NOTICE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
Air Traffic Organization Policy

N JO 6191.36

Effective Date:
07/20/2017
Cancellation Date:
07/20/2018

SUBJ: Addition of Wide Area Multilateration (WAM) and Virtual Radar (VR) to Order JO 6191.5, Standard Terminal Automation Replacement System (STARS) Maintenance Technical Handbook (MTHB) Generation 4 (G4)

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1. Purpose of This Notice. This notice advises regional Technical Operations divisions, Technical Operations field offices, and other selected offices to use the attached changes to Order JO 6191.5, Standard Terminal Automation Replacement System (STARS) Maintenance Technical Handbook (MTHB) Generation 4 (G4). These pages add Technical Characteristics and Standards and Tolerances for WAM and VR as a surveillance source of input.

2. Audience. This document requires actions by the Airway Transportation System Specialist (ATSS) and the DoD equivalent at operational facilities with Facility, Service, and Equipment Profile (FSEP) equipment: **STARS G4.**

3. Where Can I Find This Notice?

a. FAA Personnel.

(1) For electronic copies, FAA personnel can use one of the following websites to locate this order.

(a) On the Technical Library website at:
http://nas.amc.faa.gov/phoenix/views/technicalLibrary.xhtml

(b) On the Directives website at:
https://employees.faa.gov/tools_resources/orders_notices/

(c) From the My FAA website, select *Tools and Resources* then select *Orders and Notices*.

(d) The ATSS and all administrative personnel must subscribe to the Auto-Notifications Services for electronic library release notifications at http://technet.faa.gov/. Administrative offices can print these documents for local use as required.

(2) The field office must keep accurate FSEP records and Logistics Center Support System (LCSS) addresses per Order 6000.5D, Facility, Service, and Equipment Profile (FSEP).

(a) To update FSEP information, visit this link:
https://employees.faa.gov/org/linebusiness/ato/operations/technical_operations/ajw1/ajw1b/fsep/

(b) To update LCSS information, visit this link: https://lcss.faa.gov/lcss

b. Department of Defense (DoD):

(1) All DoD customers must register for an Aeronautical Data Exchange (ADX) website account at https://www.adx.faa.gov. When registering, the user must request access to the NAS Engineering tab of the application. The FAA does not distribute hard copies to

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Distribution: FAA and DoD
STARS Facilities

Initiated By: AJM-2422

DoD customers. For problems accessing the ADX website contact 9-ACT-ADX-PM@faa.gov.

(2) For DoD customers who have questions related to this Notice, contact the TSLE Systems Field Support PMO Helpdesk at 1-800-377-0308.

4. Cancellation. Not applicable.

5. Action. The recipients of this notice who perform, manage, check, or instruct Order JO 6191.5 STARS MTHB G4, are directed to replace current versions of the following paragraphs and tables with the updated paragraphs and tables included in this notice that add WAM and VR information and guidance.

2-8, Wide Area Multilateration (WAM) and Virtual Radar (VR).

3-5, RTQC Check Report.

The changes presented in this notice require compliance and will be included in the next revision of FAA Order JO 6191.5.

CHAPTER 2. TECHNICAL CHARACTERISTICS

2-8. Wide Area Multilateration (WAM) and Virtual Radar (VR).

Wide Area Multilateration (WAM) is a cooperative surveillance system that utilizes multilateration technology to determine the position of aircraft. Multilateration is the process of determining an aircraft's location by solving for the mathematical intersection of multiple ellipsoids based on the time difference between the transponder's signal receipt at multiple ground stations.

WAM is a distributed surveillance technology. Multiple ground stations are dispersed throughout a geographic area to receive downlink signals from aircraft. The ground stations decode and timestamp the received data and forward the decoded messages via a communications network to target processors for further processing. The target processors utilize time deltas to calculate an aircraft's position. This positional data is then distributed to automation equipment for use by ATC personnel.

The Virtual Radar (VR) function provides aircraft positional information data to terminal automation systems in the form of Digital Airport Surveillance Radar (DASR) messages to support separation assurance and Traffic Flow Management (TFM). The VR converts ASTERIX-formatted CAT010 and CAT019 reports containing target position, ID, altitude, and other information into messages in DASR format. The output of the VR emulates the output of an actual digital ASR-11.

CHAPTER 3. STANDARDS AND TOLERANCES

3-5. RTQC Check Report.

Parameter	Reference Paragraph	Standard	Tolerance/Limit	
			Initial	Operating
(6) Virtual Radar (DASR Format)				
(a) Mode 3/A Validity (≥)	Note 1	98%	Same as standard or baseline value.	Within 10% of initial.
(b) Mode C Validity (≥)	Note 1	97%	Same as standard or baseline value.	Within 10% of initial.
(c) Search RTQC Reliability (≥)	Note 1, 3	98%	Same as standard or baseline value.	Within 10% of initial.
(d) Beacon RTQC Reliability (≥)	Note 1, 3	98%	Same as standard or baseline value.	Within 10% of initial.
(e) Zero Code (<)	Note 2	1%	Same as standard or baseline value.	Same as standard or baseline value.
(f) Beacon Blip/Scan (≥)	Note 2	90%	Same as standard or baseline value.	Within 10% of initial.
(g) Beacon Azimuth Split (<)	Note 2	1%	Same as standard or baseline value.	Same as standard or baseline value.
(h) Range Split (<)	Note 2	1%	Same as standard or baseline value.	Same as standard or baseline value.

NOTE: Virtual Radar is short range.

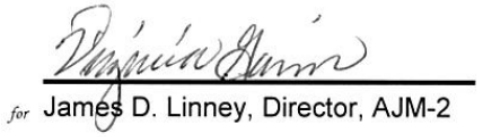
6. Background. Wide Area Multilateration (WAM) and Virtual Radar (VR) is an implementation that converts WAM ASTERIX CAT010 and CAT019 data to a Digital ASR-11 (DASR) ASTERIX 34/48 format for input into STARS. WAM and VR will be fused with other available sensors and provide extended airspace coverage with a provision of 3NM separation services, utilizing existing Automatic Dependent Surveillance – Broadcast (ADS-B) radio stations.

7. Risks.

a. Operational. There are no operational risks associated with this Notice.

b. Safety. In compliance with the latest edition of Orders 1100.161, Air Traffic Safety Oversight, and JO 1000.37, ATO Safety Management System, all NAS changes require an SRM assessment for all notices prior to delivery. The SRM information for this notice is available in ATTACHMENT 1 – SAFETY DOCUMENTATION. For further guidance in SRM documentation, refer to the latest edition of the Safety Management System (SMS) Manual.

c. Security. There are no security risks associated with this Notice.



for James D. Linney, Director, AJM-2

ATTACHMENT 1 - SAFETY DOCUMENTATION

Standard Terminal Automation Replacement System (STARS)
Notice JO 6191.xx, Addition of Wide Area Multilateration (WAM) and Virtual Radar (VR) to Order JO 6191.5, Standard Terminal Automation Replacement System (STARS) Maintenance Technical Handbook (MTHB) Generation 4 (G4)

Safety Risk Management (SRM) Document without Hazards

Version 1.0

June 29, 2017

SRM Document Change History

VERSION	DATE	DESCRIPTION OF CHANGES
Version 1.0	06/29/17	Initial Document

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Section 1.0 Executive Summary

1.1 Administrative Information

Title:	Notice JO 6191.xx, Addition of WAM and VR to JO 6191.5 STARS MTHB G4
Originator:	John Williamson, Systems Field Support, AJM-2422
Originator's Organization:	Terminal Second Level Engineering (TSLE), AJM-2422
Originator's Phone Number:	(609) 485-5187
Safety Analysis Type:	Operations and Second Level Engineering
Configuration Management (CM) Reference:	Software Change Manager (SCM) package #102862
Version Number:	1.0
Submission Date:	June 29, 2017
Safety Management Tracking System (SMTS) #:	SMTS2017062904083

This SRM document captures the STARS SRM Panel's safety assessment of Notice 6191.xx, Addition of WAM and VR to JO 6191.5 STARS MTHB G4.

The SRM Panel used methodologies and guidance as documented in the current Safety Management System (SMS) Manual to conduct this SRM analysis. The 5M Model was used to ensure that the appropriate elements of the system were taken into account for an accurate safety risk analysis of the described system.

The panel reviewed the change and no credible hazard was identified.

1.2 Description of Current National Airspace System (NAS)/Existing Safety Issue

STARS provides continuous real-time support to air traffic controllers at terminal sites through the automation of certain functions. The primary automated functions are surveillance and tracking, controller data entry and display, aircraft separation assistance, Flight Plan (FP) processing, data recording, and system monitoring. STARS also provides support functions for data reduction, system evaluation, controller training, system administration, site and system adaptation data management, and software development and maintenance.

STARS is a digital system consisting of software, processors, displays, peripherals, and local and remote connectivity and interfaces. STARS also maximizes the use of Commercial Off-The-Shelf (COTS) hardware and software. The automation subsystem software performs the air traffic monitoring and report processing using either Full Service Level (FSL) or Emergency Full Service Level (EFSL) mode. Both FSL and EFSL modes provide the radar target and weather data, situation display processing, monitoring, and man-machine interface functions required for

Air Traffic Control (ATC). In addition, FSL utilizes inter-facility data to provide flight data to the ATC positions.

WAM is a cooperative surveillance system that utilizes multilateration technology to determine the position of aircraft. Multilateration is the process of determining an aircraft's location by solving for the mathematical intersection of multiple ellipsoids based on the time difference between the transponder's signal receipt at multiple ground stations.

WAM is a distributed surveillance technology. Multiple ground stations are dispersed throughout a geographic area to receive downlink signals from aircraft. The ground stations decode and timestamp the received data and forward the decoded messages via a communications network to target processors for further processing. The target processors utilize time deltas to calculate an aircraft's position. This positional data is then distributed to automation equipment for use by ATC personnel.

The VR function provides aircraft positional information data to terminal automation systems in the form of Digital Airport Surveillance Radar (DASR) messages to support separation assurance and Traffic Flow Management (TFM). The VR converts All Purpose Structured Eurocontrol Surveillance Information Exchange (ASTERIX)-formatted CAT010 and CAT019 reports containing target position, identification, altitude, and other information into messages in DASR format for input into STARS. The output of the VR emulates the output of an actual digital Airport Surveillance Radar (ASR)-11.

STARS is a critical service that requires system and service certification.

1.3 Description of NAS Change

The STARS MTHB provides guidance and prescribes technical standards, tolerances, and procedures applicable to the maintenance, inspection, and certification of the system.

The STARS MTHB requires changes to be incorporated into chapter two, Technical Characteristics, paragraph 2-8, Wide Area Multilateration (WAM) and Virtual Radar (VR), and chapter three, Standards and Tolerances, paragraph 3-5, Real Time Quality Control (RTQC) Check Report. This notice advises regional Technical Operations (Tech Ops) divisions, Tech Ops field offices, and other selected offices to use the attached changes to Order JO 6191.5. These pages add technical characteristics for WAM and provide previously established standards and tolerances for WAM and VR as a surveillance source of input.

This notice will be distributed NAS-wide to all STARS G4 facilities.

Assumptions for this analysis:

No assumptions were necessary to conduct this assessment.

1.4 Rationale for a Safety Finding without Hazards

On Thursday, June 29, 2017, an SRM Panel was conducted in accordance with the current online version of the SMS Manual to analyze the potential safety risk of implementing changes to the STARS MTHB, Order JO 6191.5 outlined in Notice JO 6191.xx.

The SRM Panel reviewed the STARS MTHB changes and concurred that the addition of the WAM and VR technical characteristics in chapter two, paragraph 2-8 will not introduce risk to the NAS. Also, the standards and tolerances added in chapter three, paragraph 3-5, are the same as the established parameters for the DASR-11 and will not introduce a risk to the NAS.

Notice 6191.xx, Addition of WAM and VR to JO 6191.5 STARS MTHB G4, was successfully tested on June 07, 2017, at the William J. Hughes Technical Center (WJHTC), Atlantic City, New Jersey.

1.5 Risk Summary

Not applicable.

1.6 Dissention

The SRM Panel members concurred that this change will not introduce a risk to the NAS.

Section 2.0 SRM Document Signature Page

Reviewer(s):

Marcia Gonzalez
Safety Quality Assurance, Terminal Second Level Engineering, AJM-2430
7/6/17
Date

Patti Dee McNeill
Manager, Safety Risk Management, AJM-2470
7/6/17
Date

Concurrence(s):

Frank Gallo
Manager, Hardware Field Support, AJM-2422
7/6/2017
Date

Joan H. Somogy
Group Manager, Terminal Second Level Engineering, AJM-24
7/6/17
Date

Approval:

Tony Mello
Director, Operations-Headquarters, AJT-2
7/17/17
Date

Section 3.0 Safety Risk Management Panel Attendees

The STARS SRM Panel included representatives and stakeholders from organizations affected by the change. The panel discussed the scope of the effort and identified key issues and an approach to complete the required safety analysis. The panel then conducted a safety analysis of the proposed change(s) and documented the findings in this SRM document.

Table 3.1 SRM Panel Members, Thursday, June 29, 2017

NAME	ORG	TITLE	ROLE
*Craig Bielek	NATCA	National Air Traffic Controllers Association (NATCA)-WAM Subject Matter Expert (SME)	SRM Panel Member
**Hilton Braithwaite	AJM-2422	STARS System Support	SME
Russell Busbee	AJV-723	Terminal Validations and Requirements – Air Traffic (AT)	SRM Panel Member
Dan Bussey	AJV-723	Terminal Validations and Requirements – AT	SRM Panel Member
Allen Casey	AMA-421	Electronics Technician Instructor-Federal Aviation Administration (FAA) Academy, Terminal Automation Section	SRM Panel Member
Donna Hare	AJM-2470	TSLE SRM Specialist	SRM Support
Robert Padilla	AJM-2411	TSLE STARS Software Build Co-Lead	SRM Panel Member
*John Santos	AJV-723	Terminal Validations and Requirements - Tech Ops	SRM Panel Member
Andrew Stachowiak	CSG-I90	NATCA-Surveillance Broadcast System (SBS) SME	SRM Panel Member
Loi Tran	AJV-723	Terminal Validations and Requirements – Tech Ops	SRM Panel Member
Rebecca Viggiano	AJM-2470	TSLE SRM Lead	Facilitator
John Williamson	AJM-2422	TSLE Systems Field Support	SME/Change Proponent

*via telecon
**Concurred to SRM document via email

A Professional Airway System Specialists (PASS) representative has has been included throughout the SRM process of this notice.

Section 4.0 Hazard and Risk Analysis

Not applicable.

Appendix A Related FAA Documents

The following list of documents (e.g., Air Traffic Organization (ATO) Orders, directives, regulations, handbooks, and manuals) addresses NAS safety management that relates to this change and has been consulted in the SRM process**.** In some cases, the documents listed below may have been updated since this list was compiled**.** Please refer to the Office of Primary Responsibility (OPR) for the most recent version of these documents.

The following FAA documents were used during the SRM analysis for this change:

FAA System Documentation:

1320.1	FAA Directives Management
1320.58	Instructions for Writing Notices, Maintenance Technical Handbooks and System Support Directives
6000.15	General Maintenance Handbook for National Airspace System (NAS) Facilities
6032.1	National Airspace System (NAS) Modification Program
JO 7210.3	Facility Operation and Administration
JO 7110.65	Air Traffic Control
FAA-G-2100	Electronic Equipment, General Requirements

FAA Test and Evaluation Gold Standard and Implementation Guide

Safety Risk Management:

ATO Order 1030.1	Air Traffic Organization Safety Guidance
ATO Order JO 1000.37	Air Traffic Organization, Safety Management System
FAA Order 1100.161	Air Traffic Safety Oversight
ATO SMS Manual	

Appendix B Acronyms

ASR	Airport Surveillance Radar
ASTERIX	All Purpose Structured Eurocontrol Surveillance Information Exchange
AT	Air Traffic
ATC	Air Traffic Control
ATO	Air Traffic Organization
CM	Configuration Management
COTS	Commercial Off-the-Shelf
DASR	Digital Airport Surveillance Radar
EFSL	Emergency Full Service Level
FAA	Federal Aviation Administration
G4	Generation 4
FP	Flight Plan
FSL	Full Service Level
MTHB	Maintenance Technical Handbook
NAS	National Airspace System
NATCA	National Air Traffic Controllers Association
OPR	Office of Primary Responsibility
PASS	Professional Aviation Safety Specialists
RTQC	Real Time Quality Control
SBS	Surveillance Broadcast System
SCM	Software Change Manager
SME	Subject Matter Expert
SMS	Safety Management System
SMTS	Safety Management Tracking System
SRM	Safety Risk Management
STARS	Standard Terminal Automation Replacement System
Tech Ops	Technical Operations
TFM	Traffic Flow Management
TSLE	Terminal Second Level Engineering
VR	Virtual Radar

WAM	Wide Area Multilateration
WJHTC	William J. Hughes Technical Center