Night into day

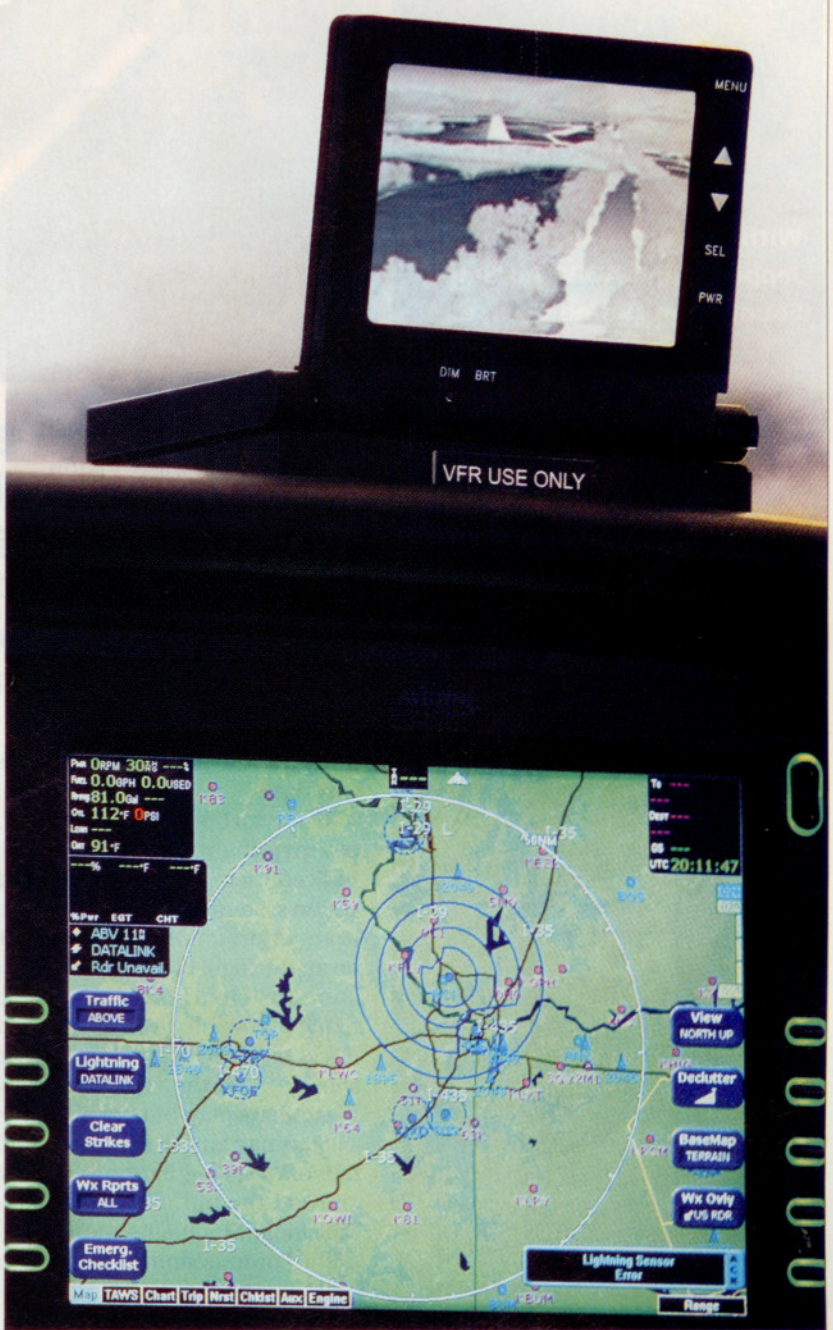
Infrared camera illuminates the view

BY DAVE HIRSCHMAN

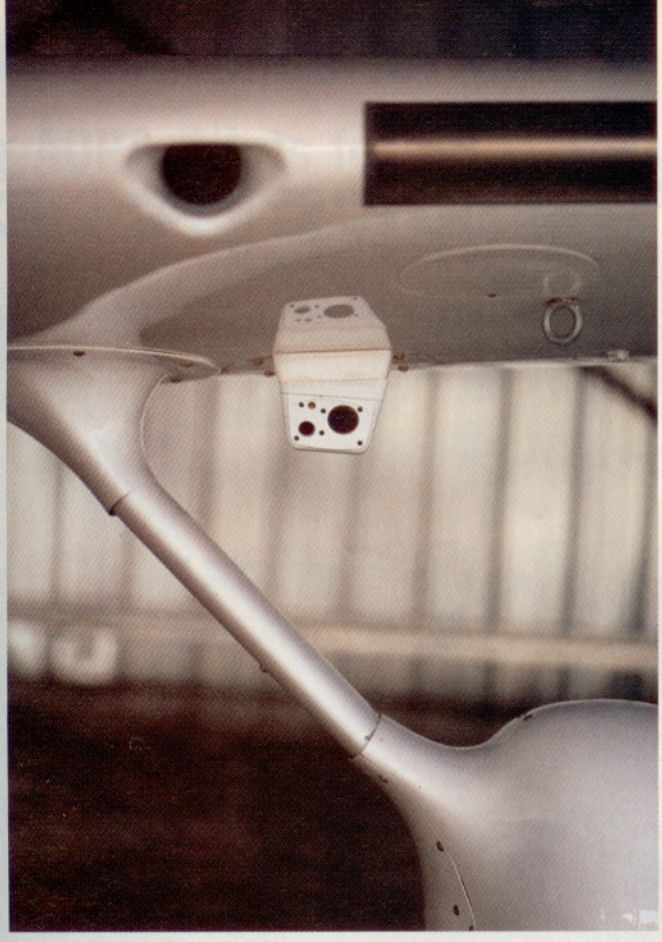
The landing light casts a powerful but narrow shaft of light across the dark and unfamiliar airport ramp. It was time to taxi for departure in the misty, predawn darkness at a nontowered Florida airport, and AOPA's 2009 Let's Go Flying Sweepstakes Cirrus SR22 had to navigate a series of narrow taxiways and obstacles to get to the runway. Blue taxiway lights were too far away to provide any meaningful help, and the white runway lights were even more distant. But a pop-up video screen atop the glareshield showed the way in sharp relief.

A recently installed Forward Vision EVS-100 Enhanced Vision System with an infrared camera mounted under the airplane's left wing gave a bright, wide-angle view of the path ahead and made taxiing to the pitch-black runway a simple affair. The heat-generated images displayed on the screen showed the runway environment clearly, even before activating the airport's pilot-controlled lighting system.

PHOTOGRAPHY BY CHRIS ROSE



A pop-up video screen atop the glareshield shows moving images from the wing-mounted infrared camera. The EVS-100 provides clear images of ground obstacles, terrain, clouds, and even birds in flight.



The infrared camera is mounted under the SR22's left wing in an existing inspection panel. The installation has no noticeable effect on aircraft performance. The thermal imaging system can't see through clouds—but it clearly shows obstacles even on the darkest nights.

Enhanced vision is like having night-vision goggles, but without cumbersome, view-limiting hardware.

It was my first experience with Forward Vision and its EVS-100 system that is increasingly being used to improve flight safety in a wide variety of general aviation aircraft, from helicopters to business jets. I had expected it to aid approaches and landings made in darkness, but its utility in night ground operations was the first of its many pleasant surprises.

Once airborne on the long cross-country flight to AOPA's home base in Frederick, Maryland, the Forward Vision system continued to provide relevant information. Level at 11,000 feet on an IFR flight plan, the system showed cumulus cloud buildups ahead and made it possible to steer clear of them. A few of the heavier cloud formations showed up on the airplane's XM Satellite Weather display, but not all of them.

Starting a long descent over the craggy hills of West Virginia, the infrared images showed the outline of the oncoming Blue Ridge Mountains, the curving paths of the Potomac and Shenandoah rivers, and their confluence at Harpers Ferry. Looking through the windshield, however, only blackness and a few clusters of white lights on the ground were visible.

Visibility at the airport was reported as four miles in mist, and the Let's Go Flying SR22 was vectored for an ILS approach to Runway 23. Established on the localizer at eight miles, the airport was still invisible through the windshield. But the paved surface and its hot lights showed up as a bright speck on the video screen. The approach lighting system was out of service, so there were fewer visual cues than usual on this approach.

Descending on the glideslope, the runway environment came into view at about four miles. There are a pair of obstacles below and slightly left of the approach course: two tall grain silos about one mile from the runway threshold. At night, those silos are hidden and indistinguishable from the rolling hills that seem to envelop them. But the video display showed them clearly from more than two miles, as well as the farmhouse next door, and even the cows in a nearby pasture.

If there are deer, cars, or another airplane on the runway, the EVS-100 could be a lifesaver. But the infrared system can also be invaluable in scenarios such as a failed radio preventing activation of the pilot-controlled lighting system, failed VASI lights, or a burned-out aircraft landing light. In case of an engine failure at night in a single-engine aircraft, a Forward Vision system could help a pilot spot the most suitable emergency landing site.

As useful as the Forward Vision system is, however, it's important to point out what it's not. Unlike Superman-style X-ray vision, an EVS-100 can't see through clouds. And unlike synthetic vision, which gives a terrain database and GPS-derived, three-dimensional depiction of the outside world, enhanced vision isn't designed for high-altitude, cross-country navigation. It's also not a head-up display that projects airspeed, heading, and other critical flight information on a single display screen.

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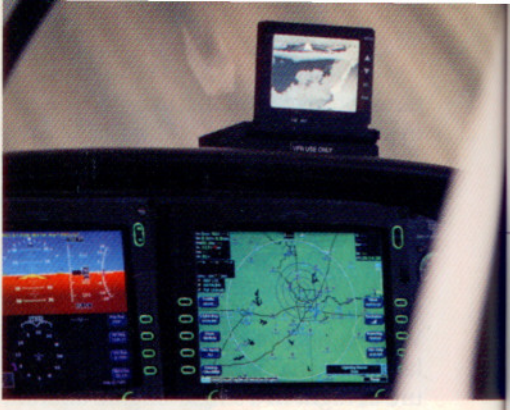
The benefits of the EVS-100 are especially clear on night VFR flights and non-precision night approaches.

On a recent nocturnal trip to the Greater Cumberland Regional Airport in western Maryland, a facility located at the base of a deep valley, the EVS-100 showed the jagged hilltops on both sides of the Runway 23 localizer approach. During a missed approach, with the airplane climbing in a nose-high attitude, none of the surrounding high terrain was visible out the windshield. But the infrared camera's position under the left wing gave it an unobstructed view of the ground—and the EVS-100 showed the dangers clearly on the screen.

Returning to Frederick Municipal Airport on a clear but moonless night, the city was visible 20 miles away, and the airport came into view at about 10 miles. But the EVS-100 was about to show us an obstacle that we wouldn't have been able to see without it.

On final approach, an unlit aircraft was waiting at the approach end of Runway 23 in total darkness. No strobe, navigation, or landing lights were illuminated on the airplane, but it was clearly visible on the EVS during the final mile before touchdown.

"I wouldn't have been able to see that aircraft at all without the EVS," said War-



The infrared camera showed the contours of nearby terrain and clouds.

ren Morningstar, an AOPA staff member, pilot, and videographer. "It was totally hidden. The taxiway lights and runway lights didn't provide enough illumination to show the airplane at all."

The darkened aircraft was being operated by *AOPA Pilot* Senior Editor Alton Marsh. At our request, he had taxied the airplane to the runway, both with and without lights, to help test the EVS-100 system. The infrared camera showed the contours of nearby terrain and clouds. The manufacturer claims it can help pilots avoid flocks of birds in flight.

Forward Vision recently received FAA approval to install its EVS-100s on almost all of Cessna's single-engine piston aircraft, and the company has STCs for 160 aircraft types including all Cirrus SR20s and SR22s. Enhanced vision is also an option on Garmin's G1000 integrated avionics suite (where it shows up on the multifunction display), and it's coming to Avidyne's new Entegra Release 9 avionics system, too.

The Forward Vision EVS-100 in the Let's Go Flying Cirrus SR22 has a retail sales price of about $15,000. Lancaster Avionics in Pennsylvania installed the system, and Forward Vision says it usually takes between six and 10 hours of shop labor to complete the job.

We're just beginning to explore the utility of the EVS-100—and it's already proving itself indispensable on night flights from engine start to shutdown. AOPA

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