

3D PDF Pro

Version 2.1

Help Manual

This guide serves as a user manual for the 3D PDF Pro – Adobe® Acrobat® Plugin

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End User Help Guide

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Table of Contents

3D PDF Pro

1. Getting Started	4
1.1 Overview - 3D PDF Pro	4
1.2 Accessing the 3D PDF Pro tools	5
3D PDF Pro Menu Items	6
1.3 Preferences	6
1.4 Quick Access Support	9
2. 3D PDF Animate	12
2.1 Using 3D PDF Animate	12
2.2 Accessing the 3D PDF Animate tools	12
2.3 Selecting a 3D Model	13
2.4 Start 3D PDF Animation	14
2.5 3D PDF Animate User Interface	15
2.6 Creating an Animation	30
2.7 Editing Existing Animation	39
2.8 Import/Export Animation	39
2.9 Save Animation to PDF	40
2.10 Add Play Controls in PDF	40
3. 3D PDF Publish	44
3.1 Using 3D PDF Publish	44
3.2 Accessing 3D PDF Publish tools	44
3.3 Selecting a 3D Model	45
3.4 Start 3D PDF Publish	46
3.5 3D PDF Publish User Interface	47
3.6 Configuring 3D Object Settings	55
3.7 Add Description Fields in PDF	57
3.8 Add X-Ray Buttons to PDF	59
4. 3D PDF Compare	62
4.1 Using 3D PDF Compare	62
4.2 Accessing the 3D PDF Compare tools	64

Table of Contents

4.3	Selecting a 3D Model	65
4.4	Start 3D PDF Compare tools	68
4.5	Best Practices	76
5.	Licensing	78
6.	Additional Support	80

1. Getting Started

1.1 Overview - 3D PDF Pro

The 3D PDF Pro Plugin for Adobe® Acrobat® is designed from the experience of several years of 3D PDF projects and instruction advancing business documentations and technical publications.

There are other tools/plugin-ins offering a vast number of functionalities for various cases. However, the problem with these tools is that they are either not specialized enough or are too complex to use for most people.

For these reasons the 3D PDF Pro was developed. 3D PDF Pro comes with three sets of tools.

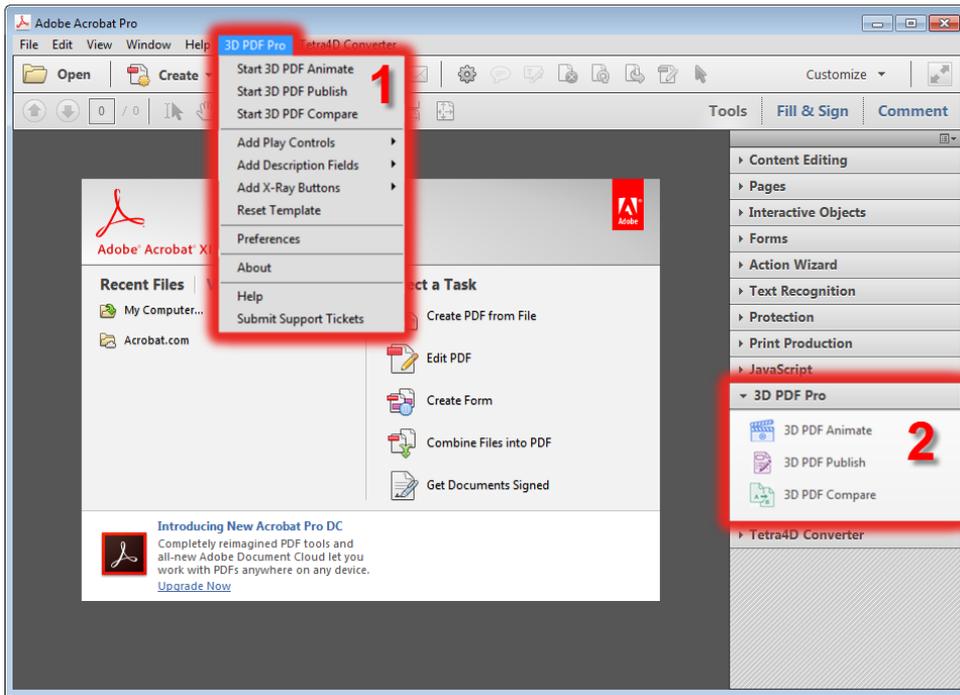
- **3D PDF Animate** is multipurpose easy-to-use animation authoring tool helping tech writers and engineers alike enhance their technical publications with 3D visualization.
- **3D PDF Publish** offers the capability to add descriptive information to the animation steps in different languages, allowing users to create a complete engineering documentation on a single 3D PDF page. Additionally, the author can add part attributes which can be viewed selectively for specific animated parts or by selecting individual parts. Also, with 3D PDF Publish the author can define special navigation settings for the 3D object in the PDF that cannot usually be defined in Acrobat®.
- **3D PDF Compare** enables the author to replace the 3D model within the existing 3D PDF document with little to no repairs, including models with animation already defined. In other words, if a project has already been created the author will not need to start from scratch. This tool checks and lists which parts have been updated, as well as which parts were removed.

Getting Started

1.2 Accessing the 3D PDF Pro tools

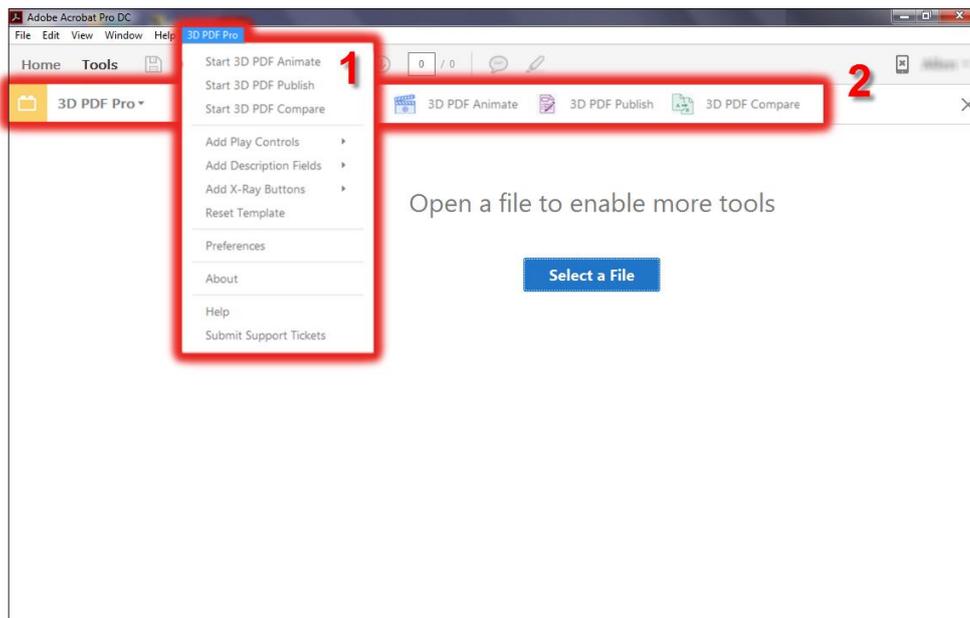
After the installation of 3D PDF Pro, the plugin will be found within the Adobe® Acrobat® application. The 3D PDF Pro menu is available in the Acrobat menu bar and a 3D PDF Pro men is found under the Tools Panel.

Acrobat XI Pro:



1) 3D PDF Pro Drop-down Menu 2) 3D PDF Pro Toolbar Menu

Acrobat DC:



1) 3D PDF Pro Drop-down Menu 2) 3D PDF Pro Toolbar Menu

3D PDF Pro Menu Items

Start 3D PDF Animate accesses the 3D PDF Animate Editor. See section [2.2 Accessing the 3D PDF Animate tools for more information](#).

Start 3D PDF Publish accesses the 3D PDF Publish Editor. See section [3.2 Accessing 3D PDF Publish tools for more information](#).

Start 3D PDF Compare accesses the 3D PDF Compare Tool. See section [4.2 Accessing the 3D PDF Compare tools for more information](#).

Add Play Controls adds predefined play control buttons to the PDF template. See section [2.10 Add Play Controls in PDF for more information](#).

Add Description Fields adds predefined text fields to the PDF template, which are linked to the steps defined in the 3D PDF Publish editor. See section [3.7 Add Description Fields in PDF for more information](#).

Add X-Ray Buttons adds predefined X-Ray buttons to the PDF template. See section [3.8 Add X-Ray Buttons to PDF for more information](#).

Reset Template clears any text fields relating to the 3D PDF Pro plug-in within the PDF document.

1.3 Preferences

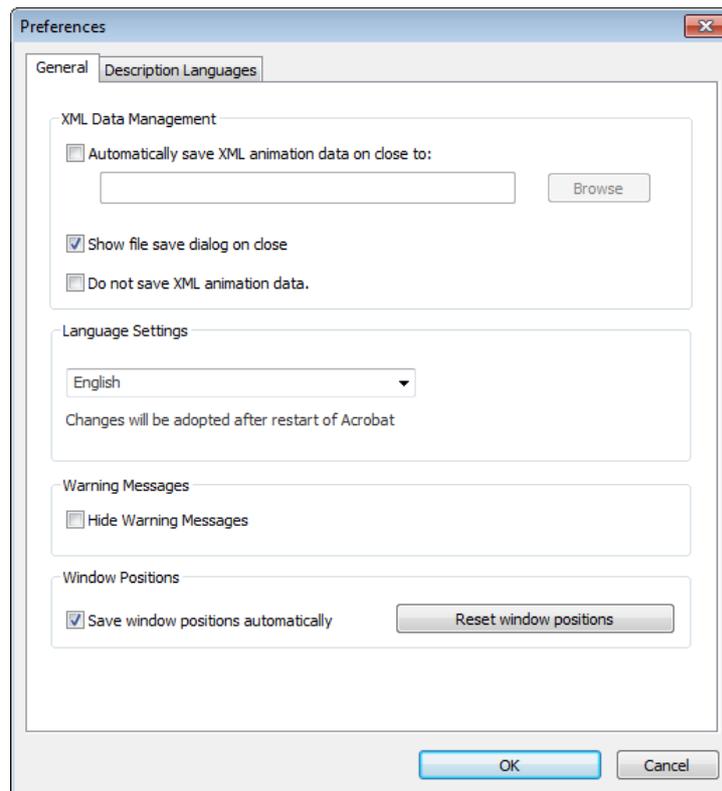
To access the 3D PDF Pro preferences menu, click on the **Preferences** entry in the **3D PDF Pro** drop-down menu from the Acrobat® menu bar. The following tab will be found:

General Tab

XML data management

Here, the option to automatically or manually save the animation/description XML data can be set. (This is also where the location to save XML files can be set.)

Getting Started



During creation of the animation and editing of the descriptions, all of the generated data is stored as XML data inside the PDF document. More specifically, 3D PDF Pro stores the generated XML data within the backbone of the PDF document by embedding it in the container used to position the 3D model on the page of the PDF document. (Note: prior to Acrobat version 9, this container was called a 3D Annotation; in versions 9 and later the 3D Annotation was deprecated in favor of the Rich Media Annotation which can also be used to place video content on a PDF document.)

Additionally there is the possibility to automatically store the XML as a separate file for backup reasons, or for using in other PDFs which include the same 3D data. In the upper area of the **General** tab in the preferences dialog it can be set to automatically store this XML file, as well as the file location.

Automatically save XML animation data on close to:

If this option is activated, browse for a folder where the data should be stored every time an animation is saved to the PDF.

Show file dialog on close:

If this option is activated, each time an animation is saved to the PDF a file save dialog box will open giving the option for the XML file to be saved.

Do not save XML animation data:

If this option is activated, the XML animation data will only be stored in the PDF. This gives no option to additionally save the XML file as a separate file. If the XML animation data is needed as a separate file when this option is activated, it will need to be done manually via the file export functionality within 3D PDF Animate.

Language settings

The default language for all 3D PDF Animate menu items and functionality may be changed to any of the languages listed in the Drop-Down menu. Once you change the Language settings, select **Save and close** then you must restart Adobe® Acrobat® in order for the changes to take effect.

Warning Messages

While creating animation there are a few messages of caution which will appear often depending how the user jumps around to different Steps and Groups and makes modifications to the existing animation. As these windows can become interrupting to the user, this option eliminates the amount of messages that will appear while using the editor. To show the messages again just uncheck the **Hide Warning Messages** option.

Window Positions

Each time a user accesses 3D PDF Animate three floating windows will appear; the Model Tree, Timeline, and 3D PDF Animate editor windows. By default, these three window will appear on screen overlapping the Adobe window. This causes the windows to often overlap, or cover, the 3D area making it difficult for users to work with the 3D data. The user will need to adjust the floating windows so they are positioned properly for the users comfort.

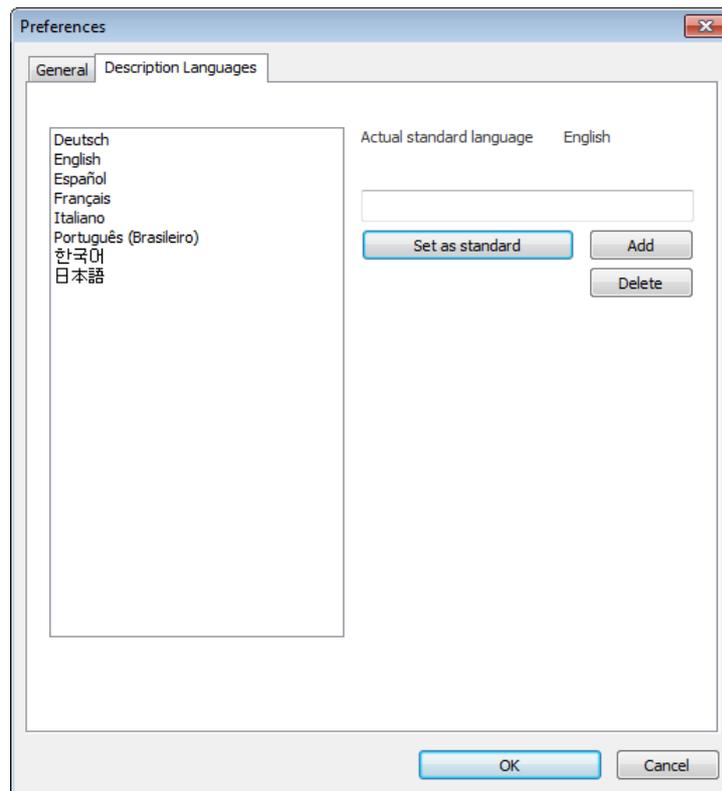
This option allows users to save where the 3D PDF Animate windows will appear every time the editor is accessed. By enabling the **Save window positions automatically** will keep the windows locked into position so users do not have to move the floating windows around each time the editor is accessed.

Any time the windows are not visible just select the **Reset window positions** button to return the windows back to the original location. Switching the monitor display will sometimes cause the windows to disappear because the window may have been positioned on a secondary monitor.

Description Languages Tab

Here, languages can be added to the step description language list.

The description languages do not correspond in any way to the language the UI (User Interface) is shown in. This language list defines the possible selectable languages in which the step descriptions for the animation can be typed or imported.



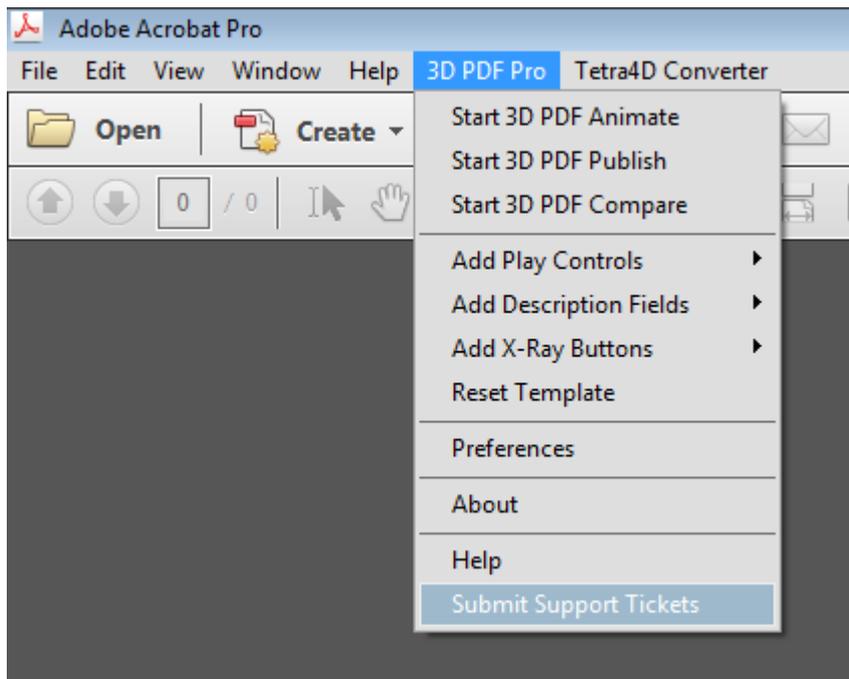
This list may be changed as necessary. Simply type the name of the language (choose the correct name, because this name will also be shown in the language selection field in the PDF) in the text field at the right and click **Add**. (Keep in mind, that only languages which are in this list can be used for step descriptions.)

When an entry in the list is selected, it can also be deleted by selecting **Delete** on the far right, or **Set as standard**, which means that this will be the standard language, in which the descriptions are initially entered. For more detail, see the chapter "Step descriptions and part attributes" in the 3D PDF Publish description.

1.4 Quick Access Support

To access your customer account or to get more information online about the latest features of 3D PDF Pro along with some other tools, please go to www.3dpdf.com/en/client-solution.html. For direct access to your customer portal or additional help 3D PDF Pro has quick access tools under the 3D PDF Pro drop-down menu located at the top menu bar of Adobe® Acrobat®.

Getting Started



Help

Under the 3D PDF Pro menu, is a Help option that will direct you to the <http://www.3dpdf.com/en/client-solution.html> support page. Here you can request some help from PROSTEP directly and learn more about the Adobe® Acrobat® 3D PDF Plugins.

Submit Support Tickets

Clicking on **Submit Support Tickets** will compose a new email to hotline@prostep.com.

If you have any questions, feedback, or having trouble with with software you may contact PROSTEP's Support team by submitting your request [here](#) further assistance.

3D PDF Animate

2. 3D PDF Animate

2.1 Using 3D PDF Animate

Why use 3D PDF Animate?

With 3D PDF Animate the user has the ability to easily animate repurposed 3D-CAD data, which is already integrated into the PDF.

3D PDF Animate provides users with a set of intuitive animation tools for creating dynamic 3D PDF documents advancing company documentation for multiple purposes. This 3D enrichment tool allows any Adobe® Acrobat® user to transform ambiguous procedural instructions into a single 3D PDF document with precise step-by-step 3D animation.

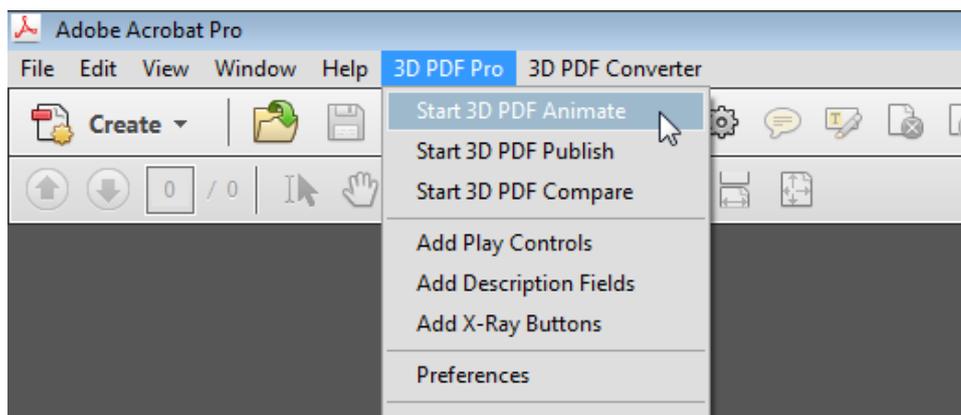
In addition to the animation, step descriptions can be included in the animation with the functions available within the 3D PDF Publish tool. See [3.1 Using 3D PDF Publish](#) for more information.

If the 3D-CAD data needs to be modified, and it would be more effective to not completely start the animation over again, 3D PDF Compare will enable end users to replace the 3D model within the existing PDF document. See [4.1 Using 3D PDF Compare](#) for more information.

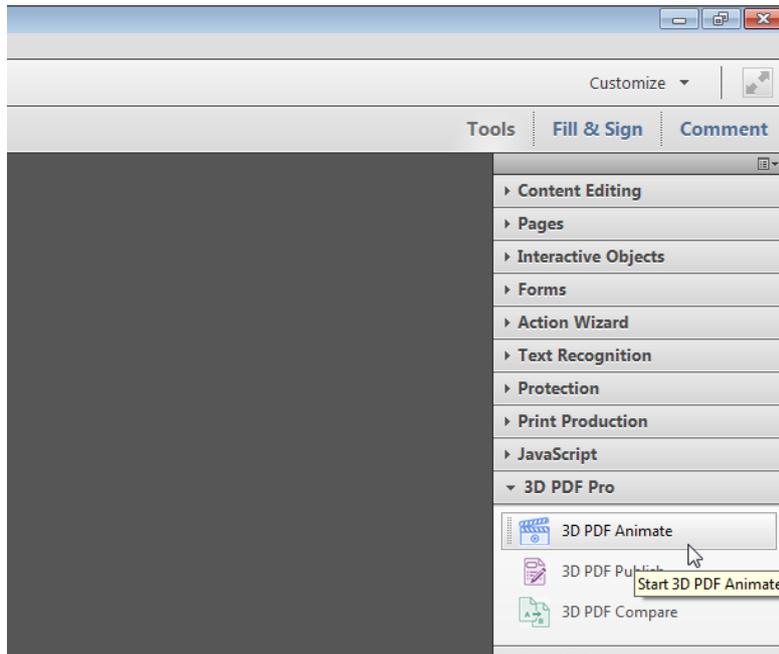
2.2 Accessing the 3D PDF Animate tools

Once 3D PDF Pro has been installed, 3D PDF Animate will be found under the 3D PDF Pro menu items within Adobe® Acrobat®.

Access the 3D PDF Animate editor via the 3D PDF Pro Drop-Down menu available in the Acrobat® main menu bar.

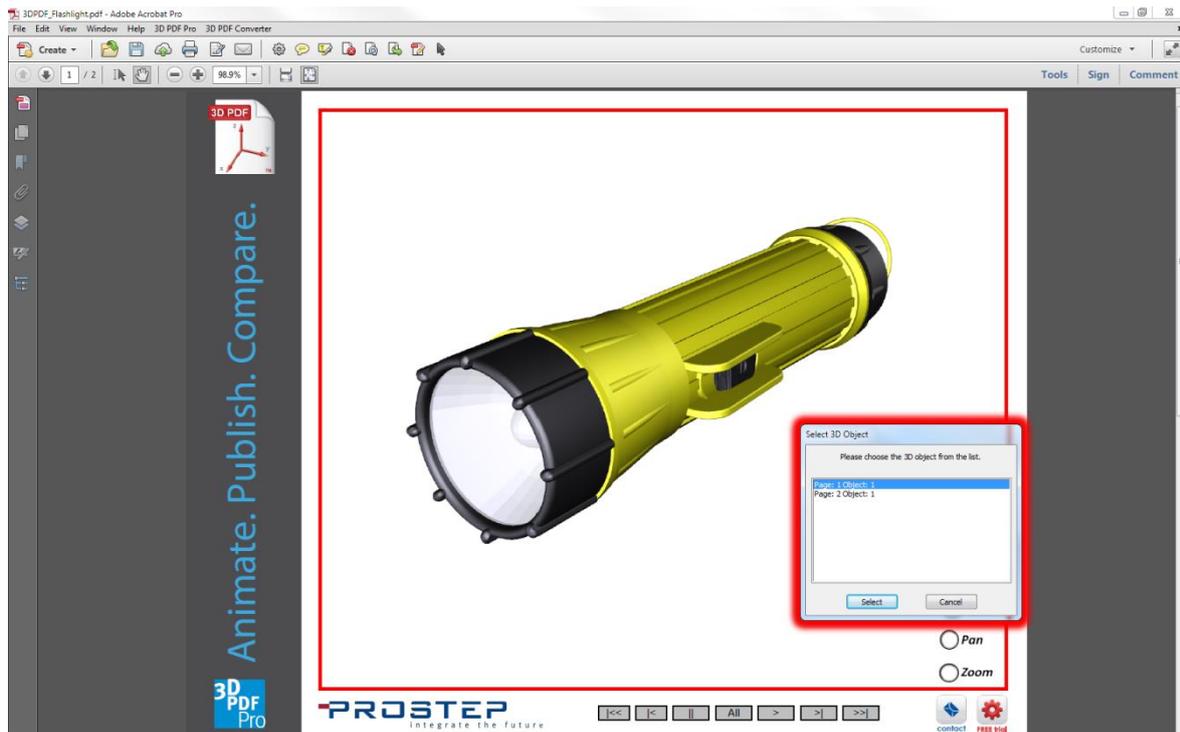


The 3D PDF Animate editor is also available via the Tools Panel found on the right-hand side of Adobe® Acrobat® Pro.



2.3 Selecting a 3D Model

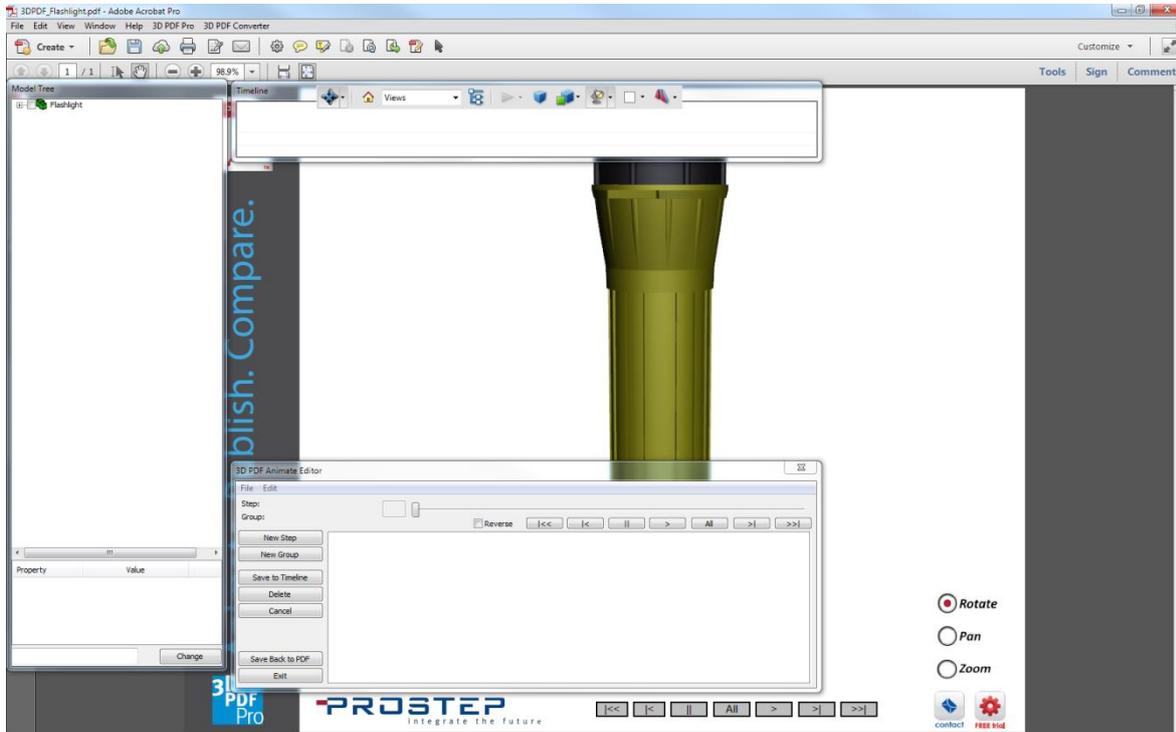
If the document has multiple 3D metadata objects the following dialog will appear to select which 3D object to work with. From this dialog identify which 3D object in the PDF to edit by highlighting one of the options on the list; e.g.: **“Page:1 Object: 1”**. When an option in the list is selected, the PDF will jump to the page which contains the selected 3D object and highlight the 3D Object showing a red outline box around the 3D area.



3D PDF Animate

If 3D PDF Pro needs to be licensed, please go to the [Licensing](#) section for further instructions.

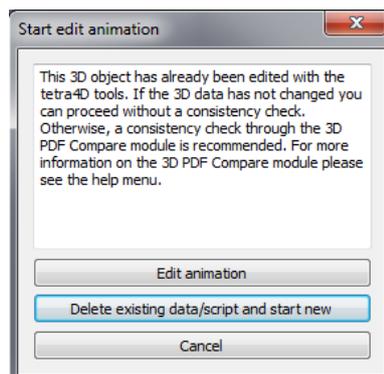
Once 3D PDF Animate has been started, the following dialogs will appear. See [2.5 3D PDF Animate User Interface](#) for more detail.



- Model Tree
- Timeline
- 3D PDF Animate Editor

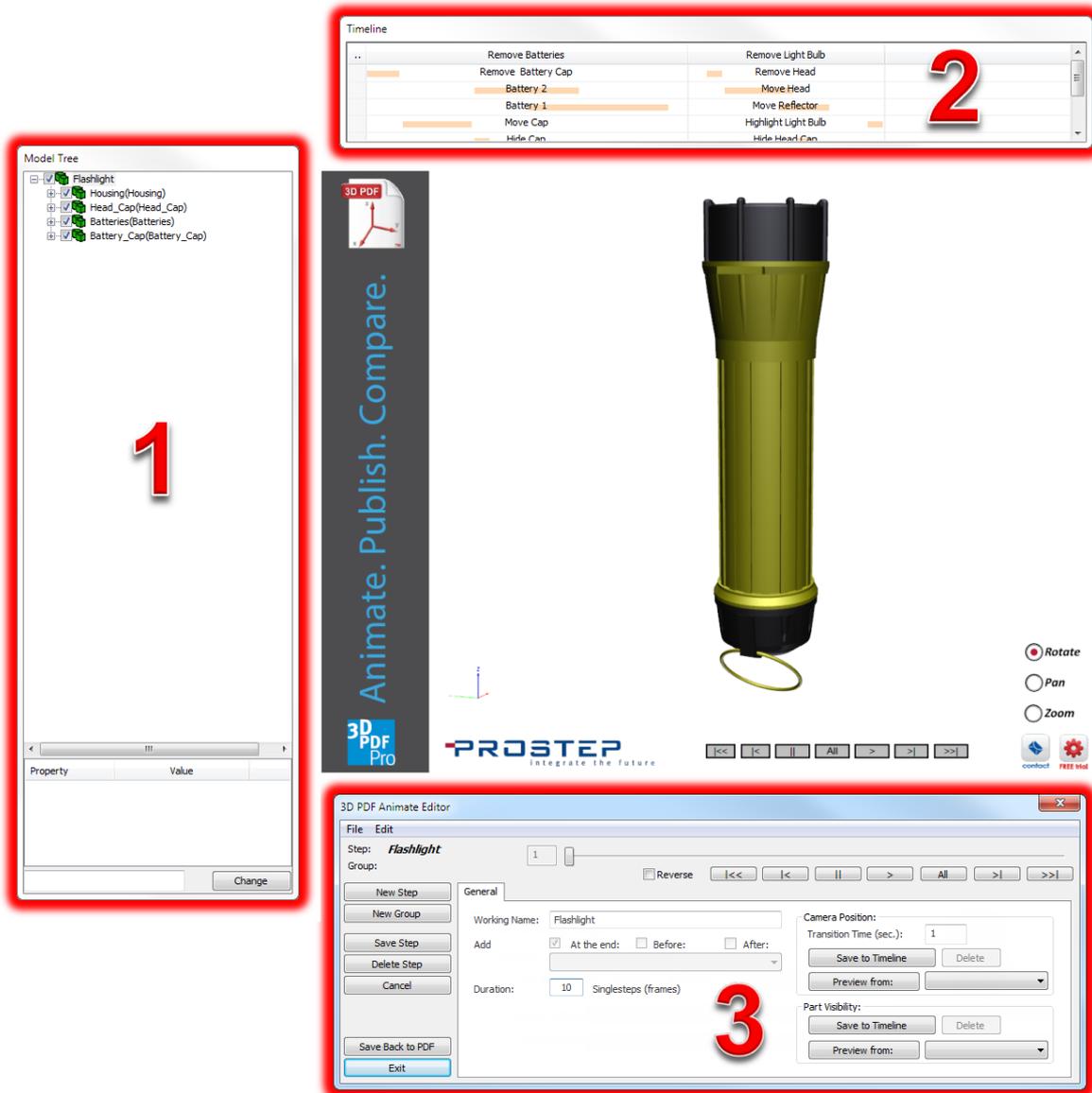
2.4 Start 3D PDF Animation

After selecting the 3D object in the PDF the dialog box shown below may appear. If there is already existing XML data belonging to the 3D PDF Pro tools embedded in the 3D object the **Edit animation** and **Delete existing data/script and start new** options will be available. If there is no data/script behind the 3D data, the system will automatically start the 3D PDF Animate user interface.



2.5 3D PDF Animate User Interface

The user interface of 3D PDF Animate is divided into three separate windows.



- 1) Model tree
- 2) Timeline
- 3) 3D PDF Animate Editor

Model Tree

The model tree is sometimes displayed differently from the one in Adobe® Acrobat®. The reason for this is explained below, which is then followed by the explanation of the functionalities.

The model tree in many CAD systems looks like this:

- Assembly
 - Subassembly 1
 - part 1
 - part 2
 - part 3

 - Subassembly 2
 - part 4
 - part 5
 - ...

Starting with Acrobat® 3D Version 8.1, Adobe® integrated the PRC 3D format into PDF which enables the import of PMI (Product Manufacturing Information) data, resulting in the addition of an additional hierarchy step. If 3D data is now imported and stored in the PRC format in Adobe® Acrobat®, the part will be displayed as a subassembly which contains the geometry (named "node") and if there is PMI it will be attached to the part. When importing CAD data designed using a surface modeler, rather than a solid modeler, all single surfaces from the part will occasionally be shown as a unique geometry node under the part. In that case, the tree for only one part with 3 surfaces might look like this then:

- Component 1
 - node
 - node
 - node
 - (PMI)

It was realized that this structure causes issues and it was decided to show only the part and, if present, the PMI, in the 3D PDF Animate Model Tree. The 3D PDF Animate model tree will therefore show all the surfaces belonging to one part gathered in the part, and not shown as different objects.

Caution! Due to the simplification functionality for data created with surface modelers, no parts within a model should be named "Mesh" or "Node".

Another difference of this updated model tree is that all parts get a unique identifier after their name, divided by a point. If the name shown in Acrobat® is:

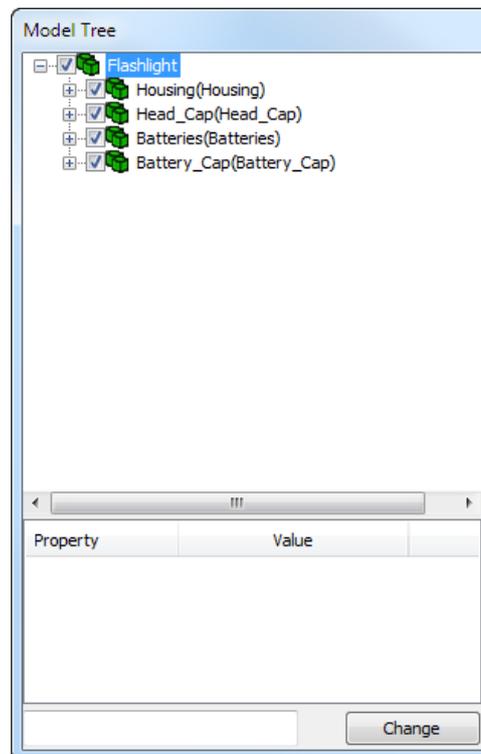
" part1"

The original name, which is stored in the PRC data, might be something like:

"part1.add3467f992376a98798723fd2635a34628976de1..."

This is also the name that will appear in the 3D PDF Animate model tree.

Functionalities of the model tree:



Selecting or Assigning Parts:

The icons in the tree show whether the object is an assembly or a part, and if it's selected (red) or not (green).

Not selected:

-  part
-  assembly

Selected:

-  part
-  assembly

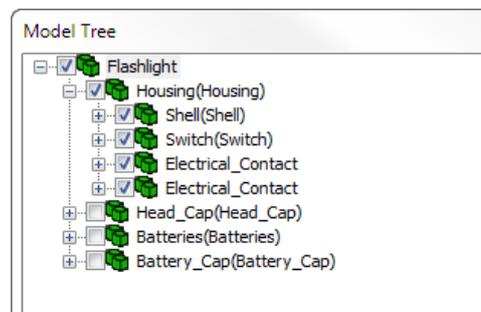
To select a part, it can either be clicked on in the model tree or in the 3D model (i.e, by clicking on the model in the PDF page displayed in Acrobat). If a part or assembly is clicked a second time it will become unselected. To select more than one part, there is no need to use the "Ctrl"-key on the keyboard; simply continue clicking the additional parts.

If an assembly is selected which already had parts inside of it selected, the parts inside will become unselected, and the assembly will stay selected. The reasoning behind this is that if a move or rotation is added on the selected objects in the animation, the assembly will be moved or rotated by the selected value, and will include the parts inside of the assembly.

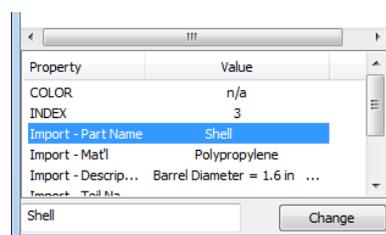
If a new animation step or group is created, parts previously selected will become unselected automatically. If a group is selected to be edited after creation, the parts and assemblies which were translated in this group will be automatically selected.

Part Visibility (Enabling / Disabling parts):

The visibility of parts and assemblies is controlled by the check box in front of every object in the tree. The same concepts and functionality that come with selecting parts are applicable to hiding and showing parts. Hiding or showing an assembly also changes the check boxes in the model tree and the visibility of the parts inside of the assembly.

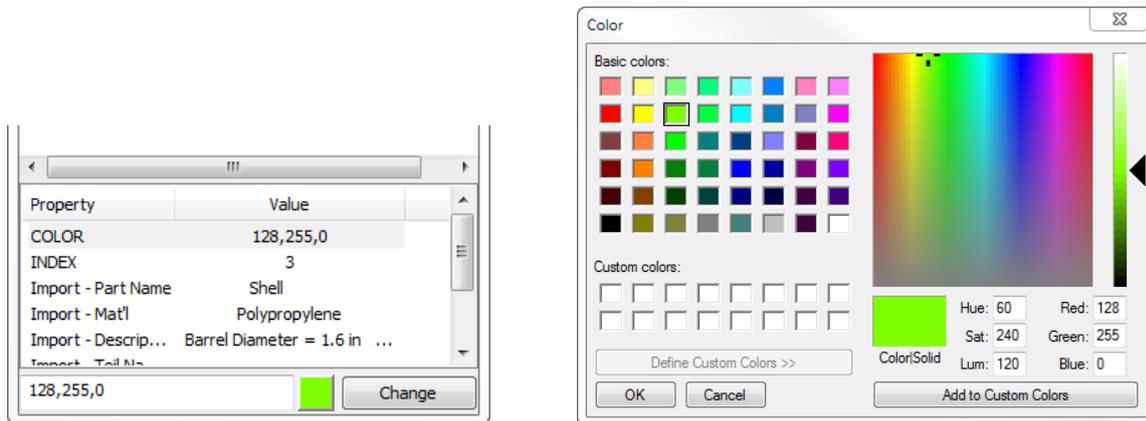
**Part Attributes:**

In the lower area of the Model Tree the attributes of the selected part or assembly are shown. This area enables users to make a change to any of the attributes related to that part.



Part Color Change:

When a 3D object is selected the user may change the color of that part or assembly. Please note changing colors of parts will only be compatible with Adobe 11 or later.



Timeline

The structure of the animation is displayed in the timeline. Every column contains one animation step and the animation groups which belong to this step. The definition of animation steps and groups is explained in the chapter "Creating an animation" .

Timeline						
Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	
Group 1	Group 3	Group 5	Group 6	Group 9	Group 10	
Group 2	Group 4	Group 8	Group 7	Group 11		

The length of an animation step has a direct relation to the width of the column in the timeline. For groups the length, as well as the start time, is identified by the tan color coded bar representing the group.

Editing existing steps/groups:

To edit an already-existing step or group, click on it in the timeline and all necessary information will be displayed in the 3D PDF Animate main window.

Moving steps in timeline (**Caution: read carefully!**):

If there is a need to move a step, ensure that where the step is currently displayed is prior in the timeline to where it is to be moved. To move the step grab it at the header in the timeline, and move it to a different position by dragging.

3D PDF Animate

If the step is moved to a position earlier in the timeline, the positions of the parts or assemblies in 3D could become out of order. If this happens save the animation to the PDF and restart editing by reopening 3D PDF Animate. Everything should then be moved into the correct place.

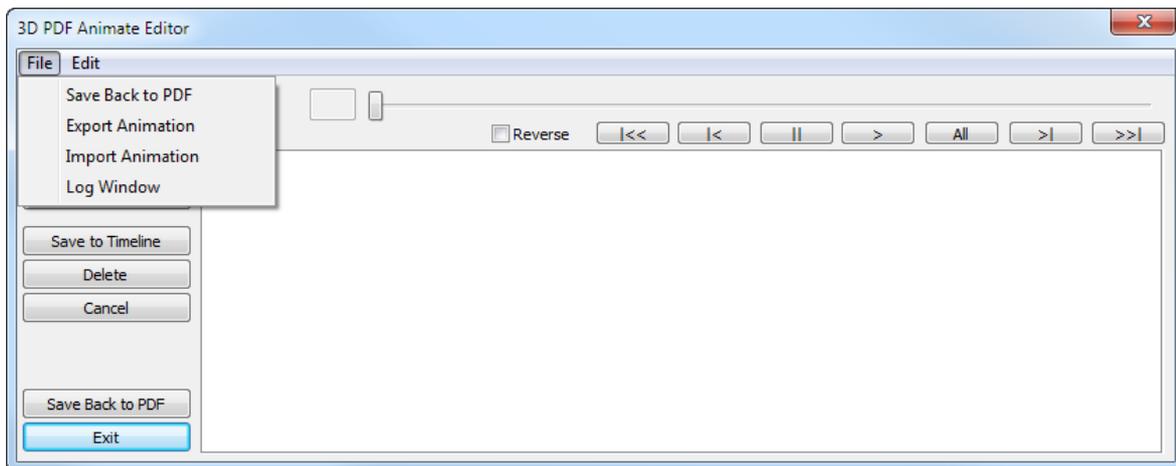
3D PDF Animate Editor Main Window

The 3D PDF Animate main window is the main control window. Here steps and groups can be created and the transformation of the parts or assemblies can be defined.

Depending on what kind of animation element (step/group) is being edited, the user interface of the main window will change.

Basic functions

If the main window is visible, and no step or group is created, it will look like this:

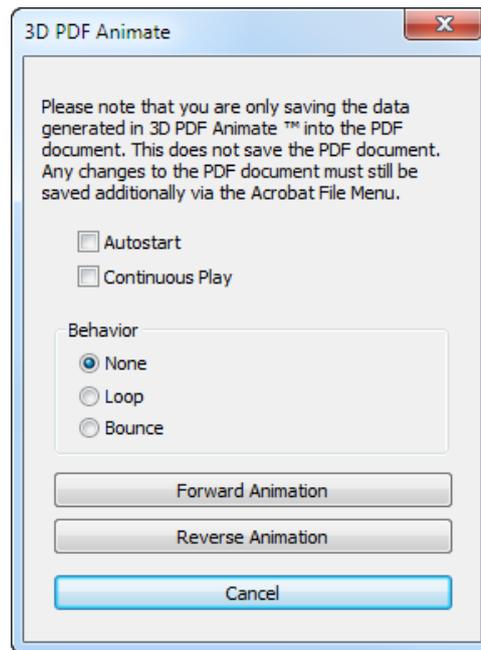


File Menu

- File Menu
 - Save Back to PDF
 - Forward Animation
 - Reverse Animation
 - Cancel
 - Export Animation
 - Import Animation
 - Log Window

Save and Close

This option will save any changes made to the animation and returns to the PDF document. When option is selected another window will appear asking to save in forward or reverse order.



Autostart

When the 3D PDF document first opens, or when the 3D area is first activated, this option enables the animation to start playing right away without. With this selected the animation will start without clicking on any options.

Continuous Play

This option allows the animation to play repeatedly without the user having to start the animation over again.

Behavior

None

By default None is selected. This is the standard option set for the animation to be controlled by the user. The animation will only play forward or reverse depending on how the user saves the animation to the PDF document.

Loop

The Loop feature allows the animation to continuously loop through the animation. The user only has to tell the animation to play once and it will repeat the animation over and over again. For example, if the user creates an animation with Lathe machine spinning, the creator generates one rotate motion. With this option enabled, the lathe will now spin continuously.

Bounce

The Bounce feature allows the 3D model to play forward and backwards, or back and forth. In other words, if the user wants to simulate a door opening and closing they just need to create a move activity with the door opening. This option will tell the animation to play forward opening the door, then play backward closing the door.

Forward Animation

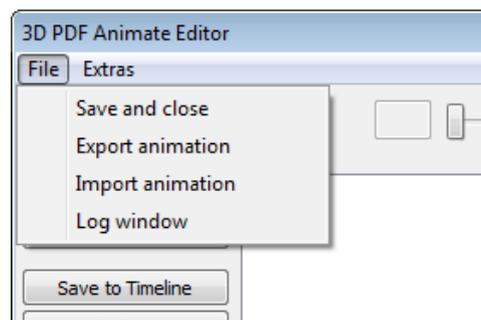
This option will save the animation to the PDF in forward order, or as it was created. After saving, 3D PDF Animate is automatically closed.

Reverse Animation

This option will save the animation to the PDF in reverse order, or the reverse of how it was created. This allows the user to create an animation in disassembly order, but save it as an assembly instruction. After saving, 3D PDF Animate is automatically closed.

Cancel

This option will allow you to return to the 3D PDF Animate Editor.



Export Animation

This option will allow the user to manually export the animation data as an XML file for usage in other PDFs which integrate the same 3D-CAD object.

Import Animation

This option will allow the user to import a previously exported or saved animation XML file which used the same 3D-CAD.

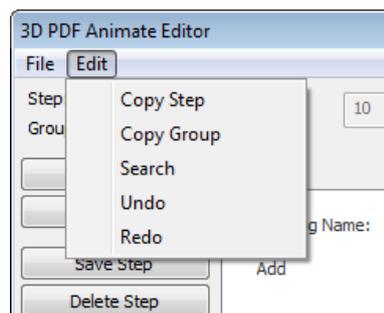
Log Window

Some events in 3D PDF Animate will write a message to the current log. If the log is closed during work, it can be reopened for review.

Edit Menu

The Edit menu offers additional features to aid the user in creating animation. These tools may allow the user to create animation more quickly and effectively. With the ability to copy and paste Steps and Groups users can reuse activities that were already defined in the animation. The Search option helps the user pinpoint specific part names in the Model Tree structure.

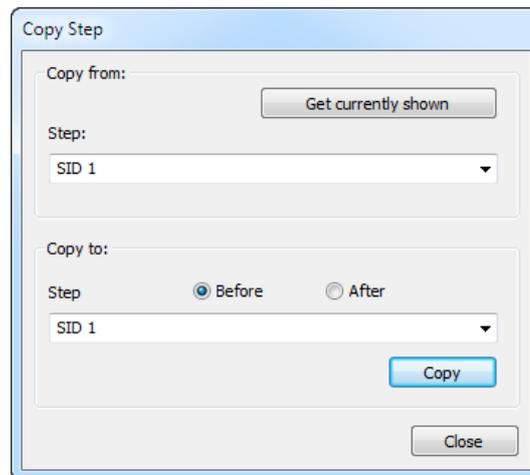
- Edit
 - Copy Step
 - Copy Group
 - Search
 - Undo
 - Redo



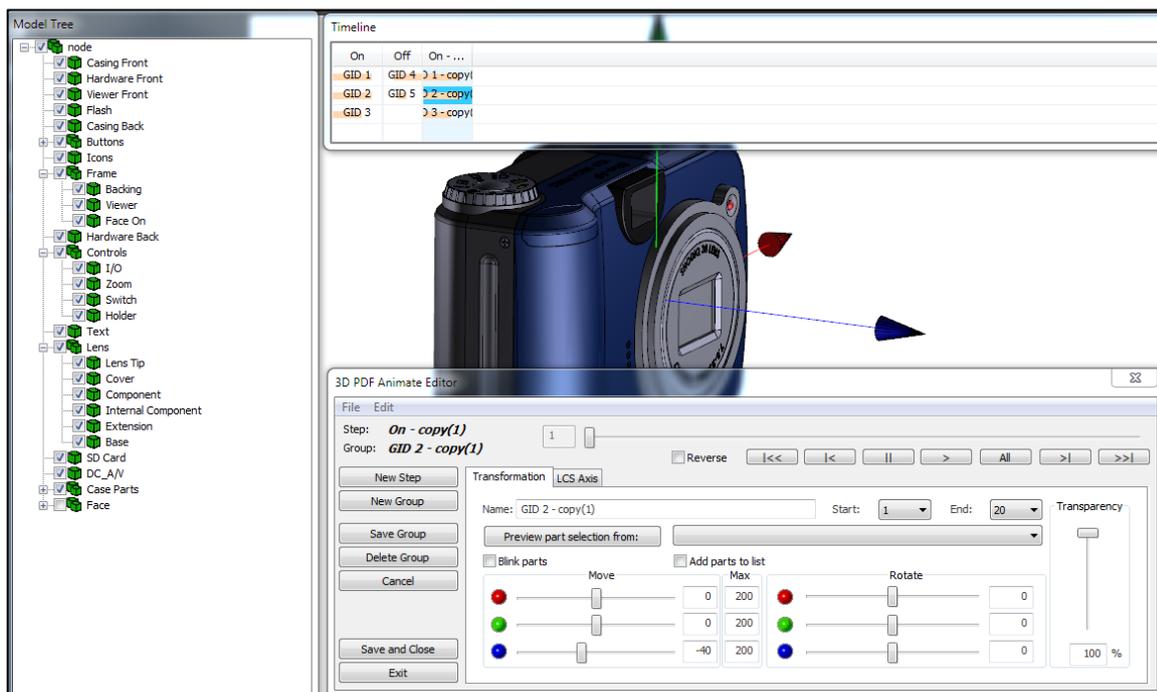
Copy Step

The ability to copy steps that have already been defined in the animation. The user will choose to select the which Step to Copy from. The first pull-down menu will list all the current steps to choose from. The **Get currently shown** button will update the animation to preview the selection.

Then the user will choose where to paste the step to by selecting from the bottom pull-down menu. The user will choose whether to apply the copied step before or after the step chosen in the pull-down menu.

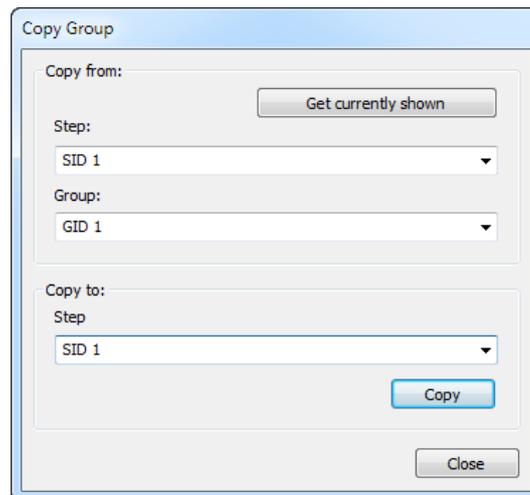


Any parts assigned to any of the Groups will not be copied because this may cause false start times for the actual 3D objects. The user must go back to the Groups to reassign the parts.



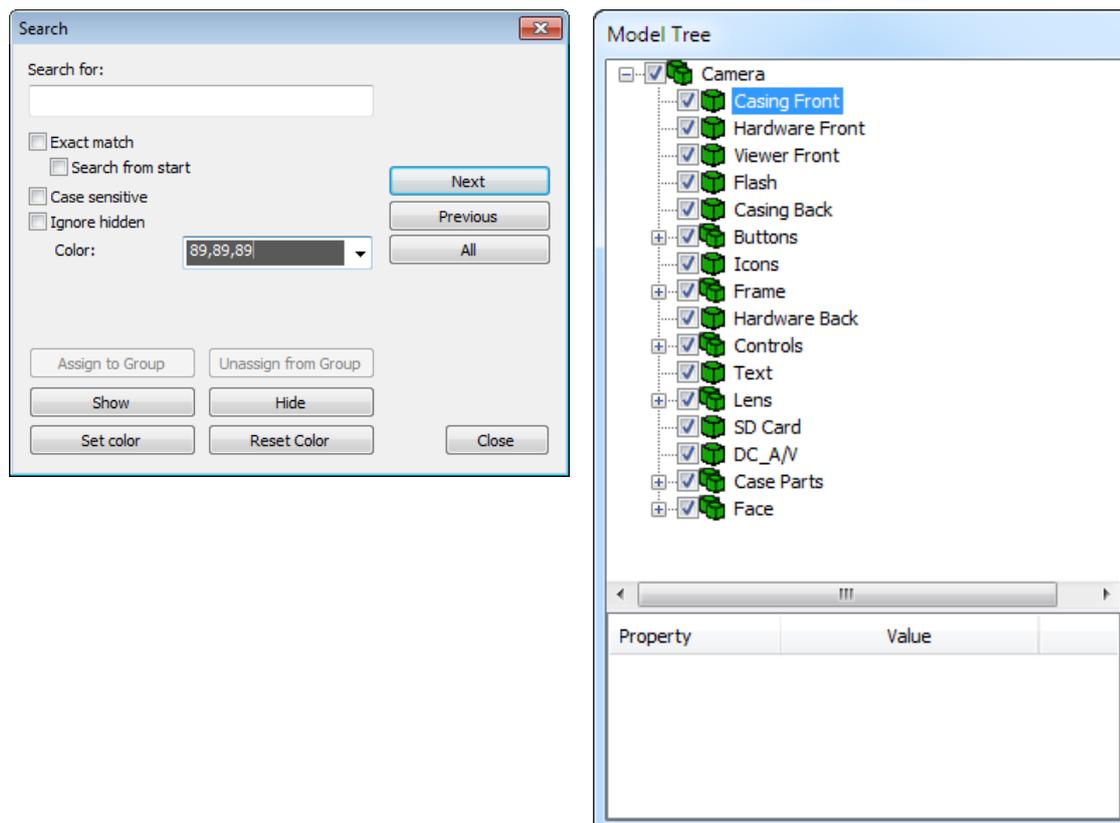
Copy Group

Similar to the Copy Step option, the user will need to select which Steps to copy from. But now, the user will also specify which Group to copy from within the chosen Step. Next, the user chooses which Step to copy the Group to. When copying Group activities, all the values will copy over except for the assigned part. The assigned parts will not be copied over because this may cause false start times for the actual 3D objects. The user must go back to the Groups to reassign the parts.



Search

The search option will aid the user in searching, or pinpointing, through the model tree structure. This is very useful where large assemblies may take longer to find small components, such as a specific bracket on a full assembly airplane.



Search for:

Type in a key to search for specific nodes (Part Names) within the Model Tree.

3D PDF Animate

Exact match

Searches the exact text that is typed in the search field.

Search from Start

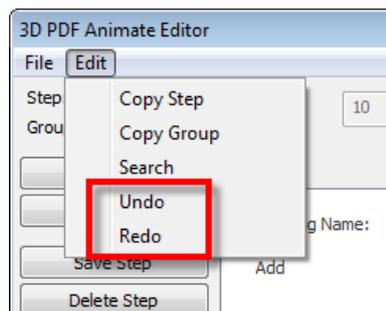
A sub option for searching “Exact Match”. In many cases a Part Name will have delimiters (blank/space, comma) in the name, however when this option is enabled the tools searches the exact match by searching from start eliminating the delimiters and sees them as part of the phrase to search for.

Case sensitive

Enables a case sensitive search. (e.g.: “house” will not find “House”, user must type “House”)

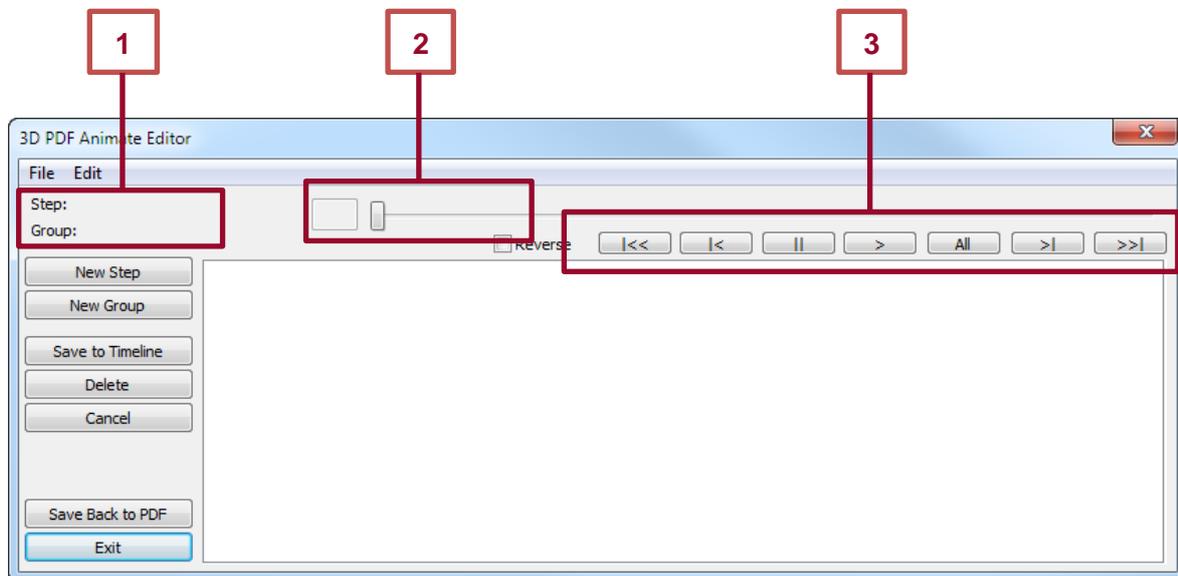
Ignore hidden

Helps to ignore all parts that have been disabled, or are currently unchecked.

**Undo / Redo**

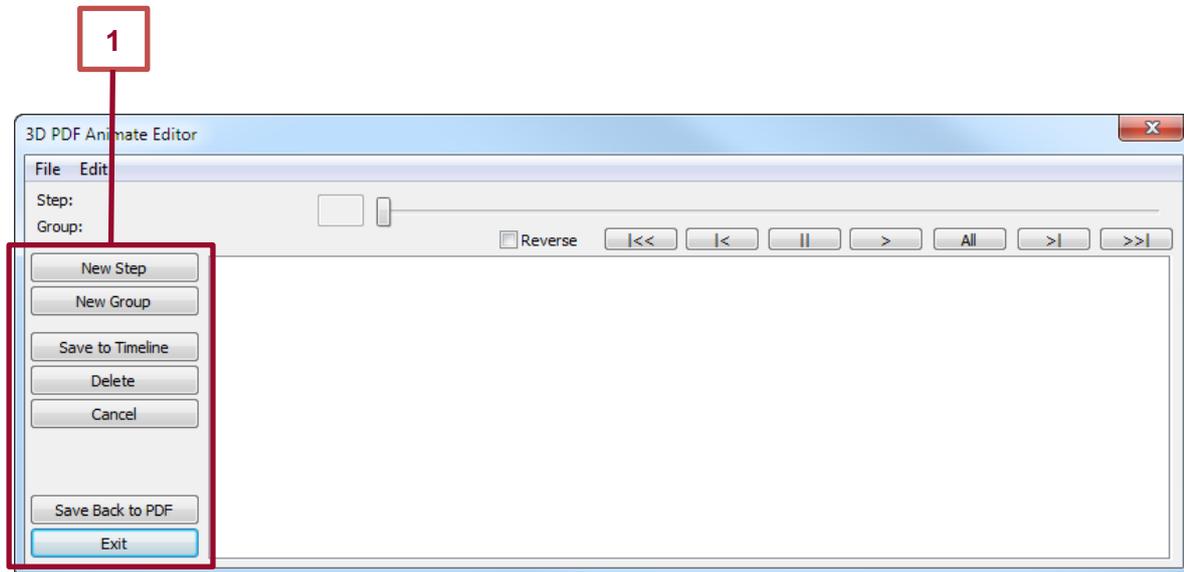
Helps the author correct mistakes with many levels of Undo and Redo when editing the animation.

Under the menu bar :



1. To the right of **Step:** and **Group:** the name of the current selected step and group which are being edited will be displayed. If a new step or group is being created the names will only be displayed after the step or group has been saved.
2. Further on the right side there is a **Slide Bar** with a text box on the left. The text box shows the actual position (frame number) of the animation within the step. The slide bar can only be moved within the time frame of the current step or group that is being edited.
3. Below the Slide Bar there are **Play Controls** that offer the possibility to go to the beginning or end of the complete animation, to go one step back or forth, and to play the step or halt it with the pause button. The check box named "Reverse" allows users to play the whole animation in reverse order. This is very useful when starting with a complete assembled model if the goal is to show the end user how to assemble the completed product.

Left side of the main window:



New step

Click on this button to create a new step.

New group

Click on this button to create a new group.

Save to timeline

Clicking this button will save the current step/group data to the timeline. This button will be labeled “Save step” or “Save group” depending on the current Step or Group selected. If this button is not selected before going to the next step, or group, this function will be executed automatically.

Delete

Hitting this button causes the current step or group to be deleted from the timeline.

Cancel

This option cancels the last thing selected if it has not already been saved. See Save to timeline for more information.

Save Back to PDF

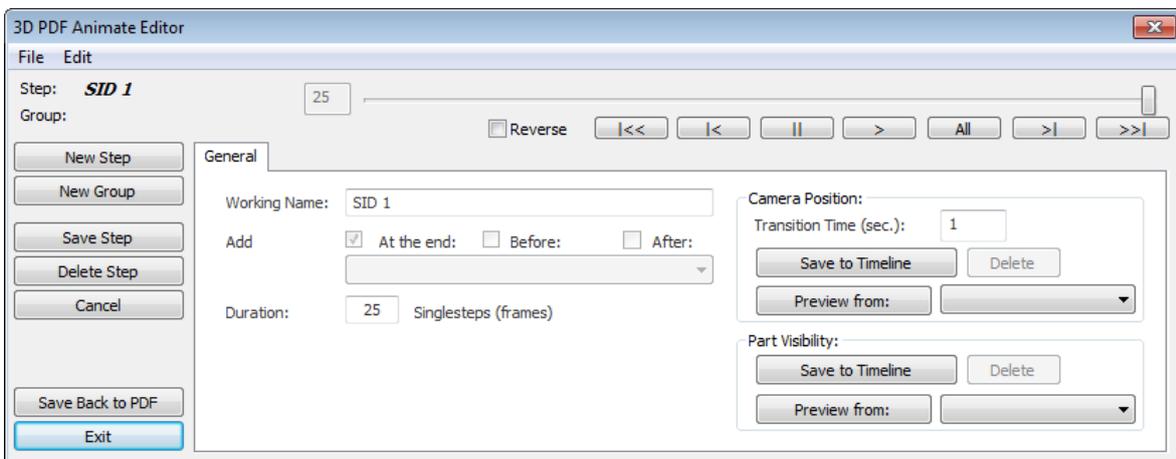
This option will save any changes made to the animation and returns to the PDF document. When option is selected another window will appear asking to save in forward or reverse order. See the File Pull-down Save and close for more detail. Once this option is selected another window will appear allowing the user to select “Save to PDF and close” or “Save reverse to PDF and close.” See Save and close in the previous section for more information.

Exit

This executes the same functionality as the "X" in the upper right corner of the window, and will close 3D PDF Animate. If any part of the animation has been changed and this button is clicked a security warning will pop up asking the user to confirm an exit without saving. Proceeding results in the loss of any unsaved changes since the last time the animation was saved to the PDF.

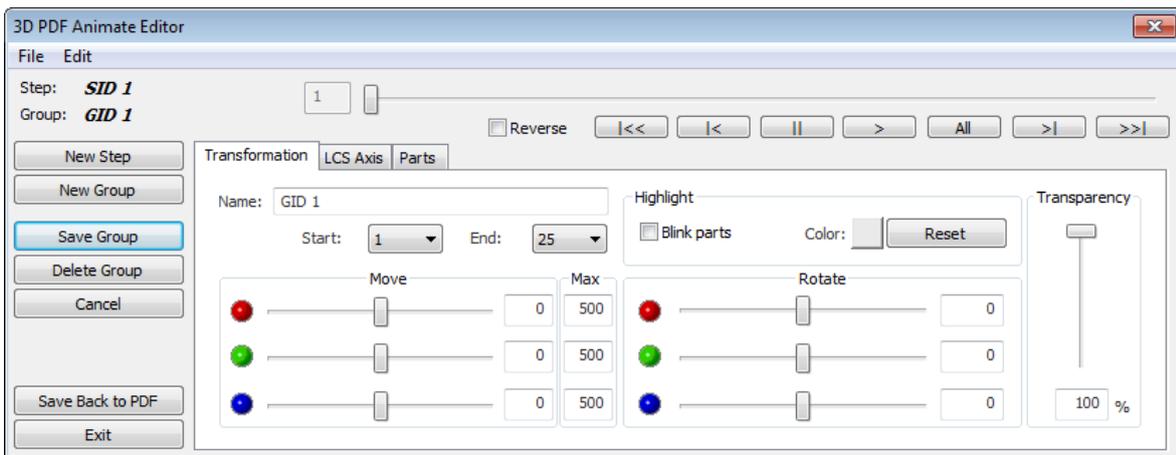
Step ID Menu

If an animation step has been created, or an existing step has been clicked on for editing, then the main window will look like the image below:



Group ID Menu

If an animation group is created, or an existing group has been clicked on for editing, then the main window will look like the image below:



The set-up of these animation steps and groups is explained in the "Creating an animation" section.

2.6 Creating an Animation

To give the user a better understanding of the possibilities of animation steps and groups, it will be useful to learn how an animation is structured in 3D PDF Animate.

Structure of an Animation

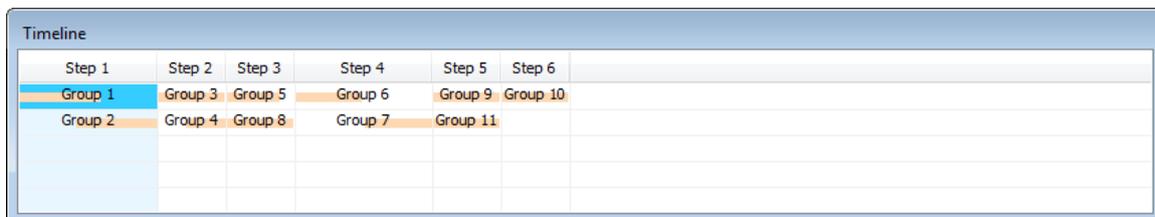
Each animation is divided into **Steps** and **Groups**.

An animation step has a certain duration which is defined during creation. The duration is measured as a number of frames and it can be expected that approximately 25 frames correspond to one second of run time. This can vary, depending on the computer's performance. Steps may have a camera position that is activated when the step is played. It is also possible to turn the visibility of parts in the model being animated on/off and to store that state as part of a step.

Groups are used to define a set of parts and define transformations to those parts that occur over the group's duration. The duration of a group is measured in frames and is a subset of its containing step. Transformations include moving, rotating and changing the transparency of the set of parts associated to the group. The part transformations defined by groups belonging to a step occur during playback of that step within the animation.

The steps and groups are displayed in the timeline . The duration of a step is reflected in the width of its column in the timeline. The duration for groups is reflected in the width and placement of the tan colored rectangle in the group's cell in the animation timeline.

This approach provides a quick visual understanding of the relationships between the steps and groups in the animation.



Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
Group 1	Group 3	Group 5	Group 6	Group 9	Group 10
Group 2	Group 4	Group 8	Group 7	Group 11	

As shown in the timeline , each column in the timeline corresponds to a single step in the animation and the name of the step is found in the top row of the step's column. Each step can consist of one or more groups and the step's groups are listed vertically underneath the step title in the order they are created. The step and group names can be assigned as required. As seen in the above example, a particular step or group can be easily and quickly identified by name.

Groups can be configured chronologically within their step as desired using the start and end values of their durations. This makes it possible to

- Transform several parts simultaneously in different directions
- Transform one set of parts sequentially in different ways

Please note: the same individual part cannot be included in two groups running simultaneously.

An example:

Step 1:

Duration: 50 frames (approx. 2 sec.)

Group 1:

Duration: frame 1–15

Animation: a screw moves outside up to the thread's end (e.g. displacement in the x direction by 20mm) while it is rotating (rotation about the x axis by 1,440 degrees).

Group 2:

Duration: frame 16–20

Animation: the screw moves away faster from the drill hole (x direction by 40mm)

Group 3:

Duration: frame 21–25

Animation: screw moves fast upwards (z direction by 40mm)

Group 4:

Duration: frame 26–40

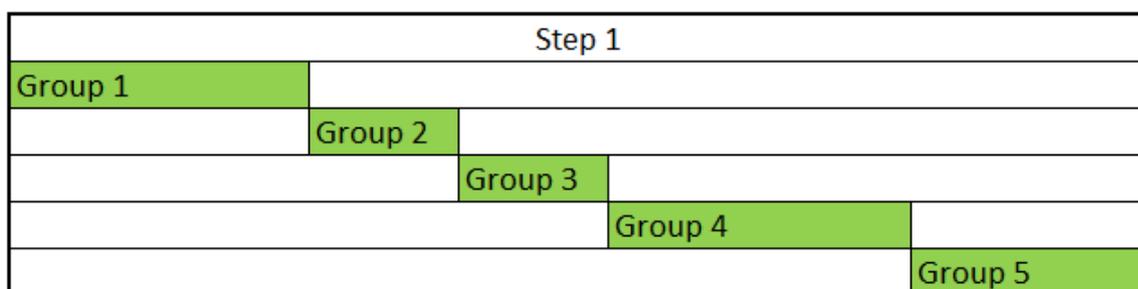
Animation: cover moves away from the screw joint (x direction by 20mm)

Group 5:

Duration: frame 41–50

Animation: fading out of screw and cover (i.e., change transparency to 0%)

The graphical description of step 1 looks like this in detail:



Creating Steps – Defining Step timeframe

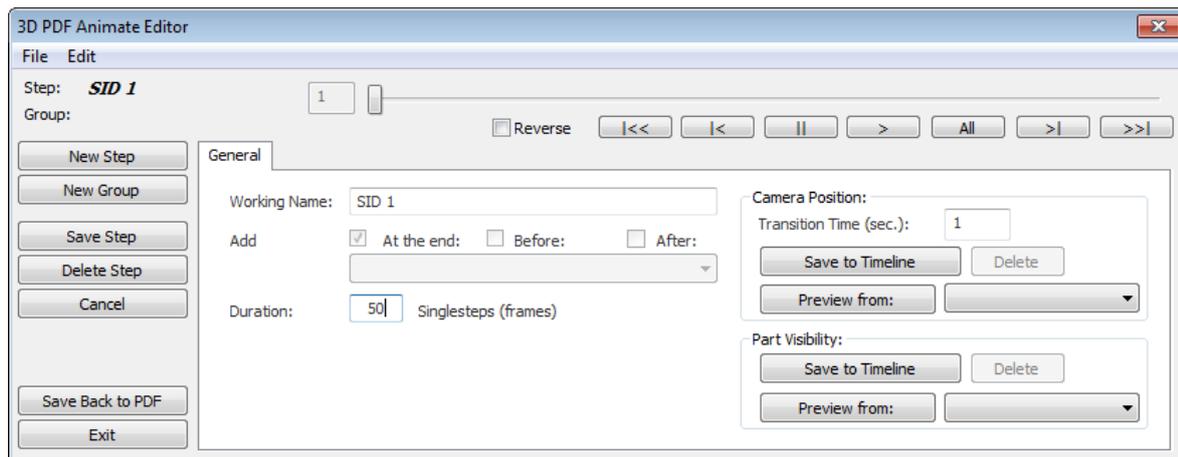
To create a new animation step click the button **New Step** in the 3D PDF Animate main window. To edit an existing step there are two options: jump to the particular step using

the control elements to play the animation or click the particular step (column) in the timeline .

The main window's middle area will change accordingly and will show a general tab.

General Tab

In the General tab the following adjustments can be made:



Working Name

The working name is the name that will appear later in the PDF in the step list. The working name is meant to identify the step easily while working with the animation; a name identifiable to the user should be chosen. This name will also be displayed in the timeline. Two steps may never have the same name and some characters (e.g., " and ; and < or >) are not allowed. If a character that is not allowed is used, a message will pop up to alert the user they cannot use the character.

Add

If the step that is being created is not the first in the animation it can be decided where to paste the new step. The options are, **At the end** and **After** or **Before** a particular step. If "Before" or "After" are selected the drop down box to the right will become active and show the currently existing steps. If a step is selected there may be a slight wait time as the parts update to the active position in the 3D window.

Duration

This is the number of frames the animation step will have. On a fairly recent computer with a graphic card that is adequate to the 3D model's size, 25 frames equal about one second of playing time (a more precise statement is not possible as the performance depends on the number of parts and the complexity of the particular geometries). Within that time the start and end time of each moving group can be selected. Different movements can be made sequentially or simultaneously in one single step.

Camera Position

To set the position of the camera for the selected step, click this **Save to Timeline** button under the **Camera Position**. It is most effective to define this while creating the step, even though you may need to change it again later. Please note the following:

	Step 1	Step 2	Step 3	Step 4	Step 5
Camera saved			X	X	

If a skipped step does not have a defined view but there is a view defined for the prior step, that previous view will be shown for the skipped step. If the animation is played in the reverse order the same concept will apply. Looking at the above example again, if the animation is played in reverse order, from step 5 to step 1, for step 5 the view of step 4 is used. For these reasons, it is recommended to define a view at least for the first and last steps of an animation.

If a view has been set for a step, but later on while editing the view needs to be removed, simply go to that step and then select the **Delete** button under **Camera Position**. To copy a camera view from another step, select the step with the desired camera view from the drop down, select **Preview from:**, then select **Save to Timeline** to save the view to the Step.

The camera transition speed (**Transition Time (sec.):**) between Steps can be adjusted by seconds. One second is equal to 25 frames. The animation does not pause between each camera transition, so the author should build their animation knowing the animation will still play while the camera is transitioning.

Note: When editing or changing a view in a particular Step, the view can be reused from another Step by selecting a view from the **Preview from:** Pull down menu. The Pull down menu will also include defined views from the Acrobat 3D Views list. However, please note that views copied from Acrobat must be in Perspective mode in order to obtain the correct field of view of the model

Once you chose a view from the Pull down menu, select **Preview from:** to preview the view, then select **Save to Timeline** save the view to the current Step.

Part Visibility

To set the visibility of the parts for the selected step, click this Save button. It is most effective to define this while creating the step, even though you may need to change it again later. Please note the following:

	Step 1	Step 2	Step 3	Step 4	Step 5
Part Visibility saved			X	X	

If two initial steps do not have part visibilities set on them, as shown in the table above, all available parts will be shown within these steps. If a skipped step does not have part

visibility saved, but there is visibility defined for the prior step, that previous visibility will be shown for the skipped step. If the animation is played in the reverse order the same concept will apply. Looking at the above example again, if the animation is played in reverse order, from step 5 to step 1, for step 5 the visibility of step 4 is used, and in step 1 and 2 all of the parts are shown. For these reasons, it is recommended to define a part visibility at least for the first and last steps of an animation.

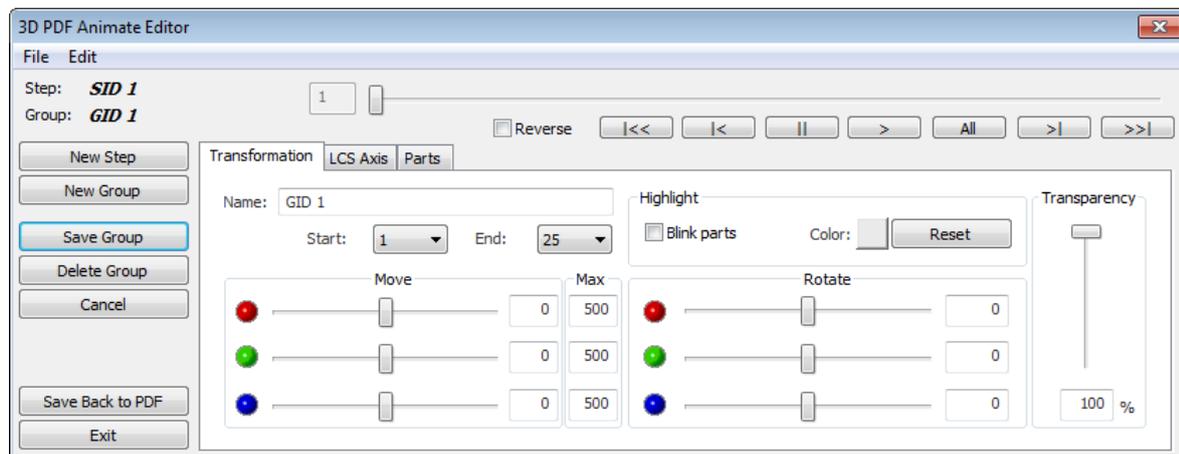
If part visibility has been set for a step, but later on while editing needs to be removed, simply go to that step and then select the **Delete** button under **Part Visibility**. To copy part visibility settings from another step, select the step with the desired visibility from the drop down and then select **Preview from:**.

Creating Groups – Defining Move Activities

A Group Activity is a group of objects assigned to one activity using the same values. An animation group can be added to an existing animation step by clicking on the **New Group** button in the main window. A new group is created in the currently selected step. (The active step name is shown to the right of the text **Step:** at the top left of the main window.)

Transformation Tab

After creating an animation group, the following adjustments can be made in the **Transformation** tab:



Name:

A name which can be easily identified for the group should be specified. The group name will not show up anywhere else in the PDF except in the timeline. It is important to ensure that no two groups have the same name.

Duration:

It is possible to set an individual start and end time (**Start** and **End**) within the particular step for the animation group. The maximum duration of a group must be less than or

equal to the number of frames that are specified in the animation step to which it belongs. Please note that two groups which overlap in time must not contain the same part; in this case a pop up warning will display.

Highlight:

Blink Parts

The **Blink Parts** option will allow the assigned items in a Group to flash in order to highlight the items. When this option is enabled, the user will only be able to preview the flashing in the animation in the PDF document after the Editor has been saved and closed. When previewing the animation with the blinking items enabled, the animation will pause and the flashing of the assigned items will occur before the Group action takes place.

Color

The author can highlight all the components assigned to the Group by selecting a color from the color pallet. The assigned parts will only be highlighted in the selected color until the end of the Group frame duration. To remove the selected color click on **Reset**.

Choose Parts for the Animation:

To select parts for an animation group, click on the part either in the 3D window or the model tree. To select more than one part, there is no need to use the "Ctrl"-key on the keyboard, simply continue clicking the additional parts. To remove a part from the group, simply click the part a second time and it will become unselected.

Preview part selection from:

The 3D PDF Animate Editor gives the option copy parts that are assigned to another specific group with the option of the Drop-down menu. Once another Group is selected, clicking on the **Preview part selection from** button will then copy all the assigned parts from the other Group into the current Group. Depending on the amount of assigned parts, it may take some time for the Editor to update. The user will then need to select **Save Group** to confirm the assigned parts to the current Group.

Move Parts:

The selected parts can be moved, (i.e., translated) independently along each axis defined by a local coordinate system (LCS). The current position of the LCS is represented by a 3D 'orientation axis' or 'triad' in the 3D window. The distance to move the parts is adjusted using the slider bars or the input field to the right of each slider bar. Any parts added later will jump to the correct position automatically, and will be reset to their original position when unselected in the 3D or the model tree. The colored dot in front of each slider bar matches the color of an axis in the LCS triad (Red = X, Green = Y, Blue = Z) and identifies the direction in which the part will move. If the LCS orientation axis is not visible, there is an explanation to fix this in the **Scale LCS** section below. In the input fields below

Max a maximum dimension for the slide bar can be set. The default value is initially calculated from the overall dimensions of the model.

Rotate Parts:

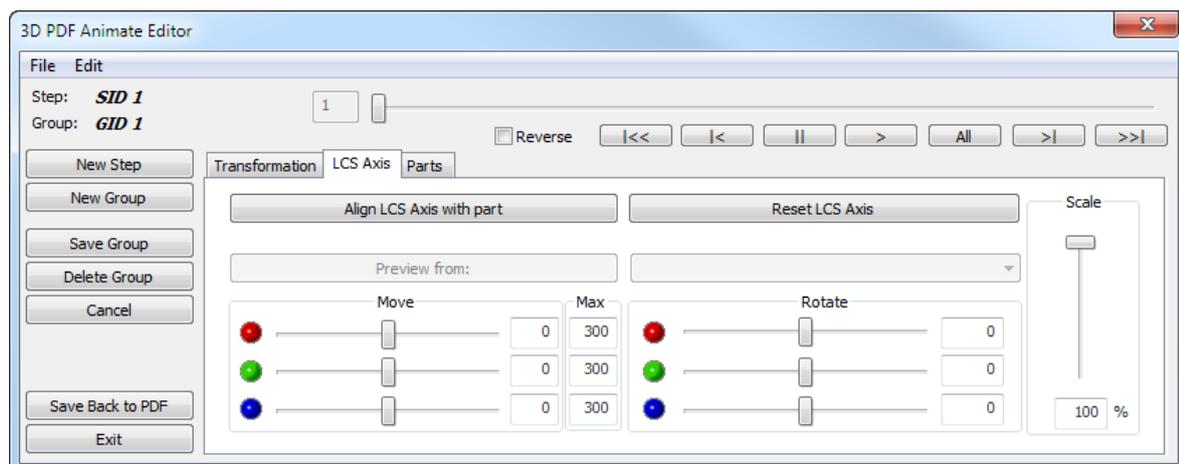
The rotation of the parts works by following the same principle as sliding the parts. It will be rotated around the corresponding axis of the local coordinate system that is displayed in the color of the slide bar. If the default values are not enough, users can set the value in the appropriate input field.

Transparency of Parts:

The remaining vertical slide bar on the far right controls the transparency of the set of parts associated to the group. As with parts moving, a reduction of opacity is animated evenly over the frames in the duration of the group.

LCS Axis Tab

To position the Local Coordinate System (LCS) users must switch to the tab "**LCS Axis**":



Align LCS Axis with part:

In order to simplify the positioning of the local coordinate system, it is possible to align the position and orientation of the LCS to the center and orientation of the bounding box of a part by using the button **Align LCS axis with part**. Here, a bounding box (a cuboid enclosing the particular part completely) is calculated and the origin of the LCS is set to the bounding box's center. Additionally orientation axis of the LCS is rotated to match the orientation of the part's bounding box.

After selecting 'Align LCS Axis with part', the LCS will be aligned with the next part selected in either the 3D PDF Animate model tree or the Acrobat 3D window.

Reset LCS Axis:

When rotating or moving the LCS, the current orientation of the LCS always defines the moving direction. Due to this, it is not mathematically possible to return to the original

starting position when resetting all slide bars to zero. This would only be possible when the slide bars would be pushed back in the exact reverse order and with the correct values as they were pushed initially, therefore there is the button **Reset LCS Axis**.

Preview from:

The function gives the ability copy, or reuse, the LCS Axis position that had been defined from another Group. To reuse a the LCS Axis position from another Group, the user can simply select another Group from the Drop-down menu, then click on the **Preview from:** button to preview the current LCS position. The user will then need to select **Save group** in order to confirm the new position of the LCS for the current Group.

Move LCS:

To move (i.e, translate) the LCS use the slide bars or the input fields after the slide bars. Using the input fields below **Max** a maximum dimension for the slide bar can be set, as it is with the moving of the parts.

Rotate LCS:

The rotation of the LCS works similarly to the rotation of the parts. You can rotate the LCS about a particular axis as designated by the colored circle to the left of the slider. If the maximum dimension is not enough another value can be set in the input fields below **Max**.

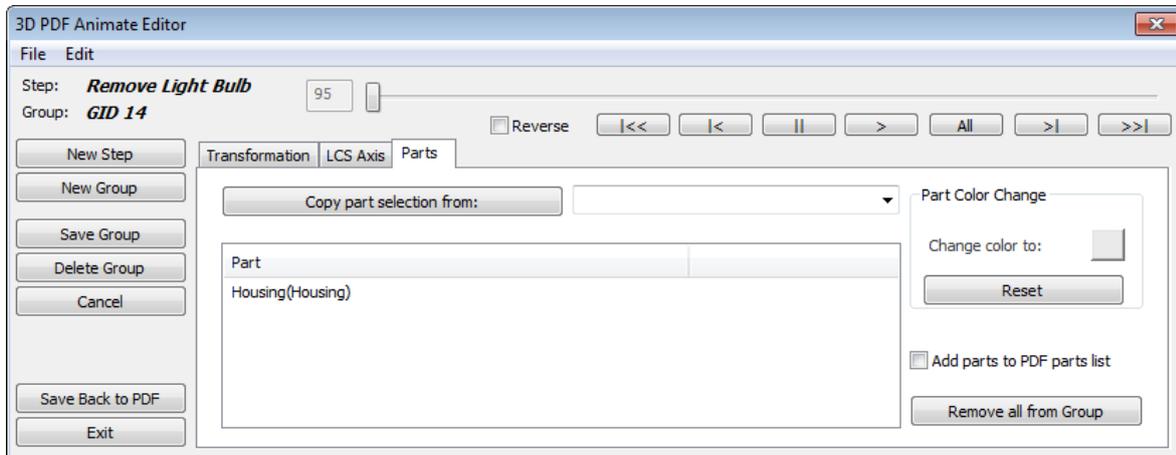
Scale LCS Triad:

Under certain circumstances the triad used to denote the position and orientation of the LCS may be too big or too small for a coordinated movement of the parts or the LCS. To correct this, the scaling of the dimensions of the LCS's triad can be changed using the far right vertical slide bar.

Note: If a slide bar is clicked once, it can be moved/rotated one step further using the keyboard's arrow keys.

Parts Tab

The **Parts** tab displays all parts assigned to the current Group.



Part Color Change

Changing the color under the Parts tab will change the color of all the parts assigned to the particular Group. The changed part color will stay in effect for the remainder of the animation

Add parts to PDF Parts List

With the ability **Add parts to PDF Parts List** the user can easily manage the Part Attributes list. Enabling this function for specific Groups will display only the information from the assigned items in that Group for the entire timeframe of that Step.

In other words, if you have five Groups under Step 1, you may choose to tick on the **Add parts to PDF Parts List** for only Group 1. The parts in Group 1 will only be displayed in the PDF Parts List throughout the entire Step 1.

All the parts assigned to the other Groups will not be displayed in the PDF Parts List field during the timeframe of Step 1.

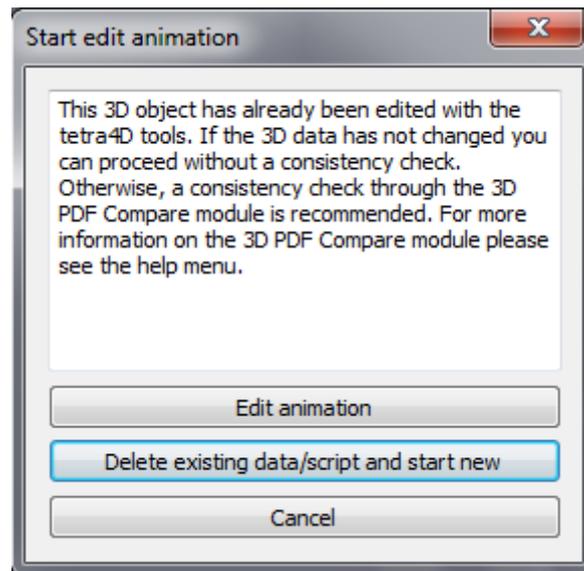
Step 1				
Group 1				
	Group 2			
		Group 3		
			Group 4	
				Group 5

Remove all from group

The option allows the user to quickly unassign all of the parts assigned to the group at once.

2.7 Editing Existing Animation

If 3D PDF Animate is already closed and the animation was saved to PDF, simply run the plug-in again and select the 3D object (see [Start](#)). If XML/Script data is found in the 3D object (which should be the case when saving an animation to PDF using 3D PDF Animate), the "Start edit animation" window will pop up. In this window users can decide how to proceed.



If it is necessary to start a new animation, from scratch, selecting **Delete existing data/script and start new** will delete the current animation that is saved to the PDF and open 3D PDF Animate with a blank timeline. If **Edit animation** is selected, the XML script data, which was found embedded in the 3D object, is identified and generated by 3D PDF Animate. This script data will open in 3D PDF Animate allowing the user to edit and add to the existing animation. Whether starting a new animation, or editing an existing one, the techniques and ideologies found in the "Creating an animation" apply.

2.8 Import/Export Animation

To export the complete animation as an XML file choose **File >> Export animation** from the menu bar. Here the term, "complete animation", refers to all data generated from 3D PDF Animate and 3D PDF Publish. This includes, for example, imported part attributes and step descriptions (it is only possible to add these in 3D PDF Publish). The generated data will be stored as an XML file which can be imported again using **File >> Import animation**.

This allows the user to transfer animations from one PDF to another. Furthermore, this can also be used, for example, to re-use certain parts of an animation in a different place. This always requires that the 3D data that was previously utilized is integrated into the particular PDF. It also requires that the CAD data is imported in the same format into the PDF in which the animation was originally created.

It is also possible to use an already advanced assembly or a slightly modified assembly. In this case 3D PDF Compare will need to be installed. The 3D PDF Compare module can be used to check the consistency of the animation with the new assembly before starting to edit the complete animation.

2.9 Save Animation to PDF

Once an animation is created it can be saved into the PDF. The same options for saving are available as are for playing the animation within 3D PDF Animate. It is possible to save the animation to the PDF in forward or reverse order. For example, an animation can be saved as disassembly or assembly instructions. After saving to the PDF the plug-in closes automatically and may be started again for further editing of the animation.

If it has been set in the preferences to save the animation data (XML) separately, this is done automatically in parallel to saving, otherwise a save dialog appears for the XML to be saved.

To save the animation before finishing the complete animation simply use the **File >> Export animation** option to save at any time.

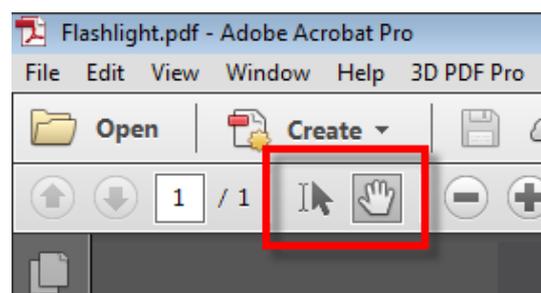
To save the animation into the PDF there are two options under the **File** menu. By clicking **Save to PDF and close** the animation will be saved to the PDF in the same sequence as it was created in 3D PDF Animate. Clicking **Save reverse to PDF and close** saves the animation in the reverse order (playing from the end to the beginning), as the name suggests. When re-editing the animation it will be imported in its original sequence. Reversing the animation entails the same data structure, but it is played internally (even when playing in the PDF) in one direction or the other.

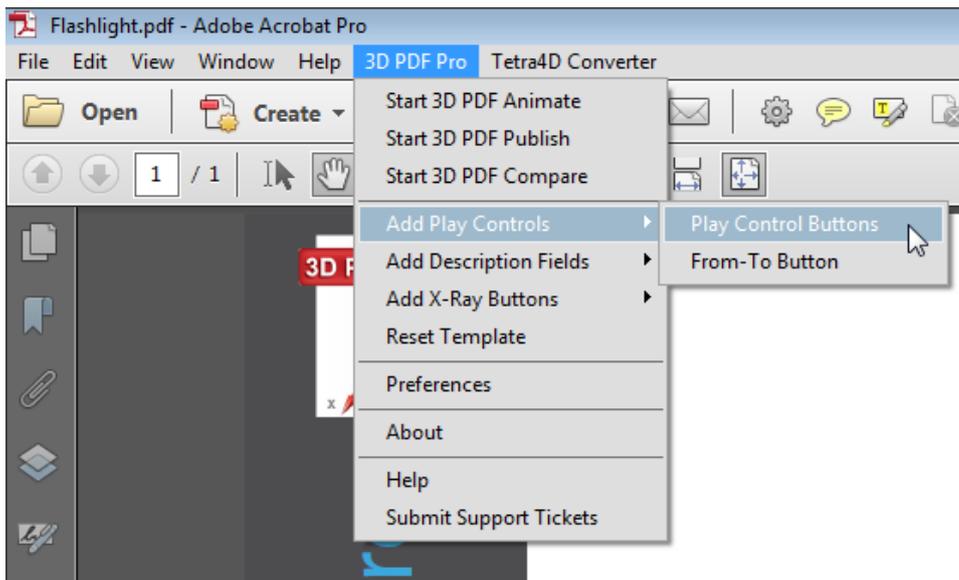
2.10 Add Play Controls in PDF

Once the animation is added to the 3D object in the PDF, the reader can preview the animation with either the default play control buttons that come with 3D PDF Pro, or create a custom button to play only certain Steps.

Play Controls

To add the play controls to the PDF template, go to the **3D PDF Pro** menu in the Acrobat® menu bar and select **Add Play Controls >> Play Control Buttons**. Often times when editing the PDF template the user will be working with the Content Editing or Interactive Objects, however when placing the buttons to the template Acrobat must be in **Selection** or **Pan** mode.





At this point the author clicks anywhere in the PDF where they would like the play controls to be added. The fields will always be positioned downwards and to the right from where the screen was clicked.



After clicking to place the Play Controls, it is necessary to click again on the document and choose “Close” to finish the process of adding Playing Controls.

These fields are typical Acrobat® AcroForm buttons. By using the Acrobat® select object tool, the properties of these fields can be accessed by a right click. The complete look and behavior of the fields can be edited to meet the user's needs.

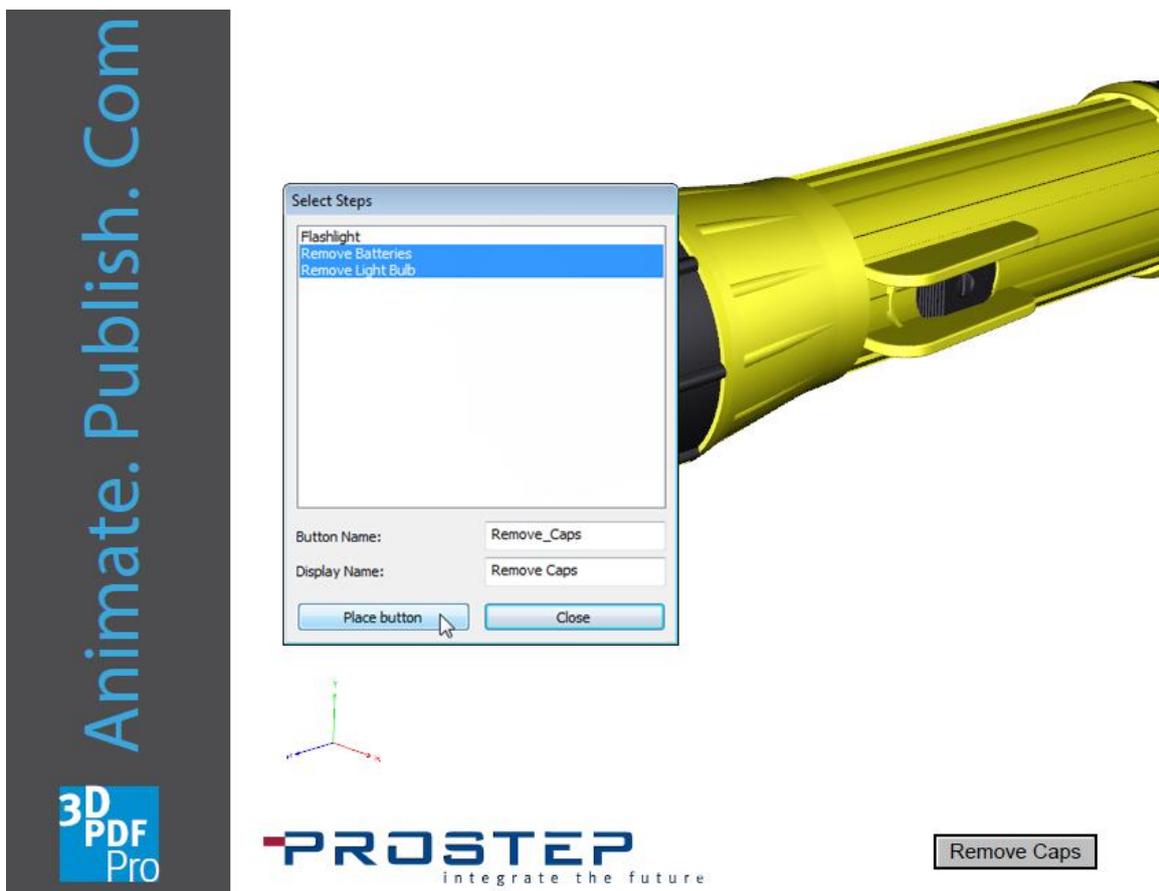
If there are unnecessary fields in the PDF template they may be deleted, so the author may delete any of the buttons if they wish to not include all the default play control buttons. The functions which have been added to the PDF by the 3D PDF tools will always check which fields or buttons are present before interacting with them.

Add From -To Button

The author of the animation created with the 3D PDF Animate editor can add buttons that focus specifically on specific steps. The default play control buttons play the animation from start to finish and can jump from one step to another. The From-To buttons allow the author to create a button to play only steps 2-7.

To add a custom play button go to the **3D PDF Pro** menu in the Acrobat® menu bar and select **Add Play Controls >> From-To Button Button**. Similar to the default play controls, when placing the buttons to the template Acrobat must be in **Selection** or **Pan** mode.

The Select Steps dialog will appear with the list of Steps displayed in forward or reverse. The author will select the first to last step for the new button to play through only those selected steps. As all standard buttons have a title for the action button, the author must give it a title by typing in a **Button Name**. The **Display Name** is the name that is visible for the reader.



3D PDF Publish

3. 3D PDF Publish

3.1 Using 3D PDF Publish

Why use 3D PDF Publish?

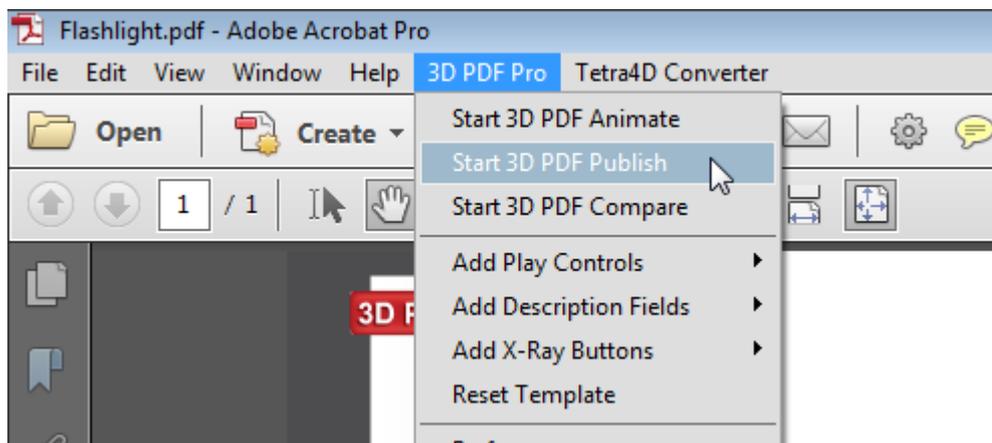
With 3D PDF Publish, the user has the ability to add step descriptions, in multiple languages, to an existing animation as well as interactively displaying specific part attribute data and other content within the 3D PDF template.

With the 3D PDF Publish tools, the user can additionally define special settings for the 3D object in the PDF which cannot usually be defined in Acrobat®.

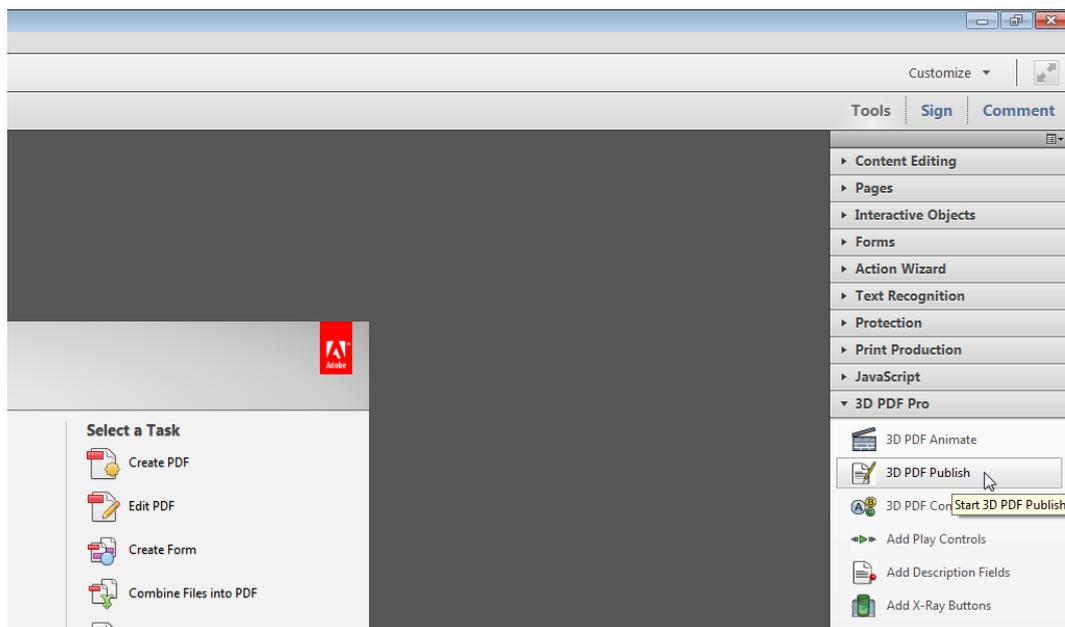
3.2 Accessing 3D PDF Publish tools

Once 3D PDF Pro has been installed, 3D PDF Publish will be found under the 3D PDF Pro menu items within Adobe® Acrobat®.

Access the 3D PDF Publish editor via the 3D PDF Pro Drop-Down menu available in the Acrobat® main menu bar.

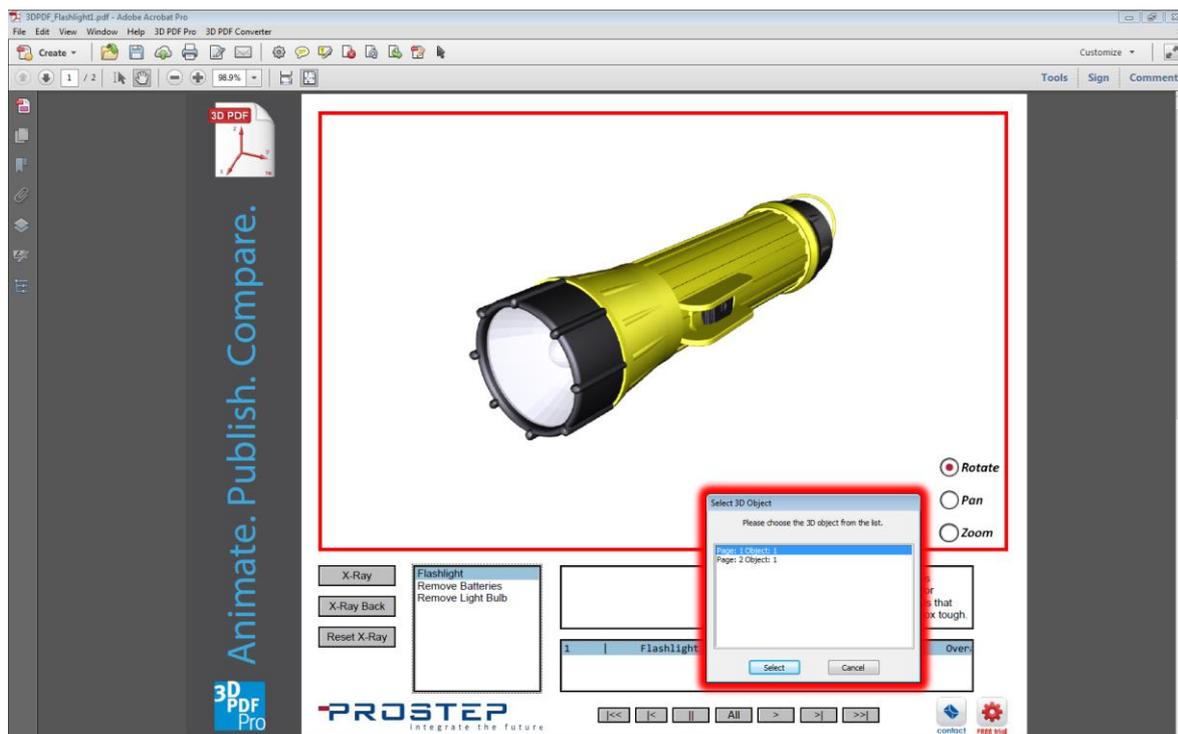


The 3D PDF Publish editor is also available via the Tools Panel found on the right-hand side of Adobe® Acrobat® Pro.



3.3 Selecting a 3D Model

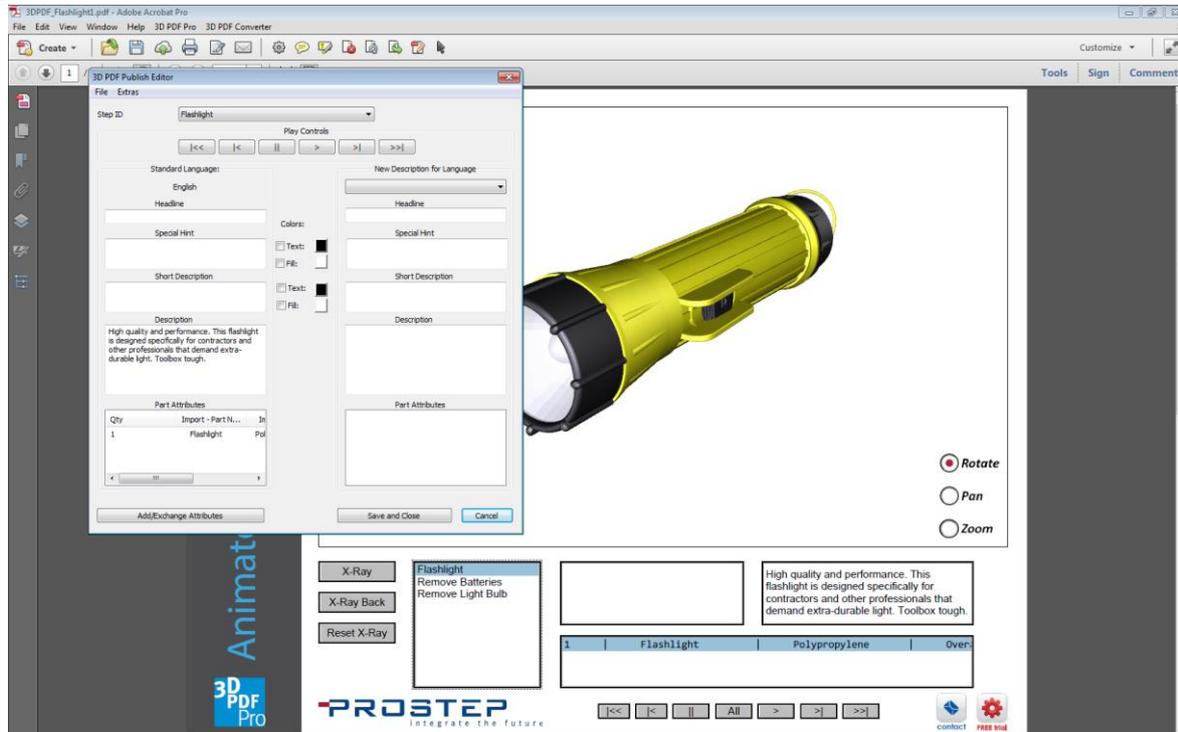
If the document has multiple 3D metadata objects the following dialog will appear to select which 3D object to work with. From this dialog identify which 3D object in the PDF to edit by highlighting one of the options on the list; e.g.: **“Page:1 Object: 1”**. When an option in the list is selected, the PDF will jump to the page which contains the selected 3D object and highlight the 3D Object showing a red outline box around the 3D area.



3D PDF Publish

If 3D PDF Pro needs to be licensed, please go to the [Licensing](#) section for further instructions.

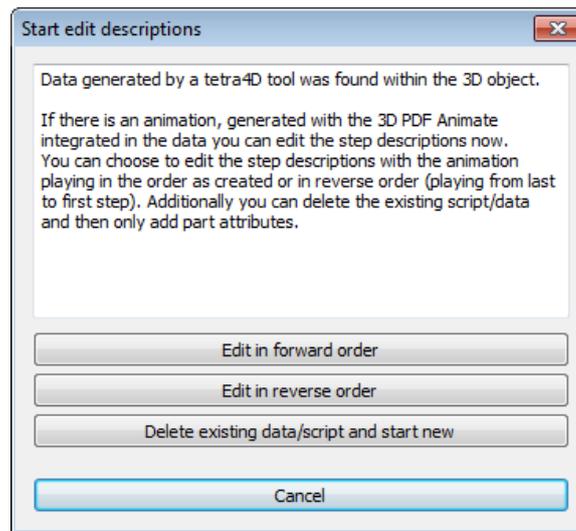
Once 3D PDF Publish has been started, the following dialogs will appear. See [3.5 3D PDF Publish User Interface](#) for more detail.



3.4 Start 3D PDF Publish

After selecting the correct 3D object in the PDF, the dialog box shown below will pop up. If there is already XML data belonging to the 3D PDF tools embedded in the 3D object all three options in the pop up will be available.

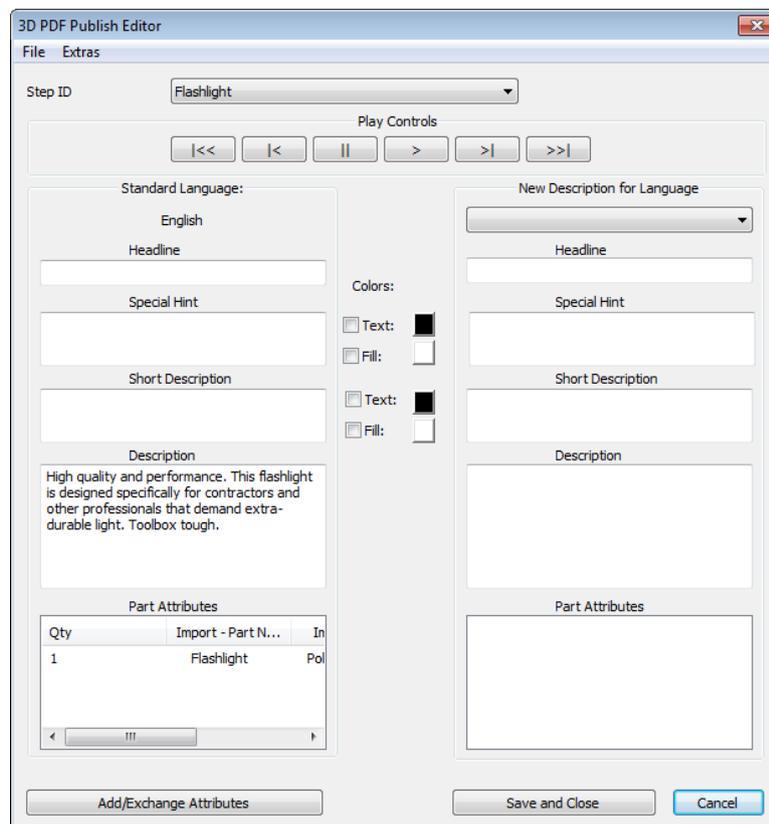
Usually an animation is generated by starting with a completed assembly to show a disassembly process. This assembly is then disassembled in the animation step by step. To add step descriptions to an animation which shows disassembly the **Edit in forward order** option should be chosen. In some cases the end goal is to have an assembly animation rather than disassembly. For such cases there is the option to save the animation in reverse order so that it starts with the last generated animation step and ends with the first one. If users want to add step descriptions to this type of animation, it may make more sense to select **Edit in reverse order**. It is always possible to go back to edit and save the animation in the order that is needed. Therefore, users can enter the descriptions using either option as they are associated with the specific step and not the order that the animation was saved in.



3.5 3D PDF Publish User Interface

Step Descriptions

Once either **Edit in forward order** or **Edit in reverse order** has been chosen the following dialog will open. Inside of this dialog the user can input step descriptions in any language that has been set in the preferences menu.



With the top **Step ID** drop down menu it is possible to jump to the particular step to which a description needs to be added. If it is unclear what happens in a particular step, jump to that step using this **Step ID** drop down or **Play controls**, then use the **Play controls** to view the animation of a selected step. While changing to a different step anything written under **Headline**, **Special Hint**, **Short Description**, and **Description** information entered in the current step will automatically be saved.

The remainder of the window is divided into two columns. In the left column the user can input the descriptions in the standard language (set in the preferences). In the right column, the user can choose a language via the **Language** drop down and then enter the descriptions associated with that language.

The **Special hint** and **Short description** allows the user to change the text and fill color for that specific text field. When the animation is previewed in the PDF document, the text and fill color will change during the timeframe of the Step that is being illustrated.

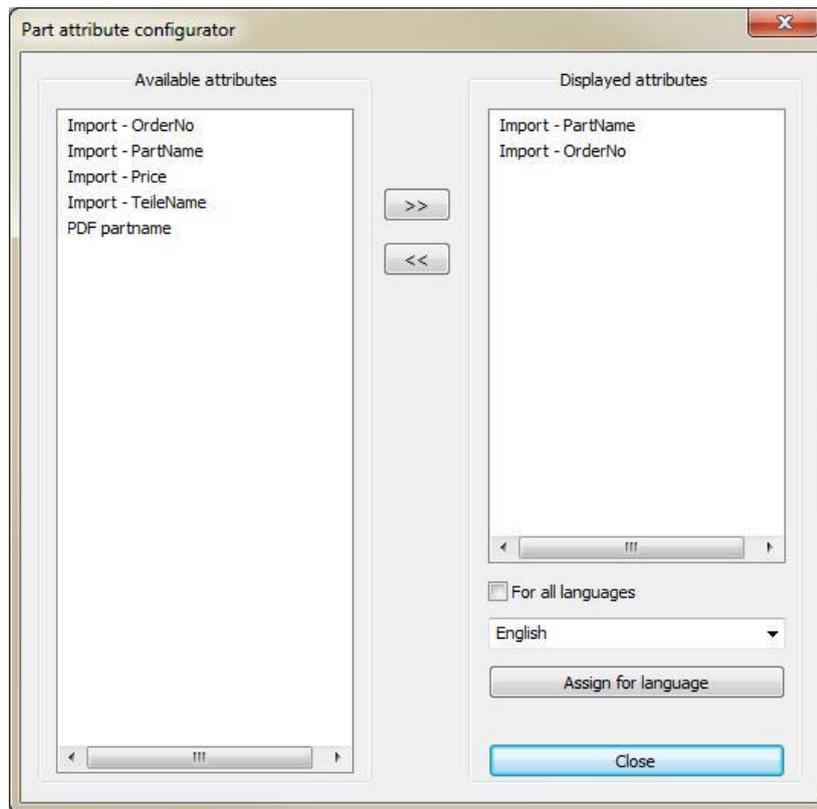
It is also possible to export the descriptions for use in a later file which uses the same animation, or to translate them into a different language and import later. See more in the Import/Export step descriptions section.

Below the descriptions is a list that cannot be edited, but displays the attributes of the animated parts in each particular step. It is required to specify which part attributes should be displayed. More details on this issue can be found in the following section.

Part Attributes

Before configuring the Part Attributes to display in the PDF document, the user must import the attributes, which are brought in via a separate CSV or Text file. More information can be found under the the **Importing Part Attributes** section of this document.

To open the window **Part attribute configurator**, select the **Extras** menu in the menu bar of the 3D PDF Publish step descriptions dialog and click on **Configure part attribute display**.



In the left list box the currently available part attributes are shown. If additional attributes have been imported (see Importing part attributes) they will be signed with the identifier "Import-". The order part attributes are displayed applies to both the window "Step Descriptions" and in the PDF; this corresponds to the order defined in the list on the right side of this dialog box. In order to define a part attribute for display click on the attribute and then click the **>>** between both list boxes. To remove an attribute, simply click the **<<** button.

Before configuration, define the language in which the attributes should be set. The **For all Languages** option results in all attributes being displayed, regardless of which description language is selected. For example, a part name might have various attributes that change depending on the language selected. To assign these attributes, choose the language from the drop down and then configure via the **Assign for language** button.

Import/Export Step Descriptions

The **Import/Export step descriptions** option in the **File** menu of the 3D PDF Publish step description dialog gives the opportunity to export descriptions in any language, as well as import them again. This is very useful because it gives the user the ability to translate descriptions externally and import them again in a different language.

Under **File > Export step descriptions** the user has the choice to export the descriptions as a TXT, CSV, or XML file. The step descriptions will be exported in the language which is selected in the next window.

When editing the exported data, note the following:

CSV & TXT Format

```

StepID;StepDescriptionName;StepDescriptionShort;StepDescriptionLong
SID 1;disassembling axis;required tools: socket wrench M6; solve M6 nuts on the underside of the board and pull axis;

```

In both CSV and TXT formats the separator is a semicolon. This separates each information block from the others. Each line is the description to one step. The first line contains the headings of the "columns", i.e. the kind of information (title, short description/special note, long description).

In each following line the first entry followed by the first semicolon is the identifier of the particular step. This identifier must not be altered!

Furthermore there must not be a semicolon in the information blocks (description text) themselves!

XML Format

```

<?xml version="1.0" encoding = "iso-8859-1"?>
<Step>
  <StepName>SID 1</StepName>
  <Description>
    <DescName> disassembling axis </DescName>
    <DescShort> required tools: socket wrench M6
  </DescShort>
    <DescLong> solve M6 nuts on the underside of the
board and pull axis </DescLong>
  </Description>
</Step>

```

In the XML version the layout of the information is analogous. Each step is enclosed by a <Step> ... </Step>. The unique identifier that must not be altered is placed between <StepName> ... </StepName>.

To import the step descriptions go to **File > Import step descriptions** in the 3D PDF Publish menu bar. From here it is determined for which language the step descriptions will be imported.

Importing Part Attributes

If the attributes which are already attached to the parts in the model from the CAD data import are not sufficient, it is possible to import additional attributes (e.g. order number, price, storage/shelf, etc...).

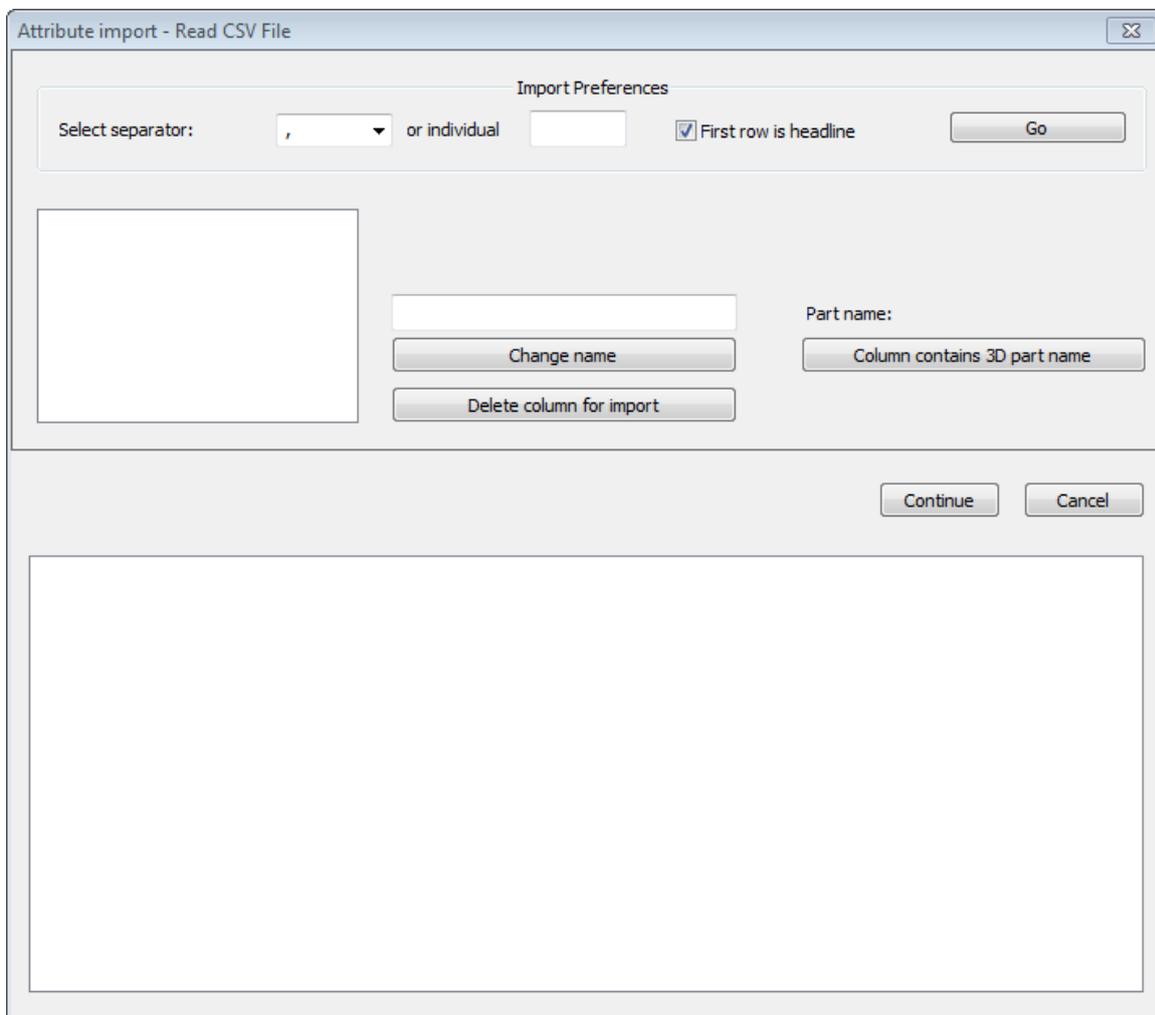
This import is possible as a TXT or CSV file. (A CSV file can be saved from MS Excel.)

The file that is to be imported must contain a column that has the part name for each dataset. This part name must be the same part name that appears in the model tree in Acrobat®, or respectively in the 3D PDF Animate model tree. Since the part name in 3D PDF Animate is displayed as it actually looks in the data structure in Acrobat®, often the part name is followed by a period and a fairly long combination of letters/digits – the unique identifier which is not shown in the Acrobat® model tree. However, this is only the case when the file has been imported in PRC format. This period and the unique identifier can be left off for the import file, as the name is only verified up to the last period.

To invoke the appropriate import dialog select the **Add/Exchange Attributes** button found at the bottom left of the 3D PDF Publish Editor window.

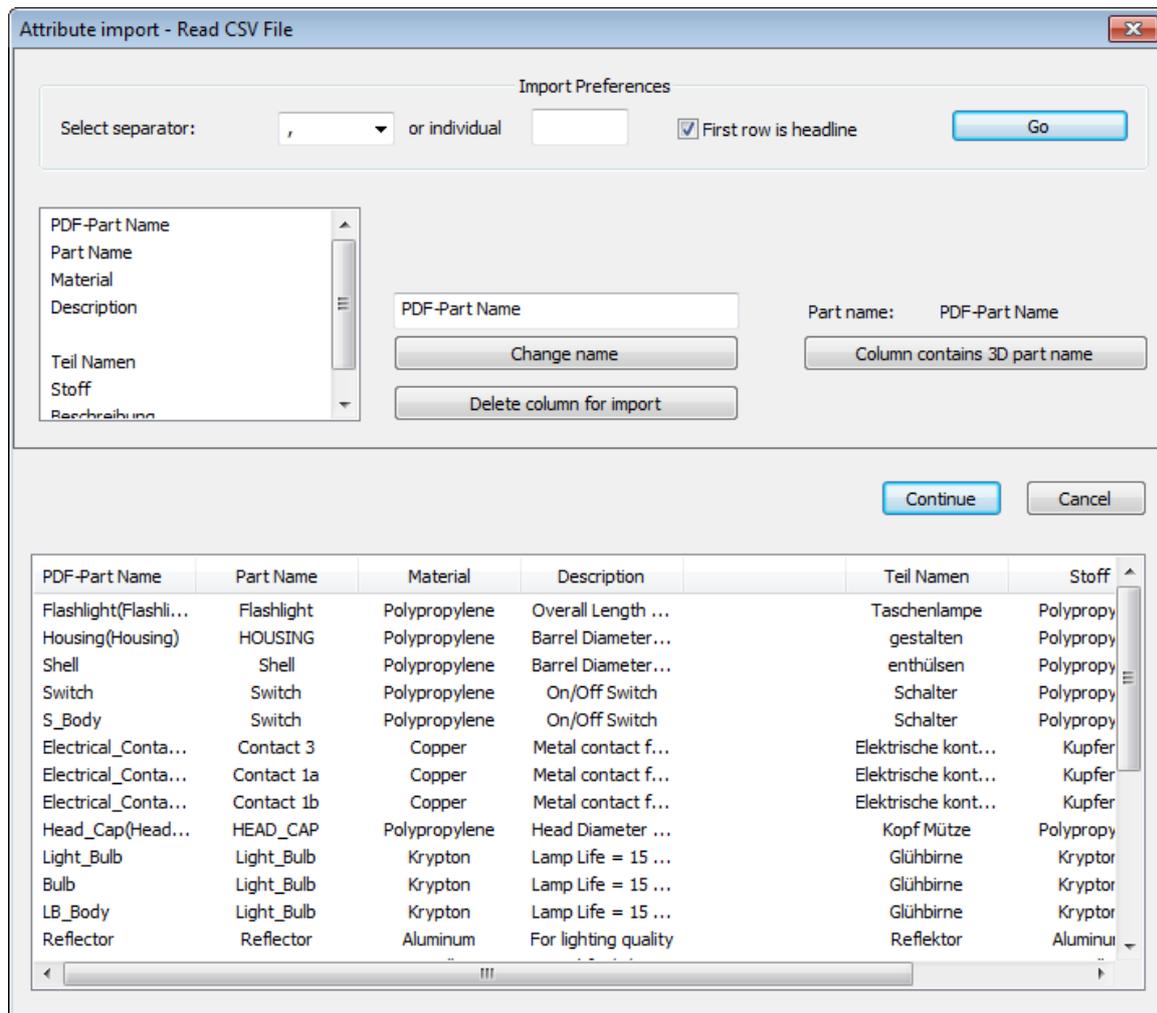
Attribute import – Read CSV File

After the file has been selected, the following dialog will open:



Choose the Separator or enter an individual one in the top area of the window that is used in the particular file to separate the information from each other in each line (i.e. belonging to one part). It is also defined here whether or not the file contains a header line. Selecting the **Go** button will import the file for analysis.

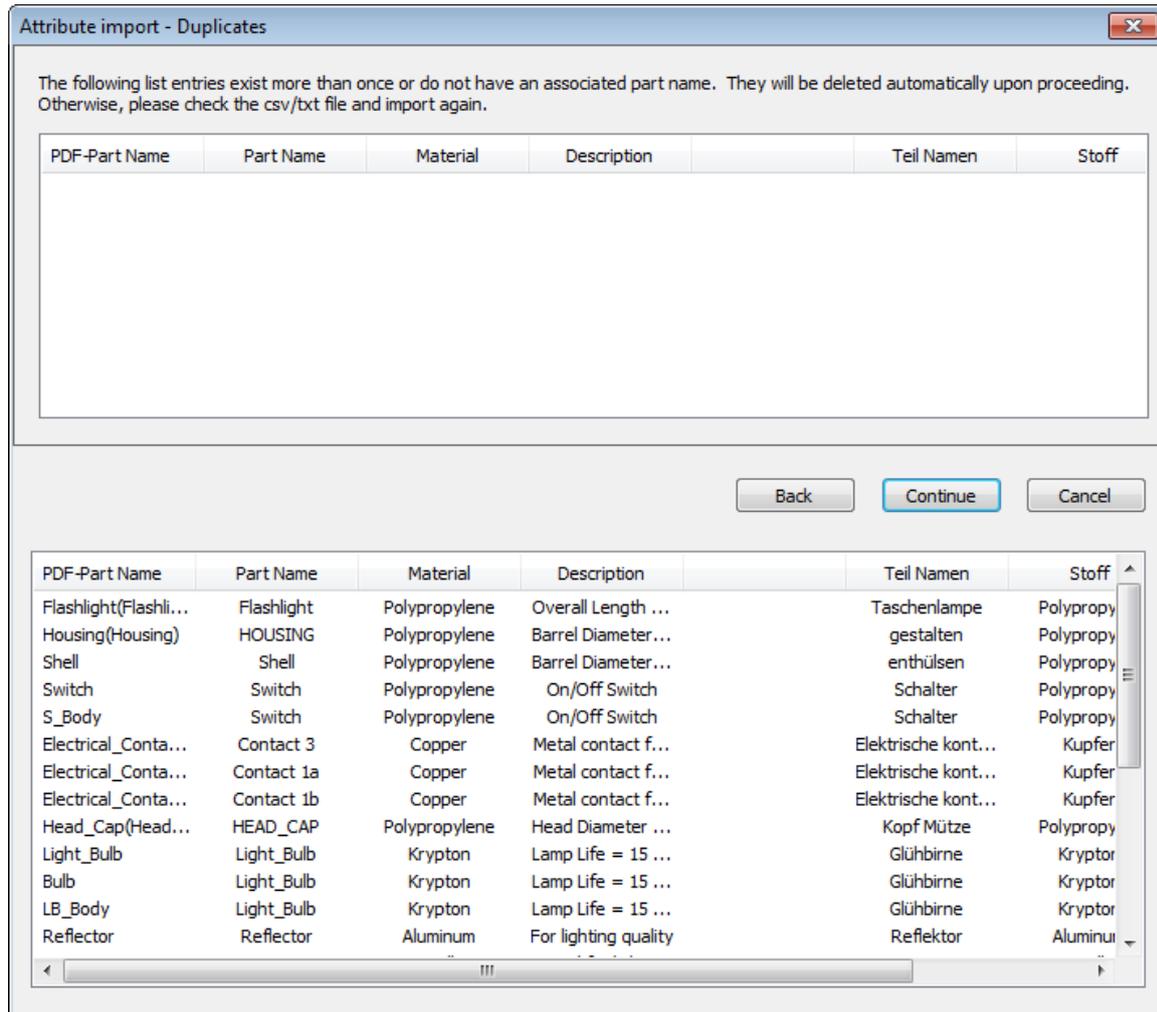
3D PDF Publish



The information is shown in the lower list box as it is imported. In the middle of the dialog, on the left, there is a list box that shows the headers. Upon clicking one of the entries in the header list box, the name of the header will appear in the text field to the right. Here it can be decided to either **Change name** or **Delete column for import** completely. Further to the right, the selected column/header can be defined as that which contains the part name. Therefore, it is not necessary that the part name always be found in the first column during import.

The next step is to click **Continue** which will bring up a dialog that shows the double entries.

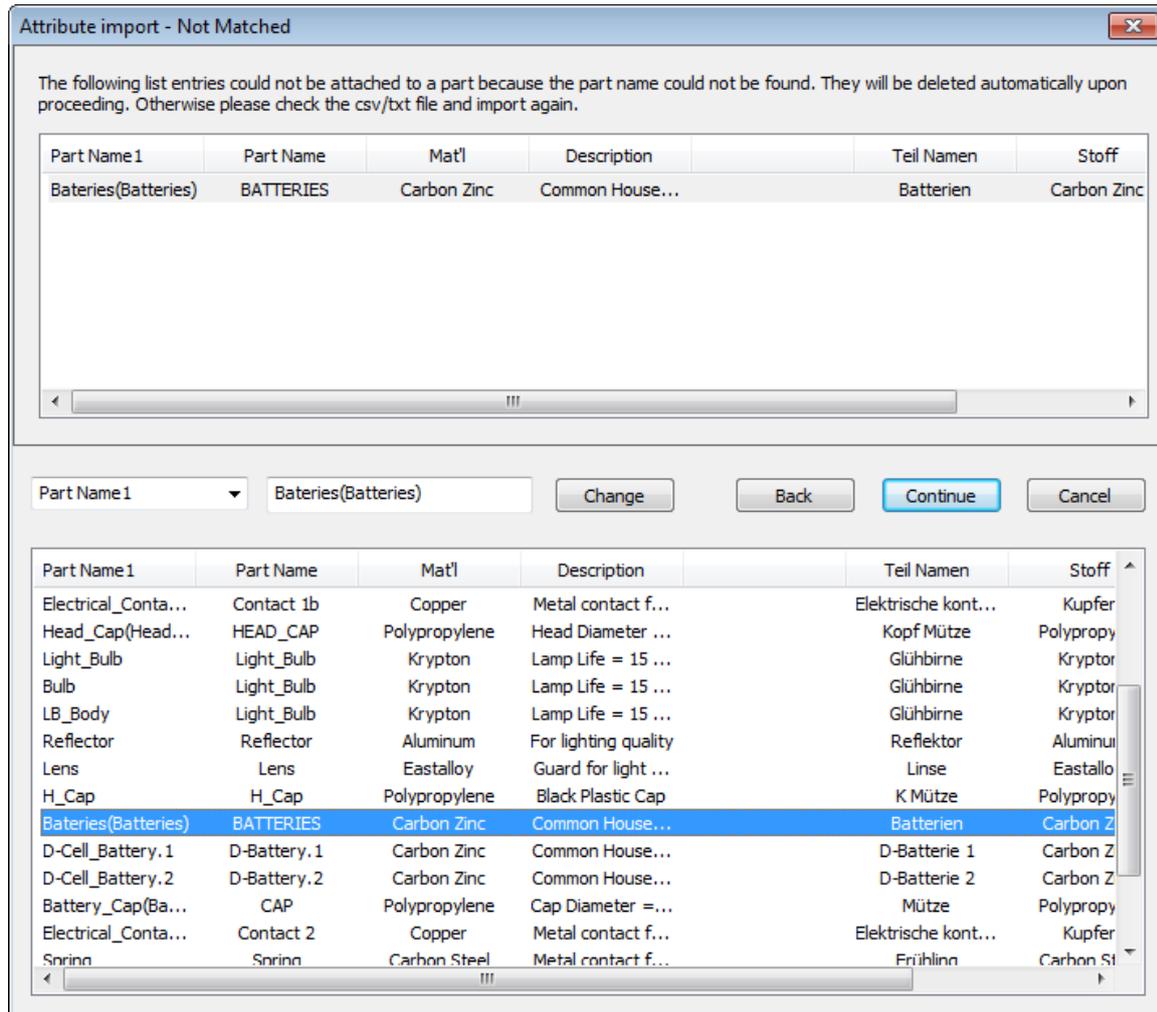
Attribute import - Duplicates



This dialog is a report only, and cannot be changed. All that is compared here is the part name. If any mistakes are found here, the file which was imported will have to be edited and **Back** can be selected to return to the first dialog to import the file again. All that is compared here is the part name.

If **Continue** is selected the double entries will be deleted from the list and a report of the parts that could not be found in the 3D file will be displayed in the next dialog.

Attribute import – Not Matched



If the upper box in this dialog is empty everything is okay. Otherwise, if there are items in this list they will be the part names from the imported file that could not be assigned to a part in the 3D.

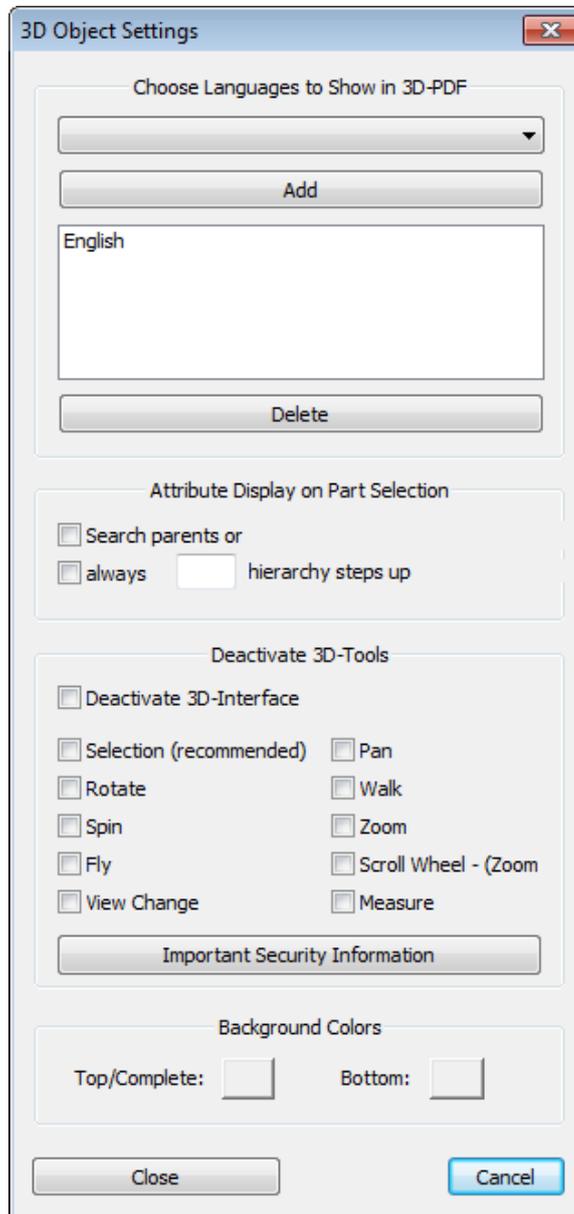
Fixing Part Attribute Information

If there are any items, or parts, displayed in the top window, it is because the parts listed do not match. There are items, or Part Names, in the CSV file that are not found in the 3D object data. The user may fix the Part Attribute information simply by first selecting a column from the drop-down menu, then clicking on the row in either the top or bottom window. The user can then replace the text in the text field and select **Change** to make the changes. The information will automatically update right away.

Clicking on **Continue** now will import the information and brings back the 3D PDF Publish user interface.

3.6 Configuring 3D Object Settings

To configure the settings for the 3D object in the PDF beyond what Acrobat® allows, select **Extras > 3D object settings** in the 3D PDF Publish menu bar.



Choose languages to show in the PDF

The languages which are selected and added here are the ones which will be shown in the PDF document's language drop down menu. (To show the step descriptions in several languages it is required that they are entered in several languages.) The drop down box in this dialog will list all languages that have been added in the preferences and any of these can be added for display by clicking the **Add** button. By clicking the **Delete** button any highlighted language will be removed from this list. For this function to be effective the language selection box (see Add description fields in PDF) must be added. The language which appears first in this list will be that in which the PDF is opened with by default.

Attribute display on part selection

To have the part attributes not only show with the animated parts in the particular step, but also by clicking a part (assuming that the field **Part information** has been placed in the PDF) the user must set this option here for the function to work properly.

As previously described for the model tree, the tree structure in Acrobat® may have another hierarchy level below the actual part (that would also include the part attributes). If data is imported in JT format, as many as three additional levels will appear below. These hierarchy levels have to do with the internal data structure, but may be counterproductive if users click the bottom element, in which case this element has no part attributes that can be displayed. Precautions can be taken so that after clicking on a part in 3D, the object with the part attributes will be selected automatically.

The safest option is to specify the number of hierarchy levels that should be moved upwards when a part is selected. It is also possible to select **Search parents** which will attempt to determine which object in the ascending hierarchy contains the corresponding attributes. This has to be tested accordingly as the correct element might not be selected.

Deactivate 3D-tools

Using the check boxes shown here the user interface and allowable functions in the PDF can be restricted. This functionality is intended to lessen the end user's chances of making mistakes.

The **Deactivate 3D Interface** option disables the 3D user interface completely. Checking this box disables all access to the standard 3D features of the 3D toolbar as well as right-clicking within the 3D. The only function that will still be active is control of the 3D camera viewing the content using the mouse buttons:

- Left Mouse Button >> Rotating
- Right Mouse Button or Mouse Wheel >> Zooming
- Both Mouse Buttons >> Moving (a.k.a., Panning)

Aside from deactivating the navigation tools, the author can also deactivate the 3D measuring tool.

Background Colors

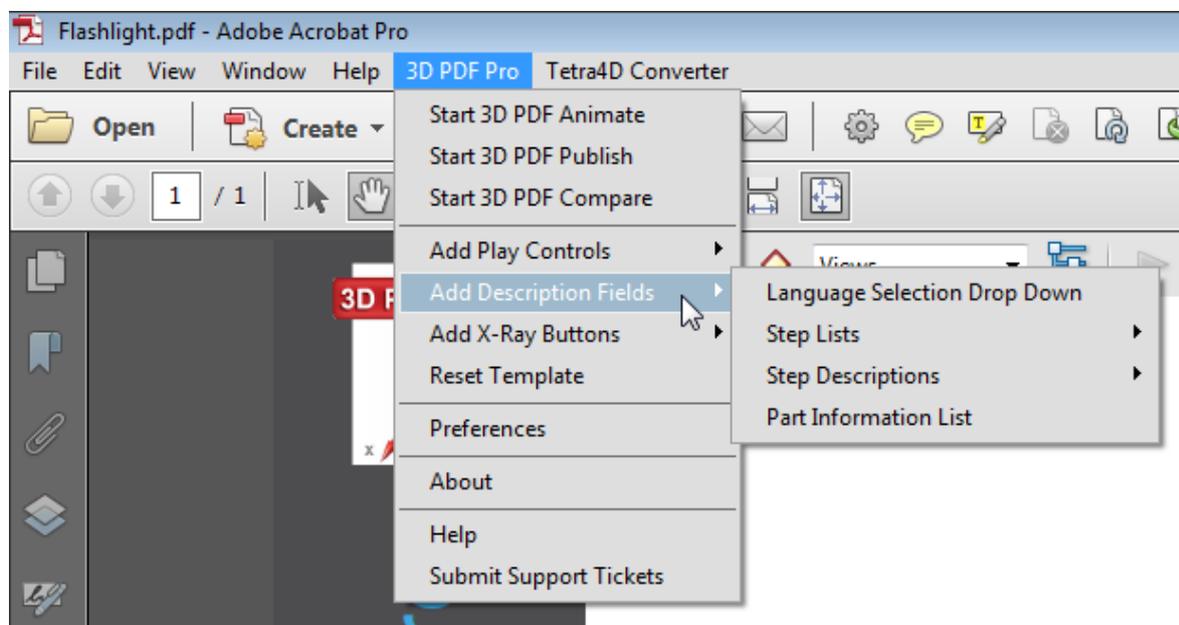
These buttons allow the user to change the background color of the 3D window. The Acrobat® functions only allow a solid background color, but here even a gradient from top to bottom can be defined. **Top/Complete** changes the complete background color. Setting **Bottom** to a different color results in a corresponding gradient.

3.7 Add Description Fields in PDF

If step descriptions have been added, or the display of part attributes has been configured, the text and controls fields need to be added to the PDF to display the corresponding information.

To add the language drop down, description fields, step list, or the part information fields go to the **3D PDF Pro** menu in Acrobat® and select **Add Description Fields**. Often times when editing the PDF template the user will be working with the Content Editing or Interactive Objects, however when placing the buttons to the template Acrobat must be in **Selection** or **Pan** mode.

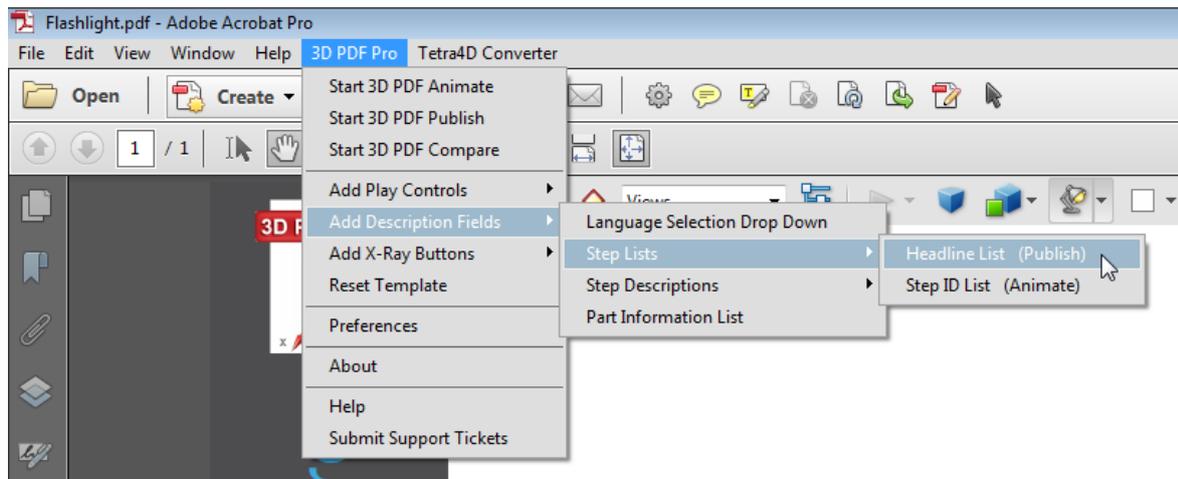
Once the 3D object has been selected, click anywhere in the PDF where the fields should be added. A pop up window will come up which will show the options of the fields that can be added. Note that the fields will always be positioned downwards and to the right from where the screen was clicked. It should also be noted that for the language selection drop down to work properly, it should be placed outside of the 3D object window.



Language Selection Drop Down

This feature enables users to establish specific languages for a reader to be able to switch between languages. This tool does not translate the languages, but with the proper set up, users can easily view the 3D PDF document in multiple languages.

3D PDF Publish

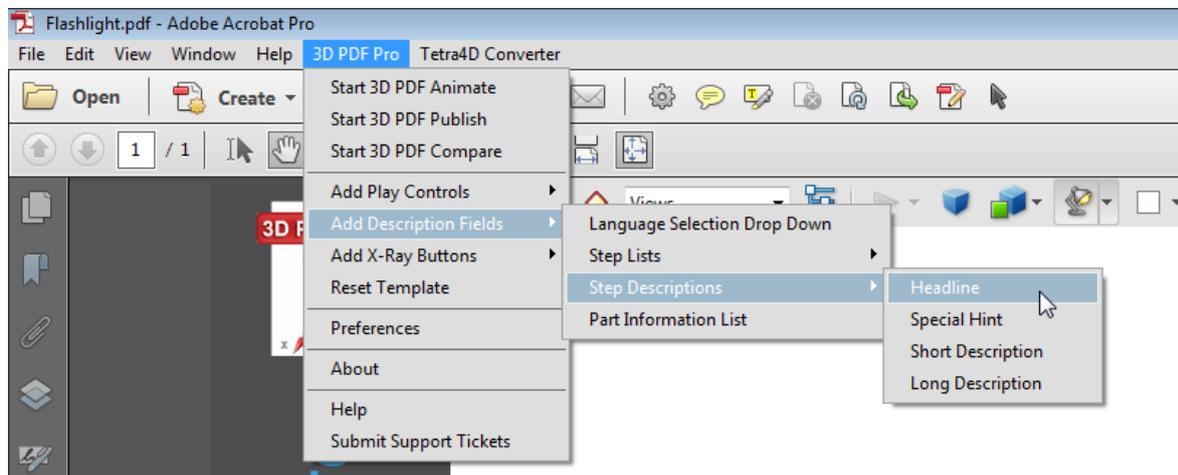


Headline List (Publish)

The Publish tool enables users to display a custom set of Step lists that differ from the user who labeled the steps in the animator. This field will allow users to see the step list and are able to click on the different items on the list to jump to specific steps.

Step ID List (Animate)

This option displays the Step List as it was defined in the 3D PDF Animate tool. Users can click on a specific item on the list to view a specific step.



Step Descriptions

Adding the description fields will automatically add all four fields at once, which are defined in the 3D PDF Publish tool; Headline, Special Hint, Short Description, and Long Description.

Headline

Associated with the Headline List (Publish) this text field will display the individual **Headline** defined in the 3D PDF Publish editor.

Special Hint

Defined in the 3D PDF Publish editor, the author can use this field to ideally display a caution / warning message. However, the **Special Hint** field is just a text field for the author to display any type of text information throughout the animation.

Short Description

Defined in the 3D PDF Publish editor, the author can use the **Short Description** field to include additional information about each step of an animation.

Long Description

Defined in the 3D PDF Publish editor, the author can use the **Long Description** field to include additional information about each step of an animation.

Part Information List

The author can set up an interactive Parts List or BOM that can either list the entire components of the assembly or limit to only the items being used in a specific step. The user can set up the template to be able to click on a part and see part attributes displayed in this field or be able to click on a part in the list to see highlighted in the 3D assembly.

The fields which are placed are typical Acrobat® list, text, and down down fields. By using the Acrobat® select object tool, the properties of these fields can be accessed by right clicking. The complete look and behavior of the fields can be edited and rearranged to meet the user's requirements.

If there are unnecessary or extra fields, they can easily be deleted. The functions which have been added to the PDF by the 3D PDF tools will always check which fields and buttons are present before interacting with them.

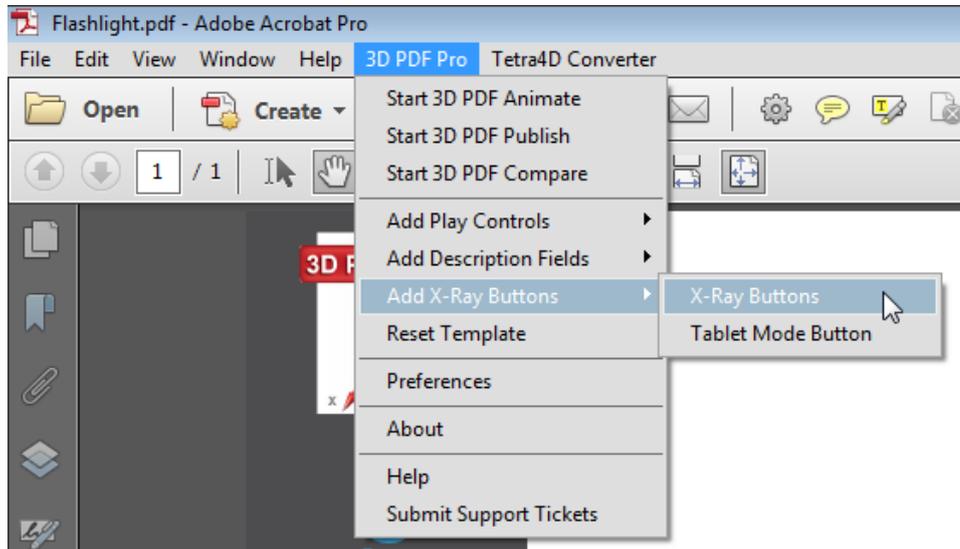
3.8 Add X-Ray Buttons to PDF

The X-Ray tool is intended to provide access to the inner parts of an assembly without creating an animation first. This is especially useful for spare part identification. If the X-Ray tool is activated, it temporarily makes parts transparent when the mouse moves over them. Clicking on the part will make the part completely hidden. Using this tool, it is easy for the user to expose the internal parts of an assembly and find the "parts of interest" quickly.

Adding this tool requires the addition of two more buttons. The first of these two buttons will go one step back in the hiding process; it will always show the last hidden part again. This button acts as an undo button and can be pressed multiple times to continue jumping back. The second button will reset the complete function, and set the visibility of the parts back as they were when the X-Ray function was first activated.

This functionality has an even greater impact when the part attributes display has been set up in the 3D object settings dialog ; the attributes are configured to specific languages in

the part attributes configuration dialog , and a part information field has been added to the PDF.



To add the X-Ray buttons to the PDF, go to the **3D PDF Pro** menu in Acrobat® and select **Add X-Ray Buttons >> X-Ray Buttons**. Often times when editing the PDF template the user will be working with the Content Editing or Interactive Objects, however when placing the buttons to the template Acrobat must be in **Selection** or **Pan** mode.

X-Ray buttons

This feature will add three new buttons to the 3D PDF template; X-Ray, X-Ray Back, and Reset X-Ray. These tools will enable users to dissect or turn off certain parts to only focus on a specific scope of the assembly. The X-Ray Back button will make the last selected object visible again. The Reset X-Ray button will make the entire assembly visible again.

Tablet mode button

Some tablets are sensitive to the touch that it may be difficult to navigate through a model using the X-Ray buttons. This function will allow users to use the X-Ray buttons with tablets.

These fields are typical Acrobat® buttons. By using the Acrobat® select object tool, the properties of these fields can be accessed by a right click. The complete look and behavior of the fields can be edited to meet the user's needs.

3D PDF Compare

4. 3D PDF Compare

4.1 Using 3D PDF Compare

Why use 3D PDF Compare?

Quite often after building an interactive 3D technical document, the original 3D model design needs to be modified or revised requiring the technical document to be updated. Unfortunately, most 3D technical document authoring solutions do not provide for exchanging a model in an existing document containing associated data such as animation, step descriptions, and part attributes. With these solutions, “updating” a technical document when there is a change to the source CAD data actually requires starting over and completely recreating the technical document with the new CAD model.

The 3D PDF Compare tool will analyze the new and previous 3D data giving a report of which parts are no longer found, new, or changed. The 3D PDF Compare tool also deletes all effected parts from the animation which have changed or could no longer be found. This gives the capability to keep the animation and only review it for the necessary changes to be made.

How does 3D PDF Compare Work?

Using 3D PDF Pro enables you to enrich a 3D model in a PDF document by defining additional information like 3D animations, step descriptions, and part attributes. 3D PDF Animate and 3D PDF Publish store this enriching information as an XML data block (“Enrich XML”) inside a 3D JavaScript attached to the 3D model’s container in the PDF document.

3D PDF Compare enables exchanging 3D-CAD data in a 3D PDF with a different model and reusing associated animation, step descriptions and part attribute data created with 3D PDF Animate and 3D PDF Publish.

It accomplishes this by:

- Comparing the old and new models and detecting any parts that have been changed, deleted or added
- Identifying any inconsistencies the model differences introduced within the animation data

3D PDF Compare edits this XML Data block in the JavaScript to resolve the issues detected with the animation, and to store information about the new model for use in a subsequent comparison.

3D PDF Compare may also be used to exchange 3D data that has no associated data created with 3D PDF Animate or 3D PDF Publish. In this scenario it will detect and report differences between the old and new models.

Exchanging Models in a 3D PDF Document

3D PDF Compare enables exchanging 3D models in a PDF document while preserving the associated Enrich XML data created by 3D PDF Animate and 3D PDF Publish. As this Enrich XML data is highly dependent on the structure of the original 3D model, after exchanging the 3D model the Enrich XML data may not be consistent with the new 3D model. E.g., an animation Step or Group may include a part that was deleted in the new model; a part may have been moved and an animation transformation start position may no longer be valid. If you attempt to interact with the 3D PDF after exchanging a model the behavior may be erratic or in some cases, may cause Acrobat/Reader to crash.

Checking for Inconsistencies Introduced by Exchanging Models

3D PDF Compare enables you to detect and eliminate any inconsistencies that may be introduced by exchanging a 3D model within a PDF document. To perform this consistency check, the first 3D Model must be analyzed and the results of this analysis stored in the XML data within the 3D JavaScript attached to the 3D model's PDF container ("Analysis XML"). This step occurs when the 'Save to PDF' function completes in either 3D PDF Animate or 3D PDF Publish.

If you open a 3D PDF that has not been modified by 3D PDF Animate or 3D PDF Publish, and you want to exchange a 3D model and run a consistency check, you will first need to use the 3D PDF Compare "Analyze Model" function to analyze the first model and store the analysis results in a 3D JavaScript attached to the 3D model's container in the PDF document.

After a 3D model is exchanged, the new 3D model is analyzed and the results compared to the analysis results stored for the previous 3D model. This comparison detects any changes to the model such as parts deleted, changed. These changes are then used to detect any invalid references to parts within the animation data.

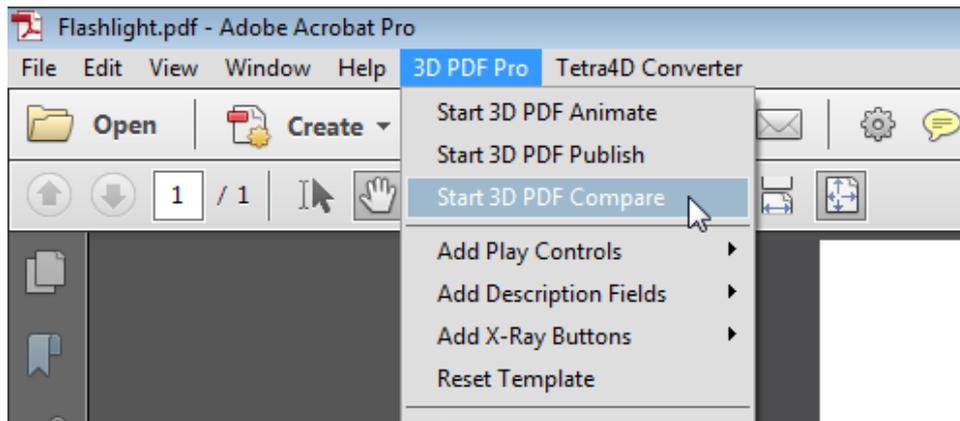
Resolving Inconsistencies Introduced by Exchanging Models

3D PDF Compare provides a report of all the consistency issues introduced by exchanging a 3D model. This information can be used in conjunction with 3D PDF Animate and 3D PDF Publish to make corrections. After making the corrections, it is recommended to run the 3D PDF Compare consistency check again. If the corrections were successfully made and saved to the 3D PDF, the consistency check report should report that no changes were introduced by exchanging the model.

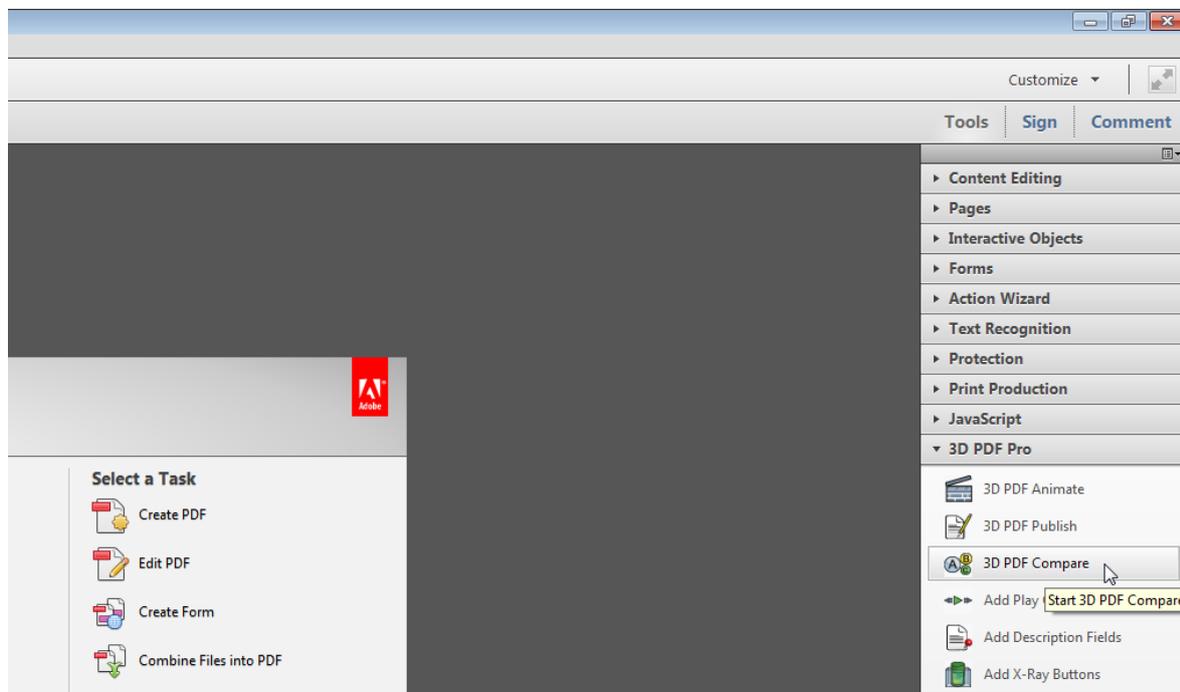
4.2 Accessing the 3D PDF Compare tools

Once 3D PDF Pro has been installed, 3D PDF Compare will be found under the 3D PDF Pro menu items within Adobe® Acrobat®.

Access the 3D PDF Compare tool via the 3D PDF Pro Drop-Down menu available in the Acrobat® main menu bar.

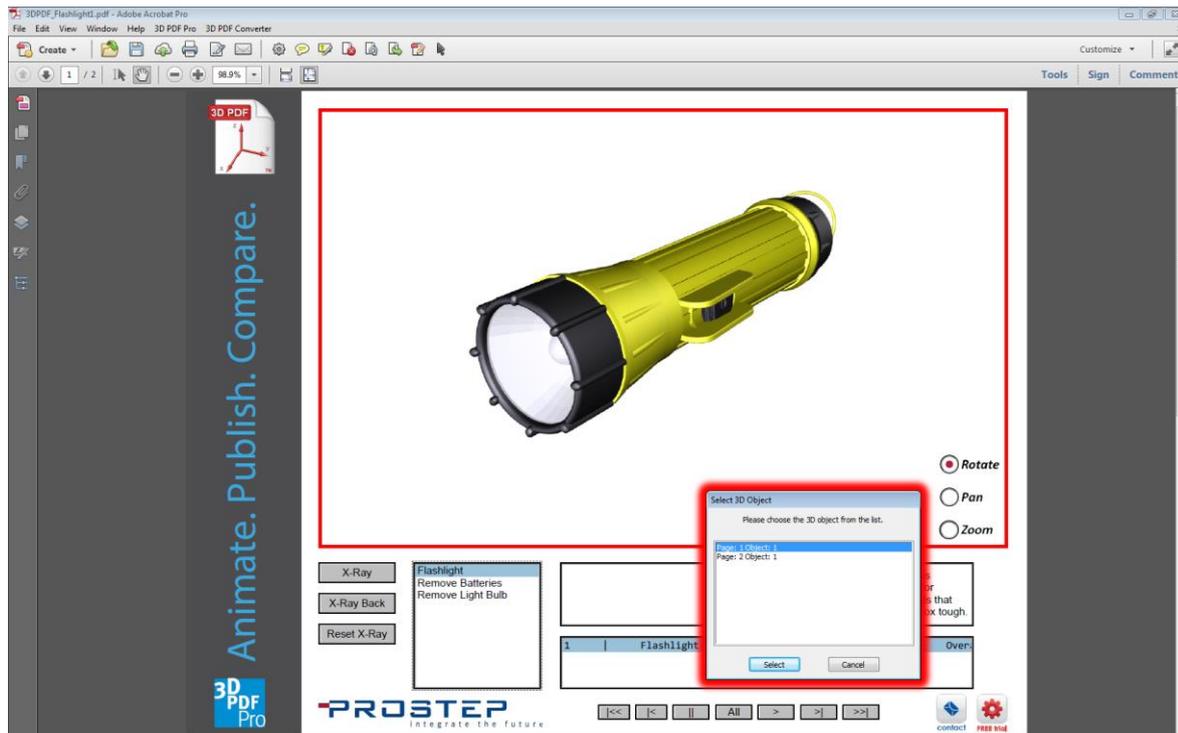


The 3D PDF Compare tool is also available via the Tools Panel found on the right-hand side of Adobe® Acrobat® Pro.



4.3 Selecting a 3D Model

If there are multiple 3D metadata objects in the PDF document, the module will open up with the following dialog. From this dialog identify which 3D object in the PDF to edit. When an option in the list is selected, the PDF will jump to the page which contains the selected 3D object and highlight the 3D Object by showing a red outline box around it.

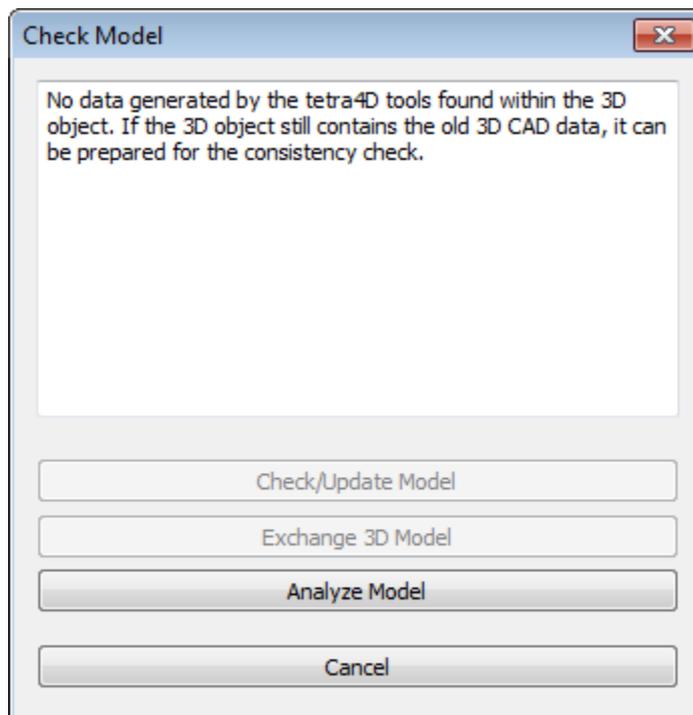


If 3D PDF Pro needs to be licensed, please go to the [Licensing](#) section for further instructions.

Check Model Dialog

After starting 3D PDF Compare and selecting a 3D object in the PDF, the Check Model dialog will pop up.

If there is no previous data embedded in 3D model from the PDF from 3D PDF Animate, 3D PDF Publish, or 3D Compare tools, then 3D PDF Compare will give you the option to analyze the current 3D metadata. **Analyze Model** will be the only option enabled.



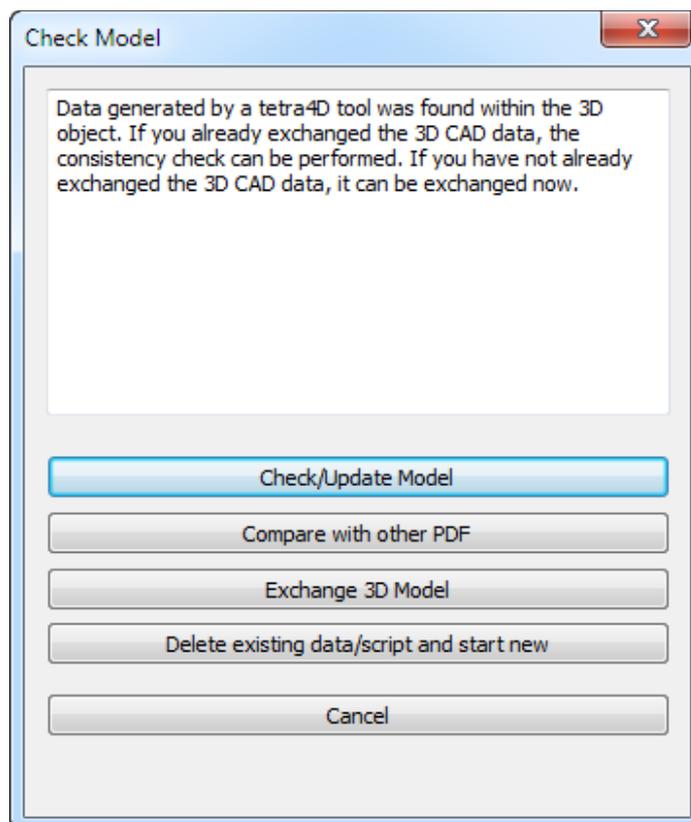
Analyze Model

If there is no 3D PDF Animate, 3D PDF Publish, or 3D PDF Compare XML data associated with the 3D model in the PDF, the pop up will instead look like the image above. Select **Analyze Model**. Then you may proceed with exchanging the model and running the consistency check as described below.

If there is existing 3D PDF Animate, 3D PDF Publish, or 3D PDF Compare XML data embedded in the 3D object the following options will be active enabling you to:

- Check/Update Model
- Exchange 3D Model
- Delete existing data/script and start new

And the dialog will look like the image below:



Check/Update Model

Selecting **Check/Update Model** after exchanging a model, will analyze the new model and compare it with the previous model's data. If the model data includes animation data, the consistency check will identify any references in the animation to parts that have been deleted or changed. After initiating the consistency check, the **3D PDF Compare Dialog** will appear.

Compare with other PDF

With this tool, users can compare the embedded 3D data within two different PDF documents. When comparing documents first start out with the updated PDF then select **Compare with other PDF** to navigate to the original PDF document. The results will display similarly as running the **Check/Update Model** feature.

3D PDF Compare

Exchange 3D Model

To exchange the current 3D model with a new one, select **Exchange 3D Model**, and then select the new 3D CAD model. Before proceeding with the 3D PDF Compare **Check/Update Model**, it is required to save the PDF, reopen it, restart 3D PDF Compare and select the 3D object in the PDF document.

Delete existing data/script and start new

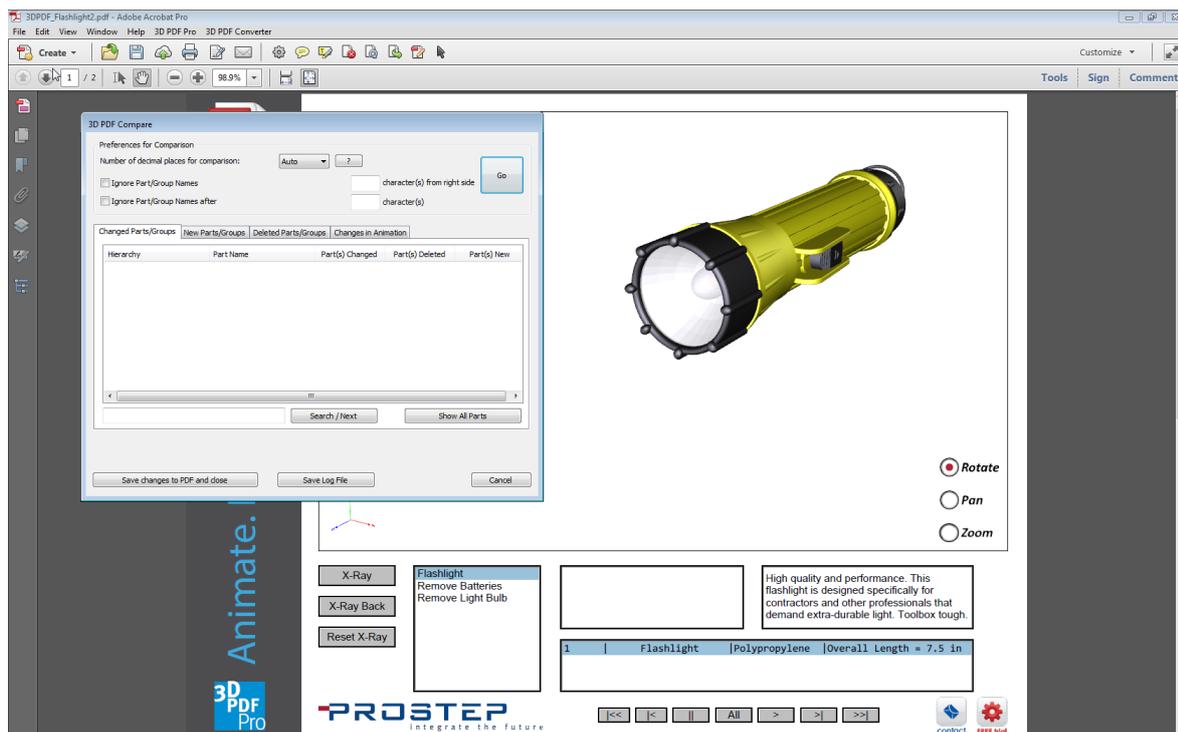
When users accesses the 3D PDF Compare tool, the user can delete the current data/script behind the 3D data in order to start fresh. This will remove all existing data that has been written behind the 3D data.

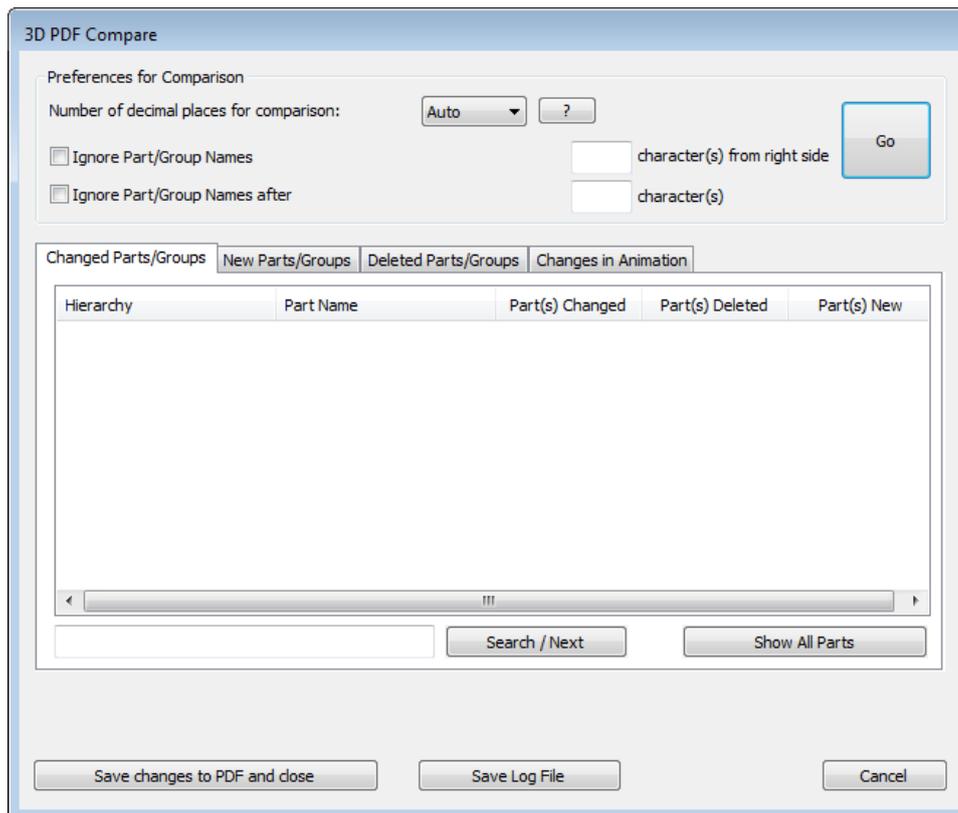
Cancel

Cancelling will close the dialog box and return to the PDF document. No further actions will be made.

4.4 Start 3D PDF Compare tools

Prior to checking for inconsistencies, or changes, between a new model and the associated animation, you must complete the **Exchange 3D Model** process. After you exchanged the data you must save the PDF file (best to give it a new name) and close Adobe® Acrobat® completely. Then you must open the 3D PDF file again and start 3D PDF Compare to now **Check/Update Model**. After this, the 3D PDF Compare dialog will appear and can be used to configure the settings for the comparison, initiate the comparison, and then review the comparison results.





Configuring the Comparison Preferences

Number of Decimal Places for Comparison

The **Number of decimal places for comparison** specifies the number of decimal places that will be considered by the 3D PDF Compare algorithm when deciding if parts have changed position, or been resized.

On opening a 3D PDF with Acrobat®, the 3D data is read from the PDF file and converted to an internal format used by Acrobat's 3D Player ("3D Player"). The position's of the parts in the model are calculated to eight decimal places (i.e., single byte precision) when preparing the data for the 3D Player. These positions may vary each time you open the 3D PDF even without changing the 3D Model. Because of this variance, it is necessary to test which setting is the best when manually configuring the preferences.

The available precision levels are 3, 2, 1, and 0 decimal places. It is recommended to start with 3 decimal places and work down. The number found in **Changes in Animation** (list below) will decrease steadily. If this number should rise again then this accuracy has gone up one decimal place too far, and the optimal setting is the previous precision level. This effect is due to mathematical rounding causing a problem to arise at some point, as shown with the two numbers in the following table.

Assume that a screw was placed exactly at $X=1.955$. If on reading the file, Acrobat® miscalculates the position by -0.0001 and then again by 0.0001 when comparing to a new model, there is a difference of 0.0002 in the position. Running the comparison with the

different precision levels, the positions will be considered different with the precision level of two.

Digits	Original Model = 1.9549	New Model = 1.9551
3	1.955	1.955
2	1.95	1.96
1	2.0	2.0

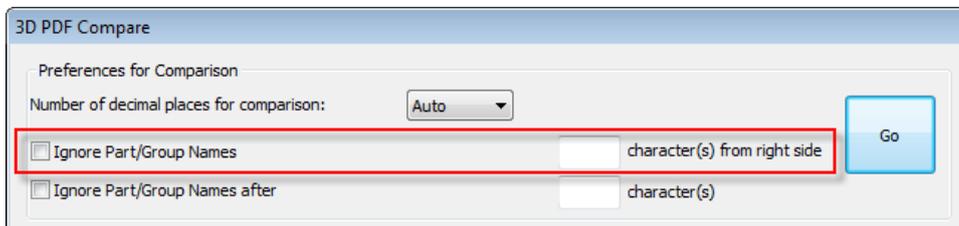
“Auto” Setting

If the ‘Number of decimal places for verification’ is set to ‘Auto’, 3D PDF Compare will run multiple iterations of the comparison while varying the precision levels and will then decide which precision level is optimal. This is the default setting for 3D PDF Compare. Because multiple iterations of the comparison are run with this option, it will take longer than manually choosing a specific precision level.

Ignore Part/Group Names by cutting a number of character(s) from right side

If the names of parts or groups of parts (a.k.a., assemblies) in the model being compared include a revision number, 3D PDF Compare has the ability to ignore a specified number of digits from the right.

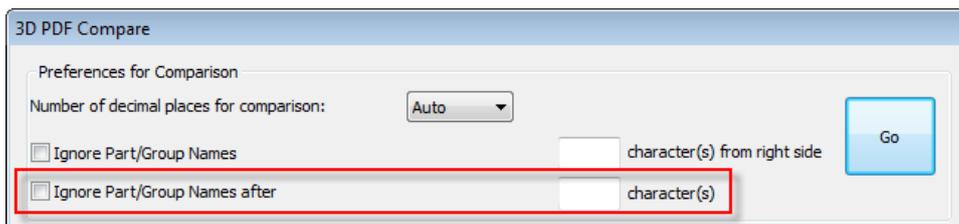
To ignore part/group names by a specific number of characters from the right, select the first option and enter the desired number of characters in the text box after “Ignore Part/group names” as shown below.



Ignore Part/Group Names after the following character(s)

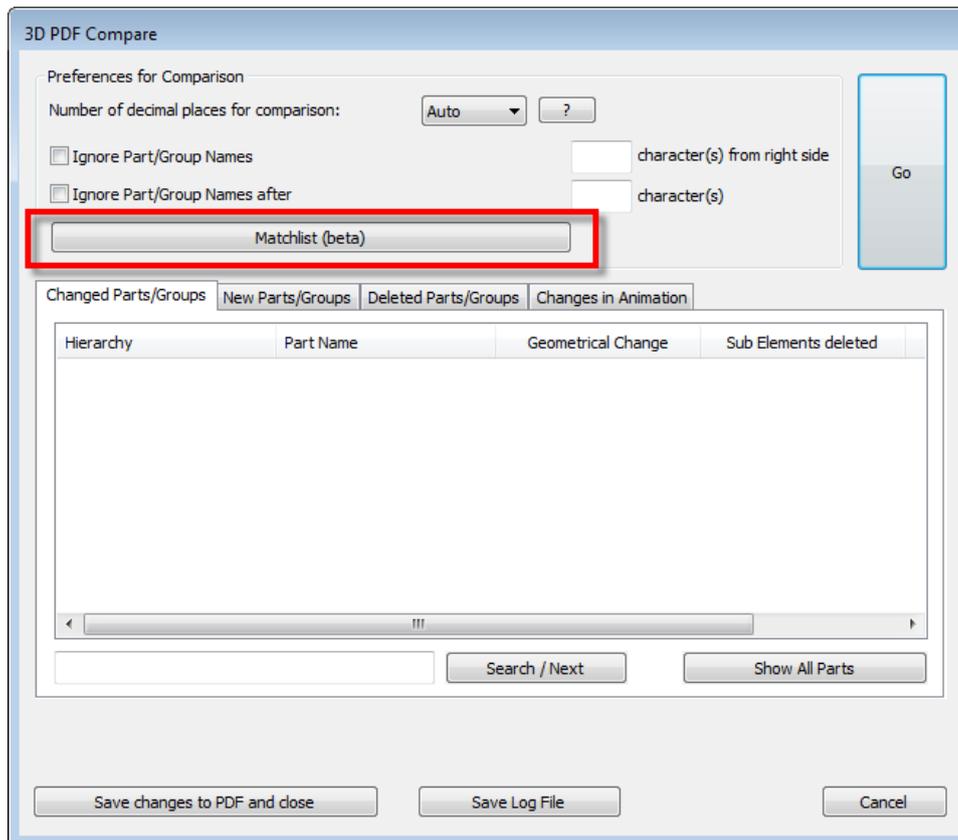
If the names of parts or groups of parts in the model being compared include characters that resemble a specified separator in a name, such as “-“, the 3D PDF Compare has the ability to ignore Part Name information after the specified separator.

To ignore part/group names after a specific character, select the second option and enter the character in the text field box to the right after “Ignore part/group names by following character(s)” as shown below.

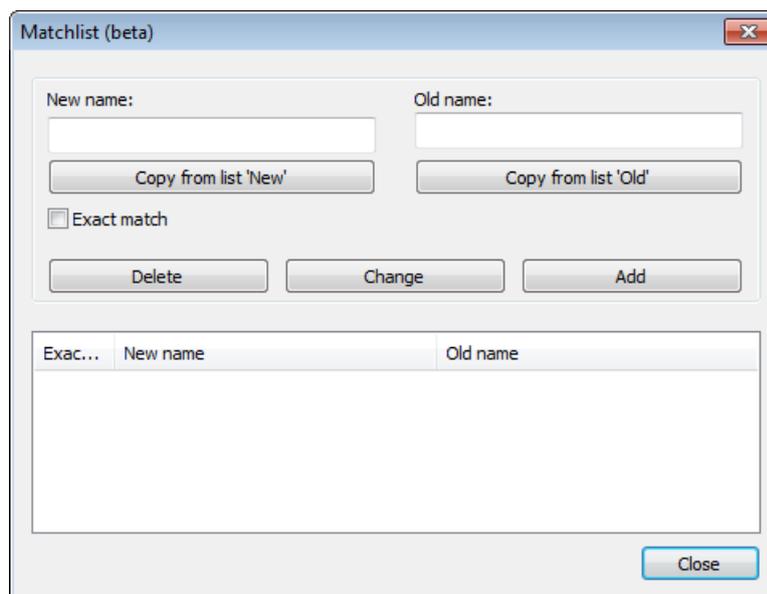


Matchlist

The **Matchlist** option helps the user to elements that may have been lost after the 3D model had been exchanged with a new model. This prevents the user from having to do further manual work fixing the animation.



Connect the new name with the old name to avoid losing elements from the original version that the user does not want to lose.



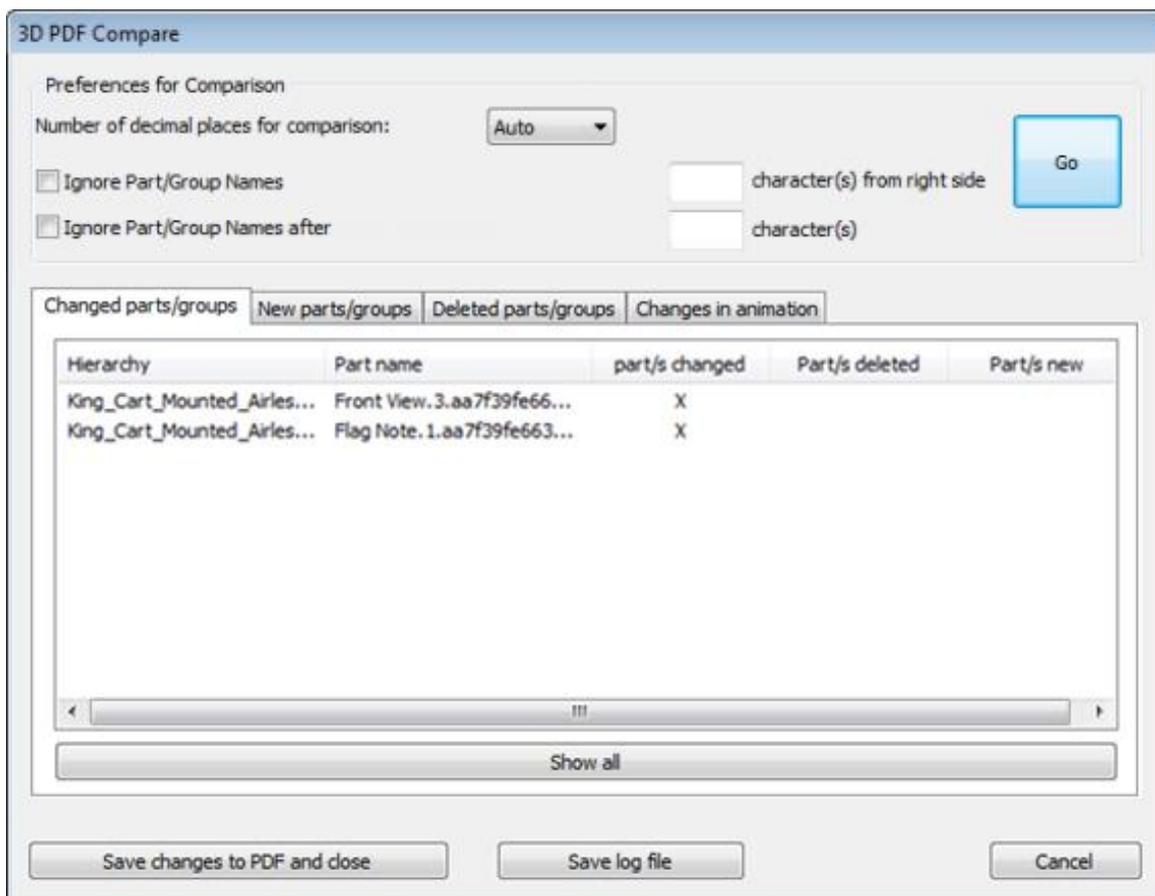
Reviewing the Comparison Results

After initiating the comparison, the results are calculated and provided in the tabbed section of the 3D PDF Compare dialog.

Changed Parts/Groups

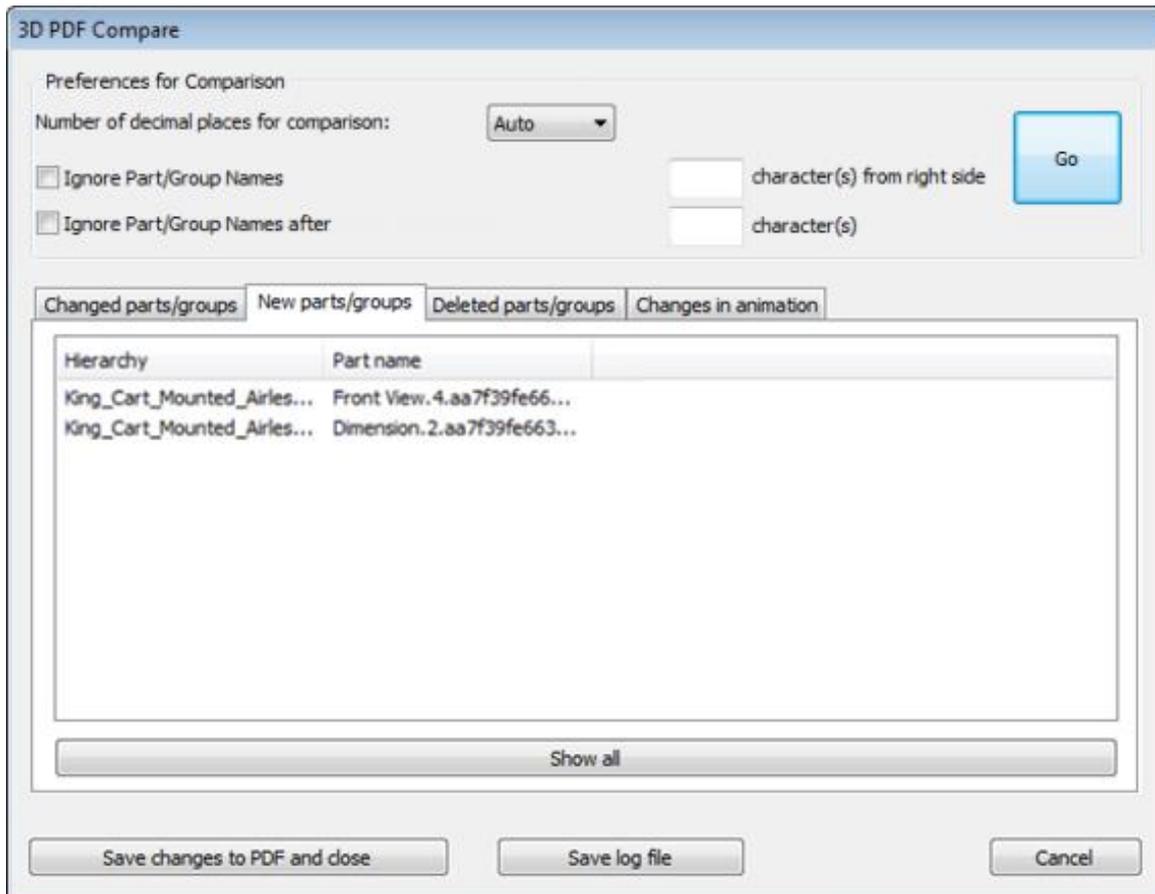
Under the first tab **Changed parts/groups** a list is displayed of the parts or groups (a.k.a., assemblies) which are still present but have been changed. It is counted as a change when, for example, a part is removed from a group in the model, or a part in a group has changed its name.

Within the list it is possible to show these parts separately by clicking on the entries in the list, or together by selecting **Show all**. The parts and assemblies will then be highlighted in the 3D model displayed in Acrobat.



New Parts/Groups

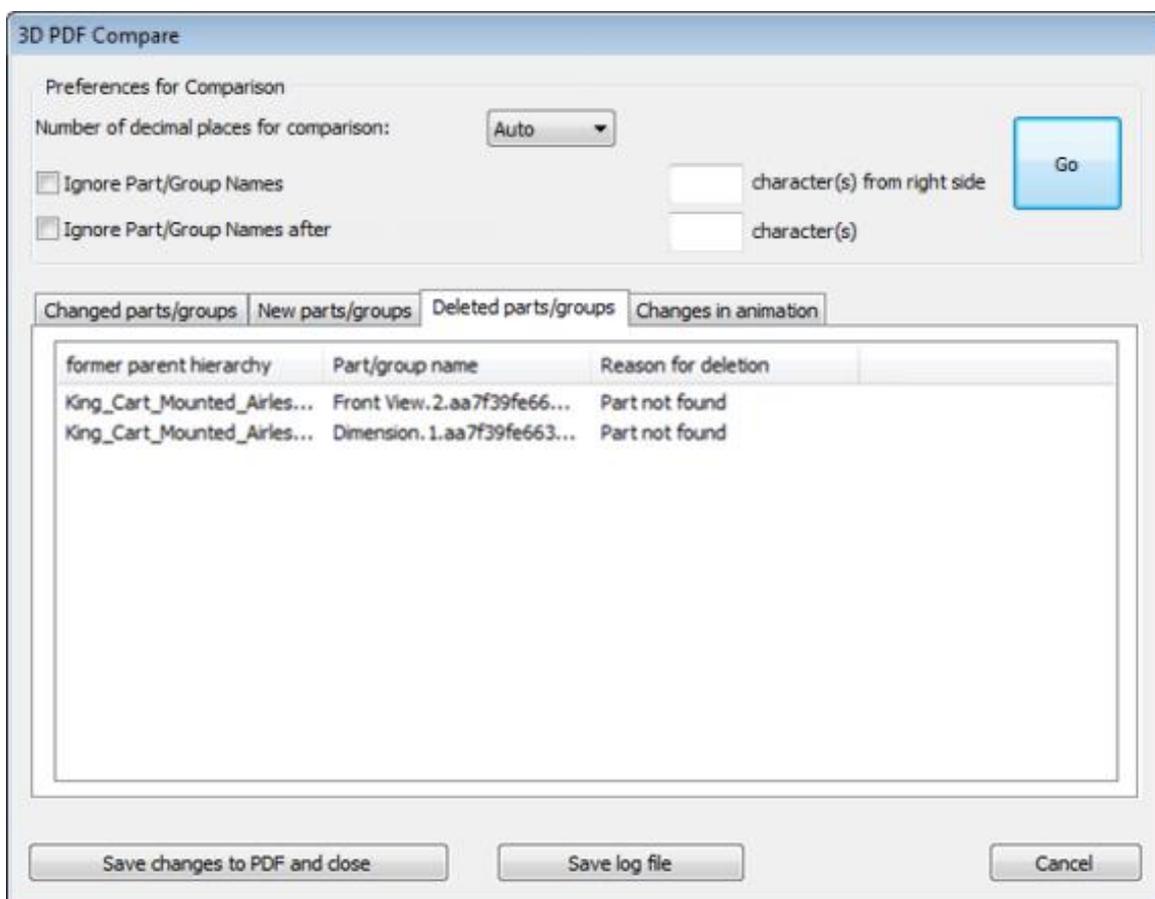
In the tab **New parts/groups** there is a list of parts and groups (a.k.a., assemblies) that are new to the model. By clicking on a list entry the particular part will be highlighted in the 3D model displayed in Acrobat. In addition, the complete list can be highlighted by clicking the button **Show all**.



Deleted Parts/Groups

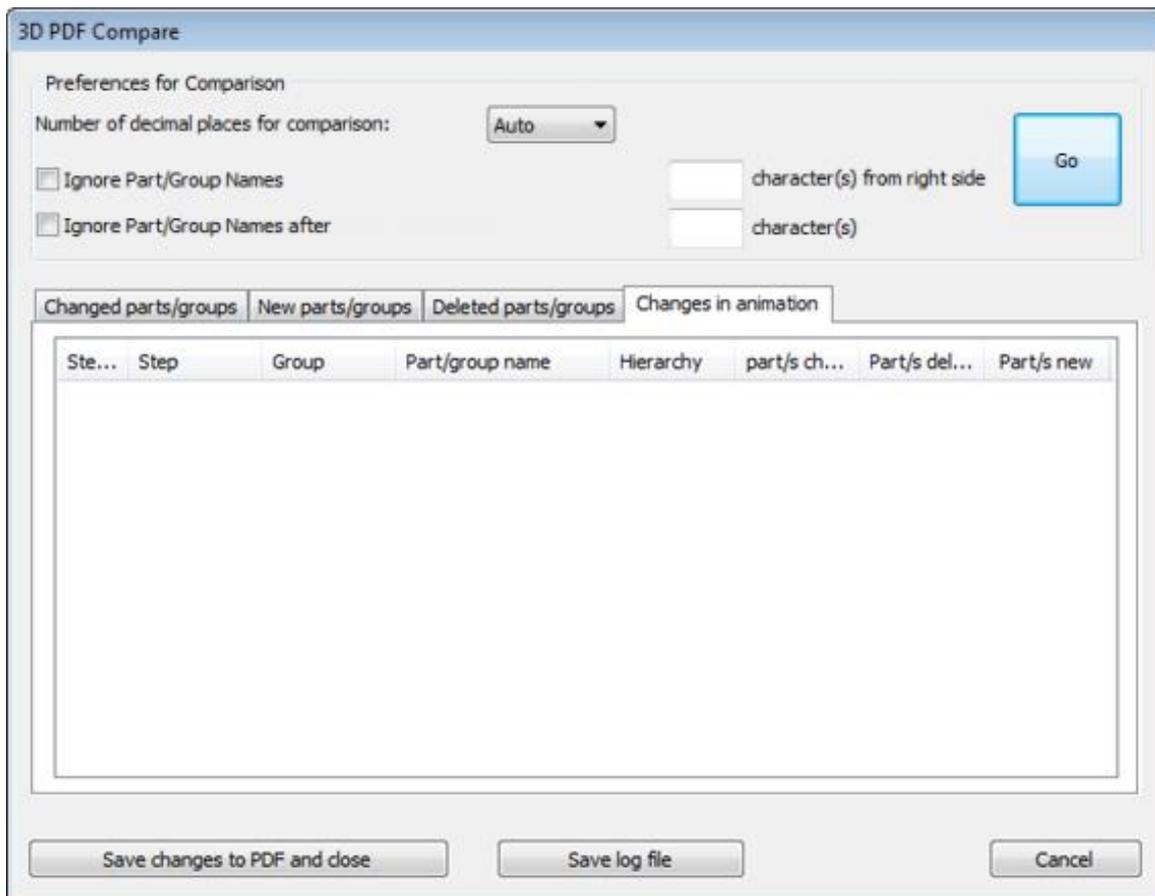
In the tab **Deleted parts/groups** there is a list of parts and groups (a.k.a., assemblies) no longer found in the model.

However, even if there are entries here, parts may not have actually been deleted. Reasons for this include that these parts have a name that appears several times in the model, have been moved, or the name has been changed. The hierarchical structure can be found in this list. This is where the part was previously found and where it was expected to appear. This will make it easier to find where the updated part is.



Changes in Animation

If there is an animation embedded in the 3D object that was generated by 3D PDF Animate, there will be a notice of changes that will be made to the animation data due to inconsistencies introduced by the new model. These changes can be found in the **Changes in animation** tab. The second column in this list shows the step name, and the third shows the name of the group in which the part was animated.



3D PDF Compare

Save changes to PDF and Close

By choosing **Save changes to PDF and close** the inconsistencies found by 3D PDF Compare will be resolved. This will update the XML data in the 3D JavaScript embedded in the 3D Object in the PDF document and will save all of the listed changes in the 'Changes in Animation' tab to the JavaScript.

So for example if there was a group created that had a part assigned to it which is not in the new model, it will save the animation to reflect that the existing group now has no parts assigned to it. Also if a part was changed which was involved in a group it will either update that group to have the changed part, or remove that part from the group.

Cancel Changes

Choosing **Cancel**, will cause the 3D PDF Compare to close without making any changes to the XML data in the embedded JavaScript. This will result in the PDF file having the new exchanged 3D model and the 3D JavaScript with XML data built from the original model. In most cases it will be impossible to start 3D PDF Animate or 3D PDF Publish again and attempt to edit the associated data and the only option available that will work is to choose 'delete existing script and start new' from within 3D PDF Animate or 3D PDF Publish.

Save Log File

The results from 3D PDF Compare can be saved to a log file using the **Save Log File** function.

This will save a log file which lists all changes detected in the model and all changes made to the animation to resolve inconsistencies between the new model and the animation data.

4.5 Best Practices

When working with 3D PDF Compare the following principles should be followed or observed:

Using Acrobat tools to delete the 3D object will also remove its 3D PDF Animate and 3D PDF Publish Data

Since 3D PDF Animate data is stored in a JavaScript attached to the 3D model's container, deleting this object using tools in Acrobat will remove the JavaScript and the associated animation data. Therefore, the complete 3D object should never be deleted and instead the CAD model should be exchanged using the **Exchange 3D model** command in the 3D PDF Compare module which preserves the 3D Model's container object (i.e., the Rich Media Annotation) and any associated 3D JavaScript.

Use the same 3D format in PDF for each model to be compared

When exchanging data always make sure that the same 3D storage format inside the PDF is used for the new 3D model as was used with the old 3D model (i.e. PRC Solid, PRC

tessellated, PRC Solid+Tessellated, or U3D). If the 3D storage format is changed the entire model will likely be reported as new by the consistency check.

Part name/position changes and the Compare Algorithm

In addition to animation data, during the consistency check 3D PDF Compare analyzes changes to a model's product structure and to individual parts. This algorithm will work as long as the parts have the same name and are roughly positioned in the same place.

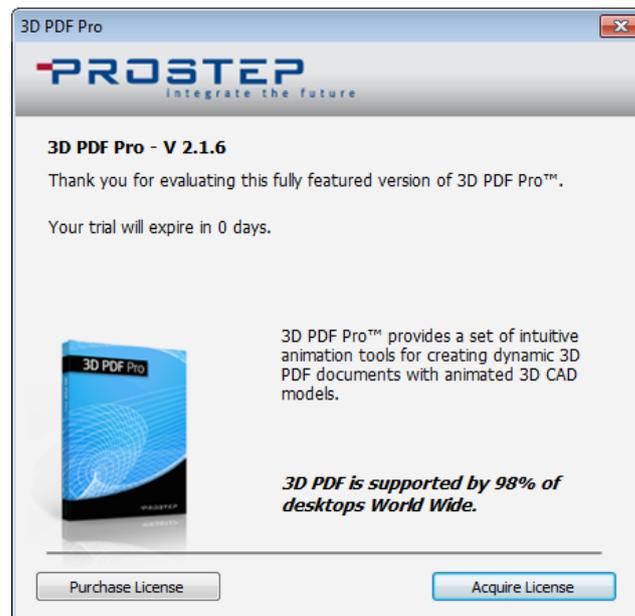
Updating an animation after exchanging and comparing a 3D Model

When updating an animation after completing a compare it is best to work through the steps in order that they appear in the timeline, one after another. Otherwise the parts could be moved to another position. If this happens a message box will appear warning the user. All parts which were updated and listed in the **Changes in animation** tab will be removed from the animation automatically after the changes are saved. Furthermore, additional imported attributes associated with these parts will also be deleted. These animations and attributes should be updated and re-imported.

Even though all care has been taken to design this analysis as accurately as possible it is strongly recommended that the animation is checked to ensure that everything moves as intended.

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To access the licensing dialog select any of the **3D PDF Pro** tool in the Acrobat® menu. Select **Start 3D PDF Animate** or **About**. The following dialog box below will open if you have not yet registered your 3D PDF Pro plugin.



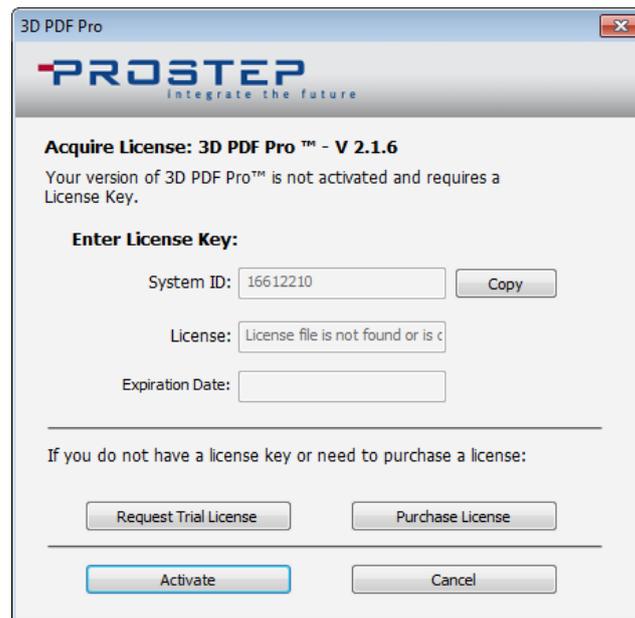
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