# The Mysterious D: Dumbfounding Data or Dangerous Disregard?

by Matt McDaniel

Early this year I was reviewing and preparing material for my series of WAAS/Advanced IFR refresher seminars, and while doing so I noticed a symbol on an approach plate that I had never seen before. It was the letter "D" placed on a black square background. The symbol appeared on the airport diagram portion of a NACO Terminal Procedure Chart (Approach Plate), near the field elevation block (Figure 1). At first I thought it might be indicating that the airport was within Class D airspace, but in fact, the airport in question was uncontrolled. I went to the legend at the front of the Terminal Procedures booklet – no luck, the symbol was simply not there. To add more confusion, the symbol was appearing inconsistently. At some airports it was on each approach plate's airport diagram, but not the full-page airport diagram. At other airports it was on the full-page airport diagram, but not the individual approach plates. And at other airports, it was either on both or nowhere to be found at all. Confused yet? I certainly was.

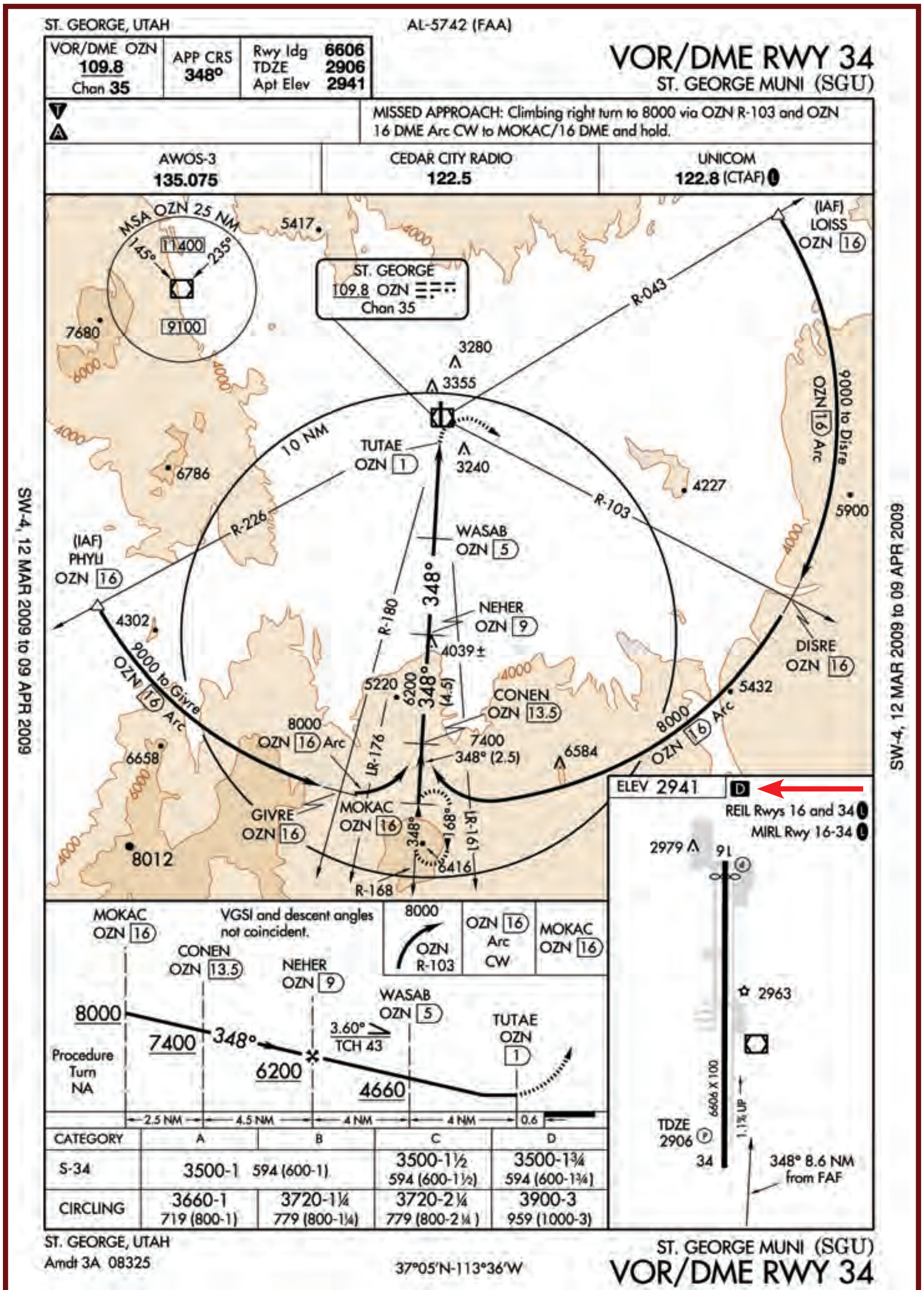


**FIGURE 1:** *A St. George, Utah approach plate with the D symbol in the airport diagram section (lower right).*

I placed a few calls to my local FSDO, where I personally know several FAA inspectors. I asked about this mysterious D symbol, but no one could answer definitively. I made a mental note to keep searching and returned to work on my seminar presentation. You can probably guess what happened next. The first time an approach plate with this new symbol appeared in front of a room full of pilots at the seminar, one of them asked, "What's that D on the airport diagram?" I admitted my search for its meaning, so far, had been frustrating. I promised to get the answer for everyone as soon as possible. Within two days, one of the seminar attendees was hot on the trail of the mysterious D, gathering enough information from his local FSDO (different than mine) to get us both digging in the right places for the answers.

Enough with the suspense; the D symbol indicates that there is Declared Distance Information (DDI) available for that airport and that this DDI is not on the airport diagram. But, that is only the beginning of the answer. The complete answer is like the body of an octopus with numerous tentacles of related information attached to it. Let's proceed to dissect this octopus, one piece at a time.

## When, Where & Why?

**When:** The D symbol is brand new and is being implemented by the FAA and the National Aeronautical Charting Office (NACO), but it will take time to get it into the system consistently. As of this writing, it is so new that the symbol doesn't even appear in the Terminal Procedures Legend sections, although it will eventually.

**Where:** At airports where the D symbol is appropriate, it will appear on the full-page airport diagrams within the Terminal Procedures booklets and the Airport/Facility Directory (A/FD) (Figures 1 & 2). At airports large enough to merit a full-page diagram, the D-symbol could be eliminated from the small airport diagram appearing on each individual approach plate. If said airport does not have a full-page airport diagram, the D symbol will appear on each approach plate's airport diagram.

**Why:** The new D symbol serves two purposes: First, it allows a great deal of information to be excluded from the airport diagram. This can greatly declutter the diagram, making the remaining information more readable. Second, it tells the pilot that the DDI can be found in the A/FD. This encourages pilots to reference the directory in their flight planning. It contains a wealth of information, which is all-too-often overlooked by pilots. Use of the A/FD has been declining for years, yet even the advanced GPS databases we've all grown used to in recent years don't include much of the information found within its pages. The D symbol is another way the FAA can encourage pilots to reference the A/FD, where they can find not only the DDI, but all the other available safety data. *Note: Digital A/FDs are now available* *free* *at www.faa.gov.*

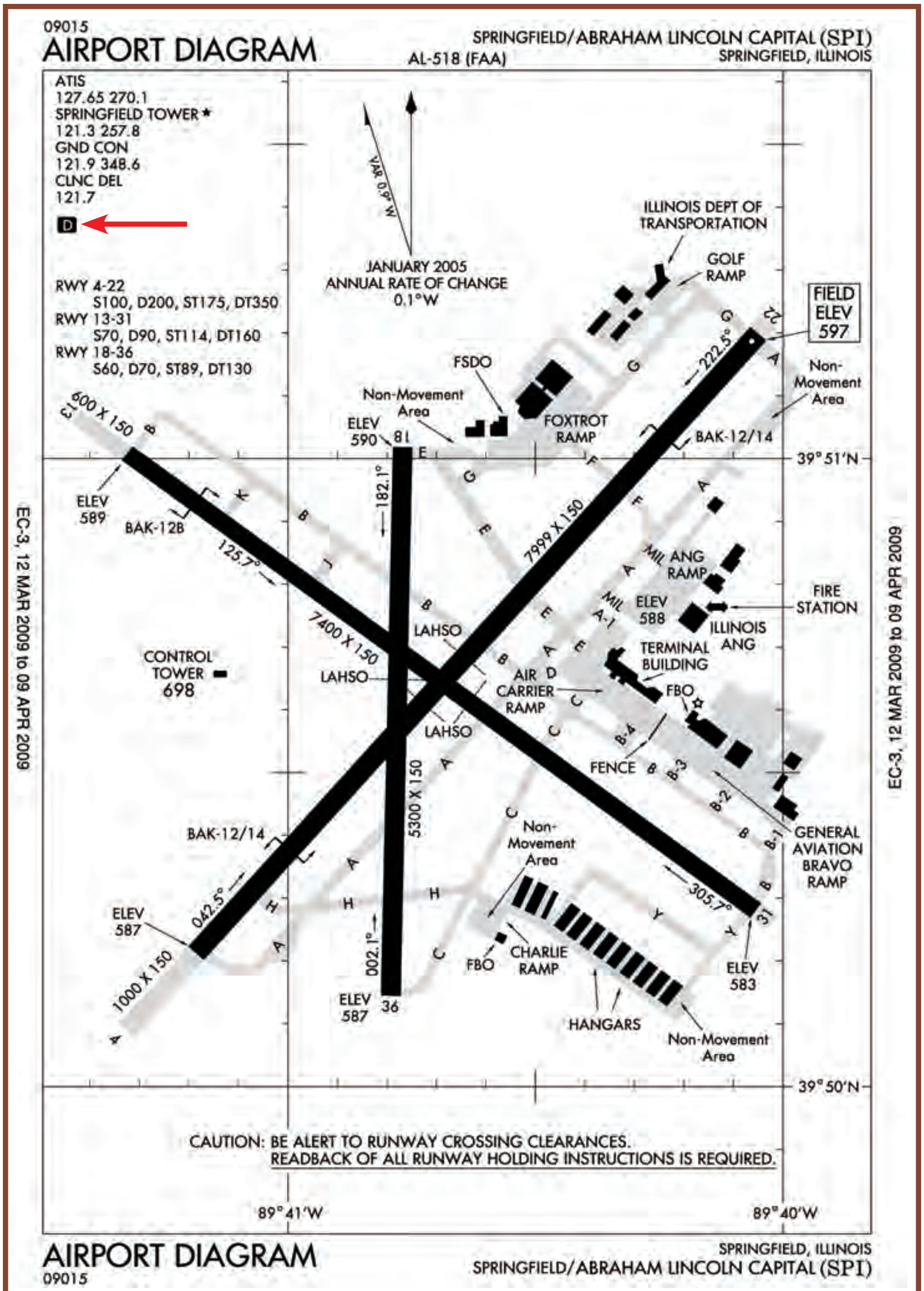


**FIGURE 2:** *The full-page airport diagram for Springfield, Ill. Note the D symbol in the upper-left corner.*

## Declared Distance Information (DDI)

DDI is runway length information that is different than the simple total runway length that is shown on the airport diagram. DDI includes a variety of lengths for a given runway that break down its total length into distances which should be considered for normal, abnormal, and emergency operations (Figure 3).

**RUNWAY DECLARED DISTANCE INFORMATION**

| | | | | |
|---|---|---|---|---|
| **RWY 13:** | TORA-7400 | TODA-7400 | ASDA-7217 | LDA-7217 |
| **RWY 31:** | TORA-7400 | TODA-7400 | ASDA-7000 | LDA-7000 |

**FIGURE 3:** *Coded Runway Declared Distance Information (DDI) from the Airport/Facility Directory, for Springfield, Ill. (KSPI).*

First, I'll define the terms and discuss the lengths associated with the DDI information. DDI includes:

**TORA – Takeoff Run Available:** The length of runway available and suitable for the takeoff ground run.

**TODA – Takeoff Distance Available:** The length of the takeoff run available (TORA), plus the length of the clearway, if provided.

**ASDA – Accelerate-Stop Distance Available:** The length of the takeoff run available, plus the length of the stopway, if provided.

**LDA – Landing Distance Available:** The length of the runway that is available and suitable for the landing ground run. This would exclude any runway prior to a displaced threshold or otherwise unusable pavement due to glidepath angle, obstructions and/or other landing safety factors.

As you can see, the basic length of a runway simply does not tell the whole story of that runway's usability. To further clarify the above, let's define some of those terms:

**Clearway:** In a certification sense, this term applies only to turbine-powered airplanes. Yet, the existence of a clearway is a safety enhancement to all aircraft utilizing that runway. A clearway is an area beyond the runway, at least 500 feet wide, centered on the extended runway centerline, and under the control of the airport authority. It can be thought of as an imaginary surface sloping upward from the departure end of the runway (at no steeper than a 1.25% slope) above which no object or terrain may protrude. An exception is that threshold lights may protrude into the clearway if their height at the threshold is 26 inches or less, and they are located on each side of the runway. Certain turbine airplanes certified prior to August 1959 may include clearways as little as 300-feet wide in their performance calculations.

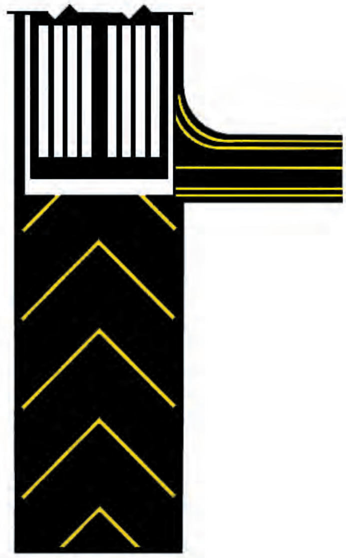

**FIGURE 4:** *A stopway/blastpad. The yellow chevron markings indicate it is not to be used for any normal aircraft ground operations.*

**Stopway:** An area beyond the runway, centered upon the extended runway centerline and no less than the runway width, able to support an airplane during an aborted takeoff without causing structural damage to the airplane. This area must be designated by the airport authority for use in decelerating an airplane during an aborted takeoff. Stopways often double as blastpads, or areas free of items that could be damaged by a departing aircraft's jet or prop blast (Figure 4).

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**Accelerate-Stop Distance:** While this term generally applies to multi-engine aircraft, it can certainly be related to single-engine aircraft for the purpose of prudent preflight planning of the runway distance required under a worst-case scenario. Officially, it's the distance required for a twin-engine airplane to accelerate to a specified speed (generally a takeoff decision speed or V1) and, assuming failure of an engine at the instant that speed is attained, to bring the airplane to a stop. For single-engine aircraft, this distance can be estimated by adding the computed takeoff ground roll to the calculated landing ground roll.

**Runway Safety Area (RSA):** The surface surrounding a runway, suitable for reducing the risk of aircraft damage during an undershoot, overshoot, or runway excursion. The RSA dimensions vary, but all RSAs shall be:

a. Cleared, graded and free of potentially hazardous surface variations;

b. Drained to prevent water accumulation;

c. Capable of supporting snow removal and fire/rescue equipment and occasional aircraft passage without causing structural damage to the aircraft;

d. Free of all objects except those necessary to be placed in the RSA due to their function. Those objects must be on low-impact-resistant supports no higher than three inches above grade.

## Displaced Thresholds

Most likely, these terms are not new to you. It is worth pointing out that a displaced threshold will shorten a runway's usable landing distance, but not affect its usable takeoff distance.

**Threshold:** The beginning of that portion of the runway suitable for landing.

**Displaced Threshold:** A threshold that is located at a point on a runway, other than the designated beginning of the runway.

A threshold is generally displaced to allow the glidepath to the touchdown zone to clear obstructions and/or to comply with noise restrictions. Typically, the pavement prior to the displaced threshold is still perfectly suitable for the takeoff roll or the landing rollout from the opposite direction (Figure 5). Therefore, it is included in basic runway length. So, how are you considering it when calculating your Landing Distance Required (LDR)? Specifically, you should be excluding it and considering it unusable when it's at the approach end of your landing runway.

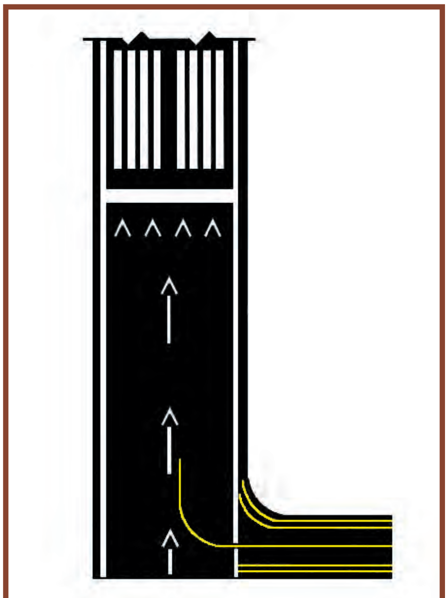

**FIGURE 5:** *A displaced threshold. The white arrows point the pilot to the landing threshold of the runway, indicated by the white band across the runway end. The area prior to the displaced threshold may be used for taxi, takeoff and landing rollout from the opposite direction.*

## Distance Beyond Glideslope

When conducting precision instrument approaches, always consider that any amount of runway under the glideslope will be mostly unusable. **Distance Beyond Glideslope** is the effective runway length for landing and is published by Jeppesen on the back of their Airport Diagrams. Typically a precision glideslope is designed to intersect the runway 1,000 feet from the threshold (denoted by the 1,000-foot fixed distance markers on instrument runways).

## Engineered Materials Arresting System (EMAS)

EMAS is a runway safety device that has gained wide acceptance in recent years and is being installed mainly at runways with limited or no stopways and/or where dangerous terrain or obstructions exist beyond the stopway/EMAS area. It consists of high-energy-absorbing materials installed in the RSA (Figure 6).

**FIGURE 6:** *A stopway/blastpad with EMAS installed. The EMAS section is grey and slightly raised above the rest of the stopway. This example is installed on Runway 12R at Minneapolis/St. Paul International Airport, due to a deep and abrupt terrain dropoff into a river gorge just beyond the EMAS area.*

The material is designed to crush under the weight of a commercial aircraft and exert decelerating forces on the landing gear. EMAS is a fabulous idea and at many airports it cannot be installed quickly enough. For instance, when a 737 overran its runway at Chicago-Midway on December 8, 2005, it careened through the approach lights, blast fence, and airport perimeter wall, crushing a car outside the airport property (killing a child in the car). Had that runway had EMAS installed, there is a high probability the 737 would have been decelerated within the airport property, preventing a child's death. Yet, as pilots of smaller aircraft, we must bear in mind that EMAS is designed for commercial aircraft. It may not crush under the weight of small GA aircraft, limiting its effectiveness on deceleration; or it may literally tear the gear out from under a Cirrus-sized aircraft, causing significant aircraft damage and possible injury to persons onboard. Yet, even those options seem better than the alternatives at airports where significant overruns can mean a collision with buildings, bodies of water or other unforgiving surfaces. EMAS may be located as close at 35 feet from a runway end and should never be taxied or driven on.

## Usable Runway

Hopefully, this information has made it obvious that the length of a usable runway can vary wildly from its basic, published length. This is true for normal, abnormal and emergency situations. In comparison to basic runway length, usable length can be shorter in the case of displaced thresholds, missing or non-conforming clearways, obstructions, glidepath variations, etc. It can be longer than the basic length in the case of suitable clearways, stopways, RSAs, etc. When your runway distance is performance critical, will you know the correct length to apply to your situation? The safety of you, your passengers and innocent bystanders may very well depend on it. COPA

About the Author: *Matthew McDaniel is a Master & Gold Seal CFII, ATP, MEI, AGI, IGI and CSIP. In 19 years of flying, he has logged over 10,000 hours total and over 4,000 hours of instruction-given. As owner of Progressive Aviation Services, LLC (www.progaviation.com), he has specialized in Cirrus instruction since 2001 and has held the CSIP credential since the first day it was available in late 2003. Currently, he's teaching Cirrus clients nationwide via personal flight training and seminars. He's also an airline and corporate pilot, having flown a wide variety of airliners & corporate jets, holding five turbine aircraft type-ratings. Matt can be reached at: matt@progaviation.com or 414-339-4990.*

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