

Project Team Charter

MIME 497: Capstone I

Signature Cover Page

Each team member will copy the following statement in their own handwriting (LEGIBLY) in one of the designated areas below:

I agree to do an equal amount of work in the team. I understand that my grade will reflect my effort in the team.

Print Name: MJ Santos

Signature: MJS

Handwritten Statement:

I agree to do an equal amount of work in the team.
I understand that my grade will reflect my effort in the team.
-MJ

Print Name: Alexander Hickey

Signature: ATH

I agree to do an equal amount of work in the team. I understand that my grade will reflect my effort in the team.
- Alexander Hickey

Print Name: Torstein Helland

Signature: TJH

Handwritten Statement:

I agree to do an equal amount of work in the team. I understand that my grade will reflect my effort in the team.
- Torstein Helland

Print Name: Ty Kaleo Humber

Signature: TKH

Handwritten Statement:

I agree to do an equal amount of work in the team.
I understand that my grade will reflect my effort in the team.
- Kaleo

Print Name: Joshua Lizee

Signature: JL

Handwritten

I agree to do an equal amount of work in the team.
I understand that my grade will reflect my effort in the team.

Print Name: Sarah McAlister

Signature: SM

I agree to do an equal amount of work in the team. I understand that my grade will reflect my effort in the team.

- Sarah McAlister

Team Purpose

This team's formation is for the following reasons:

We are tasked with mechanically integrating advanced steering and autonomous sensor hardware in a multidisciplinary setting, working with. Our purpose in this group is to deliver our project on time and with high-quality deliverables while completing all team assignments.

The largest stakeholders in our group include our sponsor(s), course instructors, end users of the systems we develop, and ourselves as team members. Our sponsors expect us to deliver high-quality, well-thought-out, and properly verified solutions to current and potential platform goals and problems. Our course instructor(s) expect us to produce high-quality deliverables both individually and as a team. We, as team members, are invested in the project's development to gain relevant engineering experience, maintain a good GPA through success in this course, and avoid having to pick up the slack when other team members drop the ball on output and collaboration.

Team Goals

As a team, we aim to complete as much development as possible while maintaining high quality and producing appropriate documentation. Our goals include addressing as many sponsor objectives as possible, maintaining a high level of documentation and communication, and providing functional and affordable solutions to all relevant engineering problems, current and future. Our team is willing to commit what is required to meet these goals and deliver effective results.

We are all aiming to get an A in this course. To achieve this goal, we will ensure that we set aside adequate time for both individual assignments and team-based activities. Additionally, we have agreed to keep an open line of communication for any help related to the project, team, or even individual writing assignments/tasks.

High5 Strengths

MJ Santos - Mech. Eng'g Major CS Minor

High5 Result:

1. Analyst
2. Philomath

3. Deliverer
4. Time Keeper
5. Problem Solver

Torstein Helland - Mech. Eng'g Major

High5 Result:

1. Believer
2. Peace Keeper
3. Coach
4. Optimist
5. Philomath

Sarah McAllister - Mech. Eng'g Major

High5 Result:

1. Time Keeper
2. Deliverer
3. Philomath
4. Strategist
5. Problem Solver

Alexander Hickey - Mech. Eng'g Major

High5 Result:

1. Thinker
2. Analyst
3. Strategist
4. Problem Solver
5. Philomath

Ty K - Mech. Eng'g Major

High5 Result:

1. Catalyst
2. Problem Solver
3. Strategist
4. Believer
5. Brainstormer

Josh Lizee- ECE

High5 Result:

1. Self Believer
2. Problem Solver
3. Empathizer
4. Brain Stormer
5. Analyst

Team Roles

MJ Santos - Simulation Engineer

This role is responsible for developing analytical and simulation-based models to predict system performance (including steering geometry, turning radius, etc) and guide design decisions before hardware is built. It also supports modeling sensor placement like LiDAR coverage, camera occlusion risk, or vibration sensitivity. Deliverables include simulation code, models, and plots like comparison of simulated results versus real test data.

This role is a good fit for me because I like problem-solving, analyzing results, and delivering data to back up decisions. I also have a lot of experience when it comes to programming and embedded systems in general through coursework, personal projects, internships, and work experience.

Torstein Helland - CAD Engineer

This role is responsible for organizing and delegating the CAD work, both 3D models and engineering drawings, and organizing the completed CAD files of everyone in the team. They will also work with the Project Manager to ensure all delegated CAD work is being completed and made available in a timely manner.

This role fits my 3D modeling and engineering drawing experience from college courses, personal projects, and my past internship. I also have organizational skills to keep the files orderly, and leadership skills to be able to delegate the work and keep tabs on everyone's contribution to the CAD aspects of this project.

Sarah McAllister - Logistics and Financial Manager

This role is responsible for managing and tracking all purchases made, the current budget, as well as contacting sponsors and documenting meetings.

I feel this role is a good fit for my strengths of being a time keeper and deliverer. Tracking finances for a team project, documenting meetings, and being a reliable point of contact for sponsors all rely on a strong sense of organization and timeliness.

Alexander Hickey - Test Engineer

This role is responsible for testing and verifying the proper functionality and implementation of new systems as they are developed for the project. This role includes developing proper testing procedures as well as documenting and processing data in a way that is useful for development. Additionally, this role includes validating sensors to ensure they function as expected, reducing confusion in programming.

I took this role due to my experience assembling and testing mechanical components. I work well with tools and can develop testing and data-collection strategies that the whole team can leverage to meet our goals.

Ty K Humber - Manufacturing engineer

This role is responsible for designing, implementing, and continuously improving our project while applying lean principles, Six Sigma, and other manufacturing methodologies. This role will work with the CAD and simulation engineer to ensure that the project is safe, working properly, and efficient.

I feel this role is a good fit for me due to my background and related experience. I am currently working toward my Six Sigma certification and plan to earn the Lean Six Sigma Green Belt certification. Having taken lean manufacturing puts me at an advantage for this position. I can and will use knowledge from lean methodologies to improve our project. I also have a light background in CAD and familiarity with working on mechanical and automotive parts/projects.

Josh Lizee - Project/Equity Manager

This role is responsible for coordinating team tasks and schedules, facilitating meetings, and reviewing individual contributions while fostering an inclusive, collaborative environment. In addition, the allocation of team members to specific tasks.

This role aligned with my prior experience in creative projects that require clear coordination and inclusive decision-making. This type of role is also what I would like to pursue in my future career.

Ground Rules

Our team will be meeting weekly on ~~Thursdays from 7-9~~ Wednesday 4-5, primarily online. If face-to-face work is needed, our group will meet in person. Our primary method of communication will be Discord, with email as a secondary option. Team discussions will take place during scheduled meeting times or, if needed, via Discord. Decisions will stem from these discussions, in which the group as a whole can decide on the best route. Our sponsor will stay on the same page as the team through sponsor-team meetings, with email being used to update as needed. Our advisor will stay on the same page as the team through regular meetings during our weekly lecture time. Additional issues will be discussed via email.

Dissenting views among members are an inevitable part of group work. When they arise, the equity manager will be there to help the team navigate a more difficult group discussion. Though it is the equity manager's role, it is up to every team member to address conflicts and seek to resolve them fairly. Team members will be held accountable by discussing and agreeing on project and individual assignment expectations. If a team member isn't meeting these expectations, other team members can provide additional support. If a week has passed without meeting expectations, the advisor/Capstone instructor will be contacted.

The course expectation is for team members to commit 10-12 hours per week to Capstone assignments. Some weeks may be higher or lower, depending on circumstances. As assignments are divided among group members, we will discuss how items are distributed and the anticipated time commitment to complete the project. If a subtask is more or less involved than anticipated, it will be the group members' responsibility to bring the issue up to the group. Through discussion, tasks can then be redistributed as decided among members.

Team Barriers

Some potential barriers to effective teamwork are disagreements about the decisions we need to make as a team, different communication expectations, not delegating the work evenly, and not taking initiative or responsibility for our work. Another barrier is scheduling conflicts, since it is not always possible for everyone to be available for team meetings or group activities. The goal is to mitigate these problems by agreeing on general practices and expectations and communicating openly as the project progresses. If any problems arise, we will first attempt to resolve them within our team, referencing the agreements we made initially to reach consensus. If there are still problems, we may use methods such as a majority vote or a similar approach to determine the best path forward. A problem we have all experienced is team members not contributing as much as others. This can be mitigated by setting clear expectations from the start, holding each other accountable, and checking in on each other's progress regularly. Our goal is to never diminish or ridicule anyone's ideas or contributions, but rather to keep an open mind and talk honestly about our own ideas to benefit the project's outcome.

Sponsor Barriers

The biggest barrier would be inadequate communication with our sponsor, either on our part or the sponsor's. Another potential barrier with our sponsor is a misunderstanding regarding the project scope and goals. To combat these potential problems, we must understand that it is our responsibility to communicate with them effectively by reaching out early, responding promptly, and using clear, concise language. We must also maintain open communication, especially early on in the project, to define and understand the scope and goals of our project. This will ensure that everyone is on the same page about the project, allow this team to work on truly important aspects of the project right away, and keep us on track throughout the course of this project.

Prototyping Strategies

This project is design-based because the main work involves creating, building, and testing new physical hardware as well as mounts for autonomous sensors on an existing electric vehicle. The design will be considered ready for prototyping once CAD models are complete, interfaces with electrical software systems are defined, and basic checks, such as loads, steering geometry, and clearances, confirm that the design should work.

After building the prototype, testing will be conducted on steering angles, turning radius, alignment, and structural stiffness. Additionally, sensor stability will be tested using physical measurements, data logging, and visual inspection. These results will be compiled and compared with our performance targets.

To handle shipping delays or part shortages, our team will identify long lead parts early, use off-the-shelf parts when possible, and design mounts with adjustability so substitute components can be used if needed.

If the prototype does not perform as expected, our team will use test data and inspections to determine whether the issue is caused by a build or tolerance problem that can be fixed through iteration, or by a deeper design flaw that requires redesign. Knowledge gained during design and testing will be documented in CAD notes, test reports, and the final technical report. The project sponsor will be involved through design reviews and feedback during prototyping and testing to help guide decisions.