Exploring the technologies that ease infrastructure requirements to enable smart cities transportation options.

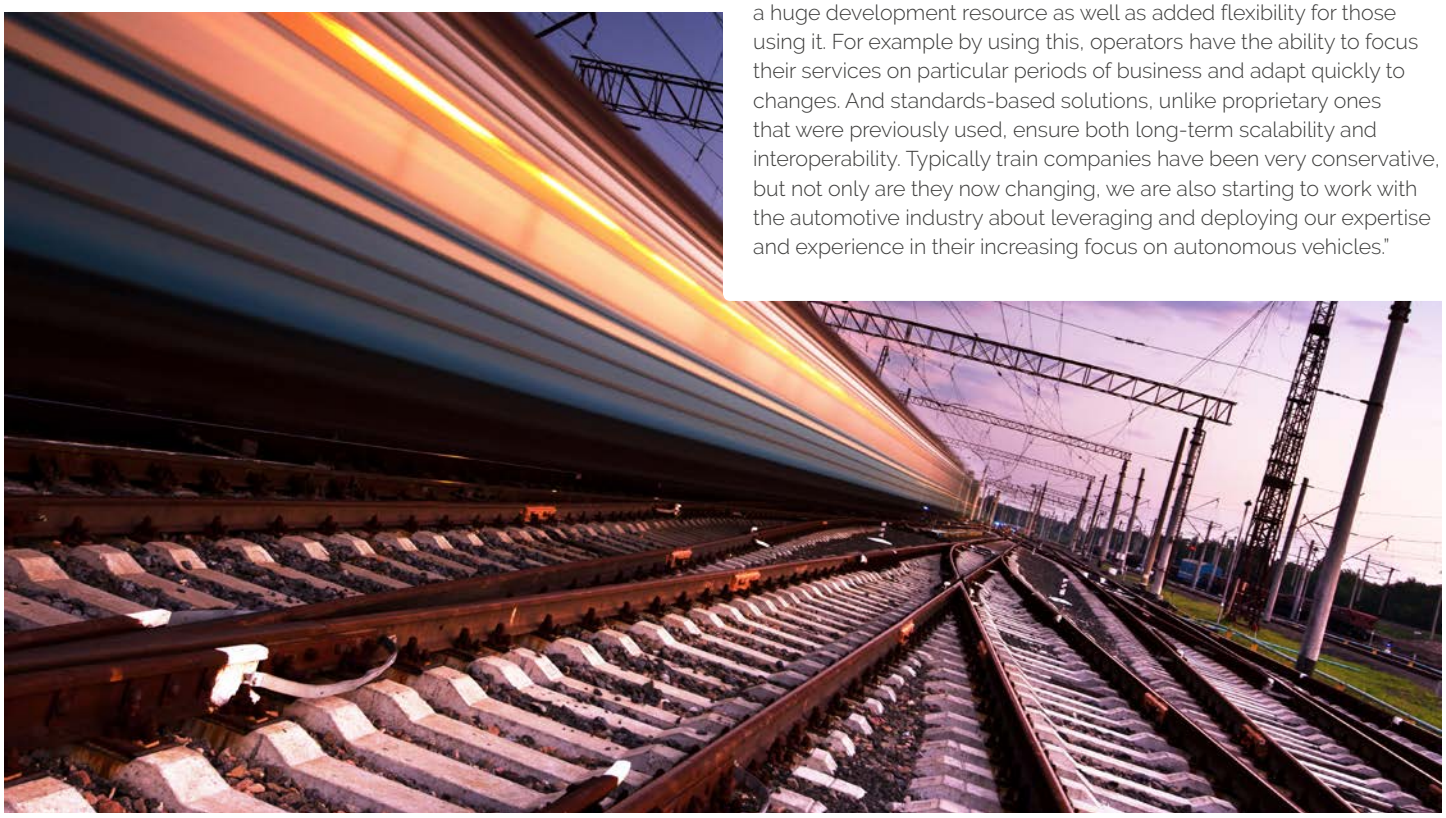
For those of you still trying to come to grips with Industry 4.0, we have some news: 5.0 is on the way. And soon. Just as a recap, 1.0 was the Industrial Revolution powered by water and steam, 2.0 saw electrical-powered, assembly line mass production, 3.0 was the introduction of computerized automation and 4.0 ushered in the integration of high-tech cyber systems to optimize production during the 21st century. And now we have 5.0 rapidly approaching, and there is a belief that it is here already in some sectors.

What is Industry 5.0? Well its precise definition is still being debated, but Shermine Gotfredsen, General Manager, APAC, Universal Robots sees it as "the transformation of the modern manufacturing process to enable man and machine to work hand-in-hand, pairing the unique, cognitive skills of workers and precise, technical skills of robots to inject an innovative culture into the workforce."

For transport, this latest step in the industrial revolution offers a number of opportunities for autonomous vehicle development. Helping to advance more autonomous transportation operations, Industry 5.0 shines a light on the ability to now bring together multiple technology approaches such as deep learning, Software Defined Trains (SDT), an advanced Internet of Things (IoT), Big Data, Mobility as a Service (Maas) and much more. It also plugs into the concept of Smart Cities, that utilize connected vehicles and the intermodal journey – some of the biggest trends and preoccupations in our industry.

To learn more, I spoke to an industry expert currently exploring this next frontier for transport - Valentin Scinteie, Transportation Business Development Manager at Kontron, a global leader in embedded computing technology and an adviser to many in the transportation sector. Kontron offers a blend of best of class German and French engineering quality and Silicon Valley innovation. Whilst familiar to many of you for their work in rail, they have now expanded their focus beyond the tracks and into wider transport, including all forms of in-vehicle systems. Val has worked in transit ITS (Intelligent Transportation Systems), rail security and communications and in vehicle ECT (Embedded Computing Technologies) for over 20 years, 15 of which were spent at Alstom making him the perfect guide to what is fast approaching for us all.

"The major shift for us at Kontron is to enable our customers to move from a hardware focussed train to a software focussed one. We now have in our telecom platforms a 'software defined network' that offers a huge development resource as well as added flexibility for those using it. For example by using this, operators have the ability to focus their services on particular periods of business and adapt quickly to changes. And standards-based solutions, unlike proprietary ones that were previously used, ensure both long-term scalability and interoperability. Typically train companies have been very conservative, but not only are they now changing, we are also starting to work with the automotive industry about leveraging and deploying our expertise and experience in their increasing focus on autonomous vehicles."



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The development of autonomous vehicles (AV) is now occurring at a remarkable pace. Recent media reports have Uber Technologies discussing the possibility of installing its self-driving system in Toyota Motor Corp. vehicles as the U.S. ride-hailing firm seeks to sell its autonomous driving technology to outside companies. Without citing sources, Japanese business daily said that the firms are negotiating a possible deal for Toyota to use Uber's automated driving technology in one of the automaker's minivan models.

I ask Val, where he sees the current status of autonomous vehicles; "Already we are seeing pilot projects coming online within automotive, with Waymo, GM, Ford, Uber and Lyft among those the leaders. But in other transport verticals too – the Rio Tinto autonomous train in Australia, the work that Alstom is doing in close collaboration with ProRail and RRF and autonomous shuttles in Florida and New York among other places. The partnerships that Kontron is forging with major automotive companies are particularly exciting. These leading companies are talking to us due to our HPEC (High Performance Computing) and rugged platforms expertise. They knew of our work in transport, and we are proud to be using this experience to further the growth of autonomous vehicles."

Autonomous cars, are a major aspect of achieving the vision of truly Smart Cities. Already major car manufacturers are increasingly engaged in this technology. But Smart Cities need to combine various modes of transport as well as different technologies if this dream is to become a reality. The precise role of how public transport can fit into this vision is still being ironed out. But the rail industry can definitely learn from advances realized from driverless car technologies.

Kontron S10 HPEC Board for autonomous driving platforms with Intel® XEON® Scalable 8160T 24-Core Processor.

Kontron is leading in this technology sharing. Its High Performance Embedded Computing (HPEC) connected platforms don't need large central servers, but can still be directly linked to control rooms to enable I2V and improved V2V. This allows trains to use the same platform as AV. It also enables vehicles to make decisions themselves, using sensors, 3D maps and real-time data. By integrating HPEC into transportation systems, trains can use the concepts already being used by AV cars, and when combined with the Cloud and IoT gateways truly enable Mobility as a Service.

To conclude I ask Val to share some thoughts on what we can expect to see in the next decade: "Where do I begin! Well I think there will be big developments in the processing of Big Data through IoT fixed and mobile meshed gateways. We will see Autonomous 'Anywhere' systems become more prevalent, backed up by deep learning. The autonomous revolution in transport will all help facilitate the growth of Software Defined trains and vehicles to deliver a truly intermodal and much more efficient transportation world. These are very exciting times with great changes ahead. It's fantastic to be a part of making them happen."

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