



## RENOVATION OF HISTORIC BUILDING

SAN FRANCISCO CITY HALL, SAN FRANCISCO, CA

### PROJECT GOALS

- Perform as-built survey of truss connection details for dome trusses
- Create scanned image of dome structure itself

### PROJECT FACTS

- All truss joint details were inaccessible
- 100-foot-high by 40-foot-wide dome scanning area
- Scan time: 1.5 hours
- Post-processing time: 1 hour
- Project performed February 1998

### CYRAX BENEFITS

- Ability to measure inaccessible structures accurately and rapidly
- Collection of additional measurements for future use
- Ability to do as-builts without disrupting ongoing construction

*Cyrax*<sup>™</sup> was used to perform a demonstration of its capabilities for as-built surveys. This was done on two portions of San Francisco City Hall, which was undergoing a major renovation.

First, the *Cyrax* laser scanning system was used to accurately measure details of hard-to-access truss connections. These connections are part of a series of 4-foot-high by 20-foot-long horizontal trusses that support the domed portion of City Hall. Each joint that connects adjacent trusses contains six bolts. Exact bolt centerline locations were needed for the fabrication of new trusses and subsequent replacement of the original trusses.

The second portion of City Hall scanned by *Cyrax* was part of the dome structure itself, which included both the actual dome as well as a "false" dome beneath it.

The location of the trusses and joints made them virtually inaccessible for traditional

manual measuring methods. Even electronic total station measuring techniques were not feasible, as there was no reasonable way to attach EDM 'reflecting targets' to the bolts. *Cyrax's* reflectorless, remote scanning capability was able to overcome these problems and generate useful results.

All of the *Cyrax* scanning was done from one setup on a balcony partway up the domed section of the hall. The unit was rotated and angled from this single setup to perform four different scans.

Another *Cyrax* advantage was that its use did not interfere with the ongoing construction work at the site. In addition to the practical benefit of using *Cyrax*, the City of San Francisco was interested in storing all information collected for potential future use.

All of the above work was performed through Bergen Industries for the City of San Francisco.

# CYRA

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