Observing the efficacy of the automation of small-scale farming in regolith and soil conditions

Emily Soucy, Tyler DeScenza, Anthony Digiovanni, Vivienne Nipar, Caitlyn Hubric, Indigo Boggs, Charlotte Aplin, Caitlin Rosinus

Faculty Advisor(s): Andrew G Palmer, Dept. of Ocean Engineering and Marine Sciences, Dept. of Biomedical and Chemical Engineering and Sciences, Florida Institute of Technology

Background
- In space conditions, the automation of farming offers a way to reduce the toll on several limited resources, particularly time, as well as increase crop monitoring.
- Farmbot Genesis v1.2 is equipped with tools for seeding, weeding, watering, and taking pictures.
- Farmbot can perform plant care sequences and track plant condition and age without human input.
- Open Farm provides crop information to Farmbot and relevant data can be automatically applied to plant care regimens.

Preliminary Data
- The tools experience increasing resistance to motion in the more dense substrates (specifically regolith).
- Substrate compaction dramatically increased after watering.
- The weeding tool was unable to move through the watered unsifted and sifted regolith substrates, while maintaining connection to the active tool.

- Tool pins and wiring have corroded over time and wear, needing replacement to regain functionality.
- Dust buildup has occurred in wiring connections and tools, limiting their consistent functioning and requiring regular human upkeep.
- The web interface is entirely reliant on a stable internet connection for Farmbot to be able to process commands and perform sequences.

Research Goals
- Repair and rebuild Farmbot from its 2-year hiatus.
- Troubleshoot mechanical issues.
- Analyze hardware integrity and identify potential problem sources.
- Fine tune software preferences and build usable sequences.
- Test Farmbot’s durability in regolith conditions with preliminary growth studies.

Future Studies
- Grow the plants to maturity using Farmbot.
- Perform a comparison of time use between traditional and automated farming.
- Compare the collected biomass between traditional and automated farming.

Acknowledgments
FarmBot
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