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**NATIONAL TRANSPORTATION SAFETY BOARD
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**EXECUTIVE SUMMARY AND FACT FINDING
REVIEW OF NATIONAL MSAW PROGRAM
SEPTEMBER 1997**

(3 pages)

EXECUTIVE SUMMARY

MINIMUM SAFE ALTITUDE WARNING (MSAW) FACT FINDING REVIEW SEPTEMBER 1997

At the direction of ATS- 1, a review of MSAW equipment and operational procedures was conducted at ATLANTA ATCT (ATL), Birmingham ATCT (BHM), Boise ATCT (BOI), Charlotte ATCT (CLT), Dallas/Fort Worth ATCT (DFW), Monterey ATCT (MRY), Palm Springs ATCT (PSP), Pasco/Tri-City ATCT (PSC), Reno ATCT (RNO), and Salt Lake City ATCT (SLC). The review was conducted by teams each made up of a representative from AAT-20, a regional airway facilities representative, an air traffic automation specialist (AUS) and ARTS IIA and IIIA computer specialists (ARTS III computer specialist at DFW) from AOS-430. The review was conducted through a review of data, practical demonstration of MSAW equipment, personnel interviews, and observations. One hundred five (105) air traffic (AT) personnel and 33 airway facilities (AF) personnel interviews were conducted.

Air traffic staff and operational personnel, except for those with automation training, claimed little knowledge of the parameters or components that make up MSAW. Some individuals indicated a general, unspecified knowledge that some type of mapping existed. Very few of those interviewed remembered receiving facility training about different MSAW areas. A majority reported that the extent of their MSAW training was an overview during the initial air traffic course. Most believe that a check of the MSAW aural alarm is required at the beginning of each shift and is documented in the Watch Checklist Complete (WCLC) entry. Replies to an added question about what should be done if MSAW was not functioning properly ran the gauntlet from 'Report it to airway facilities or the automation specialist (AUS) to send a NOTAM and put it on the automatic terminal information service (ATIS) broadcast. '

There was a consensus that a controller should issue an advisory if an aircraft they are working actuates an alert. Concerning responsibilities associated with MSAW alarms at satellite towers, responses varied concerning with whom and where the responsibility existed. The majority believed it was the responsibility of the controller at the satellite facility to initiate the safety alert, while some believed it to be the parent facility controller's responsibility to notify the tower. There was also some disagreement among respondents as to what constituted a nuisance alarm. It was generally agreed that most operational personnel knew where nuisance alarms were most likely to occur; however, no action was being taken to correct the problem.

Seven of the ten facilities have permanently assigned AUS's who appear to have the confidence of air traffic personnel. DFW ATCT had an AOS specialist assigned. PSC relied on hub support, and RNO relied on a stall specialist. The AUS's interviewed,

however, believed that their training could have been more comprehensive. Six of the seven AUS's have additional duties. When air traffic personnel were asked who had authority to adjust MSAW parameters, answers included the procedures department, support manager, operations manager, AUS and air traffic manager. Except among the AUS's, responses about MSAW GENOT'S and notices were vague.

Only the AUS's gave specifics about the 6-month National Oceanic and Atmospheric Administration updates. Distribution of updates included either a hard copy or a combination of a hard copy and electronic format. Two incorrect bins were found at one location. These errors appear to have resulted from transposed x and y values when the digital terrain map (DTM) was updated. Several of the sites polled indicated they were using neither targets of opportunity in accordance with FAA Order 7210.3, Facility Operation and Administration, nor enhanced target generator (ETG) targets to test updated digital terrain map bins. Indications were that very little overlap occurred between the incoming and outgoing AUS's.

Responses from airway facilities personnel were uniformly consistent in response to a question about monthly MSAW checks. All replied that MSAW checks were a daily requirement accomplished via a diagnostic that sounds aural alarms and that this check is documented in the Technical Performance Record (TPR) as a part of the ARTS certification. When asked how they would complete the checks if MSAW was inhibited, answers ranged from asking air traffic to enable it to running the diagnostics anyway since the check does not rely on or use the operational program. Some airway facilities personnel indicated they had received briefings from the AUS on the two dimensional (2D) maps while others disavowed any knowledge of them. MSAW training ranged from receiving initial hardware training and on-the-job training (OJT) to OJT only for those who completed initial schooling before the implementation of MSAW. All respondents agreed that there is a heightened awareness about MSAW.

Present A6.04 (ARTS IIIIE) and A2.08 (ARTS IIA) documentation is unclear and confusing in the area of site adaptable MSAW parameters. There are no guidelines or standards defined in any document concerning the proper way to adapt the MSAW site variables. As a result of the inadequate A6.04 reference material, DFW, Chicago TRACON (ORD) and New York TRACON (N90) adapted the MSAW Approach Path Monitor altitudes to be above ground level when the system expected mean sea level values. This resulted in all the altitudes used for MSAW at DFW, to be 600 feet too low and ORD as much as 800 feet too low. The altitude impact at N90 was negligible due to its approximate sea level elevation. All ARTS IIIIE systems were corrected and verified immediately after this problem was identified.

AAF- 1 has provided interim recertification guidance to 193 terminal and 25 en route MSAW/EMSAW sites. Flight checks were completed for 23 sites, with 2 of those sites failing one or more parameters which were corrected with a repeat flight check. Action was completed correcting the problems and subsequent flight checks were successful.

A work group consisting of AF and AT personnel convened the week of September 29 to examine MSAW policy, orders, directives, inspection procedures, coordination processes, certification procedures, and AT/AF roles and responsibilities. In addition, the work group addressed the findings documented in the ATS MSAW evaluation team reports. Notwithstanding the efforts expended by the work group, it is recommended, as a result of these evaluations, that

a. A standardized comprehensive training program be established to provide a basis for not only entry level training, but also for periodic refresher training in the operation and maintenance of MSAW equipment;

b. A certification process be established for personnel completing the aforementioned training;

c. National guidance be provided to both AT and AF personnel for program administration;

d. Uniform site adaptation/system parameters be established for MSAW equipment operation; and,

e. Provisions for periodic evaluation of field facility MSAW equipment and program administration be established to ensure system integrity and reliability.

f. Configuration management of all software be reflected in appropriate documents and controlled by AQS.



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