Future Work:

The capstone team has identified many items which could be beneficial to include in future iterations of the Autonomous Crawl Space Inspection Robot. Beginning with the navigation subsystem, team members believe that the autonomy algorithms could be made more efficient by developing custom Robot Operating System (ROS) packages for Autonomous Simultaneous Localization and Mapping. Currently, the robot uses a python-based wall avoidance algorithm for navigation and the ROS Hector SLAM algorithm for mapping. By combining navigation and mapping in ROS, the robot could use more complex navigation packages such as Rapidly Exploring Random Tree and Autonomous SLAM. The team suggests improvements of the image stitching algorithms which will be important for capturing a graphical representation of the ceiling photos, humidity, temperature, and moisture content of the crawl space.

In addition to improving navigation algorithms, the team suggests improvements in the mechanical structure of the inspection robot. Some of the suggestions for improvements to the mechanical system include: a chassis with a lower center of gravity, rubber treads for stronger grip, and cleaner mounting/cable management. While the robot's current mounting and cable management is sufficient, future teams can negate any possibility of brown outs and increase the strength of the robot chassis. Team members also suggest including a dynamic compensator, such as a PID, to give the robot a smoother closed-loop feedback control system.