Problem Definition

Have you ever reached into your pocket to retrieve your wallet only to find a handful of pocket lint? Don’t worry if this has happened to you; you are not alone. Roughly two-thirds of people claim to have lost their wallets, while nearly one-third claim to misplace their wallets. As a result, many people carry an e-Wallet, such as Apple Pay, which can store almost any card. However, if you are a student who frequently uses public transportation, misplacing your wallet could mean missing the bus and final exam. What if you could keep both your transit and student card in a single, easily accessible location?

Our project aims to combine a UBC and Compass card into one wristband for easier access. With TalariaTag catered to mainly UBC students, users will be able to store their Compass card and UBC student ID on a sleek and minimalistic wristband that travels with them wherever they go. Getting onto the bus or accessing buildings is now as simple as raising a wrist near the scanner. Our wristband will store your two most important cards, Transit and UBC cards. So, the next time you are at the bus stop and reach into your pocket for a handful of lint, you’ll notice your wristband and remember that TalariaTag has got your back.

Requirements

- Capable of storing both the UBC ID and compass chips
- Adjustable for all wrist sizes
- Withstand daily wear and tear for at least 3 years
- Reliable—works 95% of the time
- Weather-resistant (minimum rating of IPX4 in IP68)
- Must not exceed the cost of $10

Materials

Throughout this project, we used a variety of materials listed below:

1. Platinum Cure Silicones
2. 3D Printing Filaments
   - TPU (Thermoplastic Polyurethane)
   - PLA (Polyactic Acid)
   - PETG (Polyethylene Terephthalate Glycol)
   - Toughened PLA
3. Stainless Steel
4. Copper

Design

TalariaTag’s design is a flexible wristband made from Smooth-On Smooth-Sil 950 silicone with a keeper made from PLA. Two communication chips and their separate circuitry is embedded within the wristband. One chip is a Compass transit pass, and the other chip is a UBC Student ID. TalariaTag is a convenient and efficient replacement for carrying both a UBC and Compass card for UBC students. One multipurpose tap gesture with TalariaTag can grant access to UBC facilities and public transit within Metro Vancouver.

Testing and Results

Testing was conducted to ensure we met the requirements. Lab testing was unnecessary because we were able to test the everyday functionality of our wristbands through other means. Real-world testing included:

1. Water Resistance
   IPX8 waterproof rating is submersion of 1.5 meters deep water for 30 minutes. TalariaTag was dropped into 3-meter-deep water for 30 minutes and was completely undamaged.

2. Heat Resistance
   Our wristband was able to stay intact at 400°F in an oven. This temperature is much higher than any temperature regular use would entail.

3. Dust Resistance
   We dropped our wristband into vacuum dust bag and turned the vacuum on to simulate an extreme dust environment which would not be seen during regular use. The dust bag had debris of sizes ranging from small dust particles to square-inch pieces of metal. After a rinse, TalariaTag remained completely operational and dust-free. We are unable to give it a dust rating because it was not a standardized test—X rating.

4. Daily wear and tear
   Over the course of a week, we have been putting on and taking off the wristband to simulate normal use. It is completely intact and can withstand daily proper use for at least 3 years.

5. Chip Reliability
   Our wristband reliably works on both Compass transit and UBC card terminals.

Conclusion

TalariaTag is a sleek, convenient way to combine the UBC and Compass Card into one wristband. It is comfortable and can withstand the elements for daily use. In the future, we would like to pitch our idea to the HATCH Accelerator in hopes of working with them to gain engineering-specific and entrepreneurial skills while building on our design. This could include a wristband that incorporates more cards, such as credit and debit cards, and even use them in other wearable accessories (rings, keychains, etc.).

Special thanks to: