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The Dispatcher's Manifesto

Transport cannot be viewed in isolation. Traffic congestion is not caused by cars. It is an effect of policy decisions about where people live, work, shop and recreate. Most people live where they can afford to live and work where they get a job; everything else follows. The numbers and types of cars and trucks that are sold are the results of political and business decisions that are made locally, nationally and globally. Most people don't buy cars and trucks to just drive around. They buy them to take them where they need to go and to make their lives easier to live. Changes to the transport network that affect driving and owning cars and trucks motivated by environmental considerations should only be made after full consideration is given to all potential societal impacts and after evaluating all alternatives, including possible future technological breakthroughs. If actions we take make life for humans not worth living, then what's the point?



My nephew's son Nikolai just turned six. He has been interested in all types of motorized vehicles since he was old enough to play with toys. In return for the birthday gift we had sent him, he sent us a collage with cutouts of drawings of cars, buses and vans he had made. I don't see any drivers or passengers. I'll have to ask him why.

Creating Standards in an Environment of Mistrust



Using their knowledge of astronomy and mathematics, the Maya developed one of the most accurate calendar systems in human history. The Maya calendar served both practical and ceremonial purposes and were based on solar, lunar, planetary and human cycles.

1. Russell, Andrew. **Open Standards and the Digital: History, Ideology, and Networks**. Cambridge University Press (2014).

2. When referring to 'China' following WWII, I distinguish between the People's Republic of China and the Republic of China, unofficially known as Taiwan. In using 'China', I refer to the PRC.

Will ITS standards work fall prey to geopolitical conflicts and meddling?

STANDARDIZATION IS NOT a new phenomenon. The Mayan, Babylonian, Egyptian, Greek and Roman civilizations codified systems for measuring time and space. King Henry I of England in 1120 A.D. defined the preferred unit of measurement, the 'ell', as the length of his arm. It is said that the French Revolution provided the opportunity for a new system of measurement "as a way to erase the arbitrary nature of local rule" (like basing it on the current king's arm) since the metric system allowed citizens to be "truly free, independent and self-reliant because citizens could make calculations and measurements on their own."¹

Standardization enabled the Industrial Revolution by making interchangeable parts possible, and this in turn reduced costs and the time it took to manufacture just about everything. China missed both the First and Second Industrial Revolutions (respectively 1760-1840 and 1870-1914). In 1952, 83% of the Chinese workforce were employed in agriculture. When the Third Industrial Revolution began in 1969, the country was in the clutches of its Cultural Revolution, which had started in 1966. It is a cliché to say that China² has caught up quickly with industrialization, drawing even to and then surpassing most countries. As we enter the Fourth Industrial Revolution, China is the self-proclaimed *Factory for the World*, producing products of every kind for everywhere and employing standards of all types to do it.

While automobiles and other types of vehicles are built in China, the country is not among the leaders in innovation or standards development for intelligent transport systems (ITS). On the other hand, it is attempting to take the lead in telecommunications, particularly 5G, through its national champion HUAWEI. And while it may not be innovating in battery electric vehicles as TESLA has done and continues to do, it is creating a BEV industrial cluster

that will be able to dictate standards through its sheer size. The present and future of intelligent transport is wireless connectivity, and if one believes what is being said by almost everyone about the automotive industry, its future is also electric. So China is positioning itself to be in a commanding position.

In this time of heightened mistrust by the United States and other western governments of Chinese businesses, especially HUAWEI, and of tensions over intellectual property rights to technology which China has notoriously been obtaining by all means available to it, I believe it is a worthwhile exercise to look at the position China holds in the ITS standards development arena. Are there any signs that it is attempting to abuse a dominant market or production position to control standards and direct them to its own products or processes, or are other countries attempting to use the current extensive standards development programs to keep China from promoting its own approaches? Are there any signs that China wants to replace the current order of global standardization with an order of its own, or will western countries and their standards bodies continue into the foreseeable future to establish the norms by which all companies and countries, including China, must abide? I'll begin this analysis with a look at where we are today and a description of how we arrived here.

Globalization began with standardization

There was a time when European and American and Japanese companies and government representatives could separately create standards for their own markets, which were sufficiently large to warrant the effort, and these standards were then adopted by clusters of countries. The Americans had their inches, feet, yards and acres; ounces, pounds and tons; and, cups, pints and gallons. The Europeans had their millimeters, centimeters, meters and hectares; grams, kilograms and tonnes; and, deciliters and liters. It wasn't until the aftermath of World War II that true international and open standards began in earnest with the founding of the INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO).³ It was established in February 1947 at the initiative of the newly formed *United Nations Standards Coordinating Committee (UNSCC)* in conjunction with the INTERNATIONAL FEDERATION OF THE NATIONAL STANDARDIZATION ASSOCIATIONS (ISA). ISA had been started in Prague in 1928, had suspended its activities in 1942 and had just started anew when it was approached by UNSCC to participate in organizing a global body. Geneva was chosen for its headquarters, a location which it shares with many UN and non-governmental

3. The organization adopted ISO as its abbreviated name in reference to the Greek word *isos* (ἴσος, meaning "equal"). This is because its name, International Organization for Standardization, would have had different acronyms in the three official languages.

4. The American Standards Association (ASA), serving as the chair of a working party organized to create a new international standards body, was asked at a meeting of the Standards Council why the pre-war international association, ISA, was not being reactivated rather than being replaced. In response, the Chairman said that the enemy countries (i.e., principally Germany, Italy and Austria) had been members of the old organization and that it might be difficult to carry on work if the old organization were reactivated. It therefore seemed desirable to organize a new body which could function free from any prejudices. Unlike the author of the Economist article, the ASA leaders were obviously not yet ready to include enemy countries in any new organization, apparently wishing at least to establish procedures for the new organization with other friendly countries. Moreover, although the U.S., as represented by ASA, had played a relatively small role in ISA, a new organization would necessarily put it in a more central position. That new organization would be the ISO.

<https://web.mit.edu/iandeseminar/Papers/Fall2006/Yates.pdf>

organizations. Its three official languages were chosen to be English (Oxford English spelling), French and Russian.⁴

ISO is a voluntary organization whose members are the recognized and official standards bodies in the member country, each one representing one country. Today, there are currently 165 member countries and only one standards body per country.⁵ They meet annually at a General Assembly to discuss the strategic objectives of ISO. The organization is coordinated by a central secretariat based in Geneva with approximately 150 staff. The ISO Council, with a total membership of 19 member bodies provides guidance and governance, including setting the annual budget of the central secretariat. The ISO Council meets twice a year and is responsible for the development of ISO's multi-year strategic plan, the development of the ISO annual budget, ISO's relations with other external organizations, and other political/strategic decisions and the general operations of ISO. The technical management board is responsible for more than 250 technical committees, who develop the ISO standards.

As an organization with roots in the U.N., at its founding ISO shared one important trait with that body: Those who won the War received preferential positions. When ISO was formed, there were eleven members of the Council. The USSR wanted to establish five permanent members of the Council (as is the case in the UN with the Security Council). A compromise was reached in which there would be five members, China⁶, France, the UK, U.S. and USSR, that would be the same during the first five years, while the other six rotated. After five years, all members would rotate into the Council. Nevertheless, there are three countries that have been ISO Council members since its founding: the United States, the United Kingdom and France. Representing the U.S. on the Council is ANSI (AMERICAN NATIONAL STANDARDS INSTITUTE). France is represented by AFNOR (ASSOCIATION FRANÇAISE DE NORMALIZATION), and the U.K. by BSI (BRITISH STANDARDS INSTITUTION).

Japan has been an active member of ISO since 1952, represented by JISC (JAPANESE INDUSTRIAL STANDARDS COMMITTEE). The country became an ISO Council member for the first time in 1957, and has been a member of the council every year since 1969. Germany (Federal Republic of), represented by DIN (DEUTSCHES INSTITUT FÜR NORMUNG), has been a member of ISO since 1951 and a member of the Council every year since 1954. China's membership was suspended in 1949 when The People's Republic of China was de-



ISO is not a traditional international organization (IO). It is not an intergovernmental organization (IGO), since it is not treaty-based, but it is not a "traditional NGO" either. Its hybrid nature is confirmed by ISO's status in Switzerland: it is considered as a "quasi-governmental organization" defined as in-between an intergovernmental organization and a classic NGO.

5. I am not sure whether the European Union requested a separate membership position, but it has not received one, unlike its seat at the G7 and G20 tables.

6. This was the Republic of China, not the People's Republic of China. The Republic of China's membership was suspended in 1950 and withdrawn in 1952. The PRC became a member in 1978, representing China. The Republic of China, today Taiwan, does not have a seat on ISO.

clared, and its membership was withdrawn in 1953. The PRC re-joined ISO in 1978. Its representative is SAC (STANDARDIZATION ADMINISTRATION OF CHINA). In 2008, SAC issued a press release stating that the PRC had become a permanent ISO Council member. The press release stated that this was “twelve years ahead of SAC’s objective set forth in its development plan”.⁷ In other words, PRC had decided that it was going to become a permanent member of the ISO Council when it joined ISO even though there are officially no permanent members of the ISO Council. Try as I might, I found no references to how members were nominated to become members of the Council, and no mention of permanent membership in the ISO Statutes. Nevertheless, ANSI, the U.S. representative, states on its site that it is one of five ‘permanent members’.

Who foots the bill for ISO?

Here’s what ISO says about how it is financed:

“Our national members pay subscriptions that meet the operational cost of the Central Secretariat. The subscription paid by each member is in proportion to the country’s Gross National Income and trade figures. Another source of revenue is the sale of standards.

However, the operations of ISO’s Central Secretariat represent only about one fifth of the cost of the system’s operation. Other costs are related to specific standard development projects and technical work. These costs are borne by member bodies and business organizations that allow their experts to participate and pay their travel costs.”

In 2019, ISO had total revenue of CHF 43.157 million, 50% of which was from membership fees and 49% from sales of standards, and CHF 39.302 million in expenditures, 92% of which was for operations, principally salaries. This is a tiny fraction of the total amount of money that is devoted to ISO work because in addition to paying their dues, members pay their own costs for their time and travel. It is not compensated nor reimbursed. Those costs are paid by the national standards organizations funded by tax money and companies that dedicate their personnel (called experts) to the standards activities.

ISO’s goals are built into its structure

The purpose of ISO is broadly defined in Article 2 of its Statutes.

“It shall be to promote the development of standardization and related activities in the world with a view to facilitating international exchange of goods and services and to

7. China Becomes ISO Permanent Member, XINHUA NEWS, Oct. 17, 2008, available at http://www.china.org.cn/china/national/2008-10/17/content_16630164.htm; Our Country Becomes ISO Permanent Member Country, Historic Breakthrough in Realizing Standardization Work.

developing co-operation in the spheres of intellectual, scientific, technological and economic activity.” ISO defines standardization as the “activity of establishing, with regard to actual or potential problems, provisions for common and repeated use, aimed at the achievement of the optimum degree of order in a given context”.

All ISO Standards are voluntary. ISO’s main interest is the design and implementation of standards, however it has no power to enforce these standards.

The real work of ISO takes place in the Technical Committees (TCs), their Sub-Committees (SCs) and in the Sub-Committee Working Groups (SWGs). The TCs are the main standardization bodies, comprising experts from the national committees who work on a completely voluntary basis. In 2019, there were 248 TCs, 501 SCs and 2782 WGs and SWGs. This work is coordinated by the Technical Management Board (TMB), which reports to the Council. It is responsible for strategic planning of work, setting up the various technical committees, appointing chairs and monitoring progress of the work. It is also responsible for preparing the Directives, the rules for the development of the international standards. There are fifteen members of the current TMB (See sidebar. Figures in parentheses show the year its term expires).

Responsibility for the secretariat of each TC is assigned to one of the national standards bodies. There is a defined vetting process for choosing the TC Chair to ensure that the person is fully qualified to lead the specific work of the TC. This is also intended to gain ‘buy-in’ from the countries’ individual and independent standards bodies. This was also intended by the founders of ISO to mediate the initial conflict of those establishing ISO who wanted the body to set standards versus those who simply wanted it to be a coordinating body.

Currently, Germany has the largest number of TC and SC chairs (130). The U.S. is second with 103. The U.S. has the largest number of Working Group convenorships (437), with Germany second (391). China has the third largest number of TC and SC chairs (79) and fourth largest number of WG convenorships (199).

There are two ISO Technical Committees that specifically address motor vehicles, TC 22 and TC 204.

ISO/TC 22 was first off the blocks. ISO/TC 22, the **Technical Committee for Road Vehicles**, was founded at the same time as ISO,

ISO Technical Management Board

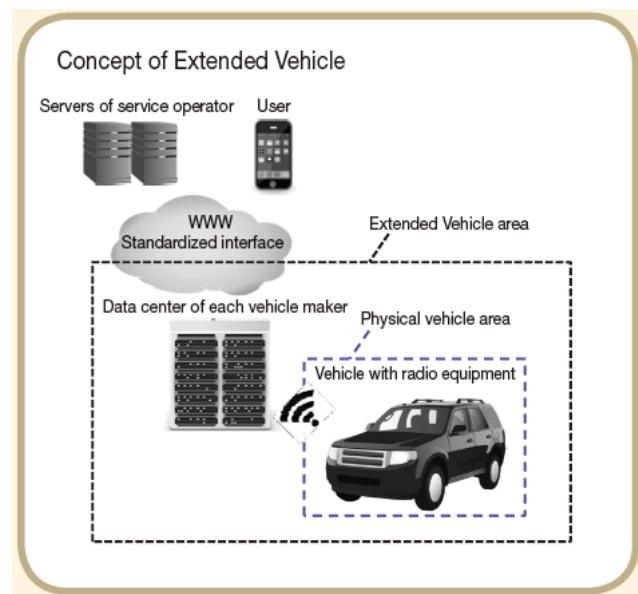
AFNOR France (2020)
ANSI USA (2021)
BIS India (2022)
BSJ Jamaica (2020)
BSI United Kingdom (2021)
DGN Mexico (2020)
DIN Germany (2021)
GOST R Russian Federation (2022)
ISIRI Iran, Islamic Republic of (2020)
JISC Japan (2022)
KATS Korea, Republic of (2022)
SAC China (2020)
SCC Canada (2021)
SIS Sweden (2020)
SN Norway (2020)

in 1947. It is therefore among the oldest of the TCs. AFNOR (France) has held the Secretariat since the start. Its scope is prescribed as the following:

All questions of standardization concerning compatibility, interchangeability and safety, with particular reference to terminology and test procedures (including the characteristics of instrumentation) for evaluating the performance of the following types of road vehicles and their equipment as defined in the relevant items of Article 1 of the Convention on Road Traffic, Vienna in 1968 concluded under the auspices of the United Nations: mopeds; motor cycles; motor vehicles; trailers; semi-trailers; light trailers; combination vehicles; articulated vehicles.

Of the eleven TC 22 Sub-Committees, Italy holds three, the U.S. three, Japan two, Germany two on its own and one shared with France SC 31/Data Communication. There are a many overlaps between TC 22 and TC 204, and a Memorandum of Understanding between the two TCs was agree in 2014 in which cooperation procedures were established.

One excellent example of an overlap is the *Extended Vehicle Remote Diagnostic Support*. The concept of the *Extended Vehicle* was proposed in May 2014 by the automotive sector for standardization of an interface to information collectors external to the vehicle. Responding to the proposal, TC 22 created SC 31/WG 6 Extended Vehicle (ExVe)/Remote Diagnostic Support, and standardization proceeded. According to the Working Group, "...this standardization aims to reduce the risk of information from the vehicle being stolen or compromised and to provide vehicle data for outside-vehicle services. New services using vehicle data are likely to spread in the future. Over the medium- to long-term, it is possible that additional use cases using the *Extended Vehicle* concept will be examined."



ITS standards got the infotainment ball rolling in 1992

ISO/TC 204, the **Technical Committee for Intelligent Transport Systems**, was established in 1992 and held its first meeting the following year, which was the year I joined AB VOLVO and became the Swedish representative to *ISO/TC 204/Working Group 3 – ITS Database Technology*. J. Martin Rowell was the first chair for ISO/TC 204, serving until 2004 with SAE as the Secretariat.

The scope of TC 204 is the following:

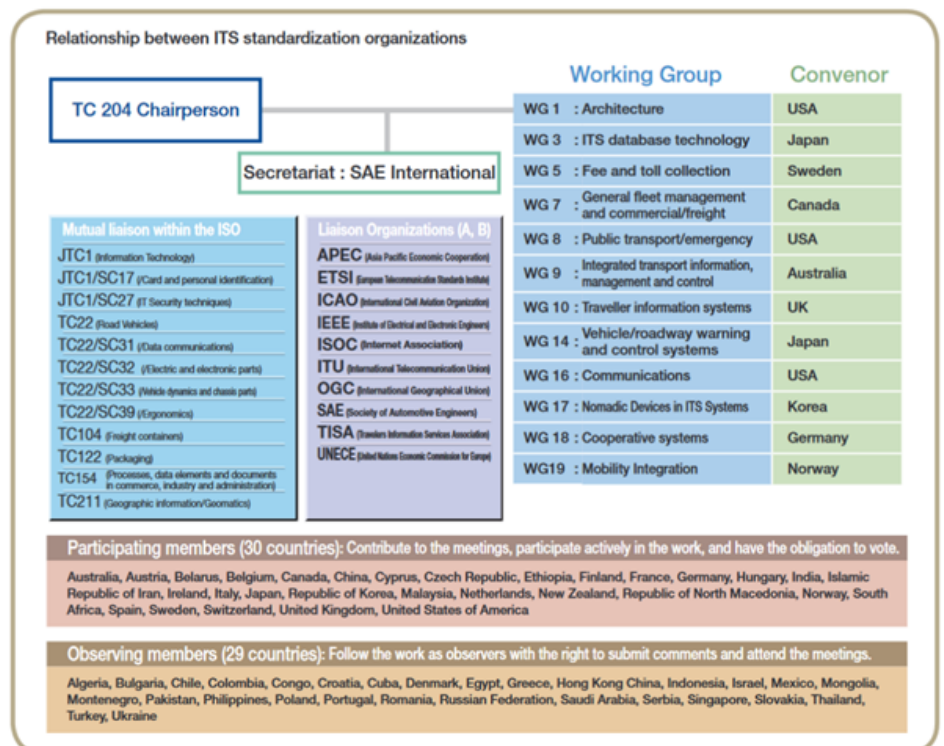
Standardization of information, communication and control systems in the field of urban and rural surface transportation, including intermodal and multi-modal aspects thereof, traveler information, traffic management, public transport, commercial transport, emergency services and commercial services in the intelligent transport systems (ITS) field.

ISO/TC 204 is responsible for the overall system and infrastructure aspects of ITS, as well as the coordination of the ISO work programme in this field, including the schedule for standards development, taking into account the work of existing international standardization bodies.

Today there are twelve Working Groups with the U.S. holding three convenorships, Japan two and the remainder led by seven different countries. PRC is not among them.

During the four years that I was a member of ISO/TC 204/WG 3, there were no representatives from China in the Working Group. It was led then, as it is today, by Japan, and it was the U.S. and Europe along with Japan that were the principal contributors. This was the result of the main navigable map producers, NAVTEQ, ETAK, TELE ATLAS and JDRMA (JAPAN DIGITAL ROAD MAP ASSOCIATION), being U.S., European and Japanese companies, and the primary providers of navigation systems (e.g., MOTOROLA, BOSCH, PHILIPS and PANASONIC) being based in those three countries.

Navigation systems with turn-by-turn route guidance were the principal focus of the automotive OEMs at the time of ISO/TC 204's founding, and therefore the main task on which WG 3 concentrated. Communications were important, which is why it was included, especially as WG16, but it would be a few more years before mobile communications became an integral part of OEM

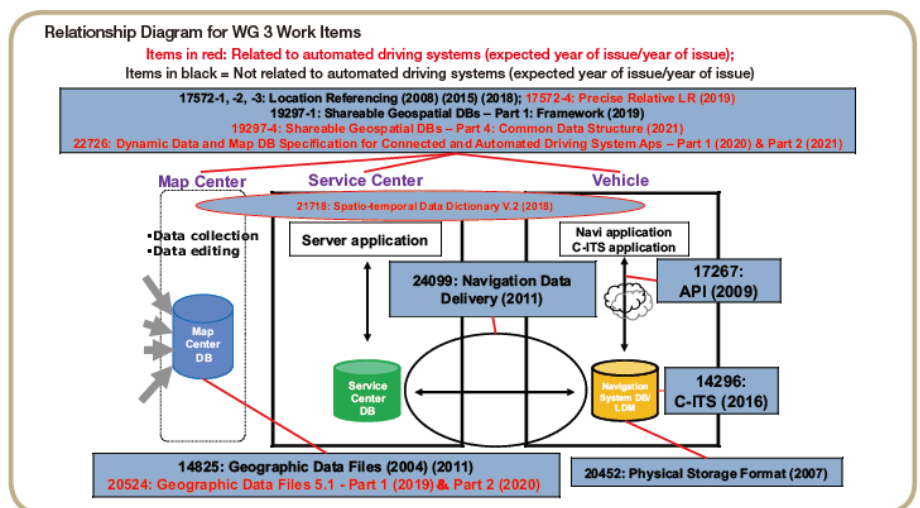


offerings (e.g., *OnStar*, *Volvo On Call*, *BMW Connect*). Japan already had a type of waypoint navigation, and it had a physical storage format called KIWI that it promoted as a standard for physical storage format.⁸ The navigable map data suppliers were interested in having a standard format for delivering their data so they were not forced to compile to every system developer's format, and the system suppliers also wanted a standard delivery format so they could choose among the suppliers. Sub-Working Group 1 developed GDF (Geographic Data Files) for this.

What no one wanted at the time except the car OEMs was a standard for the data that was used in the systems so that OEMs could pick their data supplier separately from their system supplier. Sub-Working Group 2 was assigned this task, but to this day all it has produced is a logical data model. This diagram, from a 2019 report titled *ITS Standardization Activities of ISO/TC 204*, shows the hoped-for relationships between all of the work items included in WG 3.

I learned several important lessons from my period of working directly in the ISO standardization activity, and these lessons have been reinforced by my experiences since then. One is that the main reason for working on ISO standards is not to produce a standard that everyone will use. Since ISO's standards are not mandatory, there will always be parties that choose not to pay any attention to them at all. It's the process that is important, to meet the main players—or at least all the players that are trying to do something to keep the main player who is not participating from dominating the market with its proprietary solution—and to contribute to the collective understanding about what might be the best approaches to finding a solution that would be good for both the businesses and the eventual consumers. The other lesson is that there are basically two types of people participating in the standards activities: those who know and have their company's (or nation's) interests in mind at all times and whose actions during the committee meetings and standards preparations reflect those interests; and, those who believe there is an ideal approach to performing

8. Standardization of the physical storage format (PSF) for navigation map data and related information stored on physical media used by in-vehicle navigation system was intended to facilitate an interoperable in-vehicle navigation market environment by developing a standard PSF that would enable navigation media offered by different providers to be used by any navigation system and navigation systems made by any developer to be able to read the same media.



an activity and it must be applied without compromise to the standard in question. This ideal can either be a computer programming method, a logical process design or physical component architecture.

During the course of a standards activity, you learn quickly who are the players standing outside the conference room, not wishing to join in and why they must not be allowed to win. There was one navigation system developer that claimed it had developed a method of packing the entire continent of Europe on one CD that never took part in any of the standards work, either fearing that it would have to reveal its secret or that its claims would be unmasked. You also learn quickly that you will be assigned by your own actions to one of the groups, pragmatists or idealists, or you will forever float around the edges of both. I was a floater on multiple counts. Since I worked for Volvo, my main interest was in a PSF, but there were no activities in that area while I was an ISO member. Because I did not wholeheartedly endorse the lockstep, turn-by-turn route guidance paradigm, I continuously tried to broaden the GDF data model and data dictionary so that it could accommodate other types of navigation, with little success.

Since its founding in 1947, ISO has done the world a lot of good by bringing together experts to discuss how to develop common solutions to problems that exist everywhere. These solutions may not end up as *de jure* or *de facto* standards, but they inform the work of those standards-setting bodies that do produce standards that everyone must adhere to. It also functions as a guiding hand to the companies that decide how they will design their products for both local and global markets. ITS/TC 204 has been a meeting ground, principally for the U.S., Europe and Japan, where the major issues affecting the design and development of connected and automated vehicles are discussed. Relationships formed during the committee meetings and the countless hours of discussions about the requirements of the industry groups and the consumers in each of the markets taking part has informed the work of those groups that put the final touches on the standards that are implemented.

When it comes to standards, you never walk alone

ISO is only one of three major international standards bodies. The other two are the INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC) and the INTERNATIONAL TELECOMMUNICATION UNION (ITU). The IEC was created in 1906 and it also has its central offices in Geneva. The

IEC's members include technical committees from 42 participating countries and represent the interests of their respective countries with regard to electrotechnical matters. The IEC and the ISO coordinate their work through a Joint Technical Programming Committee. The IEC handles all matters regarding worldwide electronic engineering and electrical standards. The ITU is also headquartered in Geneva and has close cooperation with the ISO. The ITU's work covers communications, including the Internet, radio, cable television, and related industries.

The UNECE (United Nations Economic Commission for Europe) is one of the five regional commissions under the jurisdiction of the United Nations Economic and Social Council. It was established to promote economic cooperation and integration among its member states. Those member states are principally in Europe, but the U.S. and Canada are also members. *World Forum for Harmonization of Vehicle Regulations (WP.29)* is a unique worldwide regulatory forum within the institutional framework of the UNECE Inland Transport Committee. Three UN Agreements, adopted in 1958, 1997 and 1998, provide the legal framework allowing Contracting Parties (member countries) attending the WP.29 sessions to establish regulatory instruments concerning motor vehicles and motor vehicle equipment:

1. UN Regulations, annexed to the 1958 Agreement;
2. United Nations Global Technical Regulations (UN GTRs), associated with the 1998 Agreement; and
3. UN Rules, annexed to the 1997 Agreement.

The UNECE Transport Division has been providing secretariat services to *WP.29*. In addition to acting as secretariat to the *World Forum*, the Vehicle Regulations and Transport Innovations section serves as the secretariat of the Administrative Committee for the coordination of work, and of the Administrative/Executives Committees of the three Agreements on vehicles administered by the World Forum.

WP.29 is doing important work in automotive standards, especially in the areas of cybersecurity,⁹ ADAS, and vehicle dynamics under the responsibility of the Working Party on Automated/Autonomous and Connected Vehicles (GRVA). Another area in which it has made an important contribution is harmonization of accident emergency call systems (AECS). There are two standards which are legal requirements for AECSs, one for the EU (EU eCall: EU No. 2015/758; EU 2017/79; EU 2017/78) and the other for the

World Forum

for

Harmonization of Vehicle Regulations (WP.29)

In existence for more than 50 years, and with participants coming from all over the world, especially the main motor vehicle producing countries, the World Forum for Harmonization of Vehicle Regulations (WP 29) offers a unique framework for globally harmonized regulations on vehicles. The benefits of such harmonized regulations are tangible in road safety, environmental protection and trade.

WP.29 is a permanent working party in the institutional framework of the United Nations with a specific mandate and rules of procedure. It works as a global forum allowing open discussions on motor vehicle regulations. Any member country of the United Nations and any regional economic integration organization, set up by country members of the United Nations, may participate fully in the activities of the World Forum and may become a contracting party to the Agreements on vehicles administered by the World Forum. Governmental and non-governmental organizations (NGOs) may also participate in a consultative capacity in WP.29 or in its subsidiary working groups.

The World Forum convenes officially three times per year and entrusts informal groups with specific problems that need to be solved urgently or that require special expertise. More than 120 representatives participate at the sessions of the World Forum.

The work of the World Forum is transparent: All agendas, working documents and reports are openly accessible on the Internet website of the World Forum.

Russian Federation (ERA-GLONASS). UN Regulation No. 144 is intended to harmonize the testing of the physical components comprising an AECS. It is not intended as a substitute for the EU or Russian regulations concerning the communication modules. In practical terms, what the Regulation allows is crash testing of the system once, rather than having to crash one car for the EU and another for Russia. Other countries, like Japan, are adding the tests prescribed in R-144 for cars that are sold there that are equipped with an AECS.

There is a tired joke about standards: “I love standards because there are so many to choose among.” During the past fifteen years, the principal arena for ITS standards, particularly navigable map data standardization, has moved from ISO and other official national and international standards organizations to industry groups, such as the *Navigation Data Standard Association*, a legal entity formed under German law that owns shared IP in the standard developed by its members and “safeguards members from litigation between members on foreground IP owned by the individual members.” NDS was started by BMW, DAIMLER and VW to develop a physical storage format without interference from other OEMs. Today, NDS counts among its members its founding OEMs and the three non-German OEMs, including the one that was invited in as an observer, RENAULT with its Alliance partners NISSAN, and HYUNDAI. It has a number of China-based companies, including TENCENT, BAIDU, HUAWAI, NAVINFO and NEUSOFT.

Another industry group is the *ADASIS Forum*, that has standardized the interface specification for the electronic horizon that is used in map-based advanced driver assistance systems. The *ADASIS Forum* made a decision following the release of its first specification that it would not submit it to ISO for standardization, and it has maintained that position ever since. TENCENT, BAIDU and NAVINFO are also members of the ADASIS Forum, as are AUTONAVI, NAVINFO’s main competitor. *SENSORIS*, initiated by HERE and, like the *ADASIS Forum*, managed for its members by ERTICO, is a standardized interface to exchange information between in-vehicle sensors and a dedicated cloud, as well as between clouds.

The *Open AutoDrive Forum* (OADF) was initiated by NDS, led by Dr. Volker Sasse of NAVINFO to serve as an umbrella organization for the industry

9. In June of this year, WP.29 issued two new regulations, one for vehicle cybersecurity and another for software updates.

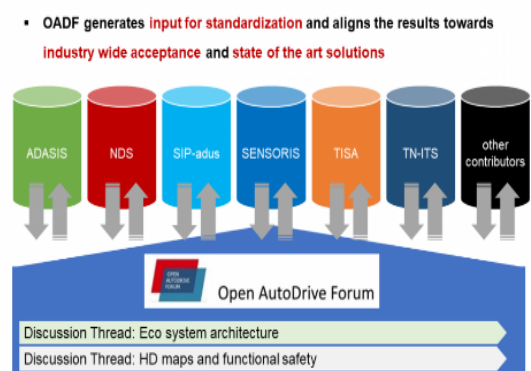
The UN Regulation for cybersecurity provides a framework for the automotive sector to put in place the necessary processes to:

- Identify and manage cyber security risks in vehicle design;
- Verify that the risks are managed, including testing;
- Ensure that risk assessments are kept current;
- Monitor cyber-attacks and effectively respond to them;
- Support analysis of successful or attempted attacks;
- Assess if cyber security measures remain effective in light of new threats and vulnerabilities

The Regulation text is available at: <http://www.unece.org/fileadmin/DAM/trans/doc/2020/wp29grva/ECE-TRANS-WP29-2020-079-Revised.pdf>

The UN Regulation on software updates and software update management systems text is available at: <https://un-docs.org/ECE/TRANS/WP.29/2020/80>

These requirements will be audited by national technical services or homologation authorities. Thus far, 54 contracting parties (countries and the EU) have agreed to apply the regulations.



groups dedicated to auto-related map data, particularly “important questions for autonomous driving”. In 2015, together with ADASIS and SENSORIS, OADF was formed to “give all stakeholders the opportunity to present their issues and to jointly work on standardized solutions across different standardization organizations and companies”.

Will China have a chair at the ITS standards table?

If anything, the industry standards groups represented in OADF have opened ITS standardization to China when ISO/TC 204 and ISO/TC 22, in particular, have been relatively free of active engagement on the part of Chinese companies. I do not find this odd. When NAVTEQ (now HERE) and TELE ATLAS (now TOMTOM) attempted to set up operations in China to make sure the Western automobile companies had navigable map data to feed their systems, they were faced with the same restrictions as the car companies. They were not allowed to operate on their own. They had to set up joint ventures and hand over their IP to the JVs. NAVTEQ teamed up with NAVINFO and TELE ATLAS with BEIJING CHANGDI MAPPING TECHNOLOGIES Co, an affiliate of RITU INFORMATION SYSTEMS INC. The China JV members provided access to data, while the Western companies delivered the IP to produce navigable maps. The China partners may have gotten a look at the recipes of their Western partners’ secret sauce, but they still could not produce something better or even as good on their own. This was a repeat of their automobile experience. China simply has not had much to offer the ITS standards committees, nor the automotive standards groups either.

However, it is different with wireless communications and 5G. Regardless of how it got there (it was in large part the result of huge cash transfers from the state), HUAWEI and other Chinese telecommunications firms have world-leading technology. China wants to promote the firms and their technology by leading standards efforts. The U.S. has tried to prevent China from taking a leadership position by preventing its companies and those of its allies from buying China-made telecommunications gear. After the U.S. Commerce Department last year put HUAWEI on a list of companies that it considered unsuitable for U.S. companies and government—and the companies and governments of all its allies—to do business with, engineers in most U.S. technology companies stopped engaging with HUAWEI to develop standards. Since the standards train was going to go down the tracks with or without the U.S. on board, and Europe’s, Japan’s and the rest of the

world's companies were continuing to occupy their seats, the absence of U.S. engineers put the U.S. at a severe disadvantage, said QUALCOMM, Intel, AMAZON and many others.¹⁰ HUAWEI had a louder voice at the table with the U.S. sitting outside. "Confusion stemming from the May 2019 entity list had inadvertently sidelined U.S. companies from some technical standards conversations, putting them at a strategic disadvantage," said a representative for the *Information Technology Industry Council*, a Washington, DC-based trade association that represents the companies making the complaint.

After a year, the Commerce Department drafted a new rule which states that if HUAWEI is sitting at any standards table (not just 5G), the U.S. needs to be there. On June 15th, the rule was approved. In confirming the rule's passing, U.S. Commerce Secretary Wilbur Ross said:

"The United States will not cede leadership in global innovation. The department is committed to protecting U.S. national security and foreign policy interests by encouraging U.S. industry to fully engage and advocate for U.S. technologies to become international standards."

Once upon a time we didn't know the time in China

It is often said that for most of human history, China was the world's most advanced technological power. What came of it? China's great explorer, Zheng He, reached Africa before the European countries had made their first journey of exploration. When he returned, China's leaders decided that the rest of the world had little to offer it and it settled into managing and fighting for its own rather large patch. Now, having awakened, it wants to be the best of the best and control the destiny of everyone. Europe, beginning with Greece and Rome, were the center of attention for the past two thousand years until centuries of war that more or less ended in the middle of the last century put it into a more docile position relative to its offspring to the west, the United States. The United States, for its part, has vacillated throughout its history between wanting to be left completely on its own and wanting to lead everyone toward the ideal of liberal democracy.

In this context, it would seem that talking about standards for intelligent transport systems is of no importance. It is quite the opposite. As the experience with 5G standards has shown, people sitting at the standards tables are on the front line of diplomacy. And I would argue that we need fewer and stronger standards organizations creating standards that can be applied globally, not

10. <https://www.reuters.com/article/us-usa-china-huawei-tech-exclusive/exclusive-u-s-drafts-rule-to-allow-huawei-and-u-s-firms-to-work-together-on-5g-standards-sources-idUSKBN2211ZY>

regionally, and in which more countries and more industry groups can participate, not fewer. The structure for accomplishing this exists, but it is not being used effectively. It is ISO.

ISO is not WHO. ISO is not a specialized agency of the United Nations like WHO, UNICEF or UNHRC. It does not have to follow the regulations established by the United Nations, such as not allowing particular countries to become members because other countries object (Yes, I mean Taiwan!). The work performed by its relatively small staff is primarily coordination; the substantive work is done by volunteers devoting their time and energy. It does not rely on funds being provided—and potentially cut off—by member countries for the bulk of its work. It does not have to restrict membership to a single agency or association in each country that represents all other organizations and companies. It does not have to restrict participants to companies that are approved by all countries or take away someone's seat at its table because one country objects to its presence.

There is no reason why ISO/TC 204 and ISO/TC 22 cannot develop standards that can then be promulgated in every country, in the same way that the European standards organization, CEN, develops standards that the member countries of the EU are obligated to write into their laws.

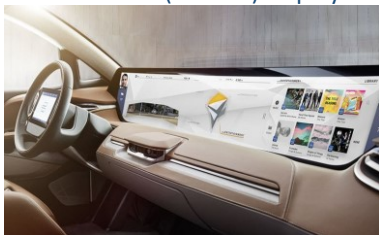
As I have said, ISO is performing an excellent service to the world by providing a forum where groups can meet, discuss and develop their ideas. This is a good start, but it has shown itself to be insufficient. ISO needs to do more, and it can do more precisely because it is not entwined in the nets that have been set by the United Nations. The UN is going to have to figure out how it should be run in a post-COVID-19 world, in a world that looks very different today than when it was established seventy-five years ago. It has thus far not proved that it can keep the peace. It does not have to be responsible for managing everything else.

Where does this leave WP.29, which has gone well beyond vehicle road worthiness? As I have pointed out, there is a significant overlap between the work of WP.29 and that of ISO/TC 204 and ISO/TC 22. I believe they should be consolidated. The two TCs and WP.29 should become the **ISO/TC for Harmonization of Vehicle Regulations** within an invigorated ISO in which global standards are established and where everyone (person, business, country) who can make a positive contribution can do so.





Byton described its *M-Byte* as a compact luxury SUV with a price range of between \$45,000 and \$55,000. It was to have a range of between 224 and 286 miles, depending on the battery pack selected. Its main feature was its over-the-top instrument panel with a 48-inch (122 cm) display.



I can imagine Crocodile Dundee delivering his favorite line in an advert for the vehicle, pointing first to a puny TESLA display, saying: “That’s not a display;” and then following the camera panning to a BYTON interior, saying, “this is a display.”

11. <https://www.the-verge.com/2019/9/20/20875328/byton-carsten-breitfeld-first-auto-works-chinese-government>

Battery Electric Vehicle News

Chinese BEV maker BYTON bites the dust, maybe

THE NAME BYTON is a play on ‘byte’, as in *M-Byte* and *K-Byte*, the names it gave its battery electric vehicle concept cars. It was founded in China in 2017 by Carsten Breitfeld and Daniel Kirchert, who were CEO and President respectively. Breitfeld had a long career at BMW. Kirchert had lived in China for twenty years since he had been a student at Najning University. He had been Managing Director of INFINITI CHINA and Senior VP of Sales and Marketing at BMW BRILLIANCE AUTOMOTIVE LTD.

At its founding, Byton was a subsidiary of CHINA HARMONY NEW ENERGY AUTO HOLDING LTD (now CHINA HARMONY AUTO HOLDING LTD.), an investment holding company principally engaged in the sale of motor vehicles and the provision of motor vehicle related services in mainland China. It is particularly focused on the sale of high-end luxury cars, including BMW, INFINITI, ROLLS ROYCE and others. In 2018, FIRST AUTO WORKS, a Chinese state-owned automotive manufacturing company, invested a “significant amount of money” in BYTON, giving it about 15% of the company. Following the investment, FAW provided hundreds of millions of dollars more to BYTON, using the company’s manufacturing facility in Nanjing as collateral.¹¹

It was shortly after that when Breitfeld left the company. He said he left “because the Chinese government exerted too much influence” after FAW entered the scene. He said further that FAW brought credibility and access to suppliers, but those advantages came with oversight and interference. And they took away his responsibilities. He said that he feared they were only interested in gaining access to the BYTON electric platform (what is referred to as the skateboard) and would eventually close down the company’s operations. That is exactly what has happened. BYTON announced in April that it has furloughed around one-half of the 450 employees in its U.S. headquarters, and then followed that up with a statement that it had suspended production during a six-month period “for a reorganization,” starting on the July 1st. Odds are that it is unlikely to resume production.

Germany officials investigating EV charging

THE GERMAN GOVERNMENT established in 2010 the National Platform for Electric Mobility (*Nationale Plattform Elektromobilität*) as an advisory council to the government on the introduction of electric vehicles in the country. It was created as a partnership program with the German car industry. Its task was to advance the National Development Plan for Electric Mobility, the goal for which was to make Germany a leading supplier and lead market for electric mobility by 2020, and to gain an employment effect of 30,000 additional jobs. It had a stated objective of supporting a fleet of one million plug-in electric cars in Germany by 2020 with 100,000 charging points to power them.¹²

As of July 2018, there were 13,500 public and partially public charging points at around 6,700 charging stations in the country. This was a 25% increase over the same time a year earlier, but clearly the rate of building them makes the goal of 100,000 unachievable.

Germany's Federal Cartel Office (*Bundeskartellamt*) president, Andreas Mundt, said in a statement in on the 13th of July that his office was "receiving more and more complaints about the prices and conditions on the charging stations." He said that non-discriminatory access to suitable locations for charging stations and the terms of use for the charging stations are of crucial importance to make sure companies are competing fairly.¹³ The plan is to build a nationwide charging infrastructure by 2030. For some reason, the process of setting up and operating the charging stations was not made subject to the comprehensive regulation of electricity networks, and this has left it open to possible manipulation. The fear is that one supplier ends up with a monopoly that can decide on locations and dictate prices.

This is new ground that is being plowed by governments, and if their industries and their citizens are the two horses that should be pulling that plow, it's important that they are hitched up properly and that they can be convinced to pull in the same direction. That is not what is happening anywhere today, including in Germany. The Cartel office would be wise to investigate why companies might feel compelled to build monopolies, just like the ones that existed for delivering electricity to everyone before deregulation.



12. As of December 2019, cumulative registrations in Germany totaled 305,787 plug-in electric passenger cars since 2010, consisting of 168,396 all-electric cars and 137,391 plug-in hybrids.

Source: Kraftfahrt-Bundesamtes (KBA) (January 2020). "Neuzulassungsbarometer im Dezember 2019" [New Registrations Barometer December 2019] (in German). KBA.

13. <https://www.msn.com/en-us/money/companies/electric-car-charging-probed-as-germans-see-to-go-greener/ar-BB16xclF>

A reader's clarification on Tesla as pure online seller

Preferring to remain anonymous, a reader who I can confirm knows the car sales business inside and out, wrote that TESLA is not a wholly online-order, pull-system OEM. TESLA sells from inventory, both new and used, which can be seen on their web site. He says that a large majority of sales do involve at least a phone call to a TESLA advisor or a visit to a store. TESLA announced in February 2019 that it was closing most of its stores, but a check on the Sweden site shows that its five stores, including one in a mall, are still open. The number that is quoted for online sales is 80%, which appears to stem from a leaked internal memo penned by Elon himself:

Last year, 78% of all Model 3 orders were placed online, rather than in a store, and 82% of customers bought their Model 3 without ever having taken a test drive. Customers can now buy a Tesla in North America via their phone in about 1 minute, and that capability will soon be extended worldwide. We are also making it much easier to try out and return a Tesla without a test drive. You can now return a car within 7 days or 1,000 miles for a full refund. Customers are becoming increasingly comfortable making purchases online, and that is especially true for Tesla — which is a testament to the products we make.

As a result, over the next few months, we will be winding down many of our stores and significantly reducing our spend on sales and marketing, which will help make the price changes we've announced today possible. Shifting all sales online combined with other ongoing cost efficiency will enable us to lower all vehicle prices by about 6% on average, allowing us to achieve the \$35,000 Model 3 price point.

Both phone advisors and store/service center staff are incentivized to close sales, have sales quotas and are paid partly on commission, according to my source. He says that people don't believe him when he tells them this, so he provided a few sample testimonies from former staff published on *GLASSDOOR*. He offers the following closing thought:

"Net/net Tesla stores look to me more and more like OEM-owned dealerships, than "pure" delivery points for sales (etc.) completed online."

Is the new FCA and Waymo deal a big deal?

LAST MONTH the title for this space had the name VOLVO CARS instead of FCA asking the same question. My answer to that question was "No it isn't". I don't think this extension of FCA's and

Tractors and Sports Cars

What could possibly be the connection between the iconic sports car brands ASTON MARTIN and LAGONDA and a tractor maker? Hint: The tractor company name was DAVID BROWN TRACTORS GROUP. DB? Yes, the DB model name comes from the initials of David Brown, who bought ASTON MARTIN in 1946 and then added LAGONDA in 1947. Below is the DB1, built from 1948 to 1950.



The DB2 ('50-'53) below is the car that defines ASTON MARTIN up until today.



James Bond drove a DB5 ('63-'65) below in *Goldfinger*, and it is said that this is the reason ASTON MARTIN is still in business.



ASTON MARTIN has always had financial trouble. In 1972, David Brown paid off all of the company's then-current debts totaling £5 million and sold the company to investors. In the same year he sold his tractor business to TENNECO INC., the company that owned CASE TRACTOR COMPANY. Below is a 1975 Case David Brown tractor.



So the next time you're stuck behind a tractor on a country road, give a thought to Sir David Brown (1904-1993), who rescued ASTON MARTIN, gave the name LAGONDA a new life and has carved his initials into the tree of motorized vehicle history.

Waymo's current agreement is as big a deal as they are trying to make it either, especially not for Waymo. Here's why.

Four years ago, in December 2016, the Google unit working on driverless car technology was spun off into a new division in Alphabet. It was called Waymo. In the same year it had begun working with FCA, which had been formed in October 2014 through a merger of FIAT and CHRYSLER. Waymo calls FCA its "first OEM partner," even though the group started in 2009 by retrofitting TOYOTA PRIUSES. In October 2017, Waymo began testing its software and hardware kit, called *Waymo Driver*, installed in CHRYSLER PACIFICA HYBRIDS. John Krafcik, Waymo CEO and formerly president and CEO of HYUNDAI MOTOR AMERICA, who came on board Google in 2015, said in the announcement of the new deal with FCA:

"Since 2016, we (FCA and Waymo) have worked closely to integrate the Waymo Driver into FCA vehicles and have made self-driving history in the proven, capable, L4-ready Chrysler Pacifica Hybrid minivan. This partnership has led to the first commercial autonomous ride-hailing service, including the offering of fully driverless service to riders, as well as driving in dozens of cities across diverse geographies and challenging weather conditions."

What's the new deal? On the 22nd of July, FCA and Waymo issued a joint press release from Auburn Hills, Michigan. Waymo announced that it will now work "exclusively" with FCA as its preferred partner for the development and testing of class 1-3 light commercial vehicles for goods movement for commercial delivery customers, including *Waymo Via*. FCA announced that it had selected Waymo as its "exclusive strategic partner" for Level-4 autonomous technology across the entire FCA fleet. Mike Manley, CEO of FCA said the following:

"By incorporating the Waymo Driver, the world's leading self-driving technology, into our Pacifica minivans, we became the only partnership actually deploying fully autonomous technology in the real world, on public roads. With this next step, deepening our relationship with the very best technology partner in this space, we're turning to the needs of our commercial customers by jointly enabling self-driving for light commercial vehicles, starting with the Ram ProMaster. Adding Waymo's commitment to partner with us to deploy its L4 fully autonomous technology across our entire product portfolio, our partnership is setting the pace for the safe and sustainable mobility solutions that will help define the automotive world in the years and decades to come."



A Waymo-outfitted Chrysler Pacifica Hybrid.

So FCA has chosen Waymo for delivering a Level-4 autonomy solution for all of its vehicles, and Waymo has chosen FCA as its preferred partner for class 1-3 light commercial vehicles for goods movement for commercial delivery customers, including its own service, *Waymo Via*. This sounds a bit lopsided to me. No financial terms were released and no time plan provided. This new agreement between FCA and Waymo also extends to future affiliates. This point matters because FCA and French automaker GROUPE PSA are in the process of trying to merge into a newly formed corporation called STELLANTIS. If the 50-50 merger closes as expected in the first quarter of 2021, the agreement would theoretically include all the brands that fall under STELLANTIS.

Waymo and FCA said they will be integrating Waymo's self-driving stack (i.e., the suite of software and hardware that allows the vehicle to operate without a human behind the wheel) into FCA's *RAM PROMASTER* vans.¹⁴ Once this is done, Waymo will use them for *Waymo Via*, the company's trucking and local delivery service.

FCA has been testing the waters with other self-driving/driverless car technology companies. In June of last year, FCA made a fuss about working with Waymo rival AURORA, the company founded by former Google employee Chris Urmson. Urmson left Google after Waymo was started and Krafcik was named CEO. Manley said at the time: "AURORA brings a unique skill set combined with advanced and purposeful technology that complements and enhances our philosophy of self-driving." FCA had apparently signed a memorandum of understanding with AURORA. It was up for renewal, but it appears that at least FCA decided not to continue with the cooperation. The two companies are still working on custom-built *PACIFICA HYBRIDS*, which AURORA is using in its testing, but they are not co-developing autonomous commercial vans.

As late as May of this year, FCA and self-driving start-up VOYAGE announced that they would cooperate in the development of "fully driverless cars". VOYAGE would install its solution into *CHRYSLER PACIFICA HYBRIDS* that have been developed for integration of automated technology. These vehicles come with customizations such as redundant braking and steering that are necessary to safely deploy driverless vehicles. Perhaps FCA has now settled down with a true soul mate and partner for life, but it looks like Waymo still has a lot more wild oats to sow. We shouldn't make too big a deal of it.



14. A 2021 FCA RAM PROMASTER VAN. The Ram ProMaster is built at FCA's Saltillo Van Assembly Plant in the Mexican state of Coahuila. It's based on the Fiat Ducato, which the company builds through a partnership with PEUGEOT maker PSA GROUP. This connection between PSA and FCA might easily be passed over, but it turns out to be significant since the companies are planning to merge. European regulators plan longer investigation of FCA, PSA Group merger plans. The proposed merger's possible impact on reducing competition in the commercial van sector is an area of concern for European regulators, who last month announced a more in-depth investigation of the companies' plans. European Commission Executive Vice President Margrethe Vestager said in posted remarks that commercial vans are an "increasingly important market in a digital economy where private consumers rely more than ever on delivery services." The commission noted in a news release that either FCA or PSA GROUP is the market leader in light commercial vehicles in many countries, and a merger "would remove one of the main competitors."

Undecided between Geely and Volvo Cars

AS I REPORTED in the [July 2020](#) issue of The Dispatcher, VOLVO CARS and GEELY AUTOMOBILE announced in February of this year that together they would investigate the economic and other synergies of merging the two companies and listing the new entity on one or more stock exchanges. Then, suddenly, in late July, VOLVO CARS declared that the merger plans were on hold. GEELY AUTOMOBILE made a public statement in June that its board had approved a preliminary proposal to list new shares in GEELY AUTOMOBILE (not the merged VOLVO CARS and GEELY) valued in Renminbi on Shanghai's STAR exchange. For some unexplained reason, as long as this GEELY AUTO listing is ongoing, there can be no discussion of GEELY AUTO merging with another company. A GEELY AUTO spokeswoman was quoted in *AUTOMOTIVE NEWS* as saying: "Talks (between VOLVO CARS and GEELY AUTO) would resume as soon as GEELY AUTO had ended its activities related to that ('that' referring to the STAR listing)."

Håkan Samuelsson, VOLVO CARS' CEO, was quoted in the Swedish press, stating that "The logic (of the merger) is still the same, and it is positive, but the merger plans have temporarily been put on ice."

In other VOLVO CARS news, Samuelsson, who came into the company in October 2012 with the mandate to take the company to 800,000 car sales by the end of 2020, informed us on the 24th of July that he wasn't going to be able to deliver. It had been a banner year in 2019 with 705,452 cars sold globally.¹⁵ I don't believe he ever thought he would have gotten that far with just one more year to go. But even without COVID-19, adding 94,548 in 2020 to reach 800,000 was never going to be easy. After the first six months showed that COVID-19-impacted sales were down a total of 21%, it was going to be impossible. The company will sell fewer cars than it sold in 2019, said Samuelsson, but, hey!, that's still a lot for Volvo. Samuelsson is looking forward to next year, leaving what he calls the "corona year" behind. We all are, Håkan.

Six months of COVID-19 and still counting

IT HAS BEEN six months since most of the world closed down. It was around the same time that China was opening up after a few months of a strictly enforced quarantine, just in time to start producing the products that the rest of the countries would need, including all the ones for which it already controlled the markets, and all the others that the countries could not produce themselves because their factories were closed. China seems to have

Undecided

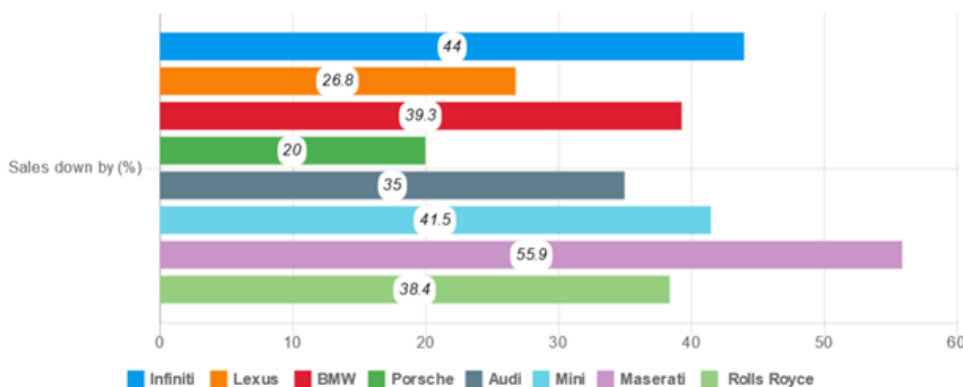
*First you say you do
And then you don't
And then you say you will
And then you won't
You're undecided now
So what are you gonna do?
Now you want to play
And then it's no
And when you say you'll stay
That's when you go
You're undecided now
So what are you gonna do?
I've been sitting on a fence
And it doesn't make much sense
'Cause you keep me in suspense
And you know it
Then you promise to return
When you don't
I really burn
Well, I guess I'll never learn
And I show it
If you've got a heart
And if you're kind
Then don't keep us apart
Make up your mind
You're undecided now
So what are you gonna do?
Written by Sid Robin and Charlie
Shavers, 1938*

15. In 2012, Volvo Cars sold just over 400,000 cars worldwide.

gotten itself back on line very quickly with fewer deaths than Sweden. But let's not dwell on that. Let's look at where the automotive industry is at this point.

You can't build cars in your den. We knew that, but it was worthwhile to have it confirmed. All those folks who were talking about life carrying on from their newly established home offices never worked in a factory.¹⁶ This was a time when you found out if you were an 'essential worker'. People who build cars are essential, as the numbers show. People who aren't working are not going to run out and buy a car, as the effect of high unemployment also shows in the sales numbers. Compared to Q2 2019, FCA's sales were down 39% with the DODGE brand down 64%. GM was down by 34% with CADILLAC taking a 41% hit. FORD was down 33.3%. VW (-29%), TOYOTA (-34.6%), NISSAN (-49.5%), HYUNDAI (-22%) and MITSUBISHI (-58%) did no better than the U.S. brands. TOYOTA actually eked out a profit of 13.9 billion yen (\$129.4 million), which was down 98% from a year earlier.

How about the luxury brands? PORSCHE fared best, but was still down by 20%.



Source: TopSpeed, Ciprian Florea, Senior Editor and Supercar Expert¹⁷

There was some good news in July with MERCEDES-BENZ up 11%, BMW up 17% and RENAULT up fully 30%. Overall new car sales in Germany were down 5.4%, which was the best result for Europe's largest market this year. The entire German market was down 30.1% for the first six months of 2020.

Did any company beat the virus? Tesla. On the 22nd of July, TESLA released its financial results for the second quarter. It beat Wall Street's expectations, which was a loss of \$0.14 per share. It made \$6 billion in revenue and a profit of \$0.50 per share. In its letter to shareholders, TESLA stated that "...positive impacts included lower operating costs due to a temporary reduction in employee compensation expense, a sequential increase in regulatory credit



16. I wrote a letter to *Bartleby*, the author of a column with that name in *THE ECONOMIST*. His column in the May 30th edition made it sound like everyone in London left their office at the same time as he did and went home to do whatever they did before the virus struck. He went so far as to congratulate himself and his colleagues for having produced the first entire edition from the comfort of their home offices. I read this in the print edition. I doubt that the good folks working the press, or the ones who delivered the paper and inks to the printing plant, or those who picked up the finished copies, and all the others who got it to my door shared Bartleby's view that magic happens when everyone is asleep. I said he could congratulate himself for being a non-essential worker. He did not respond to my letter.

17. <https://www.top-speed.com/cars/car-news/au-tomakers-feel-the-burn-as-q2-profit-and-loss-numbers-paint-a-very-sad-picture-ar188853.html>

revenue and a deferred revenue recognition of \$48 million related to a Full Self Driving (FSD) feature release.” The “regulatory credit revenue” of \$428 million was for TESLA’s sale of credits for electric vehicles to companies like FCA. It would not have made a profit without those credits.

Jim Hackett’s tenure at Ford is ending. He had planned on ending his brief, three-year career as FORD’s CEO in 2021, but Jim Farley will take over the reins on the 1st of October. Hackett was the polar opposite to hyperactive Mark Fields, whom he succeeded. Bill Ford had brought Hackett in from furniture-maker Steelcase (another Michigan-based company) to improve FORD’s “competitive fitness”. That may have been one of the reasons for replacing Fields, but the main one was that FORD’s share price had lost 35% of its value during his also-brief term. On top of this, the chemistry between Ford and Fields was never the best.

The fact that FORD’s share price has lost 38% of its value during Hackett’s three years at the helm cannot have escaped the Ford family’s notice. Nothing that the company did, including eliminating sedans from its lineup, tying up with VW for R&D investments, and putting money into RIVIAN helped to lift its stock price and valuation. But FORD’s product lineup has been overhauled and it has spent a reported \$11 billion in restructuring costs. Now it’s time to build cars.

Jim Farley is a car guy. He was hired away from TOYOTA in 2007 by Alan Mulally, FORD’s CEO from 2006 to 2014. He had been with TOYOTA since 1990. FORD is making a big thing about Farley’s grandfather having been a factory worker for FORD in the early 1900s, about the fact that Farley bought a 1965 Ford Mustang when he was only fourteen and drove it back to Michigan from California—illegally without a driver’s license—and that he owns race cars and drives them on the weekends. He headed FORD’s European operations between 2015 and 2017 and lead FORD’s mobility and technology divisions. Of AMAZON, APPLE and other tech companies, he said: ““The ambition for those technology companies in our space is very, very high. I am sure we will have a frenemy relationship.” On the 1st of October, Jim Hackett will get the chequered flag for the end of his session, but not the race, and on the same day, Jim Farley will get the green flag to start his session. Let’s hope that Ford (i.e., Bill) has picked a keeper this time and that Farley can bring glory back to FORD. It’s a tall order.



Ford’s new CEO, Jim Farley is to the left, and Jim Hackett in his signature button-up sleeveless sweater is on the right. Hackett projected a calming and steadying image, sort of a plumper version of Mr. Rogers. Bill Ford said of Hackett: “I am very grateful for all he has done to modernize Ford and prepare us to compete and win in the future.” Of Farley, he used a very different vocabulary to describe his expectations: “Jim Farley matches an innate feel for cars and customers with great instincts for the future and the new technologies that are changing our industry.”

The Low-earth Orbit Satellite Broadband Battle



*This illustration of **Starlink**, a fleet or constellation of internet-providing satellites designed by **SPACEX**, shows roughly 4,400 satellites of the project's first phase deployed in three different orbital "shells". Photo: University College London*

Is this another win for Elon Musk?

ANYONE WHO OWNS a mobile phone has been there. You could be on a train somewhere between cities or on a drive into the countryside. You pick up your phone to make a call and there are no coverage bars. You are in a mobile network desert (MND). Some people hunt for such places and return to them to find a respite from the constant ringing and humming of their phone, but you don't want to be in a MND if you have a crash in the middle of the night and your car's telematics system can't reach out and touch someone who can send help.

One might think that filling in all the coverage holes would be the priority as the telecommunications industry moves us up the G-ladder. Anyone who has worked with vehicle connectivity for the past thirty years knows that it is exactly the opposite. The priority is data speed in highly populated areas, not ubiquitous coverage. The best coverage the U.S. had was AMPS (Advanced Mobile Phone System), the analog precursor to the digital variants TDMA and CDMA. It was developed by Bell Labs and Motorola, first introduced in the U.S. in 1983 and is termed 1G for First Generation. This was in the days when people used telephones for talking, and radio waves were simply a substitute for telephone wires.

Digital telephony (CDMA, TDMA, PDC, 2G) brought widespread usage of phones (for talking), the start of global standards and the beginnings of data messaging.¹⁸ SMS over 2G was the workhorse of early telematics messaging until GPRS came along with 2.5G. WAP and i-mode allowed access to the wireless Internet. This was all before the dot.com revolution, which was going to turn cars into large mobile phones, came to a crashing end in 1999. As it turns out, the crash was not fatal. It was more of a video game crash in which the cars and drivers miraculously survived to begin the race anew as if nothing had ever happened. The Universal Mobile Telecommunications System (UMTS), which was standardized by 3GPP was first offered in 2001 in the GSM regions, principally Europe and Japan.

18. The International Telecommunication Union (ITU) began in December 1932 with the merger of the International Telegraph Union and the International Radiotelegraph Union. On the 15th of November 1947, an agreement between ITU and the newly created United Nations recognized the ITU as the specialized agency for global telecommunications. This agreement entered into force on 1 January 1949, officially making the ITU an organ of the United Nations. 3G technology was the result of research and development work carried out by the ITU in the early 1980s.

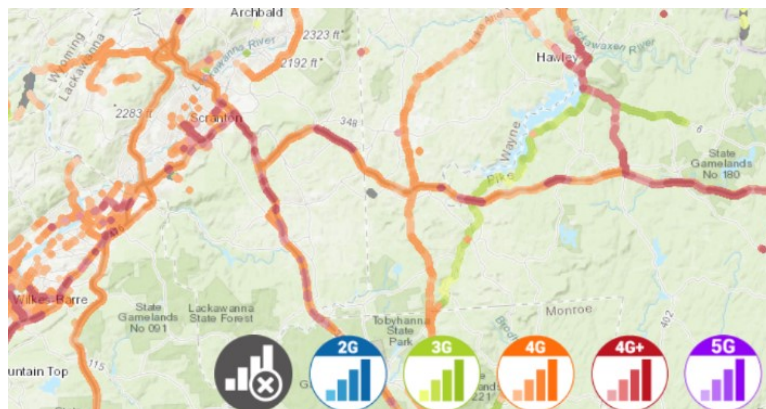
W-CDMA (Wideband Code Division Multiple Access) was standardized by 3GPP2 and used in North America, South Korea and a few other places.

3G was really the end of progress for talking on mobile telephones in the traditional telephone sense. This is a map showing network coverage for AT&T MOBILITY in Northeastern Pennsylvania as of the 8th of August 2020 in an area a mere 200 kilometers from both Philadelphia and New York City.¹⁹ The green colors are not forest or field but different strengths of 3G coverage. The orange and red variations are 4G and are clearly along roadways, principally the Interstates. There is no 5G in sight in this corner of the world. 2G has been discontinued.

In the U.S., approximately 12% of wireless service users are still relying exclusively on 3G service.²⁰ The main reason (87.3%) is that they do not want to pay for a 4G subscription, presumably because they don't need the data services that come with 4G. About 12.7% don't have a 4G package, even though they may have a 4G-compatible phone, because they do not have 4G coverage where they spend most of their time. Looking at the map above, you can see that a very large area is not touched by 4G. If you have a 4G phone, and it is not voice-capable, it will use 3G to make and receive all voice calls. If you have a 4G phone that is voice-capable, it will use the 4G voice alternative when it is in 4G coverage, and fall back to 3G when it is out of 4G and there is 4G coverage.²¹

Carriers are providing dates for when they will shut down (called sunset) their 3G networks. Why do they want to do that when it seems that we depend on them for so much, including fallback for voice. In the EU, the mandated 112 eCall system requires 3G or 2G to function.

The current eCall system is based on circuit switching and thus can only be supported on the GSM (2G) and UMTS (3G) networks, as LTE (4G) is packet switched and requires the addition of an IP Multimedia Subsystem (IMS) to support voice services or VoLTE. Work is underway to migrate the eCall system to an IMS as many of the required features already exist in the IMS Emergency Call and IMS Multimedia Emergency Service. Furthermore, the European Telecommunication Standards Institute (ETSI) has proposed several migration scenarios for discussion,



19. The Scranton/Wilkes-Barre/Hazleton area has a population of approximately 555,000.

<https://www.nperf.com/en/map/US/-/2420.ATT-Mobility/signal/?ll=41.403982015922075&lg=-75.59675216674806&zoom=13>

20. https://www.phonearena.com/news/when-will-verizon-t-mobile-att-phase-out-3g_id125233

21. A voice-compatible 4G phone is one that uses VoLTE, which stands for 'voice over LTE', and LTE stands for Long-Term Evolution. It's voice calls over a 4G LTE network, rather than the 2G or 3G connections which are usually used as fallback for voice calls on non-VoLTE 4G phones.

but some of these still rely on circuit switching to support the voice call capability and therefore by implication, 2G and 3G. However, there are no agreed timescales to implement the 4G eCall service.

They say it is to make room for new technologies that will “improve your service and your experience” by allowing faster speeds and new features. AT&T says it will phase out 3G by February 2022, and once they do, 3G devices and 4G wireless devices that don’t support *HD Voice*²² will no longer work on its network. So, you might ask, what happens if you have a nifty 4G phone that is voice capable, that is, it can make voice calls without switching to 3G, but then 3G is switched off? If there is no 4G coverage and no 3G back-up, your phone just does not work, neither for voice nor for data. What can the network operators and the telecommunications oversight agencies be thinking? Here’s what I think.

Stars don’t shine in the city’s lights

I believe that among those who are thinking about this problem of coverage versus features, there are two schools of thought: the **Urbanists**, those who are fascinated by glittering city lights; and, the **Sky Gazers**, those who are captivated by sparkling stars. The urbanists currently represent the predominant view, which is that the future for humankind is in cities, that coverage outside of cities and beyond the narrow transportation channels connecting them won’t matter because everyone will live, work and recreate in cities. (While the best cities enable all three, many cities, like Venice and Prague, were well on their way to becoming amusement parks for globe-trotting, cruise-taking global tourists before COVID-19 put at least a temporary stop to the pillage and decamping of residents, who abandoned their homes to Airbnbers.)

There is no question that the trend in most countries has been for inhabitants to move from rural to urban areas.²³ The People’s Republic of China, a major proponent of 5G, has directed its efforts to moving its inhabitants from non-urban to urban locations at an unprecedented rate, and building super-sized manufacturing cities to accommodate them. In 1960, 16.2% of the country’s inhabitants lived in urban areas. By 2019, that had increased to 60.31%. In 1960, 70% of the inhabitants of the United States lived in urban areas. By 2019, that number had increased to 82.46%. Comparable figures for the U.K. are 78.44% and 83.65%, for Japan 63.27 and 91.7%, for Germany 71.38% and 77.38% and for Nigeria 15.41% and 51.16%.

22. HD Voice is a suite of services enabled by VoLTE technology that are connected to 4G LTE networks. HD Voice also includes additional benefits such as:

- Simultaneous voice and 4G LTE data
- 1-way or 2-way video calls¹ (including video calls over Wi-Fi)
- 6-way conference calls
- Wi-Fi Calling

23. What is an urban area? Urban population refers to people living in urban areas as defined by national statistical offices. It is calculated using World Bank population estimates and urban ratios from the United Nations World Urbanization Prospects. Aggregation of urban and rural population may not add up to total population because of different country coverages.

<https://www.macrotrends.net/countries/CHN/china/urban-population>

The other school of thought is that there will always be a need for people to live in or spend significant amounts of time in non-urban settings, whether it is because they choose to live there, work there or play there. The star gazers don't deny that urban areas will be important, but they do not believe that it is inevitable or desirable that rural and exurban areas are depopulated. Those 40% of the PRC's inhabitants not living in urban areas represent a population as large as the current population of the collective countries of the European Union. Also, the rate of movement from non-urban to urban in the PRC has been declining for the past thirty years, from 4.6% in 1990 to 2.29% in 2019, so maybe everyone on the planet won't be urban by mid-century.

This group—I'll call them the S-Team—looks up to the sky for a connectivity solution. The solution its members see is satellites, and that is where STARLINK and its ilk come into the telecommunications picture. For the S-Team, the G-Men can keep on doing whatever it is that they do, increasing network speeds for massive data handling, adding more features and erecting more antennae. In the meantime, the S-Team will set up an array of satellites that will eventually allow broadband coverage in every nook and cranny on Planet Earth that will provide both broadband data and Internet telephony. Rather than laying cable and putting up antennae, the satellite solution works by beaming information through the vacuum of space where it travels 47% faster than in fiber-optic cable. The group's current leader is the rocketman extraordinaire and honorary Martian, Elon Musk, CEO of TESLA and SPACEX.

Star light, star bright, are you a star or a satellite

Starlink is the name of a satellite network being put into low earth orbit (340 miles/550 kilometers) by SPACEX. The company announced its proposal to provide space-based Internet service in January 2015. Elon Musk said at the time that his company had filed documents with international regulators to place 4,000 satellites into orbit. Since then, the U.S. Federal Communications Commission (FCC) has granted SPACEX permission to fly 12,000 satellites with a possibility to increase that to 30,000 or more.²⁴ SPACEX launched its first two *Starlink* test craft, dubbed *TinTinA* and *TinTinB* (cute) in 2018. It launched its first 60 operational satellites on the 23rd of May 2019.

Each *Starlink* satellite weighs 227 kilograms and is about the size and shape of a rectangular kitchen table top. A solar panel that powers the satellite's ion propulsion system folds out about six



24. According to the U.N. Office for Outer Space Affairs, a total of 9,611 'objects' have been launched into outer space, and approximately 2,000 of these objects currently orbit earth. http://www.unoosa.org/oosa/osoindex/search-ng.jsp?lf_id=



meters (see sidebar). With 400 satellites, Starlink has said it will be able to provide “minor” Internet coverage, and with 800 it would deliver “moderate” coverage. The next step, now that it has 595 satellites deployed as of the 8th of August 2020, is a private beta test that will begin in the autumn of 2020 and then a public data service to start at the end of 2020.

How does Starlink work? You don’t connect your iPhone directly to the space-based network, like Iridium or Inmarsat. A ground terminal connects to the *Starlink* network. The ground terminal looks like a satellite dish (What else?). Elon Musk is quoted as saying that the terminal looks like a “thin, flat, round UFO on a stick... that is the size of a pizza box”. (It must be a deep-pan, American-style, family-sized pizza). In a 2015 speech, Musk said the terminal would cost between \$100 and \$300. The terminal connects to a Starlink Router (made in Taiwan, according to the drawings accompanying the filing), which has been given FCC approval. Few details are available, but it appears to be a Wi-Fi-like router that links to a customer’s devices which are in the vicinity of the terminal.

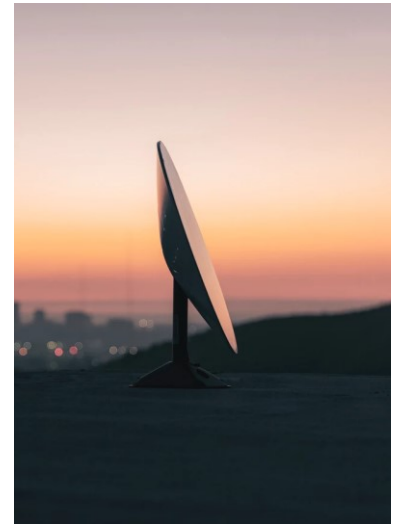
SPACE X president Gwynne Shotwell said in 2019 that the consumers are paying \$80/month for “crappy service”, and *Starlink* will provide excellent service. So it is presumed that the price would be competitive. Its FCC filing stated it would provide Internet service up to a Gigabit per second with latencies between 25 and 35 milliseconds. A fiber-optic Internet connection delivers up to 940 Megabits per second.

For the time being, we are going to have to use our imaginations to envision how the *Starlink* network will be integrated with TESLA vehicles. Luckily for us, one of my readers, Ken Pyle, Managing Editor of *VIODI VIEW*, has an excellent imagination and has shared his vision with us.²⁵

“Could this (Starlink satellites) form the backbone of a larger network that uses Tesla vehicles as mobile 5G towers? Eventually, will we see Tesla flying vehicles that serve as another layer in a 3-dimensional mesh wireless network?”

Ken Pyle

Not everyone is over-the-moon happy that SPACE X is churning out and sending up its satellites at such a frenetic pace. Astronomers, both amateur and professional, have asked it to stop adding more until it fixes the problem with those that are already there.



25. Ken Pyle, A Multi-Dimensional Broadband Network or is This Just Pie in the Sky?

<https://viodi.com/2020/05/13/a-multi-dimensional-broadband-network-or-is-this-just-pie-in-the-sky/>

The problem is that they reflect the sun and become bright, shining star-like objects that get in the way of the astronomers' observations, as can be clearly seen in the time-lapsed photo shown here in the sidebar. SPACEX has reacted by adding sun visors, blackening the antennae, tilting the satellites dynamically to reflect as little sun as possible. So far, the astronomical community is not impressed. In the meantime, the satellite-making machine continues to churn and the rockets continue to shoot them up.

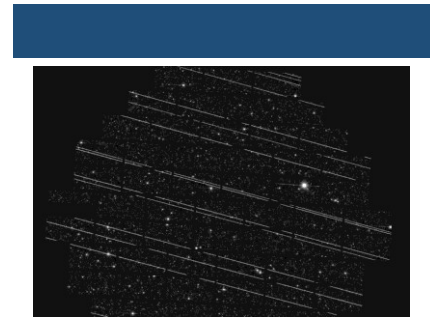
Is the outer space pie big enough for everyone?

Given the problems that *Starlink* has already created for astronomers, you might think that one satellite Internet network was quite enough for one planet. Not so. *Starlink* jumped into the satellite communications pool with both feet, and there were already others swimming around in it. Since then, others have joined.

ONEWEB was one of the Old Guard of space-based communications contenders that include IRIDIUM and LEO SAT. ONEWEB, headquartered in the UK with most of its operations in the U.S., went bust this March when it could not convince its investors, including Son Masayoshi (leader of SOFTBANK) to pump in more cash. In an interesting twist reminiscent of the UK's government nationalization of British Leyland in 1968, the UK government has decided to invest \$500 million to resuscitate the company. It is thought that one of the reasons for the investment was to keep the company out of Chinese hands.

Elon Musk's rival in space, Jeff Bezos, has also decided to create a satellite Internet system. AMAZON's project is known as *Kuiper*.²⁶ On the 30th of July this year, the FCC declared that AMAZON would be allowed to build its satellite Internet system that would see the launch of 3,236 satellites into low-earth orbit. AMAZON announced that it will invest more than \$10 billion in *Kuiper*. Service would begin when it has put 578 satellites into orbit. It is AMAZON's Aerospace and Satellite Solutions division that is part of Amazon Web Services which is responsible for *Kuiper*.

On the 3rd of March, ZHEJIANG GEELY HOLDING GROUP threw its hat into the satellite Internet ring when it announced it would invest 2.27 billion Yuan (\$326 million) in a satellite manufacturing facility to be located in Zhejiang Province. It will be operated by GEELY's *GeeSpace* subsidiary, and will make LEO satellites for "low-latency connectivity and positioning, navigation and timing (PNT) services for GEELY-manufactured autonomous vehicles." This is part of Li



This is a time-lapsed photo of the stars showing StarLink's traces across the stars.

26. Gerard Peter Kuiper (1905-1973) was a U.S. astronomer, born in The Netherlands, who suggested in 1951 that there is a belt of comet-like debris at the edge of the solar system.



Here is Jeff Bezos introducing Blue Moon, the lunar lander developed by Blue Origin, one of his companies.

Shufu's vision of the GROUP as a mobility service provider, according to *SPACEWATCHGLOBAL*, a source of information on the Chinese market. The theory is that vehicle manufacturers will have to transition from designing, building and selling vehicles to building and operating fleets of autonomous vehicles. *GeeSpace* expects to launch its first satellite by the end of 2020. The PNT service is planned to offer accuracy of several centimeters, as opposed to BeiDou and GPS. Since Chinese law will most likely restrict any space-based Internet services delivered from *StarLink*, *Kuiper* or *ONEWEB*, why not try to build up an internal capability?

I was once part of an S-Team. Between 2005 and 2008, I spent approximately one-half of my time consulting to a company called ONDAS MEDIA. It was going to do for Europe what SIRIUS and XM had done for the U.S. and Canada: deliver satellite digital radio services and content. My assignment was to help ONDAS develop services that should be of interest to the automotive sector, including, among many others, real-time traffic information and over-the-air data and software updates. We met with all of the OEMs operating in Europe. By the time I left to take on a full-time consulting assignment, ONDAS had commitments from three European automotive OEMs and had a kick-off project meeting with one of the major Japan-based companies at their headquarters. Then the financial crisis hit, and the investment required to put up the three high-earth orbit (HEO) satellites over Europe, which had been promised and was only a signature away, was never made. The terrific team that ONDAS had assembled, that had the vision and the abilities to deliver on that vision, scattered and brought their talents to other endeavors.

I firmly believed in what ONDAS was doing. At the same time, I gained an appreciation of what it takes to finance and run an operation that is based on building complex satellites, on putting those satellites on rockets that will deliver them into space, and on creating services that customers will buy because they are better or less expensive than what they can obtain from earth-bound suppliers. The fact is, it is rocket science, and the lessons we have all learned from the past seventy-plus years is that not every rocket lifts successfully off the launch pad, not every rocket that does lift off makes it into space, and not every payload is successfully deployed. When accidents happen in space-based activities, a lot of money turns into intergalactic debris. Although we have been at the "space thing" for seventy years, we're still at the beginning. Anything can happen.



About Michael L. Sena

Michael Sena, through his writing, speaking and client work, attempts to bring clarity to an often opaque world of vehicle telematics. He has not just studied the technologies and analyzed the services, he has developed and implemented them. He has shaped visions and followed through to delivering them. What drives him—why he does what he does—is his desire to move the industry forward: to see accident statistics fall because of safety improvements related to advanced driver assistance systems; to see congestion on all roads reduced because of better traffic information and improved route selection; to see global emissions from transport eliminated because of designing the most fuel efficient vehicles.

This newsletter touches on the principal themes of the industry, highlighting what, how and why developments are occurring so that you can develop your own strategies for the future.



Michael L. Sena

Editor

SUNDBYVÄGEN 38

SE-64551 STRÄNGNÄS

SWEDEN

PHONE: +46 733 961 341

E-MAIL: ml.sena@mlscab.se

www.michaellsena.com