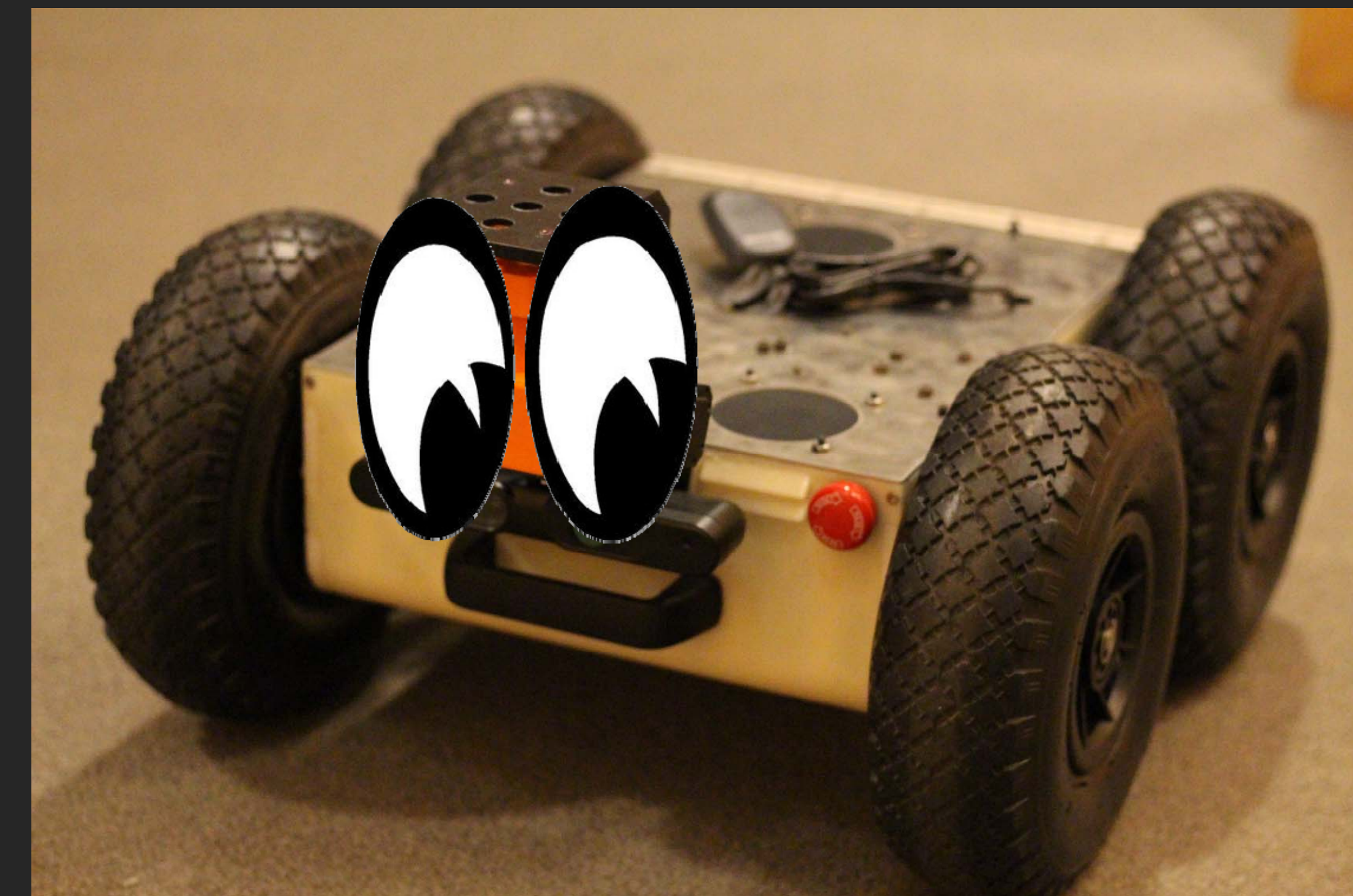# SPEAR SENSOR SUITE

Sponsor Liaisons: Stuart Young and Dave Baran

Advisor: Professor David Barrett

Team: Juliette Chevallier, Kimly Do, Murphy Kitchell, Nicholas Ostrom, Sarah Seko
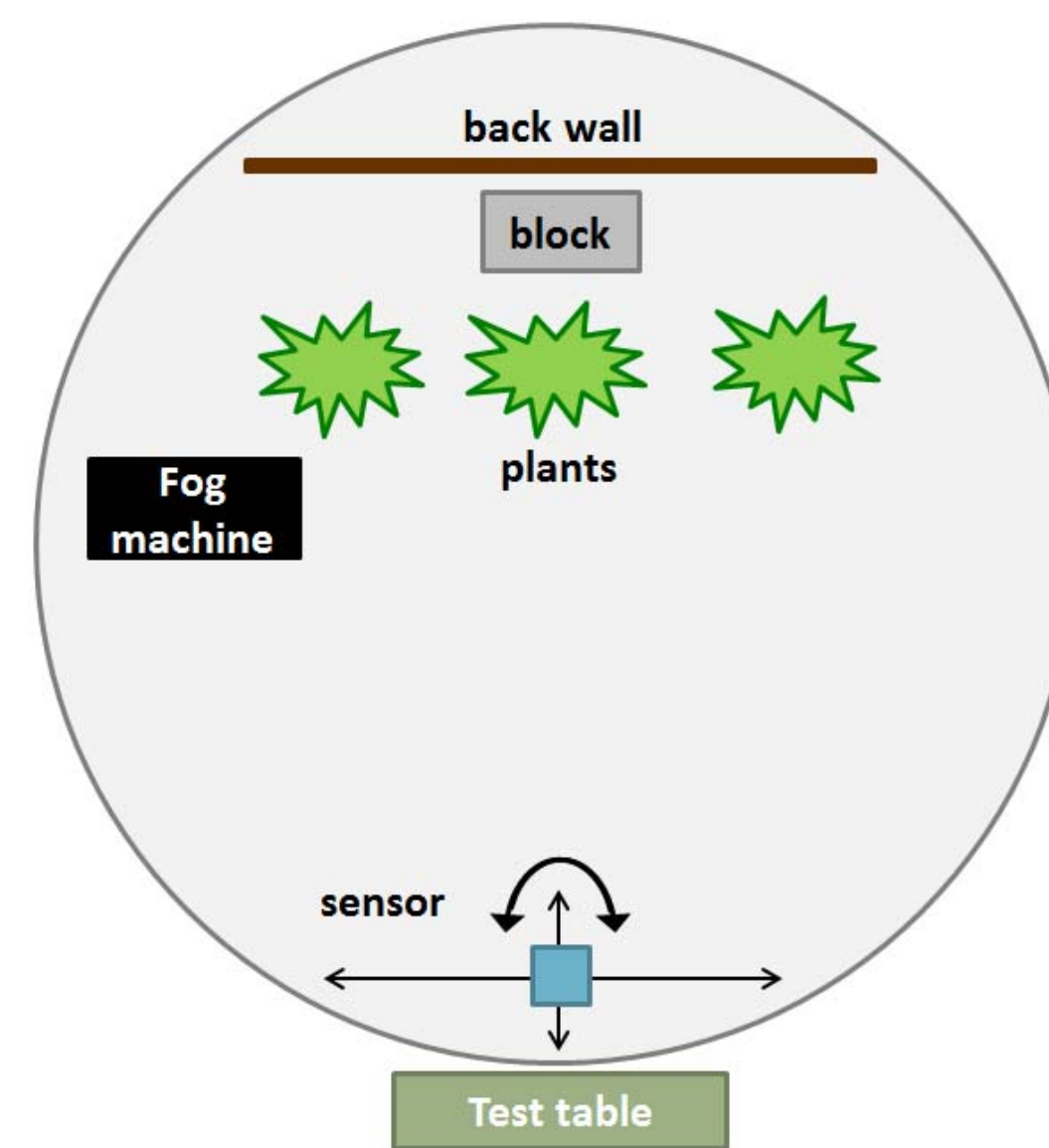
Mis-

The 2013-2014 Olin College SCOPE team worked in collaboration with the Army Research Laboratory to develop a sensor suite for the application of small autonomous ground vehicles. The team focused on machine sensing in environments which inhibit sensor performance. Their exploration of these sensing edge cases is intended to support ARL's research in the development of advance autonomy and control algorithms.

Multi-Spectral Imag-

The multi-spectral imaging portion of the sensor suite consists of a UV camera, IR camera, and a visible light camera. These cameras proved promising for sensing obstacles under environmental test conditions such as tall grass and thick fog or other air particulates .
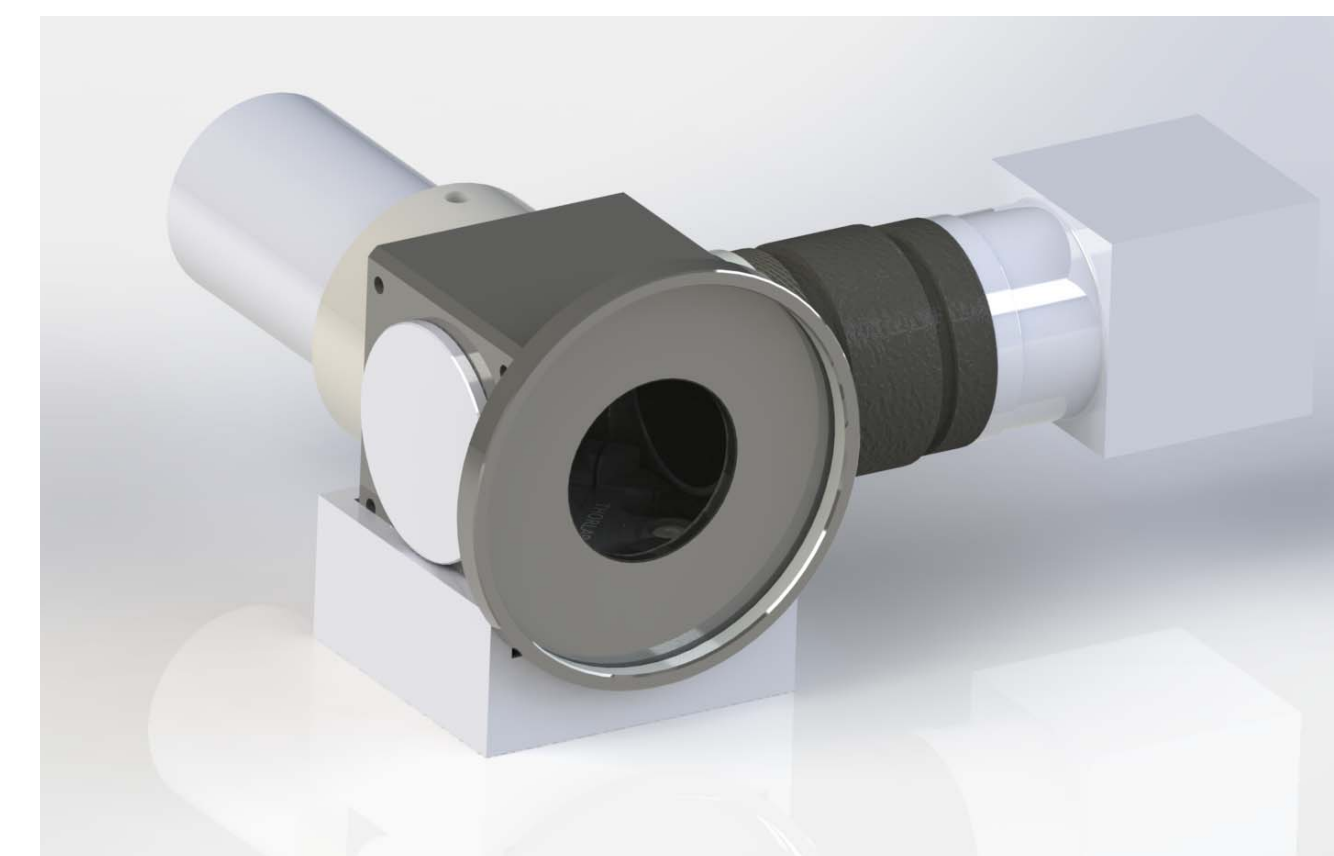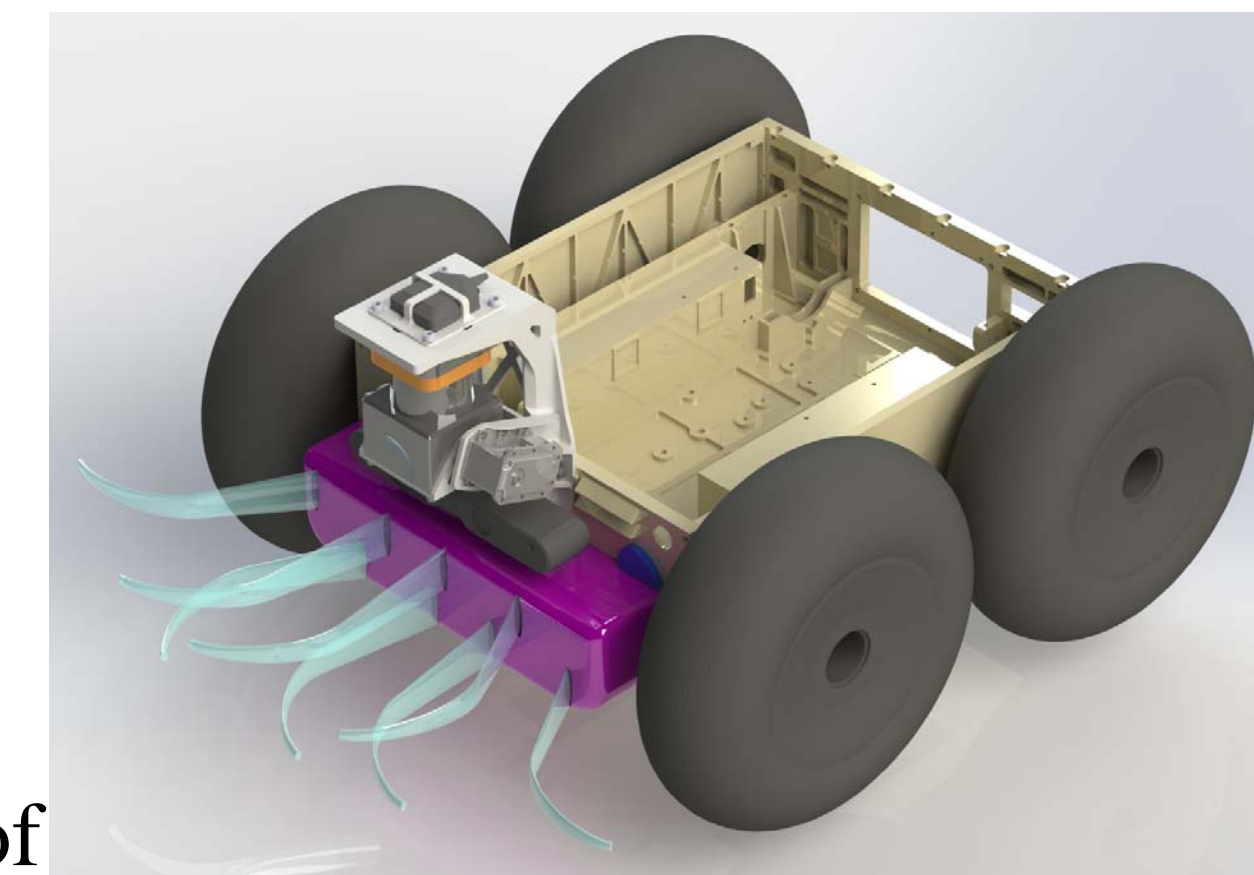
Edge Cases

Under the guidance of ARL, the team decided to pursue the detection of obstacles in two environmental conditions: tall grass and other vegetation, and fog, smoke, dust, or other particulates that interfere with camera and Lidar readings. For each environment, the team researched, acquired, and tested two sensing technologies. Analyzing the results of our collected data, the team worked with ARL to develop a sensor suite which will be package into a robust system ready for field testing.

Flex Sen-

After researching several off the shelf sensor solutions, the team decided to design a force sensor to collect data about the physical attributes of the environment. The team looked into biomimetic solutions and created a set of flex sensors that act like whiskers. The team created two designs for the whiskers: a static solution and an actuated solution.

back wall

block

plants

Fog machine

sensor

Test table

ARL

Olin College of Engineering