

- An explanation of the original design problem or need that the design solves:

This mobile 3D printer is designed to print on surfaces at all angles using computer vision and a unique configuration. The basic printer architecture is now successfully operating after a year of work. This year the mobile 3D printer project is a multidisciplinary project involving 3 teams. The ECE team, the ME team, and the Graduate student team.

As the ECE team, our ultimate goal is to pass the coordinates of the surface's position relative to the robot at that point to the computer when the robot is moved to a position suitable for printing on the specified surface. In this process, we need to collect information about the environment, the robot, plan the path, move the robot, compare and select the surface, and calibration. Some features that involve getting the robot to the print surface and accurately print required us to collaborate with the ME team. They added a stable, liftable balancing structure to the robot, and the physical movement system allowing the robot to move with the position information collected. At this stage, we have completed and tested the whole system.

- A narrative explanation of how you approached the project as a team, including development phases and ongoing evaluation and revision to the design:

From the team management, we set up a weekly meeting to talk about our weekly tasks and completion, use google drive and Teams to manage our whole assignments and necessary documents, use discord to communicate with each other and other teams.

From the technical aspect, we separated the project into several parts, and then several blocks. During the first term, we continued revised our block diagram based on our new ideas and project partner requirements and found the ideal items to use. During the second term, we worked on our blocks and keep communication to solve the problem we encountered. During the last term, we worked on improvement of the whole system, although we have finished our system verification, we are still working on it.

- The project timeline image:



For the clear timeline image, please see the link.

[+ Timeline](#)

- Key lessons you learned from the project as a team:

Communication is really important to make the team together and keep everyone in the same step.

Schedule is necessary for a long-term project. It can make split the project into small tasks to be easy to complete.

Work ahead is significant because it needs to plan ahead to help members do better.