

Attempting to break the world rail speed record

**“Discover the French Program of Excellence in
Very High Speed Railway”**

Press kit





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THE FRENCH EXCELLENCE IN VERY HIGH-SPEED RAIL PROGRAMME

France today is the holder of the world rail speed record, after the TGV^{TM1} Atlantique n°325 reached a top speed of 515.3 km/h on 18 May 1990. But quite aside from the records, the TGVTM high-speed rail network represents an ultra sophisticated, reliable and safe system.

Developed jointly by Réseau Ferré de France (French railway network), Alstom and the SNCF, the **French Excellence in Very High Speed Rail programme** aims to define high-speed transport for years to come and to ensure France maintains its position as the global leader in high-speed railways.

A large-scale, long-term project

As well as the entry into service of the East-European High Speed Line, 2007 represents a key stage for the French Program of Excellence in Very High Speed Railway and its international profile. The V150 programme will see the three partners pool their extensive expertise in order to:


- Improve **the performance** of the French rail system, by working on the quality of its infrastructure, while ensuring the passenger is the focus of all activities.
- Establish a **long-term programme** to define high-speed transport by the 2050s.

Three complementary partners developing the future of rail transport

The three partners of the French Excellence in Very High-Speed Rail programme are working closely together, pooling their knowledge and skills to deliver the best possible results.

- The owner and manager of the French rail network, **Réseau Ferré de France** will be involved in all aspects of infrastructure performance (materials, equipment, tracks, signalling, noise, etc), in order to improve the quality of the rail network over the long-term and help develop public rail transport.
- **Alstom Transport** brings the expertise it has acquired through the design and construction of over 560 high-speed trains to satisfy the market's ever increasing demands in terms of power, speed, design and interoperability.

¹ TGVTM, Train à Grande Vitesse, is a trademark of the SNCF

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- The TGVTM represents a highly efficient volume-based economic model. Under the TGVTM brand, the **SNCF** transports 100 million passengers a year at 300 km/h, and is constantly developing new services. Service and pricing innovations play a key role as the organization brings France ever closer to an era of carefree travel, and are at the centre of the French Excellence in Very High-Speed Rail programme

Four key areas for moving forward

The French Excellence in Very High-Speed Rail Programm is based on the complementary expertise of its three partners and on four key priorities for serving customers: the on-board experience, safety and performance, the journey, and the environment.

1. Respecting the environment

The high-speed train is the only means of long distance transport that does not rely on fossil fuels, and thus the only one not to produce any CO2 whatsoever.

The environment forms a key part of the French Excellence in Very High-Speed Rail Programm : new lines are integrated into the countryside in a way that respects the local environmental and topographical situation, while the requirements of local people are always taken into account.

As well as work to reduce vibrations and noise pollution both inside and outside of the train sets, the programme is also focused on conserving energy as part of the development of **eco design**:

- the use of composite materials, improvement of traction systems' efficiency and introduction of articulated design has already reduced the mass of high-speed trains and the energy they require **by 10% to 15%**;
- the AGVTM train weighs 100 tons less than competitor models. This results in savings of **650,000 kWh** for a train travelling 500,000 Km a year, representing €50,000 per year for every train;
- the further development of **electrodynamic braking with energy recovery**, already incorporated on the future TGVTM East line, offers a host of new possibilities for reducing energy consumption on lines featuring steep gradients.

2. Guaranteeing high levels of safety

The French Excellence in Very High-Speed Rail Program is centred on improving everyday safety. Participants in the programme are working on reliability and braking, introducing on-board video surveillance and new types of overhead lines, and improving safety in the surrounding area.

To ensure trains maintain a safe gap between each other (greater than the distance required to come to a halt), LGVs^{TM2} (high-speed train lines) feature measures such as the **permanent train localisation system based in Pagny-sur-Moselle for the East-European LGVTM**. The LGVTM is divided into portions of 1,500 metres, each featuring sensors along the track. When they pass, the trains activate these sensors, informing the command post of their presence on a particular stretch.

When travelling on LGVsTM, the speed limit is indicated directly on the driver console. Alongside the traditional French signalling system of micro currents running around the track – and for the first time in France – the East-European LGVTM is also fitted with ERTMS (European Rail Traffic Management System), which is currently being introduced throughout Europe and will allow interoperability of high-speed trains across the continent. ERTMS is based on a system whereby information is transmitted to the train from the ground, using GSM technology. On the East-European LGVTM, all telecommunications pass through a main fibre optic cable that follows the line, while information is transmitted via radio waves broadcast by masts (pylons appear every six kilometres). The system is known by experts as GSM – R (R standing for railway).


The **safety of passengers and staff** is at the heart of the French Excellence in Very High-Speed Rail Program. In order to ensure RFF tracks remain in good condition, participants in the programme have introduced the “**IRIS 320**” TGVTM. The trainset offers a means of constantly surveying the tracks and travels at speeds of up to 320 km/h, recording information on comfort, track quality and safety.

Reliable, powerful braking systems also further improve passenger safety. TGVsTM often use **electric braking** to slow the train in such a gentle way that passengers barely notice it, with an **electropneumatic brake** taking over when necessary. The motor bogies fitted all the way along AGV^{TM3} trainsets should further limit the use of the electropneumatic brake, though increases to the train's performance mean high-energy brake discs have had to be introduced for heavy braking. Designed to dissipate heat exceptionally quickly, AGVTM brake discs will be able to absorb up to 30 megajoules, compared to 24 megajoules for TGVTM systems.

Finally, the TGVTM and future AGVTM share **an articulated structure**, with bogies positioned between the cars. This design brings proven safety benefits, as the

² LGVTM, trade brand for Alstom transport

³ AGVTM, Automotrice Grande Vitesse, is a trademark of Alstom



articulation creates a semi-rigid line throughout the cars, ensuring they always remain on the same path.

3. The on-board experience and new services

The French Excellence in Very High-Speed Rail Program aims to anticipate the needs of passengers and offer them innovative, practical solutions. As part of this, the Programm's three partners are developing new services to improve areas such as high-speed links between the trains and the ground, and to optimise accessibility and the use of space.

To ensure train journeys offer both comfort and relaxation, ALSTOM and the SNCF are working together on:


- trains **interior design**,
- the **optimisation of the use of space**, with harmonious and practical layouts throughout each different area of the train,
- **train design** itself (the distribution of power across the AGV™ improves modularity and increases capacity by 20%),
- **sitting comfort** (in the long term, high-speed trains will feature chairs with multiple, personalised settings, adapting to the passenger's shape and individual preferences),
- **passenger comfort**.

As one of the key differences between individual operators in Europe and around the world will be the level of service offered, the French Excellence in Very High-Speed Rail Programm is also firmly focused on maximising the facilities offered on French trains. A range of services will be introduced across the East-European LGV™, such as Cinétrain booths, dedicated family areas in standard class, and improved telecommunication facilities (broadband connections, satellite antennae, and WiMAX-type technology). TGVs™ will shortly offer high-speed internet access at 320 km/h, while East-European TGVs™ are equipped with two-way antennae on the roof (streamlined, so as to minimize aerodynamic disruption).

4. Travel time

The French Excellence in Very High-Speed Rail Programm will also examine aspects of **city and regional planning** with the aim of **shortening distances** and bringing people together across the country. In addition to improving the regularity and punctuality of trains, the programme will also study ways to increase traffic, while improving interoperability and traffic flow.

As of 15 March 2007, LGVs™ cover a total of 1,800 km in France. This expansion of the high-speed network **has opened up areas across the country** and is **playing a**



major role in the changing geographical and economical makeup of France. By serving over 150 train stations across the country and around 30 stations in Europe, the TGVTM has led to a significant rise in economic exchange.

High-speed rail has also transformed French people's frames of reference in terms of times and locations. By ensuring Lille is no more than 3 hours 10 minutes from Lyon, Marseille is 3 hours from Paris, and Strasbourg is 2 hours 20 minutes from the capital, the TGVTM represents the perfect "teleportation" tool. It transports passengers ever further – with ever shorter journey times – and thus offers huge mobility for work as well as a host of new leisure and tourism possibilities.

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About Réseau Ferré de France

The Réseau Ferré de France (RFF) is a government-owned firm established in 1997. Its 29,000 kilometres of active track constitutes one of Europe's largest rail infrastructures, while it operates the leading network of high-speed lines (LGV™).

A decentralised organization, Réseau Ferré de France, operates at the heart of the rail system and works to develop local, regional, national and international transport links:

- The RFF is in charge of allocating train paths, thus enabling train traffic organization in terms of both space and time;
- To maintain its network (which is delegated to the SNCF) the RFF determines development principles and objectives in line with local transportation requirements;
- The RFF is responsible for developing rail solutions in France, and leads projects (which include mainly regional partners) that combine town and regional planning, budgetary requirements and sustainable development,
- The RFF organizes the use of lines by freight as well as passengers trains. It is responsible for modernising the network by carrying out the rail aspects of government contracts;
- As the general contractor, the RFF is in charge of constructing LGVs™ (high-speed train lines), and is assisted by a range of French and European project managers;
- In the area of national heritage, the RFF's policy involves anticipating rail transport needs while taking into account the city and regional planning projects of public authorities.
- With the French Excellence in Very High-Speed Rail programme, the RFF aims to improve global long-term performance across the network, by applying knowledge gained in high-speed tests concerning electricity supplies, noise, ballast calculations, the durability and resistance of infrastructure, and signalling.
- With the opening of the East-European LGV™, the world's fastest LGV™, the RFF will enter into a new era of high-speed rail transport. Commercial services are due to be launched in June, and the RFF is currently involved in projects to further improve the quality of service and ensure its regularity, and to develop connections between the LGV™ and traditional rail lines.



About Alstom Transport

World leader in very high-speed rail transport and number two in urban transport, Alstom Transport holds an 18% share of the world rail transport market. With sales of 5.1 billion euros and an operating margin of 6.3%, ALSTOM Transport is the most profitable manufacturer in the market.

Its range of products and services includes rolling stock, infrastructure and signalling equipment, in addition to maintenance. With a presence in over 60 countries, Alstom Transport employs 26,000 staff worldwide.

From the first TGV (Very High Speed Train) put into service by the French transporters SNCF in 1978, to the future East European TGV (which will provide service between Paris, Frankfurt, Stuttgart, Luxembourg and Zurich) – not to mention the South Korean TGV, the Eurostar and Thalys – Alstom has established itself as the world leader in tilting trains, high speed trains (over 200 km/h) and very high speed trains (over 300 km/h).

Alstom ranks second in the urban transport market. The company has supplied metros for many cities throughout the world, including Paris, London, New York, Washington, Caracas, Singapore, Shanghai and Istanbul. More than 24 cities in France, Italy, Spain, Ireland, Germany, Australia, the Netherlands, Algeria, Tunisia and Israel have chosen ALSTOM to supply their tramways.

Alstom has also been successful with its CITADIS tramway model. To date, over 870 Citadis have been ordered by 24 cities across the world. The company expects to exceed that 1,000 mark in terms of the number of Citadis sold by the year 2009.



About SNCF

SNCF transports over 900 million passengers each year throughout its network. Everyday, it operates 13,400 trains: high speed trains bearing the TGV, Eurostar and Thalys marque, Transilien commuter trains which serve the Ile-de-France region surrounding Paris and its 10 million inhabitants, Corail TéoZ, Corail Intercités and TER intercity trains covering all of France, as well as SNCF freight trains which carry 300,000 metric tons of merchandise every day while conforming to the strict requirements of the company's sustainable development policy.

SNCF, a leading employer in France with 169,000 staff. The company actively develops world-class skills and competencies in a range of 200 different trades and professions.

SNCF also brings together more than 650 companies under SNCF Participations, providing services in a wide range of transport-related activities: urban services, intermodal information, freight car rentals, combined transport, engineering, exporting of expertise, freight terminal services, etc.

SNCF passenger traffic has grown almost continually over the past decade, gaining market share over air travel. Traffic will be stepped up even further in June 2007 with the opening of the East European TGV. This brand new, 300-kilometer, high-speed line will provide service at 320 km/h, a speed never before achieved on regular service runs. Its trains will feature original designs by Christian Lacroix, with MBD Design and Compin. The line will serve 20 cities in eastern France, with significantly reduced travel times. For example: Paris-Strasbourg in 2 hours 20 minutes, instead of the current 4 hours! And a tremendous network of inter-regional links will be developed, connecting eastern France with Roissy-Charles de Gaulle airport, the cities of Lille, Rennes, Tours, Bordeaux and many other destinations. And beyond the French border, Luxembourg, Frankfurt, Stuttgart, Munich, Basle and Zurich will also be accessible through the new TGV line.