

Autonomous Drone for Air, Water, and Soil Sampling

Members: Colby Smith, Chantel Lapins, Issak Allaire-MacDonald, Rudy Gapinski, Blake Roling, Ryan Dalby Advisor: Dr. Kam K. Leang

DEPARTMENT OF MECHANICAL ENGINEERING

Project Overview

Problem Statement: Design an autonomous drone with air, water, and soil sampling capabilities.

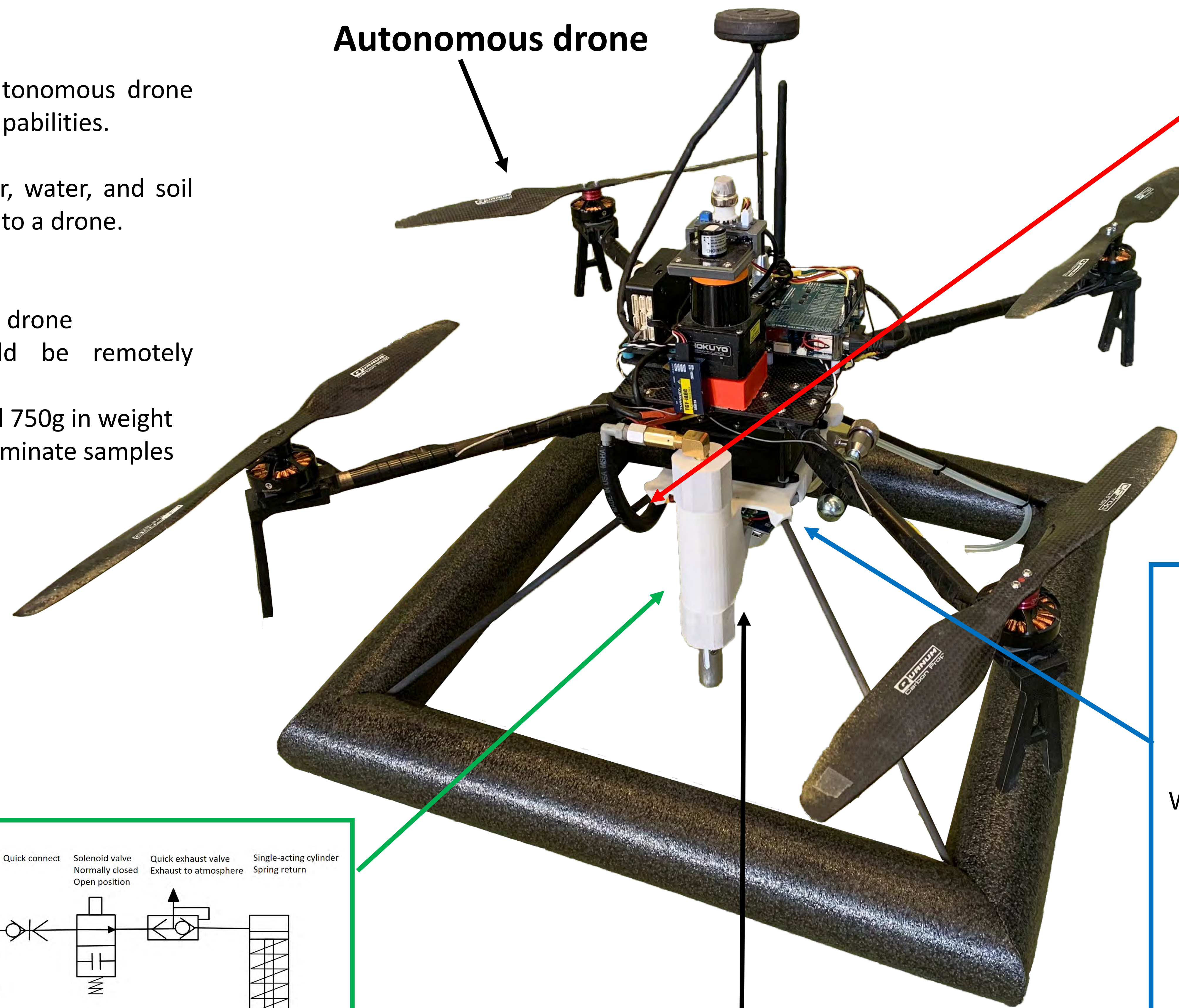
Solution: A remotely controlled air, water, and soil sampling mechanism that attaches to a drone.

Constraints:

- Mechanism should attach to a drone
- Sampling mechanism should be remotely triggered
- Mechanism should not exceed 750g in weight
- Mechanisms should not contaminate samples

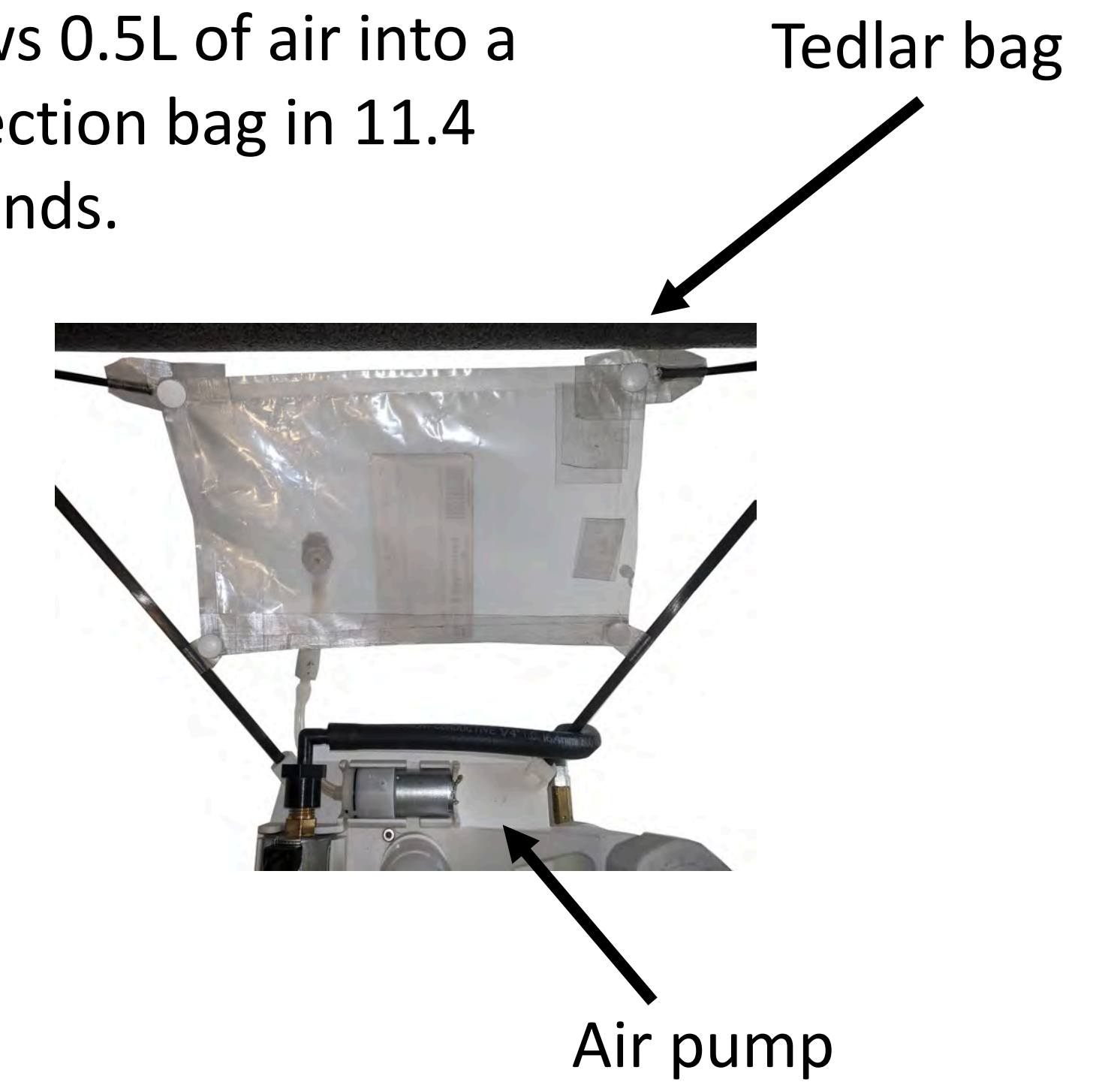
Applications

- Environmental monitoring
- Disaster response
- Emergency response
- Research
- Air quality management
- Humanitarian efforts



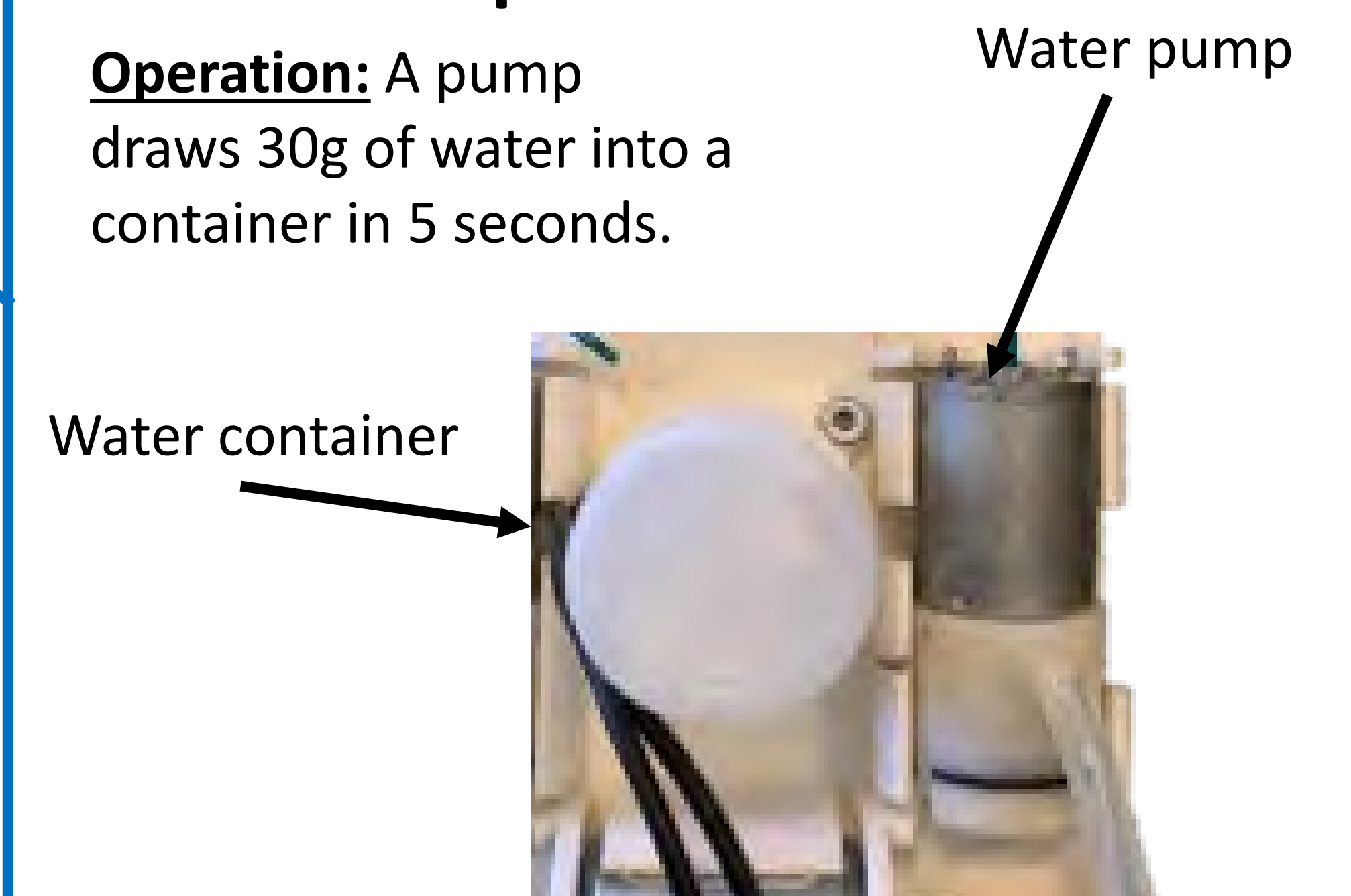
Air Sampler

Operation: A pump draws 0.5L of air into a collection bag in 11.4 seconds.



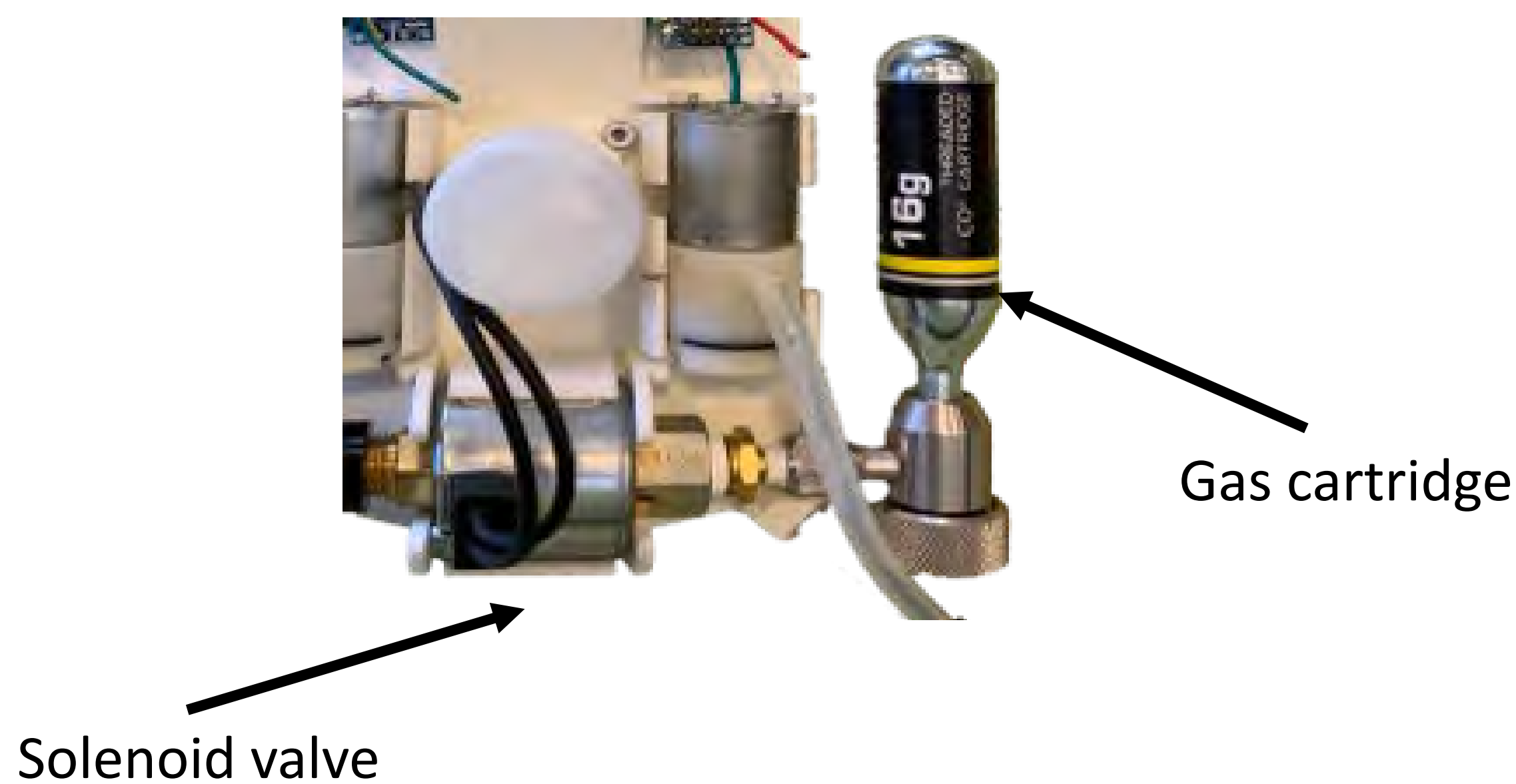
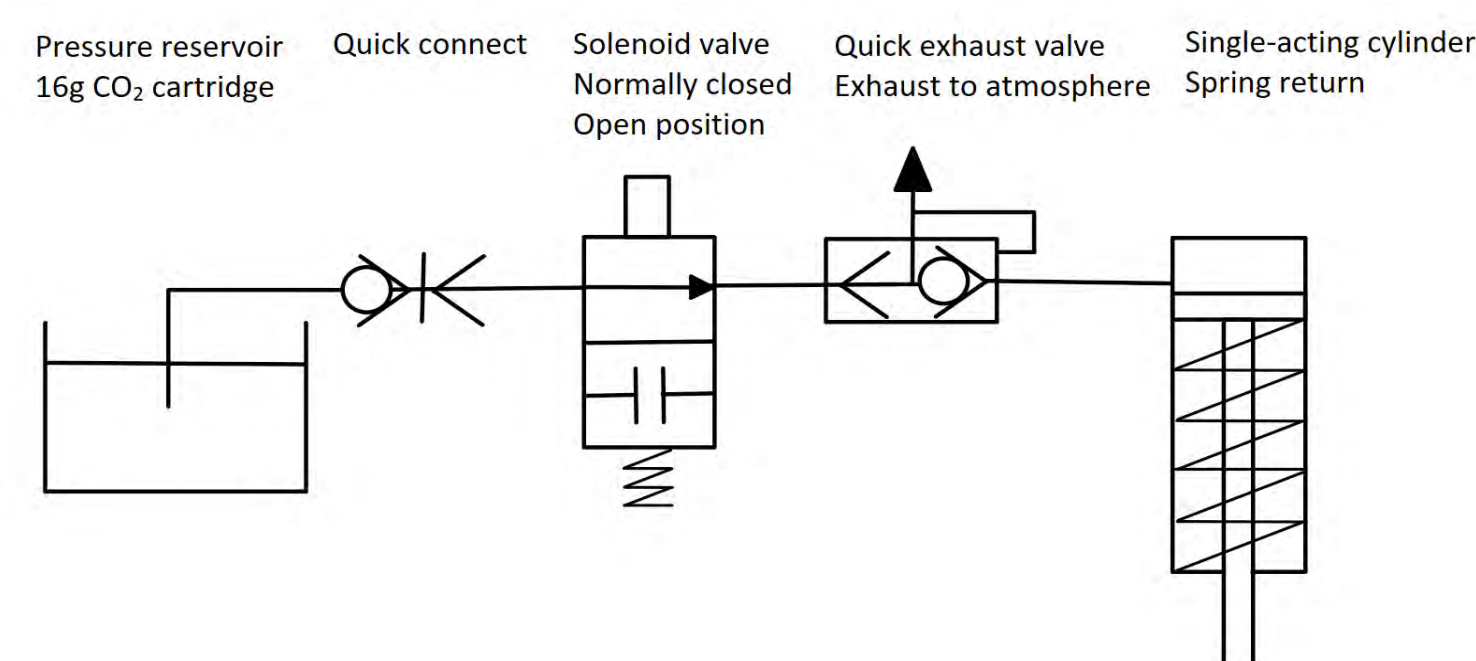
Water Sampler

Operation: A pump draws 30g of water into a container in 5 seconds.

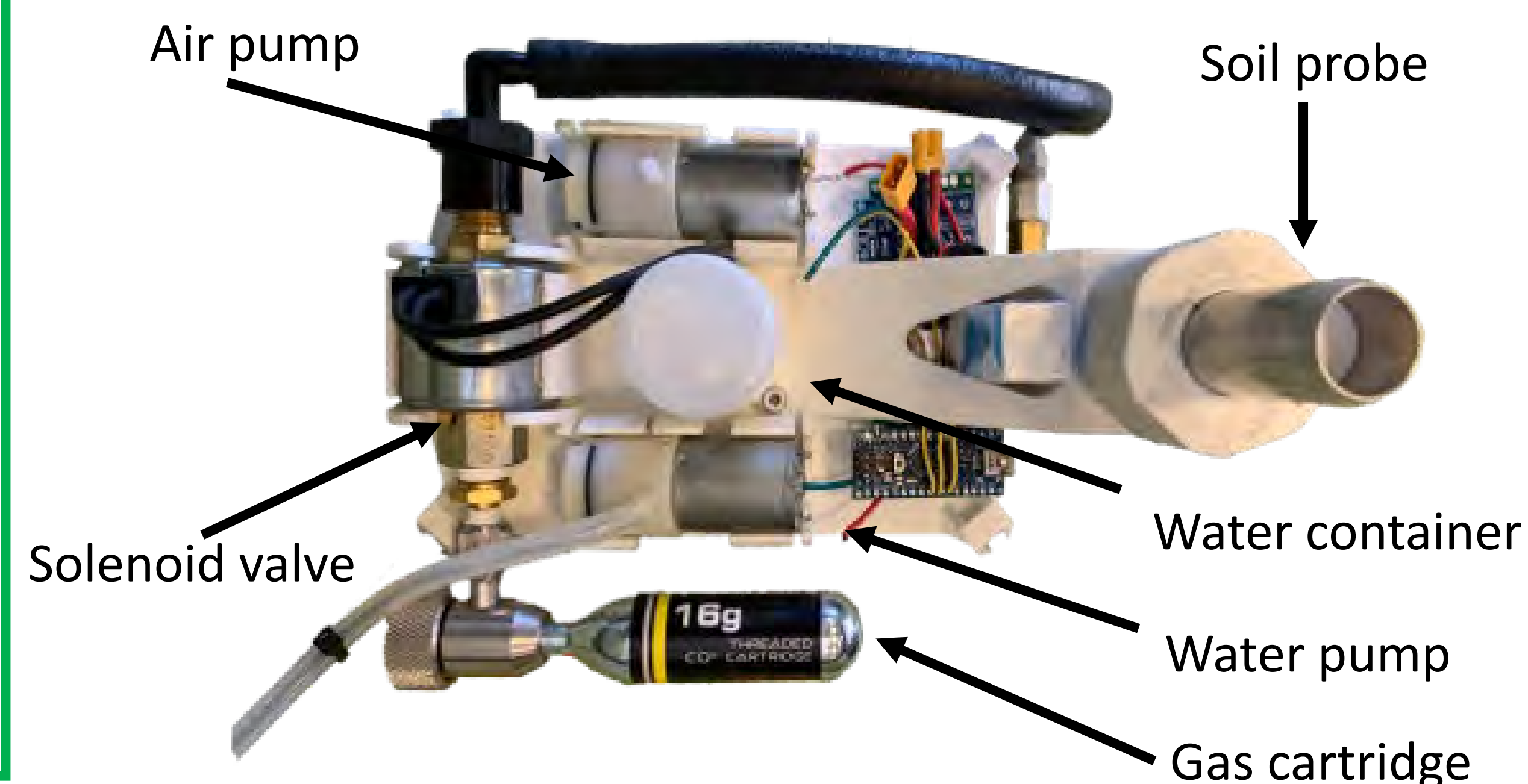


Soil Sampler

Operation: Solenoid valve triggers pneumatic soil probe to sample 8g of soil.



Bottom view of sampling mechanism.



Conclusion

- Mechanism can remotely sample air, water, and soil
- Can attach to most drones
- Mechanism is low power
- Design objectives have been met

Acknowledgments

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