

## Appendix

### Interview

- What is the current problem with the robot?

The current problem is that the robot, when it does it's, we're going to call it, it's mission, it's not able to detect obstacles that are, like, really low to the ground. Like a boulder or a log. The robot is a outdoor surveillance vehicle with LDAR on top. The LDAR can detect big obstacles - people, walls, bushes - from farther away. We are talking like 20, 30 feet. The LDAR is a planar scanner - it only sees big obstacles. It cannot detect something that is not big, like a boulder. The scans just go over it.

- What hardware and/or software limitations do I have to work with?

There are no hardware limitations, but I would say that the hardware has to be some type of a sensor that can interface with a microcontroller, such as an Arduino. There is a Arduino onboard already, but we can just add one. It needs to be low cost - it cannot be another LDAR. I can order any hardware that is needed as long as you give me a heads up.

- How does your Arduino interface with the rest of the robot?

The main computer on the robot gets information from the Arduino through serial port.

- What do you need to know from those sensors?

There are two main things I need to know - where the obstacle is in relation to the robot, how far the obstacle is away. It needs to be constantly be reporting - let's say 4 times a second - because the robot is moving and needs to know where, if any, obstacles are.

- Do you need the Arduino to tell you sensor information or decisions based on that?

Just sensor information. The computer on board will make higher level decisions. The Arduino just needs to be sure that it isn't reading a false positive. You could potentially return a third piece of information about how likely that it is a real obstacle. The sensor information could also be used to determine how wide the obstacle is.