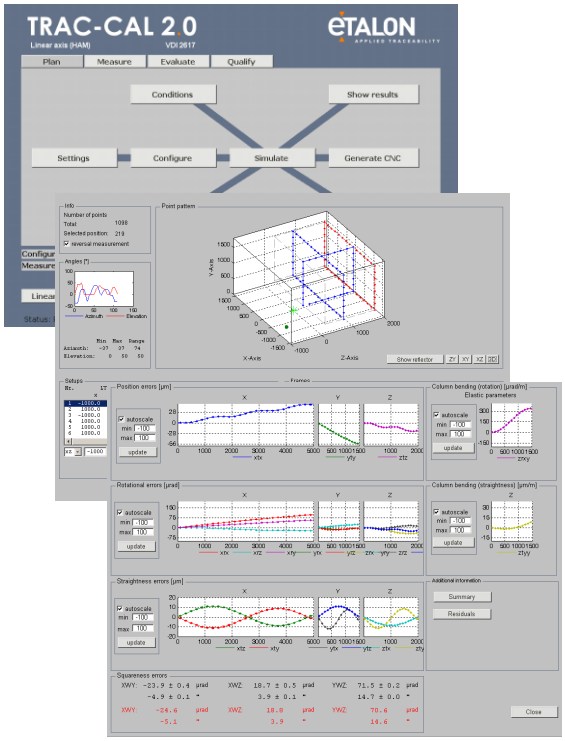
TRAC-CAL

Calibration of Measuring Machines and Machine Tools



TRAC-CAL is a revolutionary method for spatial calibration and verification of measuring instruments and machine tools of all sizes.

The method can be performed with a conventional laser-tracker (Leica, Faro) as well as with the ETALON LaserTRACER. The LaserTRACER is especially designed for this application. The method is based on the sole of interferometric measurement of spatial displacements and doesn't need angular information or additional measurement implements. Thus, it does not require any precise adjustment or positioning and can be performed by a trained machine operator after a short instruction time.

In contrast to methods observing directly the physical motion of the kinematics, the method is also suited for monitoring already numerical corrected machines.

- Module Plan and Features
- Graphical tool to Create the machine program
- Display of the Results

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Principle of Measurement

The laser-tracker or LaserTRACER is placed sequentially at different positions inside or close to the working volume of the machine without a precise alignment. A reflector is mounted to the tool or probe fixture of the machine. The laser interferometer of the laser-tracker or LaserTRACER automatically tracks the reflector and the machine is moving through a set of positions in a spatial grid. At each grid position, the machine stops and the associated length is measured.
A large number of length measurements at least at four different positions are carried out in an automatic mode. Using these measurements, the parametric errors of all machine axes are determined by an intelligent evaluation procedure. Position, straightness, pitch, yaw, roll and squareness of all axes are determined with highest accuracy. For horizontal arm machines the elastic deformation of the column are evaluated automatically.

Compensation data for several types of controller can be obtained easily.

Application Areas

Verification and calibration of CMMs and machine tools of every size and accuracy class.

Software Features

- High-precision calibration of position, straightness, squareness, pitch, yaw and roll as well as the elastic parameters of a horizontal arm CMM
- Flexible adaptation to different machine types
- Interface to the LaserTRACER and conventional laser-tracker (Leica, Faro)
- Forecast of the achievable accuracy in the simulation mode
- Automatic generation of the required machine control code for the measurement
- Control of the machine during the verification of the machine for a number of interfaces (including I++)
- Direct feedback on the machine repeatability and the quality of the acquired data during the measurement
- Automatic evaluation of the measurements and graphical visualisation per mouse click
- Qualitative validation of the results by simulated performance evaluations
- Output of a complete error map

System requirements

- Processor: at least 1 GHz
- RAM: at least 512 MB
- Free hard disk space: 250 MB
- Graphic card resolution: 1024 x 768
- Operating system: Windows XP or VISTA
- Port: two free USB
- Reporting reader: Microsoft Word 2003 or higher

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