Adaptable House Project: Support System
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BACKGROUND

The Adaptable House Project aims to increase independence and confidence in the mobility of individuals by providing full or partial body-weight support in a user’s home. This subsystem focuses on the interface between the body-weight support modes and the user.

CORE REQUIREMENTS

Existing solutions do not allow for varying ranges of mobility in daily life or in-home usage. To address these gaps, our design expects the following:

Customer Requirements

- Ease of use
- Safe and durable
- Comfortable and promotes good health
- Integrable into the user’s home

Engineering Requirements

- Full rotation
- Load capacity of 300 lbf (static)
- Customizable
- Scalable in size
- Minimal transition time

DESIGN AND DEVELOPMENT

The system includes 3 distinct modes of support for varying levels of mobility: Fall Protection mode, Partial Support mode, and Full Support mode.

RESULTS & VALIDATION

Frame dynamically loaded and supports 300+ lbf for all system modes.

Harness dynamically loaded and supports up to 300 lbf.

Users can comfortably wear system freely for 4+ hours and can apply full body-weight during harness modes.

CONCLUSION & NEXT STEPS

Successful testing has grown confidence in the harness subsystems for manufacturability and use in an in-home setting.

Further development of stowing methods for each mode should be explored for ease of use.

Full support mode should consider a wider variety of stiffer chair designs for more comfort.

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