21: Source: ORD 3.r.(3).\$1 Arrival-ASDE-3 Track Data Correlation. The probability of correct arrival-ASDE-3 correlation shall exceed 90 percent.	MAOR-1.21: Arrival-ASDE-3 correct track data correlation must exceed 90%.	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-1.22: Source: ORD 3.r.(3).\$2 The probability of false arrival-ASDE-3 correlation (wrong arrival data paired with wrong ASDE-3 track) shall be less than 1 percent.	MAOR-1.22: Arrival-ASDE-3 incorrect track data correlation must be less than 1%	PASS			
MOP-1.23: Source: ORD 3.r.(3).\$3 The probability of missed arrival-ASDE-3 correlation (arrival data not paired with ASDE-3 track) shall be less than 10 percent.	MAOR-1.23: Arrival-ASDE-3 missed track data correlation must be less than 10%.	PASS			
MOP-1.24: Source: ORD 3.r.(4).\$1 ASDE-3 Target Processing. The AMASS shall detect any aircraft or surface vehicles in any area selected for the AMASS coverage on each opportunity (i.e., for each scan) with a probability of detection of at least 99 percent, including post-detection processing.	MAOR-1.24: AMASS PoD must be 99% or greater on a per scan basis for any selected AMASS coverage.	PASS		AMASS STR-PROD-0001 has been implemented.	
MOP-1.25: Source: ORD 3.r.(4).\$2 The AMASS shall not output false detections at a rate exceeding 10 tracks or 60 detections per hour.	MAOR-1.25: AMASS false detection rate must be less than 10 tracks or 60 per hour.	PASS		AMASS STR-PROD-0006, , 0003, 0005 has been implemented	
MOP-1.26: Source: ORD 3.r.(5).\$1 Clutter Map. AMASS shall maintain a clutter map to aid in the removal of static or slowly varying clutter.	MAOR-1.26: An AMAS clutter map must be maintained to aid in the removal of static or slowly varying clutter.	FAIL	AMASS Clutter Map is limited to 12,000ft, ASDE-3 coverage area is 24,000 ft.	STR was written.	

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-1.27: Source: ORD 3.r.(5).\$2 Neither target detection nor false detection rates shall be degraded in weather conditions throughout the AMASS coverage area including fair weather, rain levels up to and including 16 nm/hour; and snow conditions.	MAOR-1.27: AMASS PoD and False detection rates must not be affected fair weather, rain up to 16 mm/hour and snow conditions.	PASS	AMASS generates false tracks and alerts in heavy rain.	A "RAIN" operational configuration that turns of safety logic on ground tracks until rain conditions improve has been created.	
MOP-1.28: Source: ORD 3.r.(8).\$1 Centroiding. The AMASS shall estimate the geometric centroid of each detected target.	MAOR-1.28: AMASS centroiding must estimate the geometric center of each detected target.	PASS			
MOP-1.29: Source: ORD 3.r.(8).\$2 The root-sum-square scan-to-scan fluctuation of the centroid shall not exceed 5 meters north and east combined.	MAOR-1.29: Scan-to-scan fluctuation of the AMASS centroids must not exceed 5 meters.	PASS			
MOP-1.30: Source: ORD 3.r.(8).\$3 The bias error of the estimated centroid from the true physical centroid shall not exceed 15 meters.	MAOR-1.30: The bias error of the AMASS centroid must not exceed 15 meters.	PASS			
MOP-2.1: Source: ORD 3.a.(1).\$1 The AMASS shall provide the capability to establish and maintain all of the site-specific functional and system data bases to adapt the operations of AMASS at any airport.	MAOR-2.1: AMASS includes a capability to establish and maintain site-specific data bases to any airport.	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-2.2: Source: ORD 3.a.(1).\$2 A unique AMASS data base configuration shall be created and available for use for each of the operational runway configurations that are employed at the adapted airport.	MAOR-2.2: Each operational runway must have a unique AMASS data base configuration.	PASS			
MOP-2.3: Source: ORD 3.a.(1).\$3 The adaptation capability shall include defining traffic flows that may include one-way traffic flows on runways and taxiways.	MAOR-2.3: The AMASS adaptation capability must include the ability to define one and two-way traffic flows on runways and taxiways.	P3I	This feature is not included in the AMASS design	Reconsider the need for the feature. (AMASS Work Group is working this issue for P3I)	
MOP-2.4: Source: ORD 3.a.(1).\$4 It shall also include the specific runway incursion safety logic parameters.	MAOR-2.4: The AMASS adaptation capability must include the runway incursion safety logic parameters.	PASS			
MOP-2.5: Source: ORD 3.a.(2).\$1 AMASS shall include a capability to accept user input to establish or change adaptation data items or sets.	MAOR-2.5: The AMASS adaptation capability must accept user input to establish and change data items and sets.	PASS			
MOP-2.6: Source: ORD 3.a.(2).\$2 This capability shall be available at each AMASS site.	MAOR-2.6: Each AMASS site must have the AMASS adaptation capability.	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-2.7: Source: ORD 3.a.(2).\$3 It shall be available to the users via a menu selection capability in such a way that all selected adaptation parameters and sets of parameters may be specified and changed as needed.	MAOR-2.7: The AMASS adaptation capability must be menu-driven and allow the users to modify all adaptation parameters.	PASS			
MOP-2.8: Source: ORD 3.d.(5).(a) The user, through adaptation, shall be able to: change the message for any safety logic cell by changing the message number in the data base to another existing message number.	MAOR-2.8: The AMASS adaptation capability must allow for changes to the messages for any safety logic cell by changing the message number.	PASS			
MOP-2.9: Source: ORD 3.d.(5).(b) The user, through adaptation, shall be able to: modify the word composition within an alert message.	MAOR-2.9: The AMASS adaptation capability must allow for the modification of alert message composition.	PASS			
MOP-2.10: Source: ORD 3.d.(5).(c) The user, through adaptation, shall be able to: adjust the volume level of the voice messages.	MAOR-2.10: The AMASS adaptation capability must allow for the adjustment of volume level for the voice messages.	PASS			
MOP-2.11: Source: ORD 3.r.(9) Segment Definition. The AMASS shall permit defining segments (4-sided figures) for each movement surface as part of the adaptation process.	MAOR-2.11: The AMASS adaptation capability must allow for 4-sided segment definition for each movement surface.	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-2.12: Source: ORD 3.d.(3).(c).4.\$2 This capability to display the safety logic cell identifier shall be able to be set "on" or "off" in the adaptation mode and ...	MAOR-2.12: The AMASS adaptation capability must allow for the toggling of the display of the safety logic cell identifier.	PASS			
MOP-2.13: Source: ORD 3.d.(3).(c).4.\$3 This capability to display the safety logic cell identifier shall default to the "off" setting.	MAOR-2.13: The AMASS adaptation capability must default the safety logic cell identifier to "off".	PASS			
MOP-3.1: Source: ORD 3.b.(1).\$1 AMASS shall provide for the use of the ASDE-3 keypad and keyboard to control AMASS functions.	MAOR-3.1: AMASS accepts input from the ASDE-3 keypad and keyboard.	PASS			
MOP-3.2: Source: ORD 3.b.(1).\$2 Rapid Controller input shall be provided using "hot keys".	MAOR-3.2: AMASS provides for the use of "hotkeys".	PASS			
MOP-3.3: Source: ORD 3.b.(1).\$3 Each "hot key" shall enable a unique function that can be activated by depressing the "Enter" key or canceled by depressing the "ESC" key.	MAOR-3.3.1: The "hot key" function is activated by depressing "Enter". MAOR-3.3.2: The "hot key" function is cancelled by depressing "ESC".	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-3.4: Source: ORD 3.b.(1).\$4 When AMASS is turned on, the ASDE-3 keyboard and keypads shall remain in the ASDE-3 keyboard and keypad operations (i.e., functionality) until the appropriate "hot key" has been activated to switch the keypads and keyboard to AMASS operations.	MAOR-3.4: An appropriate "hot key" must be used to switch the ASDE-3 keyboard and keypad to AMASS operations.	PASS			
MOP-3.5: Source: ORD 3.b.(1).\$5 Once in AMASS operation a selection of the same "hot key" and its activation shall return the individual ASDE-3 keypad or keyboard to ASDE-3 functionality.	MAOR-3.5: The same "hot key" as described in MAOR-3.4 will return the keyboard/keypad to ASDE-3 functionality.	PASS			
MOP-3.6: Source: ORD 3.b.(2).\$1 "Hot keys", which provide user access to functions, shall be controlled via the ASDE-3 keypad using a single keystroke to activate the functions while the system is in AMASS operation.	MAOR-3.6: The ASDE-3 keypad will be controlled using single keystrokes to activate functions while in AMASS operation.	PASS			
MOP-3.7: Source: ORD 3.b.(2).\$3 In addition to providing all of the keypad functions, other functions shall be controlled via the ASDE-3 keyboard using function "hot keys" to activate the function when the keyboard is in AMASS operation.	MAOR-3.7: The ASDE-3 keypad will control additional functions using "hot keys".	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-3.8: Source: ORD 3.b.(2).\$4 To activate a function which requires a trackball slew, a function "hot key" shall be depressed first.	MAOR-3.8: Functions requiring a trackball slew will be preceded by depressing a "hot key".	PASS			
MOP-3.9: Source: ORD 3.b.(3).\$1 When the ASDE-3 keyboard has been switched to AMASS operations, a "hot key" on the ASDE-3 keyboard shall provide display of and access to the AMASS operational menu.	MAOR-3.9: While in AMASS operations, a "hot key" will provide for the display and access the operational menu.	PASS			
MOP-3.10: Source: ORD 3.b.(3).\$2 The AMASS operational menu shall show all options and current selections, including each available runway configuration.	MAOR-3.10: The AMASS operational menu must show all options and current selections including each available runway configuration.	PASS			
MOP-3.11: Source: ORD 3.b.(3).\$4 The design of the menu shall provide expansion capability for other selections.	MAOR-3.11: The AMASS operational menu must allow for expansion of capabilities.	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-3.12: Source: ORD 3.c.(1).\$1 At the beginning of the use of each operational runway configuration, or when environmental conditions change, the users shall be able to select an applicable data base configuration which will have with it associated runway traffic flow definitions, selected filtering of alerts in specific areas, and other relevant parameters.	MAOR-3.12.1: AMASS users must be able to select an applicable data base configuration when changing operational runway configurations and when environmental conditions change. MAOR-3.12.2: The applicable data base configurations must have runway traffic flow definitions, selected filtering of alerts and other relevant parameters.	PASS			
MOP-3.13: Source: ORD 3.c.(2).\$1 In the off-line setup mode, the user shall be able to select and modify a startup data base configuration that will be used when the system is activated into the operational state.	MAOR-3.13: The AMASS startup database must be modifiable in the off-line setup mode.	PASS			
MOP-3.14: Source: ORD 3.c.(2).\$2 If a startup data base configuration is not selected at startup, the data base configuration that will be activated shall be either: (a) The saved configuration that was in use when the system last transitioned from the operational state to the non-operational state, or (b) If there is no saved configuration, a data base configuration that has been defined as the default startup configuration.	MAOR-3.14.1: Upon AMASS startup and when no startup database configuration has been selected, the previously saved database configuration must be used. MAOR-3.14.2: Upon AMASS startup and when no startup database configuration has been selected and when no database configuration has been saved, the defined default startup database configuration must be used.	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-3.15: Source: ORD 3.c.(3) In these cases, on-line inputs by users shall not be required for the system to operate the AMASS functions that have been selected in advance for the normal operation of any runway configuration.	MAOR-3.15: User input is not required to operate the AMASS functions when a startup database configuration is not selected.	PASS			
MOP-3.16: Source: ORD 3.c.(5)(c).\$2 The new data base configuration shall be placed in effect automatically at the activation phase ending time,	MAOR-3.16: New database configurations are to be placed in effect immediately following the activation phase.	PASS			
MOP-3.17: Source: ORD 3.d.(1).\$1 AMASS shall impose the following static and dynamic presentations on the ASDE-3 displays, as well as, producing aural alerts when specified events occur and are detected by the safety logic cells.	MAOR-3.17: AMASS must impose static and dynamic presentations on the ASDE-3 displays and produce aural alerts when safety logic cells are activated.	PASS			
MOP-3.18: Source: ORD 3.d.(2)(a).1.\$1 When AMASS is on-line the static presentation shall include: AMASS operational status: OPERATIONAL" - a full operating mode, including an operating Terminal Automation Interface Unit (TAIU).	MAOR-3.18: When AMASS is on-line and fully operational the static display must include "AMASS operational status: OPERATIONAL".	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-3.19: Source: ORD 3.d.(2)(a).1.\$2 Note: AMASS shall not be in operating mode when the TAIU interface is not capable of sending data to the AMASS cabinet.	MAOR-3.19: The TAIU must be operational for the AMASS to be operational.	PASS			
MOP-3.20: Not used		PASS			
MOP-3.21: Source: ORD 3.d.(2)(a).3.\$1 When AMASS is on-line the static presentation shall include: AMASS operational status: "TEST" - for when AMASS is in a test state.	MAOR-3.21: When AMASS is on-line and in test mode the static display must include "AMASS operational status: TEST".	PASS			
MOP-3.22: Source: ORD 3.d.(2)(a).3.\$2 When AMASS is in a test state (and) it shall be capable of obtaining: live inputs from the ASDE-3 and TAIU (or the ASDE-3 only), input from recorded data playback; or a combination of recorded and live inputs.	MAOR-3.22.1: When AMASS is in a TEST state, it must be capable of receiving live input from the ASDE-3. MAOR-3.22.2: When AMASS is in a TEST state, it must be capable of receiving live input from the ASDE-3 without the TAIU. MAOR-3.22.3: When AMASS is in a TEST state, it must be capable of receiving input from recorded data. MAOR-3.22.4: When AMASS is in a TEST state, it must be capable of receiving a combination of live and recorded inputs.	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-3.23: Source: ORD 3.d.(2).(b).1 When AMASS is on-line the static presentation shall include: AMASS off-line mode: "OFF_LINE"" - for when the AMASS is operating but has been placed off-line.	MAOR-3.23: When AMASS is on-line, operating, but has been placed off-line, the static display must include "AMASS operational status: OFF_LINE".	PASS			
MOP-3.24: Source: ORD 3.d.(2).(c).\$1 In addition to the display of the currently invoked AMASS mode, an indicator shall be provided as a companion to the full and limited operating mode identifications to denote that alerts are inhibited for one or more AMASS tracks, "TRK INHIB" or arrival tracks, "ARR TRK INHIB."	MAOR-3.24.1: Additional limited operating mode identifications must be presented on the static display when alerts are inhibited for one or more AMASS tracks, "TRK INHIB". MAOR-3.24.2: Additional limited operating mode identifications must be presented on the static display when alerts are inhibited for arrival tracks, "ARR TRK INHIB".	PASS			
MOP-3.25: Source: ORD 3.d.(2).(c).\$2 If alerts are inhibited from both AMASS and arrival tracks, both inhibit indicators shall be displayed with the operating mode identification.	MAOR-3.25: Both the "TRK INHIB" and ARR TRK INHIB" indicators must be displayed if the situations exist simultaneously.	PASS			
MOP-3.26: Source: ORD 3.d.(2).(c).\$3 A combination of mode and alert inhibit indicators shall be displayed if the situations exist simultaneously.	MAOR-3.26: Both the mode and alert inhibit must be displayed if the situations exist simultaneously.	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-3.27: Source: ORD 3.d.(3).(a) The dynamic presentation shall include: Hold bars at intersections to active runways (see Hold Bar requirements).	MAOR-3.27: The AMASS dynamic presentation must include hold bars at active runway intersections.	PASS			
MOP-3.28: Source: ORD 3.d.(3).(b).\$1 The dynamic presentation shall include: Location of alert icons around a track(s) involved in the activated alert.	MAOR-3.28: The AMASS dynamic presentation must include the location of alert icons around each involved track.	PASS			
MOP-3.29: Source: ORD 3.d.(3).(b).\$2 The dynamic presentation shall include: The alert icon on the ASDE-3 used to highlight the track(s) involved in the alert shall be nondirectional, preferably having an octagonal shape.	MAOR-3.29: The AMASS dynamic presentation alert icon must be non-directional.	PASS			
MOP-3.30: Source: ORD 3.d.(3).(b).\$3 The dynamic presentation shall include: During an alert situation, each alert icon shall be centered on the associated AMASS track centroid and remain displayed as long as the alert condition continues.	MAOR-3.30: Alert icons must remain centered on the AMASS track centroid for as long as the alert condition exists.	PASS			
MOP-3.31: Source: ORD 3.d.(3).(c) The dynamic presentation shall include: Alert text messages.	MAOR-3.31: Alert text messages must be part of the dynamic display.	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-3.32: Source: ORD 3.d.(3).(c).\$1 When an alert is activated, a text message shall be displayed in the alert window on the ASDE-3 display in the same format as described for the voice (aural) alert messages.	MAOR-3.32: Text messages must be displayed in the alert window on the ASDE-3 display when an alert is activated.	PASS			
MOP-3.33: Source: ORD 3.d.(3).(c).\$2 The window in which the message is displayed shall be able to be relocated anywhere on the ASDE-3 display.	MAOR-3.33: The alert window must be able to be relocated anywhere on the ASDE-3 display.	PASS			
MOP-3.34: Source: ORD 3.d.(3).(c).1 Alert messages shall be displayed in all upper case characters.	MAOR-3.34: Alert messages must be in upper-case only.	PASS			
MOP-3.35: Source: ORD 3.d.(3).(c).3 Displayed alerts shall contain abbreviations for words furnished by Air Traffic.	MAOR-3.35: Alert messages must contain abbreviations as furnished by Air Traffic.	PASS			
MOP-3.36: Source: ORD 3.d.(3).(c).4.\$1 A capability shall be provided to display the safety logic cell identifier as a field that precedes the three fields of the alert message.	MAOR-3.36: The capability to display the safety logic cell identifier prior to the alert message must exist.	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-3.37: Source: ORD 3.d.(3)(d) The dynamic presentation shall include: Arrival Indicator Lines and icon.	MAOR-3.37: The dynamic presentation must include Arrival Indicator Lines and icon.	PASS			
MOP-3.38: Source: ORD 3.d.(3)(f) The dynamic presentation shall include: Simulation tracks.	MAOR-3.38: The dynamic presentation must include simulation tracks.	PASS			
MOP-3.39: Not used.					
MOP-3.40: Not used.					
MOP-3.41: Source: ORD 3.d.(4).\$1 When an alert condition has been detected by AMASS, in addition to the display of the text message in the alert window and the track highlighting described above, a voice message composed of combinations of the words available in the Air Traffic furnished word dictionary shall be pronounced aurally.	MOP-3.41: A voice message composed of combinations of the words available in the Air Traffic furnished word dictionary must be pronounced aurally when an alert condition has been detected..	PASS			
MOP-3.42: Not used.					

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-3.43: Source: ORD 3.d.(4).(a).1 The format for pronounced alert messages shall consist of three fields: (field 1 of 3, case 1 of 2) Type of alert: "CAUTION" for single-track alerts.	MAOR-3.43: Field 1 of 3, case 1 of 2 of pronounced alert messages must be "CAUTION" for single-track alerts.	PASS			
MOP-3.44: Source: ORD 3.d.(4).(a).2 The format for pronounced alert messages shall consist of three fields: (field 1 of 3, case 2 of 2) Type of alert: "WARNING" for two-track alerts.	MAOR-3.44: Field 1 of 3, case 2 of 2 of pronounced alert messages must be "WARNING" for two-track alerts.	PASS			
MOP-3.45: Source: ORD 3.d.(4).(b).\$1 The format for pronounced alert messages shall consist of three fields: (field 2 of 3): The alphanumeric identifier for that movement area involved in the situation (e.g., "two-eight right" for runway 28R or "sierra" for taxiway S).	MAOR-3.45: Field 2 of 3 of pronounced alert messages must be the alphanumeric identifier for the involved movement area.	PASS			
MOP-3.46: Source: ORD 3.d.(4).(b).\$2 Pronouncements for field 2 of 3 shall use the ICAO phonetic alphabet for numeric and alphabetic identifiers of runways and taxiways,	MAOR-3.46: Field 2 of 3 of the pronounced alert messages must use the ICAO alphabet for numeric and alphabetic identifiers.	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-3.47: Source: ORD 3.d.(4)(b).§3 ... except that pronouncements for field 2 of 3 left, right, and center runway identifiers shall be pronounced as "left, right and center."	MAOR-3.47: An exception to MAOR-46 is that left, right, and center runway identifiers must be pronounced "left", "right", and "center".	PASS			
MOP-3.48: Not used					
MOP-3.49: Source: ORD 3.d.(4)(b).1 For an intersection of a runway and a taxiway, the runway designation shall be given first, followed by the word "at," followed by the taxiway identifier (e.g., "one-left at whiskey" for runway 1L at taxiway W).	MAOR-3.49: An exception to MAOR-46 is that for an intersection of a runway and a taxiway, the runway designation must be given first, followed by the word "at," followed by the taxiway identifier	PASS			
MOP-3.50: Source: ORD 3.d.(4)(b).2 For an intersection of two runways, the word "and," shall be pronounced between the runway identifiers (e.g., "two-eight left and one-niner right" for runway 28L and runway 9R).	MAOR-3.50: An exception to MAOR-46 is that for an intersection of two runways, the word "and" must be pronounced between runway identifiers.	PASS			
MOP-3.51: Source: ORD 3.d.(4)(c) The format for pronounced alert messages shall consist of three fields: (field 3 of 3): Content of the message as prescribed by adaptation for each safety logic cell using the set of Air Traffic designated alert messages.	MAOR-3.51: Field 3 of 3 of the pronounced alert messages must include the content of the message as prescribed by adaptation for each safety logic cell using the set of Air Traffic designated alert messages.	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-3.52: Source: ORD 3.d.(6) Any alert condition that appears and disappears in a time interval during which a previous voice message is being outputted shall only be displayed (i.e., no voice message shall be issued).	MAOR-3.52: An alert condition that appears and disappears in a time interval during which a previous voice message is being outputted must only be displayed	PASS			
MOP-3.53: Source: ORD 3.e.(1).\$1 The AMASS shall provide a statistical analysis package to summarize alert data from the recorded log data file(s) of track data.	MAOR-3.53: The AMASS must provide a statistical analysis package to summarize alert data from the recorded log data file(s) of track data.	PASS			
MOP-3.54: Source: ORD 3.e.(1).\$2 The statistical analysis package shall operate off-line, in normal time or fast time, as an aid in the rapid adjustment of all site parameter values during and after system installation.	MAOR-3.54: The statistical analysis package must operate off-line, in normal time or fast time, as an aid in the rapid adjustment of all site parameter values during and after system installation.	PASS			
MOP-3.55: Source: ORD 3.e.(2) The statistical analysis package shall provide a hard copy print out and an electronic text file containing the following information:	MAOR-3.55: The statistical analysis package must provide a hard copy print out and an electronic text file.	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-3.56: Source: ORD 3.e.(2).(a) The statistical analysis package shall include: Date of report.	MAOR-3.56: The statistical analysis package must include the date of report.	PASS			
MOP-3.57: Source: ORD 3.e.(2).(b) The statistical analysis package shall include: Period of time covered (log period).	MAOR-3.57: The statistical analysis package must include the log period.	PASS			
MOP-3.58: Source: ORD 3.e.(2).(c) The statistical analysis package shall include: Airport configuration and associated data base configuration file name(s).	MAOR-3.58: The statistical analysis package must include the airport configuration and associated data base configuration file name(s).	PASS			
MOP-3.59: Source: ORD 3.e.(2).(d) The statistical analysis package shall include: List of inhibited cells.	MAOR-3.59: The statistical analysis package must include the list of inhibited cells.	PASS			
MOP-3.60: Source: ORD 3.e.(2).(e) The statistical analysis package shall include: List of cells invoking alert(s) including:	MAOR-3.60: The statistical analysis package must include the list of cells invoking alert(s).	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-3.61: Source: ORD 3.e.(2).(e).1 The statistical analysis package shall include: List of cells invoking alert(s) including: cell number.	MAOR-3.61: The statistical analysis package must include the list of cells invoking alert(s) including the cell number.	PASS			
MOP-3.62: Source: ORD 3.e.(2).(e).2 The statistical analysis package shall include: List of cells invoking alert(s) including: alert output message.	MAOR-3.62: The statistical analysis package must include the statistical analysis package shall include the list of cells invoking alert(s) including the: alert output message.	PASS			
MOP-3.63: Source: ORD 3.e.(2).(e).3 The statistical analysis package shall include: List of cells invoking alert(s) including: time of alert.	MAOR-3.63: The statistical analysis package must include the list of cells invoking alert(s) including the time of alert.	PASS			
MOP-3.64: Source: ORD 3.e.(3).\$1 The statistical analysis package printed report shall list the invoked alert cells chronologically and numerically by cell number.	MAOR-3.64: The statistical analysis package printed report must include the list the invoked alert cells chronologically and numerically by cell number. must include the date of report.	PASS			
MOP-3.65: Source: ORD 3.e.(3).\$2 In addition, the statistical analysis package printed report shall include a summary of the number of occurrences that each cell generated an alert during the log period.	MAOR-3.65: the statistical analysis package printed report must include a summary of the number of occurrences that each cell generated an alert during the log period.	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-3.66: Source: ORD 3.e.(4) The capability shall be provided by the statistical analysis package to rerun at a rapid pace the recorded track data to generate another summary report using a different data base configuration (i.e., changed parameter values).	MAOR-3.66: The statistical analysis package must include the capability to rerun at a rapid pace the recorded track data to generate another summary report using a different data base configuration.	PASS			
MOP-3.67: Source: ORD 3.f.(1).(e).\$1 Any caution alert involving a track which is also involved in a warning alert shall not be issued if detected during the same 1 second scan or shall be removed (if already issued) from the displayed active alert list.	MAOR-3.67.1: Any caution alert involving a track which is also involved in a warning alert must not be issued if detected during the same 1 second scan . MAOR-3.67.2: Any caution alert involving a track which is also involved in a warning alert must be removed if already issued from the displayed active alert list.	PASS			
MOP-3.68: Source: ORD 3.f.(1).(e).\$2 The caution alert involving a track which is also involved in a warning alert shall be reissued if a caution alert situation still exists when the warning alert ceases.	MAOR-3.68: The caution alert involving a track which is also involved in a warning alert must be reissued if a caution alert situation still exists when the warning alert ceases.	PASS			
MOP-3.69: Source: ORD 3.f.(1).(f).\$1 Modifications to the displayed alert list shall be made on a complete radar scan basis, ...	MAOR-3.69: Modifications to the displayed alert list must be made on a complete radar scan basis.	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-3.70: Source: ORD 3.f.(1)(f).S2 ...but voice message issuance modifications shall only be performed based on the availability of the voice processor. For example, if the voice processor, is busy sounding a caution alert, and a warning alert is issued involving the same track, the voice processor shall complete the generation of the current caution alert, but the displayed caution message shall immediately be replaced by the warning message. Once the voice processor has completed output of the caution alert, the warning alert message shall be voiced.	MAOR-3.70: Voice message issuance modifications must be performed based on the availability of the voice processor.	PASS			
MOP-3.71: Source: ORD 3.f.(1)(g) The display of alert messages and alert icons together with the aural alert message output shall comply with the "Display and Audio Output" requirements.	MAOR-3.71: The display of alert messages and alert icons together with the aural alert message output must comply with MAOR-3.17 through MAOR-3.53.	PASS			
MOP-3.72: Source: ORD 3.n.(1).S1 AMASS shall provide for display of fixed hold bars at intersecting taxiways and runways for the full length of the runway in front of an oncoming departure, lander, or arrival track.	MAOR-3.72: AMASS must provide for display of fixed hold bars at intersecting taxiways and runways for the full length of the runway in front of an oncoming departure, lander, or arrival track	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-3.73: Source: ORD 3.n.(1).\$2 As the departure or lander track passes each intersection, the hold bar for that intersection shall be eliminated.	MAOR-3.73: The hold bar for an intersection must be eliminated as a departure or lander track passes that intersection.	PASS			
MOP-3.74: Source: ORD 3.n.(1).\$3 The hold bars for an arrival track shall be activated when the track is a parameter distance from the runway threshold.	MAOR-3.74: The hold bars for an arrival track must be activated when the track is a parameter distance from the runway threshold.	PASS			
MOP-3.75: Source: ORD 3.n.(1).\$4 The hold bars shall be displayed with a higher brightness level than the normal map and at the edge of the appropriate runway.	MAOR-3.75: Hold bars must be displayed with a higher brightness level than the normal map and at the edge of the appropriate runway.	PASS			
MOP-3.76: Source: ORD 3.n.(1).\$5 Hold bars shall not be displayed at the runway-runway intersection of two intersecting active runways.	MAOR-3.76: Hold bars must not be displayed at the runway-runway intersection of two intersecting active runways.	PASS			
MOP-3.77: Source: ORD 3.n.(2) AMASS shall not provide moving hold bars.	MAOR-3.77: AMASS must not provide moving hold bars.	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-3.78: Source: ORD 3.o.(1).\$1 This system shall record, retain for 15 days, and playback, all synchronized time-stamped data and alerts on the airport movement area, including up to the vertical coverage height of the ASDE-3.	MAOR-3.78: AMASS must record, retain for 15 days, and playback, all synchronized time-stamped data and alerts on the airport movement area, including up to the vertical coverage height of the ASDE-3.	PASS	Issue: The larger disk drives are not yet installed at the first three AMASS sites.	Larger Drives have been installed at all sites (6 gig drives) and will handle the 15 days of recording.	
MOP-3.79: Source: ORD 3.r.(6).\$1 Runway Configurations. The AMASS shall be capable of displaying up to 25 runway configurations, but	MAOR-3.79: AMASS must be capable of displaying up to 25 runway configurations.	PASS			
MOP-3.80: Source: ORD 3.r.(6).\$2 ... only the number of Runway Configurations established during adaptation shall be displayed or occupy display space.	MAOR-3.80: Only the number of Runway Configurations established during adaptation must be displayed or occupy display space.	PASS			
MOP-3.81: Source: ORD 3.r.(7).\$1 Arrival Tags. The AMASS shall have the capability to continuously process up to 25 tags for landing aircraft tracks that are within the AMASS surface area.	MAOR-3.81: AMASS must have the capability to continuously process up to 25 tags for landing aircraft tracks that are within the AMASS surface area.	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-3.82: Source: ORD 3.r.(7).\$2 The AMASS shall utilize arrival data and information on aircraft within the defined AMASS approach areas to determine the intended arrival runway.	MAOR-3.82: AMASS must utilize arrival data and information on aircraft within the defined AMASS approach areas to determine the intended arrival runway.	PASS			
MOS-3.83: Source: Derived from COI-3 Is the display presentation of AMASS and the alerts suitable to perform the AMASS mission?	MAOR-3.83.1: As determined by test team consensus, the implemented government provided list of text messages is suitable for performing the AMASS mission (Message content, font size track icons, multi-path icons, filter icons, alert icons and TA indicator). MAOR-3.83.2: As determined by test team consensus, the implemented closed runway designation (an "X" at the ends of each closed runway) is suitable for performing the AMASS mission.	PASS			
MOS-3.84: Source: Derived from COI-3 Is the aural presentation of AMASS alerts suitable to perform the AMASS mission?	MAOR-3.84: As determined by test team consensus, the government provided list of aural messages is suitable for performing the AMASS mission (tone, diction, speed, message content).	PASS			
MOS-3.85: Source: Derived from COI-3 Does AMASS provide suitable controls to operationally control the system?	MAOR-3.85: As determined by test team consensus, the operational control provided by AMASS are suitable for performing the AMASS mission (Closing runways, Volume adjustment, Hot keys, controller/supervisor).	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-4.1: Source: ORD 3.d.(8).\$1 An indicator shall be provided to denote that alerts are inhibited for one or more AMASS tracks (i.e., "TRK INHIB") or one or more arrival tracks (i.e., "ARR TRK INHIB").	MAOR 4.1: AMASS must provide an indicator to denote that alerts are inhibited for one or more AMASS tracks (i.e., "TRK INHIB") or one or more arrival tracks (i.e., "ARR TRK INHIB").	PASS			
MOP-4.2: Source: ORD 3.d.(8).\$2 If alerts are inhibited from both AMASS and arrival recorded tracks, both inhibited indicators shall be displayed.	MAOR 4.2: If alerts are inhibited from both AMASS and arrival recorded tracks, both inhibited indicators must be displayed.	PASS			
MOP-4.3: Source: ORD 3.g.(1).\$1 The users, via the ASDE-3 keypad/keyboard and trackball, shall be provided the capability to inhibit all or some alerts for specified AMASS tracks.	MAOR 4.3: AMASS must provide the capability for the users to inhibit all or some alerts for AMASS tracks through the use of the ASDE-3 keypad/keyboard.	PASS			
MOP-4.4: Source: ORD 3.g.(1).\$3 Each alert inhibit action shall continue for an allocated parameter time period, or in the case of arrival aircraft track, until it crosses the runway threshold.	MAOR 4.4: Alert inhibits must continue for an allocated parameter time period, or in the case of arrival aircraft track, until it crosses the runway threshold.	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-4.5: Source: ORD 3.g.(1).\$4 After the allocated time period has elapsed, the previously selected track(s) shall automatically return to their normal alert status allowing automatic activation of alerts.	MAOR 4.5: After the allocated time period has elapsed, the previously selected track(s) must automatically return to their normal alert status.	PASS			
MOP-4.6: Source: ORD 3.g.(1).\$5 A capability shall be provided to increment the inhibit time for any track(s) with a predetermined parameter time period in which the inhibit action remains in effect and the cumulative continuous inhibit time has not exceeded the total alert inhibit time parameter for the selected track(s).	MAOR-4.6.1: AMASS must provide the capability to increment the inhibit time for any track(s) with a predetermined parameter time period. MAOR-4.6.2: During this period, the inhibit action remains in effect as long as the cumulative continuous inhibit time has not exceeded the total alert inhibit time parameter for the selected track(s).	PASS			
MOP-4.7: Source: ORD 3.g.(2).\$1 Three separate "hot keys" shall be provided for selective aircraft filtering.	MAOR-4.7: Selective Aircraft Filtering must use three separate "hot keys".	PASS			
MOP-4.8: Source: ORD 3.g.(2).\$3 The selection of one of the three "hot keys" along with the trackball shall be used to identify the desired selective aircraft filtering function and track(s).	MAOR-4.8: The selection of one of the three hotkeys, along with the use of the trackball, must identify the desired selective aircraft filtering function and track(s).	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-4.9: Source: ORD 3.g.(2).(a) "Hot key" 1 of 3 shall be: Inhibit all alerts for up to three simultaneous AMASS tracks.	MAOR-4.9: "Hot key" 1 of 3 must inhibit all alerts for up to three simultaneous AMASS tracks.	PASS			
MOP-4.10: Source: ORD 3.g.(2).(b) "Hot key" 2 of 3 shall be: Inhibit all single-track alerts for up to three simultaneous AMASS tracks.	MAOR-4.10: "Hot key" 2 of 3 shall inhibit all single-track alerts for up to three simultaneous AMASS tracks	PASS			
MOP-4.11: Source: ORD 3.g.(3) The "Inhibit all alert" function shall have priority over the "Inhibit all single-track alert" capability.	MAOR-4.11: MAOR-4.10 must take precedence over MAOR-4.9.	PASS			
MOP-4.12: Source: ORD 3.g.(4).S1 Through the use of the appropriate "hot key" (i.e., the same key used to originally inhibit the track) and trackball, a capability shall be provided for a user to extend an inhibit alert time by adding a time increment parameter to the remaining alert time before the inhibiting time has expired...	MAOR-4.12: AMASS must provide the capability to extend an inhibit alert time by using the same hot key and trackball combination.	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-4.13: Source: ORD 3.g.(4).\$2 ...a user may extend an inhibit alert time with the restriction that the total inhibiting time shall not exceed 15 minutes. This "hot key" can be used continuously to add additional time to the same track, but not to exceed the 15 minutes.	MAOR-4.13: The capability to extend an inhibit alert time must not exceed 15 minutes.	PASS			
MOP-4.14: Source: ORD 3.g.(4).\$3 Once the total cumulative inhibit time expires on any designated track, it shall be possible to reinitiate this process on that track, but, only by again selecting the track as described above. A de-inhibiting capability is not required.	MAOR-4.14: Once the total cumulative inhibit time expires on any designated track, it must be possible to reinitiate this process on that track.	PASS			
MOP-4.15: Source: ORD 3.g.(5).\$1 A track inhibit message, "TRK INHIB," shall be displayed with the AMASS mode indicator as long as any AMASS track is inhibited.	MAOR-4.15: As long as any AMASS track is inhibited, the "TRK INHIB" message must be displayed.	PASS			
MOP-4.16: Source: ORD 3.g.(5).\$2 Additionally, another track inhibit message, "ARR TRK INHIB," shall be displayed with the AMASS mode indicator when one or more arrival tracks are inhibited and remain displayed until the last arrival that is inhibited crosses the arrival runway threshold.	MAOR-4.16: "ARR TRK INHIB," must be displayed with the AMASS mode indicator when one or more arrival tracks are inhibited and remain displayed until the last arrival that is inhibited crosses the arrival runway threshold.	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-4.17: Source: ORD 3.g.(5).\$3 All tracks within the approach area within a parameter distance to the threshold at the time of activation shall be inhibited for as long as they remain arrival tracks;	MAOR-4.17: Tracks within the approach area within a parameter distance to the threshold at the time of activation must be inhibited for as long as they remain arrival tracks	PASS			
MOP-4.18: Source: ORD 3.g.(5).\$4 however, new tracks entering this approach area shall not be inhibited.	MAOR-4.18: New tracks entering the approach area subsequent to the activation of the arrival track inhibit function must not be inhibited.	PASS			
MOP-4.19: Source: ORD 3.g.(6).\$1 When applicable alerts involving a track have been inhibited via one of the "hot key" operations, the effect shall be to inhibit graphic, text, and voice processing with alerts associated with the selected track(s).	MAOR-4.19: Graphic, text, and voice processing with alerts associated with the selected track(s) all must be inhibited when applicable alerts involving a track have been inhibited. Via one of the hot key .	PASS			
MOP-4.20: Source: ORD 3.g.(6).\$2 The display and voice alert processing for a track that has been inhibited shall automatically be enabled after the inhibit alert time parameter has elapsed.	MAOR-4.20: The display and voice alert processing for a track that has been inhibited must automatically be enabled after the inhibit alert time parameter has elapsed.	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-4.21: Source: ORD 3.g.(7).\$1 An inhibit alert time parameter for each of the first two "hot keys" shall be selectable between 0 and 10 minutes (in one-half minute increments) to specify how long alerts associated with the selected track(s) are to be inhibited.	MAOR-4.21: The inhibit alert time parameter for each of the first two "hot keys" must be selectable between 0 and 10 minutes in one-half minute increments.	PASS			
MOP-4.22: Source: ORD 3.g.(7).\$2 An inhibit alert time increment parameter shall be selectable between 0 and 4 minutes (in one-half minute increments) to specify the time to be added to the existing inhibit alert time.	MAOR-4.22: The inhibit alert time increment parameter must be selectable between 0 and 4 minutes in one-half minute increments to specify the time to be added to the existing inhibit alert time.	PASS			
MOP-4.23: Source: ORD 3.g.(7).\$3 The inhibit icon display time parameter shall be selectable in 1 second increments between 1 and 2 seconds).	MAOR-4.23: The inhibit icon display time parameter must be selectable in 1 second increments between 1 and 2 seconds.	PASS			
MOP-4.24: Source: ORD 3.g.(7).\$4 These inhibit time parameters shall be modifiable from the PC platform.	MAOR-4.24: These inhibit time parameters must be modifiable from the PC platform.	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-4.25: Source: ORD 3.g.(7).\$5 An Additional parameter shall be provided to assure that the total cumulative, consecutive alert-time for-inhibiting an alert on any track will not exceed 15 minutes.	MAOR-4.25: The total cumulative, consecutive alert-time for-inhibiting an alert on any track must not exceed 15 minutes.	PASS			
MOP-4.26: Source: ORD 3.g.(7).\$6 In the event that an inhibit alert action and any subsequent alert inhibit action(s) on one or more tracks that produces a cumulative total of 15 minutes, the alert output shall be automatically enabled after 15 minutes.	MAOR-4.26: In the event that an inhibit alert action and any subsequent alert inhibit action(s) on one or more tracks that produces a time that exceeds a cumulative total of 15 minutes, the alert output must be automatically enabled after 15 minutes.	PASS			
MOP-4.27: Source: ORD 3.h.(1).\$1 AMASS shall allow for the creation and execution of stopped track alert inhibit timeout values, assigned to each runway within a specific runway configuration.	MAOR-4.27: AMASS must allow for the creation and execution of stopped track alert inhibit timeout values, assigned to each runway within a specific runway configuration.	PASS			
MOP-4.28: Source: ORD 3.h.(1).\$2 The user of an ASDE-3 keypad/keyboard and trackball shall be provided the capability to add time to extend the stopped track alert inhibit timeout period.	MAOR-4.28: The user of an ASDE-3 keypad/keyboard and trackball must be provided the capability to add time to extend the stopped track alert inhibit timeout period.	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-4.29: Source: ORD 3.h.(1).\$3 After the allocated time period has elapsed, the previously selected track(s) shall automatically return to the normal alert status allowing automatic activation of alerts.	MAOR-4.29: After the allocated time period has elapsed, the previously selected track(s) must automatically return to the normal alert status allowing automatic activation of alerts.	PASS			
MOP-4.30: Source: ORD 3.h.(2).\$1 On the ASDE-3 keypad and keyboard, a "hot key" shall be provided to extend a stopped track alert inhibit timeout period.	MAOR-4.30: On the ASDE-3 keypad and keyboard, a "hot key" must be provided to extend a stopped track alert inhibit timeout period.	PASS			
MOP-4.31: Source: ORD 3.h.(2).\$2 The trackball shall be used to identify the track on which the stopped track alert inhibit timeout is directed.	MAOR-4.31: The trackball must be used to identify the track on which the stopped track alert inhibit timeout is directed.	PASS			
MOP-4.32: Source: ORD 3.h.(2).\$3 Before the initial stopped track timeout has expired, the timeout period for the identified track shall be extended through a subsequent activation of the same "hot key."	MAOR-4.32: Before the initial stopped track timeout has expired, the timeout period for the identified track must be extended through a subsequent activation of the same "hot key."	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-4.33: Source: ORD 3.h.(2).\$4 The total extended alert inhibit timeout period shall equal the sum of the remaining stopped track alert timeout value plus a parameter time. For example, if the initial timeout period is set to 3 minutes at any time during the 3-minute interval, it shall be possible to add an additional 3 minutes to the alert inhibit time as long as the maximum stopped track alert inhibit time does not exceed the maximum stopped track alert inhibit time parameter.	MAOR-4.33: The total extended alert inhibit timeout period must equal the sum of the remaining stopped track alert timeout value plus a parameter time.	PASS			
MOP-4.34: Source: ORD 3.h.(2).\$6 Prior to the track moving, the AMASS shall only activate one alert, but the alert icon shall remain until the track moves.	MAOR-4.34: Prior to the track moving, the AMASS must only activate one alert, but the alert icon must remain until the track moves.	PASS			
MOP-4.35: Source: ORD 3.h.(2).\$7 If the track stops again, an initial alert inhibit timeout parameter shall be initiated without any extended time.	MAOR-4.35: If the track stops again, an initial alert inhibit timeout parameter must be initiated without any extended time.	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-4.36: Source: ORD 3.h.(2).\$8 However, the user shall be able to extend the stopped track alert inhibit timeout period if the stopped track timeout has not expired and the track continues to be stopped, provided that the maximum stopped track alert inhibit time parameter has not been exceeded.	MAOR-4.36: the user must be able to extend the stopped track alert inhibit timeout period if the stopped track timeout has not expired and the track continues to be stopped.	PASS			
MOP-4.37: Source: ORD 3.h.(3) A track inhibit message, "TRK INHIB," shall be displayed with the AMASS mode indicator for as long as any stopped track is inhibited.	MAOR-4.37: A track inhibit message, "TRK INHIB," must be displayed with the AMASS mode indicator for as long as any stopped track is inhibited	PASS			
MOP-4.38: Source: ORD 3.h.(4).\$1 When alerts involving a stopped track have been inhibited via a "hot key," the effect shall be to inhibit graphic, text, and voice processing associated with the selected track(s).	MAOR-4.38: When alerts involving a stopped track have been inhibited via a "hot key," the effect must be to inhibit graphic, text, and voice processing associated with the selected track(s).	PASS			
MOP-4.39: Source: ORD 3.h.(4).\$2 The display and voice alert processing for a track that has been inhibited shall automatically be enabled after the appropriate inhibit stopped track alert time parameter has elapsed.	MAOR-4.39: The display and voice alert processing for a track that has been inhibited must automatically be enabled after the appropriate inhibit stopped track alert time parameter has elapsed.	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-4.40: Source: ORD 3.h.(5).\$1 The stopped track alert inhibit timeout parameter shall be selectable for each runway between 0 and 10 minutes in one-half minute increments.	MAOR-4.40: The stopped track alert inhibit timeout parameter must be selectable for each runway between 0 and 10 minutes in one-half minute increments.	PASS			
MOP-4.41: Source: ORD 3.h.(5).\$2 The parameter for this stopped track alert inhibit timeout increment shall be selectable between 0 and 4 minutes in one-half minute increments.	MAOR-4.41: The parameter for the stopped track alert inhibit timeout increment must be selectable between 0 and 4 minutes in one-half minute increments	PASS			
MOP-4.42: Source: ORD 3.h.(5).\$3 The maximum time for a stopped track alert inhibition parameter shall be selectable between 0 and 10 minutes in one-half minute increments.	MAOR-4.42: The maximum time for a stopped track alert inhibition parameter must be selectable between 0 and 10 minutes in one-half minute increments.	PASS			
MOP-4.43: Source: ORD 3.h.(6).\$1 The stopped track alert inhibit timeout parameter shall not be accessible via the ASDE-3 interface, but shall only be modifiable from the PC platform.	MAOR-4.43: The stopped track alert inhibit timeout parameter must not be accessible via the ASDE-3 interface, but must only be modifiable from the PC platform.	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-4.44: Source: ORD 3.h.(6).\$2 The stopped track alert inhibit timeout parameter, the stopped track alert inhibit timeout increment parameter, and the maximum time for stopped track alert inhibition parameter must be part of the AMASS data base configuration.	MAOR-4.44: The stopped track alert inhibit timeout parameter, the stopped track alert inhibit timeout increment parameter, and the maximum time for stopped track alert inhibition parameter must be part of the AMASS data base configuration	PASS			

APPENDIX B
AT OT Issue Matrix

AMASS AT OT ISSUE LIST

For the issues identified below, criticality has been defined as follows:

- **High** - A problem that will prevent, degrade, or interrupt operational service or jeopardize safety, and has no acceptable work-around.
- **Medium** – To prevent, degrade, or interrupt operational service or jeopardize safety, but has an acceptable work-around.
- **Low** - The issue constitutes an improvement to the operational use of AMASS and can be resolved through post-commissioning modifications.

I S S U E	TITLE	DESCRIPTION	RESOLUTION/STATUS	Priority	OPEN/ CLOSED
1	False Tracks and False Alerts	The current AMASS implementation cannot be adapted to reduce false tracks and false alerts to an acceptable level. Contributing issues are listed below.			
1a	False Tracks and False Alerts	Long term false tracks on a runway surface will transition to "real" track status within 4 minutes.	Add the capability to allow an AMASS segment to have an infinite confidence level count. (See AMASS STR-PROD-0006.)		CLOSED
1b	False Tracks and False Alerts	Some real tracks are not transitioned to "real" track status due to the AMASS multi-path algorithm.	Resolve the error in the AMASS multi-path algorithm by fixing the multi-path lines error. (See AMASS STR-PROD-0001.)		CLOSED
1c	False Tracks and False Alerts	The multi-path algorithm does not correctly identify false tracks in certain situations.	Resolve the computational error in the multi-path algorithm. (See AMASS STR-PROD-0003.)		CLOSED
1d	False Tracks and False Alerts	AMASS generates false tracks and false alerts in heavy rain.	Determine an operational procedure for transitioning from/to the "RAIN" configuration in poor weather. (The AMASS Work Group is working the Supervisor procedures to handle this issue.)		CLOSED
			Develop a "rain" operational configuration that turns off safety logic on ground tracks until the rain		

I S S U E	TITLE	DESCRIPTION	RESOLUTION/STATUS	Priority	OPEN/ CLOSED
1e	False Tracks and False Alerts	False tracks can reach real track status on a taxiway and then move across the grass and onto runway surfaces resulting in false alerts.	conditions improve. AMASS drops the track when it leaves a valid surface. (See AMASS STR-PROD-0005.)		CLOSED
2	Nuisance Alerts	The current AMASS implementation cannot be adapted to reduce nuisance alerts to an acceptable level. Contributing issues are listed below:			
2a	Nuisance Alerts	The TAIU may not provide a track update for 4 seconds after a track crosses the runway approach zone.	TAIU software sends data within 1 second of the track entering the runway's approach zone. Also the AMASS alert logic does not process arrival alerts until an arrival track is within a parameter distance of the threshold.		CLOSED
2b	Nuisance Alerts	Setting the taxi to departure transition speed to the allowable maximum of 100 ft/sec may not remove all nuisance alerts due to vehicles.	AMASS allows taxi to departure transition speeds above 100 ft/sec. And AMASS includes the track's acceleration as an additional parameter in the taxi to departure transition		CLOSED
2c	Nuisance Alerts	Analysis of recorded data found some situations in which a taxi crossing the runway did not create an appropriate alert.	Resolve AMASS STR-PROD-0008.		CLOSED
2d	Nuisance Alerts	Taxis crossing runways cause nuisance alerts.	AMASS projects tracks taxiing across the runway "off" of the runway when appropriate (Table 6 alerts)		CLOSED
2e	Nuisance Alerts	The initial velocity calculation made by AMASS is sometimes greater than the actual velocity. This causes a track to be projected too far down the runway, creating nuisance alerts.	Resolve AMASS STR-PROD-0009.		CLOSED
2f	Nuisance Alerts	Lander chasing a Taxi Scenario: The OT Test Team members felt that this alert would be more useful to the controller if given earlier. The OT Test Team members felt that the controller still had time to prevent the collision, but the situation would not be pretty. The current setting is 20 secs.	The AMASS Work Group evaluate the alert and will keep the current setting to 20 secs.		CLOSED
3	Two Way	AMASS does not include the capability to define	Reevaluate the need for this function as additional	L	OPEN

I S S U E	TITLE	DESCRIPTION	RESOLUTION/STATUS	Priority	OPEN/ CLOSED
	Traffic	two way traffic flows on runways and taxiways.	alert cells are enabled in the future. (This function will be re-evaluated by the AMASS Work Group at a later time)		
4	Data Recording	AMASS cannot record 15 days of operational data.	6gig Hard drives have been install at all current AMASS sites.		CLOSED
5a	AMASS User Interface	AMASS does not include a suitable means of checking the alert speaker volume.	AMASS contains an "AMASS Test Message" command to verify the alert speaker volume.		CLOSED
5b	AMASS User Interface	The process to open/close runways and change operational configurations is cumbersome.	Integrate the AMASS Utilities Menu into a single AMASS Main Menu.		CLOSED
5c	AMASS User Interface	The AMASS Main Menu does not provide a means to return to the ASDE-3 Main Menu.	This was integrated into the AMASS Utilities Menu		CLOSED
5d	AMASS User Interface	AMASS hotkey configuration should be reconfigured.	This requires a Table update in the AMASS source code. (This action will be passed onto AOS as enhancement to the AMASS system)	L	OPEN
5e	AMASS User Interface	Keypad overlay should use the assigned key names with a look-down list to the side with a mapping of each key command for AMASS	The keypad overlay should be redesigned. (The AMASS Work Group decided not to change the Keypad overlay based on the OT Test Team member's comments.)	M	CLOSED
5f	AMASS User Interface	Keypad overlay is removable and possible misplaced.	The keypad overlay should be affixed permanently to the keyboard without use of adhesive substances.		CLOSED
6a	Training	AT Training could not be assessed because it has yet to be definitized.	AMASS Training was conducted on June 20 th at ATL. The AT OT Test Members had training in the AMASS User's Manual and AT Procedures.		CLOSED
6b	Training	AT Training should include a clear and concise presentation on the AMASS Alerts.	Provide a video demonstrating each AMASS alert scenario on the potential collisions.	M	OPEN
6c	Training	Some controllers may not be comfortable with the ASDE-3 user interface.	Provide ASDE-3 user interface refresher training as part of the AMASS training.		CLOSED
6d	Training	Recurrent AMASS AT Training may be necessary to refresh users on the AMASS user interface.	Develop a recurrent AMASS AT Training course.		CLOSED
6e	Training	Supervisor's will need a procedure on handling a False Alert	The AMASS Work Group is currently developing the Supervisor procedures which will give guidance on handling a false alert.		CLOSED

I S S U E	TITLE	DESCRIPTION	RESOLUTION/STATUS	Priority	OPEN/ CLOSED
6f	Training	AT Procedures: The words Operational/Useability was confusing to the AT Controllers during the training.	The AMASS Work Group has change the AT Procedures to clarify the confusion		CLOSED
7a	Documentation	The AT Users Manual does not include instructions on how to set and verify the volume setting of the alert speakers.	The AT Users Manual has been updated with this information.		CLOSED
7b	Documentation	The AT Users Manual provides too much information for use by a controller on a day to day basis.	Include a Quick Reference Card to summarize the AMASS commands (in addition to the planned Mini-DCU keypad template.)	M	OPEN
8	Inadequate Airport Movement Area coverage	AMASS is currently limited to 12,000 ft. of movement area coverage from the antenna.	(The AMASS Work Group may develop a quick reference card.) Modify AMASS to support the full ASDE-3 range coverage of up to 24,000 (STR has been written by Norden).	M	OPEN
9	AMASS ORD Inconsistencies	The April 1999 Human Factors Evaluation resulted in AMASS design changes that need to be captured in the AMASS ORD	This problem will be fixed prior to DFW and DEN going ORD. Update the AMASS ORD to reflect the proposed/implemented design changes		CLOSED
10	AMASS site optimization	A detailed adaptation/optimization plan and procedures are need to be developed and approved by Air Traffic to support the implementation of the 34 AMASS systems.	ACT has assisted AOS and Air Traffic in developing the plan and procedures.		CLOSED
11	AMASS OT Incomplete	Until finalized AMASS Operational Procedures and an approved alert set is available, AMASS OT cannot be completed.	Assist Air Traffic in developing an optimized alert set to support the AMASS Operational Procedures. Perform AMASS OT Regression and Retest.		CLOSED
12	Multipath Target	A departure takes off over a multipath track. The multipath track becomes real causing alerts while the departure is dropped from the alert logic.	An STR was written by NORDEN (STR #39). This STR will be fixed prior to SFO ORD phase.		CLOSED
13	Bidirectional Interface	Bidirectional Interface between AMASS and TAU	This will reduce the nuisance alerts. AMASS would be able to tell the TAU when to change airport configurations (currently TAU uses only one airport configuration for all operations). Also arrival hand-offs could be confirmed between TAU and AMASS.	L	OPEN

I S S U E	TITLE	DESCRIPTION	RESOLUTION/STATUS	Priority	OPEN/ CLOSED
14	Enabling and Disabling Tracks	Controller slewing and enabling or disabling tracks into Safety Logic.	This could help increase the number of tracks in safety logic and reduce the number of false alerts.	L	OPEN
15	Dropped Tracks due to the Clutter Map	10-20 Departure Tracks are being dropped per day.	The problem may be fixed by resizing the Clutter segments. AOS is currently working on redrawing the clutter maps at SFO, ATL and DTW. (This will be evaluated during the Final Data collection effort.) An STR was written by NORDEN (STR #40) and further investment into the problem is currently be done.		CLOSED
16	Data Collection Analysis	AMASS False Alert Rate, TAIU new software build/adaptation, and AMASS adaptation changes requires a final data collection effort.	Final Data collection was completed on August 31 st . False Alert rate has dropped significantly.		CLOSED
17	Audio AMP	Due to the size of the AMASS audio amp, a suitable location in the Tower Cab at all 34 sites may not be available.	The audio amp has been re-designed/tested at SFO	L	OPEN

APPENDIX C

AT OT, APS Sub-Test MOP/MOAR Result Matrix

Test Result Matrix for ATO-2, APT

Test Date(s): 7/19/99 to 8/13/99

Test Lead: Jeff Livings

Test Engineer: Chuck Dudas

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-1.27: Source: ORD 3 r.(5).\$2 Neither target detection nor false detection rates shall be degraded in weather conditions throughout the AMASS coverage area including fair weather, rain levels up to and including 16 nm/hour; and snow conditions.	MAOR-1.27.1: AMASS PoD and False detection rates must not be affected fair weather, rain up to 16 nm/hour and snow conditions. MAOR-1.27.2: As determined by test team consensus, AMASS false detection rates in fair weather, rain and snow conditions are suitable for AMASS operations.	PASS			
MOP-1.31: Source: Derived from COI-1 Does the AMASS provide controllers with suitable alerts?	MAOR-1.31: As determined by test team consensus, the alerts needed to support AT operations are turned on and provide suitable coverage (parameters) for all required airport configurations.	PASS			
MOP-2.14: Source: Derived from COI-2 Do the AMASS adaptation capabilities allow for a false alerts rate suitable for performing the AMASS mission?	MAOR-2.14: As determined by test team consensus, the AMASS false alert rate does not adversely affect airport operations or the controllers ability to perform the assigned duties.	PASS	See AMASS AT OT Issues 2b, 2c, 2d, 2e.	Status: June 2000, False Alert Rate has dropped significantly to approximately 2/month.	
MOP-2.15: Source: Derived from COI-2 Do the AMASS adaptation capabilities allow for a nuisance alert rate suitable for performing the AMASS mission?	MAOR-2.15: As determined by test team consensus, the AMASS nuisance alert rate does not adversely affect airport operations or the controllers ability to perform the assigned duties.	PASS	See AMASS AT OT Issues 1a, 1b, 1c, 1d, 1e	Status: June 2000, Nuisance Alert Rate has dropped significantly due to the new AMASS Build and adaptation changes.	

APPENDIX D

AT OT, AMASS Parameter Listing

AMASS Parameters

Current:9/29/00

Arrival to Occupied RWY

Situation	Cell #	Current Setting	
		Time	Distance
Arr ch Dep	1.5.1.c/1.1.5.h	20	3000
Arr ch Abort	1.5.2.c/1.2.5.h	20	3000
Arr ch Taxi	1.5.4.c/1.4.5.h	20	3000
Arr ch Lnd	1.5.3.c/1.3.5.h	20	3000
Arr ho Dep	1.5.1.d/1.1.5.d	40	15000
Arr ho Abort	1.5.2.d/1.2.5.d	40	15000
Arr ho Taxi	1.5.4.d/1.4.5.d	30	6000
Arr ho Lnd	1.5.3.d/1.3.5.d	40	15000
Arr vs Stop	1.5.6.b/1.6.5.d	20	3000
Arr w/Taxi Enter	6.4.5.c/6.4.5.d	20	3000
Arr w/Taxi Leaving	6.4.5.g/6.4.5.h	20	3000
Arr w/Stop Over Hold Line	6.6.5.b/6.6.5.d	20	3000

Arrival to Closed Runway

Situation	Cell #	TAIU Threshold
Arr Clsd RWY	19.2.5.a/19.2.5.b	4000 feet

Lander to Occupied Runway

Situation	Cell #	Current Setting	
		Time	Distance
Lnd ch Dep	1.3.1.c/1.1.3.h	30	3000
Lnd ch Abort	1.3.2.c/1.2.3.h	30	6000
Lnd ch Taxi	1.3.4.c/1.4.3.h	20	3000
Lnd ch Lnd	1.3.3.c/1.3.3.h	30	6000
Lnd ho Dep	1.3.1.d	40	15000
Lnd ho Abort	1.3.2.d/1.2.3.d	40	15000
Lnd ho Taxi	1.3.4.d/1.4.3.d	30	6000
Lnd ho Lnd	1.3.3.d	40	15000
Lnd vs Stop	1.3.6.b/1.6.3.d	30	6000
Lnd w/Taxi Enter	6.4.3.c/6.4.3.d	30	6000
Lnd w/Taxi Leaving	6.4.3.g/6.4.3.h	30	6000
Lnd w/Stop Over Hold Line	6.6.3.b/6.6.3.d	30	6000

Departure to Occupied Runway

Situation	Cell #	Current Setting	
		Time	Distance
Dep ch Dep	1.1.1.c/1.1.1.h	40	1000
Dep ch Abort	1.1.2.c/1.2.1.h	40	15000
Dep ch Taxi	1.1.4.c/1.4.1.h	40	15000
Dep ch Lnd	1.1.3.c/1.3.1.h	40	15000
Dep ho Dep	1.1.1.d	40	15000
Dep ho Abort	1.1.2.d/1.2.1.d	40	15000
Dep ho Taxi	1.1.4.d/1.4.1.d	40	15000
Dep ho Lnd	1.1.3.d	40	15000
Dep vs Stop	1.1.6.b/1.6.1.d	40	15000
Dep w/Taxi Enter	6.4.1.c/6.4.1.d	40	15000
Dep w/Taxi Leaving	6.4.1.g/6.4.1.h	40	15000
Dep w/Stop Over Hold Line	6.6.1.b/6.6.1.d	40	15000

Movement State Transition

Velocity

Transition States	ft/s	knots
Stop to Taxi	7	4
Taxi to Departure	80	47
Departure Abort to Taxi	90	53
Taxi to Stop	4	2
Landing to Taxi	100	59
None to Landing	60	36

Acceleration

Taxi to Departure	6	ft/s^2
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Departure to Airborne Departure

Velocity	125	ft/s
	74	knots
Acceleration	3.5	ft/s

Holdlines/Projections

Initial SFO Hold Lines 125' Revised SFO & DTW Hold Lines: 110'
All K factors set to 2

TAIU Threshold Value = 6000 feet

APPENDIX E

AT OT, OET Sub-Test Questionnaires (July 1999)

Summary of test team responses to the ATO-2, OET, Operational Events Test questionnaire	
Case 1a, Cell 1.5.1.c, Arrival Chasing a Departure When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties? Negatively 1 ----- 2 ----- 3 ----- 4 ----- 5 No Effect ----- 3 ----- 4 ----- 5 Positively ----- 5	SYS2, T3066, INJECT TEST1-0007@16:46:00 Test team responses: ✓ AMASS did not alarm and should not have. No collision could have occurred. ✓ No alert. ✓ No alert. ✓ No possible collision.
Case 1b, Cell 1.5.1.c, Arrival Chasing a Departure When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties? Negatively 1 ----- 2 ----- 3 ----- 4 ----- 5 No Effect ----- 3 ----- 4 ----- 5 Positively ----- 5	SYS2, T7211755@17:55:10 Test team responses: ✓ AMASS did not alarm and should not have. No collision could have occurred. ✓ No alert. Situation was tight/close. From mandatory go around mindset, n/a,- however, in this scenario an alert to call my attention to the situation would be useful. ✓ No alert ✓ Look for collision.
Case 1c, Cell 1.5.1.c, Arrival Chasing a Departure When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties? Negatively 1 ----- 2 ----- 3 ----- 4 ----- 5 No Effect ----- 3 ----- 4 ----- 5 Positively ----- 5	SYS1, T4181926@19:25:45 Test team responses: ✓ AMASS did not alarm and should not have. No collision could have occurred. ✓ N/a, no alert. This was a DTW scenario, I'm unfamiliar with DTW's way of doing business. ✓ No alert ✓ No alert ✓

Case 2, Cell 1.5.2.c, Arrival Chasing Aborted Departure		SYS2, T3066 INJECT TEST1-0009@16:46:05	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses:	
Negatively	No Effect	✓ Alarm seemed to trigger soon enough but not too early.	
1 ----- 2 ----- 3 ----- 4 ----- 5	Positively	✓ Mandatory go around in this scenario is appropriate. Note: This is an injected target and looks like it.- If it were a true situation-LCL would be talking to the arrival Ref. The aborted aircraft and the arrival would be slowing down.	
	2 ----- 3	✓ Caught traffic still on RWY.	
		✓ Alert was appropriate for this situation. However, if a/c is further down runway or near a high speed exit, I don't think it would be needed.	
Case 3, Cell 1.5.3.c, Arrival Chasing Lander		SYS2, T3066 INJECT TEST2-0000@16:47:05	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses:	
	No Effect	✓ No possible collision	
Negatively		✓ A collision was not imminent so an alarm should not have gone off	
1 ----- 2 ----- 3 ----- 4 ----- 5	Positively	✓ Mandatory go around alert occurred too early in the scenario. This scenario occurs a lot in ATL- and the controller would be evaluating and massaging the situation.	
3 ----- 2		✓ Alert did not indicate the possibility of collision.	
		✓ Go around issued too soon. Criteria seemed to prevent "OD" not collision.	
Case 4a, Cell 1.5.4.c, Arrival Chasing Taxi		SYS2, T3066 INJECT TEST1-0007@16:46:20	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses:	
	No Effect	✓ Look for collision.	
Negatively		✓ Alarm went off and should have with only 2000' or so between a/c	
1 ----- 2 ----- 3 ----- 4 ----- 5	Positively	✓ Mandatory go around is appropriate.	
		✓ Alert did not indicate possibility of collision.	
		✓ Go around would be appropriate. Alert was appropriate.	
Case 4b, Cell 1.5.4.c, Arrival Chasing Taxi		SYS3, T8042214@22:13:30	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses:	
	No Effect	✓ No collision.	
Negatively		✓ Alarmed and shouldn't have. No collision imminent.	
1 ----- 2 ----- 3 ----- 4 ----- 5	Positively	✓ Mandatory go around is not appropriate- preceding a/c was making a midfield runway exit.	
4 ----- 1		✓ Alert did not indicate possibility of collision.	
		✓ No alert should have been issued	

Case 4c, Cell 1.5.4.c, Arrival Chasing Taxi	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?	Test team responses:
Negatively 1 ----- 2 ----- 3 ----- 4 ----- 5	✓ Did not alarm and should not have. ✓ No alarm ✓ No pending collision. ✓ No affect
Case 4d, Cell 1.5.4.c, Arrival Chasing Taxi (Taxi Xing ARR)	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?	Test team responses:
Negatively 1 ----- 2 ----- 3 ----- 4 ----- 5	✓ Crossing traffic was well clear and AMASS did not alarm. ✓ No alarm, not even close. ✓ No alert, A/c clear. ✓ No alert.
Case 4e, Cell 1.5.4.c, Arrival Chasing Taxi (Taxi Xing ARR)	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?	Test team responses:
Negatively 1 ----- 2 ----- 3 ----- 4 ----- 5	✓ Traffic would clear. ✓ Crossing traffic was no factor but triggered an alarm. ✓ Fix alert, Go around command is not appropriate . traffic crossing was almost clear, no factor. ✓ Not an indication of a potential collision. Alert too soon.
Case 4f, Cell 1.5.4.c, Arrival Chasing Taxi (taxi Xing ARR)	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?	Test team responses:
Negatively 1 ----- 2 ----- 3 ----- 4 ----- 5	✓ No alarm, good. ✓ No alert, no conflict, not close. ✓ No action required. ✓ No alert
Case 4g, Cell 1.5.4.c, Arrival Chasing Taxi	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?	Test team responses:
Negatively 1 ----- 2 ----- 3 ----- 4 ----- 5	Not tested.

Case 5, Cell 1.5.1.d, Arrival Head-on with Departure		SYS2, T3066 INJECT TEST1-0010 @ 16:46:30	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses:	
Negatively	No Effect	Positively	✓ Appropriate alert but too late. Open up TAIU. Don't want alert on FOD. Need acceleration.
1 ----- 2 ----- 3 ----- 4 ----- 5	1 1 3		✓ Agree that alarm occurred in timely manner.
			✓ Alert Rx: Mandatory go around is appropriate.
			✓ Impending collision
			✓ Alarm in this case was too late. A/c taking off needs to alarm sooner. Alarm was needed.
Case 6, Cell 1.5.2.d, Arrival Head-on with Aborted Departure		SYS2, T3066 INJECT TEST1-0024 @ 16:46:30	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses:	
			✓ Appropriate alert, may not need whole runway hot.
			✓ Alarm occurred in a timely manner
			✓ Alert Rx: Mandatory go around is appropriate.
			✓ Possible collision.
			✓ Alarm was appropriate.
Case 7, Cell 1.5.3.d, Arrival Head-on with Lander		SYS2, T3066 INJECT TEST1-0006 @ 16:47:00	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses:	
			✓ Agree with the alarm going off with jet on ½ mile final.
			✓ Alert Rx: Mandatory go around appropriate (if an aircraft).
			Note: These head-on examples are confusing- if the head-on traffic is a vehicle, mandatory go around is/may not be appropriate.
			✓ Potential collision.
			✓ Alarm appropriate.
Case 8a, Cell 1.5.4.d, Arrival Head-on with Taxi		SYS2, T3066 INJECT TEST1-0023 @ 16:44:45	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses:	
			✓ Agree with the alarm going off with jet on ½ mile final
			✓ Alert Rx: Mandatory go around appropriate (if an aircraft).
			Note: These head-on examples are confusing- if the head-on traffic is a vehicle, mandatory go around is/may not be appropriate.
			✓ Potential collision.
			✓ Alarm too late

Case 8b, Cell 1.5.4.d, Arrival Head-on with Taxi		SYS2, T3066 INJECT TEST1-0023 @ 16:45:00	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses:	
Negatively	No Effect	✓ Agree with the alarm going off with jet on ½ mile final ✓ Alert Rx: Mandatory go around appropriate (if an aircraft).	
1 ----- 2 ----- 3 ----- 4 ----- 5	1 ----- 2 ----- 3 ----- 4 ----- 5	Note: These head-on examples are confusing- if the head-on traffic is a vehicle, mandatory go around is/may not be appropriate.	
		✓ Potential collision. ✓ Alarm was appropriate	
Case 9a, Cell 1.5.6.b, Arrival vs. Stopped Target		SYS2, T3066 INJECT TEST1-0000 @ 16:47:00 (SINGLE TARGET)	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses:	
Negatively	No Effect	✓ ½ mile alert was timely ✓ If aircraft, then appropriate. If vehicle, maybe not. ✓ Potential land over. ✓ Alarm was appropriate.	
1 ----- 2 ----- 3 ----- 4 ----- 5	1 ----- 2 ----- 3 ----- 4 ----- 5		
Case 9b, Cell 1.5.6.b, Arrival vs. Stopped Target		SYS2, T3066 INJECT TEST2-0004 @ 16:47:00 (LINE OF TARGETS)	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses:	
Negatively	No Effect	✓ ½ mile alert was timely. ✓ Appropriate. ✓ Potential collision. ✓ Alarm appropriate reflecting 5 different stopped targets on runway.	
1 ----- 2 ----- 3 ----- 4 ----- 5	1 ----- 2 ----- 3 ----- 4 ----- 5		
Case 9b, Cell 1.5.6.b, Arrival vs. Stopped Target		SYS2, T3066 INJECT TEST1-0007 @ 16:46:40	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses:	
Negatively	No Effect	✓ Potential collision. ✓ Mandatory go around is appropriate. ✓ Potential collision. ✓ Alarm was appropriate.	
1 ----- 2 ----- 3 ----- 4 ----- 5	1 ----- 2 ----- 3 ----- 4 ----- 5		

Case 10, Cell 1.3.1.c, Lander Chasing Departure		SYS2, T7211755@17:55:00
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses:
Negatively		✓ Didn't alarm and shouldn't have.
1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 1		✓ No alert received for this situation is a deal and close.
No Effect		✓ No potential collision.
3 ----- 4 ----- 5 ----- 1		✓ No alarm, no alarm needed.
Case 11, Cell 1.3.2.c, Lander Chasing Aborted Departure		SYS2, T3066 INJECT TEST1-0025 @ 16:46:30
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses:
Negatively		✓ Alarm went off at appropriate time.
1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 3		✓ No potential collision.
No Effect		
3 ----- 4 ----- 5 ----- 3		
Case 12, Cell 1.3.3.c, Lander Chasing Lander		SYS2, T5215544@22:43:45
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses:
Negatively		✓ No alarm, none needed.
1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 1		✓ No alarm, routine scenario, anticipated separation (high speed taxiway)
No Effect		✓ No potential collision.
3 ----- 4 ----- 5 ----- 1		✓ No alarm needed.
Case 13, Cell 1.3.4.c, Lander Chasing Taxi		SYS2, T5211645@16:44:25
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses:
Negatively		✓ Not needed, no collision.
1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 1		✓ Alarm went off when a collision did not seem imminent.
No Effect		✓ A caution was received, no action taken due to taxi was clearing.
3 ----- 4 ----- 5 ----- 1		✓ Did not indicate a potential for collision.
Case 16, Cell 1.3.3.d, Lander Head-on with Lander		SYS2, T3066 INJECT TEST1 0006@16:47:27
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses:
Negatively		✓ Good alarm
1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 4		✓ Definite collision.
No Effect		✓ Warning given, no mandatory go around.
3 ----- 4 ----- 5 ----- 4		

Case 17a, Cell 1.3.4.d, Lander Head-on with Taxi		SYS2, T3066 INJECT TEST1-0023 @ 16:46:15	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses:	
Negatively	No Effect	✓ Would like an alarm when arrival is ¼ mile final, not after becoming a lander because at that point it is too late. ✓ Alarm too late. ??? traffic needed alert when in arrival state. ✓ Opposite direction needs more space . Aircraft in arrival state. ✓ Want go around with opposite taxi.	
1 ----- 2 ----- 3 ----- 4 ----- 5	Positively		
2 -----			
Case 17b, Cell 1.3.4.d, Lander Head-on with Taxi		SYS2, T3066 INJECT TEST1-0023 @ 16:46:30	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses:	
Negatively	No Effect	✓ Want go around with opposite taxi. ✓ Would like an alarm when arrival is ¼ mile final, not after becoming a lander because at that point it is too late. Too late for me to do anything. Anytime dealing with opposite direction traffic I would like an alarm prior to arrival becomes a lander, regardless of where taxi is on runway (we lose control at the point a/c is rolling out. ✓ Alarm too late. ??? traffic needed alert when in arrival state. ✓ Opposite direction needs more space . Aircraft in arrival state. ✓ Truck or airplane?	
1 ----- 2 ----- 3 ----- 4 ----- 5	Positively		
1 -----			
Case 17c, Cell 1.3.4.d, Lander Head-on with Taxi		SYS2, T3066 INJECT TEST1-23 @ 16:46:45	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses:	
Negatively	No Effect	✓ Want go around with opposite taxi. ✓ Too late, ✓ Alarm too late. ??? traffic needed alert when in arrival state. ✓ Opposite direction needs more space . Aircraft in arrival state. ✓ Opposite direction cell should have distance increased.	
1 ----- 2 ----- 3 ----- 4 ----- 5	Positively		
1 -----			
Case 17d, Cell 1.3.4.d, Lander Head-on with Taxi		SYS2, T3066 INJECT TEST1 0023 @ 16:47:00	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses:	
Negatively	No Effect	✓ Want go around with opposite taxi. ✓ Not sure. ✓ Need to look at crossers vs opposite direction traffic.	
1 ----- 2 ----- 3 ----- 4 ----- 5	Positively		
1 -----			

Case 18a, Cell 1.3.6.b, Lander vs. Stopped		SYS2, T3066 INJECT TEST1-0021 @ 16:46:45	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses:	
Negatively		✓ Timely alert.	
1 ----- 2 ----- 3 ----- 4 ----- 5		✓ Timely alert.	
No Effect		✓ Alert received (warning)- but it is to be changed to a caution. (non mandatory alerts). No collision potential.	
Positively		✓ No collision potential	
2 ----- 3 ----- 4 ----- 5		✓ Alarm was appropriate	
Case 18b, Cell 1.3.6.b, Lander vs. Stopped		SYS2, T3066 INJECT TEST1-0022 @ 16:46:30	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses:	
Negatively		✓ Timely alert.	
1 ----- 2 ----- 3 ----- 4 ----- 5		✓ Timely alert.	
No Effect		✓ Alert received (warning)- but it is to be changed to a caution. (non mandatory alerts). No collision potential.	
Positively		✓ No collision potential	
2 ----- 3 ----- 4 ----- 5			
Case 19a, Cell 1.1.1.c, Departure Chasing Departure		SYS2, T5240200 @ 01:59:15	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses:	
Negatively		✓ No alert, none needed.	
1 ----- 2 ----- 3 ----- 4 ----- 5		✓ No alerts, two rollers same runway	
No Effect		✓ No alert, no collision potential.	
Positively		✓ No alert, no conflict	
2 ----- 3 ----- 4 ----- 5			
Case 19b, Cell 1.1.1.c, Departure Chasing Departure		SYS2, T3066 INJECT TEST1-0013 @ 16:45:10	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses:	
Negatively		✓ Time, not distance.	
1 ----- 2 ----- 3 ----- 4 ----- 5		✓ I don't believe an alarm was necessary.	
No Effect		✓ 2 departures same runway- nuisance.	
Positively		✓ Don't want this alert.	
2 ----- 3 ----- 4 ----- 5		✓ Departure following closely with alarm.	

Case 19c, Cell 1.1.1.c, Departure Chasing Departure	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?	Negatively 1 ----- 2 ----- 3 ----- 4 ----- 5 No Effect Positively 3
SYS3, T8040457 @ 04:36:30 Test team responses: ✓ No alarm, not needed or wanted ✓ 2 ??? departures(mu-2's) same runway ✓ Don't want this alert ✓ No alarm	
Case 19d, Cell 1.1.1.c, Departure Chasing Departure	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?	Negatively 1 ----- 2 ----- 3 ----- 4 ----- 5 No Effect Positively 3
SYS3, T8040557 @ 05:56:00 Test team responses: ✓ No alarm, none needed. ✓ Multiple BKA departures 9/ no alarm ✓ no alert wanted ✓ no alarms	
Case 20, Cell 1.1.2.c, Departure Chasing Aborted Departure	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?	Negatively 1 ----- 2 ----- 3 ----- 4 ----- 5 No Effect Positively 1 2 2
SYS2, T3066 INJECT TESTI-0014 @ 16:45:00 Test team responses: ✓ Timely alarm. ✓ Warning alert- is appropriate ✓ alert. ✓ Alarm was appropriate.	
Case 21a, Cell 1.1.3.c, Departure Chasing Lander	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?	Negatively 1 ----- 2 ----- 3 ----- 4 ----- 5 No Effect Positively 4
SYS2, T5241854 @ 18:54:25 Test team responses: ✓ truck on runway 26R- after an arrival/lander ✓ No alert ✓ ✓	

Case 21b, Cell 1.1.3.c, Departure Chasing Lander		SYS2, T3066 INJECT TEST1-0012 @ 16:47:00	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses:	
Negatively 1 ----- 2 ----- 3 ----- 4 ----- 5		✓ Timely alarm.	
No Effect		✓ Appropriate alert.	
Positively 1 ----- 2 ----- 3 ----- 4 ----- 5		✓ Alert was appropriate.	
1 ----- 2 ----- 3 ----- 4 ----- 5		✓	
Case 22, Cell 1.1.4.c, Departure Chasing Taxi		SYS2, T5241854 @ 18:54:25	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses:	
Negatively 1 ----- 2 ----- 3 ----- 4 ----- 5		✓	
No Effect		✓	
Positively 1 ----- 2 ----- 3 ----- 4 ----- 5		✓	
1 ----- 2 ----- 3 ----- 4 ----- 5		✓	
Case 23, Cell 1.1.1.d, Departure head-on with Departure		SYS2, T3066 INJECT TEST1-0016 @ 16:47:00	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses:	
Negatively 1 ----- 2 ----- 3 ----- 4 ----- 5		✓ Timely alert	
No Effect		✓ Timely alarm	
Positively 1 ----- 2 ----- 3 ----- 4 ----- 5		✓ Alarm is appropriate	
1 ----- 2 ----- 3 ----- 4 ----- 5		✓ Alarm appropriate	
Case 24, Cell 1.1.2.d, Departure head-on with Aborted Departure		SYS2, T3066 INJECT TEST1-0019 @ 16:46:40	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses:	
Negatively 1 ----- 2 ----- 3 ----- 4 ----- 5		✓ Timely alert	
No Effect		✓ Timely alarm	
Positively 1 ----- 2 ----- 3 ----- 4 ----- 5		✓ Alarm is appropriate	
1 ----- 2 ----- 3 ----- 4 ----- 5		✓ Alarm appropriate	

Case 25, Cell 1.1.3.d, Departure head-on with Lander		SYS2, T3066 INJECT TEST1-0020 @ 16:47:00	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses: ✓ Timely alert ✓ Timely alarm ✓ Alarm is appropriate ✓ Alarm appropriate	
Negatively 1 ----- 2 ----- 3 ----- 4 ----- 5	No Effect 1 1 1 1	Positively 5	
Case 26, Cell 1.1.4.d, Departure head-on with Taxi		SYS2, T3066 INJECT TEST1-0017 @ 16:47:00	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses: ✓ Timely alert ✓ Timely alarm ✓ Alarm is appropriate ✓ Alarm appropriate ✓ Alerted to potential collision.	
Negatively 1 ----- 2 ----- 3 ----- 4 ----- 5	No Effect 1 1 1 1	Positively 5	
Case 27, Cell 1.1.6.b, Departure vs. Stopped		SYS2, T3066 INJECT TEST1-0018 @ 16:47:00	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses: ✓ Timely alert ✓ Timely alarm ✓ Alarm is appropriate ✓ Alarm not needed	
Negatively 1 ----- 2 ----- 3 ----- 4 ----- 5	No Effect 1 1 1 1	Positively 5	
Case 28, Cell 19.2.5.a, Arrival to Closed Runway		SYS2, T3066 @ 16:46:50, note: CLOSE RUNWAY!	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses: ✓ Timely alarm ✓ Alarm appropriate ✓ Identified arrival to closed runway	
Negatively 1 ----- 2 ----- 3 ----- 4 ----- 5	No Effect 1 1 1 1	Positively 5	

APPENDIX F

AT OT, OET MOP/MAOR Result Matrix

Test Result Matrix for ATO-2, OET.

Test Date(s): 8/9/99 to 8/13/99

Test Lead: Jeff Livings

Test Engineer: Chuck Dudas

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-1.27: Source: ORD 3.r.(5).\$2 Neither target detection nor false detection rates shall be degraded in weather conditions throughout the AMASS coverage area including fair weather, rain levels up to and including 16 nm/hour; and snow conditions.	MAOR-1.27.1: AMASS PoD and False detection rates must not be affected fair weather, rain up to 16 mm/hour and snow conditions. MAOR-1.27.2: As determined by test team consensus, AMASS false detection rates in fair weather, rain and snow conditions are suitable for AMASS operations.	PASS			
MOP-1.31: Source: Derived from COI-1 Does the AMASS provide controllers with suitable alerts?	MAOR-1.31: As determined by test team consensus, the alerts needed to support AT operations are turned on and provide suitable coverage (parameters) for all required airport configurations.	PASS			
MOP-2.2: Source: ORD 3.a.(1).\$2 A unique AMASS data base configuration shall be created and available for use for each of the operational runway configurations that are employed at the adapted airport.	MAOR-2.2.1: Each operational runway must have a unique AMASS data base configuration. MAOR-2.2.2: As determined by test team consensus, AMASS provides for the suitable configuration of an adapted airports operational configurations.	PASS			
MOP-2.14: Source: Derived from COI-2 Do the AMASS adaptation capabilities allow for a false alerts rate suitable for performing the AMASS mission?	MAOR-2.14: As determined by test team consensus, the AMASS false alert rate does not adversely affect airport operations or the controllers ability to perform the assigned duties.	PASS			

MOP-2.15: Source: Derived from COI-2 Do the AMASS adaptation capabilities allow for a nuisance alert rate suitable for performing the AMASS mission?	MAOR-2.15: As determined by test team consensus, the AMASS nuisance alert rate does not adversely affect airport operations or the controllers ability to perform the assigned duties.	PASS			
MOP-3.35: Source: ORD 3.d.(3).(c).3 Displayed alerts shall contain abbreviations for words furnished by Air Traffic.	MAOR-3.35.1: Alert messages must contain abbreviations as furnished by Air Traffic. MAOR-3.35.2: As determined by test team consensus, the AMASS provided displayed alert messages are suitable for AMASS operations.	PASS			
MOP-3.83: Source: Derived from COI-3 Is the display presentation of AMASS suitable to perform the AMASS mission?	MAOR-3.83: As determined by test team consensus, the display presentation of AMASS is suitable for performing the AMASS mission (i.e., implemented government provided list of text messages, font size track icons, multi-path icons, filter icons, alert icons, closed runway indicator, TA indicator and system status).	PASS			
MOP-3.84: Source: Derived from COI-3 Is the aural presentation of AMASS alerts suitable to perform the AMASS mission?	MAOR-3.84: As determined by test team consensus, the government provided list of aural messages is suitable for performing the AMASS mission (tone, diction, speed, message content).	PASS			

APPENDIX G

AT OT, OUT Sub-Test Questionnaires (July 1999)

Questionnaire for ATO-2, OUT.

Questionnaire ATO-2,OUT, Training and Documentation					Composite Results				
AMASS Menu Mode	Enter AMASS Mode	Go to the Utilities Menu	Select an AMASS airport Configuration	Close/Open runways	Go to AMASS Main Menu	Move AMASS Alerts Window	Go to ASDE Main Menu	Display AMASS Function Key Summary	
Q1: AT User's Manual	OK- 4	OK- 4	OK- 4	OK- 4	OK- 4	OK- 4	OK- 3	OK- 4	
Was the command found easily enough?	Too Hard	Too Hard	Too Hard	Too Hard	Too Hard	Too Hard	Too Hard	Too Hard	
Q2: AT User's Manual Entry	Not Found	Not Found	Not Found	Not Found	Not Found	Not Found	Not Found-1	Not Found	
Was the command's entry useful/complete enough?	OK- 4	OK- 4	OK- 4	OK- 4	OK- 4	OK- 4	OK- 3	OK- 3	
Q5: Training	Too Cryptic	Too Cryptic	Too Cryptic	Too Cryptic	Too Cryptic	Too Cryptic	Too Cryptic	Too Cryptic	
To what extent should the AMASS AT Training cover each listed function?	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete-1	Incomplete-1	
	Emphasize-2	Emphasize-2	Emphasize-3	Emphasize-3	Emphasize-2	Emphasize-2	Emphasize-3	Emphasize-3	
	Include-2	Include-2	Include-1	Include-1	Include-2	Include-2	Include-1	Include-1	
	De-emphasize	De-emphasize	De-emphasize	De-emphasize	De-emphasize	De-emphasize	De-emphasize	De-emphasize	
***** Comments *****	✓ User's Manual is fine for training rooms, however operationally we need quick-reference cards which define entires. ✓ Selling the AMASS program would be easier with a 15-minute video explaining what it does and doesn't do. ✓ Operational training will take less than 15-minutes. ✓ Manual appears well-written and information is readily available. ✓ Manual is too bulky for day-to-day operations. A cheat card with all the most likely items a controller would need. ✓ The AT Users manual assumes that the user is already "ASDE-3 Entry" friendly. ✓ The AT User Manual will be cumbersome to the controller and not well received. A condensed/Quick reference Card would be more "user friendly".								

Questionnaire ATO-2,OUT, Training and Documentation							Composite results			
AMASS Keyboard Commands	Move AMASS Alert window	Return to ASDE Functions	Display the AMASS Function Key Summary	Filter all alerts on ground track	Filter caution alerts on ground tracks	Enable all alerts on ground tracks	Filter arrival alerts	Enable Arrival Alerts	Extend Alert Timeout Period Stopped Track	Restore Alert Timeout Period Stopped track
Q1: AT User's Manual Was the command found easily enough?	OK-3 Too Hard Not Found	OK-2 Too Hard-1 Not Found	OK-3 Too Hard Not Found	OK-3 Too Hard Not Found	OK-3 Too Hard Not Found	OK-3 Too Hard Not Found	OK-3 Too Hard Not Found	OK-3 Too Hard Not Found	OK-3 Too Hard Not Found	OK-3 Too Hard Not Found
Q2: AT User's Manual Entry Was the command's entry useful/complete enough?	OK Too Cryptic-3 Incomplete	OK Too Cryptic-3 Incomplete	OK Too Cryptic-2 Incomplete-1	OK Too Cryptic-3 Incomplete	OK Too Cryptic-2 Incomplete-1	OK Too Cryptic-3 Incomplete	OK Too Cryptic-3 Incomplete	OK Too Cryptic-3 Incomplete	OK Too Cryptic-3 Incomplete	OK Too Cryptic-3 Incomplete
Q5: Training To what extent should the AMASS AT Training cover each listed command?	Emphasize Include De-emphasize	Emphasize Include De-emphasize	Emphasize Include De-emphasize	Emphasize Include De-emphasize	Emphasize Include De-emphasize	Emphasize Include De-emphasize	Emphasize Include De-emphasize	Emphasize Include De-emphasize	Emphasize Include De-emphasize	Emphasize Include De-emphasize
***** Comments ***** Place in the appropriate command column the Q# before each comment.	✓ This was acceptable during lab/class- As I was able to take the time to read and make entries- But in a control tower atmosphere- There is not enough time to look at the manual									

Questionnaire ATO-2,OUT, Training and Documentation						Composite Results					
AMASS Keypad Commands	Move/AMASS Alert window	Return to ASDC Functions	Display the AMASS Function Key Summary	Filter all alerts on ground track	Filter caution alerts on ground tracks	Enable all alerts on ground tracks	Filter arrival alerts	Enable Arrival Alerts	Extend Alert Timeout Period Stopped Track	Restore Alert Timeout Period Stopped track	
Q1: AT User's Manual Was the command found easily enough?	OK-4 Too Hard Not Found	OK-4 Too Hard Not Found	OK-4 Too Hard Not Found	OK-4 Too Hard Not Found	OK-4 Too Hard Not Found	OK-4 Too Hard Not Found	OK-4 Too Hard Not Found	OK-4 Too Hard Not Found	OK-4 Too Hard Not Found	OK-4 Too Hard Not Found	
Q2: AT User's Manual Entry Was the command's entry useful/complete enough?	OK-4 Too Cryptic Incomplete	OK-4 Too Cryptic Incomplete	OK-4 Too Cryptic Incomplete	OK-4 Too Cryptic Incomplete	OK-4 Too Cryptic Incomplete	OK-4 Too Cryptic Incomplete	OK-4 Too Cryptic Incomplete	OK-4 Too Cryptic Incomplete	OK-4 Too Cryptic Incomplete	OK-4 Too Cryptic Incomplete	
Q5: Training To what extent should the AMASS AT Training cover each listed command?	Emphasize Include-4 De-emphasize	Emphasize Include-4 De-emphasize	Emphasize Include-4 De-emphasize	Emphasize Include-4 De-emphasize	Emphasize Include-4 De-emphasize	Emphasize Include-4 De-emphasize	Emphasize Include-4 De-emphasize	Emphasize Include-4 De-emphasize	Emphasize Include-4 De-emphasize	Emphasize Include De-emphasize	
***** Comments ***** Place in the appropriate command column the Q# before each comment.	✓ Same as Menu's, All info is available but most controllers will never bother to open the manual. Need a cheat sheet.										

APPENDIX H

AT OT, OUT MOP/MOAR Result Matrix

Test Results Matrix or ATO-2, OUT.

Test Date(s): 8/9/99 to 8/13/99

Test Lead: Jeff Livings

Test Engineer: Chuck Dudas

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-3.83: Source: Derived from COL-3 Is the display presentation of AMASS suitable to perform the AMASS mission?	MAOR-3.83: As determined by test team consensus, the display presentation of AMASS is suitable for performing the AMASS mission (i.e., implemented government provided list of text messages, font size track icons, multi-path icons, filter icons, alert icons, closed runway indicator, TA indicator and system status).	NOT TESTED	Human Factors Report		
MOP-3.85: Source: Derived from COL-3 Does AMASS provide suitable controls to operationally control the system?	MAOR-3.85: As determined by test team consensus, the operational control provided by AMASS are suitable for performing the AMASS mission (Selecting AMASS configuration, closing runways, volume adjustment, placement of alert text box and hot keys).	PASS			
MOS-4.45: Source: Derived from COL-4 Does the inhibit/re-inhibit functions of AMASS suitably support the AMASS mission?	MAOR-4.45: As determined by test team consensus, the AMASS inhibit/re-inhibit functions suitably support AT Operations (i.e., available filters, filter controls, filter display and filter status).	TESTED IN ATO-1			

APPENDIX I

AT OT, OET Sub-Test Questionnaires at ATL
(July 1999)

Summary of test team responses to the ATO-3, OET questionnaire	
Case 1a, Cell 1.5.1.c, Arrival Chasing a Departure	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?	Test team responses:
Negatively 1 ----- 2 ----- 3 ----- 4 ----- 5 1 1 1	☒ Close, no need for go around ☒ Alerted, arrival not a potential for go around ☒ No alarm needed, too much separation
Case 1b, Cell 1.5.1.c, Arrival Chasing a Departure	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?	Test team responses:
Negatively 1 ----- 2 ----- 3 ----- 4 ----- 5 1 1 1	☒ No need for alarm, too much separation ☒ No potential for collision, go around would create unwarranted situation
Case 1c, Cell 1.5.1.c, Arrival Chasing a Departure	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?	Test team responses:
Negatively 1 ----- 2 ----- 3 ----- 4 ----- 5 1 3 2	☒ Alert close, but no need for a go around ☒ No collision potential ☒ Mandatory go around with almost 4700' in front of departure ☒ Alert terminated quickly, difficult to analyze the situation. Alert began in plenty of time however. Mandatory go around not necessary in this cell ☒ Time of alert sufficient for GA. Possibly could have landed.
Case 2, Cell 1.5.2.c, Arrival Chasing Aborted Departure	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?	Test team responses:
Negatively 1 ----- 2 ----- 3 ----- 4 ----- 5 1 3 2	☒ Warning appropriate ☒ Timely alert ☒ Alarmed at 2/3 mile . ☒ Procedure is appropriate, AMASS reacted in adequate time to warn of impending situation. ☒ Aircraft to far out to issue go around. Could have gotten aborted a/c off the runway . If not watching this, the alert would have been effective to warn of an impending situation.

Case 3, Cell 1.5.3.c, Arrival Chasing Lander	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?	Test team responses: ✓ Time of alert sufficient to issue go around. Could have come in 1/4 mile but still would have sent around. Traffic on runway. ✓ The situation is variable and dependant on the speed of first a/c. I can see in some situations where an a/c will be clear of the runway but AMASS still alarms and causes a go around. ✓ Warning with an arrival and a lander ✓ Don't want alert ✓ Alert appropriate/could go either way/
Case 4a, Cell 1.5.4.c, Arrival Chasing Taxi	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?	Test team responses: ✓ Both a/c slow enough to issue any instructions. Deal has happened but no action taken. ✓ Not enough reaction time available. ✓ Alarmed with slow a/c or vehicle on runway ✓ Tight but good alert ✓ alert appropriate
Case 4b, Cell 1.5.4.c, Arrival Chasing Taxi	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?	Test team responses: ✓ Both a/c slow enough to issue any instructions. Deal has happened but no action taken. ✓ As an arrival there was insufficient time to take action according to the procedures ✓ Good alert ✓ Alert appropriate ✓
Case 4c, Cell 1.5.4.c, Arrival Chasing Taxi	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?	Test team responses: ✓ alarm was adequate to bring your attention to an imminent situation too early for a mandatory go around ✓ Appropriate alert

Case 5, Cell 1.5.1.d, Arrival Head-on with Departure When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses: ✓ Time of alert sufficient for Go around. Could have come in 1/8 mile. ✓ A little earlier alert would have been helpful ✓ Too late to send around arrival ✓ Good ✓ Timely ✓ Appropriate if a/c, if truck, no mandatory go around needed.
Case 6, Cell 1.5.2.d, Arrival Head-on with Aborted Departure When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses: ✓ Time of alert sufficient for Go around. Could have come in 1/8 mile. ✓ Enough time to take action ✓ 2/3 to 3/4 mile alarmed. Good alarm with warning ✓ Not sure if I want mandatory action ✓ Appropriate if a/c, if truck, no mandatory go around needed.
Case 7, Cell 1.5.3.d, Arrival Head-on with Lander When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses: ✓ Time of alert sufficient for Go around. Could have come in 1/8 mile. ✓ If this was planned, a go around would be inappropriate ✓ Good alarm w/ a/c., If vehicle, could get it of runway. ✓ Good alarm, close but no collision. ✓ Timely ✓ Go around appropriate- although lander did exit runway on high speed (so go around was not needed)
Case 8a, Cell 1.5.4.d, Arrival Head-on with Taxi When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses: ✓ Time of alert sufficient for Go around. Could have come in 1/8 mile ✓ Appropriate alert ✓ Alarm too late if on a/c. ✓ Collision ✓ Timely ✓ Very appropriate

Case 8b, Cell 1.5.4.d, Arrival Head-on with Taxi							
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?							
Negatively 1 -----	No Effect ----- 2 -----	Positively ----- 4 ----- 2	4	Test team responses: ✓ Time of alert sufficient for Go around. Could have come in 1/8 mile ✓ Go around required and appropriate ✓ Good alarm ✓ Collision ✓ Timely ✓ Very appropriate			
Case 9a, Cell 1.5.6.b, Arrival vs. Stopped Target							
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?							
Negatively 1 -----	No Effect ----- 2 ----- 3	Positively ----- 4 ----- 2	1	Test team responses: ✓ Time of alert sufficient for go around ✓ Unable to issue go around in time ✓ Good alarm again ✓ Don't think I could have sent him around in time ✓ Good alert, but if target had been moving it would've been too soon ✓ Go around would be spooky, not enough time.			
Case 9b, Cell 1.5.6.b, Arrival vs. Stopped Target							
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?							
Negatively 1 ----- 2	No Effect ----- 2 ----- 1	Positively ----- 4 ----- 1	5	Test team responses: ✓ Arrival could have come in a lot closer ✓ Text box in the way, more time may be needed for go around ✓ Alarmed at 2/3 mile ✓ Good alert, but if target had been moving it would've been too soon ✓ appropriate			
Case 9c, Cell 1.5.6.b, Arrival vs. Stopped Target							
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?							
Negatively 1 ----- 2	No Effect ----- 2 ----- 3	Positively ----- 4 ----- 1	5	Test team responses: ✓ text box in the way. Timing seemed better timely, but possibly not needed ✓ Possibly some other action could have been taken ✓ Too early, plenty of time to maneuver			

Case 19c, Cell 1.1.1.c, Departure Chasing Departure When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses: ... Not tested...
Negatively 1 ----- 2 ----- 3 ----- 4 ----- 5 Positively		
Case 19d, Cell 1.1.1.c, Departure Chasing Departure When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses: ... not tested...
Negatively 1 ----- 2 ----- 3 ----- 4 ----- 5 Positively		
Case 20, Cell 1.1.2.c, Departure Chasing Aborted Departure When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses: ✓ If not watching this, the alert would have been effective to warn of impending situation. ✓ Useful and appropriate ✓ Good alarm. ✓ Good alert ✓ Appropriate.
Negatively 1 ----- 2 ----- 3 ----- 4 ----- 5 Positively		
Case 21a, Cell 1.1.3.c, Departure Chasing Lander When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses: ✓ If not watching this, the alert would have been effective to warn of impending situation. ✓ Good alert ✓ Good alarm ✓ Not a collision potential, could be a nuisance
Negatively 1 ----- 2 ----- 3 ----- 4 ----- 5 Positively		

Case 25, Cell 1.1.3.d, Departure head-on with Lander	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?	Test team responses:
Negatively 1 ----- 2 ----- 3 ----- 4 ----- 5	✓ Sufficient time to cancel clearance. ✓ Need to issue abort instruction ✓ Good alarm ✓ Need earlier alert to facilitate abort ✓ Appropriate alert, a bit early
No Effect 1 ----- 2 ----- 3 ----- 4 ----- 5	
Positively 1 ----- 2 ----- 3 ----- 4 ----- 5	
Case 26, Cell 1.1.4.d, Departure head-on with Taxi	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?	Test team responses:
Negatively 1 ----- 2 ----- 3 ----- 4 ----- 5	✓ Sufficient time to cancel clearance. ✓ Very useful and appropriate ✓ Good alarm ✓ Could abort take-off ✓ Appropriate ✓
No Effect 1 ----- 2 ----- 3 ----- 4 ----- 5	
Positively 1 ----- 2 ----- 3 ----- 4 ----- 5	
Case 27, Cell 1.1.6.b, Departure vs. Stopped	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?	Test team responses:
Negatively 1 ----- 2 ----- 3 ----- 4 ----- 5	✓ Sufficient time to cancel clearance. ✓ Alert is useful ✓ Good alarm ✓ Need earlier alert to facilitate abort. ✓ Appropriate alert but a bit early. ✓
No Effect 1 ----- 2 ----- 3 ----- 4 ----- 5	
Positively 1 ----- 2 ----- 3 ----- 4 ----- 5	
Case 28, Cell 19.2.5.a, Arrival to Closed Runway	
When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?	Test team responses:
Negatively 1 ----- 2 ----- 3 ----- 4 ----- 5	✓ Good alarm ✓ Good alarm ✓ This alarm could be moved out possibly for a more timely alert
No Effect 1 ----- 2 ----- 3 ----- 4 ----- 5	
Positively 1 ----- 2 ----- 3 ----- 4 ----- 5	

Case 29, Crossing taxi with departure When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses: ✓ No action required, but if not watching the alert would have been effective ✓ Too late ✓ Alarm not needed, a/c was clearing ✓ Alerted after traffic was in the air ✓ A/c airborne, no conflict ✓
Negatively 1 ----- 2 ----- 3 ----- 4 ----- 5 3 1		
SYS4, note: uses AMASS and ODU		
Case 30, Crossing taxi with departure When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses: ✓ No action required, but if not watching the alert would have been effective ✓ Too late to be useful ✓ No need for caution. ✓ Alerted after traffic in air ✓ Aircraft airborne ✓ Not tested.
Negatively 1 ----- 2 ----- 3 ----- 4 ----- 5 1 1 1		
Case 31, taxi under departure When following the Draft ATC AMASS Operational Procedures, how does the AMASS response affect your ability to perform your assigned duties?		Test team responses: ✓ Target crossing under departure alarm did not recognize departure was airborne and did not provide any alarm until too late to react. ✓
Negatively 1 ----- 2 ----- 3 ----- 4 ----- 5 1 1		

APPENDIX J

AT OT, OUT Sub-Test Questionnaires at ATL
(July 1999)

Questionnaire for ATO-3, OUT.

Questionnaire ATO-3,OUT, Select Airport Configurations	
Please answer the following questions for the "Select Airport Configuration" function.	
Circle your answer and include any comments in the blank space	
Q1: AT User's Manual	Was the function found easily enough? OK -5 ✓ Manual is very wordy Too Hard-1 ✓ Table of Contents was used. Index would be better, Quick-reference card even better. Too many blank pages. Not Found ✓ STILL don't want to dig thru the manual. Need a cheat sheet.
Q2: AT User's Manual Entry	Was the function's entry useful/complete enough? OK -4 ✓ Easier to do this hands-on. Too Cryptic 2 ✓ Too wordy Incomplete
Q3: Keystrokes	Are the function's keystrokes acceptable? Good ✓ Too much heads down time. Too many keystrokes. Usable-5 ✓ But will be better with template. Unacceptable-1
Q4: Feedback	Was the function's feedback acceptable? Ok-4 ✓ Some messages were not understandable. Not Useful-1 Not Needed
Q5: Training	To what extent should AMASS AT Training cover this subject? Emphasize-2 ✓ Important everyday function. Include-4 De-emphasize
Q6: Command Selection	Does the function work as you require/prefer? Yes-5 ✓ Tab/arrow keys are not used enough. Selection of keys should be more intuitive. Minipad is a bit better. No-1

Questionnaire ATO-3,OUT, Closing/Opening Runways	
Please answer the following questions for Closing /Opening Runways	Circle your answer and include any comments in the blank space
Q1: AT User's Manual Was the function found easily enough?	OK -4 ✓ Manual is very wordy. Too Hard-1 ✓ Table of contents used, but 2 possibilities exist Not Found ✓ Want a cheat sheet.
Q2: AT User's Manual Entry Was the function's entry useful/complete enough?	OK -3 ✓ Too wordy Too Cryptic-2 ✓ Want a cheat sheet. Incomplete
Q3: Keystrokes Are the function's keystrokes acceptable?	Good-2 ✓ Too much heads down time. Usable-1 ✓ Keypads did not always work. Keys stuck. Unacceptable-2 ✓ Want a cheat sheet
Q4: Feedback Was the function's feedback acceptable?	Ok-2 ✓ Some was useful, some was confusing. Not Useful-2 ✓ Want a cheat sheet. Not Needed
Q5: Training To what extent should AMASS AT Training cover this subject?	Emphasize-3 ✓ Also everyday functions. Include-2 ✓ Want a cheat sheet De-emphasize
Q6: Command Selection Does the function work as you require/prefer?	Yes-3 ✓ Too easy to get lost in other functions. Hot keys needed. No-2

Questionnaire ATO-3,OUT, Setting the Alert Speaker Volume	
Please answer the following questions for Setting the Alert Speaker Volume	Circle your answer and include any comments in the blank space
Q1: AT User's Manual Was the function found easily enough?	OK ✓ No info in users manual Too Hard Not Found-5
Q2: AT User's Manual Entry Was the function's entry useful/complete enough?	OK ✓ Same as above Too Cryptic ✓ Not in there Incomplete-2
Q3: Keystrokes Are the function's keystrokes acceptable?	Good-1 ✓ Turn knobs up or down, Turn unit off Usable Unacceptable
Q4: Feedback Was the function's feedback acceptable?	Ok ✓ There is no feedback as to how the volume is set. Not Useful-2 ✓ Not Needed
Q5: Training To what extent should AMASS AT Training cover this subject?	Emphasize ✓ ??? Include-1 De-emphasize
Q6: Command Selection Does the function work as you require/prefer?	Yes ✓ No way to test volume of alert unless alert goes off. Position of amp in tower will probably be inaccessible to adjust volume. What are 2 channels for? What happens when the power is turned off? No-6

APPENDIX K

AT Regression Questionnaire Test Responses (June 2000)

AT- REGRESSION QUESTIONNAIRE RESPONSES **USER INTERFACE TEST RESULTS**

Questionnaire AT-ORT-3, UIT, Set the Alert Speaker Volume			
Question	Answer		Comments
Q1: AT User's Manual	Ok	2	The user's manual as an operational tool is of very limited use. Quick reference cards at the Mini DCU are the best option for the ops quarters.
Was the function found easily enough?	Too Hard	1	
	Not Found	0	
Q2: AT User's Manual	Ok	2	Same as above.
Was the function's entry useful/complete enough?	Too Cryptic	1	
	Incomplete	0	
Q3: Keystrokes	Good	2	
Are the function's keystrokes acceptable?	Useable	1	
	Unacceptable	0	
Q4: Feedback	Ok	3	After trying, the volume setting a couple of times – an acceptable level was reached.
Was the function's feedback acceptable?	Not Useful	0	
	Not Needed	0	
Q5: Training	Yes	3	Seemed Simple – Hotkey, Enter.
Did AMASS AT Training sufficiently cover this subject?	No	0	
	N/A	0	
Q6: AT Operational Procedures	Yes	3	
Does the AMASS provide the commands and controls necessary to adequately complete this task?	No	0	
	N/A	0	

Questionnaire AT-ORT-3, UIT, Opening/Closing Runways			
Question		Answer	
		Comments	
Q1: AT User's Manual		Ok	2
Was the function found easily enough?		Too Hard	1
		Not Found	0
Q2: AT User's Manual		Ok	2
Was the function's entry useful/complete enough?		Too Cryptic	1
		Incomplete	0
Q3: Keystrokes		Good	2
Are the function's keystrokes acceptable?		Useable	1
		Unacceptable	0
Q4: Feedback		Ok	3
Was the function's feedback acceptable?		Not Useful	0
		Not Needed	0
Q5: Training		Yes	2
		No	0
Did AMASS AT Training sufficiently cover this subject?		N/A	1
Q6: AT Operational Procedures		Yes	3
Does the AMASS provide the commands and controls necessary to adequately complete this task?		No	0
		N/A	0
		Same as Q3 above.	

Questionnaire AT-ORT-3, UIT, Changing Operational Configurations			
Question	Answer		Comments
Q1: AT User's Manual	Ok	2	The user's manual as an operational tool is of very limited use. Quick reference cards at the Mini DCU are the best option for the ops quarters.
Was the function found easily enough?	Too Hard	1	
	Not Found	0	
Q2: AT User's Manual	Ok	2	Same as above.
Was the function's entry useful/complete enough?	Too Cryptic	1	
	Incomplete	0	
Q3: Keystrokes	Good	2	
Are the function's keystrokes acceptable?	Usable	1	
	Unacceptable	0	
Q4: Feedback	Ok	3	
Was the function's feedback acceptable?	Not Useful	0	
	Not Needed	0	
Q5: Training	Yes	3	
	No	0	
Did AMASS AT Training sufficiently cover this subject?	N/A	0	
Q6: AT Operational Procedures	Yes	3	
	No	0	
Does the AMASS provide the commands and controls necessary to adequately complete this task?	N/A	0	
Additional Comments			
The 'Rain' portion of the Operational Configuration needs to be clarified – as it is used for functions other than 'Rain'			

Questionnaire AT-ORT-3, UIT, Changing to/from a "rain" Operational Configuration				
Question		Answer		
		Ok	Too Hard	Not Found
Q1: AT User's Manual				
Was the function found easily enough?				
Q2: AT User's Manual				
Was the function's entry useful/complete enough?				
Q3: Keystrokes				
Are the function's keystrokes acceptable?				
Q4: Feedback				
Was the function's feedback acceptable?				
Q5: Training				
Did AMASS AT Training sufficiently cover this subject?				
Q6: AT Operational Procedures				
Does the AMASS provide the commands and controls necessary to adequately complete this task?				

Comments

2 The user's manual as an operational tool is of very limited use. Quick reference cards at the Mini DCU are the best option for the ops quarters.

1

0

2 Same as above.

1

0

3

0

0

3

0

0

2 Yes Comment : Need to decide on terminology. Rain or Limited?

1

0 No Comment : Some confusion as the training reflects the use of rain selection for uses other than rain.

3

0

0

Questionnaire AT-ORT-3, UIT, Training and Documentation, SHEET 1

AMASS Menu Mode	Enter AMASS Mode	Move AMASS Alerts Window	Go to ASDE Main Menu	Display AMASS Function Key Summary
Q1: AT User's Manual	Ok	2 Ok	2 Ok	2 Ok
Was the command found easily enough?	Too Hard	1 Too Hard	1 Too Hard	1 Too Hard
	Not Found	0 Not Found	0 Not Found	0 Not Found
Q2: AT User's Manual	Ok	2 Ok	2 Ok	2 Ok
Was the command's entry useful/complete enough?	Too Cryptic	1 Too Cryptic	1 Too Cryptic	1 Too Cryptic
	Incomplete	0 Incomplete	0 Incomplete	0 Incomplete
Q3: Training	Yes	3 Yes	3 Yes	3 Yes
	No	0 No	0 No	0 No
Did AMASS AT Training adequately cover each listed function?	N/A	0 N/A	0 N/A	0 N/A

Additional Comments

Questionnaire AT-ORT-3, UIT, Training Documentation, SHEET 2

[illegible]

Additional Comments

We need a permanent overlay such as a sticker or decal cheat sheet to attach to the mini DCU for the hotkeys.

APPENDIX L

AF OT, MOP/MOAR Result Matrix

1. TEST DATA LOG.

Test Date(s): February, 2000

Test Coordinator: Dan Dellmyer

Test Engineer:

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-5.1 Source: ORD 3.s.(1) The AMASS shall have a useful life of 20 years, operating 24 hours per day, 7 days a week, with downtime limited to corrective and preventive maintenance.	MAOR-5a1: Remote Monitoring Subsystem (RMS): The RMS for the AMASS shall be accomplished via the ASDE-3 RMS link. Its status shall also be reported locally at the ASDE-3 maintenance data terminal (MDT). MAOR-5a2: Built-In-Test (BIT)/Fault Isolation Test (FIT): AMASS shall provide both BIT and FIT capability to sense, identify and locate failures. MAOR-5a3: Local Support Tools: AMASS shall provide the capability to plug in a PC platform monitor, keyboard, and mouse for use within the tower cab to accommodate functions such as system setup, testing, and adaptation modification. MAOR-5a4: Additional connection capabilities shall be provided for the three units (PC platform monitor, keyboard and mouse) adjacent to the AMASS cabinet (i.e., in the equipment room). MAOR-5a5: One additional connection capability shall be provided for an additional unit (PC platform, keyboard and mouse).	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-5.2 Source: ORD 3.s.(2) Inherent Availability (Ai); The inherent availability, which does not include the ASDE-3 availability or the AMASS preventive/scheduled maintenance, must not be less than 0.998 times the Ai for the ASDE-3.	MAOR-5.2: The inherent availability, which does not include the ASDE-3 availability or the AMASS preventive/scheduled maintenance, must not be less than 0.998 times the Ai for the ASDE-3.	PASS			
MOP-5.3: Source: ORD 3.s.(3) Mean Time Between Failure (MTBF). The mission MTBF shall be greater than 2190 hours.	MAOR-5.3: The mission MTBF must be greater than 2190 hours.	PASS			
MOP-5.4: Source: ORD 3.s.(4) Mean Time To Repair (MTTR). The MTTR shall not be greater than 30 minutes in the three-channel configuration.	MAOR-5.4: The MTTR must not be greater than 30 minutes in the three-channel configuration.	PASS			
MOP-5.5: Source: ORD 3.s.(5) Preventive Maintenance (PM). The maximum PM required during any 6-month period shall not exceed 5 hours.	MAOR-5.5: The maximum PM required during any 6-month period must not exceed 5 hours.	PASS			
MOP-5.6: Source: ORD 3.s.(6).\$1 Remote Monitoring Subsystem (RMS). The RMS for the AMASS shall be accomplished via the ASDE-3 RMS link.	MAOR-5.6: The RMS for the AMASS must be accomplished via the ASDE-3 RMS link.	PASS			
MOP-5.7: Source: ORD 3.s.(6).\$2 Its status shall also be reported locally at the ASDE-3 maintenance data terminal (MDT).	MAOR-5.7: The AMASS status must also be reported locally at the ASDE-3 maintenance data terminal (MDT).	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-5.8: Source: ORD 3.s.(7) Built-In-Test (BIT)/Fault Isolation Test (FIT). AMASS shall provide both BIT and FIT capability to sense, identify, and locate failures.	MAOR-5.8: AMASS must provide both BIT and FIT capability to sense, identify, and locate failures.	PASS			
MOP-5.9: Source: ORD 3.s.(8).\$1 Local Support Tools. AMASS shall provide the capability to plug in a PC platform monitor, keyboard, and mouse for use within the tower cab to accommodate functions such as system setup, testing, and adaptation modification.	MAOR-5.9: AMASS must provide the capability to plug in a PC platform monitor, keyboard, and mouse for use within the tower cab to accommodate functions such as system setup, testing, and adaptation modification.	PASS			
MOP-5.10: Source: ORD 3.s.(8).\$2 Connection capabilities shall be provided for the three units (monitor, keyboard, and mouse) adjacent to the AMASS cabinet (i.e., in the equipment room) and at a location identified by the tower Air Traffic Manager.	MAOR-5.10: Connection capabilities must be provided for the three units (monitor, keyboard, and mouse) adjacent to the AMASS cabinet (i.e., in the equipment room) and at a location identified by the tower Air Traffic Manager.	PASS			
MOP-5.11: Source: ORD 3.s.(9).\$1 Interchangeability. All AMASS equipment shall be constructed with like units, assemblies subassemblies and replaceable parts being physically and functionally interchangeable.	MAOR-5.11: All AMASS equipment must be constructed with like units, assemblies subassemblies and replaceable parts being physically and functionally interchangeable.	FAIL			
MOP-5.12: Source: ORD 3.s.(9).\$2 Modular construction shall be used with a minimum number of item types.	MAOR-5.12: Modular construction must be used with a minimum number of item types.	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-5.13: Source: Derived from COI 5 Integration of the AMASS AIU subsystem into the NAS does not degrade any NAS system in normal operations, capacity operations, or degraded mode operations.	MAOR-5.13.1: The AMASS AIU subsystem does not cause any maintenance alerts or alarms, degradation of displayed data, or affect the recording of data to the following NAS subsystems while it is in normal operating mode(s), i.e. operational or test mode. MAOR-5.13.2: The AMASS AIU subsystem does not cause any maintenance alerts or alarms, degradation of displayed data, or affect the recording of data to the following NAS subsystems while it is processing a capacity scenario. MAOR-5.13.3: The AMASS AIU subsystem does not cause any maintenance alerts or alarms, degradation of displayed data, or affect the recording of data to the following NAS subsystems while it is operating in a degraded mode.	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-5.14: Source: Derived from COI 5 Integration of the AMASS display features onto the ASDE-3 display subsystem does not degrade any NAS system in normal operations, capacity operations, or degraded mode operations.	MAOR-5.14.1: The integration of the AMASS display features into the ASDE-3 display subsystem does not cause any maintenance alerts/alarms or degradation of displayed data while it is in normal operating mode(s), i.e. operational or test mode. MAOR-5.14.2: The integration of the AMASS display features into the ASDE-3 display subsystem does not cause any maintenance alerts/alarms or degradation of displayed data while it is processing a capacity scenario. MAOR-5.14.3: The integration of the AMASS display features into the ASDE-3 display subsystem does not cause any maintenance alerts/alarms or degradation of displayed data while it is operating in a degraded mode.	PASS			
MOP-5.15: Source: Derived from COI 5 Integration of the AMASS RMS into the ASDE-3 RMS subsystem does not degrade any NAS system in normal operations, capacity operations or degraded mode operations. (derived from COI 5 and the AMS T&E process guidelines)	MAOR-5.15.1: The integration of the AMASS RMS into the ASDE-3 RMS subsystem does not cause any maintenance alerts/alarms or degradation of displayed data while it is in normal operating mode(s), i.e. operational or test mode. MAOR-5.15.2: The integration of the AMASS RMS into the ASDE-3 RMS subsystem does not cause any maintenance alerts/alarms or degradation of displayed data while it is processing a capacity scenario. MAOR-5.15.3: The integration of the AMASS RMS into the ASDE-3 RMS subsystem does not cause any maintenance alerts/alarms or degradation of displayed data while it is operating in a degraded mode.	PASS			

MOP	MAOR	PASS/ FAIL	ISSUE	PROPOSED SOLUTION	PRIORITY
MOP-1.19: Source: ORD 3.r.(2).(a).\$2 AMASS shall accommodate target data from either channel of the ASDE-3.	MAOR-1.19: AMASS accommodates data from either ASDE-3 channel.	PASS			

APPENDIX M

AF OT, AF Questionnaires (February 1999)

AFO-2, AF Questionnaires

AMASS LRU Name: RF Filter Box Assembly, PC Platform extender transmitter and receiver, Fixed hard drive, Removable disk, Voice processor, Amp/speaker, Computer Interface module, PC platform, Modem, Micro-bus interface, Power monitor, Display processor interface card,	Recommendations... a. Technician #1 b. Technician #2 c. Technician #3
Q1.- LRU Replacement Was the LRU removal and replacement procedure described in a suitable and efficient manner?	a. Redundant and takes a lot for granted. Removal of some items such as pins (spring loaded) not very descriptive.
Q2.- AMASS Maintenance Section Is the AMASS Maintenance section detailed and comprehensive enough to troubleshoot and fault isolate, to the defective LRU?	a. Fault flow diagrams and equipment names don't necessarily follow block equipment names, very hard to follow and find specifics such as equipment names in tech manual. b. Fault logic diagram needs to indicate a figure number to return to on Figure 7-5. See blocks: Perform AC&DC power fault isolation
Q3.- AMASS Maintenance Section Is the AMASS Maintenance section detailed and comprehensive enough to assist you in physically locating the LRUs?	a. Definitely not, equipment LRU names are not consistent throughout tech manual b. Site selected installation of speaker/amplifier assembly.
Q4.- AMASS Maintenance Section Is the AMASS maintenance section detailed and comprehensive enough to assist you in replacing the LRUs?	a. Redundancy. Equipment very hard to access if equipment cabinet is located against the wall.

Q5.- Training Effectiveness Was the training provided to you (system overview, manuals, system), sufficient to use the AMASS system in an operational environment?	a. Still could use OS-2 and Windows 95 overview for file management. b. Will be attending equipment school in OKC when available.
Q6.- System Setup Training Effectiveness Was the training provided to you, sufficient to use the AMASS manuals and system to perform a setup, data collection, or calibration on this AMASS system?	a. Data collection and clutter map collection not expressed
Q7.- AMASS Software User's Manual Is the AMASS Software User's Manual detailed and comprehensive enough to assist you in the operation and setup of the AMASS system?	a. I'm not a so called expert in this phase, so I really can't comment a. Table 7-1, which was referenced by the flow chart troubleshooting referred to AMI-Diagnosis. Where is this found?
Q8.- BIT/FIT Was the Built-in-test (BIT) and Fault-isolation-test (FIT) sufficient in providing guidance to the faulty LRU?	a. Not necessarily b. With the PC expander (Rx) broken, the maintenance terminal is blank. You must depend on the fault logic diagram.
Q9.- Support Equipment Were you informed of the support equipment requirements for AMASS LRU removal and replacement before beginning the maintenance task? (Tools, manuals, etc.)	a. Absolutely not

Q10.- Overall System Safety Do the test tools, AMASS documentation, system or procedures allow you to perform this LRU removal and replacement in a safe manner?	a. Sometimes it tells you to pull the plug on the 208V. Pulling the plug on the 115V disabling the light, which is needed. a. All procedures should state unplugging 208VAC from cabinet. Unplugging 115VAC removes just the light (which is needed) and the receptacles at the base of the equipment, which may be needed for test equipment. b. Procedure has you secure power at the A/C power switch on the front panel. The procedure should have you secure power by unplugging cabinet or secure circuit breaker.
Additional comments/suggestions regarding AMASS LRU removal and replacement: a. Removal and replacement of LRUs are very unsatisfactory in an environment where the AMASS cabinet is located against the wall. Use of a mirror, body contortions, feeling method and removal of unnecessary LRUs to gain access to the failed unit is very time consuming and can be somewhat destructive. b. No comments c. <i>Documentation</i> The AMASS troubleshooting charts did not lead me to the cause in any of the four problems I was given to solve. I was never directed, by the charts, to observe either the RMST AMASS inquiry screens, the AMASS application screen for status, or POST FIT results. In fact, I was led to unnecessary removal and replacement of components <u>several</u> times. Only after loosely interpreting the charts, was I once led to run FIT which gave the correct result (with exception, see note). Before starting each of the troubleshooting problems, I made quick cursory observations of the ASDE and AMASS screens and was able to correctly determine the probable cause in each case. The charts actually caused extended outage and I personally would have abandoned their use after the first few moments in favor of my independent observations. There were instances of contradiction as when the AMASS display indicated an LRU (DP1/DM1) had passed POST (or in some cases, displayed blank status field) but failed the FIT results returned to the RMST (this being the true condition). Running FIT manually did not remedy the situation nor did replacing DP1/DM1 as suggested. <i>Note: Found AMASS TAIU comm fault. Ran FIT, which correctly identified the modem as the defective component. The modem was replaced and operated normally. Ran FIT again to verify operation. FIT erroneously returned a failure with probable causes of 1) serial card, 2)-voice processor, and 3)-comp iff. Ran FIT one more time with no failure found.</i> The 'Table of Contents' is incomplete. Several LRUs (all of the A2 Card Rack Assembly CCAs) were not listed in the removal and replacement procedures. Other maintenance procedures were difficult to find and usually required browsing the List of Illustrations for the LRU with the assumption that the required procedure would be located near the figure. Incorporating a simple index in the documentation would greatly enhance efficiency in field operations. <i>Hardware</i> Access from the front of the cabinet for the CPU, video switch, and modem is nearly impossible. Replacement procedures were crude and cumbersome. For example, the video switch must be unsecured and rested on the unprotected (open cabling and backplane) units below to accommodate CPU chassis removal. Cable routing further complicated the procedures as there was barely enough length to accommodate the re-connection of the cables. These situations can easily contribute to component damage. Re-positioning of the modem to the very top of the rack with the video switch next and the CPU at the lowest available space could elevate an impossible task to a difficult one. Cabling needs serious attention - especially for 'front access sites only'. <i>Software</i> The command 'Sysres -Amass' is only valid while the application is running in 'Operational Mode' but initiating the command at the RMST returns 'System Command Processed' regardless of Amass status. This invalid response appears to occur with all RMST generated commands. A second example would be the command 'Amass -Online' entered before the FIT results have been returned to the RMST - the command was ignored (unbuffered) and a misleading 'System Command Processed' message was displayed.	

AMASS Maintenance Procedures: Dedicated Clutter Collect, Load recorded log file, Load current log file, Data reduction utilities, Site-specific file back-up procedures	Recommendations/The problem is...
Q1.- AMASS Maintenance Procedures Is the training and AMASS manuals detailed and comprehensive enough to provide you with a functional and operational overview of the AMASS system?	a. Picture with no written procedures. a. No written procedure, though the program seemed user friendly although could not load current log file
Q2.- AMASS Documentation Is the AMASS documentation detailed and comprehensive enough to allow you to perform routine maintenance tasks on the AMASS system?	
Q3.- AMASS Configuration Is the documentation and training of sufficient detail to allow you to perform an operational configuration change? (Workstation mode change, load recorded log file, inject synthetic tracks, etc.)	
Q4.- Dedicated Clutter Collect Is the Dedicated Clutter Collect procedure described in a suitable and appropriate manner?	b. Many references are incorrect. Some of the steps are confusing and the procedure ends before instructing you to return thresholds to normal and restoring normal operations
Q5.- Support Equipment Were you informed of the support equipment requirements for the AMASS maintenance before beginning the maintenance task? (Tools, manuals, etc.)	

Q6.- AMASS Maintenance Procedures Is the AMASS maintenance section detailed and comprehensive enough to troubleshoot, isolate, and reconfigure the system upon locating a fault in the Display Processing Unit (DPU) cabinet?	
Additional comments/suggestions regarding AMASS Maintenance Procedures: a. Write procedure (step by step) for loading recorded log file for playback. b. Write procedure for renaming and saving current log file for access. Consider file management training c. While in 'test:on' mode, all synthetically generated targets and alarms are also present in the tower cab and manual suppression of each display and aural alarms is necessary. While this is an undesirable situation, it is workable but should at least include a cautionary statement in the procedure. There were no detailed contiguous procedures for data playback and required searching the documentation and several empirical iterations to accomplish the basic task. Invoking the 'AMASS MT' mode (<i>amass -disconnect</i>), causes an ASDE fault. No scenario for arrival alarms other than real-time arrival target with stopped synthetic target. There are no site specific file or critical file backup procedures. There are no data reduction utilities. Incomplete and incorrect clutter map procedures.	

Terminal Automation Interface Unit (TAIU) Comments

- Technician
- a. Most LRUs were more or less obvious to what needed to be removed.
 - b. The two days spent getting familiar with the TAIU were sufficient to get an overall understanding of the functionality. Troubleshooting flow chart (page C-3 of 8) refers to ARTS interface (primary/secondary IOP channel). At this location, the radar technicians don't work on the ARTS.
 - c. OJT training was adequate in scope but should be limited to 2 or 3 persons per session. I was not able to see the displays or controls most of the time because of the number of people gathered in the limited space of the ARTS environment.

The TAIU troubleshooting charts were acceptable and I was taken to the correct result each time. Consideration should be given to switching IOP interfaces to aid the process. The modem configuration procedure addresses only 'Idle or Training' and not the 'Online' condition. There were obvious places in the charts where paragraph references would have been very useful.

TAIU Documentation

The flow chart for IOP repeater amplifier needs to have a couple of blocks before the block "Call for assistance."

Add a block to check ODS for IOP configuration.

Question: Configured ok?

If the answer is Yes - Change to secondary IOP.

Question: Are FPU data blocks now present?

If the answer is Yes – Interchange IOP repeaters to isolate faulty unit.

If the answer is No – Reconfigure ODS correctly.

Question: Are FPU data blocks now present?

If the answer is Yes – the problem is solved.

If the answer is No – then you return to the previous block where the ODS is configured properly and proceed.

If the answer is No after changing to the secondary IOP, this is where the Cal for assistance block goes.

Make very clear whom the technician is to call.

APPENDIX N

AF OT Issue Result Matrix

AMASS AT OT ISSUE LIST

For the issues identified below, criticality has been defined as follows:

- **High** - A problem that will prevent, degrade, or interrupt operational service or jeopardize safety, and has no acceptable work-around.
- **Medium** - To prevent, degrade, or interrupt operational service or jeopardize safety, but has an acceptable work-around.
- **Low** - The issue constitutes an improvement to the operational use of AMASS and can be resolved through post-commissioning modifications.

ISSUE	TITLE	DESCRIPTION	REGRESSION TEST PASS/FAIL	REMARKS/STATUS
1.A	Documentation	The maintenance manual lacks consistency in naming (i.e. initialization process, boot-up, and power-on self-test).	PASS	
1.B	Documentation	AMASS troubleshooting flowcharts should include blocks to observe the AMASS MT, RMST and FIT results.	PASS	
1.C	Documentation	The table of contents is incomplete with many of the A2 CCAs not listed as LRUs.	PASS	
1.D	Documentation	Each listed LRU should have the equipment reference number (i.e. A2A4, A1A7, etc.) following the title and all should be included in an index.	PASS	
1.E	Documentation	Required procedures should be located near or with the figures, which would increase end-user efficiency.	PASS	
1.F	Documentation	The User's manual does not list how to perform a dedicated clutter collect in the AMASS TIB and once found in the manual it is inaccurate and incomplete.	PASS	
1.G	Documentation	No procedure is available to make site-specific files, or to backup critical files.	PASS	
1.H	Documentation	No procedure is available to save or playback the current log file.	PASS	
1.I	Documentation	Table of Contents is very difficult to read and hard to find an item quickly. Need to make sections stand out	PASS	

1.J	Documentation	Create a separate index volume.	PASS	Table of Contents was created by AND-410
1.K	Documentation	AMASS BIT Screen from the RMST should be used in the Flow Charts	N/A	AF Tech. need to run FIT and not rely on the BIT information.
2	LRU Replacement (Medium)	Access from the front of the cabinet for the CPU, video switch, and modem is nearly impossible. Cable dressing complicated the R&R procedures, with cable ties having to be cut to facilitate removal of equipment. Use of a mirror, body contortions, feeling method and removal of other LRUs to gain access is time consuming and could be damaging.	FAIL	STR has been written.
3	Site Installs	Future site installations need to address providing rear accessibility.	PASS	AMASS sites will have access from the rear of the cabinet.
4	Spares	As yet, a finalized spares and LRU list has not been completed. LRUs for the OT were selected as a best guess. An agreed LRU and spares philosophy is a requirement for successful NAS integration	PASS	Logistics needs to submit a finalized spare and LRU philosophy Status: Final LRU list has been submitted.
5	Certification	Three separate discussions were held regarding certification. An agreed philosophy was presented but procedures are not currently in place.	PASS	Certification Procedures were tested at DTW, with only minor red lines required. See comments
6	Single Point of Failure	Technicians are concerned with AMASS designated as being a reportable system.	PASS	AMASS system is classified as an essential system.
7	Training	The technicians believed the system overview to adequate, however a full training course on AMASS is forthcoming. Training for the TAIU system was approved on site by AFZ. Windows, OS-2 and DOS training were brought up as issues.	PASS	Status: A separate course will be developed for OS-2 Operating system.
8	Data Reduction	There is nothing in either manual regarding how to copy log files to the removable drive.	PASS	TIB includes procedures on how to copy log files.
9	Safety	Procedure for removal and replacement of the RF Filter Box assembly instructs you to secure power at the a/c power switch. Power needs to be secured at the circuit breaker or by unplugging the cabinet.	PASS	AF Reviewed the procedure
10	Video Stitching	AMASS is generating a video stitching on the ASDE-3 Display.	FAIL	Modify the AMASS equipment to resolve the video timing issue.

APPENDIX O

AF OT, AF Regression Comments
(June 2000)

AF Comments to the AMASS Manuals

I. Comments to the AMASS TIB

1. *Problem:* The format of the AMASS instruction book title page is not clear.

Solution: Reverse the title page format

- a. Move AMASS Addendum to top of page in same bold print as ASDE
- b. Move the ASDE where the AMASS is now and use the smaller print.

2. *Problem:* TABLE OF CONTENTS – Very hard to find an item quickly. Need to make the various sections stand out. Also the Technicians were having problems looking up detailed information in the AMASS TIB.

Solution:

- a. Add an A to Volume numbers i.e. Volume 7A
- b. Separate Section and Sub-Section Titles with a space at top
- c. Capitalize Section and Sub-Section Titles
- d. Use indentation under Section Titles and Sub-Section Titles

Example:

3.0 OPERATION

3.1 POWER SYSTEM UP

3.2 CONTROLS AND INDICATORS

3.2.1 Cabinet Controls and Indicators

3.2.2 Operational Display Unit (ODU)

4.0 POST-OPERATION

- e. *One possible solution:* Creating A SEPARATE INDEX VOLUME may help the technicians to find an item quickly.
3. *Problem:* No Boot Sequence for AMASS/ASDE in the AMASS TIB Manual could be found. If ASDE is powered down, what is the sequence of events, do you power down AMASS, then power up ASDE first or visa versus. This information is contained in the change pages for the ASDE but should also go into the AMASS TIB. Should this be located in a AMASS TIB flow chart diagram?
 4. *Overall Comment:* The AMASS TIB's should clearly defined in the procedures when the Technician should use AMASS MT or the ASDE MT with the appropriate commands for AMASS disconnect.
 5. *Problem:* POWER DOWN/POWER UP – missing steps in the procedure.

Solution: Last step should be added "Reset -System". This is needed to clear the stored faults

6. *Problem:* COPY LOG FILES – page 7.10.50 - routine did work,
Solution: Add to the first step "FROM ASDE MT TYPE: AMASS –DISCONNECT"

7. *Problem:* PLAYBACK – routine did work

Solution:

- a. Path must be specified where to put it

- b. Instructions do not tell how to get out of playback. Add step to say “go to system – select mode, select operational”

8. *Problem:* DEDICATED CLUTTER COLLECT – routine did work

Solution:

- a. Page 7.10.61, “Menu Path: System> Dedicated Clutter Collect” – the word “system” (AMASS or ASDE?) keeps changing throughout the book. This needs to be made uniform.
- b. Page 7.10.62 -top sentence – remove “weather conditions” or “off more than one hour.” Be more specific: If there is no reason for field personnel to perform this procedure. Then we should consider stating that because this requires power down/power up, it is a big interruption.
- c. Command “AMASS-DISCONNECT” causes AMASS fault but there is no fault. There should be a difference noted on the screen between a keyboard command to disconnect and an actual fault that causes a disconnect
- d. Page 7.10.62 – AMASS Terminal, under Step 2 - add sub step c. to read “There is a short wait for automatic clutter window to appear.”
- e. Step 5 should reference Shut Down Procedures, Volume 1, page 1.3.36, paragraph 3.44
- f. Step 6 Rewrite to read “ASDE needs to be returned to facility Area 12 Threshold values and the IF Thresholds turned “ON.”

9. *Problem:* COPY BACKUP SITE DATA/ DATABASE FILES - page 7.10.215, When copying the DTW_DATA Folder over to the F drive there was NOT enough capacity.

Solution: Create a separate folder for each the Site Configuration files and the Log Files or write a script file to copy only the site configuration files.

10. Faulted speaker amplifier, disconnected cable at the top of AMASS cabinet – Maintenance Mode

1. *Problem:* Figure 7-1, troubleshooting flow chart assumes that the AMASS is connected to the ASDE RMST after rebooting the AMASS system.

No resolution required: In AMASS Configuration file the following line was commented out:

```
Control_Mode = MT
                MT = AMASS MT Only
                RMS = Connect AMASS to ASDE RMS
```

therefore, the AMASS would not auto connect to the ASDE RMST on reboot. During normal operations, the AMASS will auto connect to the ASDE RMST on reboot.

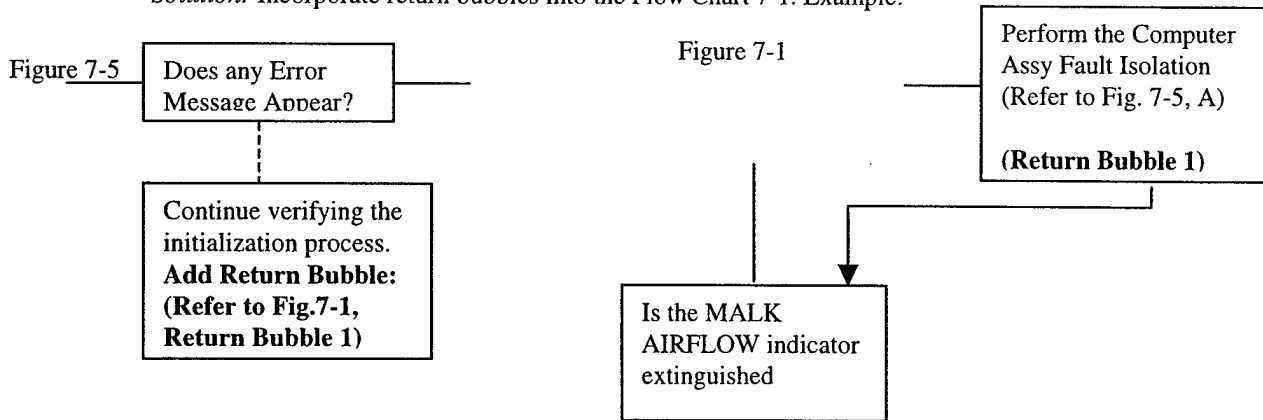
2. *Problem:* The technicians thought if you incorporate the “check AMASS BIT results on the ASDE MT Inquiry screen first” into the Troubleshooting flow charts. This could find the problem immediately. Then run the Fit at the ASDE MT.

Solution: FIT runs a more detailed fault testing then BIT provides, solution is to run FIT each time. A detailed note in the AMASS TIB Manuals and the training class should stress the use of running FIT instead of relying on BIT.

Side Note - FIT should always be run after a clean boot, if you just run FIT (no AMASS Reboot) then FIT program will use the previous history and may provide the wrong information.

3. *Problem:* Technicians were having a difficult time following the flow charts, when ask to return back to Figure 7-1.

Solution: Incorporate return bubbles into the Flow Chart 7-1. Example:



II COMMENTS TO TAIU TIB

1. No procedure in TAIU TI manual Section 5.2.e to set the system clocks. This has been designated as a certification requirement in (AF Certification Procedures) Section 1, Performance Checks, 411.d.1.
2. Section 5.2.e maintenance checks: reference illustrations/pictures of the various systems when available.

III COMMENTS TO THE CERTIFICATION PROCEDURES 6330.5A

A. TAIU

1. Section 1, Performance Checks, 411.d.1 change paragraph 5.2.a to 5.1.
2. Section 1, Performance Checks, 411.d.1 change paragraph 525 to 528
3. Section 11, TAIU, 396, change paragraph 525 to 528
4. Paragraph 528, Checking the Altimeter – omit calling ATC to get an altimeter reading from Step 5. This will be an annoyance to ATC and is unnecessary. The best procedure is to check the DASI; next best is to check the DEDS for altimeter reading
5. Section 1, Performance Checks, 412.i.3, Computer Power Supply – change paragraph 526 to 529
6. Paragraph 529, Procedure should refer technician to rear of cabinet where power supplies are located. The LEDs are on the power supplies.

- *Side Note 3/2/2000, DI will be replacing the power supplies in the TAIU Cabinet, and the new power supplies have no LEDs.*

7. Paragraph 529 Step B, Need to make reference to Illustration on p.15 of 15, Appendix A of the TAIU TI Manual.
8. Section 1, Performance Checks, 414, if available in the TAIU TI Manual should make reference to Illustration showing grills and filters

B. AMASS

1. Section 1, Performance Checks, 410.b, Change maintenance procedures paragraph from 527 to 530
2. Change Paragraph 530.d Step 1 & 12 to “At an ODU in the air traffic control tower cab, go to ASDE main Menu, scroll to the AMASS function, activate the AMASS Main menu.”

3. Add a statement to Paragraph 530.d Step 11 on “AMASS may not alert immediately due to the amount of time required for AMASS to process the closure of a runway.”
4. Change Paragraph 530.d Step 21: replace “active” to “open”. Change “an X” to “No X” and change “each” to “either”.
5. Add Step 22 “To toggle to ASDE Menu - Depress Function – U – Enter, then Scroll to Exit - Enter”,
6. Section 1, Performance Checks, 412.h, Quarterly – add step 3, “Check fans on PC Platform.”

C. ASDE

Page 3-2, paragraph 311 to 317, ASDE Handbook manual paragraph references are correct, but the Site Manual has not been updated. Why two references?

D. Appendix I Certification Requirements, Table 1

1. SIA Incursion Alert Test – change reference paragraph 527 to 530
2. Acronym TSGDT Description is wrong, needs to be changed to TSSDD throughout table.