Executive Summary

Design Challenge

For individuals with amputations, hobbies such as gaming can become more difficult as they are primarily designed for two-handed people. Charlie, a former Shirley Ryan AbilityLab (SRAL) patient with an above elbow right arm amputation, needs a solution that allows him to proficiently play fast-paced first-person shooter games.

Mission Statement

To create a device that enables people with above-elbow right arm amputations to proficiently play first-person shooter games on Xbox with minimal effort for extended periods of time.

Research Methodology

Through discussions with Charlie and additional secondary research, the design criteria were identified and resulted in several initial ideas and mockups. Collaboration with another team resulted in a multi-part design that includes a left-hand controller and residual limb joystick. Both user testing with Charlie and final performance testing reinforced this final design.

Design Concept and Rationale – Aim Buddy

Aim Buddy, a residual limb joystick addresses the design criteria (see Appendix A: Project Definition) through the following features.

Primary Features	Benefits
1. Armrest Attachment	1. Large base and rubber-lined straps hold the device steady.
2. Residual Limb Control	2. Large cup lined with padding used as interface with limb
3. One Arm Setup	3. Straps attach to the armrest, and cable plugs into the console.

Figure 0: Aim Buddy Prototype

Future Development

Future iterations of this prototype could consider the following:

- Increasing the precision and stabilization of the joystick to improve gameplay.
- Exploring different cup shapes to make the design more comfortable for a variety of users.
- Exploring ways to include a joystick button in the design.
- Optimizing and refining electronics organization and performance to increase durability and improve gameplay.