DESIGNING FIT-FOR-PURPOSE INFRASTRUCTURE

BEGINS WITH OPENBUILDINGS™ STATION DESIGNER AND LEGION® SIMULATOR

Image courtesy of Voyants Solution Private Limited
Welcome to the OpenBuildings Station Designer and Legion Simulator Product Tour Guide

This e-book provides a look at how OpenBuildings Station Designer and its companion application Legion Simulator support the evolving BIM requirements that help you connect the data, people, workflows, and ideas necessary to support today's complex building projects.

It also includes links to videos and success stories that illustrate how these applications support highly complex building geometry and designs of virtually any scale, as well as simulate multiple what-if scenarios related to pedestrian movement in and around the infrastructure.

If you have questions or need more information, please visit OpenBuildings Station Designer, Legion Simulator, or call our OpenBuildings specialist at 1 800 236 8539.
SOLVE YOUR **CRITICAL BUSINESS ISSUES**

**Global population growth and urbanization are projected to add about 2.5 billion people to cities by 2050.***

With cities becoming increasingly populous, there has been a public demand to increase capacity on rail and metro networks. In fact, rail and metro stations have become destinations in their own right, just like airports. They are not only expected to provide the core benefit of faster and efficient travel but also become economic centers that generate indirect revenue and employment opportunities. These stations are becoming more sophisticated and complex. But, regardless of the size, form, or complexity of the infrastructure, the core demands remain the same. Rail and metro stations must be sustainable and high performing.

With these demands come the challenges of reducing the cost and time of design and construction, improving collaboration across multiple teams, ensuring safety in design, complying with infrastructure regulations, and maximizing the return on the owner’s investment. As these challenges increase, it becomes imperative for AEC firms to incorporate BIM methodologies across their building design teams.

*Source: United Nations – Department of Economic and Social Affairs*
GOING DIGITAL WITH BENTLEY

That's why we built OpenBuildings Station Designer, an all-in-one BIM platform that enables professionals from multiple disciplines to collaborate in real-time. It reduces communication redundancy by allowing coordination and assembly of data sets and physical objects on the common topography and geographical coordinates, including architectural and structural elements, electrical, mechanical, and plumbing systems, and inter-station infrastructure such as track and tunnel.

OpenBuildings Station Designer is the only design software that fully integrates with passenger simulation via its companion application LEGION Simulator. It enables people movement simulation to analyze building performance for design and lifecycle operational improvements. The software also replicates space and activities in models that support people behavior visualization.

Are you ready to surpass client expectations by delivering error-free and safer designs on time and build a stellar reputation in the market by developing innovative and optimized structures that are distinctive, sustainable, and future-ready?

Explore OpenBuildings Station Designer and LEGION Simulator to learn how.

LEARN MORE BY WATCHING THE VIDEOS BELOW

- STATION DESIGN AND OPERATIONAL PERFORMANCE
- OPENBUILDINGS STATION DESIGNER - THE WORKFLOW
- LEGION PEDESTRIAN SIMULATION – AN INTRODUCTION
- BUILDING AND INFRASTRUCTURE PROJECTS USING OPENBUILDINGS
WITH **OPENBUILDINGS STATION DESIGNER**
AND **LEGION SIMULATOR**, YOU CAN:

- **Control** project costs and minimize financial risks.
- **Meet** project timelines and enhance client satisfaction.
- **Ensure** optimized, safe, and error-free project delivery.
- **Enhance** design and operational performance.
Building design firms like yours frequently have a multidiscipline team working across different locations on a single project. To avoid rework, reduce errors, and mitigate risks before they impact cost, schedule, and safety, you need enhanced project visibility, improved communication across teams, and the capability to integrate data of any size, type, or format. Here’s how OpenBuildings Station Designer can help:

- OpenBuildings Station Designer provides a federated data model that enables distributed teams of any size to work on models simultaneously, regardless of their geographic locations, thereby enabling an integrated project delivery.

- The application delivers DGN file format and supports other third-party products, as well as multiple file formats like IFC, DWG/DWF, gbXML, SKP (Sketch-up), and Rhino, enabling seamless data aggregation from multiple sources.

- OpenBuildings Station Designer is a one-stop solution that eliminates the need for supercomputers, multiple software, hardware accelerators, and complex manual document coordination procedures.

LEARN MORE BELOW
MEET PROJECT TIMELINES AND **ENHANCE CLIENT SATISFACTION**

To navigate their way through today’s competitive building design landscape, design firms must satisfy the client and end-user needs and expectations. Here’s how **OpenBuildings Station Designer** can help you meet project timelines, build trust, and ensure customer loyalty that translates into client retention and business continuity:

- OpenBuildings Station Designer drives collaboration by efficiently integrating architectural, mechanical, structural, and electrical design disciplines and practices so users can reduce errors.

- OpenBuildings Station Designer’s generative design modeling capabilities help to streamline workflows and accelerate iterative modeling to accommodate change requests faster and expedite the delivery of the best design at the highest quality for new buildings or retrofits.

- OpenBuildings Station Designer and LEGION Simulator enables users to re-imagine the design by simulating different near real-life variations of all types of activities. Users can also produce lifelike visualizations and analyze models quickly, thereby enabling them to visualize results at an early stage.

**REAL-WORLD SUCCESS**

- **VOYANTS SOLUTIONS ACHIEVES 500% ROI ON ICONIC STATION DESIGN IN INDIA**
- **ANIL VERMA CREATES DIGITAL 3D MODELS OF UNDERGROUND STATION’S ANGLES**
ENSURE OPTIMIZED, SAFE, AND ERROR-FREE PROJECT DELIVERY

Building design firms are only as good as their last mistake. So is their reputation. We understand that you are under tremendous pressure to deliver optimized and error-free designs. Let us help you tackle the road ahead with **OpenBuildings Station Designer** and **LEGION Simulator**. Here’s how they can help safeguard reputations and goodwill in the market:

- **OpenBuildings Station Designer**’s generative design modeling capabilities enable users to model rail and metro stations with total freedom and flexibility, from simple to highly complex geometry and designs. These capabilities reduce rework with models that can be changed without manual reconstruction and help to tackle complex design challenges related to internal and external design constraints or space planning.

- **LEGION Simulator** accounts for individual decision-making, crowd formation, and patterns of movement behavior, enabling users to test multiple what-if scenarios and ensure fit-for-purpose space utilization and activity distribution.

- **LEGION Simulator**’s wayfinding visualization, crowd management, and evacuation planning features help users test and improve different emergency and evacuation scenarios, and ensure compliance with infrastructure safety regulations.

REAL-WORLD SUCCESS 🔄

PIPETECH ENGINEERING IMPLEMENTS 3D STRATEGY FOR LONDON BRIDGE STATION
ENHANCE **DESIGN AND OPERATIONAL PERFORMANCE**

Strong competition in the building design services marketplace is here to stay, and users must expand their creative horizons to stand out. Here’s how **OpenBuildings Station Designer** and **LEGION** can boost creativity by providing an unrestricted design environment, helping to build market differentiators to secure more complex and innovative projects.

- With OpenBuildings Station Designer and LEGION Simulator, users can easily bring design and operational performance scenarios to life at early design stages with various visual maps, graphs, and 2D/3D animations that represent accurate simulation results and consistently communicate the design intent.

- OpenBuildings Station Designer’s structural and energy simulation models enable the valuation of building system performances with comprehensive energy and structural analysis. The results help enhance infrastructure safety, optimize energy costs, and reduce environmental impact.

- The output of these simulations can be easily analyzed, shared, compared, and referenced to avoid rework by exploring various options for iterative refinement. The best design options can then be selected at earlier design stages, thus impacting capital and operational costs associated with the project.

**TECH TALK**

**TECH TALK ON LEGION SIMULATOR WITH EDUARDO LAZZAROTTO**

**LEGION SIMULATOR PRODUCT DATA SHEET**
Building HS2: True-scale Rail Design and Construction

High Speed Two

London, Birmingham, Manchester, and Leeds, United Kingdom

High Speed Two is Britain’s first new intercity railway north of London in 100 years. The GBP 55.7 billion line will connect London, Birmingham, Manchester, and Leeds by 2033. The HS2 design, from track alignment to stations, needed to be true-to-scale and required that no further corrections occur during the construction phase.

The major advantages of this innovative approach were initially offset by technological incompatibility, resulting in massive data conversion and multiple sources of truth. Working with Bentley, HS2 added continuous true-to-scale projection as a core component of Bentley solutions for the first time. This practice enables spatial scanning in ProjectWise, and minimizes mass data conversion and conversion errors, among other benefits. The vastly more efficient data management supports rail design best practices. Project Playbook: AssetWise®, ContextCapture, gINT®, MicroStation®, OpenBuildings, OpenCities™ Map, OpenRail™ Designer, ProjectWise®
Waterloo Station and South West Upgrade

Network Rail

London, United Kingdom

Network Rail invested GBP 800 million to improve and increase the capacity of London Waterloo Station. At its busiest peak, the station serves 125,000 passengers, equivalent to over 100 million trips annually. To ensure that the renovation efficiently accommodates passenger flow, the station capacity team was involved from conceptual stages throughout the design process. Given the crowd size and complexity of passenger movements, the organization needed to analyze foot traffic of the railway station.

LEGION helped model the station, simulate traffic flow, and assess passenger movements and their interaction with the infrastructure. The modeling outputs were the key link between project design and network operations, enabling the teams to visualize decision implications. LEGION helped formulate and customize the design to best suit the specific passenger movements, reducing changes during construction. The application accelerated concepioneering, enabling numerous engineering configurations to be considered to achieve an optimal design resilient to future changes. Project Playbook: LEGION
Pedestrian Simulation Consultation of Beijing Fengtai Railway Hub
China Architecture Design and Research Group
Beijing, China

Fengtai Junction Station is set to become one of the most important transportation hubs in Beijing. As part of the CNY 7.5 billion railway initiative, pedestrian simulation research optimized design and construction to handle the concentrated passenger flow and ensure a safe and effective traveler environment. Given the project’s scale and complexity, the team required comprehensive simulation and modeling technology to assess the station design and perform accurate quantitative analysis on the passenger flow service.

LEGION helped build an objective pedestrian and simulation model covering the entire junction and different passenger flow conditions. The model facilitated scheme comparisons and provided a reference platform for design and construction, predicting the future operation of the junction. Bentley’s model builder and pedestrian simulation software improved coordination efficiencies among project team members and simplified design workflows. The software optimized the spatial layout of the facilities and rationally matched it with passenger flow, avoiding costly construction inefficiencies. **Project Playbook: LEGION**
REAL-WORLD PROJECT SUMMARIES

Passenger Flow Study at 22 CPTM Train Stations
Companhia Paulista de Trens Metropolitanos (CPTM)
Sao Paulo, Brazil

The Companhia Paulista de Trens Metropolitanos, a Sao Paulo state metropolitan train company, operates seven rail lines that services 23 municipalities. The network features 94 stations and moves an average of 3 million passengers each business day. With network passenger demand increasing, CPTM initiated improvement and modernization works. The team wanted to effectively analyze passenger flow and facilitate renovation of existing stations, using a pedestrian simulation software to anticipate how commuters might move around the stations.

LEGION was used to model and assess passenger movement at 22 stations. The application provided a visual representation of anticipated passenger behavior and identified congested embarkation and disembarkation issues. The simulated pedestrian data precipitated development of a new design that minimizes saturation in the platform area, avoiding unnecessary rework and expenses, while optimizing existing asset use. LEGION accelerated conceptioneering and streamlined workflows to leverage the digital DNA from the models. Project Playbook: LEGION
OPENBUILDINGS STATION DESIGNER
AND LEGION SIMULATOR

AEC firms around the world are employing OpenBuildings Station Designer and LEGION Simulator to design and deliver world-class infrastructure of all sizes and shapes, ranging from the conventional to some of the most inspiring rail and metro stations of our time. These comprehensive applications are empowering architects, engineers, and contractors to add real-world digital context to solve design, construction, and operation challenges more quickly, accurately, and cost effectively across all phases of both new station buildings and renovation projects.

Get started with OpenBuildings Station Designer and LEGION Simulator today.