MicroStation

An Unrivaled Information Modeling Environment

How Do You Choose the Right Information Modeling Software?

Most projects today are designed and documented using computer-aided design (CAD) software. But with shrinking budgets, compressed delivery schedules, and ever-increasing project scales and complexity, many organizations are turning to information modeling in search of efficiencies in design, delivery, and operations. Information modeling goes beyond simple 2D or 3D geometric representations of a design by including the opportunity to:

- Capture and incorporate all design-related information that should be considered

- Make more informed and, thus, better high-impact decisions much earlier in the design process with better, more complete conceptual designs

- Eliminate errors and omissions in the documentation process by having fully synchronized documentation from the model

- Explore and analyze many options to maximize the performance of the asset in the real world

- Reuse this information to improve construction and operations of the asset

However, unlike most CAD software, information modeling software is typically only useful for a single discipline, introducing the need for many software products to deliver an entire project. As a result, maintaining consistency when exchanging design information, analyzing and evaluating it, creating designs, and producing deliverables can take an enormous amount of manual effort. Ask yourself:

- How much does inadequate interoperability cost you in additional manual re-entry, data loss, and error-prone translations?

- Can your project team and project stakeholders make the best design, construction, and operational decisions without ready access to all of the available relevant information?

- How much time and money is lost due to errors and changes and a resulting lack of confidence in project documentation?

- Could you design and build better infrastructure if you were able to accurately predict its real-world performance in advance?

MicroStation: An Unrivaled Information Modeling Environment

MicroStation is an unrivaled information modeling environment developed explicitly for the demanding requirements of architectural, engineering, construction, operations (AECO), and geospatial professionals. It is ideally suited for all infrastructure types, and can be used either as a software application or as a technology platform for a wide range of discipline-specific applications from Bentley and others.

Used as a software application, MicroStation provides immersive interaction with 3D models and 2D designs to produce trusted deliverables such as precise drawings, lifelike renderings, and compelling animations, and its robust data and analysis capabilities enable performance simulation of designs. Moreover, its ability to integrate a broad spectrum of engineering geometry and data from an unmatched range of CAD software and engineering formats ensures that users can work seamlessly with the entire project team. For example, MicroStation enables the incorporation of an unmatched range of point-cloud data of any scale to provide context for designs and accelerate the design process.

Used as a technology platform for discipline-specific applications from Bentley and other software vendors, MicroStation offers robust subsystems for consistent integration of geometry and data, and provides a common user experience across a comprehensive portfolio of design, engineering, and simulation applications. It ensures each application leverages these advantages, enabling multidisciplinary teams to benefit from an interoperable software portfolio.
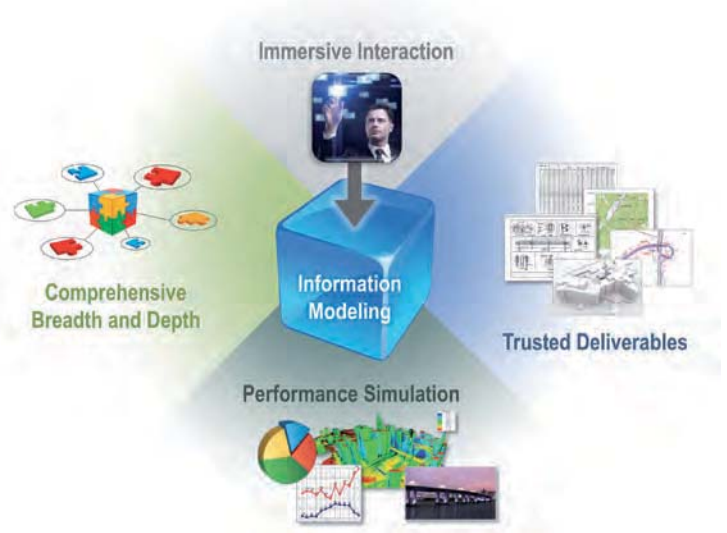
The Global Standard

Since 1984, millions of users have relied on MicroStation to design, model, visualize, document, map, and sustain countless infrastructure projects around the globe. As one of the world's leading design products, used in 143 countries and available in 13 languages, it is the information modeling environment of choice for:

- 47 of the Top 50 *ENR* Design Firms

- 299 of the *Bentley Infrastructure 500* Top Owners, the largest owner-operators of infrastructure assets around the world

- 47 of the U.S. state departments of transportation

Interoperability and Federation Lets You Leverage All Information

MicroStation provides a highly interoperable environment that ensures information from diverse sources is integrated and accessible on demand by your team, empowering the incorporation of any design data, regardless of format. For example, Bentley's interoperability agreement with Autodesk ensures that RealDWG libraries are embedded in MicroStation, allowing users to consume, edit and deliver authentic DWG files with the exact same fidelity as Autodesk's own products. In turn, this gives MicroStation users the flexibility to confidently exchange data with any Bentley or Autodesk user.

Moreover, because it enables teams to work on information models that are federated – rather than compromised within a single database – MicroStation handles even the largest and most demanding projects by teams on the same site or distributed around the world. Federation allows design information to be developed and stored by each participant locally, in an environment that loosely couples it with related designs being worked on by others, keeping them connected and enabling them to be aggregated on demand. In short, MicroStation's comprehensive breadth and depth enables you to leverage all of your available information regardless of format, scale, complexity, or geography.
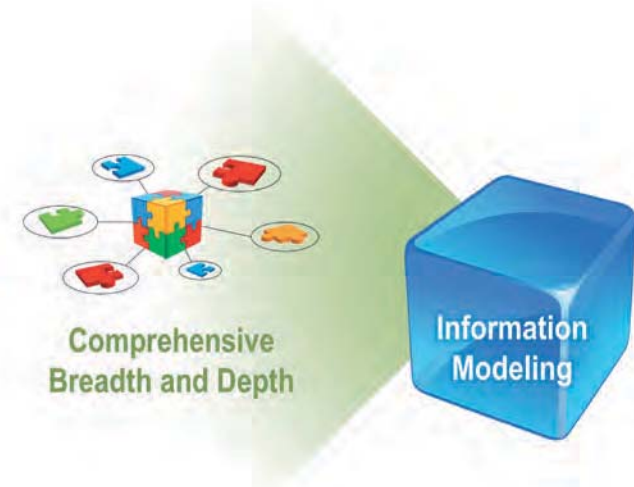
Key Features

Extensive Format Interoperability – Precise incorporation of existing data from an extensive range of AECO and geospatial formats including DGN, RealDWGTM, DXF, PDF, point clouds, U3D, 3DS, Rhino 3DM, IGES, Parasolid, ACIS SAT, CGM, STEP AP203/AP214, STL, OBJ, VRMLWorld, Google Earth KML, SketchUp SKP, Collada, ESRI SHP, IFC, and more.

Geocoordination – Automatic transformation and integration of geospatial information supporting hundreds of geospatial coordinate systems and ensuring spatial information is always displayed in its proper context.

Flexible File Referencing – Live design information can be viewed and shared across multiple formats in real time with all project participants, regardless of location.

Programmatic Extensibility – Wide range of options to tailor MicroStation's behavior and data exchange with other systems including customizable user interface, user-defined macros, support for VBA, >NET, C++, C#, and Bentley MDL.

Point Clouds in MicroStation

Point clouds are increasingly used to precisely capture existing conditions, providing as-built context for new designs and eliminating time wasted remodeling existing structures.

MicroStation provides unparalleled speed and efficiency in handling local point clouds, empowering users to view and interact with, render, snap to, measure, and dimension this data in real time – directly within the design environment. The value this creates is increased when MicroStation is used with Bentley's ProjectWise system of collaboration servers and services. ProjectWise streams subsets of point-cloud files directly to MicroStation, enabling users to quickly access and share point clouds of virtually any size, across geographically dispersed teams. Together, these capabilities give MicroStation users powerful advantages that include:

- Better decision making, from their ability to easily view and render point clouds

- Greater productivity, from their ability to quickly measure and dimension point-cloud data to speed the design process

- Faster access to point-cloud data, when used with ProjectWise Point-cloud Streaming Services
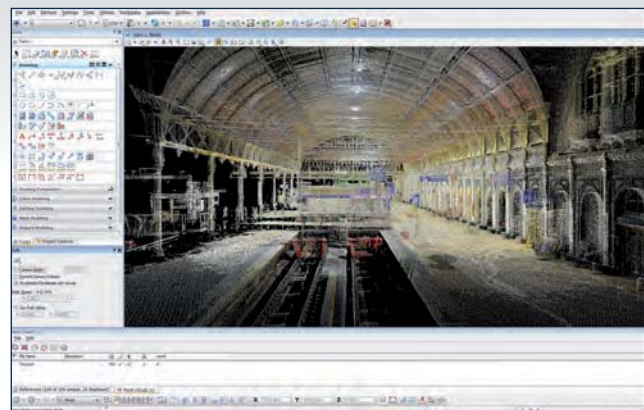
Unifying Production Environment Provides Trusted Deliverables

With MicroStation you can: document and present your design efficiently, precisely, and with confidence; act on reliable fit-for-purpose deliverables that reflect the latest design revision throughout the work in progress; and consistently communicate your design intent – with changes intrinsically reflected throughout.

MicroStation's unifying production environment helps ensure that all representations simultaneously reflect the same design model – with all the characteristics appropriate for each use. Among these are 3D modeling; drawings for plans, sections, elevations, and details; diagrams; alphanumeric or tabular reports; active data exchanges and queries; visualizations and renderings; 3D plots; and direct machine control output.

MicroStation makes it easier for users to follow standards than to break them. The result is better quality, consistent documentation in less time, without headaches. In addition, its capability to instantaneously synchronize the model and the representative drawings simplifies and automates the drawing composition process. Since all deliverables adhere to the same project standards and come from the same model, the result is high-quality documentation in which the entire project team can be confident.

i-models and Information Mobility

How do you share the information in your models accurately and easily without losing control of your intellectual property? The answer is with i-models.

i-models are containers of information developed by Bentley to enable the fast, easy, open exchange of precise engineering content with or without MicroStation. i-models:

- Are self describing – carrying with them the associated data-model specifications (schema) to describe their content.

- Provide portability – and are optimized for sharing and distribution.

- Retain provenance – preserving knowledge about their original source, the purpose, and the state of the information at the time they were created.

- Maintain precision – containing perfectly accurate 2D and 3D geometry and embedded business properties with no loss of fidelity.
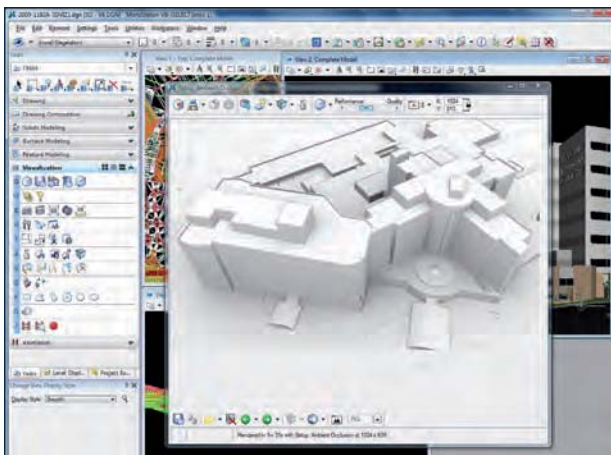
Key Features

Precision 2D/3D Plotting – Production tools for the creation of consistent high-quality paper and intelligent digital plots, 3D physical and digital models, and reports.

Integrated Design Review – Built-in tools to exchange digital mark-ups of designs and the associated redlines right within the information modeling environment.

Design and Production Standards Management – Controls and templates to put in place and enforce the application of organizational and project-based geometry and data standards including styles for dimensions, text, lines, and detail symbols including tools for analyzing and auditing designs for compliance.

Scalable Change Management – Capability to track and report on changes made to designs down to the component-level throughout the model's lifecycle including revision control, roll-back of changes, and visual display of historical changes.

Digital Signatures and Rights – Design file controls to ensure that only authorized individuals can view, edit, or print designs within a user-defined time limit.

MicroStation produces clear and reliable intelligent 2D and 3D digital and physical project deliverables.

Hypermodeling Delivers Immersive Interaction

MicroStation helps you understand and immersively interact with designs more naturally, so you can make better decisions. By effectively leveraging, in real time, all applicable information available, you can provide broader project awareness across the enterprise. This capability is delivered through hypermodeling, which enables interrelated design information of all types to be presented for interaction within the spatial context of the 3D model. This information can include solids and surfaces, drawings, specifications, images, point clouds, documents, business data, reports, videos, animations, web content, and more.


Key Features

Hypermodeling – Industry-leading capability enabling the convergence of modeling and documentation workflows. It automates drawing production and annotation tasks, and integrates related documents and information into the 3D model through links embedded in it.

Complete Modeling Toolset – A wide range of 2D and 3D design tools to easily create information models, including complex geometry and relationships such as surfaces, meshes, and feature and solid models.

Streamlined Design Environment – Innovations to simplify and speed design tasks and related workflows including AccuDraw for dynamic input with heads-up display, customizable menus, keyboard position mapping, and intelligent and interactive snapping.

Real-World Example

In this example of hypermodeling developed for The Nemours Children's Hospital in Orlando, Florida, you can see the fusion of project information into the model – immersively integrating drawings and details in 3D context. Imagine how many errors can be avoided and how much more clearly project teams can understand designs with hypermodels that allow them to see all of the applicable project information within the context of the information model. Hypermodeling resolves the potential ambiguity of 2D drawings alone and the inherent incompleteness of 3D models as they typically exist today.
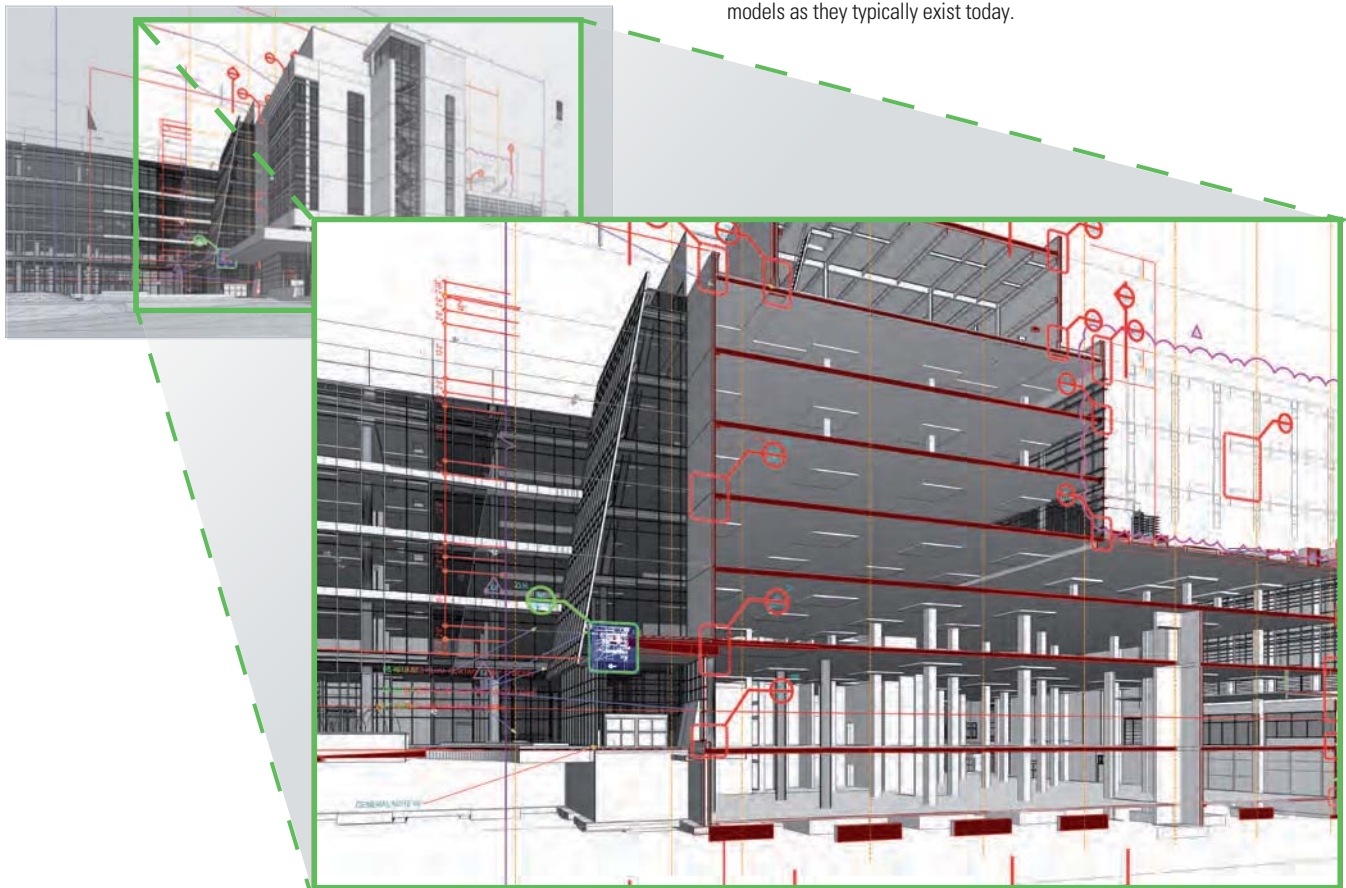
# Engineering Data and Analytics Environment Enables Performance Simulation

Increasingly, project teams need to accurately predict the real-world performance of designs quickly and with precision to maximize the achievement of design objectives. MicroStation's engineering data and analytics environment enables conceptual and fully detailed engineering analysis of infrastructure assets. It provides this through subsystems that handle interrelated geometry, data, relationships, constraints, behaviors, spatial location and geo-coordination, raster imagery, renderings, animations, point clouds, design history management, and thematic displays.

MicroStation's industry-leading visualization empowers users to easily produce lifelike renderings and vivid animations to assess the impact of design decisions and gain clear insight into how the structure will look in the real world. And using MicroStation's capabilities to automatically detect clashes and simulate schedules, design and construction teams can identify and resolve issues before they become costly problems in the field.

Its wide range of performance simulation capabilities allow you to quickly explore MicroStation's options and predict real-world performance to discover the best design choices, resulting in better designs, in less time, with less risk. In addition, it provides a MicroStation provides a powerful platform for other discipline-specific simulation applications.
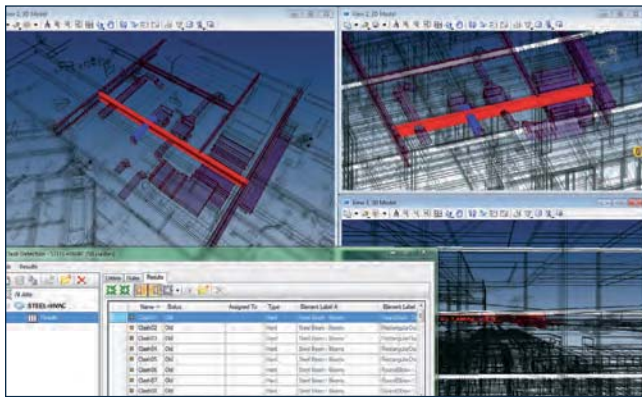
Simulate and resolve clashes before construction starts to avoid costly errors on-site.
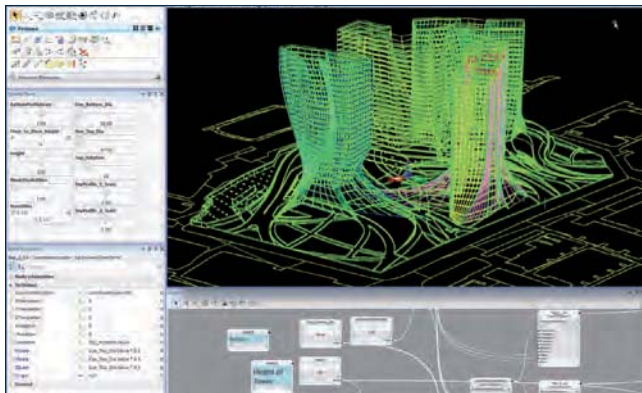
GenerativeComponents enables the pursuit of designs that were virtually unthinkable before.

Key Features

GenerativeComponents — Computational design tools to capture and exploit the critical relationships between design intent and geometry, allowing designers to explore a wide range of design alternatives and discover the best performing design options.

Graphical Design Simulation — Tools to analyze and visualize models based on their geometry or attributes including detection and resolution of clashes, animation and simulation of models based on project schedules, and display styles to enable real-time visualization and analysis of height, slope, aspect angle, solar exposure, and shading.

Lifelike Rendering — Industry-leading tools to produce lifelike visualizations of models using the Luxology rendering engine supporting point-and-shoot physically correct materials and lighting libraries, rich photorealistic content (RPC), and distributed network rendering.

Vivid Animation — Animation capabilities to produce realistic movies and simulations from design and operational models using keyframe and time-based animation tools and easy-to-use workflows for specific infrastructure visualizations like roadway and construction simulation.

A Technology Platform for Discipline-Specific Applications

For projects involving many different disciplines, MicroStation delivers a common technology platform to enable the exchange of data among participants across the infrastructure lifecycle — from design through construction to operations and maintenance. Because of this common technology platform, teams can adopt streamlined workflows that are inherently interoperable and support real-time collaboration. The ability to employ a highly flexible and customizable common interface also significantly reduces the learning curve for new users and the adoption speeds of new applications. For all of these reasons, users around the globe rely on market-leading MicroStation-based applications for virtually every discipline — to create buildings that consume less energy, roads that are safer, plants that generate greater outputs while producing fewer carbon emissions, and much more.

What Users Are Saying

> "What has traditionally been a linear process from 3D design models to 2D production drawings has now come full circle. This enables our teams to have a **much more fluid production workflow**, in particular when working in large design teams with complex building geometry. Inlaying 2D production drawings into 3D models has always been labor intensive, now with hypermodels it can be done with two clicks of a mouse button."

Stephen Holmes, Foster + Partners

> "Designers are showing the CAD industry how they want to work with increasingly complex computational design systems. Bentley has responded with GenerativeComponents and, especially, with an audacious and insightful redesign of its core dataflow interface: the GC Graph. This rapidly developing project promises to advance the state of the art by providing **new tools for managing and understanding complex parametric models.**"

Robert Woodbury, Simon Fraser University

> "The quality of imagery, rendering performance, continual stream of enhanced and new visualization tools, as well as integration with industry standard file types and content have **dramatically optimized the workflows that are required to model, render, and produce imagery.**"

Tim Kohn, AECOM
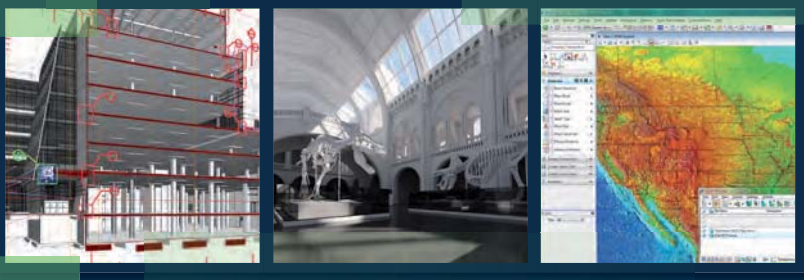
Learn More

Are you ready to empower your project teams to work smarter and more efficiently? Contact your Bentley sales professional or visit us online at www.bentley.com/MicroStation.

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