SOFTWARE REQUIREMENTS SPECIFICATION

FOR THE 2001 ELEVATOR SYSTEM

Table of Contents

Note: The sample in this handout contains only pages 1 through 6 of the specification and the figures on pages 19 and 20.

Disclaimer: This is a fictitious system and does not claim to be a model for a good Software Requirement Specification. It is used for exercise purpose only.

1. INTRODUCTION

The 2001 Elevator System will provide advanced installation, operation, and maintenance features for a bank of one to eight elevators in high rise buildings. This Software Requirements Specification (SRS) describes the features to be provided by the software for this system.

1.1 Purpose

The purpose of this SRS is to serve as a statement of understanding between the Marketing and Engineering Divisions of Consolidated Elevators. Any desired departures from the specifications described herein must be negotiated by the affected parties.

The audience for this SRS is the engineers who are involved in the development of the 2001 Elevator System, the marketers who are involved in its advertisement and sale, and the testers who will validate the system.

1.2 Scope

The overall objective of the 2001 Elevator System is to provide the maximum in passenger convenience and service within the constraints of available equipment.

Figure 1 gives a view of 2001 Elevator System as it would appear to a user during operation. From the user's perspective the 2001 Elevator System provides all the expected elevator control, operational, and display features. The 2001 System also provides features to expedite the initial installation period and any subsequent maintenance or upgrade efforts.

The 2001 Elevator System contains three distinct sets of operations:

1. Master Control Operations

2. Car Operations

3. Console Operations

Master Control Operations receives service request from hall buttons and from floor buttons in each elevator. It keeps current information on the status of all cars and determines which car will respond to each hall call.

There are Car Operations for each car. Each of these receives commands for its car's operation from passengers and Master Control and information on current car position and weight from car sensors. It utilizes this information to control the car hoist motor to position the car at the requested floor.

Console Operations provide status displays and control functions to the building operations staff.

2. REQUIREMENTS

In this section all of the functions that the 2001 Elevator System Software is to perform are specified. These specifications are first given from total system perspective. They are then given from the perspective of the two types of microprocessor subsystems, which along with the operations staff console subsystem, provide the system functionality.

2.1 Total System Perspective

In this section the requirements of the system are described from the perspective of:
1. Passengers

2. Building operations staff

2.1.1 Passenger requirements

Passenger requirements can be considered from the perspective of the various passenger devices:

1. Hall buttons and lamps

2. Hall displays

3. Cab displays

4. Cab floor buttons

5. Elevator doors

6. Cab door control

7. Cab overloaded alarm

The requirements on each of these devices is described below.

2.1.1.1 Hall buttons and lamps

On every floor there are hall buttons used to request either up or down service (i.e., to make a "hall call"). When a hall button is pushed, all associated lamps (one lamp with each button, one or more buttons per floor) will light if there are any elevators in service.

2.1.1.2 Hall displays

Hall displays consist of

- a hall position indicator (current floor display) for each car

- a hall direction indicator for each car

These displays function as follows:

1. The hall position indicator shows the current floor of a car.

2. The hall direction indicator is turned on whenever a car stops at a floor to unload or load.

2.1.1.3 Cab displays

A cab is the interior of a car where passengers are carried.

A cab display consists of
- a cab position indicator
- a cab direction indicator
in the cab of each elevator car.

The cab position indicator functions as described above for the hall position indicator. The cab direction indicator shows the currently scheduled direction for travel for that car.

2.1.1.4 Cab floor buttons

An elevator passenger pushes a floor button to request service to the floor indicated on the button, i.e., to make a "cab call." When a button is pushed, a lamp associated with that button lights.

2.1.1.5 Elevator doors

The elevator doors open when the elevator stops at a floor. The doors stay open during any unloading/loading activity and then automatically close. On the closing edge of each door is a safety bumper. If the bumper touches anything while the doors are closing, the door motor is immediately reversed and the doors open again.

2.1.1.6 Cab door control

The cab operating panel contains a door open button for overriding the automatic closing of the elevator doors.

2.1.1.7 Car overload alarm

An audible alarm sounds if more than the maximum allowable weight enters the cab. The alarm continues to sound until the weight is reduced below the maximum allowable.

2.1.1.8 Elevator ride

The elevator ride is perceived by the passengers as rapid and with smooth acceleration and deceleration. The car stops at a floor without overshooting or undershooting and without jerking.

2.1.2 Operations staff requirements

Building operations staff requires two types of functions or services from the 2001 System. They are
1. the display and control functions
2. the efficiency/safety operations functions

2.1.2.1 Display and control functions

Display and control functions are provided at the operations staff console. The operations console consists of a touch-screen terminal controlled by its own microprocessor. The requirements for the microcode in this processor are described in <u>Software Requirements Specification for the 2001 Operations Staff Console</u>.

2.1.2.2 Efficiency/safety operations functions

All aspects of system control and operation are under continuous surveillance of the system software. In particular,

1. Whenever a hall call is made, an estimated time to respond to that call is computed for <u>each</u> car in the system. The calculation includes current car position, load, status, calculated run time, and number of scheduled stops.

2. For each service response, the flight path of the car is calculated to minimize flight time within the constraints of acceleration and jerk required for passenger comfort.

3. The software also continually monitors all input signals for any indication of system malfunction. When these are detected, the software will put the car under manual control (exercised from the operations staff console) at the next stop.

Figure 1 — USER INTERFACE

Figure 2 — SYSTEM BLOCK DIAGRAM