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

ORDER
JO 7470.1B

Effective Date:
November 1, 2021

SUBJ: Distance Measuring Equipment (DME)/DME Infrastructure Evaluation for Area Navigation (RNAV) Routes and Procedures

1. Purpose. This order provides guidance and standardization for DME/DME infrastructure evaluation in support of RNAV route and procedures development.

2. Distribution. This order is distributed in Washington headquarters at the division level of Flight Standards; director level of Air Traffic, the offices of Airport Safety and Standards and Communications, Navigation, and Surveillance Systems, the Aeronautical Information Services; the Regulatory Standards Division at the Mike Monroney Aeronautical Center; regional Flight Standards offices, Air Traffic Organization (ATO) service centers, all air traffic field offices and facilities, and special military and public addresses.

3. Cancellation. This order cancels Federal Aviation Administration Order 7470.1A, Distance Measuring Equipment (DME)/DME Infrastructure Evaluation for Area Navigation (RNAV) Routes and Procedures, dated April 30, 2007.

4. Explanation of Changes. This order is revised to reflect updated FAA branding. Minor administrative changes to processes and office identification have been incorporated throughout. Additionally, changes have been made to the Roles and Responsibilities of the Service Center Instrument Flight Procedures Validation Team in regards to DME/DME infrastructure assessment of published altitudes for DME/DME RNAV Standard Terminal Arrival Routes and Standard Instrument Departure Procedures.

5. Background. Many RNAV aircraft systems use information from multiple DMEs to determine the aircraft's position. Procedures and routes relying on this capability require evaluation to determine if the DME/DME coverage provides adequate support.

a. The FAA is responsible for evaluating DME/DME coverage against a minimum standard (baseline) DME/DME RNAV system for each route and procedure authorized to use DME/DME RNAV. The FAA will assess if adequate DME/DME coverage is available on the routes and procedures using a combination of a computer tool (assessing if the available DME/DME performance is adequate) and flight inspection (to validate the reception and performance of individual DME facilities). This document establishes the procedures for the DME/DME infrastructure evaluation and its operational implementation.

b. The assessment of DME/DME coverage will also determine if an expanded service volume (ESV) is necessary for select DME facilities. The implementation of DME/DME will

also affect the long-term sustainment and implementation of DME facilities to support these operations.

c. All DME facilities maintained by the FAA and used to define the availability of these RNAV routes or procedures comply with applicable International Civil Aviation Organization (ICAO) facility maintenance and performance standards and several added requirements necessary to support RNAV operations. Canadian and Mexican DME facilities meet ICAO standards for use in flight, but the FAA will not assume their availability for use on these domestic RNAV routes and procedures. For RNAV route DME evaluation purposes, foreign DME facilities are not considered.

6. Definitions. Definitions are contained in Appendix A.

7. Related Publications.

a. Order 6050.32, Spectrum Management Regulations and Procedures Manual

b. Order 7100.41, Performance Based Navigation Implementation Process

c. Order 7400.2, Procedures for Handling Airspace Matters

d. Order 7930.2, Notices to Airmen (NOTAM)

e. Order 8260.19, Flight Procedures and Airspace

f. Order 8260.3, United States Standard for Terminal Instrument Procedures (TERPS)

g. Order 8260.43, Flight Procedures Management Program

h. Order 8260.46, Instrument Departure Procedure (DP) Program

i. Order 8260.58, United States Standard for Performance Based Navigation (PBN) Instrument Procedure Design

j. Order 9840.1, U.S. National Aviation Handbook for VOR/DME/TACAN Systems

k. Advisory Circular 90-100, U.S. Terminal and En Route Area Navigation (RNAV) Operations

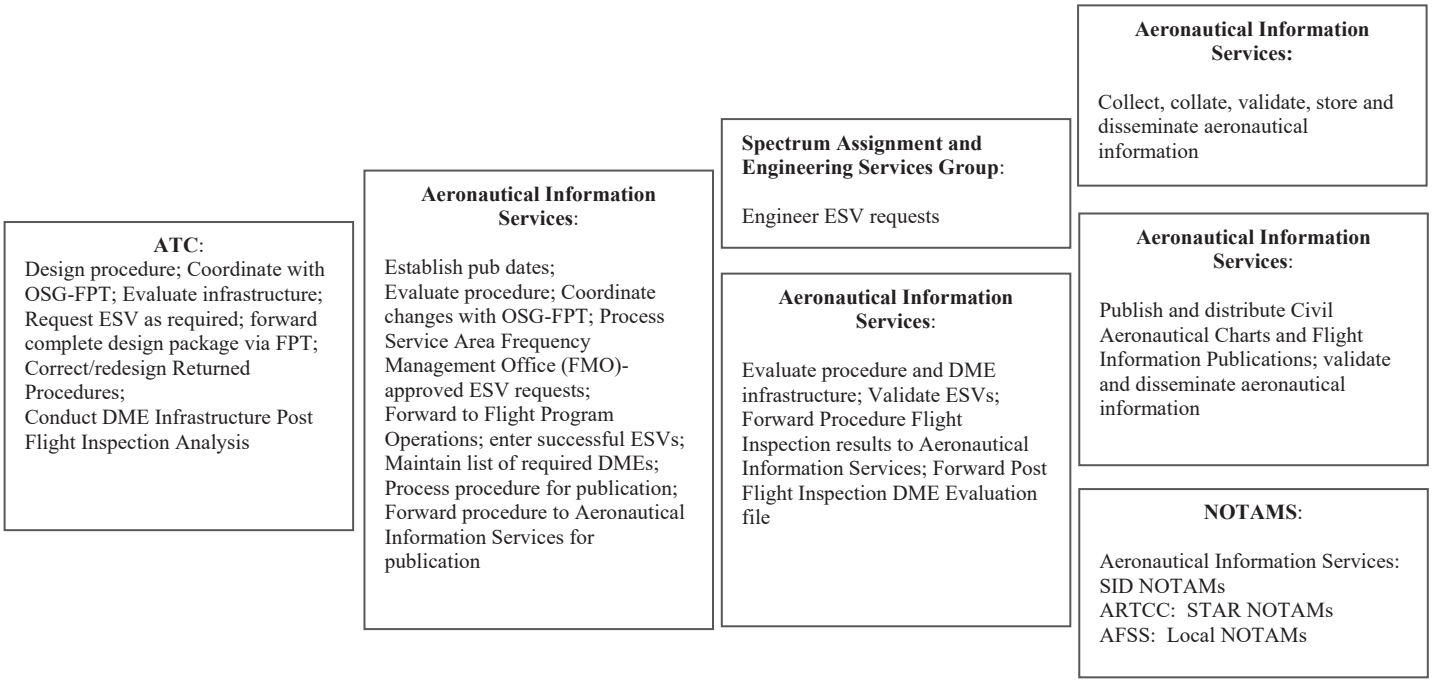
8. Forms. Appendix B is the format for required data for Terminal Area Route Generation, Evaluation, and Simulation (TARGETS) Evaluation.

9. DME/DME Infrastructure Evaluation Process.

a. General. The following guidance outlines procedures for conducting DME/DME infrastructure evaluation in support of RNAV procedure development. Procedure

development normally begins within FAA service areas, with air traffic facilities or industry proponents, and tracks through the development process to approval at the national level. Figure 1 depicts the design and DME evaluation process.

Figure 1
Procedure Design and DME/DME Evaluation Process



(1) The FAA DME/DME evaluation tool is incorporated into TARGETS as a plug-in and shall be used to perform the computer assessment of the DME infrastructure supporting a specific route or procedure.

(2) The TARGETS DME/DME evaluation tool is an FAA-approved software tool for instrument flight procedure development. The TARGETS DME evaluation tool analyzes RNAV Standard Terminal Arrival Route (STAR), RNAV Standard Instrument Departure (SID), RNAV obstacle departure procedures (ODP), applicable Performance Based Navigation (PBN) ATS routes, and RNAV feeder routes to conventional approach procedures for DME/DME navigation coverage. The DME Tool analyzes DME/DME coverage by checking the line of sight between the procedure and available DME source facilities. The tool identifies solutions of at least two DME signals at every given point within appropriate geometries.

Solutions are created using Standard Service Volumes (SSVs) for designated DME NAVAID classes (DME High, DME Low, High, Low, and Terminal). Selected DMEs owned by the Department of Defense (DoD) and foreign service providers are available by formal agreement and should be utilized in TARGETS. The NextGen DME program is leveraging DMEs and implementing larger service volumes for existing DMEs. That schedule should be consulted. Requests to implement larger service volumes on existing DMEs should be considered.

Expanded Service Volumes (ESVs) may be used to increase coverage within appropriate limits. Using ESVs requires appropriate co-channel spectrum protection as well as coordination of aircraft NavDatabase changes such that the ESVs can be used by aircraft. Published NAVAID restrictions are honored and will prevent a NAVAID from being used within the restricted area. Embedded within TARGETS is a file-import/export function to provide input files for the DME/DME infrastructure evaluation tool.

(3) Regional Coordination. Instrument Flight Procedure (IFP) Validation Teams, chaired by the regional Flight Procedures Team (FPT) manager, are established within each FAA region for the purpose of coordinating, evaluating, approving, and/or denying requests for establishment, amendment, and cancellation of instrument flight procedures. In its facilitative role, the OSG-Flight Procedures Team (FPT) is responsible for tracking regional procedures from inception to operational implementation in accordance with applicable FAA instructions. This includes ensuring completion of DME/DME infrastructure evaluation and requesting ESV for DMEs as needed.

(4) National Coordination. The IFP Oversight Committee ensures consistent application of FAA policy nationwide during the development of procedures and, when necessary, resolves problems with the development process. The IFP Oversight Committee will clarify policies and procedures for the IFP Prioritization and OSG-Flight Procedures Team (FPT) and, when necessary, establish national priorities.

b. DME Infrastructure Assessment. The DME/DME evaluation tool provides assessment results that include:

(1) Identification of critical facilities. RNAV SIDs, ODPs, and STARs may be published with only two DMEs providing a navigation solution at any given point, each of which would be a "Critical DME" facility. Loss of one of the critical DMEs results in procedure non-availability for DME/DME-only navigation. In addition, where more than two facilities are available and the loss of a particular facility results in the loss of a navigation solution, that facility is a critical DME facility. En route procedures may not be published with critical facilities. If during an evaluation critical facilities are indicated for an RNAV route, these must be resolved with DoD/foreign DMEs, new DME service volumes, new DME sites, ESVs, DME/DME/Inertial Reference Unit (IRU), or a requirement for a global navigation satellite system (GNSS). (See paragraph 9b (6) b below.)

(2) A list of available DMEs and transition points for flight inspection assessment. The list will identify each DME facility as critical or available. If the DME/DME evaluation tool determines insufficient DMEs are available, the tool will identify gaps in reception and can propose facility ESVs to mitigate the gaps.

(3) A list of other available DMEs and applicable route/procedure segments. This includes facilities which are expected to be available along the route, but which are not required to support the publication of the route.

(4) Identify very high frequency omnidirectional radio range (VOR) facilities within 40 nautical miles of the route within a DME coverage gap. Identify VOR along-track and cross-track distance at the beginning and end of DME coverage.

(5) Expanded service volume requirements. Where the DME infrastructure assessment indicates insufficient DME coverage or critical facilities, the tool can identify proposed ESVs for a subset of DME facilities that should ensure an acceptable navigational solution. The user also can manually input proposed ESVs for evaluation. ESVs are requested through the Expanded Service Volume Management System (ESVMS), which is Internet-accessible and managed by the Technical Operations ATC Spectrum Engineering Services Office, Spectrum Assignment and Aeronautical Information Services Group.

(6) Use of DME/DME and DME/DME/IRU. The tool is capable of screening procedures emulating aircraft DME/DME and DME/DME/IRU operation.

(a) Screening is accomplished using the user-selectable, baseline simulation profiles for SIDs, ODPs, STARs, En route, and feeder route procedures. A user-defined option is also available.

(b) When operationally advantageous or if unable to obtain satisfactory results with DME/DME or DME/DME/IRU, screen the route using a proposed set of ESVs to mitigate navigation gaps. A combination of ESVs and/or procedure redesign may be required to obtain satisfactory results.

10. Roles and Responsibilities.

a. Airspace Modernization Group (AJV-S3). AJV-S3 is a stakeholder in the TARGETS DME/DME plug-in and the OPR for this order. AJV-A has primary responsibility for FAA TARGETS and fielded capabilities. The DME/DME tool performs assessment of individual routes and procedures, or area assessment of user-defined parameters per baseline avionics in Advisory Circular AC 90-100.

b. Service Center. Through the OSG-FPT the service center manages the procedures development process. The OSG-FPT coordinates the activities of the PBN procedure design team established for development of a particular procedure. The OSG-FPT:

(1) Ensures availability of the TARGETS operator for STAR, SID, ODP, route, and approach development. Where training or assistance is needed in the use of TARGETS coordinates with the Airspace Modernization Group.

(2) Uses the DME screening tool to perform the DME/DME infrastructure assessment. PBN procedure design team will perform the assessment normally using the input files generated

by TARGETS. The DME screening must be accomplished before the procedure is submitted to the FPT. Ensures a copy of the screening is included with the procedure submission package.

(a) When unable to access the screening tool or where screening output is inadequate for submission contact the TARGETS Help Desk for assistance. When TARGETS is not available, coordinate with the FPT and forward a flight plan profile using the format in Appendix B.

(b) Air traffic procedure designers must ensure the altitudes used by air traffic are reflected for waypoints or route segments when conducting DME/DME infrastructure assessment. These altitudes impact assessment tool performance and the output provided for flight inspection operations.

(i) For STAR en route transitions and en route procedures, evaluate an altitude for each waypoint, route, or route segment. Use the lowest suitable altitude that provides for DME/DME navigation coverage, obstruction clearance and communications. The altitude evaluated at a waypoint will be charted as the minimum En route altitude (MEA) for the segment immediately preceding the waypoint, and will be entered as the MEA, on FAA Form 8260-17.

(ii) For STAR common route and runway transition waypoints, evaluate an altitude for each waypoint intended to have a published altitude restriction, using the lowest altitude expected at those waypoints.

(iii) For SID procedures:

a. Prior to en route transitions, evaluate an altitude for every waypoint intended to have a published altitude restriction, using the lowest altitude expected at each of those waypoints.
b. For waypoints within the en route transitions, evaluate the lowest suitable altitude for each waypoint that provides for DME/DME navigation coverage, obstruction clearance and communications. The altitude evaluated at those waypoints will be charted as the MEA for the segment immediately preceding the waypoint.

(iv) For ODPs, evaluate an altitude for every waypoint intended to have a published altitude restriction, using the lowest altitude expected at each of those waypoints.

(c) When advised by Aeronautical Information Services of unsatisfactory flight inspection results, coordinates potential mitigations with the Aeronautical Information Services and the FPT. When help is needed to resolve deficiencies contact the TARGETS help desk. When complete, reevaluates the procedure or route.

(d) If satisfactory results are then obtained from the tool, follows the ESV request procedure, if required, and coordinates changes with the Aeronautical Information Services. Additional flight inspection may not be required.

(e) When unable to obtain satisfactory results, proceeds as in paragraph 10b (4) (c) below.

(3) Notifies the FPT when unsatisfactory results are obtained but the DME screening tool output indicates foreign facilities within radio reception of a proposed route or procedure. If no alternatives are available coordination with other national Air Navigation Service Providers through AJV-I to evaluate use of any foreign facilities will be required.

(4) Where DME coverage is insufficient for baseline avionics (AC 90-100), DME/DME/IRU performance is inadequate, or when operationally advantageous, ESVs may be requested as follows:

(a) Submit an ESV request using the ESVMS. If approved, the ESV detailed report is available to the requester and shall be included in the procedure and route submission package. Appropriate service volume and figure of merit designations must be in the aircraft navigation database for the aircraft to use the new ESVs.

(b) When restricted, ESVs are returned to the requester with alternatives. The alternatives shall be screened in the DME evaluation tool through use of the User Data function to input ESV sector and range limitations. If acceptable for the procedure, complete the ESVMS process using the alternative, and forward the ESV detailed report with the procedure and route submission package.

(c) Where ESVs are not approved and DME/DME/IRU is not an alternative:

(i) Redesign the procedure to obtain the required coverage, or

(ii) Limit the procedure to GNSS-equipped aircraft.

(5) Completes procedure design following successful DME infrastructure assessment.

(a) Forwards the assessment results output with the procedure submission package to the Aeronautical Information Services through the service center FPT.

(b) Requests for applicable PBN ATS routes are forwarded to Mission Support Services, Rules and Regulations Group (AJV-P2) for initiation of a Notice of Proposed Rulemaking (NPRM) action. DME screening documentation is not required with this submission. Concurrent with submission to AJV-P2, the service center forwards the route submission package, including the DME screening output, to Aeronautical Information Services via the FPT. This facilitates route validation and review before rulemaking action is initiated.

c. Technical Operations ATC Spectrum Engineering Services Office, Spectrum Assignment and Engineering Services Group. Processes requests for ESVs. Enters approved, disapproved, or restricted results in the ESVMS.

d. Aeronautical Information Services. Reviews STARs/SIDs for conformance with established criteria. Performs obstruction evaluation of STARs/SIDs and will return any nonconforming STAR/SID to the originating service center through the FPT.

(1) When necessary, advises and assists the submitting service center with revisions needed to ensure conformance with criteria.

(2) Forwards the procedure to the Flight Program Operations for completion of the procedure flight inspection.

(3) Reviews unsatisfactory flight inspection results and coordinates with the submitting service center, through the regional FPT, potential mitigations for resolution. If mitigations are not possible, returns the unsatisfactory STAR or SID to the submitting service center through the regional FPT.

(4) Following successful completion of the flight inspection, prepares the final STAR/SID procedure package for publication. Forwards the final copy to the Aeronautical Information Services for further processing, and forwards a copy to the originating service center through the regional FPT. When ESVs have been requested, forwards ESV evaluation results to the Spectrum Assignment and Engineering Services Group.

(5) Prepares FDC NOTAMs as required by Order 8260.19.

(6) Conducts a prepublication review of submitted forms to ensure compliance with applicable directives and resolves data conflicts, form discrepancies, etc., with the Aeronautical Information Services and submitting service center.

(7) Assigns an effective date authorizing charting agencies to publish the route, STAR, or SID.

(8) Files and maintains the original signed copy of procedure forms.

(9) Advises the OSG-FPT and service center of any charting issues or publication delays.

(10) Conducts applicable PBN ATS route validation and review before document submission.

(11) Publishes the STAR, SID, or route as required on the assigned effective date. For applicable PBN ATS routes, publishes a listing of DME facilities evaluated in the appropriate Chart Supplement. For RNAV STAR and SID procedures, critical DME facilities are published in the procedure notes.

e. Flight Program Operations Aircraft Operations. Flight inspection results are forwarded to the Aeronautical Information Services. Flight inspection results will:

(1) Measure DME signal coverage and log findings, including any DME proposed for ESV.

(2) Evaluate the route or area with available DMEs and identify facilities not meeting stated accuracy requirements.

(3) Provide a comma separated value (CSV) file of DMEs identified to provide the navigation solution.

11. Operational Implementation.

a. Navigation & Flight Deck Technologies Section (AIR-6B01). Develops and publishes aircraft/avionics qualification criteria for DME/DME RNAV systems.

(1) Incorporates characteristics of baseline system as minimum requirements.

(2) Establishes ground-based navigational facility requirements to support RNAV DME/DME STARs, SIDs, and routes in the NAS. Include requirements for tactical air navigational aid, instrument landing system/DME, and the use of foreign facilities.

(3) Develops criteria for minimum DME/DME/IRU RNAV system.

(4) Updates provisions for use of the DME figure of merit.

b. Flight Operations Group, AFS-410. Publishes operational guidance for operations on RNAV routes and procedures.

(1) Defines and documents operational and performance requirements.

(2) Ensures criteria are compatible with baseline criteria developed for the aircraft.

(3) Develops guidance for flight planning and operations to ensure pilots understand the impact of critical DME facility outage.

c. Airspace Modernization Group.

(1) Coordinates national DME infrastructure evaluation requirements.

(2) Provides DME infrastructure evaluation training for PBN procedure design specialists.

(3) Assists the PBN procedure design team in accomplishing DME/DME infrastructure assessment.

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APPENDIX A. Acronyms, Terms, and Definitions

Acronym/Term	Definition
Available DME	A distance measuring equipment (DME) facility whose operational service volume (OSV) covers all, or a portion, of a route or procedure.
Critical DME	A DME facility that, when unavailable, results in inadequate DME/DME area navigation (RNAV) system performance to sustain operations along a specific route or procedure. The required performance assumes an aircraft's RNAV system meets, but does not exceed, the minimum standard (baseline) for DME/DME RNAV systems found in Advisory Circular 90-100.
DME	Distance Measuring Equipment. The term "DME" is a generic term for any ground-based navigational aid (NAVAID) facility that responds to DME interrogations, including different types and/or combinations of collocated DME and tactical air navigational aid (TACAN) facilities (e.g., non-directional radio beacon (NDB)/DME, very-high-frequency omnidirectional radio range (VOR)/DME, VOR and TACAN collocated (VORTAC), TACAN, instrument landing system (ILS)/DME).
DME/DME Coverage	DME/DME coverage exists where the availability of DME facilities permits the minimum standard RNAV system performance defined in FAA Advisory Circular 90-100. DME/DME coverage requires at least two DME facilities operating within their OSV.
ESV	Expanded Service Volume. ESVs are used to designate a service volume larger than the standard service volume (SSV). If a DME facility requires an ESV to serve as an available DME for an RNAV route or procedure, the request is submitted via the Expanded Service Volume Management System.
Flight Plan	The term "flight plan," as used in this document, refers to an input file consisting of a series of route/procedure-related fields. The input file fields include waypoint name, waypoint latitude and longitude, aircraft altitude at waypoint, climb logic (i.e., step or vertical navigation), airspeed, waypoint type (i.e., flyover or flyby), and RNAV leg type.

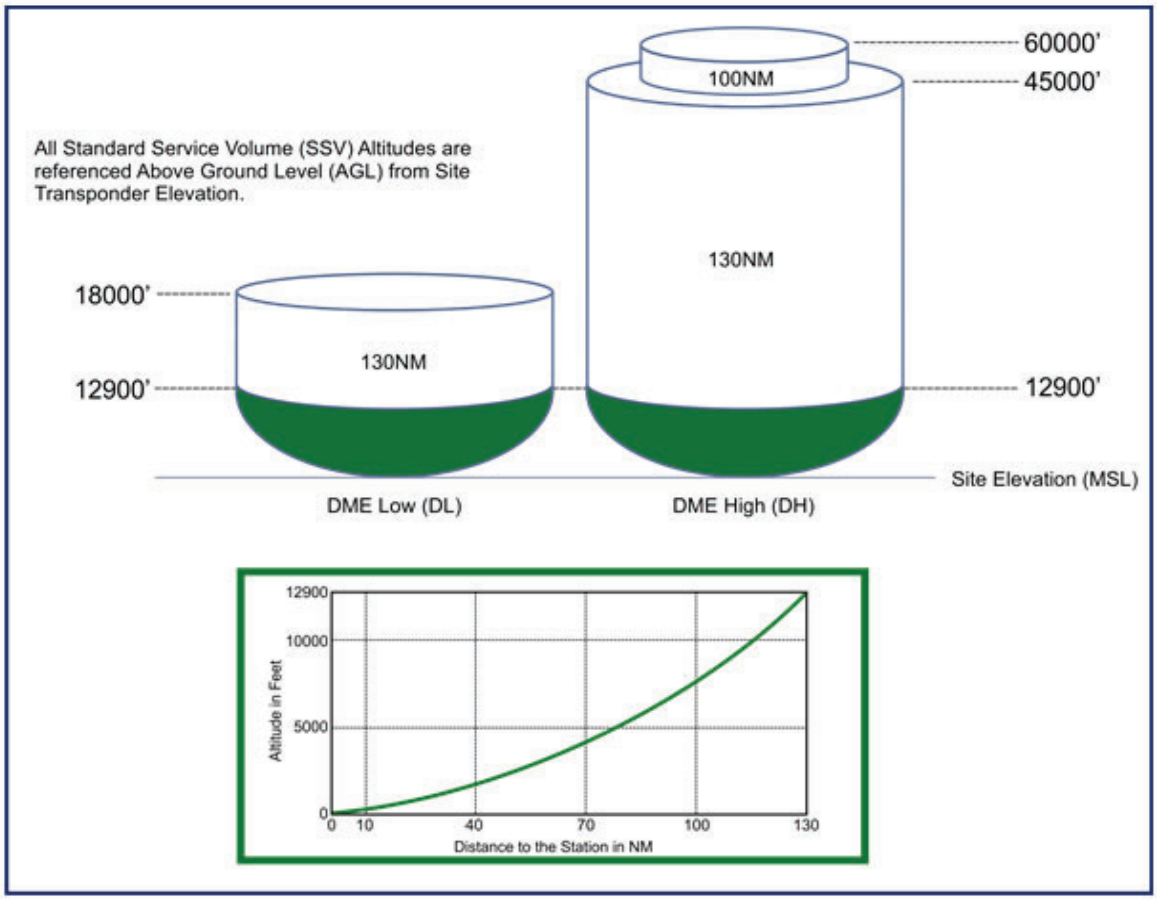
Flight Track	The term "flight track" refers to an input file consisting of a series of sequential latitudes, longitudes, and altitudes that defines the exact position of the aircraft as it flies the route or procedure.
OSV	Operational Service Volume – Includes the SSV (minus any restricted areas) and any approved ESVs. The OSV shall not extend beyond the frequency-protected service volume on any radial from the facility, at any distance from the facility, or at any altitude beyond the altitude spectrum defining the facility's service.
Required DME	A DME facility that if it fails flight inspection or does not receive approval for a proposed ESV, then DME/DME coverage is not available, and the proposed route or procedure requires reevaluation or redesign.
(Route) Segment	A portion of a route along which DME coverage is provided by up to five facilities. Segments vary in length and are predicated on tool-determined changeover points between facility subsets. Segment length should not be less than 4 nautical miles.
SSV	Standard Service Volume – The three-dimensional volume of airspace within which NAVAID performance meets specified performance criteria and is free of interference and co-channeling as defined by FAA Order 6050.32B, Spectrum Management Regulations and Procedures Manual. The DME evaluation tool assumes the following SSV for each class of DME facility: ▪ Terminal DME Facility (T): 25 nautical miles from the facility (from 12,000 feet down to 1,000 feet above the facility). Below 1,000 feet, the coverage area takes the shape of a parabolic cone. ▪ Low-altitude DME Facility (L): 40 nautical miles from the facility (from 18,000 feet down to 1,000 feet above the facility). Below 1,000 feet, the coverage area takes the shape of a parabolic cone. For a DME/TACAN paired with a VOR MON facility, the VOR and the DME/TACAN frequencies are protected together at 70 nm below 18,000 ft to 5,000 ft above the facility. The SSV abbreviation for these facilities are VL; "V" denotes the VOR retention for MON airport coverage under the VOR MON Program.

- High-altitude DME Facility (H): 100 nautical miles from the facility (from 60,000 feet down to 45,000 feet above the facility); 130 nautical miles from the facility (below 45,000 feet down to 18,000 feet above the facility); 100 nautical miles from the facility (below 18,000 feet down to 14,500 feet above the facility); 40 nautical miles from the facility (below 14,500 feet down to 1,000 feet above the facility). Below 1,000 feet, the coverage area takes the shape of a parabolic cone. For a DME/TACAN paired with a VOR MON facility, the VOR and the DME/TACAN frequencies are protected together at 70 nm below 14,500 ft to 5,000 ft above the facility. The SSV abbreviation for these facilities are VH; the volume dimensions above 14,500 ft remain the same as the legacy High.

- DME Low (DL): From 12,900 feet (3,933 m) AGL up to and including 18,000 feet (5,486 m) AGL at radial distances out to 130 nautical miles (241 km). (See Figure 3.). **Lower edge:** Within 130 nautical miles (241 km) the bottom of the DL service volume is defined by the curve in Figure 3.

- DME High (DH): From 12,900 feet (3,933 m) AGL up to and including 45,000 feet (13,716 m) AGL at radial distances out to 130 nautical miles (241 km). From 45,000 feet (13,716 m) AGL up to and including 60,000 feet (18,288 m) AGL at radial distances out to 100 nautical miles (185 km). (See Figure 3.). **Lower edge:** Within 130 nautical miles (241 km) the bottom of the DH service volume is defined by the curve in Figure 3.

Figure A-1. DL and DH Standard Service Volumes and Definition of the Lower Edges



Appendix B. Example of Required Data for TARGETS DME/DME Evaluation

WP Name	WP Type	Latitude	Longitude	Altitude	VNAV Mode	IAS	Turn Type	Turn Direction	Leg Type	CF Radial
SKILS	WP	N 393014.00	W 0763752.32	14000	STEP	300	FLY_BY	DECIDE	TF	
BAL	WP	N 391015.83	W 0763940.52	12000	STEP	300	FLY_BY	DECIDE	TF	
BRUNC	WP	N 385550.89	W 0765624.24	10000	STEP	250	FLY_BY	DECIDE	TF	
FLETY	WP	N 384646.15	W 0765640.79	8000	STEP	250	FLY_BY	DECIDE	TF	
HITEK	WP	N 384119.00	W 0765609.00	6000	STEP	250	FLY_BY	DECIDE	TF	
CAVDI	WP	N 382533.43	W 0765443.49	4000	STEP	250	FLY_BY	DECIDE	TF	

Appendix C. Airway Facility Assumptions

1. Background. Before procedure design and operational implementation, airway facility performance standards must be documented.

2. Collocation. The geographic coordinates of the very high frequency omnidirectional radio range (VOR) component are reported as the facility position in the Airport/Facility Directory. AC 00-31A, "*United States (U.S.) National Aviation Standard for the Very-High-Frequency Omnidirectional Radio Range (VOR)/Distance Measuring Equipment (DME)/Tactical Air Navigation (TACAN) Systems*," defines offset collocation as follows:

a. For those facilities used in terminal areas for approach purposes or other procedures where the highest position fixing accuracy of system capability is required, the separation of the VOR and DME or tactical air navigational aid (TACAN) antennas will not exceed 100 feet (30 meters).

b. At Doppler VOR sites, the antennas may be separated by not more than 260 feet (80 meters).

c. For purposes other than those indicated in paragraph 2a, the separation of the VOR and either the DME or the TACAN antennas will not exceed 2,000 feet (610 meters).

3. Technical Operations Performance Assumptions.

a. DME/TACAN facilities classified as "collocated" but not within 30 meters of the same VOR vertical axis should be published with separate geographic coordinates in the Chart Supplement and the NASR, to be appropriately databased in the Aircraft Navigation Database.

b. Ensure VOR and TACAN collocated (VORTAC) or DME facility movement remains within 30 meters of published coordinates. DME facilities not meeting facility survey and notification requirements and/or Department of Defense TACANs should not be used for DME/DME RNAV.

4. Survey Accuracy and Publication Resolution.

a. FAA Specification 405 states horizontal survey accuracy of 20 feet when located on public-use airports and military fields, and 50 feet horizontal accuracy elsewhere.

b. Aeronautical Information Services publishes navigation aid position data in degrees, minutes, seconds, and ten-thousandths of a second resolution (for example, N35 35 04.5435 W97 23 05.0234). This data is contained in the National Airspace System Resource Aeronautical Data files.

c. The publication resolution of all En route (L, H, DH, DL, VH, and VL station classes) DME, VOR/DME, VORTAC, or TACAN facilities is to the nearest one-hundredth of a minute when published in the Airport/Facility Directory.

d. The navigation aid resolution in ARINC 424 specifications can accommodate survey measurements reported to one one-hundredth of a second (1 foot) for electronic database use.