Ready or not: Assuming the driving in a semi-autonomous vehicle

Do you consider yourself a *multitasker*? If you think this increases your efficiency, think again.

Studies show that only 2% of people can multitask effectively (http://www.psychologytoday.com/blog/brain-trust/201202/is-your-brain-multitasking & James Watson [University of Utah]). The large majority of us are *monotaskers*, who decrease our productivity when we try to accomplish more than one task at a time. In reality, even when we think we're multitasking, "our brains are actually switching rapidly between tasks".

Numerous studies have concluded that *multitaskers* make up to 50% more errors and that multitasking results in greater inefficiencies (http://brainrules.net).

Now, think about the number of tasks that drivers try to accomplish while driving. Interaction with others through a cell phone, handheld or hands-free is an activity that drivers

Nearly **one in three** say they did this "fairly often" or "regularly."

undertake regularly while driving. In fact, a 2012 survey "conducted by the AAA Foundation for Traffic Safety found that more than two in three drivers report talking on

their cell phone while driving at least once" in the 30 days preceding the survey. Nearly one in three drivers say their "fairly often" or "regularly" speak on cell phones while driving.

Few of us are aware, however, that "drivers talking on handheld or hands-free cell phones are four (4) times as likely" to be involved in a car collision. In fact, according to a study by Carnegie Mellon University, "the area of the brain that processes movement of visual images and is important for safe driving, decreases by as much as 37% when listening to language". According to this same study, drivers "talking on cell phones can miss seeing up to 50% of their driving environments, including pedestrians and red

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lights": a phenomenon known as attention blindness.

Another study undertaken by the University of Utah concluded that "drivers using cell phones had slower reaction times than drivers with a .08 blood alcohol content, the legal intoxication limit".

Using a cell phone, handheld or hands-free, delays a driver's reactions:

As much as having a BAC of .08%.

According to the National Safety Council (http://www.nsc.org/safety_road/Distracted_Driving/Pages/The-Great-Multitasking-Lie.aspx), driving and talking on the phone are thinking tasks that involve many areas of the brain. Instead of processing both simultaneously, the brain switches between two cognitive activities.

Speaking on the phone, or even worse, texting, represent major driver distractors. We already know that approximately 93% of collisions are attributed to human error and that driver distraction is an important contributor to this. The driver distraction factor is likely to increase significantly over the next few years due to the plethora of in-vehicle infotainment features and other devices brought into the car environment.

Automotive OEMs are introducing a number of autonomous driving driving features to help decrease

the potential of collisions (related primarily as stated above, to driver error and distraction). But, will these autonomous features be sufficient to compensate for increased driver distraction?

As the autonomy of the vehicle increases, the driver will increasingly rely on these autonomous features to perform the tasks that he/she once performed. The driver's time will instead be used to catch up on work, for entertainment, for texting or for phone conversations. But wait! Even with Level 3 autonomy, OEMs will demand that the driver continue to be "*engaged*" while behind the wheel as the vehicle can request that the driver take over at any time. How likely is it that the driver will be prepared to take over? How successful will this transition be?

Pilots 'losing flying skills' due to modern plane technology
November 19, 2013

In the aviation industry, the skill erosion experienced by professional pilots might be useful in helping us understand where Level 3 autonomy might bring us. Recently, the FAA reported the following:

Relying too heavily on computer-driven flight decks — and problems that result when crews fail to properly keep up with changes in levels of automation — now pose the biggest threats to airliner safety world-wide, the study concluded. The results can range from degraded manual-flying skills to poor decision-making to possible erosion of confidence among some aviators when automation abruptly

malfunctions or disconnects during an emergency.

What can we expect from drivers in the future? Unlike professional pilots, drivers are already considered to have relatively poor skills. By diminishing their time driving / parking, we will likely contribute to diminishing those skills.

With Level 3 autonomy, drivers surrounded by increased infotainment possibilities, will be reminded by OEMs that they need to be fully engaged, even when the vehicle is driving as the driver may be required to "take control" of the vehicle at any time. Even with notice of several seconds, will the driver be ready when that hand-off occurs? And what if he/she is not?

In the short term, will semi-autonomous features result in an increased number of collisions? And when these collisions do occur, will they be costlier due to the increased price of the vehicles packed with electronics? Will insurance premiums increase to reflect a potential increase in the number and cost of collisions?

Given driver interest to already do more than drive behind the wheel, given the plethora of new in-vehicle features connecting him/her with the world, given the risk of skill erosion as dependency on technology increases, we fear that Level 3 autonomy will not provide a greater level of security and safety but will rather result in the opposite.

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So why this risky step in the transition process? Not likely in the interest of consumer safety. Not because autonomous vehicle technology cannot be ready. Is it possible that such a step is simply buying time for some of the auto manufacturers that are reluctantly moving in the unavoidable direction of driverless cars because they are concerned about what this technology and the accompanying changes in business models will do to their bottom line?

Only Level 4 autonomy will provide the significant safety benefits needed to save lives.

In the news

Toyota's i-Road concept car

Toyota's electric, 3-wheeled "pod-like" vehicle is destined for the car sharing market. It tops out at around 45 km/h and does 48 km on a single charge. It is considered as "an ultra-efficient way to get around in dense, urban areas".

Induct Navia: first commercially available driverless shuttle (all electric)

All yours for 270,000 USD

Elektrobit partnered with Université de Sherbrooke to develop a new urban electric vehicle with autonomous driving technology

Project VUE, involving QNX OS technology, was displayed at the Consumer Electronics Show in Las Vegas.

UK study to consider autonomous road trains

UK government exploring platooning as a step towards increased autonomous driving. Ricardo to undertake the feasibility study.

2014 Consumer Electronics Show

140,000 sq. ft. dedicated to driverless technology this year, including Induct, BMW, Volvo, Audi to name a few. It should be noted that QNX contributed significantly to several of the vehicles demonstrated.

3 things needed for autonomous technology to make its arrival

Dr Weber, Head of R&D for Mercedes: Fully autonomous technology to be available in 2020. *"Technology wise, a lot is possible today, but there are three things that need to be improved first; better maps, more on-board computing power and legislation – not everything we can do is allowed yet"*.

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In the news

What will happen to public transit in a world full of autonomous vehicles?

The Transportation Research Board annual meetings took place in January. During one of the TRB sessions, Jerome Lutin, former planner with New Jersey Transit stated: "*The transit industry needs to promote shared-use autonomous cars as a replacement for transit on many bus routes and for service to persons with disabilities.*". In a world where autonomous vehicle technology is available, should we be running buses with 5 or 10 people? Is this sustainable transportation? How can our transit systems adapt to the new technological realities? Given the large investments associated with transit projects and the large number of years of operation required for payback, shouldn't our transit properties be planning with the knowledge that this technology will be among us?

CityMobil2: "driverless taxis" in 5 cities

Beginning in February 2014, testing will begin with "specially designed self-driving road vehicles". The team "is working to produce detailed maps and a perception system that allows a vehicle to recognize its location and identify nearby pedestrians and vehicles, all using only stereoscopic or fisheye cameras."

California's DMV finalizing autonomous vehicle testing regulations

The state's autonomous vehicle operating regulations are expected to be in place by January 2015.

Do Canada's municipal politicians support sustainable transportation?

According to the Montreal Gazette, Montréal's Mayor "*Coderre has criticized the auto-sharing concept … saying it could harm the taxi industry.*" Politicians across this country need to embrace shared, multi-modal electric transportation. Luckily, the STM (Montréal's transit system) is more forward-looking, signing an agreement with Communauto, a car sharing service provider in the City, where an STM pass holder can use his/her pass to access the Communauto vehicle. Kudos to the STM!

University of Michigan to build fake downtown to test driverless cars

A new $6.5-million, 32-acre site will be built on the University of Michigan's campus as a test centre for autonomous vehicle testing.

Autonomous vehicles: the future of merchandise deliveries?

Much of our focus has been on the transport of people but autonomous vehicle technology will certainly have an impact on merchandise deliveries and retailing. Companies like Amazon, Walmart and Best Buy are just some of those experimenting with new delivery models aimed at increasing customer service.

Quote

"*The car is the ultimate mobile computer. With onboard supercomputing chips, futuristic cars of our dreams will no longer be science fiction*"
Jen-Hsun Huang, President & CEO, NVIDIA

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