Team 508: Drone Payload Sample Collection
Virtual Design Review 1

DOW®

Team Introductions

Dominic Bellocchio
Systems
Engineer

Tauben Brenner
Manufacturing
Engineer

Roberto Lacasa
Programming
Engineer

Matthew Lancaster
Control Systems
Engineer

Dylan Ma
Design
Engineer

Dominic Bellocchio

Sponsor and Advisor

Engineering Mentor
Alicia Washington
M&A Senior Project Manager
Dow Chemical

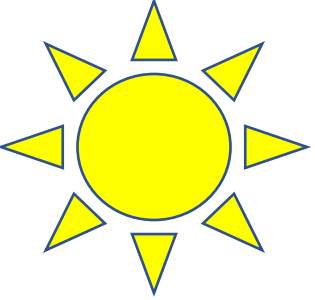
Engineering Mentor
Marcus Rideaux
Global Implementation Leader
Dow Chemical

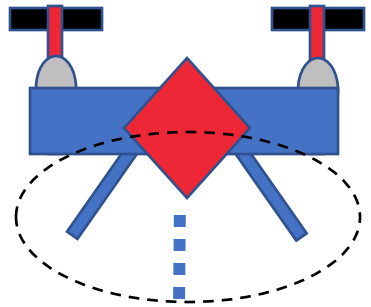
Academic Advisor
Camilo Ordóñez, Ph.D.
ME Teaching Faculty
Florida State University

Dominic Bellocchio

Objective

The objective of this project is to collect liquid samples, prevent contamination, and store the samples safely.





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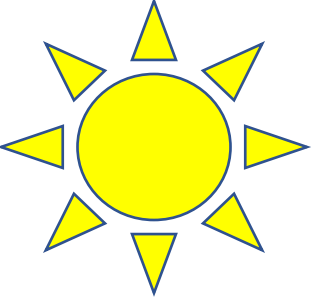

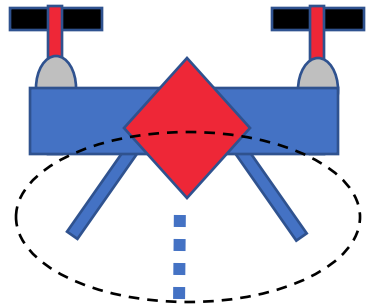

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Harmful algae blooms are on the rise

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Devastated ecosystems
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The benefit of using a drone

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Sampling is needed
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Additional uses

Assumptions

Built in state estimation

The drone has a built-in flight controller

All testing will be done on shore

Drone has live video feedback

Markets

Primary Market: Dow Chemical and municipal and federal water monitoring agencies.

Secondary Market: agricultural organizations, disaster relief groups, and environmental conservation groups.

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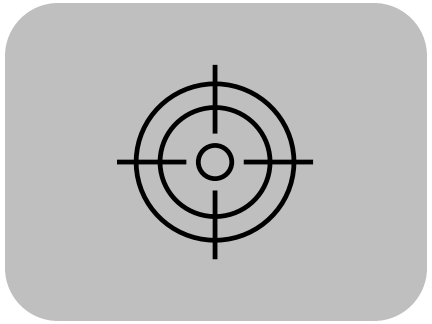
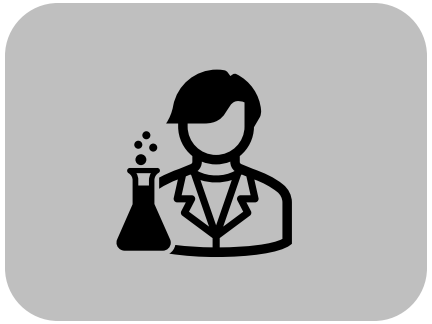
Stakeholders

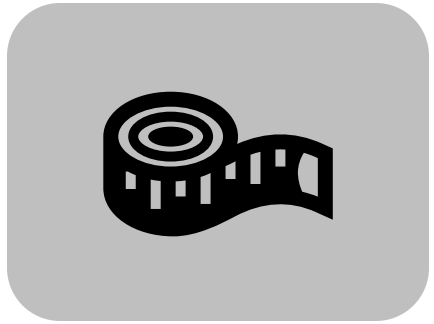
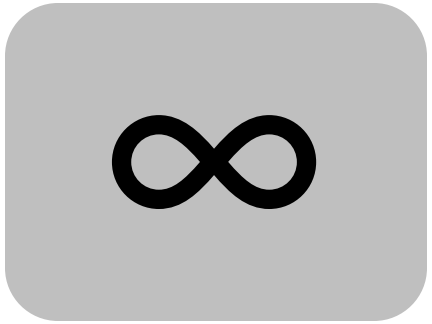
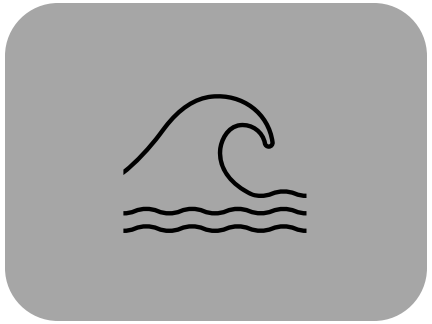
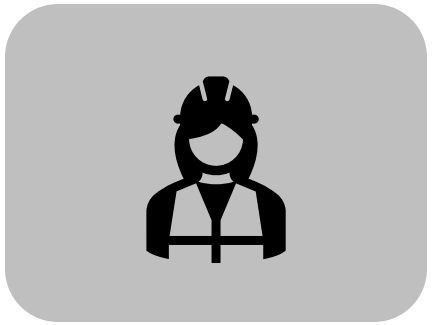
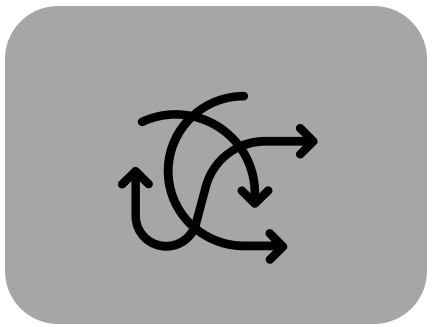
Dr. Shayne McConomy

Camilo Ordóñez

Dominic Bellocchio

Customer Needs

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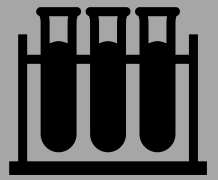
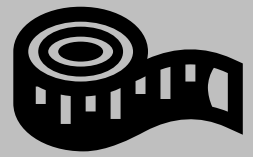
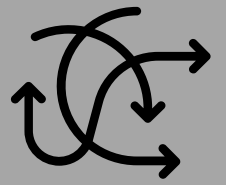
Customer Needs

The payload can collect multiple samples without contamination







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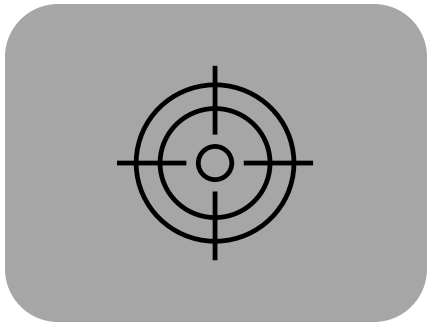
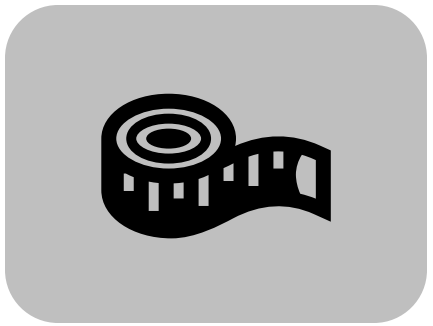
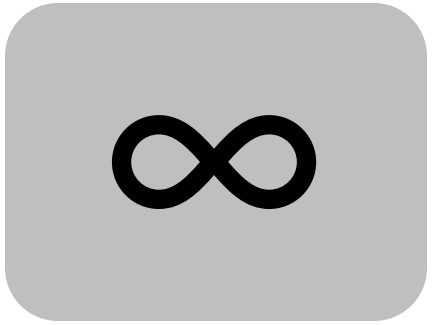
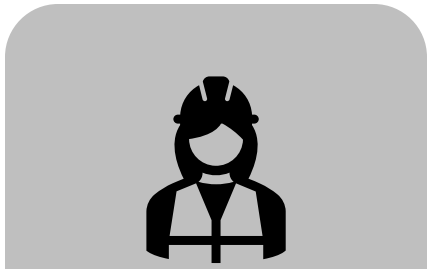
Customer Needs

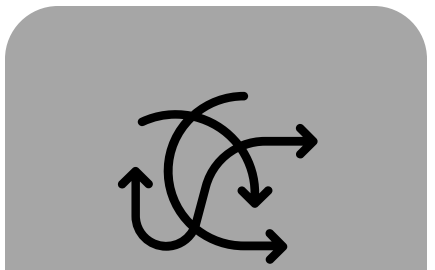


The drone only needs to transport the samples









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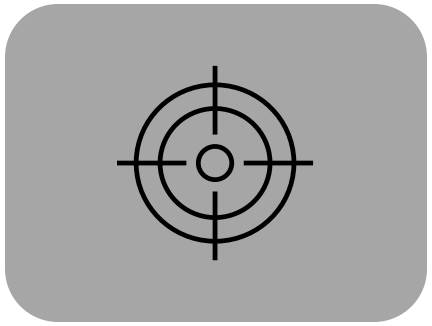
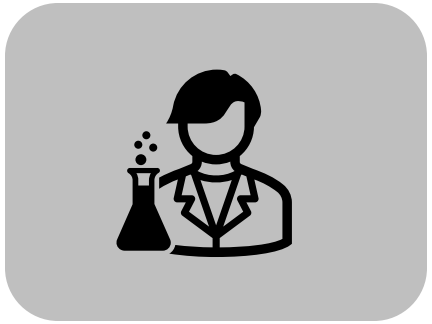
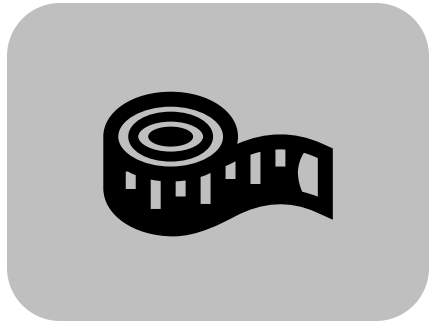
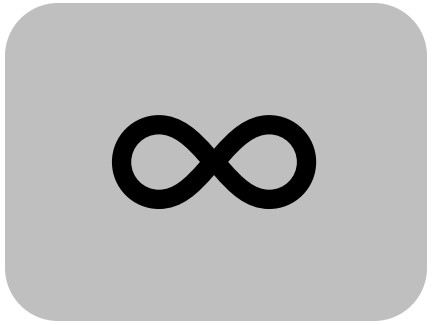
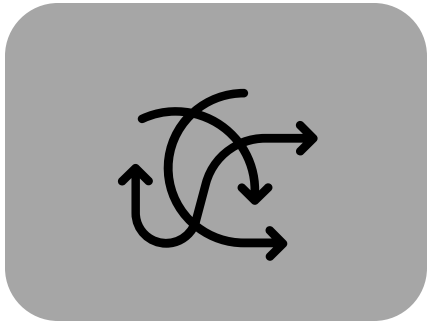




The amount will allow for balancing







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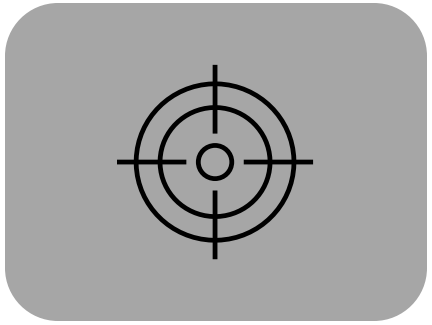
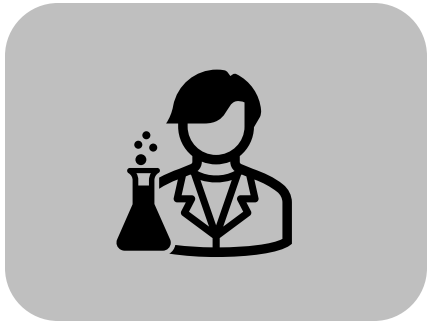
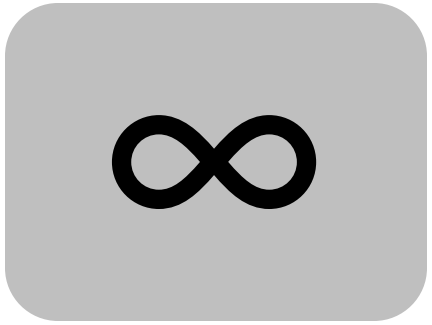
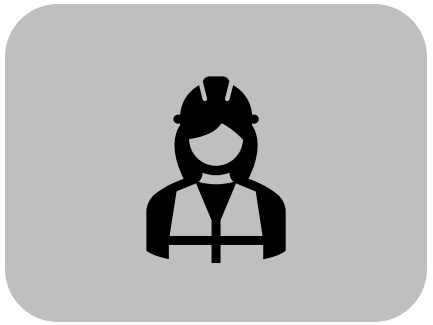
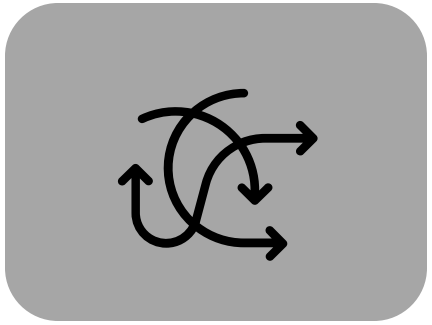




The payload should be 1 kg or less







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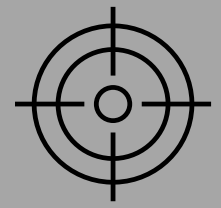
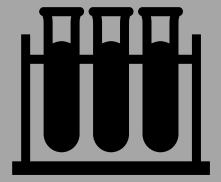
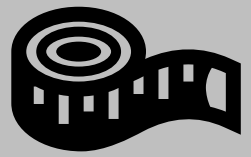
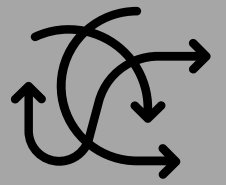






The payload will be applicable to multiple drones



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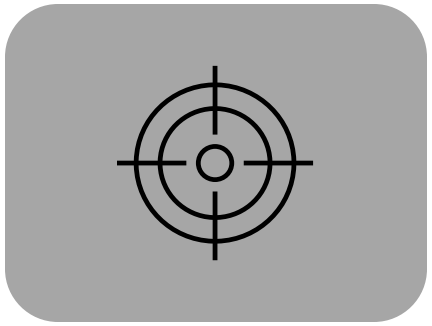
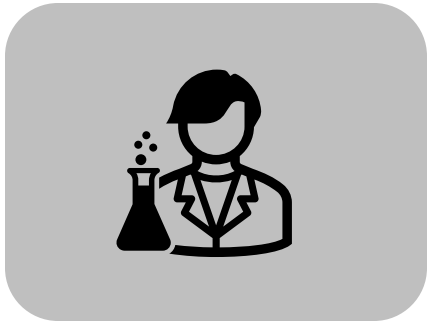
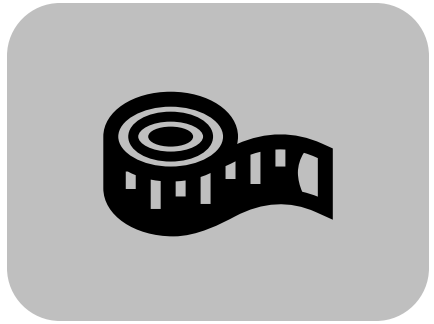
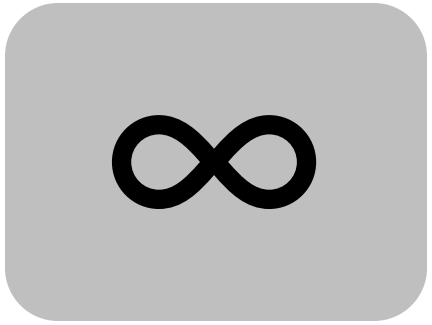
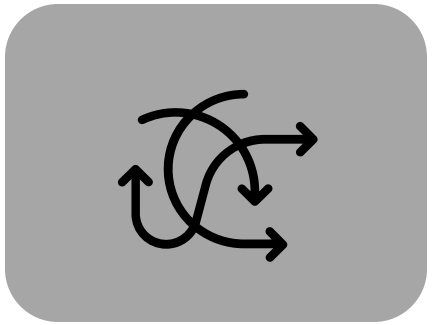



The payload can collect saltwater samples and chemicals

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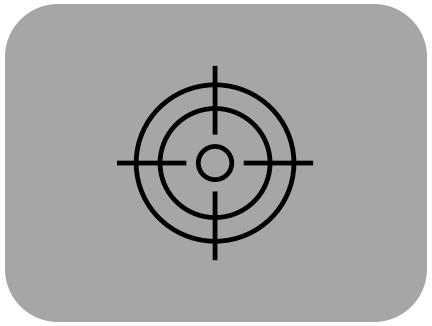
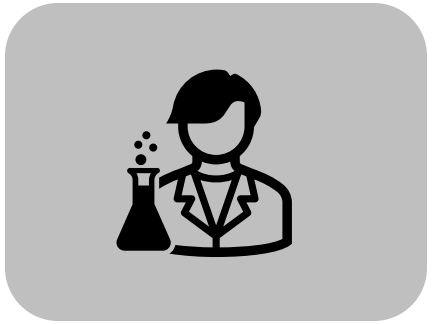
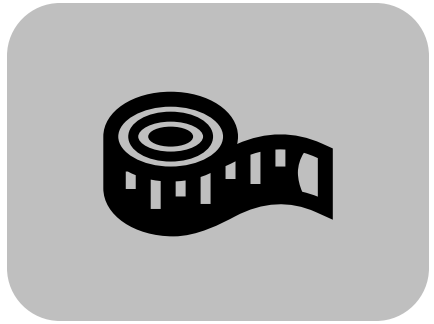
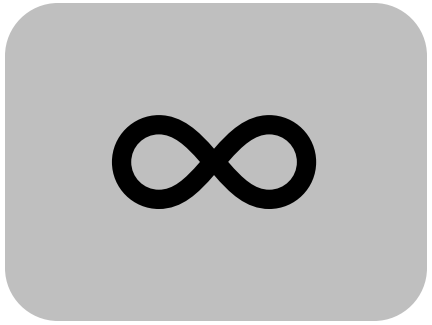
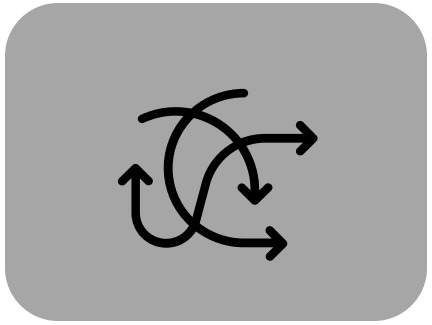








Payload is inert and retractable



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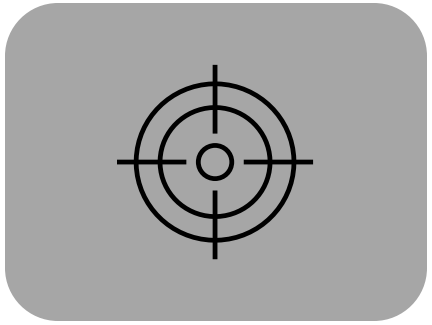
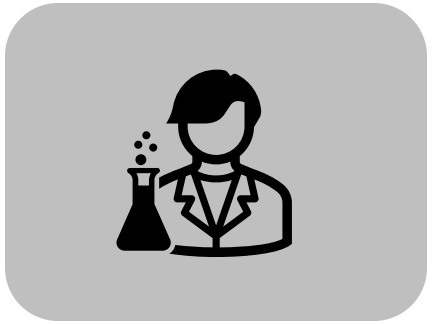
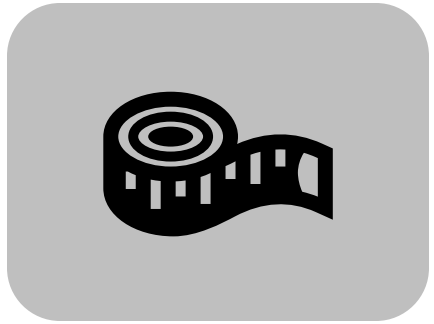
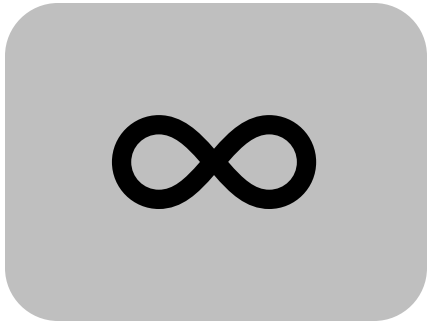
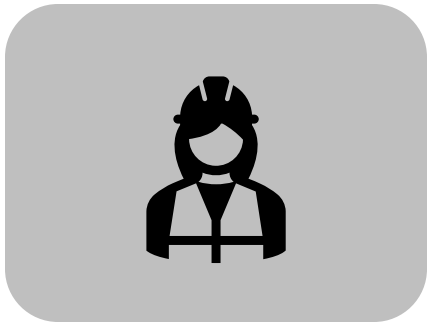
Customer Needs



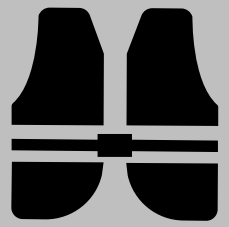
The payload needs to be stable and unobtrusive

Roberto Lacasa

Functional Decomposition

Drone Payload

Safety



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Functional Decomposition

Drone Payload

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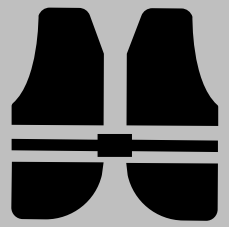

Stability

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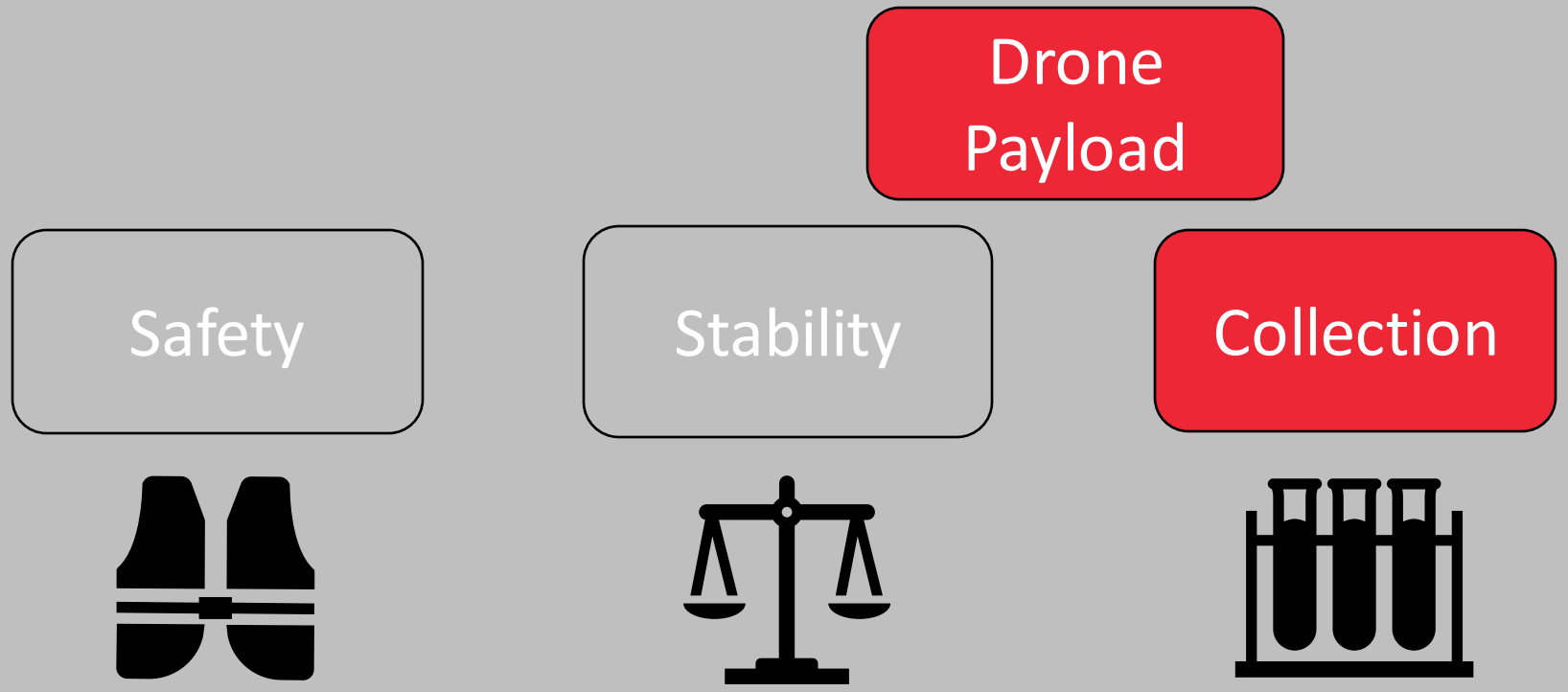
Functional Decomposition



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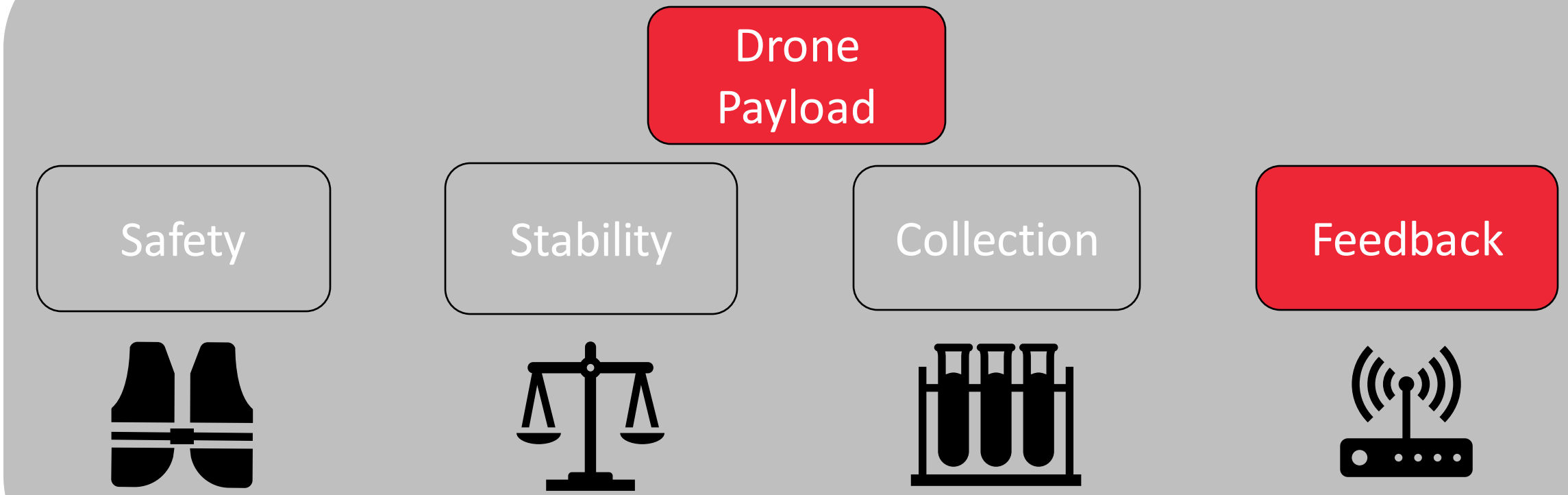
Functional Decomposition



Roberto Lacasa

Outside Research

Marine Biologist
Dr. Tara Merrill
Assistant Research Faculty
Coastal & Marine Lab

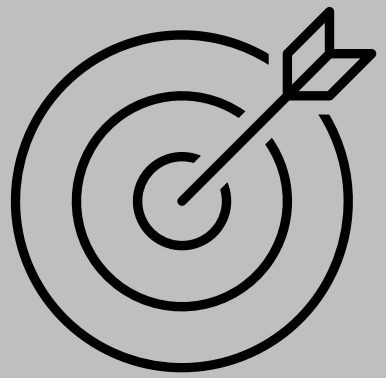
Sample size specifications

Sample collection requirements

Additional research resources

Roberto Lacasa

Future Work



Target & Metrics

Concept Generation & Selection

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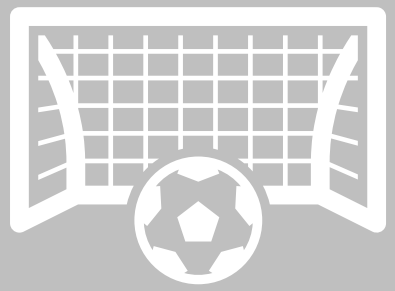
Backup Slides

Project Scope

Objective



Goals

Assumptions

Markets

Dominic Bellocchio

Key Goals

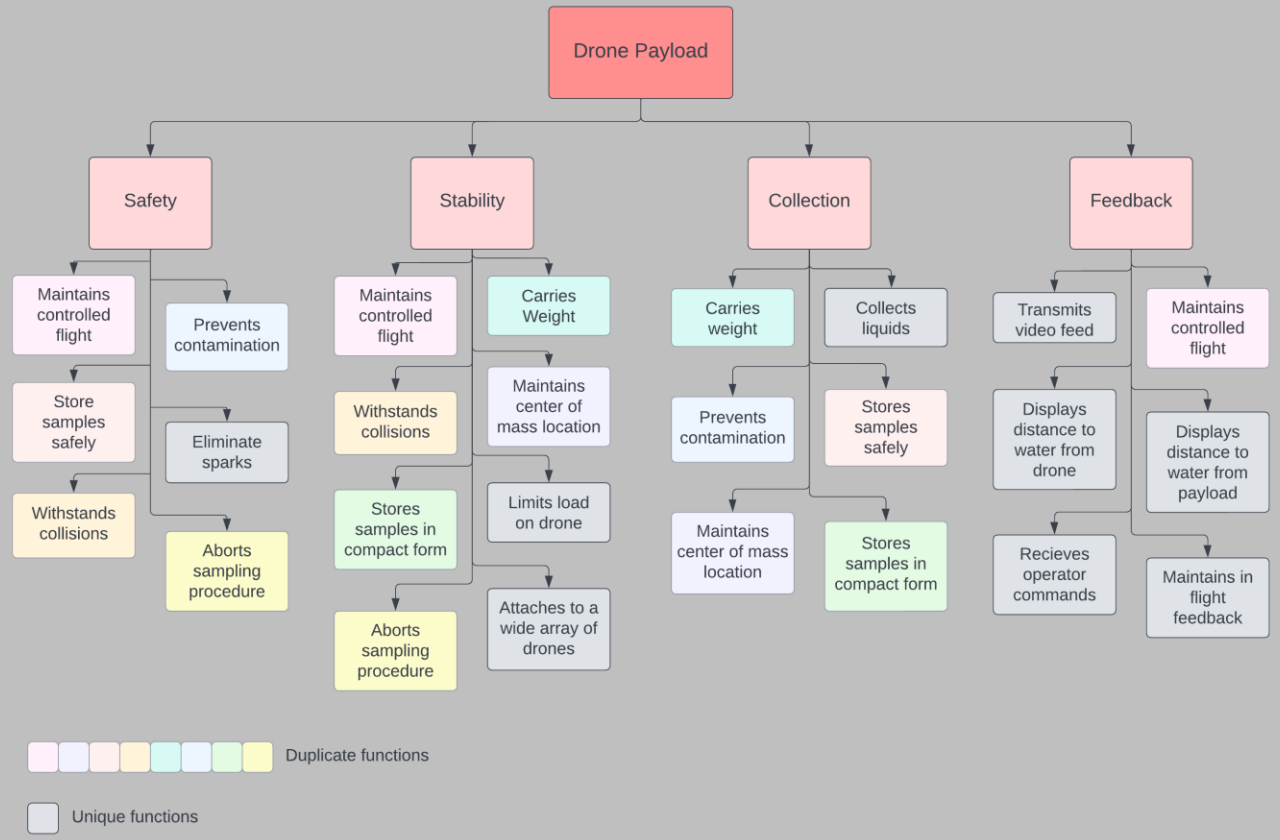
- Collect Samples
- Prevent Contamination
- Universal attachment
- One kilogram payload

Dominic Bellocchio

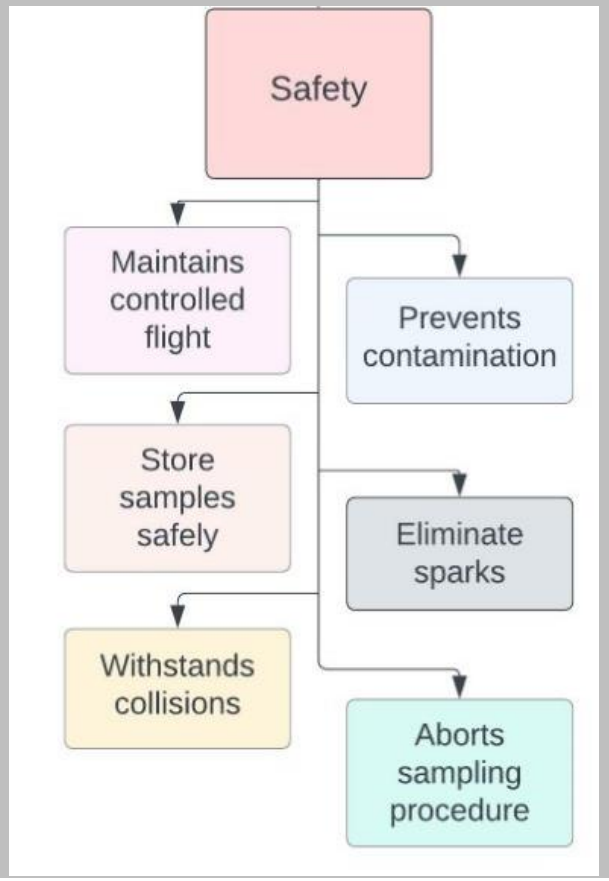
Customer Needs

- The payload can collect multiple samples without contamination
- The drone only needs to transport the samples
- The amount will allow for balancing
- The payload should be 1 kg or less
- The payload will be applicable to multiple drones
- The payload can collect saltwater samples and chemicals
- Payload is inert and retractable
- The payload needs to be stable and unobtrusive

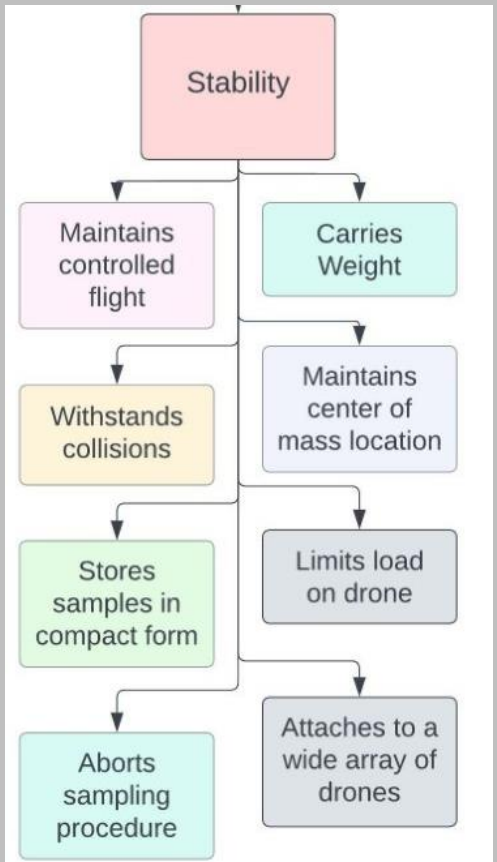
Functional Decomposition



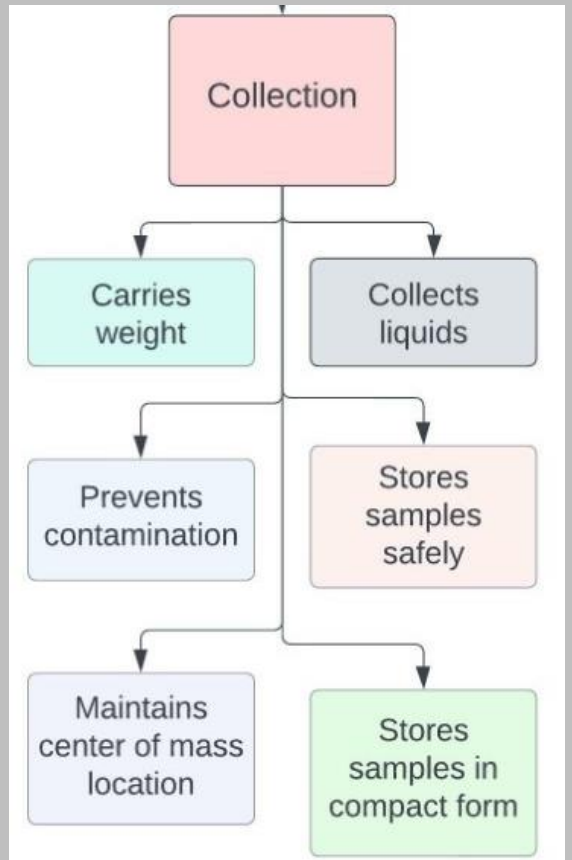
Functional Decomposition



Functional Decomposition



Functional Decomposition



Functional Decomposition