

Underwater “Tire” Robot A.U.V.

Software Team

Faculty Sponsor
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Client
Dr. Stephen Wood



Project Goals

- Develop a master control system for a fully autonomous underwater vehicle.
- Collect and collate data from multiple internal and external sensors.
- Autonomous navigation with collision detection and avoidance.
- An emergency response system with two options based on mission specifications.

Approach

- The system uses automated navigation through GPS coordinates and the MOOS world modeler. The AUV drifts for as long as possible to preserve battery life. Uses sonar to detect potential obstacles and sends the data to the MOOS collision avoidance system if needed.
- The system is monitored by an emergency system that take action in the case an internal sensor detects values outside of the accepted operational limits. The response type is based on mission type.
- A separate mission planner to automate the writing of the MOOS mission scripts for users with no knowledge of MOOS.

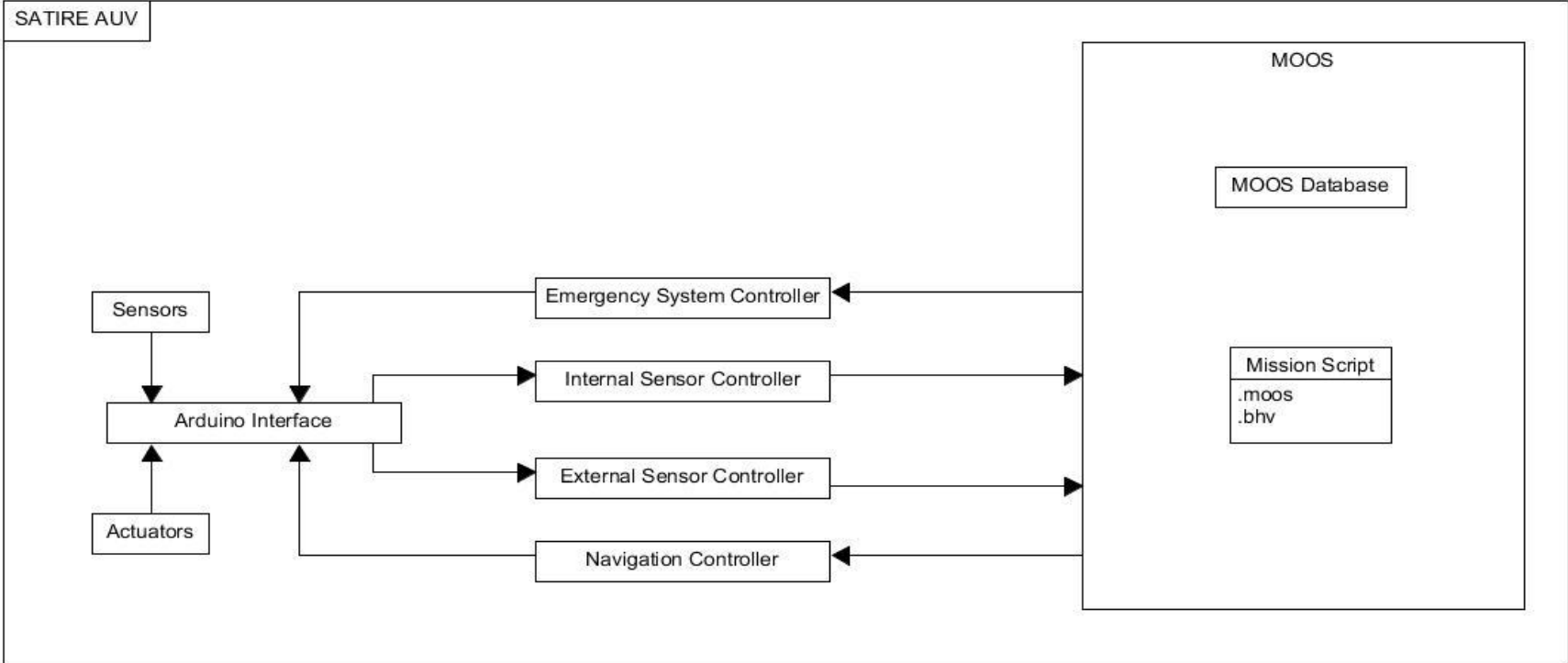
Technical Challenges

- 1) Learning how to get the hardware to interact with MOOS code
- 2) Building simple artificial intelligence for the vehicle to survive without user dependency
- 3) Understanding and programming the hardware, including data gathering and sensor synchronization.

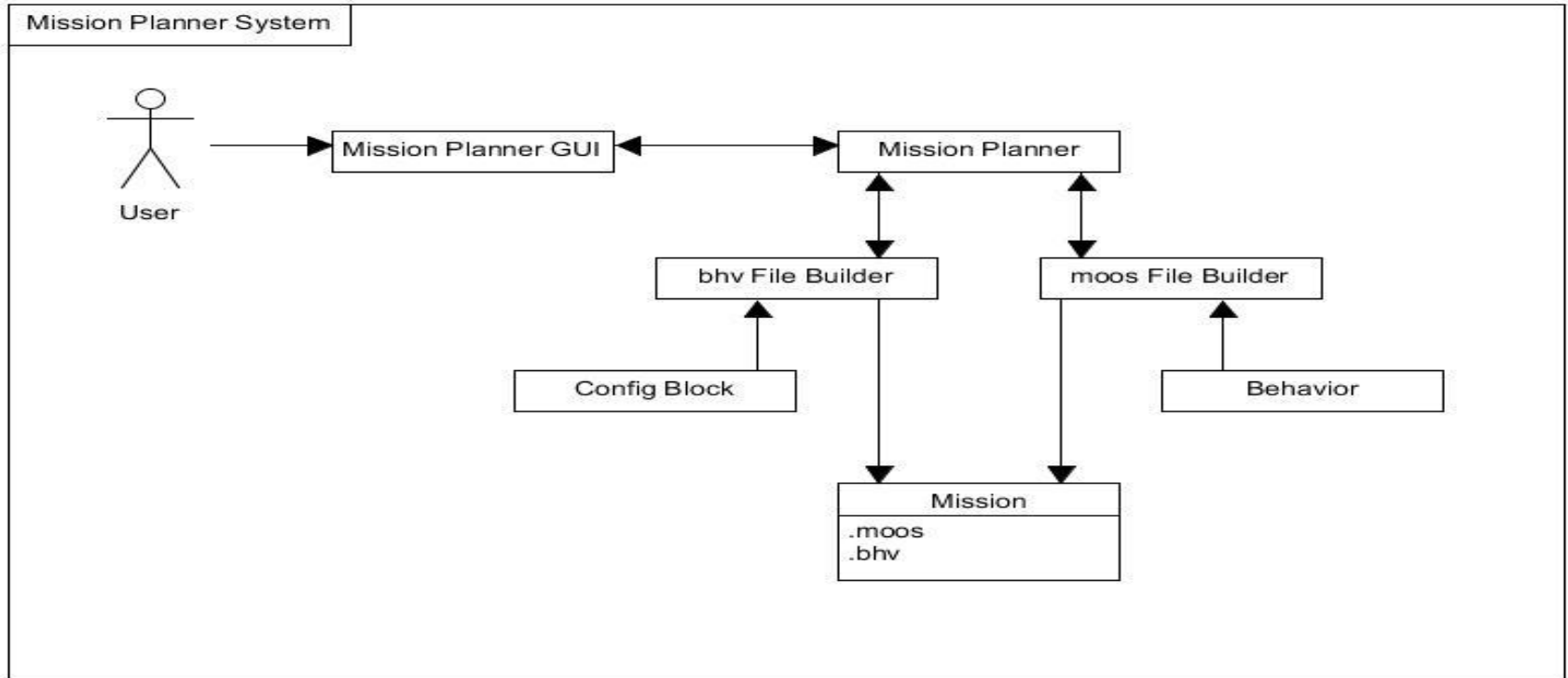
Progress Summary

Module / Feature	Completion	To Do
Obstacle avoidance	75%	Implement Sonar to detect obstacles for the AUV and feed into MOOS
Emergency Systems	40%	Get sensor data, set operational limits, decide on the correct action based on mission type.
Navigation	100%	GPS navigation and world mapping is currently functional.

System Architecture



Mission Planner System



Milestone 4

- Design and implement a connection interface for the existing arduino code
- Install MOOS and the external plugins onto the Arduino hardware
- Demo and test a prototype of the Mission planner

Milestone 5

- Create the poster for Showcase
- Implement and test emergency system with placeholder methods for the scuttle and message transmission.
- Implement and test sonar based obstacle detection.

Milestone 6

- Create a user manual and a progress report for the next development team.
- Create demo video
- Test and debug the current system in entirety

Milestone 4 Task Matrix

Task	Taylor	Robert	Clayton	Sean
Arduino connection	30%	30%	20%	20%
Hardware Install	25%	25%	10%	40%
Mission Planner	10%	10%	70%	10%