

The Dispatcher

Special interest features covered in each issue:

- Autonomous and Self-driving Cars
- Big Data
- DSRC versus Wireless Communication
- Connected Vehicles – V2V and V2I
- Third party services for eCall

Individual Highlights:

Telematics Update Munich 2014	1
Standardization	1
Next Phase for Maps	3
Mobility Wishes	6
The Newsletter	6

In the next issue:

- Did ERA-GLONASS happen?
- Safe test sites for not-yet-so-smart-driving cars.

Telematics Industry Insights by Michael L. Sena

Telematics Update Munich 2014

One measure of success for any conference is the year-on-year increase in the number of attendees. In last year's November issue of *The Dispatcher* I reported that attendance was up from 2012 by 20% to over 800. I cannot confirm that there was another 20% increase this year, even though the organizers said there were over 1000 in total, including the exhibitors, but it seemed like everything was more crowded than last year, from the session rooms and exhibition space to the lunch area. Maybe after its second year at the *Dolce Hotel* in Unterschleissheim it is time to look for a bigger venue, maybe closer to the center of the city. There wasn't a rush for taxis right after lunch on the last day, another good sign. I attended a panel at the end of the two-day event with Continental, Volvo Cars and Telenor, and it was filled with eager listeners right up to the closing bell.

The annual conference had an unusual start. In past years there was someone telling us that we are soon at the inflection point on the hockey stick, poised for quadruple digit growth. We would all then breathe a collective sigh of relief that we didn't have to worry about finding a new field of work and then we could relax for the remaining two days. TU 2014 started with a

Continued on p.2

Standardisation: Keeping it at the industry level or making it official depends on what needs standardizing

The idea for what eventually became the ADASIS¹ Forum was initiated by Navteq. It started with a small group of vehicle manufacturers, in-vehicle system suppliers and the map data providers, including TeleAtlas. The first meeting was held at Opel, chaired by Andreas Hecht, then with Navteq. I was invited to attend as well. Our mission was to decide whether we would try to

create a standard for the transfer of geographic data from any map database to any ADAS application. Data would be in the form of an electronic horizon. Our motivation for creating such a standard was to prevent the situation that had occurred with navigation map data where there was no interoperable map data format².

Following approximately a year of meetings, with the

The World Forum for Harmonization of Vehicle Regulations (WP.29), formerly the Working Party on the Construction of Vehicles, provides the terms of reference for a framework of policies of the United Nations and the Economic Commission for Europe. Their purpose is, to "improve vehicle safety, protect the environment, promote energy efficiency and anti-theft performance and provide uniform conditions for periodical technical inspections." Agreements related to WP.29 include Adoption of Uniform Technical Prescriptions for Wheeled Vehicles, Equipment and Parts (1958); Periodical Technical Inspections and Reciprocal Recognition of Inspections (1997).

group increasing in size at every meeting, we approached ERTICO³ in 2002 and requested that it take on the job of administrating the group as an ERTICO industry forum. Non-ERTICO members would pay an annual fee to belong to the Forum while the fee would be waved for ERTICO members. New members would pay a

Continued on P.5

Telematics Update Munich 2014 (Continued from P.1)

It started with ring tones on phones and spread to the celebrity voices on turn-by-turn navigation systems. Why not give self-driving cars personalities of their own. How about the Sunday Driver car that moves at half the speed limit in no passing zones and twice the speed limit when it is possible to pass? Or how about the Boston Driver car that looks the opposite way whenever making a turn or entering a roundabout for maximum deniability in the event of a crash?

Editor

Notable Quotes from TU 2014

"In the future, cars will compete on user experience rather than on features."

Christian Feltgen, Visteon

"Is there anyone in the room from Google? No? Good, we can talk about them."

"Technology skews youngers (sic), but they don't buy cars."

Jim Robnett, NNG

"Mobility is not vehicle centric; it is person-centric."

Simon Euringer, BMW

"Today we use cables and WiFi; the future, in my opinion, is built-in."

Marcus Heitmann, VW

"We would never do this, of course, but one use for 'big data' is to collect eye movements to detect which billboards attract the most attention from drivers."

Identity to remain anonymous

presentation by Edoardo Gianotti, a representative from the *United Nations Economic Commission for Europe*. He provided a status report on efforts by UNECE to create a regulatory structure for autonomous vehicles. The group seems to have gotten as far as nomenclature (i.e. How many levels of autonomy are there, actually?). Creating a harmonized approach to self-driving cars is probably good, but I think it's too early to start setting standards, and it would be better to keep these cars off public roads until they have proven to be safe rather than trying to make it easier to allow them on.

The panel discussion that followed with Volvo Cars' Thomas Müller, Conti's Michael Ruf and Visteon's Christian Feltgen was my favourite because it clearly highlighted the differences between suppliers to the auto industry and the buyers of the suppliers' solutions. Müller mused that autonomous driving was the biggest challenge facing the car industry in the coming years, while Feltgen felt that moving away from the 'start of production' paradigm to continuous updating of the vehicle was inevitable. Ruf sees more of what happens now in the car happening outside of the car on those back-office systems Conti will build. The walls between infotainment and safety/security systems will crumble, say the suppliers, as customers' desire for a seamless user experience prevail over the OEMs' preference to keep the systems separate. Not so, says the OEM. The systems need to be kept in separate domains so that security and data privacy are not compromised by pressure to use the car as just one more sales channel.

I had an epiphany during this panel that was moderated (guided, actually) with a light touch by a normally more provocative Roger Lancot. The OEMs are trying to keep their on-board systems, and, by extension the customer data, as secure as encrypted, over-the-air wireless communications allow, but a simple OBD-II dongle equipped with a SIM-card hung onto the vehicle's CAN bus opens up all of the mission critical systems to remote access mischief. Well-meaning for emissions, but it has gotten out of hand. Phase it out. Build secure communications instead over WiFi for workshop systems.

One thing I do not appreciate are the simultaneous sessions. The organizers have undoubtedly studied this and determined that my view is in the minority, that the advantages of having more sessions which potentially appeal to sub-groups of attendees outweigh the down sides of having to choose one among three equally interesting topics running at the same time. If there is too much interesting material for two days, extend it to three, or start earlier in the day and end later. It's not as if there are a lot of distractions out there in Unterschleissheim.

HARVARD BUSINESS REVIEW published this month its annual list of the world's 100 best CEOs. Number One is Jeff Bezos, the epitomic American entrepreneur founder/leader of Amazon. This is something we should celebrate. Today Amazon is a retailer, cloud computing service provider and e-book reader OEM. It is in the process of adding logistics operations to its businesses. There is one car company executive on the list, Martin Winterkorn of Volkswagen squeaking in at place number 89. Conti's Elmar Degenhart is up at an impressive number 19, the highest placed company in the automotive space. There are two US mega-dealers at spots 62 and 80, AutoZone and O'Reilly Automotive respectively. Telenor is the only mobile network operator. The CEO of a not-so-well-known company, Danaher, is in a notable 38th place. With H.L. Culp, Jr.'s guidance, Danaher has bought its way into the telematics business with acquisitions of Teletrac, Navman Wireless and Trafficmaster. Valeo's Jacques Aschenbroich at number 94 rounds out the list for automotive related companies.

What I want to see is one of these CEOs showing up at Telematics Update event in Munich or Detroit, or one of the regular TU attendee CEOs making the HBR Top 100 CEO list because he or she (there are two woman on the list at 27th and 51st places) has matured into a world class CEO. TU Munich is not just for schmoozing. For those who turn off their phones and take a pause in their e-mail and twitter chatter, there are always a few good ideas with which to return home.

The Next Phase of Digital Maps for Vehicles has Already Begun

In my office I have bookshelves filled with maps and files from my earliest work with Esselte Map Service, Rand McNally, AAA, AA and MapQuest. I have binders brimming with ISO TC204 Working Group 3 and CEN TC278 meeting notes, reports and final standards. I have dozens of cardboard storage boxes loaded with data sheets on navigation systems and their digital map specifications. And then there are the position papers I have written and presentations I have given on the use, production and evolution of digital maps in all forms.

These files represent the move from paper maps produced using various graphic arts techniques to digital maps produced with the then newly developed computer techniques, either scanning and vectorising paper maps or tracing on a digitizing table the centrelines of roads and the outlines of areas with a cursor fitted with a crosshair. The military (CIA and Defence Mapping Agency in particular) were in the forefront of developments,

and I was privileged to be able to view the work they were doing—in return for telling them in the minutest detail what we were up to.

In the early '90s, before the first introductions of navigation systems, a group of ISO country experts in the field of digital mapping, standardized the data model for navigable maps as part of the work done to produce the standard for transferring navigable map data to the navigation systems. The result was GDF¹. The map suppliers were Navigation Technologies (later Navteq and now Here), Bosch Cartographic Services and Etak (that became part of Tele Atlas, now integrated into TomTom) and JDRMA in Japan.

Data collection techniques and updating methods for navigable map data have changed drastically during the past twenty-five years. *Open Street Map* and *Google* substituted crowd sourcing and massive video data processing respectively to collect street vectors and all the various data elements needed to produce maps



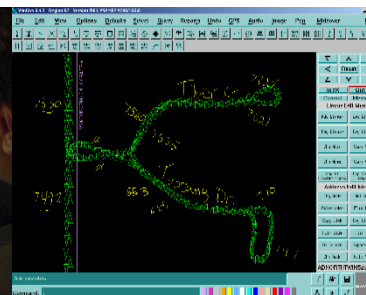
that could be used in navigation systems. These navigation systems take users from the place they are standing, or pretty much any other origin in the world, to one or more destinations, also anywhere in the world.

This alone is amazing, but even more amazing is that for most places on earth there are photo images, thanks to those 360° cameras Google has fitted to a fleet of 250 *Street View* cars they have been driving around. To actually see where the *Hotel Toledo* and *Antica Pizzeria* are in Naples' Spanish District, as I did for research I am doing for a book on fishing and eating in Italy (another life), to walk down the narrow streets as if I were among the residents and tourists, gives a completely different impression than looking at photos in a guidebook or reading on-line reviews. One is 'almost' there.

I could see how this type of moving imagery would be useful for both the creation and updating of maps—although when I paid a virtual visit to our former residence in Åsa I saw our two cars parked in front of our home. (We moved almost four years ago!). These images are an improvement over static photos for trip planning. But it wasn't until I paid a visit recently to Dr. Alain Kornhauser at his Princeton University office that the penny dropped. We went to his lab where one of his doctoral students is developing a self-driving simulator. He is using images from a video game and adding in the self-driving car. The car is guided by: 1) the distance to the car ahead in the same lane; 2) lane markings for the current lane and the lane markings or curbs to the left and right; and, 3) the existence of a car behind and its relative speed. The speed of the self-driving car is now up to around 70 km/hr. The speed is limited by the computer power available to process the video frames as the cars move around the track.

There is no geographic database in this simulation.

Continued on page 4



The Next Phase of Digital Maps (Continued from P.3)

Everything is based on the video frames and the image processing of these frames. It took me some minutes to understand what I was seeing, but when I did I felt both wonder and discomfort. The paradigm was shifting under my feet.

After this visit I wrote to Russ Shields, who as most of you know, was the founder of Navteq and contributing founder to the establishment of ISO TC204 and the ITS World Congress. He is not only an astute business person; he was completing a PhD in computer science when he decided to found SEI instead. Navteq became the leader in navigable mapping because it had a superior data processing solution. While Etak was scanning and vectorising USGS maps, and conflating the resulting street vectors with census maps to add street names and addresses, Navteq was laboriously digitizing the same maps and adding street names plus all of the other attributes the navigation systems would need to deliver turn-by-turn instructions. In addition, the system that held all of this data was reachable by field staff all over the world who could extract sections of the data, edit and return it to its proper place. Russ Shields knows what it takes to put maps in cars,

and this is what he said to me:

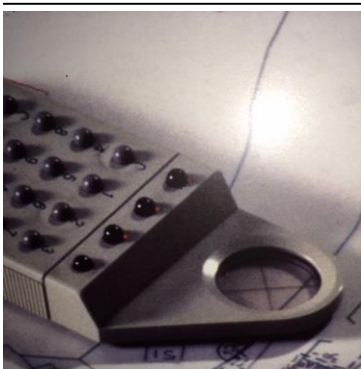
“For many years, starting in 2020, highly automated vehicles will be on limited access highways and then eventually going onto major rural roads without people and bicycles. I expect that the ‘map’ for the physical road network will be images of what the on-board sensors (lidar/radar and cameras) will see. This will be created entirely by probe data. Mike, you were involved in the movement from raster maps to data elements and attributes since the vehicle sensors were GPS and gyros. These sensors did not work in raster. Now there will be a similar change. Cameras and radar/lidar do not work with data elements and attributes. They work in images.”

I do not believe we will be abandoning the vector map paradigm anytime soon. If we want the benefits of autonomous driving along with advanced driver assistance—with an electronic horizon that sees around corners and beyond the crests of hills—and long-distance trip planning, we will need to integrate both mapping technologies, maps and images, in our vehicles and they will need to talk to each other. Can we perform this not-so-trivial task by 2020? There are

quite a lot of companies and institutions out there giving it their best shot. Car company executives (GM, Renault/Nissan, and Daimler) are falling all over themselves to promise self-driving cars. Test driving centres are springing up like mushrooms in the forest after a period of steady rain.

Navigation systems were ready well before they were introduced to paying customers in Europe and North America in 1995. They worked fairly well without GPS, which did not become public until 1995. The displays and storage devices were available in the early ‘90s. It was the map data that was missing, and precious little geography was covered when the systems started to be sold. Large areas had only highway-level data, and even where there was street geometry, the street names and addresses were not yet added.

My guess is that the hardware will be the easy part. Besides the legal and consumer acceptance barriers, it will be the environmental data necessary to allow the cars and trucks to drive themselves, to ‘see’ where they are going and to ‘feel’ their way through the maze of streets which we humans have learned to navigate.



This is what was called a digitizing ‘puck’ or ‘cursor’. The many buttons could be programmed to represent different features, such as different categories or roads or the edges of lakes or rivers. Copying maps using this method was tedious, but when you were finished you knew what was in the database you had created.

Standardization: (continued from p.1)

one-time fee to obtain a right to use the interface specification.

For several years I was leader of the *Standards and Industry Contacts Working Group* in the ADASIS Forum. I met with CEN and ISO map data committee chairpersons to familiarize them with the ADASIS concepts and to discuss the procedures for initiating the process of standardization.

After the first version of the ADAS Interface Specification had been produced, we put the issue of standardization to a vote at our annual meeting, which that year was in Aachen, Germany at Ford's research facility. Should we turn the work over to CEN or ISO, or should we keep it as an industry standard? The resulting vote effectively put me out of a job. It was decided to keep the format within the Forum. Why did we make that decision? There were two principal reasons:

Time to market – Many of the people in the room had participated in the ISO TC204 WG3 meetings that had standardized GDF⁴. These had started in 1991 and continued all over the world until the final document was completed ten years later. The companies represented in that room in Aachen needed ADASIS now, not in five or ten years.

Control – CEN (*Comité Européen de Normalisation*) is a European standards group while ISO is international. In both cases, the people doing the standardizing are assigned by each country's standards organization. Once a topic is submitted to scrutiny and normalization, there is no guarantee that it will look anything like the original when it comes out. The ADASIS Forum rather liked what we had created and wanted it to stay pretty much like it was.

ADASIS is being used today by many of the Forum's members, both in their own applications and in those they develop for their clients. GDF4.0 is not in use as a transfer format. The industry moved beyond it for many reasons, mainly because by the time it was done most of them had developed their own variations of the pre-standard GDF3.0. What GDF4.0 does provide and which is used extensively, including in the ADAS Interface Specification, is the geographic data model comprising features, attributes and relationships. It is the foundation for all vehicle-related map data.

The analogy to time and timepieces helps me to think about the question of what to standardize and why, and whether

something that is standardized needs to be common and in the public domain, or limited to those who are committed to its further development and use.

The job of a timepiece is to present time in hours and minutes and perhaps seconds relative to the agreed benchmark time in the region where the timepiece is located. When it is exactly 12 noon on the 1st of June in Stockholm, it should be exactly 6 a.m. in New York City. Any watch should work anywhere, but it does not present the correct time unless it is reset—or it resets itself automatically—to the region's time. What is standardized is the measurement of time, not how the timepiece does the measuring. A properly functioning timepiece is one that measures time in exactly the same way as the 'standard' measure of seconds that add up to minutes and then hours. This measure is the same everywhere, but time isn't and neither are the timepieces that dot the measuring.

Happily for the Swiss watch makers and all those buyers and collectors of their watches, there was no European commissioner creating a watch design that everyone had to use in order to build a watch. My \$20 Timex windup watch keeps time as well as the

€10,000 JAEGER-LECOULTRE. As far as I know, there is no law that says an *Omega* must keep better time than a *Swatch*. A watch that does not keep proper time is a bracelet, but if someone wants to wear a €25,000 or a €20 bracelet, it's no one's business but the wearer's.

So now to the topic of whether there is a need to standardize the on-board device in order for multiple service providers to be able to compete for the car owner's business, rather than having the service supplier decided by the car manufacturer who placed the device in the vehicle. For me, the on-board system is the inner workings of the watch. The equivalent of face of the watch, where I see the information produced from what is measured in the car, is not even in the car. It is where that information is presented to someone, or some process, that will do something with that information. It could be at a call center or at a CRM computer node. Those who are calling for standardizing the on-board device have not understood that simple point—yet. A group of like-minded souls are working on that and making some progress.

A *Rolox* of an on-board device is doing the measuring with diamonds

Continued on p. 6

Michael L. Sena Consulting AB

Sundbyvägen 38
SE-64551
Strängnäs
Sweden

PHONE:
+46 733 961 341

FAX:
+46 152 155 00

E-MAIL:
ml.sena@mlscab.se

We're on the Web!

See us at:

www.michaellsena.com

On a recent trip to Bordeaux to address the *Network of National ITS Associations*, I read the Air France airline magazine as we prepared for takeoff. There was an article titled *Beautiful Libraries*. It was the author's opinion of what are the world's ten most beautiful libraries. It was an excellent list with wonderful photos. As those of you who have visited my web site know, it has the title *Michael Lawrence Sena Library*, and it includes a section on my own favourite libraries. My list and the Air France list have one building in common, the Stockholm City Library. My list will keep expanding, and I hope to visit the other nine Air France selections. I hope you will visit my library and browse through the offerings.

How many of the wishes I made ten years ago have come true

My Personal Wish List for Owning and Driving a Automobile - In Order of Priority

- I will never have an accident or cause an accident while driving.
- If I do have an accident, neither I nor my passengers will be severely injured and we will receive help immediately.
- I will never have a mechanical problem while driving.
- If I do have a mechanical problem I will receive immediate assistance allowing me to continue my journey.
- I will never be lost.
- My car will never be stolen or broken into.
- I will never be delayed along a journey.
- If there is a delay, I will know the exact reason for it and how to avoid it.
- My car will fuel, park and maintain itself.

It's bad luck to say that something has not yet happened. Usually, the moment after the words have left your mouth fate strikes. But how many of the items on the list I made ten years ago for a full-day telematics workshop in Berlin have come to pass? ADAS and telematics are doing a great job on most of them. The first and last ones are still eluding us and it is with them that self-driving cars will make the difference.

Standardization: (continued from p.5)

and rubies, while a *Timex* of a device is doing it with steel and plastic. Measurements are delivered to the mechanism that will eventually display the information (the equivalent to the hands of the watch) via an intermediate mechanism, the telematics service provider (TSP). The on-board device receives what has been assembled from the various sensors in the vehicle, combines them into a data package and sends it with the modem in the telematics device. It is the TSP that unwraps this package, supplements it with relevant vehicle and user data stored in various databases, and puts the result into a form that can be acted upon. The TSP is an integral part of the on-board device, not an immediately substitutable link in the chain. It is possible to change TSPs, just like it is possible to replace the on-board system suppliers or the sensor suppliers, but you don't do it overnight.

It is my view that if you try to force the TSP to be expendable by sending data messages directly from the on-board communications device to all of the various service providers, you end up with all on-board devices either being *Rolaxes*, *Timexes* or something in between. Either you standardize the device so that it sends a bare bones message that every service provider reads, parses and acts upon, or you make it possible for the device to compile and send out many different messages for different purposes (e.g. UBI⁵, diagnostics, software download, emergency assistance, etc.) that only the specialized groups of service providers can understand. The former is not worth the effort, and the latter is more safely and securely done by the TSPs.

To paraphrase the famous bard, "*The TSP is the thing by which you will catch the conscience of the King.*"⁶

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. 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.

Footnotes:

1. ADASIS – *Advanced Driver Assistance Systems Interface Specification*.
2. A standardized format for navigation data was eventually created. It is called NDS, for Navigation Data Standard. It is an industry standard, not an official ISO, CEN or SAE standard.
3. ERTICO – *European Road Transport Informatics Coordinating Organisation; ITS Europe*
4. GDF – *Geographic Data Files; GDF4.0, an ISO standard for the definition and exchange of geographic road databases*.
5. UBI – *Usage Based Insurance*.
6. *William Shakespeare: Hamlet; Act 2, Scene 2. "I'll have grounds more relative than this—the play's the thing wherein I'll catch the conscience of the King."*