



Catamount Kennel



School of Engineering + Technology

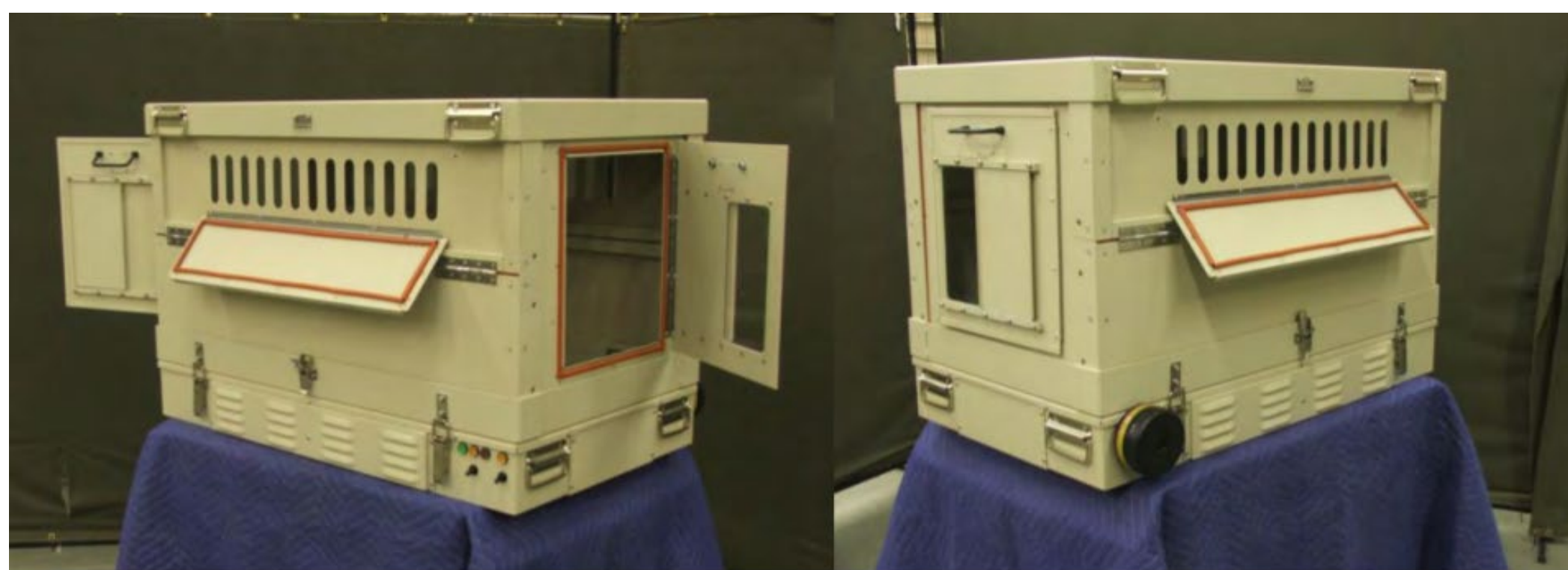
Problem Statement

- The current protective kennel for Military Working Dogs (MWDs) has a large logistical footprint
- It is desirable to have an emergency use, rapidly deployable kennel to quickly protect (MWDs) from contaminated environments

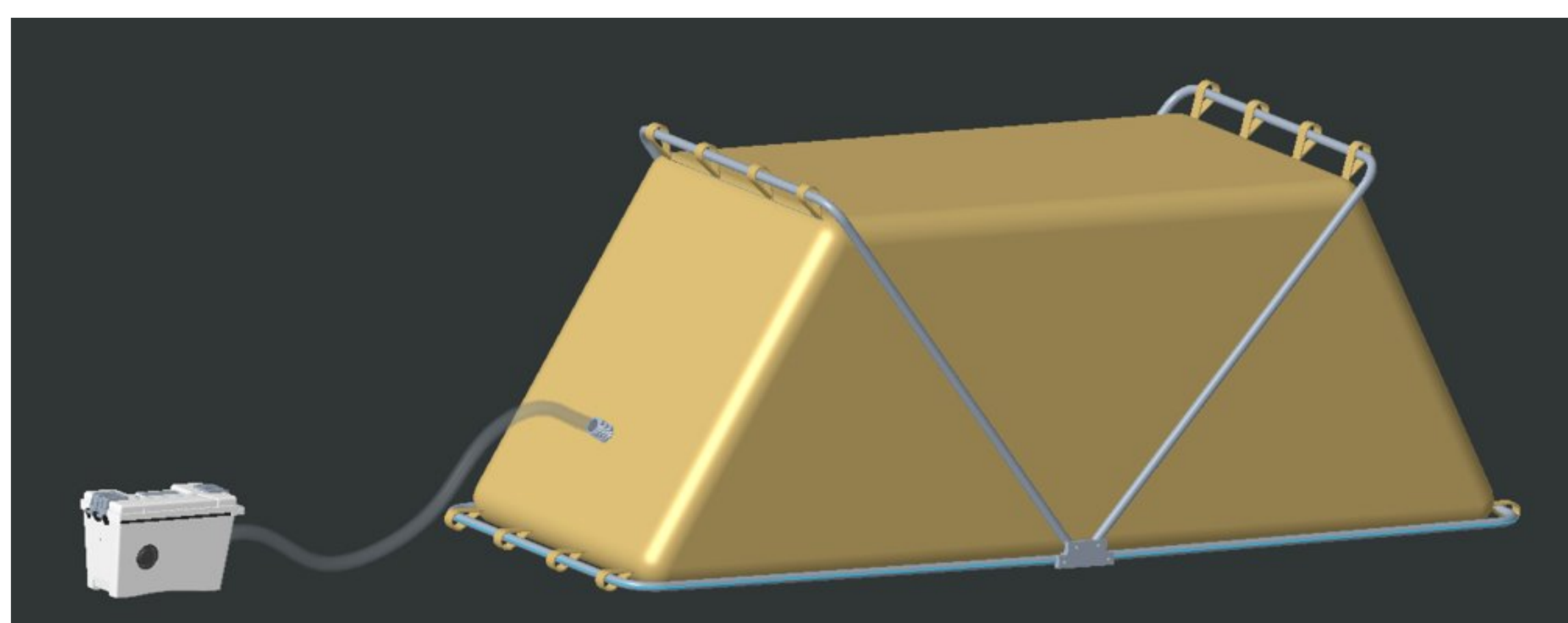
Requirements

- Must fit inside a large duffel bag
- Must use an active filtration system
- Must be easily transportable and deployable
- System will require no external power source

Concepts

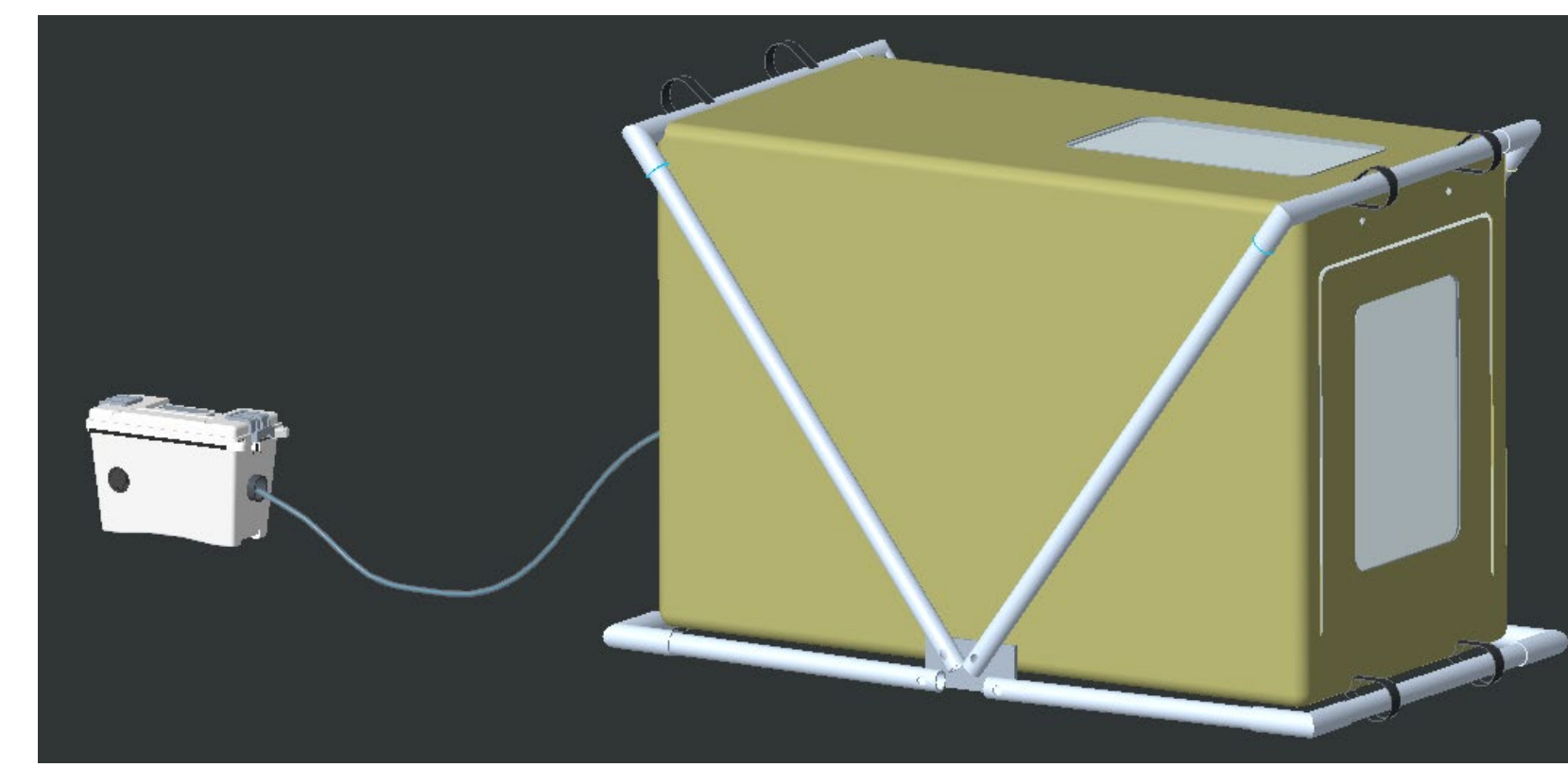
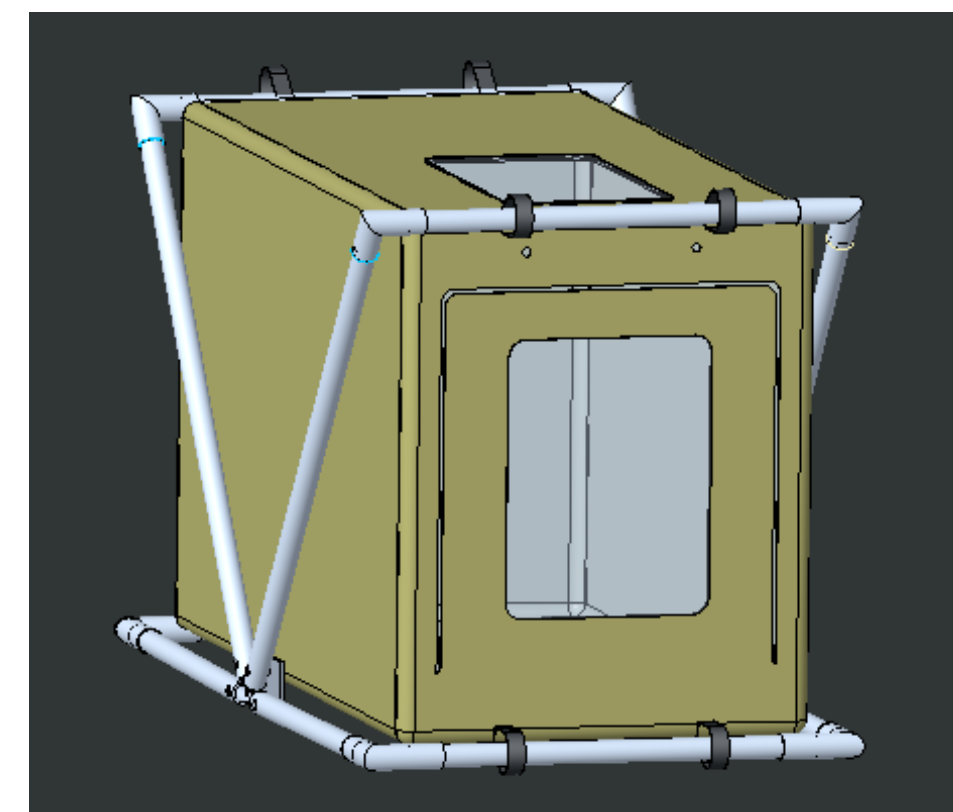


- The team drew inspiration from the currently used protective kennel and its ability to safely filter contaminated air



- The initial design involved a fabric kennel with an aluminum exoskeleton
- An ammo box would house the air blowers and filter
- The exoskeleton and fabric would inflate and collapse for portability

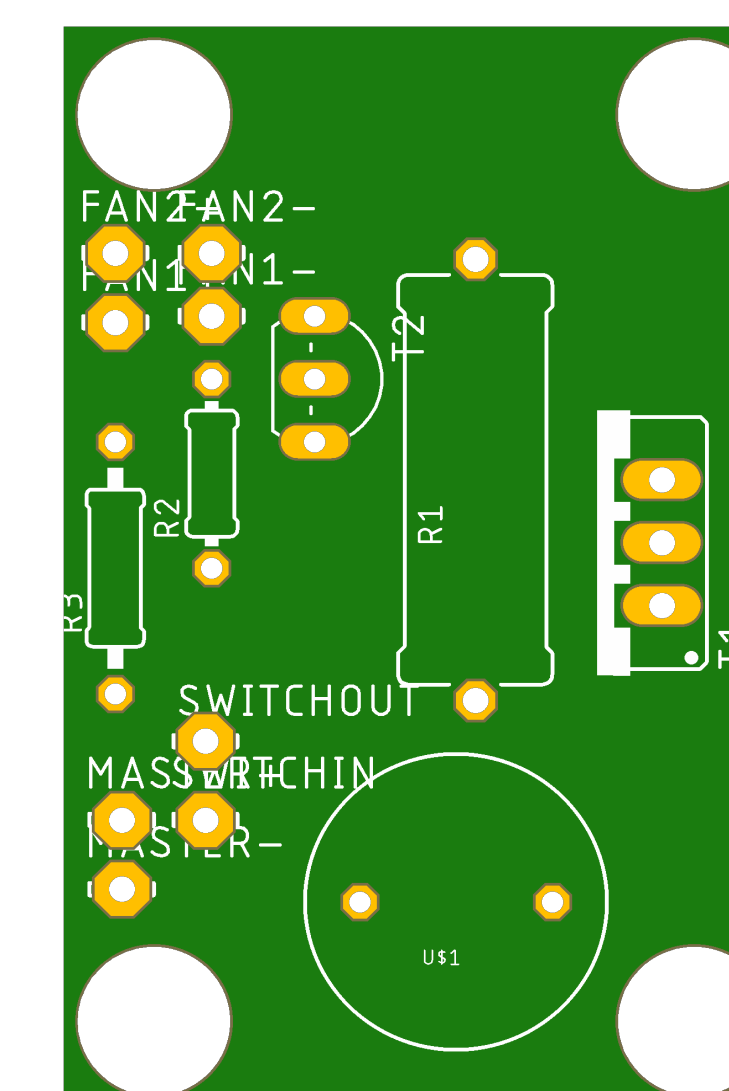
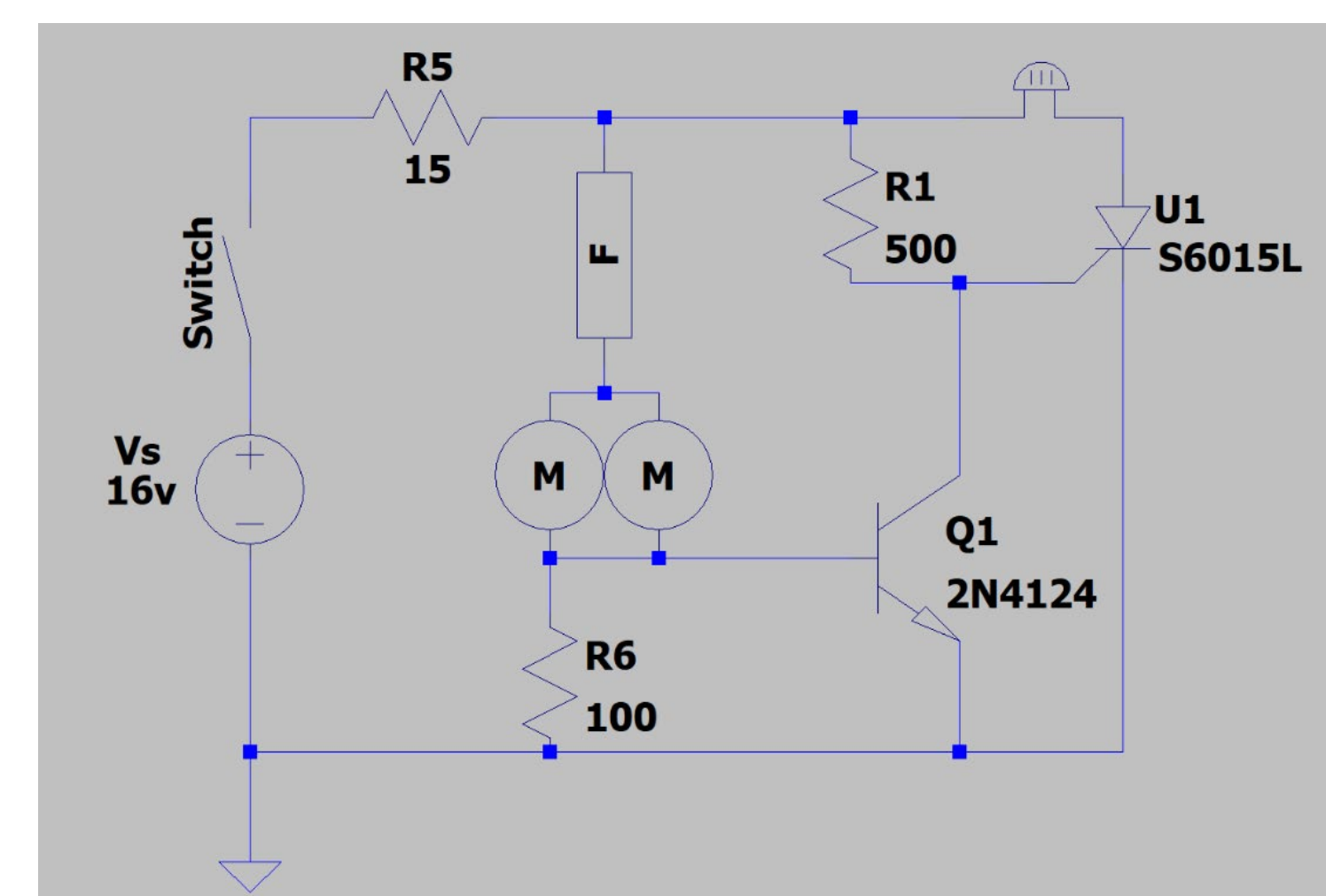
Final Design



- Final design includes a soft kennel made of an outer non-woven CHEM/BIO resistant fabric, an inner non-woven rip-stop fabric, and vinyl windows for easier handler viewing
- The exoskeleton is telescopic to have a smaller footprint when collapsed
- The kennel has a one-way hose connection for clean air entry and two one-way valves for continuous air exchange



- Kennel & Exoskeleton weight: 21.2 lbs
- Collapsed Size: 25inx21inx8in



- The circuit is designed to power the dual air blowers from a standard ARMY-issued battery
- The circuit has an audible alarm system to alert handlers if the blowers fail

Results

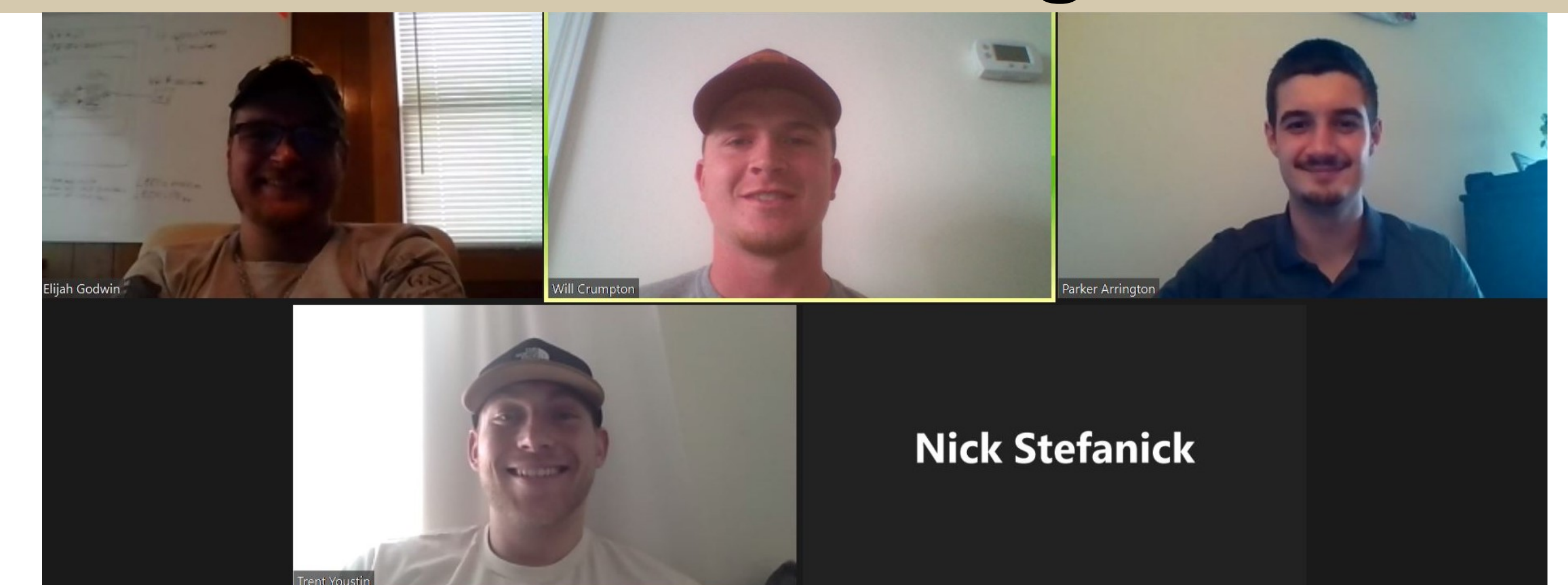
Test Name	Status	Result
Electrical Test	Complete	PCB functions as intended
Inflation Test	Complete	Initial air blowers failed to inflate kennel. Modified system with larger air blower inflated kennel in 55 seconds
Deployment Test	Complete	Deployable by one person in 51 seconds
Volumetric Airflow Test	Complete	Initial air blowers failed to deliver measurable air to the kennel. Modified system with larger air blower and removed valve delivered an acceptable 1.76 cfm to the kennel
Pressure Difference Test	Incomplete	WCU does not have currently have the equipment to determine the pressure difference of the system

- The current air blowers do not have the adequate static pressure to deliver necessary air flow to the kennel
- Additional testing is needed to determine the pressure difference of the system

Summary

- A rapidly deployable MWD kennel with reduced logistical footprint for emergency use in a contaminated environment
- Future design considerations will include:
 - Implementing an air blower with higher static pressure ratings to deliver acceptable airflow rates
 - Replacing exoskeleton PVC with carbon fiber tent poles for further collapsibility and reduced weight

Team & Acknowledgements



From upper left: Elijah Godwin –ECET, William Crumpton –ET, Parker Arrington –BSE, Trent Youstin –ET, Nick Stefanick –ECET

- *Dr. Brandon Conover* – Industry Sponsor
- *U.S. Army Research Office* – Project Sponsor
- *Dr. Patrick Gardner* – Faculty Mentor
- *Fabric Loft*

Thank you to all who helped in this project