

# Measurement-Solutions

## An Introduction to 3D Scanning and Generative Design



Joe Winston

MSL

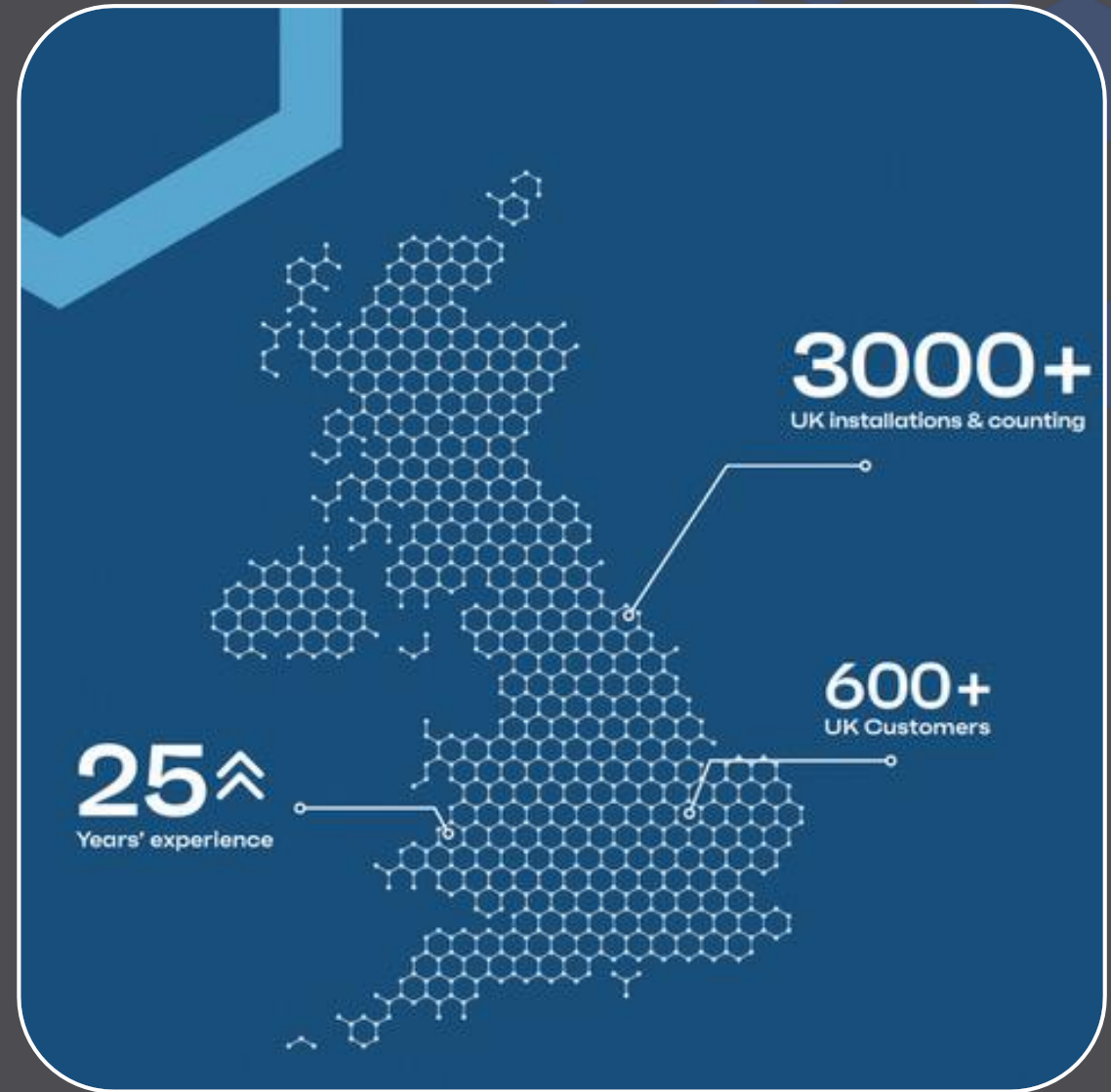
Account Manager – nTop

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# WHO IS MSL?

- 2 Office Locations – Silverstone + Derby
- 3000+ UK Creaform Installations
- 25 Years Experience in Metrology – Est 1998
- Key Partners for :





PORTABLE AND AUTOMATED  
**3D MEASUREMENT**  
SOLUTIONS

# TECHNOLOGY PORTFOLIO

SCANNING / AUTOMATION / SOFTWARE



**MSL**  
3D SCANNING

[www.measurement-solutions.co.uk](http://www.measurement-solutions.co.uk)

**CREAFORM**

THE FASTEST AND EASIEST  
3D COLOUR SCANNING  
EXPERIENCE



ACCURACY  
Up to 0.050 mm (0.0020 in)

VOLUMETRIC ACCURACY  
0.050 mm + 0.150 mm/m  
(0.0020 in + 0.0018 in/ft)

**GO!SCANSPARK**

THE TRULY PORTABLE  
METROLOGY-GRADE LASER  
SCANNER

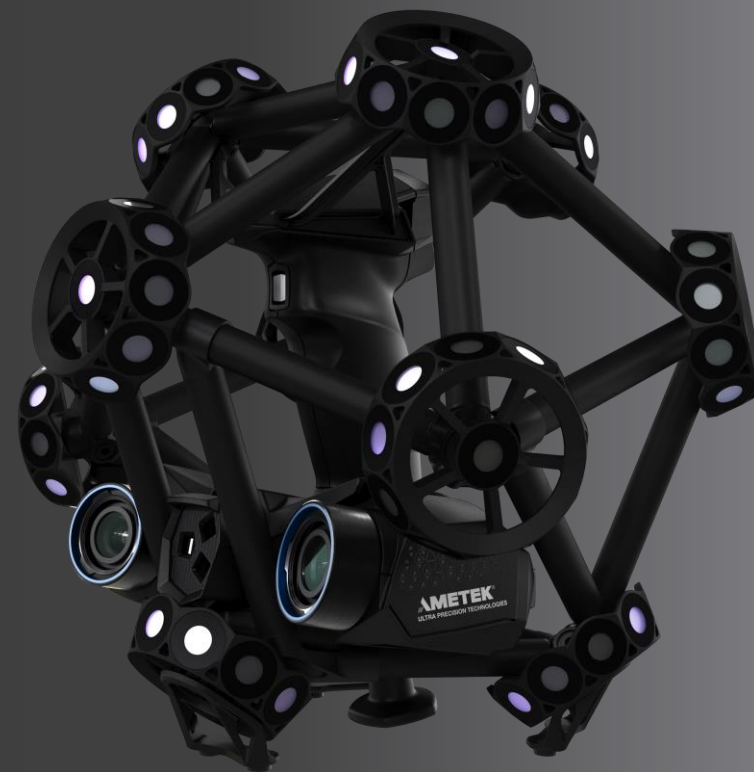


ACCURACY  
0.012 mm (0.0009 in)

VOLUMETRIC ACCURACY  
0.020 mm + 0.040 mm/m  
(0.0008 in + 0.0005 in/ft)

**HANDYSCAN**

LARGE VOLUME “TARGETLESS”  
3D SCANNER FOR THE SHOP  
FLOOR



ACCURACY  
0.025 mm (0.0009 in)

VOLUMETRIC ACCURACY  
0.064 mm (0.0025 in)

**METRASCAN**

# VXelements <sup>TM</sup>

3D SOFTWARE PLATFORM  
AND APPLICATION SUITE



[www.measurement-solutions.co.uk](http://www.measurement-solutions.co.uk)





**Navigation**

- VXscan
  - Scan 1

Scan details

Scan parameters

Resolution (mm) 0.50

Smart resolution Standard

Remove isolated patches 71

Finalize scan parameters

Optimization mode Standard

More details



HandySCAN BLACK | Elite - 9270926

Connected - 11/09/2023

**Positioning parameters**

Target diameter 6 mm

Target reflectivity Normal

**Scanner parameters**

HDR mode

Shutter (ms) 0.15

More details



Frame 1 | Shutter: 0.15 ms

# NTOP

## OPTIMISATION SOFTWARE



**MSL**  
3D SOFTWARE

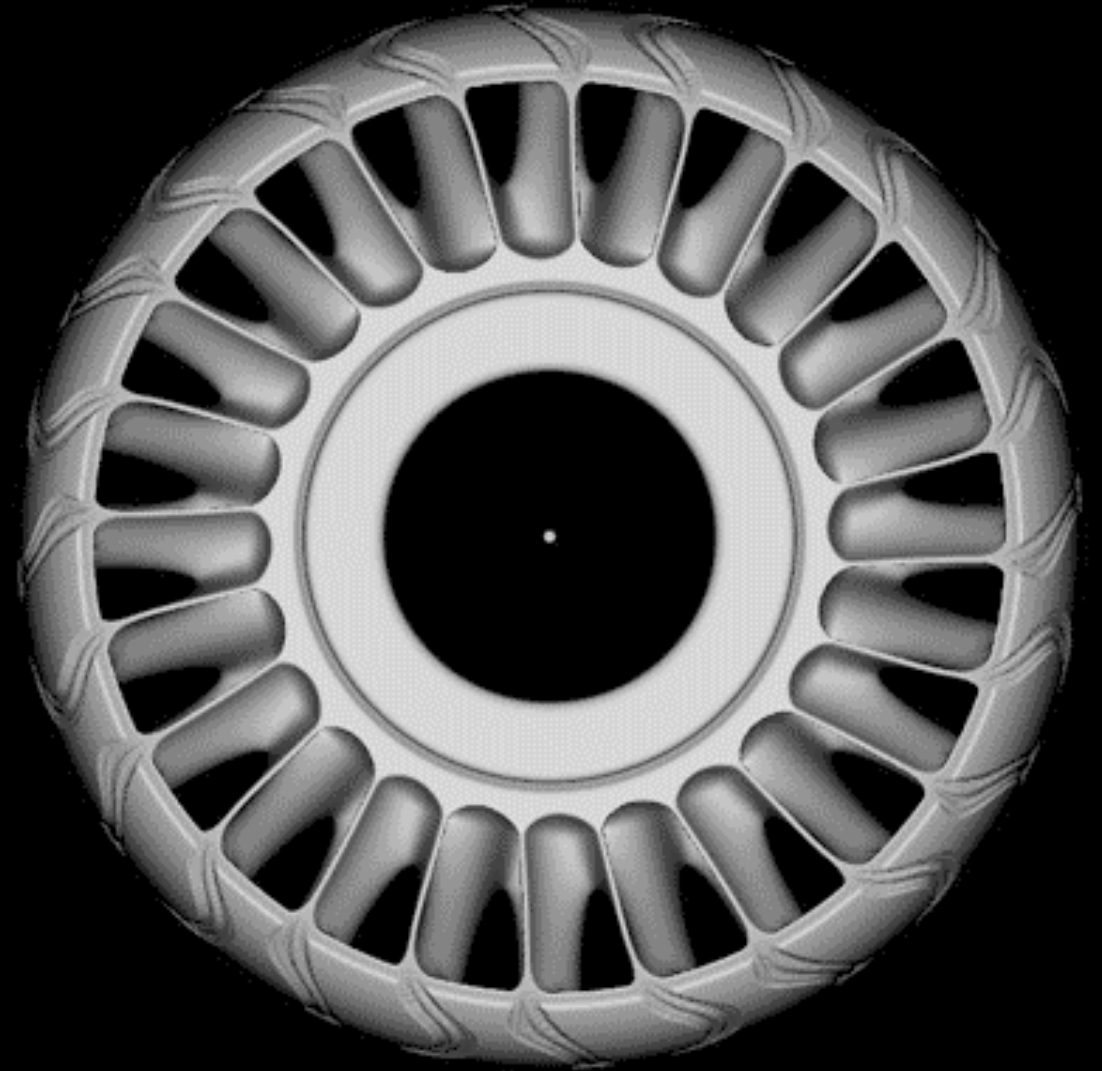
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# Design Without Boundaries.

~~How I can draw it in CAD~~

How I can solve the fundamental design challenge



File Edit View Window

Create Modeling **Lattices** Fields Math Simulation Utilities Manufacturing Beta Additive Manufacturing Architected Materials Design Analysis Lightweighting Topology Optimization

Lattice Unit Cells Cell Maps Conformal Stochastic Utilities

Conformal Lattice Between CAD Fa...

Add description...

+ Add Block... (Ctrl+L)

Final Part

Blend radius 2 mm

Final part Boolean Intersect

Static Analysis

FE Model FE Model

Material Al 6061-T6

Edge length 1 mm

FE Restraint Displacement Restraint

FE Force Force

Vector 0 0 -1500 N

Boundary Condition... Boundary Cond...

0: FE Force

1: FE Restraint

Static Analysis Static Analysis

Create Optimized Lattice

Ramp Black Ramp

Scalar field: Static Analysis... Pa

In min: 4.79250e+03 Pa

In max: 2.70087e+07 Pa

Out min: .75mm mm

Out max: 2.5 mm

Output:

Static Analysis

Static Analysis

Stress

Von Mises

Deformation scale

0

Units: Pa

2.70087e+07

2.25080e+07

1.80074e+07

1.35067e+07

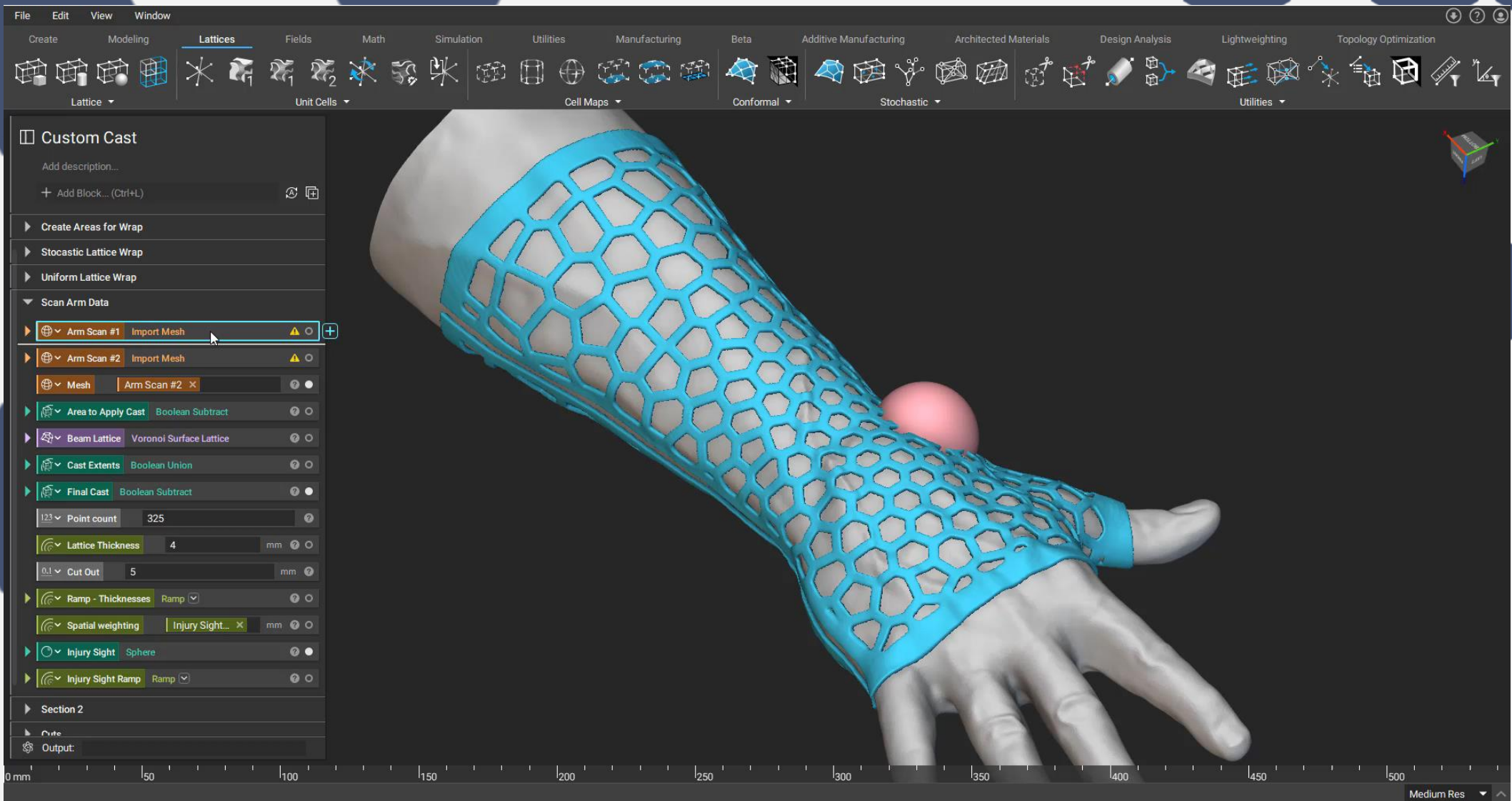
9.00610e+06

4.50544e+06

4.79250e+03

0 mm 50 100 150 200 250 300 350 400

Medium Res



**MSL**  
3D SOFTWARE



File Edit View Window Update Available

Create Modeling Lattices Fields Math Simulation Utilities Manufacturing Beta Additive Manufacturing Architected Materials Design Analysis Lightweighting Topology Optimization

Notebooks Primitives Vectors Curves Color

Webinar2  
Add description...  
Search blocks... (Ctrl+L)

Inputs

LHS

- LHS Clamp Import Part
- LHS Clamp Implicit Implicit Body from ...
- LHS Interfaces CAD Face List (72)
- LHS Vertical Force CAD Face List (5)
- LHS 90 Degree Force CAD Face List...
- Passive Areas Concatenate Lists (143)
- LHS Lattice Faces CAD Face List (44)
- Custom Block - Lightweight Implicit Body\_4

RHS

- RHS Clamp Import Part
- RHS Implicit Body Implicit Body from C...
- RHS Interfaces CAD Face List (85)
- RHS Vertical Force CAD Face List (4)
- RHS 90 Degree Force CAD Face List...
- Passive Areas Concatenate Lists (136)
- RHS Lattice Faces CAD Face List (39)
- Ramp to Drive Lattic... Ramp

Output:

0 mm 50 100 150 200 250 300 350 400 450 500 550 600 Medium Res

**£315**  
**518g**

**£556**  
**989g**

# EXAMPLE CASE STUDIES

AUTOMOTIVE / NUCLEAR / 3D PRINT



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# Case Study

M-Sport Design



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## M-Sport World Rally Tier 1 Supplier :

- FIA regulation measurements required for each car
- Space envelope analysis (rear wing to body of car)
- Improvement to design and manufacturing tolerances
- Pre and post race measurements
- Design and fitment optimization



# LIVE DEMO EXAMPLE



MORE INFO Here :



[www.measurement-solutions.co.uk](http://www.measurement-solutions.co.uk)

