

Barajas Terminal 4 Airport & rail link, Spain

Barajas Airport Terminal 4 (T4) doubled passenger capacity at **Spain's largest international airport**, to 70 million passengers annually, with aircraft taking off and landing every 30 seconds. **The rail link to the airport was a key enabler of this expansion**, with the future capacity to be a fully operational high-speed line allowing passengers to link directly onto the national railway networks for onward connections through Chamartin and Atocha stations.



AENA / Spain
Ministry of
Development



£800m
(multiple
contracts)



 1997 – 2006
 2007 – 2012



Design
& Build

Barajas Terminal 4 (T4) is one of the world's largest airport terminals at 470,000m², alongside a satellite building, T4S, at 290,000m². The buildings are approximately 2.5km apart and are connected by a rapid transit system. We managed delivery of the new terminal featuring metro, rail station and landside transit linking to the existing terminals T1, T2 and T3. The new T4 comprises a sequence of parallel spaces separated by a linear block allowing daylight to penetrate deep into the interior with glass panes instead of walls and numerous domes in the roof, which allow natural light to pass through.

The scope of the rail link included all the civil works and railway systems required to connect the existing Chamartin station with the new T4. We redoubled the existing 4.1km section of ballasted track and constructed 4.7km of new tunnel and all associated railway systems. In collaboration with the Spanish Ministry of Development, we amended the design to incorporate a third-rail, dual gauge track system along the route in order to allow high-speed trains to access the airport. The project also involved works at a control room, three stations and the design of a complex signalling system.



ADDED VALUE

- Environmental measures, aimed at significantly reducing energy consumption, included a stratified cooling system, displacement ventilation supply to the piers, low level air supply to all other passenger areas, extensive shading to the facades and roof lights
- Awarded Best Civil Work by the Institution of Civil Engineers' Spanish counterpart, the Institution of Spanish Civil Engineers (CICCP). The project was selected by the CICCP Professional Review Panel of experts due to:
 - Connection of the High Speed Rail and the Conventional Network with the airport
 - First in Europe to implement slab track with 3 rail system
 - Facilitate the urban development of the city
- Redesigned one of the tracks in the tunnel as a three-rail, dual-gauge system, allowing local trains (Iberian gauge) and high speed trains (international gauge) to run on the same line. This was the first time a three-rail, dual-gauge system had been used in Spain.



470,000m²

terminal surface footprint

38

new stands

35 million

passenger annual design capacity



8.8km rail systems

covering track, OLE, signalling and communications

3 stations

constructed (Fuente de la Mora and Valdebebas) and refurbished (Barajas) and a control room

4.7km new tunnel

using cut and cover and timber heading tunnelling methods