



U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

Air Traffic Organization Policy

ORDER
JO 7210.37G

Effective Date:
July 16, 2012

SUBJ: En Route Minimum Instrument Flight Rules (IFR) Altitude (MIA) Sector Charts

- 1. Purpose of This Order.** This order establishes procedures and criteria to develop MIA sector charts for en route air traffic facilities.
- 2. Audience.** This order applies to the following Air Traffic Organization (ATO) service units: En Route and Oceanic and Mission Support; associated service center offices; William J. Hughes Technical Center; Mike Monroney Aeronautical Center; and Air Route Traffic Control Centers (ARTCC).
- 3. Where Can I Find This Order?** This order is available on the MyFAA employee Web site at https://employees.faa.gov/tools_resources/orders_notices/.
- 4. Cancellation.** This order cancels Order JO 7210.37F, effective February 6, 2012.
- 5. Scope.** This order establishes procedures and criteria to develop MIA sector charts for en route air traffic facilities operating within the scope of the HOST, En Route Automation Modernization (ERAM), Microprocessor En Route Automated Tracking System (MEARTS) and Ocean 21 automation platforms. Unless otherwise specified, the procedures listed are the responsibility of each Air Route Traffic Control Center (ARTCC).
- 6. Explanation of Change.** This change adds the procedures to build En Route Minimum Safe Altitude Warning (E-MSAW) polygons, also known as ERAM Terrain Alert Volume (TAV), to Appendix B.
- 7. Procedures.** Each ARTCC must develop and maintain their MIAs by using Sector Design and Analysis Tool (SDAT). SDAT completes FAA Form 7210-9. SDAT creates and sends the necessary data files to Mission Support Services, ATC Products Group for certification.
 - a. At a minimum, the airspace considered for providing obstacle clearance information on MIA charts must accommodate:
 - (1) HOST/MEARTS/Ocean 21: The lateral limits of the facility's delegated area of control as well as adjacent airspace where control responsibility is assumed because of early handoff or track initiation.
 - (2) ERAM: See Appendix B.
 - b. MIAs are established irrespective of radar coverage. It is the responsibility of the controller to determine that a target return is adequate for radar control purposes.

- c. Verify that the altitude information adapted in the National Airspace System (NAS) E-MSAW/TAV polygons agree with the MIA sector charts.
- d. Establishing the buffers, lateral boundaries and names of the MIA.
 - (1) Apply a minimum buffer of 5 NM.
 - (2) Do not include a buffer area for evaluation of controlled airspace or an Air Traffic Service (ATS) Route. The lateral limits of these areas will serve as the associated lateral boundary

NOTE-

Sectional charts are currently the only source that identifies the floor of controlled airspace.

- (3) MIA area names are used with respect to the E-MSAW/TAV area identification criteria and to identify areas relative to significant geographical points or fixes.

- e. Establish the base altitude of the MIA by applying:

- (1) The appropriate mountainous or non-mountainous required obstacle clearance (ROC) criteria.

NOTE-

The location of the obstacle, in either mountainous or non-mountainous areas will determine the appropriate ROC for the whole area. If appropriate, the MIA area will include the associated buffer. When this occurs, consider revising the lateral boundary.

- (2) The requirements of controlled airspace.

- (a) MIAs must provide a 300 ft buffer above the floor of controlled airspace.

- (b) In some cases, the requirement to establish an MIA that is 300 ft above the floor of controlled airspace will result in an exceptionally high MIA; (e.g., in areas where the floor of controlled airspace is 14,500 MSL). In these cases a second altitude may be established that only provides obstruction clearance.

NOTE-

See Displaying a Facility MIA Chart for controlled airspace charting purposes.

- (3) ATS routes adapted as a MIA area. Facilities may adapt the Minimum En-Route Altitude (MEA) altitude as the (E-MSAW) altitude to prevent nuisance alerts. In this case use the following:

- (a) The SDAT calculated MIA altitude for the area is at or below the MEA. A single MIA altitude can be used for aircraft assigned the airway and those aircraft on a direct route or being vectored.

Example-

The MEA for the airway is 2,000 feet. The SDAT calculated MIA altitude for the area is 1,900 feet. In this case a single MIA altitude of 1,900 feet maybe used for aircraft assigned the airway, on a direct route or being vectored.

- (b) The SDAT calculated MIA altitude for the area is above the MEA. In this case a second

altitude must be displayed. The MEA can be used for aircraft assigned the airway but the MIA must be used for aircraft on a direct route or being vectored.

Example-

The MEA for the airway is 2,000 feet. The SDAT calculated MIA altitude for the area is 2,500 feet. In this case, 2,000 feet maybe used for aircraft assigned the airway but aircraft on a direct route or being vectored must use the MIA of 2,500 feet.

NOTE-

See Displaying a Facility MIA Chart for MEA charting purposes.

f. Changes to the MIA base altitude.

(1) Apply an AAO to terrain except those areas around primary/satellite airports exempted by FAA Order 8260.19 and/or where applying 2,000 feet of unreduced ROC.

(2) Designated mountainous terrain must be evaluated for precipitous terrain characteristics and the associated negative affects when rounding down or requesting a ROC reduction. Air Traffic Managers must use FAA Order 8260.3, paragraph 10.2.8 and the following to determine precipitous terrain:

(a) The facility must include a query to an independent data source to determine if any ground proximity warnings have been reported in the subject area. Independent data source should include but are not limited to the National Aeronautics and Space Administration (NASA) Aviation Safety Reporting System.

(b) Consideration must be given to the facility's history and experience with turbulence at the MIA requested altitude.

(c) The facility submittal package must include a detailed account of the steps taken by the facility to determine if precipitous terrain applies.

(3) Sector altitudes may be rounded down to the nearest 100-ft increment over AAO obstacles when operationally required.

NOTE-

AAO obstacle is defined as terrain with an AAO added.

(4) Non AAO obstacles may be rounded down to the nearest 100 ft increment in the contiguous United States if the altimeter setting issued to the pilot is located within 65 nautical miles of the MIA/TAV sector and in the following areas:

NOTE-

1. *Non AAO obstacles are defined as terrain without an AAO added or man made structures.*

NOTE-

2. *Not authorized in Alaska, Hawaii, or any other territory or possession.*

(a) Non-mountainous.

(b) Mountainous where ROC is not reduced.

(c) Mountainous where ROC was reduced but precipitous terrain is not present and/or the elevation in the area does not change by more than 1,500 feet.

(d) Mountainous where ROC was reduced and precipitous terrain is present. Rounding down can only be used when applying the procedures in Appendix A.

(e) Mountainous where ROC was reduced and the elevation in the area changes by more than 1,500 feet. Rounding down can only be used when applying the procedures in Appendix A.

(5) ROC reductions for terrain and man made obstacles.

(a) ROC reductions are only approved in mountainous areas.

(b) The facility MIA package must include a detailed account of the steps taken by the facility to determine if the sector will qualify for a ROC reduction in the sector.

(c) ROC reductions must be submitted to the appropriate Service Center Operations Support Group (OSG) for review.

(d) Previously approved ROC reductions require subsequent approval during each facility submittal.

(e) ROC reductions are available only if an operational need is identified and documented in the Remarks Section on FAA Form 7210-9.

(f) ROC reduction requests in areas with precipitous terrain characteristics must follow the steps contained in paragraph 7.f.2.). If associated negative effects of precipitous terrain are discovered during the evaluation process then ROC reductions are not authorized in the subject area.

(g) ROC reductions for terrain include a 500 feet reduction in designated Eastern Mountainous areas or a 300 ft reduction in designated Western Mountainous areas.

(h) ROC reductions for man made obstacles include a 1,000 feet reduction. The ROC for the terrain underlying the obstacle must also be considered when applying a ROC reduction to a man made obstacle.

g. The Digital Obstacle File (DOF) contains the registered accuracy code for all obstacles. If (NA/NA) is displayed under the ELEV (Acc H/V) column on the facility's FAA Form 7210-9, use the following process:

(1) The facility must enter the following words in the Remarks Section on FAA Form 7210-9: To facilitate MIA chart submittals, an obstacle accuracy code place holder of 5E is in effect.

(2) The SDAT office must:

(a) Record the obstacle for record keeping.

- (b) Forward the obstacle to the Obstacle Terrain and Data (TOD) Team.
- (c) Advise En Route and Oceanic Operations Support (AJE-3) if an accuracy code has not been obtained within 90 days.
- (3) AJE-3 will determine if the facility needs to adjust the sector altitude to account for the lack of an accuracy code or determine the appropriate course of action for obtaining an accuracy code for the obstacle.

h. Waivers.

- (1) Requests to waive criteria contained in Order JO 7210.37 must be submitted to the appropriate service area. The waiver request must contain:
 - (a) The criteria requested to be waived and
 - (b) The operational need fully explained and
 - (c) A Safety Risk Management (SRM) document for the change.

i. Facility's MIA submittal process.

- (1) Facilities must submit their MIA charts for review periodically but not to exceed 24 months.
- (2) Each submission must include the following items imported into the SDAT Project file and stored in the SDAT repository:
 - (a) A facility cover letter and
 - (b) The SDAT generated FAA Form 7210-9 with the manager's signature.
- (3) Forward the signed cover letter, signed FAA Form 7210-9, and any other documentation to the AeroNav Products for review and certification.

NOTE-

All information, whether a hard copy or soft copy sent to AeroNav Products, must be included in the MIA SDAT project file.

- (4) When the project is approved, AeroNav Products will send an approval letter to the facility.
- j. After the submittal, monitor available sources including the weekly National Flight Data Digest (NFDD) pertaining to construction notices that may affect specific MIA areas.
 - (1) When needed, revise the affected charts.
 - (2) Enter the revised charts into the SDAT repository.

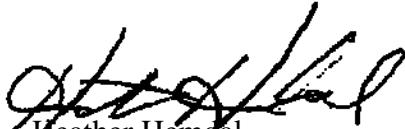
k. Displaying a Facility MIA Chart.

- (1) Applicable portions of the facility's MIA chart must be displayed at each low altitude sector.
- (2) Air traffic managers must determine the appropriate method for displaying this information at the sector.
- (3) MIAs must be displayed with each associated MIA area.
- (4) Displaying an additional obstruction clearance altitude in conjunction with a higher MIA based on controlled airspace.
 - (a) The additional obstruction clearance altitude must be identified on the chart by an asterisk (*) (i.e., 90*70).
 - (b) A facility directive must contain an explanation that the higher altitude on the left of the asterisk is the MIA for the area and the lower altitude to the right of the asterisk is the obstruction clearance altitude.
- (5) Displaying an airway adapted as a MIA area:
 - (a) If the MEA is sufficient for off-airway operations, the MIA and the MEA must be displayed as one altitude for that area.
 - (b) If a higher altitude is required for off-airway operations, then both the MEA altitude and the off-airway operations altitude must be displayed separated by a slash (i.e., 90/70).
 - (c) A facility directive must contain an explanation that the higher altitude on the left of the slash is the MIA for the area and the lower altitude to the right of the slash is the MEA.

8. Distribution. This order is distributed to the following Air Traffic Organization (ATO) service units: En Route and Oceanic, Terminal, Mission Support, and System Operations; all associated air traffic control facilities; the FAA William J. Hughes Technical Center; and Mike Monroney Aeronautical Center.

9. Background. This change adds the procedures to build En Route Minimum Safe Altitude Warning (E-MSAW) polygons also known as ERAM Terrain Alert Volume (TAV) to Appendix B following En Route Automation Modernization (ERAM) Implementation.

10. Safety Risk Management. Safety Risk Management was conducted on the changes in the NAS that are contained in this document. A Safety Risk Management Decision Memorandum (SRMDM) was issued that stated that these changes do not introduce any new risks into the NAS.



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Appendix A: Rounding down in MIA areas with approved ROC reductions that have precipitous terrain or elevation changes of more than 1,500 feet maybe utilized if the following conditions are met:

1. The 5 year average temperature must be documented in the Remarks Section on FAA Form 7210-9 and
2. The 5 year average temperature for the MIA area is at or above the “Minimum Average Low Temperature” for the “Approved ROC reduction” listed in the ROC Reduction/ Temperature Table.

ROC Reduction/Temperature Table

Minimum obstacle clearance in feet	Minimum average low temperature in °F
1851	-40
1651	-22
1451	-4
1251	14
1051	32
1051	36
951	45

NOTE-

Interpolation of this table is permitted.

3. Use the following process to determine the 5 year average of the low temperature:
 - a.) Go to National Climatic Data Center web site – www.ncdc.noaa.gov
 - b.) Click on “Find a Station”.
 - c.) Click on “State/Division/County/City”.
 - d.) Select the state and click on “List Stations”.
 - f.) Select Station representing the primary airport in the MIA area.
 - g.) Scroll down to Forms, Publications, and Web Pages and select “Annual Climatologically Summary”.
 - i.) Select each relevant year.
 - j.) Find the Lowest Temperature for the year. This is the EMNP column, on the bottom row.
 - k.) Calculate the total of the last five years worth of temperature and divide by five.
 - l.) This amount is the value of the 5 year average temperature.

Appendix B: ERAM E-MSAW/TAV procedures.

General. Local Air Traffic must resolve any E-MSAW/TAV discrepancies noted by FAST during facility adaptation.

1. Initial ERAM E-MSAW/TAV build.

- a. Each facility must build the E-MSAW/TAVs for the FPAs that they own to the surface.
- b. If there is a question about who owns the FPAs to the surface, the airspace offices of the affected centers must determine who will build the E-MSAW/TAV for the area in question.
- c. This determination must be entered into an appropriate facility's directive for reference.
- d. This will be the SDAT file that the facility must submit for the bi-annual requirement.

2. Adding E-MSAW/TAVs outside your common boundary.

- a. After the initial ERAM E-MSAW/TAV build is approved, facilities must confer with each of the Adjacent facility's airspace offices to obtain all E-MSAW/TAVs that are located within 30 NM of their common boundary.

NOTE-

If FAST requires adaptation past 30 NM this needs to be coordinated with the adjacent ARTCC and entered in an appropriate facility's directive for reference.

- b. The adjacent airspace offices must coordinate that the nodes on a common ARTCC boundary match up and did not create any holes or overlaps.
- c. These must be added to the approved facility's SDAT file.
- d. Each added E-MSAW/TAV must include the E-MSAW/TAV boundary and the E-MSAW/TAV altitude.

NOTE-

This can be accomplished by obtaining the adjacent facility's approved SDAT file located in the SDAT repository.

- e. To add E-MSAW/TAV's in Canadian or Oceanic airspace.
 - (1) Coordinate with the appropriate facility to determine the E-MSAW/TAV boundary and altitude.
 - (2) Add this information to the facility's approved SDAT file.
 - (3) Enter the agreed upon E-MSAW/TAV information sharing in a directive between the two facilities. This must include how the two facilities would share future E-MSAW/TAV changes.

NOTE-

Adding E-MSAW/TAVs from Mexico is not authorized.

- f. The E-MSAW/TAV build is now ready to be entered into the facility's adaptation.

3. Coordination between the Airspace Office and FAST.

a. It is important that a common chart date be established and coordinated between all facilities. This includes both the airspace office and FAST. If any party needs to change the common chart date then this information must be coordinated to all affected facilities.

b. Once the build has been approved and ready for implementation, both the airspace office constructing the E-MSAW/TAV and the airspace office receiving the coordination must enter a AIMS ticket within their facility.

c. The AIMS ticket must contain the E-MSAW/TAV build and the wording "Coordinate with Zxx" (Zxx being the appropriate center) entered into the AIMS ticket description.

NOTE-

Upon viewing the wording "Coordinate with Zxx" in the AIMS ticket description, the facility FAST should coordinate with the adjacent center FAST to determine a common chart date. The facility FAST team should coordinate the common chart date with the facility's airspace office.

4. Subsequent E-MSAW/TAV builds.

a. When a change is made to a E-MSAW/TAV that is located within 30 NM of the agreed upon common ARTCC boundary, the facility building the E-MSAW/TAV must coordinate with any adjacent ARTCC airspace offices.

NOTE-

The coordination should ensure that the revised build meets their operational needs.

b. The coordination must include any revisions to the E-MSAW/TAV boundary and E-MSAW/TAV altitude.

c. The facility building the E-MSAW/TAV must verify the build did not create any holes or overlaps.

NOTE-

The SDAT Airspace Validation report must be used to ensure holes or overlaps do not exist.