

Project Name:	Topo Survey for Design of Highway 880 Widening
Project Description:	Safe, accurate, complete survey of high-traffic roadway, without lane closures
Scope:	8 miles of divided 4-lane highway; break lines and TIN surface file export to Softdesk®
Owner:	Valley Transportation Authority
Project Date:	Spring, 2000



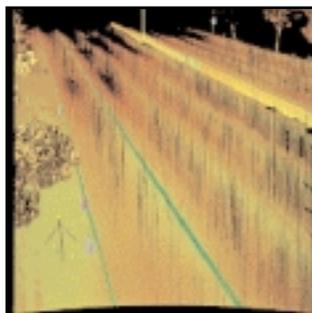
Cyrax mounted on boom arm, raised above overpass (left). Scans are done even while traffic is on the road (middle). Final surface is much more complete and accurate along the entire roadway (right).



"We were able to survey the highway much safer and faster, without lane closures, plus we provided greater detail for our road designers. We estimated that using Cyrax on our first project (Hwy 880) cost roughly the same as using traditional methods. On our second project (Hwys 101 and 85) we just about doubled our production."

**Tom Milo, Division Manager, Mark Thomas & Co., Inc.
San Jose, Ca**

BACKGROUND: Mark Thomas & Co., Inc., a civil engineering and surveying firm that has done numerous major highway and transportation projects, has switched to *Cyrax* for conducting accurate topographic surveys of congested highways. These types of projects are particularly challenging because closing lanes to allow traditional surveying is often not a viable alternative, especially during weekdays. Moreover, placing surveyors on busy roadways, even with lane closures, poses a safety risk. Mark Thomas & Co. elected to take advantage of *Cyrax*' remote, high-accuracy scanning capabilities for a major widening project of Highway 880 in the heart of Silicon Valley. Vertical accuracy of .02' was required to ensure that the road widening design provided a smooth transition from the existing pavement to the new pavement.



Vertical black stripes represent passing cars that were captured, then edited out of the data. By mouse-clicking along the road striping in this image, the operator conducts a "virtual survey" in the office.

PROJECT: For this project, the *Cyrax* scan head was mounted at the end of a boom arm on a van. The van was driven along the shoulder of the highway in 50m increments. At

each van stop, a *Cyrax* operator seated inside the van used a remote control feature to aim the scanner at the desired section of highway and then conduct the scan. Individual scans were tied to control using three targets conveniently placed within the scanner's view (but not on the road itself).

Cyra Software was used to edit out extraneous data (caused by passing cars and by shrubs) and to convert the edited data into formats suitable for export into Softdesk® version 8, the road design software used by Mark Thomas. Break lines were created as a 3D DXF file by

mouse-clicking along visible line striping in *Cyrax* point cloud images, essentially performing a virtual survey in the office. Densely gridded spot points were also created in Cyra Software for export to create a TIN surface in Softdesk®.

Mark Thomas has since used *Cyrax* successfully on similar projects.

PROJECT FACTS

Number of scans	229 scans
Number of miles	8 miles
Number of miles/day	½ mile/day (@full production rate)

CYRAX BENEFITS

- Much safer- no need to occupy the roadway
- No need for lane closures
- No need to survey at night or on weekends
- Much greater detail throughout the roadway
- More complete, high-accuracy topo data for better road design