Smart Shower

Yellow A
Mock Up Presentation
October 18\textsuperscript{th}, 2007
Problem

- Water waste due to shower habits
  - Old Showers: 40 gallons/shower
  - New Showers: 25 gallons/shower
- $60-$120/year on water for showers
- About 10,000,000 J/shower
Solution

- Saving water by reducing the volume flow rate when high volume is not required for the user’s showering routine.
  - Pressure/Volume Regulation
  - User Controlled
- About 10% less water used
- $2/year in savings per person
- 1,000,000J/shower saved
Critical Issues and Risks

- Individual Shower Habits
- User Preferences
- Consumer Reluctance to Change
Customer Interviews

- **65 interviews**
  - 52% female, 48% male

**Age Distribution**
- 61%
- 18%
- 12%
- 9%

**Shower Length [minutes]**
- 35%
- 48%
- 6%
- 6%
- 5%
Customer Insights

- Concerns
  - Shower Warmth
  - Rinsing Pressure
  - Sensor Reliability and Maintenance

- Conclusions
  - People want to save water
  - Quite concerned with losing shower quality
  - Considerable variability in customer responses
Design Concept Concerns

Challenges
- Electrical Hazard
- Shower System Integration

Proposed Solutions
- Low Voltage Wireless
- Multiple Modules for Input

<table>
<thead>
<tr>
<th>Sensor Type</th>
<th>Proposed Detection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bump</td>
<td>Soap usage</td>
</tr>
<tr>
<td>Infrared (IR)</td>
<td>Position</td>
</tr>
<tr>
<td>Ultrasound</td>
<td>Position</td>
</tr>
<tr>
<td>Light</td>
<td>Position</td>
</tr>
<tr>
<td>Sound</td>
<td>User command</td>
</tr>
</tbody>
</table>
Design Concept Concerns

Challenges
- Electrical Hazard
- Shower System Integration
- Effective Use of Sensors

Proposed Solutions
- Low Voltage Wireless
- Multiple Modules for Input
- Customer Research
Next Steps

- Aesthetics
- Wireless communications
- Multiple sensor integration
- Decrease low flow from 20% by more efficiently dissipating heat (steam?)
- Customer feedback and testing