The Dispatcher

If we really believe that robots make better drivers than humans, why not just let them drive our cars rather than making cars into robots?
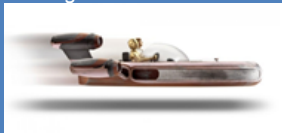
Trusty robot C-3PO drives Master Luke in the Speeder

Telematics Industry Insights by Michael L. Sena

Report from Dispatch Central

BMW, AUDI AND MERCEDES-BENZ compete fiercely in all markets for top dog position in the volume luxury segment. In 2015, they had a combined sales of 6 million vehicles, with BMW in the number one spot with 2.3 million, MB in second with 1.9 million and Audi in third with 1.8 million. They are the undisputed leaders of this high-margin segment. Lexus had global sales of 652,000.

It wasn't always this way. In the 1960s, BMW was producing Chevy Corvair look-alikes. In the 80s, Audi had a near-death experience when U.S. owners accused its automatics transmission cars of unintentionally accelerating when the ignition was turned on. In 1998, MB parent, Daimler, in a "What were they thinking?" moment paired the brand with Chrysler. It took nine years for everyone to come to their senses.

During the past few years, slowly, quietly and resolutely the three competitors have forged a partnership. Although they compete, they are pulling in the same direction in a number of important areas, including with HERE and 5GAA. They have shown that they have the financial resources, the will and the capabilities to take on the task of leading the automotive industry into the next generation of mobility.

1964 Chevrolet Corvair

1964 BMW 1800

Autonomous Driving News

HUMAN ERROR IS THE CAUSE of 95% of all vehicle-related accidents; robots are not humans; therefore, cars driven by robots will not have accidents caused by human error. According to Merriam-Webster, a robot is "a real or imaginary machine that is controlled by a computer and is often made to look like a human or animal." Even if you believe that robots will not make errors of their own—which I do not—at least those 38% of errors that are related to mental causes (sleep, inattention, drugs and medical conditions) and perhaps one-half of the 46% of the misjudgment errors (lane keeping, static vehicle, preceding car) could be eliminated. We are left with 11% of the 95% caused by unexpected behavior, which is the really difficult nut to crack. That is where human judgment, or lack thereof, determines the vehicle's occupants' fate.

So, let us assume that at some point in the future, all the tests have been made to ensure that robots can drive vehicles more safely than humans, the laws have been passed to allow robots to drive our cars and the public have been prepared to accept their new role as passengers. What then? A billion non-robotic cars will be running around the streets of the world and a few million new robotic-controlled cars will be doing their best to avoid them. I, for one, do not believe that is a particularly good approach to the problem of reducing traffic-related fatalities.

Governments and the vehicle industry, working together with the health and insurance industries, have done an excellent job of improving the crash-

ASTAZERO IS A PROVING GROUND for testing advanced safety systems, including driverless technologies. Its size (2 million square meters or 494 acres) and diversity of road types (highway, rural and urban) makes it a great place to test both vehicles and infrastructure. It opened in the summer of 2014 and is owned by the SP Technical Research Institute of Sweden and Chalmers University of Technology. Its location about an hour to the east of Göteborg close to the rejuvenated city of Borås is ideal.

I had been looking for a good reason to visit the facility. When I received an invitation to the Final Event of AutoNet2030, I could not pass it up. AutoNet2030 is an EU-funded, DG-CNECT project with nine partners. The goal has been to test the combination of cooperative ITS and automated driving. One of the principal developments in the project is the concept of a dynamic, multi-lane convoy, as opposed to a single-lane platoon. The highlight was riding in one of the three test vehicles as they drove on the test track. It was impressive.

What the Car Companies Are Doing

DAIMLER, BMW AND AUDI have teamed up with ERICSSON, HUAWEI, INTEL, NOKIA and QUALCOMM to form the **5G AUTOMOTIVE ASSOCIATION**. The idea is to develop, test and standardize the fifth generation of high-speed wireless communication. As with all new cellular G-enerations, the next one is always faster, handles higher data volumes, connects more devices, dramatically reduces latency and is significantly more reliable. One thing is certain about 5G: it will bring the full power of the Internet to the vehicle.

It seems that the idea behind the organization of **5GAA** is to try to get more things right at the start, before the services go live in a few years. They will attempt to develop technical requirements and implementation strategies in order to support standards and regulatory activities. They need to make sure that privacy and security issues for vehicle-related applications are designed into standards and regulations, and not added as an afterthought as has been the case. It would be good to see a few mobile network operators in the mix as well as the telematics service providers and platform service providers. The Chairperson of the Association is Audi's Christoph Voigt and Qualcomm's Dino Flore is its Director General. Expect announcements of other automotive and telecom companies joining the group.

ALAIN VISSER MOVED from VOLVO CARS to GEELY AUTO in September 2015 to help launch a totally new brand. On October 19th this year, as the Vice President of *Lynk&Co*, he presented the brand's first model, an SUV, named simply, *01*. Alain had done an excellent job as head of marketing and sales to prepare VOLVO CARS for the sales ramp-up that began under his tenure. This is why he was picked by GEELY Chairman, Li Shufu, with the blessing of VOLVO CARS CEO, Håkan Samuelsson, to head up the new brand developed by the GEELY-VOLVO joint venture, CEVT (China Euro Vehicle Technology). They also put their top designer, Peter Horbury, in charge of giving the car its form. It has the same platform, CMA (C-segment Modular Architecture) as the soon-to-be-released new V40 Volvo.

The *01* looks good, but the real innovation is how it will be offered to customers. One option is as a subscription service. "If folks want to buy the car, we won't say no," said Alain during the introductory press conference, "but we will not have a dealer network where the transaction can take place." He was referring to Europe and North America. The car will go on sale first in China starting Q4 2017, where it will be sold through company-owned stores as well as on the Internet, and buyers can have their car delivered to their homes. Other ideas include no-haggle pricing, no-option packaging and valet pick-up and delivery for service.

In the first week of October, Toyota introduced to the world its mini version of **Kirobo**. Its bigger brother was a companion to Japanese astronaut, Koich Wakata on an International Space Station mission in 2013. The little 'bot' will start talking to actual customers sometime in early 2017, and will sell for around $400.

Kirobo Mini is 5 cm (2 in) tall

According to Toyota, audio that is picked up by the Kirobo is sent to a companion application on a smartphone. From there, the audio is sent to a cloud system run by Toyota. The cloud system helps determine what is being said and how the robot should respond.

The U.S. press (e.g. Forbes, *The Verge*) were perplexed. Odd, I think. An ad broker (Google) builds a dinky little car that can drive itself around its campus and the pundits predict the end of the car industry. When the largest and most successful car company develops a conversational robot to test its robotics and artificial intelligence capabilities, the same 'experts' wonder why the company is wasting its time and (investors') money. We'll see who laughs last—and best.

Government ITS Policy: Tool or Weapon

THE ROMANS WERE way ahead of us when it came to making transport policy that achieved the desired objectives of moving people and goods without stepping on too many toes. The *Law of the Twelve Tables*[1] specified the width of a paved road as eight Roman feet (2.37 meters) when straight and twice that width when curved; it declared that when no paved road exists, or if the road is in disrepair, 'wayfarers' have the right to pass over private land.

Constructing the principal public roads connecting cities or other important places was the responsibility of the Roman army since the roads were viewed principally as part of the country's defense infrastructure. The soldiers had an interest in walking and moving their equipment on pavement, rather than along dirt paths or through fields. It was easier to convince private land owners to give up a strip of land for a road rather than having everyone tramping across their property. Private land holders also contributed to the cost of building the roads.

So it was in everyone's interest to build straight roads because they cost half as much as curved roads, and it was of the highest priority to build roads that needed the least amount of maintenance once they were built. My maternal grandmother was born in a house along the *Via Flaminia*, which had been built in 220 B.C. The road is still in use today.

This is an excellent example of a law being used as a tool to accomplish a specific task. The major goal was to protect the country against invaders and secondarily to facilitate the passage of goods and people among the Empire's centers of commerce. Sturdy roads, built at the lowest cost, became the objective for helping to achieve those goals.

Compare this to governments' attempts to use laws to force the adoption of ITS solutions as substitutes for, or supplements to, investing in building physical infrastructure, hiring additional traffic enforcement personnel, installing tamper-proof speed detectors, fixing cameras at all grade intersections and issuing fines and rescinding a driver's license for infractions, etc. Within the EU, it is the European Commission that sets policy for transport across all 28 countries. Their 2008 *ITS Action Plan*[2] is still the means to direct policy. Goal: deliver stronger, lasting growth and create more and better jobs. Objectives: cleaner, more efficient, safer and more secure travel and transport. It establishes a priority area, Number 4, to 'integrate the vehicle into the transport infrastructure,' and then it states that a single, open in-vehicle architecture is a necessary part of the way

to do this. How did they make this jump?

On the other side of the pond, NHTSA starts with its own mission statement: To reduce fatalities, injuries and economic losses resulting from motor vehicle crashes. Then it states its Objective: To avoid crashes. It, too, jumps to a not-so-logical conclusion: crash avoidance technologies have to be deployed, and that technology is DSRC, or Wi-Fi adapted for moving vehicles. Vehicles should 'listen for other vehicles' Basic Safety Message transmitted 10 times/second and continuously analyze the threat of possible crash threats.

Since V2V and V2I technologies do not generate significant benefits unless a large number of vehicles are equipped with interoperable systems, both the EU and U.S. governmental agencies see regulation with mandatory requirements as the only way to get the job done, but the 'job' they have identified is implementing the technology. The U.S. and EU both hope that the technology will result in a thousand lives saved annually in each of their regions by preventing a million crashes, but there are no guarantees. Then, there is the issue of the technology that has been selected. Is it the right one? Does LTE or will 5G provide a better solution for all communications rather than using multiple radio systems?

Sending messages to and from vehicles is a great idea. We did it in the '70s with CB radio. Cell phones did CB radio in, but they have not replaced it. (Ed.)

What if all cars were required to automatically stop at all red lights, stop signs and pedestrian crossings? What if cars could only drive as fast as the speed limit and, except for police cars and ambulances, could not pass on two-lane undivided roads? What if all cars—not just taxis and buses—were equipped with alcohol test devices and would not start if the driver did not pass the test? When we reflect on why we haven't implemented these and many other measures that would truly save lives we understand that there are caveats on the objective of saving lives, and the biggest one is preserving the individual's privacy and personal freedoms. Basically, if anyone wants to use their car to kill themselves or others, they are free to do so; only if they survive will they be prosecuted.

Most people use their cars to get to a specific place and usually at a specific time. Congestion, accidents and breakdowns make this difficult. With all of our route guidance, traffic information systems and mobile apps we still have not managed to give drivers a reasonable guarantee that they can arrive at their destination on time. I believe that drivers will gladly pay to use the roads if they see that they are getting something of value (on-time arrival), and their payments could be put toward the V2I and V2V technology that would dynamically track a vehicle and communicate priorities to other vehicles along the route. Cars yield because they have lower priority (started later, paid less, not medical emergency). Yielding equals not crashing and lives are saved. Different approach, better results.

The Future of Automotive Navigation

JUST AFTER THE TURN of the new Millennium, Navigation Technologies, Inc. appointed a new CEO, Judson Green, who took over from T. Russell Shields. Russ became Chairman and handed over the job of taking the company public to the polished former Disney executive. In May, 2000, Judson promoted Dr. Salahuddin Khan, who had been with NavTech since '98, to the position of VP Corporate Marketing and Strategy. In November, Judson hosted his first and last NavTech User's Group meeting. It was at this meeting that I listened and watched as Salahuddin Khan presented the company's new strategy, one he had been perfecting during the three previous years. NavTech would transition from being a navigable map data supplier to being a location services platform provider.
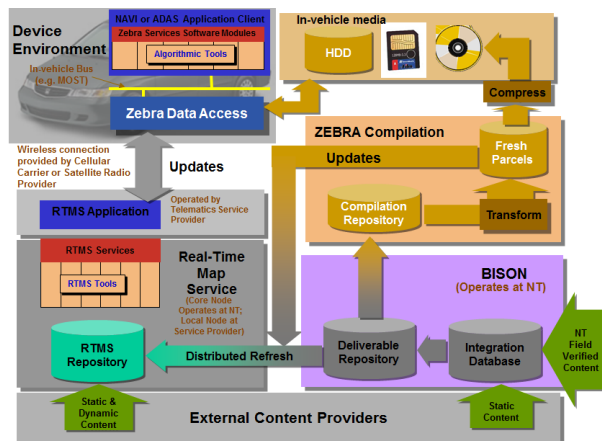
At the time, NavTech had locked up most of the OEM navigation system data business. Microsoft had signed a long-term deal for Internet maps, and a Karlsruhe, Germany company, PTV, was building a strong position in Europe delivering Internet map services to businesses. Dr.-Ing. Hans Hubschneider, the CEO of PTV, was among the attendees of that User's Group meeting. When Salahuddin finished, Dr. Hubschneider stood up and said that if NavTech was going to compete with its customers (i.e., PTV), he was going to have to look at licensing someone else's database.

Judson Green turned purple. Literally. There was no more talk after that of NavTech's ambitions to become a service provider. The next year's gathering was labeled *NAVTECH DIRECTIONS 2001* and it was a well-orchestrated set of presentations of how the company was going to support the businesses of all invited guests. The User's Group had been quietly disbanded.

Navigation Technologies' vision in 2000

Fast forward fifteen years, after the company's public offering and name switch to NAVTEQ in 2004, after Judson's and many of the old guard's exits, after its acquisition by Nokia in 2008, its name change to HERE and its sale to BMW; Audi and Daimler. HERE defines itself now as 'your destination for data-driven location solutions', the ***Open Location Platform company***. Services <u>with</u> data are exactly what its automotive customers want. Google's aggressive free-to-fee strategy and *Open Street Map* ate into its non-auto business. The OEMs needed to move up market with their profitable navigation systems and ADAS offered the perfect path. The diagram that Salahuddin presented sixteen years ago, shown below left, has many of the elements that HERE has incorporated into its services platform.

Dr. Ralf Herrtwich, Daimler's long-time leader of research on everything to do with spatial data, connectivity and autonomous driving, became HERE's new SVP of the Automotive Business Group on October 1st. HERE is now ready to push forward on the next phase of its thirty-year life. So I thought it was time to accept an open invitation from Bruno Bourguet, SVP of Sales and Business Development, to visit the company.

Autonomous Driving News (continued from p.1)

worthiness of vehicles during the past fifty years. Cars' occupants are far safer than they were in the Corvair days, and vehicles are much better at avoiding accidents and protecting the occupants when accidents do occur. So why are we not doing more to improve the drivers when they, not the vehicles, are responsible for most accidents? If all drivers could be as good as robots are supposed to be, we would get to the more ideal state of 95% fewer vehicle-related fatalities much faster. Right?

When the crash dummy comes to life

It is definitely not too late to change our thinking on autonomous driving from making the car a robot to putting a robot in the driver's seat. Think about it. Instead of adding even more cost to vehicles in order to make them driverless, put a *driverbot* in the driver's seat of any car. If the human driver wants to take the wheel on occasion, the *driverbot* can become the *backseat-driverbot* for the trip, adding an extra, and unfaltering 360 degree 'pair' of sensor eyes.

This is not fiction. DARPA[3], the same agency that sponsored the *Grand Challenge* and *Urban Challenge* for autonomous ground vehicles—which was the basis for most of what is now happening in driverless cars—sponsored a *Robotics Challenge* between 2012 and 2015. It consisted of eight tasks, one of which was a robot driving a utility vehicle. Apparently, the robots in all shapes and sizes did about as well as the first robotic vehicles in the *Grand Challenge* in 2004, that is, lousy. Most of the robots fell over trying to walk on rough terrain and over rubble. The one task that they did seem to be able to complete without too much trouble was driving. The overall winner, a 5' 9" humanoid robot called *DRC-Hubo* from Team KAIST of South Korea, drove around in the modified Polaris utility vehicle supplied by DARPA "about as well as a person might."

Not satisfied with putting ground vehicle drivers out of work, DARPA is also sponsoring research to replace the second human pilot in two-person flight crews with robot co-pilots. The program, called *Aircrew Labor In-Cockpit Automation System*, or *ALIAS*, is just getting off the ground (pun intended).

The Future of Automotive Navigation (continued from p. 4)

I met Alex Mangan and Sebastian Kurme at HERE's office in Berlin. They provided the high-level strategic overview and the detailed technical insights that I had asked for. Their energy and enthusiasm was evident during the entire meeting. The three current shareholders along with Edzard Overbeek, their choice for CEO, and the management team he has assembled since he moved from Cisco to HERE in February of this year, have clearly brought a renewed intensity and excitement to the company.

Strategically, HERE has moved from serving automotive and enterprise customers with mapping solutions to operating an open location platform that will serve multiple initiatives. Today, those initiatives include *Automotive* and *Internet of Things*. Tomorrow, they will include many other service areas.

Although Alex and Sebastian could not share any names, HERE management have already made it known that there will be additional shareholders, possibly by the end of the year, and both strategic partner and data contributor announcements. HERE is receiving sensor data from its three shareholders' vehicles today in North America and Western Europe, processing it on its Open Location Platform, integrating it with location context and turning that data into services. It is that thirty years of 'location context' that is HERE's key selling point. Four initial services have been announced (Traffic, Parking, Hazard Warning and Road Signs), but this offering is really just the tip of the proverbial iceberg.

I believe that the folks who made the original NavTech/Navteq what it was would be pleased and proud to see what it is in the process of becoming.

Audi, BMW and Mercedes-Benz have agreed to supply HERE *with real-time sensor data collected from their cars to support the production of more accurate traffic information, hazard warnings, road signs and on-street parking.*
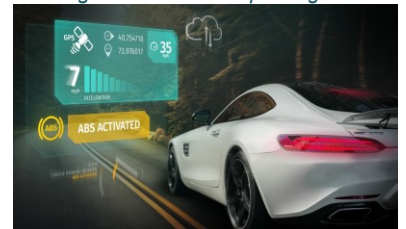
http://www.bmwblog.com/2016/09/26/bmw-mercedes-audi-joining-forces-take-google/
The companies claim that this is the first time for such collaboration in the industry. Other car and truck OEMs are invited to supply data from their sensors, but supplying data is not a quid pro quo for receiving services, and they are not limited to vehicles. Municipalities, road authorities or app developers are also welcome customers.

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Footnotes

1. Law of the Twelve Tables (*Duodecim Tabulae*) was the legislation that stood at the foundation of Roman law; first drawn up in 450 B.C.
2. Action Plan for the Deployment of Intelligent Transport Systems in Europe. Communication from the Commission (Brussels, 16.12.2008)
3. DARPA (Defense Advanced Research Projects Agency of the U.S. Department of Defense. Congress authorized DARPA to award cash prizes to further DARPA's mission to sponsor revolutionary, high-payoff research that bridges the gap between fundamental discoveries and military use.).
4. Eric Teicholz is, and was back in 1987, President of his own consulting firm, Graphic Systems, Inc. in Cambridge, MA. He was Associate Director of the Harvard Lab for Computer Graphics from 1968 to 1982. We worked together from 1983 to 1990.

What the Car Companies Are Doing (from P.2)

CARLOS GHOSN is impressive. For the past eleven years he has been CEO of both Nissan and Renault. In October he was named Chairman of Mitsubishi Motors after Nissan took a controlling interest in the company. He was interviewed by the Editor-in-Chief of *Harvard Business Review* and the interview was published in the October issue of the magazine. It is well worth reading. Here is one clip:

"Is the innovation by Google and others in Silicon Valley worrisome for the auto industry?" asked Adi Ignatius.

"I'm not worried. Sure, it's interesting to talk about Apple or Google making cars. But we have a long tradition of taking technology from the outside and putting it into our products. Automakers are architects. We assemble parts. We assemble technologies. We assemble know-how—all to make a product and bring it to the customer. Our big challenge is, How do you put new technologies into a car while continuing to deliver on classic expectations?"

https://hbr.org/2016/10/making-the-car-a-mobile-connected-workspace

Musings of a Dispatcher

"I DON'T KNOW if you are trying to sell us a new washing machine or a completely different way of cleaning our clothes. Why do we need computer-aided design in the first place?!"

Eric Teicholz[4] and I were working together in 1987 on an assignment for one of the major architecture and engineering firms that had its headquarters in New York City. We were tasked with helping the firm and its employees make the transition to the world of computer-aided design and drafting. The remark above came from one of the architects during a workshop we were conducting. This was all new to most of them, and it was clear that they were not having an easy time with it.

I had spent the previous ten years helping to take a group of cartographers at a Swedish map company from ink pen to light pen, from scribing to scanning, from peel coat to laser plotters. I had learned something about change management, and one of the lessons was that not everyone likes change. Another was that not everyone benefits from change. The map publishing industry is a case study in how automating a manual function leads eventually to fundamental changes in how the product which that function helped to produce is used. We don't use printed maps as we did before, and many of the old map companies are no longer with us.

Those bus, truck and taxi drivers won't thank you for automating them out of a job. Take my word on that. And don't expect the majority of car drivers to happily hand over their steering wheels to you. You'll have to wait for the chauffeured generation to outnumber the folks who actually enjoy driving their car.

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.

Beating Traffic
Time to Get Unstuck
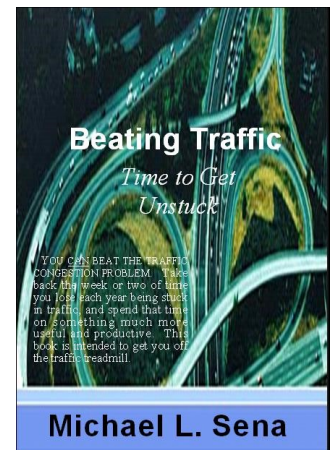
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