

PRESS RELEASE

SNCF AND ITS PARTNERS RUN THE FIRST SEMI-AUTONOMOUS TRAIN ON THE NATIONAL RAILWAY NETWORK

SAINT-DENIS, 16 DECEMBER 2020

For the first time in France, a locomotive has run in partial autonomy, under real operating conditions, with fully automated acceleration and braking functions. This trial, conducted on 29 October, marks a key stage in the Autonomous Train project.

A MAJOR STEP FOR THE AUTONOMOUS TRAIN PROJECT

Two years after the launch in 2018 of a consortium to develop the prototype of an autonomous train, a Prima BB 27000 locomotive ran in partial autonomy on the national rail network between Longwy and Longuyon, in eastern France, on a line equipped with the European signalling system ERTMS, under the supervision of a driver.

The consortium, consisting of Alstom, Altran¹, Apsys, Hitachi Rail, Railenium and SNCF, carried out all the steps that made this important trial possible: from the design to the description of the computer systems, cabling and software programming. As a result of this work, to which nearly a hundred people from all the partner companies contributed, the schedule announced in 2018 has been met and the ambition for 2020 achieved.

THE NEXT STAGES OF THE PROJECT

The next key stage of the project will be the circulation, at the end of 2021, of a train with the same level of partial autonomy on a line equipped with lateral signalling² without any modification to the infrastructure.

¹ A company of the Capgemini group

² Lateral signalling is the signalling in force before the deployment of the European ERTMS signalling system. It is still used on the vast majority of lines (excluding high speed lines).

This step will allow SNCF and its partners to manage all the possibilities of partially autonomous operation, regardless of the signalling system.

Meanwhile, engineering work is continuing in order to develop the various functions required for full autonomy, such as obstacle detection or environment monitoring. Twelve test sessions have been scheduled, which should enable the gradual addition of the functions required to increase the level of autonomy.

These stages will then take the consortium towards its final objective: running a prototype in complete autonomy in 2023.

AUTONOMOUS TRAIN: REAL BENEFITS FOR TRANSPORTING CUSTOMERS AND GOODS

Train automation means real benefits for rail customers:

- **Increased capacity**, because running more trains means being able to transport more passengers and more goods;
- **Greater fluidity and regularity** thanks to harmonised traffic flow and optimised speed, making it easier to react to unforeseen circumstances;
- **More environmentally-friendly transport**, thanks to reduced energy consumption and the shift from road to rail.

Autonomy thus provides rail transport with new perspectives: more flexible organisation, with the possibility of rapidly changing the number of trains in line with changing needs. These benefits will encourage a modal shift from road to rail, thereby contributing to a more environmentally-friendly mode of transport.

"Our shared project has just passed a key stage, in adherence to the schedule that was announced. It's a success. The research and tests conducted with our partners over these two years have allowed us to make rapid progress towards the autonomous train, and we are overcoming the technical obstacles one by one. Our work is aimed at making the rail mode more competitive and will contribute to developing a more environmentally-friendly mode of transport."

Luc Laroche, Director of the Autonomous Train project at SNCF

"As the technical leader of the project, Alstom is particularly proud to have contributed to achieving a new stage of autonomous operation in France. This project is a major opportunity for Alstom to promote its skills and innovations in the field of rail automations and autonomous transport, thereby developing its leadership in new forms of autonomous and digital mobility."

Jean-Baptiste Eyméoud, President of Alstom France

"These first dynamic tests of an autonomous train, in GOA2 under ETCS on the national rail network, showcase two years of studies and partnerships based on the expertise of our engineering teams, the trustful relationship with SNCF and a common desire to innovate and promote safe, available and greener transport solutions. As part of this ambitious and innovative SNCF programme for the French and European rail sectors, Hitachi Rail is providing its technological components, its expertise and its experience commissioning the first autonomous

freight train in Australia to contribute to the standardisation of a smart, sustainable railway world.” Gilles Pascault , President of Hitachi Rail STS France

"We salute the work of the teams and are very happy to contribute to this project, which is putting our engineers to work on the challenges of intelligent, connected, autonomous mobility. Above and beyond the technological challenge of the autonomous train, the entire sector can envisage new perspectives for its economic models, its activities and its environmental footprint." Arnaud Maury, CEO France, Altran

"The chapter on cyber security is an essential part of the Technical Architecture file. It provides the guarantee that the requirements of cyber security are verified at the very deepest level of technology of the systems concerned. APSYS' collaboration with ANSSI in this project has been particularly successful, and enables us to anticipate the issues related to the future certification of these autonomous systems in a proper manner. APSYS is very proud to contribute to the cyber securisation of this project." Christian Forestier, CEO of APSYS.

ABOUT ALSTOM

Leading the way to greener and smarter mobility worldwide, Alstom develops and markets integrated systems that provide the sustainable foundations for the future of transportation. Alstom offers a complete range of equipment and services, from high-speed trains, metros, trams and e-buses to integrated systems, customised services, infrastructure, signalling and digital mobility solutions. Alstom recorded sales of €8.2 billion and booked orders of €9.9 billion in the 2019/20 fiscal year. Headquartered in France, Alstom is present in over 60 countries and employs 38,900 people. www.alstom.com

ABOUT ALTRAN

Altran is the world leader in engineering and R&D services. Altran offers its clients a unique value proposition to meet their transformation and innovation challenges. Altran supports its clients, from concept through industrialization, to develop the products and services of tomorrow and has been working for more than 35 years with major players in many sectors: Automotive, Aeronautics, Space, Defense & Naval, Rail, Infrastructure & Transport, Energy, Industrial & Consumer, Life Sciences, Communications, Semiconductor & Electronics, Software & Internet, Finance & Public Sector. Altran has more than 50,000 employees operating in over 30 countries. Altran is an integral part of Capgemini, a global leader in consulting, digital transformation, technology, and engineering services. The Group is at the forefront of innovation to address the entire breadth of clients' opportunities in the evolving world of cloud, digital and platforms. Building on its strong 50-year heritage and deep industry-specific expertise, Capgemini enables organizations to realize their business ambitions through an array of services from strategy to operations. A responsible and multicultural company of 270,000 people in nearly 50 countries, Capgemini's purpose is to unleash human energy through technology for an inclusive and sustainable future. With Altran, the Group reported 2019 combined global revenues of €17 billion. More information on www.altran.com

ABOUT APSYS

A subsidiary of Airbus, APSYS is a consulting and research company based in Toulouse. It specializes in the reliability, cyber protection and support of transport systems as well as industrial infrastructures, in compliance with environmental requirements. The company is involved in the design, manufacturing and operating phases of products and also develops digital solutions. It employs more than 600 people worldwide (France, UK, Germany, Spain, Mexico, China), with a turnover of €66 million in 2019.

ABOUT HITACHI RAIL

Hitachi Rail is a fully integrated, global provider of rail solutions across rolling stock, signalling, service & maintenance, digital technology and turnkey solutions. With a presence in 38 countries across six continents and over 12,000 employees, our mission is to contribute to society through the continuous development of superior rail transport solutions. We are proud of our global achievements, from our world-famous 'bullet trains', to our signalling solutions and turnkey projects, state-of-the-art traffic management and digital solutions. Drawing on the wider Hitachi Group's market-leading technology and research-and-development capabilities, we strive for industry leading innovations and solutions that can deliver value for customers and sustainable railway systems that benefit wider society. For information about Hitachi Rail, visit www.hitachirail.com.

ABOUT RAILENIUM

Railenium is an Institute for Technological Research (IRT) specialising in the rail sector. Its mission is to develop company competitiveness as a driver for growth and employment through collaborative innovation. Based in the Hauts-de-France region, supported by the State and the rail industry, the IRT Railenium implements innovation projects by creating partnerships between industry and academia. It coordinates the implementation of innovation projects that address the issues of the sector in conjunction with the public authorities. + To find out more, www.railenium.eu - @IRT_Railenium

ABOUT THE GROUP SNCF

SNCF is a global leader in passenger and freight transport services, including management of the French rail network, with revenue of €35 billion in 2019. The Group does business in 120 countries and has 275,000 employees, of which 220,000 in France and over half in its core rail business. The new SNCF, a public limited company that began operating on 1 January 2020, consists of a parent (SNCF) and five subsidiaries: SNCF Réseau (management, operation and maintenance of the French rail network, plus railway engineering) with its own subsidiary SNCF Gares & Connexions (station management and development); SNCF Voyageurs and its subsidiaries Transilien (mass transit in the Paris region), TER (regional rail), TGV INOUI, OUIGO and Intercités (long-distance rail), Eurostar, Thalys, Aléo and Lyria (international rail), and OUI.sncf (online ticket sales); Keolis (a global

operator of urban, suburban and regional mass transit systems); SNCF Fret (rail freight); and Geodis (freight transport and logistics solutions). SNCF Group works closely with its customers—passengers, local authorities, shippers and railway operators using SNCF Réseau services—and with regional communities, building on its expertise in all aspects of rail and all types of transport to deliver simple, seamless, sustainable solutions for every mobility need. Learn more at sncf.com

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