



## Project Summary

### Organization

i-TEN Associates

### Location

Portland, Oregon

### Project Objectives

- Quickly analyze massive amounts of point-cloud data captured with laser scanners to create visually immersive, 3D models of buildings, artifacts, and other objects
- Ensure a high degree of accuracy and quality, while keeping costs low
- Meet tight project deadlines

### Products Used

MicroStation® V8i

## Fast Facts

- i-TEN Associates leveraged MicroStation to quickly analyze, assemble, and render large point clouds, creating hybrid models and detailed video animations
- No data size limits
- MicroStation provided native point-cloud support, photorealistic rendering and animation, as well as powerful, easy-to-use modeling tools

## ROI

- Reduced time required to complete animations of point clouds from months to days
- Gained the ability to consistently meet tight project deadlines while keeping costs low and quality and accuracy high
- Using MicroStation's distributed rendering has provided a 5- to 10-fold reduction in the time required to complete projects

# i-TEN Associates Uses MicroStation to Deliver Highly Accurate 3D Models from Point-cloud Data

Bentley Software Enables Quick, Cost-effective Visualizations

## Support for Massive Point-cloud Files

i-TEN Associates is a Portland, Oregon-based provider of geospatial information systems (GIS), photogrammetry, computer-aided design (CAD), and computer-aided facilities management (CAFM) services. Using unfiltered point-cloud data, i-TEN can create 3D models and extraordinary visualizations that can be shared and viewed by anyone. Producing these models in the traditional way, through surveying and modeling, however, was expensive and time consuming. Laser scanning and the resulting point cloud offered i-TEN a way to produce fast, low-cost models and compelling visualizations with maximum quality, and impeccable accuracy. To achieve this, i-TEN needed software that could efficiently manipulate and integrate point clouds and 3D geometry. The right software would also need to be stable, able to support massive datasets, and easy to learn.



*MicroStation delivered the unique combination of robust point-cloud viewing and lifelike rendering that i-TEN needed.*

It researched a number of software tools available to produce laser scan data, but none could support the massive point-cloud files (up to 600 MBs each) required to produce highly accurate models and videos. Nor could these products render animations with the level of realism clients desired. It then discovered that Bentley's MicroStation V8i, which it had already been using for other project work, offered the powerful, dynamic platform it needed. "We specialize in developing highly accurate, high-resolution photogrammetry,

and derive products for clients ranging from public agencies and engineering firms to commercial enterprises throughout the U.S.," said Brian Miyake, VP of operations at i-TEN Associates. "When our clients began asking us to create visually immersive, 3D models of buildings, artifacts, and other objects, we needed a way to turn massive amounts of point-cloud data – permanent spatial digital files created using laser scanners – into these models. Bentley's MicroStation allows us to do this – quickly and cost-effectively."

## Using Point-cloud Technology to Meet New Client Needs

Laser scanners can capture detail like never before, resulting in massive, unfiltered point clouds. Using this data, i-TEN can create extraordinary visualizations and usable, measurable, 3D models that can be shared and viewed by anyone.

The models are used by architects and engineers to verify as-built conditions and create visualizations, by animators to create special effects, by historians to preserve artifacts and structures, and by marketing firms to showcase places of interest.

"We'd been using MicroStation for years, but never for animations and still rendering," said Miyake. According to Paul Tice, the Visualization Specialist at i-TEN, "It's incredibly stable, reliable and intuitive to use, and it has no data size limit." In addition, MicroStation provides unparalleled speed and efficiency in handling point clouds, empowering users to view and interact with this data in real time - directly within the design environment.

## MicroStation V8i: A Dynamic, Powerful Platform for Visualization

i-TEN now uses MicroStation to produce photorealistic animations and renderings from highly accurate 3D models and point clouds – quickly and cost-effectively. For video production and renderings, i-TEN professionals first use scanners to capture unfiltered point-cloud data of a physical landscape, artifact, or structure. Scanner software is then used for post-processing of the data, such as registration and filtering. The final step is to analyze point-cloud data in MicroStation, which renders 100 percent of the point clouds.

*“With MicroStation V8i, we can deliver exactly what the client wants – with minimal time and expense.”*

*– Brian Miyake,  
vice president of operations,  
i-TEN Associates*

*“With native point-cloud support and superior rendering and animation capabilities, MicroStation V8i has become our standard for point cloud visualization.”*

*– Brian Miyake,  
vice president of operations,  
i-TEN Associates*

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These renderings are examined for reflectance anomalies, floaters, and other objects that are then cropped out using specialized editing software. Gaps in point-cloud data are filled in by modeling and applying materials using digital photographs taken in the field. Utilizing MicroStation’s distributed rendering tools and the processing power of up to 10 CPUs, i-TEN can quickly render animation sequences requiring multiple point clouds.

Because MicroStation can import and export multiple file formats not supported by other commonly used CAD platforms, clients can receive visualizations in AVI, MOV, MP4, and other video formats. The finished models can also be provided in a wide range of formats including DWG, DGN, 3D PDFs, or i-models with point clouds attached. This allows engineers and architects to enable stakeholders to review and accurately measure as-built conditions of a building at a particular date with millimeter accuracy.

### **Delivering 3D Models and Animations Faster and at a Lower Cost**

With MicroStation, i-TEN can meet client requests with fast turnaround for highly accurate, high-quality, affordable 3D models and animations. Using MicroStation’s distributed rendering has provided a 5- to 10-fold reduction in the time

required to complete projects. “We completed an animated marketing video for the five-story Evergreen Wings and Waves Waterpark in just two weeks – and \$5,000 under budget,” said Tice. “Before, it would have taken us months to finish. We were also able to use MicroStation to create camera angles in the animation that would have cost the client \$30,000 to create with a whole camera crew.”

Over time, i-TEN finds that it can complete these projects even faster. The company has donated scanning and rendering time to produce animations for non-profits and other organizations – investments that have helped the company gain free publicity and attract new, paying clients for these services. For example, i-TEN produced a photorealistic video for a submarine museum that enables anyone – including those with physical limitations – to virtually tour their submarine’s interior without having to walk through it. Immersive, 3D animations like this one also provide a way to preserve historical sites in highly accurate, digital models for historians and students to study for years to come, with zero environmental impact.

“This is an exciting time to be part of the visualization industry,” said Miyake. “With MicroStation, we can deliver exactly what the customer wants – with minimal time and expense.”