



Model Solution for As-built Information



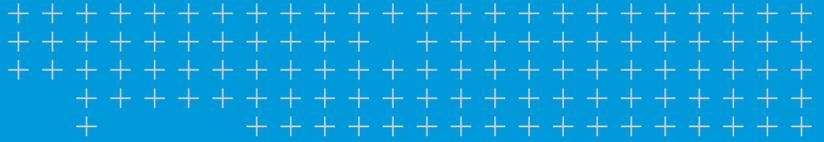
An SOA surveyor uses the Trimble SX10 for pipeline locations.

3D scanning supplies speed and safety on a challenging project.

Trimble solutions provide flexible approaches to meeting client needs.

Solution

Trimble® SX10 Scanning Total Station
Trimble Business Center Software



overview

Texas-based S Oliver and Associates (SOA) has provided surveying services for the oil and gas industry for more than 20 years. The varied and changing requirements of their clientele call for flexibility, innovation and the ability to implement solutions to handle site-specific challenges. With increasing demand for 3D scanning, SOA seized the opportunity to use new technologies to meet client needs and simultaneously improve productivity.



Location
TEXAS



With its primary focus on pipeline surveys, SOA receives frequent requests for scanning. Maintaining aboveground pipeline equipment often requires detailed surveying and modeling—work that is a good fit for scanning.

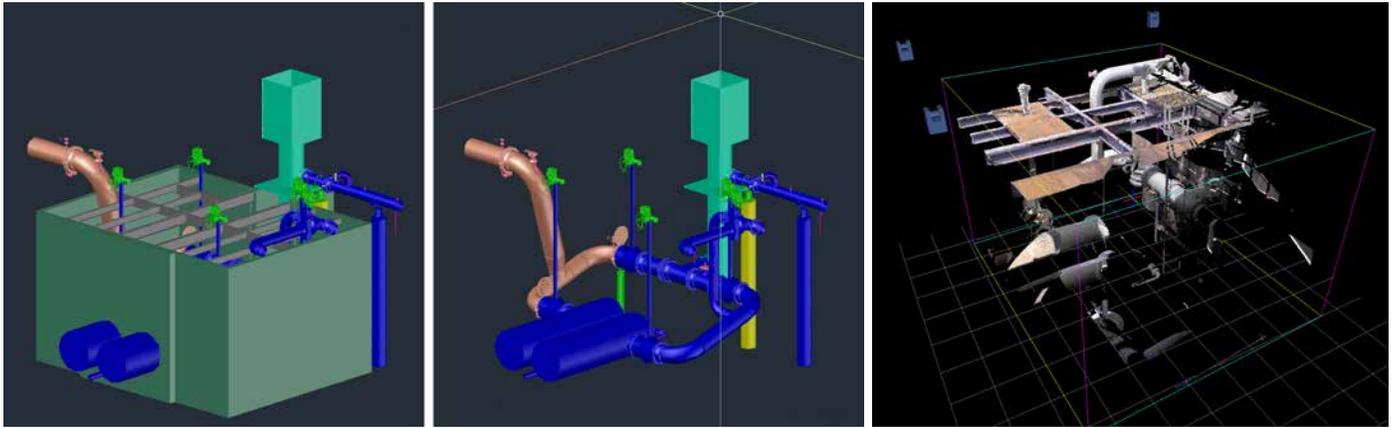
SOA had tried scanning more than a decade ago but had never owned a scanner. According to SOA project manager Jason Trevino, when a client recently presented a large, complex scanning project, the firm demurred. “We felt it was too big a project for our first return to scanning,” Trevino said.

Instead, SOA concentrated on developing a flexible and productive approach to serving their clients. They selected the Trimble SX10 scanning total station, which enables them to scan and survey with a single instrument. One of SOA’s first scanning projects illustrated the value of the SX10.

CHALLENGING SITE DEMANDS A FLEXIBLE APPROACH

SOA needed to provide a detailed survey of a 15-acre (6 ha) tract that contained a large excavation that exposed several large pipes. The site also held a roughly 10,000-square foot (900 sq m) area filled with pipes and equipment, including a 900-square foot (80 sq m) in-ground vault holding piping, flanges, tees and valves. To have crews descend into the vault for the survey would require removing grating over the vault, a process that entailed costly and time-consuming procedures for approvals, safety and plant operations.

To work around the constraints, SOA crews used the SX10 to establish control points around the site. Then, for subsequent setups they used resection to accurately determine the instrument’s location, typically with residuals of 0.02ft (6mm) or less. The approach enabled



Finished 3D model of the vault developed from SX10 scanning data.

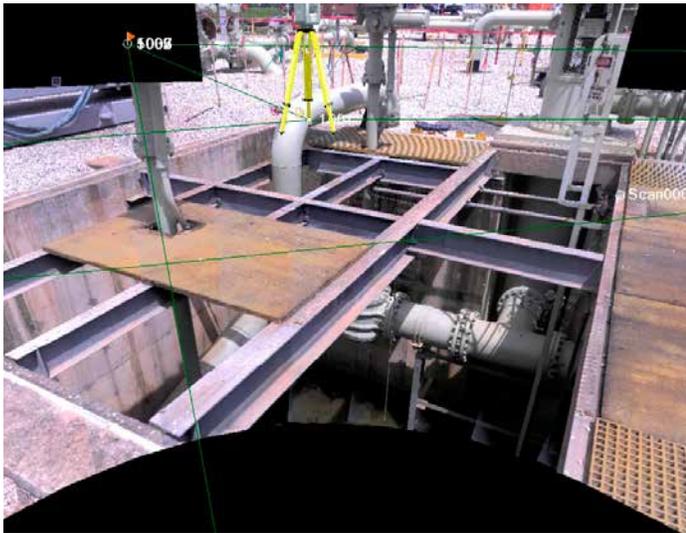
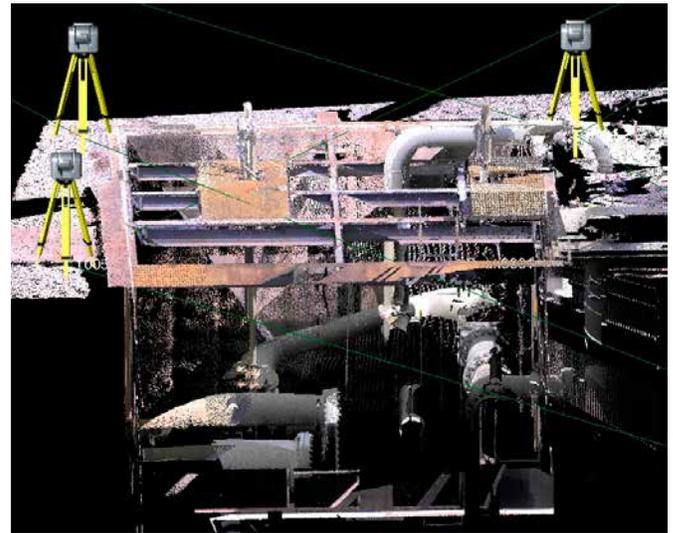


Image data from the Trimble SX10 combines with point cloud to provide accurate 3D information.



Combined point clouds provide complete data on piping and equipment in sunken vault.

them to place the SX10 in optimal locations for both scanning and conventional total station measurements.

Rather than removing the vault grating, crews could use smaller openings to safely measure the equipment in the vault. By placing the SX10 in strategic locations to scan the vault, they completed the work with just three setups in half a day. Surveying the remainder of the site required another half day and included scanning as well as prism measurements for precise location of the excavated pipes. The SX10 also captured high-resolution digital images of the site and equipment. In all, the crews visited the site on three separate days to set control and capture comprehensive data.

INTEGRATING COMPLEX INFORMATION

SOA technicians used Trimble Business Center Software (TBC) throughout the project. For the control, they combined data from the SX10 as well as digital levels and Trimble R10 GNSS receivers. "Most of our GNSS work is done with Trimble VRS," Trevino said. "And we have long used TBC for QA/QC on our data and for computing control coordinates."

Using TBC's scanning module, SOA technicians quickly combined all of the scans from the project site. Because all setups were resected onto project control



no adjustment was needed. The finished point cloud was delivered to engineers in PTX format for use in Autodesk and LFM modeling software.

The performance of SX10 delighted SOA and their clients. "They enjoyed seeing the SX10 in action," Trevino said. "We had scan data from three different days and everything fit together nicely. It was an easy deliverable for our first project: A clean, comprehensive point cloud."

The Trimble SX10 Scanning Total Station combines scanning and high-accuracy surveying in a single instrument.

"All the clouds fit together. That's a big deal, and a big reason we use the SX10."

— Jason Trevino, PLS, Project Manager, S Oliver and Associates

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