



Jet Propulsion Laboratory
California Institute of Technology

May 15, 2020

PULSE

**A Pendant to Warn You When
You Touch Your Face**

CHANGING OUR HABITS FOR THE BETTER

OUR MISSION:

The objective of PULSE is to minimize the spread of the COVID-19 virus, which can be transmitted if an individual touches an infected surface with their hand and then touches either their eyes, nose, or mouth - all entryways for the virus into the body. PULSE is a 3D-printed wearable device that pulses, or vibrates, when a person's hand is nearing their face. The haptic feedback from a vibration motor simulates a nudge, reminding the wearer to avoid touching these entryways in order to reduce potential infection. This concept is a response to how often hand-face contact occurs throughout the day, a subconscious behavior that can be overlooked and challenging to correct. Developing the PULSE prototype is important given that stay at home measures are being lifted and people are returning to the workplace. During this transition, health officials have advised that we continue washing our hands, social distancing, and wearing a face mask when going outside.

When designing PULSE, our goal was to create a simple and affordable technology that can easily be reproduced by anyone regardless of their level of expertise. A list of parts, STL files, and assembly instructions are all available as Open Source for individuals or companies to replicate, refine or enhance. Ideally, we expect the public to further develop this concept and make it easily available for distribution.

CHANGING OUR HABITS FOR THE BETTER EVERYDAY USE:

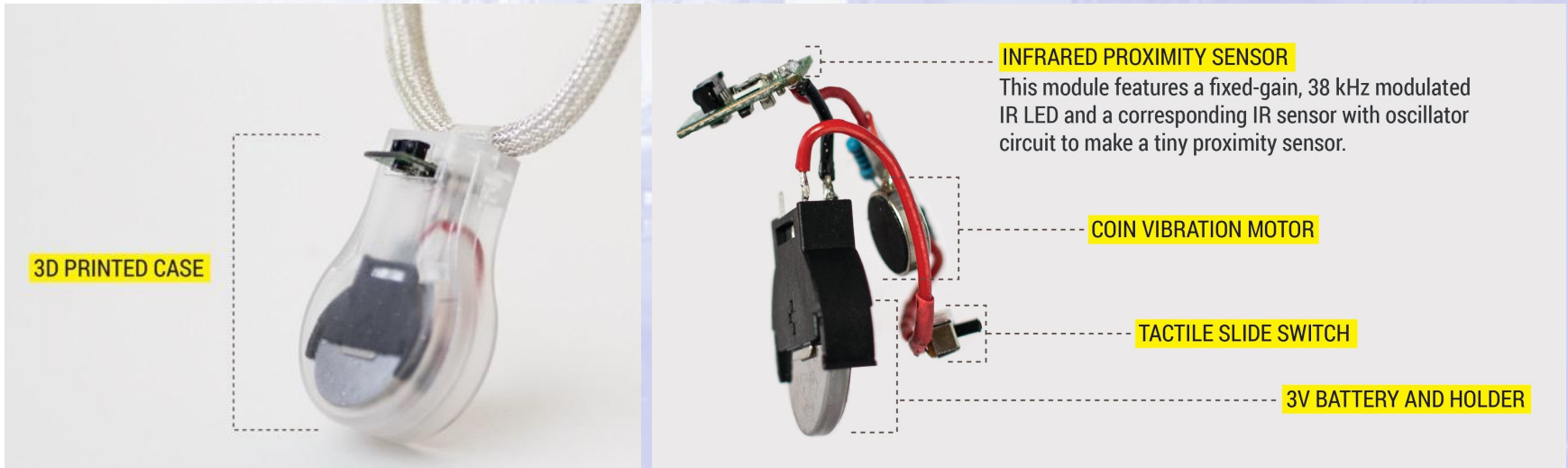
JPL developed PULSE to stand side-by-side with the existing efforts in order to keep the public as healthy as possible.

PULSE is not meant to take the place of masks or respirators, but only to be a warning device that your hands are moving past the pendant towards your face.



TECHNICAL COMPONENTS:

PULSE is comprised of simple, low cost parts placed within a 3D printed case. To detect motion, it uses an infrared proximity sensor with up to 12 inches of range. Once motion is detected, a vibration motor is triggered. The closer the moving object is to the sensor, the stronger the vibration.



CASE ASSEMBLY:

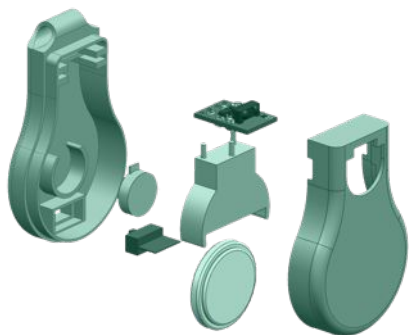
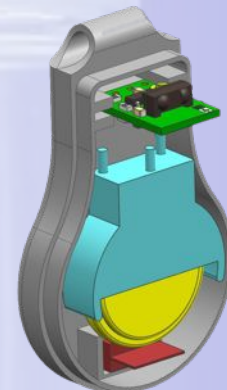


Image Credit: Lisa Harbottle

The electronics are housed by a 3D printed case. Since the IR sensor has a built-in LED output, we printed using transparent material for the initial prototype. Other colors and pendant designs can be used. Our CAD model was designed to securely hold each technical component in place making it a reliable architecture with easy assembly.

HOW IT'S WORN:



The 1.8" pendant is worn 6" – 12" below the chin when attached by a 18" - 24" necklace. When the wearer's hand approaches their face, the movement is detected and the vibrating motor is activated. As the hand gets closer, the response becomes stronger.

Image Credit: Lisa Harbottle

PULSE IN OUR EVERYDAY LIFE:



Until a reliable vaccine is made available, PULSE can be seamlessly integrated into our everyday life as we return to our workplace. Designed to be reproduced by anyone with simple maker skills, this low-cost, wearable device can help stop the spread of infection and keep us healthy.



Use while at work | Image Credit: Lisa Harbottle