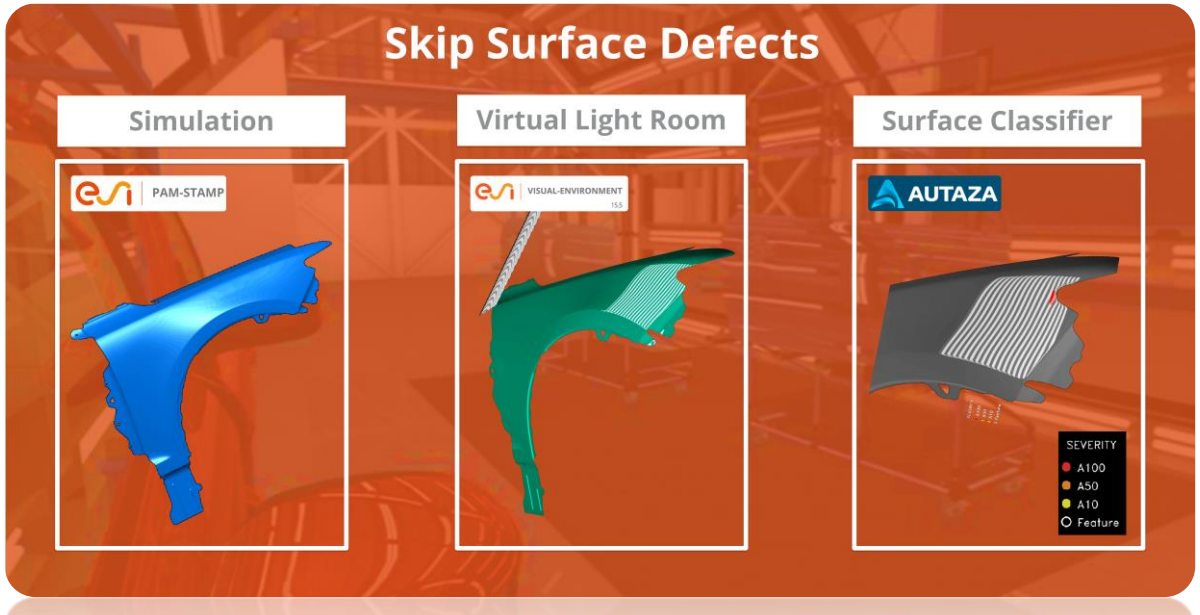
Surface Quality Assessment with a Virtual Light Room
- A Virtual Audit -



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10 September 2020

get it right®

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Today's Seminar

- Why do we need a new way to detect and quantify defects?
- The method used
  - Mesh to Virtual Light Room
  - Partnership with AUTAZA
- Workflow and Customization
- Validation
  - Partnership with OEM
- Methodology to rate defects by AI
- Where it can be used
  - Data for each application

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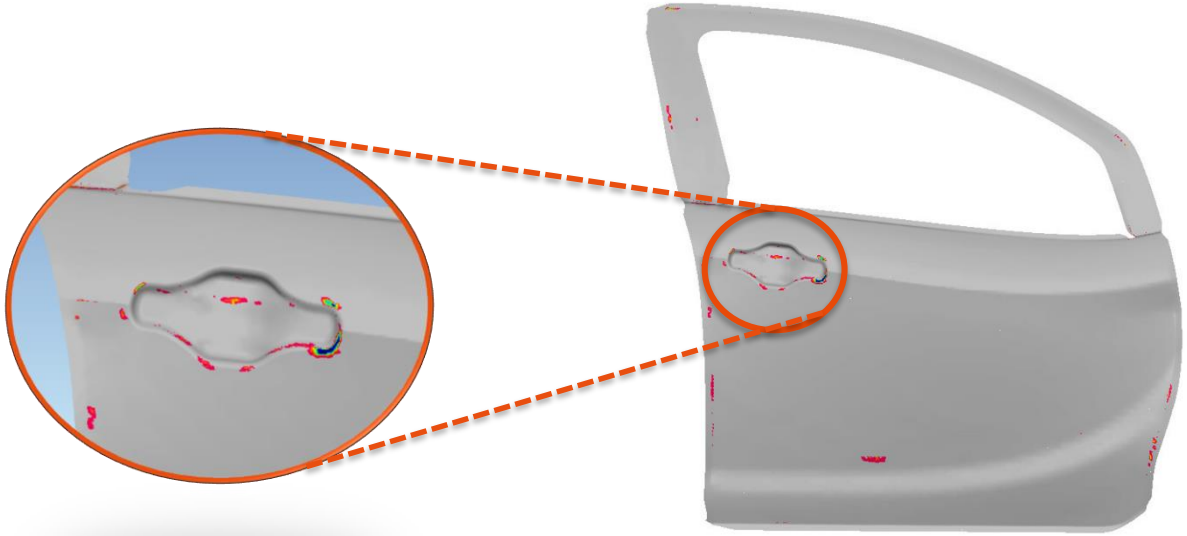
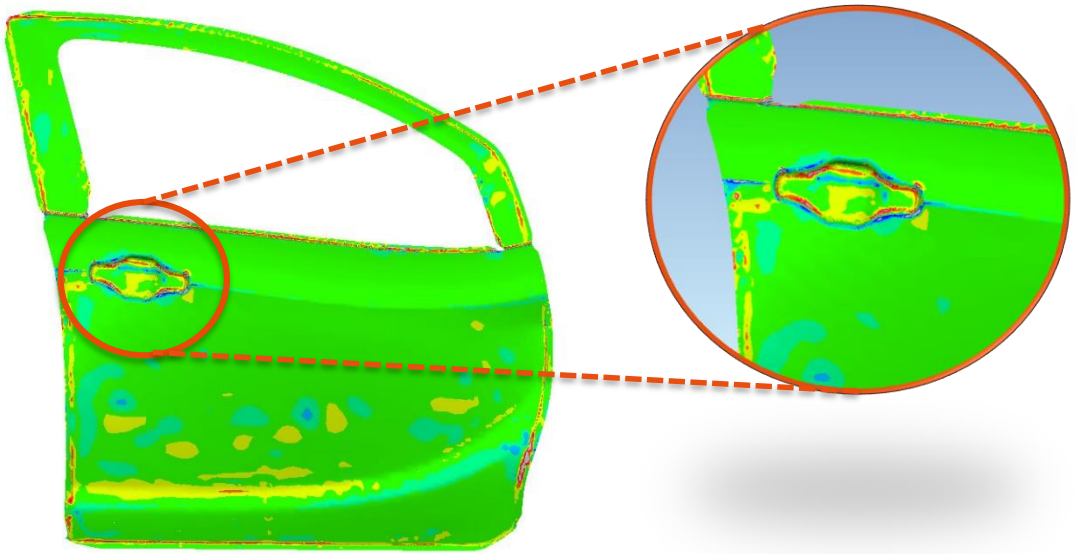
Advanced Visualization of Stamping Defects in Simulation

The Quest for the Magic Contour: Digital Stoning, Stresses, Strains, …





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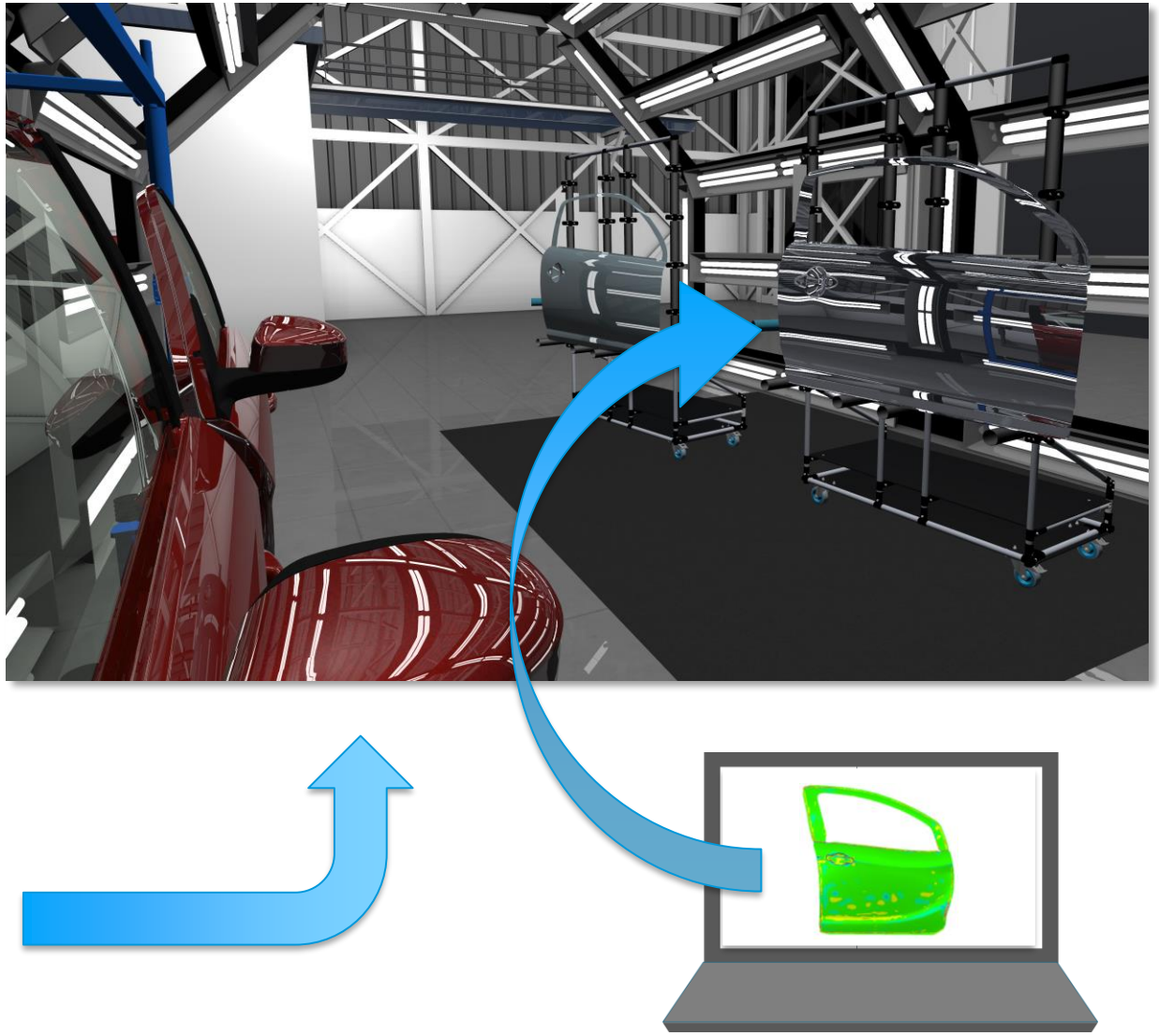
The Virtual Light Room

Parts from Simulation and Scanning



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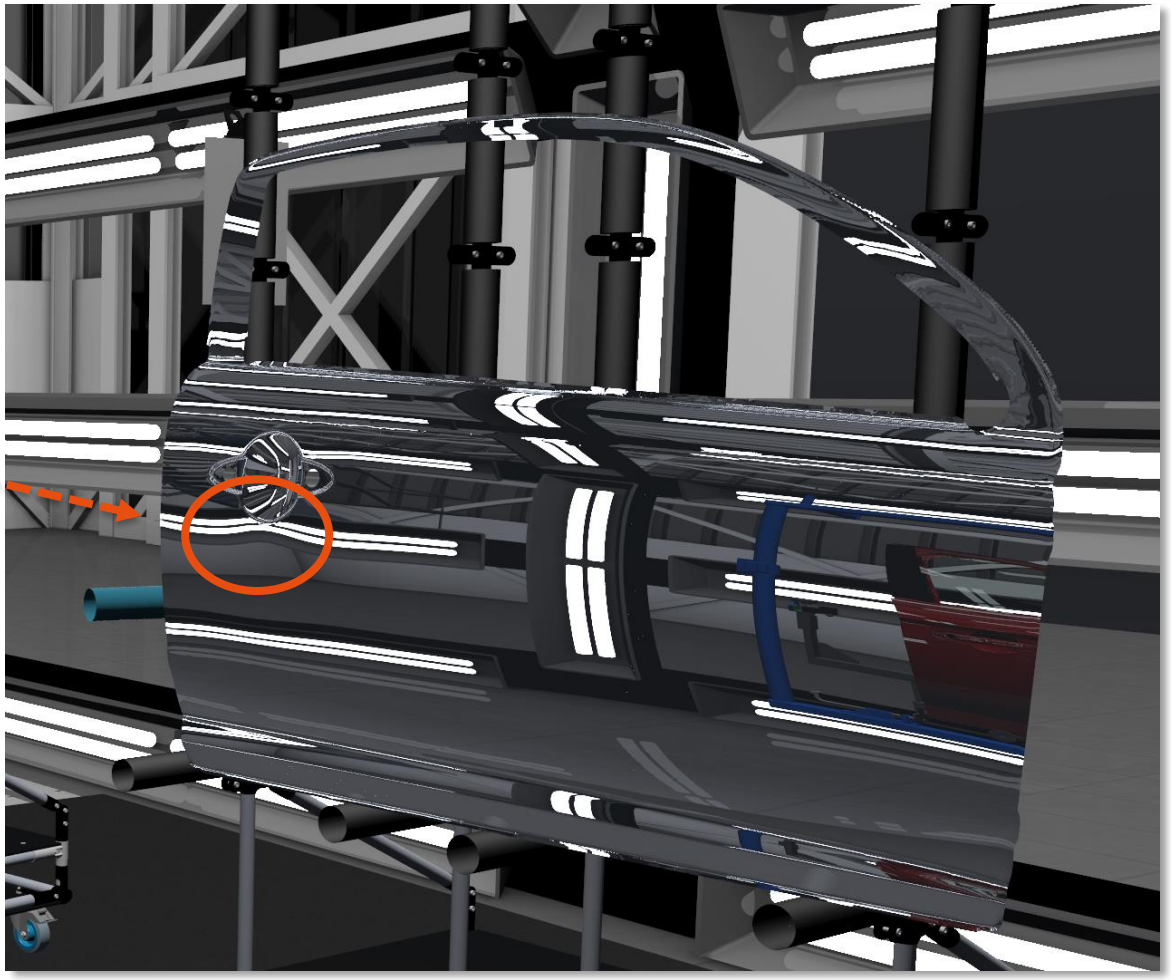
Virtual Light Room

Defects are now clear … Well…



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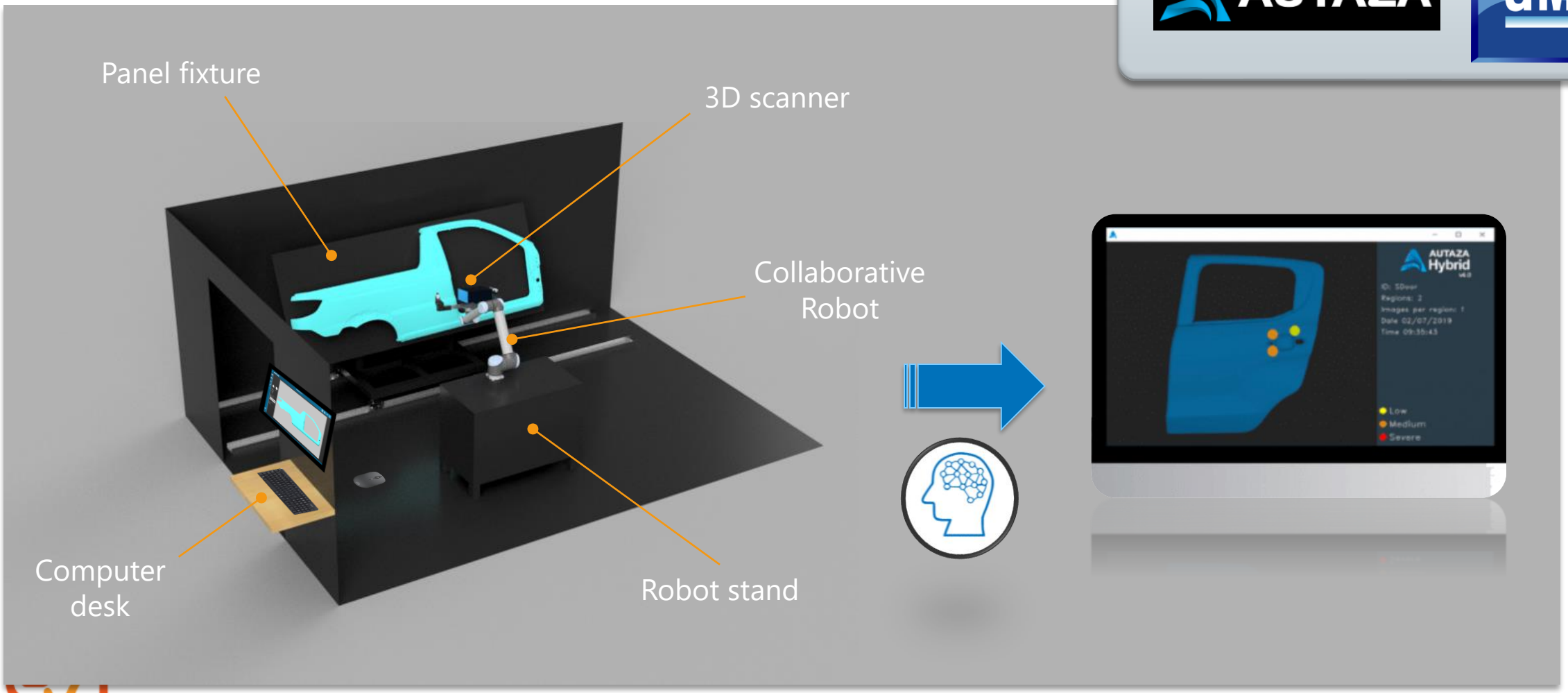
Partnership: AUTAZA Hybrid System

On-line surface quality assurance

Joint development 2013 - 2016



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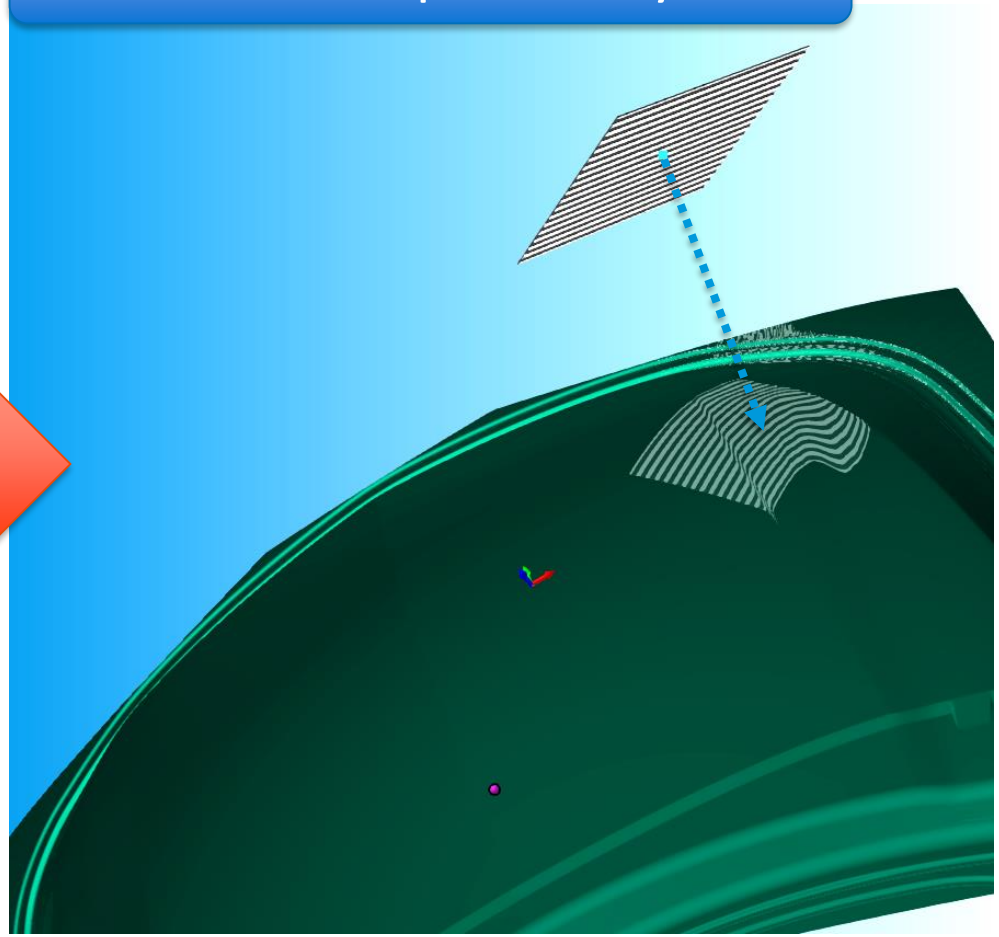
AUTAZA Hybrid was brought into ESI's Visual Environment

The actual inspection system by AUTAZA

ESI's virtual inspection system



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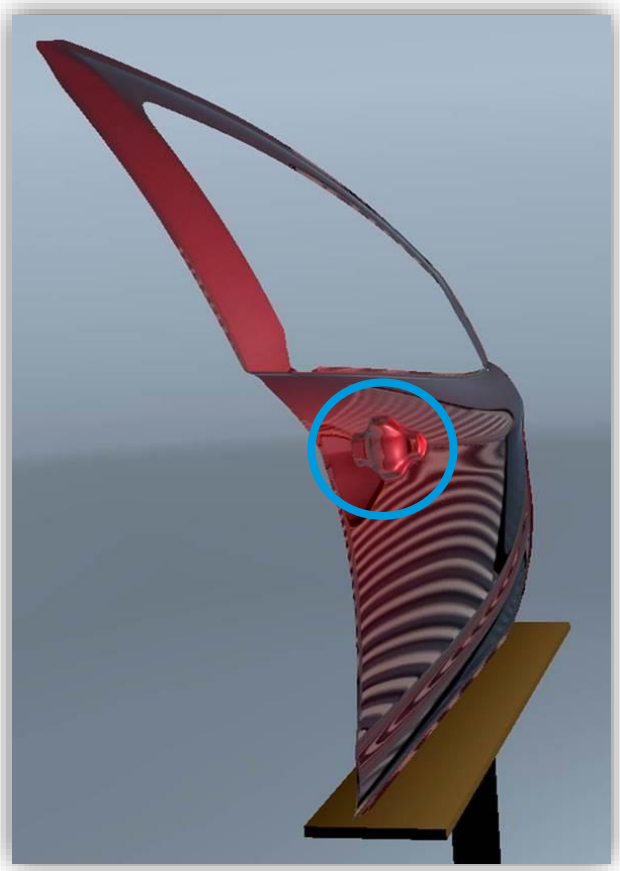
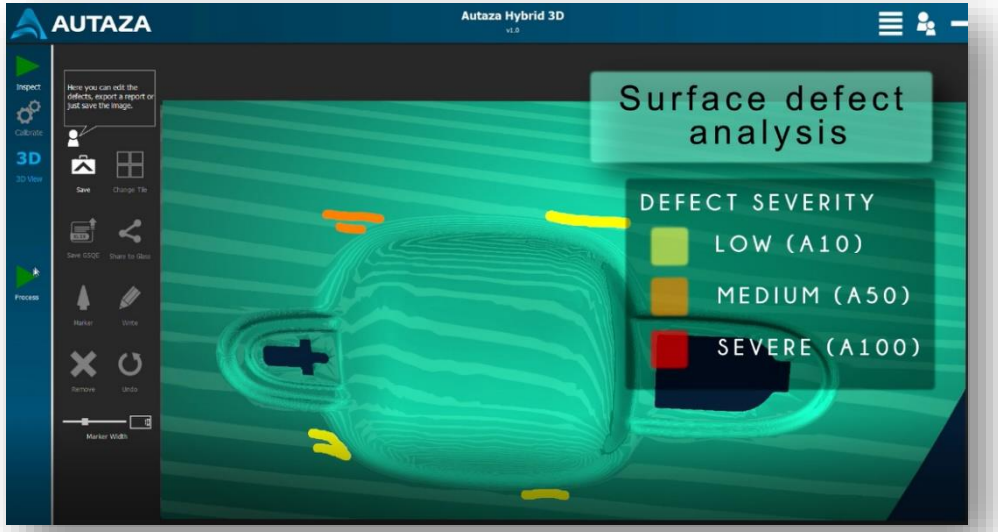
Surface Defects Classifier

Uses AI to rate defects (customizable)

Simulation results in Virtual Light Room



Surface Defects Analysis



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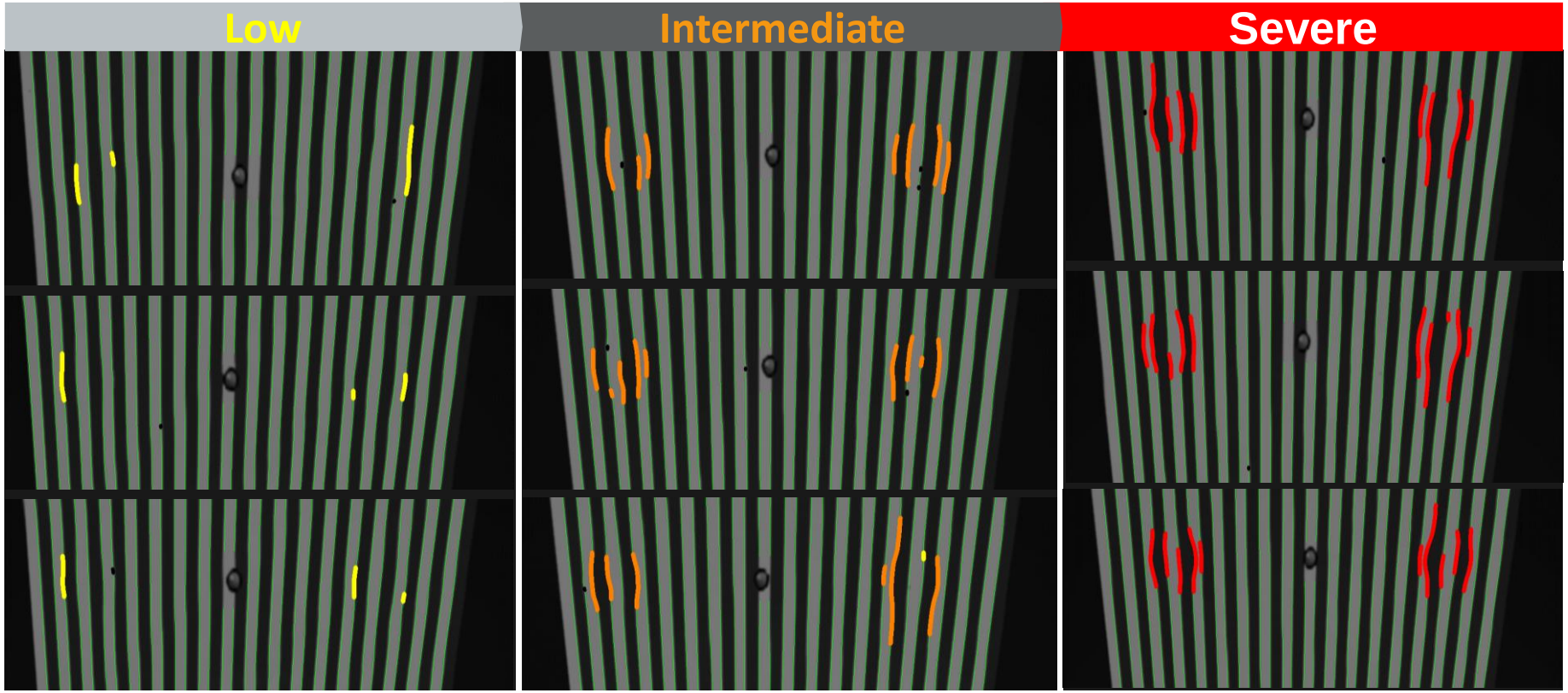
Customization of Severity Criteria



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Typical Workflow

Simulation

Virtual Light Room

Surface Classifier

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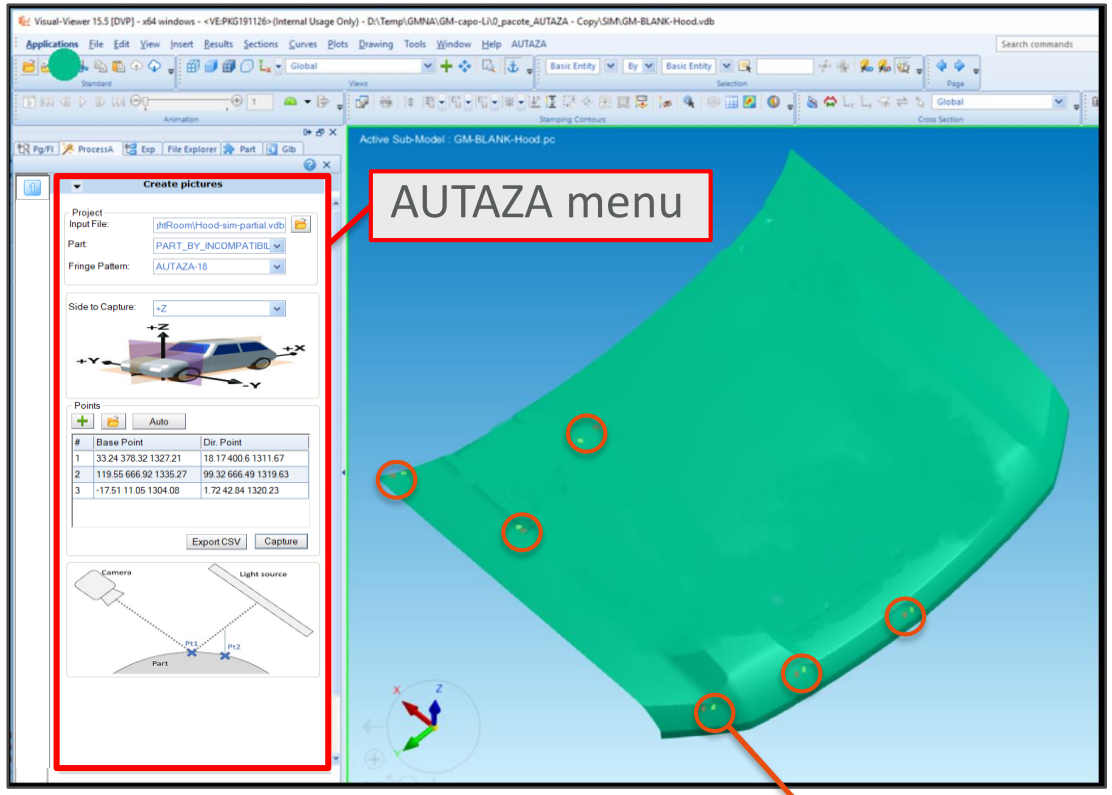
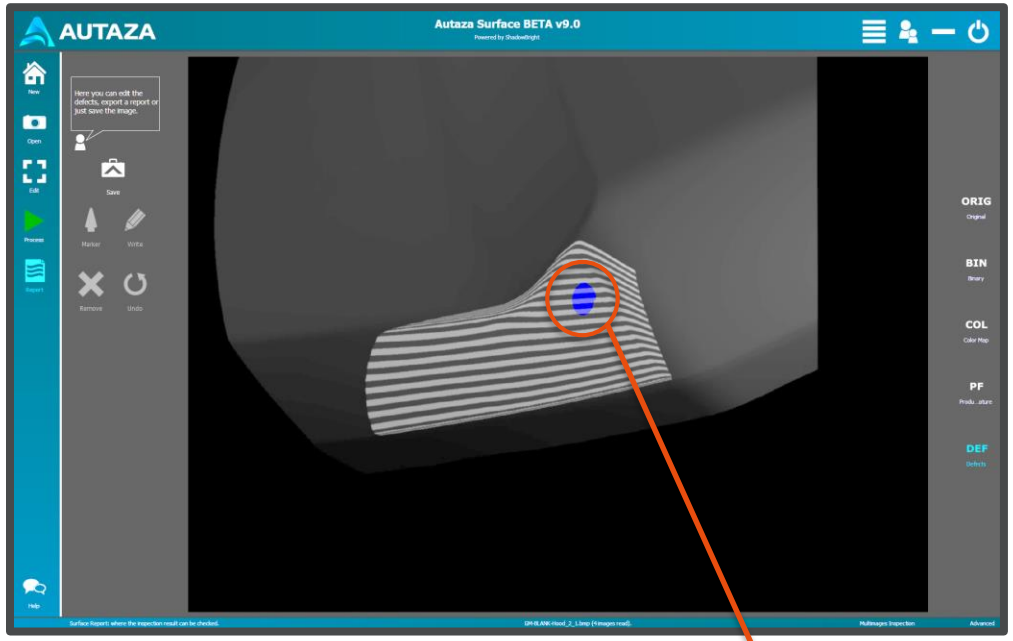
A dedicated menu in ESI Visual and direct link to Autaza Surface

Visual Viewer



Point of Interest

AUTAZA Surface



Surface defect was found

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VALIDATION

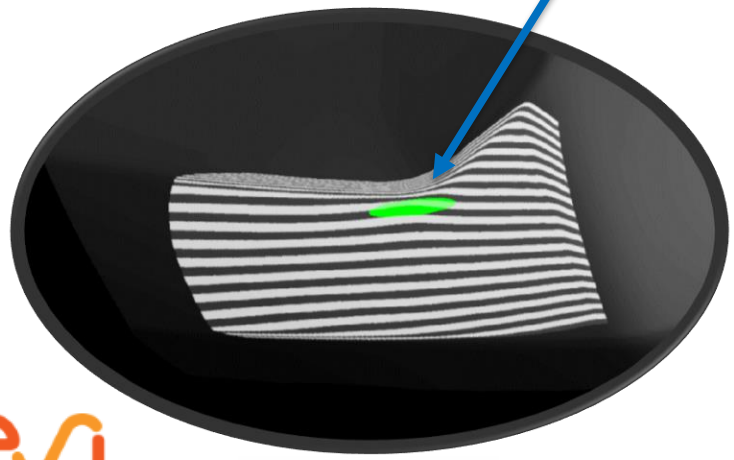
Real part was analyzed by a professional

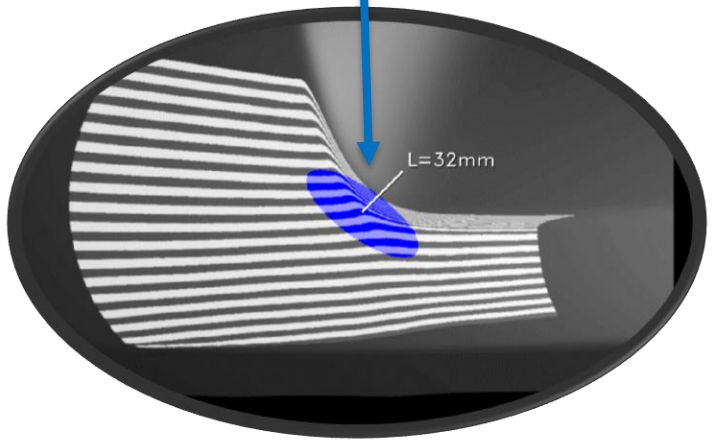
Defects are marked

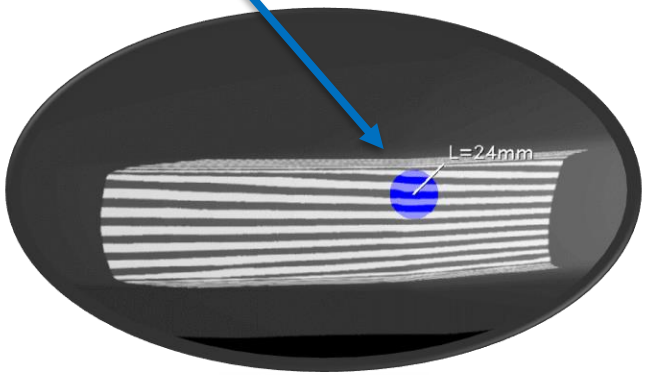
PAM-STAMP + AUTAZA

Perfect correlation

Surface evaluation made by inspector







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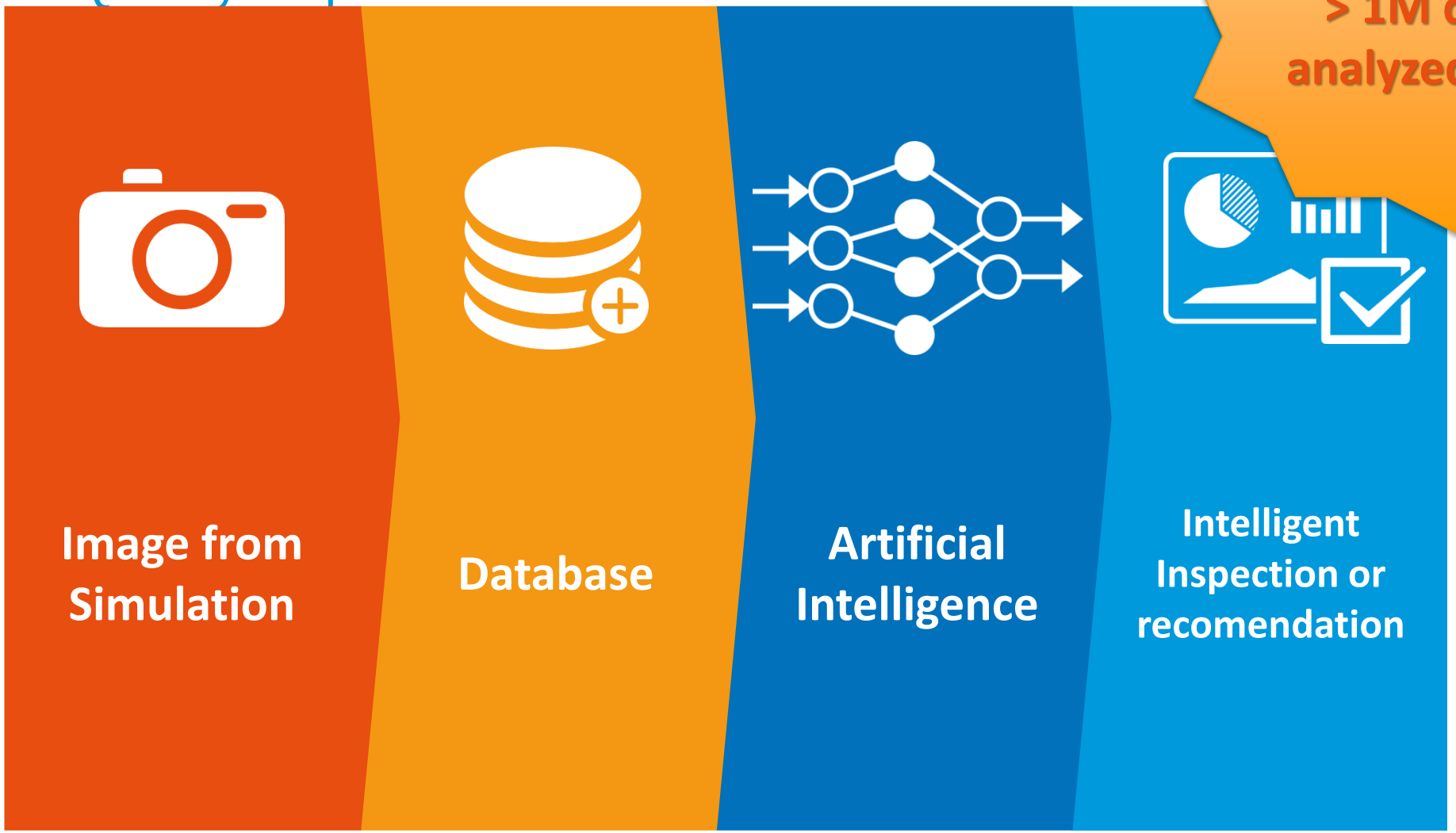
Methodology

Intelligent Quality Inspection



> 1M defects analyzed to date

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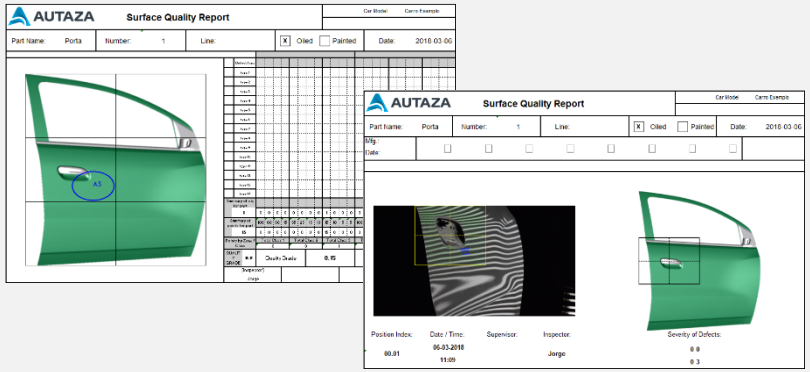
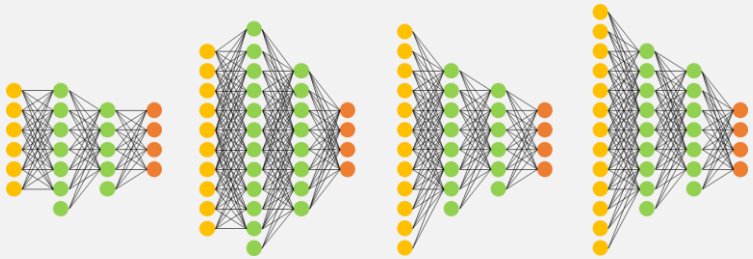
Methodology

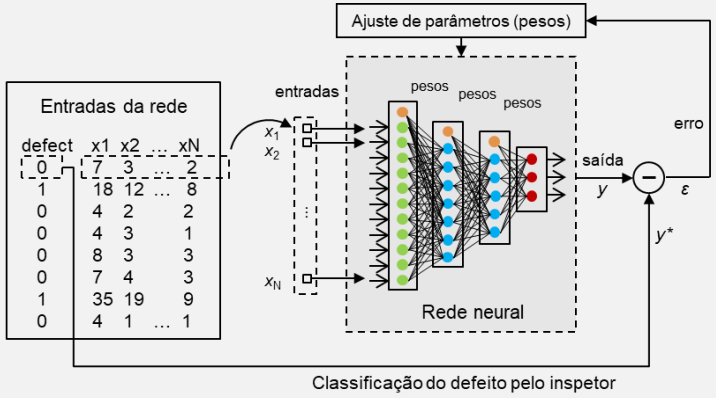
Quality criteria from OEMs



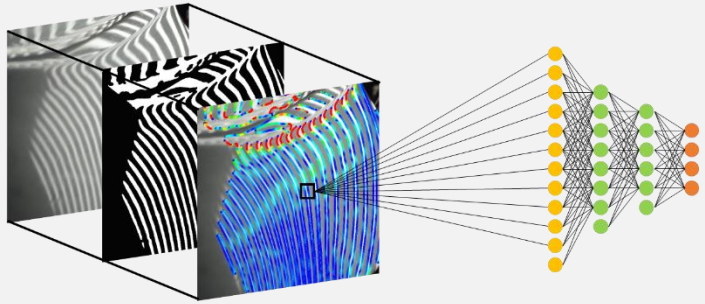
AI algorithm optimization



AI training



Defects classifier



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This Methodology Provides

100% inspections with the unique and INTELLIGENT mathematical STANDARD.

Inspection TRACEABILITY with unified database.

Generated SAVINGS can reach 60% of the current rework costs.

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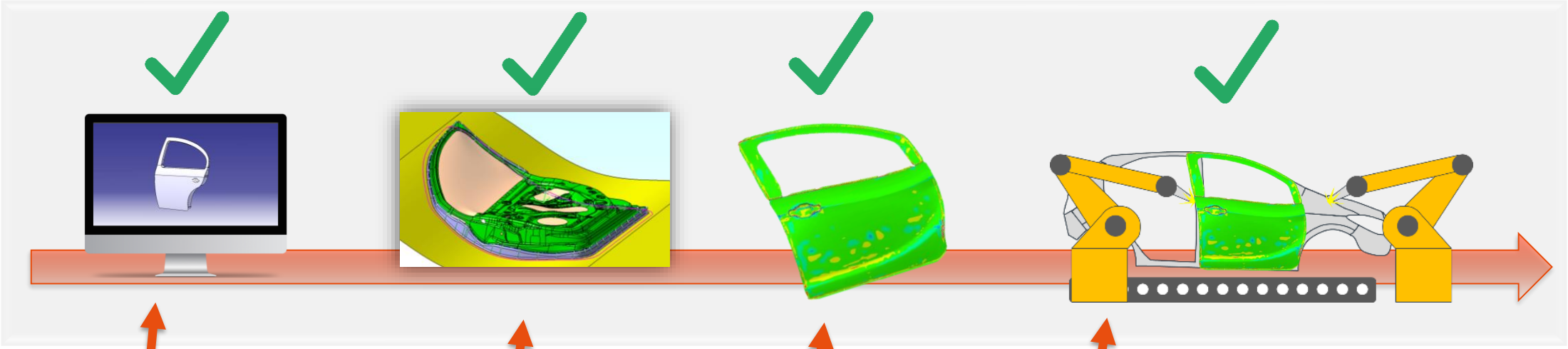
Absence of Value in the Product Lifecycle



Assembly
Check if new defects show after assembly

Stamping
Check surface defects accurately and quantitatively

Die face
Check die face design surface quality

Parts CAD
Check part design surface quality

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Autaza inspects from a simulated part to the finished car

Data needed for each use case

- Simulation
  - PAM-STAMP input file

  OR
  - Die faces in CAD
  - Process data
  - Material data

  ✓ Fast link to PAM-STAMP via Catia

  ✓ Easy setup from any CAD with Process Editor

- Real part
  - Scan file in STL

- Part or Die faces
  - Part CAD
  - Die faces in CAD (compensated or not)

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Take aways

- ESI's Virtual Light Room is a new solution that helps users detect and rate surface defects
  - The same criteria is shared by simulation and shop floor, making it much easier to compare and trace the sources of potential surface issues

- Surface defects can be potentially found on:
  - Part CAD from studio – potentially surface issues that were overseen
  - Die face CAD design – potential surface issues after die compensation
  - Simulation – process related surface defects

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Thank you!

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