BLACKBOX

PROJECT PROPOSAL

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SUBMITTED TO:

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COURSE	SE 4450 SOFTWARE ENGINEERING DESIGN II
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REVISION HISTORY

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20/09/11	1.0	Report cover page tweaked.	Dan Martyn
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26/09/11	1.1	Started changes for version 1.1.	Dan Martyn
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29/09/11	1.2	Rearranged some of the helping material and added some content.	Dan Martyn

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PROJECT PROPOSAL

1 Introduction

In the trucking industry there are two groups of people working for trucking companies. The first group are hourly, paid a certain rate for the number of hours they work. The other group are owner-operators, who own their own trucks and are paid differently. The pay scale is negotiated beforehand between the trucking company and the driver. There are different kinds of pay schemes that can be negotiated, such as hourly, set amounts for certain types of moves and pay based on weight. The pay scale based on weight can also include set amounts for specific types of work, like using a tailgate, carry-ins, direct drives, etc. The driver has to compile a billing report detailing the work they have done to hand in to the trucking company to get paid, which means they want to keep very accurate records of the work they complete on a daily basis.

The methods available for tracking daily work include *calling in the details*, *pen and paper* and software. Calling in the details means that for each stop, the driver needs to contact dispatch and let them know the particulars of the stop. The driver needs to make sure they get a print out at the end of each day for their own records and to compile their billing report. The upside to this method is that it is quick, as the driver can just call in and let the dispatch know the details while on route to their next stop. However, it takes the control of having the details out of the drivers hands. They will also, more than likely, have to go back through the records after the fact to figure out their pricing, as the negotiated contracts between the owner-operators and the trucking company could all be different. The pen and paper method puts the control back into the drivers hand, as they can record whatever information they want. This method does raise concerns of legibility and the fact that if anything happens to the paper copy, the driver loses all their information for the day. It also makes keeping detailed records more work for the driver, as everything is done by hand. Software tries to address these issues by allowing the control of the record keeping to stay in the drivers hands, while allowing the information to be backed up. Computer-based knowledge management systems have become a major part of today's communication system, and with the Internet as a medium, distance is no longer the barrier[1]. However, some software is made for more than just an owner-operator, which leads to unused features making the software less intuitive for users and makes an owner-operator pay for features they will never use.

ITS Dispatch[2] is a piece of software by Internet Truckstop[3]. It is a web based solution that allows a company to track drivers, loads, customers, etc[3]. There is a version for owner-operators which meets their specific needs[2]. It allows for many of the planned features of the Blackbox project, however it can only be accessed through a network, which may not always be available on the road, necessitating a driver to record information by hand. In these situations, the software lets the driver down.

CabPal[4] is a piece of software by MSB Solution[5] meant exclusively for owner-operators. It again includes many of the planned features of the Blackbox project and even includes an iPad[6] version. However, it is a FileMaker[7] application and thus lacks the ability to use native iPad classes.

The Blackbox project is attempting to address all these issues with a native iPad application to keep the record keeping in the drivers' hands. Auto ID systems can replace time-consuming, costly and error-prone processes of human data entry and produce detailed real time information[10]. It will input many of the details

automatically for the driver, allowing them to only need to focus on the particulars of the stop, such as piece count and weight. By utilizing a multitude of services, such as email, Dropbox[8] and iCloud[9] the driver can be content in knowing their information will always be backed up securely. Report generation will be incredibly simple as well, with just a few taps needed to create a report for handing in by email, or printing out.

2 Background

The literature review done for the Blackbox project happened over two distinct time periods. The first was completed over the last two years and includes many books[11-16] and websites[17-21] on the subjects of Objective-C[22] and Cocoa[23]. These resources were vital in learning how to create applications for iPads, which are "..aimed at anyone who doesn't need the power of a regular PC or Mac[24]." The iPad was also chosen as the target for Blackbox because it contains the hardware necessary for the features planned for the application. If a desktop version was to be made, then a driver with a laptop missing certain hardware, would not get the full benefits of the application.

The second distinct time research was done for the project was to see what kind of software was in the market already. The research was focused on applications which utilize the Internet or iPad as those are two key aspects of the Blackbox project. Two separate and quite different applications were found and are detailed in the following sections.

2.2 ITS Dispatch

ITS Dispatch by Internet Truckstop is a web based solution for trucking companies, company drivers and owner-operators. It has web interfaces for each, allowing for the same sorts of features that the Blackbox project aims for, plus a multitude of other features for dispatch and company drivers. At first glance, this seems like the ideal solution to the problem, but it raises some concerns. First of all, there are too many features. Blackbox aims to be simple and intuitive so that the training time on the software is minimal. Ideally, an owner-operator can pick up a copy and start using it right away without reading a manual. The ITS Dispatch system is so complex however, that you would need to read the manual to use it properly.

Another seemingly great feature of ITS Dispatch is that it is web based. This means that all the data that is created is automatically stored online for safe keeping. You use a browser to interact with the application. This is great for a dispatch office that is hardwired into the Internet, but can introduce problems for a driver out on the road. Most stops will be in urban areas where the network connectivity should be good for an iPad or laptop, however in certain situations the driver could have connectivity problems. Due to the browser based, online storage workings of ITS Dispatch, if the driver can not connect, they will not be able to store the information they need. If this is the case, they will have to resort to another method, which makes ITS Dispatch an unideal solution.

Blackbox will be a native iPad application that will use the 3rd Generation (3G)[25], Wireless Fidelity (WiFi)[26] and Global Positioning System (GPS)[27] resources of the iPad for certain features, like finding the location of the driver and backing up data. However it will not rely on those resources for system critical tasks like creating new stop data or report generation. The application will work fine for an owner-operator who turns off

all network access while on the road and turns it back on when at home to back up data, although that is still not technically required.

2.3 CabPal

CabPal by MSB Solution is a closer approximation to what the Blackbox project will be. It has many of the features Blackbox will have, but again has other features not required by Blackbox and missing features. Some of the features of CabPal are:

- Contact tools
- Shipment tools
- Trip tools
- Accounting tools
- Document tools
- Log sheets
- Vehicle Inspection sheets

Blackbox will utilize many of the same features, allowing for contact management, tracking stops and generating reports. At first glance, it seems that there would be no need for the Blackbox project, however upon further inspection, CabPal is a FileMaker app. FileMaker is a cross platform database application which allows developers to quickly create apps for other users. This allows users to have an iPad, Windows or Mac version of the software, but it doesn't allow for native iOS API's to be used. Blackbox, being a native iOS app, will allow for features like utilizing the GPS of the device and using iCloud for backup, all without having to pay a monthly fee to use the app. CabPal also has a lot of information to fill in for each stop because it was created in FileMaker, making the amount of time needed to record a stop and the time needed to learn the app that much longer.

3 Objectives

3.1 Goals

The goals of the Blackbox project are to create a native iPad app that allows for the quick creation of stop information for an owner-operator. The project will also allow for the creation of various reports. By utilizing the GPS of the iPad, stop information can be created automatically for the driver, as well as directions should they be needed. The camera can be used to document freight and any mishaps. Backup of the information created by the app is crucial, as it is how the driver gets paid. Different options, such as email, iTunes integration[28] and services like Dropbox and iCloud will be used for backing up information.

3.2 Constraints

Due to the time constraint on this project, the first version of Blackbox will be geared towards a single owner-operator. This will allow the focus of the project to be on data input and report generation. Certain information will be hardcoded into the app, such as driver details and pay rates, so that time does not need to be spent on allowing for different details to be entered by different drivers. Subsequent versions of Blackbox will allow

for different driver details and pay rates to be added to the application. By targeting one driver now the project can focus on the core of the application, data entry and report generation.

4 Deliverables

The Blackbox project will include a multitude of deliverables:

- Project Proposal
- Project Estimation Report
- Software Requirements Specification
- Software Design Specification
- Test Plan
- Source Code
- Documentation
- Verification and Validation Document
- User Manual
- Final Report

5 Resources

During the design and implementation of the Blackbox project the hardware utilized will be an iMac[29] for most of the at home work. Portable work will be done on a MacBook[30]. Most testing will take place on a WiFi iPad. Testing the GPS functionality will take place on a 3G enabled iPad or 3G enabled iPad 2. Development will take place in Mac OS X 10.7 Lion[31], using Xcode 4.1[32] and Xcode 4.2[33]. The targeted operating system for the app is iOS 5[34] which will be released sometime this fall[34]. Data backup within the application will be done using iCloud and Dropbox, along with email and iTunes integration. To allow for code revisioning across the iMac and MacBook, GitHub[35] will be utilized.

6 Project Plan

The Gantt Chart for the project is on the following page. It shows the expected tasks/ milestones required to complete the Blackbox project and their estimated dates.

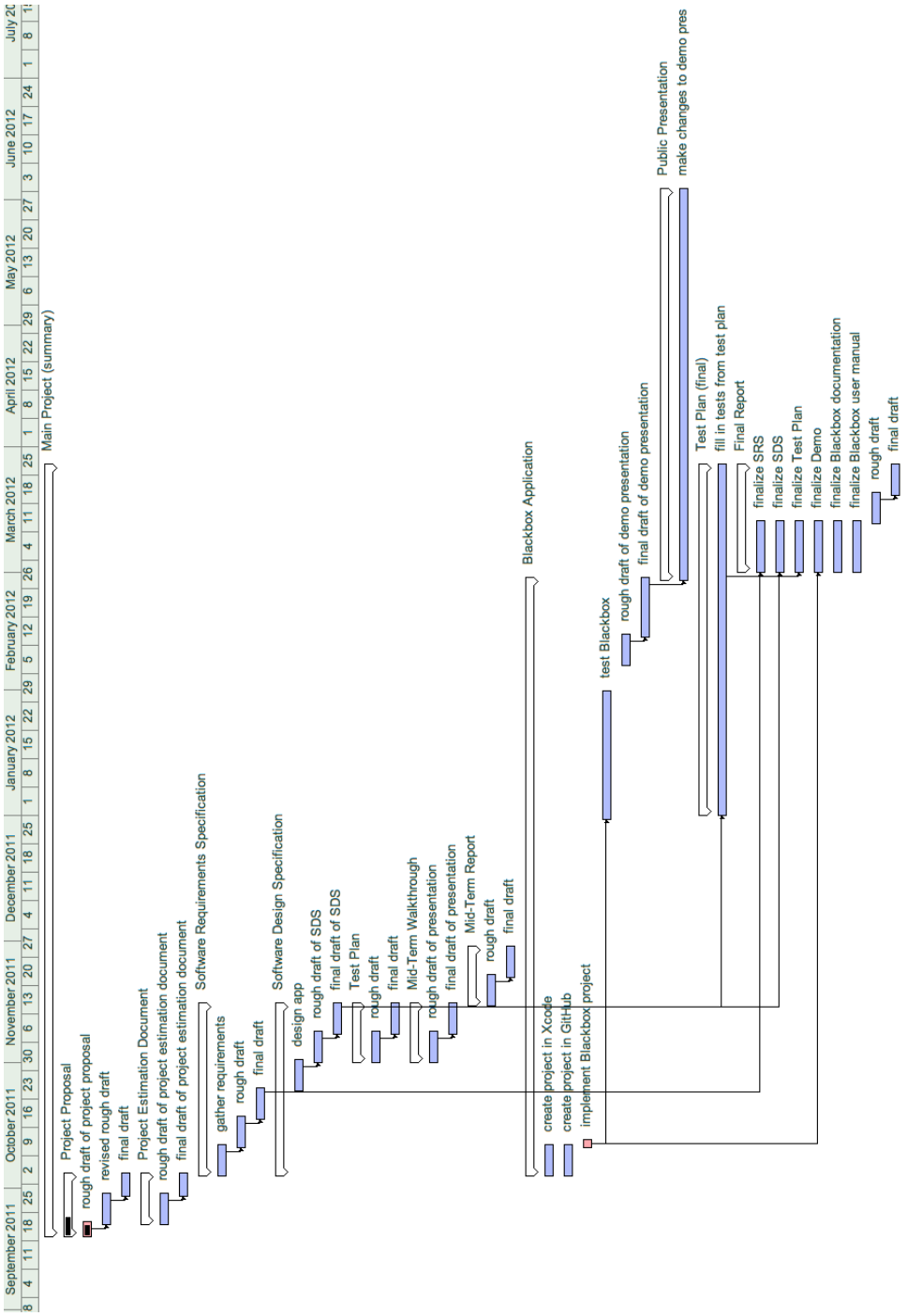

Figure 1: Gantt Chart for Blackbox Project

FACULTY ADVISOR SIGNATURE

Dr. Quazi Mehbubar Rahman has agreed to be the faculty supervisor for the Blackbox project, to be completed by Daniel Martyn of Jetcube, for the SE 4450 Software Engineering Design II course 2011-2012.

Parties representing the Blackbox project:

Daniel Martyn
Project Lead

Dated this 4th day of October 2011

Quazi Rahman
Project Advisor

Dated this 4th day of October 2011

Witness

Dated this 4th day of October 2011

GLOSSARY

3G	3rd Generation
API	Abstract Programming Interface
Direct Drive	Picking up freight from one customer and driving it directly to where it is being shipped.
GPS	Global Positioning System
Owner-Operator	Someone who owns their own trucks. They can own one truck and drive it, or own multiple trucks and pay others to drive their trucks.
WiFi	Wireless Fidelity

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[2]	ITS Dispatch	http://its-dispatch.com/owneroperators.php	
[3]	Internet Truckstop	http://its-dispatch.com/	
[4]	CabPal	http://www.cabpal.ca/	
[5]	MSB Solution	http://www.msbsolution.ca/	
[6]	iPad	http://www.apple.com/ca/ipad/	
[7]	FileMaker	http://www.filemaker.com/	
[8]	Dropbox	https://www.dropbox.com/	
[9]	iCloud	http://www.apple.com/icloud/what-is.html	

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[14] Conway, Joe, and Aaron Hillegass. iOS Programming The Big Nerd Ranch Guide. 2nd ed. United States of America: Pearson Technology Group, 2011.

[15] Zarra, Marcus, and Daniel Steinberg. Core Data: Apple's API for Persisting Data on Mac OS X. United States of America: Pragmatic Bookshelf, 2010.

[16] Isted, Tim, and Tom Harrington. Core Data for iOS. Crawfordsville, Indiana: Addison Wesley, 2011.

[17]	Cocoa With Love	http://cocoawithlove.com/	Lots of different tutorials for desktop and iOS.
[18]	Cocoa is My Girlfriend	http://www.cimgf.com/	Excellent Core Data tutorials.
[19]	Lex, Briefly	http://blog.lexfriedman.com/	Good design examples.
[20]	iCode Blog	http://www.icodeblog.com/	Novice to expert iOS tutorials on different subjects.
[21]	Apple Developer Portal	http://developer.apple.com/	Official portal containing all class references.
[22]	Objective-C	http://en.wikipedia.org/wiki/Objective-C	
[23]	Cocoa	http://developer.apple.com/technologies/mac/cocoa.html	

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[25]	3G	http://en.wikipedia.org/wiki/3g
[26]	WiFi	http://en.wikipedia.org/wiki/Wifi
[27]	GPS	http://en.wikipedia.org/wiki/Gps
[28]	iTunes Integration	http://support.apple.com/kb/ht4094
[29]	iMac	http://www.apple.com/ca/imac/
[30]	MacBook	http://support.apple.com/kb/SP584

[31]	Mac OS X 10.7 Lion	http://www.apple.com/ca/macosx/
[32]	Xcode 4.1	http://developer.apple.com/technologies/tools/whats-new.html
[33]	Xcode 4.2	http://developer.apple.com/devcenter/ios/index.action
[34]	iOS 5	http://www.apple.com/ca/ios/ios5/
[35]	GitHub	https://github.com/