Power Uprate Process using CSA Laser Scanning & 3D Technology

PanoMap® is CSA's laser scanning technology which captures an as-built representation of the nuclear plant in a very accurate, photographic-quality 3D format. PanoMap is a powerful, easy to use tool applied throughout the nuclear industry.

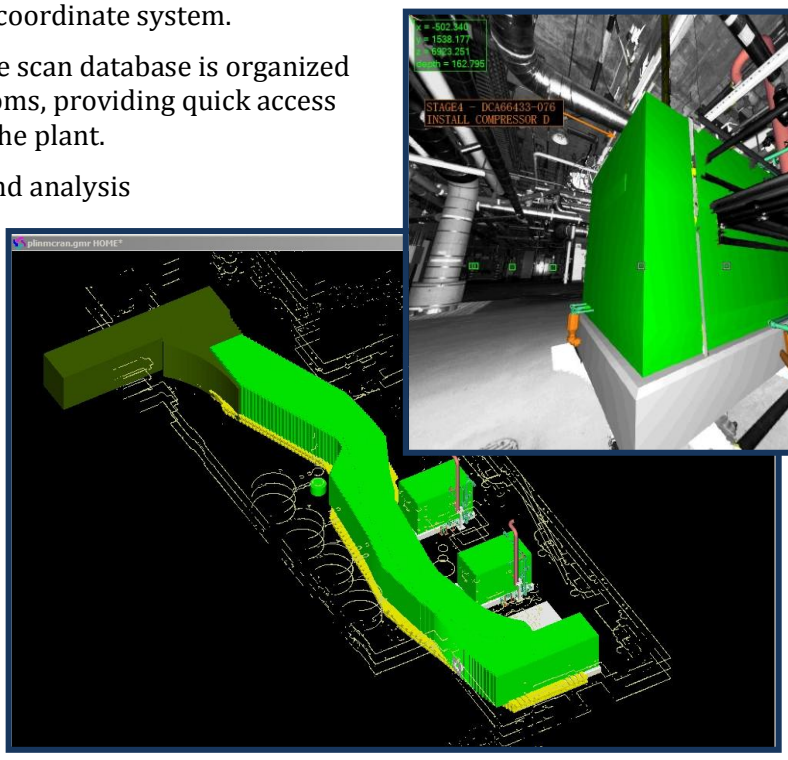
Plant/CMS™ is CSA's 3D technology which integrates with PanoMap. Its powerful conversion capability allows for export/import to other CAD systems.

CSA has extensive experience building and utilizing large-scale 3D CAD models and 3D laser scan data. The integration of these two technologies provides excellent support for power uprate applications. CSA's method uses laser scan data directly for most of the applications, without the need to build a complete 3D model. This enables communication between the owner/operator and design and construction groups. **CSA offers software and services that provide complete turn-key solutions to the customer.**

Power Uprate Applications Using PanoMap® and Plant/CMS™

Creating an integrated laser scan database includes:

- **Field Scanning** – Our scanning crews capture the plant's as-built configuration, performed during plant operation or during plant outages.
- **Processing & Registration** – All scans are processed into a visual format that is considerably smaller than any laser scan file size, and organized into a single laser scan database. Scans are registered to a single plant coordinate system.
- **Project Organization** – The scan database is organized by buildings, floors, and rooms, providing quick access (four clicks) to any part of the plant.
- **Applications** – Activities and analysis for the applications within the project scope are performed.
- **Project Delivery and Training** – The laser scan database and applicable analysis are delivered to the client. CSA installs PanoMap on local computers, and provides training.



3D model merged with PanoMap scan

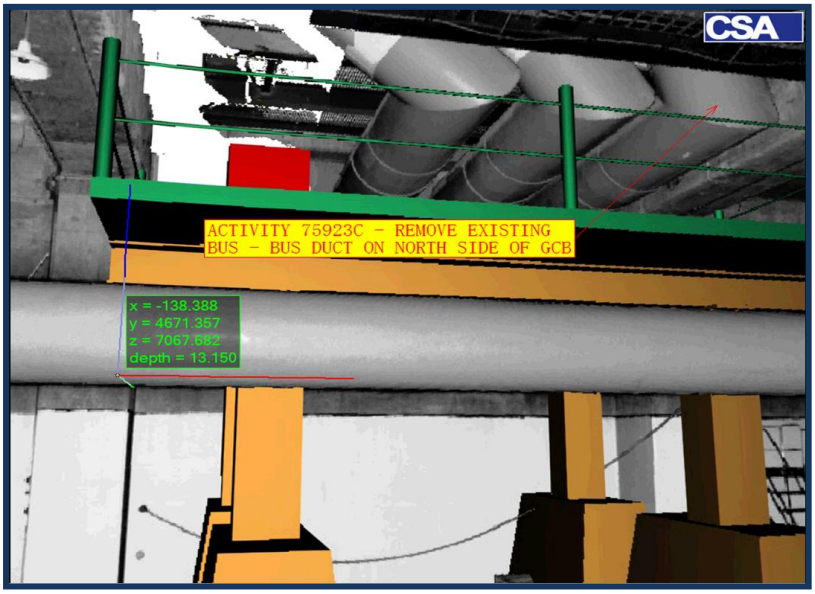
Equipment removal simulation (Top down view)

Uprate Applications

CSA solutions include:

Equipment Removal/Replacement—Clash Detection

Integrating 3D models within PanoMap allows for interference verification directly against laser scans. The interfering surfaces within the scans are automatically detected and colored in red. A clash detection report is produced. The validated interfering objects can be removed from the scans. This iterative process determines the optimal removal/replacement path and serves as a communications tool. Simulation movies are produced after finalization of the removal/replacement process.



Storyboard of planned construction activity

Engineering Changes

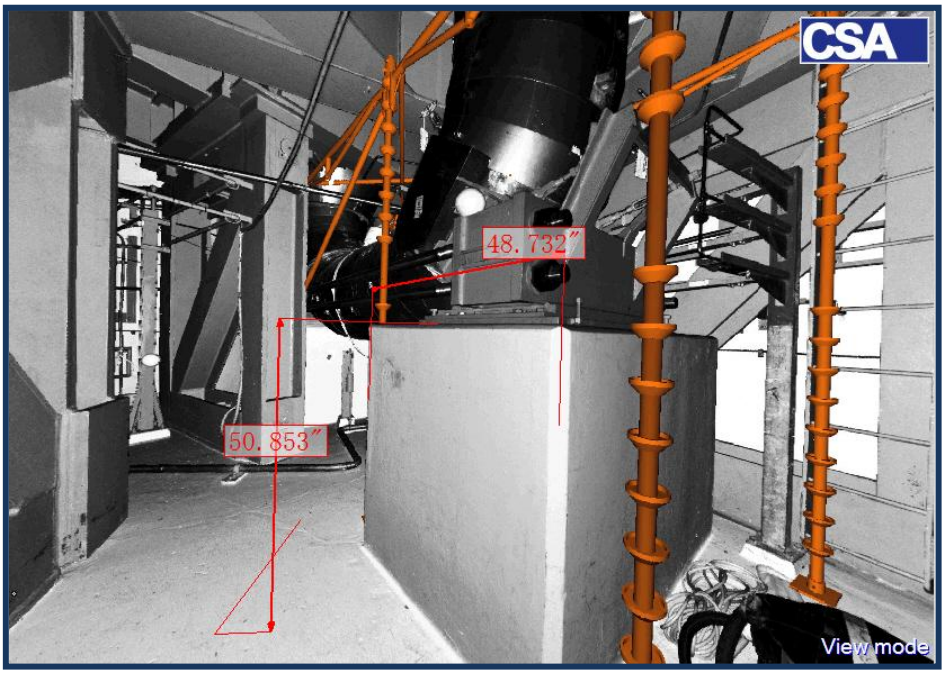
New design changes are represented by a 3D CAD model. Existing components and structures can be removed from the scans. The new design in 3D CAD format is merged into the scans, and an interference check is automatically produced.

Construction Planning and Storyboarding

Equipment removal/replacement and engineering change activities can be displayed as labels on individual components within scans. These scans can be combined within the 3D model. A storyboard, with individual construction activities listed, can be produced to better organize the process. This tool aids in planning reviews, as well as crew training. The review of this storyboard provides valuable feedback to improve planning and construction processes.

Scaffolding and Rigging Structures

3D models of scaffolding configuration can be placed within the scans.
Any interferences are detected and displayed as red. The scaffolding locations and structure can be reviewed and verified by individual users.
The same can be done for rigging and any temporary structures used to support construction activities.



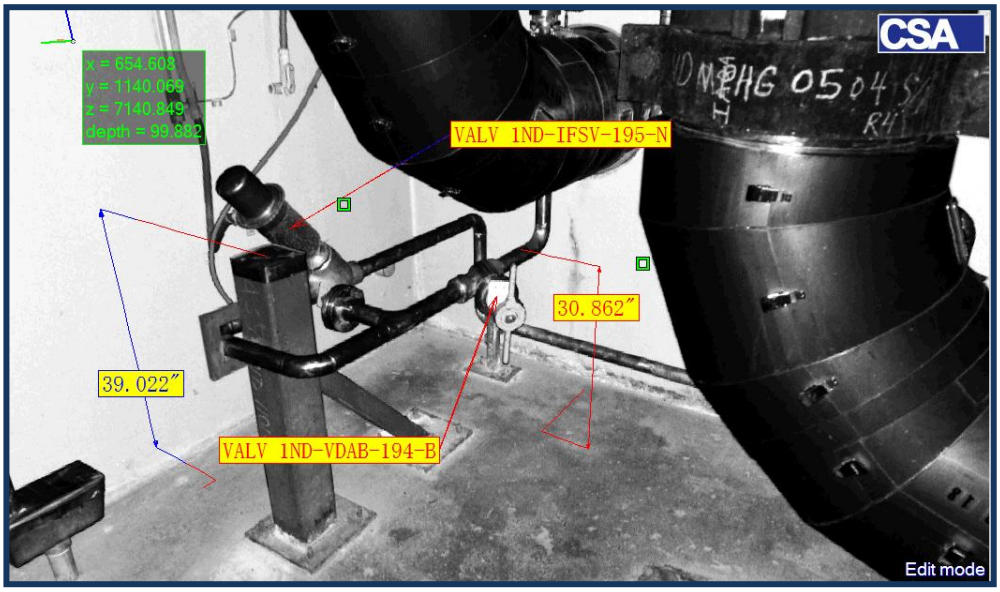
3D model of scaffolding structure merged with PanoMap scan

ALARA & Dose Display in Scans

Permanent radiation monitors can be merged within the laser scan database for a real-time display of dose data. The resulting database can be used to improve the planning process, estimation of dose, etc. Also, the scans can provide a very effective tool for personnel briefings to avoid high radiation areas, and for planning work activities. The dose reduction is also achieved by improved design, simulation activities, and better training of people using the laser scan database.

Response to Unexpected Conditions

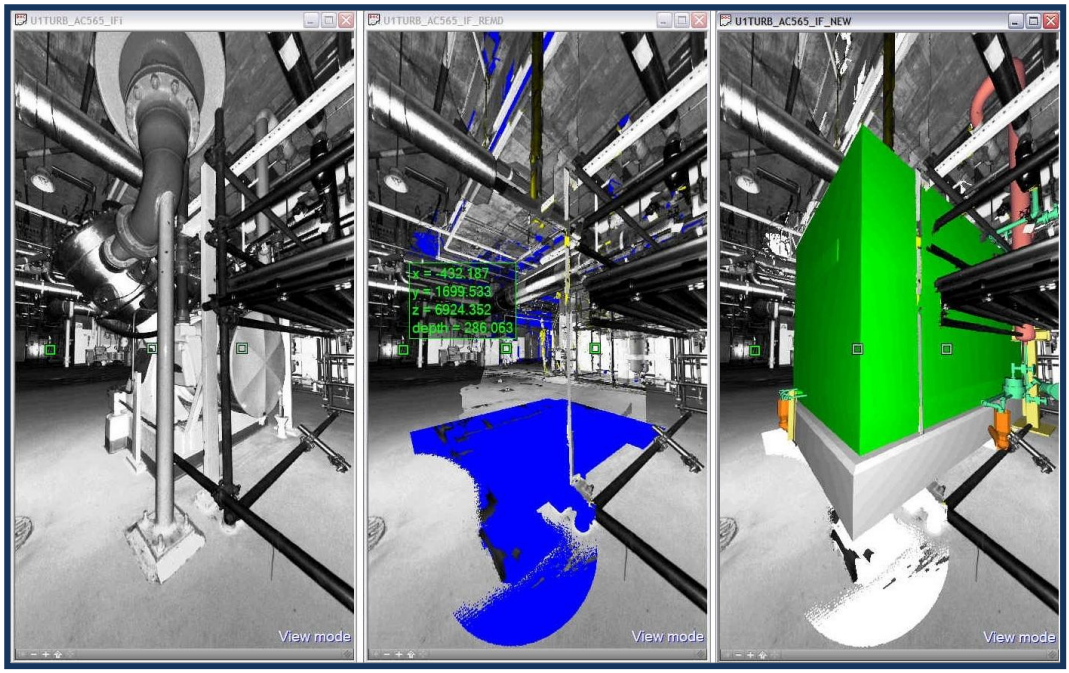
High quality digital representation of the plant provides good support to mitigate accidents and any unexpected conditions. The laser scan database can be analyzed by personnel at multiple locations. A quick response will reduce cost and time associated with these conditions.



Equipment labeling within 3D scan

Final As-Built Documentation and Updates

After the uprate is completed, affected areas can be re-scanned in order to provide final as-built documentation. Minor changes can be supplemented with a 3D model. This database, in conjunction with the engineering documentation, provides an accurate representation of plant changes. PanoMap scans can be integrated with additional plant operations and the maintenance database (e.g., Maximo, Passport), and used for other plant applications.

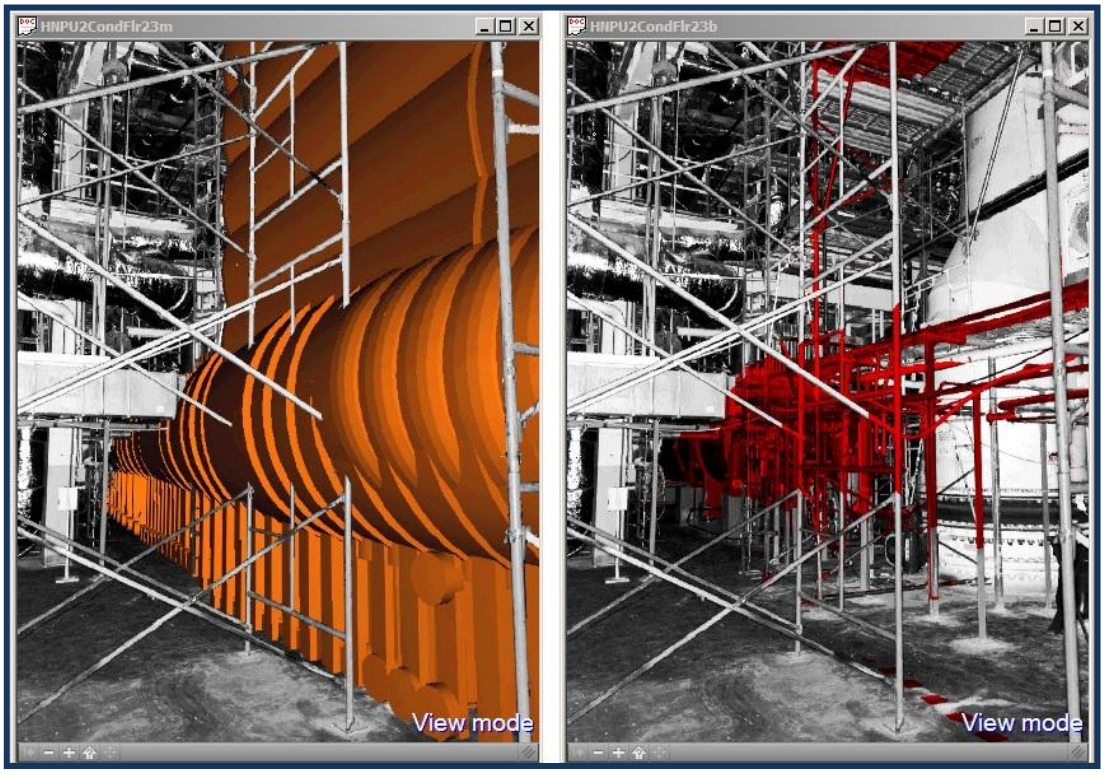


Original equipment in scan ***Equipment removed from scan*** ***3D model in scan***

What's unique about PanoMap?

All collected data resides in a single database with:

- No database size limit – our largest project has over 7,000 laser scans
- Very fast database access – four clicks to any part of the plant
- Very user-friendly interface – no CAD experience required
- High resolution visual and 3D representation
- Interface to/from all major CAD systems
- Server database installation – easy access and fast processing by all personnel, from any PC



Equipment removal sequence simulation

Interferences shown in red

Major Benefits of Using PanoMap and Plant/CMS

- **Improvement in:**
  - Planning and scheduling
  - Simulation of activities – done right the first time
  - Predictability of construction activities
  - Personnel training
  - Response to unexpected conditions
  - Communication between project team members
- **Reduction of:**
  - Dose
  - Cost
  - Errors
- **Ability to analyze alternative methods**
- **High quality final as-built documentation**

www.csaatl.com ▪ Contact: Olga Burger ▪ **770-955-3518** ▪ burger.o@csaatl.com