University of Pittsburgh
Robotics and Automation Society
Annual Competition
Fall 2011 to Spring 2012

Theme: Pirate Adventure!

Task 1: Land on the Island

Map:

- Circular pool, 6' Diameter, filled with water to a depth of 6"
- Small island located somewhere in the pool (randomly before competition), 18" x 18" with sloped sides, covered in sand, a palm tree and IR beacon are in the center

Objective:

- Reach the island and stop upon reaching the tree.

Procedure:

- The robot will be placed into the pool at a location determined before the competition date.
- At that point, the robot is switched on (or otherwise signaled by some button) and waits 3 seconds before beginning its routine.
- The round ends when the objective is completed **OR** when 5 minutes have elapsed

Points:

- Points will be given by shortest time.
- Six points to the fastest team , five to the next team, etc.
    - In the event of two (or more) robots unable to finish within 5 minutes, these robots will all be given 1 point.

Notes:

- Each robot will begin at the same point
- Each robot will have 3 chances to complete the task
- IR beacon will flash at 38kHz (and other IR remote devices are banned from the area)
- The current run will be disqualified if any part of the robot touches the bottom of the pool. The team is allowed to make quick modifications should this situation arise. However, the disqualified run still counts towards one of the 3 chances.
- If all 6 robots do not finish within 5 minutes for all three runs, the starting position will be changed and each robot will have one final attempt.

Task 2: Find the buried treasure

Map:

- Square sandbox, 6' x 6', filled with sand to a depth of 4"
- Obstacles such as walls, rocks, mulch, and hills will be scattered about the sandbox. There may be additional obstacles.
- The map will be separated into a grid with 6" x 6" squares, therefore creating a 12 by 12 grid. This grid will not be physically marked in the map.
- Beneath 4 squares will be buried "treasure chests", at a depth of 1-2". The chests will be roughly 2" x 3" in size.
- A webcam will be placed over the course to provide video data to the central computer. Additional lighting maybe used to provide the webcam with sufficient lighting.

Objective:

- Reveal all 4 treasure chests and move to the end location and stop

Procedure:

- The robot will be placed in the sandbox at a location determined before the competition date.
- The robot is switched on (or otherwise signaled by some button) and waits 3 seconds before beginning its routine.
- During the task, the following information will be transmitted wirelessly to the participating robot:
    - Current position of the robot on the grid
    - Locations of the treasure on the grid and whether that treasure has been uncovered yet
    - Ending position on the grid
- The round ends when the objective is completed **OR** when 8 minutes have elapsed.

Points:

- Points awarded = 1.2*(n+1) where n is the number of treasures found

Notes:

- Each robot will begin at the same position
- Each robot will have 2 chances to complete the task
- Each robot must have a brightly colored dot (color specified at a later date) on top of the robot
- If sand is flung further than 3 inches outside the boundary of the sandbox, a one-time deduction of 2 points will be given to that team
- When the chest is uncovered, the robot will be notified of this via the wireless signal

Restrictions:

- Maximum dimensions: 10” x 10” x 10”
- Maximum voltage: 24VDC, AC is banned
- No remote controls or IR emitting devices (besides Sharp rangefinders or similar) are allowed
- The robot may not leave the course, or the run will end at that point.
- Each team will have a budget of $300 to complete their robot.