



# **Bombardier Transportation**

## **Very High Speed Train**

*Furio Rossi*

*Gdańsk , September 26th 2013*

**BOMBARDIER**  
the evolution of mobility

# Bombardier Very High Speed “Jesteśmy w Polsce” !!



We are the major  
foreign investor  
in Poland  
Did you know?

Bombardier is the principal foreign investor in the railway market in Poland. Our four sites in Poland, with more than **1,000 employees** located in **Wroclaw**, **Katowice**, **Lodz**, and **Warsaw**, have a strong history of participation in the evolution of one of Europe’s largest and oldest railway systems.



*Bombardier Katowice Site*



*Bombardier Wroclaw Site*



*Carbody shell in Wroclaw*

## Bombardier Transportation in Poland – Highlights:

- 2,300 electric locomotives produced
- 50 complete new generation electric locomotives provided for Italian Railways
- In 2007, first electric multisystem TRAXX locomotive



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## Our ZEFIRO FAMILY

.... “a family for any Country”

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Bombardier is one of the most experienced manufacturers of high speed train sector whether the Quality of our products is main driver and the Customer satisfaction is our mission.

Until now more than 900 trains have been successfully provided worldwide matching the requirements and regulations of any Country.

*...Germany, Italy, France, Norway, Sweden, Spain, Switzerland, U.S.A. and China* are only some where Bombardier was committed to deliver an high speed solution.

# ◁ Bombardier Very High Speed & High Speed Trains



CRH1E

ZEFIRO. Very high experience. Very high speed.

**BOMBARDIER**

## Hochgeschwindigkeitszüge von Bombardier

ICx (Germany)      CRH380D (China)      ETR-1000 (Italy)



ICx (Deutschland)  
36%

CRH1-380 (China)  
100%

ETR-1000 (Italien)  
30%



**TO B**  
Bislang wurden  
Züge und Fahrzeuge  
ausgeliefert

**BOMBARDIER**  
the evolution of mobility



# ZEFIRO FAMILY

## Product range

250 km/h

300 - 360 km/h

380 km/h

### ZEFIRO 250

- Wide gauge car body
- 8-car train
- 16-car train

### V300ZEFIRO\*

- UIC gauge car body
- 8-car train TSI compliant

\* In cooperation with AnsaldoBreda for selected markets.

### ZEFIRO 380

- Wide gauge car body
- 8 car train

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ACELA USA  
ETR500 Italy  
Thalys F/G/E/R/B/NL  
TGV France  
EUROSTAR France  
BM71 Norway  
REGINA Sweden  
X2000 Sweden  
XinShisu China  
CRH1 China\*  
ICE-T / ICE-TD Germany  
ICE 3 Germany  
ICE 1/2 Germany  
ICN Switzerland  
AVE S-130 Spain  
AVE S-102 Spain  
ZEFIRO 250 China\*  
V300ZEFIRO Italy\*\*  
ZEFIRO 380 China\*

\* Manufactured by Bombardier Sifang Power (Qingdao) Transportation Ltd.  
\*\* Manufactured in cooperation with a strategic partner

The ZEFIRO products cover a wide range of VHS solutions for various markets and customers in the world

## Very High Speed concept

### Why 300kph or above?

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There are not to many doubts about why high speed is better. A reason above all is the “time” with the high technology behind the product.

- “High technology means Quality and quality means Safety”

Looking at engineering development a speed up to 360kph, or above, require performances and comfort level pushed to the maximum capacity of the technology.

- *There are significant differences and different concept if compared with lowest speed at 200 or 250kph.*

A must for VHS train is the carbody-shell design, it shall be extended to the limit of height and width which allows a maximum seating capacity, easy access, more free space and easy walking along the vehicle.

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- *6 These points ensures the highest Customer revenue along the*

# ZEFIRO 380

## China 380Kph.... "I'm the fastest of the family"

The *ZEFIRO* train sets new standards with a strong and powerful design



# ZEFIRO PLATFORM

## Main features

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### ZEFIRO 380

In 2009, the Chinese Ministry of Railways ordered 70 *ZEFIRO 380* high-speed trains. These trains will incorporate Bombardier's advanced ECO4 energy saving technologies to create best-in-class energy and operating efficiencies.

- Produced at Bombardier's JV site in Qingdao
- Service speed range up to 380 Km/h
- Energy savings of approx. 20% due to



### ZEFIRO 250 / CRH1

Since 2010, the *ZEFIRO 250* has been transporting overnight travelers in China into new realms of comfort. With the delivery of the *CRH1*, Bombardier was the first manufacturer to supply a fully locally made high speed train in China.

- Produced at BT's JV site in Qingdao
- Service speed range up to 250 km/h
- Outstanding capacity of 670 seats in an 8-car and 1,300 seats in a 16-car





# V300ZEFIRO FRECCIAROSSA 1000 ..... *“I’m sorry for being so luxury”*

Truly a pan-European train equipped with multi-voltage technology



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## V300ZEFIRO FRECCIAROSSA 1000 “the backbone”

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Italian Railways are investing a significant effort on very high speed lines, developing a VHS backbone to be able to connect rapidly the big hubs and increasing the regional redistribution also.

Huge demand of VHS is from passengers and major cities requiring a travel model such as “non stop service”

The strength of the very high speed is time to reach the down town and quality of travelling ..no better solution in a range of 400km – 500km

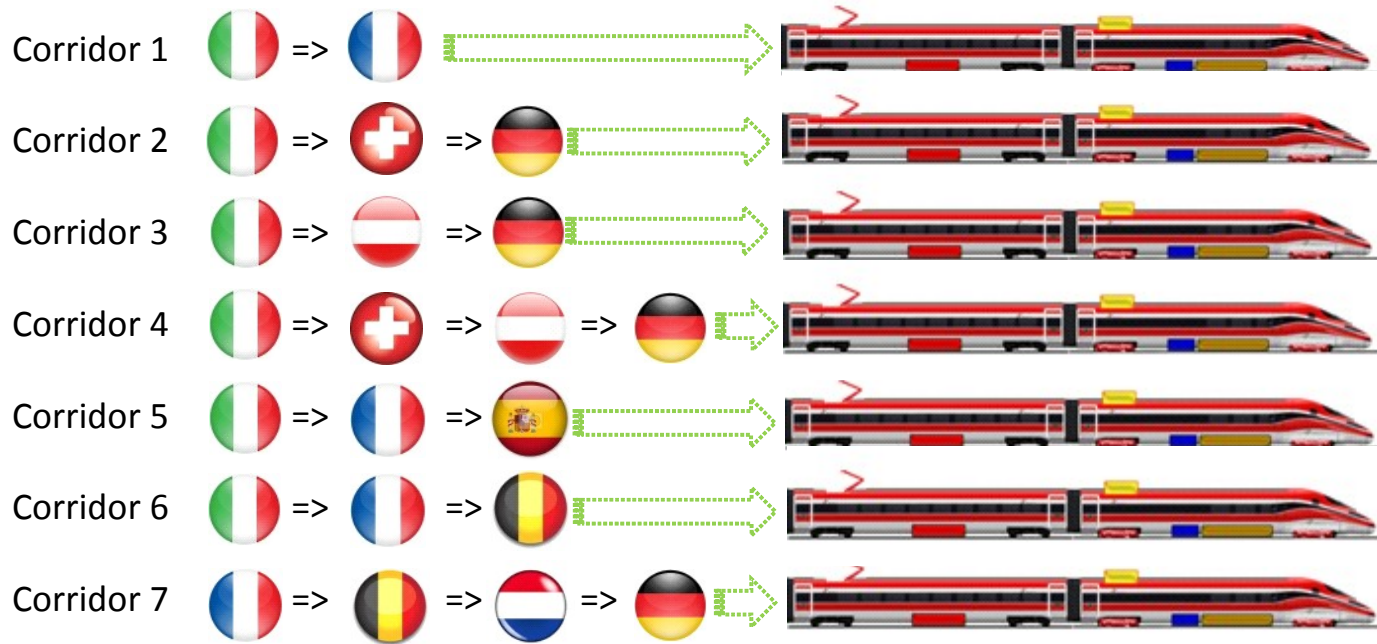
Excellent comfort, high technology, less stress, family feeling, always connected and travelling time.. are some samples how Italy decided to answer to the European passenger

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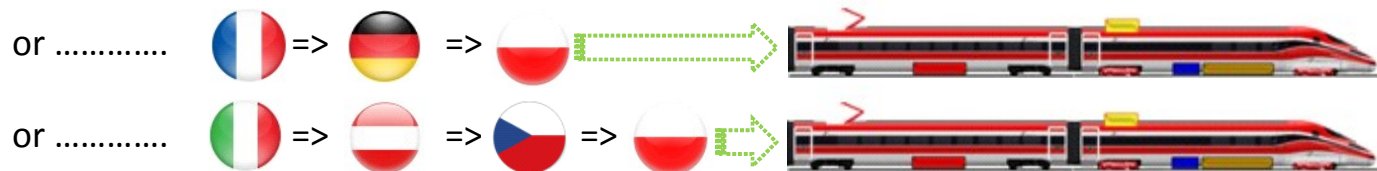
# FRECCIAROSSA 1000

## Interoperability across Europe

V300Zefiro is a real cross border VHS , its concept is studied to install a multi countries signalling equipment and fit the high speed corridors at 25kV and 15kV

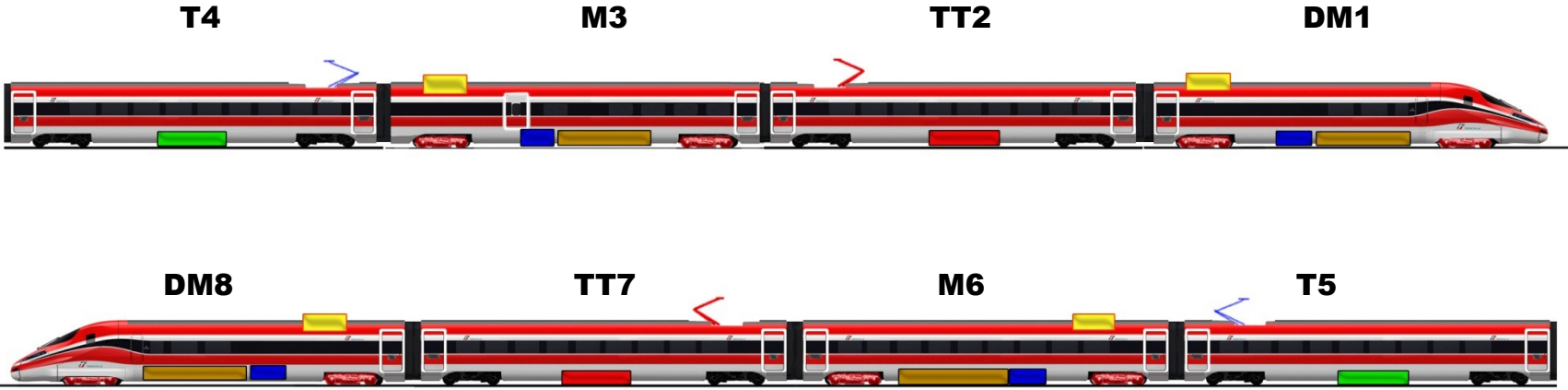







*But not only.....*



# FRECCIAROSSA 1000

## Lay - out



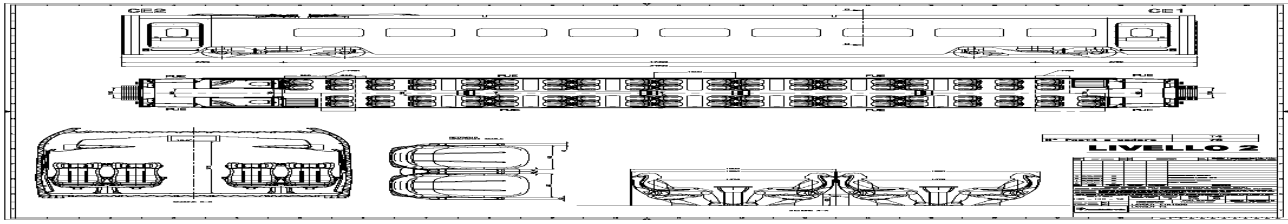
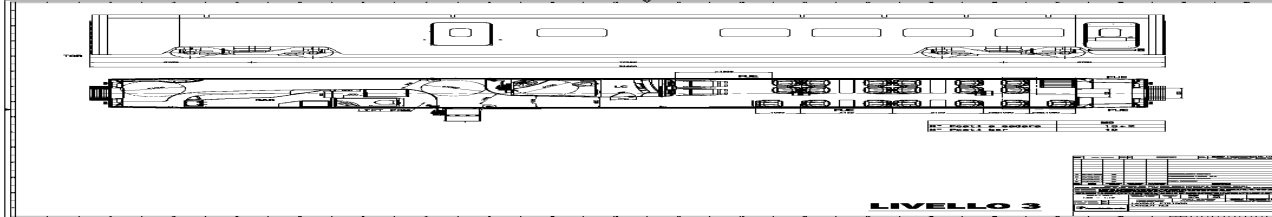
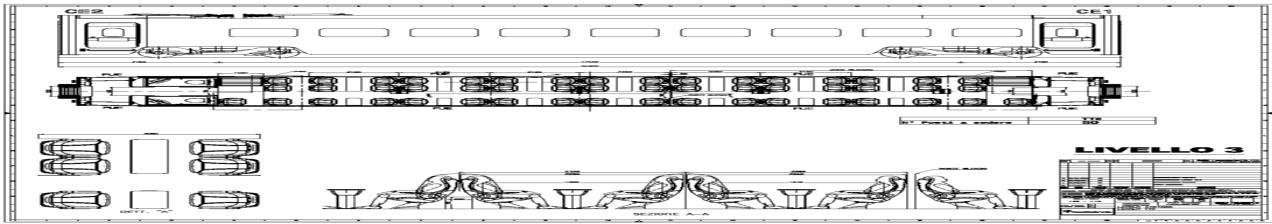
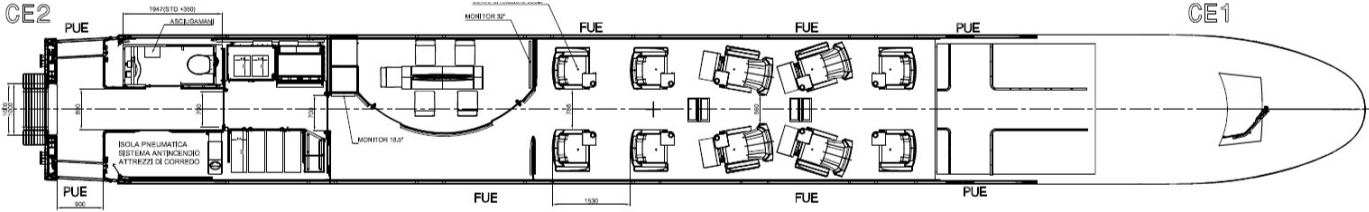
-  Transformer
-  Traction converter
-  Brake resistors
-  Batteries / Battery charger
-  AUX converters

-  **Motor bogie**
-  **Trailer bogie**
-  Pantograph DC
-  Pantograph AC



# FRECCIAROSSA 1000

## Lay - out



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# FRECCIAROSSA 1000

## Main Technical data (Italian configuration)

Parameter	Values
Max speed (25 kV)	400 km/h
Service speed	360 km/h
N° of cars / train length	Not articulated 8-car train set / 202,000 mm
Capacity range	(up to 600) 455 seats + 2 PRM/HK places per train
Propulsion	9.8 MW Single axle drive with 50% motorized axles
Voltage	25 kV AC & 3 kV DC (optional: 15 kV AC; 1.5 kV DC)
Starting acceleration	> 0.7 m/s <sup>2</sup>
Multiple operation	yes
Carbody	Aluminium car body, UIC profile 505.1, 13 + 1 PRM doors per side
Car length	End car: 26,300 mm / trailer car: 24,900 mm
Car height / width / floor level	4,080 mm / 2,924 mm / 1,240 mm
Service train weight / axle load	446 t / 17 t
TSI compliance	Compliant with all new international and national standards
Bogie	Bombardier FLEXX speed with 2.85 m wheelbase
PIS	Advanced passenger Information System
FDE System	Passive and Active fire fighting (auto extinguish system in passengers saloon),

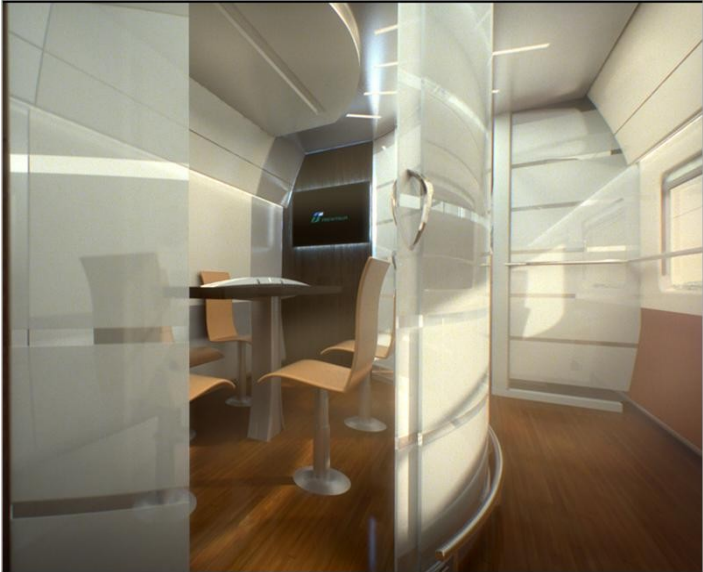
# FRECCIAROSSA 1000

## Executive class

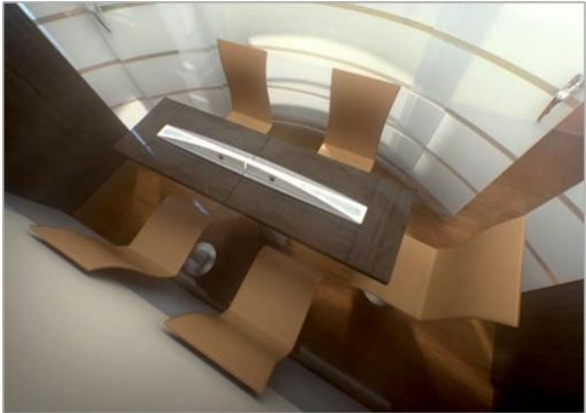
*Executive compartment with rotating seats...*



*Meeting room with monitor and facilities*



*A new standard of comfort...*

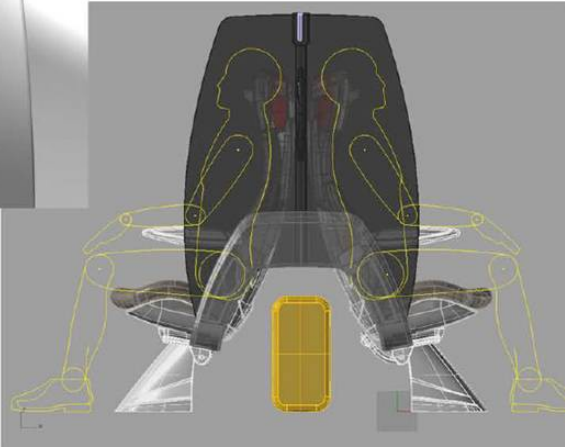
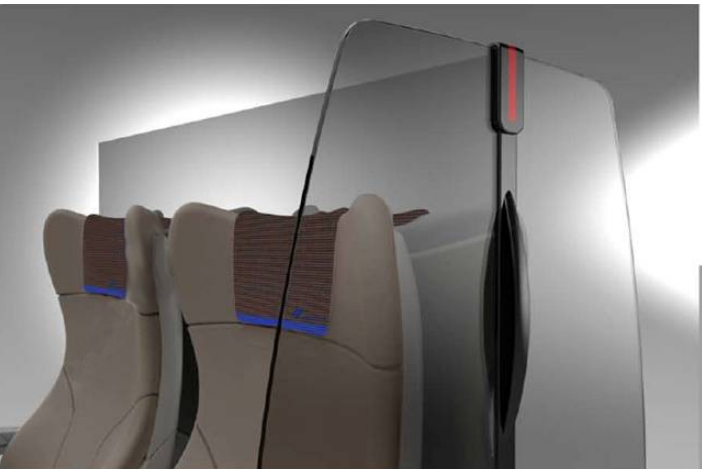


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# FRECCIAROSSA 1000

## Business class

*Pure leather  
Aircraft concept with push button in the armrest*



*Additional luggage storage between back to back seats*

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# FRECCIAROSSA 1000

## Bistro area

*Equipped bistro area with stools and refrigerated trolleys*



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# FRECCIAROSSA 1000

## Premium and Standard classes

*Premium  
Comfort excellence*



*Standard  
High technology for  
anyone*

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# V300ZEFIRO

## Turkey “a new generation”

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# V300ZEFIRO Turkey Interiors

*Business area*



*First class area*

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# V300ZEFIRO Turkey Interiors

*Second class*



*Vestibules and Toilet*

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# V300ZEFIRO Turkey Interiors

*Restaurant & snack bar area*



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# Our Vision ...next stop Poland



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## Our ZEFIRO FAMILY .... “a family for any Country”

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As you have seen Bombardier products can be easily adapted to any countries.

"Gdańsk" here we are!! with our family we can develop and customise a Very High Speed solution also for Poland.

We are Bombardier and Your satisfaction will be our commitment.



**BOMBARDIER**

the evolution of mobility



Q&A