ENGG1200 saw students design and construct a glider that would be launched off a rail with the goal of maximising flight time and distance. For this project, I worked mostly on the design of the glider itself while my teammates took care of other areas of the project, like the flight time recorder, force gauges and paperwork.

After first experimenting with wings cut from foam using a hot wire, I eventually settled on the idea of 3D printing the wings and body of the glider. An early prototype of the glider used only a small tray attached the nose to hold the flight data recorder. It was held on by clips such that when the glider impacted the ground, the module could fall off and not absorb all the energy of the crash into the structure and risk breaking parts. This version was extremely light and would have likely performed well, however, the tutors in the course decided that this was not up to spec (despite nothing in the spec disallowing this approach).

It was only at the last minute that we found out this design would not be allowed for the final project submission, so I had to hastily rush to design a whole new fuselage overnight. As a result, the final fuselage used was large and heavy, and to be quite honest, ugly. On the day, however, the glider performed well, and I was ultimately quite happy with how the 3D printed parts performed. With more practice at designing gliders to be 3D printed and better slicing software, I feel that 3D printed small scale planes could seriously compete with other construction techniques.

I initially though it would be best to construct the wings out of foam. However, at the scale at which we were building, the best technique for making wings (hot wire cutting) did not really work very well and the wings that were produced were not very good. So, having seen some work done by people on YouTube, I decided to try 3D printing the wings. There were several advantages to this, the desired air foil could be very accurately created, every wing would be almost exactly the same, and passing construction time to the 3D printer freed me up to do other things.

The key challenge though was to make the wings light but still somewhat strong. This meant that at most there could only be one perimeter used for the surface of the wings and infill had to be used very carefully and purposefully to save weight. As such, just modelling a solid of the wing in CAD and sending it to a slicer would not suffice as the infill models used in the slicers would have been too heavy for use in the glider.