Trenitalia Orders Frecciarossa 1000 HSTs

On 4 June 2019 Trenitalia awarded a contract worth around 575 million EUR to a 60/40 % joint venture formed by Hitachi Rail and Bombardier Transportation for 14 Frecciarossa 1000 (ETR 400) Type V300 ZEFIRO high speed trains. The contract includes ten years of maintenance and servicing by the manufacturers. For Bombardier the deal is worth 233 million EUR and for Hitachi 342 million EUR.

Trenitalia currently has a fleet of 50 Frecciarossa 1000s, built between 2013 and 2017. Like these, the following 14 will be built in Italy, at Hitachi's Pistoia works and Bombardier's Vado Ligure works. The 14 new trains will again have a design top speed of 400 km/h, but will be suitable for a top commercial speed of 360 km/h. On the Italian high speed network they will, however, be limited to 300 km/h in the foreseeable future. This resulted from a decision by the Italian Ministry of Infrastructure and Transport and ANSF announced on 28 May 2018, that no further very high speed testing was to take place, and the speed limit would not be raised.

Each eight-car train will be 202 m long, and will have a Bo'Bo' + 2'2' + Bo'Bo' + 2'2' + 2'2' + Bo'Bo' + 2'2' + Bo'Bo' axle arrangement. The traction equipment will be designed for quadruple-voltage (25 kV 50 Hz, 15 kV 16.7 Hz, 3 kV DC and 1.5 kV DC) operation, rated at 9,800 kW, and with a tractive effort of 370 kN. Seating capacity will be 457 (300 in standard, 76 in premium, 69 in business and 10 in executive class). Two wheelchair spaces will be provided.

The trains will comply with all current TSIs, and will be designed for use in France, Germany, Spain, Austria, Switzerland, Netherlands and Belgium, being equipped with all pertinent ATP systems, including ETCS. However, their exact areas of operation will be determined by Trenitalia. When the first batch of 50 ETR 400s was ordered, a similar wide international operating range was envisaged. Deliveries are to start within 18 months of the date on which the contract was signed. The delivery of the last train is scheduled by the end of 2021.

This photo of a pair of ETR400s was taken on 16 November 2016 in the new testing area at Pistoia works. Here, and also at is Napoli and Reggio di Calabria, Hitachi Rail Italia has evolved into the largest rail vehicle manufacturer in Italy, following the acquisition of AnsaldoBreda's train building activities in November 2015, and the latter concern's 160 years-plus of know-how in this field. Hitachi Rail Italia now has a workforce of around 2,200. On 16 March 2016 a further new factory, run by subsidiary concern Hitachi Rail USA, was opened in Medley, near Miami, and is initially building 136 Metrorail cars and 272 powered bogies for Miami-Dade County's Department of Transportation and Public Works.

On 4 June 2019 the Italian rail regulator ARAFER announced that Trenitalia subsidy Thello had informed it of its intention to run an open access passenger service on the French LGV network. A request had been submitted to SNCF Réseau for paths for two trains per day linking Milano and Paris starting in June 2020, departing from both cities at around 07.00 and 15.00 daily, with intermediate stops at Torino, Modane, Chambery Challes Les Eaux and Lyon Part Dieu, and providing an end-to-end journey time of under seven hours. On this service ETR400s are to be used, since they will be able to run on the LGV SudEst.

ARAFER is currently assessing the request, which involves the services starting prior to the implementation of the Fourth Railway Package in December 2020. There is thus a need to determine whether Thello's primary aim is to target the international market or practise cabotage on the domestic French one. Thello states that its aim is to enhance its international transport offer and improve the existing train service between Paris and Milano, which is not routed via the LGV SudEst. During the first years of operation of the service the target market will be Italian passengers, with revenue from fares between Paris and Lyon amounting to between 10 and 30 % of total turnover.

Thello is already a passenger train operator in France, with safety certificates for its sleeper service between Paris and Venezia and its open access daytime service linking Marseilles, Nice and Milano. Negotiations with the French Rail Regulator, EPSF, began in May 2019 regarding operations on the LGV network.

Mike Bent
Photo: Hitachi

Following test running, which began on 4 February (see R 1/19, p. 23), the first four of the 17 Class **ETR 700** „Albatros" EMUs, originally built for Fyra services in the Netherlands and Belgium, were put in commercial service by **Trenitalia** on 9 June. The trains are branded Frecciargento and are used on the four-hour run between Milano and Ancona, where they can reach their top speed of 250 km/h. Two return workings are provided daily, departing from Ancona at 05.00 and 06.20 and from Milano at 18.35 and 19.35.

The remainder of the „Albatros" fleet are to be phased into service by early 2020, and this will enable them to be used on services linking Milano and Venezia with Ancona, Pescara, Termoli, Foggia, Bari, Lecce and Taranto, on the Adriatic Corridor. Each eight-car train has 500 seats in three classes - standard, premium and business. A „Frecciabistro" buffet with hot and cold food and drinks is situated in car 4, while accommodation for handicapped passengers and their helpers is located in car 2. The trains are equipped for WiFi reception.

Petr Kadeřávek

Virtual Reality For Training Purposes

Brisbane-based Real Serious Games (RSG) develops interactive virtual reality (VR) technology which can be used for rail staff training, including the training of drivers. VR technology provides trainees with a computer-generated 360° view of their working environment, a virtual world, which gives them a more realistic understanding of the surroundings and situations they may be working in.

This is also known as XR (eXtended Reality) training. It is far superior to conventional classroom teaching, because it ensures that the person being subjected to training is fully focused on the situation in question, and there are no risks of distractions to attention, the trainee being fully immersed in the learning situation.

RSG's VR development is underpinned by neuroscience to maximise memory retention and home in on the learning aspect. A Telemetry system allows learning skills to be evaluated and checked through interactions with the virtual worlds, without the inherent risks involved in „hands-on" training. ***One possible use of this system could be for driver and maintenance staff training by a rail operator which has a wide range of vehicle types.*** It is then not necessary to build versions of each cab type, for use on simulators, since everything can be generated as virtual reality scenes.

VR innovation is making head waves and now entering the next phase of Haptic Feedback introduction which will enable a person's actions to be met with real tactile feelings, these taking place on the hands or elsewhere. RSG's VR simulations make use of the well-known commercial gaming engine, Unity 3D. Thanks to this it means that RSG's VR simulations can be run on ordinary consumer grade PC hardware, which is not excessively expensive. However, powerful gaming graphic cards are necessary. As the core element in the VR simulation, headsets are necessary, and consumer products can be used, again ranging from cheap models to more expensive de-luxe types, which provide better quality sound and image reproduction.

To create the simulation scenes, such as journeys over parts of the network, 3D scanning of the actual environments and routes is undertaken. This scanning incorporates signalling and ATP systems. Scenarios involving vehicle behaviour and journey events are hand-programmed into the virtual worlds.

RSG also brings new innovation to CAD modelling with its 4D planning tool. In addition to static 3D CAD designing, it is also possible to add a fourth dimension - time. „4D modelling" makes 3D CAD project work more complex and time-constrained. RSG's 4D planning tool allows users to collaborate in real time, playing out different scenarios on screen, over the life of the project.

Although we tend to associate simulation with driver training, this is not always the case with RSG technology, which was used on the Sydney Metro North West Rail Link for training operators of the TBM, prior to the actual boring of tunnels. In the United Arab Emirates, RSG technology has also been used by Roads and Transport Authority in Dubai for bus, taxi and other types of driver training. RSG has also participated on other projects in Australia: Cross River Rail - Brisbane, Moreton Bay Rail Link, HCMT Depot - Packenham, Darra to Springfield Railway, Regional Rail Link - Victoria, Melbourne Suburban Network.

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Image: RSG