Project Documentation

Android Based Situational Awareness: Moving Map Tom Atnip, Susi Cisneros, Sam Kim, and Seth Troisi

February 5, 2013

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Changes

| Date | Description |
|--------------------|-----------------------------------------------------------------------|
| September 13, 2012 | Document started |
| September 13, 2012 | Wrote Requirements and Questions to ask Raytheon |
| September 20, 2012 | Created outline |
| September 20, 2012 | Wrote Users/Stakeholders section |
| September 23, 2012 | Wrote Key Needs, Alternatives, Risks, Documentation Metrics, and Code |
| | Metrics |
| September 24, 2012 | Updated Requirements as per Gate 5 visit with Raytheon |
| October 8, 2012 | Revised Requirements, added Assumptions and Opportunities, and |
| | updated Risks |
| October 15, 2012 | Added Introduction and made Requirements into shall statements |
| October 25, 2012 | Updated Requirement, added Performance Requirements |
| November 7, 2012 | Updated Performance placeholder |
| January 26, 2013 | Project Document Audit |
| February 5, 2013 | Project Updates Winter Term |

1 Introduction

This document details all documentation associated with this project. It includes the problem statement, requirements, project plan, and metrics.

2 Problem Statement

2.1 User/Stakeholder Descriptions

2.1.1 Users

Soldier, Police Officers, and other Ground Personnel

The users of our program are seeking to maintain their situational awareness in locations which may not have connectivity to the Internet. Many of them use voice guided situational awareness technology, but in light of advances in mobile devices, they could receive this information in a visual manner.

2.1.2 Stakeholders

Raytheon

Raytheon's customers are mainly military organizations, many of which are using Raytheon's current situational awareness technologies. Raytheon is looking to update these technologies to keep their position as a leading provider of military systems.

JD Hill

JD is the client who proposed this solution. He is a major proponent of using mobile devices in a military application.

Doug Dusseau

Doug is the acting Technical Lead for this project.

Development Team

The development team on this project are graduating seniors who wish to learn more about the software development process and interaction with a client. They are very interested in learning more about developing on the Android platform.

2.2 Key Needs

| ID | Need |
|----|--------------------------------------------------|
| N0 | View map of surrounding area |
| N1 | View points of interest on the map |
| N2 | View current location on the map |
| N3 | Map must not require internet access |
| N4 | Map must be Android based |
| N5 | Application must work on any size android device |

2.3 Current Solution

The chosen mapping engine was OSMDroid. This engine came pre-built with offline map support, which handled the key functional requirement. The engine is also part of the Open source community which allows the code to be used free of charge, as long as licensing requests from the owner are met. There is also built in support for overlays.

2.4 Alternatives

All considered solutions to the proposed system require Internet access. Most other mapping engines explored were very domain specific (ie hiking or biking) and lacked significant amounts of documentation.

3 Requirements

3.1 Functional

| ID | Requirement | Priority |
|------|------------------------------------------------------------------------------------------------------------|-----------|
| FR0 | The system shall let the user pan the map by a dragging gesture | Objective |
| FR1 | The system shall let the user zoom using an on-screen button | Threshold |
| FR2 | The system shall let the user zoom using pinch gestures | Objective |
| FR3 | The system shall let the user zoom using double tap | Objective |
| FR4 | The system shall store map tiles on the device | Threshold |
| FR5 | The system shall display map tiles which are stored on the device | Threshold |
| FR6 | The system shall be able to pull map tiles which are stored on a local server and store them on the device | Objective |
| FR7 | | Threshold |
| | The system shall georeference the location of the device | |
| FR8 | The system shall let the user center on current location | Objective |
| FR9 | The system shall store multiple map types | Threshold |
| FR10 | The system shall let the user choose the map type | Objective |
| FR11 | The system shall store points of interest as a map overlay | Objective |
| FR12 | The system shall display points of interest overlays | Objective |
| FR13 | The system shall let the user choose which overlays are displayed | Objective |
| FR14 | The system shall let the user add custom points of interest | Objective |
| FR15 | The system shall let the user choose which overlay the custom point of interest is added to | Objective |
| FR16 | The system shall let the user create new overlays | Objective |
| FR17 | The system shall display a compass | Threshold |
| FR18 | The system shall let the user toggle heading/north up | Threshold |
| FR19 | The system shall let the user change default settings via a settings menu found in the menu bar | Threshold |
| FR20 | The system shall let the user access a help menu via the menu bar | Objective |
| FR21 | The system shall synchronize user added points of interest with support server | Threshold |
| FR22 | The system shall share user added points of interest with all devices connected to the same support server | Threshold |

3.2 Non-functional

| ID | Requirement | | |
|-----|------------------------------------------------------------------------|--|--|
| NR0 | The system shall run on Android platforms running at least version 3.0 | | |
| | (Honeycomb) | | |
| NR1 | The system shall receive GPS data from a local server or the device | | |
| NR2 | The system shall display properly on either mobile phones or tablets | | |
| NR3 | The system shall use modular code | | |
| NR3 | The system shall use the Android usability conventions | | |

4 Project Plan

4.1 Schedule

| Kickoff meeting Requirements Definition Requirements Definition Requirements Definition Architecture Development Architecture Development Week 1 3-Sep 7-Sep OSMDroid Demo Android Local Network Demo System Requirements Review Week 2 10-Sep 14-Sep Senior Project Presentations Week 3 17-Sep 15-Oct 19-Oct Requirements Definition Architecture Development Week 8 22-Oct 26-Oct Requirements Definition Architecture Development Requirements Definition Architecture Development Requirements Definition Architecture Development Requirements Definition Architecture Development Deve | Week 0 | 27-Aug | 31-Aug | Week 6 | 8-Oct | 10-Oct |
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| Week 1 3-Sep 7-Sep OSMDroid Demo Requirements Definition Android Local Network Demo Android Local Network Demo Android Local Network Demo System Requirements Review Senior Project Presentations 15-Oct Presentations 26-Oct Presentations | | Kickoff meeting | | | Requirements Definition | |
| Requirements Definition Architecture Development Android Local Network Demo System Requirements Review Android Local Network Demo Injoint Project Presentations 19-Oct Preliminary Design Development Environment Setup 19-Oct Preliminary Design Development Environment Setup 19-Oct Demoir Setup | | Requirements Definition | | | Architecture Development | |
| Week 2 10-Sep 14-Sep Senior Project Presentations 15-Oct 19-Oct Week 3 17-Sep 21-Sep Week 7 15-Oct 19-Oct Week 3 17-Sep 21-Sep Environment Setup 26-Oct Requirements Definition Week 8 22-Oct 26-Oct Requirements Definition Week 8 22-Oct 26-Oct Requirements Definition Week 9 Preliminary Design Development 26-Oct Week 4 24-Sep Preliminary Design Development 26-Oct Week 5 Requirements Definition Week 9 Preliminary Design Development 26-Oct Use Cases Use Cases 29-Oct 2-Nov Week 5 1-Oct Sprint Establishment Sprint Esta | Week 1 | 3-Sep | 7-Sep | | OSMDroid Demo | |
| Week 2 10-Sep 14-Sep Senior Project Presentations 4 - 15-Oct 19-Oct 19-Oc | | Requirements Definition | | | Android Local Network Demo | |
| Requirements Definition Architecture Development Week 3 17-Sep 21-Sep Environment Setup Environment Setup Use Cases 22-Oct 26-Oct Environment Setup Use Cases Week 4 24-Sep Requirements Definition Architecture Development Easy to Site Visit Week 8 22-Oct 26-Oct Environment Setup Use Cases 26-Oct Environment Setup Use Cases Week 4 24-Sep Requirements Definition Architecture Development OSMDroid Demo Android Local Network Demo Week 9 29-Oct 2-Nov Sprint Establishment Guided Coding Use Cases 29-Oct 2-Nov Use Cases Week 5 1-Oct 5-Oct Use Cases Use Cases 9-Nov Coding Use Cases Week 6 1-Oct 0-Nov OSMDroid Demo Android Local Network Demo Week 10 5-Nov Oses 9-Nov Oses Week 7 26-Nov Oses Nov Oses 14-Jan 18-Jan | | Architecture Development | | | System Requirements Review | |
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| Week 3 17-Sep Requirements Definition 21-Sep Week 8 Environment Setup Use Cases 22-Oct 26-Oct | | Requirements Definition | | Week 7 | 15-Oct | 19-Oct |
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| Week 4 24-Sep 28-Sep Environment Setup 28-Sep Environment Setup 29-Oct 2-Nov Requirements Definition Android Local Network Demo Week 9 Sprint Establishment Guided Coding Use Cases 29-Oct 2-Nov Week 5 1-Oct 5-Oct Use Cases 5-Nov 9-Nov Architecture Development OSMDroid Demo Android Local Network Demo Week 10 5-Nov 9-Nov Week 1 26-Nov 30-Nov Week 6 14-Jan 18-Jan Week 2 3-Dec 7-Dec Week 7 21-Jan 25-Jan Alpha Beta 14-Dec Week 8 28-Jan 1-Feb Week 3 10-Dec Week 9 4-Feb 8-Feb Week 4 17-Dec Week 9 4-Feb 8-Feb Alpha Alpha Alpha Demo Week 10 11-Feb 15-Feb | | Architecture Development | | Week 8 | 22-Oct | 26-Oct |
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| Alpha Beta Week 3 10-Dec 14-Dec Week 8 28-Jan 1-Feb Alpha Beta 4-Feb 8-Feb Alpha Beta 11-Feb Alpha Demo Week 10 11-Feb 15-Feb Week 5 7-Jan 11-Jan Beta 11-Feb | | Alpha | | | Beta | |
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| Week 5 7-Jan 11-Jan Week 10 11-Feb 15-Feb | Week 4 | 17-Dec | 21-Dec | Week 9 | 4-Feb | 8-Feb |
| Week 5 7-Jan 11-Jan Beta | | Alpha | | | Beta | |
| | | Alpha Demo | | Week 10 | 11-Feb | 15-Feb |
| Beta Senior Project Exposition | Week 5 | 7-Jan | 11-Jan | | Beta | |
| | | Beta | | | Senior Project Exposition | |

Key Activity Sofware Documentation

4.2 Assumptions

| ID | Assumption |
|----|-------------------------------------------------------------------|
| A0 | There exists an open source mapping engine for Android devices |
| A1 | The mapping engine does not require an internet connection to run |
| A2 | Android devices can connect to a local server |

4.3 Risks

| ID | Risk |
|----|----------------------------------------------------------|
| R0 | Organizing data in the correct format in a timely manner |

4.4 Opportunities

| ID | Opportunity |
|----|-------------------------------------------|
| O0 | Finding a feature complete mapping engine |

5 Metrics

5.1 Project

5.1.1 Documentation

The progress of the documentation will be tracked by breaking it down into three parts: the percent written and ready for review, the percent that has been reviewed, and the percent that is ready for delivery. The initial portion will encompass the percentage of the requirements, features, and other material that have been documented according to our currently known goals. A portion of the documentation will be considered in the reviewed stage once Dr. Wollowski and/or JD Hill have provided feedback and approval. Once a section of the documentation is in its final state (written, reviewed, and stable), it will be considered complete.

Percent Written: 100 Percent Reviewed: 90 Percent Complete: 90

5.1.2 Code

During the coding phase of this project, progress will be tracked by the features scheduled during an iteration and the number of features completed. Code will belong to one of five phases unwritten, written, peer reviewed, tested, or complete. Once code has been written and passes the required unit tests, it will undergo a peer review to check for good coding practices, clarity, and errors. After a peer review the functionality will then be required to pass integration tests. Once it has passed system integration, it will be considered complete and will be merged into the main branch of code.

Percent Written: 30 Percent Reviewed: 15 Percent Tested: 0 Percent Complete: 0

5.1.3 Testing

For the final phase of the project, progress will be measured by how many tests are passing. The tests that the software will be subjected to will be more thorough than the tests required for code to join the main branch. Most tests will be automated, but there will also be human factor tests.

Percent Passing: 0

5.2 Process

The process that the project is following will be measured by due dates met versus missed due dates.

Milestone Dates Kept: 0

5.3 Communication

Communication will be measured by how well the team feels that their needs are being heard and being taken care of, along with efficiency of meetings.

Team Confidence: 85 Meetings: 95

6 Questions

6.1