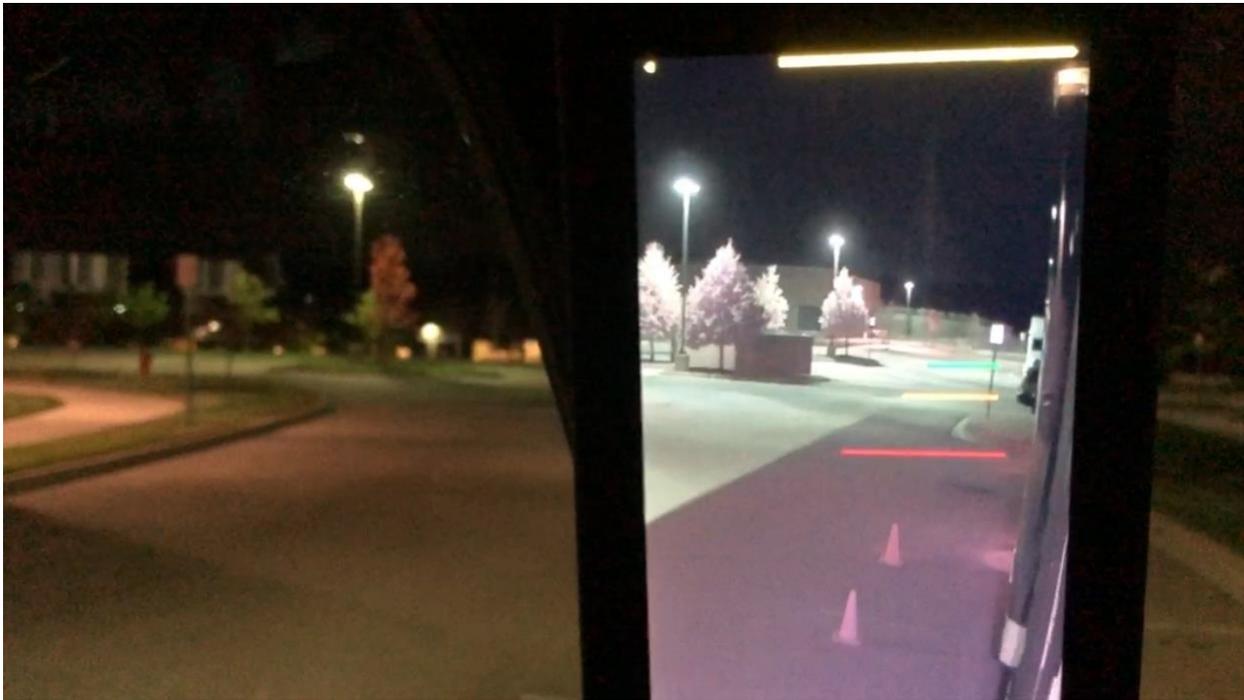


Trading truck mirrors for monitors: A test drive

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TORONTO, Ont. — For the record, I have previously expressed a high degree of skepticism about replacing traditional mirrors with camera and monitor systems. Glass mirrors work well enough and drivers are very familiar with them. I can't think of another safety system on a truck that drivers rely upon more heavily and have grown more accustomed to than mirrors.

That said, mirrors do leave areas of less-than-ideal visibility, but drivers compensate by looking twice at those so-called blind spots. Many trucks are fitted with fender-mounted mirrors — so-called “rookie-sticks” — which fill in the blanks quite nicely and are valued even by some veteran drivers.

I have heard many new tractor-trailer drivers say getting used to their mirrors was nearly as challenging as learning to shift a non-synchronized transmission. It does take time to mentally compensate for the lack of depth in a mirror, and to learn where the end of the trailer is relative to a certain point in the image reflected in the mirror.

In tight-turn maneuvers, the rear of the trailer can completely disappear from view, forcing the driver to adjust the field of view by leaning forward while turning. The smaller convex mirrors help in this regard, but the image reflected by the “fish-eye” convex is distorted and the distance between objects is greatly compressed. Still, drivers learn to compensate for this and usually safely navigate most tight situations.

All that to say, mirrors, despite their shortcomings, have been with us since the beginning, and asking drivers to switch to a new technology is going to pose its own set of challenges. If my recent experience with the MirrorEye Camera Monitor System from Stoneridge is any indication, the learning and acceptance curves will not be as steep as some may think.

Prior to test driving the MirrorEye camera monitor system, I had driven two trucks equipped with CMS. Those trucks also had conventional mirrors, so I ignored the new technology, except



to glance at the monitor occasionally to verify or compare what I was seeing in the monitor to what I saw in the mirror. Since Stoneridge is presently the only supplier with a U.S. FMCSA exemption allowing it to operate trucks without conventional external glass mirrors, ignoring the A-pillar-mounted monitors wasn't an option on this test drive. They were all I had.

I had the benefit of a pre-drive briefing with Stephen Fox, Stoneridge's vice-president of business development, and Ray Kirkland, a research engineer and veteran driver who has been instrumental in developing the MirrorEye system. So I knew what to expect when I hit the road. I also learned that Stoneridge currently has MirrorEye systems installed at 14 fleets with an estimated 5 million miles of evaluation testing — and zero reported accidents stemming from the use of the system.

“Drivers respond to MirrorEye the same way they do with automated manual transmissions,” Kirkland told me. “It takes a bit of coaxing to get the veterans to try it, but none of them want to go back to conventional mirrors after they try it.”

Caption: Three colored lines embedded in the image seen in the monitor show the rear of a 53-foot trailer (red), a position 40 feet behind the trailer (yellow) and 80 feet behind the trailer (green). Note: this image is a screen grab from video shot by a GoPro camera, not a screen grab from the actual monitor.

Driving with MirrorEye

My 40 years of driving experience turned out not to be as large a handicap as I had feared. I think most drivers will see themselves in my initial observations.

When I first sat in the driver's seat, the left-hand monitor seemed way to close to me. It was mounted on the A-pillar after all, less than an arm's-length from my face. As an aside, I wear bifocal glasses, with the lower part of the lens tuned for reading, which is usually done at about

the same distance away from my face as the monitor. Consequently, I sometimes found myself looking through the lower portion of my glasses for a clearer image in the monitor. It's not that the image in the monitor isn't razor sharp. It is. But it wasn't in the proper focal range for me. My mind's eye papered over that problem soon enough and I hardly noticed it after a few minutes.

The next incongruity was looking out the window to where the mirror used to be. It's instinctual, but that too soon became a non-issue. The monitor is front and center and there's no missing it. Looking for the outside mirror was muscle memory more than anything else.

These two "issues" weren't a factor for the right-hand monitor. It's far enough away for clear focus through the top of my glasses and it's close enough to where a mirror should be that my gaze hit the target every time. The advantage of the monitor's position on the A-pillar is the elimination of the lateral blind spot caused by the ridiculously large aero-mirror cowlings all the OEM's use. They may save a fraction of a mile-per-gallon, but visibility suffers and that's not a good trade-off in my opinion. MirrorEye's CMS solves that problem.

The view through the monitor is different from that of a mirror — not drastically, but noticeably. Again, there was this thing in the back of my mind that I expected to see, but it wasn't what I saw. For example, the objects in the right-hand monitor appeared larger than they would in a mirror. Not a bad thing, but my initial thought was that objects beside me appeared closer because of size, perspective and all that. By closer I mean further forward toward the cab. MirrorEye alleviates that discrepancy with three clearly visible horizontal colored lines in the monitor — a red line about half-way up the screen, a yellow line slightly above the red line, and a green line just above the yellow one. The red line represents the rear of a 53-foot trailer, plus four feet. The yellow line is 40 feet behind that, and the green line represents 80 feet behind the trailer.

The lines were Kirkland's brainchild and instantly remove any doubt the driver may have about where traffic is relative to the rear end of the wagon. Because my familiar reference points in a mirror no longer applied, these colored lines made up the difference.

The other thing that took getting used to is the field of view. It's wider in the monitor than a traditional mirror, so you see more of what's around you. That's good. The awkward part was getting used to the fact that leaning forward or getting in closer to the monitor has no impact on what you see. Moving your head does with a mirror — considering angles of reflection and all that. That said, the driver can pan the field of view with a rotary control on the dash. And the field of view follows the trailer in a turn. MirrorEye has cleverly designed a tracking feature into the camera/monitor algorithms that pans the view to follow the back of the trailer. The trailer wheels are almost always in view during a turn.

From the time we left Stoneridge headquarters in Novi, Mich., I was very aware of what was going on around me, more so than usual. I was aware of the different fields of view and the different perspective offered by the monitors, so I was trying to calibrate this new view of the world with my historic expectations. It took less than 30 minutes until I stopped looking out the window for the non-existent mirror. It took a little longer until I was comfortable with a passing maneuver.

I recall passing one of those slow-moving Michigan centipedes, looking into the monitor at about the time I felt it would be safe to pull back into that lane and thinking, "I'm not really seeing this,

it's just a visual representation of what's happening beside me." In a mirror, you get visual confirmation — eyes to brain. While the camera-monitor-eyes-brain connection is no different, it did take a few moments before I was totally comfortable trusting what the monitors showed me. I was fine from then on.

I even managed to navigate a double-roundabout on Michigan 23, just south of I-96. I came upon it unexpectedly and it rattled me a little, but the CMS got me through just the way a well-focused pair of mirrors would have.



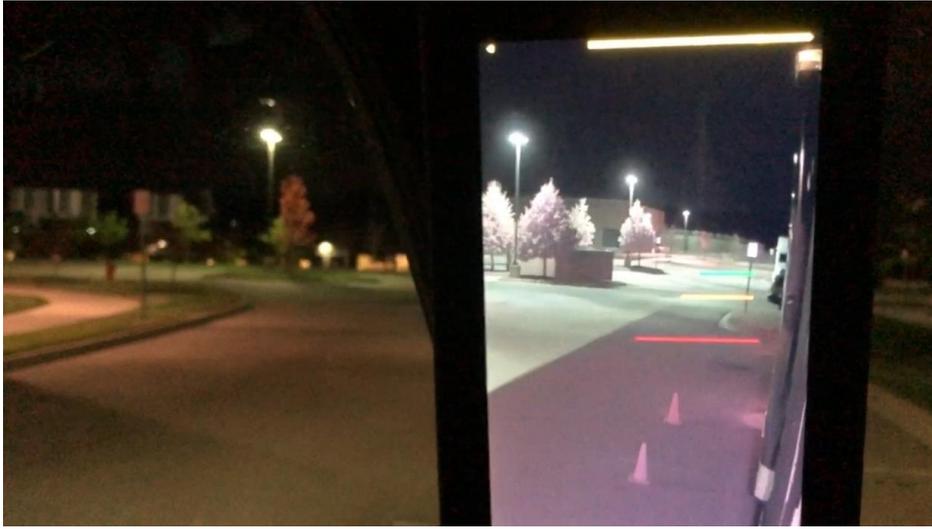
A control module allows drivers to pan the field of view slightly left or right, retract the camera wings, and adjust the brightness of image in the monitor to suit their taste.

Night Driving: The Acid Test

I was very pleasantly surprised at the night driving experience. The image in the monitor is not optical but infrared. The night image was fantastically clear and super well defined. I could even see the tar snakes and skid marks on the pavement surface when it was pitch black outside because IR doesn't require light. The white lines were as bright as day, and best of all, there was absolutely no headlight glare from overtaking cars. The headlights appear as white circles or squares on the front of the car. That's it. No glare at all.

Stoneridge has done a very good job calibrating the brightness of the monitors. During the day, the image was as bright as my surroundings, and the same at night. It wasn't too bright and distracting, nor too dim and difficult to resolve. In fact, the daytime image was as good as I'd expect from a mirror, and the night image much better than a traditional mirror.

Sunlight shining into the camera from behind produced a slight blooming effect, but the electronics subdued about 90% of it. The image in the monitor remained as clear as before, with a slight white glow where the ball of the sun was accompanied by red and green colored streaks. At one point, with the sun low in the sky and at my side, the glare on the monitor screen did wash out the image to some extent, the way a laptop screen gets washed out when it's outside. This was really the only issue I experienced with the system.



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