A railway station project of the 21st century

The new main railway station designed by ingenhoven architects forms the centerpiece of the Stuttgart 21 transport and urban design project. The new light-flooded underground through station is to replace the existing Stuttgart terminus station.

In 1997, the comprehensive concept by ingenhoven architects won first prize in the international architectural competition for the project. The state-of-the-art railway station, which is currently under construction, will provide Stuttgart with a better connection to the European rail network. In addition, by moving the new tracks underground, space is being created for a new city center. In this way, the new main railway station will become the interface between the old and new heart of the city and the departure point towards further urban development. Construction work started on February 2nd, 2010.

The extensive Stuttgart 21 (S21) project comprises urban design and transport planning aspects. It is a joint-venture project set up in 2009 between the Federal State, the State of Baden-Württemberg, the State capital Stuttgart, Verband Region Stuttgart, Flughafen Stuttgart GmbH, and Deutsche Bahn, which also acts as client. The plans of ingenhoven architects for the main station include the construction of the new station building and the conversion of the existing
In addition, the Düsseldorf firm is responsible for the design of the landscaping around the new station, the relocation of the "Staatsgalerie" SSB station, the construction of the new technology building and the utility building.

Whereas the Stuttgart railway hub is being rearranged, with tracks being moved underground, the existing station building, which was designed by Paul Bonatz and Friedrich Eugen Scholer in 1922 and is listed as a historic monument, will be retained as an entrance building. The jury’s verdict in 1997 stated: "A major urban design landmark will be placed in the city layout, without any monumentality and without—in any way—competing with the building by Bonatz."

In addition, the Schlossgarten—Stuttgart’s green heart and most important public park—will be extended above the new railway station in the course of the abolition of the aboveground track field and the Cannstatter road.

Stuttgart, in the south-west of Germany, lies in a topographic basin, which presents a special challenge regarding the connection of the existing terminus station to the growing European high-speed rail network. In addition, the ground-level tracks have become a major impediment to urban development. In the heyday of railway stations in the 19th century, these were usually constructed on the edges of the historic urban centers. Stuttgart is a typical example of how, in subsequent years, the city grew around the railway station and how, in the topographical situation, urban space became increasingly scarce. This is the main reason why the relocation of the tracks underground gives rise to a special opportunity. At a right-angle to the existing tracks, a new high-speed line will be created in an underground tunnel up to twelve meters below the existing rail network; this will free up the space of the former ground-level tracks for the new Rosenstein district.

In spite of its position underground, the station will appeal with its brightness and visual openness, which is esthetically pleasing and enhances safety. During the day, the station hall will be flooded with natural daylight via large "light eyes". At the same time, these light eyes communicate the presence of the underground railway station to passers-by at ground level. The 16 tracks and 17 platforms of the current terminus station will be reduced to eight tracks and four platforms, thus increasing efficiency and reducing travel time.

The new station consists of a white concrete structure with minimum construction depth. The thickness of the optimized
shell structure was reduced to almost one hundredth of the span, which results in significantly less material being used. The efficiency of the construction work was further increased by choosing re-usable concrete formwork and modular prefabricated components. By developing a special concrete material, it was possible to leave the fair-faced concrete surfaces exposed, without fire protection cladding, so that the architectural structure is fully open to view.

The new Stuttgart main railway station will be a “zero-energy railway station”. By making intelligent use of natural energies and resources it is possible to avoid CO2 emissions. The building does not require any energy input for heating, cooling, or mechanical ventilation; instead, heat is used from the groundwater and the air flow in the tunnels. In addition, it is planned that the station building will generate its own electricity from PV modules installed on the roof.

The integration of the new railway station, with the new public spaces and park areas, in the urban fabric gives a new quality to Stuttgart’s city center. The unique biomorphic design of the station hall results in a timelessly elegant and esthetically pleasing loadbearing structure. The new centerpiece of Stuttgart 21 is a fitting expression of the new era of railway transport.
Awards, Nominations

2016
Iconic Awards, Architecture – Public, Winner

2007
International Architecture Award 2007, Chicago Athenaeum Museum of Architecture and Design

2006
Global Holcim Award Gold for Sustainable Construction 2006

2005
MIPIM Architectural Review Future Project Award 2005, Best of Show and Big Urban Projects
Regional Holcim Award Silver for Sustainable Construction 2005

2004
BE Bentley Empowered Award 2004, nominated

Team

Client
Deutsche Bahn AG, Berlin represented by DB ProjektBau GmbH, Stuttgart

Master planner
ingenhoven architects, Düsseldorf

Architect
ingenhoven architects, Düsseldorf

Team ingenhoven architects

Scientific support for form-finding, shape, construction, and structure
Frei Otto, Leonberg

Project management
DB Projekt Stuttgart Ulm GmbH, Stuttgart

Structural design
Werner Sobek, Stuttgart / Engineering consortium
Tragwerksplanung S21 Hauptbahnhof GbR, Leonhardt, Andrä and Partners, Stuttgart with Happold Engineering, Berlin

Facade design
Werner Sobek, Stuttgart
Services installations

Building physics
DS-Plan, Stuttgart

Fire protection
BPK Brandschutz Planung Klingsch, Düsseldorf

Landscape design
ingenhoven architects, Düsseldorf / WKM Weber Klein Maas landscape architects, Meerbusch

Transport engineering
Durth Roos Consulting, Darmstadt

Lighting design, natural and artificial light
Tropp Lighting Design, Weilheim

Air flow analysis
IFI Institute for Industrial Aerodynamics, Aachen

Construction supervision
DB Projekt Stuttgart Ulm GmbH, Stuttgart