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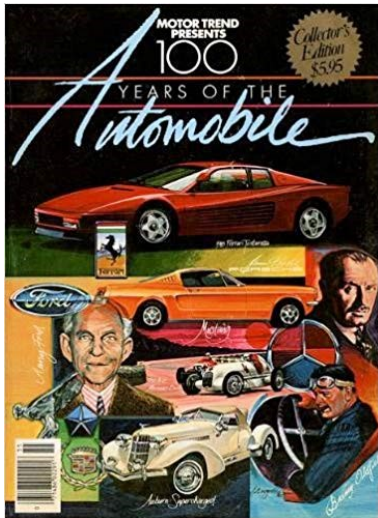
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GENEVA ON 7 MARCH 2019.

THE DISPATCHER

Telematics Industry Insights by Michael L. Sena
February 2019 – Volume 6, Issue 4

OEM De-fossilization and Automation Programs



What a difference a year makes. The leaderships of Europe's three major countries, the UK, France and Germany, are in turmoil, China and the U.S. are engaged in mutually destructive economic tit-for-tats, and the defense, political and economic institutions that have provided stability during the past five decades are all being questioned or attacked. Climate change warning bells are now ring incessantly, not intermittently. Wars continue. Mass migrations continue. The Dow Jones Industrial Average stood at 24,824 on the 2nd of January 2018, rose to 26,952 during the year, but at the close of trading on the 31st of December, it stood at 23,327. It had been down to 21,713 the day before Christmas, but rallied during the last week of the year. That was the largest yearly fall since the 2008 Great Recession. The cause is uncertainty, not interest rate rises as some would have us believe. Amidst this seeming global economic chaos, there are forces working to upend many established industries with increased automation, expanded use of collective intelligence (aka artificial intelligence) and fundamental changes to the models of how people use and pay for products and services.

BMW

DAIMLER

FIAT CHRYSLER AUTOMOBILES

FORD MOTOR CO.

GENERAL MOTORS

HONDA

HYUNDAI-KIA

JAGUAR LAND ROVER

MITSUBISHI MOTORS.

NISSAN

RENAULT

PSA

SUBARU

TESLA MOTORS

TOYOTA MOTOR

VOLVO CARS

VW (INCLUDING VW AND Audi)

THE AUTOMOTIVE INDUSTRY is one of these industries. It is in the throes of wrenching changes. These changes eventually will alter the way we build, buy and use vehicles. They will redefine all the services which these vehicles provide to their drivers and passengers as well as the services that are provided to the vehicles. Signs of these changes are taking many forms as some in the industry attempt to move quickly while others try to maintain the status quo. Arrests of car executives for falsifying fuel emissions is as much a sign of these times as the closing of car assembly plants and investing in electric scooter companies.

This article will provide a short summary of what the car companies in the sidebar list (in **BOLD**) have announced as their short-term program to meet their stated long-term goals. Future issues will continue the summaries of the

others. My objective is to try to determine which companies are likely to still be around in ten years, which companies will find it necessary to merge with rivals or allow themselves to be absorbed into businesses that have business models better adapted to the direction the world seems to be taking with mobility, and which companies are likely to just go away.

BMW

For the past 25 years, BMW has built cars that people like to drive, and its numbers are the proof. Between 2005 and 2017, it increased sales from 1,126,768 to 2,088,283. It has managed to avoid scandals, brushes with bankruptcy and debilitating mergers.¹ It was among the first in 1995 to introduce full-function navigation systems with integrated, real-time traffic information. It has also been one of the global leaders in connectivity and telematics services during the past twenty years, and was a founding member of the ADAS Forum in 2000.

With good justification, many attribute BMW's success to the steady hand exerted on the company by its principal owners, the Quandt family. In 1959, the family had become the largest shareholders and helped to steer it away from imminent bankruptcy and into profitability. They continue to be the largest shareholders of the company, with the remaining shares owned by public float.

BMW went through a number of telematics providers, including ATX and WirelessCar, before taking its global telematics platform totally in-house. Bosch is its call center service provider (as it is for Mercedes-Benz and VW). Some of the data BMW collects from its vehicles is passed on to HERE where it is processed into traffic information and sent back to BMW vehicles for use in their navigation and ADAS systems. In 2016, BMW, along with AUDI and DAIMLER, paid \$3 billion to acquire HERE from Nokia. In March, 2018, BMW and Daimler agreed to merge their car-sharing units, *Drive Now* and *Car2Go*.

BMW's first electric car was the i3, released in 2013. Its first hybrid (a mid-engine sports car), the i8, came along the following year. In 2016 the G11 740e and F30/31 330e were the company's first plug-in hybrid versions of the 7 Series and 3 Series respectively. In June, 2018, the Group delivered 13,806 electrified vehicles, putting it on track to deliver 140,000 by the end of the year. This is up over 40% from the previous year. By 2025, the BMW Group expects electrified vehicles to account for between 15-25% of sales, and it offers

1. BMW bought the Rover Group in 1994 from Honda. At the time, the Rover Group comprised Rover, Land Rover, Mini and MG as well as the rights to defunct brands Austin and Morris. In 2000, after six years of heavy losses, BMW sold Land Rover to Ford, MG Rover to a Chinese consortium and re-built the Mini, which launched in 2001.



BMW's *DriveNow* and Daimler's *Car2Go* have merged.



BMW i3 electric car.

nine electrified models already. The Mini, however, could easily be the best-selling of those nine.

BMW has been developing driver-assisted cars since 2000. Its Senior Consultant Automated Driving, Dirk Wisselmann, interviewed by CONTINENTAL AG for its 2025 AD blog on automated driving, stated that “the increasing automation of vehicle functions is inextricably tied to the development of cars. The introduction of advanced driver assistance systems (ADAS) in the nineties of the last century was a logical step. The enormous increase in the performance of these ADAS functions in the last years will now make the next step realizable, to give the possibility to completely delegate the driving task to the car if (the driver) wants to do so.”



The Rolls-Royce 103EX Concept Car (See sidebar)

Europe is still BMW's largest regional market, but China is its largest country market, followed by Germany and then the U.S. It builds the BMW 5 Series plug-in hybrid in China, and sales of this model and other electrified BMW models have increased five-fold in 2018 compared to the previous year. In California, one in three of the BMW 5 Series sold is the plug-in hybrid model.

More than any other car brand, BMW's management and its principal owners know that its biggest competitor is itself. While other car companies benchmark themselves with BMW, BMW knows that it must continue to deliver cars that a certain group of people want to drive. It does not build cars for the mass market or for people who would prefer to be doing something other than driving. For BMW owners, driving (either its cars or its motorcycles) is not considered a waste of time (see *Musings of a Dispatcher* in this issue). It has outlined its strategy for the near-term in its NUMBER ONE > NEXT in 2021: “*Intelligent lightweight design, electric drive train, autonomous driving and digital connectivity for a new dimension of individual mobility*”.

BMW is a company that will continue to try to improve the driving experience. It will add self-driving features to improve the safety and maneuverability of its vehicles. It will not be replacing its cars

Although the **ROLLS-ROYCE** brand has been in use since 1906, the **ROLLS-ROYCE MOTOR CARS** subsidiary of BMW AG has no direct relationship to Rolls-Royce branded vehicles produced prior to 2003. The **BENTLEY MOTORS LIMITED** subsidiary of Volkswagen AG is the direct successor to **ROLLS-ROYCE MOTORS** and various other predecessor entities that produced Rolls-Royce and Bentley branded cars between the foundation of each company and 2003, when the BMW-controlled entity started producing cars under the Rolls-Royce brand. Here is what its CEO says about a driverless Rolls-Royce:

“As you know, Rolls-Royce are part of BMW Group, and BMW is investing big money into autonomy. For that reason, we are able to take that technology whenever it is ripe for our customers. It's important to understand that not just many but all of our customers do have chauffeurs, if not permanently employed then somebody they can call and say, ‘Bring me to the opera tonight,’ or ‘Drive me and my friends to the restaurant.’ That is not a problem. And we will only bring autonomy into our cars if it is truly effortless.”

CEO Torsten Müller-Ötvös

This is what it says about its 103EX CONCEPT CAR pictured above:

“In a future where transport is commoditised – void of beauty, space and form – Rolls-Royce will stand apart. A beacon of luxury that's distinctly modern, and yet glows with a timeless glamour.

Each Rolls-Royce will be designed less like a car, and more like an individual sculpture made from one seamless surface. Fluid curves sing with warmth, romance and opulence. This is a presence that proudly announces its arrival, and lights your entrance with a personal red carpet.” (Gosh! Editor.)

with bicycles and scooters, nor will it start selling tickets on trains and ferries. If it ever does, it won't be BMW anymore.

Daimler

During a period of two-and-a-half years, between 2009 and 2011, I made regular visits to the Stuttgart area by plane, train and automobile to meet with various divisions of DAIMLER. It was at a time when the nine-year merger between DAIMLER-BENZ AG and CHRYSLER CORPORATION, which came to an end in October 2007, was still fresh in the minds of both management and staff. DAIMLERCHRYSLER disappeared and the two companies went their separate ways. Dieter Zetsche had become the CEO in 2006, and it was he who led DAIMLER out of the merged company and cut ties with MITSUBISHI and HYUNDAI that had developed during the merger years. DAIMLER AG became the new name of the company. On April 27, 2009, DAIMLER relinquished the 19.9% it had retained in CHRYSLER. On April 30, CHRYSLER filed for chapter 11 bankruptcy.

It took several years following the breakup for DAIMLER to get its *mojo* back after the disorienting period of being tied together at the hip with a company with which it had zero in common.² While still in the CHRYSLER relationship, Mercedes Cars of North America had begun a collaboration with Hughes Telematics (purchased by Verizon in 2012 and renamed Verizon Telematics) in the U.S. in order to leave the ATX relationship for its *Tele AID* service. This initiative was taken by the U.S. sales company and with minimum participation by headquarters. The eventual service, called **mbrace**, was never implemented in Europe. In Europe, the group in charge of its connected services program decided to develop a third-party eCall-only service with Bosch as its call center in Europe. It had a fleet management division called *FLEET BOARD* that was supplying commercial vehicle telematics to DAIMLER-BENZ and other truck brands. There did not seem to be any global connected services plan.



2. For a period of time, my father worked as a draftsman for Chrysler Corporation in its Scranton Tank Division. A scholarship from Chrysler Corp. paid for most of my undergraduate college education. My family owned Dodges (Chryslers were not in our price range), starting with a 1960 Dodge Dart. By the time Chrysler was taken over by Daimler-Benz in 1998, there was nothing left of the company that built the first Dodge Dart. Its engineering and design prowess were faint memories.



In 1909, Gottlieb Daimler's two sons recalled a very interesting postcard their father once sent their mother. It contained a drawing of a three-pointed star. He said on the postcard that the star would shine over their house in Germany, bringing them prosperity. He explained that the three points on the star stood for the company's planned future domination over all three mediums of transportation – land, air, and water. Eventually, that drawing served as the basis of the Mercedes-Benz hood and grill ornaments and continues to be the logo of Daimler AG to this day.

What Daimler did retain during the merger years, and then built on after it ended, was its focus on safe driving with advanced driver assistance systems (ADAS). It chaired the *ADASIS Forum* for several years and played a central role in developing the ADASIS specification. It also increased its proficiency in navigation and driver assistance information. In December, 2015, Daimler, along with Audi and BMW closed their purchase of HERE from Nokia for €2.55 billion (one third of what Nokia had paid when it purchased Navteq).

In the middle of 2018, the Daimler AG Board of Management and Supervisory Board approved the new corporate structure for DAIMLER AG. This was an important step because it delineated responsibility for the principal vehicle types into divisions, with cars and vans in one division and trucks and buses in another. The idea with the new structure is to give the divisions “greater entrepreneurial freedom, position them even closer to their markets and customers, and empower them to enter partnerships more easily and quickly.” The Daimler Financial Services division was renamed Daimler Mobility AG and is positioned to be in charge of mobility services for the Group.

It developed what it called its 5C-Strategy: CORE; CASE; CULTURE; COMPANY; and, CUSTOMER. CASE stands for Connected, Autonomous, Shared & Services, Electric. It states that “through the connection of all the future-oriented CASE areas, Daimler is transforming itself from an automaker into a provider of mobility services.” In the spring of 2017, Daimler already announced that it was accelerating their electric car plans by three years and would be spending \$11 billion on ten electric models by 2022. In addition, it announced plans to invest \$1 billion to build its EQ electric cars and batteries in the U.S. At the same time, it invested \$82 million in ChargePoint, an electric vehicle charging network.

Concerning Daimler’s work on self-driving and driverless vehicles, it is based on two foundations being built in parallel. The first is to progressively move from increasingly sophisticated driver assistance safety functions that eventually take over more and more of the driving task. This allows customers to gradually become familiar with the systems and to build the supply chains for them. The second is to partner with companies like Bosch and Uber that have their own reasons for developing self-driving and driverless systems and who are willing to share the risk with Daimler.

Daimler is not a risk-taking company. It has been around since the start of the automotive industry, managed to stay intact through



Recently retired Daimler Chairman, Dieter Zetsche, poses in 2017 with an all-electric EQC SUV that was to be among those used in its partnership with Uber on self-driving cars.

This photo of urban transport in the future shows a range of Daimler vehicles, from Smart electric personal transport to Daimler-Benz buses. The signs on the wind-screens of the two parked cars reads: 19¢ per minute – Automated Taxi



two wars that devastated German industry, and has flourished as a maker of high-quality vehicles of all types. It also survived a merger that would have caused terminal damage to a weaker company. It knows who its customers are and, thus far, it has delivered what they want. It will continue to do this without giving up its key position as a manufacturer of vehicles, whether these vehicles are owned by private individuals, public transport operators or fleet owners.

VW

Since September 2015, when the scandal over VW's emissions software erupted in the U.S., VW and its daughter company Audi have been mostly in damage control mode. Its CEO at the time the scandal broke, Martin Winterkorn, denied any knowledge of the cheating but resigned in an apparent attempt to diffuse the crisis. It didn't work. Nine people in the company were charged with criminal actions. Two of them who worked for VW in the U.S. pleaded guilty and were given prison sentences. In May, 2018, the U.S. charged Winterkorn with conspiracy and wire fraud for his role in trying to cover up. (As long as he doesn't leave Germany and travel to countries with extradition treaties with the U.S., it's unlikely he will see the inside of a U.S. jail.)

In spite of a bill from the U.S. government of more than \$30 billion, the ousting of Winterkorn's replacement, Matthias Müller in April 2018, and the arrest in Germany of Audi CEO Rupert Stadler in June 2018, also as part of the emissions investigation, VW sales in the U.S. were up 4.2% for the full year 2018. Audi was off 1.4% for the year, but this was apparently due to production issues. In 2018, deliveries of cars from the Volkswagen Group (VW, Audi, Bentley, Bugatti, Ducati, ŠKODA, SEAT, Porsche and Lamborghini) increased 0.9% worldwide to a record 10.83 million vehicles. The last four companies had all-time record numbers. With the exception of Audi, all brands grew. Europe, its largest market by 200,000 vehicles over China (4.4 vs. 4.2 million), grew by 1.2% while China was up by only 0.5%. Like Daimler, VW is not just cars. It owns two of the largest heavy truck and bus manufacturers, Scania and MAN, operating as Traton, formerly Volkswagen Truck & Bus AG.

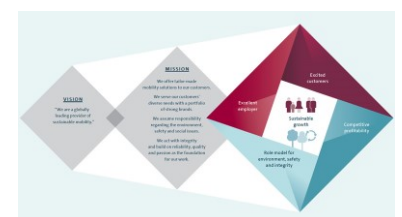
In the midst of the turmoil, VW released its future program called **TOGETHER – Strategy 2025**. It announced its new vision: “We are a globally leading provider of sustainable mobility.” Two of its mission statements ring a bit hollow given what it has been accused of and what it has admitted to doing: “We assume responsibility regarding the environment, safety and social issues”, and, “We act



Clouds over Wolfsburg

Volkswagen (VW) was founded in 1937 by the German Labour Front (Deutsch Arbeitsfront), the National Socialist labor organization that replaced the various independent trade unions in Germany after the National Socialists took power in January 1933. Its headquarters were originally in Berlin but moved to a new town built specifically for the factory and its workers called Stadt des KdF-Wagens (Kraft durch Freude <Strength through Joy>), which is today called Wolfsburg.

TOGETHER



with integrity and build on reliability, quality and passion as the foundation for our work.” It says it is going to try to “regain and strengthen the trust of our customers and restore the Group’s positive public image”, so this is at least a mea culpa for its past transgressions.

There is a lot of fluff in the strategy document about open-mindedness and working as equals, but it lists sixteen concrete initiatives as the basis of its new strategy, of which four are the most important:

- Development of self-driving systems and artificial intelligence;
- Making battery technology as a core competency;
- Building a mobility solutions business; and,
- Developing and expanding a smart mobility offering.

On the electric front, VW seems committed. Already in 2013 it said it would be the world’s largest battery electric car producer by 2020. There is a long list of others in line for that honor. At the end of 2018, VW was not on the top 20 list, which was topped by TESLA’s Model 3. But it plans to ramp up, starting with the I.D. pictured right. In March, 2018, it announced that it is equipping 16 factories to produce electric vehicles and secured €20 billion in battery suppliers to support its thrust into electric cars.

In late 2018, VW announced the acquisition of 75.1% of WIRELESSCAR, and in early 2019, it announced a major partnership with Ford. Like DAIMLER, VW’s road to connectivity has been, shall we say, winding, with plenty of bifurcations. In the U.S., it chose to work with HUGHES TELEMATICS in 2011 for its *Car-Net* system, and that business is still operated by VERIZON TELEMATICS. AUDI has used WIRELESSCAR in China, and VW has built its own in-house system in Europe, and now WIRELESSCAR will take over connectivity in Europe. Whether WIRELESSCAR assumes responsibility for all connectivity for all VW brands remains to be seen.

Christoph Hartung, head of VW Digital and New Business/Mobility Services, said of the WirelessCar deal: “Our aim is to develop VW into a mobility provider with a fully-connected fleet. Our customers will be able to use digital value-added services in their cars or on their mobile devices at all times. We are switching up a gear with this development and have gained WIRELESSCAR as the third major partner.”³

What I am missing in the VW **Strategy 2025** report is a mention (even a teeny-tiny one) of one of the most important strategic initiatives the Group has undertaken, and that is its shared ownership



Volkswagen will begin production of its I.D. EV lineup in November 2019, Autocar reports, citing a VW announcement at its MEB Supplier Summit, an event for suppliers that will work on VW’s dedicated electric vehicle platform. Volkswagen’s eventual goal is to reach 1 million annual EV sales by 2025.

3. The other two are Microsoft for its cloud-based platform and DICONIUM, a “digital specialist” company, 49% of which was acquired by VW in November 2018.

through AUDI of HERE with BMW and DAIMLER. WIRELESSCAR will have to work with HERE if VW intends to become part of the Big Data data feed from its vehicles and to share in the processed data from HERE. Either VW has not spent enough time developing its mobility services strategy, or it will be pursuing a different strategy than AUDI, which would seem to be a major waste of time and money.

The VW hook-up with Ford has been in the works for over a year. When the two companies finally announced their agreement in January, it was less than earth shattering. They will develop commercial vans and a medium-sized pickup together starting in 2022. They will “investigate” how they can work together to develop the next generation vehicles, focusing on electrification and self-driving technology. Herbert Diess, who replaced Müller as CEO in April last year, said at the time of the announcement: *“It is no secret that our industry is undergoing fundamental change, resulting from widespread electrification, ever stricter emission regulation, digitization, the shift towards autonomous driving, and not least changing customer preferences. In such an environment, it just makes sense to share investment, pool innovation capabilities and create scale effects in clearly defined areas.”*

This looks like a good deal for VW, to break into the highly profitable market for pickups in the U.S. Since neither the Ford nor Porsche-Piech families are likely to be interested in giving up their respective ownership positions, it is unlikely that there will be anything deeper in this relationship.⁴

VW has a solid stable of brands, from the cheap and cheerful SEAT to the super luxury Lamborghini. Its two largest owners have a strong stake in ensuring that the company stays in their hands and that it both survives and prospers. It will probably meet its goal of becoming a “driving force behind the expansion of electro-mobility”, selling 2-3 million e-cars annually by 2025, which would be around 25% of its total sales. AUDI is working hard to keep up the pace with its self-driving initiatives. But (and you were waiting for the ‘but’), what it all comes down to for VW is keeping people working in Wolfsburg producing cars and trucks and other vehicles. Anything that threatens that will be met with resistance.



4. VW has three major owners: the Porsche-Piech family (30.8% of equity and 52.2% of voting power); the State of Lower Saxony (11.8% of equity and 20% of voting power); and, the Qatar Investment Authority (14.6% of equity and 17% of voting power).



What happens in Vegas...

Las Vegas. CES 2019. Apple was not be there, as usual. But it knew that the talk of the town during the show would be, well, talk. So it put up a billboard stating that its iPhone does not vacuum up data like Google's Assistant and process it in collective intelligence (aka AI) systems so that it can make Google even wealthier and your data less private. The billboard also includes a link to Apple's Privacy website, which outlines the various ways "Apple products are designed to protect your privacy." For instance, on that webpage, Apple explains how Face ID and Touch ID data never leave your device.

I read that Kholer, the bathroom fixtures company, debuted at CES and won an award for its Verdera Voice Lighted Mirror that integrates an Amazon Alexa-controlled Echo speaker. So when you say: "Mirror, mirror on the wall, who's the fairest of them all?", you will get an answer.. "Honestly, you evil witch, Snow White is!"

5. A Volvo Cars Footnote: **VOLVO CARS**, a wholly-owned subsidiary of Geely, has 157,747 cars to go in order to reach its 2020 goal of selling 800,000 cars. In 2018, the company sold 642,253 globally. That was an all-time high. China was its largest market, up 14.1% to 130,593. The U.S. was up 20.6% and Europe up 6.4%. It will need a bit over 10% growth per year to reach its goal.

China car sales drop; the world reacts

IT USED TO be said about the state of the world's economic health that when the U.S. sneezed, the world caught a cold. Today, when it comes to the state of the world's automotive industry's health, it's China that causes epidemics. In case you missed it, sales of cars in China in 2018 were down by almost 5.8% to 22.35 million cars and light trucks, compared with 24.17 million in 2017 and 23.69 million in 2016. This was the first drop in sales in over 25 years, including during the 2007-2009 financial crisis! By comparison, 2018 sales of passenger cars and light trucks in the U.S. were 17.5 million, slightly down from 17.81 the year before. What's happening?

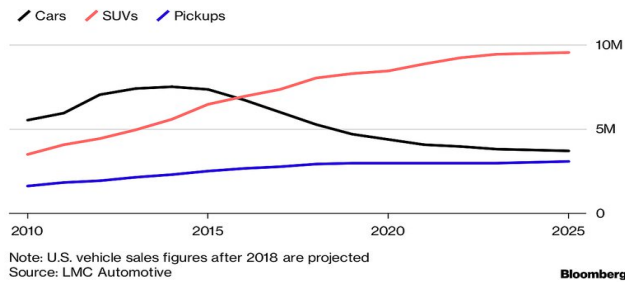
For one thing, during 2018 the Chinese government stopped its subsidies to cars with smaller motors which had been running since 2015. The purpose of the subsidies was to promote sales of Chinese brands. Secondly, Chinese consumers are concerned about the trade war that has been simmering between the U.S. and China. It has already affected economic growth. The International Monetary Fund has lowered its prognosis for growth in China in 2019 from 6.6% to 6.2%. In December, industrial output fell in China for the first time in two years.

Effects of falling sales in China have already had an impact on car producers in Europe and the U.S. JLR is reducing its workforce by 5,000 in the U.K. This is also related to the current anxiety over Brexit, but China's slowdown is the main reason behind the move. Domestic carmaker, Geely, which clocked up sales of around 1.5 million in 2018 has said that it does not expect sales to grow in 2019.⁵

The Chinese government is not sitting by idly watching car industry and other industries shrink. Its *National Development and Reform Commission* has presented a recommendation to make 2019 the year to achieve its growth targets by encouraging domestic consumption. Details of exactly what the plan entails have not been released, but they will be welcomed by everyone selling everything in and to China, including and especially car companies.

Sedan Slaying

Car sales plunge about 30% in span of just four years



Tesla joins the big league

The December U.S. car sales numbers were reported in AUTOMOTIVE NEWS with totals for 2018. For the month, Tesla was up 655% (not a typo) over December 2017 with 31,700 cars sold. For the year, Tesla was up 280% with 182,400 cars sold. Its December sales were in the vicinity of LEXUS, MERCEDES, BMW, 50% more than Audi, more than double those of JLR and almost four times Volvo's. Now comes the hard part: keeping up that pace. Tesla's (and the Musketeer's) biggest worry is that a new clutch of financial analysts will begin to value its stock as if it's a car company. If that happens, Tesla and its shareholders are going to be in for a rough ride.



Waymo gets stoned in Arizona

"They'll stone you when you're trying to be so good." That's the opening line in Bob Dylan's classic *Rainy Day Woman*, better known as *Everybody must get stoned*. Google/Alphabet/Waymo wants all of us to feel that it is one of the 'good guys'.⁶ There are people in the Chandler area of Tempe, Arizona, where Waymo has started delivering rides to paying customers, who believe it is truly one of the bad guys.⁷ It seems that the folks down in Arizona where Waymo has been testing don't think it is "doing the right thing" by driving rich kids and their parents to all of their activities, and they have decided to express their dislike by taking out their anger on the cars. Police report that car tires have been slashed, stones thrown at moving vehicles and attempts made to force them off the road. There is a video showing someone pulling a gun.

One resident family began taking aggressive action after their 10-year-old son was nearly hit by one of the Waymo test cars. They were quoted in the NYT article as saying: "They (Waymo) said they need real-world examples, but I don't want to be their real-world mistake. They didn't ask us if we wanted to be part of their beta test." At the time the article was written, twenty-one attacks had been reported to the police. Waymo has chosen not to file charges,

Advantage SUVs

The chart to the left says all that needs to be said about why Ford and GM are halting production of sedans and shuttering factories in the U.S. and Canada that produce them. In 2018, the percentage of passenger cars (i.e., sedans, or saloons as they are called in the UK) that were sold in the U.S. was 31% of the total of cars and light trucks. 69% of the total were SUVs, big and small, and pick-up trucks. Just five years ago, it was 50% each. The price of a gallon of gasoline (petrol) in the U.S. was, according to the AAA, \$2.24 at the end of the year. One year ago it was \$2.49.

6. The original slogan of Google was "Don't be evil." When Google changed its corporate name to Alphabet in 2015, it changed the slogan to "Do the right thing." I guess some folks have a different idea than Alphabet/Google/Waymo about what is 'right' and what is not.

7. Simon Romero, *Wielding Rocks and Knives, Arizonans Attack Self-Driving Cars*, NEW YORK TIMES (Dec. 31, 2018)



apparently not wishing to disrupt its tests, but probably also not wanting to create an increased amount of ill-will by having residents of the area prosecuted. So far, the city officials and transit authority are supporting Waymo, but the company is clearly between a rock and a hard place.



Venice entry fee: pedestrian congestion charge

In the January issue of **THE DISPATCHER** I wrote about the problems being experienced by the city of Venice, Italy due to over-tourism. Total overnight hotel stays per year is around 9.5 million, but the total number of annual visitors is 24 million, 2 million of whom arrive on massive cruise ships. All of these visitors result in additional costs to the city that are not covered by any form of tax or income. Hotel guests pay a city tax, but day-trippers pay nothing—today. Just before the end of 2018, the Italian parliament passed a new law allowing the city to levy an entrance fee on every non-resident or non-worker entering Venice. Students are also exempt. The fee is set at €2.50/entrance for low season and up to €10/entrance for high season. The new law is expected to come into force in the spring of 2019. One step closer to an amusement park.



How do I get to mum's for Christmas dinner?

At first I thought it was an early April Fool's Day joke. One of my transport news feeds said that in London, on Christmas Day, the number of London bike share rentals jumped by over 5,000, from a daily average of 25,900 to 35,000. The reason, the article stated, was that all of London's public transport was closed. No Tube trains or trams, no buses, no river taxis. Not even National Rail was running. So I checked the **TRANSPORT FOR LONDON** official site. Sure enough, it stated boldly, with no attempt at an apology, that "today there's no service on public transport." For those with a car, the *Congestion Charge* was suspended for a day, the site said, and "Santander Cycles are available throughout the Christmas season, including today." And, oh yes, you can take a black cab and pay a surcharge of £4.

For those who don't have a calendar handy, Christmas is on the 25th of December. Although London has a relatively mild climate for its latitude, December is winter. If it's not snowing, it's raining—usually. This year, it was a good day for cycling. It was mostly cloudy during the middle of the day, 88% humidity and 11 °C. With no buses as competition, it must have been a wonderful day to cycle through the streets of London like all these Santas are doing.



The Big C for Congestion Charging in the London C-Zone. It will be interesting to see how the City of Venice solves the problem of getting everyone entering the city to pay the entrance fee, especially those disembarking from the cruise ships.



Oxford Street in London on Christmas Day 2017. Not a bus in sight.

TomTom Telematics sold to Bridgestone

JUST AS I was putting the finishing touches to this issue of **THE DISPATCHER**, an all-points bulletin news release came in from good friend and loyal **DISPATCHER** reader, Dr. Michael W. Dobson. Dated 22 January 2019, it read: *TomTom Sells Telematics Business to Bridgestone for a Purchase Price of €910 Million (JP¥114 billion)*. Mike is hooked into so many map company-related news feeds he knows what is happening in the industry before most of the companies' management. BRIDGESTONE is mostly known as a tire company. Its occidental-sounding name was chosen by its Japanese founder to make it a global company.⁸

TomTom Telematics, formerly *TomTom Business Solutions*, is a business unit of TOMTOM dedicated to fleet management, vehicle telematics and connected car services. It was established in 2005 when the company introduced an out-of-the-box fleet management solution called WEBFLEET. It is a Software-as-a-Service solution, used by small to large businesses to improve vehicle performance, save fuel, support drivers and increase overall fleet efficiency. WEBFLEET came to TOMTOM as a result of the September 2005 purchase of DATAFACTORY AG. It supplemented its business unit in 2013 with the purchase of COORDINA (Gestion Electronica Logistica S.L.), a Spanish fleet management solutions provider based in Barcelona. *TomTom Telematics* also provides services for the insurance, rental and leasing industries, car importers and companies that address businesses as well as consumers. *TomTom Telematics* supports more than 848,000 connected cars in 60 countries worldwide.

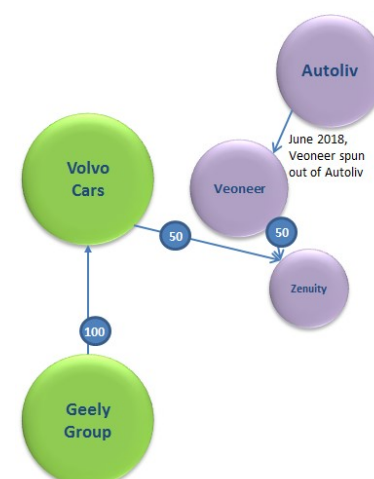
It is BRIDGESTONE EUROPE NV/SA, a subsidiary of BRIDGESTONE CORP. that is making the acquisition. The idea behind the purchase seems to be to hasten BRIDGESTONE's journey from a tire and rubber company to a mobility solutions provider. It is more likely in the short term to mean that TOMTOM will develop applications to help BRIDGESTONE sell more tires and supplement its digital solutions, such as Tirematics, Mobox, FleetPulse and Bridgestone Connect.



May I drive without a driver? Yes you may.

Zenuity, the joint venture between AUTOLIV's *Veoneer* and VOLVO CARS, has been given permission by the Swedish Transport Agency to drive on three of Sweden's major roads to test self-driving vehicles. For the time being, cars must have a driver behind the wheel and may not travel faster than 80 kph. It's a start.

8. Bridgestone Corporation, headquartered in Tokyo, is the world's largest tire and rubber company founded in 1931 by Shojiro Ishibashi in the city of Kurume, Fukuoka, Japan. The name Bridgestone comes from an English translation and transposition of 'ishibashi', meaning "stone bridge" in Japanese.



Hard to put a price tag on a sustainable climate



Carbon-intensive energy consumption combined with capital, ingenuity and cheap labor, has been the driving force of economic growth since the Industrial Revolution. Nordhaus believes that it has resulted in a huge market failure: the negligible cost of potentially catastrophic emissions. The Nobel Prize was established by Alfred Nobel, who was born at the end of the Industrial Revolution and was among the giants of the industrial age who built their personal fortunes and the fortunes of their countries, on carbon-intensive energy.

9. Nordhaus, William. [The Efficient Use of Energy Resources](#). Yale University Press (1979).

10. The Katowice Climate Change Conference, held in Katowice, Poland 2-14 December 2018, included the 24th session of the Conference of the Parties (COP 24) to the UNFCCC, the 14th session of the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol (CMP) and the third part of the first session of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA 1-3). (*That's a lot of parties! Ed.*) The conference was expected to finalize the rules for implementation of the Paris Agreement on climate change under the Paris Agreement work programme (PAWP).

ADMIT IT. When you hear the names of the **NOBEL PRIZE** recipients announced each year, you wish you had decided to become an economist, a physicist, a chemist or a medical researcher so you could at least have had a shot at winning one. The *Sveriges Riksbank Prize in Economics Sciences in Memory of Alfred Nobel for 2018* was divided equally between William D. Nordhaus and Paul Romer. They were honored jointly for their work on integrating specific factors into long-run macroeconomics. Romer integrated technological innovations and Nordhaus integrated climate change. It is Nordhaus and his economic theories on climate change that are my interest here. He created a quantitative model that describes the global interplay between an economy and climate, simulating how the economy and the climate co-evolve.

Nordhaus has been called the “inventor” of the modern economics of climate change. In 1979 he wrote his first book on the subject.⁹ In the 1990s he, along with others, developed the *Dynamic Integrated Model of Climate and the Economy*, known as *DICE*. He showed the complex interactions between carbon emissions, global temperatures and economic growth, creating ‘integrated assessment models’ that allowed him and his colleagues to project how different trajectories for the world’s carbon emissions produce different global temperatures. From this, he estimated the likely costs of different scenarios and what level of reduction in emissions would be economically ‘optimal’. He updated his models progressively up to 2016 and produced his latest findings in 2018.

COP(24)ing out of 2 °C¹⁰

‘Optimal’ for Nordhaus is a state in which the social cost of carbon (SCC) is ‘acceptable’. SCC is defined as the “present value of the net future harms from an additional ton of emissions in a particular year”. In his earliest papers, Nordhaus suggested that 2 °C was the upper limit of acceptability, but this was before he calculated the costs of achieving this goal. As he perfected his *DICE* model and began to investigate the economic impacts of implementing the measures necessary to hold global warming to 2 °C, he started to doubt the practicality of this conceptual limit. His estimate for the costs of the present discounted

value (PDV) in 2050 of the *U.N. IPCC*-recommended limit of 1.5 °C, came to \$37 trillion. This is the combination of the PDV of environmental costs of \$9.95 trillion (this is the estimated cost to the environment of the damage caused by climate change) and \$27.08 in abatement costs (these are the costs for trying to make sure that the damage is kept to a minimum). His estimate for doing absolutely nothing is \$23 trillion. In other words, we can keep on doing exactly what we are doing now and the damage caused to the environment will be valued at \$23 trillion, or we can try to keep global warming to 1.5 °C and it will cost us \$27.08 trillion to do it, but we will still end up with \$9.95 trillion in damage to the environment.

Who's paying for lunch?

Nordhaus recommends the global implementation of a carbon tax, which is a fee imposed on the burning of carbon-based fuels (coal, oil and gas). It is a policy for reducing and eventually eliminating the use of fossil fuels whose combustion is destabilizing and destroying our climate.¹¹ The amount of CO₂ released in burning any fossil fuel is strictly proportional to the fuel's carbon content. Coal generates more CO₂ emissions than oil, and oil generates more than natural gas. Nordhaus has said that it does not matter who actually pays the tax to the tax collector—or pays for other methods of reducing harmful emissions—because, in the end, the costs will be passed on to the consumer in the form of higher prices. The reason is simple from an economic standpoint: money has feet. If a carbon tax, or any other type of tax cuts corporate profits, causes the rate of return in an industry to fall below the returns that are available in other businesses or other countries, capital will move.

The *UN IPCC Report*, and the 14,000 delegates from 195 countries who met for two weeks in Katowice, Poland in early December, 2018,¹² are not on the same page as William Nordhaus. The *UN IPCC Report* did not even attempt to quantify the costs and benefits of emissions in order to suggest the size of a tax that would need to be imposed to achieve the benefits. It has taken as a given that the goal of all measures is to limit global warming to 1.5 °C, and will then consider what is necessary to achieve that goal. It states¹³ that time is running out and all action must be directed at meeting the 1.5 limit, or at least not exceeding 2.0. Nordhaus says, essentially, that the costs for such a goal are ludicrously high, will bankrupt the world—at least those countries playing the bill (which will be principally the U.S. and EU, since China, the biggest polluter, insists on being treated as a 'developing country')—and the limit should be much closer to 3.5. So far, the bill for lunch has not yet been paid.

11. <https://www.carbon-tax.org/whats-a-carbon-tax/>

"People want to be assured that (carbon emissions) targets are not simply the result of overly concerned environmentalists who are intent on saving their ecosystems at the expense of humans... People want to compare costs and benefits... It will not be sufficient to say: 'Ecosystems are priceless', or 'We must pay any cost to save the polar bears.'"

William D. Nordhaus

12. This shindig, by my estimates, cost in the neighborhood of \$100 million for travel and expenses and must have added upwards of 125,000 tons of CO₂ to the atmosphere.

13. I reported this in the November 2018 issue of **THE DISPATCHER**.

A Dispatcher's Musings: Can Time be Wasted?



The clock above is Thomas Jefferson's Great Clock that hangs in the entrance hall in his home at Monticello in Virginia. Monticello was Jefferson's primary plantation, having inherited the 5000 acre property from his father.

The clock below hangs on the side of Monticello facing the fields where his slaves toiled. Note that this clock has no minute or second hands, only one hand for the hour.



When Jefferson was not attending to the affairs of government and was at home in Monticello, he rose at dawn, worked on correspondence until 8:00 a.m. when he ate breakfast. He then rode his horse to inspect his property. At 15:00 he had his main meal with up to sixteen other guests. They conversed. At 8:00 p.m. he had a light meal with a few friends, and then retired. He did this every day.

SAVING WASTED TIME, for example in commuting, is often given as a justification for developing driverless vehicle technology. The assumption is—sometimes stated but oftentimes not—that commuting is being done alone in a car. For the 'saving wasted time driving to and from work' claim to be true, several conditions must be met. Most importantly, in my opinion, is accepting that one is wasting time by driving a car, whether it's to work or anywhere else. There are many criticisms that can be levelled at cars in general, but people buy and drive them because cars get them to places they need to go, faster, more conveniently and mostly more economically than any other means of transport. Secondly, we would have to ignore one of the reasons many commuters enjoy their car commute. It gives them time to think. Driving is a task involving a large amount of one's mental capacity, but not 100% of it. It seems our brains do have some extra neurons left over—even after performing all of the rigorous activities required for driving—and we use those neurons to solve life's puzzles.

There were three sparks that ignited this issue's *Musings*. One was an interesting article appearing on the BBC news pages that I came across this summer titled *The Neglected Benefits of the Commute* by David Robson. It is non-judgemental on the method of commuting, identifying the positive aspects of having a period at the beginning and end of the work day to put things in the mind in order. The second spark was a documentary I watched recently on the *Discovery Channel* about Thomas Jefferson, the principal author of the American Declaration of Independence, the third President of the United States, southern plantation owner and a man who lived by a tight schedule. His Great Clock (pictured upper left), showing hours, minutes and seconds, was placed in a strategic position in the main room in his mansion for a good reason. He lived by it. His workers lived by the clock (pictured lower left) that had only an hour hand.

The third spark was a statement made by Trent Victor, VOLVO CARS' principal spokesperson on the company's approach to self-driving and driverless vehicles. I found it

on VOLVO's *DRIVE ME* web site. He said: *"The commute to and from work, where traffic is often slow-moving or stationary, is also where there is the greatest potential to turn wasted time into productive time, or relaxing time. We want to get a deeper knowledge (in DRIVE ME) of what people want to do in a vehicle when they don't have to drive it, so we're looking at services that support working and entertainment."*¹⁴ Here is the claim in black and white by an employee of a company that produces and sells vehicles to people who buy them to drive them, that they are wasting their time—at least when congestion is blocking their progress.

The sun'll come out tomorrow; bet your bottom dollar

Let's first look at the notion of time. Bodin Jönson, a Swedish physicist and author of many books that explain the most complex concepts in the simplest of ways, wrote a book on the subject of time titled *What is Time?*¹⁵ She gives a brilliant answer in the first chapter: *"Time is nature's marvelous way of making sure that everything doesn't happen all at once."* She continues: *"As our forefathers gained an understanding of time, they could begin to gain control over their surroundings. Time also had a social function. It became possible to share events with others, refer to the past and the present and even predict the future."*



For thousands of years, sundials marked the progression of time through the day and calendars tracked the advancement of days through the year. The first calendar is attributed to the Sumerians around 2000 B.C. Hourglasses were used

by the tiny percentage of people who needed to measure time in fractions of hours. None of these devices were of much use to the large majority of the people all across the globe who woke before daylight, worked until after dark and were called to eat and pray by bells. Mechanical clocks, invented in the 16th century, made time more available to the few who could afford them, but it wasn't until pocket watches became affordable for more than the very wealthy in the late 18th century that tracking time by the minute and second began to reach the middle class. That happened after the start of the Industrial Revolution, when both factory workers and the growing number of office workers had their performance measured by the minute.

As Charles Taylor writes in his epic work, *A Secular Age*, today *"our lives are measured and shaped by accurate clock-readings, with-*

14. Passengers in vehicles being driven by a friend or family member, a taxi driver or a chauffeur are all free to do other things, and car companies can look at services today for these non-drivers without having to test self-driving and driverless technology to do so. *DRIVE ME* is therefore looking specifically at support to drivers who are not driving.

15. Jönson, Bodil. *Vad är tid*. Bokförlaget Langenskiöld (2017).



Mickey Mouse Watch

out which we couldn't function as we do. This thick environment is both the condition and the consequence of our far-reaching attempt to make the best of time, to use it well, not to waste it. It is the condition and the consequence of time becoming for us a resource, which we have to make use of wisely and to advantage. The dominance of instrumental rationality in our world, and the pervasiveness of secular time go together."¹⁶ Taylor, an academic and philosopher, explains how and why humankind moved from a state of existence when the world was enchanted and things happened magically, to the present era, in 'secular time', when (we believe that) science explains all. We act as if time is a resource, and we can own it. Taylor's eight-hundred-page book with often impenetrable text, but with sufficient periodic summaries for the dilettante reader, is devoted to making the case that it is not and we cannot.

Time is money, but money can't buy time

It seems we can thank Benjamin Franklin, one of Thomas Jefferson's co-conspirators in declaring independence for the American Colonies from the British, who coined the phrase "Time is money" in his *Advice to a Young Tradesman*. Its meaning has often been misinterpreted by those of us who view the world through secular time glasses, as if he said that time is a valuable resource that is finite, so it is better to do things quickly. What he clearly stated in his *Advice* was: "*Remember that time is money. He that can earn ten shillings a day by his labour, and goes abroad (meaning leaves his work), or sits idle one half of that day, though he spends but sixpence during his diversion or idleness, it ought not to be reckoned the only expence (sic); he hath really spent or thrown away five shillings besides.*"

To the extent that time can be used for any purpose, it is a resource. But time cannot be saved, it cannot be earned, and it definitely cannot be bought or sold. It has no positive or negative qualities. It cannot be turned into something like iron ore. It is just there. We cannot turn the clock back and recover time. Nevertheless, past time is preserved in our minds like the rings of a tree, and although time spent with others can be embedded in one's rings, our past belongs to us alone.¹⁷ Although we can fill up our time planner calendars with future dates, it is wishes we are writing down. Time will tell whether our wishes are fulfilled.

Shouldn't I be doing something else?

David Robson waxes lyrical on the benefits of commuting for creating a transition time between home and work, citing research

16. Taylor, Charles. [*A Secular Age*](#). Harvard University Press (2007).

17. Thanks to Bodil Jönsson in [*What is Time*](#) for this analogy. "*Think about yourself for a moment, as if you had annual rings like a tree so that your rings from the time you were born are still with you. It is through these rings and their interaction that you have learned all that you know, developed your feelings and attitudes, know what you like and what you don't like, and what new things you are ready to try. So, yes, you can recycle time. Yes, you do it all the time, and you have all your annual rings to thank for it.*"

by Jon Jachimowicz of the Columbia Business School.¹⁸ We have different roles at work versus at home. It is the age-old difference between the sacred and the profane places. Whether our work is down a set of steps and into a shoe repair shop or grocery store, or at the end of a journey that would be too long to walk, the roles we have at home are—and should be—different from the ones we have at work. Some people do not switch between these two roles very naturally, says Jachimowicz. “When we’re stuck in between these two roles—this thing that researchers call ‘role ambiguity’—we feel conflict, and that leads to a lot of negative outcomes, with feelings of exhaustion and burnout.” He says that the commute can provide the chance to change gears, effectively reducing stress, thinking about what we will do at the beginning of the day and about what we did at the end.

Thinking time is not talking-on-the-phone time, and definitely not check-email-and-social media-message time. The human brain has two memory systems centered in different parts of the brain, according to Boston University Professor Howard Eichenbaum, a neuroscientist.¹⁹ One is called the *declarative system*, which is the active memory center. This is in constant use to make decisions, including how to find our way from one place to another. It literally is a map stored in our brain of everything we know and how to get to the information. The second is the *implicit* or *habitual memory system*. After you have learned to do something, like drive a car and travel from point A to point B, the *implicit memory* lets you to do it without really thinking about it, thereby allowing you to use your *declarative system* for doing something else, like talking to a passenger or thinking.²⁰

This is not the same as multitasking, which is attempting to perform simultaneously two or more activities that require the *declarative system* and in which the *implicit memory* system cannot be called upon for support. Trying to concentrate on a language lesson or taking part in a conference call while driving in an unfamiliar neighborhood or on city streets where cyclists, pedestrians, buses and other cars are all screaming for your attention is simply asking for trouble.

Our different modes of commuting offer variable levels of using our *implicit memory* to get us to our destination while we use our *declarative memory* to reflect. It is much easier to think when walking than driving, but easier when driving than riding a bike on city streets. Sitting quietly on a train is better than standing on a

18. Robson, David. *The neglected benefits of the commute*. BBC Capital. (8 August 2018)

19. <https://www.wgbh.org/news/2017/05/17/science-and-technology/thinking-and-driving-brain-built>.

20. Eichenbaum gives an example of our brain on auto pilot when we start out driving on the same familiar route to work, but need to make a turn in order to get to a restaurant for dinner. But we miss the turn because our control of the car is in the hands of the habitual memory system. Happen to you?

crowded bus and being jostled by stops and turns. As with everything in our lives, there are trade-offs.

Did I just waste an hour walking with my own thoughts and no sounds coming into my ears except the chirping of birds in the trees, the honking of geese on the lake and the clicking of my ice cleats on the frozen path? No. Time spent walking, whether to get some fresh air and exercise or to get to work, is not subtracted from the rest of your life. It is added to your rings and becomes part of you. The same is true for the time you spend driving to get to and from the job that puts bread on the table and a bit of money in your pocket to buy something you enjoy. If you are annoyed by the delays that occur along your journey to the extent that they truly negatively affect your well-being, leave earlier or later, change your mode of travel if you can. If you can afford it, order a taxi or hire a chauffeur, change your job, or, as a last resort, move. However, don't hold your breath waiting for a driverless car to appear on the car dealer's showroom floor.

Let's get all of our motives in order

We should be careful with making what some might feel are elitist statements about the value of other people's time. What is waste to one person might be a treasure to another. There are many individuals who do not have the luxury of a job to commute to, and they would gladly exchange their 'free' time at home for any type of commute in order to have one. There are many people who do not have the choice to work within walking distance of their job, who cannot bicycle or ride a scooter because of their own physical limitations or those of their environment. Ask a young immigrant from Guatemala if he thinks he is wasting time when he's driving his pick-up from his home in Framingham to homes in the wealthy suburbs of Boston to earn a living as a gardener. Ask his wife if she is wasting her time driving their car to the same homes to clean them and do the household chores for the families who have taken their own cars to commute to their work.

Reducing congestion on the roadways is a worthy goal, but turning a traffic jam into an opportunity to feed data to Google or Facebook is not a reason for spending huge amounts of money to build cars that take over from their drivers. This money could be spent on much more worthy undertakings, like making necessary travel more affordable for more people in areas where public transport is not readily available or where private transport services are beyond the reach of the economically disadvantaged.

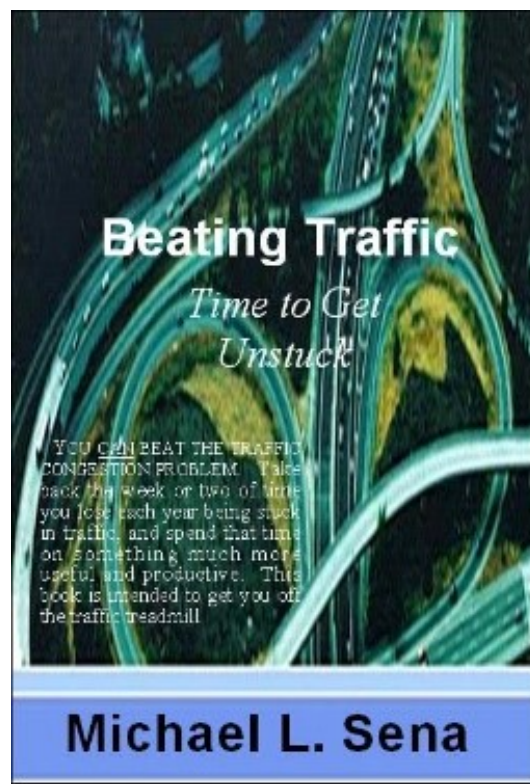


A winter morning scene in Vadstena, Sweden, after the sun has appeared over the southeastern horizon to make its short journey, low in the sky, before it sets in the southwest.

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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