

PrecisionPoint Reduces Modeling Time by 65% for Baggage System BIM.



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- Mark Hanna, CEO & Founder, PrecisionPoint, Inc.

The Project: Major Airport Baggage System Upgrade

A U.S. airline planned to upgrade its baggage handling system at a major airport. The enhancements would include replacement of some existing equipment, such as luggage carousels and conveyor belts, as well as mechanical and electrical features supporting the system. With changes proposed to a large portion of the MEP and structural elements, the project designer requested a 3D BIM for the baggage claim area inside the terminal.

The BIM would be used to design the upgraded baggage handling components and to ensure they fit into the already crowded space. Of particular concern was the ceiling plenum space where most of the electrical lines, HVAC conduits and water pipes existed. Along with structural support beams, these features were hidden above drop ceiling tiles. The BIM would have to be generated with an accuracy of 5/8 inches for the designer to perform precise clash detection analysis of the new elements that would be installed.

PrecisionPoint, Inc.

PrecisionPoint, Inc. (precisionpointinc.com) is a 3D reality capture solutions firm based in Carmel, Indiana. Serving the North American architecture, engineering and construction operations community since 2009, PrecisionPoint uses terrestrial and indoor mobile mapping laser scanners and the latest software to generate design/engineering-grade BIMs and point clouds for its clients. Prior to the

baggage system project, the firm had completed several airport BIMs and developed custom techniques for capturing MEP/structural data in ceiling plenum spaces.

Project Challenges

An active airport presents numerous challenges to performing 3D laser scanning, which compounded the difficulty of meeting the short BIM delivery deadline. Due to nearly constant flight arrivals, PrecisionPoint was granted only a four-hour window in the middle of the night to work onsite. Despite the promise of uninterrupted access to the baggage area without passengers, the scanning specialists were slowed by secured doors and occasional work stoppages related to the arrival of late flights.

“Every airport project is unique,” said PrecisionPoint CEO and Founder Mark Hanna. “You have to expect the unexpected.”

Having worked in airports before, PrecisionPoint was ready for those delays, but they unexpectedly found themselves dealing with another issue – missing control targets. The field team surveyed control points outside the terminal and placed target stickers inside the baggage claim area to tie their scans to the existing coordinate system. But when they arrived for their first several shifts, the targets placed the night before were gone. The cleaning crews had removed them. The specialists

began hiding the stickers under rugs, on top of vending machines and behind trash cans to avoid removal.

Workflow

The two scanning specialists brought two Faro Focus X330 laser scanners to the site. One was used to capture scans of baggage claim with targets from ground level. The second unit was placed on a telescoping tripod and raised into the ceiling plenum space after tiles were removed. Using a tablet to control the scanner by Wi-Fi, the specialist first captured data at the lip of the plenum so the scan included some of the targeted space below and some above. From there, the scanner was further raised into the congested ceiling area.

The idea was to register the initial plenum scans using targets while the other ceiling scans would be registered using cloud-to-cloud methods. Because scan data was being sent back to PrecisionPoint for processing while the field work ensued, due to the tight deadline, the field specialists took copious notes of precisely where the scanner head was positioned so the office technicians could conduct the cloud-to-cloud registration.

Once all 400 scans had been collected and processed into the point cloud, only two weeks remained to create the 3D BIM. Having completed many similar projects, PrecisionPoint's strategy was to maximize its efficiency by performing most modeling using the EdgeWise automated extraction software. The modelers set the software parameters to automatically extract all MEP features and used EdgeWise's QA tools to ensure all extracted components were within their scope of work (one inch in diameter or larger). The modelers also made use of the semi-automated structure modeling

tools available in EdgeWise to extract all the structural components. "In just three hours of overnight processing time, EdgeWise completed the extraction," said Hanna.

EdgeWise identified, measured and located each pipe and conduit. From experience, the modelers knew it was fastest to completely model each feature in its full run from start to finish in EdgeWise, using the manual editing functions to add fittings and elbows. They manually modeled the remaining smaller features, such as sprinkler heads, and non-standard elements, such as complex T's and conveyor belts, during the final clean-up phase in Revit.

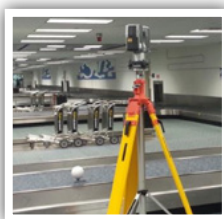
Results

Despite the tight deadline and onsite delays, PrecisionPoint delivered the 3D BIM along with the point cloud and panoramic photos of the baggage system on time with sufficient accuracy for precise design and clash detection. Not counting overnight processing time, the extraction and modeling of MEP and structural elements in EdgeWise shaved 65% off the time it would have taken to do the same work in Revit.

"The modeling of MEP and structure in EdgeWise took 25 hours, which was a time savings of about 40 hours," said Hanna. "It was really a success."

Hanna added that the speed of automated extraction is only half of its advantage. The other is the accuracy and completeness of the final 3D BIM. This deliverable incorporated subtle differences in feature dimensions and joint angles often overlooked by manual processes but that can prove critical in clash detection analysis during the design of new equipment to be installed in a complex MEP- or structure-rich environment.

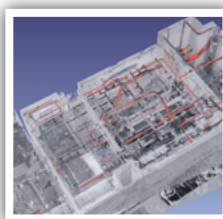
PrecisionPoint's Workflow



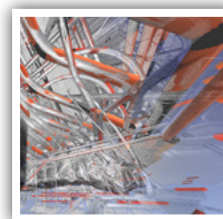
Faro Focus X330



FARO SCENE



EdgeWise



Autodesk Revit

To learn more or request a software demonstration, visit clearedge3d.com or contact us at sales@clearedge3d.com or +1 (571) 364.8597.