## Background

Current upper-body garments are not effective in keeping soldiers cool in warmer climates. Overheating in the field can cause medical issues like dehydration and fatigue.

## Technical Objectives

The goal is to develop a lightweight and compact vest that can effectively cool a soldier.

### Important Features:

- Effective fluid flow
- Environmentally friendly material
- Noticeable temperature reduction
- Lightweight/compact

## Technical Approach

To ensure our final design meets our criteria, the team developed a Pugh analysis. Functionality, cost, packaging, and sustainability were crucial aspects of this analysis. In the end, the team chose the air-powered cooling apparatus because of its temperature reduction quality, simplicity, weight, and environmental impact.

## Initial Iteration

![Initial Iteration Image](image)

## Next Steps for Development and Test

Product development is an imperative part of the design process. Currently the team is spending time finalizing the CFD analysis and assembling the final prototype. The prototype will be completed within the week.

## Commercialization Plan & Partners

In order to commercialize effectively, the team needs to finalize and optimize the design to serve the customer base. The US military has strict criteria which must be adhered to when creating products for them. Additionally, a feasibility study should be done to research supply logistics and to determine the best tooling manufacturers.

## Conclusion

This simplistic vest design provides a solution to the problem established. The minimalistic design allows for soldiers to add this vest to their uniform with some modifications to the backpack.

### Manufacturing

- **Electronics:**
  - Brushless Radial Blower (12V DC Centrifugal Fan)
  - 12V 9Ah Battery
  - 6-30V DC Motor speed Controller Reversible PWM

- **Fabrication:**
  - Hard-shell Backpack
  - Insulation (Mylar)
  - Bladder (Mylar, Foam, Plastic)
  - 3D printed funnels