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THE DISPATCHER

Telematics Industry Insights by Michael L. Sena

May 2021 – Volume 8, Issue 7

To Ban or Not to Ban: Should That Be the Question?



Pee Wee's Texaco Station. It's where Dad filled up for \$2.00 once a week, got all his cars' tune-ups and picked up free maps. Pee Wee was one my father's lifelong friends from the time they were altar boys together. He sponsored one of the Little League baseball teams that always seemed to win the championship.

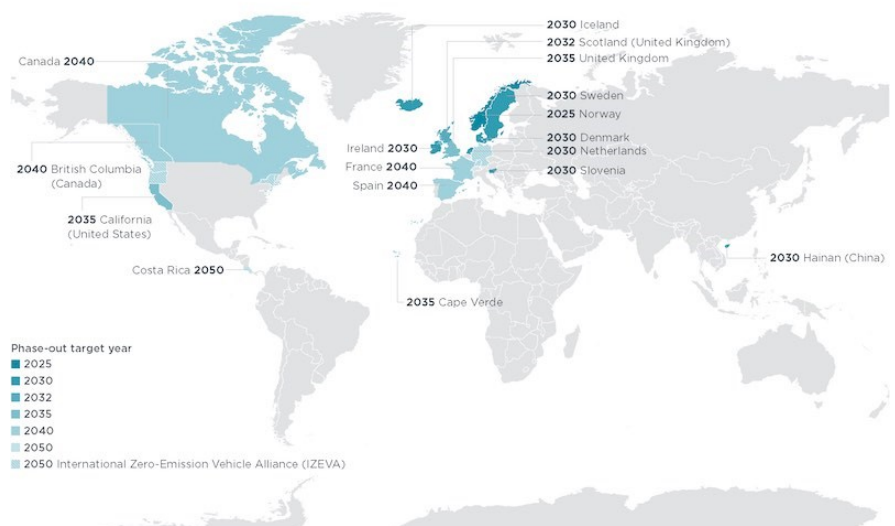
1. See the Wiki site: https://en.wikipedia.org/wiki/Phase-out_of_fossil_fuel_vehicles

They banned spray cans with chloro-fluorocarbons, didn't they? Why not ICE?

TAKING THE PLEDGE to stop selling cars with internal combustion engines (ICE). That's what cities and states and provinces and countries are doing all around the world. It's become a competition: Who will ban them sooner and who are the most credible in making their bans stick? Gas stations and car repair workshops like *Pee Wee's Texaco Service Center* pictured left are already relics of a bygone era. How long will it take for gas pumps to disappear?

Starting in and around 2016, some countries and cities began to set a date for implementing a ban on the sale of ICE vehicles. Cities were first. In 2016, Antwerp and Ghent in Belgium, Athens, Madrid, Mexico City and Paris announced bans, all starting in 2025. Barcelona, Copenhagen, Los Angeles, London and others followed in 2017.¹

Governments with set targets for phasing out all new sales of internal combustion engine passenger cars



U.S. states, Canadian provinces and European regions all started to enter the **Ban the ICE Club**. British Columbia set a ban in 2018 to take effect in 2025. The Brussels Region, the main center for the European Union, also set a date in

2018 that would begin to take effect in 2030-2035. In late September 2020, California governor Gavin Newsom announced that the state would phase out the sale of new gasoline and diesel-powered cars to reduce California's demand for fossil fuels. At the time, it was the first policy of this kind in the US. The gubernatorial executive order required that all new cars and passenger trucks sold in California be zero emissions vehicles (ZEVs) by 2035. Plug-in hybrid electric vehicles (PHEVs) were included under the ZEV mandate definitions. The Commonwealth of Massachusetts followed suit in 2020, also with a start date for their ban of 2035.

When it comes to countries that have proposed bans, the list is getting longer. Costa Rica, Denmark, Egypt, France, Iceland, Ireland, Japan, The Netherlands, Norway, Slovenia, Spain, Sweden, Taiwan and the UK have all set dates for total bans on the sales of all new passenger cars with internal combustion engines. Norway's is the most aggressive with all new cars sold by 2025 required to be zero emissions (BEV or fuel cell). The U.S. has recently decided that all government vehicles shall be electric by 2030. For a start, the government will replace its entire fleet of 645,000 cars and trucks with U.S.-made electric vehicles. Today, the U.S. government owns just 4,500 hybrids and fully-electric vehicles, accounting for less than 1% of its fleet.

Is there science behind ICE BANNING?

There are those who believe we should just put the ICE vehicle manufacturers out of their misery and simply ban the sale of petrol and diesel cars and trucks immediately. What's the point of dragging the whole thing out? In the October 3rd 2020 edition of *THE ECONOMIST*, there was an article titled *Outright bans can sometimes be a good way to fight climate change*. The article opens with the claim that "studies show prospective bans on petrol-powered cars may be less inefficient than you think. A growing number of governments are bowing to the logic of banning petrol-fuelled cars by a certain date".

THE ECONOMIST article states that politicians are attracted to bans because those bans "sound tough and neither impose immediate hardship on consumers, as a carbon tax would, nor drain the treasury, as subsidies do".² Economists generally do not like bans; they prefer actions that redress the market's failure to take account of the global costs of climate change while preserving choice for consumers, says *THE ECONOMIST*. (I can see their point on carbon taxes, but not on subsidies.) Bans, says *THE ECONOMIST*, are a "far blunter instrument and—in the absence of good substitutes



2. A carbon tax is paid by businesses and industries that produce carbon dioxide through their operations. The tax is designed to reduce the output of greenhouse gases and carbon dioxide.

Definition by Investopedia

for the banned technology—can lead to economic losses, potentially offsetting the benefits of reduced emissions”.

Actually, *THE ECONOMIST* article mentions only one study that was written by three academic economists.³ I found the study paper referred to in *THE ECONOMIST* and I read it (probably something *THE ECONOMIST* author did not expect his readers to do). *THE ECONOMIST* definitely took some liberties with the authors’ research findings and their conclusions. Here is what they really said:

“Th(e) combination of falling costs, falling emissions, and increasing substitutability has led to calls for a radical transformation of our transportation systems toward electric vehicles including policies that ban gasoline vehicles. This paper constructs, analyzes, and simulates a dynamic model of the electric vehicle transition. The model allows us to analyze questions about whether it would ever be optimal to stop producing gasoline vehicles, about the timing of electric vehicle adoption, and how the timing is affected by policies such as a gasoline vehicle production ban.

Before analyzing policies (of bans by certain countries on gasoline vehicles) we first consider a related question. If all external costs from both gasoline and electric vehicles are accounted for, does gasoline vehicle production eventually cease? We determine conditions under which this is the case. In the US, either electric vehicles must become much better substitutes for gasoline vehicles, they must become much cheaper, or parameters that determine external costs such as the social cost of carbon must be well above normal ranges.

Although these results are instructive, they do not necessarily imply that bans have no role to play because they do not capture the full dynamics of the electric vehicle transition nor the market outcomes to which policy is applied. A ban may improve welfare relative to a business-as-usual (BAU) solution that occurs in the marketplace when external costs are ignored. A production ban can reduce deadweight loss⁴ relative to BAU by changing both the timing of adoption and the long run vehicle mix. Bans perform well if electric vehicles are good substitutes for gasoline vehicles, but if they are poor substitutes, a ban cannot improve welfare. In addition, bans lead to an inefficient spike in the production of gasoline vehicles in anticipation of the ban.

An alternative policy is a subsidy on the purchase of electric vehicles. Purchase subsidies are used in many jurisdictions to encourage electric vehicle adoption. We find that the optimal electric vehicle purchase subsidy is comparable to the ban at high levels of substitutability but, unlike a ban, can also reduce deadweight loss at lower levels of substitutability.

3. Holland, Stephen, et al. *The electric vehicle transition and the economics of banning gasoline vehicles*. July 12, 2020. (https://mansur.host.dartmouth.edu/papers/holland_mansur_yates_history.pdf)

4. A deadweight loss is a cost to society created by market inefficiency, which occurs when supply and demand are out of equilibrium. Mainly used in economics, deadweight loss can be applied to any deficiency caused by an inefficient allocation of resources.

We also consider a novel policy: a cumulative gasoline vehicle production quota. This policy is similar to EPA's phase-out of lead in gasoline during the 1980's and could be implemented with an intertemporal cap-and-trade program.⁵ At low levels of substitutability, just like a ban, a quota in its basic form cannot improve welfare, although it can be modified to be effective even in these cases. At high levels of substitutability, the optimal quota has much lower levels of deadweight loss than either a ban or purchase subsidy because it encourages reductions in gasoline vehicle production from the beginning and does not lead to an inefficient spike in gasoline vehicle production. The quota's advantage is robust to considerations of changing substitutability over time (both exogenous and endogenous) and learning by doing in the production of electric vehicles.

These policy comparisons highlight the **critical role of substitutability**. If policy is set based on an incorrect perception of substitutability, then both the quota and ban lead to very large deadweight loss. For example, if electric vehicles are poor substitutes, but nevertheless a ban is put in place, then the resulting deadweight loss per year is about 200 percent of the annual external costs of air pollution from passenger vehicles. In contrast, the purchase subsidy is much less sensitive to this type of error.

A cumulative gasoline vehicle production quota has not yet been part of the policy discussion surrounding electric vehicles, but our results point to several advantages of the policy. A quota results in the smallest deadweight loss of all our policies by a substantial margin. In contrast to a production ban, a bankable quota does not lead to an inefficient spike in production because it introduces a shadow value on every vehicle produced. In addition, the quota can also be modified to be effective even in the case of low substitutability. Although these results may seem a compelling case for a quota, the sensitivity of our analyses to substitutability between vehicles raises a note of caution. We show that the ban and quota can lead to very large deadweight loss if regulators set policy based on incorrect perceptions about substitutability.”

I will summarize: If BEVs were as good as ICEVs in every way, the market would take care of phasing out ICEVs in favor of BEVs. There would be no need for bans or subsidies. If they are not, the cost of pushing consumers into BEVs will not be worth the savings from reduced emissions because of all the associated costs that would have to be taken into account. Importantly, the authors make a strong case that the benefits of both bans of ICEVs and subsidies for BEVs are based on the falling costs of BEVs, decreasing pollution from electricity and increasing vehicle substitutability (i.e., you can get everything you need from a BEV that you get from an ICE). One might argue that if you set a fixed date on the banning of all new ICE cars, charging stations would

5. **Tetraethyl lead** was used in early model cars to help reduce engine knocking, boost octane ratings, and help with wear and tear on valve seats within the motor. When lead was first added to gasoline in the early 1920s, producers and scientists knew the health risks. They went ahead with it anyway. People producing it and pumping it died of exposure to it. Health authorities warned people not to wash their hands in leaded gasoline and left it at that. In 1971, the U.S. EPA's first Administrator, William D. Ruckelshaus, issued a statement that airborne particles from leaded gasoline in the air were a threat to public health. In 1973, the EPA issued regulations requiring the gradual reduction of lead in gasoline, starting in 1975 and ending in January 1979 with almost zero lead.

In order for cars to run on unleaded gasoline modifications had to be made to their design. Hardened exhaust valves and seats had to be substituted, and thicker cylinder head gaskets had to be installed so that reduced compression could accommodate the reduced octane of the unleaded gasoline. But it was another one of EPA's regulations, one to reduce noxious emissions, which led to the end of leaded gasoline. To meet these regulations, car manufacturers began to install catalytic converters. These use a chemical reaction to change pollutants, like carbon monoxide and other harmful hydrocarbons, to carbon dioxide, nitrogen and water. Tetraethyl lead tended to clog up these converters making them inoperable. Thus, unleaded gasoline became the fuel of choice for any car with a catalytic converter.

The use of leaded gasoline is still allowed in 6 nations. These nations are Afghanistan, Algeria, Iraq, North Korea, Myanmar and Yemen.

be everywhere. Well, probably not because there are a billion cars already out there on the roads that need their fossil fuel, and unless you ban them as well, they will be there for a long time to come.

Don't forget the past. Learn from it.

I guess the reason that bans are not more widely adopted in general, and on ICE vehicles in particular, is that not everyone in the U.S. Congress or other governmental bodies around the world are thirty-somethings like the junior congresswoman from the Bronx. They remember—or have taken the time to study—how earlier bans played out.

In 1919, the U.S. Congress passed the 18th Amendment to the U.S. Constitution banning the “manufacture, sale or transportation of intoxicating liquors”. Fourteen years later, the Amendment was repealed, having resulted in the entrenchment of organized crime and a thriving black market with relatively little impact on the amount of liquor consumed. The government learned that if they ban a product they cannot tax it and they cannot control it. This is probably why it has not created outright bans on cigarettes or alcohol, and why it is now relaxing restrictions on the growing and selling of marijuana.

In 2012, then-NYC Mayor Mike Bloomberg, concerned over the increasing prevalence of obese children and adults in the five boroughs under his jurisdiction, proposed a ban on the sale of big, sugary beverages larger than 16 fluid ounces (.45 liters). Included in the ban were soda and sweetened iced tea. Calorie-free sodas and alcoholic beverages were not included in spite of the proof that both could be linked by science to weight gain. The ban applied to the sale of beverages in food service establishments, not in supermarkets. New York's courts reversed the ban because it found that the NYC Board of Health “exceeded the scope of its regulatory authority in adopting the ban”. Those who opposed the ban and took it to the courts did so on two issues: personal freedom (If I want to buy a big beverage and someone will sell it to me, no one should be able to tell me I can't buy it and drink it.); and efficacy (telling people they can't buy a soda won't solve the problem of obesity.).

These two examples point to why governments should be careful not to criminalize activity that it believes to be hazardous. Yes, criminalize. If there is a law banning the sale of something, it means that if you sell or buy that something you are a criminal.

Batteries for Electric Cars Don't Fall from Heaven

Neither can we pick them from trees nor harvest them from the oceans. They are produced from raw materials that are mined from the earth, processed in plants and then manufactured into the final products that are used in electric vehicles. Raw materials account for around two-thirds of the cost of an electric car battery.

Raw materials for the most popular and effective batteries used today include lithium, cobalt, nickel, manganese, aluminum and graphite. In the lithium-ion batteries, the negative electrode is made of graphite, a form of carbon, the positive electrode is made of a metal oxide, such as lithium cobalt oxide, and the electrolyte is a lithium salt dissolved in an organic solvent. The movement of lithium ions between the electrodes creates the energy of the battery.

Reserves of the raw materials for car batteries are highly concentrated in a few countries. Nearly 50% of world cobalt reserves are in the Democratic Republic of the Congo (DRC), 58% of lithium reserves are in Chile, 80% of natural graphite reserves are in China, Brazil and Turkey, while 75% of manganese reserves are in Australia, Brazil, South Africa and Ukraine.

China not only has its own supplies of raw materials, but it is a major investor in mines around the globe. It is also the principal processor of key metals. China processes 72% of the world's cobalt and 61% of its lithium. Of the top five producers of batteries for electric vehicles, two are Chinese: CONTEMPORARY AMPEREX TECHNOLOGY (CATL) is number one and number 3 is BUILD YOUR DREAMS (BYD). Number 2 is PANASONIC, a Japanese company, and numbers 4 and 5 are South Korean, LG CHEM LTD and SAMSUNG SDI Co LTD. *Les États-Unis et l'UE? Running to catch up.*



What happens if groups decide that the government has gone too far, as it did with Prohibition, banning big, sweet beverages, prohibiting bikinis in southern European countries after WWII and closing coffee shops in England in 1675 to prevent rebellious gatherings? So far, the courts have not been tested as a means of stopping the bans on selling ICE vehicles, but the likelihood is very high that they will be. The stakes are very high.

At some point the light bulb in our heads will turn on

An April 8th article in Bloomberg News starts with the sentence: “The shift to electric vehicles won’t happen like the flip of a light switch.” The title of the article is *Electric-Vehicle Shift Becomes Life-or-Death Risk for Automakers*. It is about the findings from a study of the electric vehicle market performed by well-known market consultant company, KPMG, titled **Place Your Billion-Dollar Bets Wisely**. Keep in mind that KPMG is one of the Big Four accounting/professional services organizations that resulted from the merger in 1987 of PEAT MARWICK INTERNATIONAL and KLYNVELD MAIN GOERDELER. It is likely that it is now or has been at one time or another engaged in assignments with many or all of the world’s automotive companies, except perhaps those in China. When KPMG talks, people they are talking to mostly listen.

KPMG states in its report that “the \$200 billion automakers are pouring into electric vehicles now—more than what NASA spent adjusted for inflation to put a man on the moon—is chasing sales that will represent 24-37% of the global automarket in 2030”. If electric vehicles are able to garner 30% market share by 2030, that will mean that the automotive industry has 40 million vehicles of excess ICE vehicle capacity. That is the equivalent of 200 unneeded factories. If carmakers invest too much and too soon on electric cars, that would leave them too little capacity in the ICE vehicles they will need to maintain sufficiently high profit levels to fund the transition. If they wait too long to invest in BEVS they could end up bankrupt.

“Getting the timing wrong is very risky,” says Gary Silberg, the study’s co-author and global head of KPMG’s automotive practice. The study finds that too many automakers are targeting a small sliver of the market for vehicles priced at \$50,000 and up.⁶ Vehicles sold above \$50,000 represent just 17% of the U.S. market.

So what happens to the car manufacturers who are currently producing all or mostly ICE vehicles. That includess every car

6. GM’s electric Hummer has a sticker price of \$100,000. RIVIAN’s pick-up and SUV are going to set a buyer back \$75,000. Tesla’s Model 3 has a theoretical MSRP of \$38,690, but you’re not likely to get into one for much less than \$50,000.

maker other than TESLA, a couple of start-ups in the U.S. and a whole lot of Chinese companies chomping at the bit to flood the European and North American markets with their BEVs. Silberg and his co-authors predict that one or two of the world's top automakers "will fail to navigate the transition and cease to exist within the next decade." FORD? GM? MERCEDES-BENZ? Who's it going to be?

Is this less or more likely to happen if most of the world's countries and cities decide it is their right to ban the sale of ICE vehicles? VOLVO CARS says it will stop selling ICE vehicles by 2030. BMW says it wants 50% of the cars it sells by 2030 to be electric vehicles, but gives no date for when it will stop selling ICEVs. MERCEDES-BENZ has set 2039 as the date when they will stop selling ICE. If more countries follow Norway's lead and say they won't allow any ICE cars to be sold after 2025, including VOLVOS, BMWs, M-Bs and all the others that are claiming they will still produce ICE vehicles after 2025, then the number of markets where most of the current car makers can sell their cars will be fewer and fewer. That leaves the door open to TESLA and all those companies at the other end of the Silk Road to pile in.

In the absence of a coordinated global, science-based effort to find the best ways to transition all modes of transport to fuels that reduce emissions in a manner that is sustainable from economic, social and environmental standpoints, countries, regions and cities will make independent decisions. Those decisions will have far-reaching geopolitical effects. As it looks now, the politicians who are forcing through bans on ICE vehicles and promoting one alternative, battery electric vehicles, do not have the type of solid evidence they should have for backing bans or BEVs. It is not as clear-cut as it was when twenty-five nations met in Montreal in 1987 and signed the Montreal Protocol banning chlorofluorocarbons (see sidebar). The evidence is not even close to what was used to phase out leaded gasoline. Until the evidence is clear, and until all the countries of the world can agree to do something together, there should be a ban on ICE bans.



What happened with the chlorofluorocarbon ban?

The Montreal Protocol, officially the *Protocol on Substances That Deplete the Ozone Layer*, treaty was signed on the 16th of September 1987 in Montreal by 25 nations. There are now 197 nations that are parties to the accord. The protocol set limits on the production of chlorofluorocarbons (CFCs), halons, and related substances that release chlorine or bromine to the ozone layer of the atmosphere. On the basis of increasing scientific knowledge about the effects of CFCs and halons on the ozone layer, the original protocol has been amended several times. At subsequent meetings of the signatories to the protocol, amendments have been adopted that were designed to speed up the phasing out of or control ozone-depleting substances and aid developing countries in complying. However, not all parties to the main protocol are parties to these amendments. The production and consumption of halons was phased out by the 1st of January 1994, and of CFCs, carbon tetrachloride, methyl chloroform, and hydrobromofluorocarbons exactly two years later, subject to an exception for agreed essential users. Methyl bromide was to be phased out by 2005 but a number of users of the chemical won temporary exceptions from the ban, and hydrochlorofluorocarbons are to be phased out by 2020. (Phase out dates were set later for developing countries.)

In 2018, scientists found that the rate of decline had slowed by about 50% after 2012. They determined that there was a new production of gas coming from East Asia. If this did not stop immediately it would delay the healing of the ozone layer by a decade. Further detective work in China by the UK Environmental Investigation Agency in 2018 indicated that China was the source. They found that the illegal chemical was used in the majority of the polyurethane insulation produced by firms they contacted. 70% of China's domestic sales used the illegal gas because it was better quality and much cheaper than the alternatives. When confronted with this evidence the Chinese authorities promised to shut down the 'rogue' producers. They did.



Tesla profiting from emissions credits

BERNIE ‘THE RED’ SANDERS and Elon ‘The Musketeer’ Musk got into a Twitter spat the other day.

Bernie: *“We are in a moment in American history where two guys—Elon Musk and Jeff Bezos—own more wealth than the bottom 40% of people in this country. That level of greed and inequality is not only immoral, it is unsustainable.”*

Bezos knew better than to take on the statistical steamroller, but Musk never shirks from a no-holds-barred Twitter fight. Musk shrugged and sent back his salvo.

Musk: *“I am accumulating resources to help make life multiplanetary and extend the light of consciousness to the stars.”*

It sounded like Bernie caught him relaxing over one of his two favorite winding-down potions. How much more out of touch could a person be, Bernie must have thought as he locked and loaded his Big Bertha with his response.

Sanders: *“Space travel is an exciting idea, but right now we need to focus on Earth and create a progressive tax system so that children don’t go hungry, people are not homeless and all Americans have healthcare. The level of inequality in America is obscene and a threat to our democracy.”*

Musk’s Twitter guns fell silent. This wasn’t the first time Red Bernie has had Musk and Bezos in his tax sights. Last August he proposed taking 60% of the wealth that American billionaires hauled in during the COVID-19 pandemic.⁷ Musk’s wealth was worth less than \$30 billion when 2020 started. Then TESLA’s stock price went through the stratosphere and pushed his net worth to \$170. Bezos is \$11 billion better. The Musketeer also took to Twitter to respond to Bernie’s tax proposal back in August.

Musk: *“Official Bernie Sanders Drinking Game! Every time the Bernster mentions a free government program, chug somebody else’s beer.”*

7. The bill proposed by Sanders, “The Make Billionaires Pay Act” was cosponsored by Senators Ed Markey, D-Mass., and Kirsten Gillibrand, D-NY. It would tax the windfall wealth increases accumulated by the 467 richest Americans from March 18 through January 1, 2021. The proposed bill would cost Jeff Bezos \$42.8 billion, Mark Zuckerberg \$22.8 billion, the Walton family (Walmart) \$12.9 billion, and Elon Musk \$27.5 billion.

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8. Back in 2015 when Bernie Sanders was considering a run for the Democratic nomination for President, he claimed that 99% of all 'new' money was going to 1% of the population. This was based on a report by Justin Wolfers, a senior fellow at the Peterson Institute for International Economics and a professor of economics at the University of Michigan. He found that the average income for the richest 1 percent of Americans, excluding capital gains, rose from \$871,100 in 2009 to \$968,000 from 2012-13. The 99 percent, on the other hand, experienced a drop in average incomes from \$44,000 to \$43,900, Wolfers said. The calculation excludes government benefits in the form of Social Security, welfare, tax credits, food stamps and so on.

9. <https://www.forbes.com/sites/greatspeculations/2020/07/23/behind-teslas-profits/>

<https://phonemantra.com/where-at-tesla-the-profits-really-come-from/>

Government subsidies are one thing, but being allowed to put your hand in your competitors' pockets and picking out their wallets is something that I would call totally unethical—for the companies doing the picking and the governments that allow it. That's pretty much what both the U.S. and European governments have allowed TESLA to do.⁹

News channels were abuzz at the end of January with the news that TESLA had posted its first annual profit, a whopping \$721 million. \$270 million of that had come in the 4th quarter. Its 2019 results were a loss of \$819. Financial journalists excitedly pointed out that TESLA had record vehicle production and deliveries during that 4th quarter, handing over 180,000 vehicles. It almost made it to its stretch goal of 500,000 vehicle deliveries for the year. Total revenue for 2020 was \$31.54 billion, a 28.31% increase over 2019.

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has zero emissions at the tailpipe (i.e., battery electric vehicles) or to purchase credits from companies that have an excess of cars that meet the requirements, which has basically been TESLA. This was kept under wraps until the *FINANCIAL TIMES* discovered in 2019 that FIAT CHRYSLER had paid TESLA hundreds of millions of euros for credits.

Without the regulatory credit sales, TESLA would have had a loss as big as the one in 2019. What did the market think of this? It shrugged, knocked a couple of hundred dollars off its ridiculously high price of over \$800/share, and then started bidding it up again in early March.

More Thoughts on Operational Design Domain

THE DISPATCHER'S [APRIL 2021](#) issue's article, *A Closer, Critical Look at Operational Design Domain*, achieved its objective of eliciting comments from readers and friends of readers. There were a few "Yep. Totally agree," notes. Most were balanced "Yes, but on the other hand," missives. I didn't receive any "What a load of crap," dismissals, but they would have been welcome as well.

Fred Fishkin and Professor Alain Kornhauser invited me to join them in one of their *SmartDrivingCars* Podcasts a few days after I sent out the issue. Alain agreed that a discussion of ODD was absolutely essential and long overdue. However, his focus is on holding the manufacturers of self-driving vehicles (a back-up driver behind a steering wheel) and driverless vehicles (no back-up driver ready to take over) responsible for anything bad that happens when their product does not work when it is inside its ODD, and that the definition of the ODD should not be something that is hidden in the fine print. He feels it's fine if a company wants to develop and sell a car that it claims is driverless and states clearly that it only works in certain places and under specific and well-defined conditions, but it shouldn't be able to add one caveat after another to transfer responsibility for an error away from itself. On that point we were in full agreement.

John McElroy, host of *Autoline* and previously Detroit editor for *ROAD & TRACK*, received a copy of the article from good friend and faithful reader Martin Rowell. John said: "I agree with the guy from AURORA (Nat Beuse). Even though every place is different, cars encounter similar driving situations (slow down, accelerate, brake, turn, etc.), and AVs can be taught to deal with them. Moreover, L4 and L5 AVs will operate in 3D mapped areas, and they



Already well-known as a maestro of hyperbole, Elon Musk has added virtuoso of euphemisms to his CV with his description of one of the several crashes of SpaceX's Starship, the craft intended as the second stage of a rocket that will be able to carry 100 tons of payload, including people, into orbit and then to the Moon and Mars. On the 9th of December 2020, the SN8 was the latest to fail. He said that the flight provided "all the data we needed before its RUD". RUD is an abbreviation for Musk's euphemism 'Rapid Un-scheduled Disassembly'. In other words, the rocket blew up as it hit the ground and disintegrated into a spectacle of smoke and flames.

I wonder what euphemism Musk's minions use to tell him that one of his cars running on Autopilot (sic) has disappointed its passengers—because when Autopilot is engaged everyone in the car is a passenger. In spite of Musk's tweets to the contrary, Teslas do crash quite often, including when they are running without a human driver (see link below). Even more troubling, they seem to suffer the same fate as the Starships: they disintegrate into a spectacle of smoke and flames. Below is what was left of the Model S after it flew off the road at high speed, struck a tree, and burst into flames on the 17th of April in Texas. The photo shows what was left of the car after the flames were finally extinguished. Remains of two passengers, one in the front passenger seat and one, the car's owner, in the rear, were recovered after the fire was put out. There was no one in the driver's seat.



<https://www.tesladeaths.com/>

will be tested in new locations before they're fully deployed. Michael's ODD recommendations will speed up the learning curve. But the AV companies are correct in prioritizing and perfecting the driving chores, rather than worrying about physical differences in different cities."

I agree with John McElroy and Nat Beuse. I don't doubt that the robots driving driverless vehicles can be taught to deal with different driving situations, just like I do not doubt that most people can eventually learn to drive in a totally foreign environment on the 'wrong' side of the road, to automatically stop at marked pedestrian crossings, and to learn when it is their responsibility to yield to other cars at unmarked intersections and entering traffic circles. Will a robot one day be able to drive a car as well as a human with average driving skills, that is, well enough to pass a driver's test in the jurisdiction where that robot will be instructed to drive? If you look at the evidence today for Waymo's driverless vehicles which operate in a very restricted, heavily mapped and researched area, the answer is a qualified 'maybe'. Nevertheless, I still believe that it is not a couple of drives around the block to repeat the trick when moving from Chandler, Arizona to Stockholm, Sweden.¹⁰

My article inspired Brad Templeton to write his own piece in *FORBES ONLINE*.¹¹ He started his note to me with "Obviously there are a lot of views," and then cited work being done by TESLA, MOBILEYE with BMW and Waymo which indicated that he believed that robotic cars could be trained quickly to drive anywhere, just like us humans. He gave an example from his own experience of being allowed to rent a car in Japan.

"At first I was shocked that they would just rent me a car in Japan, driving on the other side of the road with very different customs, limited ability to read road signs, much narrower streets -- but they did, and I handled it. The question is, does that require the full intellect of humans to accomplish? What level of problem is it to take one's general driving skill and handle the new environment? Is it one of those problems only the human mind can handle, or is it actually a minor one?"

Brad comes down on the other side of the issue from my view, saying that he "suspects that it is enough to send out 500 Waymo test cars for a few weeks to learn what's different". The fact that they have not done that doesn't seem to phase him. However, I will state categorically, as did Doubting Thomas, that when I see it, I will believe it.

10. When I arrived in Sweden to make it my permanent home, I had to take the full driver's test to obtain my Swedish driver's license. In other words, I couldn't hand over my Florida State license (that was that last state in which I was an official resident before the move to Sweden) and receive a Swedish license. If I had moved from another country in Europe or even Japan I could have made the exchange, but not from the U.S. So I applied for taking the written exam, made the obligatory test drive on an ice course and showed up for the written test. I had to get at least 42 out of 45 answers correct in order to pass. I got 20. It was a multiple choice type of exam, but there could be one, two, three or zero correct answers. The English translation was horrible, so many of the questions were undiscernible. I decided that before I could take the test again, I would have to learn to read and understand Swedish. And I would have to find every study course there was in order to prepare. Three years later, just a short while before I had to pass or leave the country, I took the test. I got 43 right. Whew! I passed the driving part a few weeks later with flying colors, and celebrate every year the day I received my Swedish driver's license, the 22nd of April 2000.

11. <https://www.forbes.com/sites/bradtempleton/2021/03/30/will-it-be-hard-or-easy-for-self-driving-cars-to-expand-their-territory/>

Mike McGurrin, Principal of MCGURRIN CONSULTING, pointed out a hole in my logic. I had written that “humans who pass their driver’s license tests have the right to drive anywhere, and they are held accountable for knowing and abiding by all the rules and regulations that apply.” This is not necessarily true for all drivers. He sent a reference from the Commonwealth of Virginia’s Department of Motor Vehicles:

"In some circumstances, older drivers may have a restriction placed on their driver license. The types of restrictions vary, and are based on the results of your vision test, driving test, and the driving examiner's assessment. A restricted driver license is intended to ensure that you are driving within your abilities. Some of the most common license restrictions are those that:

- *Require eyeglasses, corrective contact lenses, or bioptic telescopic lens to be worn at certain times.*
- *Permit driving from sunrise to sunset only, or prohibit driving during rush hour.*
- *Restrict the geographical area in which a person is permitted to drive, or prohibit freeway driving.*
- *Require special mechanical devices, or an additional side mirror on the vehicle.*
- *Require extra support in order to ensure a safe and correct driving position."*

As Mike correctly points out, the second and third restrictions are definitely limitations in the ODD that are applied to us humans, so why not to robots. Just to clarify my argument, it was not to say that restrictions should not apply, it was to say that if there is no back-up driver, when a restriction in the ODD is met, someone or something needs to take over. For example, if an elderly driver doesn’t manage to get home before dark, he or she can’t just be left out all night until daylight arrives.

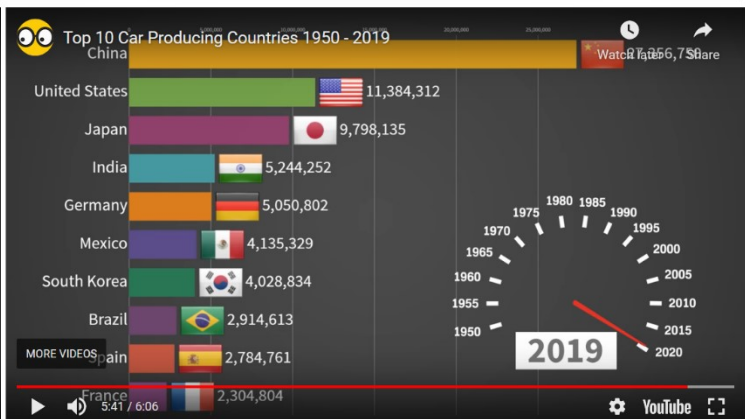
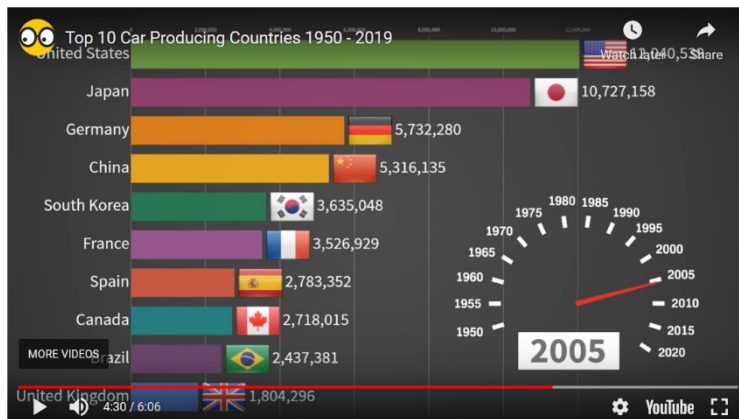
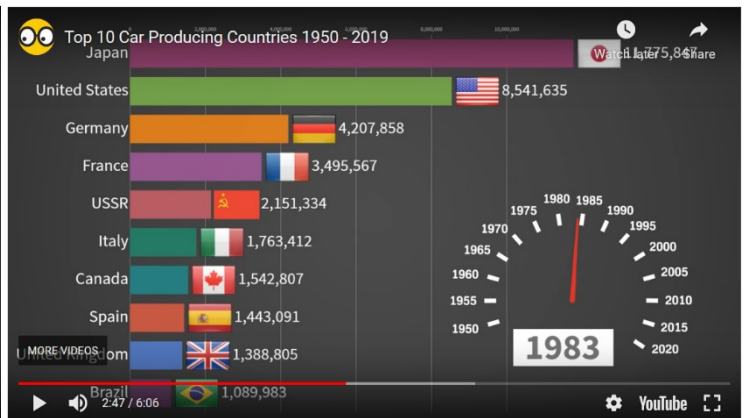
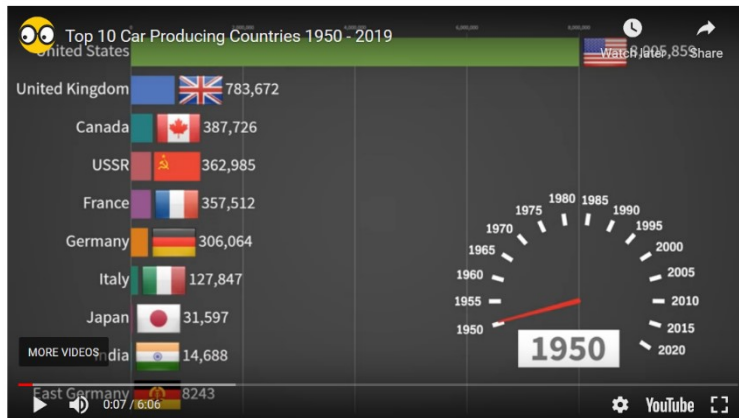
I particularly liked this reflection that Mike wrote and want to share it with you:

"Computers rarely solve problems the way humans do (think chess, go, or medical diagnoses), and this has limitations (solutions are often brittle, even with neural nets), but nevertheless for many applications they add value and the benefits outweigh the limitations. It should not be required that AI systems, including automated drivers, function in the same manner as humans, only that the results are "acceptable" by some established definition."

Thanks to all who joined in the conversation.

Seventy years of car production

THE FOLLOWING FOUR images are snapshots of the world's post-WWI economic and political history during the past seventy years. You can watch the years pass in real time on this web site: <https://para-rigger.posthaven.com/top-ten-car-producing-countries-1950-2019>.



In 1950, no other country was even close to the eight-plus million cars being produced in the United States. Japan was in 8th place with under 32,000 cars produced. By 1983, Japan had raced to first place, producing almost 12 million cars. Twenty-two years later, in 2005, the U.S. had regained first place and China had moved from nowhere to fourth place, just behind Germany. South Korea, also absent from the top ten list in 1983, was right behind China. Hyundai was making look-alikes of every top-selling car on the market at the time before it found its own winning styles. Within a few years, China passed Germany, Japan and the U.S. and simply kept going, producing over 27 million cars in 2019, the year before the COVID-19 shutdown. Even India and Mexico appeared as new names on the list. In 1950, who could have guessed what the car world would look like in 2019?

Have we now had an automotive cyberattack?

THE HEADLINES IN our Swedish morning newspapers on the 1st of April said that almost all of the Skellefteå's service vehicles would not start because the alcohol locks were not functioning.¹² The exceptions were those cars used by home care providers who visit the elderly and infirm. These cars had their alcohol locks disabled during the COVID-19 pandemic. At first, people thought it was an April Fool's joke. It wasn't. Service staff spent the early hours of the morning disabling the locks so they could get on with their work.

Skellefteå was not alone in their misery. Users of the same company's alcohol lock in Sweden, Norway and Finland all experienced the outage. Taxis, buses and trucks that had installed the systems were affected. Sweden's second largest city's largest taxi operator, TAXI GÖTEBORG, had its entire fleet of three hundred taxis out of service. Customers that were counting on a ride to the airport, school or to the hospital were out of luck.

The alcohol locks in the vehicles and the software on which the operation of these systems are based were provided by a Swedish company named DIGNITA. So what did DIGNITA have to say about all this? It was a typical "My dog ate my homework" excuse: *"Due to a manipulation that was out of Dignitas' control of the computer code that steers the alcohol locks' dates and times, the alcohol locks were prevented from starting from 1 April 2021."* The CEO explained further in a radio interview: "What we know now is that it was some form of a cyberattack, or, in any case, a data manipulation on our units." Their manufacturer, to whom DIGNITA outsources production, fixed whatever was wrong in the systems being produced, but it seems that every system of a certain model had to be addressed separately by a DIGNITA's technicians to reset the units. This is not an over-the-air update; the units had to be manually reset.

The story does not end here. On the 15th of April it was made public that TAXI GÖTEBORG was in talks with DIGNITA seeking compensation for their financial losses resulting from the non-functioning alcohol locks preventing their taxis from operating. TAXI GÖTEBORG claims that the bug that turned off all the systems at the stroke of midnight on the 31st of March was inserted into the systems at some point and not transported over-the-air to the units. Dignita responded that it cannot determine how the software bug got there, but "it was out of our control". The courts will decide.



12. Skellefteå is a city in northern Sweden with a population of 72,000. It is an industrial and mining town with copper, gold, silver and platinum being the ores that are mined. It is also home to NORTHVOLT, the company establishing 150 GWh of lithium-ion battery manufacturing and recycling capacity in Europe by 2030.



This is one of the DIGNITA alcohol lock units that was affected by the cyberattack that took place in the early hours of the 1st of April 2021. Every car that had one of these installed could not be started, no matter how safe the driver's breath was.

C-V2X PC5 Saves Face for European Commission

13. Not the peace that a sovereign, a dictator or a 'high authority' brings by deciding on its own for the rest of us, but peace that comes from reasoned discussion and democratic decision-making. (See Musings in this issue.)

14. In the U.S., until the change of administrations in 2017, the National Highway Traffic Safety Administration was favoring DSRC for the full 5.9 GHz band allocated for ITS services. In November 2020, the Federal Communications Commission followed through on its plan to reallocate a portion of the band, 45 out of 75 megahertz, to unlicensed services, to move any ITS services operating in that portion of the spectrum to the upper 30 megahertz portion and to transition from the formerly preferred DSRC ITS radio service standard to C-V2X.

See: <https://docs.fcc.gov/public/attachments/FCC-20-164A1.pdf>

15. If governments push the costs of equipment on the vehicle manufacturers, as they did with EU eCall, these costs will eventually be passed on to consumers in the form of higher prices for their vehicles. If governments believe in the safety benefits of V2X—and they should—then costs should be subsidized in the same way as they are for supporting electrification, with tax breaks and direct subsidies.

Shall we all agree to move on from DSRC?

LET ME START by saying that I am a strong believer in vehicles communicating with other vehicles. It will significantly improve safety whenever vehicles meet each other at road intersections, highway ramps, in parking lots and garages, anywhere. On the issue of vehicles communicating with infrastructure, there can be no question that I am a committed supporter. I have spent the past thirty years working on both the vehicle side and the service side with public and private service providers. I have no investments in any V2X technologies; I am not beholden to any company that makes any type of hardware or software, either in the vehicle or in the infrastructure; and, I am not on a committee or part of an organization developing or promoting standards for one approach or another.

So what is my motivation for writing about this topic? I want peace.¹³ I want us all to get on with doing the best jobs we can do to make vehicles safer to drive. I see my clients wasting time and precious resources trying to second guess what some governmental authority will do, especially the *EUROPEAN COMMISSION*,¹⁴ and I imagine how much good they could be doing instead.

We are in agreement on goals and objectives

There are no arguments on the objectives of safety-related vehicle-to-vehicle and vehicle-to-infrastructure communications between those who would be sending the messages and those who would be receiving them. The service providers, both public and private, and the vehicle manufacturers want the same things for their constituents and their customers:

1. V2X communications should be available to all drivers on all models of vehicles, irrespective of the individual driver's ability to pay.¹⁵
2. V2X communications should be delivered at no variable costs to either the sender or the receiver.
3. Messages should be standardized using a globally-accepted standard so that cars with the necessary

equipment can be produced and sold anywhere. This will increase economies of scale for manufacturing and installing the necessary equipment and maximize the global effects of the messaging.

4. It should function at all times with the highest levels of operational reliability and with maximum security.

5. The privacy and integrity of the driver and owner of the vehicle, as well as the entities sending and receiving messages, must be respected at all times.

The first port in the storm is not always the best

No one who is knowledgeable about V2X communications is saying that DSRC-based V2X, the solution that was about to be made mandatory in the U.S. in 2016 and within the EU in 2020, does not do what its backers claim that it does.¹⁶ It can be used to deliver standardized messages over the air with low latency up to a range of around 1000 meters (half a mile).¹⁷ These messages can be received by all vehicles within this range that have the equivalent technology installed, and the standard is developed to secure both the driver's privacy and the vehicle's anonymity. It should experience limited interference on its dedicated 5.9 GHz band and has non-line-of-sight operation. It also exhibits high resilience to variable weather conditions, and functions at speeds up to 500 km/h (300 mph). In 2004 in the U.S., a specific 75 MHz spectrum was allocated in the 5.9 GHz band for DSRC, dedicated for automotive purposes. The 802.11p standard was approved in 2009. Since then, field trials have proven that it does what it claims to do, and a number of companies have designed and tested 802.11p-compliant products. A few have installed them.

There is one more requirement that DSRC backers claim it fulfills that is questioned, and that is that the V2V messages are free.¹⁸ There is the issue of security for the vehicles communicating with one another. A certificate of validation is needed to ensure that messages are not coming from unauthorized sources, and for this there needs to be a link to a certificate server. If a cellular connection is not used to meet this requirement, then there needs to be a roadside unit infrastructure that is connected to a server that can generate the necessary certificates. That roadside infrastructure will not be free. It will in all likelihood be constructed by a local, regional or national road authority. The U.S. Department of Transport has said that it would not be funding such an infrastructure. While some EU countries are

16. Dedicated Short Range Communication (DSRC) wireless technology is based on the IEEE 802.11p standard, the 1609 Wireless Access in Vehicular Environment (WAVE) protocol in the U.S., and the European Telecommunications Standards Institute (ETSI) TC-ITS European standards.

17. The message that has been standardized is the vehicle's location, heading and speed which is broadcast 10 times per second in anonymous manner. The connection opens and closes in around 0.02 seconds.

18. Free communication was one of the principal reasons the European Commission would only consider a 112-based solution for EU eCall. Using only the voice channel for making the connection required that the analog in-band modem approach was employed. This was to avoid using digital text messaging (e.g., SMS) in combination with a voice call.

enthused about investing in roadside units (Austria is one of these), others are less than enthusiastic.

So, why are we here in 2021 still debating whether DSRC should be adopted? Because once those DSRC-based devices are installed in vehicles, they will need to continue working for many, many years. And to make the installation of one system worthwhile, there will have to be many, many other systems installed in many, many more vehicles. DSRC systems will use the allocated bandwidth to communicate with other DSRC systems, and that bandwidth will not be available to other systems that could be doing exactly the same things as DSRC, delivering short messages over short distances. What has made the automobile manufacturers hesitant about installing DSRC is that they are investing heavily in cellular technology which has shown that it can and does deliver all the other types of connectivity that their cars need (including both EU eCall that uses an in-band modem and third-party emergency services, theft notification, stolen vehicle tracking, remote door controls, remote interior climate controls, traffic data updates, emergency warnings, and a host of infotainment services). Why not simply extend the use cases to V2X, they have asked, as long as the result meets the objectives of safety-related vehicle-to-vehicle and vehicle-to-infrastructure communications.

Separating fact from conjecture

The simple answer to the question of why a cellular solution has not yet been applied to the V2X problem is that until 2017 there was not one that met all of the objectives. 3GPP,¹⁹ the cellular umbrella organization, understood that the stakes were high for delivering a working alternative to DSRC, but, like a tasty ragu, it took time to cook. That solution, cellular V2X (C-V2X) was a long time in the making. It's ready now.

Cellular-V2X is initially defined as **LTE in 3GPP Release 14** and is designed to operate in two complementary transmission modes:

- Direct Communications (Device-to-device V2V, V2I, V2P <pedestrian>); and,
- Device-to-network (V2N).

Direct communications occurs on the **3GPP LTE-V2X PC5 Mode 4** (also known as the LTE side-link) interface operating in the ITS bands (e.g. ITS 5.9 GHz) independent of the cellular network.²⁰ **LTE-V2X PC5 Mode 4** was standardized in 2016 and had a func-

19. 3GPP is the abbreviation for *3RD GENERATION PARTNERSHIP PROJECT*. It unites seven telecommunications standard development organizations (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC), known as "Organizational Partners" and provides their members with a stable environment to produce the Reports and Specifications that define 3GPP technologies. 3GPP covers cellular telecommunications technologies, including radio access, core network and service capabilities, which provide a complete system description for mobile telecommunications. The 3GPP specifications also provide hooks for non-radio access to the core network and for interworking with non-3GPP networks. 3GPP specifications and studies are produced by member companies, in Working Groups and at the Technical Specification Group level.

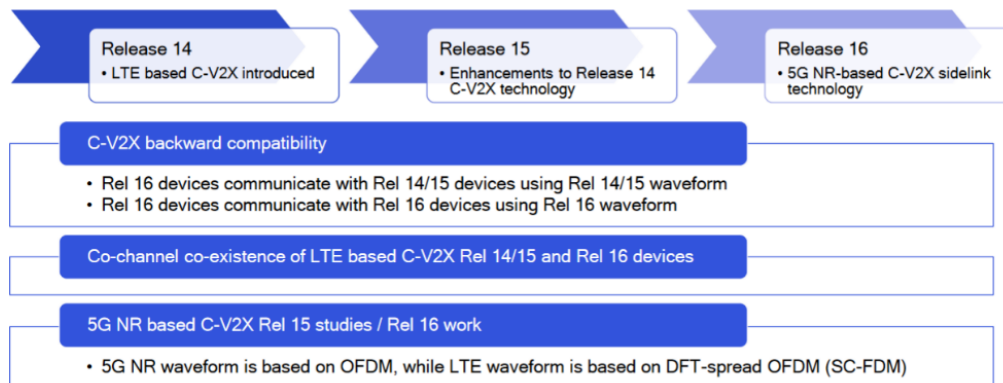
<https://www.qualcomm.com/media/documents/files/c-v2x-technology-overview.pdf>

20. Mode 4 does not require cellular coverage, and vehicles autonomously select their radio resources using a distributed scheduling scheme supported by congestion control mechanisms. Mode 4 is considered the baseline mode and represents an alternative to 802.11p or dedicated short range communications (DSRC).

tional freeze in June 2017. The reason it is called ‘direct communications’ is because it does not require a USIM²¹ and, therefore, does not require a connection to the network. Let me repeat that. C-V2X LTE-V2X PC5 Mode 4 does not require a SIM-card/chip in the vehicle or in the infrastructure device, and it does not require a connection to the network. That means there can be no invoice sent from a mobile network operator to a user.

Cellular V2X: Technology Evolution

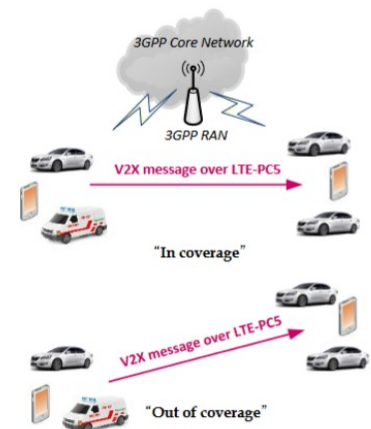
C-V2X is a feature that continually evolves over multiple releases in 3GPP



PC5 refers to a reference point where the User Equipment (the UE, such as the modem in the vehicle’s telematics unit or the roadside unit) directly communicates with another UE over the direct channel. In this case, the communication with the base station is not required. In system architectural level, proximity service (ProSe) is the feature that specifies the architecture of the direct communication between UEs. In 3GPP RAN specifications, "sidelink" is the terminology to refer to the direct communication over PC5. PC5 interface was originally defined to address the needs of mission-critical communication for public safety community (Public Safety-LTE, or PS-LTE) in release 13. The motivation of the mission-critical communication was to allow law enforcement agencies or emergency rescue to use the LTE communication even when the infrastructure is not available, such as natural disaster scenario. In release 14 onwards, the use of PC5 interface has been expanded to meet various market needs, such as communication involving wearable devices such as smart-watch.

In addition to the direct communication over PC5, C-V2X also allows the C-V2X device to use the cellular network connection in the traditional manner over Uu interface. Uu refers to the logical interface between the UE and the base station. This is generally referred to as vehicle-to-network (V2N). V2N is a unique use case

21. The USIM is the functional equivalent of the SIM in a GSM device. It is the entity that stores subscriber-related information and implements the security functions pertaining to authentication and ciphering on the user side in UMTS and LTE (3G and 4G) devices.



to C-V2X and does not exist in 802.11p based V2X given that the latter supports direct communication only. However, similar to WLAN based V2X also in case of C-V2X, two communication radios are required to be able to communicate simultaneously via a PC5 interface with nearby stations and via the Uu interface with the network.

While 3GPP defines the data transport features that enable V2X, it does not include V2X semantic content. It is proposed that the ETSI and SAE standards are used over 3GPP V2X data transport features, and that existing security and transport layers that have been defined by ISO, ETSI and IEEE 1609 Working Group also be used.

C-V2X checks off all the objectives

Let's go back to the V2X objectives I listed at the start of this article and see how well **LTE-V2X PC5 Mode 4** meets those objectives.

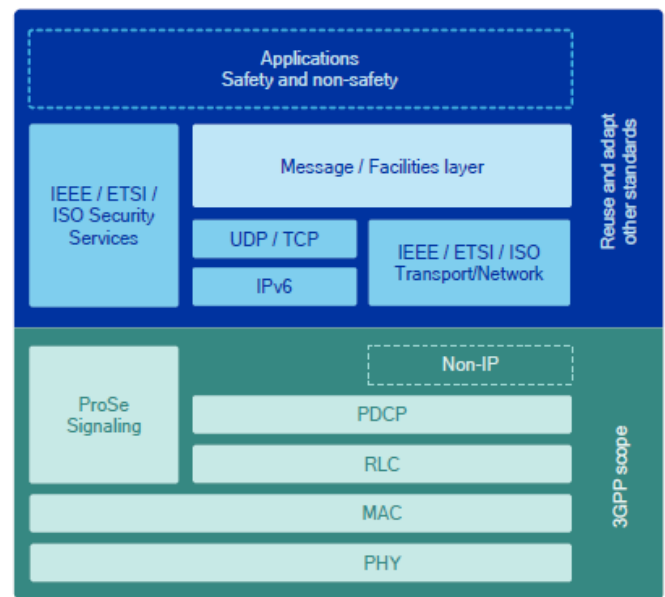
1. *V2X communications should be available to all drivers on all models of vehicles, irrespective of the individual driver's ability to pay.*

✓ In the EU and other countries that have followed the EU's lead with 112 eCall, the system is already installed. Add the software and every new car that was Type-approved after the 1st of April 2018 and has a 4G modem is ready to talk. Since most manufacturers have chosen to use third-party eCall services, they will have a 4G modem. Even without an eCall regulation, most cars in the U.S. are delivered today with built-in cellular communications. This means that there is no need to install a separate, single-function device like DSRC.

2. V2X communications should be delivered at no variable costs to either the sender or the receiver.

✓ **LTE-V2X-PC5 Mode 4** requires no connections to the mobile network for V2V, V2I or I2V. It's free. No cost.²²

3. Messages should be standardized using a globally-accepted standard so that cars with the necessary equipment can be produced and sold anywhere. This will increase economies of scale for manufacturing and installing the necessary equipment and maximize the global effects of the messaging.



22. Automotive OEMs have been installing telematics systems in their vehicles for over twenty years. The agreements they have with the mobile network operators is to have a one-time, up-front payment for the SIM-card/chip with zero charges for the lifetime of the vehicle for emergency services. This applies to both third-party services and legislated eCall. This one-time is built into the telematics system's bill of materials.

✓ The standards that have been developed already can be used as they are. A great deal of excellent work has been put into this task.

4. It should function at all times with the highest levels of operational reliability and with maximum security.

✓ **LTE-V2X-PC5 Mode 4** was designed for emergency applications, to address the needs of mission-critical communication for public safety community.

5. The privacy and integrity of the driver and owner of the vehicle, as well as the entities sending and receiving messages, must be respected at all times.

✓ Work has been ongoing in both Europe and North America on Security Credential Management Systems (SCMS) for V2X communications.²³ This work is technology-neutral and can be applied to both DSRC-based and C-V2X. With C-V2X, there is a built-in capability to include mobile network access if it is required for certificate access.

It's up to Germany and France to make the case

When the EU Commission was trying to ram through EU eCall with no private third-party service provider (TPSP) option, it was Germany and France in 2014 that stood up and said "No!". BMW and Mercedes-Benz had third party emergency service solutions and had made a significant investments in comprehensive telematics offerings. In France, PSA had a third-party service infrastructure in place for emergency calls for over a decade, and Renault backed PSA's demand to allow TPSPs. As it turned out, Germany's and France's objections were enough to convince other governments to block the Commission's EU eCall proposal that disallowed third-party services provider solutions.

In April 2015, the European Parliament and the Council of Ministers decided it was the right of the vehicle owner to use a TPSP eCall in-vehicle system providing similar services, in addition to the 112-based eCall in-vehicle system. With this agreement, Germany and France withdrew their refusals. This allowed EU eCall to proceed and it was initiated in April 2018.

There needs to be a similar stand taken by these two countries to convince the Commission that it does not need to dictate technical solutions. It has done its job by supporting standards developments. The industry will do the rest.

23. Security Credential Management Systems (SCMS) within the EU is known as **EU C-ITS Security Credential Management System (EU CCMS)**. EU C-ITS Security Credential Management System means the European Union C-ITS framework for the provision of trusted communication among all ITS stations (on-board units and roadside units) using a Public Key Infrastructure (PKI)-based approach. The EU CCMS manages the credentials generated by the C-ITS Trust model, which is implemented with a PKI. It is described through the principal document, Certificate Policy for Deployment and Operation of European Cooperative Intelligent Transport Systems (C-ITS) RELEASE 1.1, JUNE 2018, as well as the contents of Security Policy & Governance Framework for Deployment and Operation of European Cooperative Intelligent Transport Systems (C-ITS), Release 1, December 2017.

Musings of a Dispatcher: The Leviathan Syndrome



24. *Leviathan* was written by the English political philosopher Thomas Hobbes (1588-1679) and was published in 1651. The title alludes to the mighty animal mentioned in the [Book of Job](#) in which God describes it as the most impressive animal He has ever created. The mere sight of it overpowers a man. It is invincible. The word is derived from the Hebrew words *lavah*, meaning 'to couple, connect or join', and *thannin*, meaning 'serpent' or 'dragon'.

For Hobbes, the Leviathan symbolized the sovereign, who creates unity out of separate individuals. The Latin phrase beneath the giant crowned figure rising out of the mountains states: "There is no power on earth compared to him. Job 41:24". The Leviathan and the Sovereign are omnipotent; they cannot be destroyed or divided; they inspire fear in men; they do not make pacts with men; theirs is the dominion of power.

The EC can't let go of Wi-Fi-based V2X

WHY IS THAT? Why is the European Commission so determined to lock the automotive industry into a vehicle-to-vehicle and vehicle-to-infrastructure solution that uses an out-of-date technology when there seem to be no clear advantages to doing so? Digital short-range communication (DSRC) may well have been an appropriate choice twenty or even ten years ago, but not today, not with the developments that have occurred in cellular technology, as I have explained in this issue's previous article. I've spent a lot of time musing on this issue, pondering what could be the rationale for what seems to be an irrational selection.

A possible answer to this conundrum came to me when I was talking about it with colleagues who work for a national road administration and who are grappling with how they should address it. "The Commission wants the public sector to control the data flow," I said, "just like with eCall and even RDS-TMC. I think it's based on the fundamental idea of the EU that it should decide what's best for all the countries that are members and if it doesn't decide we'll end up doing different things ourselves that aren't good for the others." The idea must have been sitting back there, but this was the first time I gave it a voice. I call it the ***Leviathan Syndrome***.²⁴

It comes down to our view of the State

Mankind's views on the legitimacy of political authority and the role of government divides us into two principal groups: those who believe in collectivism and those who believe in individualism. In the United States, after its first President, George Washington, had served his two terms, he warned his countrymen to avoid fractious political parties representing diverse views. His successors did everything but follow his advice. They divided themselves up into those who believed in strong central government and lined up behind John Adams and Alexander Hamilton, and those who believed in a weak decentralized government and coalesced around Thomas Jefferson and James Madison. Their parties had different names from the ones

which exist today, respectively Federalists and Democratic-Republicans, but their beliefs remain the same.²⁵ And over the course of the nation's history, as they gained control of the Presidency or the Congress, the parties have alternated pushing down one path or the other.

In Leviathan, Hobbes provides his arguments in favor of a strong state founded on centralized leadership. It was Hobbes' belief that human beings were "highly complicated machines whose minds collect and manipulate the information fed into them by the five senses". Men are governed in their movements by passions, argued Hobbes. These passions use man's reason whose operations distinguish men from other animals and have led to language, argument and science. Hobbes simplified the evolution of man from being in a "State of Nature" to being in a "Settled and Civilized State". For Hobbes, these are polar opposites. It is government that provides for a "civilized state". Without it, mankind is in a "desperate condition".²⁶

He lived during the period of the English Civil War when the Parliament, led by Oliver Cromwell, took control of the country and beheaded the sovereign, Charles I, in 1649. Although Leviathan was published after the parliamentary uprising had started and the king executed, Hobbes' ideas had been formulated well before the date of publishing. The Civil War only confirmed his worst fears. As a royalist, he feared for his life and fled to Paris where he lived for eleven years and completed his opus. In his view, the period of the Civil War was the closest that civilized men came to a State of Nature. He had predicted that a protracted period of peace could come to an end when "turbulent subjects" challenge the civil power. This is exactly what happened during the English Civil War. In the end, order and peace were restored in 1660 when a new sovereign, Charles II, was crowned. Hobbes believed that peace is secured when "each man lays down his right of self-protection and is contented with so much liberty against other men as he would allow other men against himself".

A Hobbesian never loses sight of man as a rational individualist, but men at most times are not individualists because they submerge themselves in roles: farmer, craftsman, priest, king. At unpredictable times, two men emerge from their roles and confront each other as naked wills. It is often because they both wish to possess something which cannot be shared (e.g., a piece of land, a wife, an honor). At those times, there needs to be an arbiter. For Hobbes the arbiter was the sovereign who has been given the

25. If you can get your hands on the March 15, 2021 issue of *THE NEW YORKER*, you will find an excellent article by Jelani Cobb, *How Parties Die*. It is a treasure trove of information on the evolution of political parties in the U.S. and describes how the ideas about collectivism and individualism shaped the parties over the course of the country's still rather short history.

26. Francis Fukuyama, the American academic and author, best known for his 1992 book The End of History and the Last Man, devotes a chapter in his 2011 tome, The Origins of Political Order: From Prehuman Times to the French Revolution, to the Leviathan. The chapter title is *The Coming of the Leviathan*. In this chapter he wrote:

"Thomas Hobbes argued that the state or Leviathan came about as a result of a rational social contract among individuals who wanted to solve the problem of endemic violence and end the state of war...There is a fundamental fallacy in this, and all liberal social contract theories, insofar as it presupposed a presocial state of nature in which human beings lived as isolated individuals. Such a state of primordial individualism never existed; human beings are social by nature and do not have to make a self-interested decision to organized themselves into groups. The particular form that social organization takes is frequently the result of rational deliberation at higher levels of development."

Fukuyama posits that the chief drivers of state formation were surpluses, a sufficiently large enough agglomeration of people, a physical constraint on the spreading of its people, and a particular motivation for the people to give up their freedom to the authority of the state.

right by his subjects to keep men from returning to a State of Nature and killing each other. This is the collectivist view of government, that men have created the *Leviathan* in order that they may enjoy a secured peace.

A non-Hobbesian, such as John Locke (see sidebar), believes that individualism flowers under a weak and limited government, that the sole purpose of a strong government is to keep individuals in check, and that truth flourishes when men are free.

“The business of politics is peace, and those who believe that politics is for enforcing truth will achieve neither truth nor peace.”

Thomas Hobbes

The arbiter is always right; it has to be

Hobbesian political philosophy is the foundation for what has become the European Union. The institution was established to be the arbiter among countries that had proven themselves incapable of keeping the peace, constantly forcing their citizens back to a State of Nature by breaking the peace. They did it in two horrific wars during the first half of the 20th Century, and they did it in countless wars during the previous two millennia. Unbelievably, they were about to do it again less than five years after the armistice was signed ending World War II. Two sides wanted something which they did not believe could be shared: coal.

Germany's Ruhr Valley and the Saarland contained the largest concentration of coal mines in central Europe. As a result of the treaty that ended WWII, the Allies separated the Saarland from West Germany and established it as a semi-autonomous region. Restrictions were placed by the Allies on production, ownership and sales of coal and steel in the Ruhr Valley in order to provide a guarantee to France, Luxembourg, Belgium and The Netherlands that these resources would not be used by Germany to rebuild its military forces. France wanted to go further. It wanted the Saarland to be permanently separated from West Germany and wanted total control over the Ruhr resources. West Germany, at the time led by Chancellor Konrad Adenauer who had been elected in 1949, wanted neither. He wanted the Saarland and control of the Ruhr back in the hands of West Germany.

Enter Robert Schuman, the French Foreign Minister. He devised a plan that was named after him, the *Schuman Plan*, which he presented on the 9th of May 1950. His plan proposed that coal and steel production be placed under a 'supranational' High Authority. This would become the EUROPEAN COAL AND STEEL COMMUNITY

Britain Opts for Locke

From the time of the Restoration of Charles II in 1660, Thomas Hobbes enjoyed a position of prominence until his death in 1679. The restored king had been Hobbes' pupil and, besides granting him a lifetime pension of £100, he protected him from persecution for what was judged by some to be his atheism and profaneness.

Charles died in 1685. He converted to Catholicism on his deathbed. He was succeeded by his brother, James II, who was an open Catholic and a despotic king. He inherited the thrones of England, which included Wales, Scotland and Ireland. His repeated attempts to remove legal restrictions on Catholics and nonconformist Protestants finally led to him being deposed in 1688 when a group of Protestant nobles invited William, the Prince of Orange in The Netherlands and husband to James II's daughter Mary, to invade England. James fled to Paris where he lived under the protection of his cousin, Louis XIV, until his death in 1701. He was succeeded in what was called the *Glorious Revolution* by William and Mary as King and Queen.

Great Britain began moving away from Hobbes' thinking toward one that was formulated by English philosopher and physician John Locke (1632-1704). Known as the *Father of Liberalism*, Locke believed that human nature is characterized by reason and tolerance with man being guided by rational self-interest. While Hobbes believed that society should be governed by a sovereign, absolute monarchy, Locke believed in a democratic government that served the people.

Locke wrote the “Two Treatises of Government” in which he proclaimed that people had three natural rights: life, liberty, and property. Where Hobbes argued that an absolute state would own all property and judgment over good and evil, Locke put forward the idea that people should own their own property and they should be able to overthrow the government whenever it is doing wrong.

Locke's political philosophy has guided Britain since the beginning of the 18th

Continued on next page

(ECSC). It would pool the coal and steel resources of six countries and administer them for the benefit of all. The countries were France, West Germany, Italy, Belgium, The Netherlands and Luxembourg, which became known as “the Six”. The ECSC was established by the *Paris Treaty*, signed by “the Six” on the 18th of April 1951. The *Treaty* came into force on the 23rd of July 1952. ECSC worked to resolve the conflict between West Germany and its neighbors around the issues of coal and steel. It worked so well resolving the coal and steel conflict that it grew in power, influence and membership by gradually, over the years, becoming the arbiter of everything.

In 1957, the six members of the ECSC signed the *Treaty of Rome*, creating the EUROPEAN ECONOMIC COMMUNITY (EEC). This acronym was also translated as EUROPEAN COMMON MARKET, particularly in the UK. The EEC was formed to bring about economic integration among its member states, including a common market and a customs union. In 1993, the *Maastricht Treaty* was signed by what by then had become twelve ‘member states’ (from where the EU flag gets its twelve stars). It is formally called the *Treaty on European Union*. The EEC was renamed the EUROPEAN COMMUNITY (EC). The *Treaty of Lisbon* in 2009 abolished the EC and all institutions that had existed before and they were all incorporated into what became officially the EUROPEAN UNION (EU).

Today, ‘EC’ is used as the abbreviation of the *EUROPEAN COMMISSION*. The ‘*COMMISSION*’ traces its roots to the *HIGH AUTHORITY OF THE EUROPEAN COAL AND STEEL COMMUNITY*. This was the executive branch of the ECSC and was at the core of the idea of the ECSC. It was to be an independent, ‘supranational’ executive checked by a Common Assembly. This group would do the actual work of arbitrating. Some were concerned that they were giving the *HIGH AUTHORITY* too much power so they created a Council of Governments and a (non-elected) Parliament to act as a counterweight.²⁷ The inaugural sitting of the *HIGH AUTHORITY* was held in Luxembourg’s City Hall on the 10th of August 1952. Jean Monnet was appointed as its first President.²⁸ It is clear from where the current structure of not only the *COMMISSION* but the entire EU is derived.

The *HIGH AUTHORITY* was disbanded in 1967 by the *Merger Treaty*, also known as the *Treaty of Brussels*, and merged along with the *COMMISSION OF THE EUROPEAN ATOMIC ENERGY COMMUNITY* and the *COMMISSION OF THE EUROPEAN ECONOMIC COMMUNITY* into the *COMMISSION OF THE EUROPEAN COMMUNITIES*. Walter Hallstein, a German diplomat, was appointed as the first President of the new *COMMISSION*.

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century, through the Industrial Revolution and up until this day. It took Continental Europe a century after the Glorious Revolution for another country, France, to wrest a similar amount of power from their sovereign as enjoyed by British citizens, and this proved temporary. Absolute rule in the form of dictatorships continued to rule in Spain, Portugal, Italy, and Germany and, as Soviet puppets in Eastern Europe, through much of the 20th century.

27. The origins of the European Parliament lie in the Common Assembly of the European Coal and Steel Community (ECSC), which became the common assembly of the three supranational European communities that existed at the time. The assembly subsequently acquired the name ‘European Parliament’. Over time, the institution, whose members have been directly elected since 1979, has undergone profound changes: evolving from an assembly with appointed members to an elected parliament that is recognised as a political agenda-setter of the European Union.

Fact Sheets on the European Union – European Parliament

28. Jean Omer Marie Gabriel Monnet was a French entrepreneur with many other hats. He was involved in establishing the ECSC. He was never elected to public office, but is considered one of the founders of the European Union. The position of President of the European Commission traces back to him.



The Berlaymont Building, the seat of the European Commission. It’s come a long way from Luxembourg’s City Hall.

Between 1967 and 2009, the *COMMISSION* busied itself with work on monetary cooperation, further enlargement (the UK was finally admitted in 1973 after two failed attempts which had been blocked by Charles de Gaulle who viewed the UK as a Trojan Horse for the U.S.) and the establishment of its operational framework, the *Directorate-Generals*. These are the departments with specific areas of responsibility, which are viewed as the equivalent of ministries at a national level. Almost all of them are headed by a European Commissioner²⁹ and a Director-General, who is responsible for management of day-to-day affairs. At first these *Directorate-Generals* had numbers (e.g., DG-3 or DG-11). Romano Prodi, during his term as Commission President (1999-2004), changed the numbers to names (e.g., DG-MOVE for Mobility and Transport). The supranational body went from arbitrating coal, steel, and then atomic energy to arbitrating how many herring Swedish fishermen could catch in their local waters (DG-Maritime Affairs and Fisheries) and eventually what types of systems car manufacturers have to install in their vehicles (DG-Mobility and Transport).

As the EU gained power and control, so did the Commission

The *Treaty of Lisbon*, signed in 2007 and entered into force in 2009, clarified for the first time the powers of the EUROPEAN UNION. It distinguished between three types of competences: exclusive competence, where the UNION alone can legislate, and Member States only implement; shared competence, where the Member States can legislate and adopt legally binding measures if the UNION has not done so; and supporting competence, where the EU adopts measures to support or complement Member States' policies. The *Treaty* establishing the European Community was renamed the '*Treaty on the Functioning of the European Union*' (TFEU) and the term 'COMMUNITY' was replaced by 'UNION' throughout the text. The UNION takes the place of the COMMUNITY and is its legal successor. The *Treaty of Lisbon* gives the EU a full legal personality. Therefore, the UNION obtains the ability to sign international treaties in the areas of its attributed powers or to join an international organization. Member States may only sign international agreements that are compatible with EU law.

With the *Lisbon Treaty* came a name change of the *COMMISSION OF THE EUROPEAN COMMUNITIES*. It became simply the **EUROPEAN COMMISSION**. Today there are thirty-three DGs and over 32,000 employees working for this organization. The *Amsterdam Treaty*, signed in 1997 and entering into force in 1999, transferred more power

29. A European Commissioner is a member of the 27-member European Commission holding a specific portfolio. They are first nominated by their country (called member state in EU parlance) in consultation with the Commission President. The Parliament must approve the entire group of proposed Commissioners, and are not permitted to vote against individual proposed members.

from the member countries to the European Parliament, including legislating on immigration, adopting civil and criminal laws and enacting foreign and security policy. It also increased the *COMMISSION's* powers. It had more political accountability, and its President became viewed as something akin to a Prime Minister. Powers were strengthened again with the *Treaty of Nice*, signed in 2001. It gave the *COMMISSION's* Presidents more power over the composition of the College of Commissioners.

If you are told you are the High Authority there is only One Higher

So here we are, back to our question: Why does the *EUROPEAN COMMISSION* believe that it has to decide whether a car company installs a Wi-Fi-based or cellular-based piece of equipment in its vehicles? Isn't it enough to simply leave technical solutions to the market, to the companies making cars and trucks and other vehicles and the equipment that the companies fit into those vehicles? The answer: It is not in its Hobbesian nature. It sees two sides that are in conflict. Both sides are convinced that they are right. As the *High Authority*, the EC sees it as its duty to arbitrate and decide, to mitigate conflicts, to keep the peace, to help us all remained civilized. It cannot help itself. And which one does it choose? The one it believes gives the most power and control to the State, the Sovereign, rather than to individuals represented by the companies that individuals control. To do anything else would be a dereliction of duty.

Once we understand this—and accept it because it is not going to change—we can carry on with our businesses and our daily activities. If you decide that you want to fight city hall, both literally and metaphorically (it was, after all, a city hall where the *High Authority* first met in August 1952), then you need to know you are up against the *Leviathan*. Give it what it wants because it will accept nothing else. In the case of V2X, it may be necessary to seek help from a Higher Authority. If the Commission is going to change its mind it will have to believe that this Higher Authority has spoken. It cannot be an organization it controls or one that it views as subservient, such as ETSI. It cannot be influenced by another government, such as the U.S. or China. The Commission went ahead with EU eCall with no consideration at all to other countries adopting it. It listens only when its key member states, Germany and France, give it a sign. Pray that they will, or help to make it so.



About Michael L. Sena

Michael Sena, through his writing, speaking and client work, attempts to bring clarity to an often opaque world of vehicle telematics. He has not just studied the technologies and analyzed the services, he has developed and implemented them. He has shaped visions and followed through to delivering them. What drives him—why he does what he does—is his desire to move the industry forward: to see accident statistics fall because of safety improvements related to advanced driver assistance systems; to see congestion on all roads reduced because of better traffic information and improved route selection; to see global emissions from transport eliminated because of designing the most fuel efficient vehicles.

This newsletter touches on the principal themes of the industry, highlighting what, how and why developments are occurring so that you can develop your own strategies for the future.



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