**Software Requirements Specification**

for

**Train Controller (NSECS-TNC)**

Version 1.0

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# 1 Introduction

## 1.1 Purpose

The purpose of this document is to provide a detailed description of the Train Controller of the North Shore Extension Control System. It will explain the purpose of the TNC, how the TNC will operate, and what the TNC is expected to do in relation to NSECS.

## 1.2 Objective

A unique number is used to identify each requirement. These numbers are in the format of NSECS-TNC-REQ-XX. XX is a number between 01 and 99 numbering each requirement. These numbers are automatically assigned by the requirements tracking tool and may not be in sequential order. Once assigned, requirement numbers will not be reused. If a requirement is removed, then the requirement number will be retained and the description is changed to “Deleted in Rev. #.” If a requirement has been added, a new requirement number will used.

## 1.3 Scope

The requirements listed in this document are derived from the Pittsburgh Port Authority of Allegheny County RFP for the North Shore Connector in the document Final Project[1].

The requirements listed in this document identify only those software level requirements related to the Train Controller of the NSECS.

## 1.4 Definitions

|  |  |
| --- | --- |
| **Term** | **Definition** |
| NSECS | North Shore Extension Control Simulation |
| TNC | Train Controller |
| MBO | Moving Block Overlay |
| TNM | Train Model |
| GPS | Global Positioning System |

# 2 Software Requirements

ID: ***NSECS-TNC-REQ-01***

The TNC shall regulate the speed of the train to the lowest of the following: setpoint, speed limit and authority allowed by the system.

ID: ***NSECS-TNC-REQ-02***

The TNC shall receive track signal from the TNM.

ID: ***NSECS-TNC-REQ-03***

The TNC shall decode the track signal information to

determine speed limit and authority.

ID: ***NSECS-TNC-REQ-04***

The TNC shall receive the current acceleration and velocity from the TNM

ID: ***NSECS-TNC-REQ-05***

The TNC shall take as input the command setpoint from a Transit Operator.

ID: ***NSECS-TNC-REQ-06***

The TNC shall open and close doors at appropriate times. Doors will open upon arrival at each station and close before the train leaves.

ID: ***NSECS-TNC-REQ-07***

The TNC shall turn the lights on and off at the appropriate times.

ID: ***NSECS-TNC-REQ-08***

The TNC shall announce stations and stops at the appropriate times.

ID: ***NSECS-TNC-REQ-09***

The TNC shall receive faults from the TNM and acts upon faults in a safe manner.

ID: ***NSECS-TNC-REQ-10***

The TNC shall receive GPS position from the TNM.

ID: ***NSECS-TNC-REQ-11***

The TNC shall take as input from the TNM a signal telling the train where to stop and when to start.

ID: ***NSECS-TNC-REQ-12***

The TNC shall transmit the power of the engine to the TNM.

ID: ***NSECS-TNC-REQ-13***

The TNC shall receive train temperature from the TNM.

ID: ***NSECS-TNC-REQ-14***

The TNC shall power the heaters if the temperature drops 5 degrees or more below the desired temperature.

ID: ***NSECS-TNC-REQ-15***

The TNC shall power the Air Conditioning if the temperature rises 5 degrees or more above athe desired temperature.

ID: ***NSECS-TNC-REQ-16***

The TNC shall allow the Transit Operator to change the desired temperature.

ID: ***NSECS-TNC-REQ-17***

The TNC shall have a default desired temperature.