

Value Proposition

- A speed control module to the AgGrowBOT will help increase the efficiency drastically in stabilizing the consistency of machine operations
- The AgGrowBOT is struggling operating at a consistent speed which can interfere with the weed removal process
- Purdue University is sponsoring the development of the AgGrowBOT with the hope to minimize the use of herbicides and maximize weed removal
- AgGrowBOT participates in a contest to remove weeds autonomously
- Main problem to address is to control the AgGrowBOT's speed to 3 miles per hour

| BENCHMARKING (Unweighted) | | | | | | | BENCHMARKING (Weighted) | | | | | | |
|-------------------------------------|---------|-------------------|------------------|------------|---------------|---------------|-------------------------|---------|-------------------|------------------|------------|---------------|---------------|
| QuadCruise | Trimble | Cable Restriction | New Transmission | New Engine | Robot Control | Peddle System | QuadCruise | Trimble | Cable Restriction | New Transmission | New Engine | Robot Control | Peddle System |
| 5 | 2 | 3 | 1 | 1 | 4 | 4 | 50 | 20 | 30 | 10 | 10 | 40 | 40 |
| 5 | 3 | 3 | 3 | 3 | 5 | 5 | 25 | 15 | 15 | 15 | 15 | 25 | 25 |
| 5 | 5 | 5 | 5 | 5 | 1 | 1 | 50 | 50 | 50 | 50 | 50 | 10 | 10 |
| 5 | 3 | 1 | 1 | 1 | 2 | 2 | 75 | 45 | 15 | 15 | 15 | 30 | 30 |
| Bencharking: 5: Best 1: Worst | | | | | | | WEIGHTED TOTAL --> | | | | | | |
| | | | | | | | 200 | 130 | 110 | 90 | 90 | 105 | 105 |

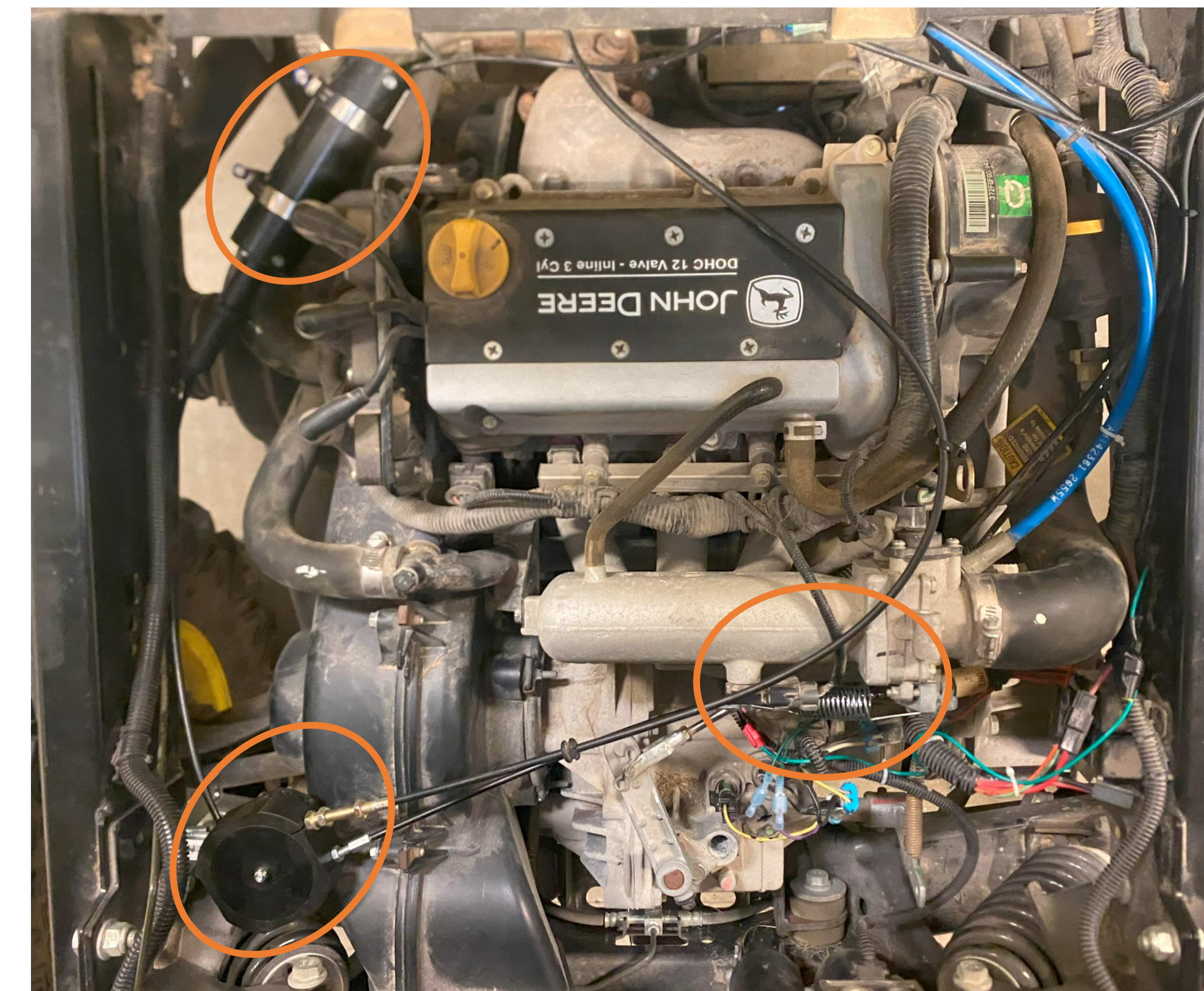
Research and Selection

- A design matrix was created to weigh the most important features across various options that were explored
- McCruise QuadCruise system was far and away the most fitting option for the AgGrowBOT's



Project Characteristics

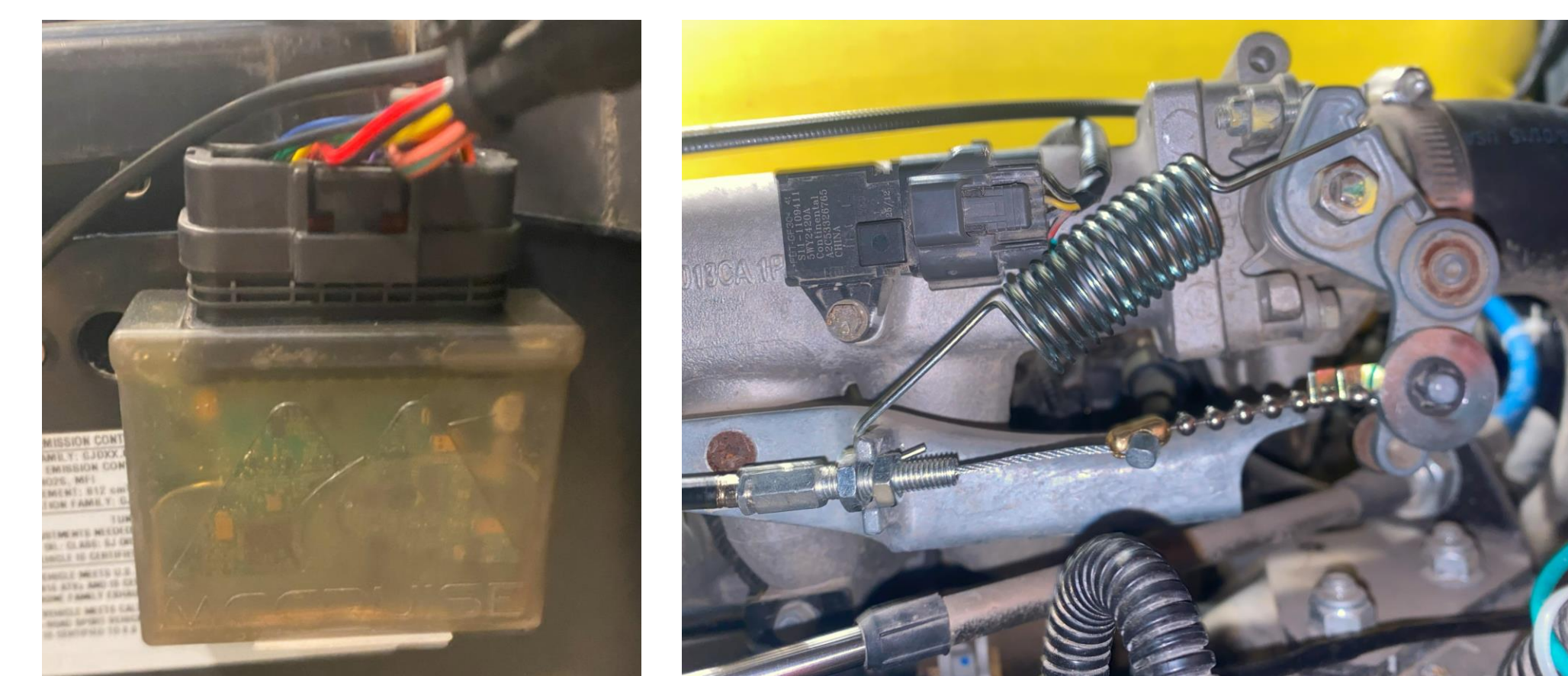
- W825i John Deere Gator
- Equipped with Greenstar Display, StarFire Receiver, AutoTrac Universal kit.
- The AgGrowBOT transmission is fully mechanical



Completed system, with the control cylinder at the top left, and the throttle cable reel on the bottom left. Not picture is the computer module, which is mounted on the frame just outside the top right of this photo.

Design and Development

- McCruise QuadCruise system was installed into the AgGrowBOT using the installation manual provided by McCruise
- Adjustments to the wiring of the AgGrowBOT had to be made to align with the Quad Cruise solution
- Combines with the current throttle cable to enable normal and controlled operation with some slight adjustments were made to the throttle
- Other small adjustments were made electronically in order to ensure peak operation of the system



Testing and Feedback

- The Quad Cruise was tested for efficiency and the team received feedback
- The AgGrowBOT's speed was lowered to a consistent 3 mph with the proposed solution
- Was decided to further improve this solution the speed signal could be enhanced to increase accuracy

Summary

- Identify or develop a reliable speed control for the AgGrowBOT system
- Maintain a speed of 3 miles per hour while being used in the field
- System needed to be robust and reliable enough to handle the work of the machine
- Thorough research and analysis of both created and aftermarket solutions
- Most economic and reliable solution was decided to be the McCruise QuadCruise system
- The final solution addresses the main issues presented in this project, while also bridging opportunities to address even more issues in the future
- The AgGrowBOT is one step closer to fully autonomous operation

Thank you to our Sponsors

The work completed on this project would not have been possible without the help of our sponsors, Dr. Roger Tormoehlen and Mr. Richard Fox; and our instructor, Dr. Margaret Gitau; and the Purdue AgGrowBOT Team.

