

## M6 Double deck trains for SNCB

When Bombardier Transportation were asked to tender for the design of the M6 double deck train to operate around Brussels, they had no hesitation in seeking the design services of DCA Design International, particularly as DCA had previously worked successfully with Bombardier on the Le Shuttle project

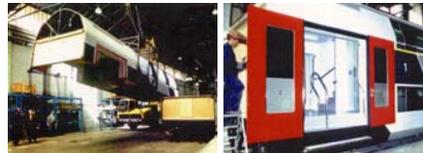
Bombardier's previous M5 double deck train for this service were engineering led and received very negative public reaction. As a result the M6 project was to be design led, with the resulting trains designed to meet an eclectic range of user needs and aspirations and to thereby transform the reputation of the service.



Design research



Concept and CAD visualisation

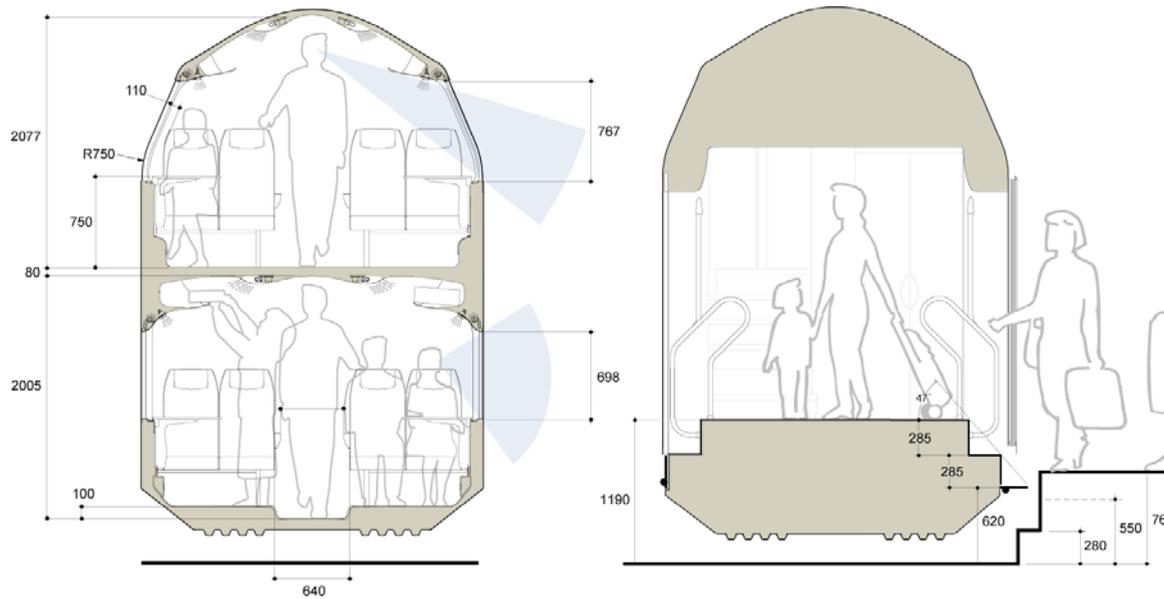


Mock-up and design validation



Production implementation

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Design research to investigate the existing problems and user issues formed a pivotal part of the design process. The key discussion points were:

**Access:** easy access from three different platform heights and accessibility for wheelchair users.

**Seating preference:** making both decks equally appealing and providing a predominately face to face seating layout.

**Luggage storage:** increasing the amount of accessible storage space.

**Environmental conditions:** better control of temperature and lighting and a general feeling of space.

**Communication:** providing real time feedback of train information to keep passengers up to date.

By using a combination of video footage, user questionnaires and mock-up trials, all these issues were identified and design solutions provided for the trains.



Images recorded during user trials

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A radical design approach was required by Bombardier if they were to meet the business case and user requirements.

DCA conceived a unique and novel solution to the seating layout. The seats were arranged in a staggered formation that provided a wider central aisle without pinch points between seat backs. This not only improved passenger flow, it also gave the interior an enhanced feeling of open space.

A second major benefit was that passengers could store their luggage at floor level between the seats directly opposite their own seat position making it highly visible and easily accessible.

In order that each seat bay should align directly with a window, the Bombardier engineering team adopted our proposal of a unique asymmetrical carriage structure. This resulted in a staggered window arrangement to match the seat layout giving unprecedented natural illumination and a very light and spacious interior feel.

Access into the saloons on both decks, via the end staircases and vestibules, was completely re-designed to incorporate a curved staircase to aid passenger egress and sliding glass doors to maintain the optimum internal ambient conditions via a sealed air conditioning system.



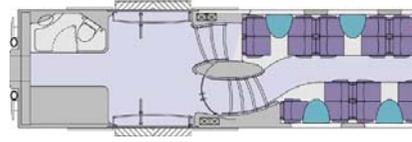
All images CAD generated



Vestibules with glass doorways and air conditioned saloons



Contemporary, modern colour scheme



Staggered seat layout with curved access staircases

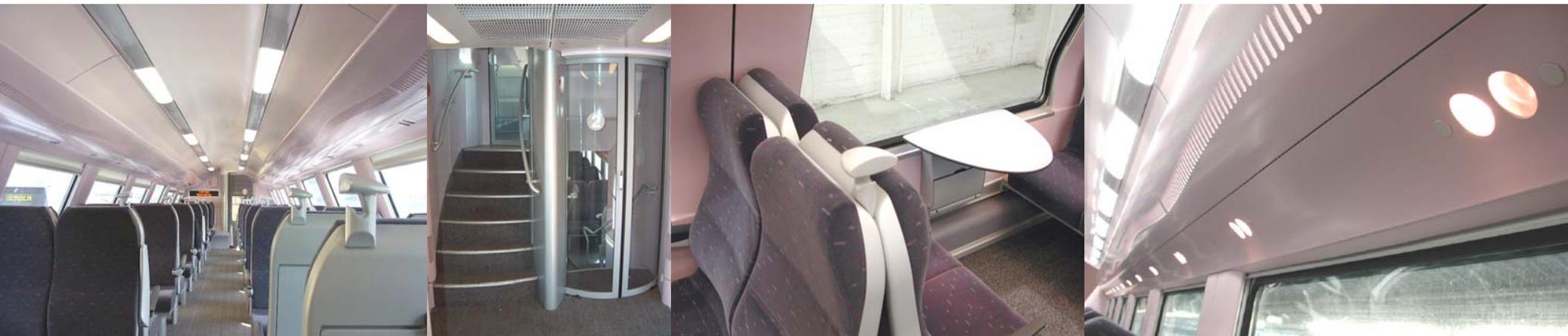
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The importance of optimising the design in every area was reflected in the decision to build a full size mock-up to demonstrate the concept to the selection committee at the end of the first stage of the tender process. This commitment to the design process was a key factor in winning over users and decisionmakers.

The mock-up was used for user trials to assess accessibility and RVAR issues and determine the best way to provide wheelchair facilities and bike storage. Feedback on subjective issues like colour, feel, sense of space was recorded and used to influence the final design output. The process of presenting the design to a wide range of users and stake holders and listening to their comments was invaluable in our efforts to meet the needs of everyone affected by the project

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As the M6 entered manufacture, DCA provided a design liaison role with the key interior suppliers, maintaining the visual integrity of the final production components, ensuring that the trains met the original design intent and provided a valuable public service that people would enjoy using.

The design has been enthusiastically received and the M6 double deck trains are now into their 3<sup>rd</sup> production tranche being manufactured in Belgium and France.