Project Overview

Quality of Life Plus is a nonprofit organization that specializes in assisting the lives of disabled veterans by providing them with specialized devices to improve their lifestyle activities.

Our challenger is a 29 year old Army Cavalry Scout named Stefan Leroy that has encountered an above the knee amputation on his left leg and a below the knee amputation on his right leg.

Our team, One Step At A Time, has been assigned to design and fabricate a device capable of transitioning the position of his foot from his original leg prosthetics from being level with the ground to an angle that allows him to comfortably run at a steady pace. This device shall be operated at ease while Possessing remote functionality and water resistance within a compact and lightweight design.

Device Description

This device shall be fabricated out of 316 stainless steel as well as titanium to provide enough rigidity to withstand any impact forces that will be encountered while our challenger is walking and running. The top and bottom pyramid pieces are made of titanium and fit into Stefan’s existing leg and foot receivers.

The solenoid is mounted on the top plate and is turned on and off to retract and extend the solenoid pin into different slots on the pin lock block. The two holes on the pin lock block represent the foot at a 0 degree angle, for the walking position, and a 20 degree angle, for the running position. The springs on the back side are in tension in the walking position, helping to pull the device into the running position once the solenoid pin is retracted. These springs are held up on a rod and locked down by spring anchors.

The device is able to rotate about a rod through the bottom plate. This rod goes through the Arms and Pin Lock Block to hold everything together with retaining rings. The bottom plate also has angled slots where the arms are attached. These slots allow the device to rotate from walking to running position.

The arms are also screwed into the top plate to keep them aligned. There is also a small rectangular piece connecting the two of them that also helps to hold the solenoid in place.

Our final design is 3.4 inches tall without the adapters that attach it to Stefan’s existing receivers. The width is 2.3 inches and the length is 2.5 inches. It also weighs about 1.93 pounds per foot, meeting our customer requirements.