Adopting New Technology: Laser Scanning CMM

Intro's and Overview:

- Rick is going to talk about how Solar adopted a "new" technology to help make our lives easier
- Kris is going to explain the technology, and the many ways it can be used.

Take Away:

- This technology may not benefit your business.
- The concept of adopting “non-rotomolding” technology is something you should consider.
- In order to drive rotomolding forward it’s my opinion that rotomolder’s need to identify and embrace technology that is aimed at the general manufacturing sector.

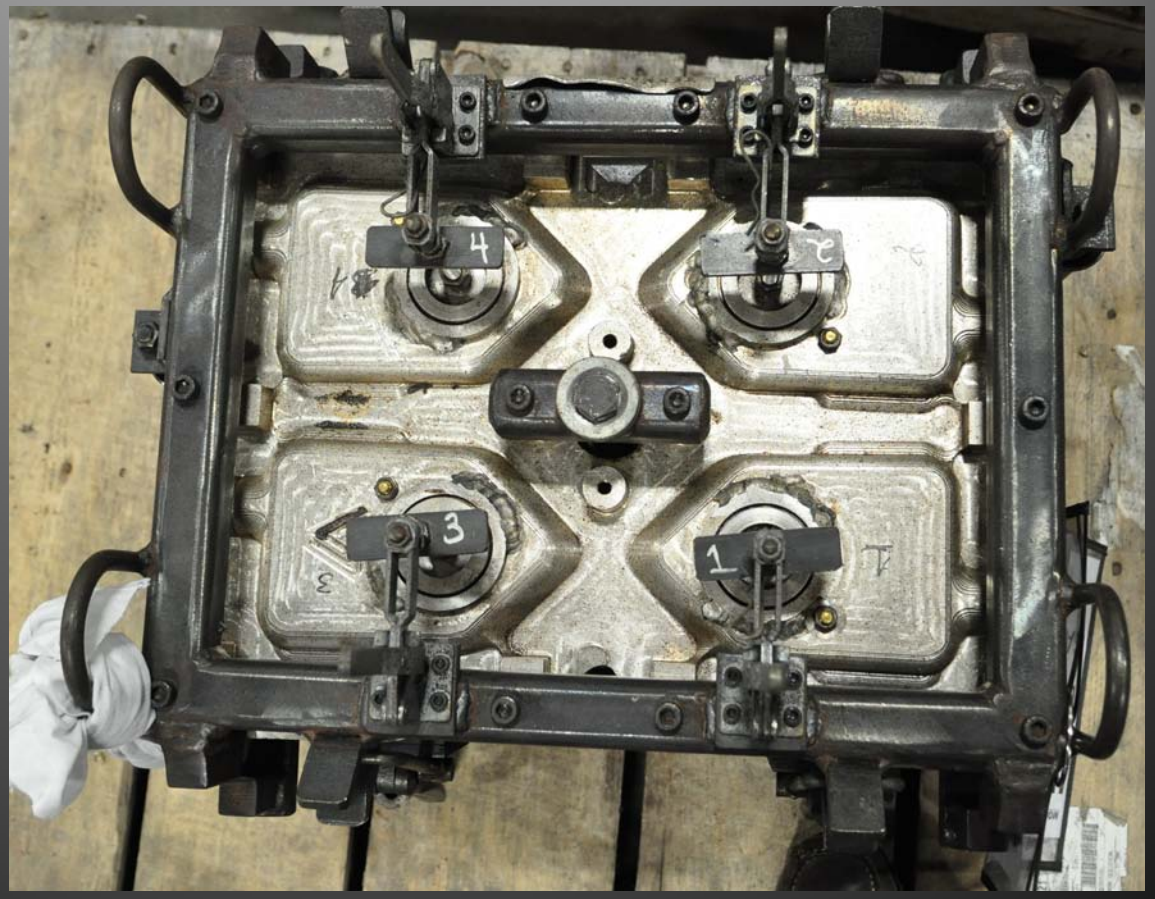
My Challenge to You:

- Seek out the right technologies that will help drive your business.
- Engage with other members to solve common problems.

The Topic –Laser Scanning Coordinate Measuring Machines.

What Do We Measure?

- Molds



What Do We Measure?

- Molds
- Parts

What Do We Measure?

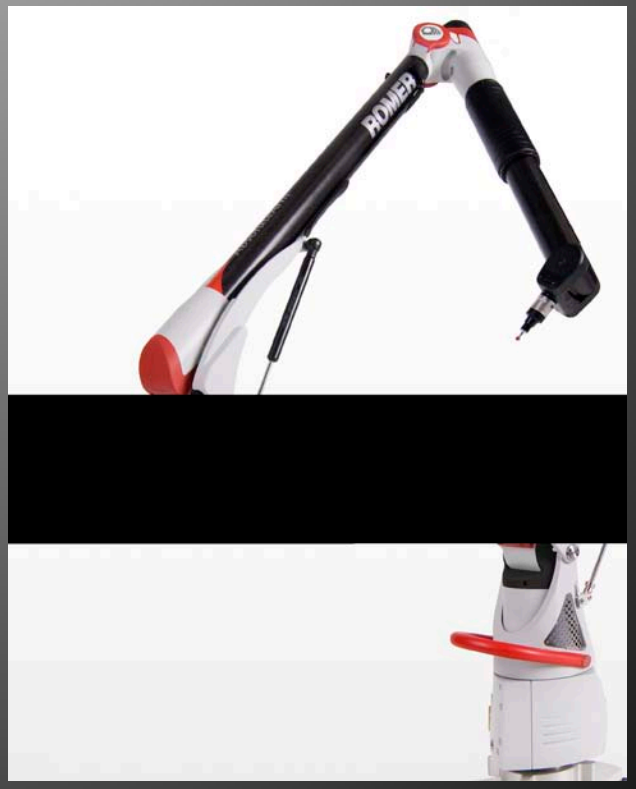
- Molds
- Parts
- Fixtures

Measuring Tools

- Tape measure
- Caliper
- Utlrasonic Gauges
- Coordinate Measuring Machine (CMM)

A Quick History

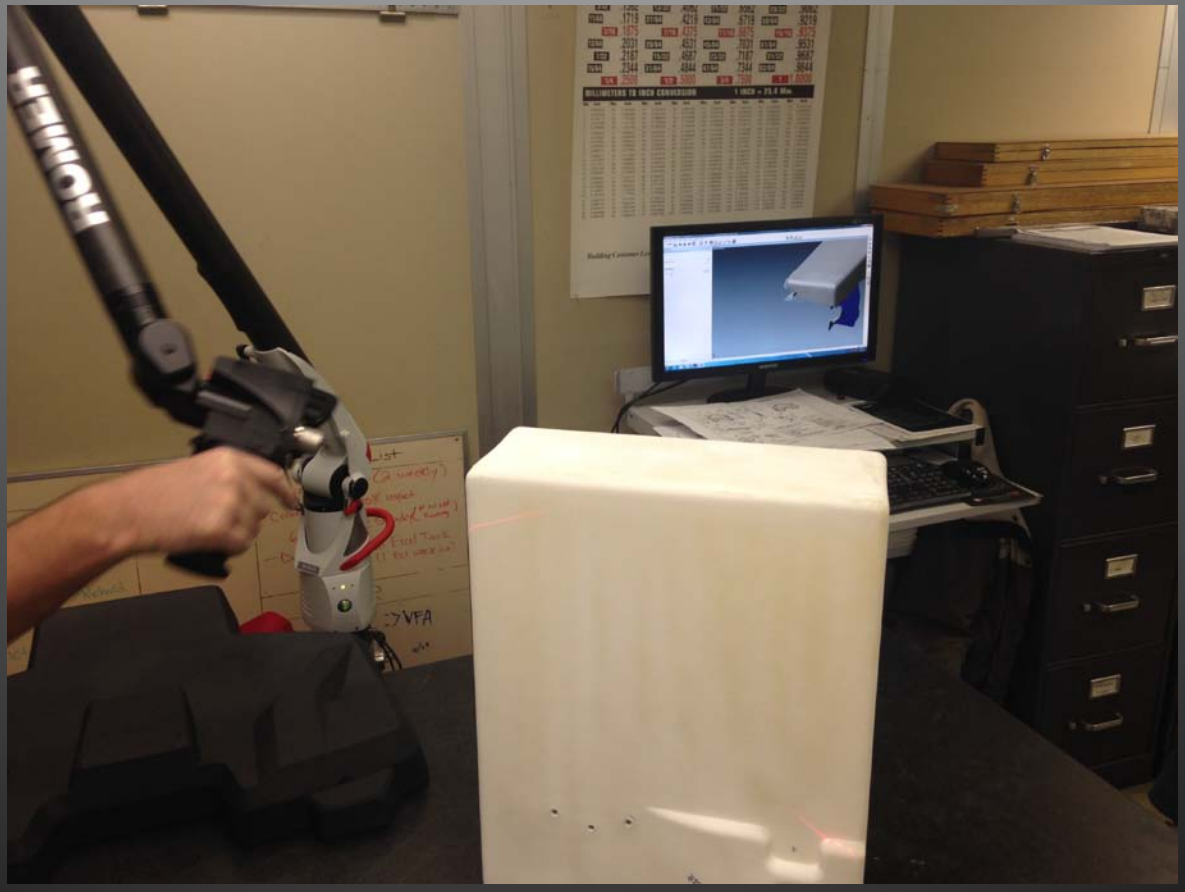
- Solar has been using contact probe style CMM's for 15+ years
- It has become increasingly difficult to align measurement results with customer's results (GD&T)

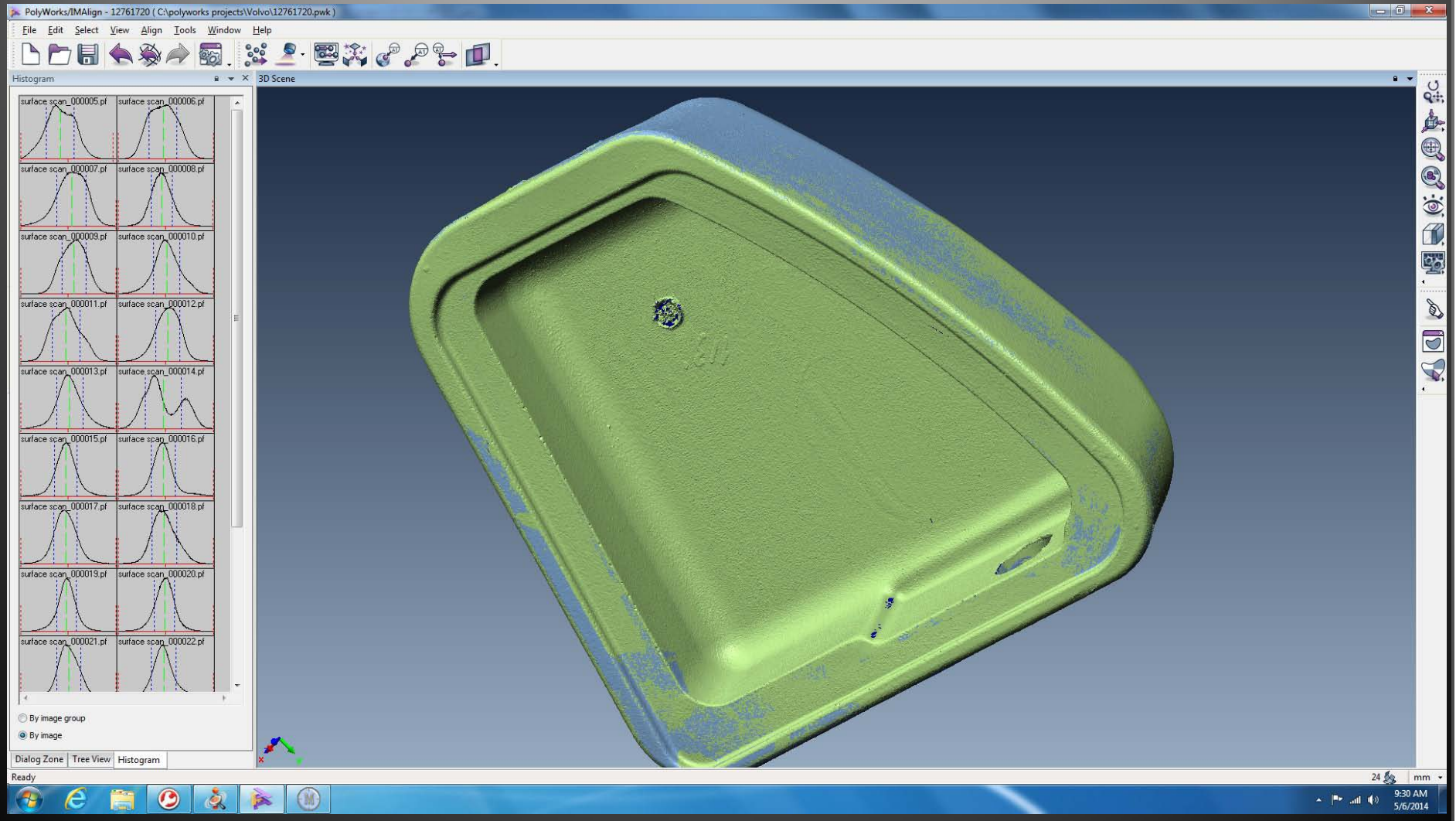


Our old system…

- Was open to operator error
- Was subjective and open to interpretation
- Produced static data.

We needed a better way to measure

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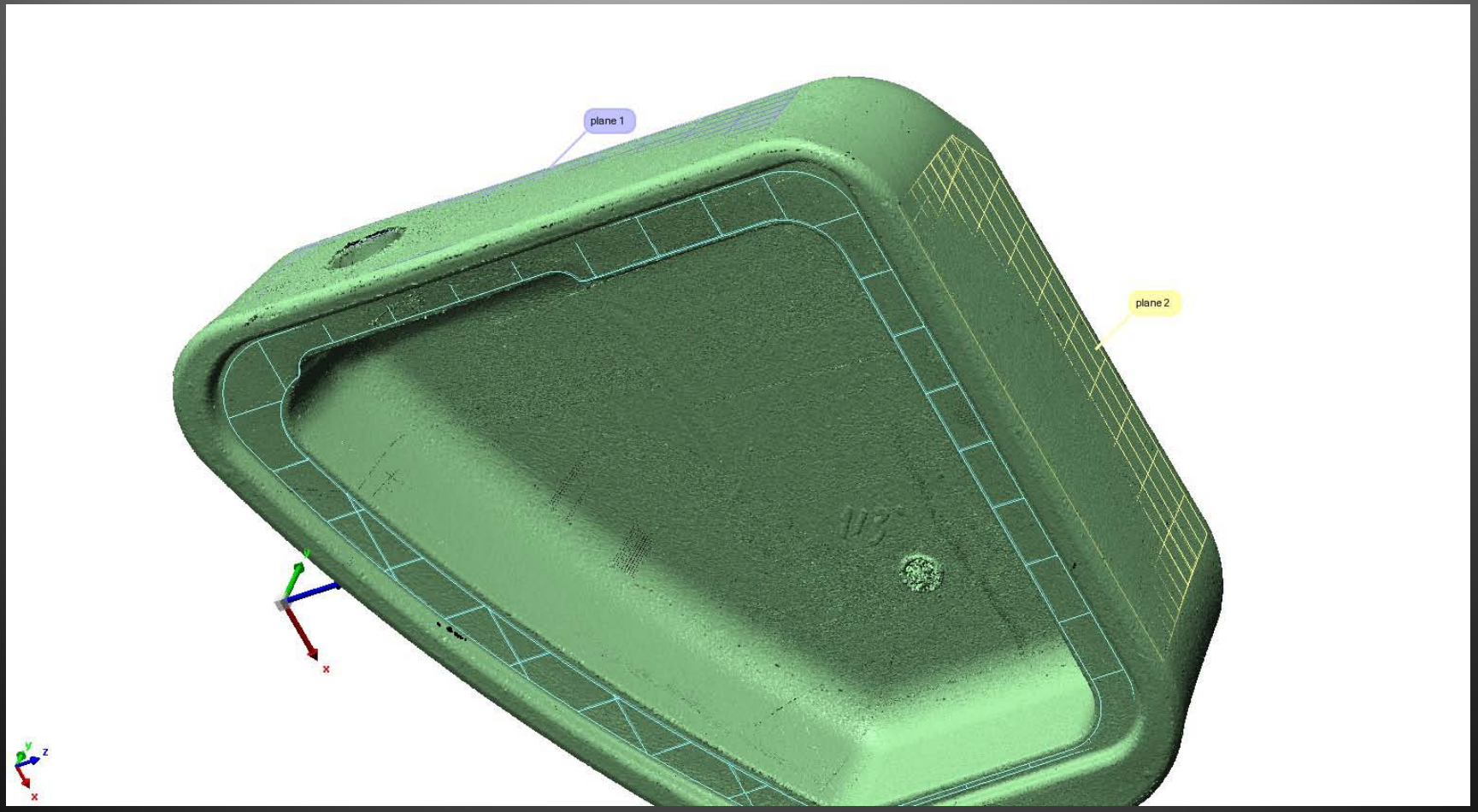
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Benefits:

- More reliable data (millions of data points v. <100)
- Scans are saved for future reference.
- System generated Initital Sample Inspection Reports (ISIR's)
- Faster for multiple part inspections

Untested Benefits:

- Long term comparative data
- Scanning for reverse engineering and prototyping.
- Others?

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Scanning Technologies

Handheld Scanners

Common specifications	
Ability to capture texture	**Yes**
3D resolution, up to	**0.1 mm**
3D point accuracy, up to	**0.05 mm**
3D accuracy over distance, up to	**0.03% over 100 cm**
Texture resolution	**1.3 mp**
Colors	**24 bpp**
Light source	**blue LED**
Working distance	**0.17 – 0.3 m**
Linear field of view, HxW @ closest range	**90 mm x 70 mm**
Linear field of view, HxW @ furthest range	**180 mm x 140 mm**
Angular field of view, HxW	**30 x 21°**
Video frame rate, up to	**7.5 fps**
Exposure time	**0.0005 s**
Data acquisition speed, up to	**1 000 000 points/s**
Multi core processing	**Yes**
Dimensions, HxDxW	**190 x 140 x 130 mm**

Optical Tracker with Laser Scanning

-Tracks infra-red led targets on scanner head

-large volume up to 35 cubic meters

-solid state tracker with no moving parts

-dynamic part referencing allows movement during the scanning process

-Perceptron laser scanner allows system to scan at rates up to 458,000 pts/sec

-Accuracy of +/- .002in to +/- .005in

Portable Laser Scanning Arms

- Fully integrated– no additional cables or controller box
- 50,000 points per second scanning
- Semi-automatic laser power and exposure control
- No warm-up time
- Scanning system certified to B89.4.22
- Scanning and probing interchangeable, automated probe recognition
- Available in measuring ranges from 6.6 ft (2 m) to 14.8 ft (4.5m)

White Light Scanners

-Available in 1.4, 4, & 8 megapixel configurations

-Projects fringe patterns of structured light onto part and high resolution cameras capture 3D data

-Various volumes ranging from 30mm up to 1500mm

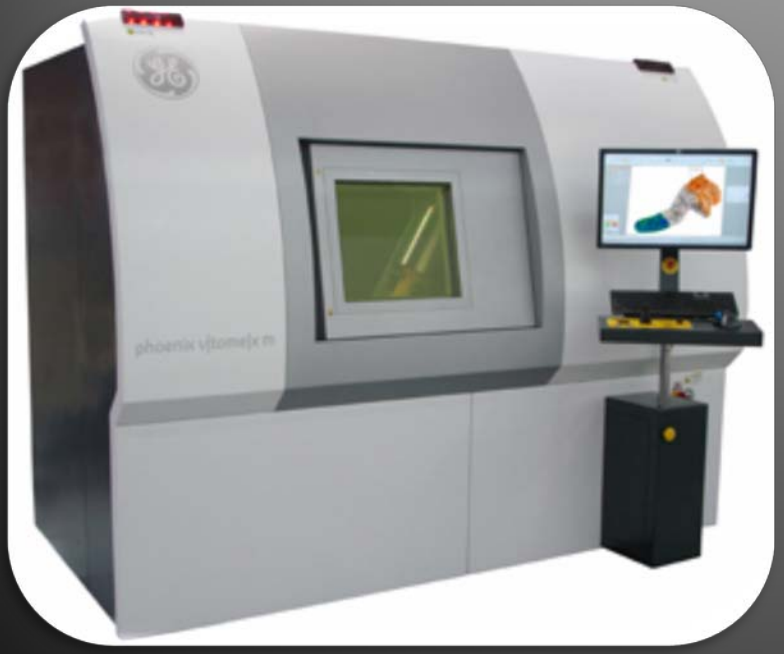
-Carbon fiber construction

-Accurate to +/- .0005in

-fast acquisition time(1 second per shot)

-Primarily used for airfoils and medical parts

CT Scanning



-used mainly for plastics, composites, aluminum, and magnesium

-radiation protective enclosure

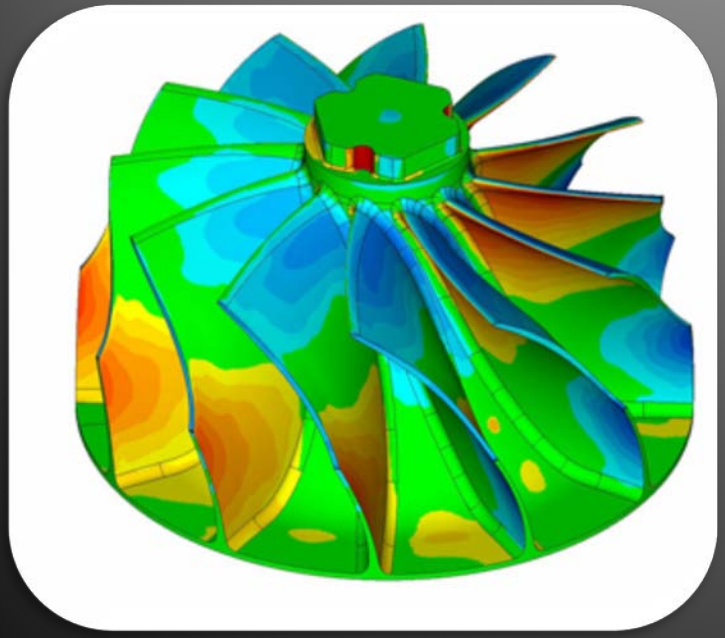
-complete full internal and external scan without destroying part

-accuracy of up to +/- .0005 in

-perfect for finding internal defects

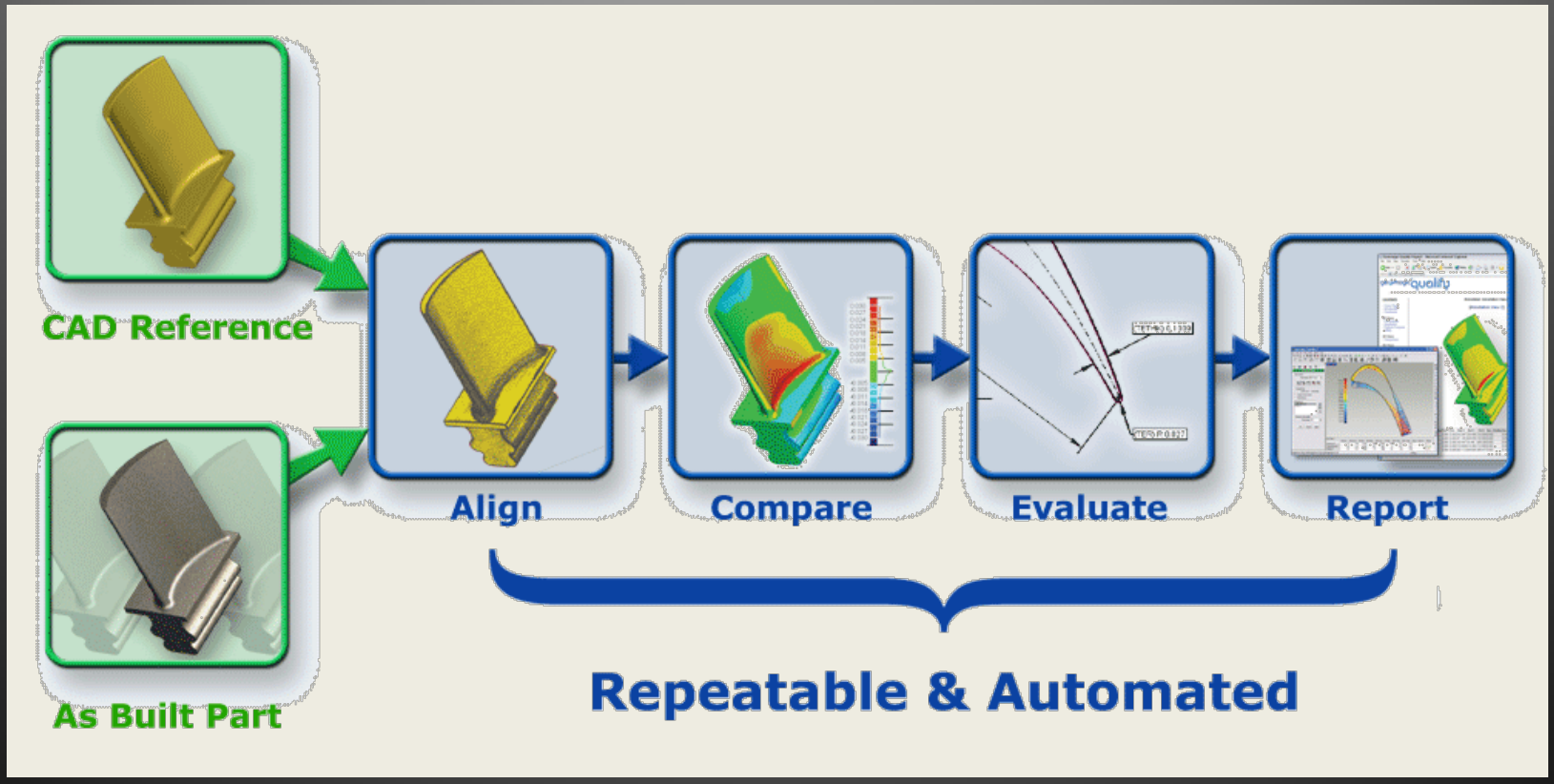
Now that we have the Data, what do we do with it?

Inspection

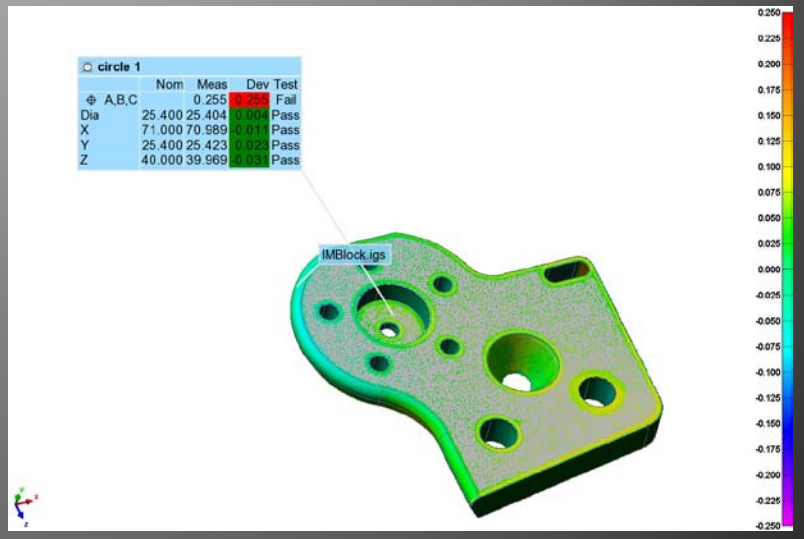


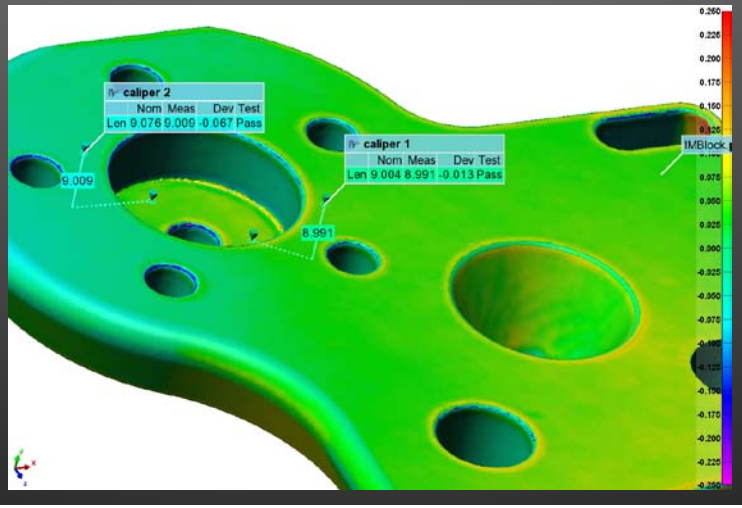
Reverse Engineering

Inspection Workflow

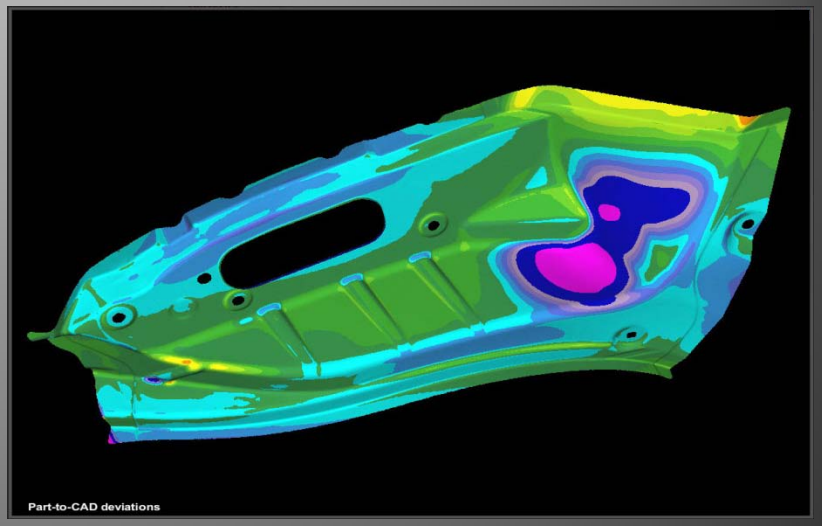


Color Maps, Features, GD&T, Gauges

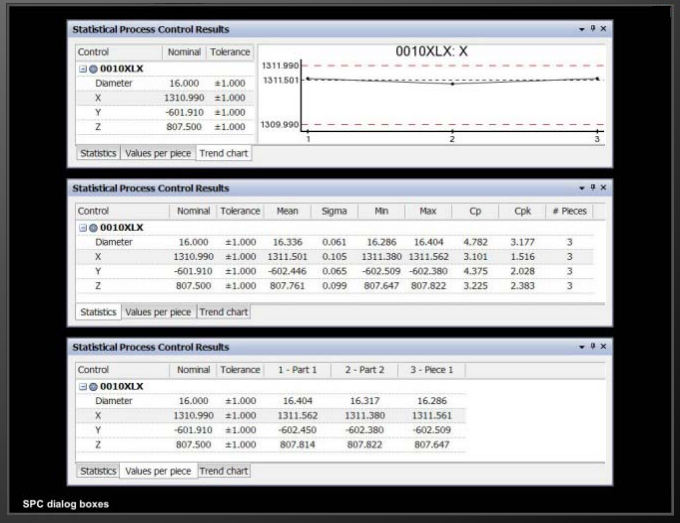




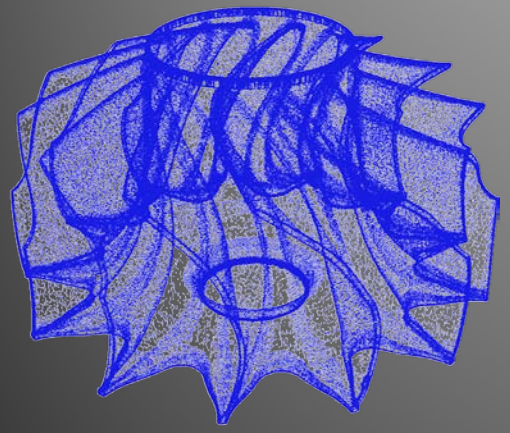
Reporting



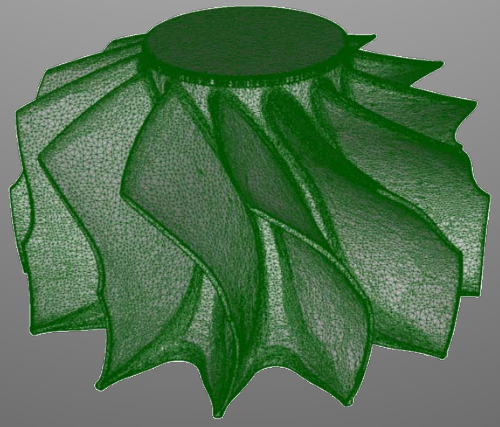
- Automatic Generation
- Customizable Formats
- Support of HTML, PDF, MS Word, MS Excel, CSV formats
- 3D VRML Result Model
- Batch processing of multiple parts
- Automatic analysis and report creation
- Trend analysis



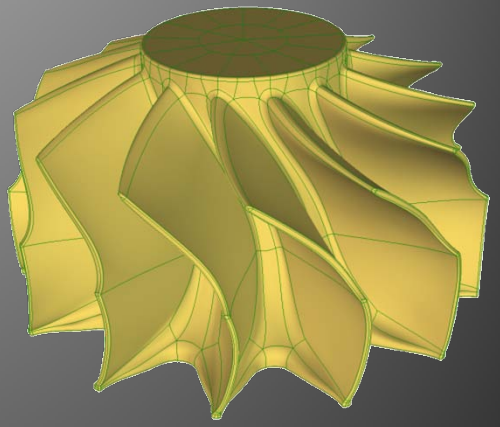
Reverse Engineering-Exact Surfacing



Point Cloud

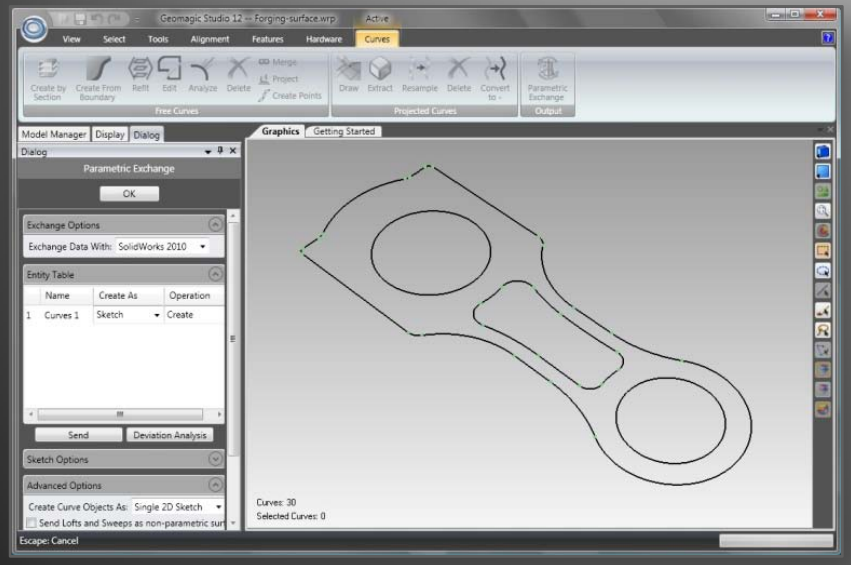


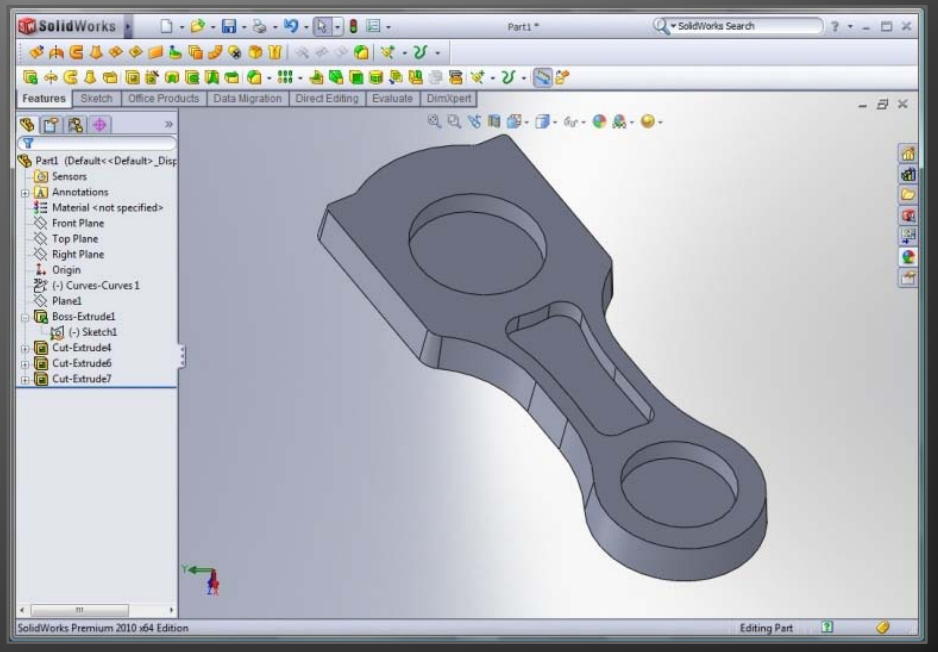
Meshing
(STL)



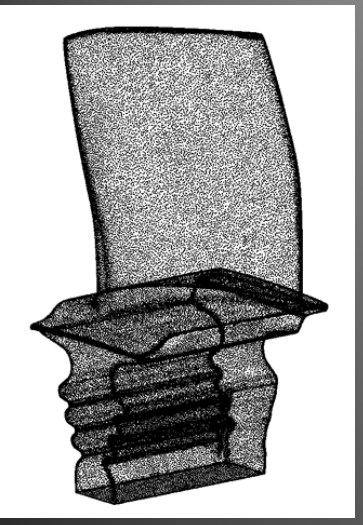
Surfacing
(IGES, STEP)

2D Sketches Exported to CAD



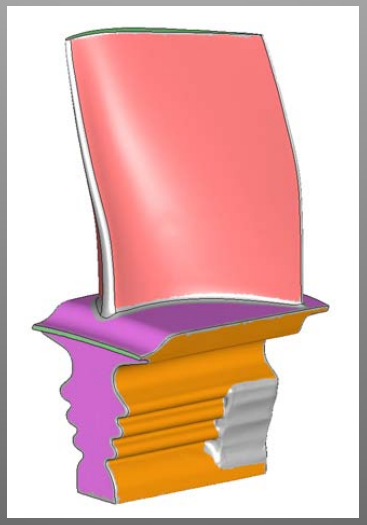


Parametric Modeling



Scan Object

Convert to Polygon



Classify Regions

Create Surfaces

Convert to Parametric CAD Model

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For more information, come visit us

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