

# Survey Feature

## Repeated multiple measurements with FARO Laser Tracker and CAM2 Measure 10 Software

When complex big parts have to be assembled or installed, it is often necessary to understand how they behave with different external conditions and change over time. This is the reason why it is not enough to perform simple measurements to verify, once for all, the object's dimensions. Rather, to properly monitor the changes of the inspected assembly/part, a series of repeated measurements should be performed at defined time-intervals.



### FARO SURVEY FEATURE

With the Survey Feature the FARO Laser Tracker, in combination with the CAM2 Measure 10 Software, provides companies a high accuracy and high repeatability metrology solution that allows to automatically monitor, track and document how multiple critical points of a part/assembly move or drift over time.

Typical applications of this functionality are deformation measurements – caused, for example, by temperature changes, mechanical impacts (pressure and loads), changes in the materials ("creep and shrinkage") – and settlement measurements (variations of machine beds compared to the surrounding building foundation).

### HOW THE FARO SOLUTION WORKS

Depending on the complexity of the part to be measured, users need to determine the optimum number of points to be measured with the Laser Tracker.

It is always desirable to locate the targets in correspondence with the most critical geometrical features of the object. This in particular is important in the event of parts and assemblies with complex surfaces and forms.

Once the points to be measured are defined and the targets are connected, FARO CAM2 Measure 10 (the measuring software that controls the Laser Tracker) can be easily programmed.

The first step is to measure all relevant points and to record their 3D coordinates. Once the coordinates for each point are available, the software has all the spatial information that is necessary to create a programme to automatically perform the measurement of all the different points in sequence to get the drift of each point in 3D dimensions over the time.

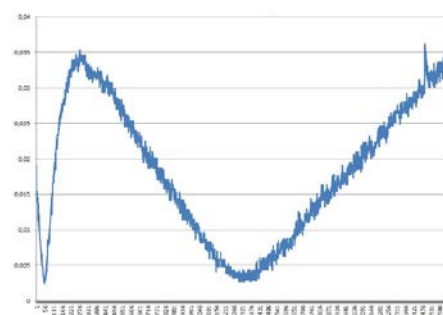
Before starting a complete cycle of measurements, the user can also define the number of times the system has to repeat the same sequence of measurements and the time-interval between one series and the subsequent one. Based on specific application requirements, users can define and set these parameters.

The Laser Tracker is now ready to perform the measurements: it can follow the defined "path" and automatically measure the points at the freely defined time-intervals. FARO Survey Feature allows to monitor, track and document how single points move or drift over time.

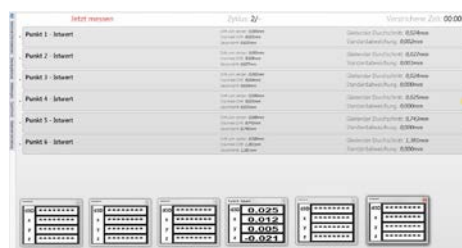
### ADDITIONAL APPLICATIONS

The Survey Feature also allows comparing measured data with nominal values: the system documents any deviations from the defined nominal positions, providing detailed reports that highlight specific information for each point. During the survey it's possible to reposition the device on premeasured fixed points, to assure a stable measurement over time.

Using the jigs and fixtures the FARO Survey Feature makes it possible to measure different specimens of the same parts: once a new specimen has been installed and set up on the jigs the measurement program can be simply repeated. The reports of the measurement results can finally attest that each component was produced or installed according to the given specifications.



Graphical representation of a spatial change in position over time



The screenshot of the survey tool gives a detailed overview of all measurements.

## BENEFITS

- **Efficiency:** A measurement activity consisting of several manual steps can be performed automatically
- **Cost and time saving:** The solution can automatically run outside the "normal" working time (even during the night)
- **Resource-allocation optimization:** Repetitive tasks can be easily performed without the employment of qualified personnel, which can be allocated to more complex tasks

## APPLICATION EXAMPLES

Here below you can read about some typical application examples of the Survey Feature:

### 1. Automotive industry - checking the repeatability of clamping a sheet metal into a welding fixture:

A number of repeatability targets should be spread over the different sheet metal parts. With the FARO Laser Tracker and the Survey Feature, users can check the position of these targets after opening and closing the jig clamps. This allows you to control and monitor the stability of clamping over time.



Observation from different reflectors on the room, to recognize move or drift on-load.

### 2. Machine measurements - checking the 3D behaviour of a machine during warm up:

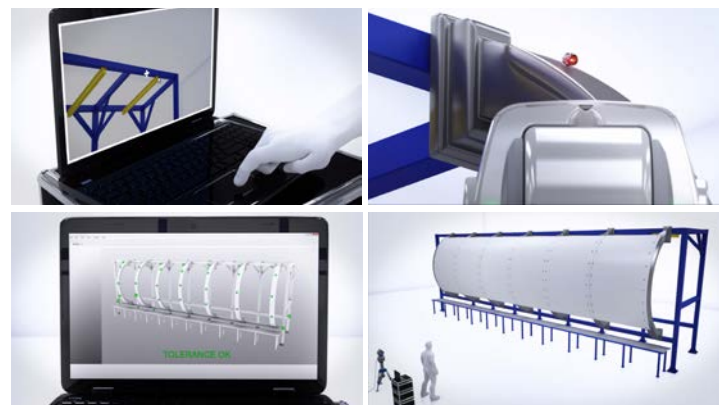
If a machine warms up over time e.g. during production cycles, with the Survey Feature you can now check how the positions of some applied targets change over time. Furthermore, users get a report with a graphical representation of the different positions in Excel or text format.

### 3. Stiffness of parts or fixtures:

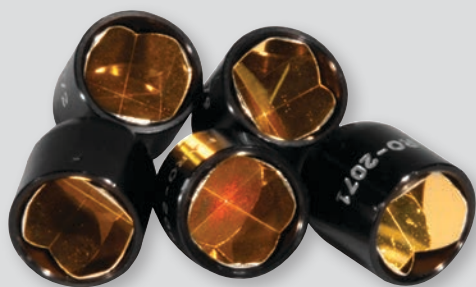
Inspect any part over time with a wide range of targets to realize bending, torsion or other 3D-movements. Machined parts, welding constructions or base frames can change, if a mechanical force influences the 3D geometry.

### 4. Machining, Metalworking & Assembly – Tool Making:

The example illustrated by the small graphics below is about aircraft manufacturing and shows deformation measurements of the tool on which parts of the planes (fuselage) are assembled. It shows how the Survey Feature can be used as a direct, systematic and intuitive solution for recording, monitoring, controlling and reporting geometric changes as part of a complex production process.



Key steps of the measurement procedure with the FARO Laser Tracker and CAM2 Measure 10 Software: identification and measurement of targets, measurements of points after installing a part on the fixture, reporting on measurement results with the final certainty to have your part manufactured to a higher standard.



## FARO REPEATABILITY TARGETS

Regardless of how accurate the laser tracker is, the quality of the measurements is directly affected by the precision of the target. The FARO Repeatability Targets are ideally suited for measuring tasks executed with the Survey Feature.

FARO's low-priced reflectors for repeated measurement ensures repeatability regardless of the pointing angle from the laser tracker.