System Requirements Document

Sideways Travel Elevator Panel Upgrade

Client: WW Elevators

Project: Next-Generation Multi-Directional Elevator Panel

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Executive Summary

This document outlines the system requirements for a proposed upgrade to the elevator control panel for WW Elevators. The current panel system is designed for traditional, single-axis vertical travel, which is incompatible with the new Thyssenkrupp MULTI elevator system capable of both vertical and horizontal movement. The proposed solution is a complete hardware and software overhaul of the in-cabin panel to create an intuitive, safe, and efficient user interface for navigating a multi-directional building environment.

This new panel will feature a dynamic touchscreen display, allowing passengers to select destinations on a 2D building map. Key benefits of this upgrade include optimized passenger flow, modernized user experience, enhanced safety and communication features, and full compliance with modern accessibility standards. This document details the functional and non-functional requirements, design constraints, and a preliminary project overview.

1.0 System Requirements

This section defines the specific functional and non-functional requirements for the new elevator panel system.

1.1 Functional Requirements

- **FR-1: Destination Selection**

    o The system shall display an interactive 2D map of the building layout.

    o Users must be able to select their destination by tapping a specific room or location on the map.

    o The system shall support destination selection via a directory search by room name or occupant.

    o The system shall calculate and display the optimal path (vertical and horizontal movements) to the selected destination.

- **FR-2: Real-Time Cabin Location Display**

    o The panel shall continuously display the elevator cabin's current position on the 2D building map in real-time.

    o The display must clearly indicate the direction of travel (Up, Down, Left, Right).

- **FR-3: Door Control**

  - The panel should provide dedicated "Open Door" and "Close Door" buttons.

  - The "Open Door" button shall hold the doors open for a user-configurable duration (default 10 seconds).

  - The "Close Door" button shall initiate the door-closing sequence immediately, unless obstructed.

- **FR-4: Emergency Systems**

  - The panel shall include a dedicated, physical "Emergency Call" button.

  - Activating the call button shall establish a two-way voice and one-way video link with building security or an emergency response center.

  - The panel shall include a dedicated "Emergency Alarm" button that triggers an audible alarm.

- **FR-5: Accessibility**

  - The panel interface must comply with ADA (Americans with Disabilities Act) standards.

  - All on-screen text and buttons shall be accompanied by Braille labels.

  - The system shall provide voice announcements for floor numbers, direction of travel, and arrival at the destination.

  - A high-contrast display mode shall be available.

- **FR-6: User Authentication**

  - The system shall support user authentication via NFC/RFID keycards for access to restricted floors or zones.

  - Authentication shall be required before a destination can be selected for restricted areas.

2.0 Performance Requirements

- **PR-1: Responsiveness:** The panel's touchscreen interface must respond to user input in under 200 milliseconds.

- **PR-2: System Boot Time:** The panel must complete its boot sequence and be fully operational within 15 seconds of a power-on event.

- **PR-3: Reliability:** The system shall have a Mean Time Between Failures (MTBF) of at least 20,000 hours of continuous operation.

- **PR-4: Real-Time Display Latency:** The on-screen display of the cabin's location must have a latency of no more than 500 milliseconds from the actual cabin position.

3.0 Design Constraints

- **DC-1: System Compatibility:** The panel's software and hardware interface must be fully compatible with the Thyssenkrupp MULTI elevator control system API.

- **DC-2: Safety Standards:** The system must be designed and certified to meet or exceed the ASME A17.1 Safety Code for Elevators and Escalators.

- **DC-3: Physical Housing:** The panel must fit within the existing physical enclosure dimensions of 12" x 24" x 4" (W x H x D).

- **DC-4: Power Consumption:** The panel's total power consumption shall not exceed 75 watts.

4.0 Schedule and Budget

This is a preliminary estimate and will be refined after a full project analysis.

- **4.1 High-Level Schedule**

    - **Phase 1:** Detailed Analysis & Design (4 Weeks)

    - **Phase 2:** Prototype Development & Testing (8 Weeks)

    - **Phase 3:** Pilot Installation & User Acceptance Testing (4 Weeks)

    - **Phase 4:** Full Deployment (Staggered over 6 Weeks)

- **4.2 High-Level Budget**

    - **Hardware Prototyping & Components:** $50,000

    - **Software Development & Integration:** $120,000

    - **Testing & Certification:** $30,000

    - **Project Management & Contingency (15%):** $30,000

    - **Estimated Total:** $230,000

Appendix A: Current System Use Case Diagram
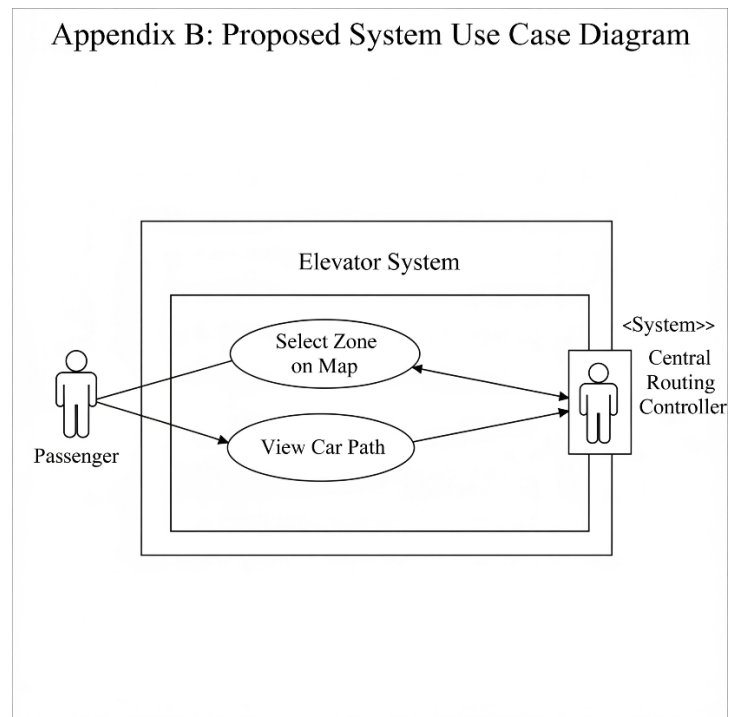
This diagram shows the basic interactions a passenger has with the existing elevator system.

Appendix A: Current System Use Case Diagram
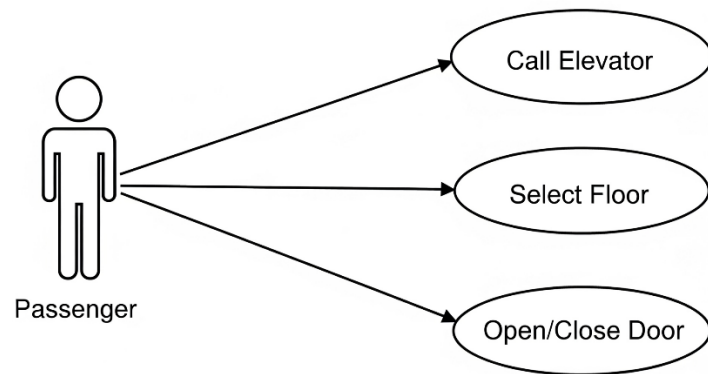
Appendix B: Proposed System Use Case Diagram

This diagram illustrates the new functionalities of the omni-directional system, including how the passenger's requests are handled by a central routing controller.

References

Thyssenkrupp. (2017). *This elevator is straight out of Willy Wonka — it can go sideways*. YouTube. Retrieved from: https://youtu.be/953en-PEi6s