



## **MS57 Training guide: Structure light scanning with Artec Space Spider using Artec Studio 16 (RBINS)**

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### **1. Start the scanner**

- 1) The Artec Space Spider is plugged with one usb cable from the computer to a micro-usb on the scanner.  
Additionally, a power cable is plugged into the scanner.
- 2) Start Artec Studio 16

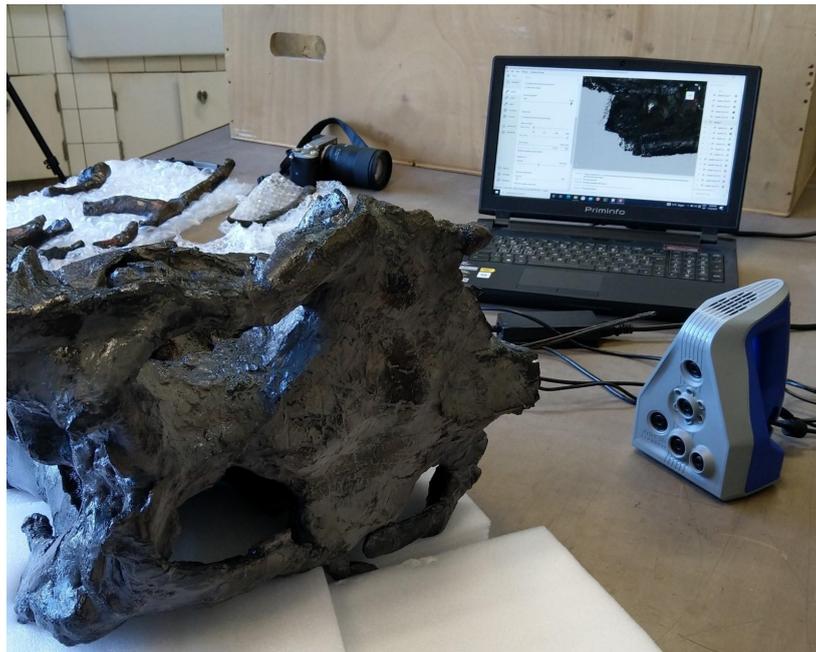
### **2. Calibration**

Artec recommends the re-calibration of the scanner after transportation, at least once a year, if extra accuracy is required or when using a new computer.

Detail of the procedure is available here:

<https://artecgroup.zendesk.com/hc/en-us/articles/201831651-Re-calibration-of-Artec-Spider-Space-Spider>

### 3. Scanning



*Artec Space Spider*

- Prepare the object you want to scan by placing it, if possible, on a manual turntable or on the Artec turntable<sup>1</sup>.
- Plug the scanner in the computer.
- Start **Artec Studio** and select scan.
- Activate “show distance color”.
- To start pre-visualising you scan data **press the button of the scanner upwards**, the scanner will start projecting a light pattern on the object and you can see what data the scanner sees. On your screen you can see a histogram indicating the distance and the amount of data in the view of the scanner. Working distance of Artec Space Spider is between 20 and 30cm from the surface you are scanning, therefore depending on the complexity of the shape of your object you will have to move forward and backward to capture the different planes of the object.
- **To start scanning press again upwards the button at the back of the scanner.** If your object is on a turntable, you can slowly rotate the turntable once you’ve captured all the data in your view. If you are not using a turntable, start turning around the object with the scanner. Once you have scanned your object completely, **press the button of the scanner down to end the scanning.**

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<sup>1</sup> The Artec turntable can load a maximum of 3kg and requires your computer to have bluetooth.

- Turn your object and scan again.
- Once you have scanned your whole object from different views you can start processing your data.
- Save project as (just one time, then the software save automatically)

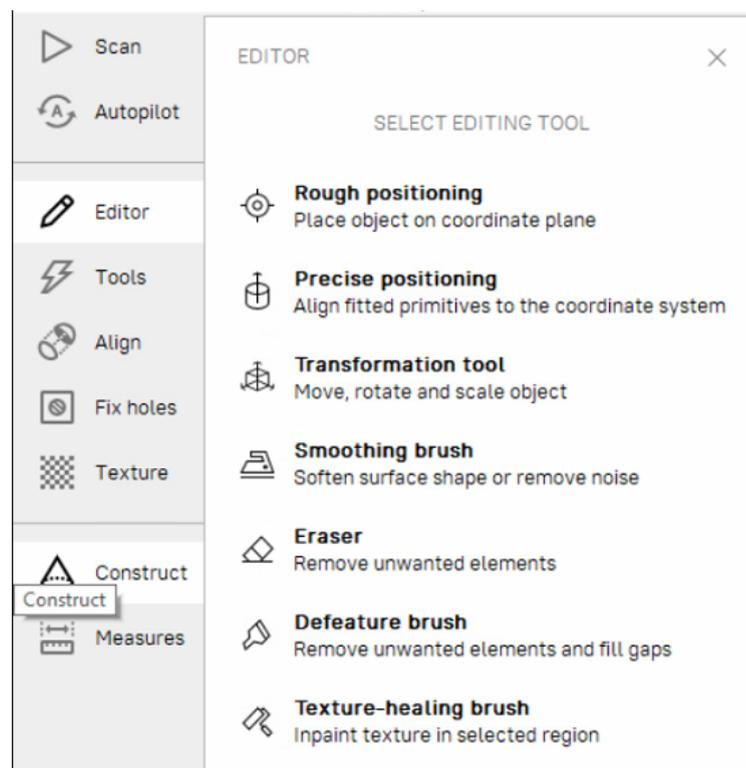
Artec tutorial video: <https://youtu.be/wT2SRzSDEBo>

#### 4. Processing with Artec Studio 16

The scans can be processed manually (A) or automatically (B).

##### A) Manual processing

- Manual processing is more flexible and therefore more precise as you can select more options.
- First, you need to clean your data. Go to **“Editor”**, select **“Eraser”**. Several tools are available. Generally, we will select the “lasso” tool or the cutoff plane. With “ctrl” pressed, select the unwanted areas of your scan like the background.



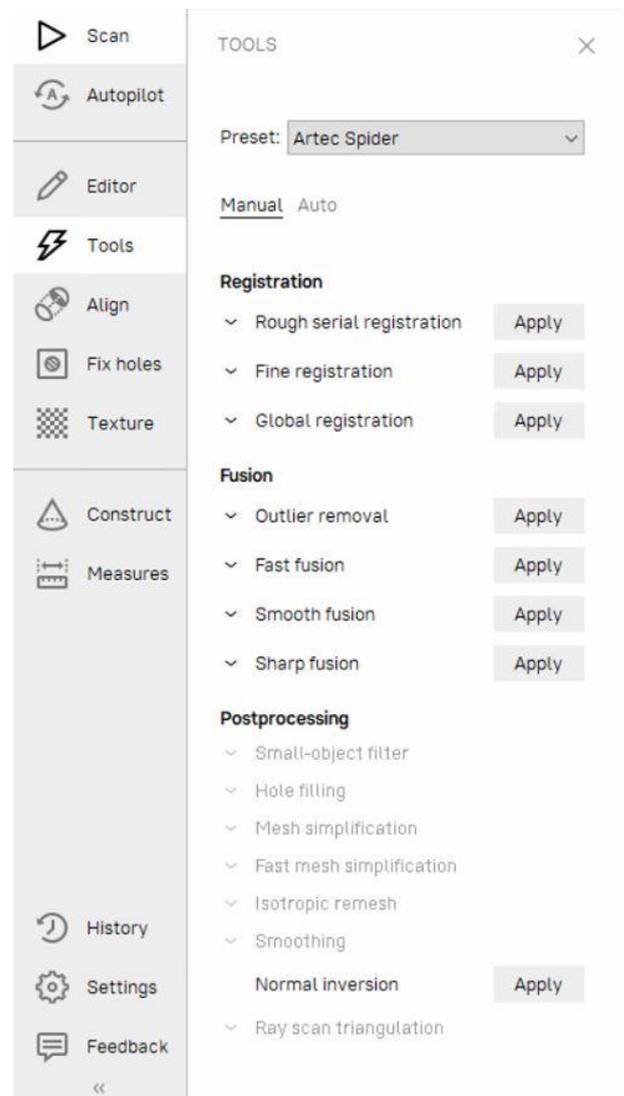
- Once you have removed all unwanted data, select your scans and go to **“Align”**. In order to align the different scans together you can do both auto-alignment and manual alignment. For **“auto-alignment”**, select one or several scans and press “auto-alignment”, this is a time-consuming operation. If the scans do not align properly, you can perform a manual alignment by moving one scan, with “shift” pressed, to align it to the reference scan (with

the blue dot). And then press “Align”. If it still does not correctly align, you can perform an auto-alignment again.

- Another possibility is aligning using markers on both scans. Place at least 3 markers on the scan to align and the registered scan and press “align” or “align markers”.

- Once alignment is correct, go to tools, perform the following operations:

- Apply “**Global registration**” (collective). It will perform a precise registration of all your scan data. It is time consuming but is an essential operation.
- Once you are happy with the registration of your scan, you can perform an “**Outlier removal**” (optional). This will remove most of the noise on your data, but sometimes it takes away too much information (never used for the EVA).
- Now, perform a “**Sharp fusion**”. In sharp fusion you can select if you want a watertight model or not and the size of holes that should be closed. Other fusion modes are available, but will produce a less accurate data set, thus our choice to use “sharp fusion”.



- **Post-processing:**

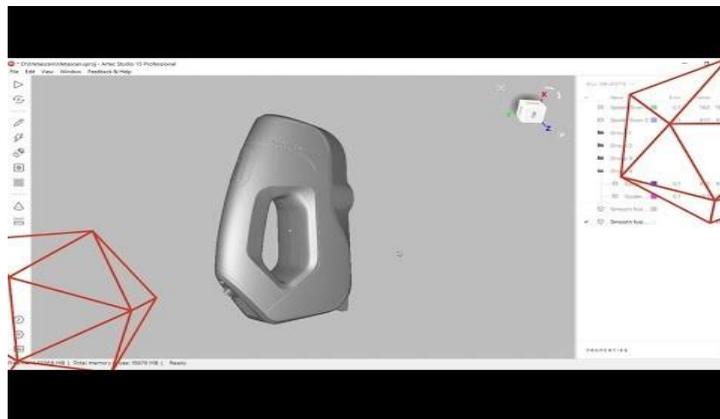
- Apply “**Small-object filter**”. It will remove part of the mesh not connected to the main model.
- In “**Mesh simplification**”, choose a tolerance of simplification according to the precision of the model you want to obtain. Generally, mesh simplification will be required before texturing. For Artec Space Spider default value is 0.01mm, for the EVA 0.02mm.

- **Texturing**

- In the texturing tab, select the scans you want to use to create your texture. Select “export” and the output texture size you want. You can also use additional options like “remove glare” in case of highly reflective objects or “inpaint missing texture” if you are missing texture data. And press “apply”.
- Once the texture is calculated, you can modify the exposure, the gamma, the contrast, saturation, etc. Once you have done that, click apply again and you have your final textured model.

- **Export the model as .obj** in order to have the texture and the mesh together.

Artec studio 15 user interface: [Artec Studio 15 – Up close with data processing](#)



## B) Autopilot processing

- Step 1:
  - Select your scans and press next.
- Step 2:
  - Select the scan quality in term of geometry (good geometry is a complex geometry, bad geometry is a sphere or a cube with no geometrical features)
  - Select the scan texture quality (good is a texture with lots of details, bad is a featureless texture or repetitive pattern)
  - Activate if necessary “hard-to-scan surfaces” (black/shiny/fuzzy or transparent materials are considered hard to scan)

Model creation	
Scan quality (geometry)	Good
Scan quality (texture)	Good
Hard-to-scan surfaces	<input type="checkbox"/>
Object size	Medium
Hole-filling method	Watertight
Model resolution	0.3
Polygon count	Auto
Texture	<input checked="" type="checkbox"/>
Texture resolution	Auto
<b>Next</b>	

- Select object size (small 1-5cm, medium 5-20cm, large 20-50cm, huge >100cm)
- Select if your hole filling method
- Select the resolution (0.3mm for space Spider)
- Press next
- Step 3 (eraser):
  - Remove background using the lasso tool, the base selection or the cutoff plane selection, selecting each scan individually
  - Next
- Step 4 (alignement):
  - Select auto-align
- Step 5 (model creation)
  - Automatic procedure until the model is finished and textured.

### C) Export

- Optional step: Position geometry in space: go to “Editor”, “rough positioning” -> select 3 points on the object that should align with XY plane; another way is to use “Transformation tool” -> allows you to manually translate or rotate your object in space
- Select your mesh, go to “File” -> “Export” -> “Meshes”, select format for texture and 3D. For a model with texture, prefer .obj.

## 5. Tips

- While scanning, if your scanner loses registration, move back to a part you have previously scanned.
- Artec YouTube channels contains many tutorials to help you with your scanning project:  
<https://www.youtube.com/channel/UCCdKxQ3PcdJJOUCyXft64fQ>
- Press F1 to see the Artec Studio user manual.
- You can align a photogrammetry model to the scans of the Spider to project photogrammetry texture.
- Artec Studio 16 enable to capture texture with external camera:
  - <https://www.youtube.com/watch?v=siBvZlzd9F8>
  - [https://www.dropbox.com/sh/qr5x5oxq8sc5y5z/AADZvsne2urOZ3UfFg2IAr6Wa/Phototexturing\\_guide.pdf?dl=0](https://www.dropbox.com/sh/qr5x5oxq8sc5y5z/AADZvsne2urOZ3UfFg2IAr6Wa/Phototexturing_guide.pdf?dl=0)

## 6. Credits

- Author: Aurore Mathys
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