Water Drone and Bathymetric Profiling

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PURPOSE:

Using Water Drones For Increased Speed, Safety, and Greater Resolution

USES:

- Bathymetric Survey
  - Water Depth
  - Sediment Thickness
  - Water Storage
- Volume Loss Over Time
- Water Sampling

PROS:

- Smaller crew
- Easy to deploy
  - Shallow water access
  - Remote locations
- Autopilot – stays on path
- No air or noise emissions
- Can be operated from shore (water safety)

CONS:

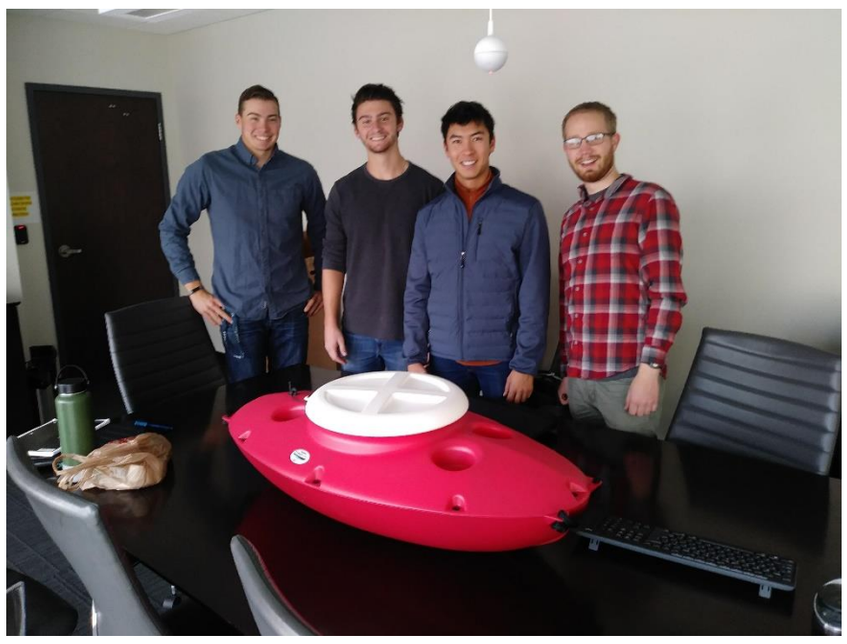
- Limited battery life, requires change-out every 2 hours
- High winds and choppy water impact survey quality and battery life
- Not ideally suited for busy water bodies (i.e., significant boat traffic)
- Autopilot is susceptible to magnetic interference
- Limited obstacle avoidance capability (current design)

CONCLUSION:

No tool is perfect, but this drone was effective at lowering costs and increasing the speed of conducting a full bathymetric survey.

Water sampling abilities are next!

DEVELOPMENT



Designed and Developed Through Partnership with the Colorado School of Mines Capstone Program

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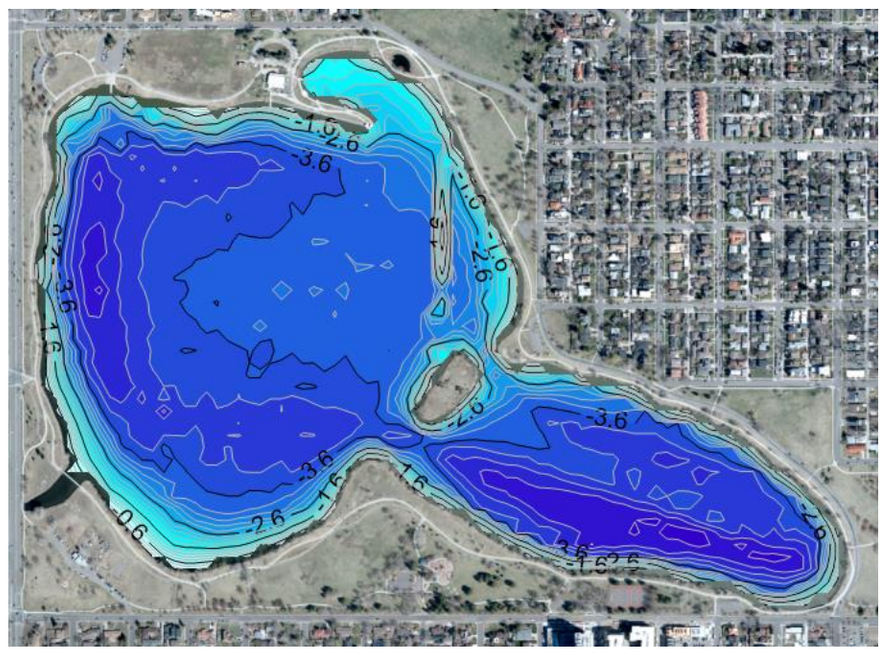
WATER DEPTH

- Map depth to sediment
- Calculate Storage Capacity
- Evaluate Water Quality Improvement Options
- Evaluate Recreational Uses



SEDIMENT THICKNESS

- Map Sediment Layers and Bedrock
- Determine Sediment Volumes
- Evaluate Dredging Options and Costs
- Understand Infilling and Storage Capacity Loss Over Time

COST SAVINGS

	2-Person Boat Crew (est.)	1-Person Drone Crew (est.)
Field Crew Hours (Total)	200 hours (~$20,000)	100 hours (~$10,000)
Bathymetric Gear, Survey Equipment, Vehicle ($ Total)	~$5,400	~$5,400
Boat/Trailer/Platform vs Drone Rental ($ Total)	~$7,850	$2,500
PM (Hours)	20 hours (~$4,000)	10 hours (~$2,000)
CAD/Data Processing	10 hours (~$1,000)	10 hours (~$1,000)
Totals ($/Hours)	$38,250 / 230 Hours	$20,900 / 120 Hours