

Project Wavedancer



Helping marine researchers get a better picture of the overall health of orca whales

Problem

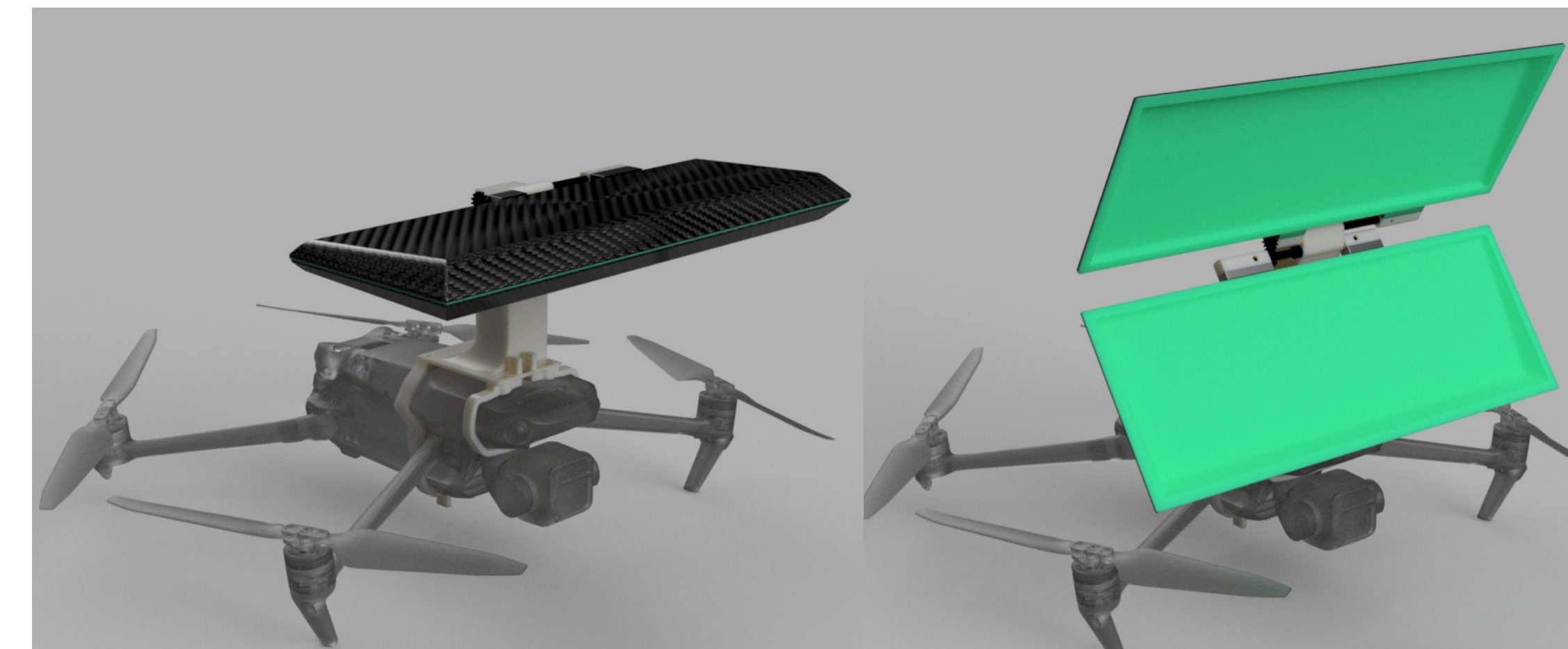
The Southern Resident Killer Whale (SRKW) population has stayed at a dangerously low level since it was first tracked in the 1970s. Researchers at NOAA are trying to discover the root causes as to why this population struggles in comparison to their northern counterparts. These researchers are monitoring the health of these whales by looking at hormones and bacteria present in their respiratory system. They do this by collecting the droplets that shoot out of a whale's blowhole as it surfaces to breath. They contract drone pilots who use a drone augmented with a Petri dish. The amount collected via this method isn't consistent enough to help them analyze these samples. Our goal is to design, build, and test a drone-mounted breath collection device for SRKW in order to help NOAA researchers better understand their overall health in order to shape policy decisions.

Solution

Our testing showed us that we needed a light payload, the ability to shield the collected sample from evaporation, and the ability to quickly swap out to new, sanitized collection mediums.

To lighten the load, we built our larger parts out of carbon fiber instead of PLA. To deal with evaporation, we made the collection plates articulable via a LoRa controlled servo motor. To make the clamshells more user friendly, designing a swappable system allowed the entire clamshell to be removed at once.

The result is a collection device that meets the technical requirements laid out by the researchers while simultaneously providing a positive user experience.



Calmshell open close and open

Process/Approach



Quantifying the maximum payload



Testing different mounting locations and methods

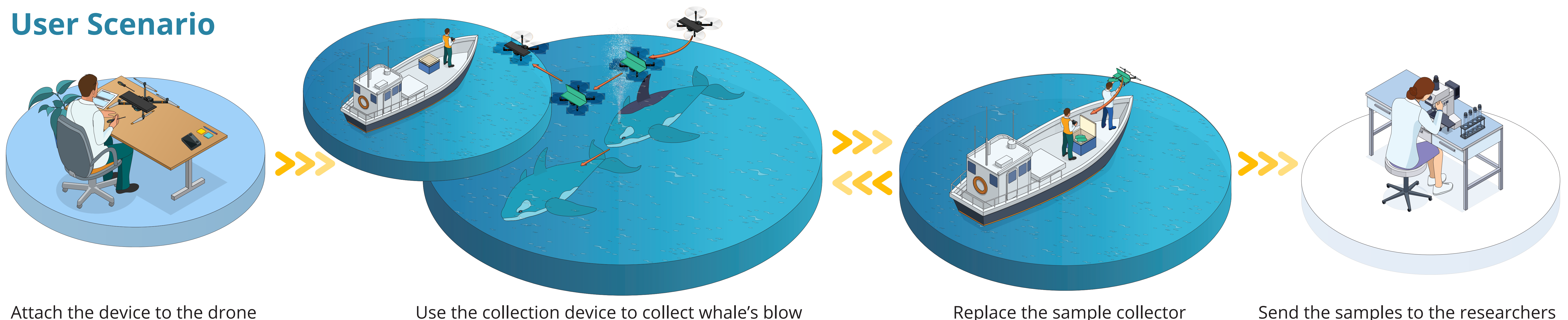


Building artificial blowhole and using it as a simulator



Making carbon fiber parts

User Scenario



Attach the device to the drone

Use the collection device to collect whale's blow

Replace the sample collector

Send the samples to the researchers