Secure Traveler

Final Project Review
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The Problem

- We forget things, lose things, divide our limited attention, and make choices we later regret.
- Traveling tourists are prime suspects for theft.
- Our antiquated methods need to be improved as size decreases and price increases.
  - Retracing your steps
  - Asking others and security
  - Assuming you forgot to bring it
  - Hoping for a good samaritan to find it
Our Solution

- Secure Traveler
  - Device
    - PCB
    - Audio
    - Adafruit Feather 32u4 Bluefruit LE
    - Power Supply
  - Smartphone
    - iOS Application
  - Database
    - Google Firebase
Block Diagram
Proposed FPR Deliverables

- Completed custom PCB
  - Speaker
- Device enclosure
- Push notifications
- Completed application
  - Settings tab
    - Google sign out, unregister devices
    - On/Off switches for bluetooth, push notifications, GPS sharing
  - Background scanning of devices
Secure Traveler Data

- **Dimensions:**
  - Length: 2.36 inches
  - Width: 1.38 inches
  - Height: 0.79 inches
  - Volume: 2.57 cubic inches

- **Power Management:**
  - Battery: 3.7V 150mAh
  - Speaker active: 0.55 mA

- **Weight**
  - 1.3 ounces

- **Battery Life (BLE + speaker)**
  - Formula:
    \[
    (\text{mAh/mA}) \times 0.7
    \]
    \[
    = \frac{150 \text{mAh}}{4.77 \text{mA}} \times 0.7
    \]
    \[
    = 22 \text{ hours}
    \]
Secure Traveler Speaker Data

- **Speaker Power**
  - 2.42 µW

- **Speaker Distance**
  - 44.42 Meters Outdoors
  - 35.76 Meters Indoor
  - 20.95 Meters Through 1 Wall
  - 18.16 Meters Through Backpack

- **Sound Level**
  - 65-70 dB

- **Speaker Dimensions**
  - Diameter: 1.1"
  - Circumference: 3.5"
  - Weight: 6g
Secure Traveler Server Data

- Advanced Encryption Standard (AES)
  - 256-bit key
- Encrypted Data
  - Location Coordinates
  - Device Name
  - Email Address
## Secure Traveler Specifications

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Initial Projections</th>
<th>Final Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection Range (Indoor/Outdoor)(Meters)</td>
<td>30 Meters Indoors 40 Meters Outdoors</td>
<td>Min: 20 meters, Max: 36 meters Average: 36 meters</td>
</tr>
<tr>
<td>Audio Range (Indoor/Outdoor)(Meters)</td>
<td>35 Meters Indoors 45 Meters Outdoors</td>
<td>Approx 36 meters Indoors Approx 45 meters Outdoors</td>
</tr>
<tr>
<td>Battery Life (Months)</td>
<td>2 Months</td>
<td>22 hours</td>
</tr>
<tr>
<td>Weight (Ounces)</td>
<td>16 ounces</td>
<td>1.3 ounces</td>
</tr>
<tr>
<td>Size (Cubic Inches)</td>
<td>6 cubic inches</td>
<td>2.57 cubic inches (2.36 x 1.38 x 0.79)</td>
</tr>
<tr>
<td>Server Connections</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>Response Time (Seconds)</td>
<td>1 second</td>
<td>Less than a second</td>
</tr>
<tr>
<td>Cost per Unit</td>
<td>$25</td>
<td>$44.01(1) - $35.80(100+)</td>
</tr>
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</table>
## Secure Traveler Parts

<table>
<thead>
<tr>
<th>Part</th>
<th>Price</th>
<th>Price of 100+</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Adafruit Feather 32u4 Bluefruit LE</strong></td>
<td>$29.95</td>
<td>$23.96</td>
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<tr>
<td><strong>TI LM386N-1 Audio Power Amplifier</strong></td>
<td>$0.53</td>
<td></td>
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<tr>
<td><strong>Lithium Ion Polymer Battery</strong></td>
<td>$5.95</td>
<td>$4.76</td>
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<tr>
<td><strong>Adafruit Mini Metal Speaker</strong></td>
<td>$1.50</td>
<td>$1.20</td>
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<tr>
<td><strong>OSH Park PCB</strong></td>
<td>$3.80</td>
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<tr>
<td><strong>Hammond Manufacturing Enclosure</strong></td>
<td>$2.28</td>
<td>$1.58</td>
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</tbody>
</table>
Demonstration

- Google Sign In
- Register/Unregister Device
- Encrypted Data on Server
- Display location
- Change Device Name
- Audio Playback
- Settings
- Background Scanning
Audio Amplifier Diagram

Adafruit Feather 32u4 Bluefruit LE 10 PWM

+3.7 V

Vcc

10k Ω

10 Ω

100 µF

0.047 µF

10 kΩ
Notification Demonstration

Plays sound when it leaves Bluetooth range (Backup)
Audio Demonstration

Play sound from the App (Backup)
Questions?