

Creating CAD Geometries in Ansys Discovery Software using 3D Scans: Background Information

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Ansys Software used

Ansys Discovery™ 3D product simulation software is used throughout the different sections of this resource.

Summary

Ansys Discovery software is a powerful simulation-driven 3D design software tool that combines interactive modeling and multiple simulation capabilities. It allows users to address critical design challenges early in the product design process.

In this set of tutorials, users will gain hands-on experience with Ansys Discovery's advanced features, allowing them to clean up 3D scan files (STL format) and convert them into simulation-ready CAD geometries, with the goal of exporting these CAD models to Ansys Mechanical for further simulation. The workflow used in each tutorial can be found in Figure 1 of this document.

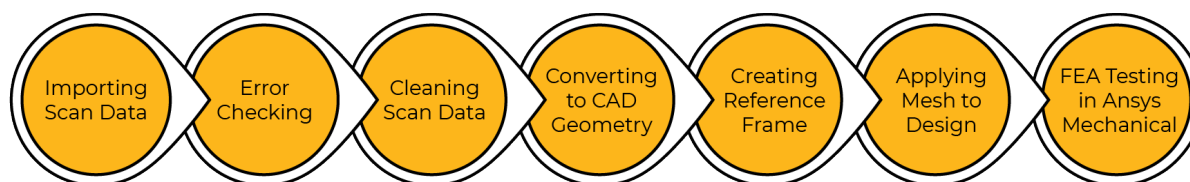


Figure 1: Steps involved in converting scan data to CAD geometry

The examples and methods showcased are simply intended to show just some of the ways to convert a 3D scan into CAD geometry.

This tutorial set includes PDFs for three tutorials and one challenge exercise and include relevant STL files for all four.

- Tutorial 1: Field Hockey Stick
- Tutorial 2: Tennis Racket
- Tutorial 3: Pickleball Paddle
- Challenge Exercise: Tennis Racket with Holes

*****Note: Tutorials will build on one another, with the most guidance provided in Tutorial 1 and the least in Tutorial 3. Be mindful of this when implementing in the classroom.***

Each 3D scan collected will have different imperfections and errors. As such, learners are encouraged to use them as a guide while taking their time to explore and become familiar with the various functions of Ansys Discovery. These tutorials are ideal for students and professionals in engineering design, computational modeling, and sports engineering.

For more resources focused on implementing Ansys software in your curriculum, check out the Ansys Education Resources site.

Background

Before delving into the steps of transforming the 3D scan data into CAD geometries using Ansys Discovery software, we will briefly describe how we generated it.

The 3D scan data provided throughout this tutorial was generated using high-resolution scanners at PrintCity, Manchester Metropolitan University (Figure 2). All scans were saved as stereolithography (STL) files, to ensure compatibility with Ansys Discovery. These manual scans capture the precise geometry of the outer surface of the objects, allowing us to create accurate digital models. During the scanning process of objects it is essential to ensure accurate geometry alignment and to reduce the number of data points in the scan while maintaining the shape of the object. This helps to optimize the process workflow and computational efficiency when transferring the scan data into Ansys Discovery.

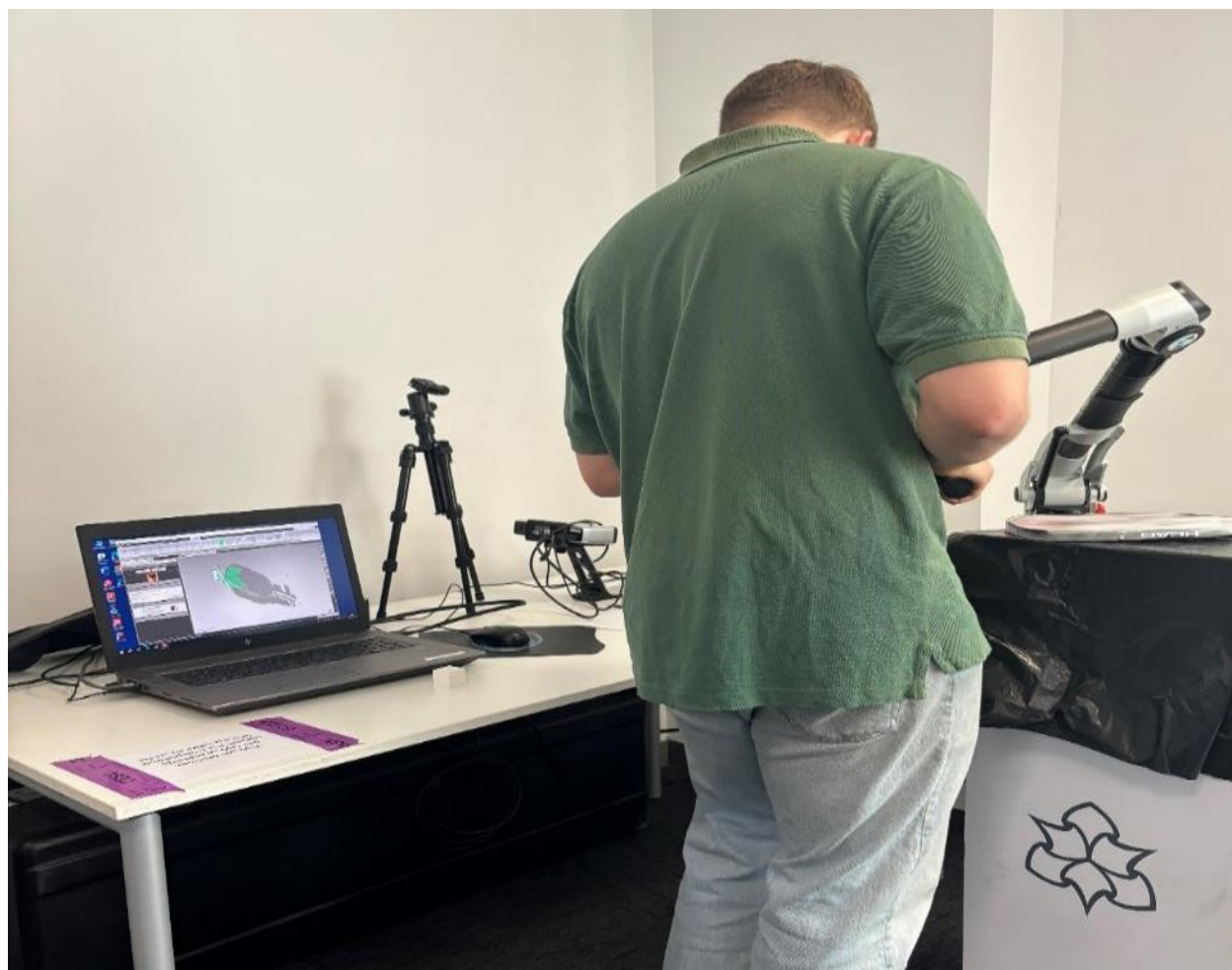


Figure 2: Showcasing the scanning process, with the live scan data seen on the laptop screen

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Document Information

This case study is part of a set of teaching resources to help introduce students to structures, fluids, or heat transfer (physics areas supported by Ansys Discovery).

Ansys Education Resources

To access more undergraduate education resources, including lecture presentations with notes, exercises with worked solutions, microprojects, real life examples and more, visit www.ansys.com/education-resources.

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