Software Requirements Specification

for

Disaster Recovery Simulation

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Revision History

Name	Date	Reason For Changes	Version

1. Introduction

1.1 Purpose

The purpose of this document is to present a detailed description of the Disaster Recovery Simulation application. It will explain the purpose and features of the application, the interfaces of the application, what the application will do, and the constraints under which it must operate. This document is intended for both the stakeholders and the developers of the application.

1.2 Document Conventions

This document features some terminology which readers may be unfamiliar with. See Appendix A (Glossary) for a list of these terms and their definitions.

1.3 Intended Audience and Reading Suggestions

This document is intended to be read by developers, project managers, users, testers, and documentation writers. The SRS has been organized approximately in order of increasing specificity.

The developers and project managers need to become extremely familiar with the entire SRS.

Users should read the Overall Description to have a better understanding of the features involved in this software.

Testers should read the System Features in order to develop meaningful test cases and give useful feedback to developers

1.4 Product Scope

This software system will be a Disaster Recovery Simulation system which will help emergency relief teams determine which routes should be used to distribute supplies or evacuate areas in the event of a disaster. This system will be designed to be easy to use and should not require special training to operate the software. This system will be designed to be used offline as many areas usually suffer a network loss as a result of disasters

1.5 References

IEEE. IEEE Std 830-1998 IEEE Recommended Practice for Software Requirements Specifications. IEEE Computer Society, 1998.

2. Overall Description

2.1 Product Perspective

This product is a disaster simulation that was worked on last semester by Sam Shrestha and Craig Jones. It is a new, self-contained product intended for use on systems using Windows 7 or later. The scope of this project encompasses only client-side functionality.

2.2 Product Functions

2.2.1 Import Map

- Allows user to import map data of terrain.
- Provides initial display for user to build upon.

2.2.2 Adding Damage Variable

- Allows user to specify how damaged a specific area on the map is.

2.2.3 Adding Difficulty of Terrain

- Allows user to specify how difficult it is to traverse terrain.

2.2.4 Adding Value of Location

- Location value determines optimal pathing routes for agents.

Further detail given in section 4 of SRS document

2.3 User Classes and Characteristics

The Disaster Recovery Simulation is designed for optimizing resource distribution along arbitrary paths using predefined nodes. The primary users of the program are emergency relief teams such as various government agencies, Red Cross, etc. However, the program may also be used by large venue businesses such as Tiger Stadium, the Mall of Louisiana, or the Super Dome in New Orleans, La to determine optimal distribution/evacuation paths.

2.3.1 Rapid Disaster Response

Rapid Disaster Response users represent the first primary demographic this product is targeting. However, the use of the program is not reliable for this class.

Examples:

a. In the event of a major natural disaster, government agencies such as FEMA need to quickly develop a plan to respond and deploy resources in a manner that is effective.
b. In the event of a non-natural disaster, such as an attack, government agencies and officials need to quickly develop a plan to get citizens to a safe environment.

Requirements:

- Ability to input common data formats such as OSM infrastructure, or government defined elevation maps.
- Ability to load premade map files to allow for disaster preparation and even more rapid response.
- An easily understandable output that can be used as a starting point for further response plan development.

2.3.2 Aid Distribution – Primary

Aid Distribution users represent the second primary demographic this product is targeting. They have a reliable need for this product, though it will only supplement their plans.

Examples:

a. In the event of a major natural disaster, relief agencies such as Red Cross need to disperse aid effectively.
b. In many countries there are relief agencies working to support the local population, such as in Africa. This program could assist those groups deploy aid personnel throughout the country.

Requirements:

- Ability to input common data formats such as OSM infrastructure, or government defined elevation maps.
- Ability to input custom data formats built from existing datasets.

2.3.3 Resource and Workload Distribution – Secondary

Resource and workload distribution users represent a lucrative secondary market that the application targets. This class of users is much broader than the primary class.

Examples:

a. LSU wants to know how to best distribution of aid stations during tailgating.
b. A ranch owner wants to know how to distribute his workers between several feed barns in order to efficiently feed all of his cattle.

Requirements:

- Ability to input common data formats such as OSM infrastructure, or government defined elevation maps.
- Ability to input custom data formats built from existing datasets.

2.4 Operating Environment

The software was designed specifically for 64-bit versions of systems using Windows 7 or later. The system is also recommended to have at least a 3.0GHz Quad Core processor and 16GB of RAM. The user must also provide their own map data in the form of an .osm file. (And other formats)

2.5 Design and Implementation Constraints

The primary design constraint of the software is operating system platform as the product was designed specifically for use on the Windows operating system. We will be responsible for maintaining the application once it is delivered to the customer and also for making necessary updates to accommodate for changes.

2.6 User Documentation

There will be two options for supplementary information given when software is delivered: video tutorials and the user manual.

The video tutorials will be a walkthrough of how to correctly use all parts of the application. Users can easily access the tutorials in the document folder.

The user manual will serve the same purpose of the video tutorials, but instead offering the user a choice to learn more about the software in a readable format, and will provide technical in depth documentation.

2.7 Assumptions and Dependencies

2.7.1 Time Dependencies

There are some additional features non-critical to the functioning of the program whose implementation depends upon whether or not there is enough time to implement such features. An example of such a feature is adding elevation data to maps.

2.7.2 Hardware Dependencies

Whether or not the program runs at its intended capacity is dependent upon the specifications of the system. The user must be sure their system meets these minimum specifications or the product may not operate as intended.

2.7.3 Load Dependencies

As this software is intended to help provide aid in disastrous situations, it is crucial that it loads quickly so that the user can respond quickly.

3. External Interface Requirements

3.1 User Interfaces

There are three main components to the graphical user interface. These components are the loading and playing of the simulation, the placing of damage and agents on the simulation area, and the collection of data from the simulation area. This is done by dividing the screen into three columns. The left column is where the user can change which mode they are in and select which action to perform and how to perform it. The user can select with action to use by either clicking on a button or using a keyboard shortcut. After an action is selected the user can use a slider to edit the action or use a keyboard shortcut. The middle column is the biggest column and will display the simulation. This is the area where the user applies damage and agents to the map. In this area an error message box will appear if an error were to occur. The right column is the smallest column and will show more info about the currently selected item.

3.2 Hardware Interfaces

The software was designed specifically for use on devices using the Windows operating system with Windows 7 or later. It is also recommended that the system has at least a 3.0GHz Quad Core processor and at least 16 GB of RAM to run the program.

3.3 Software Interfaces

Though the software is mostly self-contained there are a few pieces of information that the user needs to supply for the application to work. This first piece of information is the map data and it is in the form of an Open Street Map file, OSM. This is an open source file format and is similar to XML. In order to display the map a library called Simple and Fast Multimedia Library, SFML, is used version 2.3. In addition to this the user is also able to input elevation data in the form of GeoPDF. To ensure accurate data the user is able to input multiple copies of data and the data will then be combined to give a result.

4. System Features

4.1 Import Files to Populate Simulation Environment

4.1.1 Description and Priority

In order for the simulation to run the user needs to provide some information. This information consists of map data, population data, and elevation data.

4.1.2 Stimulus / Response Sequences

- The user is given the ability to click a button that corresponds to some data and is then prompted to supply the data.

- The user will then click on the file(s) containing the data and click submit when all data is selected.

4.1.3 Functional Requirements

- The system assumes that the user has the right to use the data.
- The system makes sure that the provided data is compatible.

4.2 Accept Manual Manipulation of Simulation Environment

4.2.1 Description and Priority

After the user provided data is accepted and loaded into the simulation, the user is then able to paint on the map. This represents the various areas and where the AGENTS are based.

4.2.2 Stimulus / Response Sequences

- The user clicks on a button or hits the shortcut key to select what type of DAMAGE they want to paint on the map.
- The user then click on the area that needs the DAMAGE to be applied to.

4.2.3 Functional Requirements

- The map will reflect the actions that the user is applying in real time.

4.3 Request Discrete Simulation Parameters

4.3.1 Description and Priority

Before simulation begins the user is able to switch between various modes and make changes to the simulation parameters.

4.3.2 Stimulus / Response Sequences

- The user clicks on a button or hits the shortcut key that corresponds to the mode that they want to be in.
- The user is then able to change parameters related to that mode.
- The user is then able to apply those changes to the map.

4.3.3 Functional Requirements

- The system makes sure the requested changes are valid and are not out of range.

4.4 Simulate Recovery Efforts

4.4.1 Description and Priority

Once all information is inputted and parameters set, the user is able to start the simulator.

4.4.2 Stimulus / Response Sequences

- The user clicks on a button or hits the shortcut key and starts the simulator.
- The user is then able to switch views and sample data.

4.4.3 Functional Requirements

- The system is able to be paused and then resumed so that the user is able to acquire data without interfering with the simulation.

4.5 Save Output to Files

4.5.1 Description and Priority

Once the user is done with the simulator, the user can then save the results into a file.

4.5.2 Stimulus / Response Sequences

- The user clicks on a button or hits the shortcut key, which causes the simulator to stop and the data to be written to a file.

4.5.3 Functional Requirements

- After saving the output to a file the user is then able to quit the program, enter some new information or resume the simulation.
- The user is prompted if there is a problem with saving the data.
    - I.E. Overriding data.

5. Other Nonfunctional Requirements

5.1 Performance Requirements

The program needs sufficient memory to store the input map data. A minimum of 16GB is recommended. The program will benefit from a multicore processor, but is not required.

5.2 Safety Requirements

Notification that this is program does not override common sense due to situations where damage or difficulty has not been taken into consideration by recovery personnel as the calculations made are

qualitative measures and not quantitative. The program's purpose is to provide an initial plan to use as a starting point during the recovery planning phase. It is not intended to be a directly implemented solution.

5.3 Software Quality Attributes

The graphical user interface is designed with usability and ease of use in mind. The program will be organized with the notion that is easy to navigate. The feedback from the program will be provided through visual cues such as instructional pop up notifications. Furthermore, using contrasting colors supports visual understanding for users. We defer liability to the client through a pop-up when the program is first opened. Portability is maintained through the use of print outs of the optimal pathing which can be taken with users to relief locations.

Appendix A: Glossary

Damage: Represent real life events that could happen to an area during a disaster.

Agents: Represent the first responders that go about the area distributing aid.

Appendix B: Analysis Models