

Automation  
Medic  
Comple  
geomet

Winner  
ITEA Award  
of Excellence  
2023

Innovation

3D PRINTING

Innovation  
Technology

**SAMUEL**

Additive  
manufacturing

Spare  
parts

Industri

# ITEA PO Days 2023

Valorise your production data and unlock your company's experience

ITEA Award of Excellence 2023 ceremony

13 September 2023

Alain Coulombe CEO 3DSemantix

25  
years



ITEA 4  
1998 - 2023

# SAMUEL

## Project consortium

- Belgium
  - Cr3do
  - Materialise
  - Sirris
- Canada
  - CRIQ – Investissement Quebec
  - Fusia
  - FZ Engineering
  - Tekna
  - 3DSemantix

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# What is Additive Manufacturing (AM)?

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## Also known as 3DPrinting

- Additive Manufacturing (AM) produces parts by adding material.
- Variety of available techniques.
- Variety of available materials.
- Can create innovative geometries.
- AM industry grew by 19.5%\*\* in 2021.



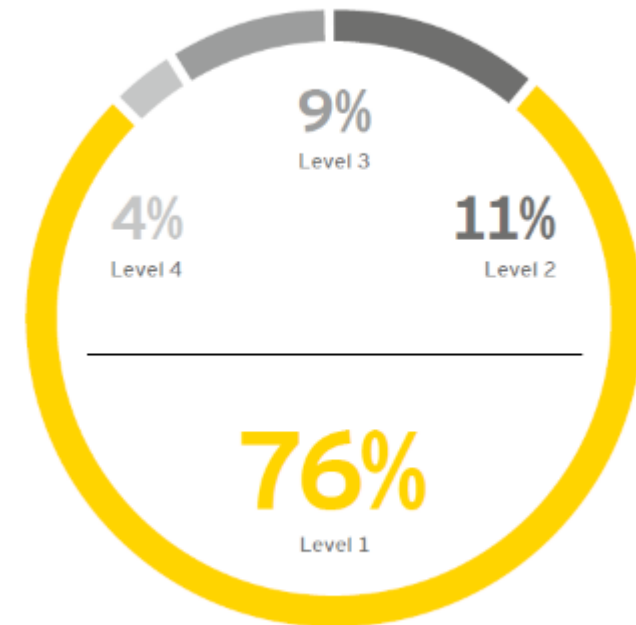
# Which technology for which application?

## AM industry during elaboration FPP SAMUEL

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- Most companies (76%) had no experience with AM.
- > 46% said they had not enough information about the technology or **lack in-house expertise.**
- **The best way to learn design for AM is hands-on.**

Global 3DP maturity level (%)\*



\*N=900 companies, EY global 3DP study, April 2016

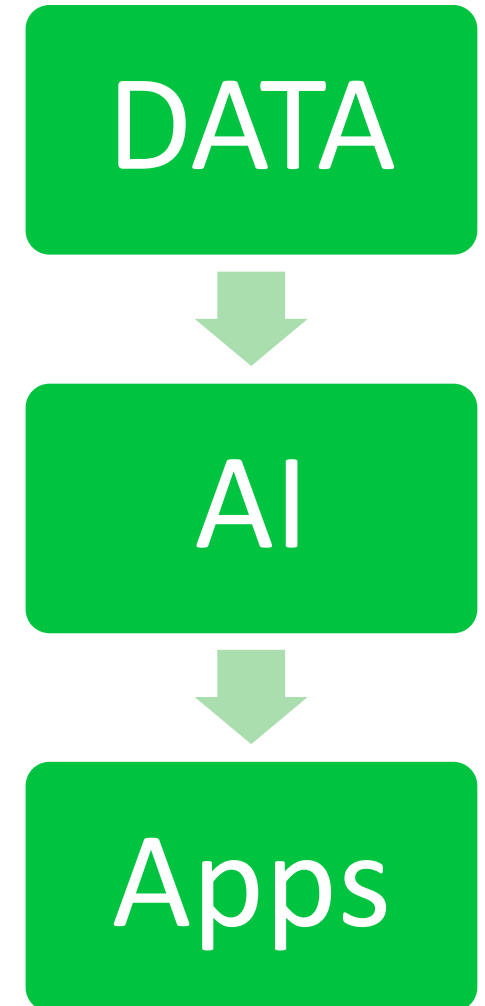
# Project objectives & challenges

## Leverage AM data to create AI applications

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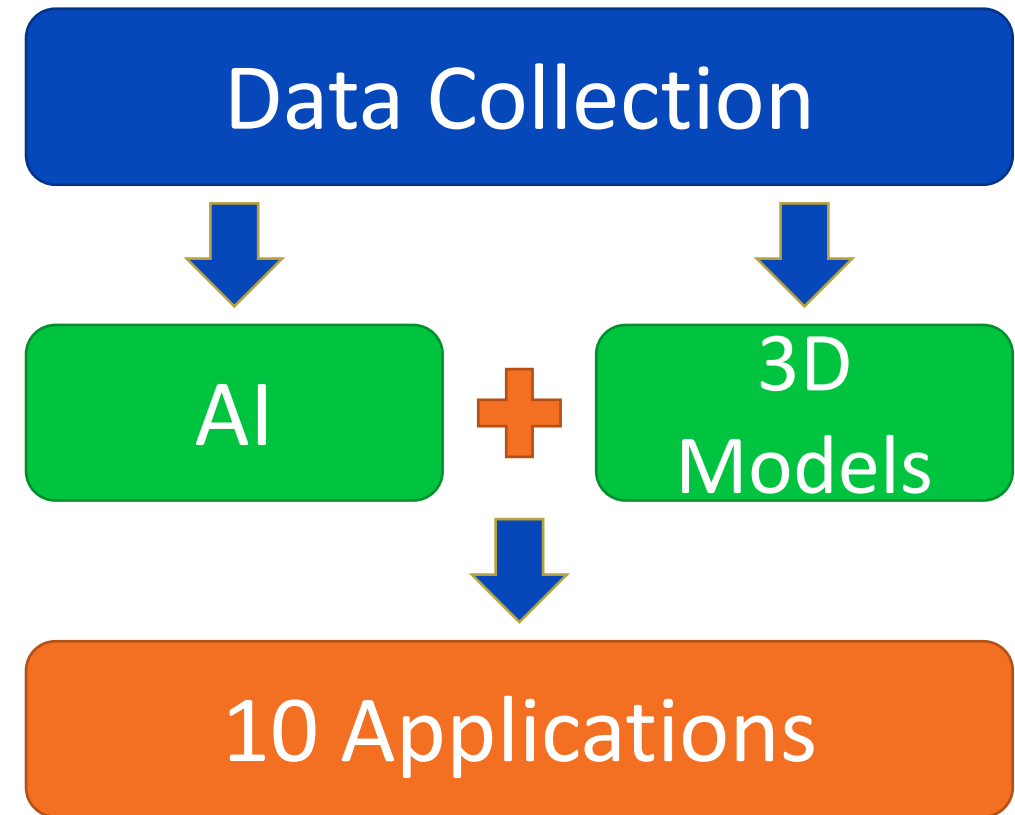
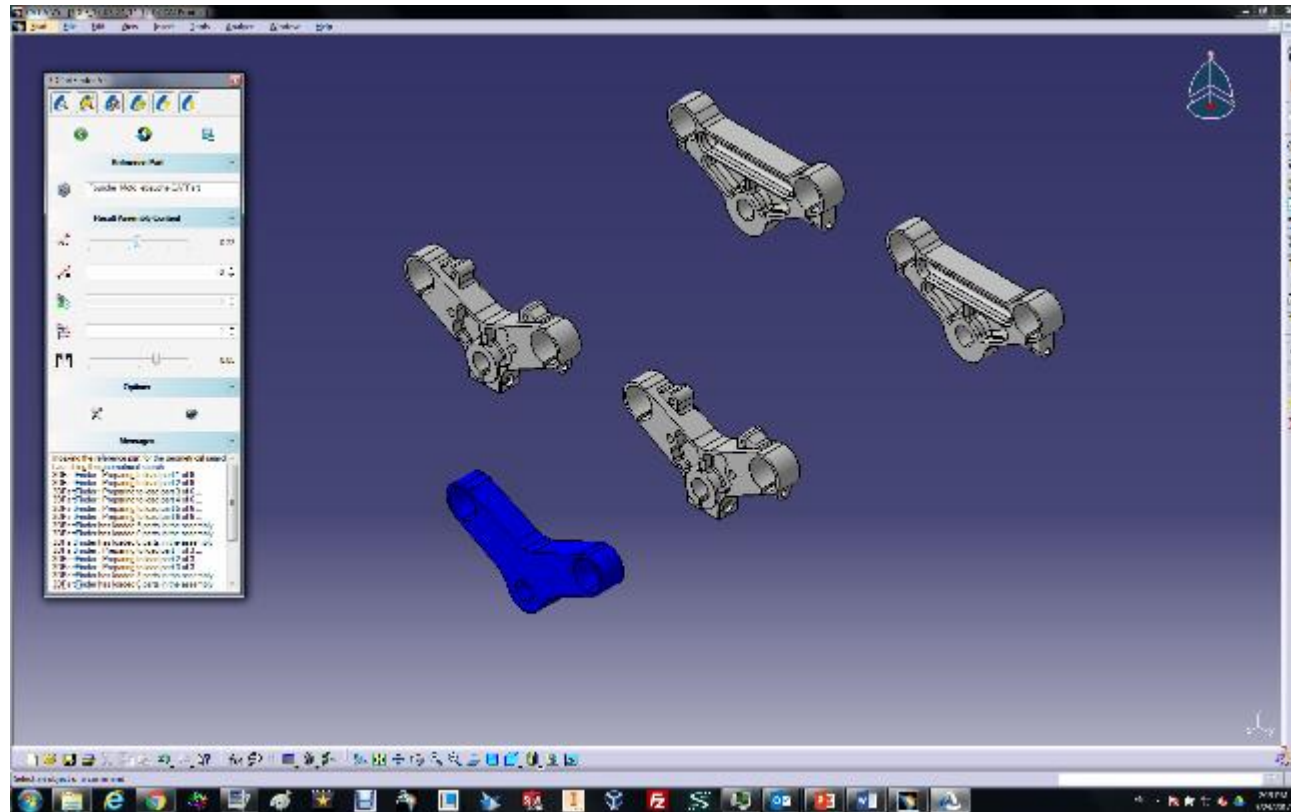
### Objectives:

- Provide AM users with expert, useful, transferable knowledge.
- Assist stakeholders in their work along the overall AM workflow.
- Help making the AM processes be more consistent, reliable and dependable.



# 10 Apps created using two Technology Pillars AI (ML) + Geometric search / 3D model analysis

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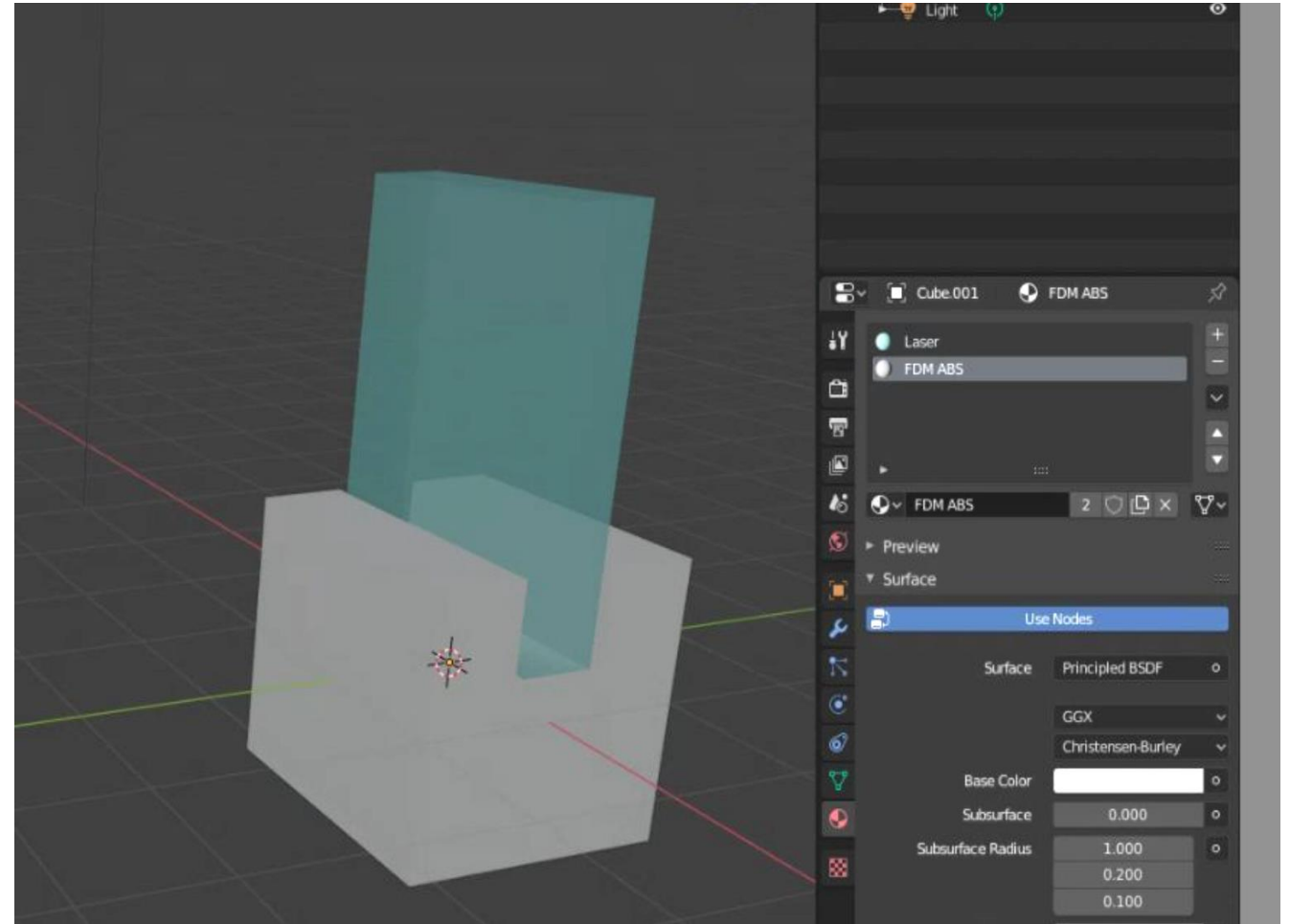


# Cr3do: Design Guidelines System

## Automated tool to improve settings

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- Design error rate reduction of 67%.
- Manufacturing error rate reduction of ~ 20%.



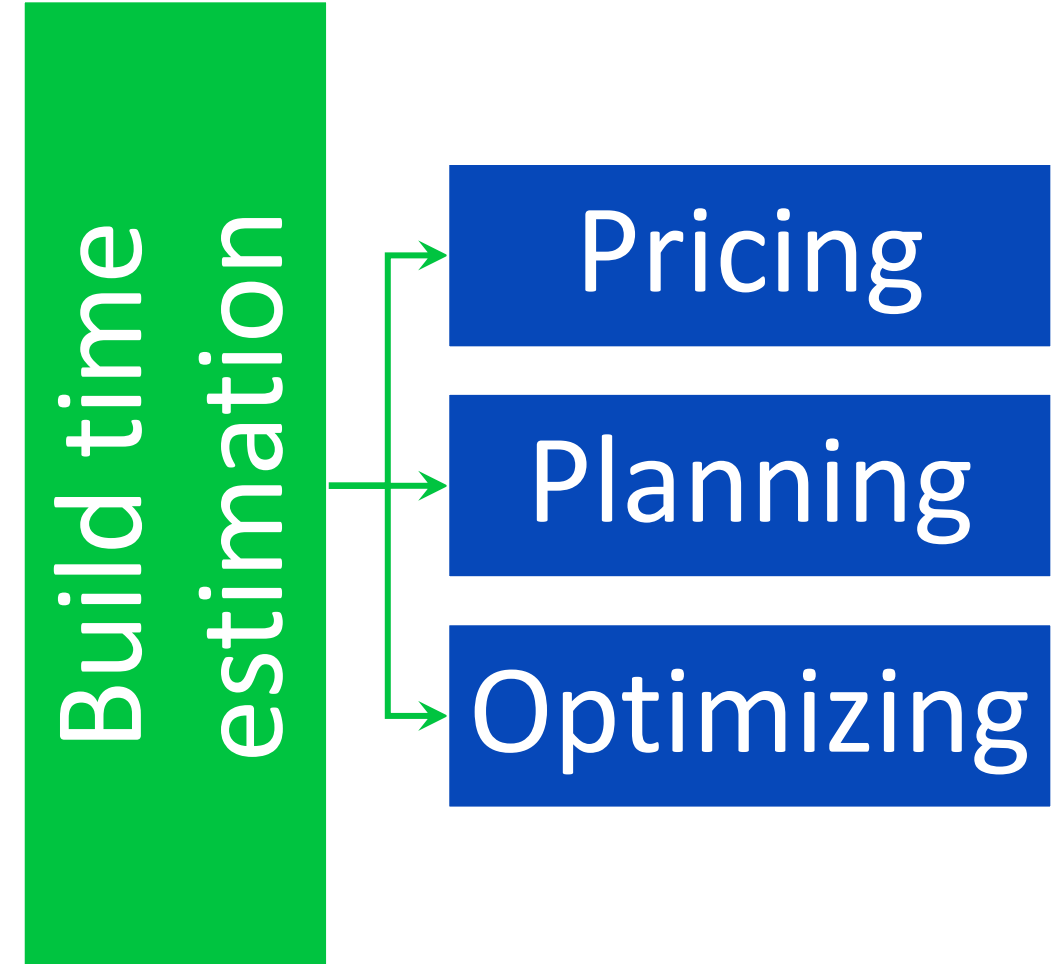


# Build Time Estimation (BTE) for FDM

Materialise + Sirris + Cr3do + 3DSemantix

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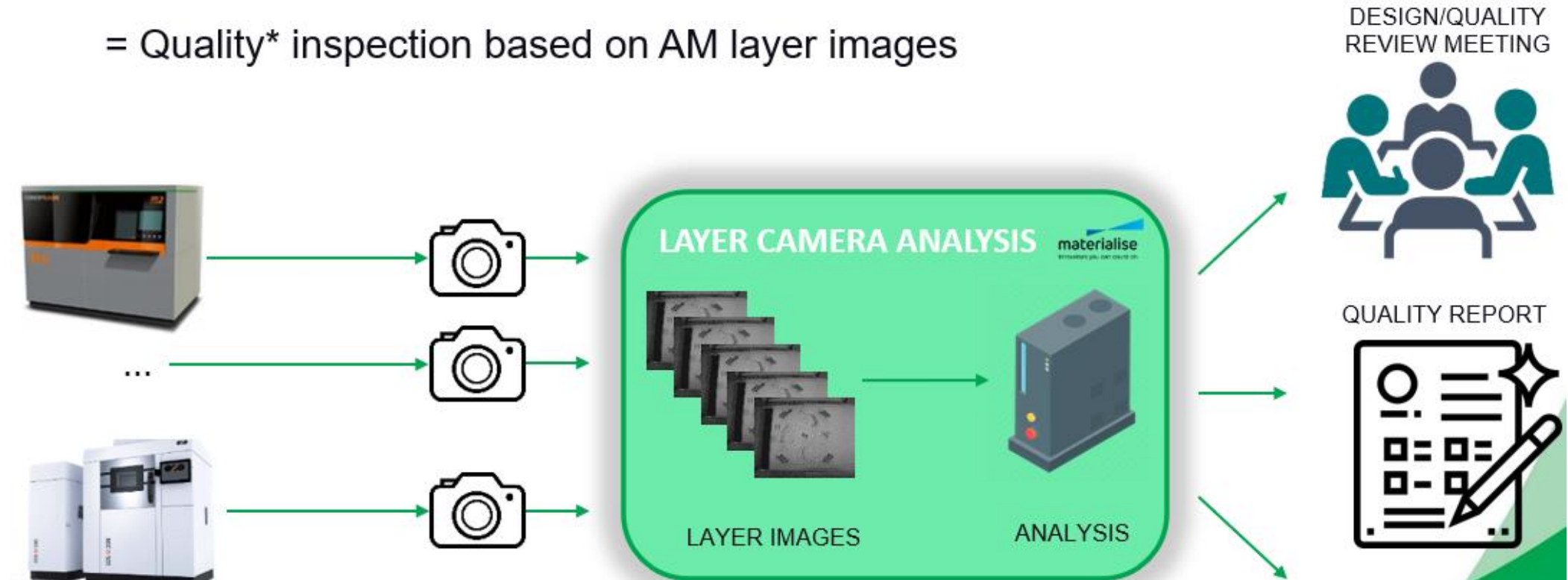
- FDM builds can take 3 – 4 days.
- Build time estimation for FDM builds.
- Currently requires complete build preparation.
- App results:
- MRE 3% printing time > 14 hours.



# Materialise: Anomaly Detection – Build Quality Surveillance Exploitation

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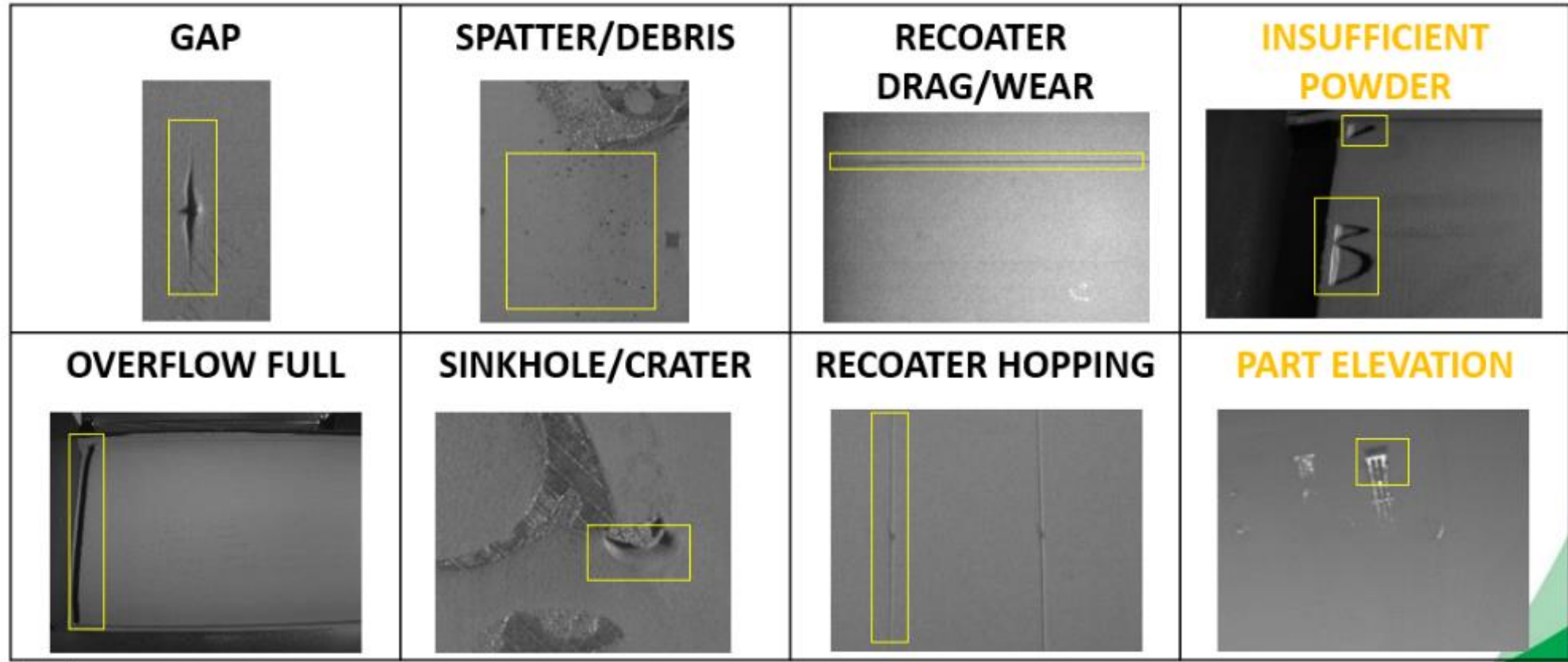
= Quality\* inspection based on AM layer images



# Ex. of Key Achievements and Exploitation

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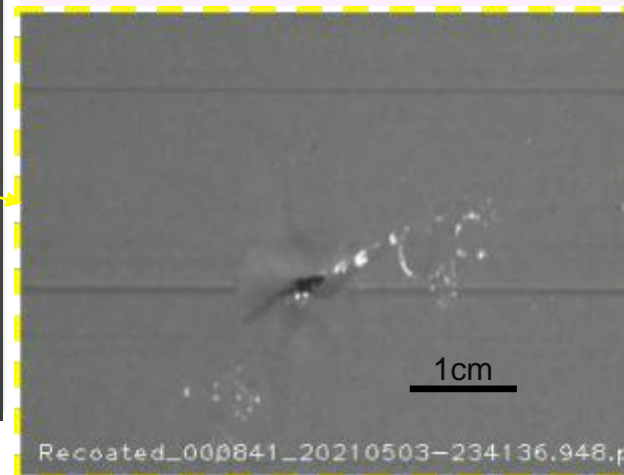
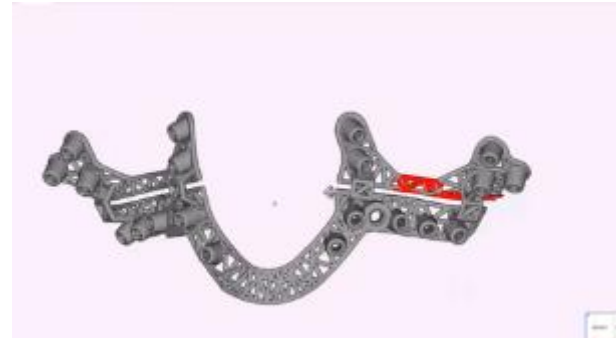
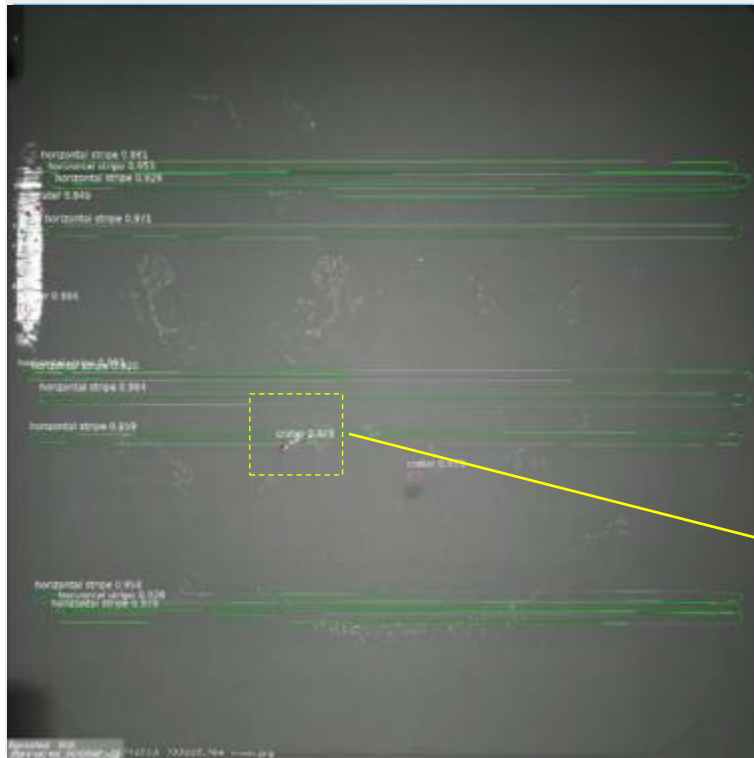
## Materialise: Anomaly Detection – Build Quality Surveillance



# Ex. of Key Achievements and Exploitation

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## Materialise: Anomaly Detection – Build Quality Surveillance



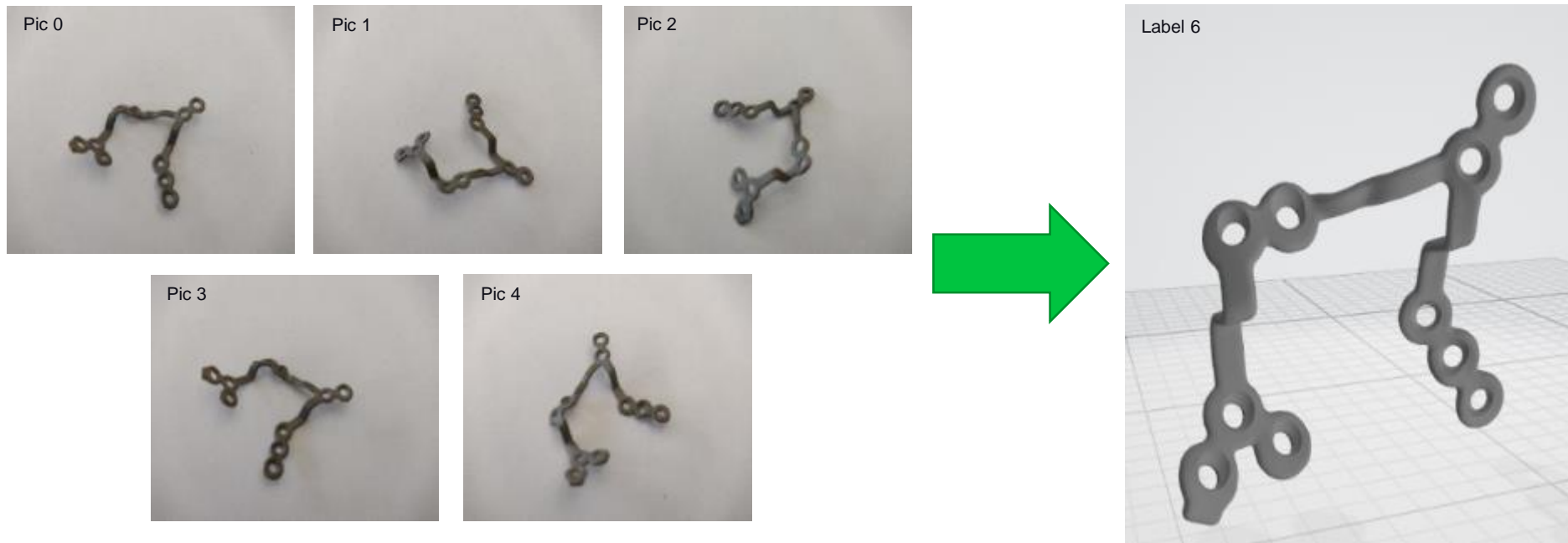
defect ID:	490
defect layers:	156
- start layer	750 (22.50 mm)
- end layer	905 (27.15 mm)
defect volume	12mm <sup>3</sup>
analysis confidence	98%

# Materialise: Part recognition

## Automate the part identification

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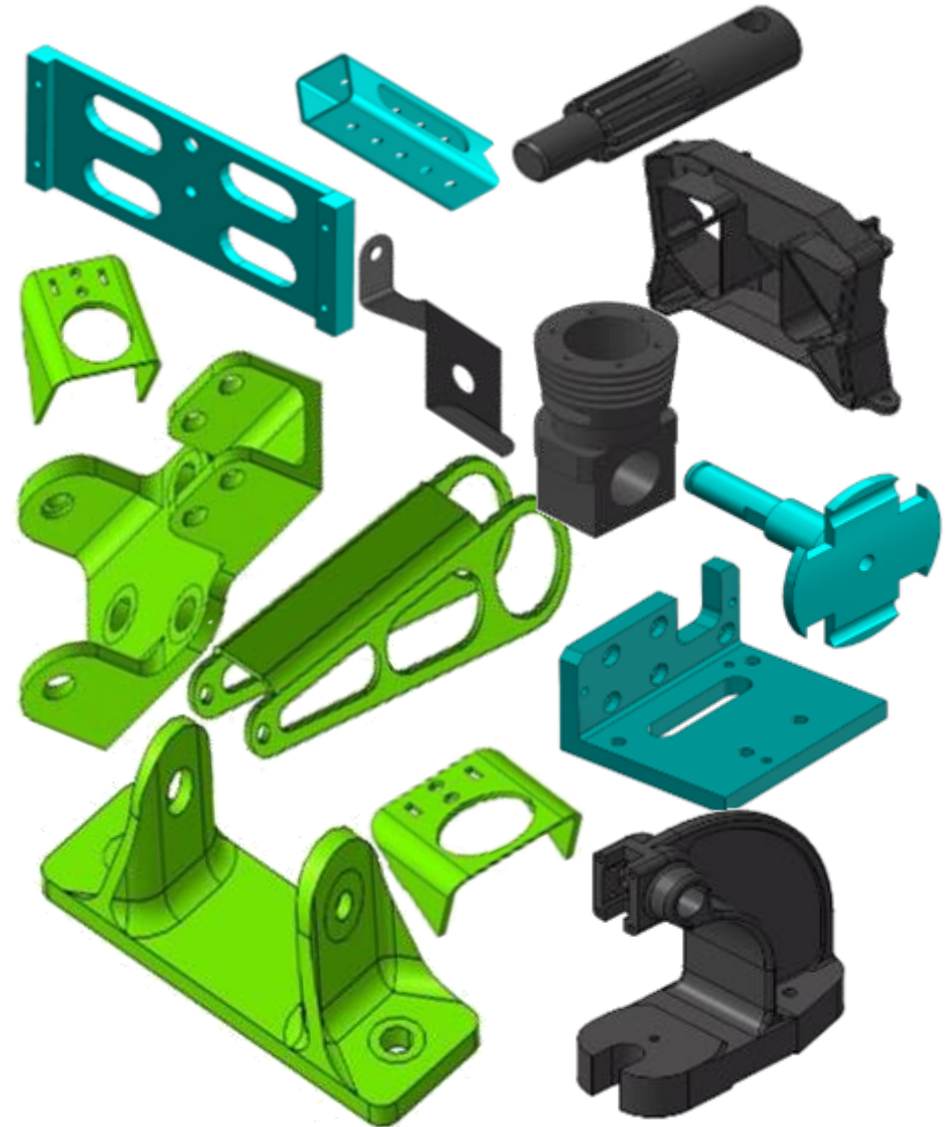
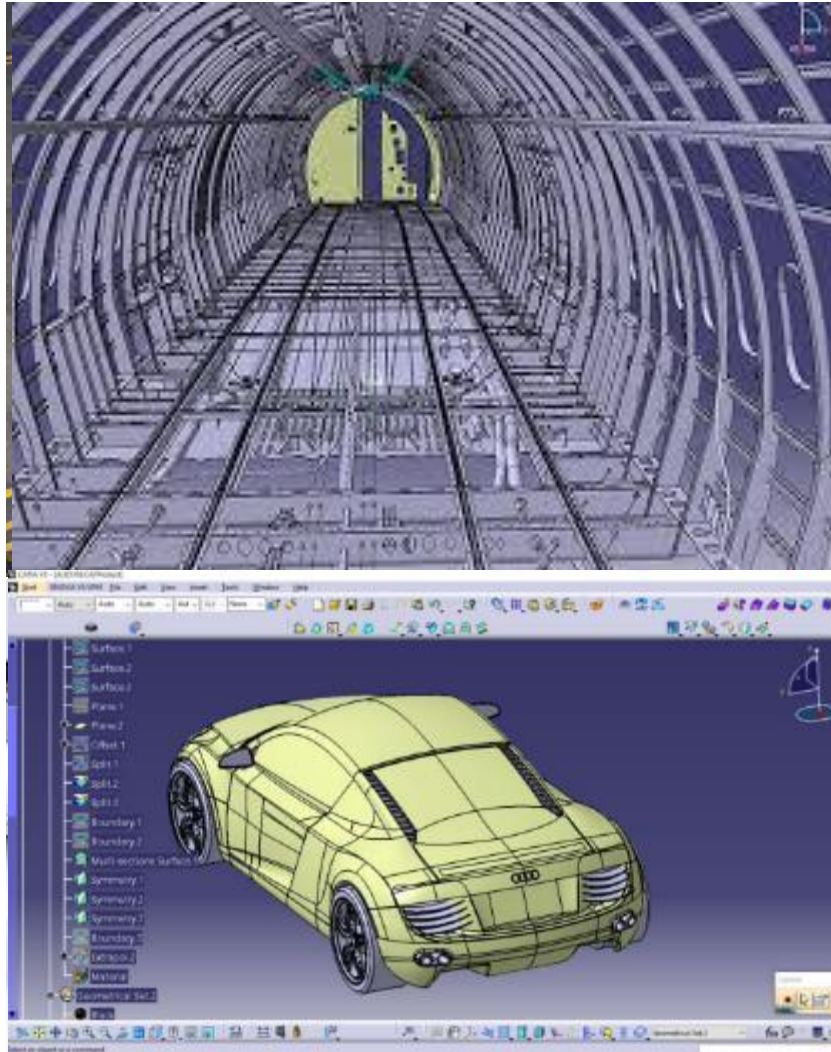
- Recognizing parts from a list
- Automatic management of builds



What do Manufacturers say when selecting Partner?  
What should you consider when selecting a Mfg Partner?



# How does the experience of a manufacturer translate?



Have you ever produced a part like this?

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A question, if you could, you would ask to all relevant AM Partners.

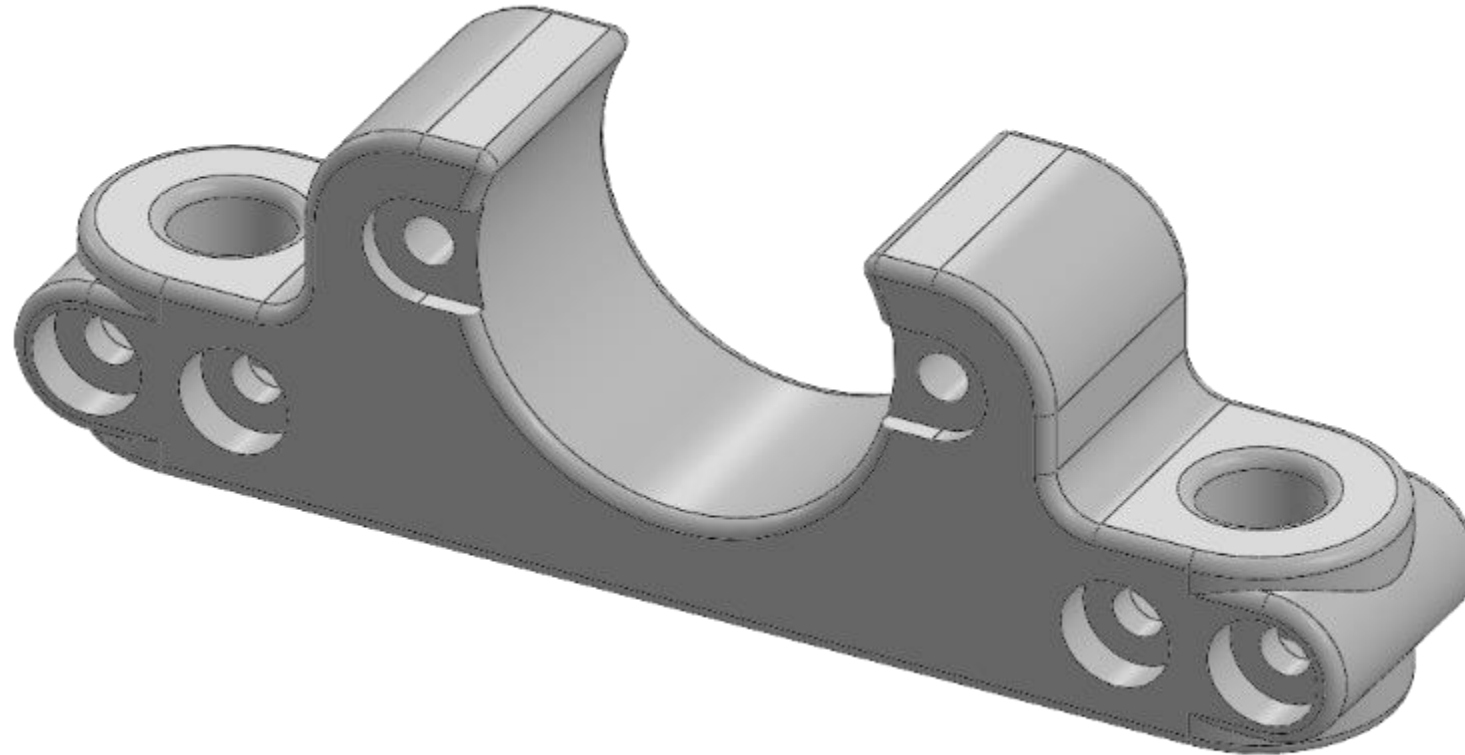




Ausborne Aero needs an AM Partner to print the 3D model

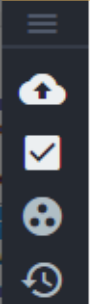
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Simply upload the 3D model privately and launch a search!





Search partners...



### CAD Parts

Drag files to upload 3D Model  
or  
[Browse Files](#)

- Succeeded** 2 ^
- 08/04/2022 3:00 PM BindingClamp.step
  - 09/03/2022 11:20 AM HouseModel.stl



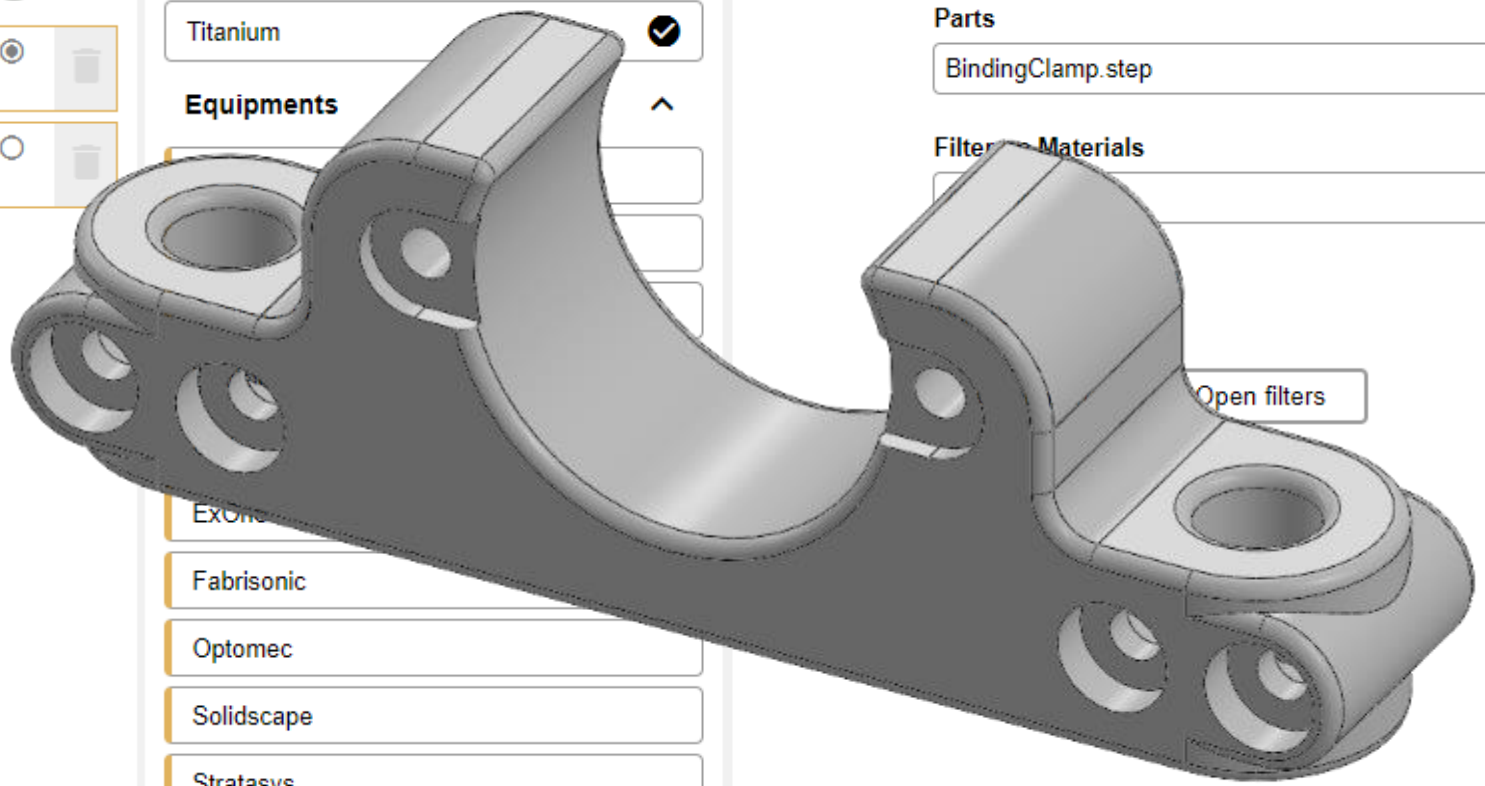
### Filters

#### Materials

- << Previous
- Aluminium** ✓
- Steel ✓
- Titanium ✓

#### Equipments

- EXOne
- Fabrisonic
- Optomec
- Solidscape
- Stratasys



### Add A New Analysis

/ Analysis / New

#### New Analysis

**Name**  
Binding Clamp

**Parts**  
BindingClamp.step

**Filter - Materials**

Open filters

**SEND**



- Parts
- Filters
- Workspace
- History

CAD Parts

Drag files to upload 3D Model  
or  
[Browse Files](#)

Succeeded 2 ^

- 08/04/2022 3:00 PM BindingClamp.step
- 09/03/2022 11:20 AM HouseModel.stl

Results Of Binding Clamp 7:05 PM - Apr 8 2022

/ Analysis / Binding Clamp

Part BindingClamp.step

Material Aluminium

Companies with relevant production experience

	<p><b>FusiA</b> FusiA Groupe is specialized in additive manufacturing (3D printing) of metallic parts and precision machining. FusiA Groupe and its subsidiaries have got over 40 years of expertise allowing it to offer services according to aeronautical standards.</p>	<p>Core business</p>
	<p><b>FZ Engineering</b> Building together an Innovative and Efficient Industrial Future. Layer by layer, we are building, with our team, our partners, and our customers, an efficient industrial future.</p>	<p>Core business</p>
	<p><b>Materialise</b> Want to revolutionize your product development with one of the most comprehensive 3D printing services in the world? Talk to us about your design and production challenges. We'll help you address them by making 3D Printing a part of your engineering...</p>	<p>Core business</p>
	<p><b>Investissement Québec - CRIQ</b> Investissement Québec - CRIQ carries out its R&amp;D projects, tests, demonstrations, and specialized analyses using state-of-the-art facilities and equipment.</p>	<p>Skilled</p>



- Parts
- Filters
- Workspace
- History

### CAD Parts

Drag files to upload 3D Model  
or  
[Browse Files](#)

**Succeeded** 2 ^

- 08/04/2022 3:00 PM  
BindingClamp.step
- 09/03/2022 11:20 AM  
HouseModel.stl

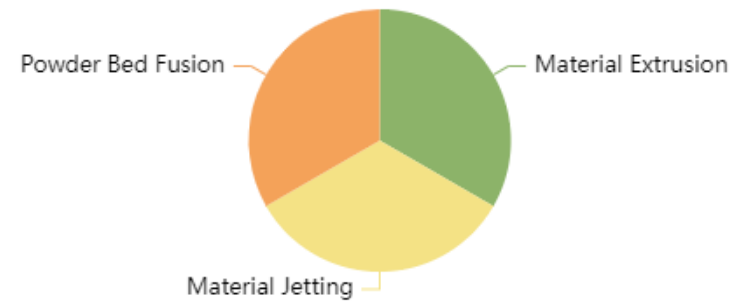
### FusiA



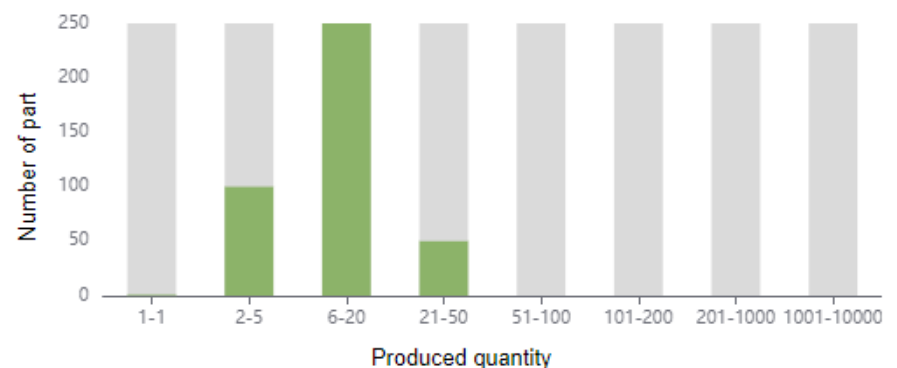
[info@fusia-groupe.com](mailto:info@fusia-groupe.com)  
[fusia-groupe.com](http://fusia-groupe.com)  
**Saint-Eustache — Canada**  
 180 boul. Industriel, J7R 5C2, QC

FusiA Groupe is specialized in additive manufacturing (3D printing) of metallic parts and precision machining. FusiA Groupe and its subsidiaries have got over 40 years of expertise allowing it to offer services according to aeronautical standards.

Distribution of manufacturing processes

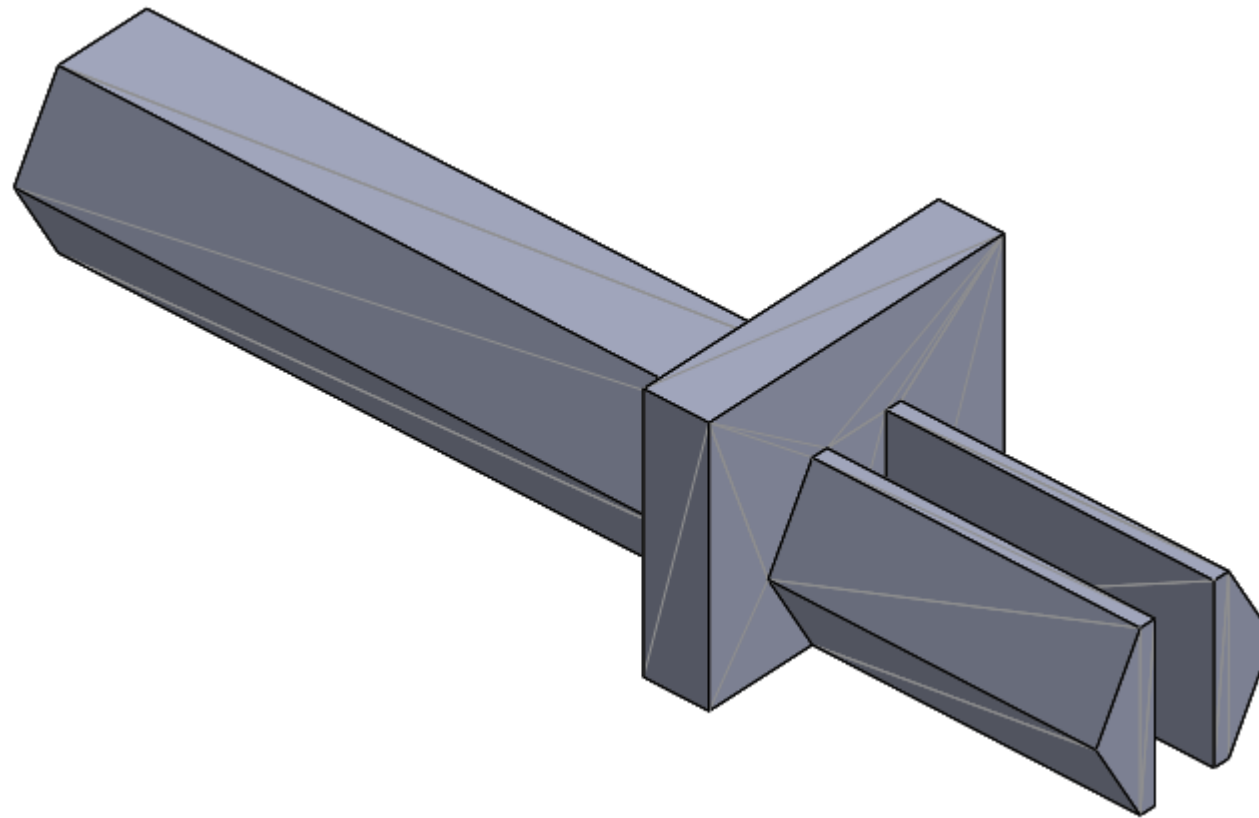


Produced quantity per part

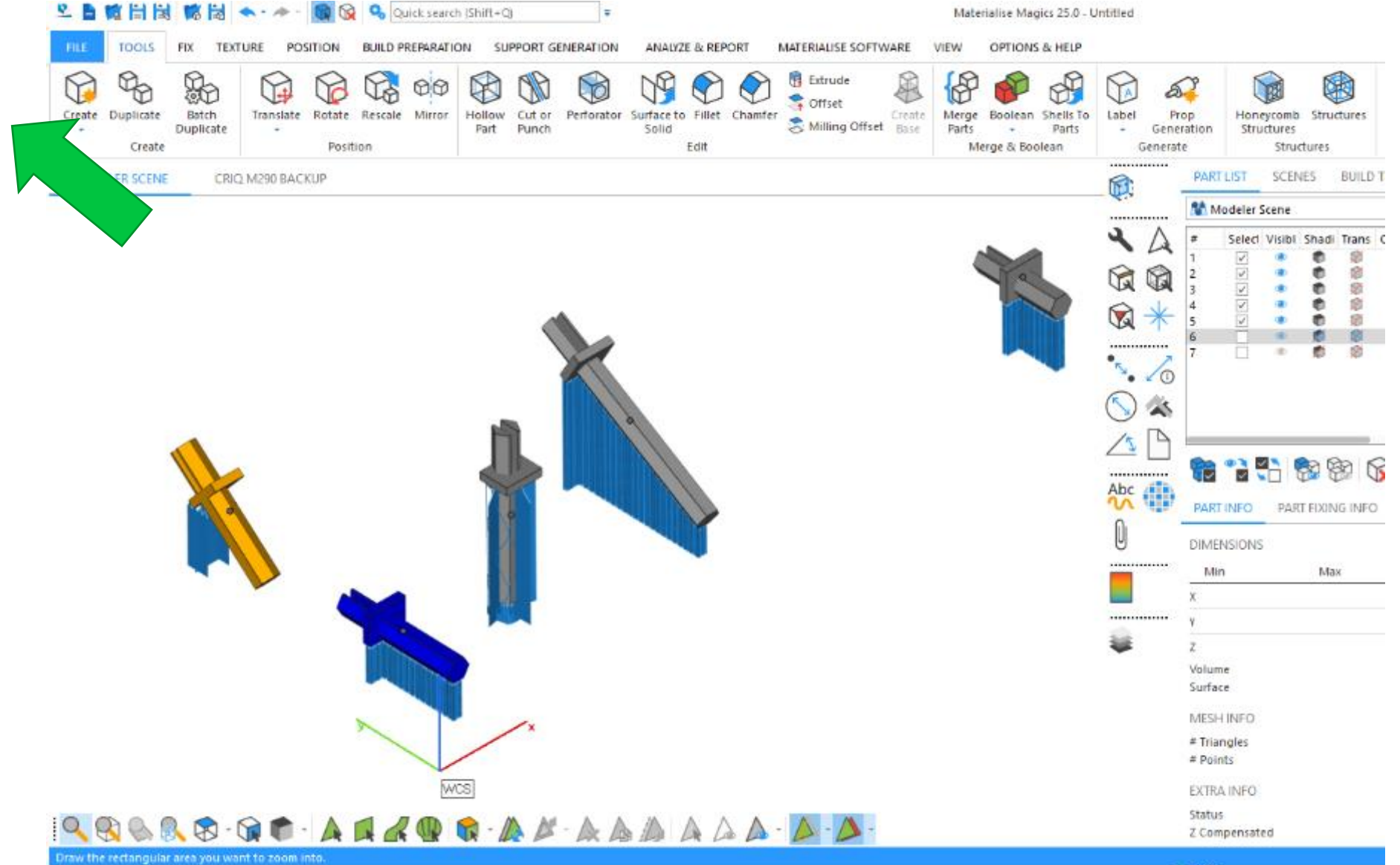
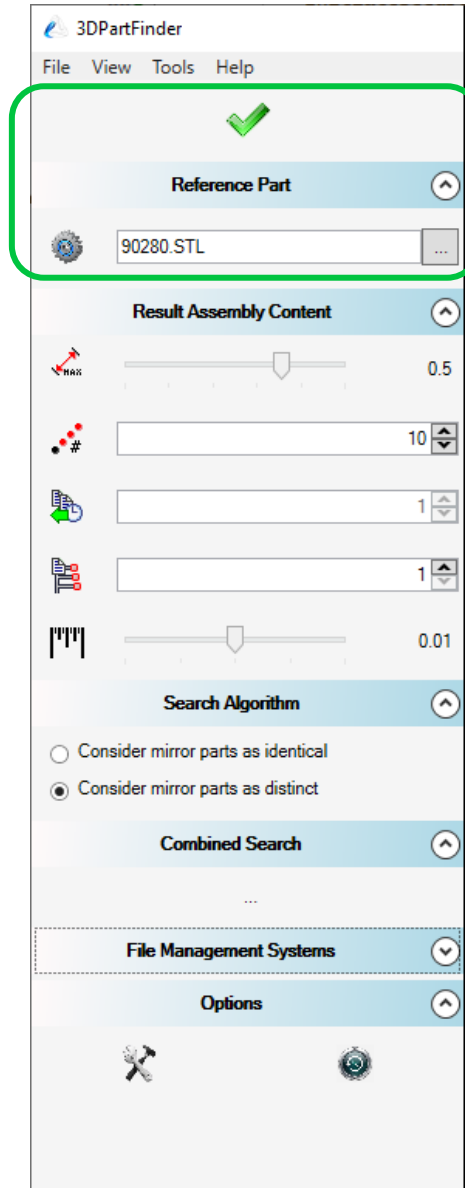


I want to quickly answer a Request for Quote  
Simply use the 3D model to do a geometric search!

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# Launch a similarity search. See and compare results directly in MAGICS.



# Quickly access relevant information

3DPartFinder  
File View Tools Help

Reference Part  
90280.STL

Result Assembly Content

0.5

10

1

0.01

Combined Search

Options

Messages

Searching similar parts...  
Research completed:  
Results rendering completed:  
4 Parts displayed

Materialise Magics 25.0 - Untitled

Quick search (Shift+Q)

FILE TOOLS FIX TEXTURE POSITION BUILD PREPARATION SUPPORT GENERATION ANALYZE & REPORT MATERIALISE SOFTWARE VIEW OPTIONS & HELP

MODELER SCENE CRIQ.M290 BACKUP

Metadata

S	Result Type	Distance	Machine	Process	Material	Build seconds	Number of layers	Number of toolpaths	Number of points
<input type="checkbox"/>	IsReference	0	F123	FDM	ABS	683	86	96	29453
<input type="checkbox"/>	IsSimilar	0.0416666176756407	F123	FDM	ABS	639	86	101	19983
<input type="checkbox"/>	IsSimilar	0.0891330463321999	Fortus 400mc	FDM	ULTEM 1010	619	86	93	24088
<input type="checkbox"/>	IsSimilar	0.106506841571417	F123	FDM	ABS	605	86	98	20614
<input type="checkbox"/>	IsSimilar	0.154351456950562	J55	PolyJet	RGD720	619	86	184	6273
<input checked="" type="checkbox"/>	IsSimilar	0.181006486182299	J55	PolyJet	RGD720	4222	86	908	40512
<input type="checkbox"/>	IsSimilar	0.18987406638697	F123	FDM	PLA	625	86	96	16392
<input type="checkbox"/>	IsSimilar	0.20076602155142	J55	PolyJet	ABS	653	86	102	23783
<input type="checkbox"/>	IsSimilar	0.206292799240422	Fortus 400mc	FDM	ABS	649	86	101	24124
<input type="checkbox"/>	IsSimilar	0.213743696158359	Fortus 400mc	FDM	Nylon 12	619	86	97	22889
<input type="checkbox"/>	IsSimilar	0.258118465433433	F123	FDM	ABS	407	86	94	19404

WCS

Draw the rectangular area you want to zoom into.

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## Conclusion

- Data cumulated over the years can lead to the creation of very useful applications.
- Start gathering data if you are not, but please store it in a reusable format. Doesn't need to be expensive but with a structure.

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Thank you