Enhanced Vision Systems

The General Aviation Joint Steering Committee (GAJSC) believes Enhanced and Synthetic Vision technology can significantly improve general aviation utility and reduce the chance of accidents during night and IMC operations. We'll take a look at available technologies and GA options.

Enhanced Vision

Pilots have always been looking for ways to improve the way we see the world outside the cockpit. Enhanced Vision (EV) and Synthetic Vision (SV) are two technologies that can help. Each technology has advantages and disadvantages.

EV systems use sensors to provide a better view of the outside world. These aircraft-based sensors use near-infrared cameras or millimeter wave radar to provide vision in limited visibility environments. EV systems can identify terrain in weather, and detect wildlife or other obstructions on the runway. A word of caution though; EV does take some getting used to. You'll have to make the transition to visual reference at some point, and that can be a challenge – especially if you're not viewing the world through a Head Up Display (HUD).

Synthetic Vision

SV differs from EV in that it doesn't use sensors to "see" outside. Instead, SV relies on GPS information and a database to create a virtual representation of the outside world that you, as the pilot, would see. Using information from navigation databases, SV creates a picture of the flight environment and overlays that picture with aircraft instrumentation and weather information to create a single image that contains all of the information necessary for safe flight operations.

One key advantage is that SV can be "installed" in many aircraft with very minimal expense or effort.

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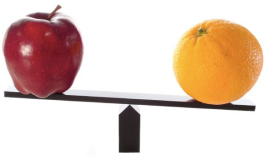
Enhanced Flight Vision System (EFVS)

vs.

Enhanced Vision (EV)



It's important to know the difference between EV and EFVS. An EV is a system where imaging sensors produce a real-time image of the outside scene. An EFVS combines flight information, symbology, navigation guidance, and a real-time image of the external scene and presents them to the pilot on a HUD or an equivalent presentation. An EFVS allows the pilot to continue looking forward along the flightpath throughout. This allows an EFVS to be eligible for operational credit. Although an EV system is a good tool for enhanced situational awareness, it does not allow for any operational credit.

Lastly …

EV can be used tactically since it is created from real-time, on-board data sources and it allows you to see what's actually in front of the aircraft. You know you have the latest information to act on because it's generated from sensors on your airplane.

Synthetic vision – especially when depicting weather events – is driven by data that is at best five minutes old and possibly much older. That's usually good enough to get the big picture but inadequate if you want to pick your way between thunderstorms. So if you're not radar or storm scope equipped, you're better off to give convective weather a very wide berth because the information you are seeing is based on outside sources and databases, not direct observation. Obviously, you'll need to keep your software and databases up to date.

You'll also want to make sure that you understand how your systems work, what all of the graphical indications mean, and what failure modes look like.

Always maintain proficiency in all flight evolutions, equipment use, and programming. Periodic proficiency training with a flight instructor who's proficient on the equipment in your airplane will give you the confidence to use all of your equipment effectively.

Resources

- FAA Advisory Circular 90-106 Enhanced Flight Vision Systems https://go.usa.gov/xnR7j
- "T=Terrain Avoidance: What Does It Take to Use NVGs?" *FAA Safety Briefing,* Nov/Dec 2015, p. 28 www.faa.gov/news/safety_briefing/2015/media/NovDec2015.pdf
- "X-Ray Vision and Alphabet Soup" *FAA Safety Briefing,* May/Jun 2016, p.25 www.faa.gov/news/safety_briefing/2016/media/MayJun2016.pdf