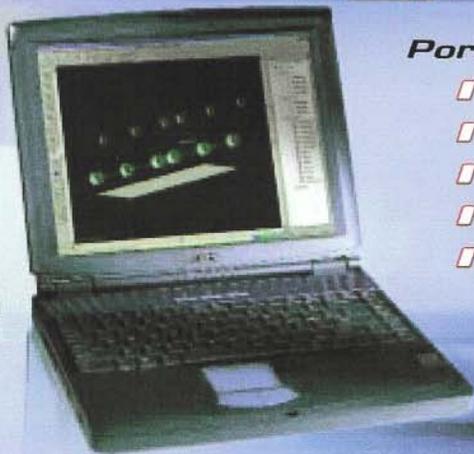


Alignment Services LLC

Laser Tracker

Laser Tracking System



Portable Coordinate Measurement

- High Precision***
- Ease-of-Use***
- Rapid Set-up***
- Compact Size***
- Intuitive Software***

Accuracy and Portability

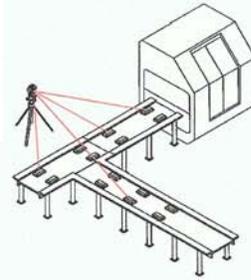
This system offers the most versatile Precision Large Scale Dimensional Metrology available for measurement, tool building, alignment, and reverse engineering applications.

Typical Applications

- Measure tooling, fixtures, chassis, and jigs
- Error map machine tools and robots
- Align machines, gear trains, rollers, and transfer lines
- Measure surface contours
- Reverse engineer parts
- Hidden point measurement

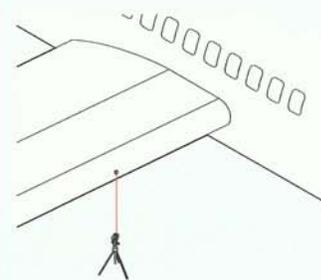
Layout Precisely

The system's superior accuracy provides the ideal tool for precise position and alignment of transfer line elements. Complex alignment jobs may be performed quickly.



Align Real- Time

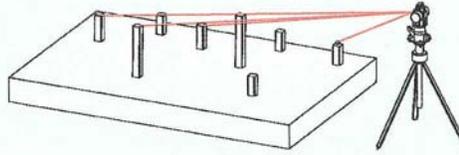
Enhanced tracker head versatility coupled to the ASC Trilogy software, enables quick alignment measurements of large three-dimensional parts. This unique tool provides the operator with real-time positioning (x,y,z) and orientation of the assembly to insure quality results.



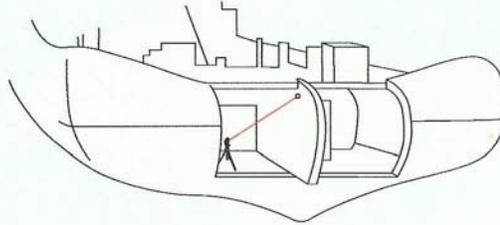
Alignment Services is your alignment solution

Align Large Fixtures, Jigs, Chassis

The rapid set-up and ease-of-use of the ASC system speeds fixture building and inspection.

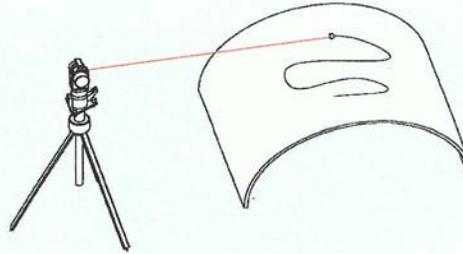


Build Large Assemblies Unmatched system portability allows efficient operation in tight work areas, such as shipboard machinery spaces, to make critical measurements and alignments.

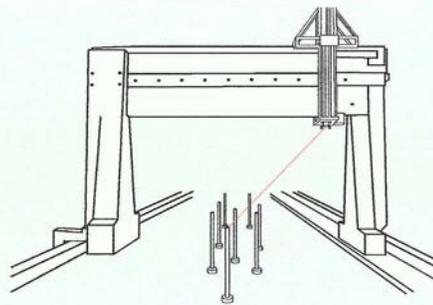


Reverse Engineer Components

High accuracy system enables reverse engineering of large dimensional parts with precision.

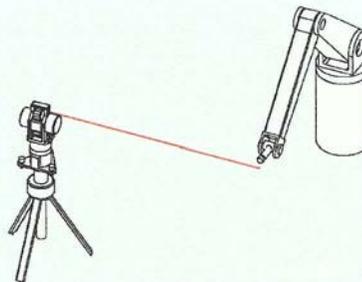


Error Map Precisely error map large machine tools. The proven reliability of the API gimbal mounted laser head insures superior measurement accuracy in harsh industrial environments.



Calibrate Robots & Machine Tools

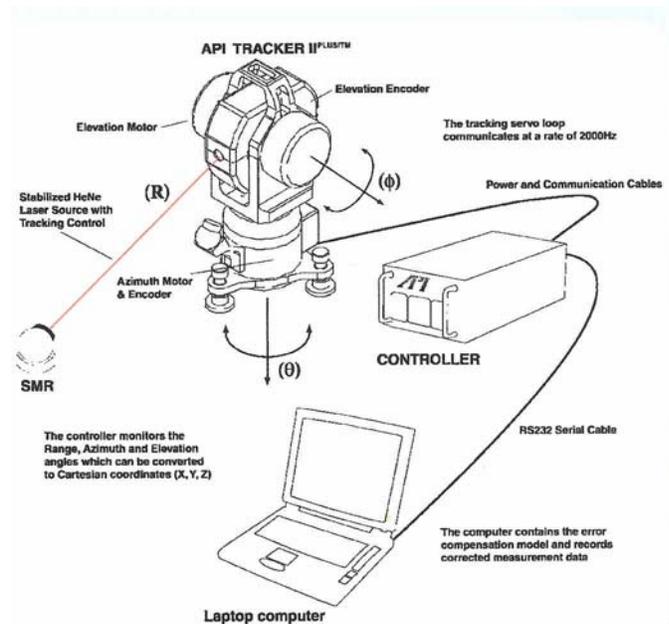
Large volumetric measurement capacity offers enhanced versatility for robot calibration.



System Fundamental

Designed for large scale measurement applications requiring high precision and accuracy, the system enables you to make precise measurements. Hold job measurement accuracies to 25 μ m (0.001") over a 10m (32') work envelope.

The system combines the linear distance of the interferometer or ADM with a position angle of the elevation and azimuth axes to derive a target's 3D coordinate position. Measurement data is displayed in cartesian coordinates. The system simply tracks the target, a Spherical Mounted Retroreflector (SMR), to the location to be measured.



As the target is moved, the tracker sensor system measures the target's position 2000 times per second providing feedback to the controller. The controller commands the elevation and azimuth servo-motors to track the target anywhere within the instrument's measurement envelope.

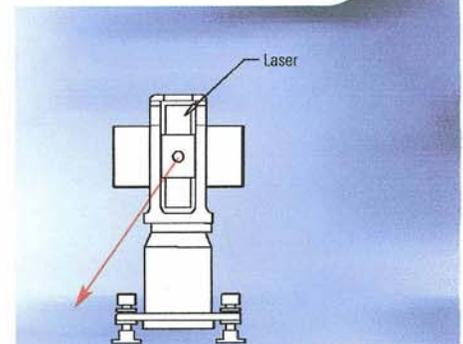
Once the target is at the measurement point, data recording is triggered via the Trilog software (keyboard entry typical). Measurement data is presented in concise reports or exported to CAD or spreadsheet programs for further data analysis.

Tracker Beam Path

Accuracy of a laser tracker depends upon the stability of the laser beam path. With conventional beam steering systems, a very small change in mirror position is greatly magnified at the point of measurement as instrument error. Change in mirror position can stem from instrument assembly error, structural instability, or thermal distortion during use. This system does not employ beam steering mirrors.

Heat Management

Heat and thermal expansion are major obstacles in precision coordinate measurement. With this system the largest instrument thermal source, servo-electronics, are completely removed from the tracker optical head. Consequently, the optical head is not disturbed by thermal gradients emitted by the instrument. Heat associated with the internal laser source is centered on the optical axis of the laser head, eliminating asymmetrical thermal distortions.



Straight line approach to Accuracy

The system offers a superior class of performance, portability, ease-of-use, and reliability. Designed with the user in mind, the advanced design translates to precise accuracy, and measurement reliability.

Advanced Optical Design

Advanced design adopts an on-the-shaft mounting of the laser head. As a result of this design approach, the laser beam exits the tracker head without going through a single bending mirror.

Superior Accuracy

The heart of this advanced tracker is the unique laser head design. The complete laser interferometer, and the ADM position sensing devices, and optics are housed in one assembly. This design minimizes thermal induced measurement errors, resulting in superior instrument stability and accuracy.

Large Measurement Volume

No other tracker offers this large of a measurement volume with a vertical range of +80. to -60.; enabling the equipment to handle large jobs including large CMM's.

Absolute Distance Measurement [ADM]

The Absolute Distance Measurement (ADM) option greatly expands the measurement capabilities. Use ADM to quickly measure inaccessible targets or automate repetitive measurement tasks. ADM can quickly measure remote points, in seconds, with its rapid target acquisition time. This ADM technology is based upon new innovative repetitive time-of-flight (RTOF) technique (pat. pend.) offering fast response, superior stability and accuracy, in an industrial environment.



Unmatched Portability

The system sets the standard in tracker portability. Weighing only 18 lbs, measuring 14 inch height, and 7.5 inch width, it is the most portable tracker available.

True 3D Versatility

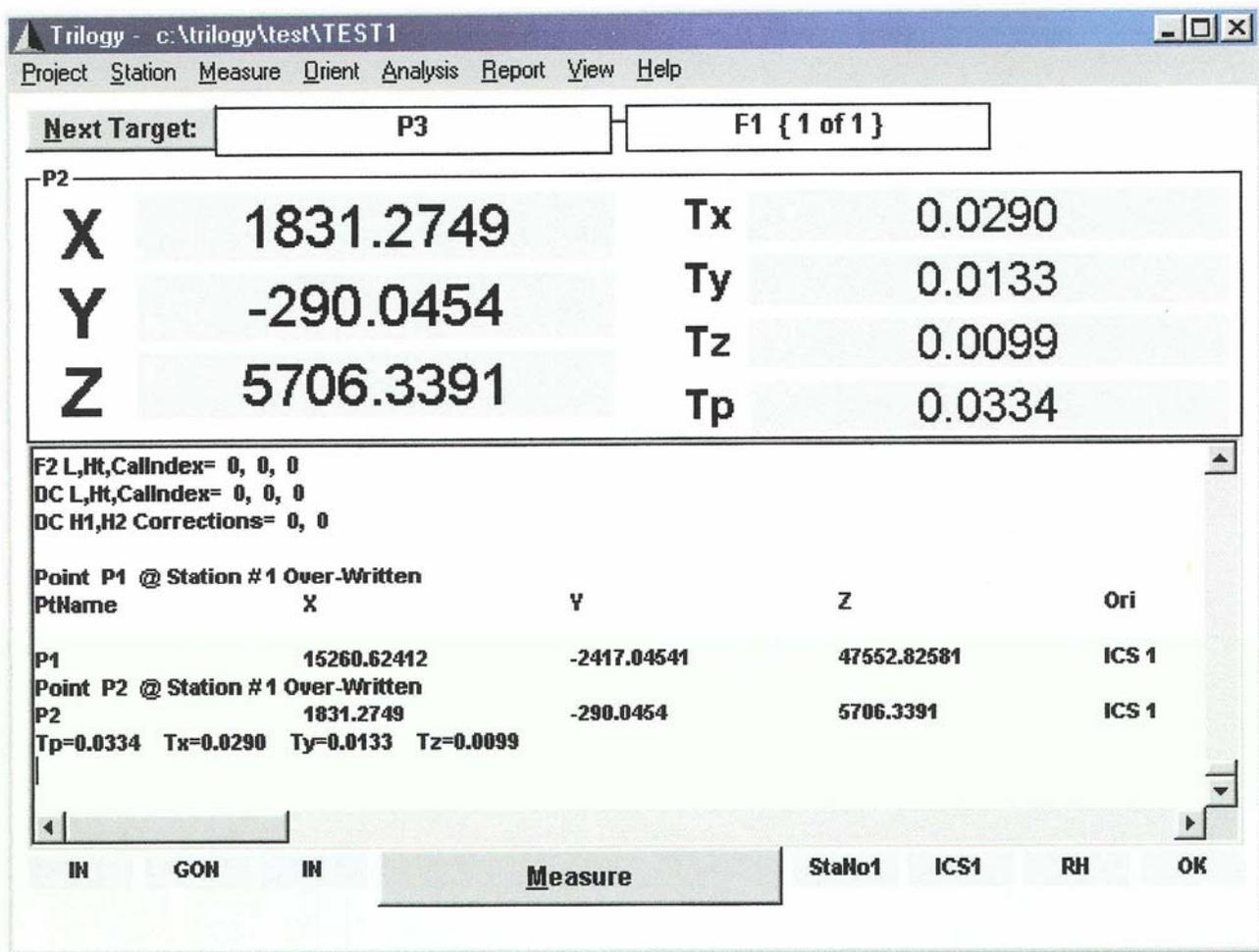
The Laser Tracker performs complex alignments of large parts and assemblies. Measure 3D positions (x, y, z) with extreme accuracy and quickness.

Rapid Warm-up

System Tracker's sealed optical head insures rapid warm-up; Less than 30 minutes typical.

System Software

Advanced feature software provides instrument control, measurement, and analysis for a large array of alignment/measurement projects.



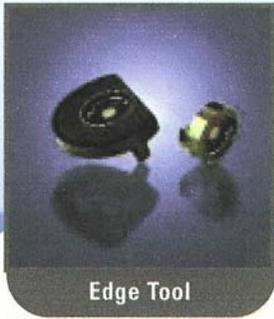
Minimum System Requirements:

- Two angle, or One angle+distance (Total Station / Tracker) digital instrument(s) interfacing to RS-232.
- pc (1.5GHz) running MS Windows 32 bit OS {9x/ NT/2000/XP}
- 512MB RAM
- One Floppy or CD Drive
- One Hard Drive, 50Mb available
- Pointing Device (mouse)
- VGA graphics set to 800 x 600 resolution
- RS232 Serial Port {one COM #1-16 [1-8 laser tracker] per instrument}

Accuracy:

Primarily dependent upon connected instrument accuracy. The greater of +- 1 arc-sec, +- .001 inch capable with appropriate instrumentation.

Targeting



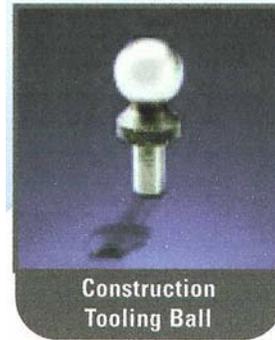
Edge Tool

Measure outer edges with precision. Available in standard and large formats.



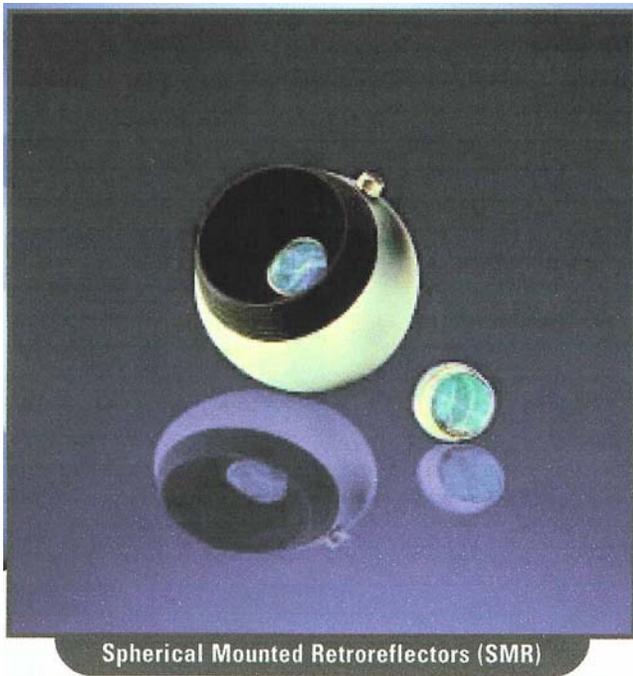
SMR Adapter
 $\frac{1}{2}$ " to $1\frac{1}{2}$ "

Enables the operator to locate a .250 inch SMR in the birdbath or remote home nest.



Construction Tooling Ball

Locate tooling control points quickly and accurately.



Spherical Mounted Retroreflectors (SMR)

Available in multiple sizes to measure different dimensional features.

Hollow Corner Cube

Available in 1.500 & 0.500 inch

0.0005 inch Accuracy

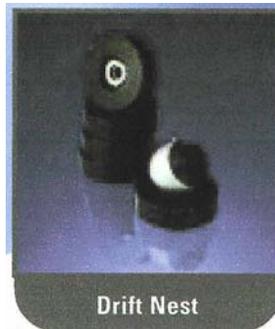
High Precision

Solid Corner Cube

1.500 & 0.500 inch

0.001 inch Accuracy

Rugged Construction



Drift Nest



Pin Nest



Surface Tool

Measure surfaces with greater precision.

0.250 inch Offset

Laser Tracker.

The Laser Tracker offers unmatched performance for your precision measurement tasks. To arrange a demonstration at your facility or to obtain more information on the Laser Tracker, contact one of ASC's offices or representatives listed below or visit our website at www.GoMeasure.com.

Specifications:

Laser Tracker

Maximum lateral target speed > 3.0 meters/sec (120'/sec)

Maximum acceleration > 2 g
in all directions

Range of Measurements

Horizontal: $\pm 300^\circ$ (600° end-to-end)

Vertical: $+ 80^\circ$
 $- 60^\circ$

Distance: greater than 40 meters

Angle Resolution 0.14 arc second

Interferometer Mode

Distance Resolution 0.1/1/10/100 um programmable

Repeatability ± 2.5 ppm (2 sigma)

Absolute Accuracy in 3D Spatial Measurement

Static: ± 5 ppm (2 sigma)

0.001 inch (25um)
at 16 feet (5 meters)

Dynamic: ± 10 ppm (2 sigma)

0.002 inch (50um)
at 16 feet (5 meters)

ADM Mode

Distance Resolution 0.1/1/10/100um programmable

Repeatability ± 25 um

Absolute Accuracy in 3D Spatial ± 25 um to ± 75 um

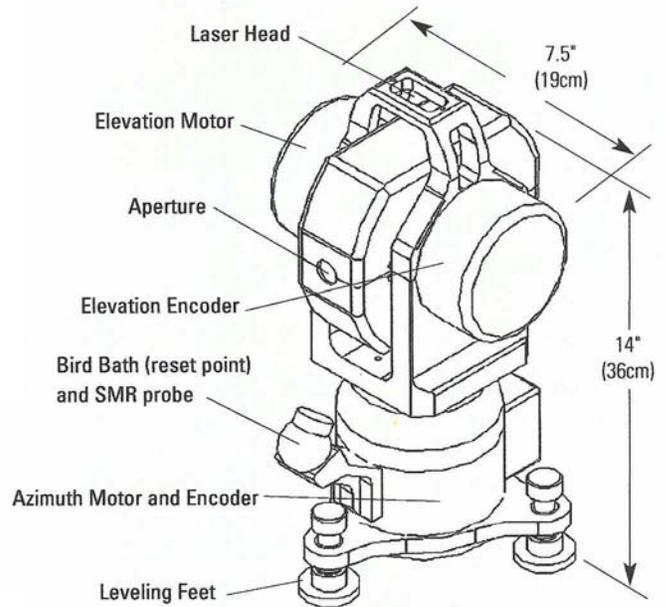
Data Rate 0.1 sec to 0.001 sec

Head Weight 18 lbs

Controller Weight 7 lbs

Total Weight ~ 50 lbs*

*(includes some accessories)



Communication: Serial interface.

All above stated accuracy and repeatability are in compliance with ASME-B89 Dimensional Measuring Standards.

Alignment Services LLC

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USA

307.733.7245

Services On-Site, Equipment Sales, Custom Software.

Specifications Subject To Change Without Notice.

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