

Problem Statement

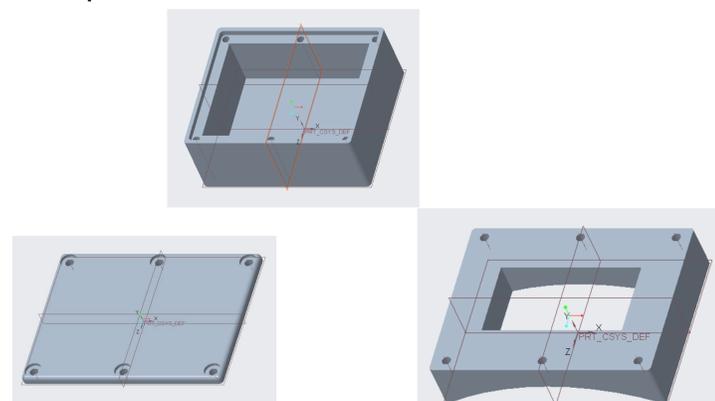
The team is faced with improving an existing tracking collar by reducing the overall cost. These tracking collars are used to track bobcats, foxes, and coyotes. The purpose of tracking these animals is to understand their movement patterns as well as how they interact with each other. The collars send back GPS information so the team can track the animals. The collars currently cost \$3,000 to purchase multiple collars to collect data. The task is to simplify the features of these collars and reduce their cost.

Requirements

- Must be able to track an animal in a 10 km² area.
- The collar cost under \$1000 to make.
- The collar must be able to be retrieved
- The collar must be able to transmit data every hour.
- The collar must be less than 5% of the animal's bodyweight. Fox = 6.4 oz, bobcat = 12 oz, coyote = 24 oz
- Not to exceed 90mm x 50mm x 32mm
- The collar must be able to be submerged in water.
- The collar must be able to operate in temperatures ranging from 0°F to 100°F.
- If the collar is transmitting data every 5-6 hours, the battery should last a year.

Concepts

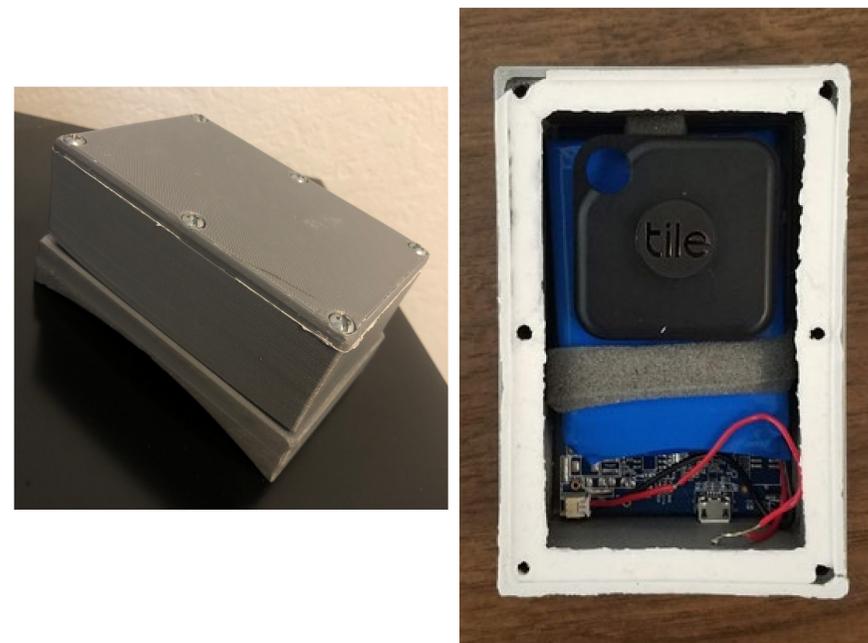
Two cases for the two trackers chosen were produced and are pictured below. 34



Final Design

Three trackers were chosen as candidates for the collar, but the Trak-4 and the Lightbug were chosen as the two that best fit the project requirements. Below is a comparison of the two trackers against our requirements.

Parameter	Trak-4	LightBug
Update Frequency	1-min/10-min/1-hour	The user can set it to any frequency
GPS Coordinates CSV	Yes	Yes
Price (initial)	\$48.00	\$137.53
Price (monthly)	Paid Annually: Hourly Reporting - \$6.99/month (\$83.88/year)	Paid Annually:
	10-Minute Reporting - \$9.99/month (\$119.88/year)	Standard (6 updates per day) - \$59.99
	1-Minute Reporting - \$14.99/month (\$179.88/year)	Unlimited - \$129.99
Size	102x55x68(mm)	90x50x32(mm)
Weight	3.8 oz. (w/o case)	4.2 oz. (w/o case)
	13 oz (with case)	7 oz. (with new case)



Results

This project resulted in two versions of a low-cost tracking collar that meet the requirements for tracking a coyote. The two versions are based around different trackers, the LightBug and the Trak-4. The LightBug and Trak-4 each have their pros and cons, and due to the weight requirement change, the team decided to make both viable for the future of the project. One of the most important goals of the project was to reduce the cost of the collar while keeping most of the functionality. The cost of the current collar that WCU is using cost approximately \$3000. The new tracker, after one year of use, will either cost \$167.88 (Trak-4) or \$266.96 (LightBug). This is a cost reduction of over 90%. The differences between the Trak-4 and LightBug are minor but worth considering, the LightBug offers extra advanced features but has a more complex user interface and costs slightly more than the Trak-4.

Summary

Both trackers work very well and can be used for the final tracker. As shown, each tracker is unique in its ability to set the trackers to fit personal needs. The trackers each have their own website to view the GPS data and change the settings. To retrieve the collar a Bluetooth proximity sensor was used to help the team locate the collar in the wilderness. The cost of the trackers was reduced by 90% while retaining the functionality of the original collars

Team & Acknowledgements

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