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Understanding File Formats that Import in MotoSimEG VRC

Introduction

MotoSim offers many formats to import from, but not all are equal. Some formats work better than others and it depends which CAD software package it came from. This document will discuss best practices for the different import formats.

Using Direct CAD Formats

They say less is better and that is true in the world of CAD. The fewer conversions required to get from the source application to the destination application the better. Converting CAD formats is like human language translation. Imagine translating English to German to Spanish to Japanese. What comes out will not be the same as what went in.

MotoSim allows for direct CAD models to be imported without the need to convert to another filetype first. Using compatible, native CAD formats are perfectly acceptable if it is understood that there are certain constraints to using direct models. The primary constraint is the version of the CAD software that was used to create the model.

Relative to the CAD software, MotoSim is a 3rd party, downstream application. There will be a delay in supporting the latest version of a particular CAD software package. For example, MotoSimEG VRC 2021SP1 supports Solidworks 2003 – 2019. Any version of Solidworks older than 2003 or newer than 2019 will be unreadable by MotoSim. Older versions shouldn't be an issue, but it is very common for companies to keep their CAD software up to date, and the latest full release of Solidworks is 2022.

Another limitation is some CAD software have limited filetype support. An example is Autodesk Inventor. MotoSim will accept Inventor part files only, not assembly files.

When running into these kinds of limitations it is best to move to the second option - using a CAD translation format.

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Preferred File Formats

Since MotoSim is able import many formats, it is best to use the format that is closest to the originating CAD software the files are being exported from.

Remember to translate as little as possible and stay as close to the native software format; to maintain model integrity.

The two formats that work best with MotoSim are Parasolid and STEP.

Parasolid has the extension of .X_T and STEP files will use the extension of .STP or .STEP.

Parasolid Format

Parasolid may seem like a universal file format, but it is not. It just happens to be the native Kernel (the core component to 3D CAD) to some of the more popular CAD packages (Solidworks, Solid Edge, and NX, to name a few).

Other CAD software (Creo and Inventor) can have issues saving files to the Parasolid format, since their Kernels are very different.

Also remember that parasolid is version dependent with MotoSim. As an example, MotoSimEG VRC 2021SP1 supports parasolid versions 9 – 31.1. When saving a CAD model as a parasolid, in the CAD software, select a version in the allowed range and MotoSim will import the file without issue.

Note: CAD software will default to the latest version of parasolid, which may be out of range. Change it before saving the file in CAD.

STEP Format

If the CAD software is not parasolid based like the examples above, then use STEP.

MotoSim will recognize all three versions (203, 214, and 242) but as a rule, try and avoid using 203.

It was the oldest version of STEP and does not support color in the models; just gray, making it difficult to distinguish details.

Import Formats to avoid

As mentioned before, MotoSim accepts many import formats but two that are best avoided is STL and IGES.

While perfectly acceptable to import; each has issues that many people will miss until it is too late.

IGES

IGES is the oldest translation format in the CAD community, going back many decades. It is considered a legacy format that CAD companies reluctantly support.

That alone should be a red flag.

The problem with IGES is that there is no one agreed standard. Every CAD company has their own "flavor". This means that it is anyone's guess what will result when converting a model, especially a complex model. The most common issues are model gaps and very large file sizes.
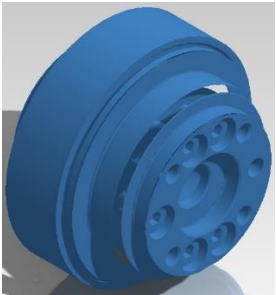
STL

STL is another format to avoid if possible. Why? Because STL contains no B-Spline curves (no real geometry), just tessellated triangles - thousands of them.

This causes two issues:

1. STL files can be massive if they were saved with high detail from CAD, slowing down MotoSim and any 3DPDF created from MotoSim
2. STL files can not be used with MotoSim's CAM function utility .Any intention to automate program-points is a no-go with STL models.

PSA on Importing

Always remember that when exporting CAD data that all models are exported from the same assembly. That way the origin is the same for all models when importing into MotoSim. All models will align the same, as in CAD. A 100% match.