Business Plan
History - CS 410 Introduction
The software project described here in this document is a result of the lessons and assignments given in the Professional Workforce Development, CS410, class taught at Old Dominion University (ODU). This document is the final project of the “Blue Team”, under the advisement of Janet Brunelle. The scope of this document extends beyond the lessons provided in CS410, and the intent is to classify it as a working document to be later revised and completed in the follow-on class Professional Workforce Development II, CS411W, during the Fall 2009 semester at ODU. The Professional Workforce Development sequence is directed under the Computer Productivity Initiative (CPI) in which the primary objective is to help students better understand how to apply their Computer Science education to real world problems.

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Document Revision History

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<td>Outline of business plan</td>
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Preface – Problem, Solution, Market (Andrew Anderson)

Communication in mass transportation is a common difficulty. Will the bus be there on time? Will the bus stop if a potential passenger is approaching the stop? Is the difficulty and amount of time required too great to balance the potential benefit of lesser transportation costs? These questions and many others can be addressed by greater forms of communication between the transportation company, the passenger, and transportation vehicle operator. [Include more on choice customers. Perhaps consider integrating survey and other reference information.]

Solutions to this problem in the past have included large public displays, new methods of delivering the route schedule, and even creating methods for passengers to alert other passengers of schedule differences. We have decided to approach this problem by opening new lines of communication between the transportation vehicle operators and the passengers through the use of text messages and inter-system communication.

Hampton Roads Transit (HRT) has been our initial focus for both idea and project development. The intended price point of the system on yearly basis is $400,000. Based upon initial calculations, by increasing customer appreciation of HRT the annual ridership should increase by 20% over the first few years as acceptance of the system increases.
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Chapter 1 Overview

Purpose, Scope, & Objectives (Alexander Lord)
Currently passenger's needs are not being met by mass transportation systems. We plan to fix this by allowing bidirectional communication between drivers and passengers using Short Messaging System (SMS). With this the passengers will be able to get real time data updates on where a bus is currently located and how long it will take approximately to get to the stop the person texts in using a unique identification number. This will also notify the transit headquarters that they are at a stop and waiting for a certain bus to pick them up. After texting in which bus stop they are waiting for they will also be notified if the bus gets behind schedule and will be late with an approximation of how late the bus will be above a certain amount of time. With this, we plan to increase the coordination between the passenger and driver through the transit headquarters.

Assumptions & Constraints (Cynthia Young)
To be completed in CS 411.

Schedule & Budget (Adam Vandover)

Phase 0:

- Our phase 0 process is no cost over four months

The phase 0 staff includes Andrew Anderson (project manager), Trafton Haynes (software specialist), Alex Lord
Business Plan

(hardware specialist), Adam Vandover (marketing specialist) and Cynthia Young (risk manager and deputy manager).

Phase 1:

- Total of $18,825 over 6 months
- $14,525 for staffing and $4,300 for resources

The phase 1 staff includes a project manager, software manager, hardware manager, financial manager, marketing director, risk director, documentation specialist and a webmaster.

Phase 2:

- $488,000 over 1 year
- $444,000 for staffing and $44,000 for resources

The phase 2 staff includes project manager, technical director, financial director, marketing director, computer scientist, two computer engineers, database developer, web designer, web developer, software/hardware tester and a documentation specialist.

Phase 3:

- $325,000 each following year
- $287,000 for staffing and $38,000 for resources

The phase 3 staff includes project manager, technical director, financial director, marketing director, computer scientist, two computer engineers, database developer, web designer, web developer, software/hardware tester, documentation specialist and two customer support representatives.

**Evolution of the Plan (Trafton Haynes)**

Scheduled and unscheduled updates to the SPMP will be disseminated by email notification of the update to all parties involved with the project.

Upon final approval of the initial version of the SPMP, the SPMP will be placed under SVN version control and marked as a release version. Any subsequent changes will be documented using the version control system of SVN and all parties will be available to view these changes and who made them.

Additional modifications to this plan will be completed in CS 411.
Chapter 2 References (Cynthia Young)


[B5] FTA Real Time Transit Information Assessment.  
http://esciencenews.com/articles/2009/02/10/bus.left.you.waiting.cold.use.your.cell.phone.track.it.down


http://www07.grants.gov/search/search.do?sessionid=MgLfJcyflkGLZ3tLyF7Rj6GTJrn0PfTyyFvzsQTd1TNF10WzQqW5i-8024666050?oppId=46140&flag2006=false&mode=VIEW


[B14] Hampton Roads Transit Power Point Presentation on Transportation.  
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http://www.gohrt.com/developmentproject/advancedcommunicationsystemproject.html


http://www.cs.odu.edu/~cs410/1490.pdf


Intelligent Transportation Systems.  
http://www.itslessons.its.dot.gov/its/benecost.nsf/Lesson?OpenForm&FEE70D4EBBB468BC8525714D004B9060^LLCats

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Metropolitan Transportation Authority.  http://www.mta.info


SMS Servers, VisualGSM Lite SMS.  http://www.visualgsm.com/products_vgsmlite.htm


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http://code.google.com/p/timetablepublisher/

Trimble.  http://www.trimble.com/mobile_resource_management/get-started/?_kk=gps%20vehicle%20tracking%20system&_kt=47a61cbd-adaa-495f-9b05-59482123e2a7&gclid=CNu1kY2n55gCFQ0NDQodvAMGcA


Chapter 3 Definitions (Trafton Haynes)

**SPMP**
Software Project Management Plan

**SVN**
Subversion version control system

**SMS**
Short Message Service, the protocol by which text messages are sent

Transit Authority

Choice Commuter

Chapter 4 Project Organization (Andrew Anderson)
The project is created by students of Old Dominion University and the parent organization, therefore, is the Computer Science department at Old Dominion University. Orchestrated by members of the CS 410 Blue group and overseen by Professor Janet Brunelle, the initial and primary customer of the project is Hampton Roads Transit. We do not currently have plans to subcontract any of the work out.

External Interfaces (Trafton Haynes)
To be completed in CS 411.

Internal Interfaces (Alexander Lord)
To be completed in CS 411.

Roles & Responsibility for Group Members (Andrew Anderson)

Andrew Anderson
Main Responsibilities: Project Manager. Minor Responsibilities: Risk Manager and Documentation Specialist.
As project manager, Andrew Anderson is responsible for maintaining group communication, coordinating meetings, and assigning major tasks. Sharing in the responsibilities of Risk Manager with Cynthia Young entails keeping up with major risks to the project and also detailing methods with which to mitigate those risks. Responsibilities of documentation include ensuring that current project documents are up to date, notes are kept, and project deliverables are presentable.

_Trafton Haynes_
**Main Responsibilities:** Software Specialist & Web site Maintainer. **Minor Responsibilities:** Hardware.

Trafton Haynes specializes in deciding the best way to implement the software solutions that are being applied to the societal issue. His responsibilities also include developing and maintaining the web site along with all of the contents therein, ensuring that the site reflects the current state of documentation for the group. He also works with Alexander Lord to develop and maintain the hardware requirements for the system.

_Alexander Lord_
**Main Responsibilities:** Hardware specialist. **Minor Responsibilities:** Marking and Financial specialist.

The hardware specialist of the group is Alexander Lord, whose focus is on the hardware required to support the software installations. Along with this he also works with Adam Vandover on Marketing and Financial duties, ensuring that the costs of the hardware are always up to date and that the Marketing documentation is polished.

_Adam Vandover_
**Main Responsibilities:** Marketing and Financial. **Minor Responsibilities:** Hardware.

Adam Vandover focuses on the Marketing and Financial tasks within the group. He also works with Alexander Lord on developing hardware requirements along with maintaining hardware costs for the financial documents.

_Cynthia Young_
**Main Responsibilities:** Risk Manager & Documentation Specialist. **Minor Responsibilities:** Software Specialist & Project Manager.

As Risk Manager, Cynthia Young follows and documents the risks that are a central part of the project, along with maintaining notes from the meetings and ensuring that the documentation is up to date. Having the secondary responsibilities of Project Manager and Software Specialist mean that Cynthia runs any secondary meetings along with helping Trafton develop any software requirements as necessary.

**Chapter 5 Managerial Process Plans – Prototype**

**Start Up Plan (Cynthia Young)**
The prototype will consist of a computer hosting a database server, algorithm processor, and a SMS gateway, while being connected to a cell phone with the ability to text. A staff member will then test the prototype by using another cell phone with the texting ability and send a test message to the SMS gateway, and verify if our prototype is functioning properly.

**Staffing Plan (Adam Vandover)**

**Phase 0:**

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**ODU CS 410 Blue Group**

Spring 2009
The phase 0 staff includes Andrew Anderson (project manager), Trafton Haynes (software specialist/webmaster), Alex Lord (hardware specialist), Adam Vandover (marketing specialist) and Cynthia Young (Financial specialist and deputy manager). We also received additional help from our specialists David Sullivan (HRT) and Joseph Ofosu (transit expert).

Figure 5-1 Phase 0 Organizational Chart

Project Manager

The Project Manager will manage the team and is responsible for the coordination, communication, and collaboration of the team. He is responsible for monitoring of development, task assignments, and project schedules. He will coordinate the communication between all team members.

- Assure that all tasks are assigned and are performed with high quality
- Resolve difference and conflict
- Develop the WBS
- Assign resources
- Prioritize tasks
- Define tasks dependencies
Marketing Specialist
The Marketing Specialist is responsible for promoting and maintaining a positive image for our emerging product. He will establish and maintain contacts with people in the transit industry. He will also design and implement effective marketing campaigns and thorough market research plans.

- Determine the target market
- Support the marketing aspect of the project
- Choose and manage the marketing vendor
- Determine the overall marketing plan

Hardware Specialist
The Hardware Specialist is responsible for design and implementation of the system hardware as stated in the design documentation.

- Determine the best hardware
- Estimate the cost of hardware
- Assist the financial specialist with hardware budget
- Research SMS technologies and other hardware
- Research the best method of developing and attaining hardware components

Webmaster
The Webmaster is responsible for the design, creation, and updating of a business front website. All specifications for the website will be worked out with the Project Manager.

- Create the team website that includes team biography, presentations, and documentations

Software Specialist
The Software Specialist is responsible for the design, development, and installation of the associated software of the project. The Specialist will run the design team and be responsible for the day-to-day processes of creating the software. They are also responsible for insuring that the software meets all evaluation and functional requirements.

- Determine the SMS algorithms for the communicate2me system
- Estimate the cost of developing the software
- Determine the most suited method for developing and maintaining the software

Financial Specialist
The Financial Specialist is responsible for managing the records and planning budgets for the project. He
will work with the Hardware Specialist and Project Manager to ensure that the budget is within acceptable ranges, and that there is enough money in order to cover future project mandated endeavors.

- Receive fund
- Create budget
- Determine product cost
- Financial and funding plan

**Phase 1:**
The phase 1 staff includes a project manager, software manager, hardware manager, financial manager, marketing director, risk director, documentation specialist and a webmaster.

{phase i} - organizational chart

![Phase I Organizational Chart](image)

**Project Manager**

The Project Manager will supervise the “Manage Team” and is responsible for the coordination, communication, and collaboration of the team. He is responsible for monitoring the development, task assignments, and project schedules. He will also coordinate the communication between all team members.

- Assure that all tasks are assigned and are performed with high quality
- Resolve difference and conflict
- Develop the WBS
- Assign resources
• Prioritize tasks
• Define tasks dependencies

Marketing Director
The Marketing Director is responsible for promoting and maintaining a positive image for the developing project. He will continue to maintain contacts with people in industry and continue to build support for our product. He will also design and implement effective marketing campaigns and conduct market research to continually improve knowledge of our consumer base.

- Determine the target market
- Support the marketing aspect of the project
- Determine the overall marketing plan

Hardware Manager
The Hardware Manager is responsible for the design, determination and acquisition of the hardware. He will determine the best hardware for the device and will ensure software and hardware compatibility. He will also assist the Financial Director with the creation and maintenance of the budget. He is also responsible for finding and managing the best outsource location for the Programmable Unit of the device.

- Determine the best hardware
- Estimate the cost of hardware
- Assist the financial specialist with hardware budget
- Research sensor technologies and other hardware
- Research the best method of developing and attaining hardware components

Webmaster
The Webmaster is responsible for continuing to maintain and enhance the website by coordinating with the Project Manager for new and ongoing requirements.

- Create the team website that includes team biography, presentations, and documentations

Software Manager
The Software Manager is responsible for the preliminary design of the prototype software and cost estimation of the development during Phase 1. They will also establish a method of communication between the software engineers to be used during the next phase.

- Determine the exercise algorithms for the communicate2me System
- Estimate the cost of developing the software
- Determine the most appropriate method for developing and maintaining the software

Financial Director
The Financial Director is in charge of handling of the money, communication, management, and creation of budgets with the associated Specialist or Director. He will also be in charge of all purchases for equipment needed for the company.
Business Plan

- Receive fund
- Create budget
- Determine product cost
- Financial and funding plan

Risk Director
The Risk Director is in charge of managing and continually monitoring the project risks with foresight and outlook for future risks. He will analyze the risks and collaborate with other members of the team in order to determine what the most effective mitigation or solution is. He will also coordinate with the Project Manager in order to solve any risks that occur over the life of the project.

  - Manage project risk
  - Determine what risks exists in the project
  - Evaluate risk severity
  - Probability of the risks
  - Attempt to mitigate the risks

Phase 2
The phase 2 staff includes project manager, technical director, financial director, marketing director, computer scientist, two computer engineers, database developer, web designer, web developer, software/hardware tester and a documentation specialist.

Figure 5-3 Phase II Organizational Chart
Project Manager
The Project Manager will manage the team and is responsible for the coordination, communication, and collaboration of the team. He is responsible for monitoring of development, task assignments, and project schedules. He will coordinate the communication between all team members.

- Assure that all tasks are assigned and are performed with high quality
- Resolves differences and conflicts
- Develop the WBS
- Assign resources
- Prioritize tasks
- Define tasks dependencies

Risk Manager
The Risk Director is in charge of managing the risks of the project and continual monitoring of the risks with foresight and outlook for future risks. He will analyze the risks and collaborate with other members of the team in order to determine what the most effective mitigations or solution is. He will also coordinate with the Project Manager in order to solve any risks that occur over the life of the project.

- Manage project risk
- Determine what risks exists in the project
- Evaluate risk severity
- Probability of the risks
- Attempt to mitigate the risks

Marketing Director
The Marketing Director is responsible for promoting and maintaining a positive image for the developing project. He will continue to maintain contacts will people in industry and continue to build support for our product. He will also design and implement effective marketing campaigns, and continues market research to continually improve knowledge of our consumer base.

- Determine the target market
- Support the marketing aspect of the project
- Determine the overall marketing plan

Financial Director
The Financial Director is in charge of the handling of the money, communication, management, and creation of budgets with the associated Specialist or Director. He will also be in charge of all purchases for equipment needed for the company.

- Receive funds
- Create budget
- Determine product cost
- Financial and funding plan
Hardware Manager

The Hardware Manager is responsible for the design and determination and acquisition of the hardware. He will determine the best hardware for the device and will ensure software and hardware compatibility. He will also assist the Financial Director with the creation and maintenance of the budget. He is also responsible for finding and managing the best outsource location for the Programmable Unit of the Device.

- The responsibilities include identifying the hardware needed for communicate2me, estimating costs, and determining the best methods for developing or attaining the components.

Software Manager

The Software Manager is responsible for managing the day-to-day operation of the software engineers. He will also utilize the previously established method of communication between the software engineers.

- The responsibilities include identifying the software needed for communicate2me, estimating costs, and determining the best methods for developing or attaining the components.

System Hardware Engineer

The System Hardware Engineer is responsible for determining the best hardware for the project based on manufacturer, quality, and cost. Research will include finding new sensor technologies and other hardware to adapt into the project. All financial information will be coordinated with the financial director to ensure that the hardware budget is maintained.

- Determine the best hardware
- Estimate the cost of hardware
- Assist the financial director with hardware budget
- Research sensor technologies and other hardware
- Research the best method of developing and attaining hardware components

Software Engineer 1 & 2

The Software Engineer is responsible for the direct creation, design, and enhancement of all system associated software. He is also responsible for the testing and integration of the software into the device itself. He is also responsible for researching and interface implementation of attained hardware utilities.

- Determine the exercise algorithms for the communicate2me System
- Estimate the cost of developing the software
- Determine the most appropriate method for developing and maintaining the software

Web Developer

The Web Developer is responsible for continuing to maintain and enhance the website by coordinating with the Project Manager for new and ongoing requirements.

- Create the team website that includes team biography, presentations, and documentations
- Manage the web developers in the future
Web Designer
The Web Designer is responsible designing the layout of the website and staying on top of current usability to continue to maintain and enhance the website by coordinating with the Web Developer for new and ongoing requirements.

- Design the website that end users will have access to
- Research new web technologies

Database Developer
The Database Developer is responsible for continuing to maintain and enhance both the web and SMS servers by coordinating with the Project Manager for new and ongoing requirements.

- Maintain databases and evaluate network activity
- Setup firewalls and keep system abuse under control

Software Tester
The Software Tester is responsible for providing detailed testing results to the Software Manager.

- The responsibilities include thoroughly testing all components of communicate2me’s software.

Phase 3:
The phase 3 staff includes project manager, technical director, financial director, marketing director, computer scientist, two computer engineers, database developer, web designer, web developer, software/hardware tester, documentation specialist and two customer support representatives.
Project Manager

The Project Manager will manage the team and is responsible for the coordination, communication, and collaboration of the team. He is responsible for monitoring of development, task assignments, and project schedules. He will coordinate the communication between all team members.

- Assure that all tasks are assigned and are performed with high quality
- Resolves differences and conflicts
- Develop the WBS
- Assign resources
- Prioritize tasks
- Define tasks dependencies

Risk Manager

The Risk Director is in charge of managing the risks of the project and continual monitoring of the risks with foresight and outlook for future risks. He will analyze the risks and collaborate with other members of the team in order to determine what the most effective mitigations or solution is. He will also coordinate with the Project Manager in order to solve any risks that occur over the life of the project.

- Manage project risk
- Determine what risks exists in the project
- Evaluate risk severity
• Probability of the risks
• Attempt to mitigate the risks

Marketing Director
The Marketing Director is responsible for promoting and maintaining a positive image for the developing project. He will continue to maintain contacts with people in industry and continue to build support for our product. He will also design and implement effective marketing campaigns, and continues market research to continually improve knowledge of our consumer base.

• Determine the target market
• Support the marketing aspect of the project
• Determine the overall marketing plan

Financial Director
The Financial Director is in charge of the handling of the money, communication, management, and creation of budgets with the associated Specialist or Director. He will also be in charge of all purchases for equipment needed for the company.

• Receive funds
• Create budget
• Determine product cost
• Financial and funding plan

Hardware Manager
The Hardware Manager is responsible for the design and determination and acquisition of the hardware. He will determine the best hardware for the device and will ensure software and hardware compatibility. He will also assist the Financial Director with the creation and maintenance of the budget. He is also responsible for finding and managing the best outsource location for the Programmable Unit of the Device.

• The responsibilities include identifying the hardware needed for communicate2me, estimating costs, and determining the best methods for developing or attaining the components.

Software Manager
The Software Manager is responsible for managing the day-to-day operation of the software engineers. He will also utilize the previously established method of communication between the software engineers.

• The responsibilities include identifying the software needed for communicate2me, estimating costs, and determining the best methods for developing or attaining the components.

Software Engineer 1 & 2
The Software Engineer is responsible for the direct creation, design, and enhancement of all system associated software. He is also responsible for the testing and integration of the software into the device itself. He is also responsible for researching and interface implementation of attained hardware utilities.

• Determine the exercise algorithms for the communicate2me System
• Estimate the cost of developing the software
• Determine the most appropriate method for developing and maintaining the software
System Hardware Engineer
The System Hardware Engineer is responsible for determining the best hardware for the project based on manufacturer, quality, and cost. Research will include finding new sensor technologies and other hardware to adapt into the project. All financial information will be coordinated with the financial director to ensure that the hardware budget is maintained.

- Determine the best hardware
- Estimate the cost of hardware
- Assist the financial director with hardware budget
- Research sensor technologies and other hardware
- Research the best method of developing and attaining hardware components

Web Designer
The Web Designer is responsible designing the layout of the website and staying on top of current usability to continue to maintain and enhance the website by coordinating with the Web Developer for new and ongoing requirements.

- Design the website that end users will have access to
- Research new web technologies

Customer Support
The Customer Support Specialists are responsible for assisting customers with any communicate2me questions or comments.

- Take complaints and questions
- Generally, take care of customers’ needs

Software Tester
The Software Tester is responsible for providing detailed testing results to the Software Manager.

- The responsibilities include thoroughly testing all components of communicate2me’s software.

Resource Acquisition Plan (Alexander Lord)
With the help of the ODU Computer Science department we will be able to acquire what we need from them in order to build a prototype. We can use their servers in order to set up our algorithm and database and will be able to connect one of our team member’s phones to the computer through a USB cable to send text messages through.

Work Plan – Work Breakdown Structure (Andrew Anderson)
The Work Breakdown Structure for Phase 1 is detailed below. This includes the major milestones from CS 411 in a general overview of the schedule for that class.
In short, detailed project specifications and requirements will be developed for the initial prototype and put in action.

### Figure 5-5 Phase I Work Breakdown Structure

<table>
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<th>Task Name</th>
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<th>Duration</th>
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<td>22</td>
<td>4</td>
<td>Define XML interface requirements (A.3.1.2)</td>
<td>1.3.2.2</td>
<td>5 days</td>
</tr>
<tr>
<td>23</td>
<td>4</td>
<td>Prioritize and integrate software requirements (A.3.2.4)</td>
<td>1.3.2.3</td>
<td>5 days</td>
</tr>
<tr>
<td>24</td>
<td>4</td>
<td>Define and develop internet interface</td>
<td>1.3.2.4</td>
<td>5 days</td>
</tr>
<tr>
<td>25</td>
<td>3</td>
<td>Prototype Development</td>
<td>1.3.3</td>
<td>20 days?</td>
</tr>
<tr>
<td>26</td>
<td>4</td>
<td>Recognition of Hardware</td>
<td>1.3.3.1</td>
<td>2 days</td>
</tr>
<tr>
<td>27</td>
<td>4</td>
<td>Implement algorithms</td>
<td>1.3.3.2</td>
<td>2 days</td>
</tr>
<tr>
<td>28</td>
<td>4</td>
<td>Test Plan Documents</td>
<td>1.3.3.3</td>
<td>15 days</td>
</tr>
<tr>
<td>29</td>
<td>4</td>
<td>Test interface</td>
<td>1.3.3.4</td>
<td>1 day?</td>
</tr>
<tr>
<td>30</td>
<td>3</td>
<td>Prototype User Manuals</td>
<td>1.3.4</td>
<td>5 days</td>
</tr>
<tr>
<td>31</td>
<td>3</td>
<td>Grant Proposal</td>
<td>1.3.5</td>
<td>5 days</td>
</tr>
</tbody>
</table>

### Figure 5-6 Phase II Work Breakdown Structure

<table>
<thead>
<tr>
<th>ID</th>
<th>Outline Level</th>
<th>Task Name</th>
<th>WBS</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>2</td>
<td>Detailed Design Phase (Phase II)</td>
<td>1.4</td>
<td>26 days</td>
</tr>
<tr>
<td>33</td>
<td>3</td>
<td>Design Group</td>
<td>1.4.1</td>
<td>26 days</td>
</tr>
<tr>
<td>34</td>
<td>4</td>
<td>Perform architectural design (A.3.2.1)</td>
<td>1.4.1.1</td>
<td>5 days</td>
</tr>
<tr>
<td>35</td>
<td>4</td>
<td>Design database (A.3.2.2)</td>
<td>1.4.1.2</td>
<td>5 days</td>
</tr>
<tr>
<td>36</td>
<td>4</td>
<td>Design interfaces (XML, Web, SMS) (A.3.2.3)</td>
<td>1.4.1.3</td>
<td>10 days</td>
</tr>
<tr>
<td>37</td>
<td>4</td>
<td>Perform Detailed Design (A.3.2.4)</td>
<td>1.4.1.4</td>
<td>5 days</td>
</tr>
<tr>
<td>38</td>
<td>3</td>
<td>Software Importation Group</td>
<td>1.4.2</td>
<td>23 days</td>
</tr>
<tr>
<td>39</td>
<td>4</td>
<td>Identify Imported Software Requirements (A.2.3)</td>
<td>1.4.2.1</td>
<td>5 days</td>
</tr>
<tr>
<td>40</td>
<td>4</td>
<td>Identify Algorithm Requirements</td>
<td>1.4.2.2</td>
<td>4 days</td>
</tr>
<tr>
<td>41</td>
<td>4</td>
<td>Evaluate Software Import Sources (A.2.3.2)</td>
<td>1.4.2.3</td>
<td>4 days</td>
</tr>
<tr>
<td>42</td>
<td>4</td>
<td>Define Software Import Method (A.2.3.3)</td>
<td>1.4.2.4</td>
<td>3 days</td>
</tr>
<tr>
<td>43</td>
<td>4</td>
<td>Import Software (A.2.3.4)</td>
<td>1.4.2.5</td>
<td>7 days</td>
</tr>
<tr>
<td>44</td>
<td>2</td>
<td>Production Phase (Phase III)</td>
<td>1.5</td>
<td>80 days</td>
</tr>
<tr>
<td>45</td>
<td>3</td>
<td>Implementation Group</td>
<td>1.5.1</td>
<td>70 days</td>
</tr>
<tr>
<td>46</td>
<td>4</td>
<td>Create executable code (A.3.3.1)</td>
<td>1.5.1.1</td>
<td>30 days</td>
</tr>
<tr>
<td>47</td>
<td>4</td>
<td>Create User Manuals (A.3.3.2)</td>
<td>1.5.1.2</td>
<td>15 days</td>
</tr>
<tr>
<td>48</td>
<td>4</td>
<td>Plan integration (A.3.3.3)</td>
<td>1.5.1.3</td>
<td>15 days</td>
</tr>
<tr>
<td>49</td>
<td>4</td>
<td>Manage Software releases (A.3.3.4)</td>
<td>1.5.1.4</td>
<td>10 days</td>
</tr>
<tr>
<td>50</td>
<td>3</td>
<td>Testing Group</td>
<td>1.5.2</td>
<td>11 days</td>
</tr>
<tr>
<td>51</td>
<td>4</td>
<td>Develop Test Procedures (A.5.1.4)</td>
<td>1.5.2.1</td>
<td>5 days</td>
</tr>
<tr>
<td>52</td>
<td>4</td>
<td>Create Test Data (A.5.1.5)</td>
<td>1.5.2.2</td>
<td>2 days</td>
</tr>
<tr>
<td>53</td>
<td>4</td>
<td>Execute Tests (A.5.1.6)</td>
<td>1.5.2.3</td>
<td>4 days</td>
</tr>
<tr>
<td>54</td>
<td>3</td>
<td>Documentation Group</td>
<td>1.5.3</td>
<td>8 days</td>
</tr>
<tr>
<td>55</td>
<td>4</td>
<td>Implement Documentation (A.5.3.1)</td>
<td>1.5.3.1</td>
<td>3 days</td>
</tr>
<tr>
<td>56</td>
<td>4</td>
<td>Produce and Distribute Documentation (A.5.3.2)</td>
<td>1.5.3.2</td>
<td>5 days</td>
</tr>
</tbody>
</table>
**Resource Allocation & Purchases (Trafton Haynes)**

For phase I of this project, we shall acquire all needed servers and software from the Old Dominion Computer Science Department. Our prototype will consist of one server running a SMS Gateway Server along with those routines developed by our team to interface with the SMS Gateway service.

**Budget Allocation (Alexander Lord)**

Due to the available resources we have here at ODU, in part from the Computer Science and OCCS departments, most of our costs only come from paying the internship salaries of our team. The total cost of our Phase 1 to implement our prototype will be a little under $19,000 for the six month period. From Figure 6-5 the estimated cost of employing the students will be about $14,500 which includes a 40% overhead.

---

**Figure 5-7 Phase III Work Breakdown Structure**

<table>
<thead>
<tr>
<th>ID</th>
<th>Outline Level</th>
<th>Task Name</th>
<th>WBS</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>57</td>
<td>2</td>
<td>Operational Phase (Phase III)</td>
<td>1.6</td>
<td>128 days</td>
</tr>
<tr>
<td>58</td>
<td>3</td>
<td>Installation Group</td>
<td>1.6.1</td>
<td>26 days</td>
</tr>
<tr>
<td>59</td>
<td>4</td>
<td>Distribute software (A.4.1.1)</td>
<td>1.6.1.1</td>
<td>15 days</td>
</tr>
<tr>
<td>60</td>
<td>4</td>
<td>Install software (A.4.1.2)</td>
<td>1.6.1.2</td>
<td>5 days</td>
</tr>
<tr>
<td>61</td>
<td>4</td>
<td>Accept software in operational environment (A.)</td>
<td>1.6.1.3</td>
<td>5 days</td>
</tr>
<tr>
<td>62</td>
<td>3</td>
<td>Operations and Support Group</td>
<td>1.6.2</td>
<td>46 days</td>
</tr>
<tr>
<td>63</td>
<td>4</td>
<td>Operate the system (A.4.2.1)</td>
<td>1.6.2.1</td>
<td>5 days</td>
</tr>
<tr>
<td>64</td>
<td>4</td>
<td>Provide technical assistance and consulting (A.)</td>
<td>1.6.2.2</td>
<td>30 days</td>
</tr>
<tr>
<td>65</td>
<td>4</td>
<td>Maintain support request log (A.4.2.3)</td>
<td>1.6.2.3</td>
<td>10 days</td>
</tr>
<tr>
<td>66</td>
<td>3</td>
<td>Maintenance Group</td>
<td>1.6.3</td>
<td>26 days</td>
</tr>
<tr>
<td>67</td>
<td>4</td>
<td>Identify software improvement needs (A.4.3.1)</td>
<td>1.6.3.1</td>
<td>10 days</td>
</tr>
<tr>
<td>68</td>
<td>4</td>
<td>Implement problem reporting system (A.4.3.2)</td>
<td>1.6.3.2</td>
<td>10 days</td>
</tr>
<tr>
<td>69</td>
<td>4</td>
<td>Reapply SPLCP (A.4.3.3)</td>
<td>1.6.3.3</td>
<td>5 days</td>
</tr>
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<td>70</td>
<td>3</td>
<td>Training Group</td>
<td>1.6.4</td>
<td>33 days</td>
</tr>
<tr>
<td>71</td>
<td>4</td>
<td>Develop training materials (A.5.4.1)</td>
<td>1.6.4.1</td>
<td>15 days</td>
</tr>
<tr>
<td>72</td>
<td>4</td>
<td>Validate the training program (A.5.4.2)</td>
<td>1.6.4.2</td>
<td>8 days</td>
</tr>
<tr>
<td>73</td>
<td>4</td>
<td>Implement the training program (A.5.4.3)</td>
<td>1.6.4.3</td>
<td>10 days</td>
</tr>
<tr>
<td>74</td>
<td>2</td>
<td>Retirement and Disposal Phase (Phase III)</td>
<td>1.7</td>
<td>46 days</td>
</tr>
<tr>
<td>75</td>
<td>3</td>
<td>Retirement Group</td>
<td>1.7.1</td>
<td>30 days</td>
</tr>
<tr>
<td>76</td>
<td>4</td>
<td>Notify user (A.4.4.1)</td>
<td>1.7.1.1</td>
<td>10 days</td>
</tr>
<tr>
<td>77</td>
<td>4</td>
<td>Conduct parallel operations (A.4.4.2)</td>
<td>1.7.1.2</td>
<td>30 days</td>
</tr>
<tr>
<td>78</td>
<td>4</td>
<td>Retire system (A.4.4.3)</td>
<td>1.7.1.3</td>
<td>15 days</td>
</tr>
<tr>
<td>79</td>
<td>3</td>
<td>Disposal Group</td>
<td>1.7.2</td>
<td>15 days</td>
</tr>
<tr>
<td>80</td>
<td>2</td>
<td>Complete Project</td>
<td>1.8</td>
<td>0 days</td>
</tr>
</tbody>
</table>
The hardware costs as seen in Figure 6-6 will cost an estimated $4,300. This will supply us with the necessary SMS and web server applications, another workstation to develop our software on and which we can use to access our website, and the two cell phones with their plans to send the text messages.

**Figure 5-8 Phase 1 Staffing Requirements**

**Figure 5-9 Phase 1 Hardware Costs**

**Risk Management Plan (Cynthia Young)**

The risks are listed in the order precedence of highest impact and probability of happening:

1. interoperability problems
2. latency issues
3. abuse of the system
4. sms message costs
5. down time
6. phone incompatibility
7. transit authority not using system

There are mitigations to all of the listed risks. To achieve successful interoperability, there will be direct communication with each transit authority’s technicians. Latency will be reduced by optimizing incoming SMS processing time and by synchronizing driver updates based on position. Abuse of the system will be decreased by restricting the number of text messages from a particular phone number within a defined time frame. And finally, the transit authority ignoring the system risk will be lessened by providing the proper education. The risk matrix is displayed here.
## Business Plan

### Probability

<table>
<thead>
<tr>
<th>Risks</th>
<th>Rare</th>
<th>Unlikely</th>
<th>Possible</th>
<th>Likely</th>
<th>Expected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extreme</td>
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<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Low</td>
<td></td>
<td></td>
<td></td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Very Low</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Table 6-1 Risk Matrix*

1. Interoperability problems
2. Latency issues
3. Abuse of the system
4. SMS message costs
5. Down time
6. Phone incompatibility
Chapter 6 Technical Process Model

Process Model (Andrew Anderson)
Due to the structuring of CS 410 and CS 411, the Waterfall process model has been selected for the duration of the project. This is highlighted in the Work Breakdown Structure overview below (Figure 6-1 Overall WBS Depicting Process Model).

Methods, Tools, and Techniques (Trafton Haynes)
To be completed in CS 411.

Infrastructure Plan (Alexander Lord)
To be completed in CS 411.

Product Acceptance Test (Adam Vandover)
To be completed in CS 411.

Chapter 7 Appendix A - Major Functional Components Diagram

Major Functional Components of Real World Product
Chapter 8 Appendix B - Marketing Plan (Adam Vandover)

Product Description
The sample area that we chose was Hampton Roads considering the approaching expansion of their transit system to include several methods of transportation (Bus, Train and Ferry). Here is a diagram to display the projected population growth of Hampton Roads in the years to come. There is no better time to set up an efficient system for mass transportation and get the area excited about using it.
Another point of interest for our project was the amount of people in the United States that currently have cellular telephones. There are a projected 100 million cell phone users by 2010. That is one third the amount of citizens in the Country. That is why we believe that this is the best method to send and receive messages from our end users.
**Market Analysis**

There currently competition that we believe we stand up well to. Many of the competitors have costly systems that must be built from the ground up. Our service provides real-time information to the transit authority and we give them the ability to dispatch the information to their drivers if they please. What's more is that the end user will receive real-time status updates about where the bus he or she is waiting for is currently located.

*Figure 8-2 Number of SMS Users in US*
Target Market
Our target market are all the commuters in the area that are choice commuters. That is to say people that choose to drive their own personal vehicle to work over taking public transportation. According to our expert, David Sullivan, only 20% of HRT commuters are choice commuters. That means that 80% have no other means of transportation. We are focused on expanding that 20% and turning HRT into a more openly used method of transportation.

Advertising Strategy
We will leverage web technologies to launch communicate2me. Web applications such as Facebook or Twitter have recently caught on and are a great place to focus our advertising energy. This young, web savvy group of individuals are the easiest to market good ideas to. They are already used to picking up new technologies and working with them. Other areas of interest would be google ads and the HRT website. Mainly online ad space as well as having information on hand at all transit stations would create a powerful strategy.

Price Point for Blue Group
Our price point according to our phase 1 the costs are $4,300 for hardware and the staffing is all students which is free. The costs for the hardware should be covered by the Computer Science department.

Price Point for Customer
For the customer we are charging $400,000. Our costs per year is going to total close to $325,000. This will give us roughly a profit of $75,000 per customer.

Break Even Point
After one and a half years will we meet our goal of breaking even.
Marketing Plan

For each of the first three years of communicate2me in the market we have set goals:

First Year
- Get funded for $100,000 (Phase 1)
- Advertise communicate2me

Second Year
- Obtain one customer
- Get funded for $450,000 (First year of Phase 2)
- Advertise communicate2me

Third and Fourth Year
- Obtain two more customers
- Generate revenue of $225,000 (Second year of Phase 2)
- Advertise communicate2me

Customer Benefits

Customers using this new technology will find its use invaluable to their success. The 20% choice commuters will increase causing less traffic and a more efficient transit system. The younger, more tech savvy crowd who are more opened to using mass transportation will being to take advantage of communicate2me.
Customer Return on Investment
Once communicate2me has moved more into the mainstream and the end users become familiar with the technology, transit systems will greatly benefit.

Promotional Statement
The slogan that will be used in the promotional campaign of communicate2me when it has been introduced to the market.

"Don't get left behind, communicate2me."