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Volume 4, Issue 4

The Dispatcher

Special interest features covered in each issue:

- Driving automation
- Map data and navigation
- Data privacy
- Third party automotive services
- Regulations and Standardization

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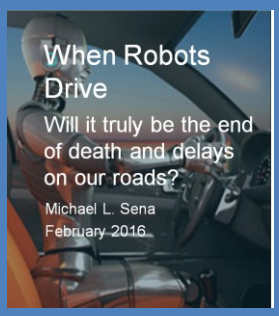


See page 5, Open AutoDrive Forum Keynote

Telematics Industry Insights by Michael L. Sena

Report from Dispatch Central

DURING A DOZEN DECADES, the motor vehicle industry has rolled along, designing, building, selling and maintaining its products. When times were good, companies added production capacity and jobs; when times were bad, they shed jobs and temporarily shuttered factories. For the past seventy years, in the absence of major famines, plagues and wars, interminable global population increases and economic growth have assured an expanding customer base for those companies that have managed to match what they offer with what consumers and businesses want at the right moment in time. Mergers and acquisitions trimmed the ranks in the middle of the twentieth century, but new companies have joined the fray in the twenty-first.

Suddenly, the old order seems to have changed and everything is up in the air. Automotive CEOs from Barra to Zetsche are talking about how their companies will evolve into mobility providers delivering rides on demand with their driverless cars, how their vehicles will never crash because of the advanced driver assistance systems they are installing and because their cars will talk to each other, delivering warnings and other useful information. Everything and everyone will be connected.

Governments at all levels seem to believe that reining cars is the new game in town, rivalling **Pokémon** (ポケモン). Oslo bans diesels; Stockholm bans studded tires; Paris would be rid of cars altogether. The U.S. is considering making a specific technology mandatory for V2V communications, just as the EU did for eCall. Then there are the self-inflicted wounds the industry must heal, like misrepresenting emissions and fuel consumption and over selling and under delivering on capabilities.

It is not an easy time to be in the transport-related business; but it sure is interesting.

Automated Driving News

IMAGINE A FEW DECADES into the future. You are being chauffeured in a driverless car to a doctor's appointment. You handed in your driver's license a few years ago. The car enters a work zone where an accident has occurred. Cars are being directed into and through a shopping center parking lot. Before the car gets through the detour, the driving software experiences an overload and starts to shut down. What happens next?

A. Before shutdown, the car signals for help and a tow truck is sent to the scene. You miss your appointment and need to hitchhike home.

B. Before shutdown, the car signals for help and a car with a human arrives within a few minutes, hitches up the disabled car and drives you to your appointment.

C. Before the car shuts down it sends a distress signal to a remote operations center. An operator takes over the controls of the car and guides it through the obstacle course without the car ever having to shut down.

Which option do you prefer? It is an unrealistic scenario, you say. Ask anyone who is working with trying to develop the software for driverless cars whether they can confuse their subjects. Nissan, for one, believes that humans will always need to be in the loop when something goes wrong—and something will always go wrong. In a

Continued on Page 5

WALMART SELLING CARS?

Walmart, *the world's largest company by revenue and employees, will begin to sell cars on the 1st of April in the U.S. through a partnership with* **CarSaver**, *an online automotive retail platform.* CarSaver *is setting up partnerships with dealership groups, including* **AutoNation** *Inc., the nation's largest new vehicle retailer. Four cities, Houston, Dallas, Phoenix and Oklahoma City, will be the initial test markets. We will report on this in more detail once the program gets started.*

FORD SELLING DIRECT ONLINE

On the 23rd of January, **Ford** *announced that it would be cooperating with software developer* **AutoFi, Inc**. *to allow customers to purchase and finance a Ford or Lincoln automobile online. Once the online process is complete, customers will pick up their cars at a dealership. It seems that Ford made similar announcements in 1999 with Microsoft, in 2000 with the formation of forddirect.com and in 2010 with FordOnline.co.uk. None of those URLs work any longer. Presumably this announcement will be lasting.*

PRESIDENT'S COUNCIL

"Advisory councils simply provide advice and attending does not mean that I agree with actions by the Administration. My goals are to accelerate the world's transition to sustainable energy and to help make humanity a multi-planet civilization."[1]

Elon Musk

The Future Networked Car Symposium

ONE YEAR AGO I attended for the first time a symposium that had been held each year starting in 2005 by the International Telecommunication Union (ITU – see sidebar on page 3) and the United Nations Economic Commission for Europe (UNECE): ***The Future Networked Car***. It is held on the first public day of the Geneva International Motor Show. This year it was on the 9th of March. Sponsors for this year's event were YGOMI, headed by Yuka Gomi and Russ Shields, and TÜV SÜD. There were 175 individuals pre-registered; the 140-seat capacity of the room was used to the maximum.

What I like about the symposium is the format. There are a series of hour-long roundtable discussions with a moderator and three-to-five panelists. Some panelists give brief presentations to explain their own or their organization's point of view on the panel topic, while others do not. The best panels, in my opinion, are those with more talk and less show. All symposium participants are engaged in one activity and there are no side show distractions. Another good aspect of the symposium is the diversity of attendees. The organizers have done a great job of attracting representatives from the public, private, regulatory and academic sectors from all over the world. The main topic is the status and future of vehicle communications and automated driving.

Following the introductions and statements on ITU's and UNECE's engagement in vehicle connectivity, the first panel addressed the future of 5G in automotive, which was moderated by Russ Shields. It quickly became clear that the panelists represented both sides of the V2X issue. On one side were those promoting 5G as the solution to V2X with C-V2X as the way to get there, and on the other side were those supporting the implementation of WAVE 802.11p/ITS-G5 (See page 3). Russ said that he does not believe in 802.11p, even though he chose it as the approach to be standardized way back in 1998. The world, and cellular technology, has moved on. Regulators should address the main problem that the automotive industry has had with cellular technology, namely forced obsolescence.

The panel on how artificial intelligence and machine learning will change vehicles and transport was led by Reinhard Scholl, ITU-T Deputy to the Director and chairman for the symposium. He had two panelists, one from IEEE and the other from the UN Interregional Crime and Justice Research Institute. It was obvious from the presentations and the discussion that people are still trying to find their way in this extremely important area. Even how we talk about giving computers and the algorithms that control them the responsibility to make split second decisions in all traffic situations is still at the most nascent stage. My main take-

Continued on P.5

NHTSA ON TESLA CRASH

On the 7th of May, 2016, an owner of a 2015 Tesla Model S was killed when his car drove under the trailer portion of tractor-trailer that was crossing the road in front of the car. The car was operating in Autopilot mode and travelling at 74 mph. There were no signs that the car's brakes were engaged prior to impact.

NHTSA was investigating this incident to determine whether Tesla was at fault for delivering a function that failed to operate as intended and as advertised, and/or whether Tesla should be forced to recall all vehicles onto which the Autopilot function had been enabled and remove the software?

Following eight months of review, NHTSA announced that it found "no defects in the system that caused the accident and Tesla's Autopilot did not need to be recalled." As my readers will understand, I am disappointed in this verdict. I have said since the crash was made public (in July!!) that Autopilot should be recalled, banned from sale for a period of time and renamed to what it actually is, a driver assistance system.

The key to NHTSA's verdict is their conclusion that the system "performed as designed". Tesla never stated that Autopilot was designed to perform as an autopilot system in all circumstances, so it could not be blamed if a driver took the liberty of believing that it would. This is a cop out, of course, but given the way regulations work in the U.S., a tiger can't bite if it has no teeth.

This is exactly the reason why NHTSA's **Federal Automated Vehicles Policy** must be implemented with pre-market testing and an approval authority to replace self-certification. The real key will be to have post-sale authority to regulate software updates, which promises to be a free-for-all if not addressed at the earliest possible time.

If cars could only talk to one another. Now they can.

WE ALL WISH at times that we could talk to the cars around us, not just to express our anger at being cut off but to offer helpful suggestions: Your gas tank door is open; your hubcap just fell off; your left rear break light is out. We use turn signals (not as often as we should) to let our fellow drivers know we intend to turn, flash our high beams to announce our approach from behind, tell an oncoming car that its high beams are blinding us or (in days past) to warn of a speed trap up ahead.

I have been studying the progress of vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communication, but it has been like watching oil-based paint dry. Then, in early October last year I received a call from the International Telecommunication Union (see sidebar), the same group for whom I wrote a study on over-the-air software and firmware updates the year before. They asked if I would be able to prepare a study of the roadblocks to implementing vehicle-to-everything communications.

When I started the work, I thought: *'It's like déjà vu all over again*.'[2] That's what it felt like digging through the early documents describing vehicle-to-vehicle communications solutions and the reasons it should be mandated by governments. There were the same arguments in favor of pushing forward with European eCall: It will save X number of lives per year; it will cost the consumer nothing; it is inexpensive; it won't require any new technology; it will be easy to implement.

For more than a decade, in public- and industry-funded initiatives in all of the major automotive markets, vehicle communications technologies have been developed, tested and standardized. Activities have focused mainly on solutions that work at relatively short range, provide instantaneous connections between senders and receivers and would be free to the users. The U.S. Department of Transportation has proposed to make a recommendation during the second quarter of 2017 that a selected technology known as WAVE—based on the same standard as products marketed as Wi-Fi—be made mandatory in all new vehicles on a phase-in schedule beginning in 2019. The Europe-based CAR 2 CAR Communications Consortium in July 2016 endorsed deployment of V2V and V2I communication using basically the same technology as that proposed in the United States.

There are two problems with moving forward with the proposed approach. First, cellular technology has developed quickly during the past decade and its supporters, such as 5G Americas and the 5G Automotive Association, believe it can do all that WAVE can do plus a lot more. 3GPP Release 14 solves the problem peer-to-peer communications. Second, although there are similarities and overlaps in how the technology would be implemented in the different regions of the world, they are not identical.

The report[3] studies two questions requiring answers: Should deployment of vehicle communications proceed with the WAVE solutions while further standards efforts in cellular technologies focus on the non-safety solutions; and, should deployment be switched to cellular technology?

In order to obtain a better understanding of what ITS stakeholders are thinking, a survey was undertaken. When the results of the survey were compiled, three groups were clearly distinguishable:

- Strong supporters of the WAVE approach;
- Strong supporters of the cellular approach; and,
- A large number of individuals from all sectors who were uncertain of the operation of either technology and their respective advantages and disadvantages.

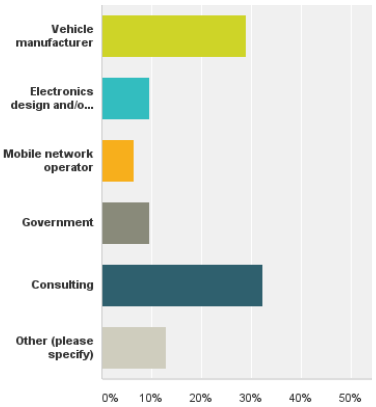
If WAVE is the initial solution, methods will need to be developed to incorporate next generation cellular technology. If you have not already received a copy of the full report, send me a mail and I will forward one to you. Thanks to all who took part in the survey.

INTERNATIONAL TELECOMMUNICATION UNION

ITU is the United Nations specialized agency for information and communication technologies (ICTs). It allocates global radio spectrum and satellite orbits, develops the technical standards that insure networks and technologies seamlessly interconnect, and strives to improve access to ICTs to underserved communities worldwide. Founded on the principal of international cooperation between governments and the private sector, ITU is the premier global forum through which parties work towards consensus on a wide range of issues affecting the future direction of the ICT industry.

ITU-T is ITU's Telecommunications Standardization Sector. It assembles experts from around the world to develop international standards known as ITU-T Recommendations*, which act as defining elements in the global infrastructure of ICTs. Standards are critical to ICTs, and whether we exchange voice, video or data messages, standards enable global communications by ensuring the countries' ICT networks and devices are speaking the same language. From its inception in 1865, ITU-T has driven a contribution-led, consensus-based approach to standards development in which all countries and companies.*

Participants in the survey: Roadblocks to Implementing V2X Communications



The Future of Automotive Navigation

TomTom Tomorrow

Founded in 1994 as *Palmtop Software* and rebranded in 2003 to TomTom, the company totally changed the market for in-vehicle navigation systems with its introduction of the ***TomTom Go*** system in 2004. For around €500 you had device that in classic 'disruptor' terms was good enough to get you from A to B.

By 2007, the company was valued at close to €6 billion and a net profit of €107 million. In June 2008, it acquired Tele Atlas for €2.9 million only to write off €1 billion of that seven months later. Its shares went from €64.80 to €2.84. TomTom has been trading between €6 and €9 during the previous twelve months.

What happened? According to one of the founders, Corinne Vigreux, it was a combination of Google's smartphone navigation and the financial crisis at the end of 2008, just after the purchase of Tele Atlas.[4] And, surprise, keeping maps up-to-date is expensive, and selling mapping services generates much smaller revenues than selling physical devices, admitted Vigreux.

It has gone through some tough times, but it is still in business and its owners/executives have proven that they are in this for the long haul. It counts both Apple and Uber as customers for its map data and it is keeping its retail device options open with a new a camera and sports watch. In January of this year, it acquired *Autonomos* (That's their spelling), a Berlin-based company specializing in driverless vehicle software. High definition, 3D maps for driverless cars. This is where they see their future.

Here has always been open to multiple owners, both in its present and former Navteq and Navigation Technologies, Inc. forms. It has had three owners, Audi, BMW and Daimler, since it was acquired from Nokia in 2015. In a flurry of activity at the end of 2016 in time for CES 2017 in January, three more were added. A fourth came in just after the start of the New Year.

The first three together will acquire a 10% stake: NavInfo Co., Ltd. and Tencent Holdings Ltd. are Chinese, and GIC is headquarted in Singapore. GIC is a global investment firm that manages Singapore's foreign reserves. NavInfo is one of the two suppliers of digital maps and location services in China (the other is AutoNavi, which is owned by Alibaba). The fourth new investor is Intel, which will have a 15% share.

Tencent Inc. was founded in November 1998. Initial funding was provided by venture capitalists. The company originally derived income solely from advertising and premium users of its messenger product *QQ*, who pay monthly fees to receive added extras. By 2005, charging for use of *QQ* mobile, its cellular value-added service, and licensing its iconic penguin character, which can be found on snack food and clothing, had also become income generators. Around 2008, Tencent started generating profit growth from the sale of virtual goods and gaming.

In January 2015, Tencent and JD.com, an online direct sales company in China, agreed to invest $1.5 billion in *Biauto* and its subsidiary, *YiXin*, an e-commerce specialist, to cooperate and provide online automotive transaction services to car buyers in China. Bitauto Holdings Limited is a leading provider of Internet content and marketing services for China's fast-growing automotive industry.

WeChat is Tencent's massively popular messaging app. Didi Chuxing is a taxi-hailing formed by merger of Didi Dache with Kuaidi Dache. Users hail the taxi with Didi Chuxing and pay using *WeChat*'s Payments. In May 2016, Apple invested $1billion in Didi. In August, Uber sold its China business to Didi Chuxing.

Tencent has an 11.8% share in NavInfo. The rest of NavInfo is owned by state-owned China Siwei Surveying and Mapping, which established the predecessor to NavInfo in 1997. BMW, VW and Mercedes-Benz, along with Toyota, GM and Volvo, use NavInfo's data in their Chinese navigation systems. It started a joint venture with Navteq in 2004 called NAV2. NavInfo took over full ownership of NAV2 in 2014. Its acquisition of Mapscape in 2011 gave it a foothold in Europe and access to important know-how in the *Navigation Data Standard (NDS)*.

Intel CEO, Brian Krzanich, explained his company's investment in Here thusly: *"Cars are rapidly becoming some of the world's most intelligent, connected devices. *We look forward to working with Here and its automotive partners to deliver an important technology foundation for smart and connected cars of the future."* Intel wants its Atom processor, and its successors, to be the brains behind the increasingly complex computations required to manage connectivity, advanced driver assistance and, eventually, self-driving cars. Computational power is its strength, not applications.

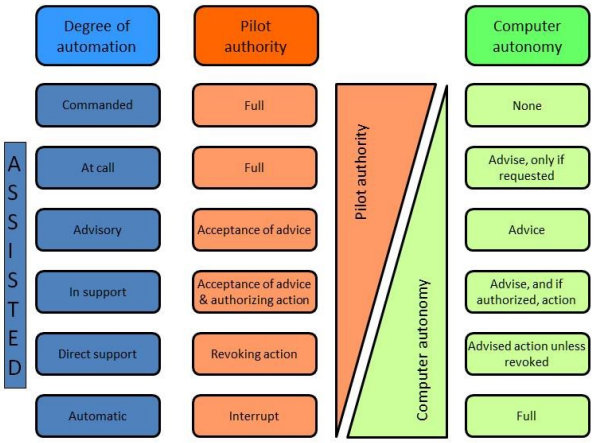
There are still 75% of Here's shares in the hands of its three automotive OEM owners. In my opinion, there is a need to add other vehicle manufacturers. Geely-owned Volvo, a long-time Here customer and ADAS pioneer, is an obvious addition. Toyota already has significant cooperation with NavInfo. Interesting times lie ahead for Here.

Automated Driving News (continued from p.1)

recent article in *Wired Magazine*[5], Nissan's Silicon Valley Research Center manager, Maarten Sierhuis, gave examples of situations that would confound the smartest robot driven car, and admitted that unassisted driverless cars were not going to happen "in the next five-to-ten years."

Nissan's solution for getting driverless cars on the road in a not-too-distant future is to build a remote control center that can take over when the driverless cars need a lifeline. Remote control operators are not going to be taking over normal driving tasks that require split second action. Cars are going to have to be able to handle black ice and heavy rain or snow conditions. It's the special situations that humans can easily handle once they have surveyed the scene, like driving through red lights when directed to do so by police or manoeuvring through traffic cones on lanes that are normally meant for oncoming traffic.

Mr. Sierhuis is no stranger to remote control of vehicles. He was a Senior Research Scientist in the Intelligent Systems Division at NASA Ames Research Center. He was the co-principal investigator, designer and project lead of the Mobile Agent Architecture that was used in simulations of human-robot exploration of Mars. He says his team's idea, which is called *Seamless Autonomous Mobility*, is a 'simple, scaleable answer to the fiendish problem of making robot drivers do everything humans can do."



There are other precedents. Take military unmanned aerial vehicle (aka drones) guidance as an example. At any time during a drone's flight from base to target, it can be in various states of autonomy, from full to none, as shown in the diagram above. Perhaps this is a more useful paradigm for driverless vehicles than the SAE's six levels of driving automation.

The Future Networked Car: Geneva (continued from p. 2)

away was the statement: Decisions should not be made by some engineers in a car company. There should be an agreed set of values that are applied equally by all car companies in their automated vehicles.

A group of panelists each presented their[7] own views on how the combination of automated driving and connectivity would change some aspect of the driving and vehicle usage experience. There were a lot of interesting ideas expressed, but probably too little opportunity to discuss their implications.

The last panel of the day was on cybersecurity and moderated by Roger Lanctot. Roger always has an on-topic question for every panelist and a great way of engaging the audience. We learned that cybersecurity is hard to solve and not enough resources are being devoted to it. The winner of my Quote of the Day Award goes to Arnaud Taddei of Symantec: *Getting to the core of the cybersecurity problem is like peeling an onion; the more layers you take away, the more you cry.*

We have to sort out the terminology. Self-driving, automated driving, autonomous driving, autonomous connected driving, connected car and networked car were all used, essentially, interchangeably during the symposium. The *SAE Standard J3016* defines levels of 'driving automation' where the top level 5 is full driving automation in which the car drives itself without any assistance from a human and without a human as a fallback in an emergency. There is no mention of 'autonomous' in the level descriptions. The more I have thought of it, the more I feel 'autonomous' was an unfortunate choice of term early on in the evolution of automated driving, and 'autonomous connected' is an oxymoron. So I will use automated and self-driving in the future, and connected when discussing V2X.

Open AutoDrive Forum

In mid-February, I was invited to give the opening keynote presentation to a meeting of the *Open AutoDrive Forum (OADF)* held at ERTICO in Brussels.[6] It was hosted by the TISA Forum. OADF is an initiative of the *Navigation Data Standard Association (NDS*). It seeks to act as an open discussion platform for cross-domain topics in the area of automated driving that require cooperation throughout the industry. The meeting was divided into a series of presentations in the morning and early afternoon and breakout workshops for the *OADF* working groups. None of the four OEM members, BMW, Daimler, VW and Volvo Cars, gave a presentation. What *OADF* is doing, bringing the industry groups *TISA, ADASIS Forum, SENSORIS* and *NDS* together, is absolutely essential, but NDS cannot be seen by the industry groups or official standards groups as assuming a position of authority. It's walking a tightrope.

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Footnotes

1.At the International Astronautical Congress in Guadalajara, Mexico on 27 September 2016, Elon Musk revealed his grand plan for establishing a settlement on Mars. "This is not about everyone moving to Mars, this is about becoming multiplanetary."

2.Yogi Berra, is famous for his magnificent baseball skills as a catcher and hitter for the New York Yankees and for his comical statements known as 'Yogiisms'. This is one of his best.

3. Sena, Michael. *Roadblocks to Implementing V2X Communications: An Automotive Industry Survey Conducted for ITU-T*. (December 2016)

4. Interview with Corinne Vigreux, co-founder of TomTom in The Guardian (21 July 2015).

5.Wired Magazine. Davies, Alex: *Nissan's Path to Self-Driving Cars? Humans in Call Centers*. (Jan. 5, 2017).

6. The title of my talk was When *Robots Drive: Will it truly be the end of death and delays on our roads?* You can find it on my web site under *Presentations*.

7. I have decided to follow a grammatical suggestion proposed in the U.S. for a gender neutral pronoun, using 'their' instead of 'his or her', and 'them' instead of 'him or her'.

Musings of a Dispatcher

THERE IS NO MYSTERY to why traffic congestion occurs. There are two reasons: 1) recurring problems (stuff that we (politicians, architects and engineers, business leaders and citizens) have caused ourselves because we have done a lousy job of making and following the rules for designing our built environment); and, 2) non-recurring problems (stuff that unexpectedly happens, like crashes, disabled vehicles, roadway construction, or the mere presence of police cars). The likelihood of a non-recurring problem occurring increases in areas where recurring problems are most acute. I didn't make this up. If you would like references, see the little book below.

The mystery is why people choose to live and work in places where traffic congestion is severe and why we—no one escapes blame—tolerate the perpetuation of recurring problems. We do not demand better performance from those in whom we have entrusted the planning and design of our built environment, and we don't take the time and expend the effort to understand our options. *'It's rush hour traffic,'* we say*, 'and this is the price we pay for living and working in areas where many other people want to live and work. It's our choice.*'

As it turns out, we don't really have totally free will in the matter. Where we live is the result of optimizing a multi-variable equation with size of dwelling, cost of living in the dwelling and distance of the dwelling to our main destinations being the principal variables, and self-image, family obligations and socio-cultural factors being the others. Our income is the prime determinant: the more we make, the bigger the dwelling we can afford in a location that is closest to everything and meets our other expectations. If we are lucky, we get through to retirement without losing our job and either having to take a position someplace farther away or someplace close for less money—which then puts the whole equation into question.

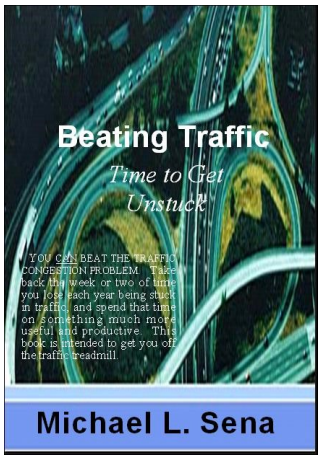
Robots driving our cars, trucks and buses have the possibility to change this situation both positively and negatively. They will probably reduce the non-recurring causes of congestion and allow us to avoid most crashes and thereby live longer. But they, and their mechanical associates, will take more and more of our jobs, reducing the critical ingredient in our recipe for a blissful life: money. And as we earn less money—or depend on the state to provide us with our minimum subsistence allowance—we will have less reason to travel in all of those robotic vehicles or buy goods delivered by drones.

Unless we start thinking about the inter-related problems of recurring and non-recurring traffic congestion from a human perspective and not from a technological one, we are going to end up with a bigger mess than we have today. Think about that.

About Michael L. Sena Consulting AB

Michael Sena works hard for his clients 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 is happening. Explaining and understanding the how and why, and developing your own strategies, are what we do together.



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