**Software Requirement Specifications**

Authors: Kyle Legters, Nick Faughey, Pavan Kottapalli, Korey Klinger, Alex Pickering

**Table of Contents**

1. Introduction
   1. Purpose
   2. Scope
   3. Definitions, acronyms, and abbreviations
   4. References
   5. Overview
2. Overall Description
   1. Product perspective
   2. Product functions
   3. User characteristics
   4. Constraints
   5. Assumptions and dependencies
3. Specific Requirements
4. Appendices
5. Index

**1 Introduction**

**1.A Purpose**

The purpose of this SRS is to lay out a set of requirements, functions, and features for the Centralized Traffic Control Center and Signaling System for the North Shore Extension of the Pittsburgh Light Rail Transit system.

The intended audience of this document is the Port Authority of Allegheny County.

**1.B Scope**

The software this project will produce includes the Centralized Traffic Control (CTC) Center and Signaling System.

The project will include the following five systems:

Track Model: Simulates the actual track of the North Shore extension.

Train Model: Simulates the physics behind a Flexity 2 Tram moving across the track.

Train Controller: Safety Critical component that controls the movement of the train.

Track Controller: Safety Critical component that controls the track and reports back to the Central office.

CTC Office: Allows a dispatcher to schedule, dispatch, and monitor trains.

The project will have an automatic mode with preset scenarios to demo the systems listed above, and this demo will be capable of running faster than wall clock time.

Implementing the North Shore extension of the Pittsburgh Light Rail system will improve the status of public transportation throughout the city of Pittsburgh. Public transportation is important, as it provides jobs, minimizes traffic, and greatly reduces a city’s carbon footprint.

**1.C Definitions, acronyms, and abbreviations**

**1.D References**

American Public Transportation Association

<http://www.apta.com/mediacenter/ptbenefits/Pages/default.aspx>

IEEE Recommended Practice for Software Requirement Specifications

<https://courseweb.pitt.edu/bbcswebdav/pid-20285500-dt-content-rid-7299133_1/users/jap182/Labs/Lab%201/IEEE%20830.pdf>

**1.E Overview**

Section 2: Provides a background for requirements to be detailed later in the document.

Section 3: Provides detailed requirements for the system that enable designers to design the

system accordingly, and testers to test the system accordingly.

2 Overall Description

**2.A Product Perspective**

This is an independent and totally self-contained product.

**2.B Product Functions**

This product will provide functions for scheduling, dispatching, and viewing status of trains in the network. (high level overview of 3.B)……..

**2.C User Characteristics**

Talk about what the experience level and technical expertise of the users are. Provide some reasons why certain specific requirements are specified in section 3, like the fact that people who schedule trains might not be able to calculate the safe braking distance for a train off the top of their head, so the system does it for them.

**2.D Constraints**

Anything that limits options for developers. Talk about importance of safety and reliability and how it adds to complexity. Talk about how the system must be adaptable to the track layout that we have no control over (i.e. it must be flexible enough to work with any track layout and with any train schedule). Talk about how it must handle unexpected events like failures and not clog up the network.

**2.E Assumptions and Dependencies**

We assume that the target computer will run Windows and be able to execute JAR files. If it does not, we would have to revisit this SRS and change things.

3 Specific Requirements

**3.A External Interfaces**

The software shall accept input from users either in a train or in a central office.

**3.B Functions**

**3.B.A User Class 1: CTC Office Manager**

The

1. The system shall enable a central office manager to create train schedules
2. The system shall provide methods for dispatching individual trains to specific stations
3. The system shall provide real-time feedback on train locations and speeds
4. The system shall notify managers of unsafe situations immediately
5. ……..

**3.B.B User Class 2: Train Engineer**

1. The system shall allow an engineer to accelerate and decelerate his/her train
2. The system shall allow an engineer to view the status of all train systems
3. The system shall show the state of train doors and lights at all times
4. The system shall provide an emergency braking function, which can be triggered by passengers
5. …..

**3.C Performance Requirements**

How many simultaneous users? How many computers can it be installed on? How many trains can it handle at once? All of these should be in a measurable format like “95% of commands shall be executed within 1 second”

1. 90% of trains routed through the network shall arrive within 1 minute of scheduled time
2. ….

**3.D Logical Database Requirements**

External .csv files shall be used when structured data needs to be provided as an input, but no external database will be used for normal data storage. All data shall be stored in the system’s main memory, and accessed when needed. Module communication will be handled natively within Java.

**3.E Design Constraints**

Not using an external database may cause information to be accessed simultaneously, so data locks will be implemented to prevent data races and conflicts.

**3.F Software System Attributes**

**3.F.A Reliability**

The software shall achieve 100% reliability by handling all errors gracefully, and continuing to operate safely afterwards.

**3.F.B Availability**

The software shall be immediately available for use after starting, and shall continue to be available until shut down by a user.

**3.F.C Security**

No extreme security precautions are necessary, since this system will run on computers in a physically secure office.

**3.F.D Maintainability**

The software’s modules can be updated independently and remain backward-compatible, to allow for updates as needed.

**3.F.E Portability**

The software shall not be portable to any other system besides those described in this document to ensure reliability.

**3.F.F Organization of Requirements**

The system is presented as one inseparable module with only one mode of operation. There are two classes of users – CTC office workers and train engineers. 3.B is organized by user class.

4 Appendices