

GROUND SBOT

GroundsBot: A Golf Course Mowing Robot

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We aim to deliver an autonomous mower that can be deployed to mow the golf course rough with minimal infrastructure.

Use Case



GroundsBot is for golf course superintendents like Steve



Steve first draws where he wants to mow and highlights zones for GroundsBot to avoid



The system plans a route to cover the outline and avoid obstacles



GroundsBot receives the plan and localizes its position through GPS



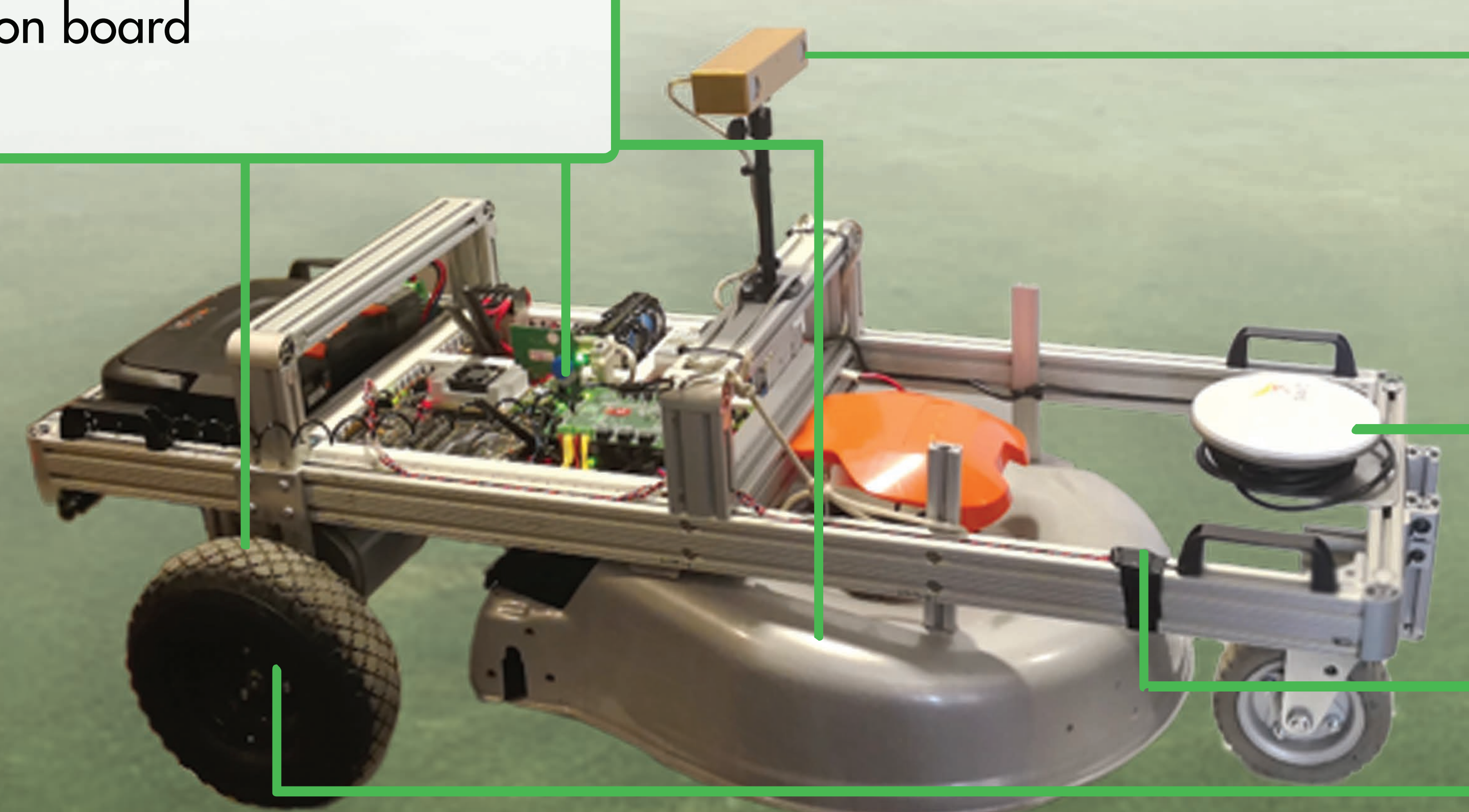
The outline is mowed precisely, to the quality that Steve desires



Unplanned obstacles are detected and the mowing path is adjusted

Hardware

- Nvidia Jetson TX2 Compute Platform
- Worx 19" Electric Lawnmower Deck
- 10" pneumatic wheels
- Custom power distribution board



Perception

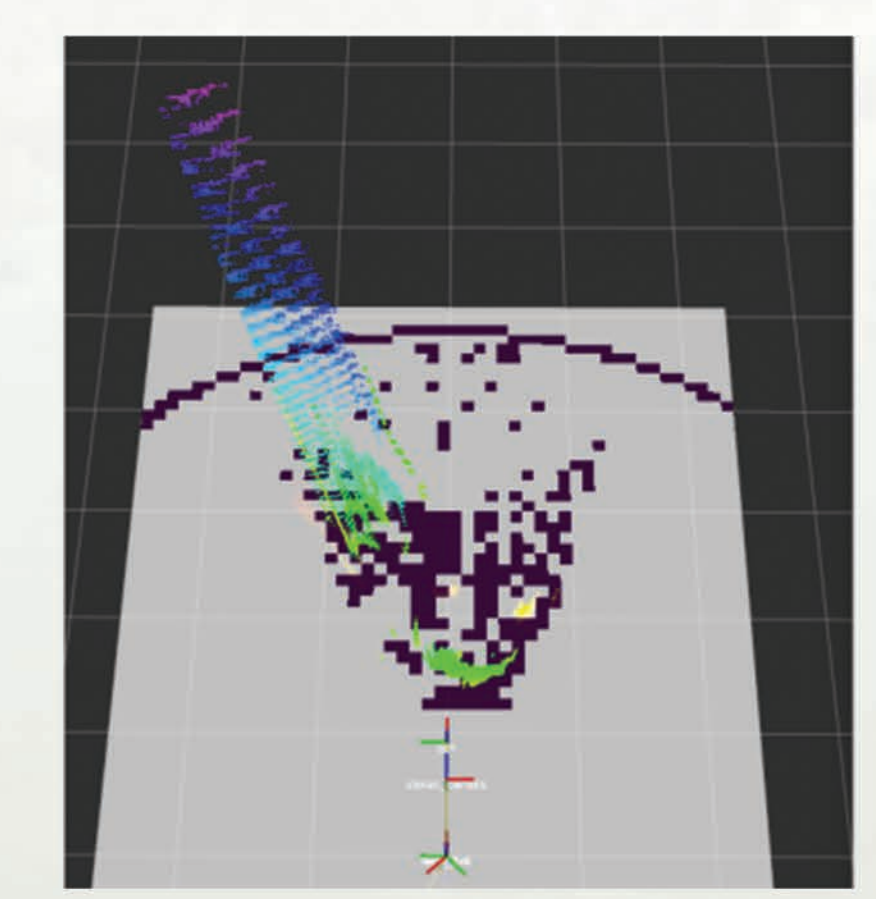
- Stereo camera or planar lidar used to get laser scans of obstacles
- Scans are used to populate costmaps with obstacle locations



Bumblebee2 Stereo Camera



Hokuyo UTM-30 Lidar



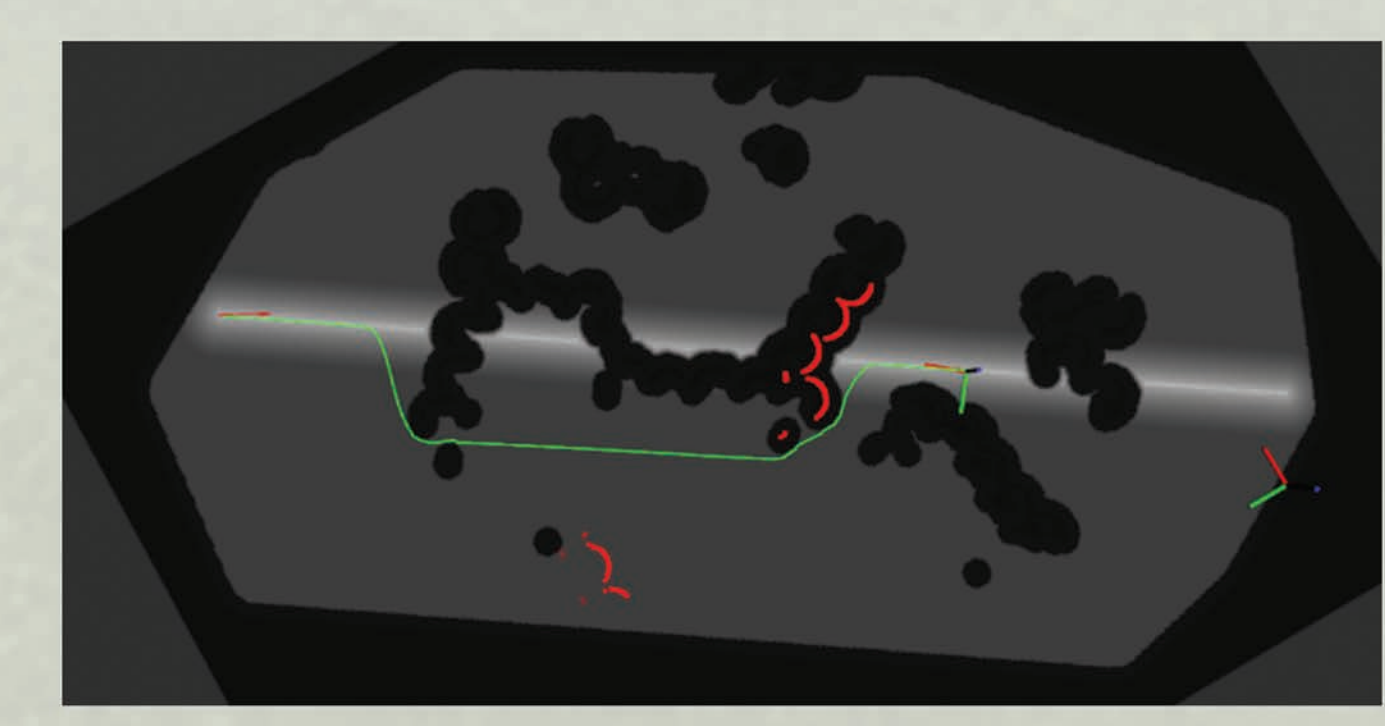
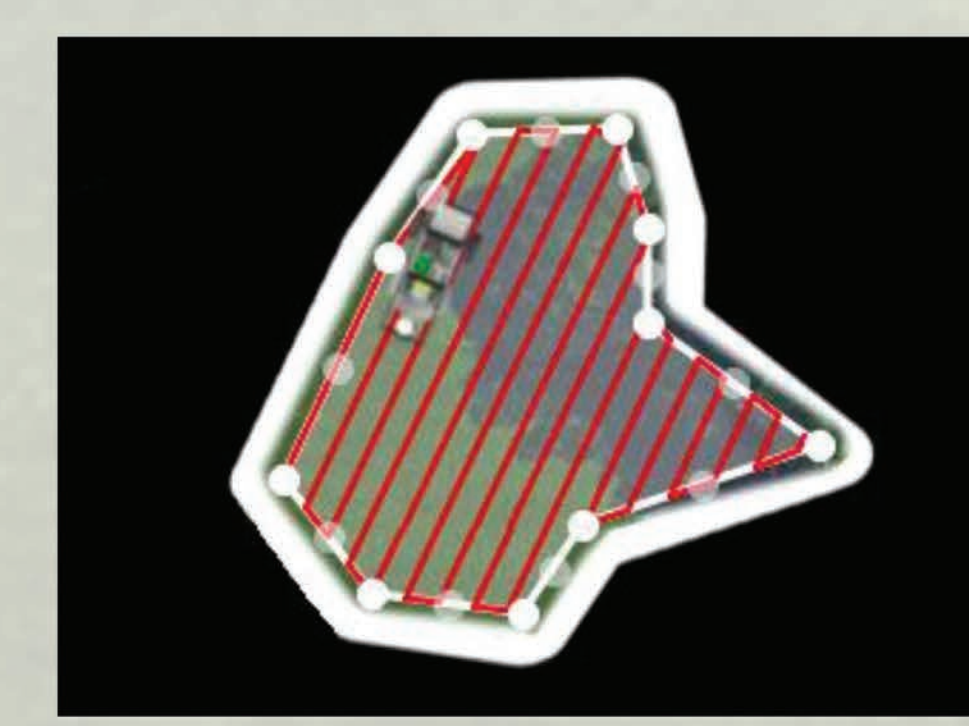
Navigation

Localization:

- GPS RTK, IMU, and wheel encoders provide localization information
- Data is fused through a dual-EKF for centimeter level positioning

Planning:

- An obstacle-free plan from waypoint to waypoint is generated using A*
- Mower-like behavior is achieved by biasing the costmap



User Interface

- Receives mowing regions from user
- Outputs proposed plan
- Sends mowing plan to robot

