Taketsugu Matsumoto

Changes for the Better – Introducing Mitsubishi Electric

Railway-News' Keri Allan recently had the pleasure of speaking with Taketsugu Matsumoto, European Business Unit President Transportation Systems at Mitsubishi Electric, where he discussed the company's plans for Europe, its stand-out projects and its focus on sustainability and circular engineering.

Keri Allan: Please can you tell me about Mitsubishi Electric Europe Transportation Systems – your company's heritage and what you offer to rail companies in Europe?

Taketsugu Matsumoto: Mitsubishi Electric is a leader in transportation systems and solutions for trains. We design and produce customised solutions and integrated systems for rail manufacturers. Our main focuses are on propulsion with our traction motor (where we hold a leading position globally), safety, which includes our world-leading train control management systems (TCMS), comfort – our heating, ventilating and air conditioning (HVAC) systems, and sustainability and energy-saving solutions.

Today we've equipped 60,000 rail vehicles with key electric and electronic components in 36 countries, and we can provide up to 50% of a train's vital components.

Our roots are in Japan, where Mitsubishi Electric Corporation was founded over a century ago. What's different about us is that we're an independent rail equipment supplier, which means that we seldom rely on external suppliers for subsystems or components. Our engineers design, develop and build systems in house.

KA: Any new or ongoing projects you can tell us about?

TM: We're currently working on our first contract in France, where we've just completed the dynamic testing of our system for the next generation CAF-built Oxygène intercity train for SNCF.

This project consists of traction motors, converter-inverters and main transformers using natural air-cooling technologies for 28 trains. Mitsubishi Electric is actually the first company worldwide to supply such roof-mounted converters and inverters with natural air-cooling systems, which lowers operational costs.

Customers see approximately 20% energy savings, 40% less maintenance and also lose the noise.

Another recent project is with Newag in Poland, where we are supplying main transformers for its next generation locomotive, Griffin 200 (E4MSUa). We started working with Newag in 2019, when we provided the main transformer for 24 dual-voltage **Dragon 2** freight locos able to operate on 3kV DC and 25kV AC.

KA: What about your biggest projects in Europe, or those you're most proud of?

TM: One thing that stands out is the success of our HVAC system. We have a long-standing partnership with what was Bombardier, now Alstom, which began in 2010 when they chose our HVAC unit for their London Underground trains. We've since provided them with HVAC systems for their new Aventra platform used in the UK.

By the end of this year, we'll have delivered a total of 8,430 HVAC units; 7,600 of which to Alstom and also 824 to Siemens for the Desiro platform; something we're really proud of.

Another achievement is our first project for high-speed trains in Northern Europe. Between 2016 and 2021 we supplied CAF and Norwegian operator Flytoget with traction systems using high-voltage hybrid silicon carbide (SiC). We supplied 16 traction transformers, converters, inverters and auxiliary power supplies for eight high-speed trains connecting the Norwegian capital to Oslo Airport.

Then there's our largest supply contract in Europe, delivering 400 traction inverters and 1,000 traction motors to equip next-generation trains for Nederlandse Spoorwegen.

We also continue to support our long-time partners RENFE and CAF, and are proud to have motorised RENFE's S449, one of the most-used railcars in Spain.

KA: What about technical innovation – what are you working on in this area and what excites you about the future of rail?

TM: We strongly believe that technology and innovation can provide solutions to achieve social change and a more sustainable world. Our motto is 'Changes for the Better' and we look to solve social challenges through 'circular digital engineering', putting the focus on sustainability, innovation and component robustness.

For instance, energy efficiency is a very important topic and the company optimises its system using in-house power devices solely designed by the semiconductor division and system engineers. For example, our hybrid SiC modules have been available since 2013, and full SiC power modules since 2015. Then there's our SiC variable voltage and variable inverter, which lowers energy consumption and volume and mass by 40%. If you look at our SiC auxiliary power supplies, these reduce power loss by at 30% and volume and mass by 20%.

Our semiconductor business will benefit from intensive investment over the next four years, with the creation of a new SiC wafer factory in Japan and the doubling of previous investment plan by 2026.

Then, with global warming, HVAC has become a key topic for decarbonisation, while remaining mandatory for passenger comfort. Our engineering teams are currently working on implementing a natural refrigerant like propane in HVAC systems to replace the ones currently in use, which will be banned as of 2029 at the latest.

We're also focusing on miniaturisation and energy conservation of our power electrics, control equipment and HVAC units, and designing them with easy integration and minimal maintenance in mind. We can proudly say that our products require limited maintenance and almost no replacements because our quality is very high.

KA: What are your plans for the company going forward? I'd love to know more about your focus for the future and your strategy?

TM: If we look at the EU Green Deal, there's some ambitious targets set for rail, like doubling high-speed rail traffic by 2030 and rail freight by 2050. We want to be part of this journey, and so partnering in Europe is a priority and cooperation with local players is key.

Our strategy is to promote localisation in Europe. In 2014, we started to grow our footprint in Europe through capital alliances and industrial partnerships with rail equipment suppliers, starting with the establishment of an HVAC competence centre and manufacturing site in Italy.

In 2016 we signed an alliance with MEDCOM in Poland for traction and auxiliary power systems and in 2020 with EKE-Electronics in Finland, which produces the train control management system and has the competence to deal with the condition-based maintenance.

We are committed to become European, to support our customers from here. If demand increases, we are ready to open more manufacturing sites and establish more partnerships with European companies.

KA: Are you always open to collaborating with different companies to provide solutions?

TM: As I mentioned earlier, our competence lies in providing a complete in-house solution. However, with the current demand for decarbonisation, speed is important. In this situation, collaborating with European partners with local knowledge, skills and capabilities is an option for us.

Looking forward, our mission is to contribute to the newest train platform developments in Europe through platform agreements with rail car builders. We're also eager to support rail operators and leasing companies in the decarbonisation and modernisation of their fleets, by replacing obsolete components with more energy efficient ones.

We've transformed from a component supplier to a systems integrator, providing an integrated solution that helps customers meet their sustainability targets.

If readers would like to discuss this, or any of the other points we've raised, then I invite them to contact us via our website, or even better, pick up the phone and give us a call. We'd be happy to discuss how we can support you and arrange a site visit to learn more about your needs.

For more information scan the QR code to contact Taketsugu Matsumoto, European Business Unit President Transportation Systems at Mitsubishi Electric