Test Report

For

Global Package Courier Tracking

COMP 4081 Software Engineering
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BitRunners (Team #5)

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Abstract

This document entails our testing process on our Airport Process Time Simulator (APTS). This document will consist of our Test-Design Specification, Test-Case Specifications and our Test-Summary Report. The primary goal is be to cover the Requirements Traceability Matrix found in the Software Requirements Specifications document and implement that in the design of various test cases.

In this document there are 3 Test Design Specifications (TDS). The TDSs have the following general descriptions: TDS01 will verify that the simulation is running to completion, TDS02 will run the GPCT file in the terminal instead of in the background, and every event will output to the terminal to ensure the simulation is creating events properly, TDS03 will inspect the generated input and results file to ensure that they are written correctly.

There are six test cases (TCS) that will be implemented. TCS01 will run the simulation with default basic user parameters. TCS02 will run the simulation using advanced user parameters. TCS03 will run the GPCT file in the terminal. TCS04 will run separate simulations with individual parameters to ensure they are correctly written to the input file. TCS05 will run separate simulations with individual parameters to ensure that the results are correct. TCS06 will run a simulation with invalid input.

The test cases in this test report are created to reflect the program in its current state, and our program so far is not at a stage where we can implement our designated tests. As our program progresses this document will be updated accordingly.

Table of Contents

1 Introduction 1

1.1 Purpose 1
1.2 Scope 1
1.3 Acronyms and Abbreviations 1
1.4 References 2
1.5 Overview 2

2 Test-Design-Specification 2

2.1 Purpose 2
2.2 Test-Design Specification: TDS01 3
2.2.1 Test Design Specification Identifier 3
2.2.2 Features to be Tested 3
2.2.3 Approach Refinements 3
2.2.4 Test Identification 3
2.2.5 Feature Pass/Fail Criteria 4
2.3 Test-Design-Specification: TDS02 4
2.3.1 Test Design Specification Identifier 4
2.3.2 Features to be Tested 4
2.3.3 Approach Refinements 5
2.3.4 Test Identification 5
2.3.5 Feature Pass/Fail Criteria 5
2.4 Test-Design-Specification: TDS03 5
2.4.1 Test Design Specification Identifier 6
2.4.2 Features to be Tested 6
2.4.3 Approach Refinements 6
2.4.4 Test Identification 6
2.4.5 Feature Pass/Fail Criteria 7

3 Test Case Specification 7

3.1 Purpose 7
3.2 Test-Case Specification: TCS01 7
3.2.1 Test-Case Specification Identifier 7
3.2.2 Test Items 8
3.2.3 Input Specifications 9
3.2.4 Output Specifications 9
3.2.5 Environmental Needs 9
3.2.6 Special Procedural Requirements 10
3.2.7 Intercase Dependencies 10
3.3 Test-Case Specification: TCS02 10
3.3.1 Test-Case Specification Identifier 10
3.3.2 Test Items 11
3.3.3 Input Specifications 12
3.3.4 Output Specifications 12
3.3.5 Environmental Needs 12

3.3.6 Special Procedural Requirements 13
3.3.7 Intercase Dependencies....13
3.4 Test-Case Specification: TCS03....13
3.4.1 Test-Case Specification Identifier....13
3.4.2 Test Items....14
3.4.3 Input Specifications 14
3.4.4 Output Specifications....15
3.4.5 Environmental Needs....15
3.4.6 Special Procedural Requirements 15
3.4.7 Intercase Dependencies....15
3.5 Test-Case Specification: TCS04....15
3.5.1 Test-Case Specification Identifier....16
3.5.2 Test Items....16
3.5.3 Input Specifications 16
3.5.4 Output Specifications....17
3.5.5 Environmental Needs....17
3.5.6 Special Procedural Requirements 17
3.5.7 Intercase Dependencies....17
3.6 Test-Case Specification: TCS05....18
3.6.1 Test-Case Specification Identifier....18
3.6.2 Test Items....18
3.6.3 Input Specifications 18
3.6.4 Output Specifications....18
3.6.5 Environmental Needs....19
3.6.6 Special Procedural Requirements 19
3.6.7 Intercase Dependencies....19
3.7 Test-Case Specification: TCS06....19
3.7.1 Test-Case Specification Identifier....19
3.7.2 Test Items....19
3.7.3 Input Specifications 20
3.7.4 Output Specifications....20
3.7.5 Environmental Needs....20
3.7.6 Special Procedural Requirements 21
3.7.7 Intercase Dependencies....21

4 Test Summary Report....21
4.1 Purpose....21
4.2 Test-Summary Report: TSR01 21
4.2.1 Test-Summary Report Identifer 22
4.2.2 TCS01 Results 22
4.2.3 TCS02 Results 22
4.2.4 TCS03 Results 23
4.2.5 TCS04 Results 24
4.2.6 TCS05 Results 25
4.2.7 TCS05 Results 26
APPENDIX A: The Requirements Traceability Matrix....27

List of Tables

Table 1: Requirements Traceability Matrix 27

List of Figures

Figure 1: Input Screen 24

Figure 2: Results Screen 25

Figure 3: Erroneous Input 26

1 Introduction

This section outlines the general purpose, intent, as well as provide an overview for the Test Report. Any acronyms used throughout the document are also noted within this section.

1.1 Purpose

The purpose of this Test Report document is to define the processes and parameters used to verify and validate the APTS application. This is done by creating test cases that cover all the entries in the Requirements Traceability Matrix (RTM). Future versions of this document will include a summary of the results of the tests specified. Once that has been completed, then the purpose of the final version of the test report will be to demonstrate that the product successfully meets all the requirements.

1.2 Scope

The specific intent of this test report is to address every requirement within the RTM. The test engineer communicated with the design team to design a set of tests with criteria set on a pass/fail basis. Should any program aspect end up in a failure in their respective test, then corrections will be made to the application.

1.3 Acronyms and Abbreviations

APTS- Airport Process Time Simulator

SRS- Software Requirements Specification

TDS- Test-Design Specification

TCS- Test-Case Specification

RTM- Requirements Traceability Matrix

1.4 References

BitRunners-Team 5, “SRS For Global Package Courier Tracking,” Version 1.2 October 10, 2014.

Goldrush-Team 9, “Test Report for Aircraft Model Simulations,” Version 1.5, December 6, 2000.

1.5 Overview

This Test Report document is divided into three sections: The introduction, the Test Design Specifications, and the Test Case specifications. In the introduction, the purpose, scope, general overview of the document are provided. Within the Test Design Specifications are three overarching test designs that cover different parts of the RTM. The Test Case specifications provide the six cases of the application that carry out the criteria specified in their respective test design.

2 Test-Design-Specification

This section includes each of our Test-Design Specifications and explains them in detail.

2.1 Purpose

This section includes each of our Test-Design Specifications and explains them in detail. Any corresponding requirements listed are addressed in the Global Package Courier Tracking SRS RTM. All requirements are identified by their SRS RTM identifiers.

2.2 Test-Design Specification: TDS01

This test-design specification format will detail the TDS Identifier, tested features, approach refinements, test identification, and feature pass/fail criteria.

2.2.1 Test-Design Specification Identifier

The first test design is a general test that verifies the program will run to completion. This test is known as TDS01.

2.2.2 Features to be tested

The tested features are listed below.

2.2.2.1 Our GUI will show the final results of the simulation encompassing the whole RTM.

2.2.2.2 All parameters are accounted for when advanced user runs program.

2.2.2.3 GUI displays graphics correctly according to results.

2.2.3 Approach Refinements

The primary method to be used for this test design will be the visual observation of the GUI before and after simulation The GUI display will simply be monitored for error, such as missing parameters.

2.2.4 Test Identification

The following are the test cases that support this test design:

Test Case One [TCS01 section 3.2]: The Simulation will be run using default parameters.

Test Case Two [TCS02 section 3.3]: The Simulation will be run using acceptable advanced user parameters.

Test Case Three [TCS03 section 3.4]: The Simulation will be run using invalid input.

2.2.5 Feature Pass/Fail Criteria

All of the following test criteria must result in passing, if any features fail, then the program is not working as intended.

2.2.5.1 If the GUI input screen does not display the proper options then it will have failed.

2.2.5.2 If the GUI crashes at any point before or after the simulation then it will have failed.

2.2.5.3 If the GUI output screen doesn't return all the values specified then it will have failed.

2.2.5.4 If the GUI output screen is not displayed after simulation is complete then it will have failed.

2.2.5.5 If the GUI responds with invalid input then it will have failed.

2.3 Test-Design Specification: TDS02

This test-design specification format will detail the TDS Identifier, tested features, approach refinements, test identification, and feature pass/fail criteria.

2.3.1 Test-Design Specification Identifier

The second test design focuses on the analysis of the results from the simulation to identify correct operation. This test is known as TDS02.

2.3.2 Features to be tested

The tested features are listed below.

2.3.2.1 As the simulation completes a separate log file will be observed for event timeline.

2.3.3 Approach Refinements

The method for this test-design will be running a log during simulation that chronicles all event during the simulation and these will be analyzed and evaluated along with corresponding results file.

2.3.4 Test Identification

The following are the test cases that support this test design:

Test Case Four [TCS04 section 3.5]: Start a simulation where the input file is not consumed for testing purposes.

2.3.5 Feature Pass/Fail Criteria

All of the following test criteria must result in passing, if any features fail, then the program is not working as intended.

If the event log file is unreasonable and doesn't fall under specified criteria, then it fails.

2.4 Test-Design Specification: TDS03

This test-design specification format will detail the TDS Identifier, tested features, approach refinements, test identification, and feature pass/fail criteria.

2.4.1 Test-Design Specification Identifier

The third test design focuses on the analysis of the results from the simulation to identify correct operation. This test is known as TDS03.

2.4.2 Features to be tested

The tested features are listed below.

2.4.2.1 The results file will be inspected to see that it displays to the user in a presentable manner. Covers RTM items 2.5, 2.6

2.4.2.2 The input GUI will be inspected to see that all parameters specified by the user are written correctly to the input file. Covers RTM items 1.1, 1.2, 1.3, 1.4.

2.4.3 Approach Refinements

The primary method to be used for this test design will be manually checking the written files to makes sure they are written correctly.

2.4.4 Test Identification

The following are the test cases that support this test design:

Test Case Five [TCS05 section 3.6]: Simulation is run with individual parameters to ensure they are correctly written to the GUI.

Test Case Six [[TCS06 section 3.7]: Simulation is run to check erroneous input.

2.4.5 Feature Pass/Fail Criteria

All of the following test criteria must result in passing, if any features fail, then the program is not working as intended.

If any parameters are missing from the In GUI file, then it will have failed.

If any parameters are missing from the results file, then it will have failed.

If any parameter is different from input to output, vice versa, then it will have failed.

3 Test-Case Specification

The following Test Case Specifications will follow the test-design specifications and further detail the testing process.

3.1 Purpose

This section will explore all current test cases in the test-design specification section. Any requirements listed can be referenced in the RTM.

3.2 Test-Case Specification: TCS01

This test-case specification format will detail the TCS identifier, test items, input/output specifications, environmental needs, and other special requirements.

3.2.1 Test-Case Specification Identifier

The first test-case, TCS01 will run the simulation with default parameters and focuses on general completion.

3.2.2 Test Items

After each test item are SRS RTM identifiers to reference the requirements specified.

3.2.2.1 The simulation length results screen will be verified to reflect:

- Length of simulation..... [A1.7, A2.4, A2.6]

3.2.2.2 The Storm information results screen will be verified to reflect:

- Mean of Storm occurrence..... [A2.3.1, A2.3.3, A2.3.5, A2.4]

3.2.2.3 The Taxiway information screen will be verified to reflect:

- Travel Time..... [A2.3.1, A2.3.3, A2.3.5, A2.4]
- Number of Taxiways ..... [A2.3.1, A2.3.3, A2.3.5, A2.4]

3.2.2.4 The Fixed planes information screen will be verified to reflect:

- Arrival rate..... [A2.3.1, A2.3.3, A2.3.5, A2.4]
- Number of planes..... [A2.3.1, A2.3.3, A2.3.5, A2.4]
- Frequency..... [A2.3.1, A2.3.3, A2.3.5, A2.4]
- Number of Taxiways ..... [A2.3.1, A2.3.3, A2.3.5, A2.46]
- Base Loading Time..... [A2.3.1, A2.3.3, A2.3.5, A2.4]

3.2.2.5 The External planes information screen will be verified to reflect:

- Number of sets of external planes..... [A2.3.1, A2.3.3, A2.3.5, A2.4]
- Number of planes in the set ..... [A2.3.1, A2.3.3, A2.3.5, A2.4]
- Frequency..... [A2.3.1, A2.3.3, A2.3.5, A2.4]
- Base loading time..... [A2.3.1, A2.3.3, A2.3.5, A2.4]

3.2.3 Input Specifications

The default user input options in the GUI screen are as follows and may not be changed:

- Arrival rate(hours-10
- Arrival ragte variation(hours)-1
- Loading time(hours-5
- Loading time variation(hours)-1
- Cat 3 landing gear availability(percentage)-50
- Number of planes-5
- Round trip time(hours)- 50
- Round trip time variation(hours)-5
- Loading time(hours)-10
- Loading time variation(hours)-2
- Simulation length(hours)-200
- Storm occurrence mean time(exponential RV, hours)- 48
- Mean storm length (hours)-4
- Storm length variation(hours)-2
- Number of berths-4
- Number of taxiways-4
- Taxiway travel time(hours)-.5
- Debirthing tiem(hours)-1

3.2.4 Output Specifications

The output from our simulation is displayed on our GUI screen. The GUI results screen will have graphic data showing various parameter results. TCS01 will mainly focus on the results screen.

3.2.5 Environmental Needs

This section defines the specific hardware and software necessary to perform the test procedures.

3.2.5.1 Hardware

The testing may be done on any computer.

3.2.5.2 Software

The testing may be done on any web browser.

3.2.6 Special Procedural Requirements

Testing team will have designated meetings to properly test the simulation and all test records will be archived by our test engineer.

3.2.7 Intercase Dependencies

TCS01 results are not dependent on the results from any other test case specifications.

3.3 Test-Case Specification: TCS02

This test-case specification format will detail the TCS identifier, test items, input/output specifications, environmental needs, and other special requirements.

3.3.1 Test-Case Specification Identifier

The second test-case, TCS02 will run the simulation with advanced parameters and focuses on general completion.

3.3.2 Test Items

After each test item are SRS RTM identifiers to reference the requirements specified.

3.3.2.1 The simulation length results screen will be verified to reflect:

- Length of simulation..... [A1.7, A2.4, A2.6]

3.3.2.2 The Storm information results screen will be verified to reflect:

- Mean of Storm occurrence..... [A2.3.1, A2.3.3, A2.3.5, A2.4]

3.3.2.3 The Taxiway information screen will be verified to reflect:

- Travel Time..... [A2.3.1, A2.3.3, A2.3.5, A2.4]
- Number of Taxiways ..... [A2.3.1, A2.3.3, A2.3.5, A2.4]

3.3.2.4 The Fixed planes information screen will be verified to reflect:

- Arrival rate..... [A2.3.1, A2.3.3, A2.3.5, A2.4]
- Number of planes..... [A2.3.1, A2.3.3, A2.3.5, A2.4]
- Frequency..... [A2.3.1, A2.3.3, A2.3.5, A2.4]
- Number of Taxiways ..... [A2.3.1, A2.3.3, A2.3.5, A2.46]
- Base Loading Time..... [A2.3.1, A2.3.3, A2.3.5, A2.4]

3.3.2.5 The External planes information screen will be verified to reflect:

- Number of sets of external planes..... [A2.3.1, A2.3.3, A2.3.5, A2.4]
- Number of planes in the set ..... [A2.3.1, A2.3.3, A2.3.5, A2.4]
- Frequency..... [A2.3.1, A2.3.3, A2.3.5, A2.4]
- Base loading time..... [A2.3.1, A2.3.3, A2.3.5, A2.4]

3.3.3 Input Specifications

With advanced user input the options in the GUI screen may be adjusted:

- Arrival rate(hours)-10
- Arrival rate variation(hours)-1
- Loading time(hours)-5
- Loading time variation(hours)- 1
- Cat 3 landing gear availability(percentage)-50
- Number of planes-5
- Round trip time(hours)-50
- Round trip time variation(hours)-5
- Loading time (hours)-10
- Loading time variation(hours)-2
- Simulation length(hours)- 200
- Storm occurrence mean time(exponential RV, hours)-48
- Mean Storm length (hours)
- Storm length variation(hours)-2
- Number of berths-4
- Number of taxiways-4
- Taxiway travel time(hours)-.5
- Deberthing time(hours)-1

3.3.4 Output Specifications

The output from our simulation is displayed on our GUI screen. The GUI results screen will have graphic data showing various parameter results. TCS02 will mainly focus on the results screen.

3.3.5 Environmental Needs

This section defines the specific hardware and software necessary to perform the test procedures.

3.3.5.1 Hardware

The testing will be done on any computer

3.3.5.2 Software

The testing may be done on any web browser.

3.3.6 Special Procedural Requirements

Testing team will have designated meetings to properly test the simulation and all test records will be archived by our test engineer.

3.3.7 Intercase Dependencies

TCS02 results are not dependent on the results from any other test case specifications.

3.4 Test-Case Specification: TCS03

This test-case specification format will detail the TCS identifier, test items, input/output specifications, environmental needs, and other special requirements.

3.4.1 Test-Case Specification Identifier

The third test-case, TCS03 will run the simulation to completion and observe terminal file.

3.4.2 Test Items

After each test item are SRS RTM identifiers to reference the requirements specified.

- **3.4.2.1** A terminal screen can be viewed that shows event list...[A2.3.1, A2.3.2, A2.3.3, A2.3.4, A2.3.5, A2.4]

3.4.3 Input Specifications

Length of simulation will be changed to 1 week while all other remain at default.

- Arrival rate(hours)-10
- Arrival rate variation(hours)-1
- Loading time(hours)-5
- Loading time variation(hours)- 1
- Cat 3 landing gear availability(percentage)-50
- Number of planes-5
- Round trip time(hours)-50
- Round trip time variation(hours)-5
- Loading time (hours)-10
- Loading time variation(hours)-2
- Simulation length(hours)- 168
- Storm occurrence mean time(exponential RV, hours)-48
- Mean Storm length (hours)
- Storm length variation(hours)-2
- Number of berths-4
- Number of taxiways-4
- Taxiway travel time(hours)-.5
- Deberthing time(hours)-1

3.4.4 Output Specifications

The output from our simulation is displayed on our GUI screen. The GUI results screen will have graphic data showing various parameter results. TCS03 will focus on the log file generated.

3.4.5 Environmental Needs

This section defines the specific hardware and software necessary to perform the test procedures.

3.4.5.1 Hardware

The testing will be done on any computer

3.4.5.2 Software

The testing may be done on any web browser.

3.4.6 Special Procedural Requirements

Testing team will have designated meetings to properly test the simulation and all test records will be archived by our test engineer.

3.4.7 Intercase Dependencies

TCS03 results are not dependent on the results from any other test case specifications

3.5 Test-Case Specification: TCS04

This test-case specification format will detail the TCS identifier, test items, input/output specifications, environmental needs, and other special requirements.

3.5.1 Test-Case Specification Identifier

The fourth test-case, TCS04 will run a simulation where the input file is not consumed for testing purposes.

3.5.2 Test Items

- **3.5.2.1** A custom input file will be generated and kept ..... [A1.1, A1.2, A1.3, A1.4]

3.5.3 Input Specifications

Length of simulation will be changed to 1 week while all other remain at default.

- Arrival rate(hours)-10
- Arrival rate variation(hours)-1
- Loading time(hours)-5
- Loading time variation(hours)- 1
- Cat 3 landing gear availability(percentage)-50
- Number of planes-5
- Round trip time(hours)-50
- Round trip time variation(hours)-5
- Loading time (hours)-10
- Loading time variation(hours)-2
- Simulation length(hours)- 168
- Storm occurrence mean time(exponential RV, hours)-48
- Mean Storm length (hours)

- Storm length variation(hours)-2
- Number of berths-4
- Number of taxiways-4
- Taxiway travel time(hours)-.5
- Deberthing time(hours)-1

3.5.4 Output Specifications

The output from our simulation is displayed on our GUI screen. The GUI results screen will have graphic data showing various parameter results. TCS04 will focus on the input file generated.

3.5.5 Environmental Needs

This section defines the specific hardware and software necessary to perform the test procedures.

3.5.5.1 Hardware

The testing will be done on any computer

3.5.5.1 Software

The testing may be done on any web browser.

3.5.6 Special Procedural Requirements

Testing team will have designated meetings to properly test the simulation and all test records will be archived by our test engineer.

3.5.7 Intercase Dependencies

TCS04 results are not dependent on the results from any other test case specifications

3.6 Test-Case Specification: TCS05

This test-case specification format will detail the TCS identifier, test items, input/output specifications, environmental needs, and other special requirements.

3.6.1 Test-Case Specification Identifier

This test-case, TCS05 will start a simulation and analyze results file

3.6.2 Test Items

After each test item are SRS RTM identifiers to reference the requirements specified.

- **3.6.2.1** A custom output file will be generated, once simulation is complete .. [A1.7, A2.6]

3.6.3 Input Specifications

Length of simulation will be changed to 1 week while all other remain at default.

3.6.4 Output Specifications

The output from our simulation is displayed on our GUI screen. The GUI results screen will have graphic data showing various parameter results. TCS05 will focus on the custom output file.

3.6.5 Environmental Needs

This section defines the specific hardware and software necessary to perform the test procedures.

3.6.5.1 Hardware

The testing will be done on any computer

3.6.5.2 Software

The testing may be done on any web browser.

3.6.6 Special Procedural Requirements

Testing team will have designated meetings to properly test the simulation and all test records will be archived by our test engineer.

3.6.7 Intercase Dependencies

TCS05 results are not dependent on the results from any other test case specifications

3.7 Test-Case Specification: TCS06

This test-case specification format will detail the TCS identifier, test items, input/output specifications, environmental needs, and other special requirements.

3.7.1 Test-Case Specification Identifier

This test-case TCS06, will run a simulation with invalid input.

3.7.2 Test Items

After each test item are SRS RTM identifiers to reference the requirements specified.

3.7.2.1 The GUI input screen will be verified to see if invalid input passes ..... [A1.7, A2.6]

3.7.3 Input Specifications

The Input fields will be changed as shown to represent invalid input

- Arrival rate(hours)-10
- Arrival rate variation(hours)-jbiubiu
- Loading time(hours)-5
- Loading time variation(hours)- 1
- Cat 3 landing gear availability(percentage)-50
- Number of planes-5
- Round trip time(hours)-50
- Round trip time variation(hours)-5
- Loading time (hours)-10
- Loading time variation(hours)-2
- Simulation length(hours)- 168
- Storm occurrence mean time(exponential RV, hours)-48
- Mean Storm length (hours)
- Storm length variation(hours)-2
- Number of berths-4
- Number of taxiways-4
- Taxiway travel time(hours)-.5
- Deberthing time(hours)-1

3.7.4 Output Specifications

The only output that will display is “Invalid Input” from the input screen.

3.7.5 Environmental Needs

This section defines the specific hardware and software necessary to perform the test procedures.

3.7.5.1 Hardware

The testing will be done on any computer

3.7.5.1 Software

The testing may be done on any web browser.

3.7.6 Special Procedural Requirements

Testing team will have designated meetings to properly test the simulation and all test records will be archived by our test engineer.

3.7.7 Intercase Dependencies

TCS06 results are not dependent on the results from any other test case specifications.

4 Test-Summary Report

This section describes the purpose and then summarizes the results of each test case.

4.1 Purpose

This section's purpose is to give an idea of what the expected results are for the test cases that pass all the criteria set by their respective test design specifications.

4.2 Test-Summary Report: TSR01

This section will summarize all test cases and give the expected results of each.

4.2.1 Test-Summary-Report Identifier

This test summary report will be identified as TSR01.

4.2.2 TCS01 Results

The results for TCS01 are fairly standard, the simulation ran to completion with the default parameters.

4.2.3 TCS02 Results

The results for TCS01 are fairly standard, the simulation ran to completion with user specified parameters.

4.2.4 TCS03 Results

The events were tracked inside the terminal and the check that the statistics match with the results

4.2.5 TCS04 Results

The input screen corresponded with the input values in the parameters.

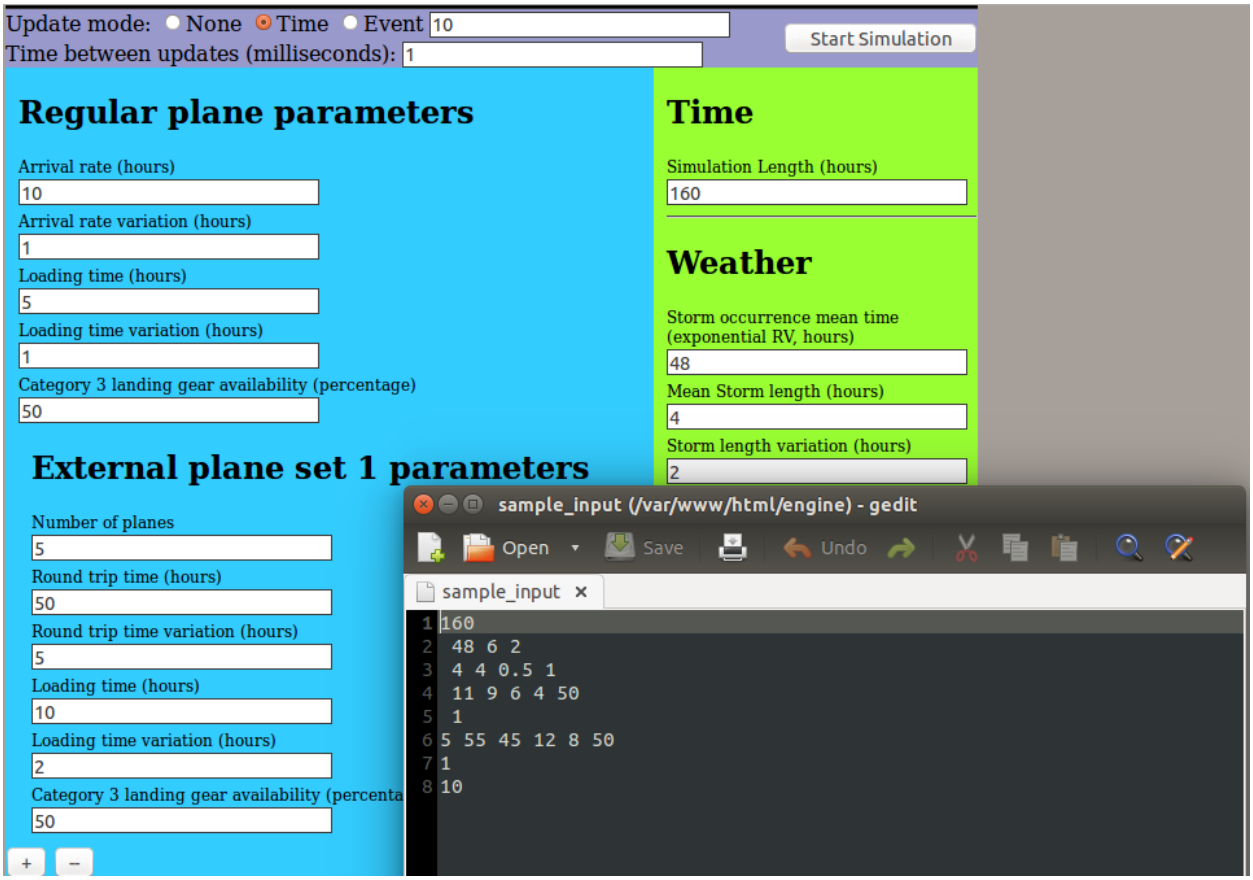

Figure 1. Input Screen

4.2.6 TCS05 Results

The expected results of TCS05 is that the results file generated matches up with the results displayed at the end of the simulation.

Figure 2. Results Screen

4.2.7 TCS06 Results

The simulation wouldn't run and told us we had erroneous input

Figure 3. Erroneous Input

APPENDIX A: The Requirements Traceability Matrix

Table 1 Requirements Traceability Matrix

Req. ID System Level.	Req. ID Sub-system level	Req. ID Sub-Sub-system level	DFD Identifiers(s)	Module Names(s)	Verification Method	Tested
A1			1	GUI Data Processor		P
	A1.1		1.1	Receive Input	T/D	P
	A1.2		1.2	Validate Input	T/D	P
	A1.3		1.3	Build Input String	T/D, I	P
	A1.4		1.4	Write Input File	I	P
	A1.5		1.5	Read Results	T/D, I	P
	A1.6		1.6	Parse Results String	T/D	P
	A1.7		1.7	Display Results	T/D	P
A2			2	Computational Engine		P
	A2.1		2.1	Read Input File	T/D	P
	A2.2		2.2	Process Input	A	P
	A2.3		2.3	Simlib process	A	P
		A2.3.1	2.3.1	Initialize	I	P
		A2.3.2	2.3.2	Insert Event	T/D	P
		A2.3.3	2.3.3	Evaluate Event	A,I	P
		A2.3.4	2.3.4	Delete Event	T/D	P

		A2.3.5	2.3.5	Update Event	T/D	P
	A2.4		2.4	Calculate Results	A	P
	A2.5		2.5	Build Output String	I, T/D	P
	A2.6		2.6	Write Results File	I	P