

Alstom and SNCF launch new TGV M

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On September 9, Christophe Fanichet, chairman and CEO of SNCF Voyageurs, Alain Krakovitch, director of TGV-Intercités, Xavier Ouin, industrial director of SNCF Voyageur and Jean-Baptiste Eyméoud, president, Alstom France, unveiled the production line of the TGV of the future in Alstom's La Rochelle workshops in France, after an operation that brings together the power cars and passenger cars.

The trains will enter service on the French rail network from 2024, with an order place for 115 units of which 100 will be for domestic services and 15 for international services. The trains will be used by both INOUI and OUIGO TGV services.

Alstom's design enables the train to be reconfigured from seven to eight or nine cars, as required to match the market's needs. First class accommodation can quickly be transformed into second class accommodation and vice versa, or the interior can be reconfigured by removing or adding seats, bicycle or luggage spaces.

There is already a 20 per cent increase in on-board space with a possible 740 seats available compared to the current maximum of 634.

The TGV M also features an ultra-competitive energy efficiency and carbon footprint per passenger said Alstom. The train's carbon footprint is claimed to be the lowest on the market whilst 97 per cent of the

train's components are recyclable.

Alstom also said that with a 32 per cent reduction in CO2 emissions, the TGV M is fully in line with the SNCF Group's environmental commitments as set out in the SNCF Voyageurs 'Planète Voyages' programme, which aims to reduce the carbon footprint and energy consumption of all its activities.

There will be access to evolving connected services that will meet passengers' needs including on-board Wi-Fi as well as complete information in real time in the various areas of the train said Alstom.

The train will also be fitted with sensors that continuously transmit thousands of pieces of data, enabling the train to be examined in real time from every angle to optimise maintenance and availability.

Alstom said that the introduction of the new train will require all TGV operating processes to be modified, whether related to driving, traffic supervision, train preparation in stations, parking, in depots or during cleaning. The manufacturer said this is linked, for example, to the TGV M having nine cars instead of eight like the current fleet, and that the majority of controls in the driver's cab have been digitalised.

Major investment has also been made in the TGV maintenance Technicenters to make their facilities compatible with the new trains, and to install automated maintenance benches that can check several hundred parts of a train in a few seconds.

Alstom said that the new predictive maintenance concepts will be based on the use of the thousands of pieces of data from the new trains. This will provide clear, reliable and high value added information, making it possible to anticipate breakdowns in doors, air-conditioning systems and, in general, all the systems that contribute to train operation and passenger comfort.

The manufacturer said that, currently, a detailed analysis of the compatibility of the TGV M with the French railway network is being conducted and this consists of ensuring that the new train is properly registered at all points on the network and in all stations. This analysis will be used to identify the adaptation work that needs to be carried out, the procedures that need to be modified and the changes that need to be made in terms of passenger flow management. Alstom said that, for example, the surveys already carried out in nearly 70 stations show the need to move stop signs to make it easier for drivers to see the signals when the trains are on the platform. This is linked to the nose of the TGV, which has been lengthened to make it more aerodynamic.

A vast project is underway on digital and information systems. This is important because the TGV M is hyper-connected and customers' uses are increasingly oriented towards digital systems.

Attendants will have an application that tells them in real time the operating status of all the elements that contribute to the comfort of customers. The Wi-Fi architecture on board the train will comply with the latest 5G standard, to deliver a high quality service. And various digital applications will be developed in particular to optimise traction energy consumption, by adapting driving instructions in real time to the speed of the train and the profile of the route.

To make a success of this major innovation project, Alstom has rethought its industrial manufacturing

process in a standardisation and lean manufacturing approach. Investments of nearly €50 million have been made in new production lines ensuring the safety of operators and the ergonomics of workstations, as well as industrial efficiency and the simplification of assemblies in order to make the solution competitive.

Ten of the 16 Alstom sites in France are involved in the design of the new train: Belfort for the locomotives, La Rochelle for the carriages (studies, industrialisation, purchasing, manufacturing and testing of passenger carriages), logistical and service support, and project management; Villeurbanne for the computerised control and command system, passenger information and on-board equipment; Ornans for the engines; Le Creusot for the bogies; Tarbes for traction; Toulouse (COE electrical) for the electrical circuits; Petit Quevilly for the transformers; Saint-Ouen for design, signalling, and Valenciennes for the study of the interior design elements. In total, 4,000 jobs will be generated.

All the new features of the TGV M have been designed with and for future users, whether passengers or SNCF Voyageurs staff.

Customers will find innovations on board that will improve their comfort and service. In the passenger lounges, the interior design has been designed to promote rest and a muted atmosphere. Elsewhere, social areas have been designed for those who wish to enjoy themselves with friends or family. The windows have been enlarged for a panoramic view of the landscape. The lighting will adapt to the intensity of the natural light in the train. All seats, designed for optimal comfort, will have connectivity features, offering everyone a powerful WIFI. The bar of this new TGV has been completely redesigned to offer a new experience.

TGV M is the first TGV which, from the outset of its design, has been designed in close collaboration with associations for people with reduced mobility (notably wheelchair users and the visually impaired). It will be the first TGV to offer fully independent access to the train. A pivoting lifting platform will allow wheelchair users to access the train independently, right up to the room reserved for them, and a sound system to locate the doors will guide visually impaired people when they board.

For the first time, drivers were involved in the design of the driver's cab. Using virtual reality goggles, 100 drivers were given a virtual tour of the cab, with a choice of three space designs. The comfort, space and ergonomics of the driver's cab have received a lot of attention. Indirect lighting has been introduced and controls have been positioned to facilitate work gestures.

The TGV M aims to reduce maintenance costs by around 30%. The TGV M was designed with the early involvement of TGV maintainers, in order to take advantage of their day-to-day expertise in the high-speed maintenance Technicenters. The TGV M is designed to facilitate maintenance and cleaning, thanks to simpler and more robust systems and components. And thanks to the layout of the components in the locomotives, on either side of a wide central corridor, facilitating interventions.

The TGV M improves the ergonomics and working environment of the train crew. The design work for the spaces intended for them was carried out in conjunction with the engineers. A first space will allow them to store their personal belongings. And the second space will be reserved for welcoming customers. The objective is to offer more freedom to attendant in the management of the trip and services to customers.

The next major step will be the dynamic test phase at 200 km/h in Velim, Czech Republic by the end of 2022. This opens the first chapter in a long period of testing for this high-speed train.

The comfort of the seats will be tested by a representative sample of people in order to gather their feelings and adjust if necessary.

The car dedicated to people in wheelchairs has several innovations. Work is continuing with the associations to finalise the technical adjustments and the choice of signage. Attendants and maintenance teams are also involved in this process, in order to identify changes in the way they work.