# 3D Project

## Introduction

A website has developed to display 3D models of objects which can be rotated and zoomed by users. The website uses a python backend running on the [Django](https://www.djangoproject.com/) web framework and uses [WebGL](http://www.khronos.org/webgl/) to display the 3D models.

## Aim

The purpose of this document is to detail the processes involved in generating a model and uploading it to the website so that it can be viewed.

## Generating a Model

### Photogrammetry

The workflow for generating a model is as follows:

* Take photos of the object to be modelled
* Upload the photos to the [ARC3D](http://www.arc3d.be/) web service and wait for the model to be generated
* Import the model into [MeshLab](http://meshlab.sourceforge.net/)
* Convert the textures into vertex colours
* Clean the mesh
* Export the model as an OpenCTM model
* Upload the OpenCTM model to the web server and configure the new model on web site administration page

The details for each step are outlined below.

#### Take photos of the object to be modelled

The details for taking photos

#### Generating the Model from the ARC3D Web Service

The [ARC3D](http://www.arc3d.be/) web service accepts a series of photos of the object and constructs a 3D model from them (Tingdahl & Van Gool, 2011; Vergauwen & Van Gool, 2006).

### 3D Scanner

* Using artec studio 9.2
* Scan the object
  + Best to keep the object steady and move the scanner around the object
* In tools, run sharp fusion

## Risks

The key risk in the processing workflow is the [ARC3D](http://www.arc3d.be/) web service. It is not an open source solution, so if the web service is taken offline there is no way to easily replace it.

## References

Cole, Keenan. 2012. Converting a 3D Model to OpenCTM In Meshlab for WebGL.CAST Technical Publications Series. Number 11015. http://gmv.cast.uark.edu/modeling/converting-a-3d-model-to-openctm-in-meshlab-for-webgl/. [Date accessed: 23 August 2013].

David Tingdahl and Luc Van Gool, "A Public System for Image Based 3D Model Generation", Computer Vision/Computer Graphics Collaboration Techniques 5th International Conference, MIRAGE 2011.

Maarten Vergauwen and Luc Van Gool, "Web-Based 3D Reconstruction Service", Machine Vision Applications, 17, pp. 411-426, 2006.