

Driven to Distraction

BY WAYNE ROSENKRANS



Deadly inattentive behaviors with portable electronic devices outpace scientists' grasp of vehicle operator risks.

A U.S. National Transportation Safety Board (NTSB) forum on distracted driving of motor vehicles, citing parallel issues in the aviation sector, has noted significant gaps in the scientific understanding of cognitive distractions in general. While acknowledging that differences in safety training and performance vary between, for example, professional pilots and average motor vehicle drivers, human factors research offers only a few insights into the nature of risks when either group uses portable electronic devices (PEDs) during vehicle operation.

The purpose of the March 27 forum in Washington, D.C., was to examine countermeasures that can mitigate distracted driving behaviors. Overall, the presenters advised caution whenever PEDs are used while a vehicle is being operated. The NTSB in December 2011 called for a federal ban on all drivers' non-emergency use of PEDs, other than those designed to support the driving task.

More than 3,000 people were killed in the United States during 2010 in distraction-related motor vehicle crashes, the NTSB and presenters said, citing National Highway Transportation Safety Administration (NHTSA) data, and presenters agreed that about 3.5 percent of these involved driver behavior with PEDs such as text messaging, email messaging, talking on handheld and hands-free mobile phones, using smartphone applications and accessing content on the Internet.

Studies of accident data in which the driver's mobile phone use was verified show four times the risk of crashing when a driver is using the phone, said Anne McCartt of the Insurance Institute for Highway Safety. "New [risk] awareness technologies in vehicles may help prevent crashes that occur due to distraction, fatigue and other kinds of inattentions," she said. "So we actually may be able to solve a lot of the problem without fully understanding it."

NTSB Member Mark Rosekind noted that, unlike safety specialists from non-aviation sectors, motor vehicle drivers have not learned from aviation events that, for example, pilots' "head down" time while interfacing with aircraft automation has to be mitigated by training, procedures and system design because of the serious risk of accidents while multitasking. "It shouldn't surprise us that [as] we're putting all this technology into the car, whether it's built-in or nomadic, basically we've just created the same situation and ... that's created a [safety] problem," he said.

"At the NTSB, we've seen distracted operations on our nation's railways, airways, waterways and, most commonly, on our roadways," Chairman Deborah A.P. Hersman told the forum. "In the past, the norm was an attentive driver, and we recognized that there were occasional distractions. The challenge now is that we have got distractions competing full-time for a driver's attention, and there's just no limit as to what can be brought into the vehicle or what can be put into a vehicle."

Donald Fisher, University of Massachusetts, said that all remedies must combine engineering, enforcement and education. The research community agrees that operator glances away from a vehicle's path ahead should last no more than two seconds, but it does not

know the minimum time that attention has to be devoted to the path to successfully anticipate a hazard, he said.

In recent years, society's assumption that the human brain can multitask or multiplex cognitive activities has been upended scientifically, but recasting multitasking as a myth has not been popular. Fisher told the NTSB that methods such as magnetic resonance imaging of the brain have yet to prove "what we're actually processing simultaneously," but the current consensus about human performance is "there's no doubt that if we're trying to do two things at once, we're compromised."

John Lee, University of Wisconsin, said that he recently found himself focusing attention five seconds or longer — at highway speeds — on tasks such as selecting songs on his vehicle's entertainment system. "I never talk on my cell phone, hands-free or handheld, in the car and yet I was inadvertently distracted — tempted to do something much more distracting," he said. "I was seduced in the moment by technology. ... The danger of distraction comes from the huge proliferation of new types of distractions.

"All of the data that we've been talking about were collected during [2003–2004]. Facebook was introduced in 2004, Twitter in 2006, the [Apple] iPhone in 2007 and the apps for the iPhone in 2008. ... The [PED technology] environment is changing almost more quickly than we can analyze the data, let alone collect it.

"Texting brings together a perfect storm of dangerous activities ... visual off-the-road glances where operators are not processing the road because they are not looking at it ... cognitive engagement in conversation ... the social compunction to continue that conversation ... [and, absent safety consequences], the failure in the course

Proposed Lockouts

Software *lockouts* — which automatically prohibit a function or task of installed electronics from being operated unless the vehicle is parked or not moving — comprise the following under NHTSA's proposed guidelines:

- Video images;
- Static images not related to driving;
- Manual text entry;
- Displaying more than 30 characters of text;
- Displaying automatically scrolling text;
- Tasks that require more than two seconds of operator attention at a time; and,
- Tasks that overall require more than 12 seconds to complete.

of driving to get feedback [and recognize] that they've just done something very dangerous."

Social aspects of PEDs remain a huge research gap. "We know that people respond [by PED] very quickly or feel compelled to answer very quickly, and in the context of driving, they're still willing to peek at that phone or [text] because a [15-second] delay in response sometimes can have a social meaning as well," said Daniel McGehee, University of Iowa Center for Policy.

Under proposed NHTSA guidelines, functions of in-vehicle electronic devices may need to be locked out by software before they are released (see "Proposed Lockouts"). "Especially as it relates to human factors for automated or semi-automated driver support/control systems, we are actively engaging our counterparts on the aviation side, the defense side and others," said John Maddox, NHTSA. "We don't need to reinvent the wheel. ... [However,] we don't have PED manufacturers [or smartphone] apps developers [working with us] on the same page. ... They need to be engaged." ➔