DEPARTMENT OF MECHANICAL ENGINEERING

Team 15
Mission Makers
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A. JAMES CLARK
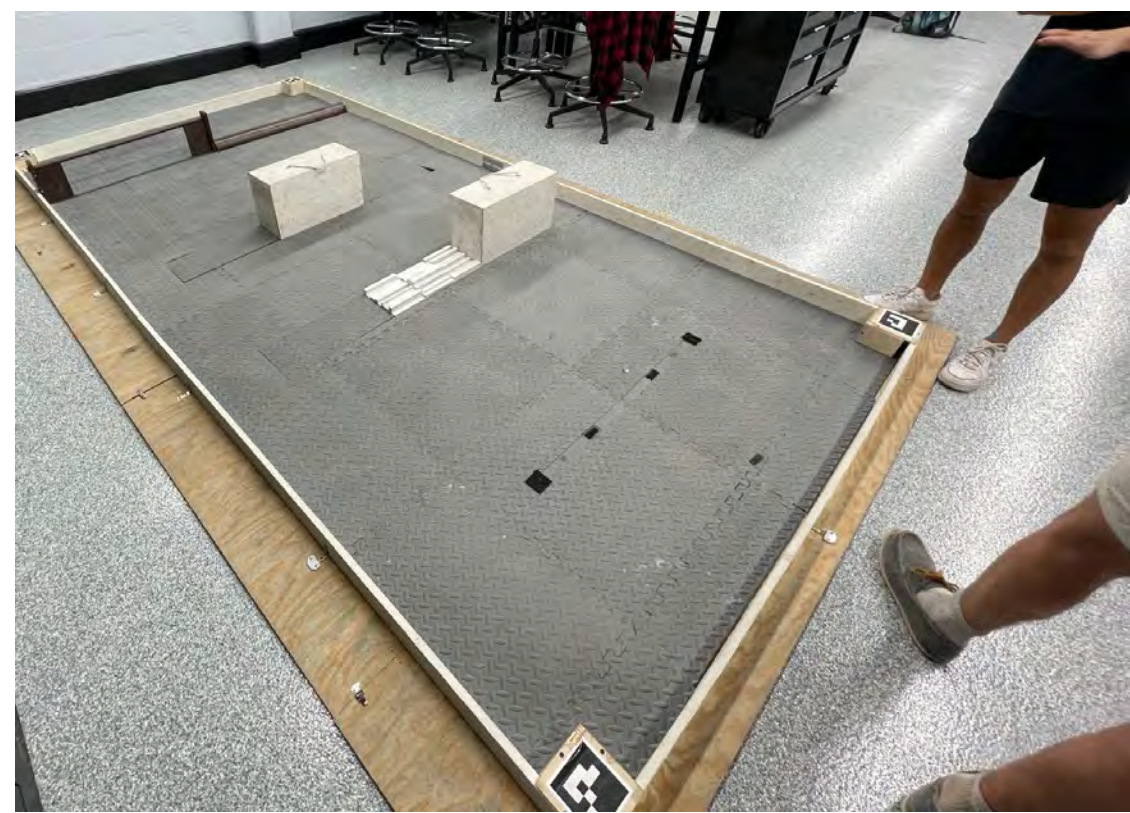SCHOOL OF ENGINEERING

Problem Definition

Design a team-based robot assignment for freshmen engineering students that will inspire them to pursue engineering.
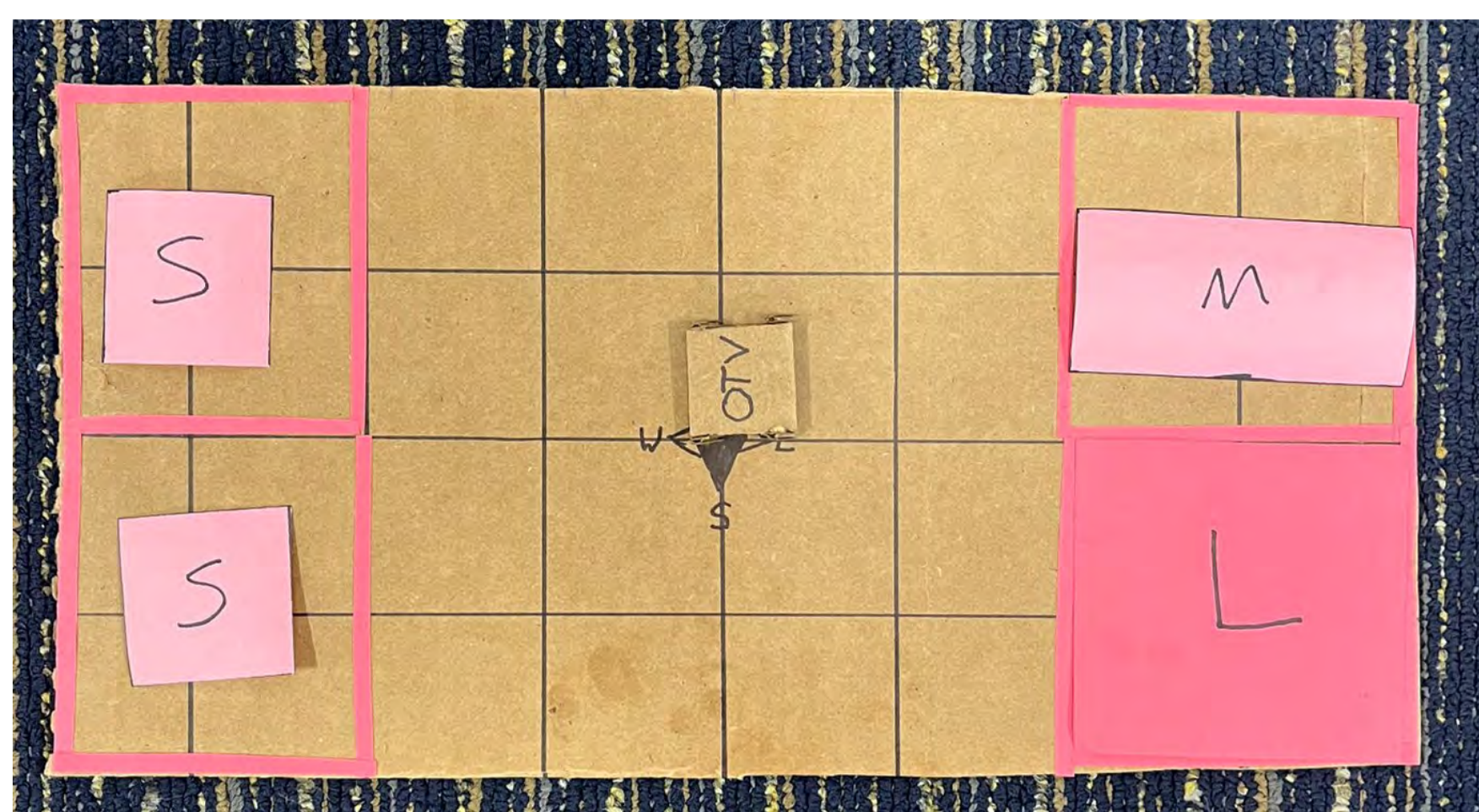
Stakeholder Requirements
- Reduce Overall Difficulty
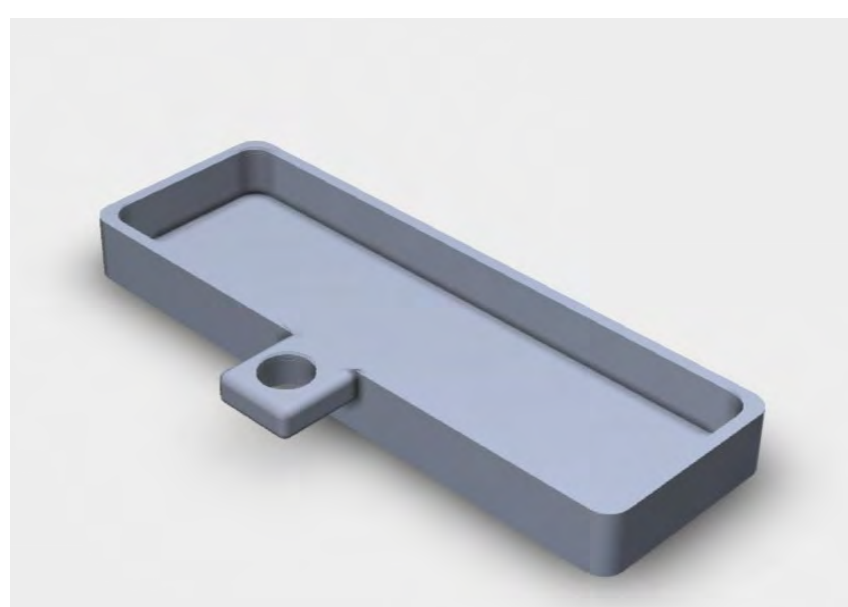- Easy for robot to navigate
- Represent multiple engineering disciplines

Current
ENES100
Arena

Design Calculations & Analysis

Prototype A2: Best Arena Design
- Easy for robot to navigate
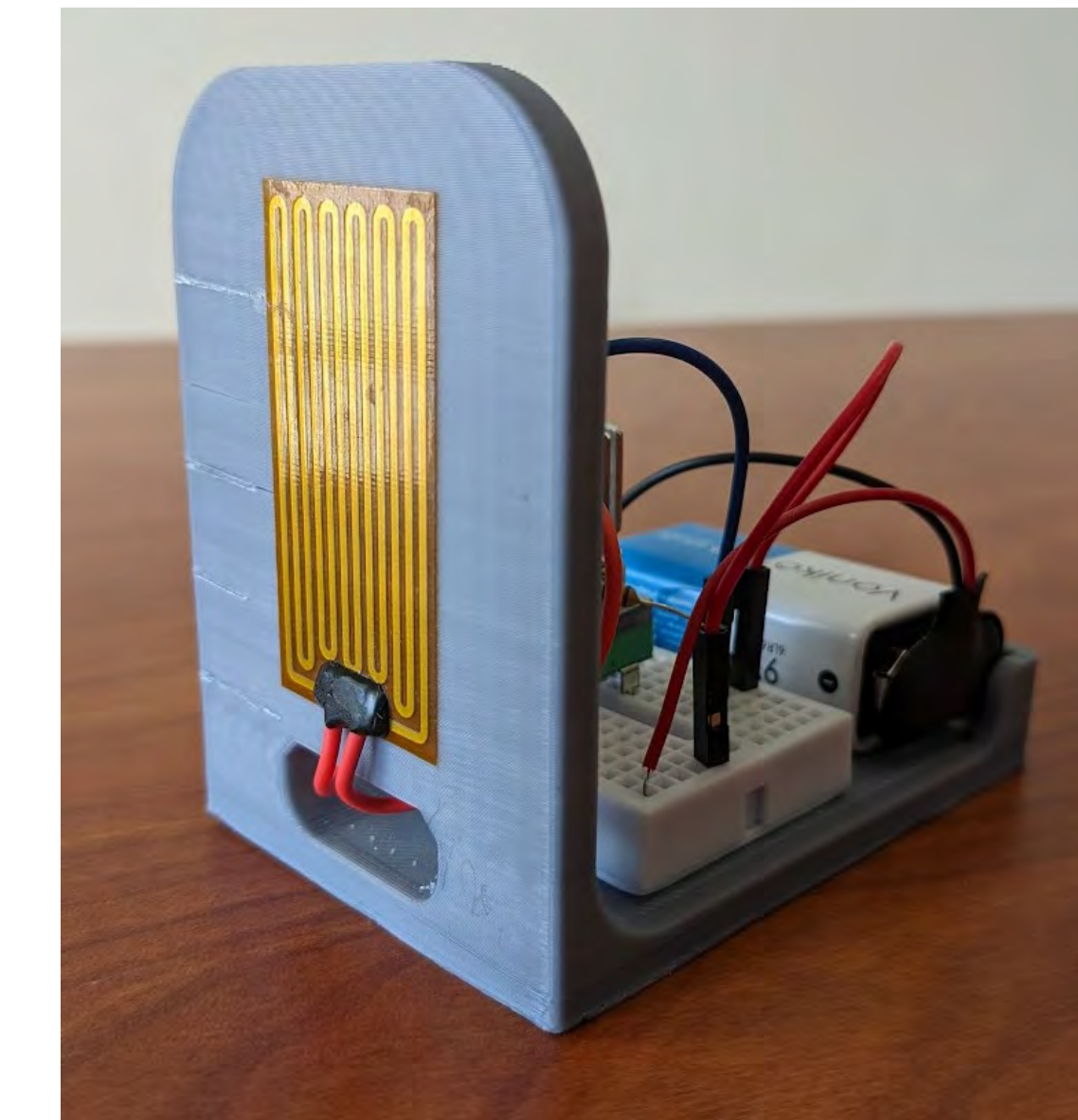- Easy for instructors to change and reset

CAD models of Carry
Supplies and
Stoplight tasks

Final Design

Our final design features 12 tasks of varying difficulty levels and a sample part of the arena.

Prototypes for arena (with tasks & sample robot), detect heat task, move ping pong ball task, and 'surgery' task.

Contract Based Assignment
- Teams create their own "missions"
- Select from list of Tasks
  - **Hard - 30 pts**
  - **Medium - 20 pts**
  - **Easy - 10 pts**
- **Contract must add up to 40 pts**
- Opportunity for students to complete extra tasks and earn extra credit

Prototype & Test Results

Fabrication:
- Task materials were primarily 3D printed PLA with along with ABS, woodshop parts, machined aluminum, electronics, and other purchased items.

Testing:
- An RC robot with an arm was used for testing of tasks and demo purposes. This was chosen as a representation of an OCV students may create.
- Tasks were re-analyzed to determine all methods of approach.

Results:
- Testing found tasks could be reasonably completed with student designed robots; however, long term testing with actual ENES100 students would be required to determine their true efficacy.