I++ Simulator
Online simulation in the virtual laboratory
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Realistic planning, effective programming, dynamic documentation and cost-effective analysis

The I++ Simulator is a metrology simulation software and a feasibility and planning tool for the quality control department. Real laboratory situations, visualised in 3D, make it possible to create an authentic machine situation. The user programs the part as if he is working on a real machine. In other words, he works on a virtual machine, which mimics the real machine, with his existing metrology software. Offline becomes online programming. The machine jog box is replaced by a conventional gamepad.

Advantages

- Reduced programming capacity
- Optimisation, plausibility and transparency of the measuring process
- Quick and economical feasibility studies
- Reduced machine downtime
- Prolonged machine accuracy by avoiding collisions

Application

For programmers, planners and decision makers:

- Offline programming
- Access, collision and measuring volume checking
- Modification and optimisation of existing programs
- Transposing programs to other machines and machine types
- Training
- Layout planning – virtual laboratory
- Feasibility studies – virtual made reality

The I++ DME interface

The I++ Simulator is based on the independant I++ DME interface. As such, the I++ Simulator operates as a I++ server and machine in one software package – independent of the metrology software. The I++ Simulator can be used with every I++-conform metrology software (I++ client).

As a result, multiple programs for the same part, increased programming capacity, program redundancy and incompatibility of results can all be avoided.
The I++ Simulator is a cradle-to-grave tool, covering equipment planning, applications simulation and 3D online process visualisation.

**Planning phase**
The I++ Simulator takes over the cost-intensive preparation: scanning, self-centering, rotary tables, tool changers etc. can all be realised offline.

**Large machines and heavy parts**
Can be programmed efficiently without having to resort to cranes, ladders, mirrors etc.

**Small machines, small parts and small tools**
Can be programmed without using a magnifying glasses and breaking tools.

**Planning and feasibility studies for various machines and manufacturing processes**
Fast and economical tool configuration selection.

**Laboratory with heterogeneous measuring equipment**
A simulation system for optimising the measuring process for different machine types.

**Training**
All aspects of coordinate metrology can be practiced offline, without damaging a real machine due to "real" collisions.
The simple, intuitive I++ Simulator user interface can be used to replicate real laboratory set ups. The investment costs for setting up a measuring station are reduced significantly.

**Library of commonly available machines**
Hexagon Metrology (DEA, Leitz, Brown & Sharpe), Wenzel, Zeiss, etc.

**Comprehensive sensor and tool libraries**
Hexagon Metrology (TESA, Leitz), Renishaw, Zeiss, etc.

**Accessories library**
Tool changers, rotary tables, etc.
The I++ Simulator has a variety of tools for the virtual 3D representation and simulation of real applications, including the import and export of simulation data.

**Collision monitoring**
Collision monitoring between the following components: Sensor system, part, fixture, rotary table and tool changer

**Gamepad as jog box**
For teach-in programming

**CAD-import**
Import from parts, fixtures, tools etc. in different formats (IGES, STEP, STL, VRML)

**Kinematic option**
Configuration of machines, rotary tables and loading systems which are not available in the standard libraries.

**Tool component modelling**
Special tool geometries can be created using parameters or directly from the CAD model.

**Zoom and camera functions**
The measurement can be observed from any angle using the camera functions.

**Video export**
The simulation can be exported in AVI format.

**Tactile measuring methods**
Known/unknown contour scans, rotary table scanning, sweep scanning, helical scanning, self centering, single points.

**Script editor**
Part loading and storage equipment can be simulated using scripts.
The tried and tested solutions from Hexagon Metrology PTS GmbH (formerly Messtechnik Wetzlar) can be implemented quickly and easily in the I++ Simulator. In addition to component visualisation, the behaviour of automatic loading systems can also be simulated. This feature completes the simulation of the entire measurement process and goes far beyond the limits of traditional off-line simulation.

Example of a real-world scenario with a large bridge CMM (Leitz PMM-G 80.40.30) and air conditioned room. What makes this room special is the movable roof section for loading large components.

Measuring room with a soaking chamber for part acclimatisation prior to measurement.

Leitz SIRIO SX with an automatic loading system for measuring cylinder head and Blisk components. The measuring range (purple cube) can be used for identifying any health and safety issues.
Loading systems and fixtures

Using the I++ Simulator for collision analysis only makes sense when all of the components involved in the measuring process are included in the scenario. The standard library contains all of the loading systems and devices necessary to simulate a complete system.

Fixturing for typical powertrain components, such as cranks, rods, heads etc. are utilised in the I++ Simulator on a day-to-day basis.

Automatic loading systems provide a high degree of automation and unattended part processing. To ensure a smooth implementation, the process can be simulated prior to installation. Of course, manual fixturing and loading systems can also be integrated into the simulation.
Hexagon Metrology PTS GmbH

PowerTrain Solutions

Hexagon Metrology PTS GmbH develops metrology turnkey-solutions focussing on powertrain applications. The company is responsible for the measuring software QUINDOS which impresses with an unrivalled number of options and long-term compatibility. Hexagon Metrology PTS GmbH offers a whole portfolio of application services such as consulting, analysis, part programming and training. This includes the development and supply of tailor-made peripherals, such as climate rooms, loading systems, pallet storage systems and fixturing.

Hexagon Metrology

Hexagon Metrology is part of the Hexagon AB Group and includes leading metrology brands such as Brown & Sharpe, CogniTens, DEA, Leica Geosystems (Metrology Division), Leitz, m&h Inprocess Messtechnik, Optiv, PC-DMIS, QUINDOS, ROMER and TESA.

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