VITAL METRIX – PHYSICAL DISTRESS MONITOR

SDSU San Diego State University

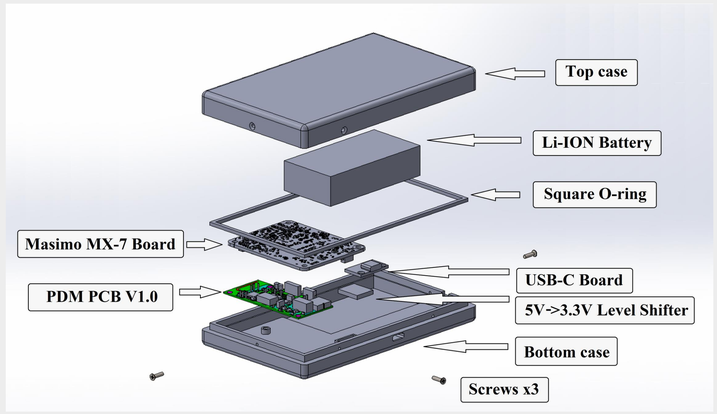
SYSTEMS ENGINEERING RESEARCH CENTER

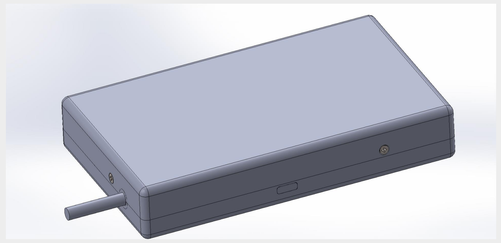
Project Overview

Problem: Military trainees face potentially life-threatening risks of severe physical distress without any reliable means to differentiate between safe physical exertion and dangerous physiological distress states.

Need: There is a crucial need for a wearable Physical Distress Monitor (PDM) system that integrates a sensor package (capturing heart rate, blood oxygen, hydration, and body temperature) with a machine-learning algorithm individually tailored to each unique wearer. This system should provide real-time monitoring and alerts for health status, enabling observers to manage and intervene appropriately in cases of distress using a compatible monitoring device.

CAD

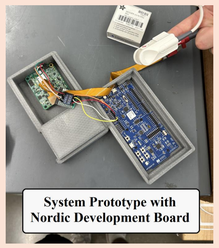


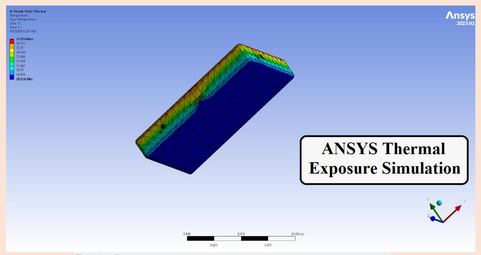


Project Requirements

PDM Requirements

- Impact testing equivalent to a 6'4 200 lbs. person falling on housing.
- Waterproofing in compliance to IPX7 standards.
- Unobtrusive to the wearer within reason.
- Able to maintain operation between 12-24 hours on a single charge.
- Able to reliably differentiate between actual physical distress and strenuous workouts.
- Able to communicate with a remote device via Bluetooth Low Energy.
- The machine learning algorithm is designed to adjust the alert limits based on the biometrics of the individual wearing the device.
- The embedded sensors maintain accurate functionality even when the user is in motion.
- The central device can simultaneously track the well-being of either a single person or a group, allowing for quick assessment of any distress.

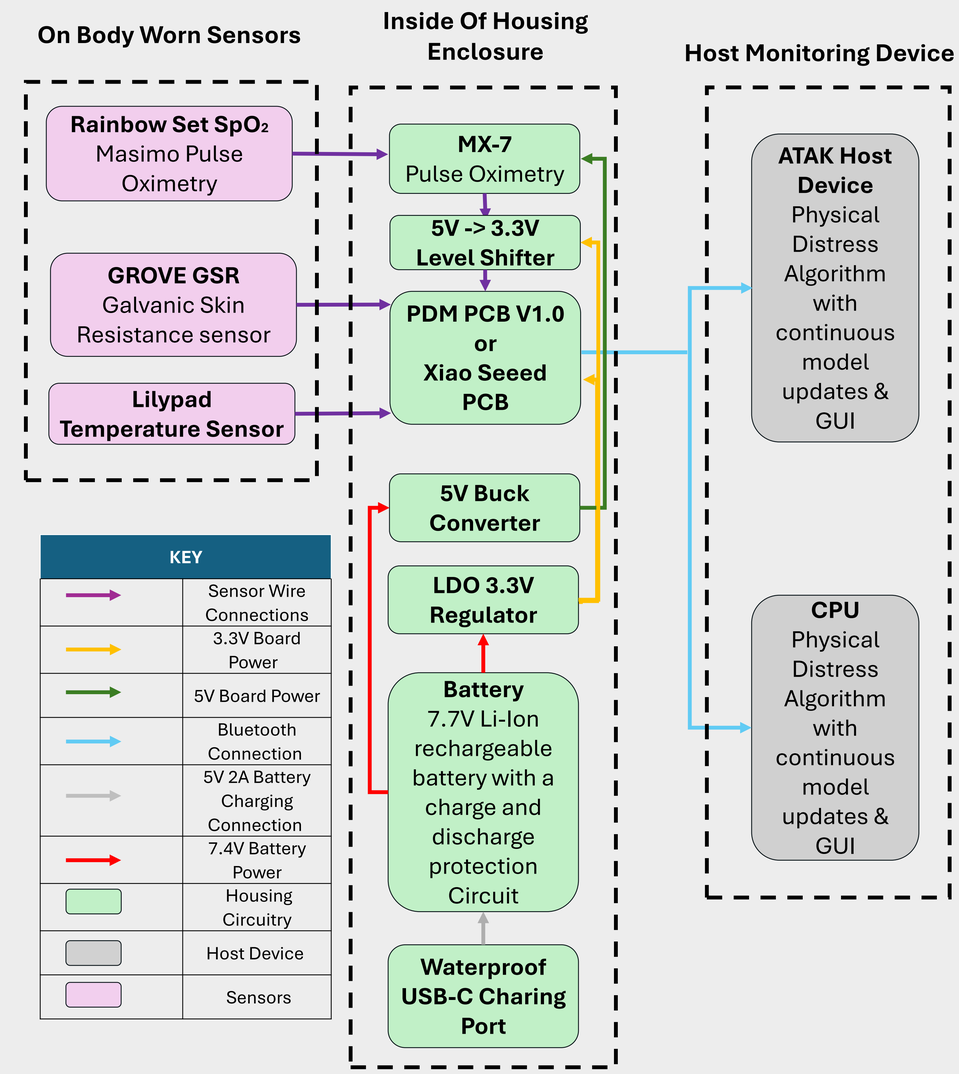




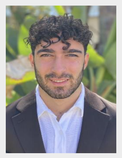
Tabular Data

	Time [s]	Minimum [°C]	Maximum [°C]	Average [°C]
1	1.	28.936	37.055	33.121

System Level Diagram



Joint ME/ECE Team Members



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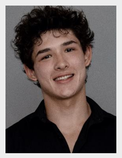

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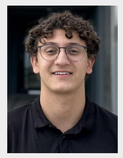

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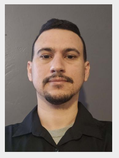

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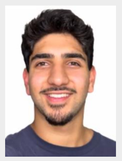

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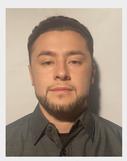

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Acknowledgements

Team Vital Metrix thanks our sponsors William Shepherd and CWO4 Christopher Wilkerson for providing us with this opportunity to grow as engineers. We would also like to thank Dr Shaffar and Professor Dorr for their guidance and general assistance throughout the course of this project. Lastly, we would like to extend special thanks to Glenn Pohly from Masimo for providing constant assistance in the form of advice and resources, despite our project not being officially sponsored by Masimo.

Spring 2024