AGENDA

- Creaform
- HandySCAN:
  - How it works
  - Applications
- Surface inspector 2.0
- Case Studies
- Questions / Demo
CREAFORM: MANUFACTURER OF PORTABLE 3D MEASUREMENT SOLUTIONS
A WORLD-CLASS METROLOGY LEADER

Applications:
- Quality Control
- Reverse engineering
- NDT

Industries:
- Aerospace
- Automotive
- Consumer products
- Manufacturing
- Heavy industries
- Medical
- Oil and gas
- Power generation

- Founded in Quebec
- 2002
- 2013 NDT Division
- 2011
- 100 M$
- 25% growth/year
- 450 Employees worldwide
- 200 CAD and metrology experts
- 7000+ HandySCANs
- Part of Ametek Group
- Creaform
QUALITY CONTROL / REVERSE

- Quality Control:

- Reverse engineering:
LARGE AREA SCANNING
PORTABILITY ANYWHERE

- Anywhere around the aircraft
- Inside, outside (daylight)
- Alignment with UT data
**TRUPORTABILITY: SELF-POSITIONING DEVICE**

- Human factor controlled
- Optimal Stand-off distance / Live feedback
- **Intelligent acquisition method**

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[Images of self-positioning 3D Scanner and Real Time Surface Rendering]

**CREAFORM**

**AMETEK® Ultra Precision Technologies**
**TRUACCURACY: HIGH QUALITY RESULTS**

- HandySCAN’s accuracy is independent of the user (30μm = 1.2 thou)
- HandySCAN’s resolution (up to 50μm = 2 thou) refers to the level of details that the sensor can acquire:
  - Set by inspector
  - Organized mesh output (.stl)
TRUACCURACY: HIGH QUALITY RESULTS

- On site calibration
- Extra fast calibration +/- 30 secs
- Traceability of calibration plate
- Similar to calibration block with UT devices
SIMPLEST POSSIBLE WORKFLOW

1. Surface acquisition (30 secs/m²)

2. Surface reconstruction/extraction of inspection data (1 min)

3. Reporting (seconds):
   • PDF or spreadsheets, editable
   • Damage characterization
   • Skin waviness (2D depth mapping)
HOW IT IS MEASURED?

- **Reference surface reconstruction** based on the curvature around the damaged area *(only good material is used as reference)*

- The reference surface is then compared to the measured data

- This allows **versatile** measurements on **any kind of surface** (convex, concave, **free form**…)

  - No limitations/error compared to pit gauge measurements
  - Results are not user dependent

Reconstructed reference surface

Depth
WHAT IS MEASURED?

- Specific damaged area dimensions (length, width, depth, A/W ratio)
- Localization of **deepest point over a specified area**
- **Position** of the damaged area
- **2D depth mapping**
- Replaces pit gages, calipers, measuring tape, etc.
**TRUSIMPLICITY: SIMPLEST POSSIBLE WORKFLOW**

- 4 clicks around the area of interest (single or multiple defects)
- Automatic surface reconstruction and measurement extraction
- Automatic report generation
  - Report personalization on the fly
  - Possibility of adding annotations and distances
SURFACE INSPECTOR 2.0

- Add automatically
  - Measurements
  - Dents
  - Snapshots/images
  - Grids with deepest point
- Set thickness
- Auto rebuild report
SURFACE INSPECTOR 2.0

Deepest Point 1

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<td>X</td>
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<td>Y</td>
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Dent 1

AW_Ratio: 44.249

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<td>Width</td>
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CASE STUDY AND EXAMPLES
CASE STUDY: DENT IN ENGINE AREA

- **Simple setup:** scanner, laptop, battery
- **Human factor controlled**
- **Benefits:** high analytical accuracy, repeatability, traceability, portability and ease of use
CASE STUDY: FIND DEEPEST POINT ON PART

- Scan whole fin which suffered mechanical damage
- Reconstruct surface
- Deepest point coordinates and value calculated
- 80% reduction in time compared traditional method
  4-5hr/m² ➞ 15 min/m²
- Completely automated process
CASE STUDY: SKIN WAVINESS

- No operator error
- Insured repeatability, accuracy and speed
- Automatic depth mapping measurement (any grid size)
- Digital record available

**Applications:** RVSM certification, doublers, patch repair measurements...
QUESTIONS? / DEMO