

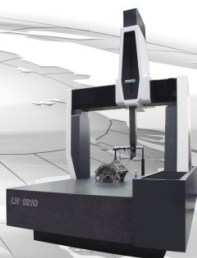
Technology Review

A 7-Systems Analysis

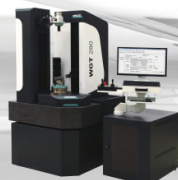
*Seven Measurement Systems,
One 3D-printed part, ALL the answers.*

Innovative Metrology & Styling Solutions

Phone 248.295.4300



3D Metrology



Gear Metrology



Styling Solutions



Optical High Speed
Scanning



Computed
Tomography

Technology Review

A 7-Systems Analysis

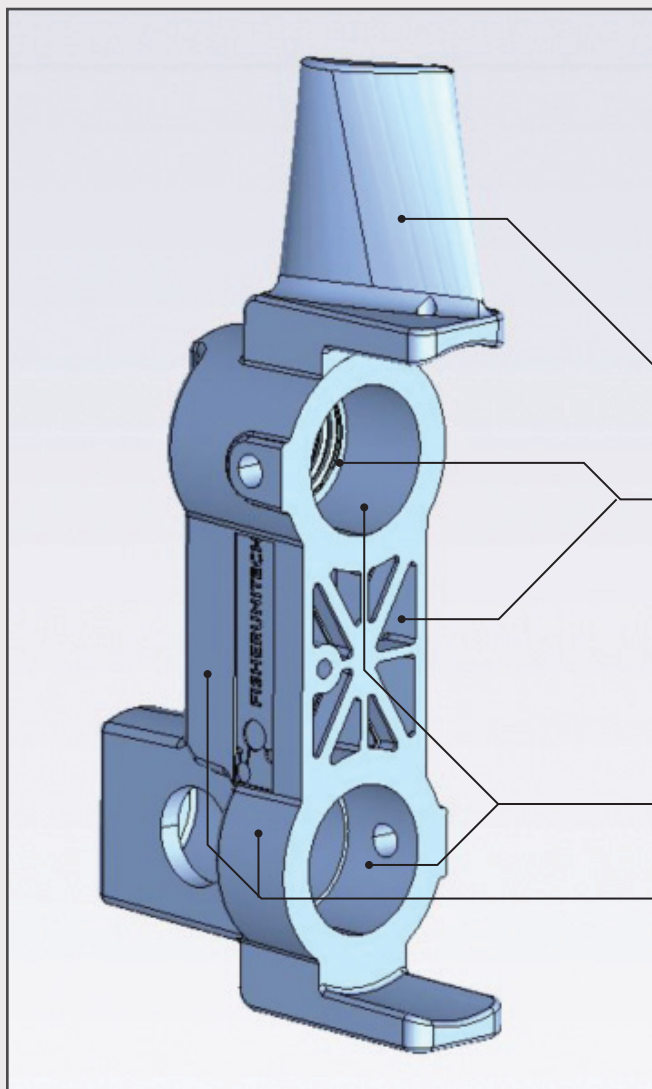
Thank you for downloading the Wenzel Technology Review

The world of Quality, Inspection, and Metrology is a broad one, with different meanings to almost everyone. Add to that dozens of companies, hundreds of measuring technologies, and thousands of possible applications and finding the best measuring tool available can be quite daunting.

This guide serves as a compilation of data that quantifies the strengths, weaknesses, and ideal uses of a suite of metrology tools and technology in a variety of applications. Its goal is simply to summarize the abilities of Wenzel's most prominent CMM products to aid in the decision making process of purchasing a new CMM machine.

[Now on to the Review](#)

Introducing the Application Roadmap



In order to aid consumers in understanding their products, Wenzel created a single, 3D-printed part to gauge all of their major measuring tools and metrology technologies in a controlled way. This allowed Wenzel to demonstrate the strengths and weaknesses of their machines in four major areas of application:

- *Airfoil Features*
- *Internal Features*
- *Prismatic Features*
- *Freeform Features*

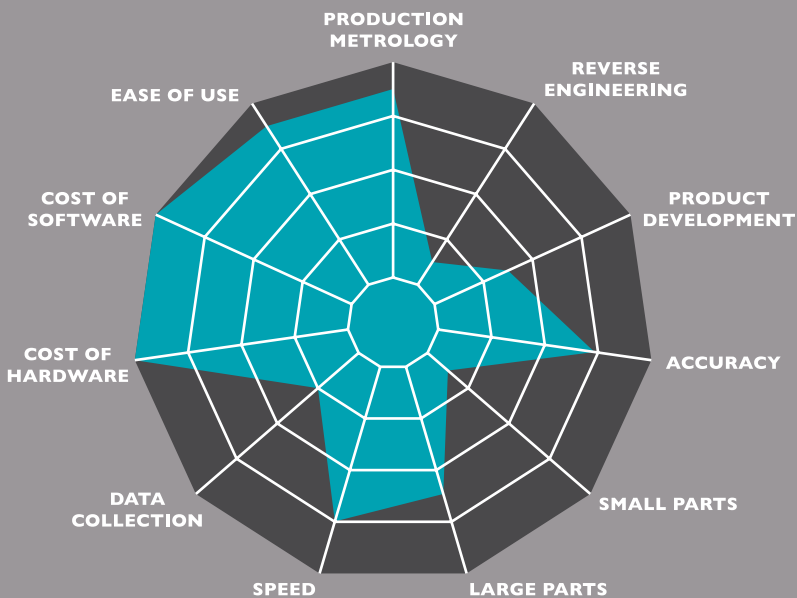
Tactile Measurement Sensors



Touch Trigger CMM - XO CMM with PH20

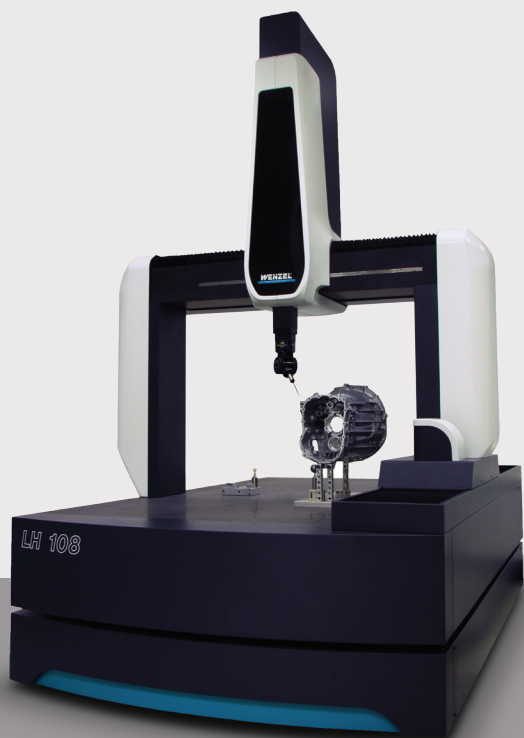
- Low cost of ownership
- Good at a wide variety of applications
- Well-established best practices
- Typical Application: Job Shop Machining

APPLICATION REPORT



CYCLE TIME: 4m 30s | **AVERAGE DATA / FEATURE:** 75 points

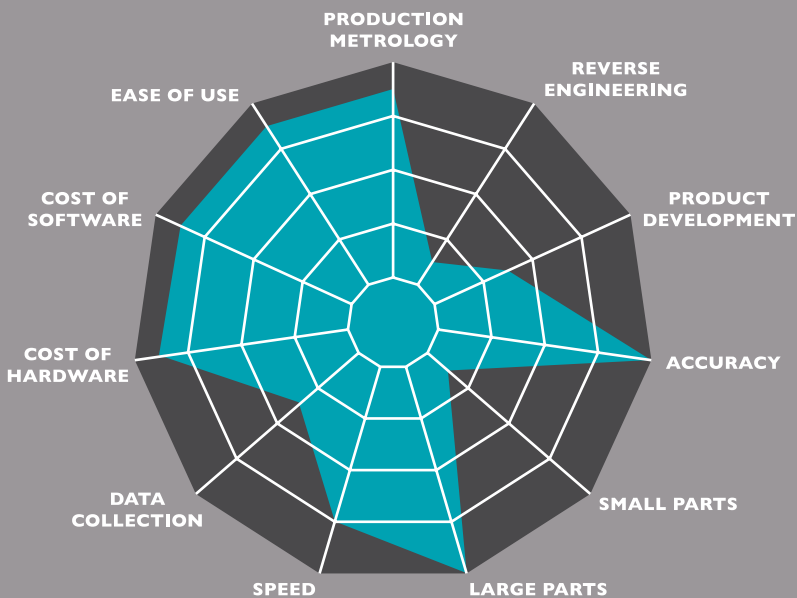
Tactile Measurement Sensors



Tactile Scanning - CMM LHG CMM with PH10M & SP25

- Measures deeper features
- Good at a wide variety of applications
- Low measuring uncertainty
- Typical Application: High Precision Machining

APPLICATION REPORT



CYCLE TIME: 5m 16s | **AVERAGE DATA / FEATURE:** 1000 points

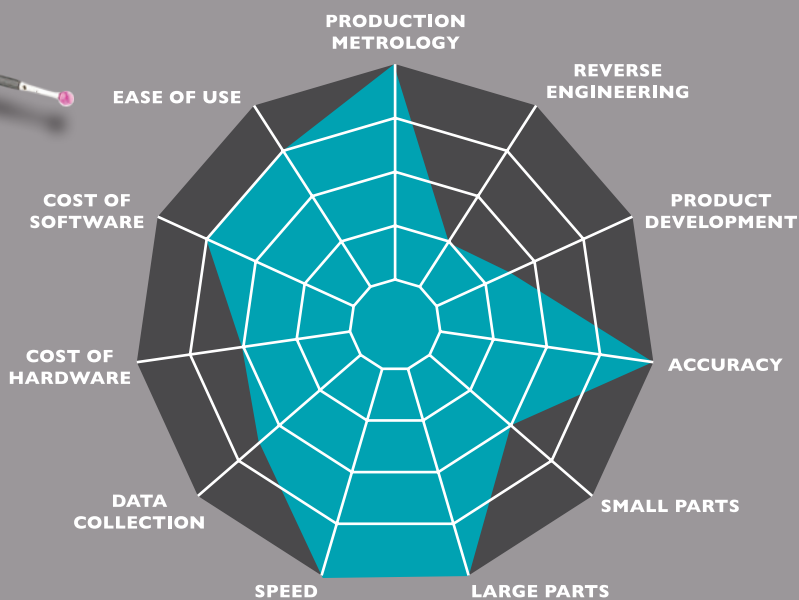
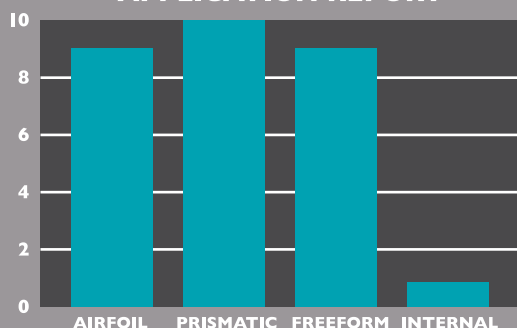
Tactile Measurement Sensors



5 Axis Scanning REVO on LHG

- World's fastest contact scanning at 500mm/s
- Infinitely positionable
- Can carry long styli up to 800mm
- Typical Application: Powertrain & Turbomachinery

APPLICATION REPORT



CYCLE TIME: 2m 43s | **AVERAGE DATA / FEATURE:** 1000 points

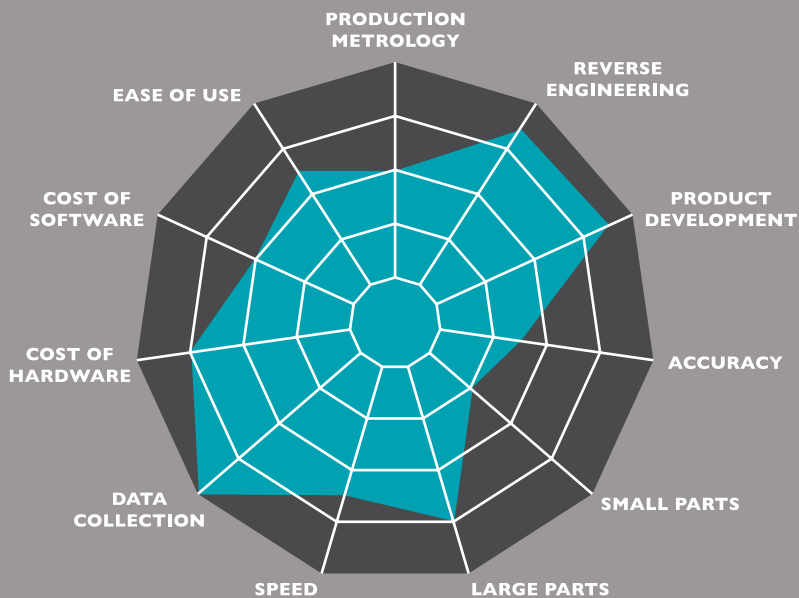
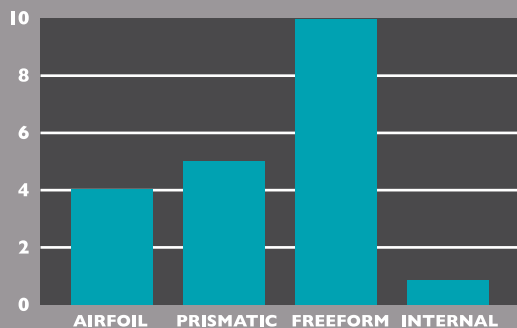


Non-Contact Measurement Sensors

Laser Scanning - Shapetracer on X0plus with PH10M

- High data collection rate
- Very good at freeform shapes
- Great for reverse engineering
- Typical Application: Painted Sheet Metal & Trim Components

APPLICATION REPORT



CYCLE TIME: 14m 42s | **AVERAGE DATA / FEATURE:** 20,000 points

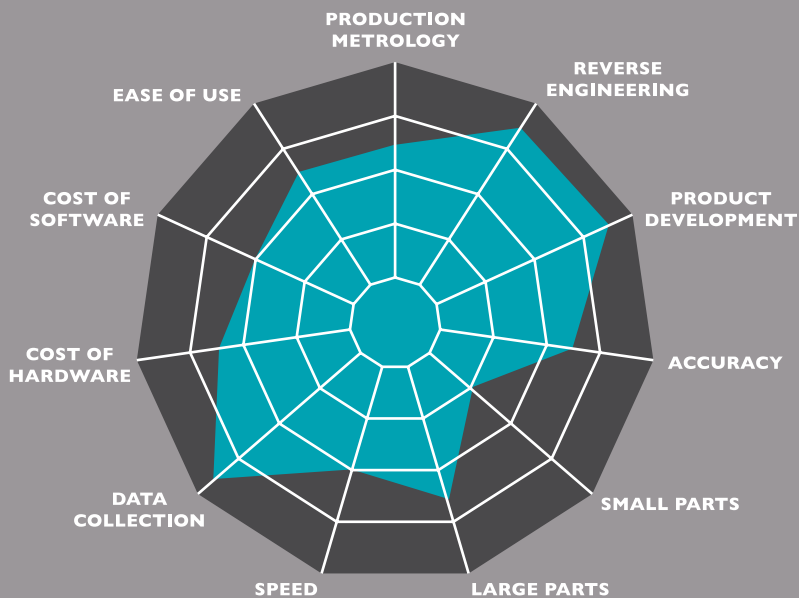
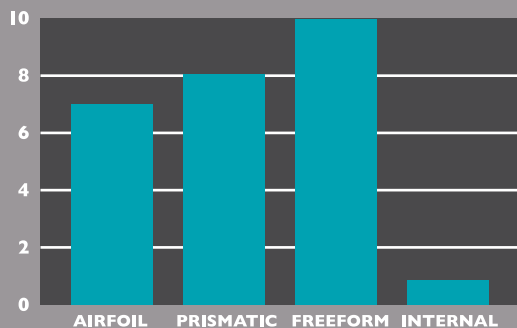
Non-Contact Measurement Sensors



White Light Inspection - Phoenix on XOplus with PH10M

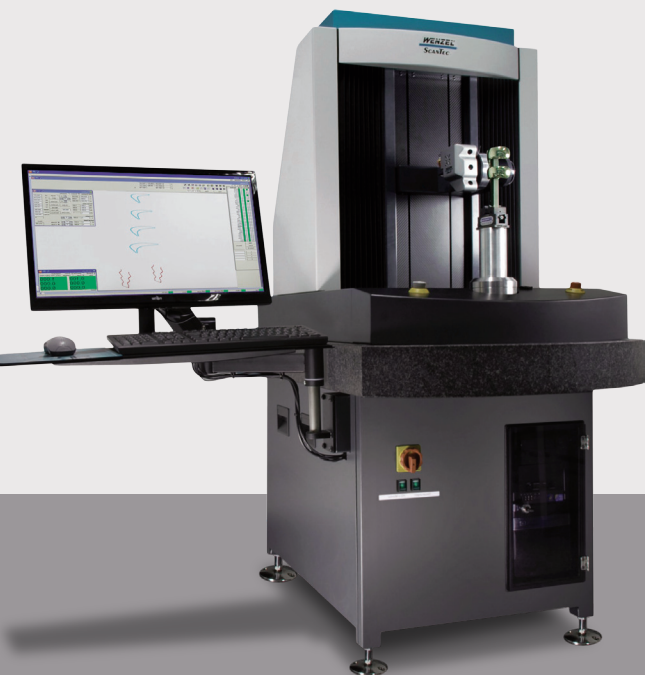
- Good for prismatic and freeform shapes
- Measures different surface types
- High Data Density
- Typical Application: Car Body & Airframes

APPLICATION REPORT



CYCLE TIME: 7m 23s | **AVERAGE DATA / FEATURE:** 150,000 points

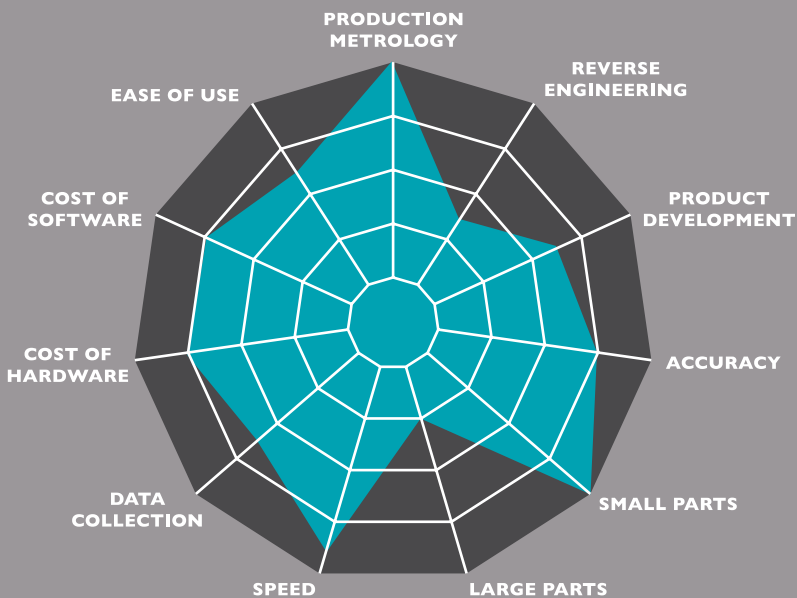
Non-Contact Measurement Sensors



High Speed Scanning - CORE DS

- Zero cosine error
- Measurements always 'in plane' unlike contact systems
- Cycle times twice as fast as contact scanning systems
- Typical Application: Turbine Blades

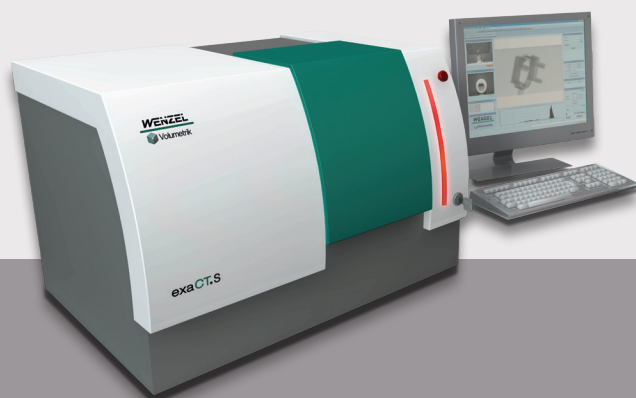
APPLICATION REPORT



CYCLE TIME: 7m 23s | **AVERAGE DATA / FEATURE:** 150,000 points

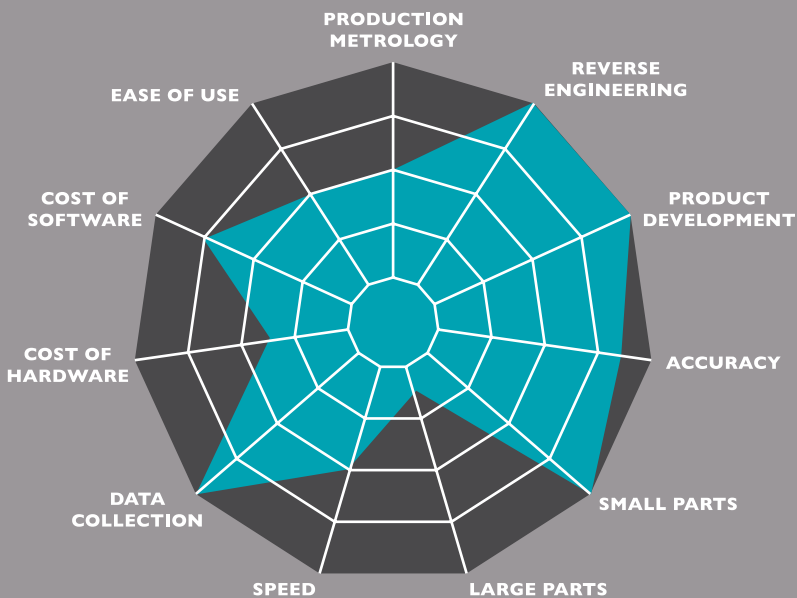
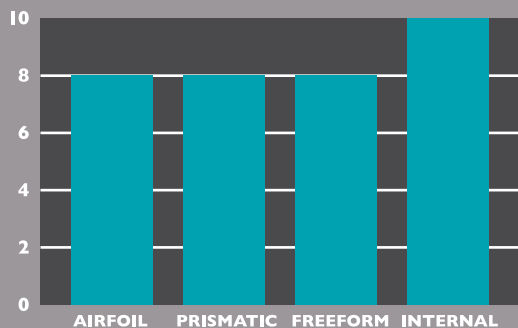
Computed Tomography

Computed Tomography - exaCT



- Ideal for measuring intricate parts
- Measures both internal & external features
- Perfect for reverse engineering
- Typical Application: Complex Parts with Internal Features

APPLICATION REPORT



CYCLE TIME: 45m | **AVERAGE DATA / FEATURE:** 46,000,000 points

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Technology Scorecard

Items Ranked from 01 to 10

10 = Ideal Solution

01 = Not the Right Solution

		TTP (PH20)	SP25	Shapetracer	Phoenix	REVO	CORE	CT
Application	Production Metrology	9	9	6	7	10	10	6
	Reverse Engineering	3	3	9	9	4	5	10
	Product Development	5	5	9	9	5	7	10
	Accuracy	8	10	5	7	10	8	9
Flexibility	Small Parts	3	3	4	5	6	10	10
	Large Parts	7	10	8	7	10	4	3
	Speed	8	8	7	6	10	9	6
	Data Collection	4	5	10	9	7	7	10
Cost	Cost of Hardware	10	9	8	7	6	8	5
	Cost of Software	10	9	6	6	8	8	8
	Ease of Use	9	9	7	7	8	7	6
	Average	7	7	7	7	8	8	8
	Total	76	80	79	78	84	83	83

Technology Summary

Tactile Measurement Scanners:

CMM with PH20



- Jack-of-all-trades
- Affordable
- Flexible

CMM with SP25



- Accurate
- Deep Reach, scanning
- Reasonable price

REVO - 5 Axis Scanning



- World's fastest contact scanning at 500mm/s
- Infinitely positionable
- Surface finish capability

Non-Contact Measurement Scanners:

Shapetracer



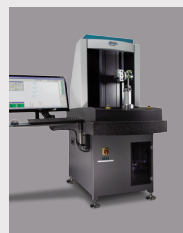
- Affordable Laser
- Reverse Engineering
- Good for metrology use

Phoenix



- Accurate point cloud collection
- Prismatic Measurement
- Both in one sensor

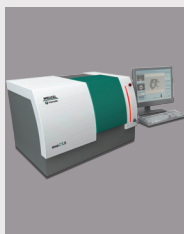
Core



- Zero cosine error
- Measurements always 'in plane' unlike contact systems
- Cycle times twice as fast as contact scanning systems

Computed Tomography:

exaCT



- Desktop and full-size models available
- Captures part DNA
- ALL features, ALL data from completed, working part