PROGRESS REVIEW 9

TEAM J: ALIGN

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Sponsor: PIX Moving

GOALS

- Finish assembling hardware
- Implement trajectory planner and controller for approach navigation
- Develop and integrate pedestrian tracking with the safety subsystem
- Extend Behavioral State Machine to the rest of the system
- Implement a server for pod location

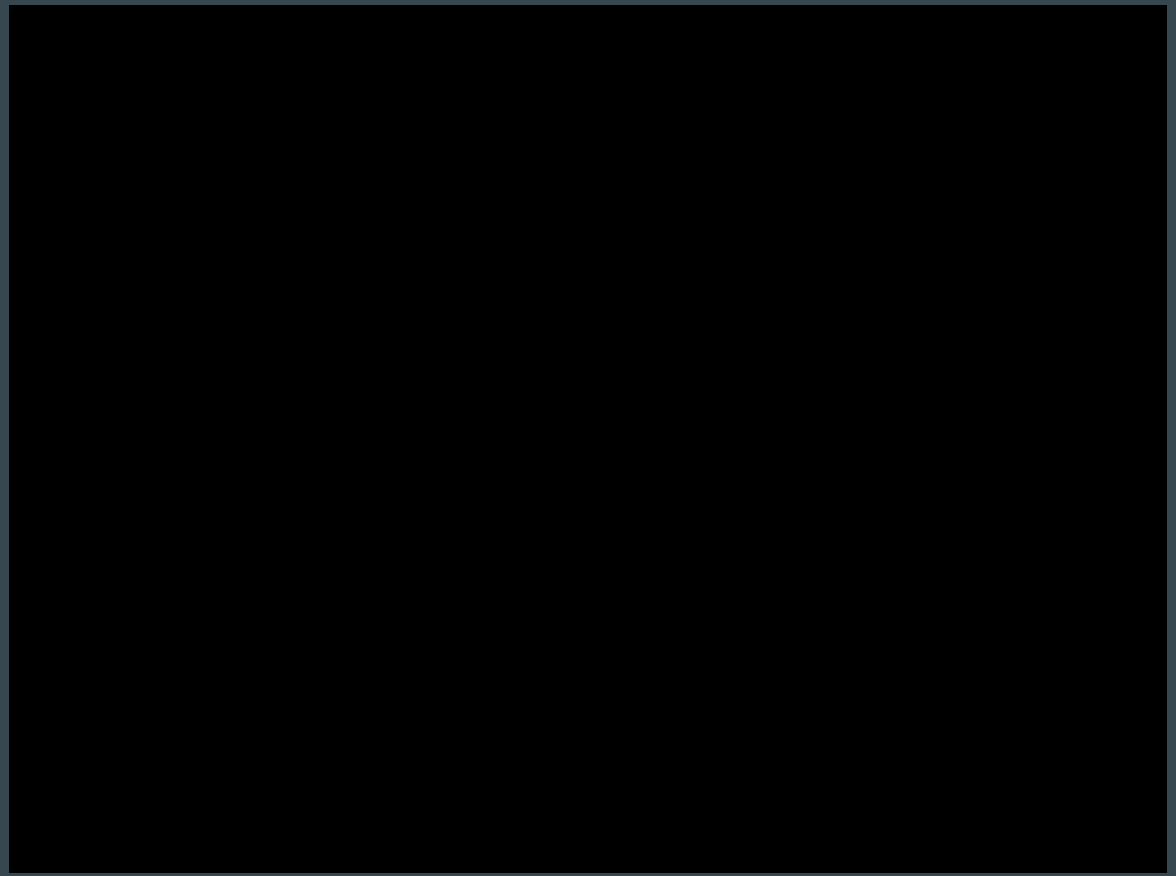
HARDWARE UPDATE

- Unboxed and installed the 72V battery for the motors.
- Installed 12V battery for control system, 48V battery for CAN
- Now chassis light turns “on”, but it cannot yet be controlled with the remote. We are debugging with PIX during late morning and evening calls, tested voltages of all points, etc.

TRAJECTORY PLANNER FOR APPROACH NAVIGATION

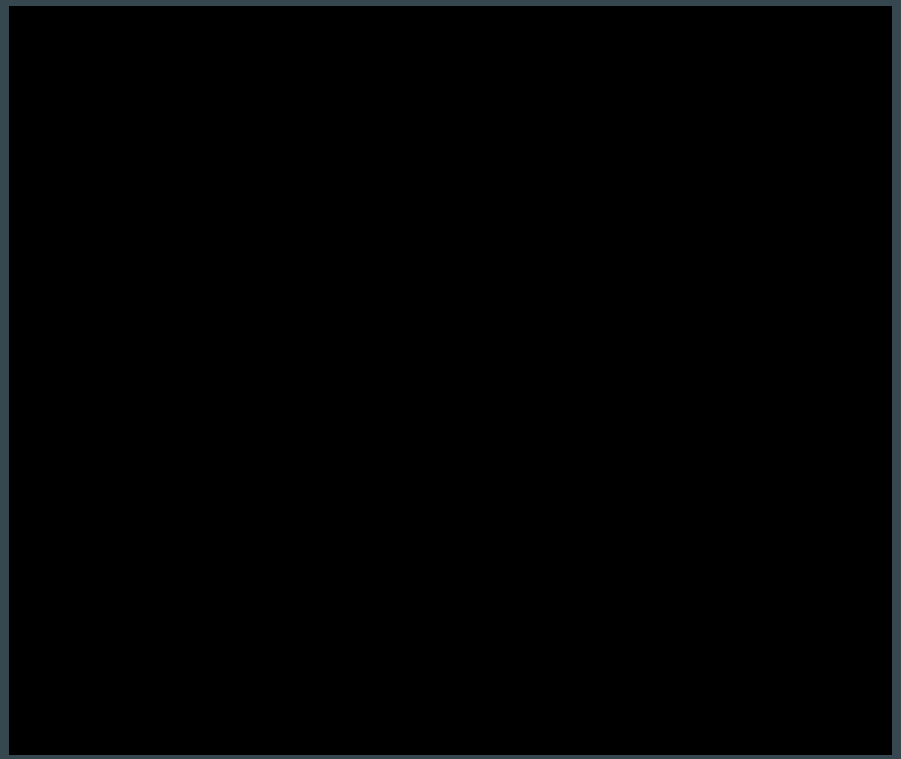
- Implemented custom free space Global Planners using both Dubins Curves and Reeds Shepp Curves, and designed a supervisory Global Planner to Switch between them (in case we want to disable reverse maneuvers).
- Tested both out in simulation and had good results
- As a results of using ROS' local planner the controller worked in both simulations removing the need for 2 simulations and we now have only one simulation
- Working on improving odometry using sensor fusion

DOCKING USING DUBINS CURVES

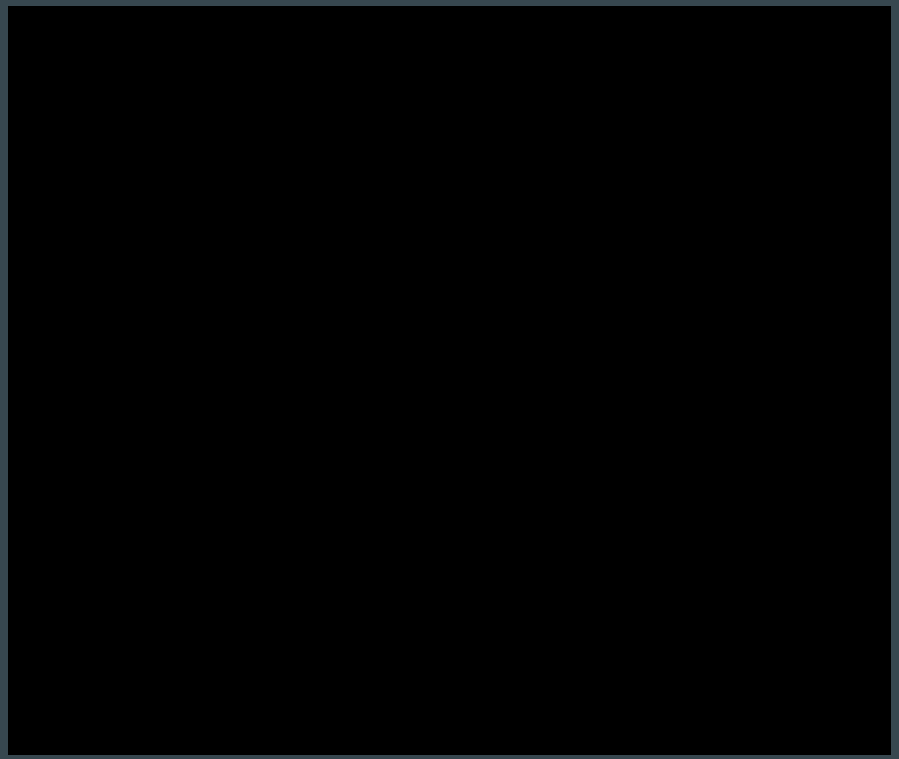


REEDS SHEPP

Maneuvers



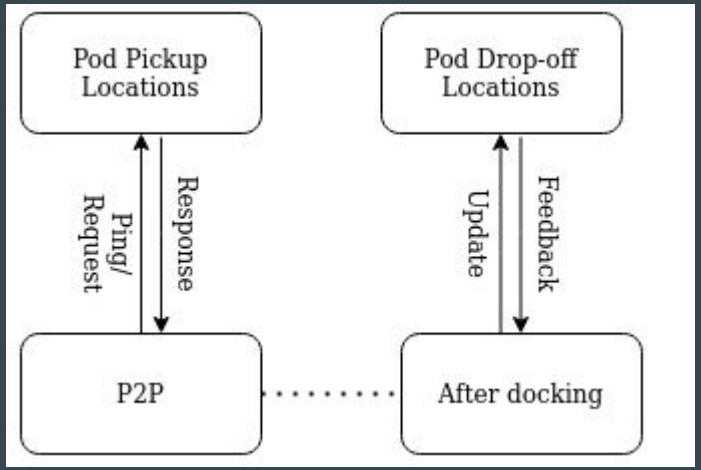
Docking and Retracing



SUCCESSFUL DOCKING

POD LOCATION SERVER

- Designed a simple system for accessing information about location of a particular pod, and state information
- Location and orientation of pod:
  - Given by x, y, theta
- State information:
  - Available-For-Pickup/Dropoff
  - Unavailable



PodLoc.json

```
{"PodID": 1, "PodLocation": [20.0, 30.0, 40], "PodState": "ForPickup"}
{"PodID": 2, "PodLocation": [12.0, 50.0, 40], "PodState": "Unavailable"}
```

Sample Json file

CHALLENGES

- Time difference and language barrier between the team and sponsors are delaying chassis assembly
- Time crunches for many teammates simultaneously

TASKS

- Develop and integrate pedestrian tracking with the safety subsystem
- Continue implementation of behavioral state machine
- Implement Pedestrian Trajectory Prediction
- Improve relative odometry by sensor fusion
- Complete hardware setup
- Complete Sim2Real tests for Navigation and Docking subsystems
- Complete safety subsystem and relevant unit tests

THANK YOU

Questions?