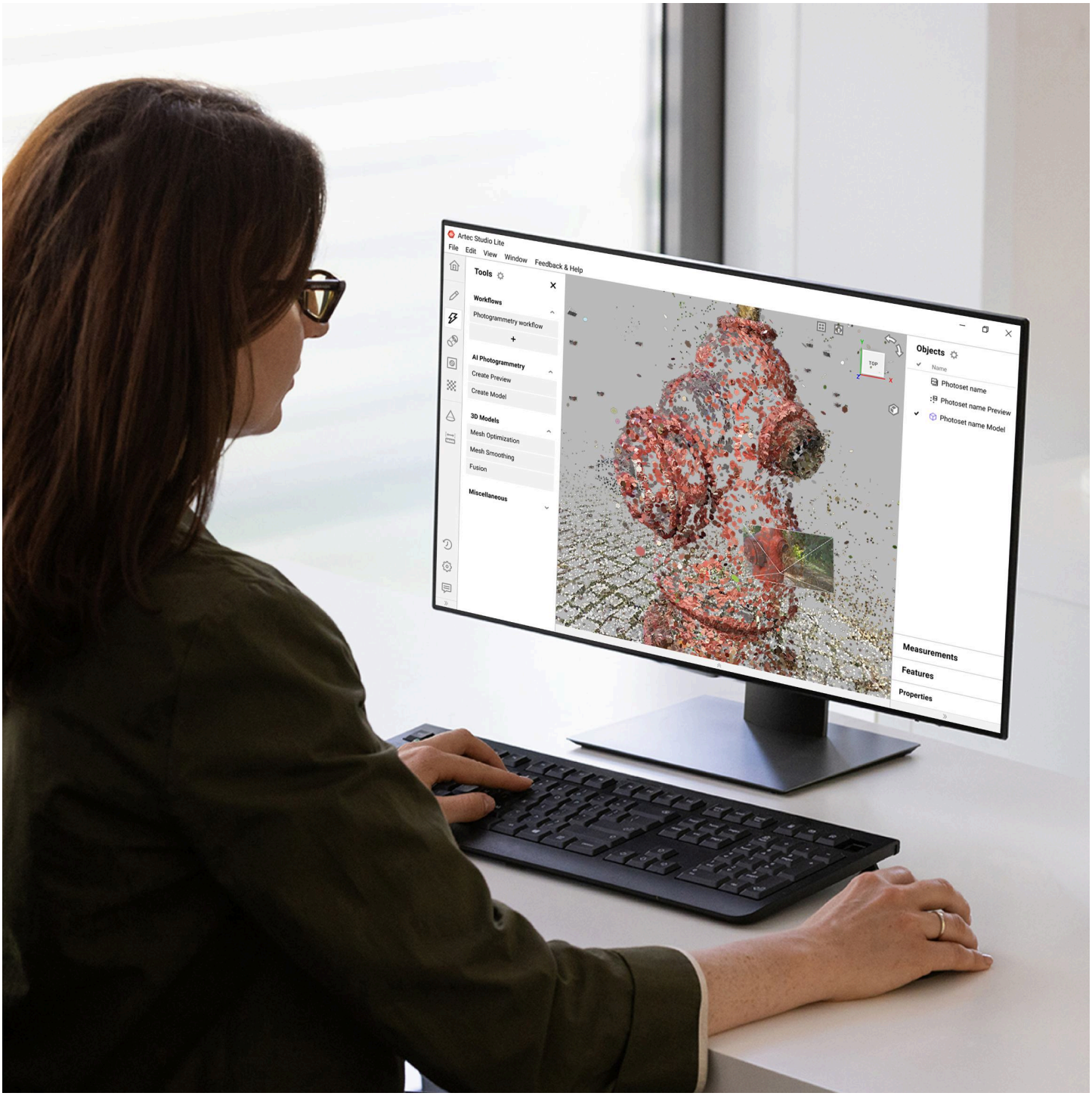
Artec Studio Lite / Lite Individual

Advanced User Manual



CONTENTS

Popular Topics

Artec Studio Lite is a stand-alone software solution designed to create accurate 3D models without the need for scanning — using only photo or video sets captured with your smartphone, drone, or DSLR.

Whether you are capturing cultural artifacts, experimenting with 3D printing, or digitizing landscapes, Artec Studio Lite provides you with the seamless solution that makes photogrammetry accessible to everyone. Even if you are new to photogrammetry, Artec Studio Lite offers you guided onboarding and smart algorithm selection to help you achieve great results.

This User Manual will guide you through the main application's features — from capturing and importing data into Studio Lite to creating and post-processing your first 3D model.

Use the left panel to get an overview of the entire manual, or refer to the Artec Studio User Manual for more information on post-processing 3D models and software settings. Consult the Index to find references to specific parameters that appear in processing algorithms. Also, take a look at the Conventions and Acronyms section for explanations of key terms and interface elements.

The incomplete list of chapters below is intended to clarify the document structure.

- Quick Start Guide provides a brief overview of the most common user scenarios for creating model based on the object type, its background and capture method.
- *Data Preparation* covers the process of capturing data, importing it into Artec Studio Lite, creating and using scale references for more accurate real-world dimensions.
- *Building Your First 3D Model* explains how to use the imported data to create a preview photo scan and then a final 3D model, including all necessary settings.
- *Data Processing* goes you through the post-processing 3D model to refine it a bit and get ready for further export.
- *Saving and Sharing* provides a guide on how to export the output data in universal 3D formats and how to save your data to a project file.

In addition to this manual, you can find practical tips and other information at the Support Center. If you encounter an issue when using our software, please submit a request.

Documentation for other software is available here.

CHAPTER

ONE

INSTALLATION

1.1 System Requirements

Your computer must meet the system requirements to use Artec Studio Lite.

To sum up, in order to use Artec Studio Lite easily and smoothly, you need to:

- Check that your computer meets the minimum and recommended specifications
- Install all necessary drivers and updates for your hardware
- Ensure stable power supply and sufficient disk space for project data

1.2 User Account

To install Artec Studio Lite and keep it up to date, register for a free account at *my.artec3d*. In addition, the website allows you to track all your Artec devices and products.

Your account at *my.artec3d* will be valid for all Artec services.

To register, follow these steps:

1. Go to *my.artec3d* and click *please sign up*.
2. Fill in all the fields in the registration form (by clicking *Next*) and click *Create account*.
3. Receive a registration email that contains a confirmation link.
4. Click the link or copy it to your browser to confirm your registration and go straight to your *my.artec3d* account.

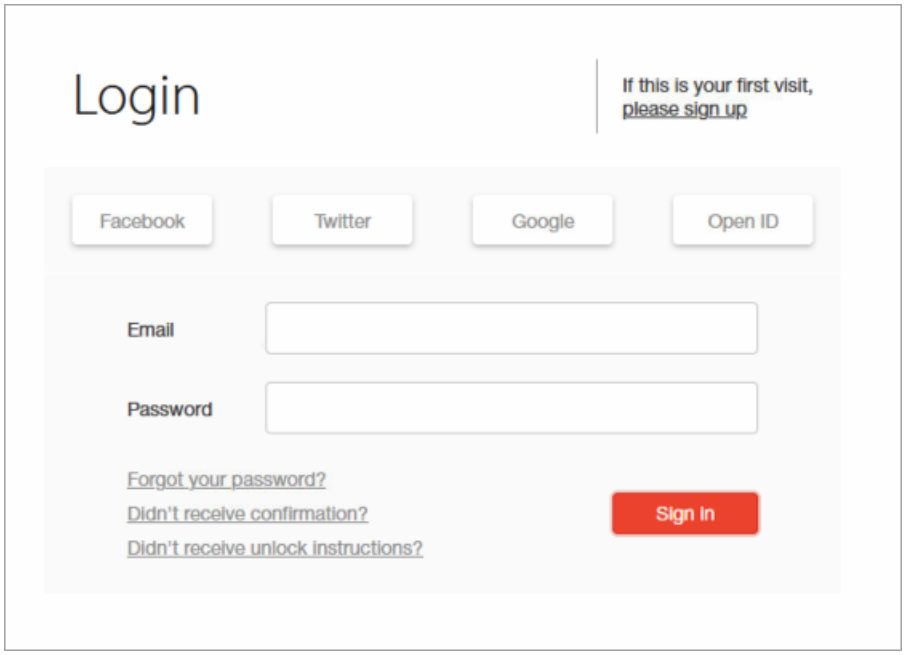


Figure 1: *my.artec3d* welcome screen.

1.2.1 Running Artec Installation Center

To use Artec Installation Center, first ensure that your computer is connected to Internet. If necessary, you can install and activate Artec Studio Lite on another computer later. Also, make sure that you already have a *my.artec3d* account; if not, see *User Account*.

1. Log into your *my.artec3d* account and download Artec Installation Center. The link for the Artec Installation Center executable is available in the *My software* section.
2. After downloading, open the folder containing the executable file and run it. Follow the on-screen installation instructions. Once Artec Installation Center is installed, you will see a dialog requesting your email address and password. Use your *my.artec3d* account to log in as Figure 2 shows.

1.2.1.1 Logging Out and Switching Accounts

You may need to change *my.artec3d* account. Artec Installation Center displays the current user name in the top-right corner.

To log out of Artec Installation Center:

1. Click *Log out*.
2. Enter another user's email and password in the window that opens.
3. Click *Sign in*.

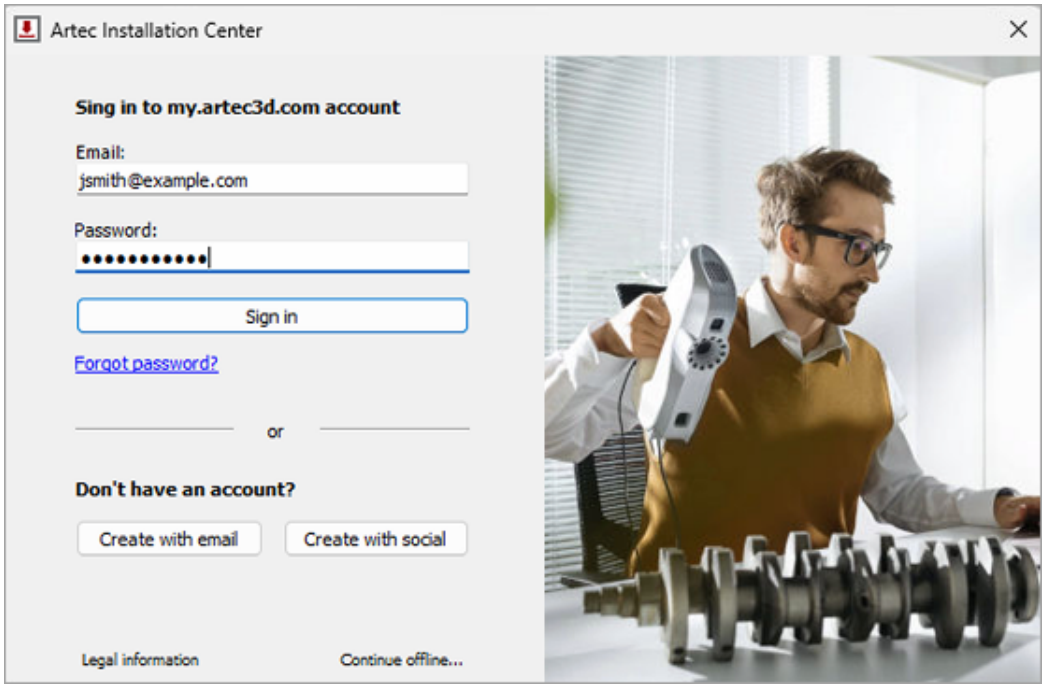


Figure 2: Authentication for Artec Installation Center

1.3 Artec Studio Lite Installation

There are two ways to download and install Artec Studio Lite:

- Through Artec Installation Center (either during the installation process or by clicking *Install* in the application)
- From *my.artec3d*—log in to the website, go to the *My software* page, and download the executable file

If you download the executable file, run it to begin installation; otherwise, click *Install* in Artec Installation Center. To continue with the installation, click *Next* and proceed to the license agreement. After reviewing the agreement, accept it by clicking *Yes*, and follow the next steps.

If you have not yet installed the Artec Installation Center, a login dialog will appear. If you are not connected to the Internet, refer to *Offline Activation* for instructions on activating Artec Studio Lite without an Internet connection.

If the computer on which you are installing Artec Studio Lite has not yet been linked to your account, an activation confirmation message will appear.

When the installation is complete, the installer will prompt you to launch Artec Studio Lite.

1.4 Offline Activation

If the computer on which you are installing Artec Studio Lite lacks an Internet connection for security or other reasons, you may use the offline activation procedure to activate the software.

Note: Copies of Artec Studio Lite activated offline cannot be deactivated, so use this option only if absolutely necessary.

For offline activation, you need the following:

- Another computer connected to the Internet
- Artec Studio Lite installation package (preferably, download it from *my.artec3d*)
- Flash drive or another storage device to transfer files from the computer with Internet access to the one where you'll install Artec Studio Lite

Installation and activation procedure:

1. Start Artec Studio Lite installation.
2. During installation the login/password dialog will appear. Click *Continue offline...*
3. Click the *Activate offline* button in the pop-up window
4. In the offline-activation dialog, click *Save...* and save generated Activation ID file to a flash drive or other storage medium
5. Log into your *my.artec3d* account and open *My software* page using the Internet-connected computer
6. Find Artec Studio Lite and click on it. A new page will appear
7. Click the *Activate application offline* link then the *Select file* button and specify the Activation ID file path. Next, click *Activate*
8. A new dialog will allow you to download an Offline Activation Data file; save it to the flash drive
9. Return to the computer on which you are installing Artec Studio Lite. Click *Activate and Continue* and specify the Offline Activation Data file

Once you complete all the steps described above, your copy of Artec Studio Lite will be activated.

1.5 Deactivation

Note that deactivation is only possible for computers on which you activated Artec Studio Lite online as *Artec Studio Lite Installation* describes. Artec Studio Lite installations activated offline cannot be deactivated.

Note: The number of deactivations may be limited, so deactivate Artec Studio Lite only if you absolutely must move it from one computer to another.

To deactivate a license on your computer, follow these steps:

1. Make sure the computer is connected to the Internet.
2. Go to *Control Panel* → *Uninstall Applications* and click on Artec Studio Lite. The uninstallation process will start.
3. In the dialog that appears, select the *I understand. Deactivate Artec Studio* checkbox.
4. Click *Next* to complete the uninstallation.

CHAPTER

TWO

PHOTOGRAMMETRY OVERVIEW

AI Photogrammetry leverages advanced algorithms to convert captured photos into detailed, feature-rich 3D models. On the way to a perfect 3D model, you can select the optimal processing mode (algorithm) based on the **object type**, its **background** and **capture method**.

2.1 AI algorithm without masks

For static small- to medium-sized objects standing on a stable background that does not change during capture, and that you photographed/recorded by walking around them (including close-ups), the *AI algorithm without masks* will deliver the best results.

This mode (where the *Extract object from background* option in *Advanced* settings is disabled) also performs best for objects with poor monotonous textures in static environments.

2.2 AI algorithm with masks

If the object was rotated (e.g., on a turntable), flipped, or moved to different positions during capture, or if the background was inconsistent or moving; and you did not take close-ups (i.e., maintained roughly the same distance from the object), we recommend using the *AI algorithm with masks*. You can use it by enabling the *Extract object from background* checkbox in *Advanced* settings. This mode will automatically separate the object from the background and produces a clean model. It is generally recommended for textured objects, especially if captured from multiple orientations. For best results, keep the full object within the camera's field of view.

Note: This mode is most suitable for small to medium-sized objects.

2.3 Classic (non-AI) algorithm

For large objects or highly detailed scenes such as landscapes, use the *Classic* algorithm.

Note: We recommend using this algorithm for drone data sets.

2.4 How It Works

The process begins by importing a set of photos into Artec Studio and creating a preview where the images are positioned in 3D space, producing a Photo scan object for further processing. Next, a triangular mesh is generated using specialized algorithms based on the scene type. This mesh can be processed and textured within Artec Studio Lite, allowing users to create accurate and visually rich 3D representations, making 3D modeling accessible to everyone without the need for a 3D scanner.

The figure below schematically shows a typical photogrammetry pipeline in Artec Studio Lite.

CHAPTER

THREE

DATA PREPARATION

3.1 Using Scale References

Scale references are used to ensure that the 3D model is created with accurate real-world dimensions. Without them, the scale of the model will be arbitrary. By using scale references, such as scale bars or scale crosses, you can define the correct scale for your model.

Figure 3: Scale references

3.1.1 Scale References Types

Scale references come in two types: *Scale bars* and *Scale crosses*.

A *Scale bar* allows you to obtain the correct scale for your model by using the distance between two targets. It defines the scale of an object but only along a single axis, making it useful for determining size but providing no information about orientation in 3D space.

Figure 4: Scale bar

In contrast, a *Scale cross* provides a reference not only for the scale of an object but also for its position and orientation in 3D space. It consists of two intersecting scale bars. This comprehensive reference is particularly valuable when you need to determine both the size and alignment of an object relative to the scene.

Figure 5: Scale cross

If you do not have a physical scale cross-reference, you can use a printed version, available as a PDF document at `C:\Program Files\Artec\Artec Studio [version]`. The file names are `ASC A4.pdf` for Europe and `ASC US Letter.pdf` for the USA.

3.1.2 Creating Scale References in Artec Studio Lite

In order to detect the real object's dimensions, you need to add scale references in Artec Studio Lite before running the *Create Preview* algorithm.

First, open the scale reference creation dialog in Artec Studio Lite. You can do it either by:

- Going to *File* → *Coded targets and scalebars*, or
- Going to *Tools* → *AI Photogrammetry* → *Create Preview* → *Settings*. Make sure that a photoset is selected in Workspace, then click the *Edit* button in the *Scale reference* section.

To add a *Scale bar*:

1. Define the IDs of the two targets, the distance between them (in millimeters), and the name of the scale bar. Note that the IDs must be unique and fall within the range of 1 to 516.
2. Click the *Create reference* button.

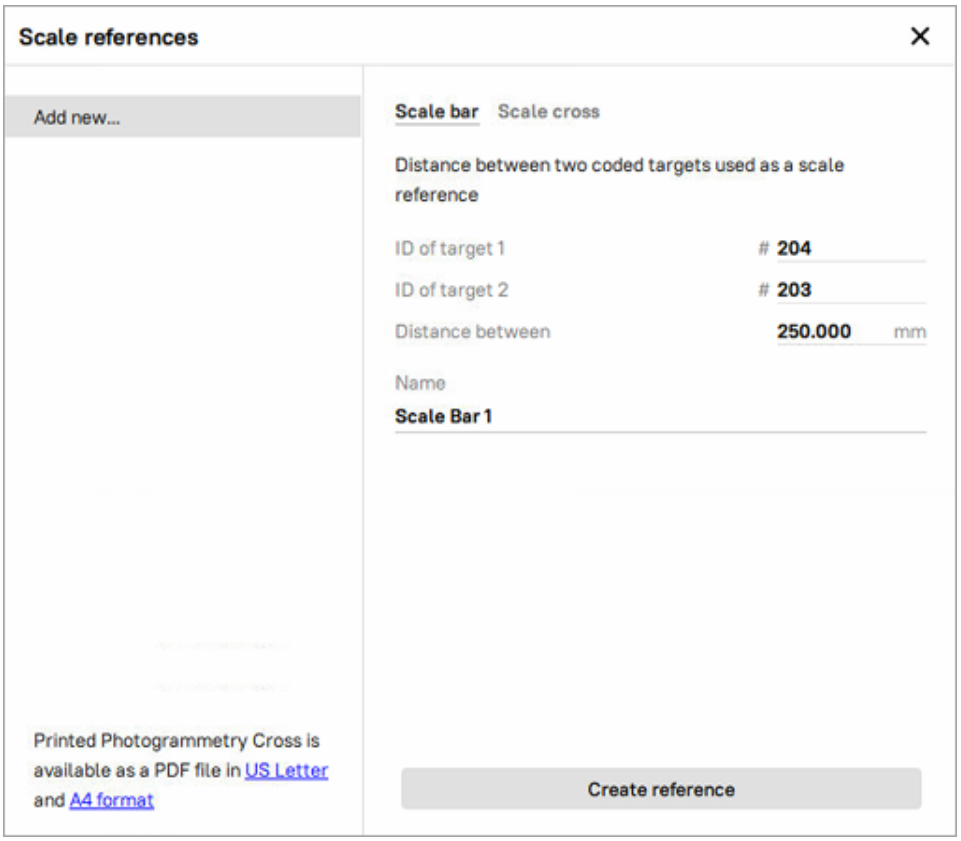


Figure 6: Creating *Scale bar*

To add a *Scale cross*:

1. Define the IDs of the two pairs of targets, the distance between them (in millimeters) in each pair, and the name of the scale bar. Note that the IDs must be unique and fall within the range of 1 to 516.

2. Finally, click the *Create reference* button.

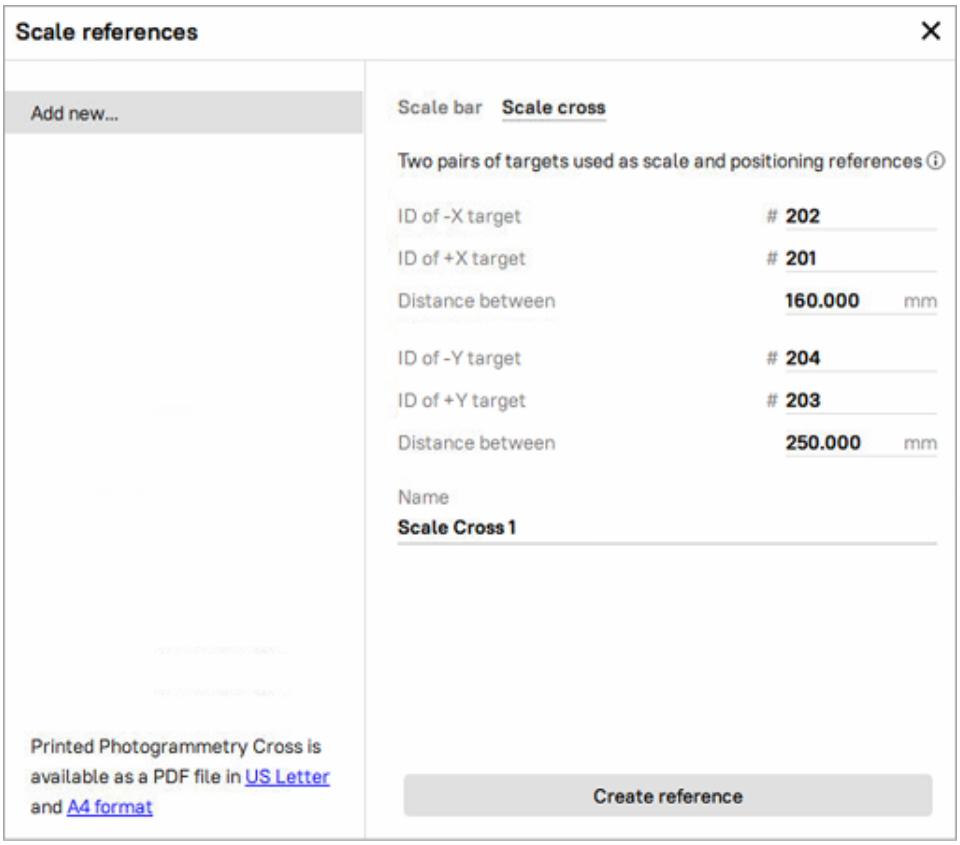


Figure 7: Creating *Scale cross*

The newly created scale references will appear in the list of all references on the left.

3.2 Capturing Data

3.2.1 General Recommendations

Here are some general recommendations on the capturing procedure, including lighting, capture methods, camera selection, and more:

- Capture the object in a well-lit environment. Aim for a strong ambient light. The best light conditions are typically achieved by capturing outside on a cloudy day.
- Make sure the entire object is in focus, with no areas blurred. If you find any blur, add more light to the scene, slightly close the lens aperture or do both.
- Ensure the entire object fits within the camera frame and is separated from the background. Refrain from the scenarios where the majority of the frame is covered by the object with some parts of the background still visible, as this may confuse the object detector.
- For the AI non-mask algorithm, closeups are allowed if they help capture fine details of the object's geometry.
- Capture the object from all the directions so that the algorithm receives a big variety of views. A good practice here is to imagine a virtual sphere around the object and try to capture images from different angles.
- You can also turn the object to another side and repeat the capture to get full 3D reconstruction. In that case make sure that images from each object orientation are imported into Artec Studio Lite as a separate photoset.
- If your object lacks texture, ensure that the background contains many features.
- Normally, 50-150 photos is typically enough to achieve good quality.

Note: Instead of photos, you can record a video of your object, considering the points mentioned above. Videos are treated as a set of frames and can be imported into Artec Studio Lite in the same way as photos.

Good examples for objects:

Figure 8: Good photos for the algorithm

Bad examples for objects:

Figure 9: Several objects within the camera frame

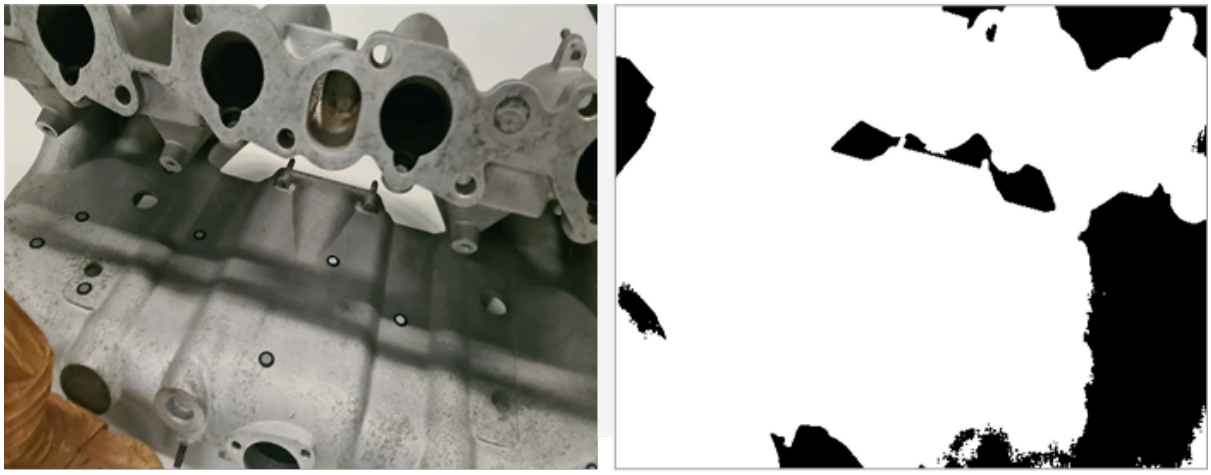


Figure 10: Closeups, when part of the object could be considered a background (allowed for the non-mask AI algorithm)

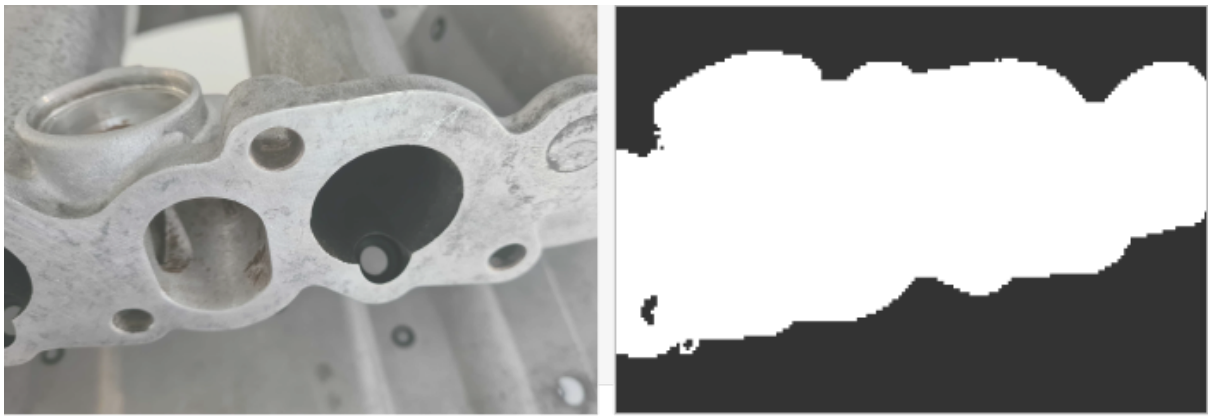


Figure 11: Overloaded background, when part of the background could be considered an object

Figure 12: Good photos for the algorithm

3.2.2 Camera Selection

You can use multiple cameras to capture the same object. When importing the photos, Artec Studio Lite will create a single *Photos* object for all images, regardless of which camera captured them.

There are no strict restrictions on using different cameras, but we recommend avoiding significant differences in the field of view (FOV). Ideally, the FOV difference should not exceed a factor of 7 to ensure consistent results. In some scenarios, using different types of cameras can be beneficial:

- Drone and ground photography: Capturing aerial views with a drone and detailed ground shots with a regular camera provides comprehensive coverage of the object.
- Wide-angle and standard Lenses: A wide-angle lens can efficiently capture a general scene, such as an entire room, while a standard lens can be used to capture detailed shots of specific elements, like a statue in the center of the room.

3.3 Importing Data into Artec Studio Lite

To import photos/videos into Artec Studio, you need to go to *File* → *Import* → *Photos and videos*.

If a video file is imported, Artec Studio Lite will create a photo set in the *Workspace* out of it. You need to specify frame rate at which photos will be imported from the video file by entering the desired value in the *Frames extracted per second* option of the *Import video* dialog.

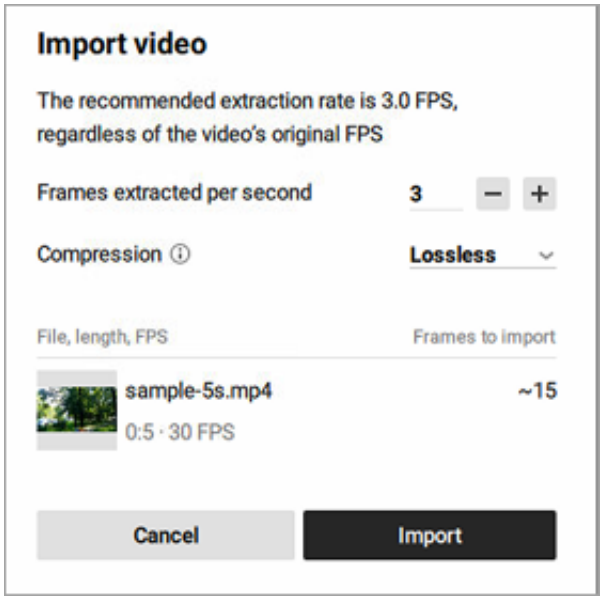


Figure 13: *Import video* dialog

Note: This value is not an original FPS value; it represents the extraction rate. The

default value is 3, but you can adjust it. Keep in mind that increasing the value may reduce performance.

Also, you can select the desired *Compression* type: *Lossless* or *Lossy*. With *Lossless Compression*, the project size will be larger but the quality is fully preserved. In contrast, *Lossy Compression* reduces the project size by 20-50%.

Once you are ready, click the *Import* button. Selected files will be added to the *Workspace* as a new object of the *Photos* type. Video files will also be added as separate objects of the *Photos* type.

3.4 Viewing Photos/Videos

In Artec Studio Lite, it is possible to assess each captured photo for adequacy of texture capturing or misalignments before reconstructing a 3D model. To inspect the quality of the imported photos, follow these steps:

1. In the *Workspace* panel, double-click a set of photos or right-click a set of photos and select the *Show photos*. The entire list of photos it contains will appear.
   - For each photo, its name, focal length, and camera data will be provided.

   Note: By default, all objects in the *3D View* window except the pictures of the selected set will be hidden. To see other objects, select the *Show other selected objects* option.

2. Double-click an individual picture to inspect it closer. It will be opened in a viewing pop-up

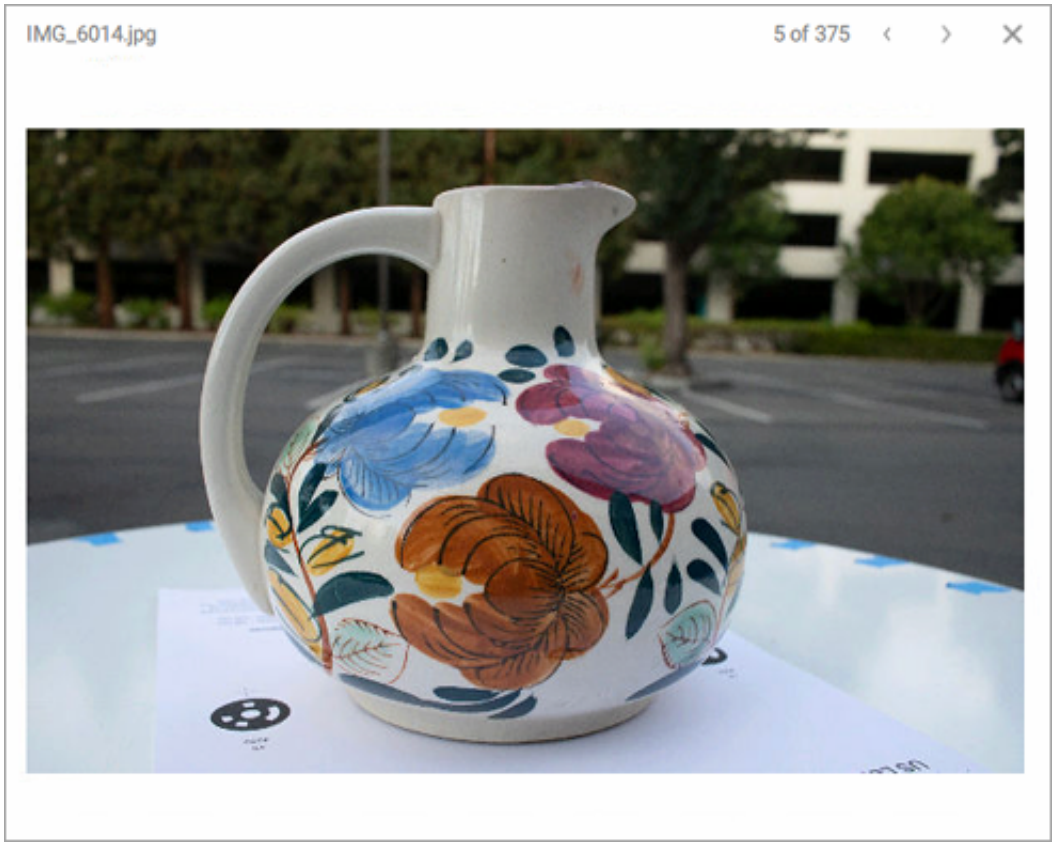


Figure 14: Viewing captured photos

Navigate between photos by clicking the right and left arrows in the top-right corner of the pop-up or by pressing the up and down arrow keys on the keyboard.

- To exit the viewing mode, press either `LMB` or `RMB` and drag in any direction.

- To delete a picture from the set of photos, click it in the *Workspace* panel by `RMB` and select *Delete* from the context menu. You can also press `Delete` on the keyboard.

CHAPTER

FOUR

BUILDING YOUR FIRST 3D MODEL

Once the data is prepared, you can start creating your first 3D model. Thanks to our algorithms, the process is very simple and divided into two consecutive steps: *Creating Preview* and *Creating Model*. The *Create Preview* algorithm registers photos by determining their position in space, resulting in a Photo Scan with aligned photos. The *Create Model* algorithm generates the final 3D model, which can then be post-processed and exported or imported.

4.1 Creating Preview

To create preview:

1. Select the imported photos in the *Workspace* panel
2. Open *Tools* → *AI Photogrammetry*
3. Click the gear icon of the *Create Preview* algorithm to open its settings window.

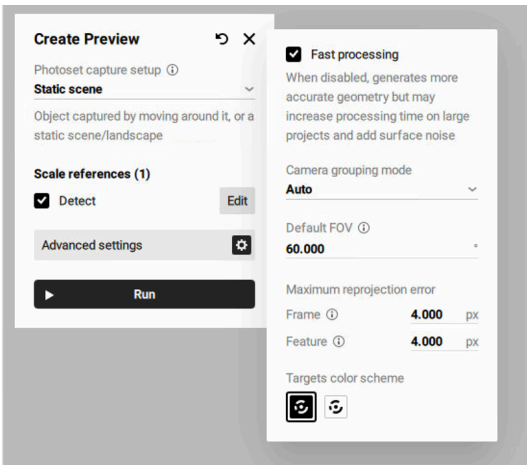


Figure 15: Create Preview settings

Before creating a preview of your future model, you can adjust the following settings:

- *Photoset capture setup* defines how the object or scene appears across the dataset. To ensure correct photo alignment and reconstruction, select *Rotated/Moved in each photo* if the object was rotated (e.g., on a turntable), flipped, or moved to different

positions during capture, and you are uploading all photos in a single photoset. Otherwise, select *Unique for each photoset* if you are uploading such data in multiple photosets.

If you select the *Rotated/Moved in each photo* or *Unique for each photoset* option, Artec Studio Lite will prompt you to set up masks. For more information on photogrammetry and the types of algorithms that Artec Studio Lite suggests, refer to *Photogrammetry Overview*.

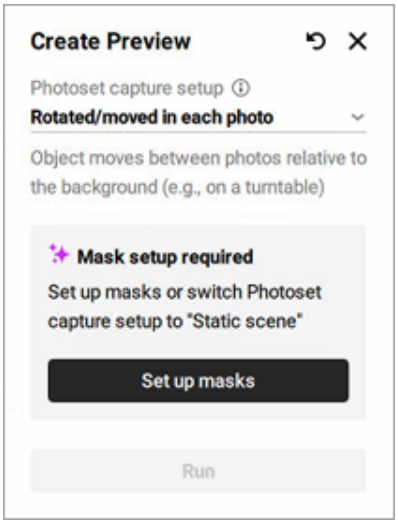


Figure 16: Setup masks required

- *Detect* for the *Scale references* section determines whether scale references will be analyzed or not. Refer to *Using Scale References* on how to create and use scale references.
- *Fast processing* speeds up processing but may reduce geometric accuracy
- *Camera grouping mode* defines how the software interprets which photos were taken by the same camera. This helps the algorithm handle variations in camera parameters, especially when metadata is missing or unreliable.
  - *Auto* assumes that all photos were taken with the same camera. Suitable when there is no metadata and the images are likely from a single device without focal length changes.
  - *Shared per photoset* treats each photoset as taken with a different camera or with significantly different camera settings. Recommended when switching phones, lenses, or focal lengths between photosets.
  - *Individual* considers every photo as taken with a different camera. Best used when camera parameters, such as focal length, may vary between individual photos.
- *Default FOV* specifies the camera's field of view, used when this information is missing or unreadable from photo metadata. The default value is 60°.
- *Frame* specifies the maximum allowable deviation for matching points between individual frames or photos. It limits how much point positions can vary within a

photoset; if the reprojection error exceeds this value, the program may mark such frames as mismatches. The default value is 4.000 px.

- *Feature* sets the maximum error for matching object features, such as contours or textures; lower values lead to more precise reconstruction of object details. The default value is 4.000 px.
- *Target color scheme* defines the color scheme of the targets for detection, with options for white on black or black on white.

1. Click *Run* to launch the algorithm

Once calculation is finished, a *Photo Scan* object appears in the *Workspace* panel. This photo scan is colored so you can see the general shape of your object.

Double-click on the newly created Photo Scan object in the *Workspace* panel and modify the cropping box around the object to adjust the region of reconstruction.

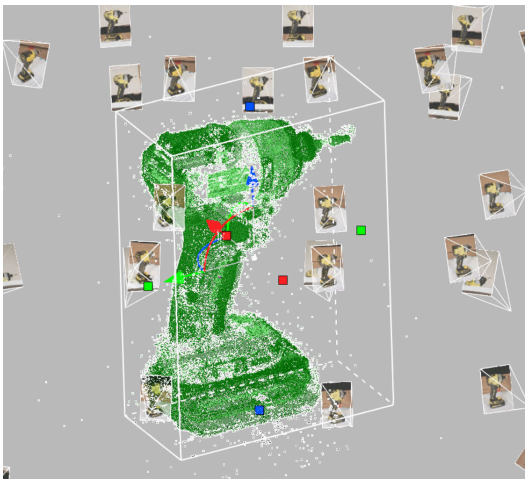


Figure 17: Created Photo Scan in the cropping box

Double-click an individual picture to inspect it closer. It will be opened in the viewing mode:

- To compare the *Photo Scan* object's texture with a reference photo or check for misalignments, use the *Show photo* toggle or press `Ctrl+Q`. The reference photo will be hidden.
- To zoom in and out, use `Scroll wheel`.
- To move the picture, hover over it and drag it holding down `Scroll wheel`.
- To exit the viewing mode, press either `LMB` or `RMB` and drag in any direction.

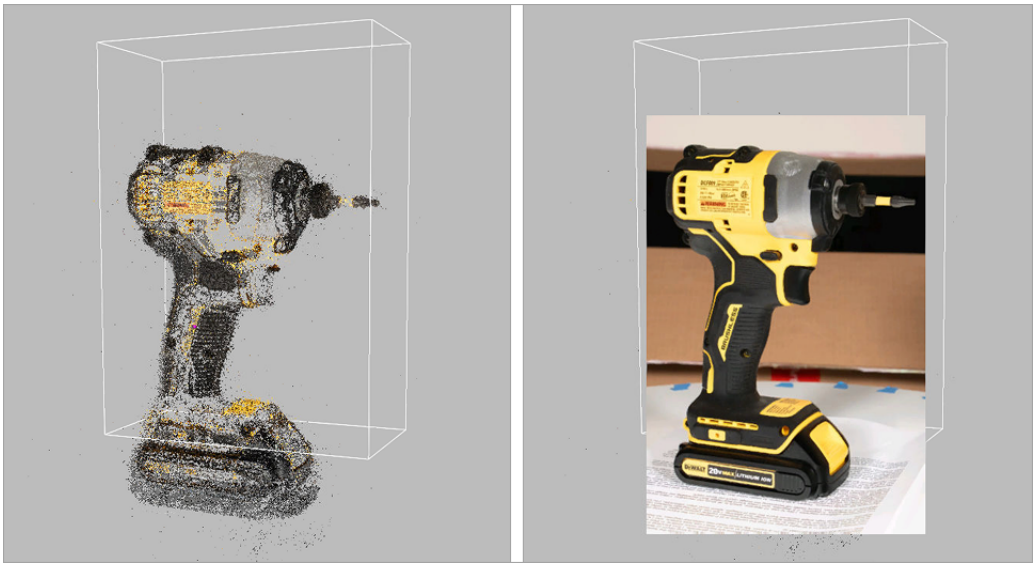


Figure 18: Photo Scan: viewing mode

4.2 Creating Model

To create model:

1. Select the previously created *Photo Scan* in the *Workspace* panel
2. If the panel is closed, open *Tools* → *AI Photogrammetry*
3. Click the gear icon of the *Create Model* algorithm to open its settings window.

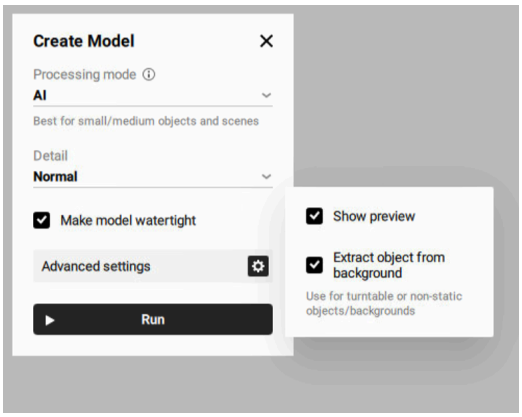


Figure 19: Create Model settings

Before creating your future model, you can adjust the following settings:

- *Processing mode* defines which algorithm (*AI* or *Classic*) will be used to create a 3D model from photos, depending on the type of object and capture method.
  - *AI*: best for small to medium-sized objects and static scenes. Suitable for both "with masks" and "without masks" modes depending on background consistency.

  - *Classic*: best for large objects and highly detailed scenes such as landscapes or drone data sets.

Refer to *Photogrammetry Overview* for more information on photogrammetry and algorithm types that Artec Studio Lite suggests.

- *Detail*: defines the level of details in the reconstructed model. In most cases, the *Normal* option would be enough. Use the *High* option if you need extra level of details or better reconstruction of thin structures of the object. The *High* option might result in more detailed but noisier reconstruction compared to the Normal option. It also takes longer to calculate.
- *Show preview* enables a real-time preview
- *Extract object from background* defines whether the object will be automatically separated from the background, resulting in a clean model. Recommended for turntable or non-static objects/backgrounds.

1. Click *Run* to launch the algorithm

Once calculation is finished, a *3D model* appears in the *Workspace* panel and in the *3D view* window.

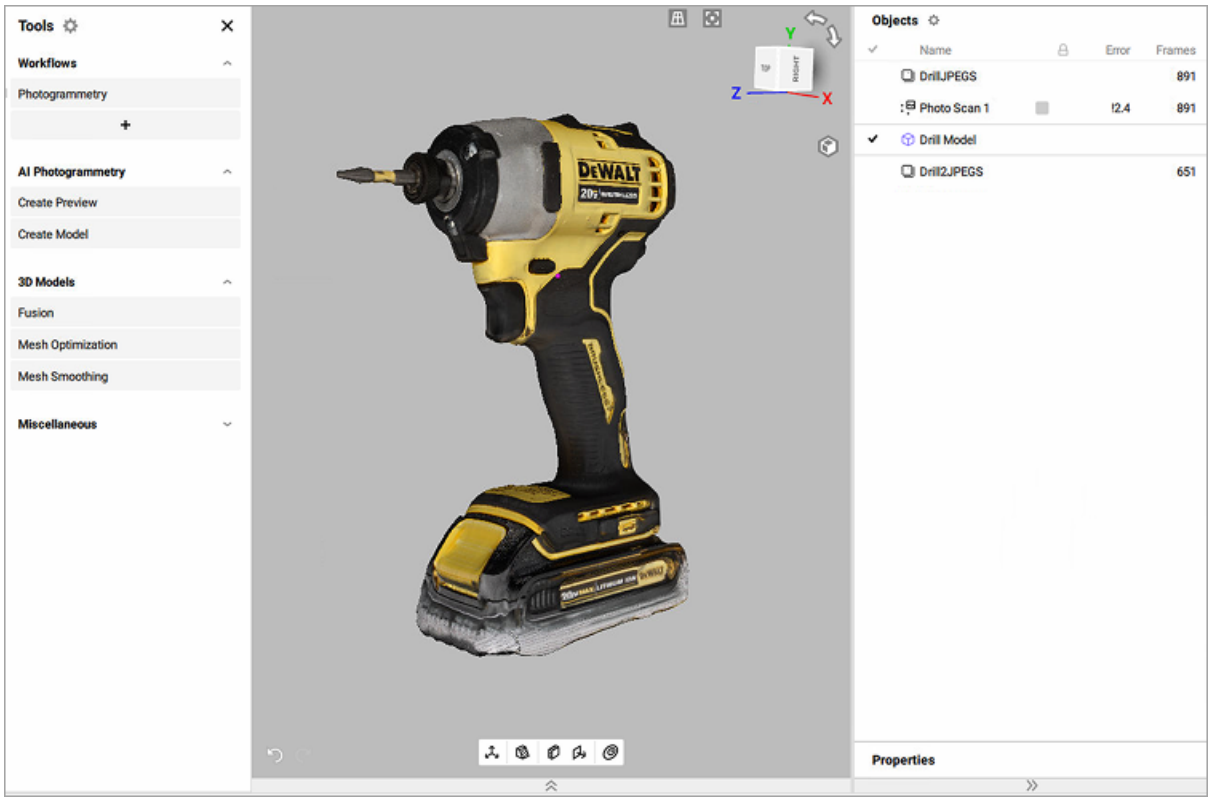


Figure 20: Created model in Artec Studio Lite

4.3 Project Masks

Artec Studio Lite allows to project object on masks. A **mask** defines which part of the photo belongs to the object you want to turn into a 3D model. It separates the object from the background. In AI Photogrammetry, masks help the algorithm focus only on the object, providing the high quality of the 3D model. The *masks projection* feature enhances the accuracy of 3D mesh reconstruction by leveraging masks created from the registered preview (*Photo scan*). This tool is particularly useful when the initial mask detection during the *Create Preview* algorithm fails or produces inaccurate results. By projecting new masks onto the created 3D model, users can exclude unwanted details, such as background elements, and regenerate a cleaner, more precise 3D model.

The typical workflow would be:

1. Run the *Create Preview* algorithm to generate a *Photo scan*. For preview settings, refer to *Creating Preview*.
2. Identify inaccurate or faulty masks detected on certain images and exclude these images from the creating model process

   To disable these masks:

   1. Double-click the created *Photo scan* in the *Workspace* panel
   2. Click a mask that you need to disable or `Shift-click` to select multiple masks
   3. Right-click on the selected masks
   4. Select the *Disable mask* option
3. Run the *Create Model* algorithm to generate a *3D model*. For model settings, refer to *Creating Model*.
4. Project masks onto the excluded images based on the *3D model*

   To project masks:

   1. Ensure that the created *3D model* and the *Photo scan* are selected in the Workspace panel
   2. Double-click the Photo scan in the *Workspace* panel
   3. Enable the previously disabled masks by selecting them and choosing the Enable mask option from the right-click context menu. For a single mask, click the crossed rectangle icon in the upper-right corner of its preview.
   4. Analyze the other masks and select the *Project masks* option from the right-click context menu
   5. Recreate the *3D model* with improved quality and accuracy by running the *Create Model* algorithm

Figure 21: Example of projection masks before and after

CHAPTER

FIVE

DATA PROCESSING

The resulting model may contain surface defects. Artec Studio Lite provides a number of tools to correct such errors:

- *Smoothing brush* enables manual smoothing of the surface areas with the most noise. For more information, refer to this section of the Artec Studio User Manual.
- *Eraser* removes unnecessary parts of the model. For more information, refer to this section of the Artec Studio User Manual.
- *Precise positioning* positions the model in the global coordinate system. For more information, refer to this section of the Artec Studio User Manual.
- *Mesh optimization* improves the quality and performance of your 3D model by combining several tools - *Small-object filter*, *Hole filling*, and *Mesh simplification*. It removes small artifacts, fills holes, and reduces polygon count while preserving accuracy and texture. For more information, refer to this section of the Artec Studio User Manual.
- *Fix holes* generates new geometry to close gaps in the model surface. For more information, refer to this section of the Artec Studio User Manual.
- *Mesh smoothing* filters low-amplitude noise over the whole model. For more information, refer to this section of the Artec Studio User Manual.

In this section, we will focus on the most essential algorithms for common workflow. For detailed information about all available algorithms and their advanced parameters, please refer to the Artec Studio User Manual.

5.1 Editing

To remove unnecessary parts of the model:

1. Open the *Editor* panel using the side toolbar.
2. Open the *Eraser* tool by clicking  or by hitting `E`.
3. Select the model in the *Workspace* panel.
4. In the *Editor* panel, choose the required selection type (e.g., *3D*)

5. Hold down `Ctrl` and use Scroll wheel to adjust the tool size. Paint with `Ctrl+LMB` to create a selection.

   To clear all selections, click *Deselect*.

Figure 22: Selected area to be erased

6. Click *Erase* to eliminate the area highlighted in red

To undo changes, click ↶ in the 3D window or hit `Ctrl+Z`. Each click of the *Erase* button generates a command history entry. To undo several operations, use the dropdown menu of button ↶ and select the lowest entry.

Note: You can also set an *Eraser* lock to one or more objects in the *Workspace* panel. The *Eraser* tool will not affect any object in the *Locked* object 🔒 status.

5.2 Positioning

5.2.1 Automatic Positioning

Before exporting the model, it is important to position it correctly in the global coordinate system. This ensures that the object is displayed accurately in external software that relies on global coordinates.

Before using the *Precise Positioning* tool, you must first create a suitable primitive. To do this, go to *Construct* → *Create* and select or create the primitive that best fits your alignment needs. For example, you can create a plane (e.g., XY plane), to which the model can then be snapped or aligned.

The *Precise Positioning* tool allows you to align the model relative to these primitives, ensuring precise placement. This is particularly useful when you want to:

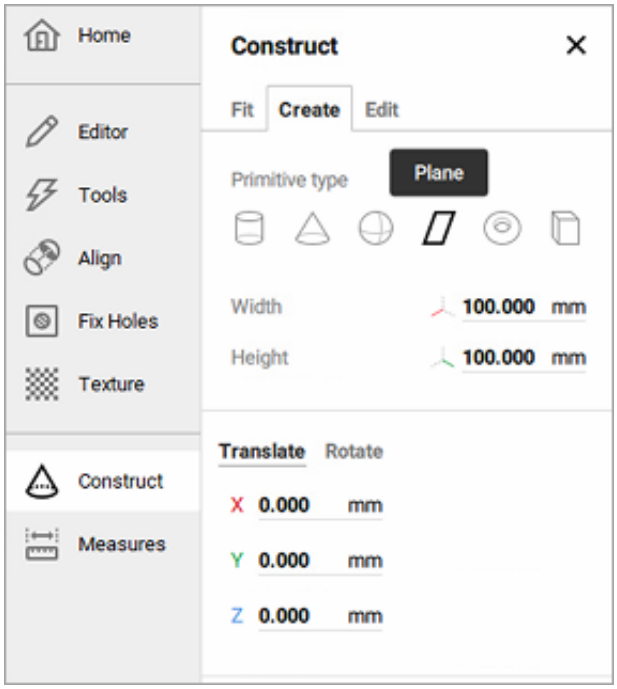


Figure 23: Create plane

- Export the model to CAD software (for example, after using the Auto Surface function to convert a mesh to a CAD-compatible format).
- Perform accurate measurements in external software.
- Ensure the correct orientation of the model for visualization or collaborative workflows.

If desired, you can skip using primitives and manually set the model's position with the *Transformation Tool* (See *Manual Positioning*), specifying its coordinates and rotation relative to the global coordinate system.

To position a model based on the created primitive (plane):

1. In the *Workspace* panel, select the model and the primitive you want to align.
2. Open *Editor* → *Precise positioning*.
3. In the *Primitives* box, select the CAD primitive you intend to position. Below the *Primitives* box you will see the available positioning options (see Table 1 for details), which appear as buttons and vary with the type of the selected primitive.
4. Click either of the self-explanatory positioning buttons. Artec Studio Lite will position the primitive in accordance with the selected option and disable this button. You will see the alignment information in the *Primitives* box next to the name of the selected primitive.

Every positioning action is recorded in the local history, so you can undo or redo it:

- To undo an action, use *Edit* → *Undo*, click in the 3D window, or Ctrl+Z.
- To redo an action, use *Edit* → *Redo*, click in the 3D window, or Ctrl+Y.

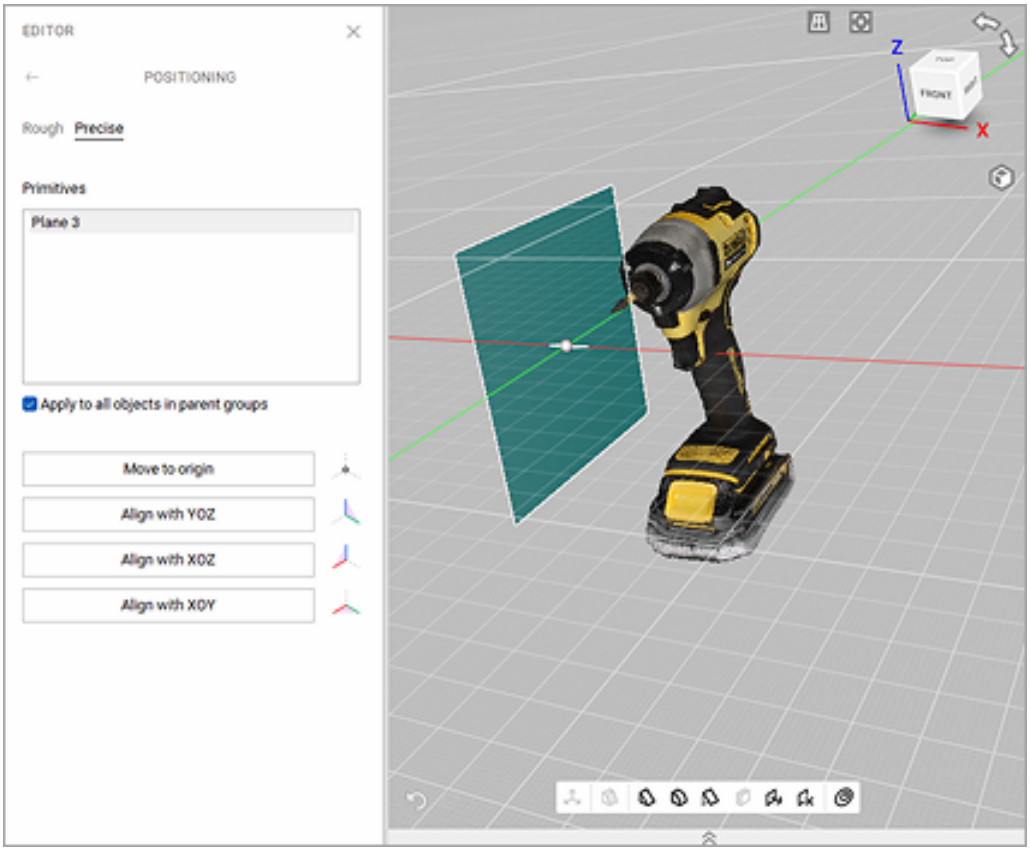


Figure 24: Editor → Precise positioning: the model and the primitive.

Table 1: Actions for primitives.

Button	Purpose	Hot Key
Move to origin	Place the selected primitive's point to the coordinate origin.	
Align with X/Y/Z	Align the primitive with the respective axis.	*X*, *Y* or *Z*
Align with YOZ/XOZ/XOY	Align the *plane* primitive with the respective coordinate plane.	*YOZ*, *XOZ* or *XOY*
Any	CAD primitive that you first align with any coordinate axis or plane is considered primary. A primary object will be given a priority when conflicting alignments occur.	*P*
Make primary	Make another object primary and remove this status from the current primary one	
Reset origin	Undo the *Move to origin* action.	
Invert direction	Invert direction of the axis or plane in the applied alignment	*I*
Reset alignment	Reset all the positioning actions applied to the primitive	

5.2.2 Manual Positioning

The *Transformation tool* allows you to move, rotate, scale and mirror objects relative to the global coordinate-system axes.

To access this tool, open the *Editor* panel and select *Transformation tool* or hit `T`. The panel will open, displaying four tabs that correspond to different modes for altering the object position in the global coordinate system. The name of the active mode appears at the bottom of the *3D View* window.

To revert your changes inside the tool, use the *Reset* button. Artec Studio Lite applies changes when you leave the tool. Use the  (*Undo*) button in the 3D window or hit `Ctrl+Z`.

Hint: To quickly move objects to the origin and align them with the camera viewport, use the *Auto-position* button.

5.2.2.1 Translate

To enter the *Translate* mode, click the *Translate* tab or hit `T`. Three input fields will appear in the *Editor* panel showing the current origin coordinates (in millimeters) of the local coordinate system. The initial position of the local coordinate system will be in the center of the global one. To translate an object, do either of the following:

- Enter the new coordinate values for the local system using the input fields in the *Editor* panel. To adjust the position only along a specific axis, first hit the corresponding `X`, `Y` or `Z` key.
- Translate the object in the *3D View* window by dragging the corresponding gizmo control
  - *Square* in the center to move it freely
  - *Arrow* to move it along a specific axis
  - *Lines between arrows* to move it along the two axes simultaneously

---

Note: Orienting the object may be easier if you first specify a new position for the origin of the local coordinate system: double-click on the desired surface point in the *3D View* window.

Figure 25: Transformation gizmo

5.2.2.2 Rotate

To enter the *Rotate* mode, click the *Rotate* tab or hit R. Three input fields containing the Euler-angle values will appear in the *Editor* panel. Initially, all values are set to zero. To rotate the object, do either of the following:

- Enter the new angle values (in degrees) using the input fields in the *Editor* panel.
- Drag one of the three gizmo circles to rotate the object. Hitting the key that corresponds the required axis (X, Y or Z) will hide the controls for the other axes.

Note: Orienting the object may be easier if you first specify a new position for the center of the local coordinate system: double-click on the desired surface point in the *3D View* window.

5.2.2.3 Scale

To enter the *Scale* mode, click the *Scale* tab or hit S. A single input field with the current scale value (1.000) will appear in the *Editor* panel. You have two options for scaling the object:

- Enter the new scale value in the field.
- Drag the origin of the gizmo control or either of its round ends in the *3D View* window.

5.3 Aligning

The *Align Tool* allows you to align any imported model with the photogrammetry result, or alternatively, align two photogrammetry models. This is useful when you want to combine data from different sources — for example, merging a photogrammetry model with a 3D scan.

A typical use case is combining a large photogrammetry model captured by drone with a detailed scan taken by a terrestrial 3D scanner. For instance, you can create a 3D model of a castle and its surrounding landscape using photos from a drone, then scan the lower part of the castle with Artec Ray II. After aligning the two datasets with the *Align* tool, you can joing them together again using *Tools* → *Fusion* to obtain a complete model.

Figure 26: The landscape model with combined data (drone footage and 3D scanning)

For more information on using the *Align* tool, please refer to the Alignment section of the Artec Studio User Manual.

5.4 Optimizing

In Artec Studio Lite, several tools, including the *Small-object filter*, *Hole filling*, and *Mesh simplification*, have been combined into a single tool called *Mesh optimization*. Using all of them at the same time is optional, but it can proide you with better output when running the algorithm.

To start working with *Mesh Optimization* tool, select only the model you are currently editing in the *Workspace* panel, open *Tools* → *Mesh Optimization*. Once you set up all parameters that you need, click the *Run* button either on the pop-up of the *Mesh Optimization* tool or next to its name on the *Tools* panel to run *Mesh Optimization* algorithm.

Adjust the number of triangles in the resulting model, displayed in the *Target quantity of triangles* field, by dragging the *Triangle quantity ratio* slider.

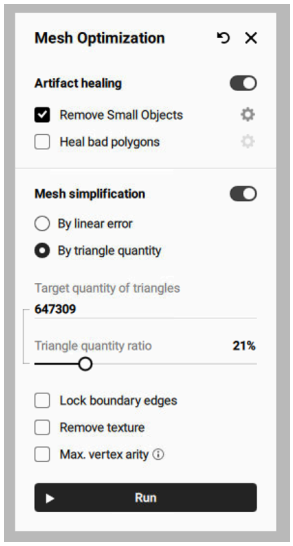


Figure 27: The *Mesh Optimization* window

5.5 Texturing

One of the must-have steps in creating your first 3D model is texturing it. To apply a texture to a model:

1. Open the *Tools* → *Texture* panel.
2. Select a model from the *Model to texture* list. Artec Studio Lite will apply the textures to this model. The model selected in the *Workspace* panel will automatically be active in this list.
3. In the *Texture source* section, the photo scans from which you created the model will be selected. Otherwise, select the necessary source data manually.
4. Select the required *Output texture size* and other options as necessary.
5. Click *Apply* to start the texturing process.

After the texturing is complete, you can adjust the texture on the model (see Figure 29).

You can adjust the following texture parameters by changing the value of the followinig sliders:

- Brightness
- Saturation
- Hue
- Contrast
- Gamma correction

The initial position of the *Hue* slider corresponds to the current texture color. Dragging it left or right corresponds to rotation counterclockwise or clockwise, respectively, on the color wheel.

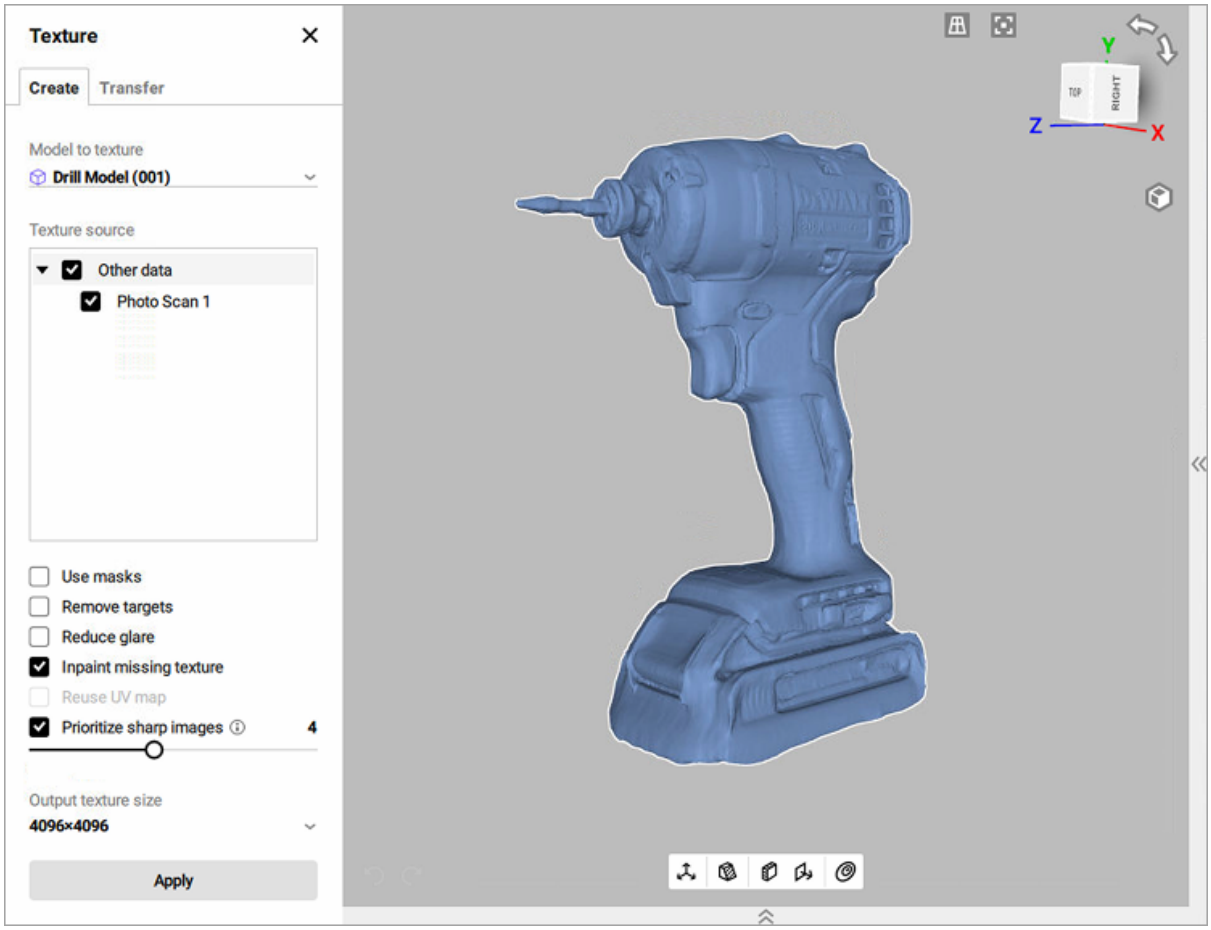


Figure 28: *Texture* panel. *Texture source* section

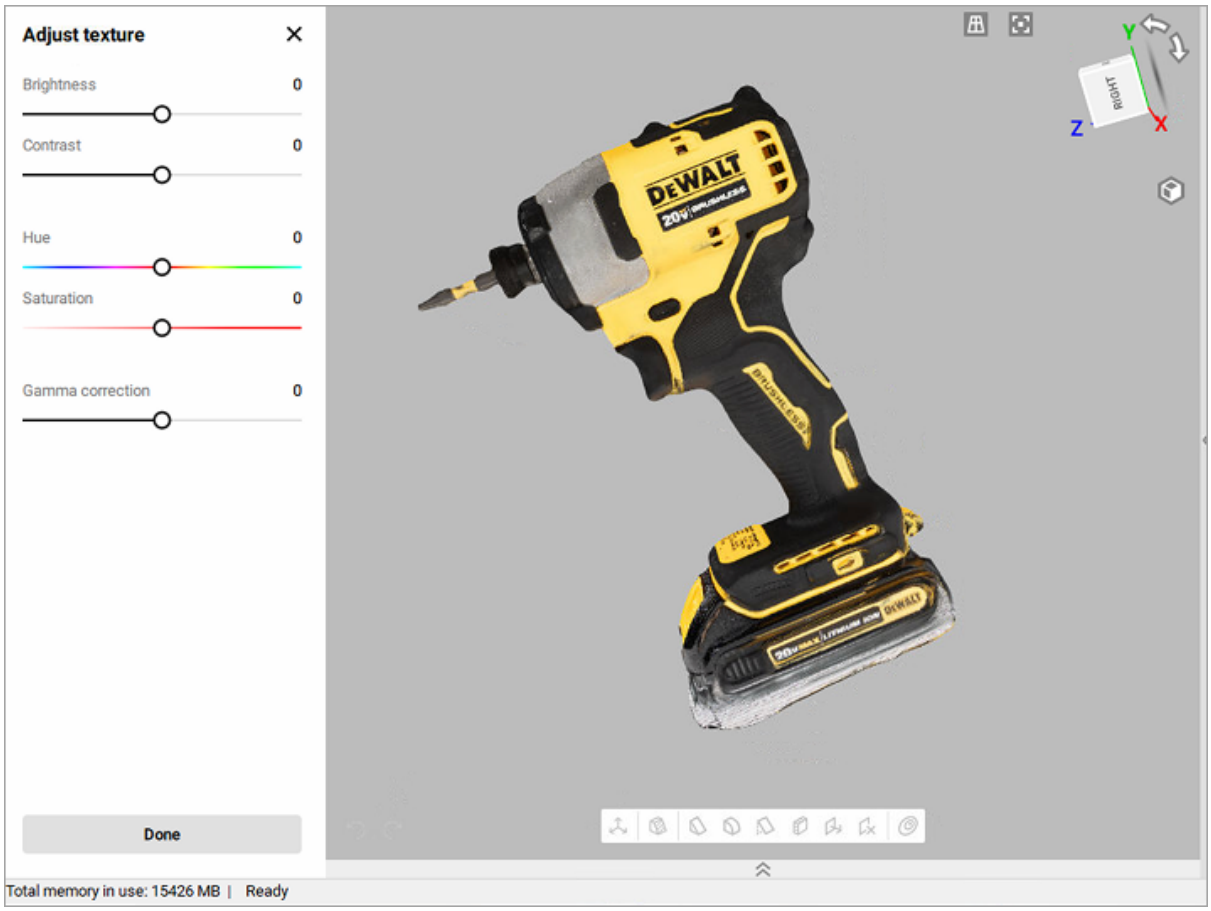


Figure 29: Texture adjustments.

After making the necessary changes, click *Done* to transfer the resulting textured model to the *Workspace* panel.

To reopen the texture-adjustment dialog, follow the steps:

1. Select a textured model in *Workspace*.
2. Use `RMB` to call the context menu.
3. Select the *Adjust texture* option from the list.

5.6 Measuring

To evaluate the reconstructed 3D model, it is possible to make measurements.

Artec Studio Lite offers a number of measurement tools, including

- Distance
  - Linear distance
  - Thickness
  - Geodesic distance
- Sections and Volume
- Distance map
- Section analysis

The corresponding buttons are located in the upper part of the *Measures* panel.

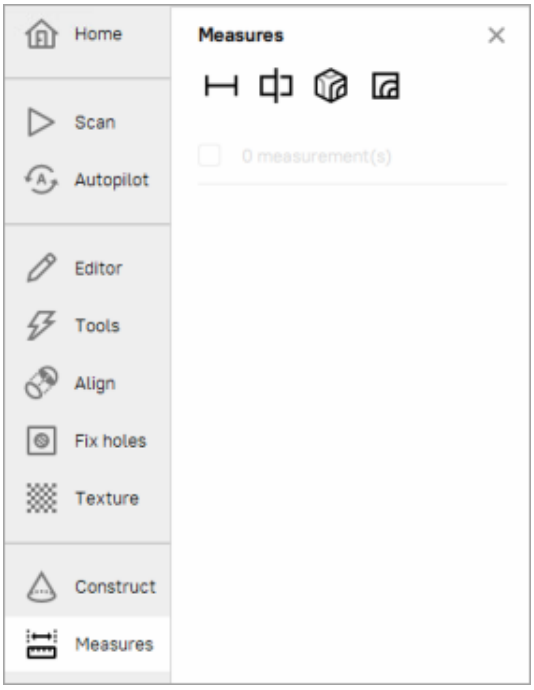


Figure 30: The *Measures* panel.

To work with these tools:

1. Mark the ✔ checkboxes of each desired scan or model to display them in the *3D View* window.
2. Select the measurement tool you need and click on the object surfaces to create measurement lines, planes, etc.

5.6.1 Linear Distance

When you select *Measures* → *Distance* (⊢), the linear measurement will be used by default. Don't mark the *Geodesic* checkbox.

The linear-measurement tool allows you to measure:

- the distances between selected points
- the thickness of a model
- the total length of a polyline determined by a sequence of points

You can enter a name for the new measurement by typing it in the *Name and color* field. Click on the color circle next to the field to choose a color of the measurement projection. The application creates new measurements with default names `Linear 1`, `Linear 2` and so on.

To measure distances between points,

- Use `LMB` to sequentially set the points on the model in the *3D View* window. The application will add these points to the current point list (in the *Measures* panel), which will also display linear dimensions and point coordinates.
- When you roll the cursor over any one of these points in the *3D View* window, the point will be highlighted; you can then drag it to another location using `LMB`. When you release the mouse button, the point will fix to its new location.

> **Note:** You can't set a point outside the object's surface; in this situation, if you release the mouse button, the point will return to its original position.

After you click *Save measurement*, the application will return to the original *Measures* panel and will display a list of all saved measurements along with editing and deletion options.

For other mesurement tools, please refer to the Artec Studio User Manual.

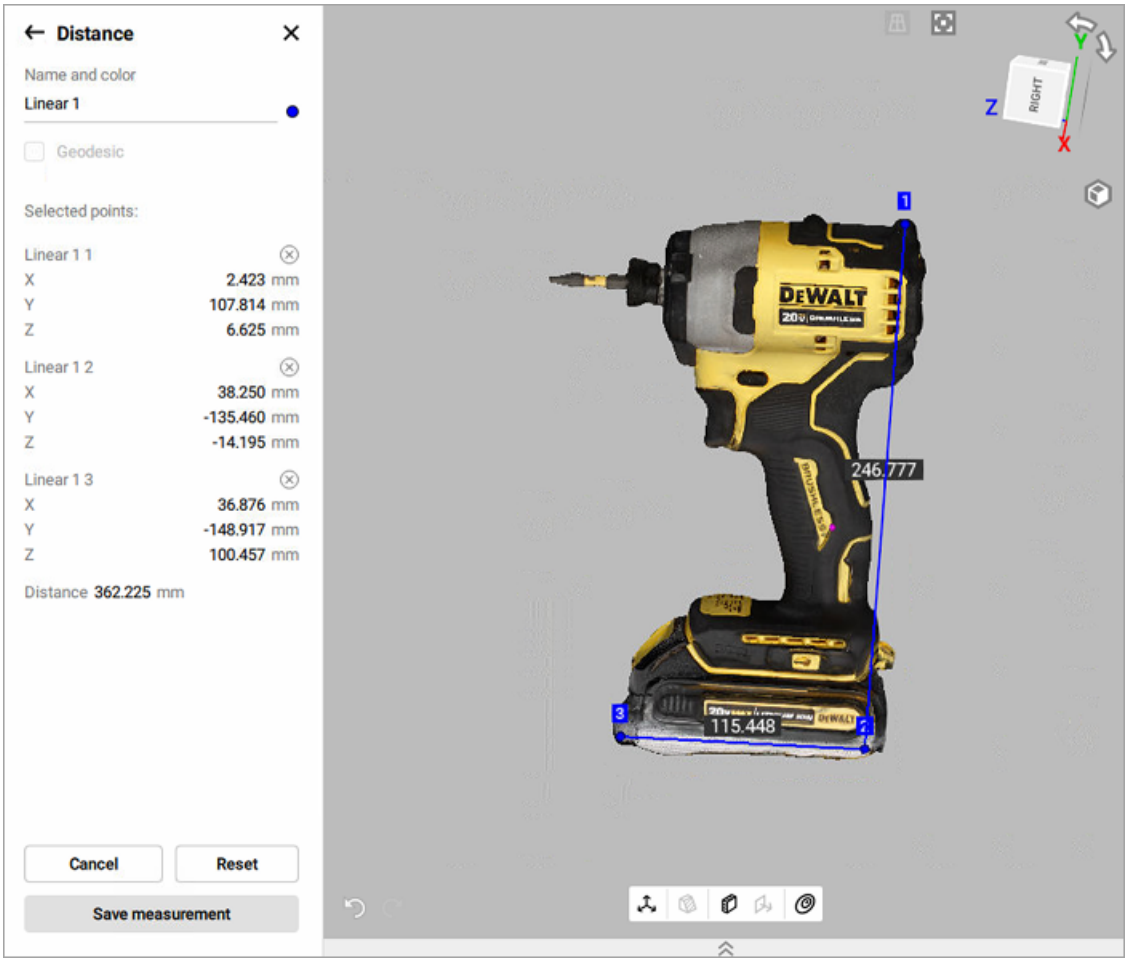


Figure 31: Linear measurement.

CHAPTER

SIX

SAVING AND SHARING

6.1 Exporting Model(s) to File

You can export a single model (mesh) or multiple models at a time. Models can be merged before export or exported separately.

To export a model:

1. Mark one or more models using ✔ or select frames in the scan by clicking on them while holding the `Ctrl` key
2. Right-click and select the *Export* → *Meshes* option, or go to the *File* → *Export* → *Meshes* command. A dialog window will appear (Figure 32)

   Tip: `Ctrl+Shift+E` hot key does the same

3. Click ... and specify the destination folder
4. Use one of the following options for file names:
   - Leave the field blank to use the names of the corresponding models from the *Workspace* panel.
   - Enter a custom export name. If you're exporting multiple meshes, this name will be used as a base. For example, if you enter 'Model', the exported files will be named *Model1*, *Model2*, and so on
5. Select the appropriate file format from the *Model export format* dropdown list (see the description of available formats below)
6. If the model has texture and the selected mesh format supports it, choose an appropriate texture export format from the corresponding dropdown list
7. To merge the models into a single mesh before exporting, select the *Merge models* checkbox. Otherwise, each model selected in the *Workspace* panel will be exported to a separate file
8. To move the models to origin before exporting, select the *Move to origin* checkbox
9. Click *OK*

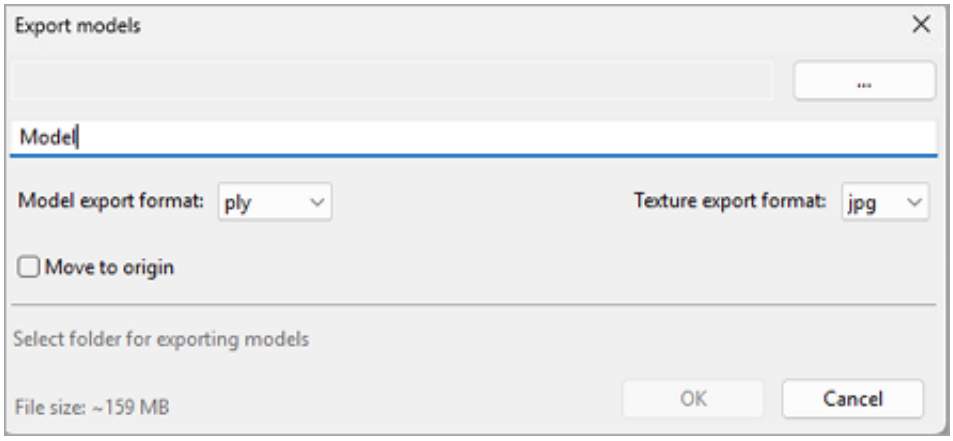


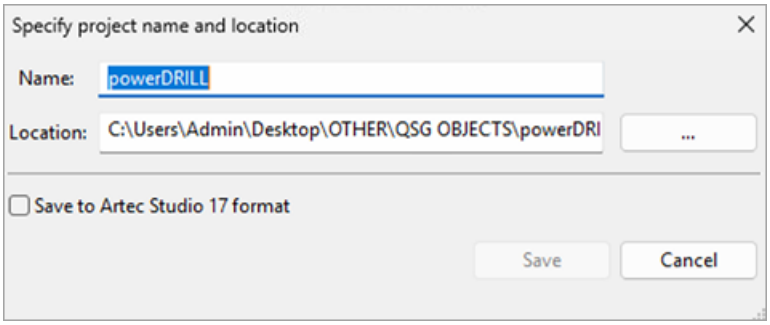
Figure 32: Dialog for exporting models

PLY	Stanford polygon file format (standard and with the support for vertex color)
STL	Stereolithography file format
VRML	VRML file (1.0 and 2.0); actual extension is *.wrl
OBJ	Wavefront OBJ file format
ASC	Point cloud 3D format
AOP	American Academy of Orthotists and Prosthetists file format
PTX	Walt Disney Ptex: mesh with per-face texture mapping
X	Direct X file format (binary or text)
Custom Text File Format	Custom Text file format
E57	ASTM E57 3D file format (with the support for vertex color)
USD	Universal Scene Description (*.usda in text and *.usdc in binary format; *.usda/usdc via usdz zipped in an archive, also in binary or text format)

Note: If you type an extension in the file name field, application will use it rather than the selected mesh file format.

6.2 Saving Project

Artec Studio Lite automatically saves projects and changes made to projects instantaneously. A newly created and yet manually unsaved project is automatically saved and stored in the default *Temporary* folder. You can manually save the project in a preferred location using the *File* → *Save project as...* menu option or access it from the temporary folder as necessary.



Note: For more information on further importing data into Artec Studio Lite or opening saved projects, please refer to the Artec Studio User Manual.

CHAPTER

SEVEN

HOT KEYS

7.1 Workspace

Select one object and deselect the rest	`Ctrl+Alt+LMB`	*Workspace* panel
Select one object and deselect the rest	`Ctrl+LMB`	*Workspace* panel, first column
Select all objects or photos	`Ctrl+A`	*Workspace* panel
Deselect all objects or photos	`Ctrl+D`	*Workspace* panel
Select/deselect the highlighted object	`Space`	*Workspace* panel
Rename object	`F2`	*Workspace* panel
Group objects	`Ctrl+G`	*Workspace* panel
Start/stop playback photos	`Ctrl+P`	*Workspace* panel → Photos list
Delete selected objects	`Del`	*Workspace* panel

7.2 Save, Export and Import

Create new project	Ctrl+N	Anywhere exc. modal dialog
Save project	Ctrl+S	Anywhere exc. modal dialog
Open existing project	Ctrl+O	Anywhere exc. modal dialog
Import 3D files	Ctrl+I	Anywhere exc. modal dialog
Import photos/videos	Ctrl+Shift+I	Anywhere exc. modal dialog
Export models	Ctrl+Shift+E	Anywhere exc. modal dialog
Clear command history	Ctrl+Alt+H	Anywhere exc. modal dialog
Save screenshot of *3D View* window	Ctrl+Shift+S	Anywhere

7.3 Viewing 3D Content

Fit to view	F	*3D View* window
Place coordinate origin to the viewpoint center (Home)	H	*3D View* window
Display/hide coordinate axis grid	G	*3D View* window
Set rotation center to the origin of axis grid	Ctrl+Shift+C	*3D View* window
Set rotation center to the object's center of mass	Ctrl+Shift+M	*3D View* window
Change rendering mode to *Texture*	Ctrl+Alt+1	*3D View* window
Change rendering mode to *Scan color*	Ctrl+Alt+2	*3D View* window
Change rendering mode to *Frame color*	Ctrl+Alt+3	*3D View* window
Change rendering mode to *Max error*	Ctrl+Alt+4	*3D View* window
Change rendering mode to *X-Ray*	Ctrl+Alt+5	*3D View* window
Turn on/off lighting	L	*3D View* window
Toggle between perspective and orthogonal views	5 (numpad) or Ctrl+5	*3D View* window

7.3.1 Switching Viewpoint

To front	1 (numpad) or Ctrl+Shift+1	*3D View* window
To back	Ctrl+1	*3D View* window
To left	Ctrl+3	*3D View* window
To right	3 (numpad) or Ctrl+Shift+3	*3D View* window
To top	7 (numpad) or Ctrl+Shift+7	*3D View* window
To bottom	Ctrl+7	*3D View* window

7.4 Editor

Activate *2D selection* mode	Shift+Alt+1	*Editor* → *Eraser*
Activate *3D selection* mode	Shift+Alt+2	*Editor* → *Eraser*
Activate *Rectangular selection* mode	Shift+Alt+3	*Editor* → *Eraser*
Activate *Lasso selection* mode	Shift+Alt+4	*Editor* → *Eraser*
Activate *Cutoff-plane selection* mode	Shift+Alt+5	*Editor* → *Eraser*
Activate *Base selection* mode	Shift+Alt+6	*Editor* → *Eraser*
Display control for adjusting cutoff plane	Alt	*Eraser/Defeature brush* → *Cutoff-plane selection*
Move cutoff plane	Ctrl+Shift+Scroll	*Eraser/Defeature brush* → *Cutoff-plane selection*
Change tool size	Ctrl+[and Ctrl+] or Scroll Wheel	*Editor* panel → any tool
Select the entire surface below the cutoff plane	Ctrl+Q	*Eraser/Defeature brush* → *Cutoff-plane selection*
Clear selection of 3D regions	Ctrl+Alt+LMB	*Editor*
Invert selection	I	*Editor* panel → any tool → *3D View*
Delete selected region	Delete	*Editor* → *Eraser*

7.5 Aligning Scans

Display aligned models	1	*Align* panel
Display unaligned models	2	*Align* panel
Display all objects selected for alignment	3	*Align* panel
Manually align objects	Shift	*Align* panel
Switch between point sets/pairs	Space and Backspace	*Align* panel → points
Confirm creation of point set	Space	*Align* panel → *Complex*

7.6 Starting Tools, Modes and Dialogs

Open the *Tools* panel	Ctrl+T	Anywhere exc. modal dialog
Open the *Align* panel	Ctrl+L	Anywhere exc. modal dialog
Open the *Fix holes* panel	Ctrl+B	Anywhere exc. modal dialog
Open the *Measures* panel	Ctrl+M	Anywhere exc. modal dialog
Open the *Texture* panel	Ctrl+U	Anywhere exc. modal dialog
Open the *Editor* panel	Ctrl+E	Anywhere exc. modal dialog
Start *Eraser* tool	E	*Editor* panel
Start *Defeature brush*	D	*Editor* panel
Start *Positioning* tool	P	*Editor* panel
Start *Transformation* tool	T	*Editor* panel
Start *Smoothing brush*	S	*Editor* panel
Open web manual	F1	Anywhere
Open local User Guide file	Ctrl+F1	Anywhere
Call *Settings* dialog	F10	Anywhere exc. modal dialog
Show/hide the *Workspace* panel	F11	Anywhere exc. modal dialog
Show/hide *Log* window	Ctrl+Alt+L	Anywhere exc. modal dialog

CHAPTER

EIGHT

CONVENTIONS AND ACRONYMS

Parts of this user guide are highlighted to draw your attention. For example:

Note: Important information appears in specially formated paragraphs.

The following examples illustrate our conventions:

- Panel and element names that appear in the application window use italics: e.g., *Workspace*, *File* and *Texture*.
- Buttons, checkboxes, and elements of dropdown lists in panels and application menus are italicized and underscored: e.g., *Invert*, *Apply*.
- Shortcuts, individual keys, and hardware buttons are formatted as keyboard input: e.g., `Ctrl+A`.
- Characters that appear in a field, file extension, or directory or file path use the following style: e.g., `A3D`, `C:\Program Files`.