

TRANSPORT 360

Q4 2018 • VOLUME 1 • ISSUE 4

TALKING HEADS

Bridging the gap between IT and OT for the Industrial Internet of Things

ASSET MONITORING:

Transport experience helps IoT to benefit other industries

AUTOMOTIVE CASE STUDY:

Vehicle-2-Anything connectivity enables safer, engaging rallying

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PLUS: Is data the transport sector's most precious cargo? • Start with a business problem to build asset tracking strategy • Micron and BMW partner on memory tech • Growth in European fleet management • Infineon buys Siltecta • More at: www.iotnowtransport.com



64

Cover Interview

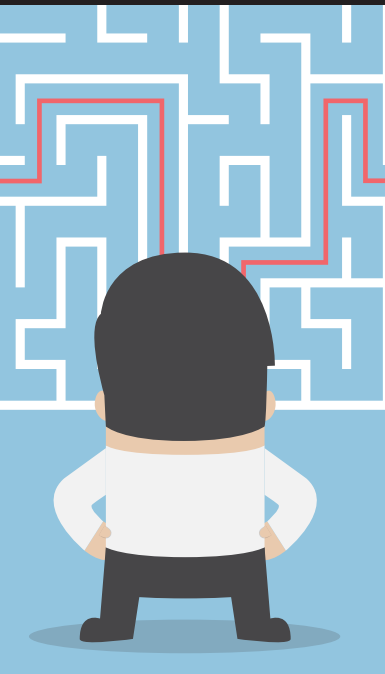


62

Asset Tracking

68

Asset Monitoring



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IN THIS ISSUE

- 57 COMMENT FROM THE EDITOR**
Is data the transport sector's most precious cargo?
- 58 COMPANY NEWS**
- 59 MARKET NEWS**
- 60 PRODUCT NEWS**
- 61 CONTRACT NEWS**
- 62 ASSET TRACKING**
As Annie Turner, editor of IoTNowTransport.com finds out, you need to start with a business problem to build a successful asset tracking strategy.
- 64 COVER INTERVIEW**
Stephan Palm, of industrial communications and networking specialists, Moxa Inc. tells Robin Duke-Woolley, CEO of Beecham Research how users are extending their IT infrastructure and enabling OT data connectivity within their industrial applications.
- 68 ASSET MONITORING**
Jeremy Cowan, editorial director of IoT Now, hears from KORE's William Sandoval that transport experience is helping IoT to benefit other industries.
- 71 AUTOMOTIVE CASE STUDY**
Vehicle-2-Anything connectivity is now supporting rally racing. But the racing wasn't always this safe or engaging.

MOXA®

[Cover sponsor] Moxa is a provider of edge connectivity, industrial computing, and network infrastructure solutions for enabling connectivity for the Industrial Internet of Things (IIoT). With over 30 years of industry experience, Moxa has connected more than 50 million devices worldwide and has a distribution and service network that reaches customers in more than 70 countries. Moxa delivers lasting business value by empowering industry with reliable networks and sincere service for industrial communications infrastructures. www.moxa.com.

Is data the transport sector's most precious cargo?

The most successful carriers and hauliers have long since learned to optimise their services by tracking their assets online. As my Antipodean friends would say, that's a statement of the Bleedin' Obvious. But it is clearer to the industry now that there is much more that they could do to enhance their quality of service and with it their bottom line.



As Annie Turner, editor of **IoTNowTransport.com**, reports on pages 72-73, "often companies opt for asset tracking primarily to fix the first issue – knowing where their assets are – with little if any thought about how they could get the much greater benefits of the subsequent phases, and potentially at incremental cost. This is partly because for many organisations, this is new territory and they do not grasp the scope of asset tracking in the first place nor how it could support wider asset management, and much else." Worryingly, she adds, "Data is a by-product of their business activities, rather than something of huge intrinsic value in its own right."

I found a similar story when interviewing **KORE's** William Sandoval (see pages 68-69). Asset monitoring doesn't just mean using vehicle diagnostics to record tyre tread, fuel consumption, mileage, engine function, and maintenance schedule – valuable as these data are. It means a

single cloud-based application can enable the fleet manager to predict more accurately when services may be required, thereby planning maintenance in quieter times and avoiding failures that are costly in profits and reputation.

Furthermore, it strengthens Just-in-Time Delivery through route optimisation, and cuts costs by better management of human and hardware resources and by accurately analysing shipping capacity. As we can see in **Berg Insight's** report on page 60, demand for these skills will only expand as the number of IoT-connected endpoints grows exponentially. Big Data is no use at all if it doesn't give you insights into your business.

We hope you enjoy Transport360.



Jeremy Cowan,
editorial director, Transport360

Contributors in this issue of Transport360

We are always delighted to bring you the best writers and commentators in the Internet of Things. In this issue they include:



Annie Turner, Editor,
IoTNowTransport.com



Antony Savvas, freelance
technology writer

MANAGING EDITOR

George Malim
Tel: +44 (0) 1225 319566
g.malim@wkm-global.com

EDITORIAL DIRECTOR & PUBLISHER

Jeremy Cowan
Tel: +44 (0) 1420 588638
j.cowan@wkm-global.com

DIGITAL SERVICES DIRECTOR

Nathalie Millar
Tel: +44 (0) 1732 808690
n.millar@wkm-global.com

BUSINESS DEVELOPMENT DIRECTOR

Cherisse Jameson
Tel: +44 (0) 1732 807410
c.jameson@wkm-global.com

DIRECTOR OF STRATEGIC PLANNING

Charlie Bisnar
Tel: +44 (0) 1732 807411
c.bisnar@wkm-global.com

DESIGN

Jason Appleby
Ark Design Consultancy Ltd
Tel: +44 (0) 1787 881623

PUBLISHED BY

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70 Churchill Square, Kings Hill,
West Malling, Kent ME19 4YU, UK
Tel: +44 (0) 1732 807411

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EDITORIAL ADVISORS



Robin Duke-Woolley,
CEO, Beecham
Research



Andrew Parker,
programme
marketing
director, IoT,
GSMA



Gert Pauwels,
head of
commercial and
marketing, IoT
and M2M,
Orange Belgium



Robert Brunbäck,
director,
Connectivity,
Lynk & Co



Aileen Smith,
chief strategy
officer, UltraSoC



David Taylor,
Board advisor on
Digital and IoT
innovation



Micron collaborates with BMW to advance automotive memory technologies

Micron Technology, Inc., a provider of memory and storage solutions, is to collaborate with BMW Group to advance the development of automotive memory solutions used in vehicles.

Memory and storage are key components in accelerating the intelligence and user experience of next-generation systems in vehicles, including in-cabin infotainment as well as advanced driver-assistance systems (ADAS) technology, which together play an important role in making self-driving autonomous cars a reality.

Micron and the BMW Group will intensify their existing efforts

toward testing and development of automotive memory solutions at Micron's state-of-the-art lab in Munich, Germany. Using the Test Automation Framework of the BMW Group as a car emulator platform, the two companies will work together to define and validate memory and storage solutions for next-generation platforms.

The collaborative effort will leverage Micron's memory and storage technology expertise, along with its broad portfolio of DRAM, NAND, and NOR technologies, including LPDRAM, e.MMC, UFS and SSD storage solutions. ■



Formula E tech partnership expanded for season 5 by Renesas Electronics and Mahindra Racing

Semiconductor solutions provider, Renesas Electronics Corporation, is expanding its technology partnership with Mahindra & Mahindra, Ltd in the development of electric vehicles (EVs), and with Mahindra Racing, one of the 10 founding teams competing in the ABB FIA Formula E Championship for the 2018-19 season.

The team is collaborating on system-level design upgrades featuring the Renesas RH850/E2x microcontroller (MCU), designed for the robust requirements of powertrain systems, and Renesas' automotive battery management ICs. For Season 5, Renesas took a module-level approach to the proof of concept design, developing an electronic control unit including PCB design, schematics, software, and modular-level testing.

The upgrades will deliver significant processing power improvements and an improved safety system for the low-voltage battery. The ABB FIA Formula E Season 5 starts with the Saudia Ad Diriyah E-Prix in Riyadh on December 15, 2018 and runs through to July 14, 2019 at the New York City E-Prix. ■

UK to open smart city mobility centre

A new Smart City Mobility Centre is to be opened in the UK's West Midlands region, to create driverless and electric vehicle technology. It is part of a multi-million-pound pilot scheme to support smart cities by reducing congestion, emissions and traffic accidents.

The centre will prototype new vehicles and systems that its backers hope will "transform UK transport", bringing together expertise and research from the Warwick Manufacturing Group (WMG), part of at the University of Warwick, and Jaguar Land Rover.

Backers are also claiming, "It will be Europe's most extensive and significant integration of technology research projects at such a scale. Combining the very latest research, transport data, infrastructure, and vehicle prototyping".

Jaguar Land Rover engineers and WMG researchers will work together at Wellesbourne to design and engineer connected, driverless capable, prototype electric modular architectures. These will be tested in real world conditions alongside a specially designed 5G communications network on the University of Warwick's main campus. ■

Investment of US\$2.6bn in insurtech forces companies to evolve quickly

The Insurtech M&A Market Report from international technology mergers and acquisitions advisors, Hambleton Partners, reveals that 2018 global fundraising for insurance technology start-ups has already reached an all-time high in volume with 204 deals and transaction values of \$2.6bn, close to the 2015 peak of \$2.7bn.

Since 2016 the insurtech sector has reported 151 transactions, with 22 buyers making more

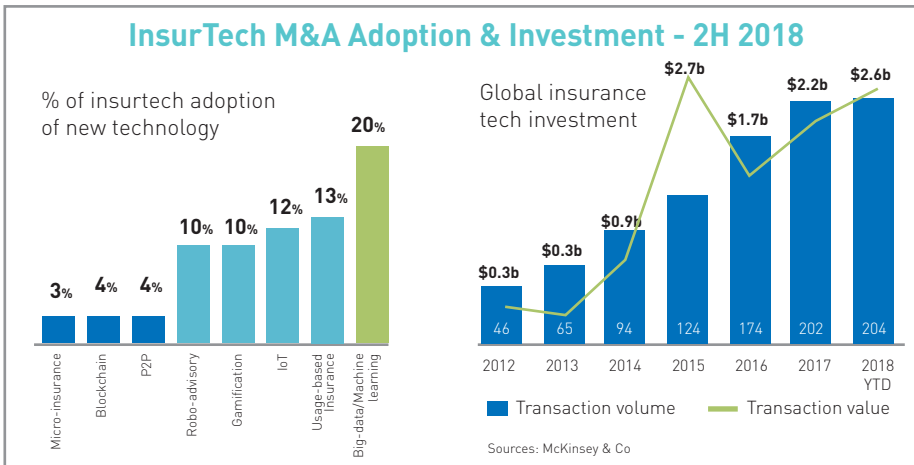
than one acquisition. Strategic buyers, such as insurance enterprise software company Sapiens International and insurtech Charles Taylor, are in the driving seat with 87% of all transactions, versus private equity's 13%, says Hambleton.

Miro Parizek, founder, Hambleton Partners, says: "There's an army of insurtech start-ups which are challenging legacy players and the market has adopted a survival of the fittest

environment. Since organic growth and investing in R&D is a long-term game, M&A has been the natural solution to the incumbents' problem of accelerating technological transformation and evolving their traditional business models for the 21st century."

One key example of an insurance giant innovating via M&A is Zurich International which bought Bright Box and its AI-first, connected car platform Remoto. Zurich Insurance Group is working with data gathered by its connected car technology to develop personalised auto insurance and services.

Parizek concludes, "Next-generation insurance is having to evolve quickly with new business models and a greater focus on technology innovation. Insurtechs have become a natural threat to incumbents, but also potential valuable partners in this changing landscape. It's a sector that's growing rapidly and stands to capture a meaningful share of the value pools within a few years. How quickly incumbents adapt to these inexorable market changes will determine the size of their share in the next generation of the insurance industry." ■



Healthy growth in European fleet management solution market

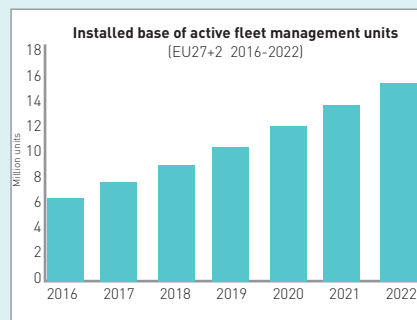
IoT analyst firm Berg Insight has again taken the temperature of the European fleet management market. Numerous interviews with the leading market players have shown that the number of active fleet management systems deployed in commercial vehicle fleets in Europe was 7.7 million in Q4-2017. Growing at a compound annual growth rate (CAGR) of 15.2%, this number is expected to reach 15.6 million by 2022.

The top 15 vendors have today more than 100,000 active units in Europe. TomTom's subscriber base has grown both organically and by acquisitions during the past years and the company is the clear market leader on the European market and reached an installed base of about 708,000 units at year-end 2017. Masternaut is still in second place and had achieved an installed base of an estimated 250,000 units. Berg Insight ranks Verizon Connect as the third largest player in terms of active installed base with around 235,000 units. ABAX, Microlise, Gurtam, Viasat, Bornemann, Teletrac Navman, Trimble, Transics and OCEAN (Orange) also have more than 100,000 active devices in the field.

All major truck manufacturers on the European market offer OEM telematics solutions as a part of their product portfolio. Mercedes-Benz, Volvo and Scania launched their first products in the 1990s followed by MAN in 2000, Renault Trucks in 2004, DAF Trucks in 2006 and Iveco in 2008. A major

trend in the past years has been the announcements of standard line fitment of fleet management solutions. Since the end of 2011, Scania has been rolling out the Scania Communicator as standard on all European markets and includes a 10-year basic service subscription.

The new generation of the Actros trucks from Mercedes-Benz contains the FleetBoard vehicle computer as standard in all EU28 countries. Volvo offers Dynafleet as standard in Europe. New MAN trucks are now equipped with RIO as standard replacing MAN TeleMatics. DAF launched its new optional DAF Connect that has been developed in-house in September 2016. The leading OEMs in Europe are Scania, Volvo and Daimler with 219,000, 117,000 and 108,000 active FM subscribers respectively at the end of 2017. ■



Infineon acquires silicon carbide specialist Siltrectra for €124mn

Infineon Technologies AG has acquired Siltrectra GmbH, a start-up based in Dresden. The start-up has developed an innovative technology (Cold Split) to process crystal material efficiently and with minimal loss of material. Infineon will use the Cold Split technology to split silicon carbide (SiC) wafers, thus doubling the number of chips out of one wafer. A purchase price of €124 million was agreed on with the venture capital investor MIG Fonds, the main shareholder.

"This acquisition will help us expand our excellent portfolio with the new material silicon carbide as well. Our system understanding and our unique know how on thin wafer technology will be ideally complemented by the Cold Split technology and the innovative capacity of Siltrectra," said Dr. Reinhard Ploss, CEO of Infineon. "Thanks to the Cold Split technology, the higher number of SiC wafers will make the ramp-up of our SiC products much easier, especially regarding further expansion of renewable energies and the increasing adaptation of SiC for use in the drive train of electrical vehicles."

Dr. Jan Richter, CTO of Siltrectra: "We are glad to become part of the team of the global market leader in power semiconductors. Having shown that the Cold Split technology can be used at Infineon in principle, we will now work together to transfer it to volume production." ■



Ericsson, Einride and Telia use 5G to connect sustainable, self-driving trucks

Einride, Ericsson and Telia are putting 5G into motion at a DB Schenker facility in Jönköping, Sweden. The goal is to power an all-electric, autonomous transport ecosystem. Ericsson Radio System and Ericsson Cloud Core for 5G are providing high performance connectivity to Einride's T-pod – a driverless vehicle operating continuously at DB Schenker's logistics facilities in Jönköping, Sweden.

Robert Falck, CEO and founder of Einride, says: "Our driving mission is to lead the sustainable transition of road freight transportation. 5G provides the connectivity and reliability we need to safely introduce the T-pod onto public roads, paving the way for a 90% reduction in CO2 emissions and the elimination of nitrogen oxide (NOx) emissions."

Ewald Kaiser, chief operating officer, DB Schenker, adds: "This pilot is a milestone in the transition to an intelligent transportation system which will be safe, cost-efficient and sustainable. Autonomous, all-electric trucks on public roads is not a dream any more – it's happening right now. Thanks to our partnership with Einride, and connectivity through Ericsson and Telia, we are at the forefront of this great transition."

"5G is a very exciting technology that will

enable new sustainable business opportunities and create customer value," according to Mats Lundbäck, chief technology officer, Telia Sweden. "Together with our partners, we are building a powerful ecosystem that is going to have a deep impact for customers and society as a whole."

Speaking for Ericsson, Åsa Tamsons, head of business area technologies & new businesses, says: "There is a paradigm shift going on in the transport industry. 5G, with its high-data speeds and ultra-low latency, is powering a new world of autonomous vehicles that takes fleet management to the next level. Einride's transportation solution is a perfect example of how 5G can drive cost efficiencies, improve safety, and create a sustainable future."

The partners believe the high-capacity and low-latency characteristics of 5G will be cornerstones of future transport solutions. Einride's T-pod and autonomous transport system, powered by 5G, can potentially replace more than 60% of today's transport with a cost-competitive and sustainable alternative. An Ericsson report on 5G business potential shows a US\$619 billion revenue opportunity for telecom operators by 2026. ■



Ericsson, Einride and Telia power sustainable, self-driving trucks with 5G

Field service solution launched with business intelligence, IoT reporting and predictive maintenance capabilities



Mary Hunter

Columbus, a global digital business services provider, has launched an end-to-end intelligent field service solution that utilises the full Dynamics 365 platform. This includes seamless integration between Dynamics 365 for field service and IoT sensor reporting, predictive maintenance and advanced business intelligence to enable customers to make real-time, data-driven decisions on operations. Completing the field service scenario is Dynamics 365 Remote Assist, the mixed reality heads-up display technology delivered via HoloLens devices.

Columbus has drawn on over 25 years of manufacturing industry experience to develop the new solution, which enables medium and large enterprises to quickly adopt and leverage emerging technologies to take full advantage of digital disruption and develop a competitive advantage. The Columbus Field Service offering introduces greater operational visibility by connecting the entire service supply chain to deliver a personalised, customer-focused experience and reduce operational costs.

For organisations looking to tailor a field service solution around existing systems, Columbus also integrates out-of-the-box with Dynamics 365 Finance and Operations to optimise additional processes such as work orders and invoicing.

By consolidating data streams to provide businesses with a holistic view of operational performance, the solution helps boost scheduling efficiency, first time fix rate, engineer punctuality, on-site productivity and engineer billable time, while enabling engineers to identify more opportunities to cross-sell and up-sell services and products.

Mary Hunter, managing director at Columbus UK, says: "As customers become increasingly connected, businesses must evolve accordingly to maintain a high level of service and meet rising expectations. Columbus helps organisations such as Orangebox, Handicare, and Capital Solutions add value to their businesses and support a customer-centric experience. The new Columbus Field Service solution extends this ability even further to introduce greater business intelligence, end-to-end business process automation and drive cost efficiencies." ■



Important wins for Intel in fleet safety and automation

Intel is aiming to grow significant alternative revenues to its traditional semiconductor business, not least in autonomous driving, as *Antony Savvas* reports.

If you want to get attention when it comes to technology deployments then what better way than getting the solution used in big red iconic London buses. With so many of them travelling on the UK capital's busy roads, anything to help them safely round their long routes is welcome. So, in steps Intel for a major trial of its safety technology Mobileye. The trial is supported by Transport for London (TfL) through a grant from its Bus Safety Innovation Fund.

Collisions

Bus company Abellio is conducting the trial. It operates 48 bus routes across London using more than 740 vehicles. For the trial, 66 buses on three of the company's routes have been equipped with Mobileye collision avoidance technology – each having a camera unit installed on the inside of the windshield and a display placed in the driver's cab. The final results of the trial should be available by the end of this year.

Focused on reducing bus collisions with cyclists, motorcycles, pedestrians and other road users, the trial's findings to date show the Mobileye technology has reduced avoidable collisions – those which are in the driver's control to prevent – by 29%, and reduced injuries from such collisions that have taken place by 60%.

Mobileye, of course, is also being used by autonomous test vehicles on many less busy roads in the US, so putting it up against a busy

road network in London is a real test. While this trial does not involve the autonomous driving seen in California, one wonders whether we'll see bus drivers assisted by such technology in the future?



Gil Ayalon, director of EMEA, Mobileye

Safety automation

What they are already using on the London buses includes collision warnings and headway warnings if the distance between the bus and a vehicle ahead becomes unsafe. The system also monitors lane markings and warns drivers of unintentional lane deviation. In addition, it recognises and reads speed limit signs and warns drivers when they are exceeding them.

Gil Ayalon, director of EMEA at Mobileye, said: "Abellio takes safety very seriously, and they've been a superb partner, helping their drivers get the very best out of the system."

The US Department of Transportation's Federal Motor Carrier Safety Administration says an estimated 119,000 injury-causing crashes involving large trucks or buses occurred in 2016 in the US. And with 4,440 large trucks and buses involved in fatal crashes during that same year, the sooner the industry gets this type of technology through trials the better. ■

Mobileye and VW deploy Israel's first autonomous EV ride-hailing service



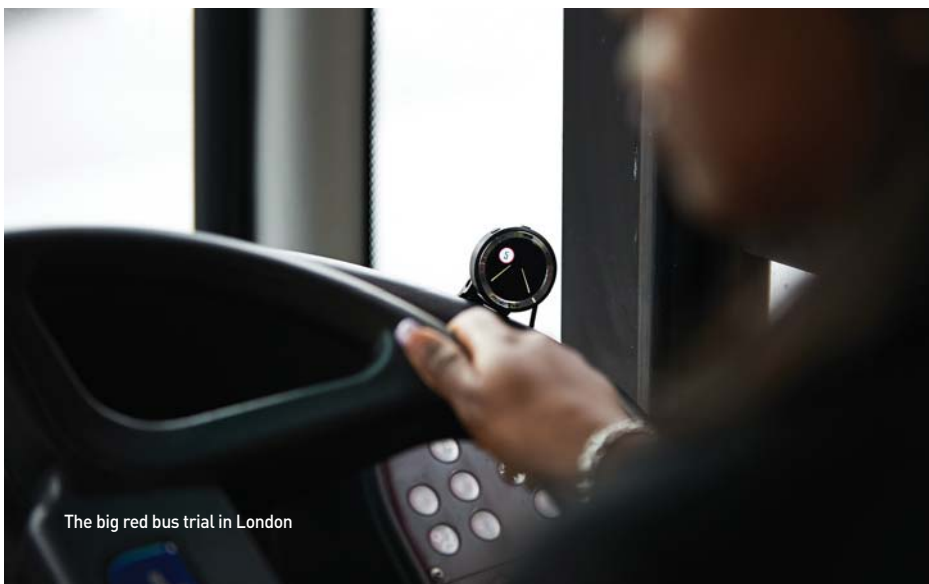
In another potential seal of approval for its solution, says *Antony Savvas*, Mobileye has joined forces with Volkswagen and its local distributor Champion Motors to deploy the first autonomous electric vehicle (EV) ride-hailing service in Israel.

The commercial mobility-as-a-service (MaaS) effort will see Mobileye provide a full turn-key hardware and software self-driving system validated for level-4, driverless capability. Champion Motors will be responsible for fleet logistics and infrastructure of the MaaS deployment.

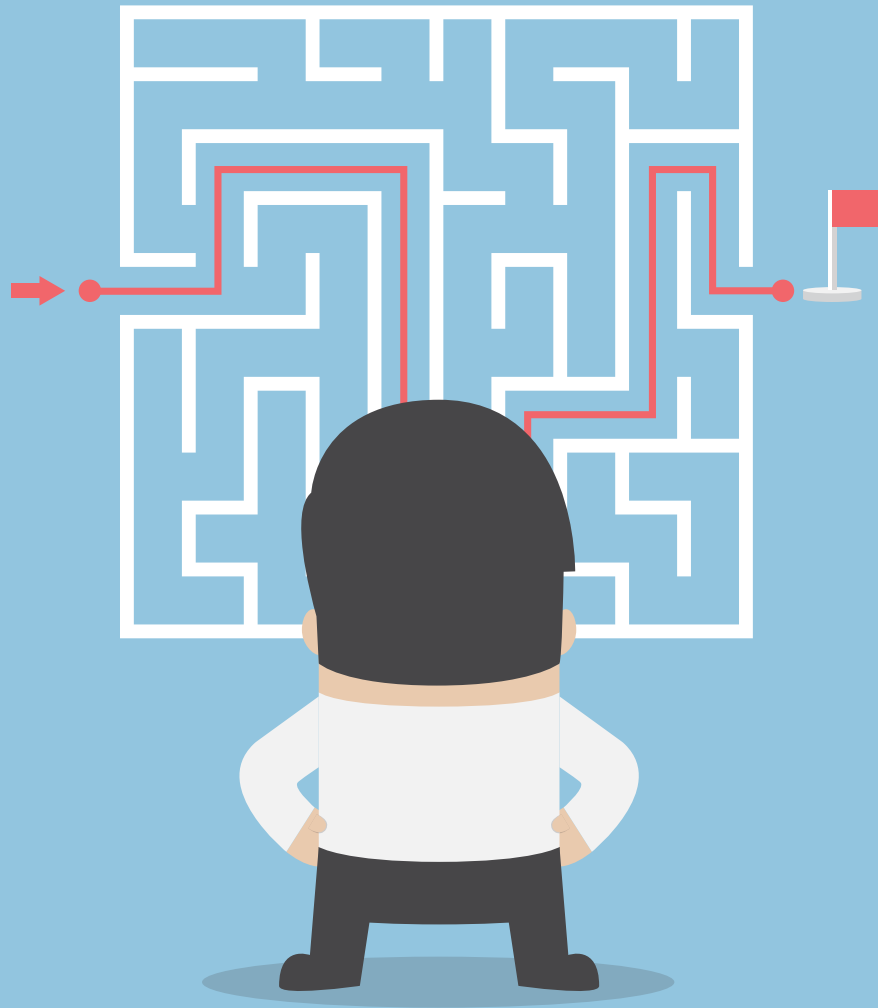
The Israeli government has backed the project, with development beginning in early 2019 and roll-out in phases reaching full commercialisation in 2022. The New Mobility in Israel joint venture and the government support it will receive, will be extended to other players coming into the market with their own services, said the Israeli government.

Volkswagen, Mobileye and Champion Motors said they will use the venture as a "global beta site" for testing the MaaS model. In Israel, they will start with "several dozen" vehicles and scale to "hundreds" of self-driving electric vehicles, they said.

"We firmly believe that self-driving electric vehicles will offer Israel and cities around the world safe, clean and emission-free mobility, which is accessible and convenient," said Herbert Diess, CEO of the Volkswagen Group. ■



The big red bus trial in London



Start with a business problem to build an asset-tracking strategy

Annie Turner explores why companies need asset tracking (beyond the immediately obvious), where to start and how to plan to get to where you need to go.



Annie Turner

You can't make use of assets if you don't know where they are. You can't make proper use of assets if you know where they are but not the state they are in or their proximity to other assets with which they need to be deployed — and the state those other assets are in.

You can't make effective use of assets without being able to predict accurately how many will be off the road or rail, or out of the warehouse or off the dock or airport apron when and for how long — whether the reason is for maintenance, modification or repair, to comply with regulation, because they've been stolen or reached the end of their life.

You can't make full use of assets without putting all that experience, practice and knowledge by combining it with data from and about your assets, so that the tracking and management system can constantly learn and recommend how to make the most efficient and sensible use of each and all your assets in combination.

A logical trajectory

This is a logical trajectory and progressing through these stages is clearly the way to run and grow a profitable, efficient transport and logistics business. Yet

often companies opt for asset tracking primarily to fix the first issue — knowing where their assets are — with little if any thought about how they could get the much greater benefits of the subsequent phases, and potentially at incremental cost.

This is partly because for many organisations, this is new territory and they do not grasp the scope of asset tracking in the first place nor how it could support wider asset management, and much else. Concerns about cost are a big factor for many transport and logistics companies. They typically operate in markets where margins are tight and competition ferocious and have little or no internal resource to investigate and plan forays into new territory.

But perhaps most of all, it is because for most companies, data is a by-product of their business activities, rather than something of huge intrinsic value in its own right. They don't yet see it as something they can commercialise in many ways and that should inform every business decision. For many, moving to a world view set out in the graphic below represents a terrific shift in thinking and often they cannot see how it applies to their business. ►



Fig 1. Phases of becoming a data-driven organisation

In this market, the suppliers' job is one of education and guidance about the options and possibilities, as well as ongoing support — in short, a partner. They need to help the client look beyond their immediate need to see what could be achieved, affordably, in the longer term and make sure investments act as a bridgehead towards those longer-term goals.

Partners listen to each other

Companies should start with well-defined issues where results will be easy to measure — fewer stolen or stranded trailers, for instance. Success will build confidence across the company in asset tracking and encourage further investment to make bigger gains. It is imperative that even when they only want to address a single problem, solutions need to be tailored to specific needs, but they should not be discrete dead-ends whose usefulness is limited. Greater reliance on data and a move to the progression described above will sooner or later be essential if companies are to compete.

As William Sandoval, VP Advanced Platform Applications, **KORE** points out, the biggest single reason for all kinds of IoT deployments failing, "can be directly traced to a lack of strategic planning and misunderstanding of the scope of activities".

The partner/supplier must pay close attention to customers' needs. It is encouraging to hear Benoît Luc, **Total's** senior vice president, Marketing & Services, Europe talking about how it had delivered a solution (called Where's my trailer?), through its subsidiary **Stela**, which had been tested for a year with the company's transporter customers. At the end of that testing phase in late 2018, Luc stated, "It's a first step that is driving us forward in our broader ambition to take greater advantage of the Internet of Things for the benefit of our transporter customers."

That phase involved putting simple boxes on all its trailers which use **Sigfox** technology to communicate via low bandwidth links at a small cost, that can be tracked through portals with a variety of dashboards.

On such foundations many additional applications can be built – Johan Fagerberg, CEO of **Berg Insight**, recently wrote about how asset tracking can evolve at airports, moving beyond keeping track of everything from chocks to complex machinery like belt and container loaders for unloading and loading baggage and containers off and onto aircraft, moving into predictive and even the beginnings of prescriptive asset management.

As Fagerberg said, "Maintenance management can enable workshops to perform maintenance based on engine hour data collected electronically and engage in maintenance forecasting to automatically determine upcoming preventive maintenance activities."

On a bigger scale, data reporting and analysis of the assets' use enables enterprises to run optimal-sized fleets and use fuel efficiently which, beyond radically cutting costs, could impact how they run operations. In addition, the reporting options and data included in airport asset tracking solutions could be exported to third-party applications using standard interfaces to enrich that data — such as weather conditions or to smooth hand-offs to other operators or to comply with regulation — and extend its use even further.

There is vast potential for all kinds and sizes of businesses in asset tracking, so long as their supplier-partners help them get started, then help them build and execute a comprehensive, pragmatic strategy to meet their business needs. In particular, it is never too soon to start thinking how ultimately artificial intelligence, beyond machine learning, could play a role. ■

"It's a first step that is driving us forward in our broader ambition to take greater advantage of the Internet of Things for the benefit of our transporter customers."



Screenshot of the Where's My Trailer? customer portal.



Bridging the gap between IT and OT for the Industrial Internet of Things

Moxa provides a full spectrum of products for industrial networking, computing, and automation, and maintains a distribution and service network that reaches customers in more than 70 countries. Its products have connected over 50 million devices worldwide in a wide range of applications, including factory automation, smart rail, smart grid, intelligent transportation, oil & gas, marine, and mining. Here, Robin Duke-Woolley (RDW), CEO of IoT industry analyst firm Beecham Research, interviews Stefan Palm (SP), business development manager - Embedded Computing at Moxa.

RDW: The convergence between operational technology (OT) and information technology (IT) has meant a significant change for industrial environments. What is Moxa's approach to bridge the gap between these two worlds?

SP: Actually, it is a change for the people in the IT environment, too, because both worlds are moving closer together - and OT as well as IT people have to leave their comfort zones as they are being confronted

with the reality that has developed outside of their scope.

For both kinds of experts it can be compared with starting to learn a new foreign language. OT people are used to Fieldbus protocols that are often based on serial communication principles. They have developed efficient ways to pass the information gathered by sensors on to the management level, for example via SCADA systems. Yet, they are not very familiar with ►

IN ASSOCIATION WITH MOXA

Moxa's core business is to build the foundation for successful IIoT and industry 4.0 implementations by connecting even legacy devices and making the data available and understandable for people in both worlds

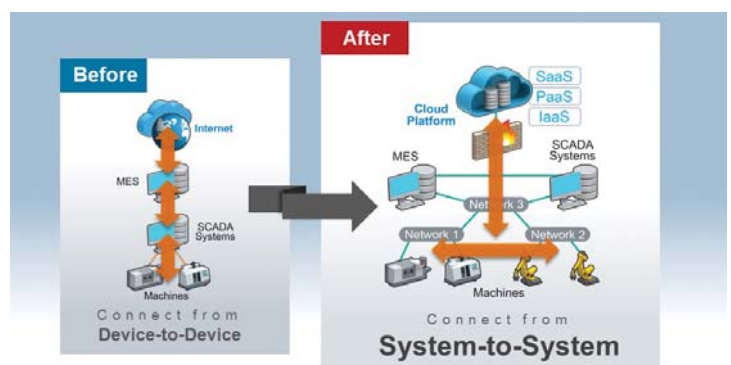
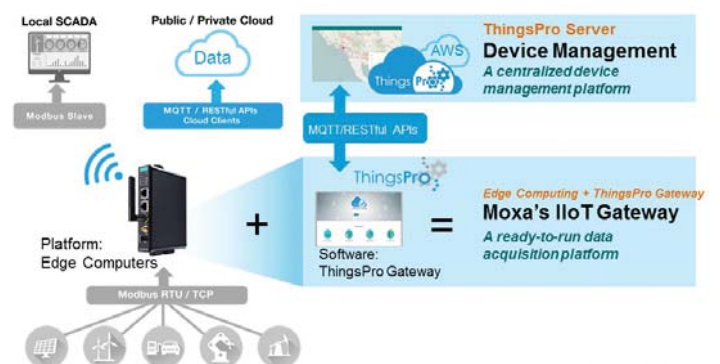
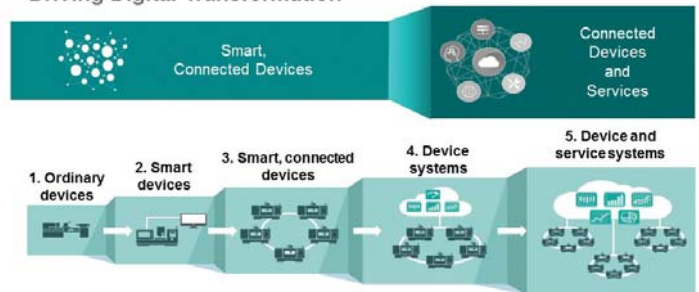
systems in an enterprise environment that use TCP/IP based protocols to efficiently transfer information over the Internet, store it in datacenters and manage the big data in a way that enables them to retrieve information through the visibility of a much bigger database.

This is the expertise and domain of the IT people who are usually unaware how the data from a single sensor finds its way into the enterprise world. As an expert in acquiring data in the field, converting it from one protocol to another and then transferring it securely and reliably, Moxa bridges the gap and makes the data available in a format that IT people are used to and can deal with.

The same happens in the other direction when it comes to giving commands towards devices in the field as a result of complex analyses done in data centers. These commands, of course, also need to be converted into a format OT people can understand and manage.

Moxa's core business is to build the foundation for successful IIoT and Industry 4.0 implementations by connecting even legacy devices and making the data available and understandable for people in both worlds.

The IIoT Is Here
Driving Digital Transformation



RDW: In the industrial IIoT space, what do you see as the main challenges and how should they be addressed?

SP: Industrial IIoT (IIoT) is currently facing three major challenges:

1. Connecting devices in the field and making the data available and usable in private and public clouds to be utilised by OT and/or IT systems
2. Making sure the acquired and transferred data is protected and will be available for the intended user only
3. Assuring that the data transfer happens in a deterministic way and in real time to enable full control even in critical situations ▶



Stefan Palm of Moxa Europe is talking to Robin Duke-Woolley of Beecham Research.



Accelerating an IIoT development is essential to ensure the correct data is delivered at the right time so that an application can reap the benefits of the IIoT

To master challenge 1, devices are necessary that can forward the data acquired in the field on sensor level and even translate them in a way that they can be understood by the big number-crunchers up in the cloud - which will then eventually come back with some meaningful actions to optimize the processes monitored by the sensors. The major obstacle is the lack of standards that can be applied to streamline the access methods. Currently, this point is being addressed, and the effort is progressing as we speak. There are promising candidates like MQTT, Restful API or OPC-UA that have the potential and are widely accepted by the industry. However, this is work in progress and we may see more in the future.

Challenge 2 is the wide field of cyber security and the ability to protect the environment from attacks, to avoid unauthorized access to machines, the production environment or even the complete plant, respectively. IEC 62443 is a widely accepted guideline that may guide you in achieving this. Yet, this requires the support of any member in the communication chain down to device level. However, this is just a start and needs further development in order to deal with the specific requirements of different industry segments which may need variation.

Mastering challenge 3 is extremely important to ensure data integrity. The technology that addresses this issue is called TSN (Time Sensitive Networking). TSN is a set

of standards under development by the Time-Sensitive Networking task group of the IEEE 802.1 working group. The different TSN standards can be grouped into three basic key component categories that are required for a complete real-time communication solution:

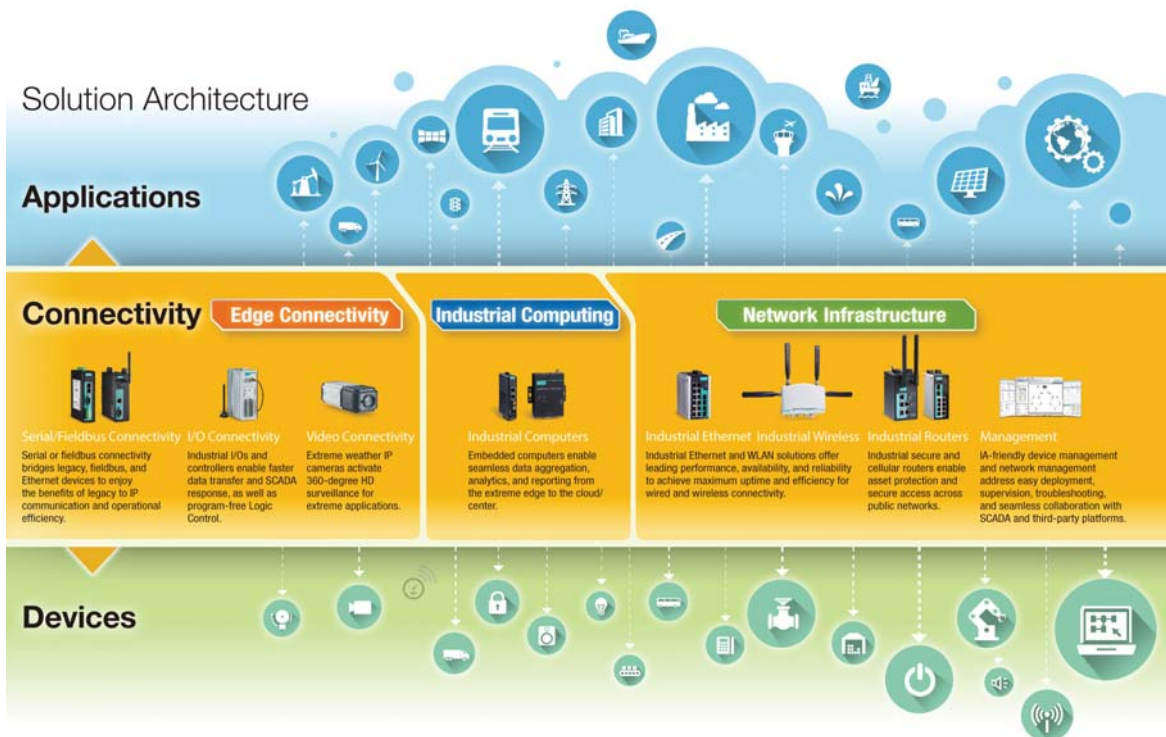
- Time synchronisation
- Scheduling and traffic shaping
- Selection of communication paths, reservation and fault-tolerance

TSN will play an important role in the future, but it still needs to be widely adapted in order to become effective. This is work in progress, too.

RDW: Can you provide an overview of your activities in the smart rail and intelligent transportation segments?

SP: Smart rail and intelligent transportation are additional sectors where Moxa is quite active. We are actively contributing to the IEC TC9 WG43 standard to define the next generation of TCN (Train Communication Network). The latest achievement is the release of the IEC 61375 that specifies the onboard communication and in particular the Train Control and Management System (TCMS).

In cooperation with leading train manufactures like Alstom and Bombardier, Moxa was able to prove the interoperability of our devices. This makes us one of the ►



leading manufacturers for network devices on board of trains. And we are still actively driving the standards forward. Another initiative is the contribution to an effort called Safe4Rail (<https://safe4rail.eu>) under the umbrella of Shift2Rail (<https://shift2rail.org/>) which is funded by the EU.

Safe4Rail provides the baseline for a fundamentally simplified embedded computing and networked TCMS platform for the modular integration and certification of all safety, time and mission critical train functions, including distributed hard real time controls, safety signals and functions up to SIL4. The results are demonstrated with a SIL4 brake-by-wire system safety concept. Ultimately, the project provides recommendations for the standardization and certification of next generation TCMS embedded platforms.

RDW: Considering Moxa’s focus on providing industrial networking solutions for the critical infrastructure sectors, how are you helping companies overcome the challenges they are facing around security?

SP: Moxa has already adopted the IEC 62443 standard on device level in a variety of our devices in order to provide the feature set that is required to satisfy even higher levels of requirements to secure the system and even the environment. The next step is the full integration into Moxa’s MxView real time network management software toolset in order to allow customers to assess their current

situation and to suggest the necessary steps to achieve the desired security level. Moreover, Moxa is participating in different industrial consortia to keep the discussion going and to shape the requirements, so they will eventually become industry standards - and, of course, to ensure constant security improvements to make our world a bit safer every day.

RDW: Transportation and factory automation are often mentioned as industries expected to lead the adoption of 5G technologies. What is your expectations of 5G and its potential impact in these markets?

SP: 5G will change the communication infrastructure significantly as, for first time, a wireless cellular technology will offer a performance as high as 20 gigabits per second which is up to ten times higher than the current 4G networks. This is a considerable performance boost that will allow the deployment of cellular networks in places where the bandwidth requirements cannot be fulfilled today.

There will be clear savings, too, especially regarding cabling as this will be no longer required. Moreover, installation and maintenance will become much easier and less costly. So, traditional wired Ethernet or Wi-Fi networks will migrate to wireless cellular technologies based on 5G. It will also enable real time applications based on TSN over telephone infrastructures, so we are expecting a shift towards this kind of network setups. ■



Transport experience helps IoT to benefit other industries

Asset monitoring has been described as one of the most promising applications of connected technologies. Applications with vehicles are well-known, but here Transport 360 asks KORE's VP and General Manager - Location Based Services, William Sandoval (pictured below) about other possibilities for using data from Internet of Things sensors. For example, how is transport experience helping IoT medical device users?

For more traditional medical devices, many of which are related to out-patient monitoring, IoT data provides valuable insights into the health of the patient as well as the effectiveness of any treatment received

William Sandoval: Just like a vehicle's tyre, engine, or brake system, IoT sensors can be embedded on or attached to medical assets or medical devices to ensure they are functioning as they should, their surrounding conditions are optimal, and any potential medical issues are detected as early as possible. Looking at medical assets, one of the primary use cases we have seen is the implementation of IoT solutions to monitor the temperature and humidity levels of donated organs as they are transported from the donor site to the receiving patient.

Real-time location data of the donated organ enables hospital staff to more appropriately prepare the receiving patient while remotely monitoring vital conditions of the organ throughout the entire trip. Analysis of IoT data generated throughout the process enables doctors and nurses to more accurately and efficiently evaluate the status and condition of the organ upon arrival.

For more traditional medical devices, many of which are related to out-patient monitoring, IoT data provides valuable insights into the health of the patient as well as the effectiveness of any treatment received. One of our customers, for example, offers an intelligent glucose monitoring device for patients with diabetes. The solution not only removes the hassle of manually recording and tracking blood glucose levels, but also stores the collected reading data in a cloud-based application. The analysis of this data enables the organisation to provide users with personalised coaching and guidance for improving their diabetes care and overall level of health.

T360: So, companies are using IoT sensor data to generate real-time alerts. What are the next steps? Implementing predictive analytics? Automating reporting processes?

WS: Most active IoT asset monitoring solutions today are in place to provide real-time alerts based on programmed rules or thresholds – should the level of oil in a tank fall below a certain level, the company is notified that it may need to be refilled. If an electric meter reader registers a certain level, the customer is billed accordingly. While IoT providers and application developers have done a great job adding value with these types of solutions, IoT data needs to be leveraged beyond triggering reactionary operations to enable long-term, actionable business intelligence.

Almost all IoT asset monitoring solutions generate some form of data, but the key lies in how the data is stored, analysed, and applied to business processes. Both predictive analytics and automated reporting processes are completely viable next steps for businesses who are able to use their IoT data effectively. For example – a fleet organisation that is leveraging asset monitoring solutions for vehicle diagnostics can store all data regarding the vehicle's tyre tread, gas mileage, engine functionality, maintenance schedule, etc. in one cloud-based application to uncover patterns and trends related to vehicle performance. This allows the fleet manager to more accurately predict when services may be required before the repair need is imminent. All of these data points can even be consolidated and presented to the fleet operator in weekly or monthly vehicle maintenance reports.

Organisations who can successfully take IoT data one step further are empowered to bring entirely new services and business models to market. The usage of IoT data enables ►



“-as-a-Service” offerings, which give businesses the opportunity to penetrate new, previously unreachable markets. For example, manufacturers of large, expensive medical devices in the healthcare space can now deliver OpEx, “Device-as-a-Service” offerings to smaller healthcare clinics that could never have afforded purchasing the equipment outright. The device activity is monitored and measured with IoT-based asset monitoring technologies to ensure proper usage and appropriate billing processes.

T360: There’s been a lot of discussion lately about regulatory compliance in telematics. What are the other big challenges: Centralised insights, monitoring driver behaviour, vehicle metrics? Or something else?

WS: Telematics solutions have been critical in helping fleet and other transportation companies obtain various levels of regulatory compliance. This includes the recently implemented “ELD Mandate” in the United States that requires all commercial drivers who must prepare Hours of Service (HOS) and Records of Duty Status (RODS) to replace traditional paper logs with Electronic Logging Devices (ELD). By leveraging an IoT-enabled ELD application that translates data collected via a device embedded on a vehicle’s engine, drivers and fleet operators are able to present the appropriate, federally mandated information using a smartphone or tablet. These types of applications are closely related to driver monitoring solutions.

While the aforementioned topics (centralised insights, driver behaviour, etc.) are certainly important challenges that telematics solutions address, some of the most prevalent issues facing fleet and transportation organisations today are actually external market pressures stemming from the rapid expansion of e-commerce. The growing popularity of online shopping has tightened trucking capacity, elevated the importance of final-mile delivery, and created demand for more precise pick-up and delivery times. These shifts are also affecting warehouse and distribution centre processes, presenting a strong need for improved routing optimisation and analysis of shipping capacity. Through telematics’ implementation and data analysis, transportation businesses can better adjust to these changing economic factors.

T360: Field Service Organisations in insurance, healthcare, industry or fleet all have big data in common. Are there also similarities when they design, implement and operate a full stack of connected devices and cloud technologies?

WS: At the most basic level, IoT solutions are implemented to establish autonomous communication among “things”, as well as collect and analyse the data that is being transferred. Of course, there are similarities across industries when examining IoT solution architecture at this very high level, however there are

myriad different components, technologies, and operational processes that vary greatly among industries as well as individual solutions. Everything ranging from the combination of IoT endpoints, to network connectivity technologies, to application functionalities – just to name a few – are specific to each IoT implementation and specifically selected or designed to achieve the desired business outcomes. The more expansive the “stack” of connected technologies used by an organisation to deploy IoT, the more complex the deployment becomes and the more unique the solution becomes.

For example, managing medical devices and patient monitoring solutions are wildly different than managing vehicles and monitoring drivers – aside from the basic components, data privacy, security, and analysis processes are some of the major processes that must be custom-fit to each IoT solution. While having IoT experience can certainly aid in the deployment process, the vast majority of businesses do not have the resources or expertise needed to understand and execute against all IoT intricacies in-house. This is where IoT ecosystem partners really show their value by complementing internal skill-sets and filling operational gaps.

T360: What are the most common pitfalls to avoid as IoT applications scale up for customer growth and more complex services?

WS: Bringing an IoT solution to market is only one step of the IoT implementation process, and many organisations fail to recognise the operational management, sustainment, and support activities that are required for the long-term health and success of the deployment. The more connected devices that need to be maintained, the more complex and comprehensive these processes become. In fact, most IoT failures can be directly traced to a lack of strategic planning and misunderstanding of the scope of activities. In order to accelerate value realisation, the comprehensive IoT strategy – tailored to the organisations’ respective industry and use case – should extend to cover the entire IoT solution lifecycle.

Planning for the entire IoT solution lifecycle enables scalability and growth, and also uncovers the potential for new revenue streams or monetisation opportunities. For example, in the operational phase of the IoT deployment, enhanced helpdesk and service assurance services ensure improved customer/end user satisfaction and enables customer organisations to scale their own deployments with a single point of contact for all component support needs and issue resolution. In the sustainment phase, advanced exchange services and processes enable rapid delivery of new endpoints or components that require upgrade, thus adding value for downstream customers with business continuity assurance. It is worth reiterating that many businesses fail in these areas because of inexperience or lack of resources, and IoT partnerships are a critical component to IoT lifecycle strategy development and execution. ■

The more connected devices that need to be maintained, the more complex and comprehensive these processes become

William Sandoval is VP and General Manager - Location Based Services at KORE.
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Pervasive Vehicle-2-Anything connectivity enables safe, engaging rally racing

Background & challenge

Over the past decade, a surge in rally sport competition has resulted in greater incidences of injury, fatalities, and property damage. In an attempt to mitigate these risks, regulators and rally industry representatives are taking steps to rewrite many of the procedures, requirements, and rules currently on the books. This includes firming up team and vehicle licensing requirements, mandating the use of specialised safety equipment, and requiring the latest integrated in-vehicle GPS and communication technologies.

These risks may be attributable to the following factors:

- Increasingly remote venues that are far from city emergency support services
- Competition involving more challenging terrains and under harsher conditions
- Higher density rallies with more competitors, spectators, and event support staff
- Faster vehicles that are pushing the limits of speed, distance, and endurance
- More rallies in more places worldwide than ever before.

Due to the technological limitations of legacy 2G cellular networks, reliable connected-vehicle communications solutions were traditionally unrealistic. In the absence of pervasive high-speed cellular or modern vehicle-to-vehicle (V2V) connectivity, organisers were forced to use high-cost, proprietary GPS-based satellite services or fall back to legacy short-range radio-frequency (RF) communications.

RallySafe realised early on that legacy, short-range radio frequency (RF) was ill-equipped to handle the expanding needs of rally sports. This technology could not handle challenging terrains or unpredictable weather conditions and did not appreciably decrease vehicle collisions. Reliance on RF communications left event organisers and officials largely in the dark, and large numbers of marshals and volunteers were needed to relay accurate information from the course back to race control.

In addition to safety concerns, timing continued to prove challenging for event management. As races grew in size and complexity, and with more vehicles competing over larger areas, the ability to accurately capture vehicle times became increasingly difficult. The traditional clipboards-stopwatches-radio method was inaccurate and couldn't keep up with the increasing pace and scale of the events.

Solution

RallySafe is a technology early-adopter, founded on a vision of providing the motorsports industry best-in-class safety and communication management solutions. Today, the company continues its legacy of providing drivers, organisers, and spectators next-generation products and services that use the latest Internet of Things (IoT) technologies.

Since 2010, RallySafe's value-proposition has been based on a unique understanding and appreciation of the safety and communication challenges of drivers, competitors, and event organisers. RallySafe's go-to-market plan is predicated on the following critical-success-factors (CSFs):

- Regulatory Compliance: Network and industry road-mapping, testing, and certification
- Seamless Connectivity: Carrier integration and secure, managed IoT connectivity
- Reliable Vehicle Communications: Integrating high-speed, low-cost V2V RF
- Pervasive GPS: Access to reliable anywhere, anytime satellite positioning. ▶

Due to the technological limitations of legacy 2G cellular networks, reliable connected-vehicle communications solutions were traditionally unrealistic

RallySafe realised that actualising their plans was predicated on careful implementation of a value-added IoT solution. This solution would provide drivers, organisers, and event staff with network-agnostic connectivity that would enable them to communicate effectively and precisely determine their location. More importantly, the solution would need to offer RallySafe customers an integrated ecosystem, purpose-built to solve their unique safety and communication challenges and those of the wider rally sports industry.

The IoT solution would also need to seamlessly integrate RallySafe product lines and engineering processes to produce a secure, managed, end-to-end vehicle-2-anything (V2X) connectivity solution. Lastly, RallySafe would require a trusted, neutral, expert IoT advisor with

the global reach and industry expertise needed to simplify complex carrier certification and connectivity challenges.

KORE was that trusted IoT advisor. Since 2012, KORE has been working closely with RallySafe leadership and product development groups to help the company simplify their strategic technology initiatives and actualise their go-to-market plans by focusing on the following criteria:

- Ubiquitous Connectivity: Expanding global connectivity for events held anywhere, anytime, worldwide
- Purposeful Enablement: Helping RallySafe customers focus on competing, organising, and managing rallies by providing enabling technologies
- Next-Gen User-Experience: Enhancing user experiences for competitors, organisers, and support staff.



Results

Implementing KORE's IoT solutions has enabled RallySafe to offer its customers the following benefits:

- **Ease-of-Use:** An all-in-one rally solution that combines embedded KORE connectivity pre-programmed with race coordinates and an intuitive no-touch hazard alerting system. Real-time GPS positioning and hassle-free V2V communications provide drivers the situational-awareness they need to navigate challenging terrains.
- **V2V RF Connectivity:** The RallySafe automated on-board vehicle-proximity technology provides drivers a low-distraction, high-value warning system. High-speed V2V communication offers push-to-pass options that enable drivers to see the road ahead.
- **Management:** Automatic hazard warnings enable race control to rapidly respond to incidents. Additionally, integrated satellite capability provides drivers V2X communication locations with poor or unavailable cellular

coverage and provides organisers an all-inclusive map-based view of participating vehicles.

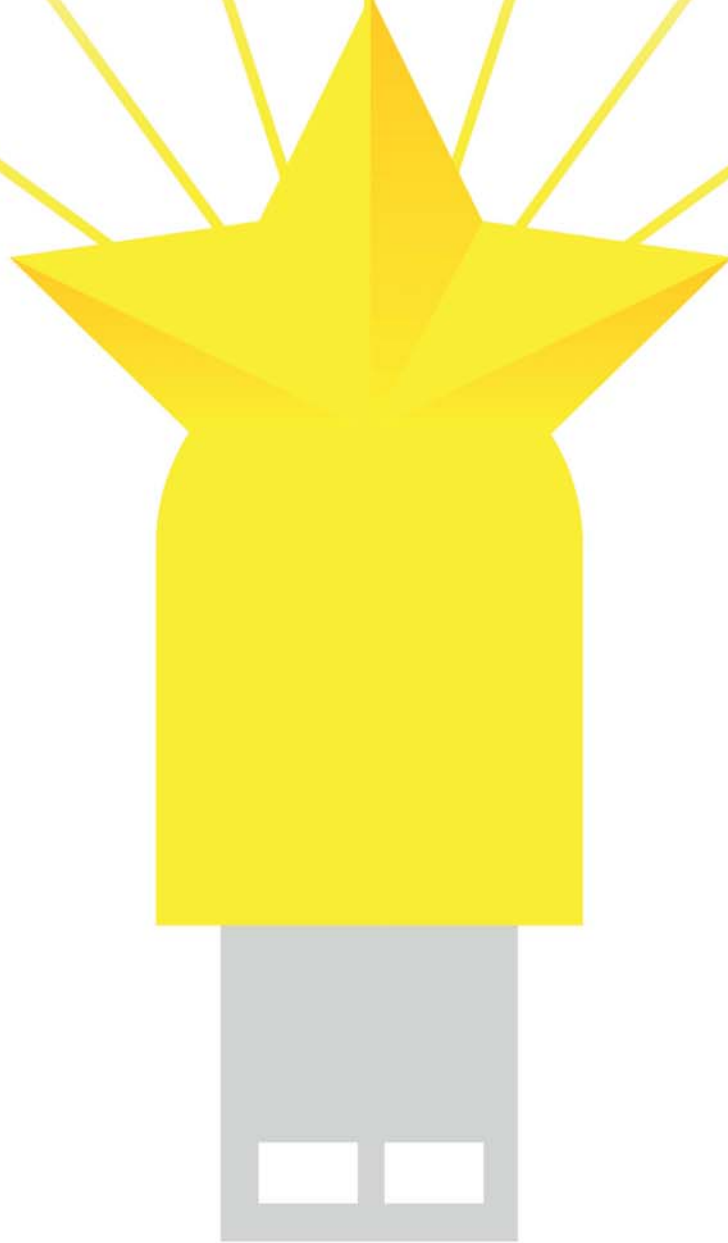
- **Timing:** Accurate and timely race metrics means better race results. Battle-tested for changing environments, high-frequency GPS and interpolated algorithms enable instant timing and increase the validity of control-start/stop times. This results in fewer race enquiries, disputes, and reduces timing errors, helping to keep event costs down.

KORE has enabled RallySafe to offer the rally racing industry an interactive, engaging, and safe user experience. KORE's comprehensive IoT capabilities have helped RallySafe go-to-market with best-in-class rally management solutions that unlock real-world benefits. Together, the RallySafe and KORE partnership represents a union of competencies and technologies that offer next-gen rally management solutions that enable the rally community to safely focus on the sport of rally racing. ■

KORE is a pioneer and trusted advisor delivering transformative business performance. We empower organisations of all sizes to improve operational and business results by simplifying the complexity of IoT. Our deep IoT knowledge and experience, global reach, purpose-built solutions, and deployment agility, accelerate and materially impact our customers' business outcomes.

RallySafe was originally conceived after the occurrence of a secondary crash that took place at a rally race-Targa Tasmania, Australia. The original creators of RallySafe – one of whom is an experienced rally racing participant – conceived RallySafe under its parent company Status Awareness Systems in 2010. The overall idea was that this accident may have been prevented if there was some way, communication-wise, to alert the drivers of the situation beforehand.

Follow the data.



Beecham Research is the leading strategic advisor on IoT, supporting bespoke IoT projects with over 25 years expertise in both M2M and IoT. We provide market information and advice to help you make wise IoT decisions.

Boston


Suite 456, 359 Newbury Street
Boston MA 02115


 617-531-0650

London

2 Bath Place, Rivington Street
London EC2A 3DR

 +44 (0)207 749 1944

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