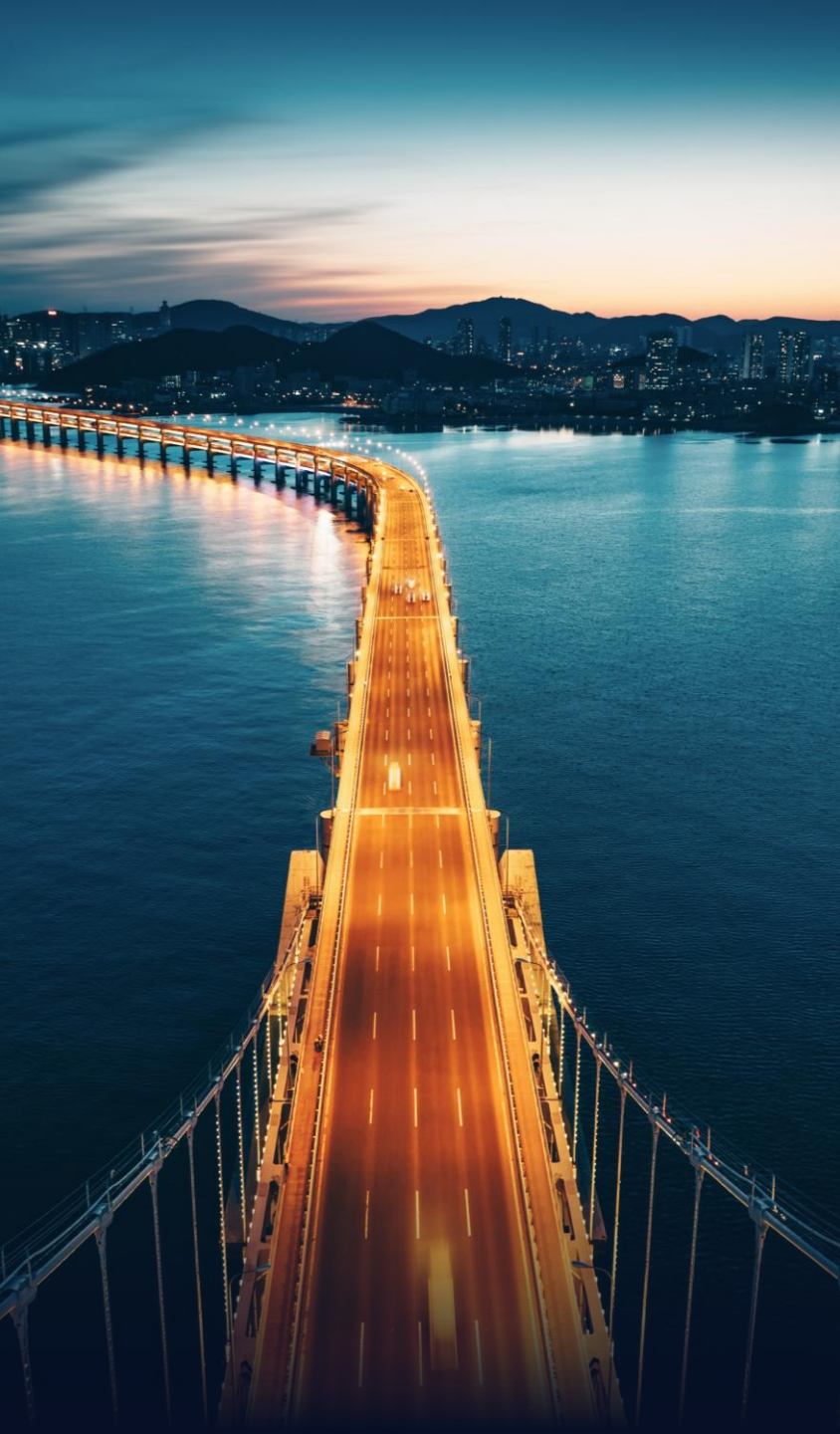


Welcome to

MWC

Barcelona 2025

Today's connections create the future



Specular Metrology

AI Defect Inspection at the Edge with NTT and Umajin

1. The Challenge
2. Automating Inspection
3. Use Cases
4. Materials & Defect Types



1

360 Million

Factory Workers Worldwide*

35 Million

Visual Inspectors*

The Challenge

Materials: Existing technologies struggle with shiny and transparent materials (existing 2D cameras, structured light and laser scanning)

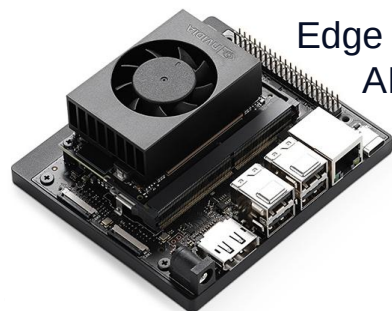
Latency: Capturing and transmitting large amounts of image and video data puts load on the network and creates latency for real time detection

Reliability: Modern manufacturing now includes a composite of different textured materials like metals and plastics reducing the reliability of AI defect detection and **requiring human** inspection

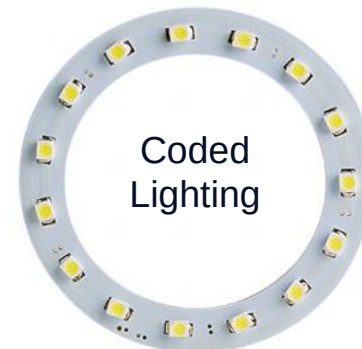
2

Automating Inspection

- Precise surface metrological data can now be captured from even very shiny or transparent materials like polished metal, carbon fibre, gloss paint and glass.
- Move to 100% inspection with repeatable results efficiently with AI processing on the edge.



Sensitivity Label: General



Specular
Metrology





3

Use Cases

High quality stationary scanning

- Detailed 3D surface direction, color and reflectivity
- Pattern matching for fixturing, gap analysis and external shape
- Inspect multiple material types in the same pass

Scanning moving parts and materials

- Real time analysis to accept or reject parts
- Find defects reliably and repeatably
- Set tolerance thresholds for acceptable and unacceptable size or number of defects

Manual Automotive Paint & Glass Inspection



35 Million
Visual Inspectors

Manual Aluminum Extrusion Inspection

35 Million
Visual Inspectors



Smartphone Manual Inspection

35 Million
Visual Inspectors



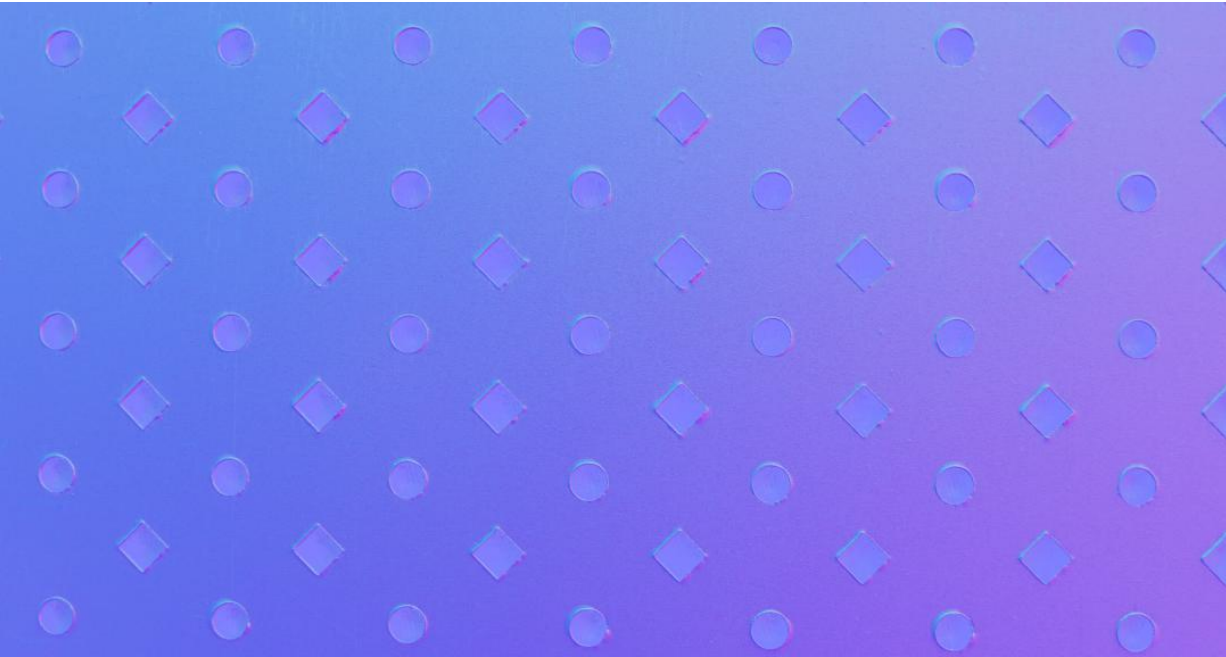


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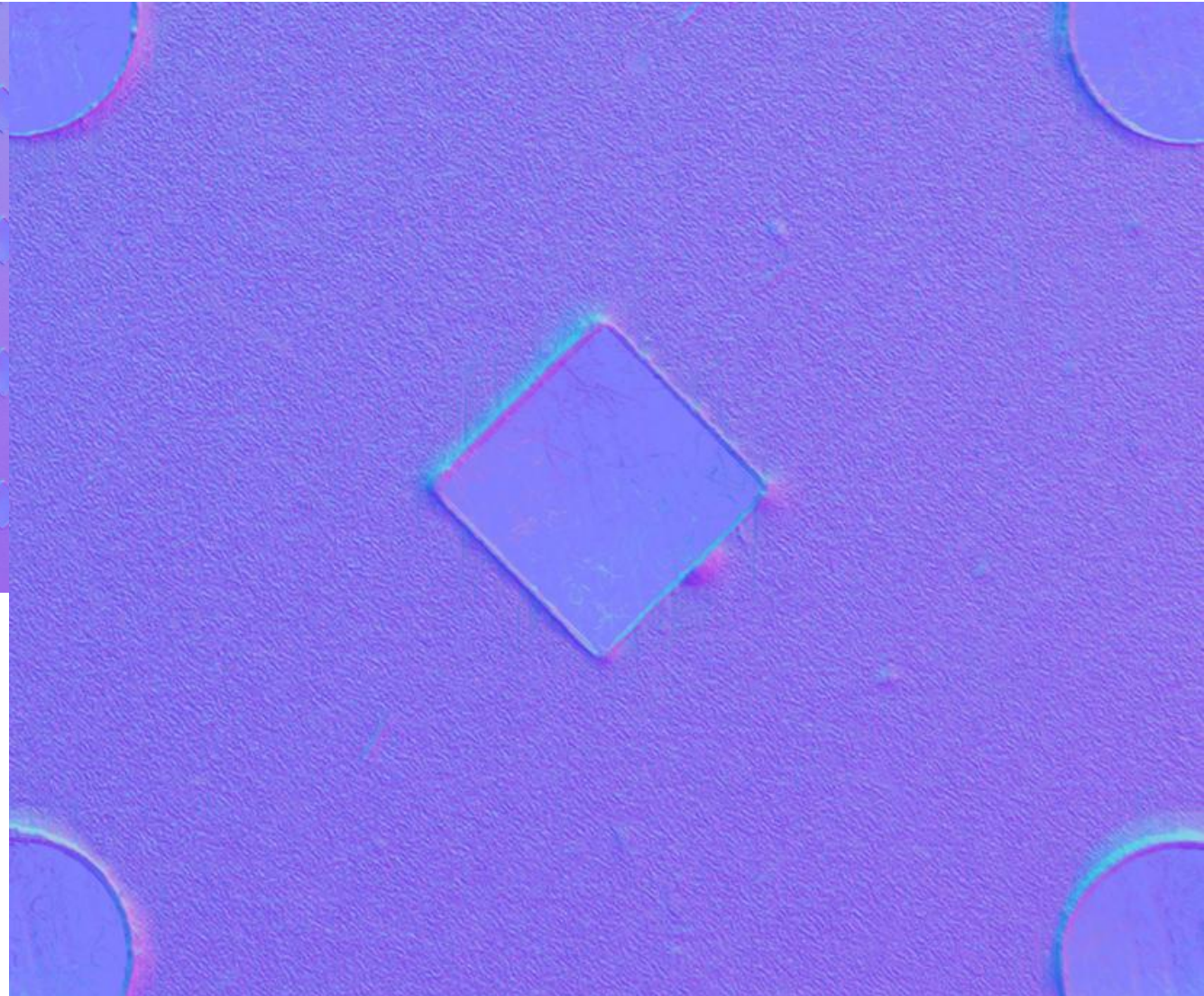
Materials & Defect Types

- Paint, glass, metal, plastic - **Scratch depths and lengths**
- Paint, coatings, metal, carbon fibre - **Dents and gaps**
- Plastic and metal combination - **Measure gaps and fit**
- Stamped metal - **Contour dimensions**
- Stamped metal - **Measure burrs and edge shape**
- Motherboard inspection – **Parts and solder joints**

Stamped Metal Parts

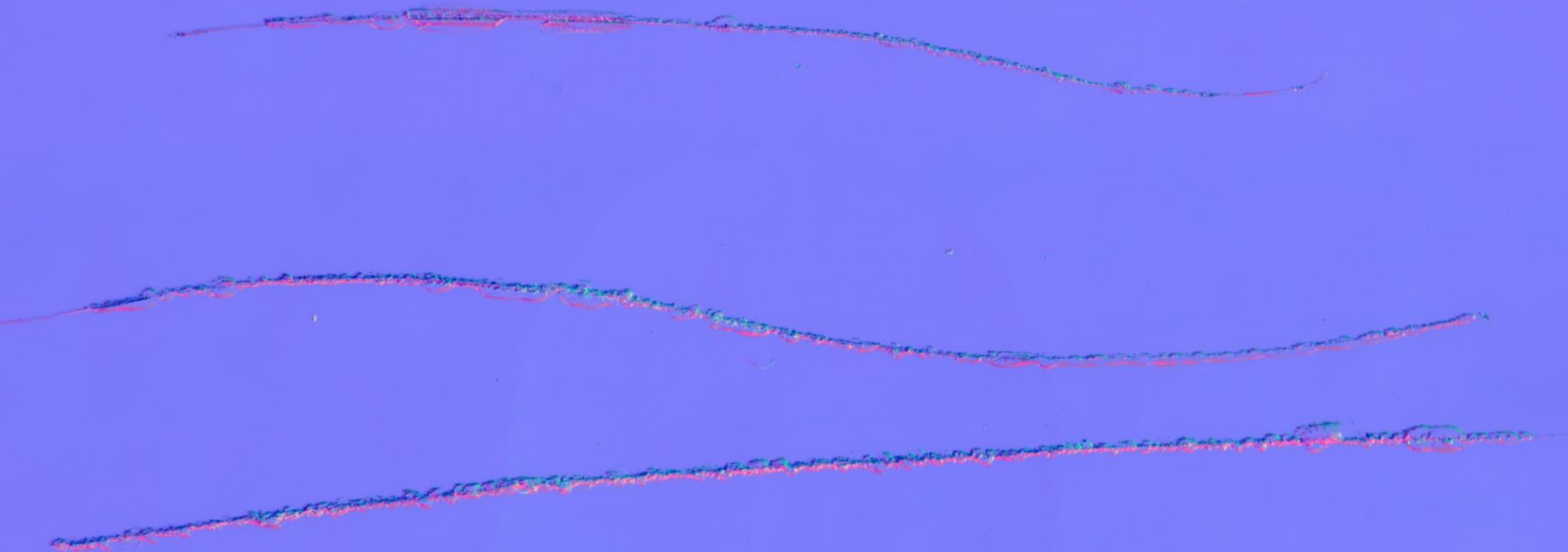


Galvanised steel punch and die burrs and defects

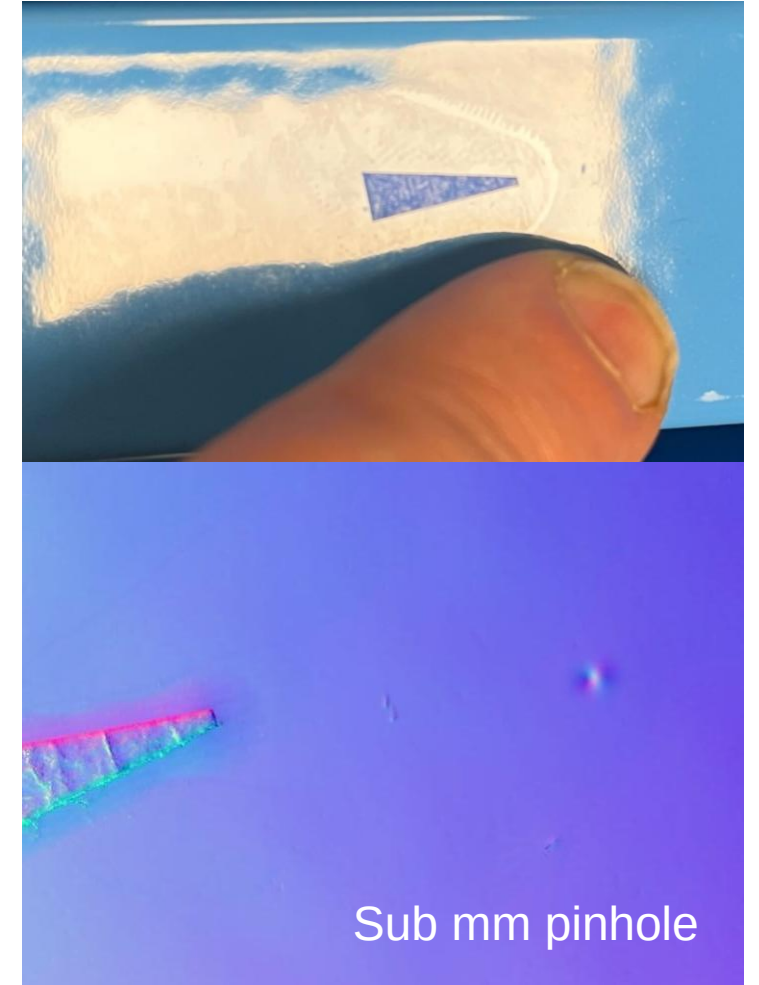
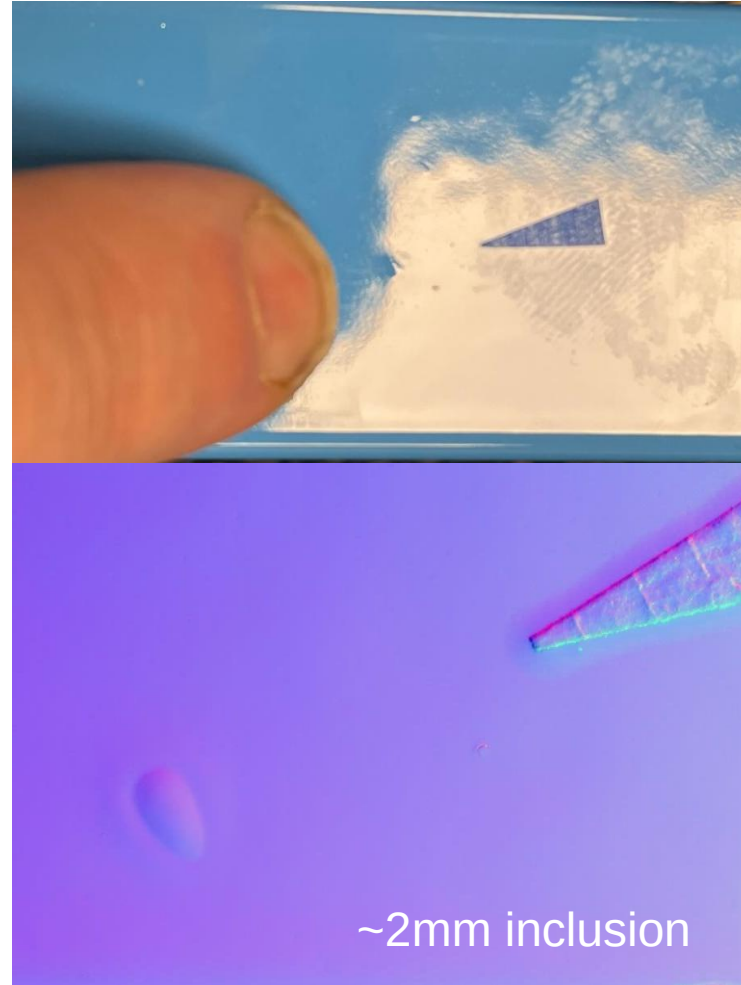
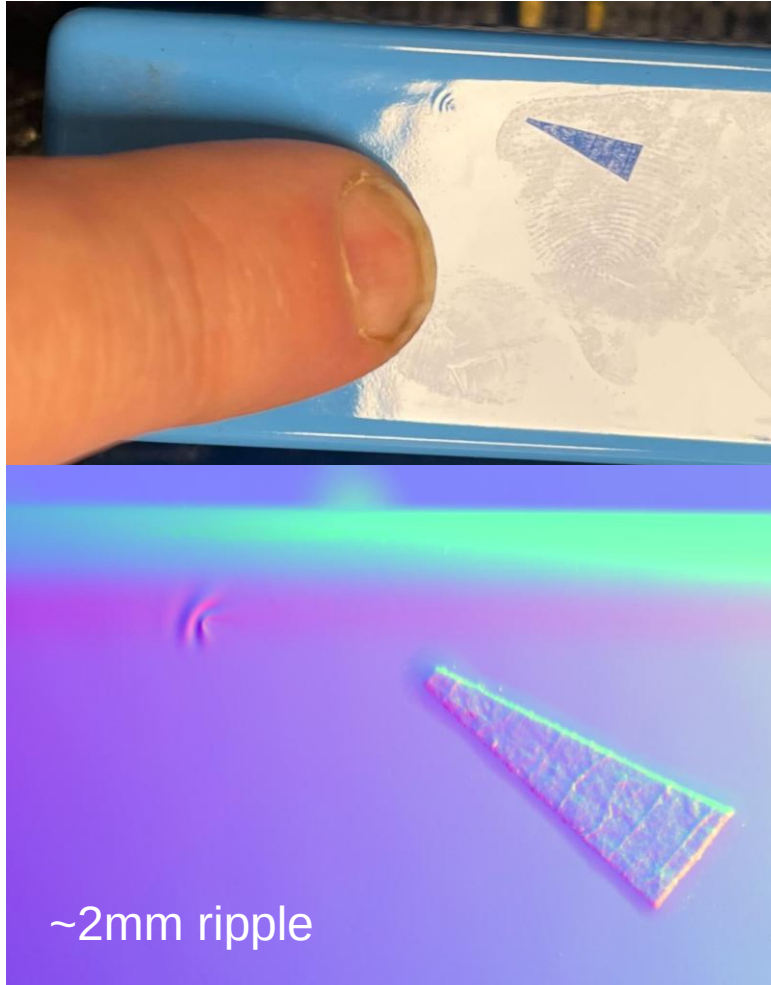


Glass

10mm long scratches

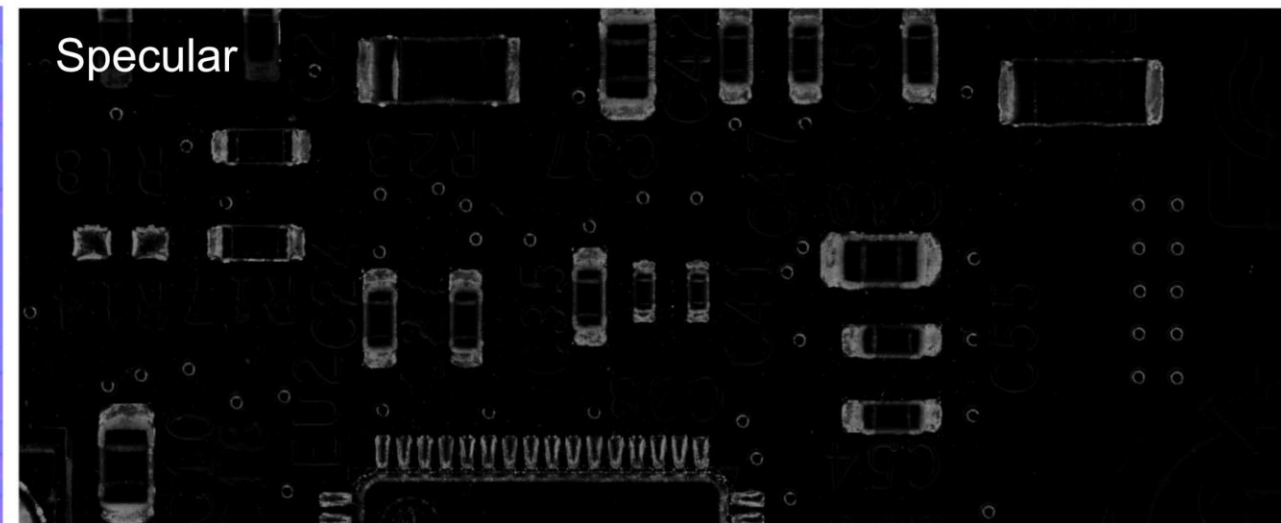
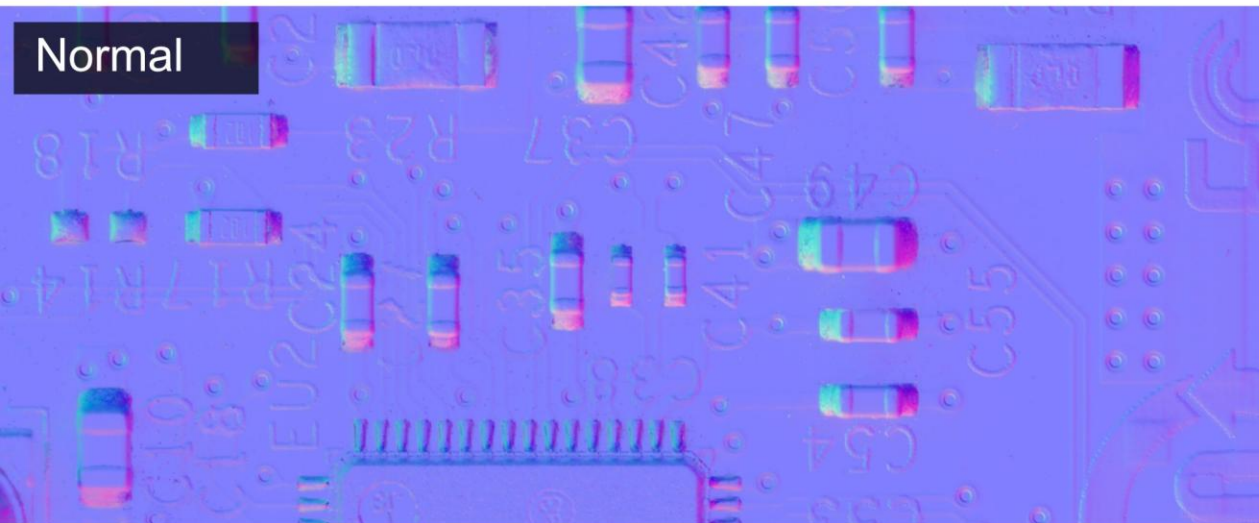
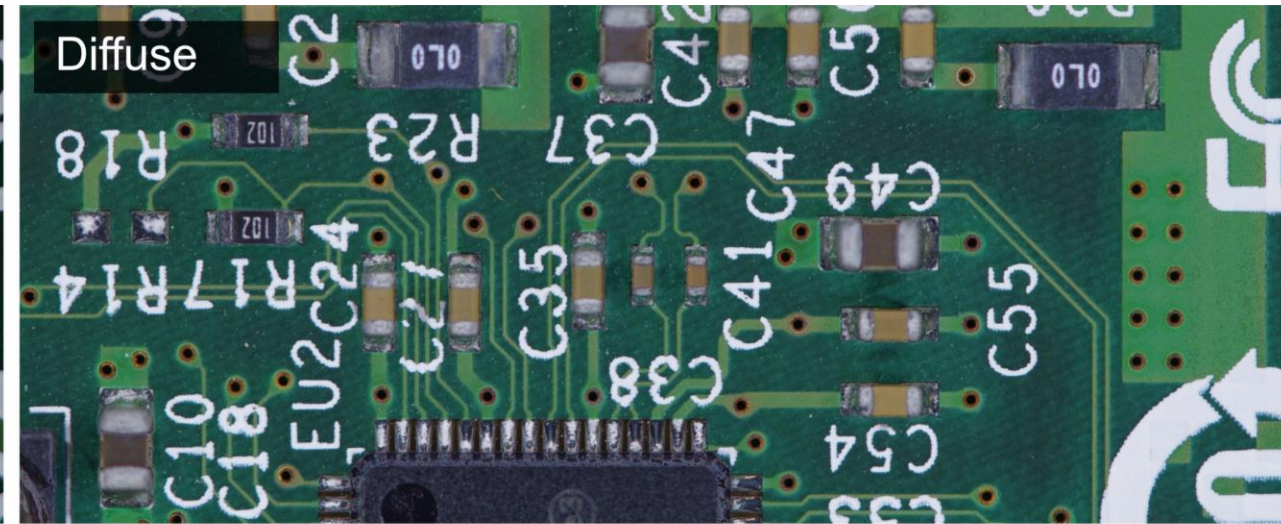
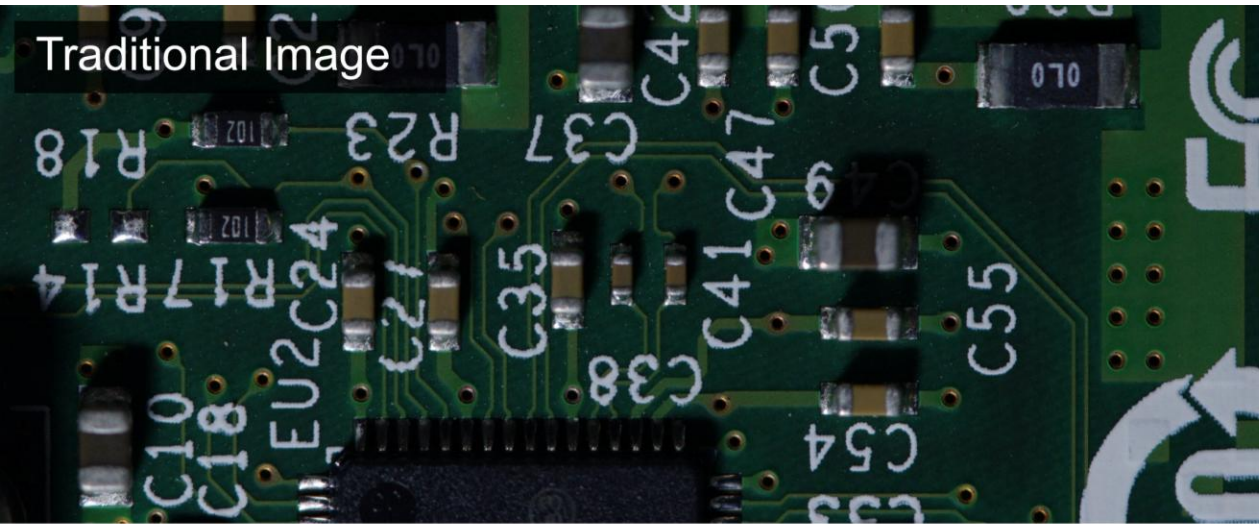


Electric Vehicle Battery Cells



Motherboard

Check Silkscreen, 2D codes & traces



Check Components

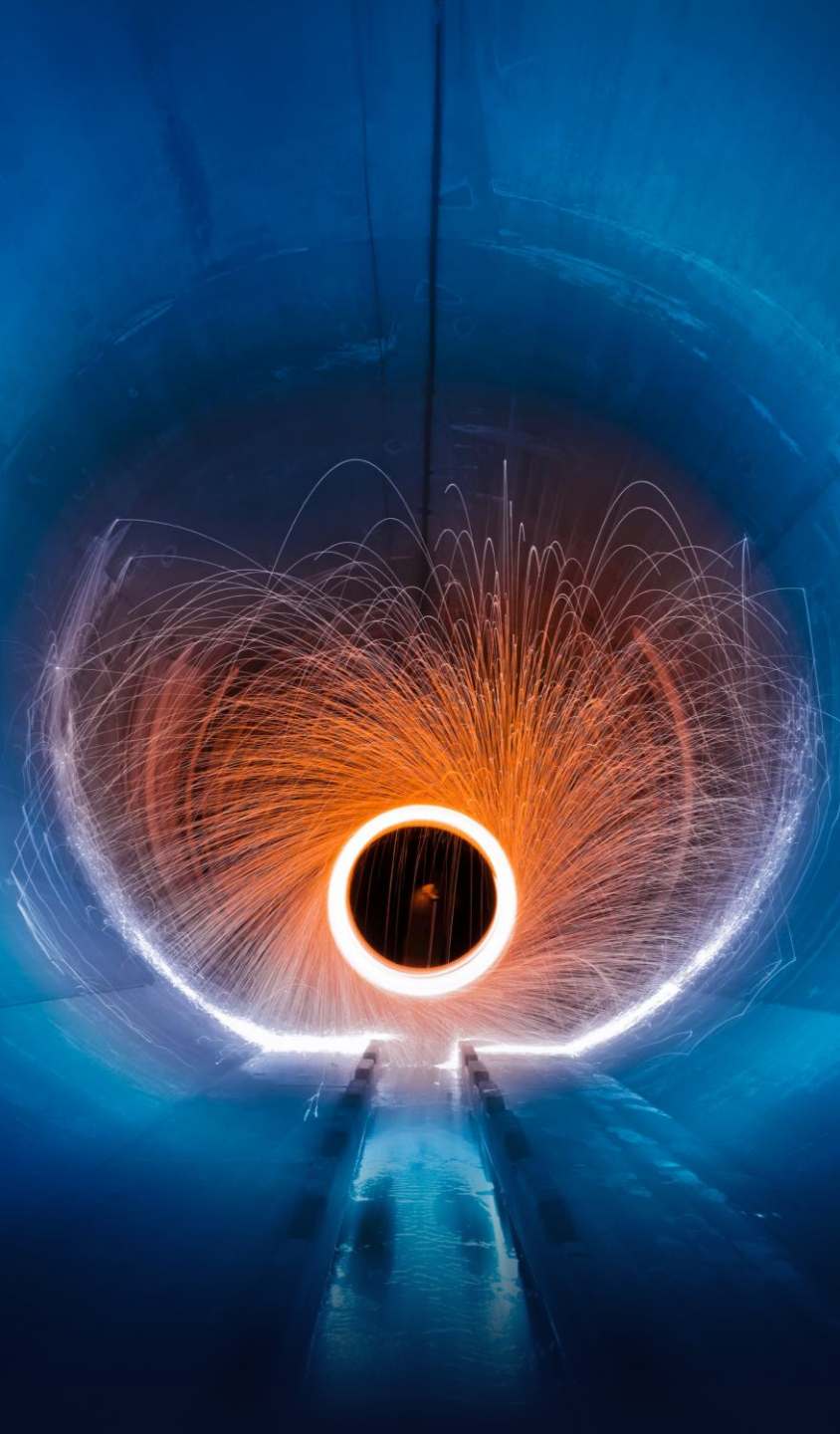
Check Solder



AR Visualization

AR Digital Twins with NTT using Umajin spatial

- Digital Twins allow us to track and locate defects directly against the CAD data for the products being manufactured
- NVIDIA Omniverse provides a range of powerful tools including utilizing the important new standard for 3D communication between software, OpenUSD
- The Meta Quest3 AR mode allows for high quality composited images with highly readable text and diagrams to be projected onto the real world showing the underlying Digital Twin data
- Visualize on site with Augmented Reality or offsite in VR
 1. Enterprise System Data
 2. IoT & PLC production Data
 3. Specular scanning defect Data
 4. CAD Data



Conclusion

Materials: Scan materials previously very difficult;

- Reflective Metal
- Glass & Ceramics
- Plastics & Carbon Fiber
- Foil & Film
- Polished Surfaces & Mirrors

Latency: Real time defect detection right at the point of scanning using the capabilities of Edge AI computation

Reliability: Improve reliability and objectivity with automated AI inspection and 100% coverage. Handle manufacturing use cases that have complex composite components



Thank you

