Automatic Cardiopulmonary Device with Ventilation

Over 350,000 out-of-hospital cardiac arrests (OHCA) occur annually in the United States. Immediate treatment, in the form of Cardiopulmonary Resuscitation (CPR), is imperative to increase chances of survival. This is comprised of two stages: compression and ventilation. Manual CPR requires multiple persons to be available and can be difficult to perform during patient transfer. Automated CPR (aCPR) can provide reliable, safe treatment if the option is available. Current market aCPR machines are very expensive, and while they do provide automated compressions, they do not include automated ventilation, requiring unnecessary human intervention in this life-saving process. This project focused on developing an aCPR machine that is more affordable, easy to use, and fully automated with ventilation so that more people who suffer an OHCA can receive life-saving treatment. The prototype consists of a pneumatic cylinder powered by compressed carbon dioxide gas (Figure 1). Th2e ventilation bellows are powered by a linear actuator. The circuits in the device use Arduino equipment and code to run the machine. All the parts are housed in a 3D printed chassis (Figure 2).

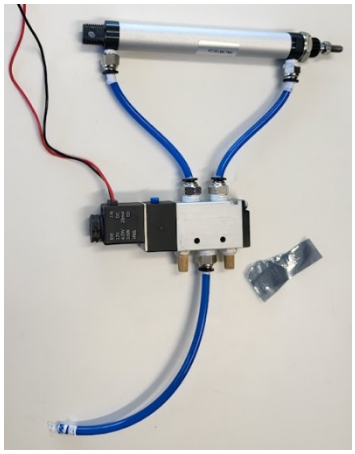

Figure 1: Pneumatic Cylinder Assembly

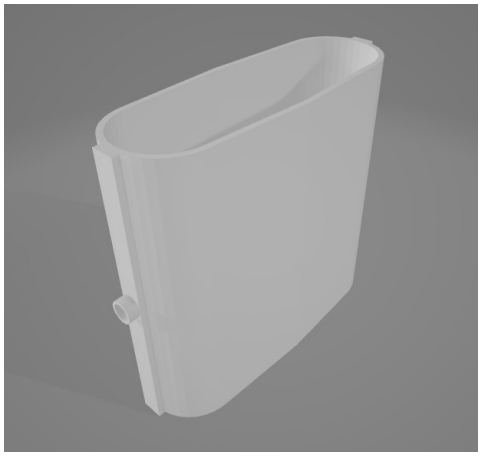

Figure 2: Chassis 3D Model

Figure 3: Safe Hands Innovation team members from left to right: Khoa Tu, Lane Saylor, Anthony Myers, Micah Self, Trae Valentine, Zach Rodriguez