

Design Scenario Response

Furthering the advancement of manufacturing working antennas using 3D printing techniques is an interesting project that has many challenges. To accomplish this goal much needed research is required in a few areas to fully understand the challenges that encompass this design task. This first would be to make sure the team fully understands the mechanical design of existing antennas used for RF and how they work so the team can better understand some of the mandatory requirements and constraints that RF antennas have (e.g. best working materials or antennae shape and length). The next step is to get an idea of what material/s the prototypes will be printed with based on price, availability, functionality, and convenience. After that, the team must understand the associated flaws and issues associated with 3D printing. For example, some of the glass printing surfaces can be warped which would mean the antenna could be printed out curved. Because of this, the team will need to discuss if there may need to be specific 3D printing machines needed for printing. The next big step would be to do a cost analysis of the project. This would have a bill of materials which includes the expected shipping costs of the materials and the cost of the potential 3D printing vendors. The team will need to decide which vendor to choose based on availability, convenience, price, and practicality.

Once the team has made all those preliminary decisions and is close to start printing the antennas, they must decide on ways of determining whether the antennas printed correctly and then determine ways of testing the antenna to make sure it still functions as anticipated. A variety of testable methods of functionality will need to be made and later tested to get feedback on the success or failure of the design.

One of the biggest challenges I would expect of this project would be using time effectively and determining the criteria for a successful print. Ideally the team would first create a schedule of the timeline that they would go about the whole project. However, it can become challenging once the team gets to the printing phase because each print cycle can take up a day and if the 3D printer malfunctions then the team will need to reprint the next day. Since the design is an iterative process, that means each time there is a new solution, there will need to be a day of printing so planning ahead for many printing days is crucial. Also, after each printed antenna, determining if it is an acceptable print prototype would seem challenging. It could be possible that a warped design may end up functioning better than non-warped design so figuring out why that happened could be an unexpected challenge by itself.