NAVIGATION AIDS: DME

Lesson Outline

LESSON OBJECTIVE

To determine that the student exhibits instructional knowledge of the elements related to navigation aids: DME by describing the elements on the following slide.

LESSON SOURCE(S)

Pilot's Handbook of Aeronautical Knowledge
FAA-H-8083-25

Aeronautical Information Manual

Lesson Outline

LESSON ELEMENTS	TIMEFRAME	EQUIPMENT/TOOLS
Distance Measuring Equipment Slant Range Distance DME Errors GPS Distances	10 Minutes *approximately* Discuss Objectives Present and Review Material Student Questions Conclusion and Quiz	Lesson Presentation Whiteboard and Markers FAA Sources and References

Lesson Outline

INSTRUCTOR ACTIONS	STUDENT ACTIONS	COMPLETION STANDARDS
Present Objectives and Standards Teach Lesson from Presentation Ask and Answer Student Questions Assign Homework Check Student's Post Lesson Quiz	Participate in Lesson Take Notes Ask and Respond to Questions Pass the Post Lesson Quiz	Student is able to understand and differentiate between the different lesson elements. Student is further able to apply this acquired knowledge in flight training/flight operation scenarios effectively and appropriately.

Distance Measuring Equipment

Distance measuring equipment (DME) consists of an ultra high frequency (UHF) navigational aid used in conjunction with VOR/DMEs and VORTACs.

DME Basics

DME measures the distance between an aircraft and an associated VOR in “Slant Range Distances.” Although DME equipment is popular, not all aircraft are equipped with DME and use GPS Distances instead.

DME Standalone

VOR/DME

VORTAC

Distance Measuring Equipment

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Slant Range Distance

DME is measured in Slant Range Distances. It is called Slant Range Distance because it measures the slanted distance from the aircraft to the associated Navigation Aid.

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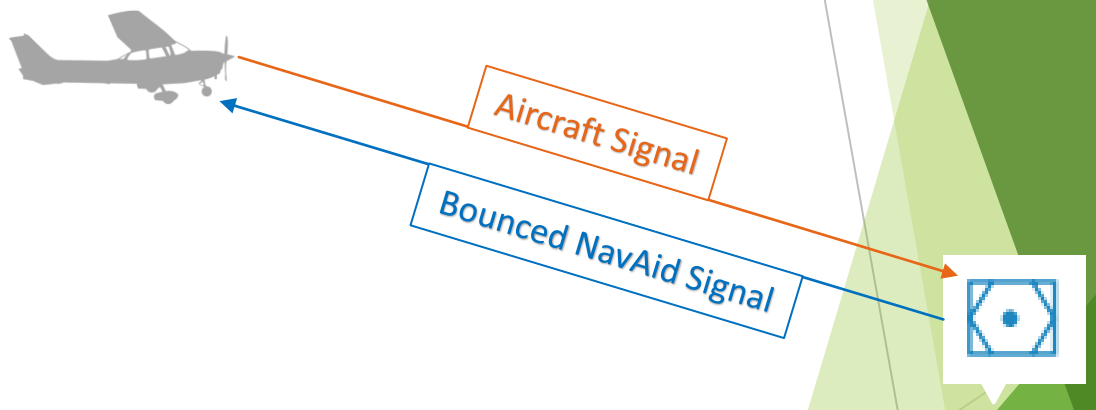
Slant Range Distance

This is accomplished by the aircraft sending out a radio signal to the associated NavAid and the NavAid bouncing that signal back to the aircraft that sent it. The aircraft's on-board DME Receiver then calculates the time it took to receive the bounced signal and relays the necessary distance information to the pilot.



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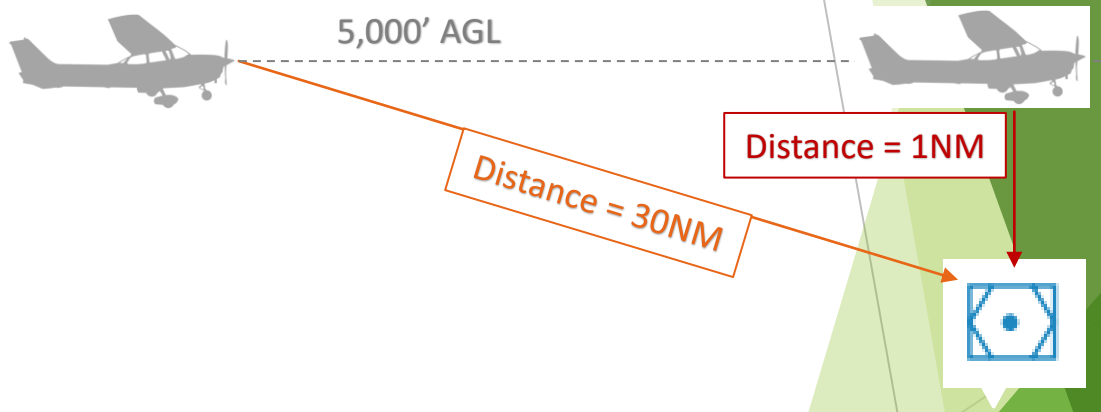
Slant Range Distance

Because DME measures Slant Range Distance, it can have some errors. The closer the aircraft gets to the NavAid, the less accurate the DME will be as seen in the depicted example. This is because the DME takes altitude into account when making its calculations.



DME Accuracy

DME is most accurate when the aircraft is further from the NavAid and at lower altitudes. This is because it "flattens" the slant.

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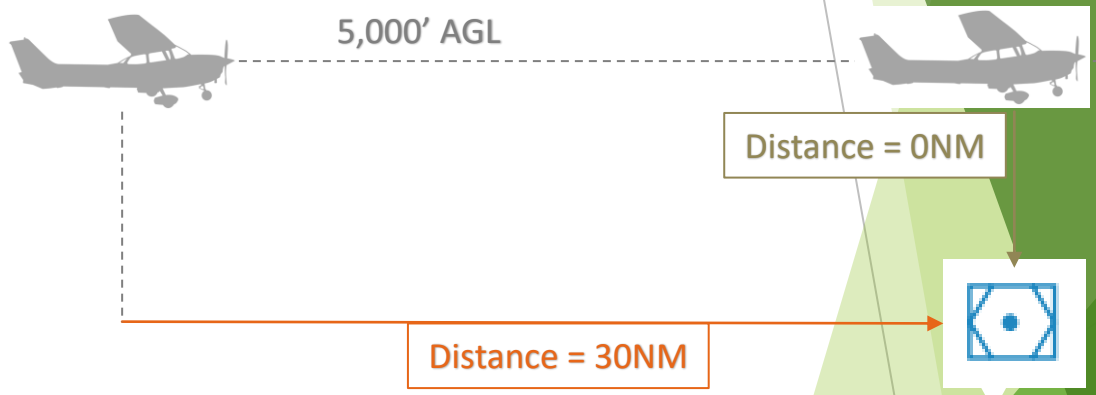
GPS Distance

However, as stated earlier, many modern aircraft are not equipped with Traditional DME and are rather equipped with GPS Distance. GPS Distance measures the “Straight Line Distance” between the LAT/LONG of the aircraft and the LAT/LONG of the NavAid. Hence, it is not prone to the inaccuracies of Traditional DME.



Lesson Summary

In this lesson we discussed DME symbology, the differences between Slant Range and Straight Line Distances, and inherent DME errors.