



What's bigger than autonomous?

It's easy for anyone to see that autonomous drive is bringing change to the automotive industry. Autonomous technology impacts the drivers and passengers, which makes it an area ripe for debate. The topic certainly has sex appeal that makes it a naturally attractive topic. However there's a much less visible change coming that will have a far greater impact on how cars are built. And that is the inevitable replacement of the ubiquitous CAN bus (see sidebar).

The CAN bus has remained a staple of the automobile since the early nineties when it was introduced. Present in nearly every mass produced vehicle today, it remains the nervous system of today's heavily computerized car, connecting modules as diverse as the airbags, antilock brakes, cruise control, engine control unit, power steering, power windows and locks and transmission. It's not an exaggeration to say that without CAN the car wouldn't run.

And herein lies the problem. Not only are all those safety critical systems on the CAN bus, but so are the car's infotainment and telematics modules. Those modules can hook to the Internet and to consumer devices through USB, Bluetooth and now, even wifi. And those new networks can send lots of new messages, not all of which are benign. Compounding this is a growing number of companies providing OBD-II aftermarket dongles—fuel economy, real-time insurance, downloadable apps, or more—all

sniffing and slipping data onto the CAN network. The once isolated vehicle communication network that was designed with fixed constraints has been opened to the outside world.

CAN (or Controller Area Network) is a standardized vehicle network - also referred to as a vehicle bus - that allows modules within the car to communicate. This technology is one of the replacements for directly wiring individual components together, which is impractical in modern vehicles due to the large number of components. Many cars contain more than one independent CAN network, one to connect all body modules together (doors, windows, locks, air conditioning, parking sensors, etc), and one for powertrain modules (engine, transmission, power steering); some modules are connected to both networks (ignition, telematics, radio, navigation, infotainment). CAN uses very concise messages of just a couple of bytes long to identify the broadcasting module and associated data if needed (on/off, temperature, speed, angle, etc), with a similar economy of wiring (only one or two wires) to connect modules together. Due to its pervasive nature, most automotive microcontrollers have built-in support for CAN networking.



CAN was designed in a time when data speeds were low and every bit was at a premium. To get the entirety of the car's messages sent with low latency, high reliability and low cost was an engineering challenge that CAN was made to solve. This was before the threat of exploits were ever-present (witness the difficulties Sony is experiencing due to hacks surrounding the movie *The Interview*). CAN was designed without a concept of trust. There is no authentication, access rights, or encryption, and anyone with access to the bus can send a message to unlock the doors, turn the wheel, or shut off the engine.

CAN cannot survive in today's open and exposed environment without a drastic overhaul or complete replacement. With cybersecurity researchers pointing out vehicle network design flaws in public forums, this change needs to come before hackers take advantage of those weaknesses. When CAN was introduced it became a de facto standard allowing automakers and suppliers to coordinate far more easily. It

filled a massive need in the auto industry, and every OEM and Tier one supplier worldwide uses it, which magnifies the scope of its replacement. CAN is not the only network—LIN, MOST and FlexRay are also present in the car—but other networks have their own areas of specialty and none is a replacement for the generic workhorse. Getting every auto maker and supplier to swap out CAN will not be a simple task.

The most discussed replacement for CAN is Ethernet AVB (EAVB). It was originally designed for transferring real-time digital video and audio fully synchronized even in live performance settings—the AVB stands for Audio Video Bridging. As EAVB was designed for real-time applications with guaranteed low message latency, it is perfect to handle critical messages in the vehicle. It requires relatively minor extensions to the chips and cables used in the ever-present Ethernet, so the cost is comparatively low. But best of all, it also can leverage Ethernet authentication or encryption

protocols, allowing trustworthiness to become part of the vehicle network.

The more cars become connected to the outside world, the more pressing the need to protect them. To reduce or remove the risk of significant hacks causing calamity and eroding public confidence, the replacement of CAN needs to happen industry-wide and as soon as possible. With vehicles becoming more tightly Internet integrated through both connected and autonomous cars, Ethernet AVB seems to be a logical replacement.

Contribution by Andy Gryc

Andy is an independent automotive technology evangelist. His reputation in the industry is rooted in hands-on experience in the automotive and embedded trenches – software architecture and engineering, technical sales, and product marketing – for well over two decades at companies like QNX, OnStar, and HP. Andy is the co-founder of a technology-focused consulting business, CX3 Marketing, and the Conference Director for the LA Auto Show's Connected Car Expo.

AT THE FOLLOWING EVENTS / AUX ÉVÉNEMENTS SUIVANTS

P. Ducharme sera conférencier à l'événement **Comment verdir votre flotte & vos profits**, à Québec, le 5 février 2015

P. Ducharme will be speaking at **Greening your fleet & your profits**, on February 12th, 2015 in Cambridge, Ontario

Y. Provencher will be speaking at the **PIT Conference** in Toronto, February 25th & 26th, 2015

Y. Provencher will be speaking at an event in Stockholm, Sweden on March 18th, 2015: **Towards Intelligent Cities and Transportation Management**

C. Kargas sera conférencière au **50e Congrès et Salon des transports : PROCHAIN ARRÊT! de l'Association québécoise des transports (AQTr)**, qui aura lieu du 30 mars au 1er avril 2015 au Palais des congrès de Montréal

C. Kargas speaking at the **Smart and Healthy Municipal Public Transport International Conference**, April 21-22nd, Pilsen, Czech Republic

C. Kargas speaking at Canada's premier electric mobility event, **EV2015VÉ**, May 25-27th, 2015, in Halifax, Nova Scotia

C. Kargas sera conférencière à **EV2015VÉ**, 25 au 27 mai 2015 à Halifax, Nouvelle Écosse

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In the news | Les nouvelles

► Car sharing for the wealthy

As auto manufacturers see their role shifting increasingly to one of mobility service providers, many are designing new services. Recognizing the clear movement to sharing, [Audi](#) is piloting a premium car sharing program and is working on another that would allow Audi owners to drive a different vehicle depending on the time of the year and the types of needs they have at different times of the year. Hmm that sounds quite a bit like mobility on demand with a premium twist. Audi's sharing model is different from BMW's [DriveNow](#), intended as upscale car sharing.

► Shared robotic taxis

Simulations are being run in numerous geographic locations to assess the costs and impacts of shared driverless fleets. Such a simulation for Austin, Texas provided the following results: [19% annual ROI](#) for a fleet operator of driverless vehicles that would charge \$1/mile traveled in unshared mode (i.e., individual alone in vehicle). If I were a cab owner, I would look to sell before the driverless wave drowns me. Uber is only the beginning of the taxi owner's headaches. Already city cab license values are declining (by [25%](#) in Philadelphia).

► Can we afford congestion?

According to a study undertaken by US & British researchers, drivers in the US wasted [\\$124 billion](#) by sitting in traffic jams in 2013. It is predicted that costs of traffic congestion in the US will increase by 50% by 2030. If we use the simple 10:1 rule, we conclude that Canadians wasted \$12 billion in 2013. Can we really afford it? More sustainable transportation models and technologies are necessary.

► Garcetti: Mayor with a driverless vision

[LA's mayor](#) wants his city to be at the forefront of the driverless revolution, "having entire neighbourhoods devoted to driverless machines". In fact, the city is working with UCLA to develop a neighbourhood for driverless vehicles. He has several ideas about tomorrow's mobility: one would be a "stakeholder would purchase a certain amount of transportation monthly" and use any number of mobility services with that amount (bike, rail, car, ...). His vision is that the city would make a small transaction fee by facilitating these transactions.

► Uber's woes

We increasingly read and hear about Uber's legal issues and battles in North America, Europe and Asia. Has the company grown too aggressively? If the company is ever to achieve [\\$10 Billion in annual revenues](#) by 2015, should management rethink the offering, the driver screening process, the insurance available to drivers and reposition the offering accordingly?

► Sharing: friend or foe of public transit?

Much has been written about [ride sharing and car sharing and their impacts on the use of public transit](#). Many in the public transit space consider these mobility services as competitors. However, these services are complementary to public transit.

"Sharing" may actually result in an increase in public transit use. Why? As we increase the number of mobility options (including transit, walking, biking, ride sharing, car sharing, etc), we decrease the need for vehicle ownership. As vehicle ownership declines, the rest of these forms of mobility get to be used. The more integrated these forms are and the greater the access of information regarding options that users have, the greater the possibility that they will be used.

Tomorrow's mobility will certainly be different from that of today and transit has an opportunity to carve a relevant spot for itself. The question is will transit properties seize the opportunity and plan for remaining relevant?

As we move further towards fully driverless technology, the transit model requires rethinking. Are transit agencies avoiding the subject as a way to appease unions or are they being honest with stakeholders, inviting them into a constructive discussion to ensure transit survives into the driverless era where self-driving vehicles may become [public property](#)?

► Vancouver swaps parking requirement for car shares

A wonderful example of creative [collaboration](#) between government, real estate development and car sharing organizations where the citizen is the winner. For every car share vehicle purchased by the developer, the City of Vancouver allows the developer to build up to 5 fewer underground parking spaces.

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› **Mobility insurance by the mile/km**

San Francisco-based [Metromile](#) is offering insurance by the mile. It relies on miles driven rather than driving habits, such as braking patterns, to set UBI rates. For those who drive less than 10K miles annually (increasingly, those in the younger generation), this type of insurance may be of interest.

› **Ride sharing insurance**

[Erie Insurance](#) (US) has developed product destined for the ride sharing market. Cody Cook, the company's VP for auto claims that premium increases on average by 30-35% (certainly less expensive than commercial auto insurance). Cook explains: "We're using a traditional class called 'business use.' For customers that have the 'business use' designation on the insured vehicle, the livery exclusion—which is standard in auto policies—no longer applies."

› **Insurance industry & driverless tech**

Did you read the [article](#) that appeared in *Canadian Insurance Top Broker* on driverless technology and impacts on insurance? More opportunities that lay ahead than most insurers think.

› **Digitally distracted driving: on the rise**

It's not a surprise! With increased but not full automation, automakers will allow the motorist to do something other than driving but require that he/she remain vigilant to take over from the vehicle when the automated system has difficulty with certain situations. In a world where drivers (particularly younger ones with little driving experience) are deskilled due to fewer experiences driving, how will they perform under pressure when the system says: "be prepared to take over in 3, 2, 1 ...". Insurance premiums may be increasing in the short term.

› **Silicon Valley's shake up of auto insurance?**

Insurance carriers are investing in UBI programs. In the future, UBI may be available through a [smart phone app](#). This would have big implications on how UBI is used and what players will be involved. Can you say [Google?](#) [Apple?](#)

› **Cybersecurity laws on their way**

Cybersecurity is often cited as a major issue when discussing driverless technology. How can vehicles be protected from hacking? How can we ensure that the vehicle will not become the weapon used by terrorists? The laws are currently not in place.

"The Hewlett Foundation, the billion-dollar philanthropic organization set up by one of HP's founders, is pledging \$15 million towards a [cybersecurity initiative at MIT](#) that will bridge the worlds of policy and future technology" by shaping cybersecurity laws for self-driving cars and delivery drones.

› **Disruption in delivery**

The delivery business is about to change in a big way. From Amazon to Dominos, the industry is preparing for drone and autonomous vehicle technology to decrease costs and increase customer satisfaction. Another example is DHL (42% of parcel delivery value in Europe) and Volvo reportedly partnering on a project that would allow the [parcel delivery service to remotely open Volvo cars](#) (DHL would only get access after the owner accepts delivery via text message). Such a service would minimize the number of missed deliveries, contributing to decreasing costs. Will these deliveries be made by drones in the future?

› **UK: aiming for the driverless lead**

The UK is positioning to be a global leader in the emerging 'Intelligent Mobility' market, estimated to be worth [£900bn per year by 2025](#). Four UK towns and cities (Milton Keynes, Coventry, Bristol, Greenwich) have won the £10m Driverless Car Competition to integrate autonomous vehicles into everyday life. First driverless pods in Milton Keynes in [March 2015](#).

› **The car sharing boom continues**

In the first month of car2go's operations in [Brooklyn](#), over 13,000 members joined. Car2go also informed the world that it officially has [1 million members](#), marking its spot as the largest car sharing company in the world. [Japan's](#) car sharing market is expected to grow at a CAGR of 60% by 2018.

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In the news | Les nouvelles

► Changing vehicle ownership landscape

A [report](#) released this month presents some statistics that underline the gradual shift away from car ownership:

- The share of 19-year-olds with driver's licenses dropped from 87% in 1983 to about 75% in 2009.
- The average distance traveled by drivers between the ages of 18 and 34 declined 23% between 2001 and 2009, from 10,300 miles per capita to 7,900 per capita.

► Drones in insurance: taking off (pun intended)

A number of insurers in the US have been using drones for claims related evaluations. Most recently, [Allstate](#) has indicated an interest in developing drones for reviewing catastrophic claims. Drones are particularly useful to “quickly inspect areas that are inaccessible by ground, speeding payments to customers”.

A [Property Drone Consortium](#) (including insurance carriers, construction industry players and the Insurance Institute for Business and Home Safety) is participating in R&D and the establishment of regulations for the use of drones for both the insurance and construction industries. In insurance, drones have numerous claims and underwriting related applications.

► New endorsements for commercial use of drones

[ISO](#) announced the availability of new coverage options to prepare insurers for the rise of commercial drones. “The new endorsements address the growing liability exposures of commercial drones, which have already developed a wide range of potential and reported uses, including package delivery, crop protection and aerial photography,” reports ISO.



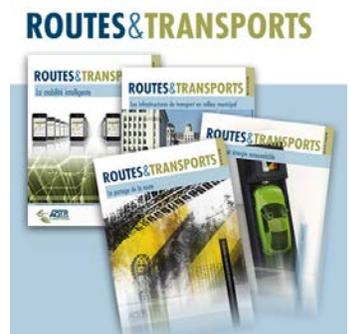
Wishing you and yours
the very best for the
holidays and 2015!

► Telecoms prepping for self-driving

[Huawei Technologies](#) is reportedly designing the “communications architecture for a new generation of autonomous cars that will be connected to the high-speed internet”. The company aims to have 5th generation mobile networks commercially available by 2020: here’s a year that keeps coming up in the driverless world.

► Routes & Transports

Nous vous encourageons de lire la publication de l’AQTR du mois de décembre. Vous aurez l’opportunité de lire l’article de Catherine Kargas sur les changements au niveau de la mobilité.



► Driverless buses

Over the last few weeks, several articles have appeared making the suggestion that there is a stronger case for [driverless buses](#) than individual passenger vehicles. Both applications have merits. Certainly in a multimodal shared environment, both modes should be used where most appropriate.

► BMW’s self-driving valet

At the CES 2015 show, BMW will reveal its [BMW i3](#) that drops drivers off and finds its own parking garage space. Now, that would be useful during the holiday season!

Meilleurs vœux pour
les fêtes et 2015 !



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