‘Go/No-Go’ 3D digital dent-mapping:

Achieving consistently accurate SRM compliant results that accelerate turn-around time

Arun Chhabra, Pia Böttcher, Erik Klaas

September 21-24, 2015

“Don't bend to technology.

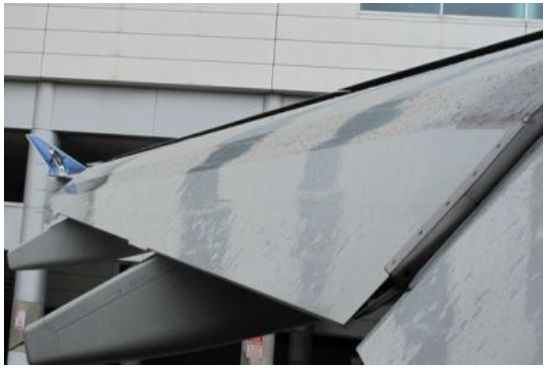
Bend technology to your needs”

- Jason Pontin

MIT Technology Review

The Dent-mapping Problem

The Challenge	The Ideal Solution
Achieve *reliable*, *accurate* and *objective* - Dent-mapping & assessment - Corrosion Blend-out	Real-time. Boosts inspection efficiency
	Reliable & Consistently Accurate
	Comprehends SRM limits
	Instant Answers…not just data
	Portable. Field-friendly. Zero Learning Curve
	No Surface Preparation needed



Hail Damage

Damage due to ground equipment

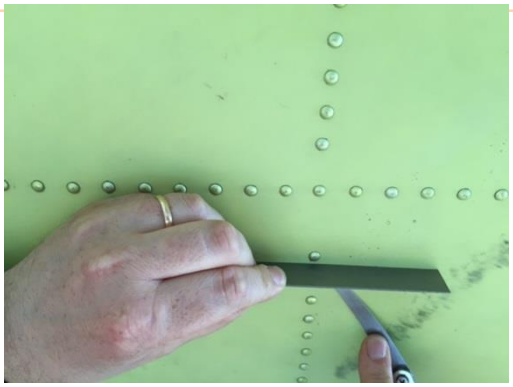
Lightning strike

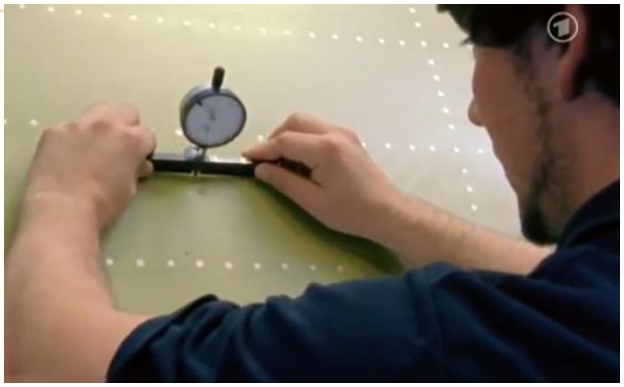
(Image Source: Boeing)

Customer Experience Today

3D Inspection Tools for dent mapping

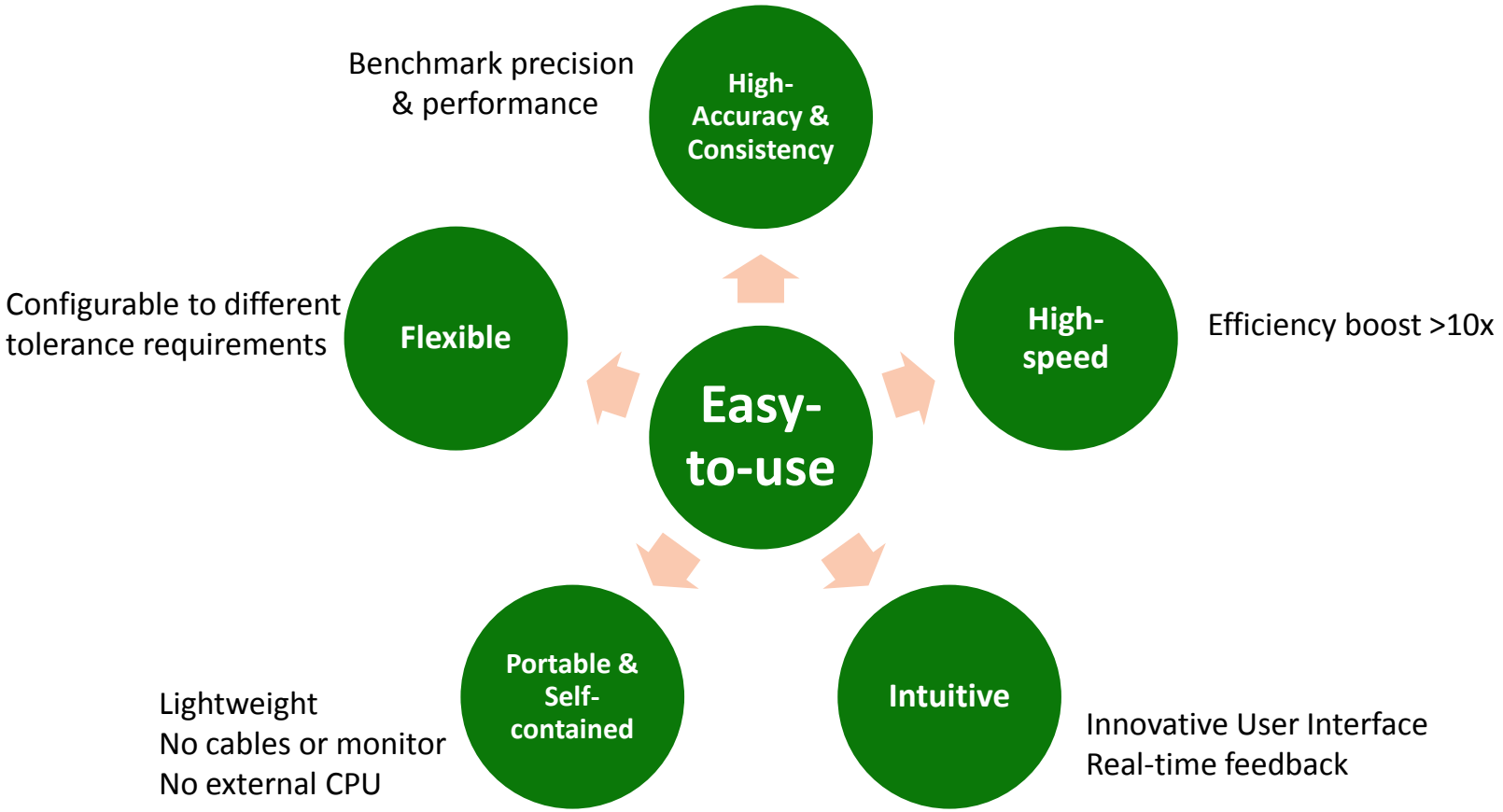
What customers demand	What customers must tolerate
Ease of use	Difficult learning curve
Accuracy	Complex tools & menus
Consistency	Long interpretation time
Reliability	Subjectivity & Human-error





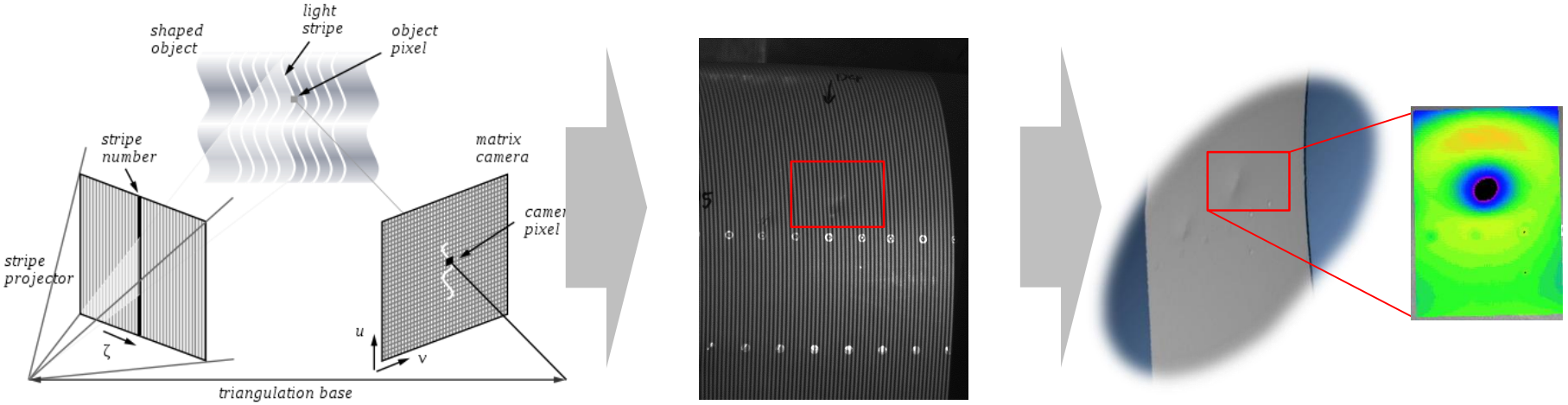
Empower the Operator

Delivering a Better Experience



Principle of Operation

Structured Light Scanning



Triangulation Image courtesy Wikipedia

Sequence of encoded stripes projected on target surface

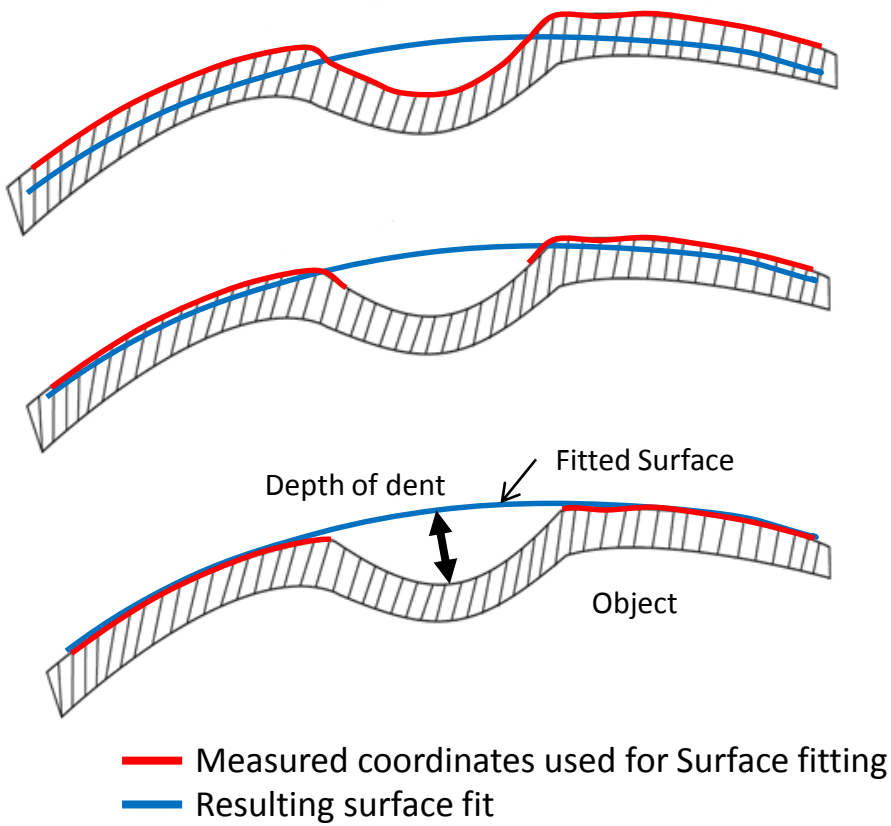
Stripes deform as per 3D features of object

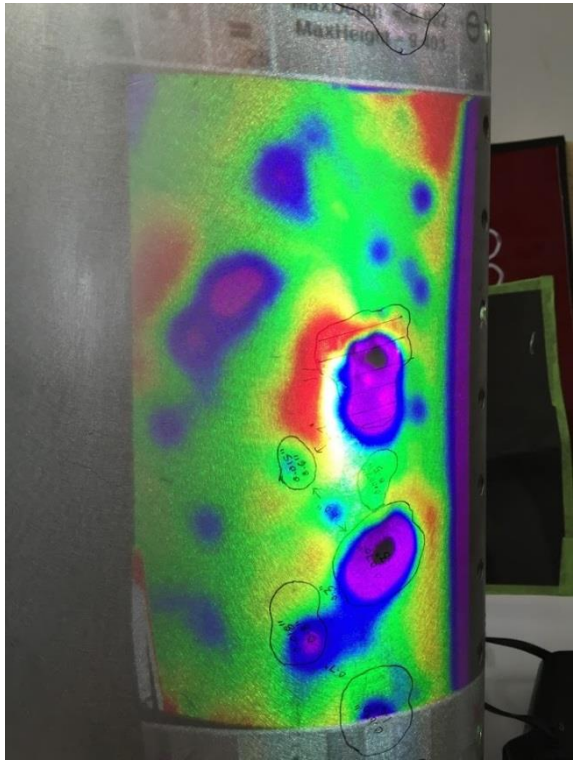
3D data computed per triangulation methods

Further analysis performed on topology map

Measurement principle

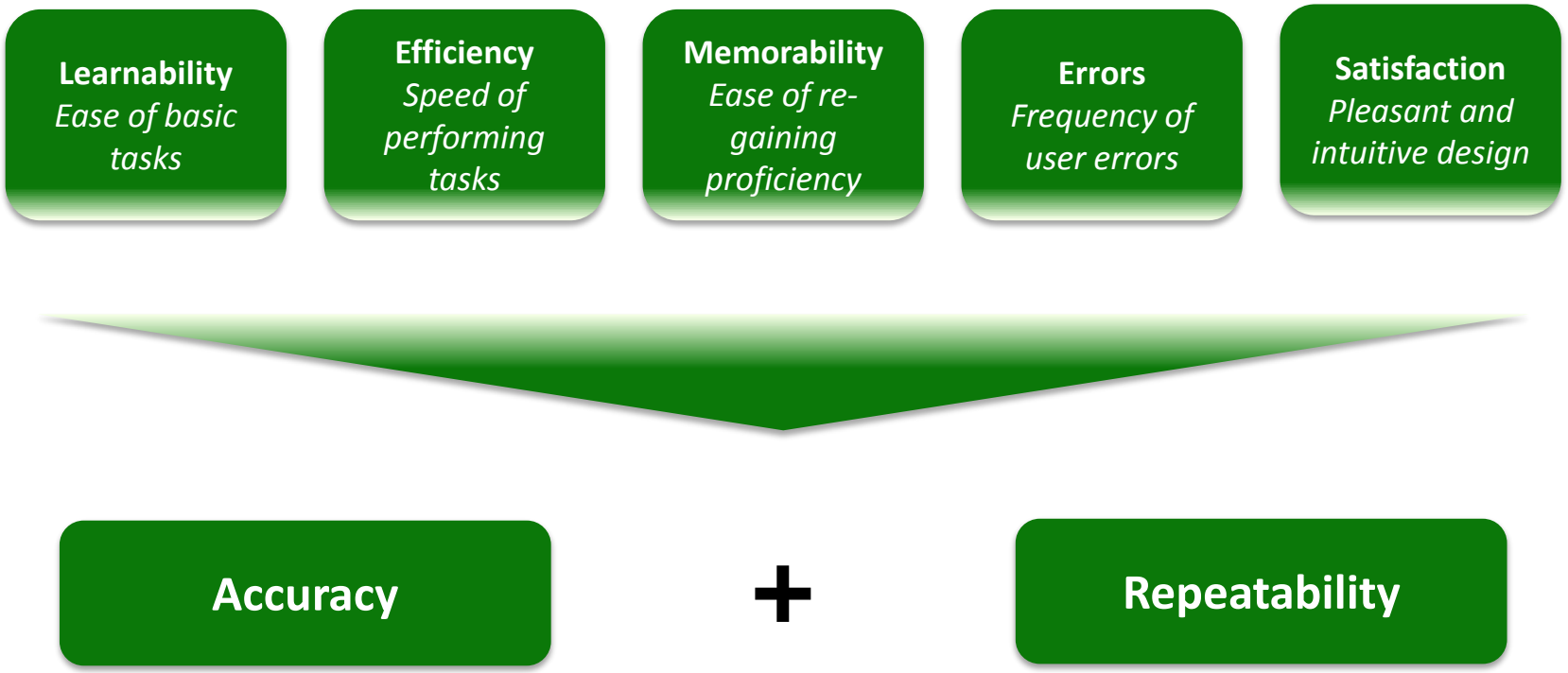
- Analysis is performed without the need of a CAD model
- All information is calculated from the measured 3D data





Usability Engineering

Enabling Ease-of-Use



Research Citation: Jacob Nielsen; "Usability Engineering"; 1993.

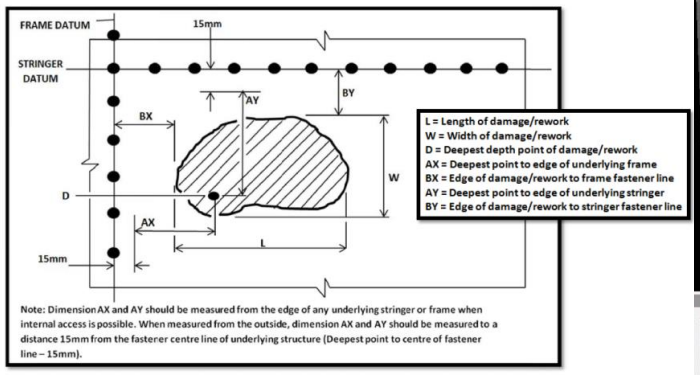
Simple One-button Operation

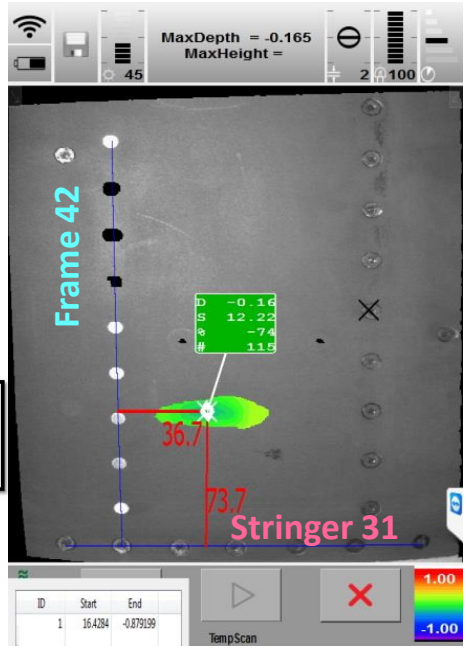
- No programming, no complex configuration menus…nada!
- Just One Button
- Quick Response (QR) barcodes = the right settings for the right job

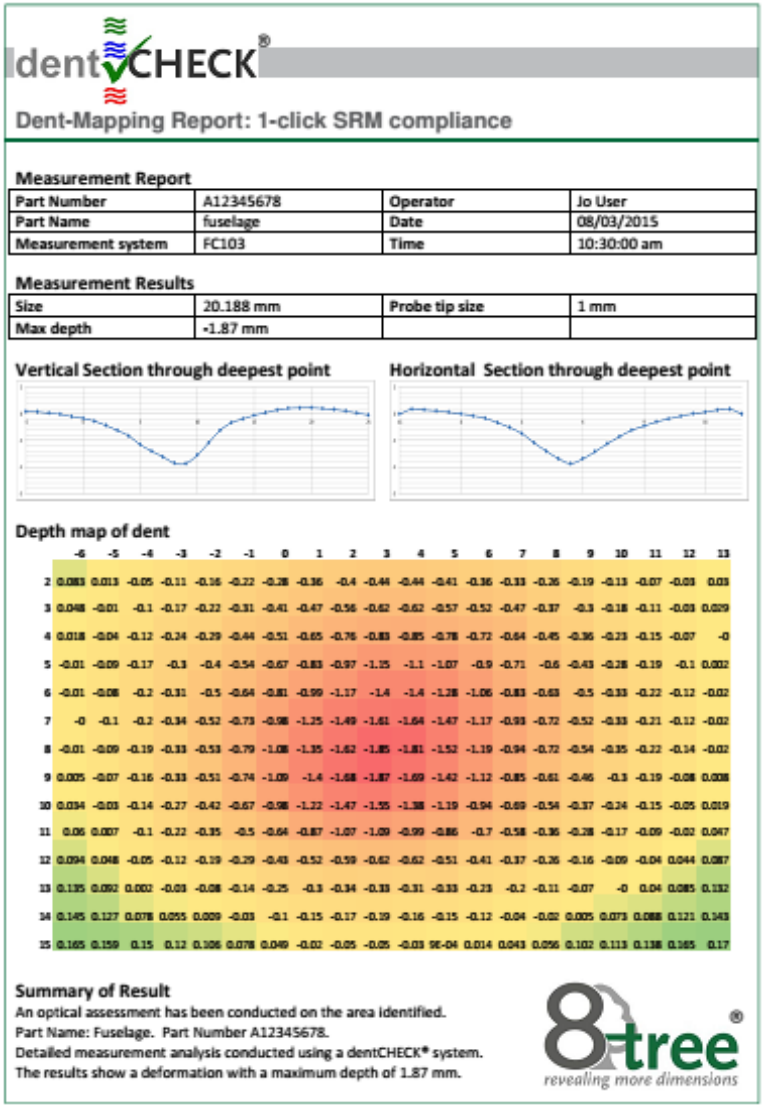
End-to-End Digital Transcription

SRM Compliant 1-Click Analysis Report™

Answers @ your fingertips	
A / Y	Distance to frame & stringer
Deepest point x-section	Color-coded annotation
Audit-ready digital reporting	Detailed log (operator ID, time-stamp, job #)
Customizable reports	Fully networked





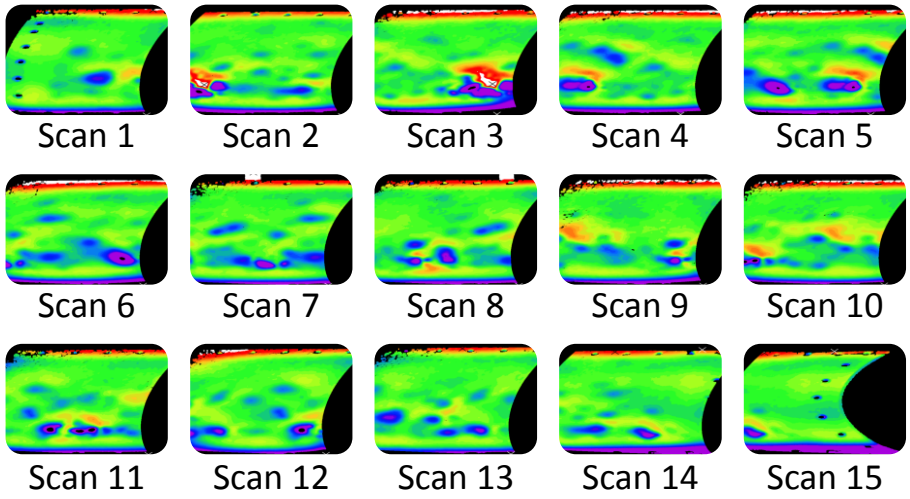


Case Study

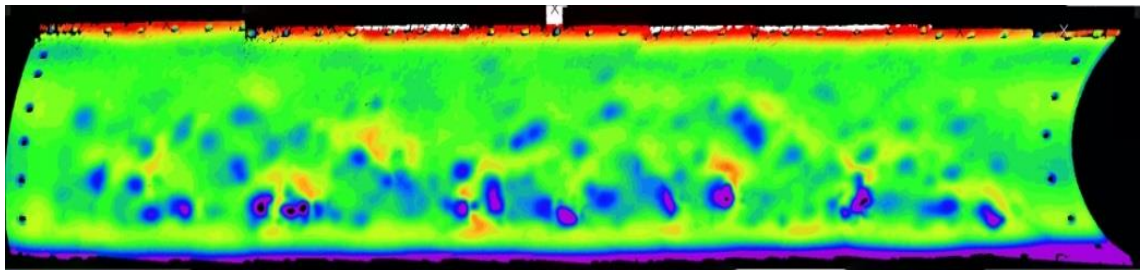
Hail-damaged 787 wing flap

Leading-edge wing-flap

Individual scans of flap sections
(scan duration → 1.8 seconds each)

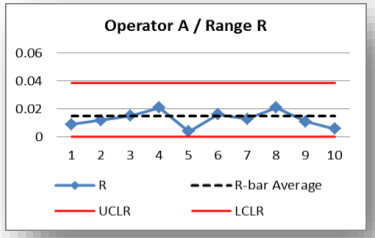


Detailed Scan of 6-ft flap
(1-click scan stitching < 2 seconds)



Delivering a Better Experience

Innovative User Interface
Real-time feedback
Zero Learning Curve



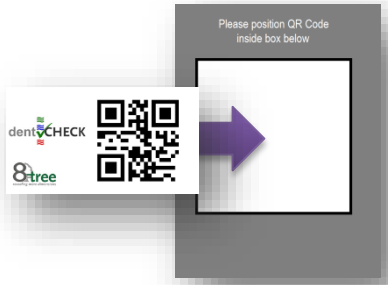
Traceable to National Standards
Quick Analytical Reporting
Statistically Consistent & Repeatable

Ease-of-use

- **Intuitive**
- **Portable & Self-contained**
- **Flexible**
- **High-speed**
- **High-Accuracy Consistency**

Lightweight
No cables or monitor
No external CPU

Actionable results <2 sec
Efficiency boost >10x



Configurable to different
tolerance requirements

Customer Benefits | The 8tree Advantage

Boosting workflow efficiency

Task	Traditional 3D Inspection Tools	8tree® - The New Standard
Unpack, set-up & power-on	Hours	Minutes
Understand how to operate	Hours	Seconds / minutes *"Zero Learning Curve"*
Program the tool to a task (one-time)	Days / weeks	Not required
Perform a measurement (scans)	Minutes	Seconds
Perform scan analysis	Hours+ *	Automatic *(fractions of a second)*
Scan-to-Actionable Result (StAR index)™	**Hours**	**Seconds**

* Requires specialized analysis software (additional expense)

Customer Benefits | The 8tree Advantage

What customers want = What customers get
Ease of Use
Accuracy
Consistency & Objectivity
Quick out-of-box experience
Simple to operate & understand
Instant Analysis = fast decisions!

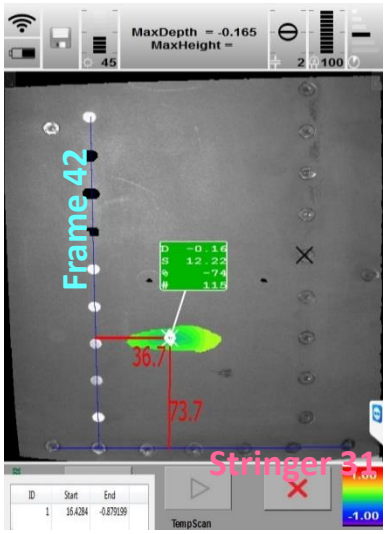
Empower the Operator

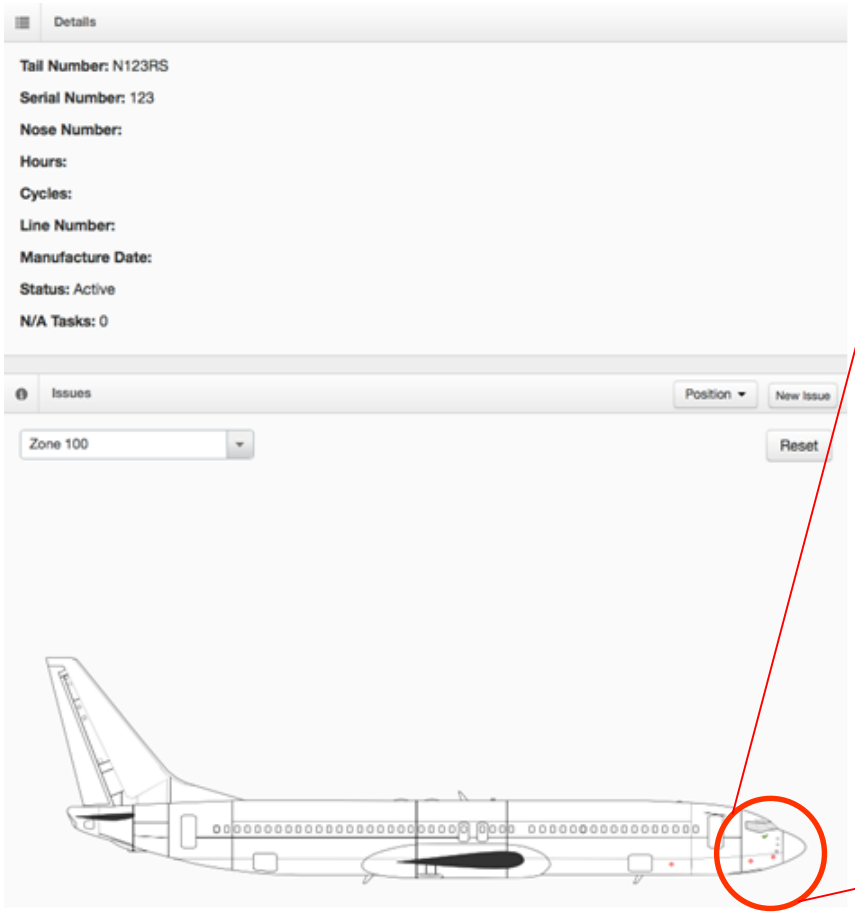
- *Real-time 3D dent-assessment*
- *1-click SRM-compliant report*
- *Industry adoption*

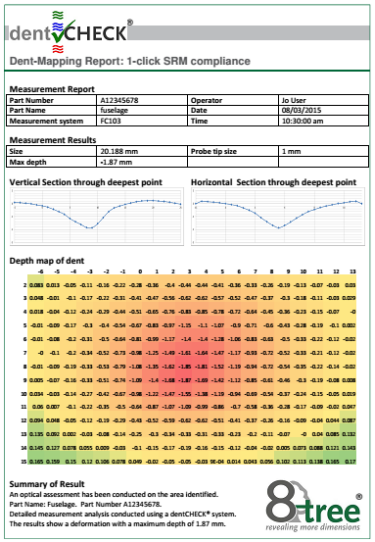
…what next?

End-to-End Solution

Digital Dent-Mapping → Aircraft Condition Tracking







…coming Jan 2016

Actionable Surface Inspection

8-tree
revealing more dimensions

stepCHECK® fastCHECK® dentCHECK®

Aerospace & Aviation

Automotive *(OEMs & Insurance)*

Pipelines & Civil Infrastructure

Thank you

Questions?

Arun Chhabra

arun@8-tree.com