September 2017

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The Dispatcher

In this issue:

A 1960 Saab 96 in less than mint condition and with a steering wheel lock has been parked in our neighborhood this summer. I'm sure it is still a joy to drive, even though it is distressing to look at its worn out body. Although, on second thought, there is some resemblance to the matt finished new BMWs and Audis I have seen recently. Like the shabby jeans look. I prefer the gleam of the old Wolseley on the other side of the page.

Telematics Industry Insights by Michael L. Sena

Automated Vehicles: Are We Moving Too Fast or Too Slow?

ARE WE MOVING too fast to get 'No Humans Needed' automated vehicles onto our roads, or are we dragging our feet? The Move Faster lobby says every day that passes without robots driving all our cars, close to a million people die needlessly in traffic accidents. Here are the numbers, and they are grim:

Annual Global Road Crash Statistics[1]

- Nearly 1.3 million people die in road crashes each year, on average 3,287 deaths a day.
- An additional 20-50 million are injured or disabled.
- More than half of all road traffic deaths occur among young adults ages 15-44.
- Road traffic crashes rank as the 9th leading cause of death and account for 2.2% of all deaths globally. (WHO ranks it 10th globally, but it is 8th in countries classified as upper-middle-income, and not on the top-ten list in countries classified as having high-income economies. Is it because cars are safer in the high-income economies?)
- Road crashes are the leading cause of death among young people ages 15-29, and the second leading cause of death worldwide among young people ages 5-14.
- Each year nearly 400,000 people under 25 die on the world's roads, on average over 1,000 a day.
- Over 90% of all road fatalities occur in low and middle-income countries, which have less than half of the world's vehicles.
- Road crashes cost USD $518 billion globally, costing individual countries from 1-2% of their annual GDP.
- Road crashes cost low and middle-income countries USD $65 billion annually, exceeding the total amount received in developmental assistance.
- Unless action is taken, road traffic injuries are predicted to become the fifth leading cause of death by 2030.

It is human error, not mechanical failure that causes the vast majority (85-95%, depending on the study) of these accidents. And it is humans both inside and outside of the vehicles that commit the errors. The vehicle industry claims that it has done as much as it can to improve the safety of the vehicles we drive so the chances of surviving a crash have significantly improved.[2] The logic of No Humans Needed AVs is that it is only by replacing humans with highly and artificially intelligent robots aided by the most sophisticated sensor systems that can see, hear and feel in ways that are not possible for humans, we can eliminate—or at least significantly reduce—the number of deaths and injuries involving motorized vehicles. Robots can be programmed to maintain constant attention to the driving task, obey all rules of the road and never start a journey when weather conditions do not permit it. They don't fall asleep unless their batteries wear down and they don't take drugs or drink alcohol.

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Dispatch Central

No ICE on Our Streets

It started with weekend street closings in Paris and other cities, to sort of clean the air and make it possible for folks to stroll down the middle of the pavement without having to be restricted to the sidewalks. Then cities like Mexico City, Oslo and Paris began announcing that within a certain number of years, they would ban diesel fueled vehicles from some of their cities' streets. Recently, it has become fashionable for politicians to claim that all internal combustion engine vehicles will be banned. The U.K. and France say they will go by 2040. Angela Merkel succumbed to the goading of her Social Democratic rival, Martin Schultz, who first floated the proposal as a trial balloon. Mrs Merkel said she would prefer not to give a start date for the ban.

I would like to suggest that it be the day the last ICE vehicle is retired from service so that a ban would not be necessary.

Here's Britain's oldest running car, a two-seater WOLSELEY 6 built in 1904. Its owner says it "runs like a dream and has never broken down." WOLSELEY disappeared in 1975, but its cars live on.

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Dispatch Central (continued)

Charge 'er up

According to a report released by the U. of Michigan, as of June 2017, the U.S. has approximately 16,000 public EV charging stations with around 43,000 connectors. That's up from 5,000 five years ago. But the main job these public stations should be doing is topping up travelers on the road, and this requires DC fast-charging. Unfortunately, there are only 2,000 of these. Just for comparison, various sources put the number of petrol stations at around 125,000. There are currently over 100,000 public charging points available for EVs across the EU, a doubling in two years. The majority are located in a few of the Member States in which 90 % of all new EVs were sold in 2015: NL has around 30,000 charging stations; DE has 25,000; FR has 16,000. (https://epthinktank.eu/2017/04/05/charging-infrastructure-for-electric-vehicles/). As of January 2017, Norway had over 7,000 charging stations of all types, including 234 Tesla Superchargers, and plug-in electric vehicles represented 20% of all cars sold in 2016.

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If China had the same number of road deaths per 100,000 per year as Sweden (18.8 for China vs. 2.8 for Sweden), 220,000 fewer people in China would die each year and 736 billion CNY ($110 billion) would be saved per year.

The Economist – What If
July 15th 2017

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GM's Maven Offers Gig

There are two main definitions of 'gig' (both 'g's pronounced as in the word 'go'): a light two-wheeled carriage pulled by one horse; or, a job usually for a specified time, especially *an entertainer's engagement. GM's* ***Maven*** *car sharing service is offering entrepreneurs a weekly rental deal on a Chevy Bolt BEV for USD229/week, inclusive of insurance, maintenance and charging. LA and San Diego are the first cities where it is offered. This is less than half of what it would cost to rent the smallest car from Hertz. Maven must know what it is doing because the word 'maven' means 'one who is experienced or knowledgeable'. Let's hope so.*

AVs: Are We Moving Too Fast or Too Slow (continued from p .1)

For those who have made up their minds that robot-driven cars are the answer to 'Vision Zero', all obstacles causing delays to development and deployment are unconscionable. Obstacle number one is the legal right for them to put test cars on any road so that developers can prove their systems perform in ways that humans cannot.

That pesky *Vienna Convention*, to which most countries in the world are signatories (the U.S. signed it, but it was never ratified by Congress), puts a spanner in the works. Article 8-Drivers, paragraph 5 states: "Every driver shall at all times be able to control his vehicle or to guide his animals." As of the 23rd of March 2016, amendments to the 1968 Vienna Convention on Road Traffic entered into force specifying that automated driving technologies transferring driving tasks to the vehicle will be explicitly allowed in traffic, "provided that these technologies are in conformity with the United Nations vehicle regulations or can be overridden or switched off by the driver." This opens the door to countries modifying their own rules of the road, but this takes time and there is no uniform standard on how it is done.

Countries around the world, and jurisdictions within countries, are competing with each other to become leaders of robotic, driverless car developments. They are passing laws to enable testing and eventual deployment, they are providing funds for special off-road test facilities, and they are providing grants to support research in artificial intelligence and deep learning. No one wants to be left behind or miss the driverless vehicle wave that many feel is all but inevitable.

WHAT'S THE RUSH?

The Move Slower camp says that we don't really know for sure that robots are better drivers than humans, we are not yet certain what changes will be required to the transport infrastructure to accommodate a mix of human- and robot-driven vehicles and, perhaps most importantly, turning over our cars, trucks and buses to robots may be just another nail in the human race's coffin. The issue of making human drivers redundant is not trivial. One does not need to look further than the vehicle industry to find an example of what robotization of manufacturing has meant to job losses, not to mention what impact these job losses have had on Detroit, the city that was the center of the automotive industry in the U.S.[3] Nitin Gadkari, India's current Minister for Road Transport and Highways and Shipping, has said categorically: "We won't allow driverless cars in India. I am very clear on this. In a country where you have unemployment, you can't have a technology that ends up taking people's jobs."

In July, the International Brotherhood of Teamsters, the union with 1.4 million members that represents freight drivers, warehouse workers and many other occupations, stated on its web site that "we are fighting tooth-and-nail against the legal implementation of autonomous trucks in the U.S…and last week successfully lobbied Congress to place a 10,000 pound weight-limit on current driverless vehicle legislation." Larry Willis, president of the AFL-CIO's Transportation Trades Division, a coalition of 32 unions, claimed Congress is progressing too quickly without understanding the full effects of autonomous vehicles, which "are likely to cause massive job dislocation and impact worker safety…and more needs to be done to make sure we adopt the right regulatory and labor policies governing the introduction of autonomous vehicles into the economy."

Saving money on labor costs is the principal argument for replacing drivers of buses and taxis. As we all know, one man's savings are another man's income. It cannot have escaped your notice when you have ridden the buses or taken a taxi in large urban areas, many of the drivers are from the newly-arrived-in-the-country groups. These jobs are, and have been for quite some time, a foot in the door to a new life, offering a good way to learn the language of the adopted country, to begin to understand the customs of its people and build up the capital and confidence to move upward.

So, outside of the TED Talk auditoriums, a favorite platform for futurists and globalists, there is not unanimity on whether self-driving cars, trucks or buses are either wanted or needed, or more importantly, good for society.

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AVs: Are We Moving Too Fast or Too Slow (continued from p .2)

The Genie Won't Go Back in the Bottle

I am not arguing for or against autonomous, self-driving or driverless vehicles; I am arguing in favor of caution. We can no more use deductive logic to prove that robot-driven vehicles will result in fewer vehicular accidents than to prove the existence of God. Just because a robot is not a human does not mean that it will not cause an accident. It would be just as valid (and ludicrous) to argue:

- Robotic vehicles are driven by computers;
- Computers often fail and crash;
- Therefore, robotic vehicles will often fail and crash.

There are two issues: The first is putting our lives in the gears of robots. The second is the impact on humans of their replacement by these robots. Removing human involvement from a task that at the same time is so very dependent on human actions and provides for the livelihood of so many people is not a decision that should be taken casually or made by private interests (whether it's GM or Google) without consideration for the societal effects.[4] This is a big deal!

A comparison to how gene research progressed is instructional.[5] Gregor Johann Mendel discovered the 'gene' in 1865. For him, it was an abstract phenomenon of living things that specified a single visible property, such as a flower's color. Thomas Morgan and Hermann Muller extended this understanding in the early 1900s by demonstrating that genes were actually physical structures carried by chromosomes. Oswald Avery in the 1930s discovered the chemical form of these physical structures as genetic information carried in DNA. In the 1950s, James Watson, Francis Crick, Maurice Wilkins and Rosalind Franklin figured out that the gene's molecular structure is a double helix, with two paired complementary strands.

Once all of these pieces were in place, the real science of genetics could take flight. Avery said: "If we are right…it is possible to induce predictable and hereditary changes in cells. This is something that has long been the dream of geneticists." During the next twenty years, technologies were developed to manipulate, clone and sequence genes. Hereditary diseases could be eradicated. Humans could be improved, made stronger, taller or more intelligent. Evolution could be given a little extra help to adapt *Homo Sapiens* to what the planet had become.

This thought, genetic engineering, caused many scientists to question whether they needed to regulate themselves before governments did the regulating for them. In 1973, the first of two conferences at the Pacific Groves Conference Center at Asilomar, California were held. The second was in 1975. Tempers flared as participants debated whether scientist should be restricted in their DNA experiments. Many of the attendees agreed with Alan Waterman, the head of the National Science Foundation, who wrote in 1962, "Science, in its pure form, is not interested in where discoveries may lead…Its disciples are interested only in discovering the truth."

After all the arguments were heard, the scientists at Asilomar agreed that the risks and uncertainties of applying the technologies they had been developing were not completely known, and if they moved too quickly they might subject all life on the planet to consequences that could not be reversed. More time and study would be needed, and strict procedures needed to be followed to ensure to the greatest extent possible that no life forms were exposed to the potential dangers. The scientists set highly restrictive constraints on themselves.

Over forty years have passed since then. In 2003, the Human Genome Project completed the sequencing of the nucleotide base pairs that make up human DNA. Thus far we have not had the DNA equivalent of a Chernobyl meltdown with catastrophic consequences. The practical application of scientific discoveries have progressed in careful steps while society has had ample opportunity to study and discuss the ethical and moral dimension of manipulating human genes in human cells.

The vehicle industry should not be asking governments around the world to loosen regulations so that it can place robot-driven vehicles on public roads. Instead, it should be explaining to the public how it will establish strict test procedures to ensure that no lives, including those of the testers, are ever put in danger.

The AV Industry Needs an Asilomar Conference

Three factors, considered simultaneously, have thus far constrained the genetic research community from using its knowledge to intervene on humans. By agreement among the medical community, gene intervention may be used only in the case of extraordinary suffering, be applied only to highly penetrant genotypes (penetrance is the frequency with which a heritable trait is manifested by individuals carrying the principal gene or genes conditioning it) and be a justifiable intervention (i.e., the advantages significantly outweigh the disadvantages). If any of these conditions are not met, no intervention may be made.

The AV industry must agree on a set of factors that can be used to establish the necessity for replacing human drivers of vehicles and to determine the efficacy of the intervention. A million deaths each year and rising can certainly qualify as extraordinary suffering, but the rates of deaths are so different among countries (e.g. China's rate is almost ten times that of Sweden's and double that of the U.S.) that such an extraordinarily intrusive action as removing the privilege of driving may not be justified in the low death rate countries.

We just do not know for sure that the cure is worse than the disease.

The Automated Vehicles Industry needs to convene its own equivalent of the Asilomar conference, with all of the vehicle industry represented. Invite the map data, sensor systems, safety systems, AI and software suppliers. Invite psychologists, sociologists, economists, urban and transport planners, insurers, union leaders, politicians of all stripes. By all means invite academics and, following the example of Asilomar, make sure the press is well represented. The venue for this conference is important. It should be held in a place where lots of people earn their livings building, selling, using and driving cars, trucks and buses.

The result of this conference should be an agreement on how to proceed to investigate the best ways to reduce road transport-related accidents and their consequences. In the end, it may not involve robots driving our vehicles—or it may.

ISO/TC 204
Working Groups

Working Group	Convenor
WG1: Architecture	USA
WG3: ITS Database Technology	Japan
SWG3.1: Geographic Data Files (GDF)	Japan (originally NL)
SWG3.2: Physical Storage Format	Japan
SWG3.3: Location Referencing	Japan (originally DE)
SWG3.4: API	USA
SWG3.5: Sharable Geospatial Database	Korea
TFT: Spatio-temporal data dictionary	Japan
WG4: Automatic vehicle and equipment identification	Norway
WG5: Fee and toll collection	Sweden
WG7: General fleet management and commercial/freight	Canada
WG8: Public transport/emergency	USA
WG9: Integrated transport information management and control	Australia
WG10: Traveller Information systems	UK
WG14: Vehicle/roadway warning and control systems	Japan
WG16: Communications	USA
WG17: Nomadic Devices and ITS Systems	Korea
WG18: Cooperative Systems	Germany

ISO/TC 204 WG3 and OADF: How do they fit together?

THE INTERNATIONAL ORGANIZATION FOR STANDARDIZATION, known as ISO, develops and publishes international standards (i.e. documents that provide requirements, specifications, guidelines or characteristics that can be used consistently to ensure that materials, products, processes and services are fit for their purpose.) ISO is an independent, non-governmental organization made up of members from the national standards bodies of 163 countries. It has its headquarters in Geneva.

There are 247 technical committees, of which TC204 is one. It is responsible for the standardization of information, communication and control systems in the field of urban and rural surface transport, including intermodal and multimodal aspects, traveler information, traffic management, public transport, commercial transport, emergency services and commercial services. Working Group 3 focuses on database technology for intelligent transport systems.

In the halcyon days of ISO/TC204 WG3, between ’92 and ’97, the principal work item was finalizing the Geographic Data Files transfer format as GDF 4.0. With a standardized GDF, any data supplier could deliver pre-compiled navigable map data to any navigation system supplier, eliminating the need to provide special formats for each system supplier. I was privileged to take part as Sweden’s representative between ’93 and ’96. The level of cooperation—and comradery—among all of the working group’s participants during that time was unparalleled. Rob van Essen of Tele Atlas was the WG Leader. Along with Volker Hiestermann, also of Tele Atlas, Tim McGrath and Jim Herbst of Navteq, and representatives from 25 other organizations, WG3 produced a body of work that has served as the basis for navigable map data for the past twenty years.

While the GDF transfer format was an extremely important accomplishment, it was the physical data storage format that was to be the icing on the cake. With a standardized PDF, data suppliers could provide navigation-ready, compiled data to any navigation system, allowing interoperability of map databases, more choice for consumers and greater flexibility for the automotive OEMs in choosing suppliers. Instead of standardizing the PSF in WG3, and instead of the entire automotive industry working together on an official industry standard, as was the case with ADASIS, a PSF standardization effort was initiated by BMW, Daimler and VW, and the result was NDS (Navigation Data Standard) in 2008. NDS is registered as a not-for-profit association. Obviously, NDS could not live an isolated life because of the requirements for common terminology and compatibility of both the physical and logical structure of the data elements among all of the existing and developing standards (i.e., GDF, ADASIS, TPEG, SENSORIS and NDS). Coordination was needed.

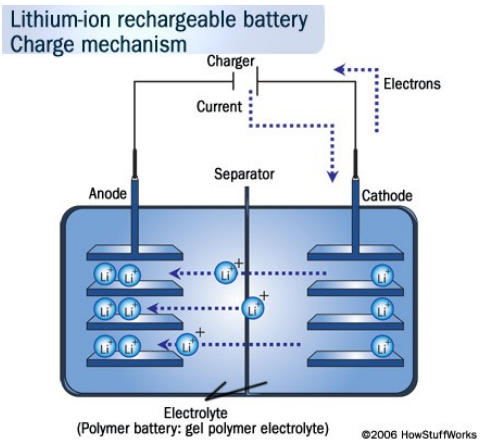
One answer to such coordination could have been to move everything back into ISO/TC204 where it all began (RDS-TMC and TPEG were standardized in ISO/TC204 WG10), and to develop the PSF as an ISO standard. What happened instead was that the Open Auto Drive Forum was started by NDS. ISO representatives, along with the TPEG, ADASIS and SENSORIS forums, have been invited to take part in the OADF meetings. It appears that the main purpose of these meetings is to expand the reach of NDS so that it eventually provides for a full end-to-end map data solution, from sourcing to visualization.

This does not mean, however, that WG3 has disappeared, nor that it has given its work items to OADF. Under the able leadership of Dr. Jun Shibata, WG3 is pushing forward on many fronts. Have a look at the TC204 web site[6] and scroll down to the WG3 area. GDF 5.1 is under development, which will “meet the growing need to update databases for navigation systems in response to the emergence of new applications for cooperative ITS, multimodal navigation and automated driving systems.” There is a new work item for lane-level location referencing, a new data dictionary that will accommodate both static and dynamic map data, and a renewed focus on the physical storage format and API standards.

There is clearly an overlap between what is being done in OADF and what WG3 is doing, at least for the time being. Will NDS be delivered to ISO for official standardization as part of GDF 5.1? Will the groups come to some agreement on what needs to be an international standard and what can remain an industry implementation? As long as they keep meeting and talking, they’ll find an answer.

Lithium-Ion Batteries: Are They Really the Answer?

WHEN IT COMES to replacing petroleum-based fuels with lithium-ion-based batteries for powering our cars, the old proverb "Jumping out of the frying pan and into the fire" may be very apt. A lithium-ion battery (LIB) is a type of rechargeable battery in which lithium ions move from the negative electrode to the positive electrode during discharge, and in the opposite direction during charging.



LIBs are the most common type of rechargeable battery used in home electronics because they have a high energy density, allowing them to operate longer at full power, they have a low self-discharge rate compared to other rechargeable batteries, they require no special treatment, like full discharge, and they can be adapted to different applications and configurations.

Lithium is described[7] as a highly reactive alkali metal element with Periodic Table symbol **Li**. It was discovered in 1817, is not naturally found isolated and it is relatively rare. It is both the lightest metal and the least dense solid element. It is soft enough to be cut with a knife. In addition to use in both non-rechargeable and rechargeable batteries, it is used to create heat-resistant glass and ceramic materials, as an additive in the production of other metals, such as steel, as a lubricant and as a drug.

Compared to those lead acid batteries we are used to seeing in our vehicles, LIBs are lighter by two-thirds, do not lose amps while charging, can discharge 100%, rather than 50% recommended for an LAB, can recycle 5,000 times, versus 400-500 cycles for an LAB, maintain voltage during the entire discharge cycle, and have a lower cost of ownership than an LAD, even though the initial cost is higher.

There are downsides to LIBs. Since lithium is highly flammable, reacting spontaneously with water, it is never found in its elemental, metallic form. It is extracted from igneous rocks and from lithium chloride salts found in brine pools. Australia and Chile are currently the largest producers of lithium in the world. The majority of the world's known lithium resources are found in brine pools on the Pacific coast of South America in Bolivia and Chile, and U.S. seems to have made recent finds.

Is there enough lithium in the ground for batteries for all of the applications, including BEVs, that companies are planning to build? In January 2017, the US Geological Survey upped its estimate of world reserves for lithium from 14 million metric tonnes to 40, and put the U.S. into fourth place, along with China, behind Bolivia, Argentina and Chile. The issue is not reserves but production capacity. It takes about five years to bring a lithium extraction production facility on line, and two years to complete the extraction process.

One major problem with LIBs is that they tend to overheat and catch fire if not properly designed, manufactured and controlled, as was the case with the Samsung Galaxy Note 7 phones, hoverboards and the Boeing Dreamliner. Impurities in the cells, separators between the electrodes that are too thin and may puncture with too much pressure and other factors can cause short circuits. The result is what is called a 'thermal runaway' and a fire.

Toyota resisted using LIBs for many years over concerns for safety. They used nickel-metal hydride batteries in their original Prius. Toyota will now use LIBs in its new Prius after its engineers developed improved control technology that precisely monitors the temperature and condition of each of the 95 cells in its new battery pack.

Not everyone thinks lithium is the 'bees' knees' for batteries. Christina Lampe-Önnerud, founder of CADENZA INNOVATION and BOSTON POWER, known as "The Queen of Batteries", believes two coal-based products, graphite and graphene, have major promise. "Lithium is a bit overrated," she says. "It's simply not sensible that a single component in battery production is getting so much attention." A sensible observation, I would say.

To Share or Not to Share

THAT'S THE QUESTION to which consumers, businesses and investors alike would like to have an answer. In June, ENTERPRISE CARSHARE ended operations in Chicago—where its 2013 acquisition, I-GO, started life in 2002. It also closed down Boston, Washington, D.C., San Francisco, Salt Lake City and Denver. An Enterprise spokesperson said of the decision: "Consumer demand for retail car sharing service in (the affected markets) did not meet Enterprise's expectations. As a result, the local programs were not able to establish themselves as a sustainable transportation alternative for the long term, and Enterprise has recalibrated to fully focus on business-to-business and university car sharing operations."

Car sharing programs like Enterprise, ZIPCAR (Avis), CAR2GO (Daimler), HERTZ ON DEMAND, and BMW's REACH NOW (image below), all demand one trait on the part of service users: ***flexibility****. If you are not a person who jumps up when volunteers are asked to give their seat on an airplane in return for cash and a later flight, car sharing is not for you.*

The idea sounds great: a car when and where you need it with a small membership fee and an all-inclusive payment only when you use it. It's the 'when and where' that usually turn out to be the problem for members. Taking a taxi, renting or simply buying a car are all options that offer more certainty that the ride is there when and where you need it.

According to the always optimistic Frost & Sullivan, in their 2016 report, Future of Carsharing (sic) Market to 2025, 'The global car-sharing (sic) market is expected to reach 36 million subscribers and 427,000 vehicles by 2025, compared to 7.9 million subscribers and roughly 112.000 vehicles in 2015. That's a 16.4 percent increase in members and 14.3 percent increase in vehicles over a ten year period." I believe we are still in a wait-and-see period some fifteen years after the idea got started.

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1. Association for Safe International Road Travel (2016)

2. ttp://www.roadandtrack.com/car-culture/a30733/this-is-why-cars-are-safer-than-ever/

3 .http://www.zero-hedge.com/news/2017-03-28/americans-losing-jobs-robots

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5. Mukherjee, Siddhartha. The Gene: An Intimate History. Scribner (2016).

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7 http://www.relionbattery.com/blog/7-facts-and-figures-comparing-lithium-ion-vs.-lead-acid-batteries

8. Merriem-Webster Dictionary

The well-known American philosopher, Yogi Berra, once said: "When you come to a fork in the road, take it." This is good advice if you don't know where either path at the fork will take you. Don't just stand there wondering what to do; do something! If you are an engineer on a train, and you come to a bifurcation in the tracks, it is a good idea to be sure that the switch is positioned correctly to take you to the next station on your pre-planned itinerary. When I was growing up, and Yogi Berra was a star catcher for the New York Yankees, we took Sunday drives in the Pocono Mountains where my father picked roads at the forks without knowing where they led. After a few hours we finally arrived somewhere and, if we were lucky, there were signs back to the big city (i.e. Scranton, PA) where we lived. This works if you are not going anywhere in particular and the whole point of the exercise is the journey, not the destination.

Musings of a Dispatcher: Plausible Deniability

AFTER I READ the article in the morning newspaper, I checked the date to make sure I had not overslept to April 1st 2018. Nope, it was the 31st of July, 2017 and the story was legit.

One hundred thirty passengers aboard a train that left a station in Scania's headquarters city of Södertälje on Sunday afternoon on the 30th of July thought they were going to the city of Nyköping. Instead, they found themselves in the scenic village of Gnesta. It seems that most passengers and the train's engineer and staff realized the mistake as soon as it was made, but correcting it ended up requiring that the train travelled about twenty kilometers in the wrong direction and finally resulted in a three-hour delay for the hapless travelers.

Statens Järnvägar (SJ), the state-owned operator of most of the country's trains, blamed the error on the other state-owned organization, *Trafikverket* (TRV), that is responsible for the planning, building, operation and maintenance of the rail network (and the roads). They turned the wrong switch, claimed SJ. The engineer ignored a signal, claimed TRV. There was a time when trains, tracks and oversight were all in one set of hands. This allowed for maximum accountability, but not **plausible deniability**. This is the 'ability people in a chain of command, typically senior officials, to deny knowledge of or responsibility for any damnable actions committed by others in an organizational hierarchy because of a lack of evidence that can confirm their participation.'[8]

There is yet another level in the transport hierarchy in Sweden that ensures an even greater level of plausible deniability. It is *Transportstyrelsen*, or the Swedish Transport Agency. It has 'overall responsibility for drawing up regulations and ensuring that authorities, companies, organizations and citizens abide by them.' In addition to formulating regulations and exercising supervision over road and rail transport as well as civil aviation and maritime shipping, it handles vehicle registrations, vehicle tax payments, toll charges and driving licenses.

This agency was recently involved in a case that eventually led to the resignation of two high-level cabinet ministers, including the Infrastructure Minister, who is part of the *Ministry of Enterprise, Energy and Communications*. So there is a 'Boss Minister' with 'Sub-ministers' working for him or her. The other cabinet member who resigned was the Interior Minister.

The problem started with the previous government's mandate to save money on IT expenses. The Transport Agency dutifully obliged by outsourcing the management of its database of all individuals who have driver's licenses and all vehicles (including civilian, police, military, government, people in witness protection programs—everyone—with addresses, photos, the works!).

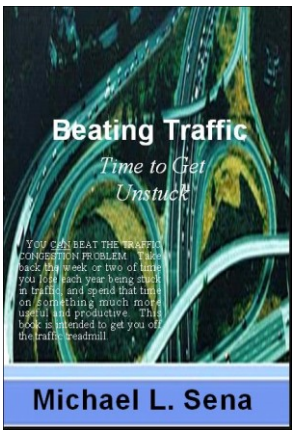
The job was more complicated than either client or contractor had thought (of course), so shortcuts had to be taken to meet the deadlines and the budgets. One shortcut was to further outsource to project teams in lower-cost countries that did not have the necessary security clearances to handle all of the sensitive data that was placed in their hands. Approval for this was given explicitly by the then General Director who, along with the board chair, resigned when all of this came out.

Which ministers got to fall on their sword in the face of no-confidence motions by the opposition parties (the parties that mandated the IT cost reductions when they were in power) depended on who knew what when and who told who what when. All parties talked about standing up and taking responsibility for one's actions, but no one questioned whether creating an organization at both the cabinet level and at the agency level was the source of all the evil that followed. Whether done consciously or not, the end result of establishing these webs was to allow **plausible deniability**, which saved a few necks, but has left the problem untouched.

About Michael L. Sena

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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