Analysis

Problem Identification

Currently there is a lack of truly free CFD (Computational Fluid Dynamics) softwares. Most programs require a subscription to use, and those that advertise themselves as free provide very limited usage without paying. This is a problem for the amateur engineer – something that is becoming more and more common with the advances in 3D printing technology. A common project that many of these people undergo is the making of a remote controlled drone or airplane. These people are likely to want to be able to run CFD simulations on their parts to find out how they will perform in the real world, however, due to the lack of free solutions, this is not something they are necessarily able to do.

This problem lends itself to a computational solution because there is realistically no way to do comprehensive fluid dynamics testing in the real world without expending a prohibitively large amount of resources and money (i.e. hiring a wind tunnel, measurement equipment). The digital environment will allow for total control of the simulation and fast iteration of scenarios. Additionally, it is not possible to do the fluid dynamics calculations by hand, as they are far too complex and would require likely hundreds of hours of calculation by hand.

Stakeholders

The stakeholders of this program would be engineering hobbyists and companies that provide a physical product.

The individual hobbyists would likely make occasional, infrequent use of the program – to check and inform their designs for any projects where fluid dynamics are important. It is not necessarily likely that hobbyists will often use it, as not all projects will require fluid dynamics simulation. This is particularly why the program would be of interest to hobbyists. Because it is unlikely it will be often used, it would not be convenient to pay for a license to use a commercial software and so would much prefer to use a free alternative – the proposed program.

Companies that provide products would be much more likely to make extensive use of the program, especially in the design and pre-production of a product. The program would inform iterative development of products, allowing for producers to design products that perform optimally without incurring any extra cost. The cost for commercial usage of CFD programs is generally large, so a free alternative that performs equal to established others would be highly preferable.

Research