

FAA gives EFVS users lower minimums

Cat II capability opens retrofit market.



Aftermarket programs for HUD and enhanced flight vision technology are becoming available for a variety of bizjet aircraft. Programs such as Jetcraft's HUD Vision Access include technical and financial analysis incorporating operational and residual value benefit to your aircraft. Shown is the new Kollsman AT-HUD offered in the Jetcraft program during design (above) and in flight (R).



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Modernization of the airspace is about improving capacity and safety and providing greater access to ports of call. For bizjets, the key to unlocking some of this future potential today comes in the form of additional components—and, often, a device that is really new technology.

Typical aircraft upgrades may be minor additions and tweaks or major investments like engine upgrades. Powerplants are frequently the focus of improvement, based on the potential for savings in both fuel and operating costs. Avionics upgrades can sometimes get overlooked because of the perceived complexity of the installation and a lack of well-defined return on investment (ROI). Performance improvement is often stated as the reason for an avionics upgrade but, other than the word “performance,” value can be hard to quantify. And unless it’s crystal clear that the new system lets you do something new, the technology can be just a “nice to have” item.

But when avionics upgrades are boiled down to 3 things—performance, safety and residual value—ROI for buyer and supplier alike becomes the common ground for an enthusiastic purchase. For example, recent developments by Rockwell Collins, Garmin and Honeywell have emerged for upgrading existing flight-deck systems with either software additions or behind-the-glass connections that add new capabilities. This is possible because these systems were built with a transition path for future technology that yielded performance and was affordable. But for something really new, like an enhanced flight vision system (EFVS), the path for the aftermarket entails both selection of the technology and the means to get it on your aircraft.

EFVS technology is maturing, and the systems are moving into their 2nd decade of operation. Vision technology is now used by all the major bizjet OEMs as both a market discriminator and sign of a leading-edge flightdeck. The simple reason is that vision technology enables the aircraft to do something that neither conventional guidance nor GPS-based technology supports—seeing in bad weather

to complete a landing.

Aggressive support by FAA has also clearly defined the operational credits and value of EFVS. In its NextGen plans, FAA has also targeted new goals for enhanced-vision-based operational capabilities such as landing in 1000-ft runway visual range (RVR) or less, surface movement for airlines, even takeoff credits. What EFVS technology does uniquely is to permit an equipped aircraft and trained crew to fly a published instrument approach to minimums and then, with the aid of an EFVS sensor, to see where the eye cannot and continue to 100 ft—at which point the naked eye must see. And EFVS performance credit is expanding to other operations.

Recently drafted industry and FAA standards for equipment and operations are also being finalized that would enable operations down to 300 ft RVR for those systems that can see through fog. So, in terms of performance, the potential number of runway ends that an EFVS equipped aircraft can travel to in all weather is tremendous—but only if you have EFVS certified for credit on your aircraft.



(L-R) Aftermarket installations of Kollsman EVS II sensor in a Boeing 757, McDonnell Douglas MD10 and Bombardier Challenger 604. FAA approved EFVS in 2004 as a means to see the required visual cues at decision height even when the human cannot, enabling the approach to continue to 100 ft, where transition to natural vision is required. FAA plans on more advantages with EFVS including taxi and takeoff, and landing in very low visibility.

Aftermarket solutions have begun to take hold in a robust way. Their operational value is now well defined, the costs of the technology and the residual value for each type of aircraft can now be tallied. The question is where to find both the technology and financial answers.

So far, FedEx and Jetcraft have been the most aggressive in aftermarket development of EFVS. FedEx began a program to modify its entire fleet of aircraft in 2004. By the nature of its operations, FedEx buys older aircraft and outfits them as freighters with specialized equipment. FedEx also has what many consider a world-class flight test and modification capability, and has completed EFVS STC programs for the MD10/11, Boeing 757 and 777.

As a result of the company's efforts, many of today's new large transport aircraft HUD functions—as well as the operational and regulatory approaches developed for EFVS—have actually been created from the FedEx template. Key to many of these developments has been the collaboration between FedEx and FAA, which set the path for air carrier use of the technology. The FedEx program—in terms of technology, flight test and operational approvals—has been pioneering and resulted in many aeronautical firsts.

Jetcraft's aftermarket EFVS

As for bizjet aftermarket efforts, all of the original EFVS systems developed by Bombardier, Dassault and Gulfstream began as STCs and then evolved to production items. So until recently the dilemma for owners who wanted access to this technology was whether to purchase a new aircraft. Jetcraft, however, as an established aircraft sales company, saw both a need and market potential in vision technology, and was the first with a comprehensive EFVS aftermarket program.

Jetcraft is known for both aftermarket improvements and conversions of "green" aircraft tailored for the individual buyer. Jetcraft's new program, called HUD Vision Access, includes the potential for specific bizjet and long-range aircraft, with the focus on turnkey delivery of HUD and enhanced vision sensors. The value proposition as Jetcraft sees it incorporates selected EFVS components, number of a specific aircraft in service, current aircraft value and annual flight usage time—all factored down to easily related terms such as cost per hour to aid in presenting an economic argument. Jetcraft has developed an ROI computation that also brings into perspective the costs of traditional Cat

II and III autoland systems—which require a certified runway with supporting ground equipment in order to use them—and compares the new operational performance with that using EFVS.

As Jetcraft notes, "Improved flight capabilities will increase aircraft performance and improve operations during adverse weather conditions into over 14,400 approach runway ends worldwide. Nonprecision, ILS, WAAS-LP/LPV, LNAV-VNAV and RNP approaches extend into Cat II equivalent operations when using certified EFVS."

The Jetcraft business case addresses safety and access—key points in corporate aviation that are often difficult to quantify. The analysis includes everything from pushback to takeoff, enroute, descent, approach and landing and taxi to the ramp. Jetcraft's straightforward cost and ROI analysis addresses value that nonpilots will grasp. In other words, it's an all-access program. Operational improvements can be viewed as actual aircraft performance changes—you can fly and land at places at night and in low visibility with safety and an identified value.

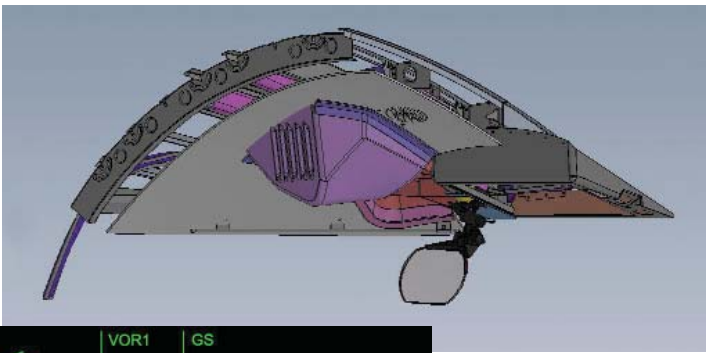
In financial terms, Jetcraft has developed a business case that states a typical 60% residual on market price.



EFVS installations typically include a weather-penetrating sensor, infrared window and processor. Shown here is the Kollsman EVS II.



Window mounted in nose fairing



(L) Flight guidance symbology developed for Jetcraft's HUD Vision Access program by Kollsman. (Above) Installation of aftermarket HUDs requires compatible designs for each aircraft installation, as shown in this CAD drawing. (R) Aftermarket developments that include a HUD and EFVS sensor require development, flight test and certification. Here Test Pilot & Designated Engineering Representative Dave Gollings checks out the Kollsman AT-HUD in flight aboard a Challenger 604.



Cost per annum is pretty attractive—and when you break it down to flight hour costs it's hard to figure what would hold you back.

The actual components currently in Jetcraft's HUD Vision Access program begin with the Kollsman EVS II sensor—as installed in the FedEx and Gulfstream fleets. The additional HUD technology is a new entry from Kollsman, taking advantage of some of the components used in the FedEx fleet and now adopted by business aviation. Installation of the EFVS sensor part has seen a variety of installation approaches. For large transport aircraft, the Kollsman EVS II is installed on the top of the radome and includes a unique infrared (IR) window and heater assembly for anti-icing. The installation includes a compatible fairing to hold the window and sensor mounting. For corporate aviation, varieties of chin mount on the top or bottom of the radome are also available. HUD installation includes connections to the aircraft's avionics and the EFVS sensor providing an image to the pilot.

Large-cabin higher-value aircraft may seem to have the most to gain from EFVS from a financial point of view but, operationally, Jetcraft is taking aim at any large aircraft where the HUD will fit so as to improve performance and safety. This includes aircraft of recent construction, but also many of the steady and lasting performers so hard to give up.

And Kollsman's recent EFVS STCs of its family of sensors for the Citation II and Sikorsky S92 have expanded the application of this technology to all sorts of flying machines. So the Jetcraft HUD Vision Access program has solutions for more "classic" flightdecks that also need leading-edge systems such as EFVS.

EFVS worldwide

Jetcraft sees aftermarket potential not just in North America but worldwide. With interest in EFVS ops in China and Brazil, the utility of investments like this puts a more global outlook on the justification and ROI. Recent developments include Dassault being granted the operational use of EFVS installed on the Falcon 7X in China and soon in Brazil. In the new aircraft arena, Gulfstream's G650 and G280 include standard and optional fits for EFVS.


Bombardier recently announced approval of the synthetic flight vision system for its Global Vision Flightdeck, which comprises Rockwell Collins' Pro Line Fusion avionics, Esterline CMC Electronics EVS sensor and Rockwell Collins HUD.

EFVS for military aircraft, while not the focus of this magazine, deserves a note of reflection. The first FAA approved EFVS systems in the Dept of Defense were on Gulfstream aircraft. The first such aircraft was delivered by Gulfstream to the USAF, and since then the Army, Navy and other US agencies have followed the Air Force's lead. Now the military is taking serious interest in EFVS. In practical application, the US needs global reach and access to all corners of the Earth, and a flight that originates in a sunny climate may call for a landing

in a commercial area plagued with fog. So the ability to complete the mission that now includes an instrument approach is also at the top of the list of things desired to support today's global operations. The shock to many in the DoD is that EFVS is over a decade old, with several thousand in service.

The vision thing

New avionics developments can both excite and intimidate a buyer unless a plain case can be made for the purchase. The dazzle of new technology can bring the flightcrew to a display booth, but in the end, parting with money and making additions to your aircraft must have a clear benefit of safety and performance. Now the rationale for aftermarket technology with EFVS has several voices.

As said earlier, vision technology is now used by every major bizjet OEM. For the modern flight department, the question becomes, "Are we a leading edge flight department without EFVS?" And that's why airplanes with plenty of life will likely be looking at this technology as part of the basic instrument package. As one vendor puts it, seeing is believing. 



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