MORE SECURE INSULIN COOLER

A portable container that keeps insulin safe 3 times longer than current solutions

ENGINEERING REQUIREMENTS

- Footprint must be close to the dimensions of a notebook.
- Store at least two 100-unit glass vials securely
- Maintain a modular and robust enclosure design
- The insulin must be well insulated
- Final cost cannot exceed $300
- Insulin must be kept as a safe temperature for at least 7 days on a single charge
- Power and temperature data must be logged for later review
- Batteries must be robust and rechargeable
- Data must be accessible to the user
- Weight must remain under 10 lbs.
- Cooling must be responsive and efficient

NEXT STEPS

- Bring our prototype to people reliant on insulin and get feedback
- Increase the manufacturability of the electronics and enclosure
- Continue to research new materials to improve performance and reduce cost
- Optimize for size and weight while maintaining performance
- Create more modules (varying battery capacity, vial capacity, vial size, and equipment storage)
- Conduct field testing to get valuable data for the client
- Use the prototype to inform future designs
- Test different cooling methods using the same enclosure

Oregon State University

BACKGROUND

Medivacc is a company started by business students at Oregon State University in 2016. The aim is to provide freedom and security to the nearly 10 million Americans who live with diabetes. Insulin, the life-sustaining hormone people with diabetes need, can go bad in warm weather in as little as 6 hours. There are few solutions for insulin-dependent Americans that is both portable, long-lasting, and secure. This is where Medivacc comes in.

The hybrid cooling box uses both passive and active cooling methods to ensure long lasting and secure cold storage for any biologic medication. On the market, the best portable options last for about 3 days max, while Medivacc can keep everything someone would need for over a week.

Fig 1: A common 10ml vial of insulin

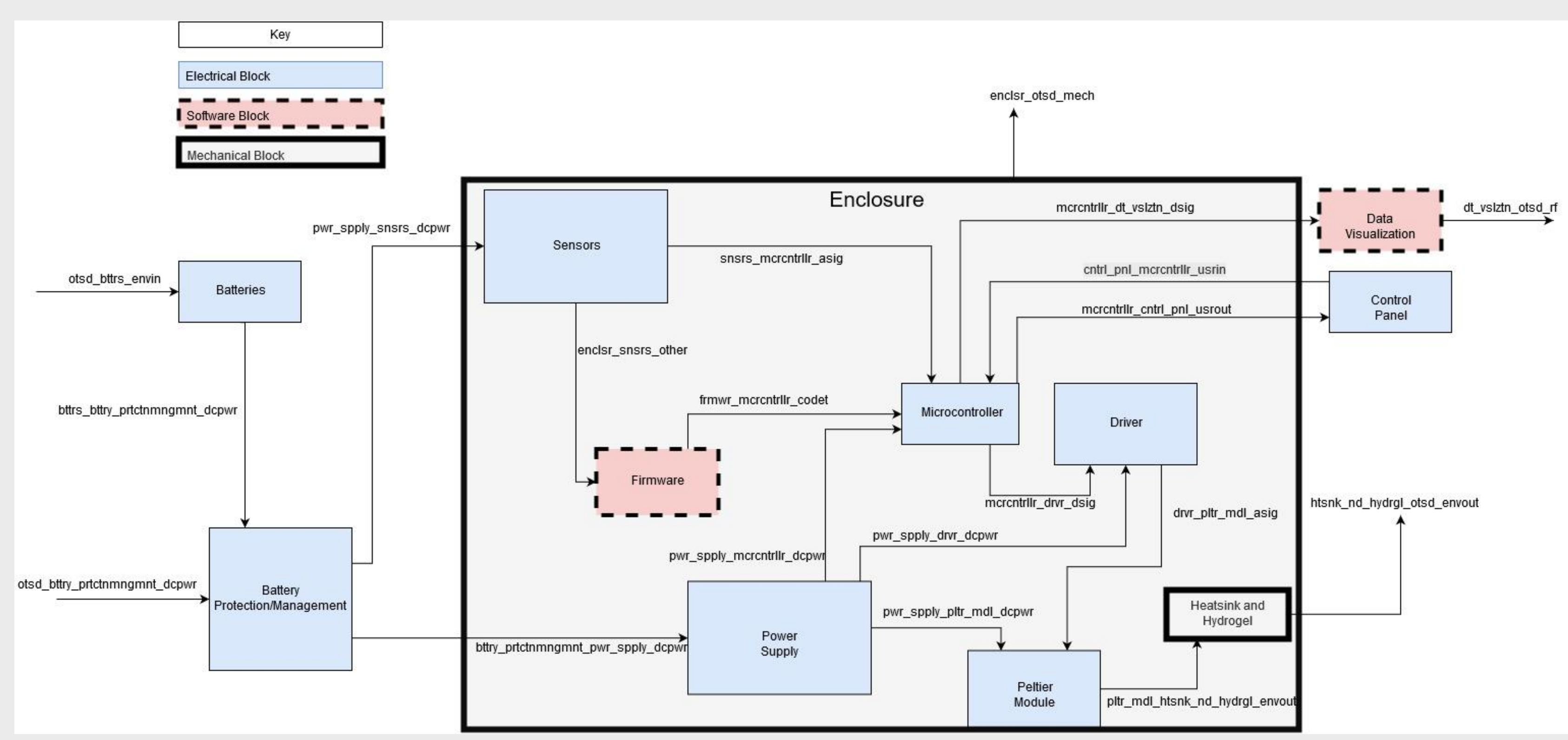

Fig 2: in-depth block diagram

SOLUTION

- Efficient power electronics
- Insulation
- Modular enclosure design
- Chemical passive cooling system
- Active solid-state cooling
- Transparent and accessible user design
- Data-based performance optimization

DESIGN CONSTRAINTS

A partial design was received from the client, but it was inefficient and mostly used off the shelf components. The main task is to balance reliability, weight, efficiency, and price. For example, the batteries must have the largest capacity possible without being dangerous, too expensive, or too heavy.

As many parts are possible will need to be custom without going over budget or time. All materials used also have to be fairly accessible so our client can further develop the prototype on their own.

Since the clients were also students, high quality documentation and clear communication was essential to this project

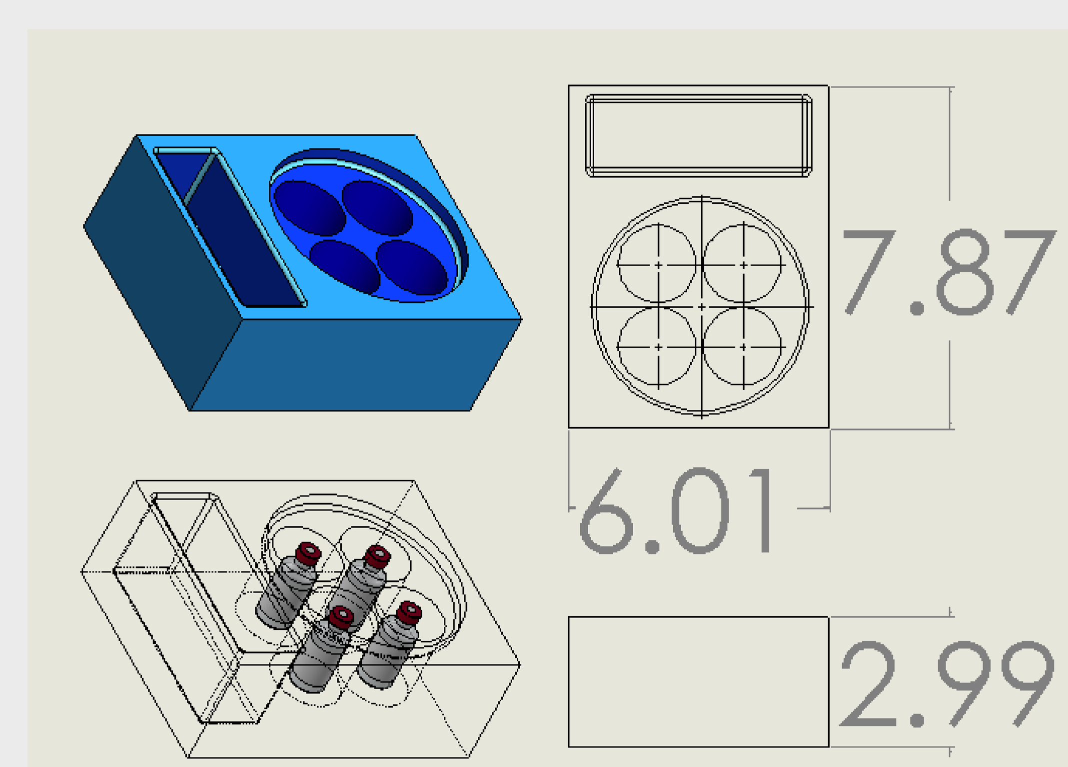

Fig 2: Model of enclosure design

TEAM MEMBERS

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Compact
Fit in your Pack
Have Your Back

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