Overview:
The current interface to a soldier’s radio consists of multiple cables to communication peripherals. Mobility and the potential for disconnection are major concerns of a wired warfighter. These concerns led to the need for a conceptual design of a replacement wireless system.

The delivered system consists of two working prototypes. Each prototype consists of an RIU, WPTT, WHS, and WPDA. Bluetooth was chosen as the wireless protocol for implementing the functionality efficiently. As a result, the design of the software and boards were then based upon one specific Bluetooth chip donated by ST Micro. Only one revision of the prototype boards, with some minor reworks, was developed. Once the Bluetooth protocol was under control, software development progressed more smoothly.

Solutions to Customer Needs:

Functionality
- Transparent wireless communication of data and voice via Bluetooth

Compatibility
- Specific to Harris radios

Power Lifetime
- High Capacity Lithium batteries and voltage regulation

Weight
- Wireless communications and embedded components used

Security
- RSSI control, frequency hopping and AES encryption

Susceptibility
- Shielding and Filtering from EMI

Bluetooth vs. Zigbee

<table>
<thead>
<tr>
<th>Parameter</th>
<th>BT</th>
<th>Zigbee</th>
<th>Comparison</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Hopping</td>
<td>Yes</td>
<td>No</td>
<td>The benefits of BT</td>
<td>Favor BT</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>Low</td>
<td>High</td>
<td>BT offers more power</td>
<td>Favor BT</td>
</tr>
<tr>
<td>Encryption</td>
<td>AES</td>
<td>None</td>
<td>BT offers security</td>
<td>Favor BT</td>
</tr>
<tr>
<td>Ease of Design</td>
<td>Simple</td>
<td>Complex</td>
<td>BT is easier to implement</td>
<td>Favor BT</td>
</tr>
<tr>
<td>Primary Application</td>
<td>Control, Bands</td>
<td>Data, Voice</td>
<td>BT is better suited for voice</td>
<td>Favor BT</td>
</tr>
<tr>
<td>Latency on Write</td>
<td>Fast</td>
<td>Slow</td>
<td>BT offers low latency</td>
<td>Favor BT</td>
</tr>
<tr>
<td>Latency on Read</td>
<td>Fast</td>
<td>Slow</td>
<td>BT offers low latency</td>
<td>Favor BT</td>
</tr>
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<td>BT vs. Zigbee</td>
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</tbody>
</table>

Radio Interface Unit (RIU)
Relays wireless device datum to Harris radio platform

Wireless Push-To-Talk (WPTT)
Triggers transmit on radio and voice input

Wireless HeadSet (WHS)
Captures user’s voice and relays received voice built in PTT.

Wireless PDA Interface (WPDA)
Interfaces to user’s PDA and sends data to the RIU

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- Harris RF Communications
- Tyson Turner of Zimmerman sales
- ST Microelectronics
- Prof. George Slack
- RIT Multidisciplinary Senior Design