

Ditching Mirrors for Monitors is Easy – If You Want To

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Taking into account a little distortion from the ultra-wide angle lens used to take this photo, the view from the driver's seat isn't much different with a monitor-based rear vision system.

Photo: Jim Park

Switching to camera/monitor systems as replacements for traditional mirrors will be a bigger transition for drivers than was the advent of the automated transmissions. When you consider all the ways drivers interface with their work environment, ditching the gear shift lever was big; replacing their mirrors will be huge.

Many have already expressed concerns in comments, direct emails and direct messages to my recent test drive story on Stoneridge's MirrorEye system. Mostly they are opposed to the idea of switching. And to be honest, I was in that camp before I did the test drive. My position had softened from a few years ago after learning more about the system and watching videos of how it worked. The test drive eliminated most of my concerns, and at the end of the story, I admitted that I could get along with the new technology.

After reading some of the readers' comments, I have to conclude that some drivers are just looking for excuses to dislike the system. Many of the concerns expressed could just as easily be said about conventional glass mirrors.

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Anything that's new and radically different is going to inspire those sorts of comments. Because camera/monitor systems are a significant departure from conventional mirrors and will affect drivers every moment of their working day, I went deeper on the test drive story than usual. I wanted to explain how the system worked and how I reacted to it, and to put some of my concerns on the table – such as, what happens when they break or the system crashes?

Several of the comments were along those lines, such as this one: "What do you do when this thing stops working on the Cross Bronx? Mirrors have worked since the beginning. Another knock [against] old-school drivers who have millions of miles of safe driving."

That's a legitimate concern, but glass mirrors can break too, and I'll bet they are broken more frequently than these camera/monitor systems will fail. Back in the early 1980s, I lost a few mirrors a month on what we called at the time The Skinny Bridge, which crosses the Susquehanna River near Clarks Ferry, Pennsylvania. Then it was an ancient two-lane affair with just enough room for two trucks to pass. I mean just enough room; the center line between the lanes was a stream of glass shards from all the mirrors that had bumped in the night. Believe me when I say nothing jolts you back to reality faster –

especially in a cabover truck – than having your left-hand mirror literally explode in your face and fill the cab up with broken glass.



The left-hand monitor is much closer to the driver and rather “in your face,” but it is less distracting than one would first imagine.

Photo: Jim Park

That truckstop just north of the bridge, a Pilot now but privately owned back then, did a roaring trade in mirrors before the bridge was widened.

Having the left-hand mirror go out would be problem enough but losing the right-hand mirror is a particularly dangerous scenario, especially if the convex disappeared too. With the MirrorEye system, each camera and monitor are on separate channels. There are two cameras in the "camera wing," one a normal view, the other a wide-angle view. And there are two screens displayed on the monitor. Stephen Fox, Stoneridge’s vice president of business development, told me that if one camera or monitor failed, the others would continue working.

As well, he said there are built-in fail-safes. For example, if the system goes down, the screen will turn blue – like the Windows blue screen of death – rather than freeze up or

just go blank. The driver will immediately be aware of a problem and not be led to rely on a frozen image on the monitor screen.

The point is, unless the wing is torn from the truck or the entire system just shuts down, drivers will have some backup in almost all situations – much like conventional mirrors.

While I used to keep a couple of spare mirrors on board because I traveled The Skinny Bridge at least twice a week back then, I can't say carrying a spare monitor or camera wing would be very cost-effective. I could replace a mirror for less than \$20 back then. The camera/monitor systems would cost considerably more. (But so would replacing one of those fancy aerodynamic mirrors on trucks today.)

I don't want to simply dismiss those drivers' concerns. They are valid. But I don't think we'll be any worse off by using the camera/monitor system than we are with the potential breakage of conventional mirrors.

Some commenters wondered if the monitor would be distracting, especially the left-hand monitor, being so close to the driver's face. I did find it distracting at first. It was something new and interesting to look at, but the novelty soon wore off. I was out in the truck for more than three hours, and after about the first hour I barely noticed it until I intentionally looked that way. The other temptation, which I mentioned in the story, was my inclination to look outside to where the conventional would be. I think that was habit or muscle memory more than anything. That habit wore off soon enough, too.

The other common concern was contamination of the camera lenses from water, ice, dirt, etc. I drove the system on a sunny clear afternoon and didn't have that problem. MirrorEye has some video footage on its website of driving in the rain. The water is clearly visible on the left-hand window, but the monitor remains clear. MirrorEye calls the camera lens "hydrophobic," which means it has the ability to repel water, which one assumes includes snow, ice and even fog. Heated mirrors do essentially the same thing, but how many trucks have working heated mirrors?

When regulators get around to drafting standards for these things, I expect they will include something about the system's ability to clean or keep clean the surface of the camera lens. The monitor itself is inside the truck, so it will remain clean in most instances.



The placement of the optional “look-down” monitor at the top-center of the windshield is arbitrary and up to the driver. MirrorEye says this is where most drivers say they like it best.

Photo: Jim Park

Safety Implications

During our test drive, Fox talked much about the potential for improvements in safety stemming from a camera/monitor system. I'm not convinced the cameras and monitors are orders of magnitude better than mirrors. but there are some advantages. You have a wider field of view with the normal and wide-angle cameras, which is a benefit, and the system has a built-in trailer tracking feature. It follows the wheels of the trailer in a turn,

which can be very helpful when turning right – a traditionally difficult place to see with conventional mirrors.

Fox also said that much of what is currently done with forward-facing cameras, such as lane departure warning, event recording, object detection, etc., could be done with cameras and monitors. The software can detect things such as lane departures or vehicles to the side of the trailer when attempting a lane change. These and other features will come in the fullness of time, but the truck I drove wasn't equipped with any of that.



Compared to a more traditional arrangement, seen here, the monitor mounted to the A-pillar reduces the lateral blind spot created by the external mirror.

Photo: Jim Park

The size and placement of the monitors probably won't be precisely regulated, but one driver commented on the difficulties she has, being of small stature. She wondered if the monitor positions were adjustable. Their placement on the A-pillars is a no-brainer. because it very closely replicates traditional placement – while eliminating lateral blind spots caused by glass mirrors. Height and angle adjustment is possible to some degree now with MirrorEye, but I can see the day when OEMs will simply build the monitor into the A-pillar or even the dashboard. That might limit driver choice to some degree, but it would be no more of an issue than it currently is with glass mirrors.

Another commenter had this observation (gently edited here), with what I think is a brilliant idea: As far as backing goes, have the back-room bright boys at Stoneridge done any testing to see if backing guide lines (similar to those generated for the rear-view cameras in cars) could be developed to aid the driver? Being able to see at least a projected path for the rear of the trailer, based off the turning radius and the steering wheel position, would give the driver a more accurate sense of where the trailer was going.

Since we're dealing mostly with software here, I'd have to think this is possible. We already use steering column sensors, used in conjunction with electronic stability control systems, so integrating that into the display probably would not be difficult. It wouldn't even need to be 100% accurate, as long as it provided the driver a projected path upon which to steer the trailer.

Stoneridge also offers a third monitor, which is essentially a look-down view that improves upon the convex mirrors mounted about the passenger door. On the test truck, that monitor was mounted top and center of the windshield. With the associated camera mounted in the right-hand camera wing, it covered an area from the front bumper to the drive wheels and a bit more than a traffic lane wide.

Fox said that mounting position was the preference of most drivers, but it seemed ill-placed to me. I'd rather see it above the passenger door, perhaps integrated into the headliner on OEM factory builds. Presently, it's an aftermarket add-on that has to fight

for existing real estate in the cab. The top center of the windshield is a reasonable location, but it's not where the driver would naturally be looking to check out the space down below.



This supplied image shows how the camera lens remains clear while rain soaks the window, which would partially obscure visibility.

Photo via MirrorEye

The Regulator's Task Ahead

Many different parties are interested in removing traditional mirrors from trucks, from OEMs seeking fuel economy gains to technology advocates that see safety advantages accruing from cameras and monitors not possible with glass mirrors.

I haven't heard many drivers say, "Please take away something we are used to and comfortable with and which has worked just fine for decades." However, Fox says drivers who are currently using the camera/monitor system say they love it. I'd probably

agree. The system I drove was great, it functioned as closely as I could imagine as a regular mirror and even did somethings better.

But MirrorEye is just one product. Its designers did a very good job of making the system as seamless as possible, but one has to imagine that many of the good things about MirrorEye are patented, which will force other suppliers to do some things differently – maybe better, maybe not.



While bright and clear in any conditions, the image the driver sees in the monitor is not what he or she is used to seeing in a traditional mirror.

Photo via MirrorEye

The regulators will have to be careful in establishing standards for these things, such as monitor size, image area, brightness and clarity, night use, the ability to stay clean, etc.

Probably even placement. And there will have to be some consistency across brands for driver familiarity. Mirrors have been more or less the same across brands since standards were developed, and I hope that wouldn't change for the sake of brand differentiation.

A set of standards already exists for conventional mirrors, which ironically MirrorEye had to meet in order to get the federal government to allow an exemption to operate trucks equipped with MirrorEye without redundant glass mirrors. Other suppliers, I'm sure, will be able to meet those standards too. But what about additional requirements, such as durability and longevity standards (probably not), the guideline MirrorEye has used for determining distance to the rear of the trailer and beyond, or the trailer tracking feature?

Other companies, Mokra-Lang for example, already have such systems in use overseas. Vision 4.0 is an option on several European truck models now. From what I have seen online, that system has functionality similar to what I experienced with MirrorEye.

However, the government decides to proceed, performance and driver acceptance should be among regulators' greatest concerns. I expect such systems will be optional for some time to come, but there will be those pushing hard to get these made standard features if not mandatory. And I'm sure in the early stages of their evolution, drivers will find ways to blame certain crashes on the new technology. I'd think some of them could make the case that in an anxious moment of confusion they reacted incorrectly to what they saw in the monitor versus what they expected to see in a traditional mirror. There is a difference.

I think younger and/or less experienced drivers will be the first to embrace these new rear-vision devices, with older and seasoned driver continuing to come up with excuses not to like them. After using them for an hour or two they will likely change their mind. All that remains is to convince them of the return on investment, which in my mind remains a little less clear.

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