

BASICS OF THE ARTEC EVA

CREATED BY THE DI CREW



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INTRODUCTION

MACHINE INFORMATION

ACCESS

any DI Hub Member

*no prior/formal training required for access

COST

None

SPECS

Artec Eva

LINKS

[User Manual](#)

[Technical Support email](#)

[Website \(including latest firmware download\)](#)

SETUP

Unboxing

When you first have the Artec Eva with you, you will be given a box and a backpack. Open the box.



In the box are two sections: an area with wires and the scanner itself.



ARtec Eva

This is the Artec Eva. It's light, and has ports for a USB-A cable, a power cord, two ethernet cables, and room to place a tripod. Those last two don't matter right now, as we are going to plug in the USB and power cord.



Plugging in

These are the wires you find after unboxing.

You will use these to plug into an outlet to give the scanner power.



You will use this to plug into the scanner and the laptop so they can interact with Artec



Plugging in

While it is tricky, plug the USB cable into the sunken outlet on the scanner. Make sure it is completely plugged in. You can tell by how easy it is to take out.



Make sure to plug the USB into the laptop



Plugging In

For the power cord, make sure you plug it into the hole next to the USB-A



Find an outlet that doesn't hinder your ability to move the scanner



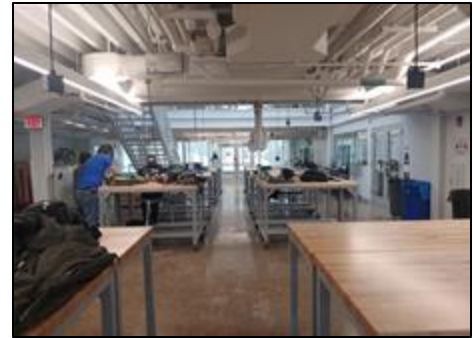
Warnings

Due to the nature of the scanner's use of rapidly-shifting lights, it is mandatory to use it in an enclosed space, like the Blank Lab or an empty room to avoid the risk of epileptic shock to sensitive students and faculty.

Yes



No



TAKING CARE OF EVA

Safe handling

Avoid causing any kind of damage to the system, such as impact, vibration, or pressure.

Under NO CIRCUMSTANCES should you try to open the scanner, remove any of its components or tamper with it in any way. This might cause the scanner to malfunction.

Do not touch the scanner's optical components.



Standby positions

The Artec Eva Scanner is a fragile and very expensive piece of equipment, so it is advised that when you aren't using the machine, lay it with the texture LEDs facing down on the worktop (best place to rest in on the foam in the interior lid of box).

This is the most stable and secure position for the scanner and reduces the risk of the device being knocked over.



← Yes

No →



INTERFACE

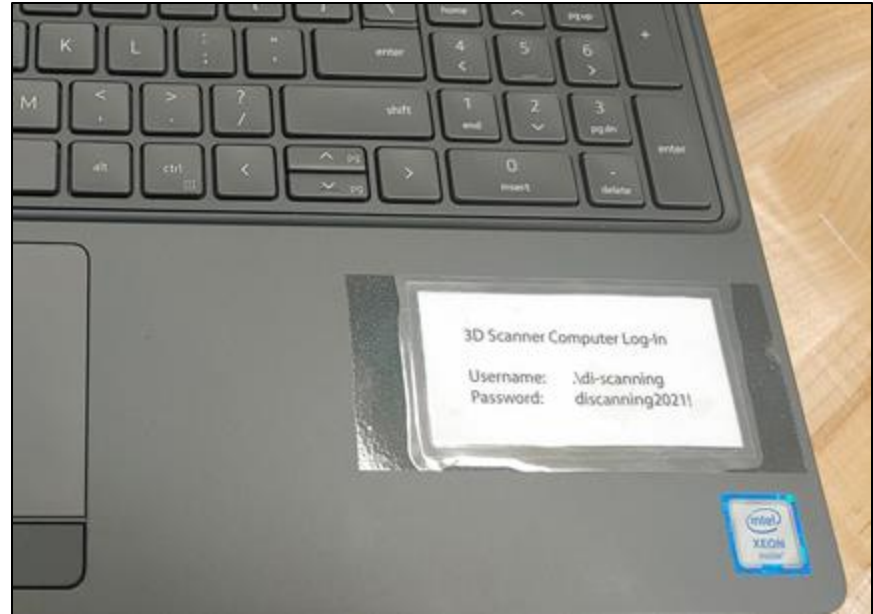
Understanding Eva



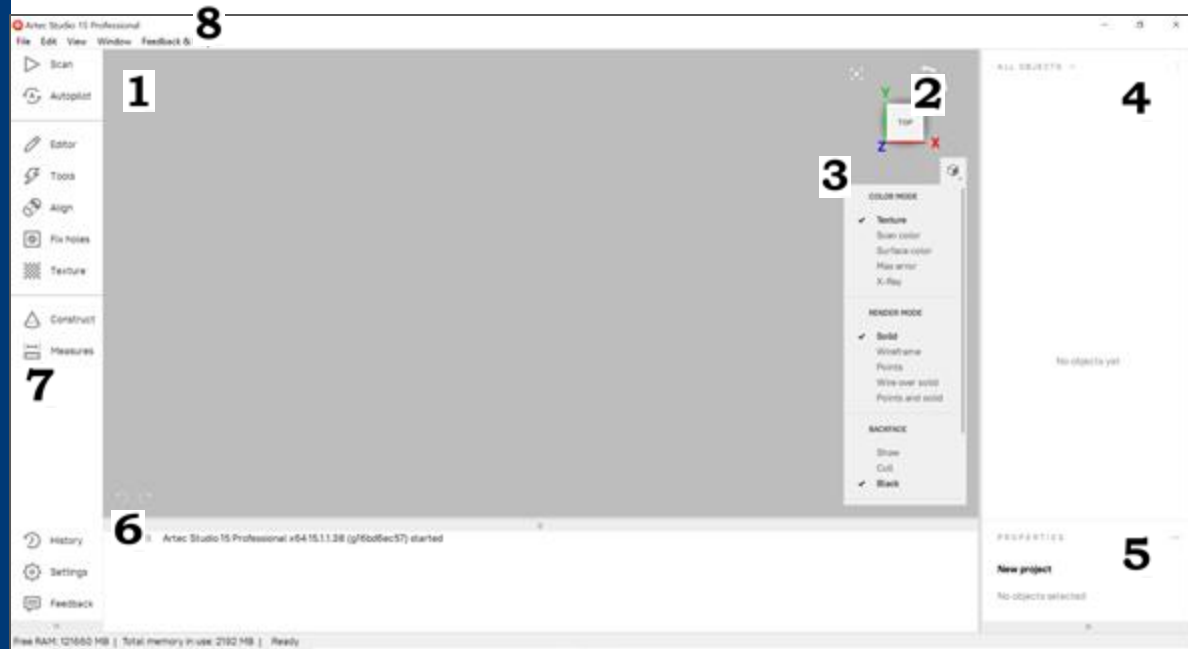
Logging on to the computer

Login to the computer using the password as shown here.

Open the Artec studio using the icon you find on the desktop.



1. 3D View- Display all 3D data.
2. Navigation cube- Quickly orient objects.
3. 3D toolbar- Alter 3D-data appearance and toggle display of coordinate grid.
4. Workspace panel- List and manage 3D objects as well as toggle their display and availability for tools.
5. Properties panel- Display detailed information for 3D objects.
6. Log window- Store records of any executed commands, specifying the time and details of each operation (error and troubleshooting messages).
7. Left toolbar- Toolbar to start the mentioned modes.
8. Menu bar- Dropdown menus with various commands.



SCANNING

Before you scan

Make sure the USB and the power cord are inserted, and are connected to the laptop.

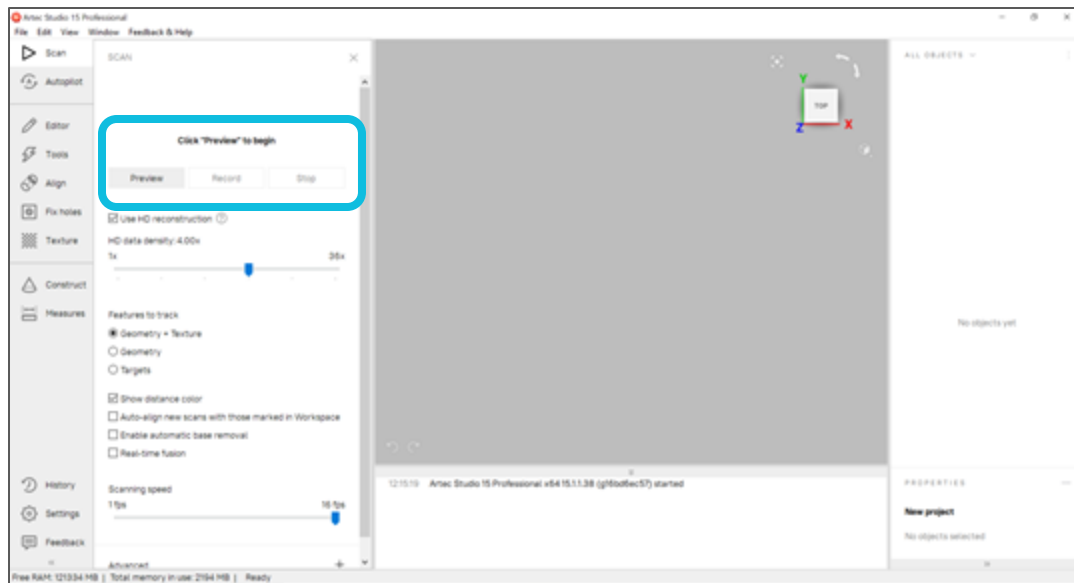


If the connections are proper, you'll see the solid green light on the Eva.



Before you scan

To start/stop the scan you can either use the buttons on the Eva's handle or use the buttons on the Artec software. We recommend using the buttons on the handle as it makes your job easy and handy.



Starting the scan

We chose to scan the bluetooth speaker for the tutorial.

To scan you might want to hold the laptop in one hand, and the scanner in the other, as it is important to monitor the screen while scanning.

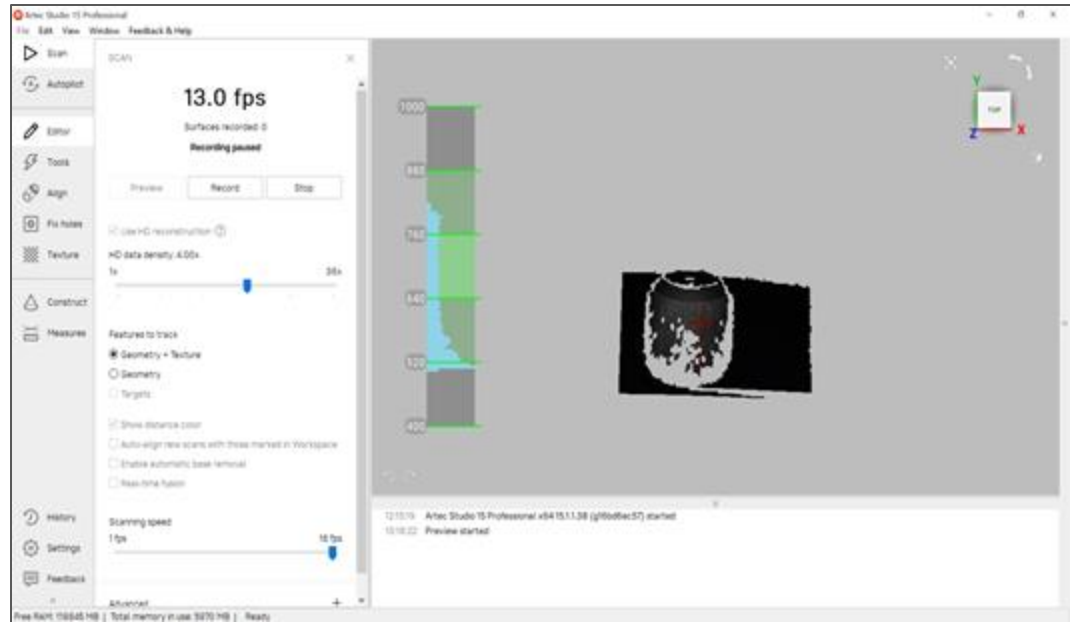


Scanning procedure

- Prepare the object and make sure it has enough geometry and texture details.
- Provide even lighting without using direct sunlight.
- Create a new project before getting started: select *File* ▶ *New project* from the menu, or use the shortcut Ctrl + N. Once you have saved the project, you will be able to load or unload the scans as necessary and thereby limit RAM usage.

Starting the scan

- Point the Scanner to the object, and press the Play button on the handle. Now, it starts the preview.
- Direct the scanner at the object and practice your movements around the object, taking into account the proper technique.



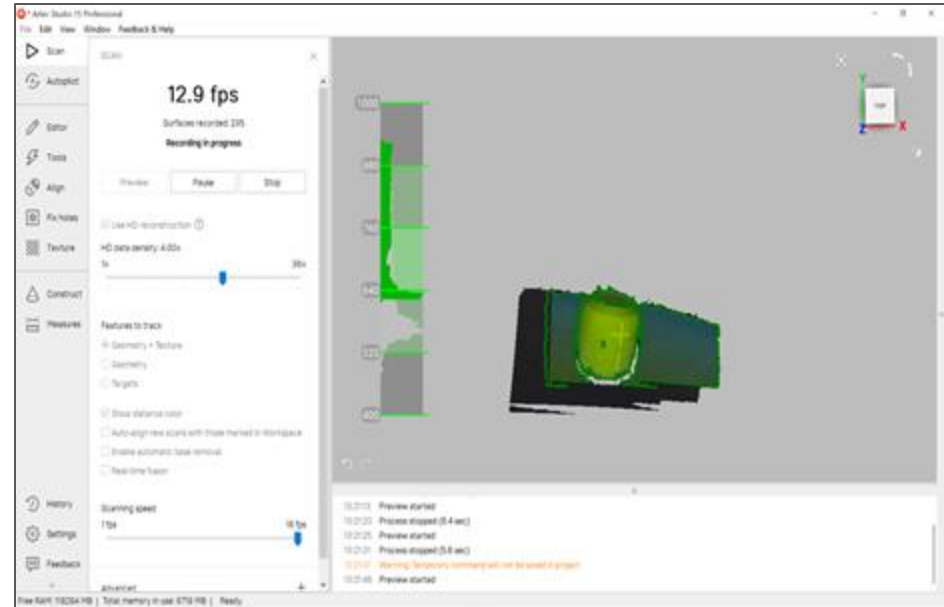
Starting the scan

Make sure the object is visible, then press play once again to initiate recording. If possible, scan all sides of the object in one go, by slowly moving the scanner around it.

Capture what you can and pause or cease recording by clicking the *Pause* or *Stop* button.

Note

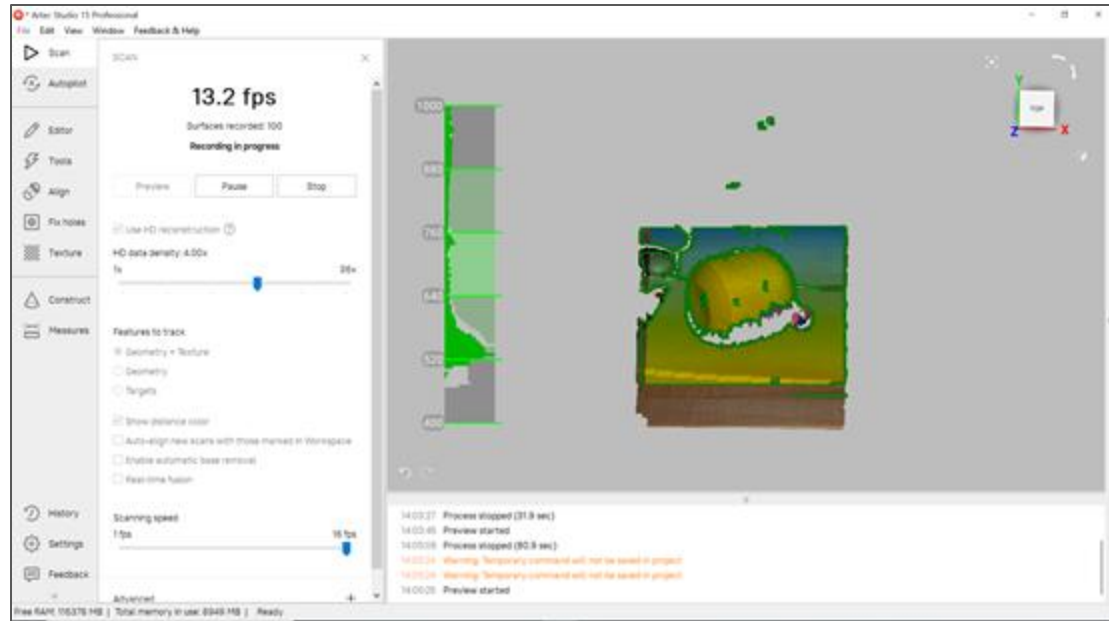
While scanning, pay closer attention to the object on the screen than to the actual object.



Turn and Scan

- Make sure to scan all the sides of the object. (All sides, the top, the bottom etc.)
- Turn the object and capture any remaining unscanned regions (Press “start”).
- Also, to facilitate alignment, record at least one previously scanned region.

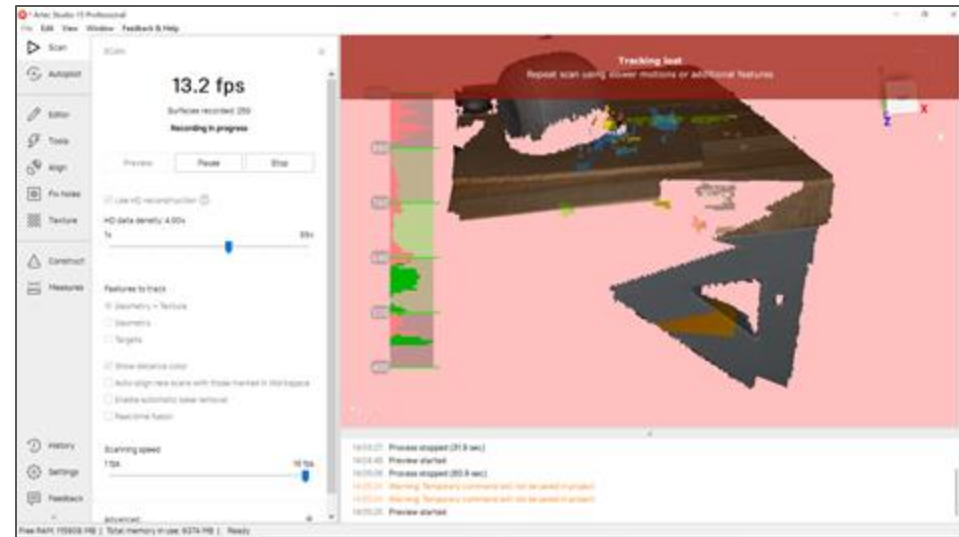
Once you have successfully captured the object from all sides, click the Stop button or press stop button on the scanner body.



Warnings

If you hear an alert sound and the screen displays an error against a red background, smoothly aim the scanner at the area you just captured. Possible reasons for the “Tracking lost” error include the following:

1. You are scanning simple geometric shapes.
2. The part of the object you are scanning is too small.
3. Scanner movement is too fast.

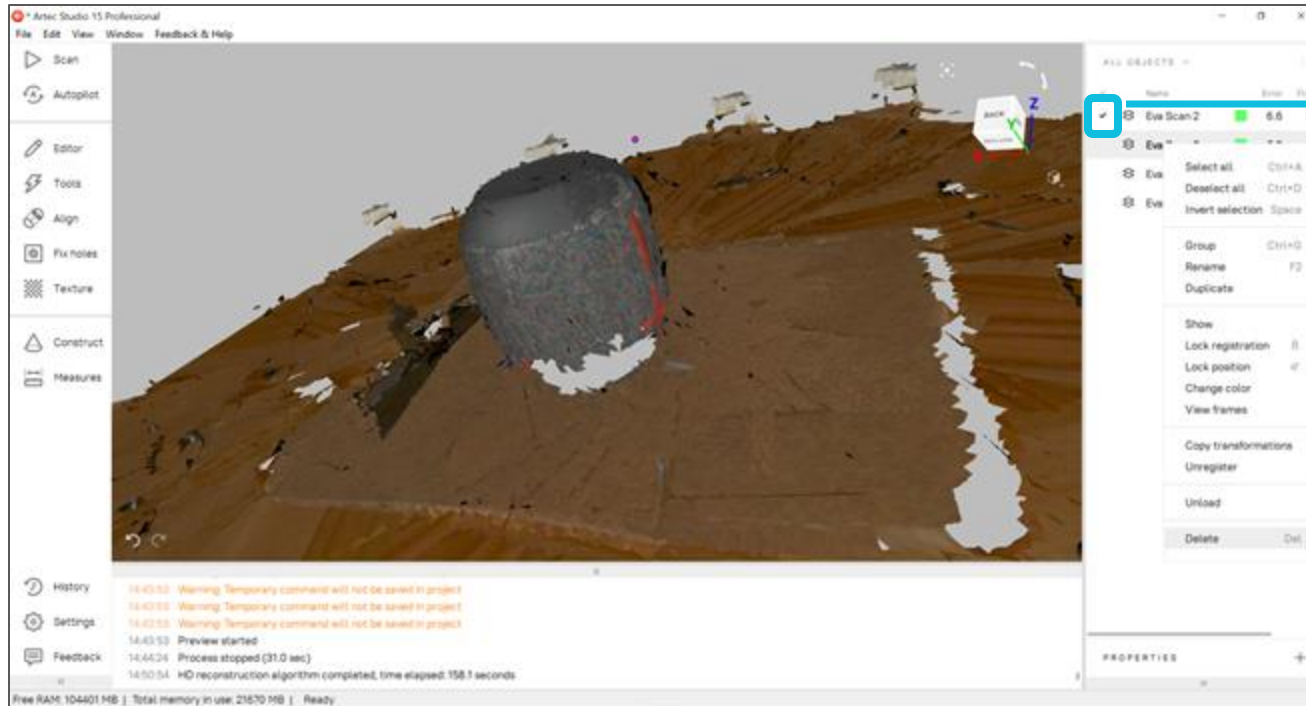


Scanning

We made two scans. One scan for the upper part, and the other one for the lower part of the speaker.



Scanning



This can manage the visibility of the scan. If you want to hide it, you can just uncheck that.

If you are not happy with the scan, you can right click on the scan and hit delete

EDITING

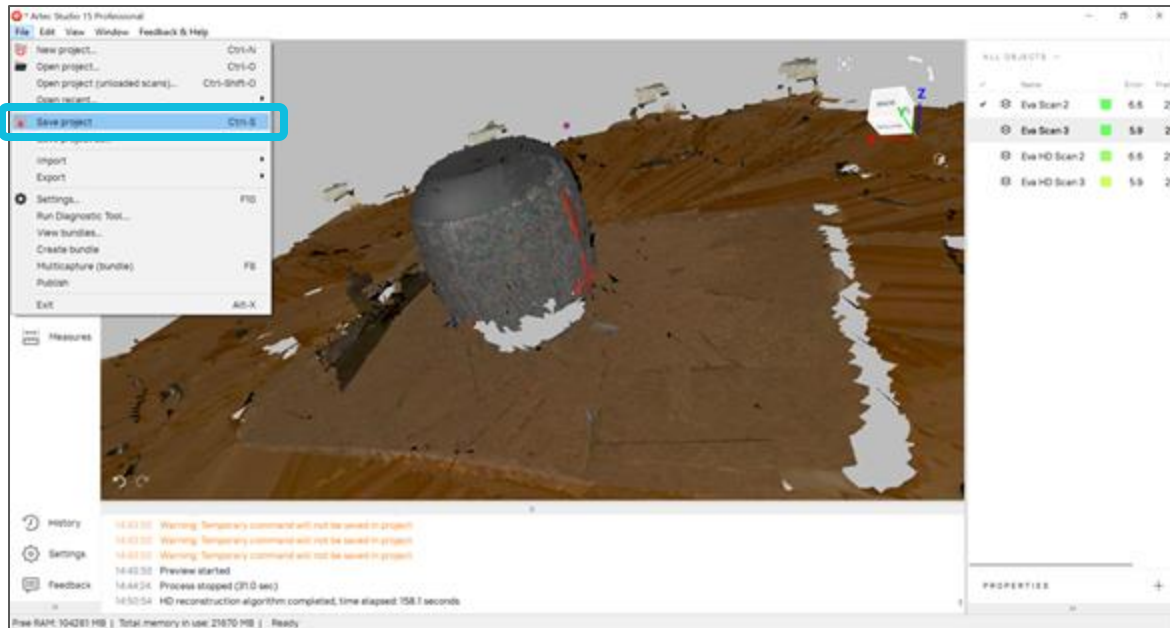
Editing

Once you are done with your scan, you'll have to edit it. The editing has the following important steps.

- Erasing
- Aligning
- Global registration
- Outlier Removal
- Fusion
- Small-object filter
- Mesh simplification
- Fix holes
- Texture

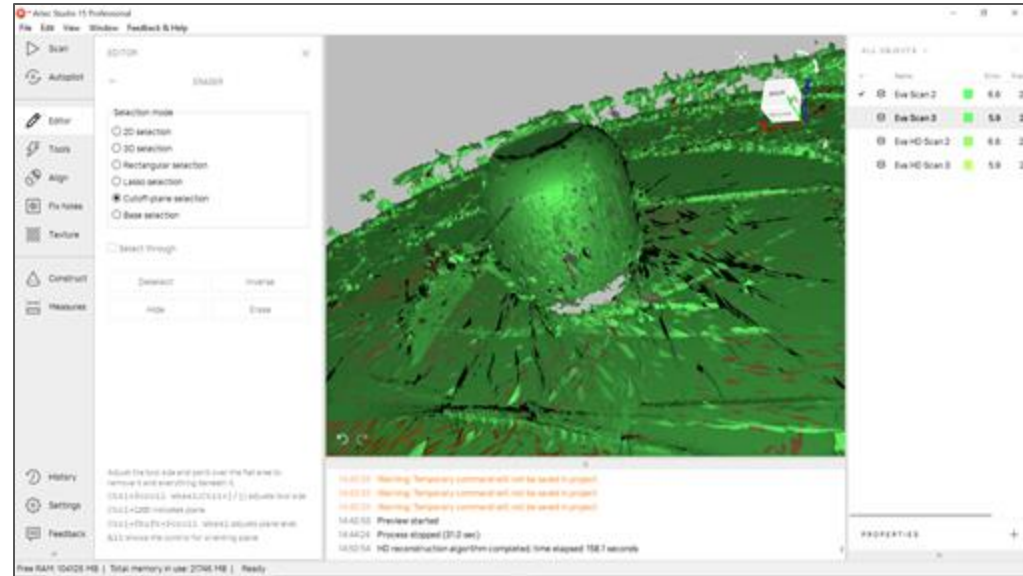
Saving the project

Once you finish, click *File* and select *Save project*. Close the *Scan* panel. You can now crop the surroundings.

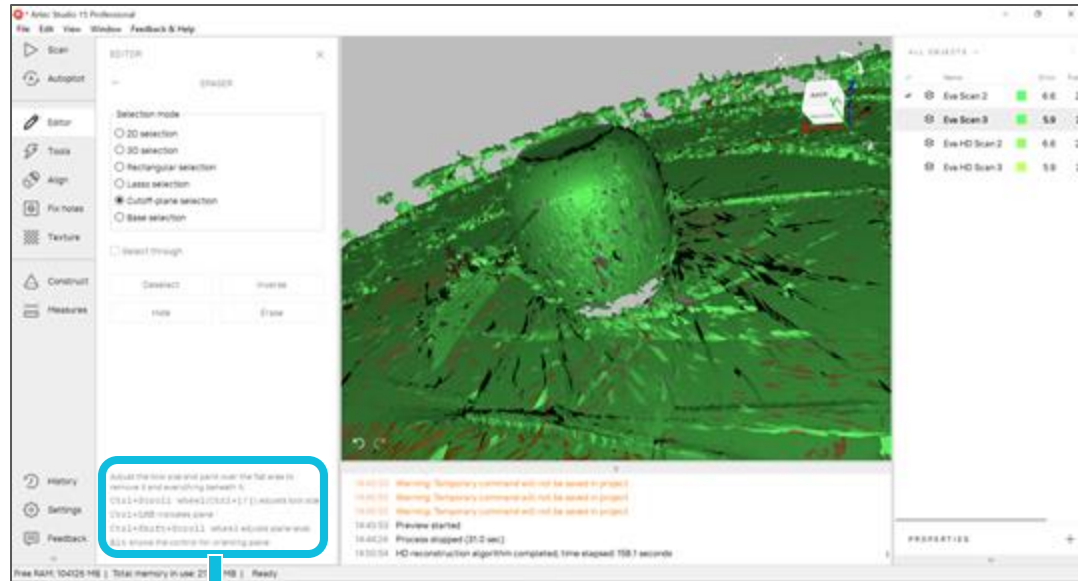


Erasing

- The purpose is to erase auxiliary surfaces (e.g., a table or floor).
- Open *Editor* → *Eraser* → *Cutoff-plane selection*. Follow the panel instructions.
- **Use freely other types of the Eraser (not only Cutoff-plane selection) to remove other unwanted elements from the scan.**



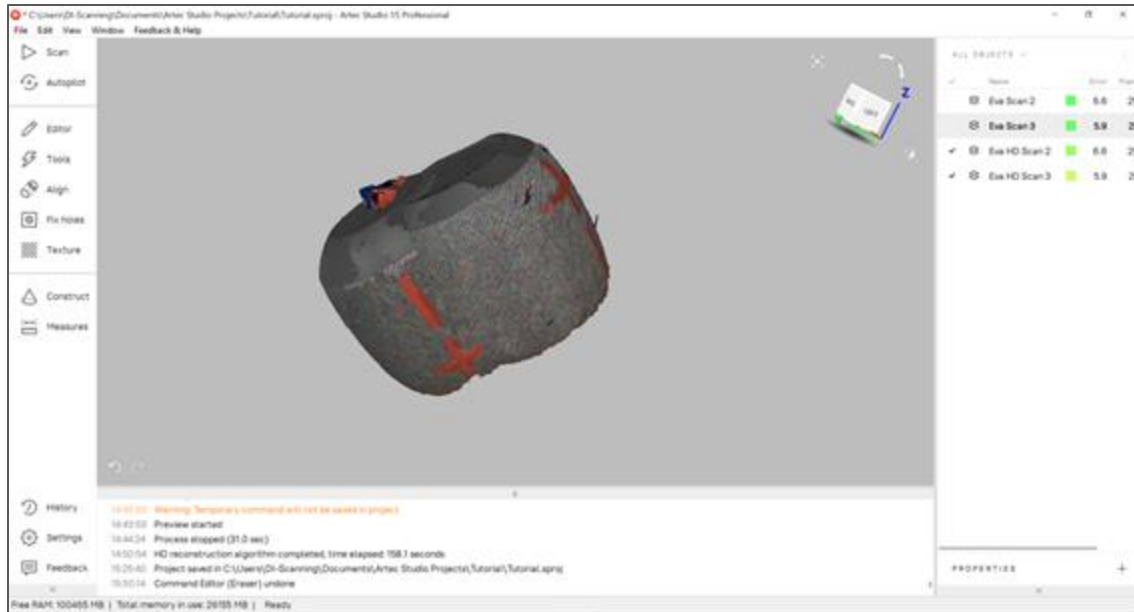
Controls for Erasing



All the controls you need to erase will be mentioned here

Erasing

After you remove all the unwanted surfaces, this is what it should look like.



Aligning

You can skip this step, if you have only one scan.

Now, that we have two different scans, it is important for us to align them into one.

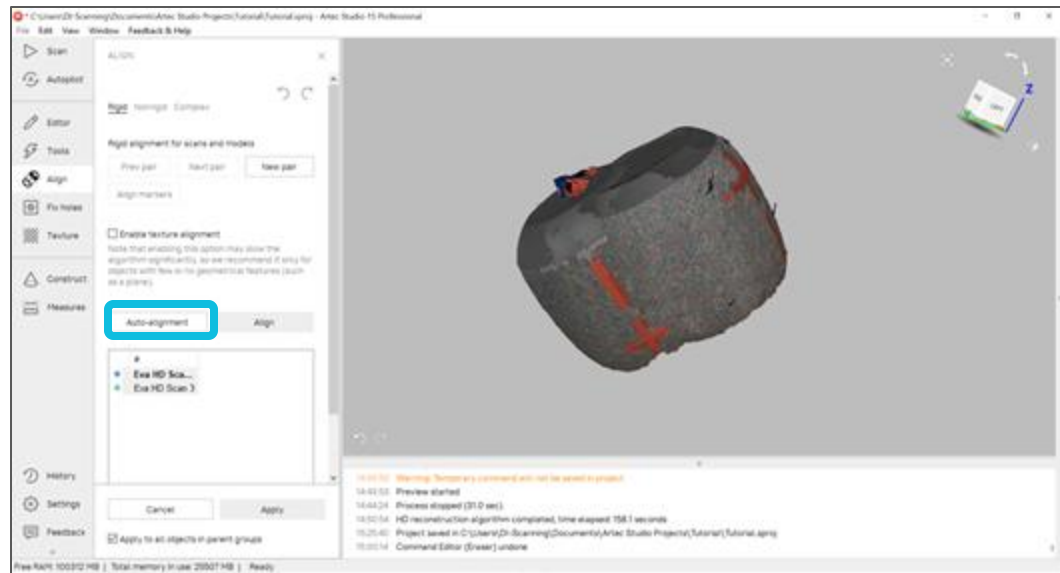
There are two ways you can align them.

1. Auto alignment
2. Manual Align

Aligning: Auto Alignment

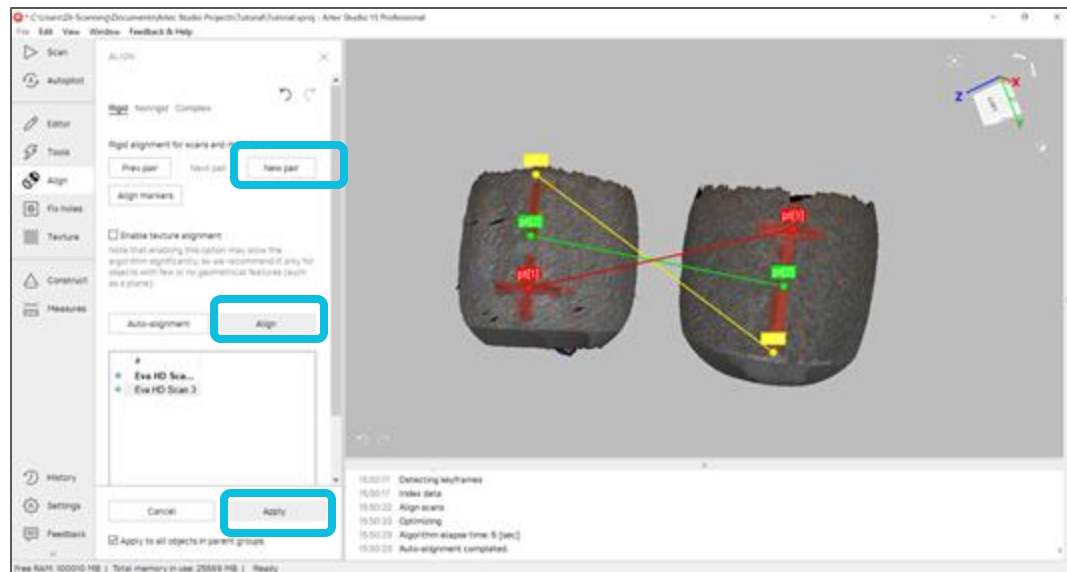
Go to Align, and you can see “Auto alignment” there. You can use it if you want the software to align them automatically. (Which might not work in all cases, but you can try though!)

It didn't go well in this case. So, I'm going to align them manually



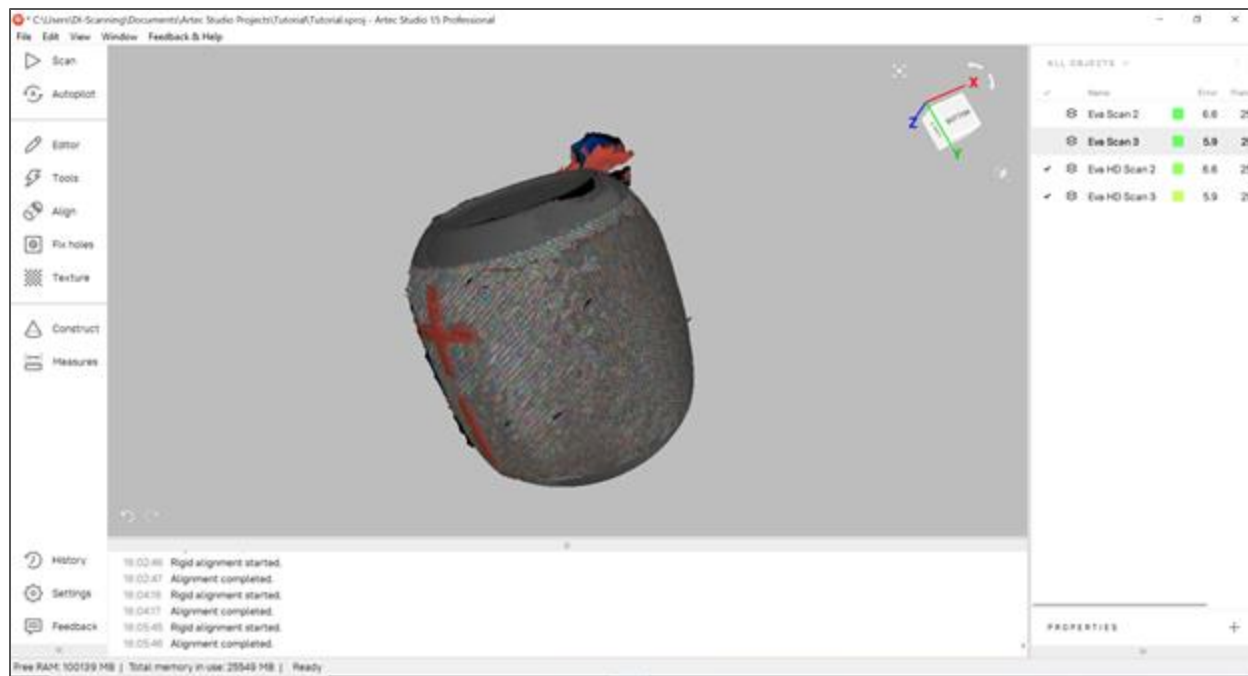
Aligning: Manual Alignment

We need to match the features manually here. Place the two scans in a convenient way so that you can start matching. Match at least 3 points (use “New pair” button), for the software to understand better. Then hit “Align”, and after the alignment is done press “Apply”.



Aligning

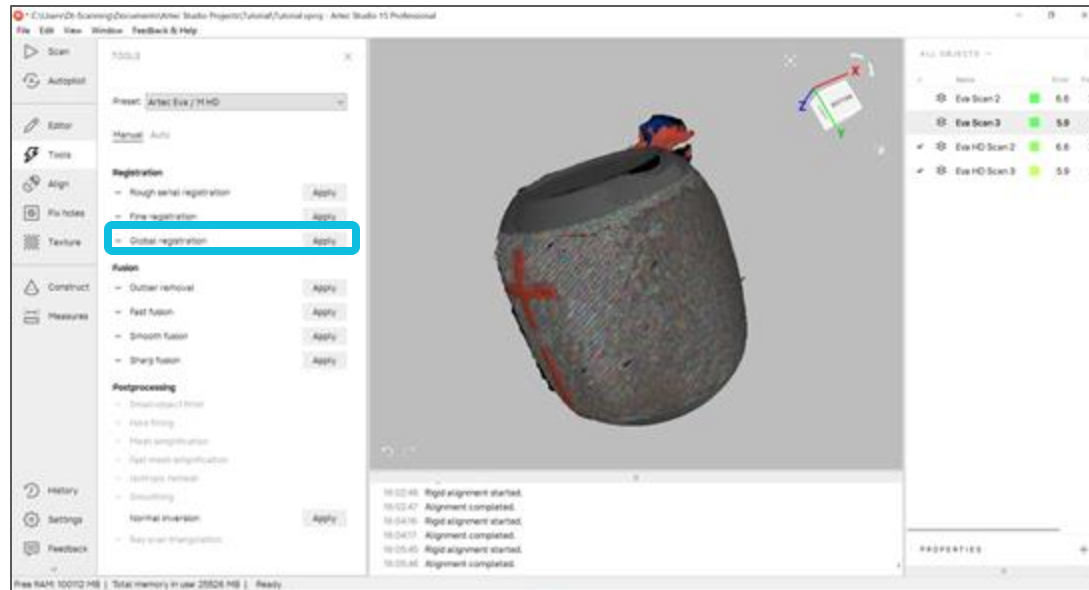
This is how it turned out after aligning.



Global Registration

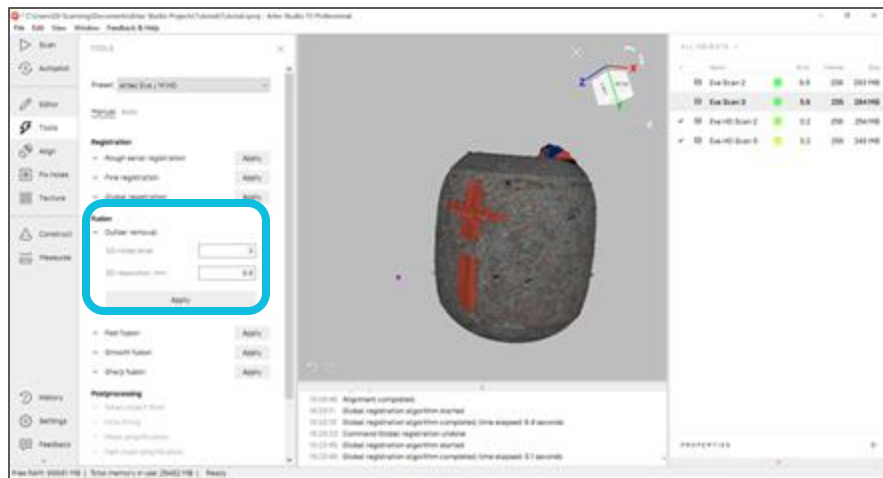
The purpose is to simultaneously optimize the frame position across all scans, thus preparing them for further processing.

Tools -> Global registration -> Apply (You can select the dropdown and see what settings it has)

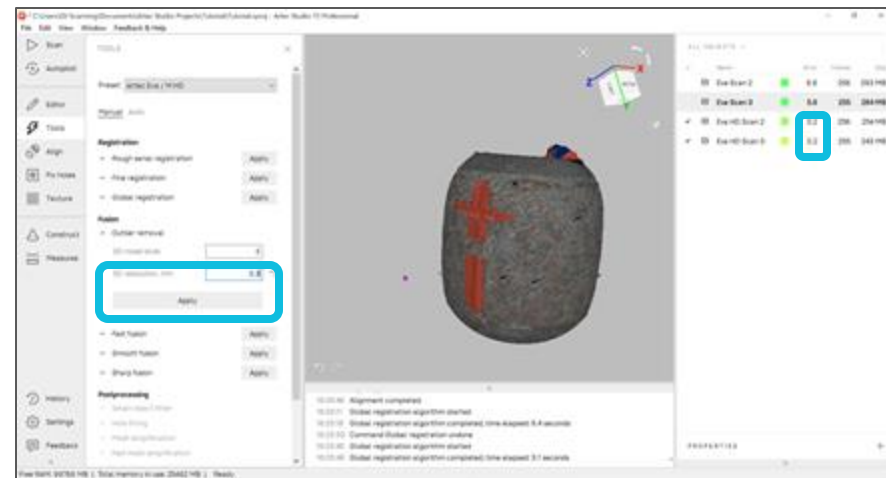


Outlier Removal

Purpose is to erase large outliers and some noise.
Tools -> Outlier removal



Make sure the 3D resolution is greater than the max error of the scans you see in the Objects space. (Only see this after global registration).
Hit "Apply".

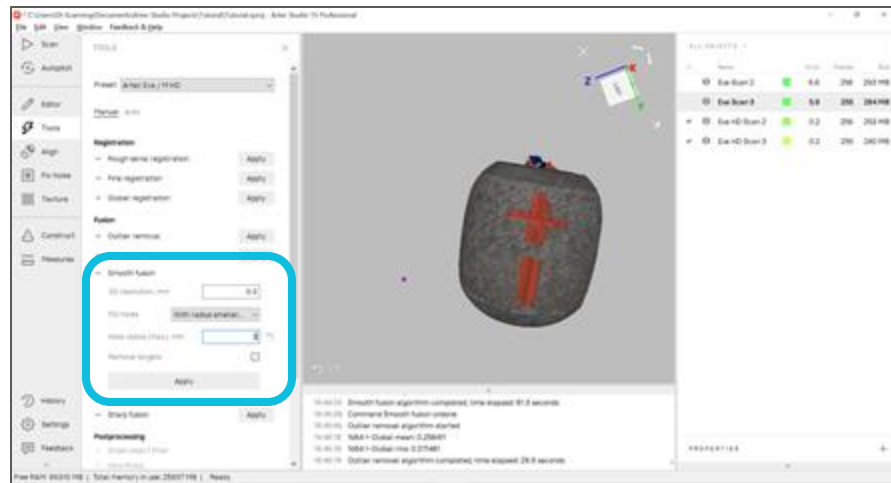


Fusion

Fusion takes all the individual frames, and merges them all together.

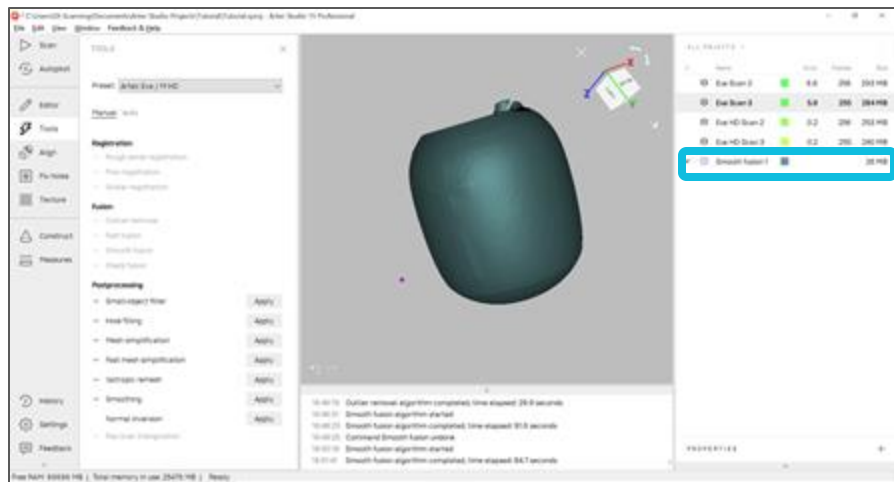
Tools -> Smooth fusion. (To obtain sharper surfaces you can select “Sharp fusion”)

Make sure the resolution is same as the one you gave in the “outlier removal” step. Select any “Fill hole” technique you think that would best suit your model. And hit “Apply”

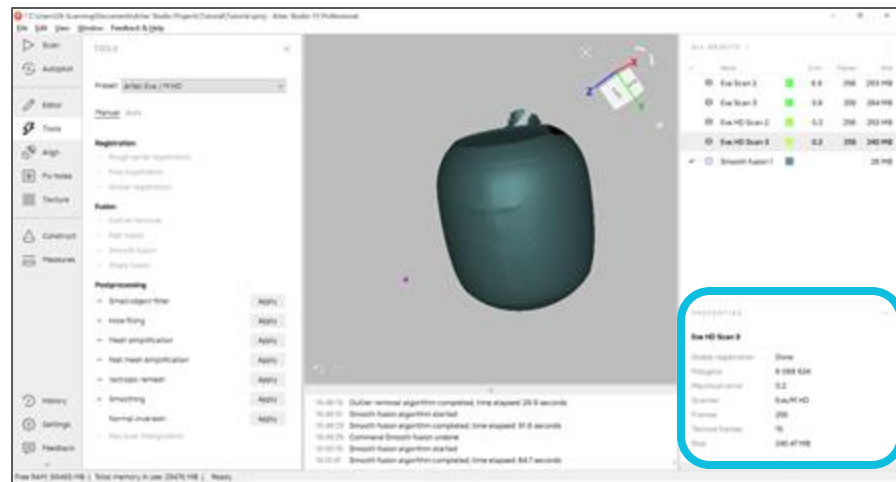


Fusion

After that, you end up like this with a Fusion in your Objects space.

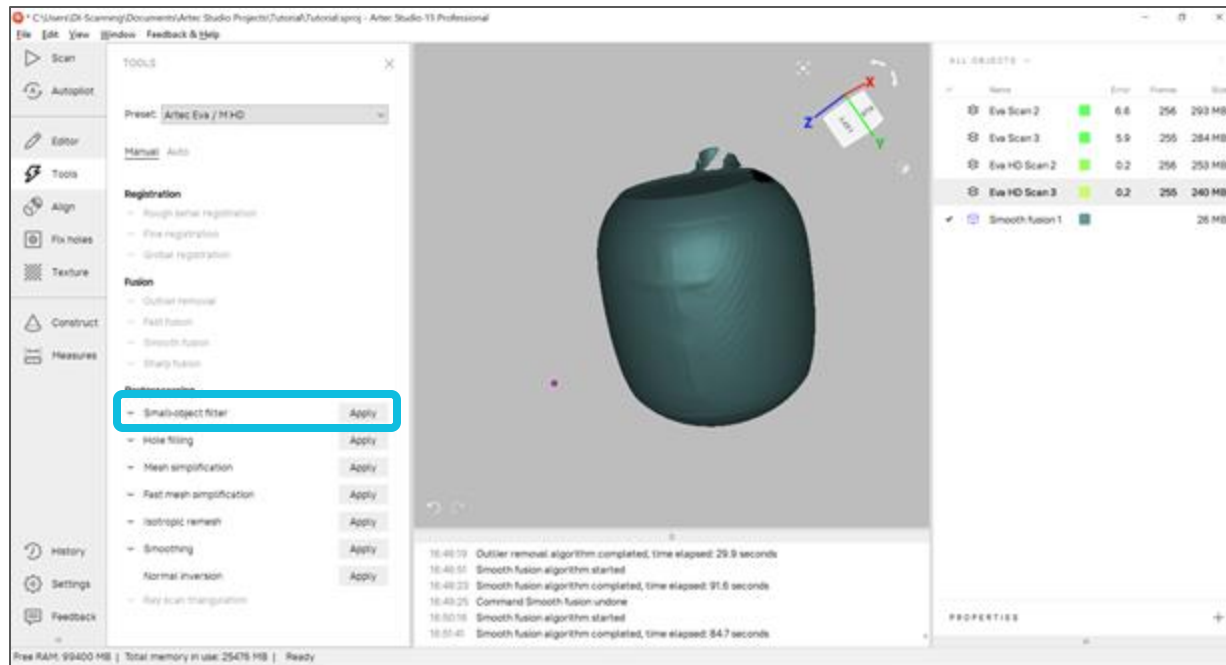


If you click on the properties you can see the details.



Small-object filter

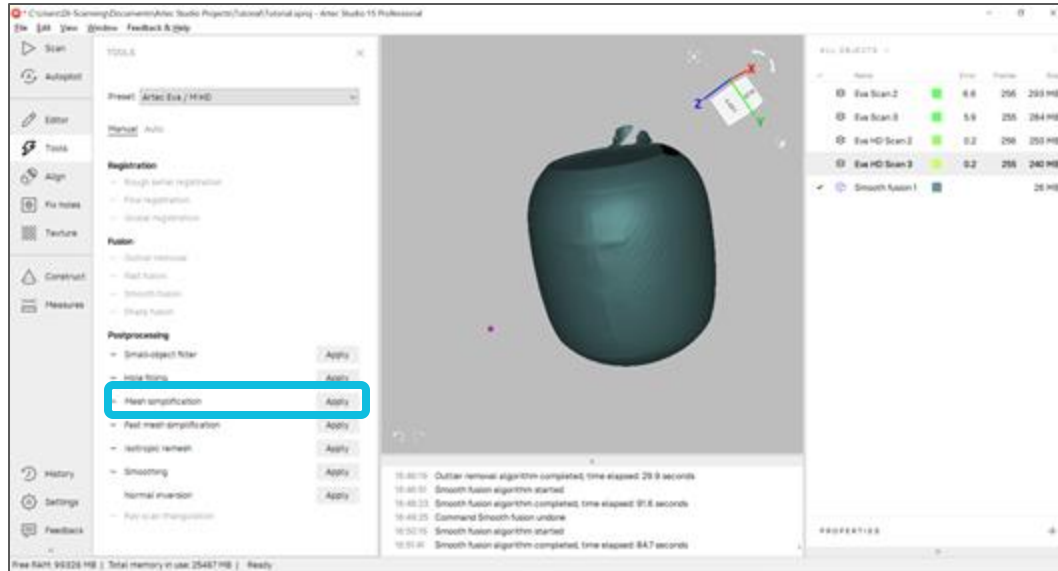
This takes care of any disconnected pieces in the mesh.
Tools -> Small-object filter -> Apply



Mesh simplification

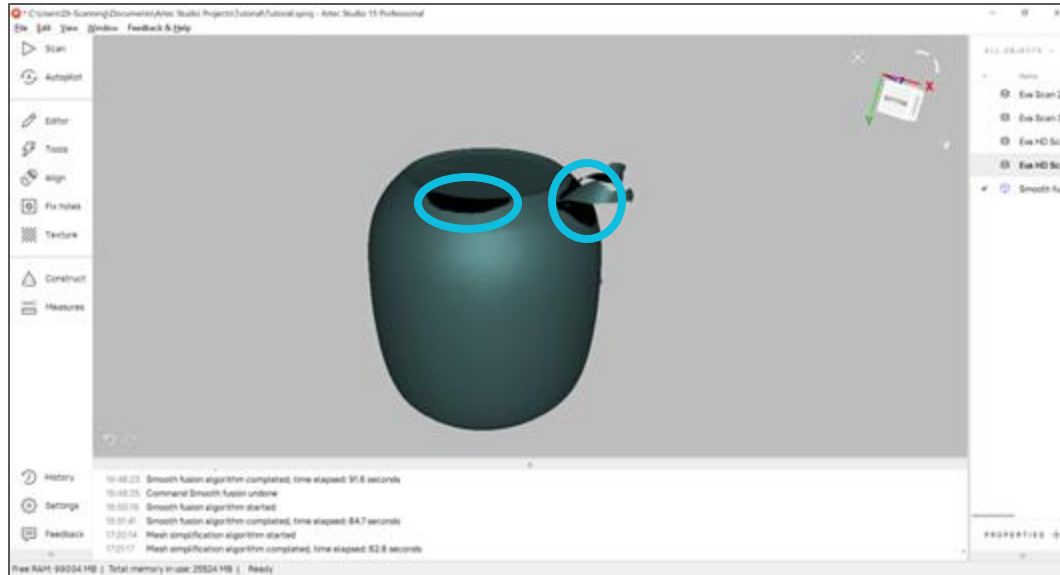
Purpose- By reducing the number of polygons without greatly distorting the real 3D geometry, to reduce the file size.

Tools -> Mesh simplification -> Apply



Fix Holes

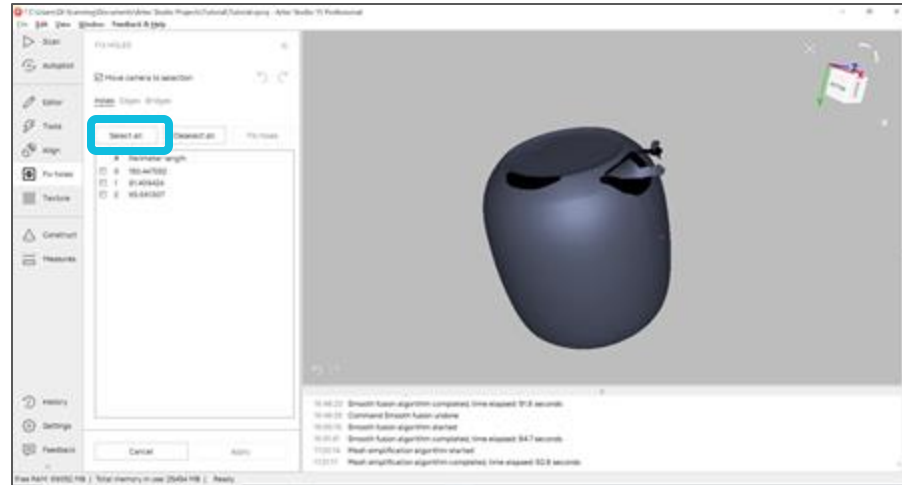
As you can see, there are parts of the model that has holes. With this feature all those holes can be covered.



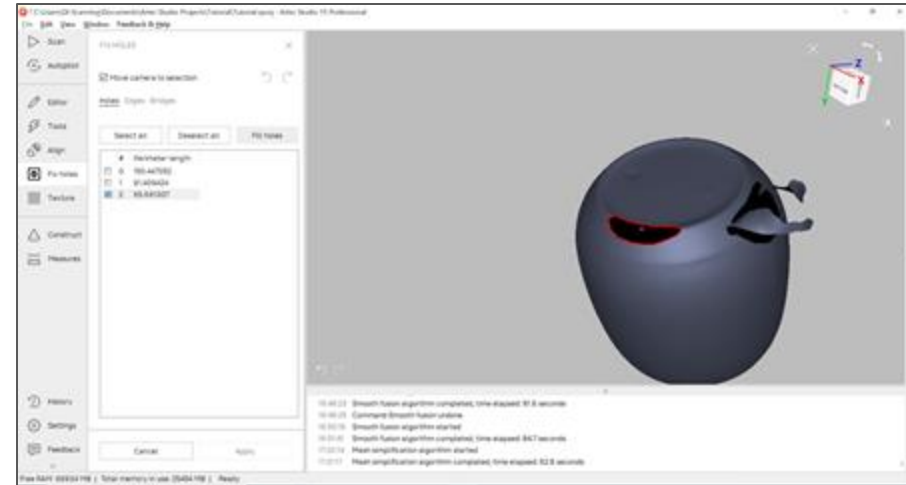
Fix Holes

Go to Fix holes -> Holes.

You can even use “Select all” -> “Fill holes” option for it to fill all the holes present. Hit “Apply”

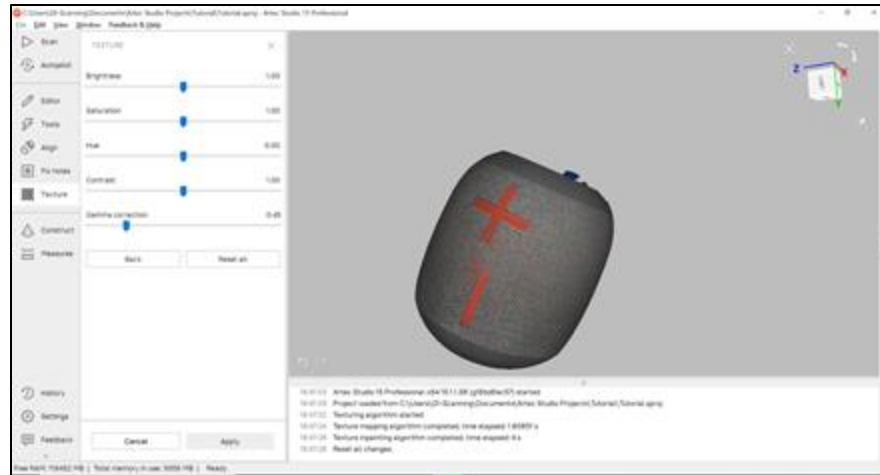
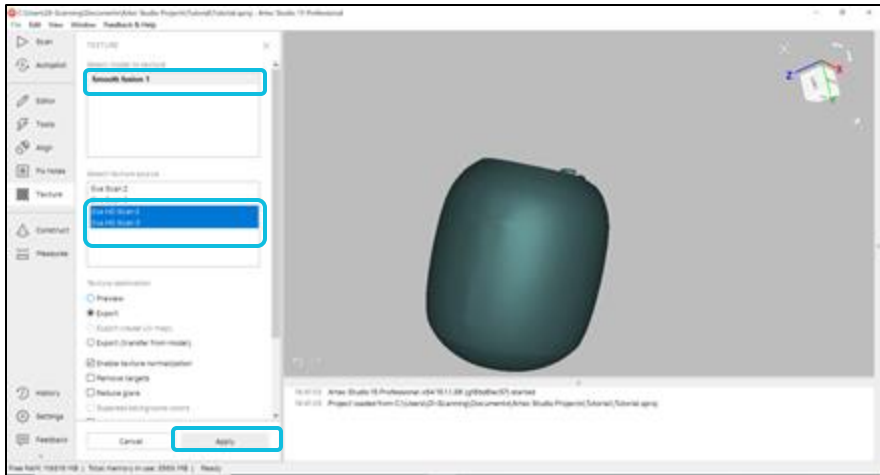


You can either select the holes and hit “Fill holes” and “Apply” to fill in there individually.



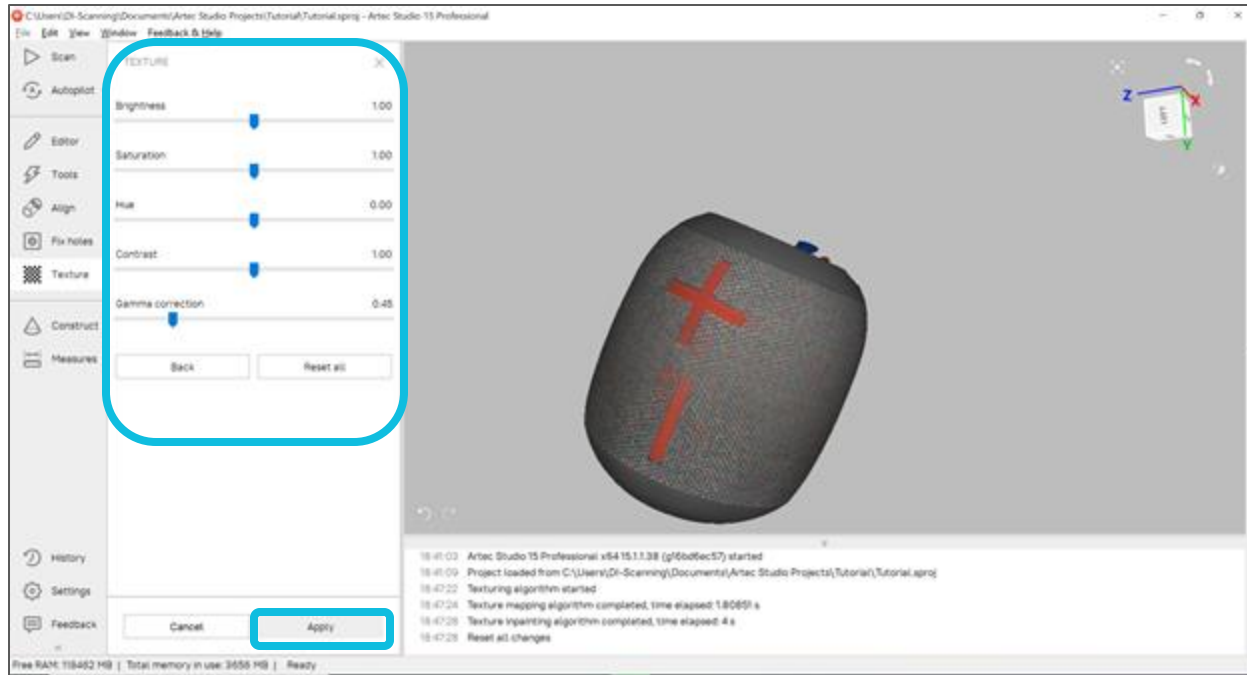
Texture

- Click *Texture*.
- Select a model (fusion output) and its source scan(s) in the corresponding fields.
- Select texturing for *Export* → *Apply*.



Texture

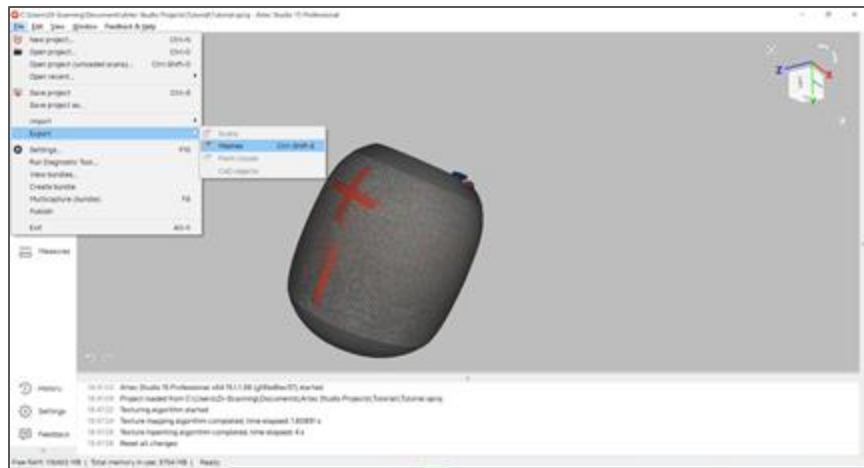
Any further editing can be done here. Then press “Apply”.



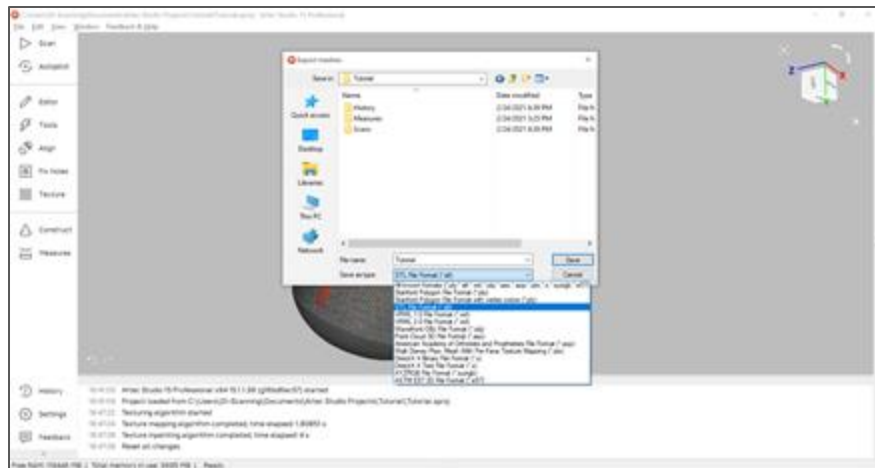
Export

Export and Save

File -> Export -> Meshes



Select the destination. Name your file. There are multiple formats like .ply, .stl etc. to export. Choose the type and hit "Save".



Use of exports

Stl: 3D printing, rapid prototyping, and computer-aided manufacturing.

Obj: exchanging information, CAD, 3D printing (unlimited colours), Ar/VR.

Ply: Polygon File Format, stores three-dimensional data from 3D scanners.

Wrl: helps browser render 3d polygons with details, associates URLs with specific graphical components.

Asc: ActionScript programming language, controls Flash-based applications

Aop: indicates to your device which app can open the file

Ptx: an image saved in the V.Flash PTX raster image format, stores page layouts, used for official meeting transcripts

X: creates a C program using a lex utility.

xyzrgb: captures the geometry [XYZ] and color [RGB] with perfect registration.

e57: stores point clouds, images, and metadata produced by 3D imaging systems, such as laser scanners.

Exports of the scans:

