



Autonomous Food Production

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Description and Objectives

- Develop key automation techniques for food production in space
- Drastically reduce the payload requirements for remote exploration beyond low-earth orbit
- Support water, waste and air management recycling
- Improve astronauts well-being and productivity
- Provide critical sub-systems for teleoperation and fully autonomous systems



Autonomous growth chamber that integrates manipulation (left) and sensing (right)

Approach

- Growing strawberries and lettuce
- Investigate novel perception algorithms for estimating plant status, exploit 3D depth sensing for estimating plant volume
- Investigate novel manipulation algorithms for manipulating flexible structures (plants) and attaching probes, e.g. fluorimeters for real-time assessment of plant status
- Use robotic system for systematic data acquisition leading to 1st-of-its-kind database

Cost, Schedule, and Status

- Year 1: Data collection on lettuce and strawberries, robotic/experimental platform, 3D construction
- Year 2: Two-hand manipulation algorithms and strategies for flexible structures
- Year 3: Long term autonomous monitoring, software interfaces for teleoperation