Project Title: Design of open-source ventilator controller

Project Description:

As seen with the recent COVID-19 pandemic, during a disaster situation there can be a shortage of ventilators which can compromise the healthcare system's ability to treat patients. With unknowns in the potential to increase production of conventional ventilators, viable, low cost and scalable solutions are necessary. Conventional ventilators are complex machines produced by a few companies around the world making it difficult to reach necessary production levels in a disaster situation. To address this issue some groups have developed open source designs for both standalone ventilator devices and functionally scaled high-acuity limited operability (HALO) ventilators. One key component to these devices is the closed loop control system which operates a number of parameters needed to be adjusted by the operator including respiratory rate, tidal volume, max pressure, and inspiratory to expiratory ratio.

Thus, the goal of this project is to design an open-source framework for a ventilator controller that is agnostic to specific ventilator designs and flexible enough to operate both HALO and full ICU ventilators.