eCOLAB 4.0

Innovative, collaborative and interoperable tools for improved higher education curricula on sustainable Industry 4.0 manufacturing.

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GRUPO DE INVESTIGACIÓN

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Reverse Engineering and 3D Scanning

Organizer: ECoLab 4.0 Project
Speaker: Enrique González, PhD in Engineering.
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15:15

High Polytechnical School of Ávila, Spain

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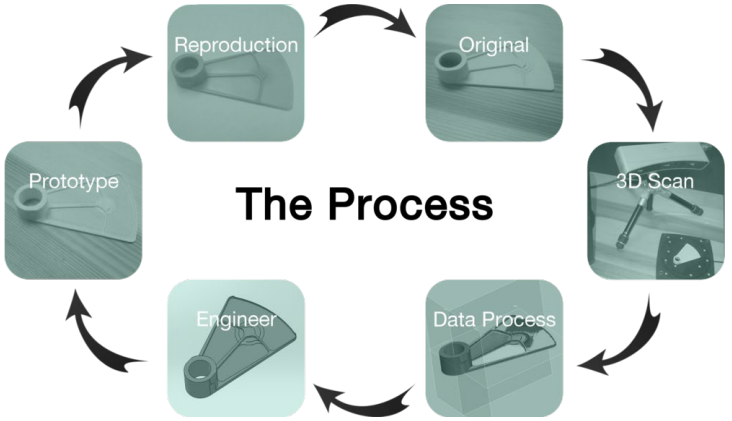
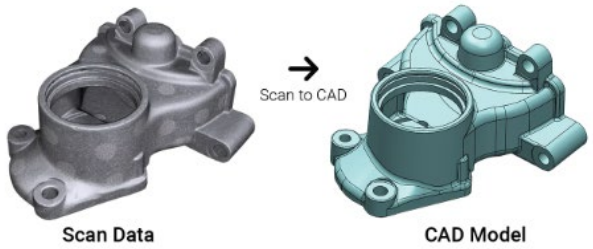
Introduction to Reverse Engineering

Definition: The process of deconstructing an object or system to understand its design, functionality, and components.

Importance in Industry: Enables part replication, product analysis of competitors, and design improvement.

Common Applications: Used in sectors such as manufacturing, automotive, aerospace, and medical fields for product development and optimization.





3D Scanners: Artec Eva and Space Spider

- Eva: A handheld structured-light 3D scanner, ideal for medium-sized objects.
- Spider: A high-precision handheld 3D scanner designed for small objects and intricate details.

Artec Eva

16 FPS capturing speed

Capturing and simultaneously processing up to an impressive 18 million points per second, Eva also provides high accuracy — up to 0.1 mm.

0.2 mm 3D resolution

Scan in brilliant color and high 3D resolution.

1.3 MP texture resolution

Make full-color 3D replicas of your object.

More info: www.artec.com

3D Scanners: Artec Eva and Space Spider

- Eva: A handheld structured-light 3D scanner, ideal for medium-sized objects.
- Spider: A high-precision handheld 3D scanner designed for small objects and intricate details.

Artec Spider

0.05 mm 3D point accuracy

Make extremely accurate 3D models of small industrial objects or sections of larger objects in fine detail.

No targets needed. Just point and shoot

No need for preparation, just plug in the scanner and point it at the item as you would with a video camera. Simple.

0.1 mm 3D resolution

Capture the geometry of your items with astonishing levels of 3D point density. Space Spider can even render the ridges of your fingerprint, that's how much detail it can pick up.

More info: www.artec.com

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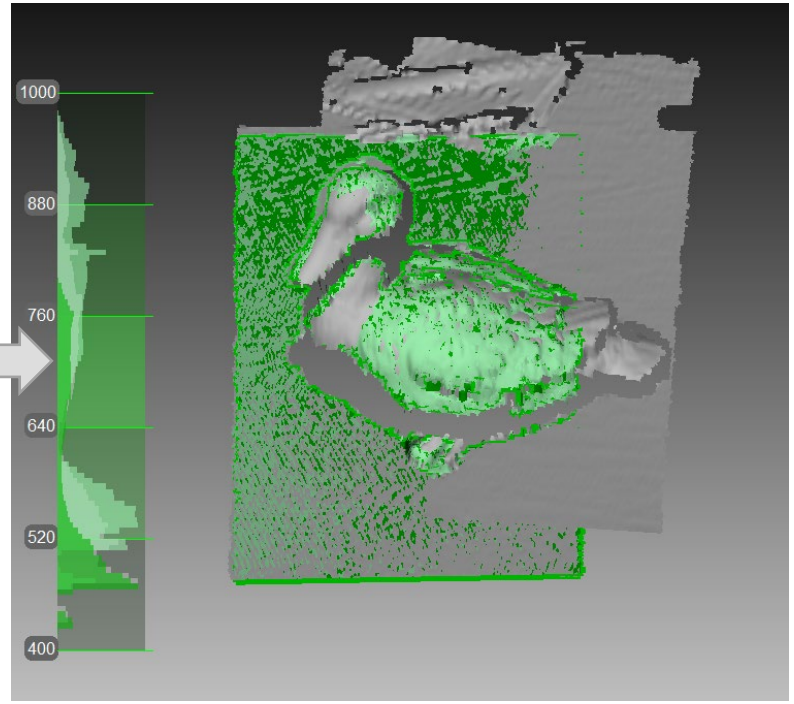
Scan to 3D model:

- Manual process

Scanning → Cleaning → Alignment → Registration → Fusion → Postprocessing

Distance indicator



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Scan to 3D model:

- Manual process

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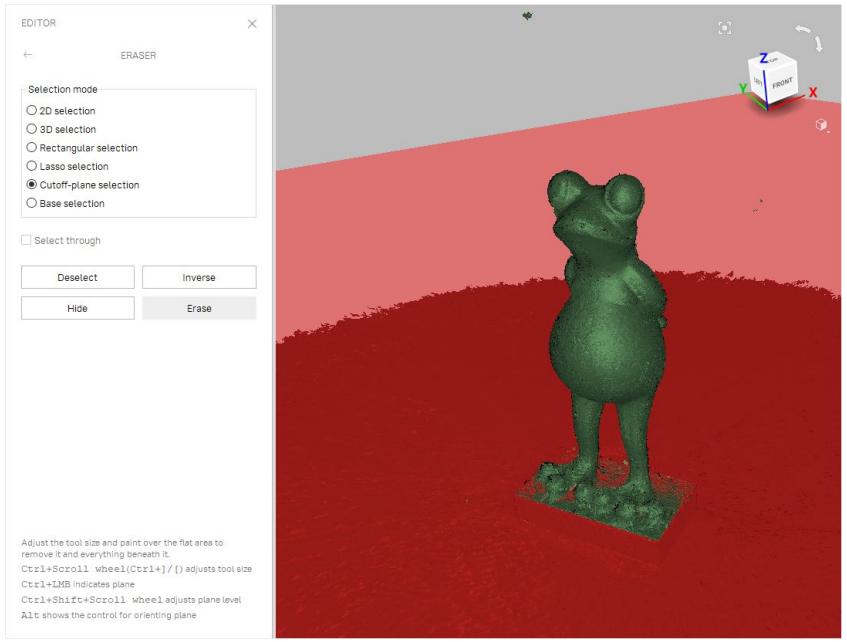

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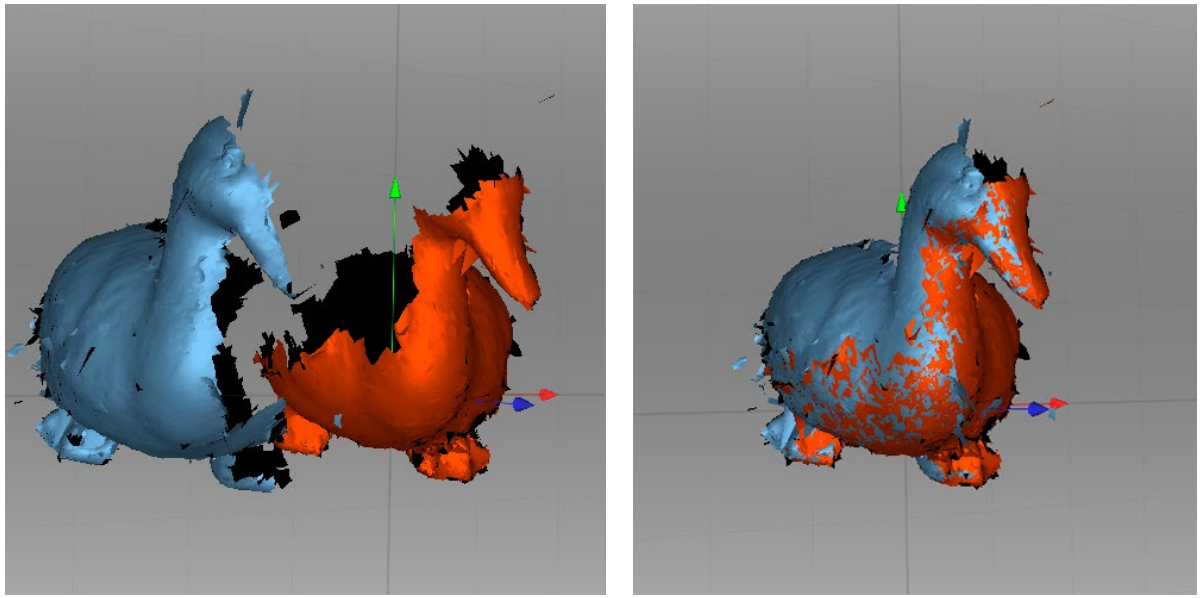
Scan to 3D model:

- Manual process



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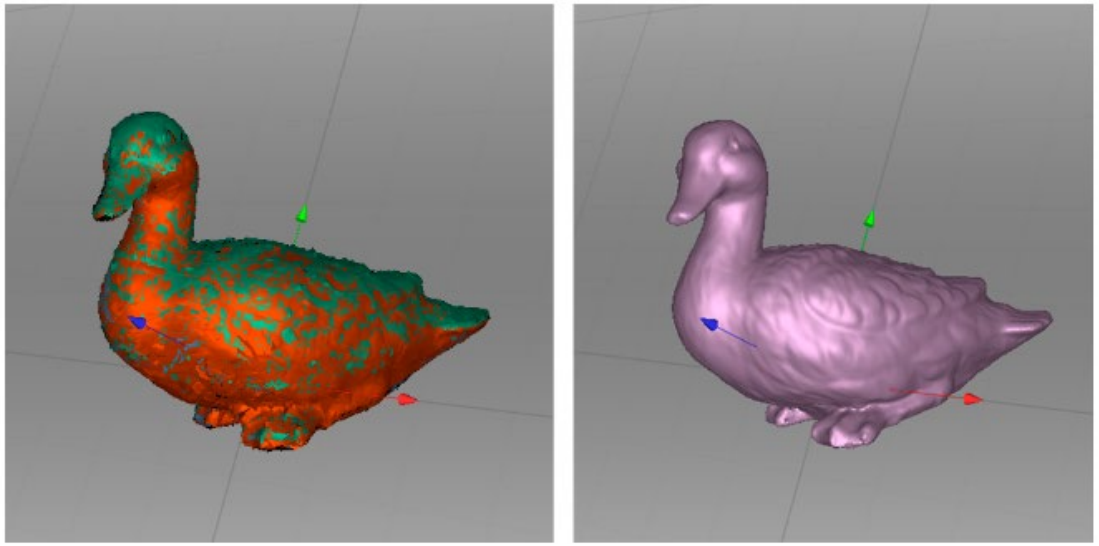
Scan to 3D model:

- Manual process

Scan to 3D model:

- Manual process

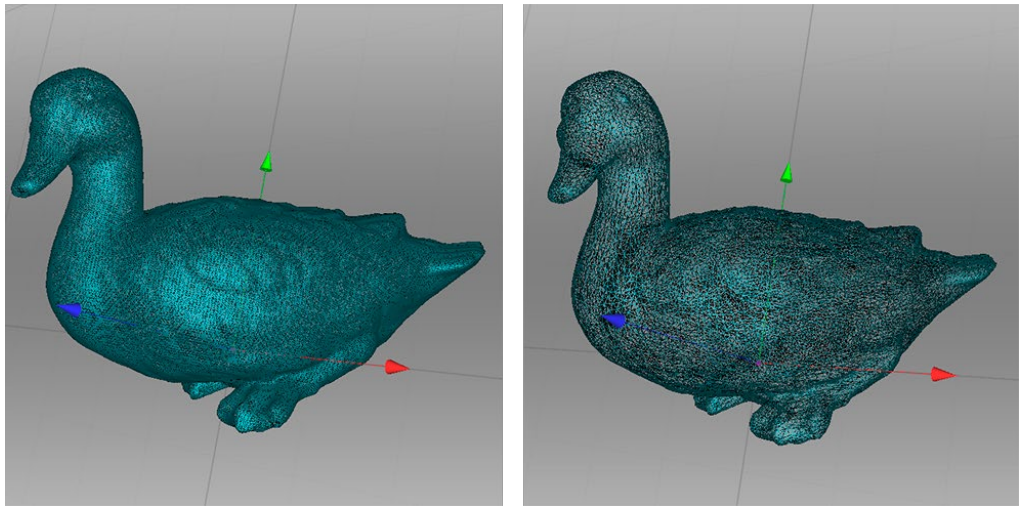
Purpose: To create a model (a single surface, as opposed to the multiple surfaces that constitute the source scan).

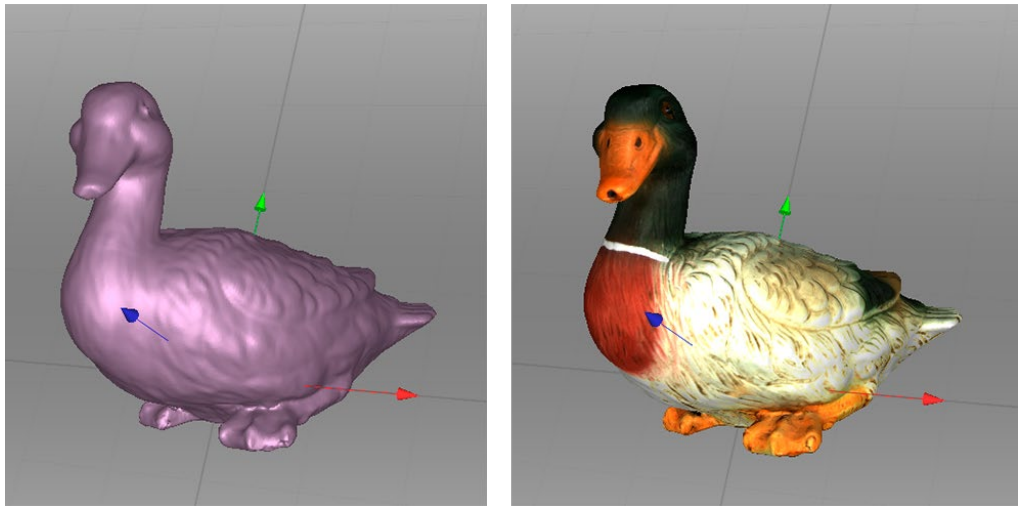


Scan to 3D model:

- Manual process

Scanning → Cleaning → Alignment → Registration → Fusion → Postprocessing





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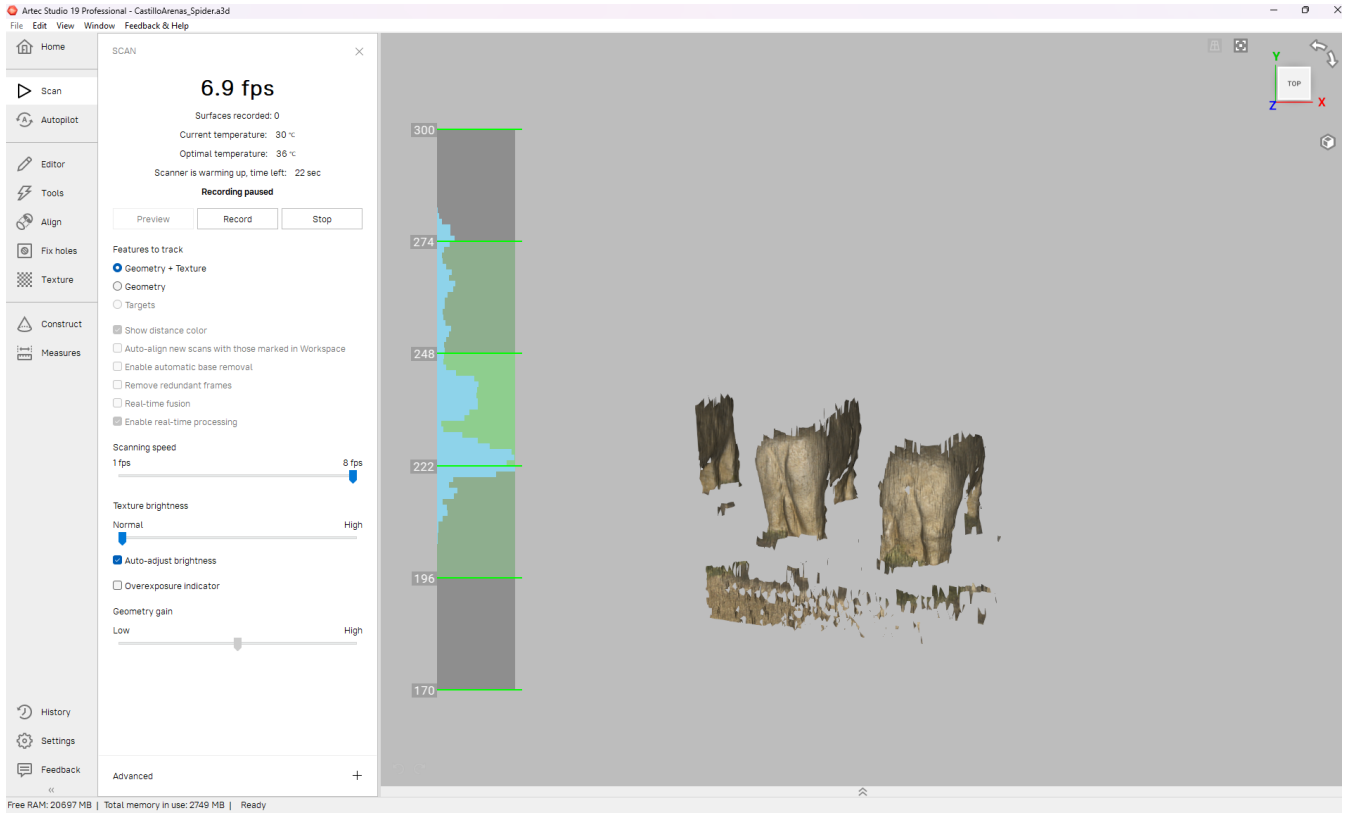
Practical Case 1:

Scanning → Cleaning → Alignment → Registration → Fusion → Postprocessing



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Practical Case 1:

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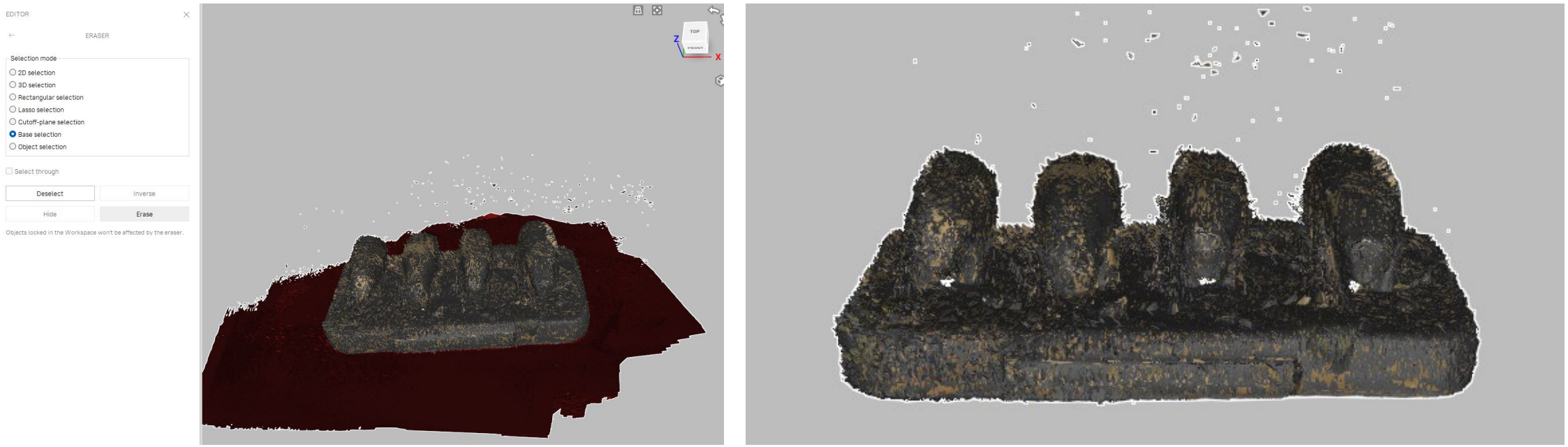
Scanning → Cleaning → Alignment → Registration → Fusion → Postprocessing



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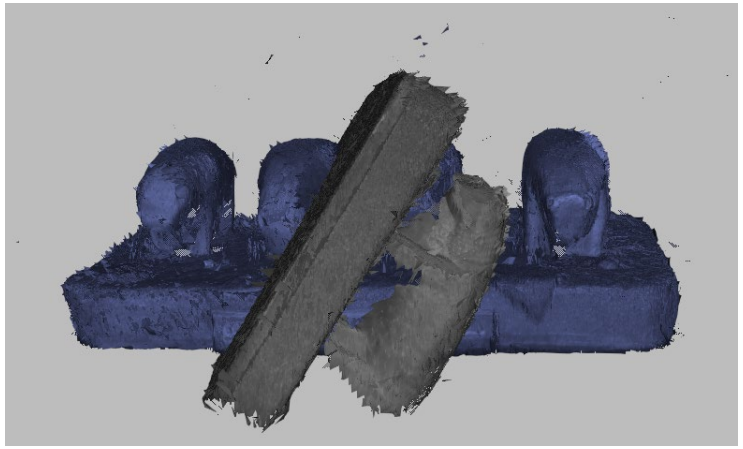
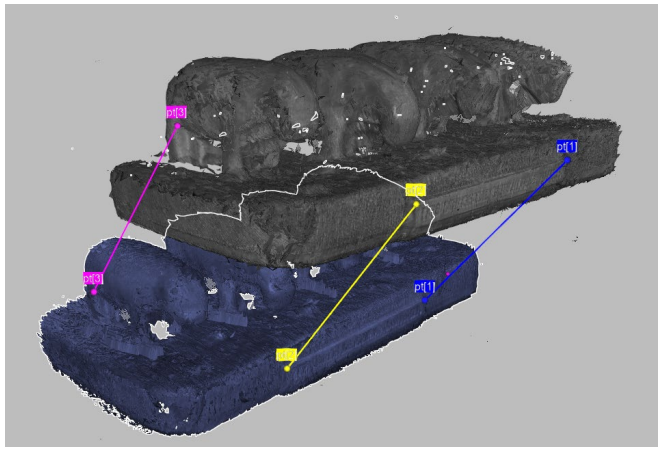
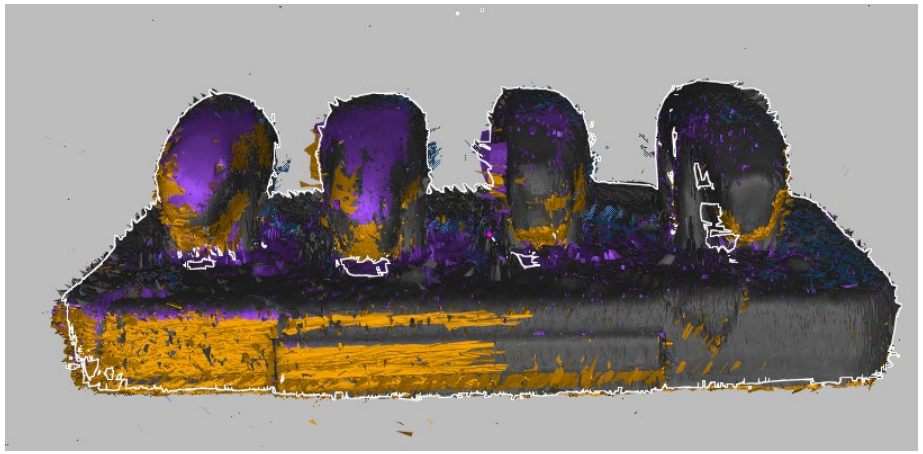
Practical Case 1:

Scanning → Cleaning → Alignment → Registration → Fusion → Postprocessing







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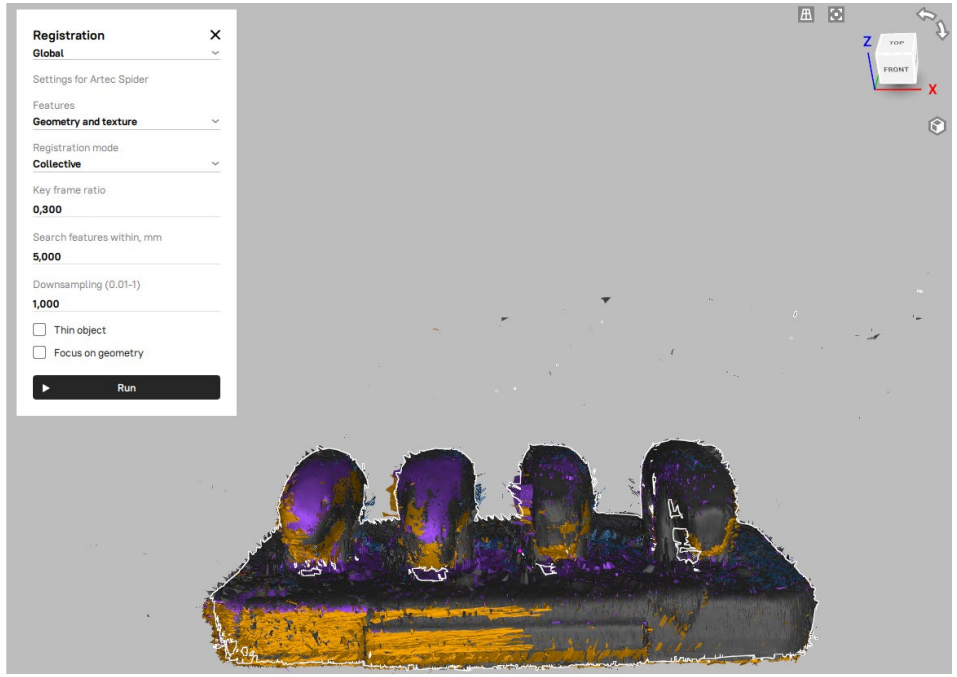
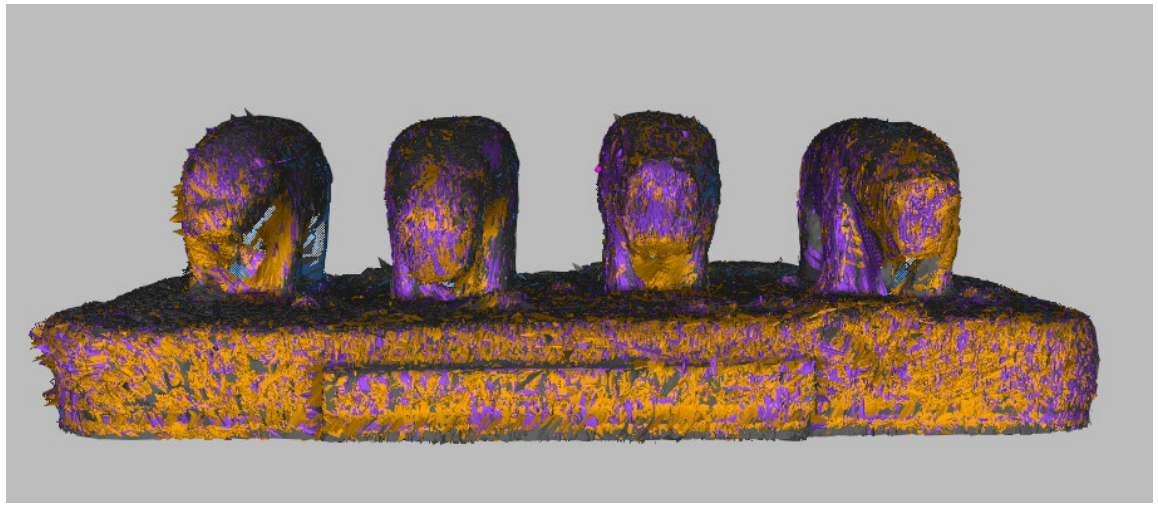
Practical Case 1:

Scanning → Cleaning → Alignment → **Registration** → Fusion → Postprocessing



Outlier Removal: Optional.



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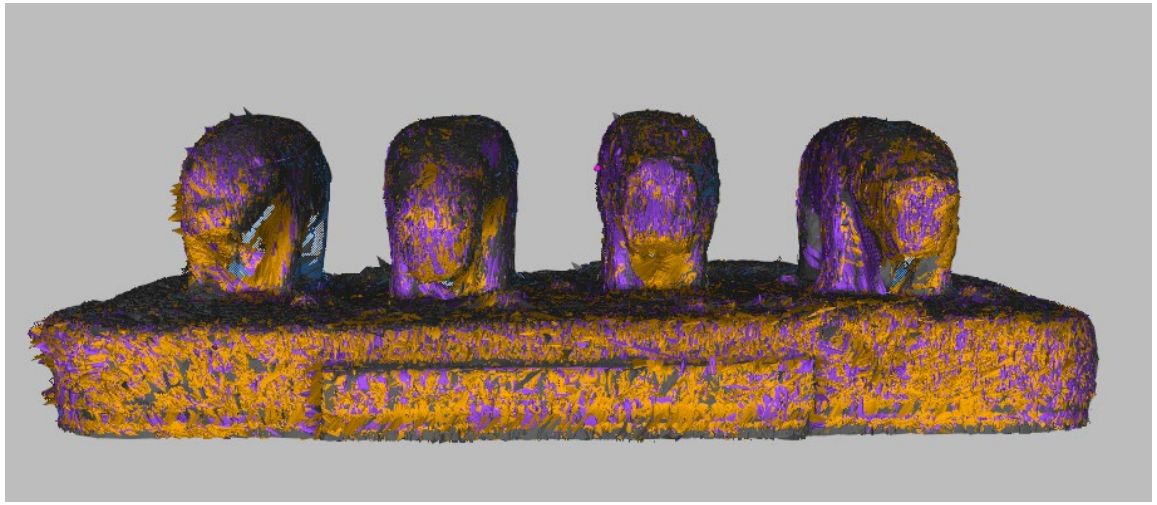
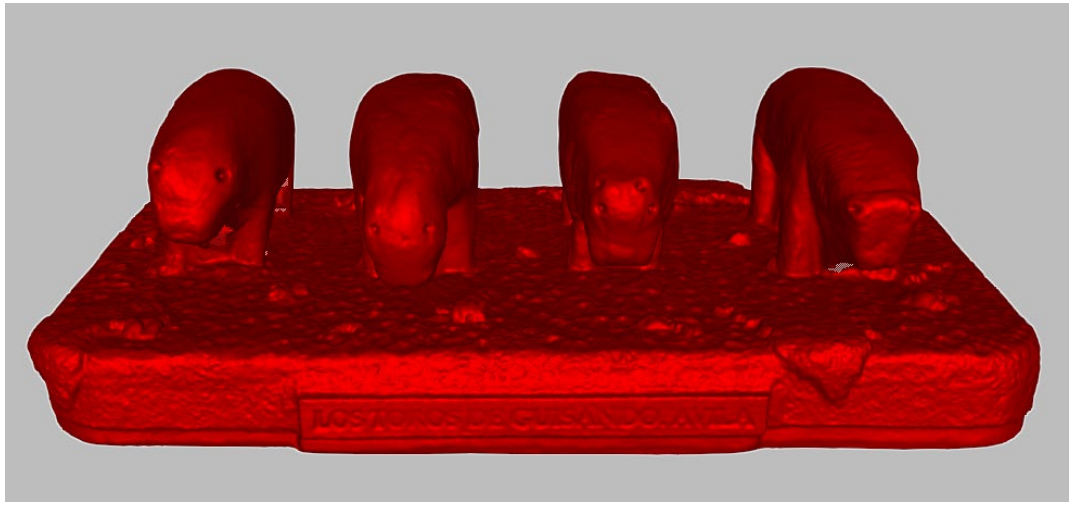
Practical Case 1:

Scanning → Cleaning → Alignment → Registration → **Fusion** → Postprocessing





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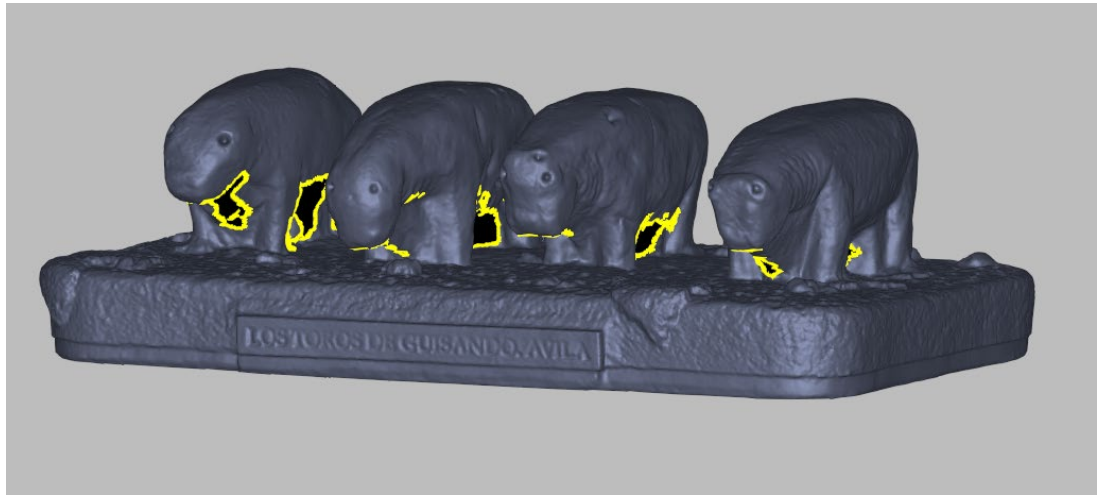
Practical Case 1:

Scanning → Cleaning → Alignment → Registration → Fusion → Postprocessing

Fit holes



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Practical Case 1:

Scanning → Cleaning → Alignment → Registration → Fusion → Postprocessing

Texture

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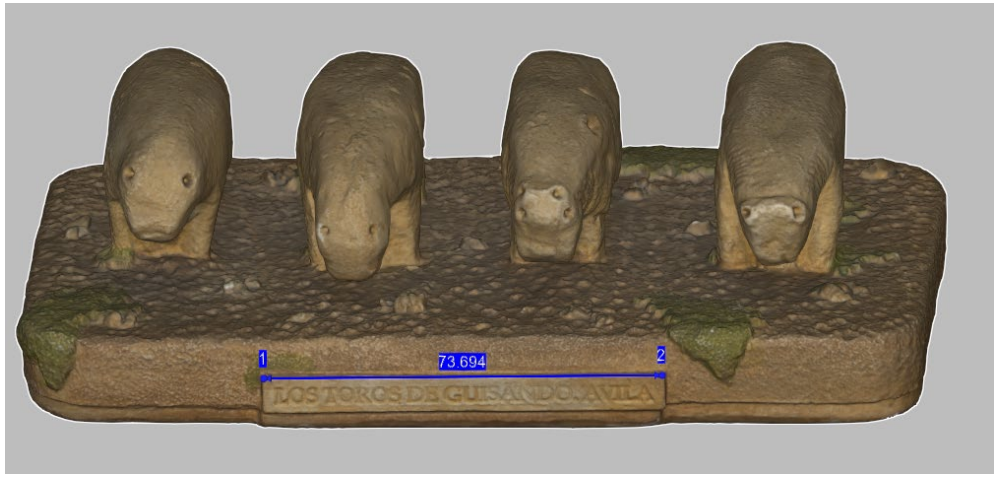
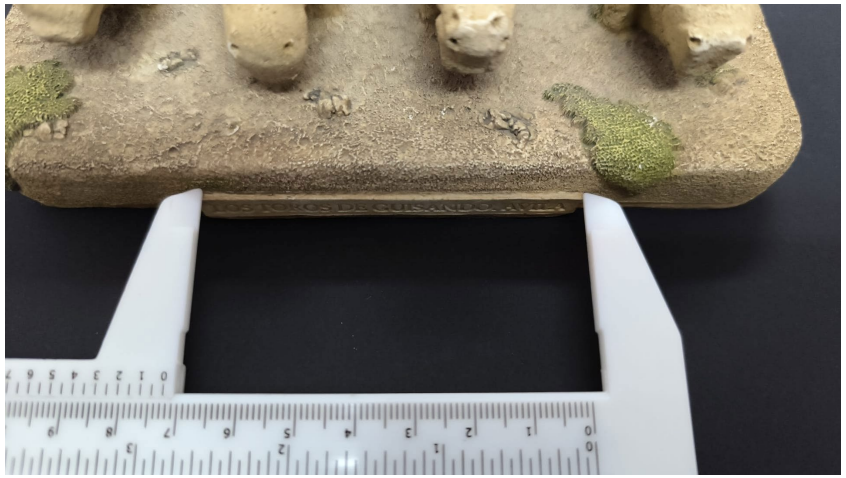
Practical Case 1:

Scanning → Cleaning → Alignment → Registration → Fusion → Postprocessing

Check Measures





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Practical Case 1:

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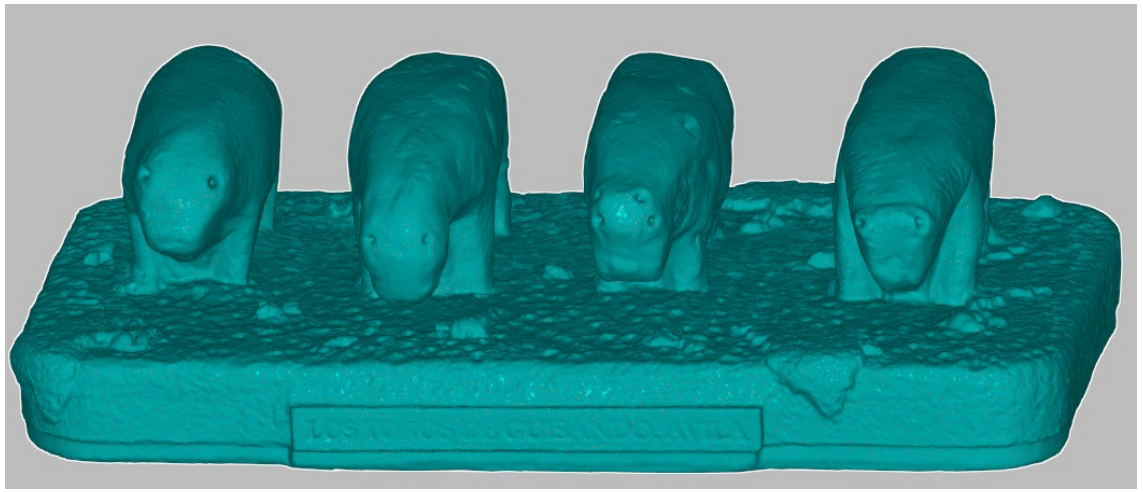
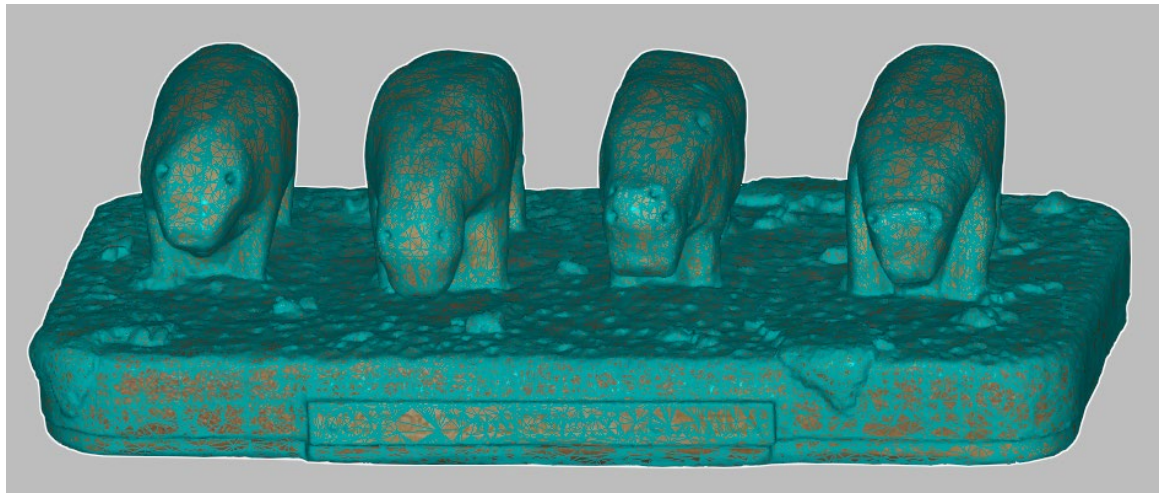
Mesh Optimization





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Practical Case 1:

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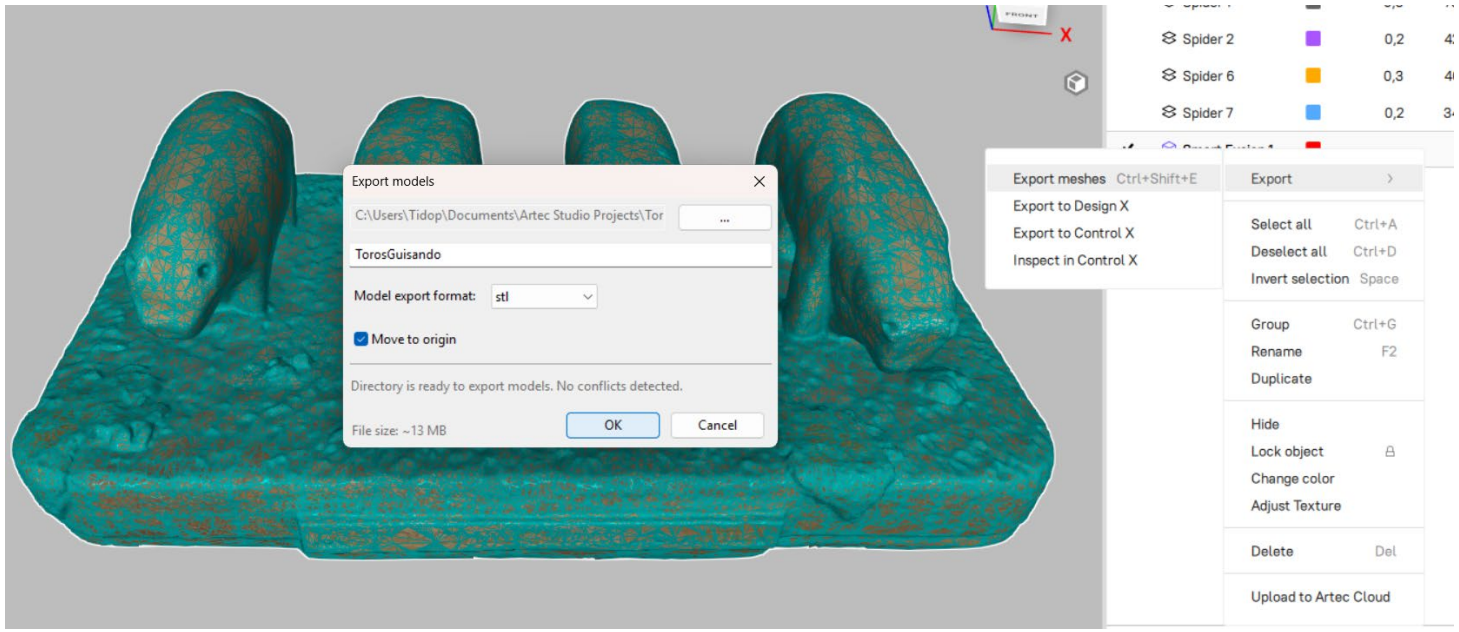
Export model *.Stl



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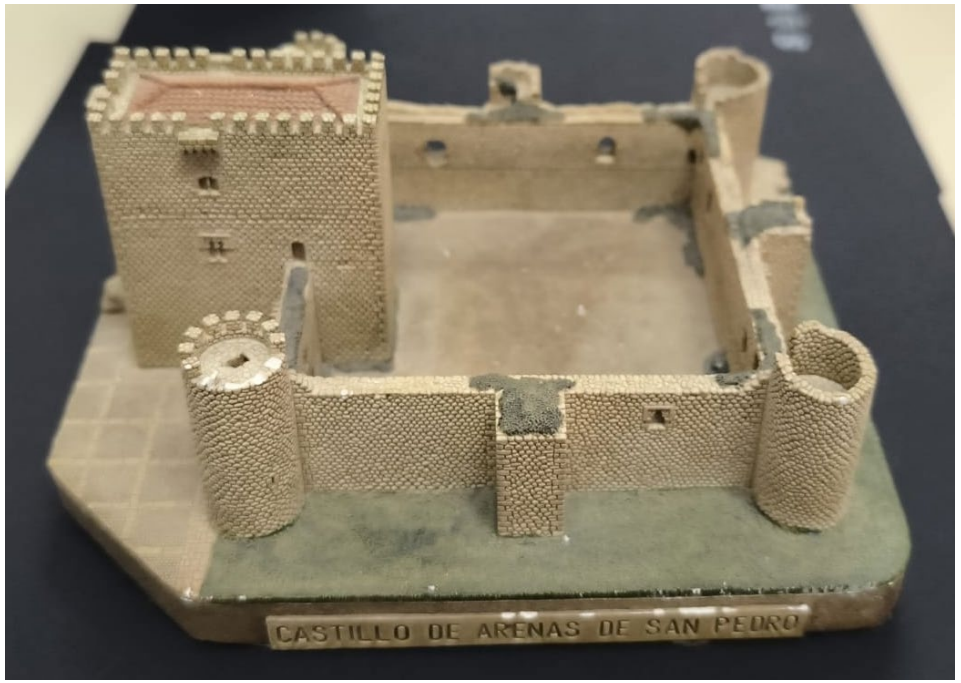
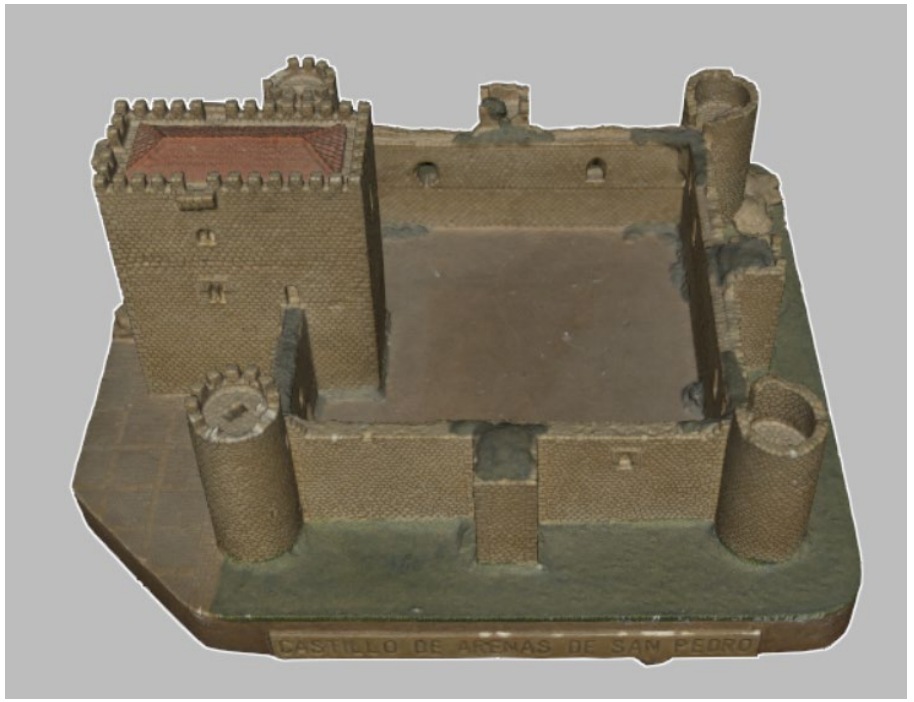
Practical Case 2:





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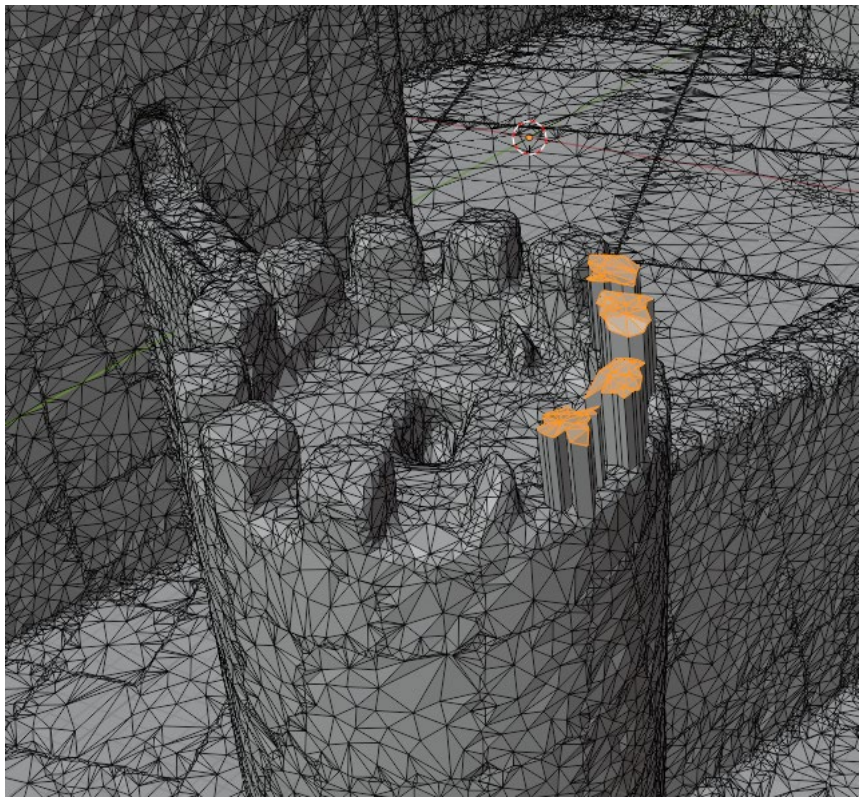
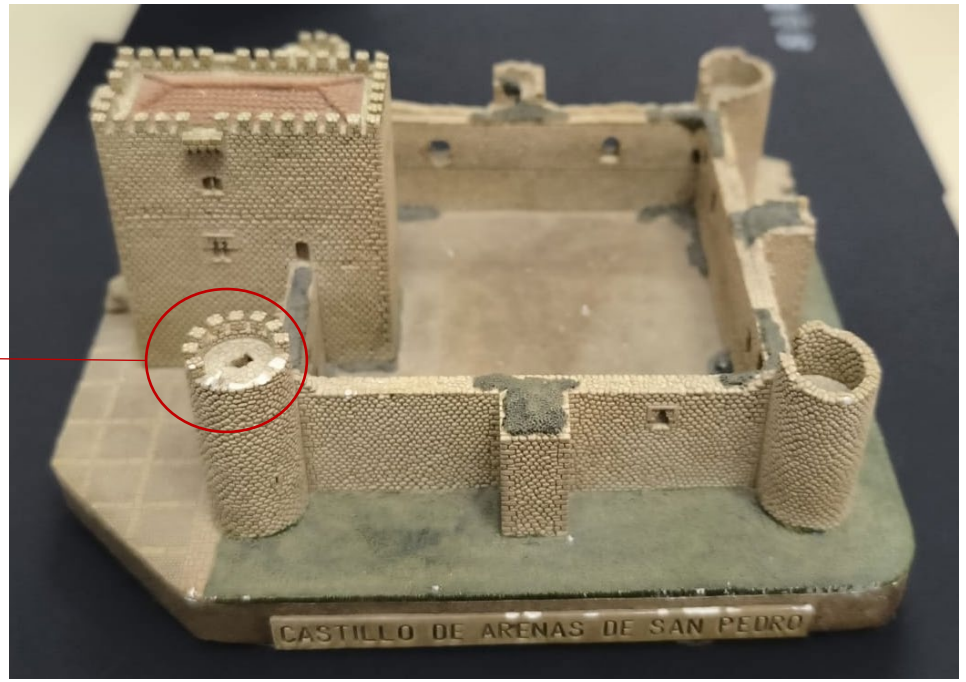
Practical Case 2: Repair tower





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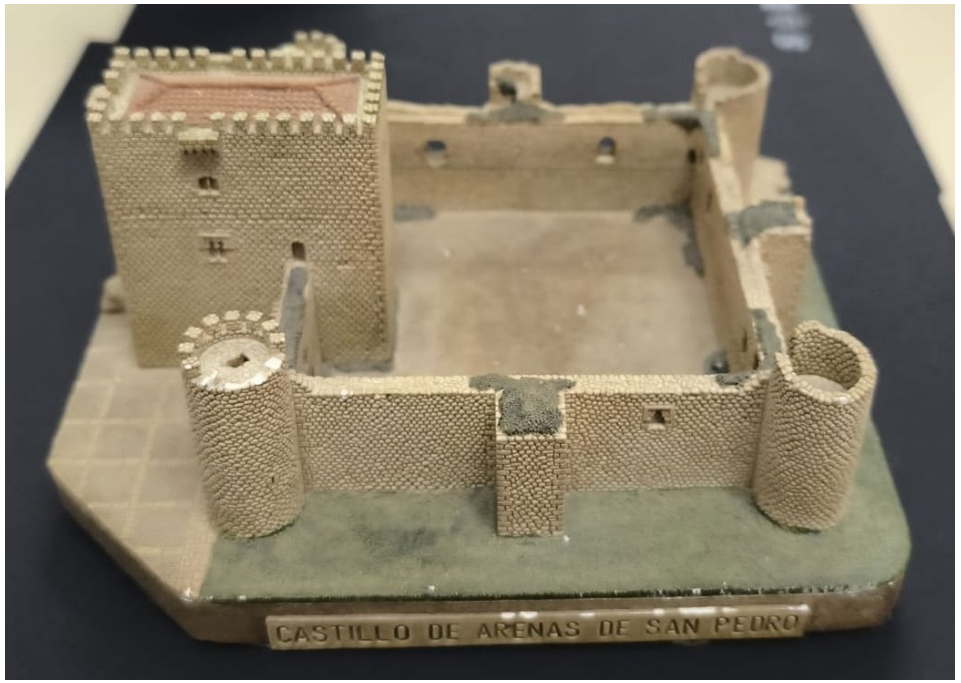
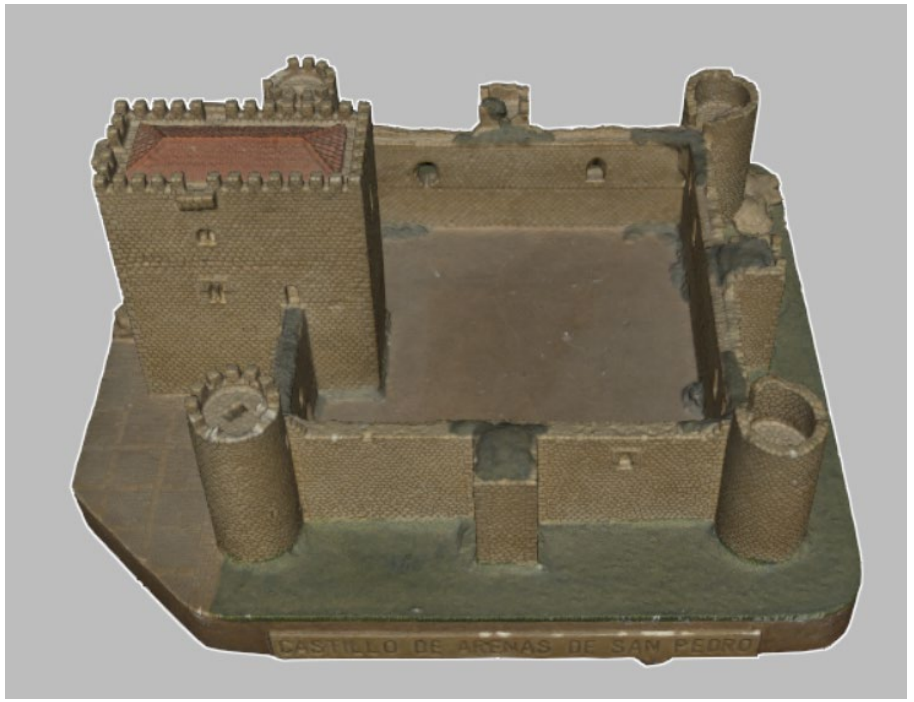
Practical Case 2: Spider





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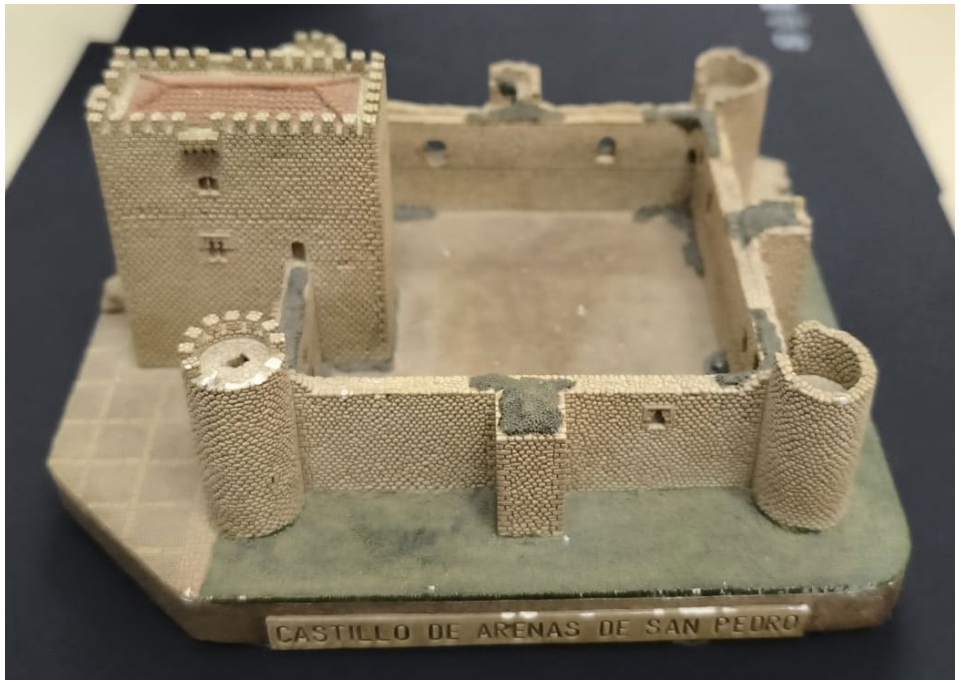
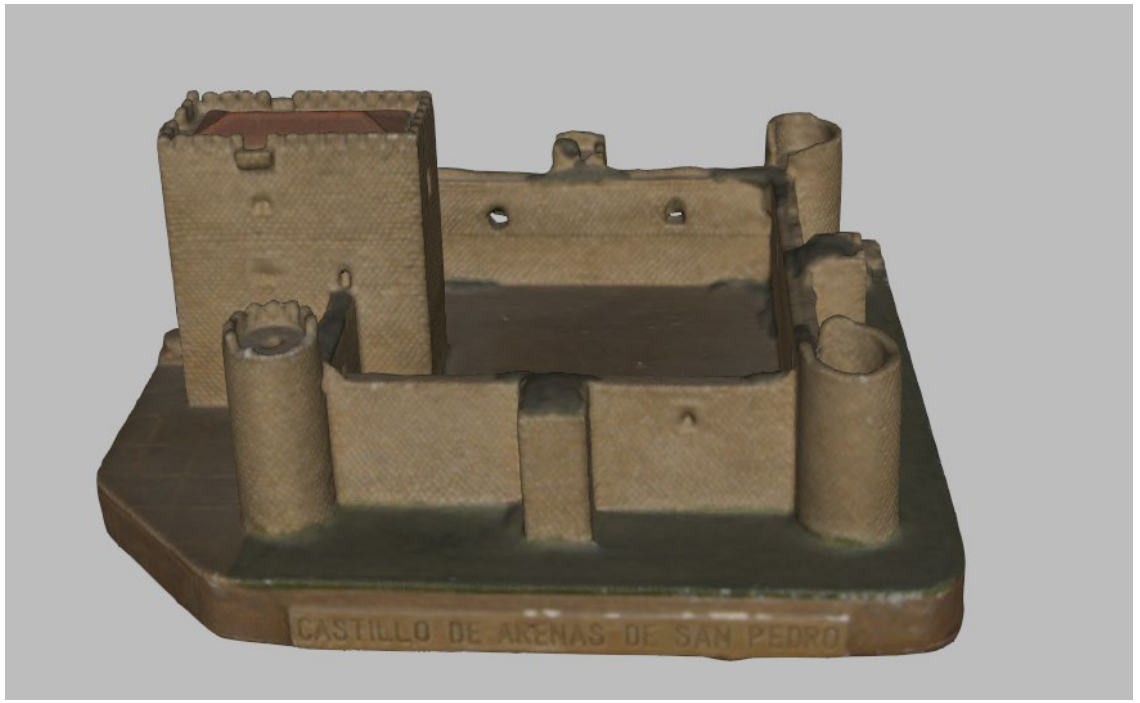
Practical Case 2: Eva





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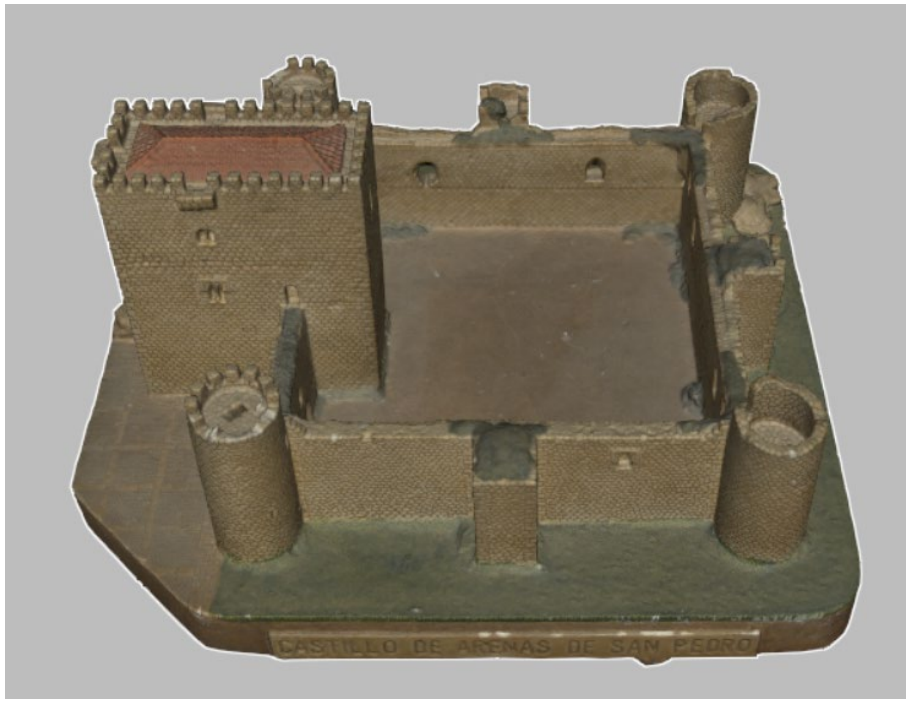
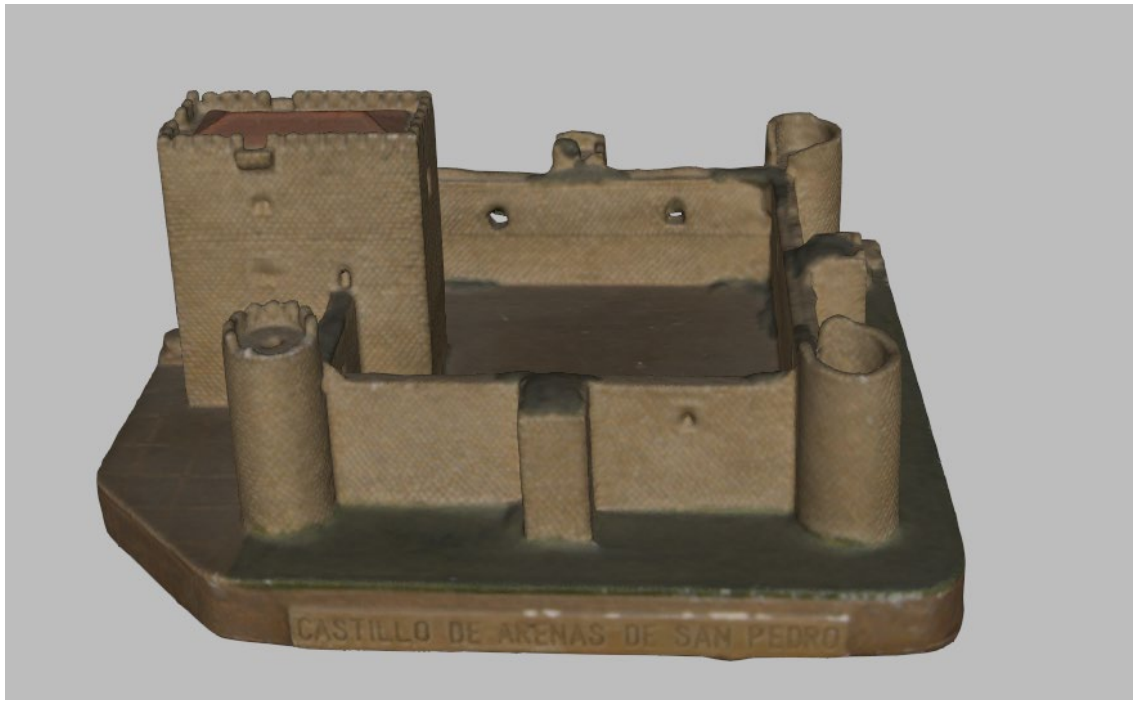
Practical Case 2: Spider Vs Eva





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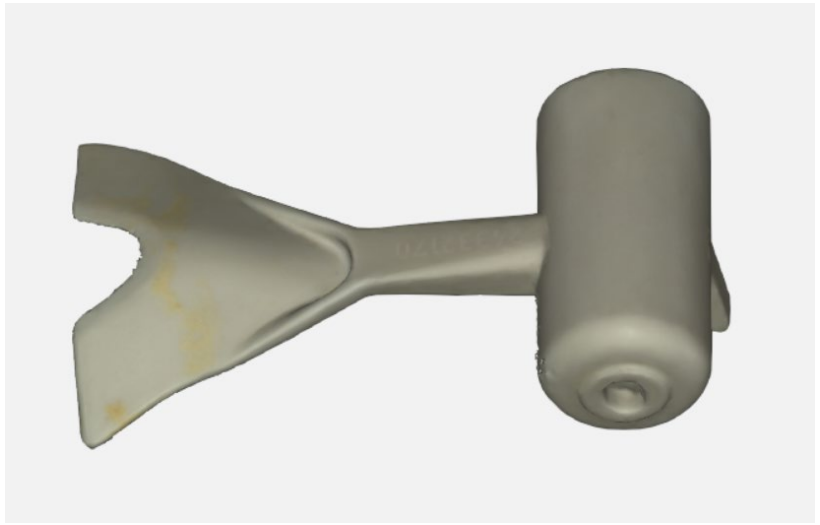
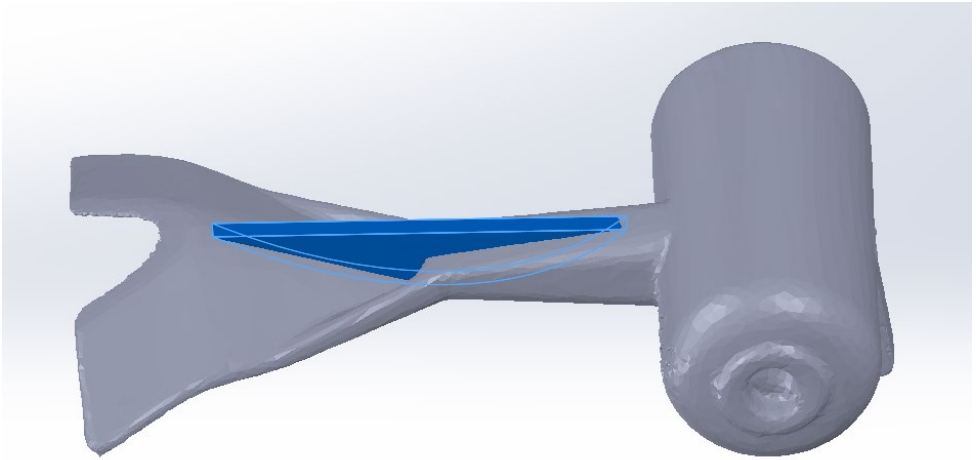
Practical Case 3: Egg classifier part

Central Stiffener implemented





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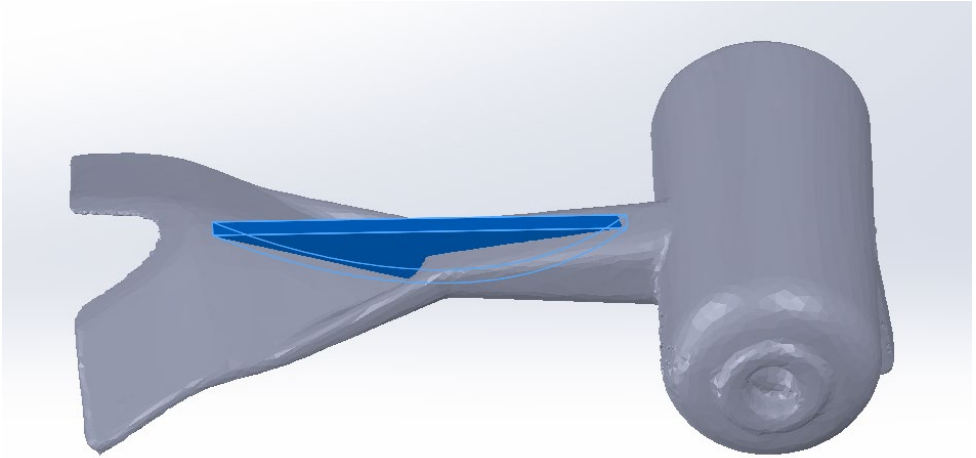
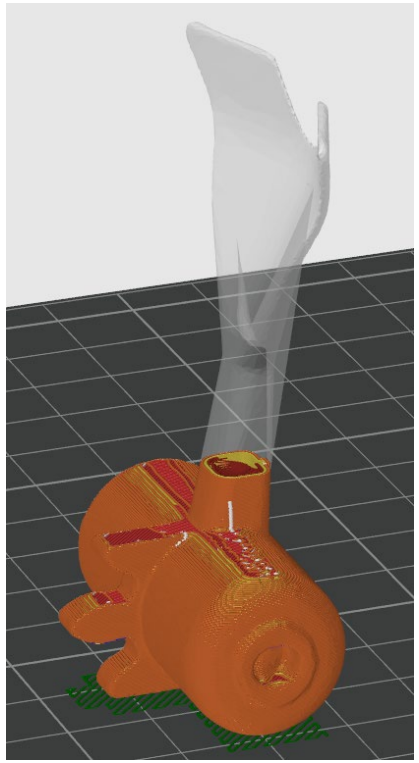
Practical Case 3: Egg classifier part

3D Print An Improved Copy





THANKS FOR YOUR ATTENTION!!!

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