10th Annual Intelligent Ground Vehicle Competition
July 6-8, 2002
Coronado Springs Resort, Walt Disney World

STUDENTS SPLIT THE PRIZE MONEY!!!

AUTONOMOUS CHALLENGE: 1st-$4000, 2nd-$2000, 3rd-$1000, 4th,5th,6th-$500 each
NAVIGATION CHALLENGE: 1st-$2500, 2nd-$1500, 3rd-$500
VEHICLE DESIGN REPORT: 1st-$2000, 2nd-$1000, 3rd-$500

VEHICLE SPECIFICATIONS:

• Unmanned, autonomous, not remote controlled.
• Length: 0.91-2.74 m. Width: less than 1.52 m. Height: less than 1.83 m. (E-stop antenna may extend higher).
• Propulsion: direct mechanical to ground contact such as wheels, tracks, pods, etc. (gas or electric drive).
• Payload: 18" x 8" x 8" cinder block, computational power, sensing, control equipment must be carried onboard.
• Maximum vehicle speed of 2.23 meters per second (5 mph).
• E-Stop: manual and wireless emergency stop:
  o Manual: center, rear, 0.61 to 1.22 meters above ground, push button, colored red, minimum of 1in. diameter.
  o Wireless: (RF), effective for at least 16 meters.
  o Stopping distance not to exceed 6ft on inclines up to 0.15, safety determined by judges.
• Must withstand light rain.
• Light that blinks when vehicle is near an obstacle.
• No tactile sensors.

AUTONOMOUS CHALLENGE:

Objective
• Reach opposite end of a narrow outdoor obstacle course as quickly as possible.
• If vehicle does not finish the course, judges will rank based on longest adjusted distance traveled.
• Penalties for obstacle collisions, pot hole hits, and boundary crossings.

Course
• Grass, pavement, simulated pavement, wooden ramp, sand 5 to 8 cm. deep or simulated with a light beige canvas tarp covering the entire width of the track for 3 meters, inclines with gradient less than 0.15.
• Approximately 55 to 73 meters long, by 36 to 55 meters wide.
• Course boundaries are dashed white and/or yellow lines, approximately three inches wide, painted on the ground.
• Track width is approximately 3 meters wide with a turning radius greater than 2.4 meters.
• Alternating side-to-side dashes will be 4.6 to 6.1 meters long, with 3.0 to 4.6 meter separation.

Obstacles
• 5-gallon white pails.
• Full-size orange and white construction drums.
• Pot holes simulated by filled white circles, 0.6 meter diameter.
• Minimum of 2.1 meter clearance between the line and any obstacle.
• Series of pails/drums will result in a trap if a wrong turn is chosen by the vehicle.

Procedure
• At the starting line, the team has 300 seconds for final preparation before the signal.
• Maximum of 9 attempts in 3 heats will be allowed, rotated in lottery order.
• An attempt will continue until one of the following occurs:
  o the vehicle finishes the course.
o 600 seconds has elapsed.
o the vehicle was E-Stopped by a judges call.
o the team E- Stops the vehicle.
o the vehicle has not started after 300 seconds from judges start signal.

NAVIGATION CHALLENGE:

Objective
- Hit as many target waypoints as possible and return to home base, avoiding obstacles.
- Target coordinates are given (on July 6) in latitude and longitude as well as in meters on an x-y grid.
- Waypoint is hit when vehicle comes within a radius of 2 meters.

Course
Asphalt parking lot, approximately 80 by 100 meters.
Total travel distance on the course will be on the order of 220 meters, depending on the route.
Exact target locations will be marked lightly on the pavement for use by the judges.

Obstacles
Construction barrels, trees, light posts

Procedure
- In the starting box, the team has 300 seconds for final preparation before the signal.
- Three (3) attempts, only the best attempt counts.
- Waypoints may be “hit” in any order.
- All runs will be terminated by an E-stop:
  o When the vehicle arrives back at the starting point.
  o If the vehicle entirely leaves the perimeter of the field indicated in the map.
  o If 5 minutes have elapsed since the start of the run (220 meters in 300 seconds is 1.6 miles per hour).

GPS NOTE:

It is expected that most contestants will use Differential GPS, but non-differential GPS is allowed as well as dead reckoning with compasses and wheel odometers. There are a number of handheld GPS systems that connect to laptop computers available on the market for under $200. Garmin, SkyMap/GPS, and Magellan are some; these may not be convenient to integrate in vehicle control programs. However, commercial differential GPS unit are available from Motorola, Trimble, and Starlink (and possibly others). Differential correction signals are available in the Orlando, Florida area from the U.S. Coast Guard.