

GradeCaster

MTM Program Product

Software Requirements

Specification

Version 1.0

Applying MTM SRS Version 3.4

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Version History

<i>Version</i>	<i>Date</i>	<i>Authors</i>	<i>Comment</i>
0.1	02/08/04	Garrett Brown	Added Title Page, Table of Contents, Introduction, General Factors
0.1.1	02/11/14	Garrett Brown	Revised Table of Contents, Introduction, General Factors
0.1.2	02/15/14	Garrett Brown, Adam Cass, Jon Wareham	Added Use Cases Request Opt-In and Send Grades. Revised Environmental Conditions, Assumptions, Dependencies
0.1.3	02/24/14	Garrett Brown	Revised Use Cases, Dependencies, Added Product Name
0.2.0	03/11/14	Jon Wareham	Updated: Version History Order, Definitions, Product Functions, Environmental Conditions, Dependencies, Send-Grades Use Case, and Request Opt-in use case
0.2.1	04/13/14	Adam Cass	Updated: Version History Order, Software Purpose and Scope, Definitions, Environmental Conditions, Dependencies, Send Grades Use Case, Request Opt-in Use Case, and Verify Email Use Case Added: Technical Definitions
0.2.2	04/23/14	Celia Schahczenski	Added excerpts back into template.

1.0	05/05/14	Adam Cass	Updated: entire document Added: Explanatory User Interfaces, Functional Requirements, Non- functional Requirements
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Readers:

The product described in this SRS, at this point in time, is in no way planned for actual development or release. This SRS is intended for educational purposes, to allow the students of ESOF 328 to better understand the creation of requirements and specifications. This document is, however, drafted in such a way that if the software were developed, this SRS would provide the information necessary for any project undertakers.

Montana Tech Software Engineering Students:

These Montana Tech Method software engineering standards encapsulate Dr. Ackerman's decades of experience in the software industry, the IEEE software engineering standards, and many suggestions from various texts. They have gone through many revisions and additions over the last several years. They are part of your software engineering studies so that (1) you may have the experience of developing software to a standard (which you may find you need to do if you take a job that requires high reliability software), and so that (2) you will have the experience of developing high quality software. You are also invited to participate in the continuing evolution of these standards by studying them critically and making suggestions for their improvement and correction.

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1 Introduction

This document describes the GradeCaster system. Before a product, such as GradeCaster, is developed, it is important to carefully define what the system is to do. This document describes what GradeCaster is to do.

1.1 Software Purpose and Scope

The goal of the GradeCaster application is to provide Montana Tech faculty members an alternative to Moodle for informing the students in their classes of their grades. GradeCaster extracts grades from an Excel spreadsheet, creating and sending emails containing the grades to the students. This application should make the tracking of grades by students and the posting of grades by instructors easier.

1.2 Document Purpose and Contents

This Software Requirements Specification (SRS) describes an application that would assist faculty in distributing their course assessment scores to the appropriate students. It was created for the professors of Montana Tech of the University of Montana, who are referred to as the customers in this document. The application is called GradeCaster.

This document is likely to be useful to the customers, developers, testers and, users of GradeCaster. All functionality needed in GradeCaster is precisely described so this document can serve as a contract between the customers and developers. In addition, this document provides information developers will need to design and implement GradeCaster. Testers can use the information to develop test cases for GradeCaster. And users may use the information to clarify questions they have about GradeCaster.

Customers sometimes find sample interfaces easier to understand than documents such as this SRS. Sample user interfaces demonstrate one way that the software could appear. This document goes further to tell precisely what functionality is needed.

This document does not attempt to tell how this software should be implemented except in those cases where the customers want the application to be developed in a particular way. Deciding exactly what a system should do before deciding how it will do it reduces development time considerably.

1.3 Definitions, Acronyms, and Abbreviations

This section provides definitions of terms, expansions of acronyms and abbreviations which are used in this document. It also defines technical terms used in this document.

1.3.1 Definitions

Software Failure A failure will be attributed to this software product whenever one of the delivered work products does not meet the requirements specified in this SRS, or does not meet ordinary and reasonable customer/user expectations.

GradeCaster Standardized Spreadsheet An Excel 2010 spreadsheet containing the GradeCaster application and formatted for the GradeCaster application.

1.3.2 Acronyms and Abbreviations

DB Database

DC Design Constraint

ESOF Montana Tech prefix for Software Engineering classes

FERPA Family Educational Rights and Privacy Act

SRS Software Requirements Specification

1.3.3 Technical Definitions/Data Dictionary

Item Name	Type	Brief description of data item
Email address column	GradeCaster spreadsheet item	Spreadsheet column which either contains a valid email address for each student or is blank.
First name column	GradeCaster spreadsheet item	Spreadsheet column which contains the first names of the students in the class, or, in the case that the user chooses to dedicate the Last name column (see below) to the full names of students, is empty.

GradeCaster Standardized Spreadsheet	Term	<p>A spreadsheet in Excel, version 2010, which contains macros to perform GradeCaster functions, along with rows and columns needed to perform the functions.</p> <p>Rows:</p> <table border="1" data-bbox="695 394 1308 642"> <thead> <tr> <th>Name</th> <th>Status</th> <th>Position top to bottom</th> </tr> </thead> <tbody> <tr> <td>Grades to be included(T/F)-></td> <td>Locked</td> <td>1</td> </tr> <tr> <td>Item description</td> <td>Locked</td> <td>2</td> </tr> <tr> <td>Send All</td> <td>Unlocked</td> <td>Varies</td> </tr> </tbody> </table> <p>Columns:</p> <table border="1" data-bbox="695 726 1308 1066"> <thead> <tr> <th>Name</th> <th>Status</th> <th>Position left to right</th> </tr> </thead> <tbody> <tr> <td>Opt-in</td> <td>Locked</td> <td>1</td> </tr> <tr> <td>Send</td> <td>Locked</td> <td>2</td> </tr> <tr> <td>No.</td> <td>Locked</td> <td>3</td> </tr> <tr> <td>Last name</td> <td>Locked</td> <td>4</td> </tr> <tr> <td>First name</td> <td>Locked</td> <td>5</td> </tr> <tr> <td>Email address</td> <td>Locked</td> <td>6</td> </tr> </tbody> </table> <p>Special Cells:</p> <ul style="list-style-type: none"> • Class name (locked) <p>The definitions of these rows and columns, with the exceptions of First name column and Email address column (see above), may be found below.</p> <p>Users may add any number of columns after the locked columns for their individual purposes.</p>	Name	Status	Position top to bottom	Grades to be included(T/F)->	Locked	1	Item description	Locked	2	Send All	Unlocked	Varies	Name	Status	Position left to right	Opt-in	Locked	1	Send	Locked	2	No.	Locked	3	Last name	Locked	4	First name	Locked	5	Email address	Locked	6
Name	Status	Position top to bottom																																	
Grades to be included(T/F)->	Locked	1																																	
Item description	Locked	2																																	
Send All	Unlocked	Varies																																	
Name	Status	Position left to right																																	
Opt-in	Locked	1																																	
Send	Locked	2																																	
No.	Locked	3																																	
Last name	Locked	4																																	
First name	Locked	5																																	
Email address	Locked	6																																	
Class name	GradeCaster spreadsheet item	The cell in the upper left corner shall hold the class name.																																	
Grades to be included(T/F) -> row	GradeCaster spreadsheet item	Spreadsheet row which contains <i>TRUE</i> or <i>FALSE</i> , indicating if the corresponding row should be included in an email.																																	
Item description row	GradeCaster spreadsheet item	Spreadsheet row which contains descriptions of items for which grades are recorded in the spreadsheet.																																	

Last name column	GradeCaster spreadsheet item	Spreadsheet column which contains the full names or the last names of the students in the class.
Locked	Term	Rows and columns in the Excel spreadsheet may be “locked”. Users may change the values in these rows and columns, but they may not delete the rows or columns.
No. column	GradeCaster spreadsheet item	Spreadsheet column which contains a number to number the students. This column can be removed.
Opt-In	Use Case/ Process	Sends emails to students to obtain permission to distribute grades via emails.
Opt-In column	GradeCaster spreadsheet item	Spreadsheet column which contains <i>TRUE</i> or <i>FALSE</i> , indicating if the corresponding student wants their grades to be sent via email.
Send All row(s)	GradeCaster spreadsheet item	Spreadsheet row which contains data that the user desires to send to all students. The “Opt-In” cell should be blank. The “Email Address” cell shall not contain an email address.
Send column	GradeCaster spreadsheet item	<p>Spreadsheet column which contains <i>TRUE</i> or <i>FALSE</i> which may indicate different things, depending on whether or not there is a value present in the “Email address” column.</p> <p>When there is a value in the “Email address” column, <i>TRUE</i> in the “Send” column indicates that an email should be sent to the corresponding student, so long as there is also a <i>TRUE</i> in the “Opt-In” column.</p> <p>If there is no value in the “Email address” column, the corresponding row represents other information. In this case, a <i>TRUE</i> in the “Send” column indicates that the information in the row should be included in the email.</p> <p>A <i>FALSE</i> indicates that this information should not be included in the email.</p>
Send Grades	Use Case/ Process	Sends emails to students containing their grades and any additional data the user chooses to include

1.4 References

This SRS does not currently contain any references.

2 General Factors

The following section provides a high level overview of what the GradeCaster application will do, its running environment, who will use it, its dependencies, and any assumptions made for it.

2.1 Product Perspective

This application will be dependent upon Microsoft Office Excel 2010 and Microsoft Outlook 2010.

2.2 Product Functions

The GradeCaster application will be used to:

- Create emails that contain a student's grades in a specific course
- Extract assessment information such as grades from a spreadsheet
- Send emails to students
- Support faculty member gaining opt-in requests of students
- Support faculty verifying email addresses of students via email

2.3 Environmental Conditions

GradeCaster will be a series of Excel macros that perform operations on a GradeCaster Standardized Spreadsheet, sending e-mail messages to students. GradeCaster will need network access to operate.

GradeCaster will use the spreadsheet format described above in the Data Dictionary. A template spreadsheet will be provided, as well as a link (will be in the template) to a video tutorial explaining how to use GradeCaster.

The user will have the option of emailing the opt-in form for the students to print or printing the forms themselves and handing them to students. The user will manually update the spreadsheet to indicate which students opted in.

Any component of GradeCaster that is associated with a macro/operation that cannot be used at a certain time will be given an appearance that indicates to the user that they should not attempt to interact with it. For example, if a button (used purely as an example of a component and not an interface constraint) were to have these properties, it would look faded.

Conversely, any component that is associated with a macro/operation that can be used, will be given an appearance that indicates to the user that it is fully operational and that it may be interacted with.

2.4 User Characteristic

The primary users of this system are the faculty members of Montana Tech of the University of Montana and their students. The faculty members will use the system to send emails to students, while the students are users in that they receive the messages from the faculty members through the system. As such, the only users who actively use the system are the faculty members, but students are impacted by it. An understanding of FERPA, a familiarity with spreadsheets, file-paths, and executables is assumed.

2.5 Dependencies

GradeCaster will utilize Microsoft Office Excel 2010 and Microsoft Outlook 2010. These programs provide an infrastructure and API that both simplifies the development of GradeCaster, and allows the software to be located inside the application with which faculty create their grade spreadsheets. They are also supported by Montana Tech. Deviation from these software programs by faculty members could result in privacy violations. Interface elements will be installed in the GradeCaster spreadsheet (which will run macros in Excel). Macros must be enabled in Excel for the new elements to function properly.

2.6 Assumptions

This application will be available on any computer on which it has been properly installed. The hardware will need to be connected to the Internet. The size of the monitor for this hardware is of no importance, as the user interfaces will not benefit from scaling to larger displays.

3 Use Cases

The following section serves to generally capture, and analyze client and user information about GradeCaster.

Actor	Use Case
Faculty Member	<ul style="list-style-type: none">• Request Opt-In• Send Grades
Student	<i>No use cases for this actor</i>

A “Verify Email” use case was created, but it was determined that it would not provide functionality to the system, so it was removed from this SRS.

3.2 Request Opt-In

Use Case Name:	Request Opt-In		
Created By:	ESOF 328 students	Last Updated By:	Adam Cass
Date Created:	2/11/2014	Date Last Updated:	05/03/14

Actors:	Faculty Member
Description:	Send email to students to obtain permission to distribute grades via emails.
Trigger:	User signals desire to obtain student permission.
Preconditions:	1. User is in a GradeCaster standardized spreadsheet in Excel 2. User has selected one or more students to receive an email
Postconditions:	Emails have been sent to those students with email addresses in the spreadsheet, requesting their permission to have grades for this class sent to them via email in the future
Normal Flow:	1. User views, together, the default subject and message body to be sent 2. User indicates to send the message 3. Emails are sent to the students
Alternative Flows:	1a. User chooses to edit the subject and/or message 2a. At the end of step 1, the system notifies the user if the subject and/or message is blank and asks if they want to continue. 3a. User indicates to send the message(return to normal step 3) or to terminate the use case 1b. User chooses to terminate the use case at any time
Exceptions:	1a. User closes the spreadsheet 2a. System terminates use case 1b. User exits Excel 2b. System terminates use case
Includes:	None
Priority:	Critical
Frequency of Use:	One to three times per faculty member per class per semester
Business Rules:	Faculty members are not allowed to send grades via email to students unless students have requested to be informed of grades via email
Special Requirements:	None
Assumptions:	None
Notes and Issues:	Printing opt-in forms was considered. It is the user's responsibility to make sure that no student is missing an email address.

3.3 Send Grades

Use Case Name:	Send Grades		
Created By:	ESOF 328 students	Last Updated By:	Adam Cass
Date Created:	2/10/2014	Date Last Updated:	05/03/14

Actors:	Faculty Member
Description:	Email grades to students who have opted-in
Trigger:	The user signals desire to email grades to students who have opted-in
Preconditions:	<ol style="list-style-type: none"> 1. User is in a GradeCaster standardized spreadsheet in Excel 2. User has obtained permission to distribute grades via email from one or more students 3. User has selected one or more students to receive an email
Postconditions:	Emails containing grades have been sent to those students with email addresses in the spreadsheet, who also gave permission for their grades to be distributed via email
Normal Flow:	<ol style="list-style-type: none"> 1. User views, together in one field, the default subject and message body to be sent 2. User indicates to send the message 3. Emails containing student grades are sent to the students
Alternative Flows:	<ol style="list-style-type: none"> 1a. User chooses to edit the subject and/or message 2a. At the end of step 1, the system notifies the user if the subject and/or message is blank and asks if they want to continue. 3a. User indicates to send the message(return to normal step 3) or to terminate the use case 1b. User chooses to terminate the use case at any time
Exceptions:	<ol style="list-style-type: none"> 1a. User closes the spreadsheet 2a. System terminates use case 1b. User exits Excel 2b. System terminates use case 1c. Email address is missing for a student(before step 1) 2c. System informs user that at least one student is missing an email address and terminates the use case
Includes:	None
Priority:	High
Frequency of Use:	Depends on faculty member
Business Rules:	Student must have opted in by responding to an email that they want grades emailed to them (for FERPA)
Special Requirements:	None
Assumptions:	None
Notes and Issues:	None

4 Explanatory User Interfaces

The following section provides examples of how the user interface may appear. These examples are not requirements, and the users observed demonstrations of these examples and agreed to them. These examples do not include the interface elements through which a user indicates that they desire to perform an action.

Class Name		Grades to be included (T/F)->				FALSE	TRUE	TRUE	TRUE	TRUE	TRUE	
1	Opt-in	Send	No.	Last	First	Email	Something private	Quiz 1	Quiz 2	Midterm	Essay	Quiz 3
3	TRUE	TRUE	1	Brown	Garrett	GRBrown@mtech.edu		10	9	100	100	9
4	TRUE	FALSE	2	Cass, Adam		ACCass@mtech.edu		10	9	100	100	9
5	FALSE	TRUE	3	Wareham, Jon		GCWareham@mtech.edu		10	9	100	100	9
6	TRUE	TRUE	.	.				.	.	.	.	.
7	TRUE	TRUE	.	.				.	.	.	.	.
8	TRUE	TRUE	.	.				.	.	.	.	.
9	FALSE	FALSE	50	Zelco, Zell		ZZZelco@mtech.edu		8	9	80	80	9
10		FALSE		Private Info				-3	10	10	10	10
11		TRUE		Class Average				9.8	9	98	98	9
12		TRUE		Class High				10	9	100	100	9
13		TRUE		Class low				8	9	80	80	9

5 Specific Requirements

The following section contains all of the requirements for GradeCaster. The details within this section are defined as individual, specific requirements. Each requirement is tagged with a priority to indicate its importance. In order from least importance to most importance, the possible priority levels are: low, medium, high, and critical. Each requirement is clearly identified for tracking.

5.1 Functional Requirements

The following subsection specifies how GradeCaster will react to every possible input situation. Pertinent changes in the environment are considered to be inputs.

5.1.1 Send Grades (SG)

5.1.1.1 SG1: Validate opt-in

When the user makes a change to the “Opt-In” column, the system shall verify that at least one student has opted-in before allowing the user to send grades.

Rationale: If no students have opted-in, there are no students to which to legally send grades via email.

Priority: Critical

5.1.1.2 SG2: Validate send

When the user makes a change to the “Send” column, the system shall verify that at least one student has been selected to receive an email before allowing the user to send grades.

Rationale: If no students have been selected to receive an email, it would be a waste of the user’s time to attempt to send emails.

Priority: High

5.1.1.3 SG3: Provide default subject and message

The system shall provide a default subject and message.

Rationale: A default subject and message will be informative to the students, and the user will not have to provide additional input.

Priority: Medium

5.1.1.4 SG4: Display default subject and message

The system shall display the default subject and message to the user before sending emails to students.

Rationale: The user may want to send an alternate message.
Priority: Medium

5.1.1.5 SG5: Edit default subject and message

The system shall allow the user to edit the default subject and message.
Rationale: The user may want to send an alternate message.
Priority: Medium

5.1.1.6 SG6: Verify spreadsheet

When the user modifies a spreadsheet, the system shall verify that the spreadsheet is in the GradeCaster standardized format. If the spreadsheet is not in this format, the system shall not allow the user to send grades nor opt-in requests.
Rationale: The system depends on the GradeCaster standardized format to function correctly.
Priority: Critical

5.1.1.7 SG7: Attach spreadsheet

When grades are sent, the system shall create a unique spreadsheet for each student to whom grades are being sent and attach the spreadsheet to the corresponding student's email.
Rationale: An attached spreadsheet will allow a student to keep up to date with their grades, and they may file it in their personal records.
Priority: Critical

5.1.1.8 SG8: Parse grades

When the user desires to send grades, the system shall parse the spreadsheet for individual student grades, which will be inserted into an email.
Rationale: Some students may prefer to view their grades within an email rather than within a spreadsheet.
Priority: High

5.1.1.9 SG9: Parse students

When the user desires to send grades, the system shall determine whether each row is a row containing a student or a "Send All" row.
Rationale: Some rows may contain data that the user wants to send to all students. The "Email Address" column of such a row may be blank without causing an error.
Priority: Critical

5.1.1.10 SG10: Display sample spreadsheet

When the user desires to send grades, the system shall display a sample spreadsheet to the user showing what a student may see when they open a spreadsheet that is sent to them.

Rationale: The user may wish to refine their selection of grades to be sent, and there may be items that the user does not want students to see.

Priority: Medium

5.1.1.11 SG11: Send grades

The system shall send grades to students who have opted-in and have been chosen by the user to have grades sent to them. The email will have a subject, date, and message.

Rationale: The purpose of GradeCaster is to help faculty members to easily distribute grades to students.

Priority: Critical

5.1.1.12 SG12: Cancel sending grades

The system shall allow the user to cancel sending grades, after which it shall cancel the current operation and exit, returning the user to the spreadsheet.

Rationale: The user may wish to defer sending grades until later so that they may correct errors in their spreadsheet before sending grades.

Priority: Medium

5.1.1.13 SG13: Notify user of blank subject and/or message

When the user desires to send grades, the system shall notify the user if the subject and/or message of the email is/are blank and ask for a confirmation to continue.

Rationale: The user will likely want to include a subject and message in the email.

Priority: Low

5.1.1.14 SG14: Notify user of missing email address

When the user desires to send grades and a student email address is missing, the system shall notify the user that a student is missing an email address and no emails will be sent to any and all students.

Rationale: Microsoft Outlook would crash if the system tried to send an email without providing an email address. The user should be made aware that no emails will be sent.

Priority: Medium

5.2 Non-Functional Requirements

The following subsection specifies both the static and dynamic numerical requirements placed on the software or human interaction with the software.

5.2.1 Design Constraints (DC)

Sometimes a client will require certain design constraints, for example the use of a certain system configuration or the use of a particular algorithm. Such constraints are described in the following subsection.

5.2.1.1 DC1: Microsoft Excel 2010

The GradeCaster spreadsheet must be created and modified using Microsoft Excel 2010

Rationale: The system must have a consistent format to prevent errors.

5.2.1.2 DC2: Macro development

The system shall be developed using Visual Basic macros which can be run inside Excel.

Rationale: Excel only allows macros to be written in Visual Basic. The users felt that the system would be most usable if it was entirely contained within Excel, and macros are the only way to achieve this.

5.2.2 Human Factors (HF)

Not everyone has the same inherent mental and physical capabilities vis-à-vis a given computer application. For example if sound is part of the application, will other clues be given that will enable a hard of hearing user to use the proposed application as well as person with normal hearing; similarly for color blindness. Some of these factors have to be defined and validated in specially equipped usability laboratories.

The system does not currently account for any human factors.

5.2.3 External Interface Requirements (XI)

5.2.3.1 Hardware (HW)

5.2.3.1.1 HW1: Accessible on any hardware

The system must be accessible on any hardware with access to Microsoft Excel 2010.

Rationale: The users may work on multiple machines.

5.2.3.1.2 HW2: Internet access

The system will be fully functional on any hardware with access to the Internet.

Rationale: The users may work on multiple machines. Internet access is required for email.

5.2.3.2 Software (SW)

5.2.3.2.1 SW1: Microsoft Outlook 2010 installed

Microsoft Outlook 2010 must be installed.

Rationale: A mail server is required to send emails. It has been verified that Microsoft Outlook 2010 is compatible with Visual Basic macros.

5.2.3.3 Communications (CM)

5.2.3.3.1 CM1: Communication with Microsoft Outlook 2010

The system shall communicate with Microsoft Outlook 2010 to send emails.

Rationale: The system will not be able to send emails unless it communicates with an external mailing client.

5.2.4 Security (SC)

5.2.4.1 SC1: Warning when using different version of Excel

If the user opens a GradeCaster spreadsheet in a version of Excel that is not Excel 2010, the system will warn the user that malfunctions may occur.

Rationale: Formatting issues could occur when switching to a different version of Excel.

5.2.5 Development Environment (DV)

None

5.2.6 Standards (ST)

None

5.2.7 Delivery Environment (DL)

5.2.7.1 Site (SI)

The following subsection specifies any requirements for installation or operation of the software that might change the pre-existing configuration of the user site.

There is currently none.

5.2.7.2 Operations (OP)

The following subsection specifies normal and special operations required by the user.

There is currently none.

5.2.8 Performance (PR)**5.2.9 Deliverable Items, Dates and Conditions (DD)****5.2.9.1 DD1: SRS**

A current version of this SRS document will be delivered with the application.
Rationale: The users may want to know more about the developmental details of the system.

5.2.9.2 DD2: Template spreadsheet

A template spreadsheet in the GradeCaster standardized spreadsheet format will be delivered with the application.

Rationale: The system will not function correctly in a spreadsheet that does not adhere to the standardized format.

5.2.9.3 DD3: Help video

A help video describing how to set up Microsoft Excel 2010 and Microsoft Outlook 2010 for macros and how to use GradeCaster functions will be delivered with the application.

Rationale: Users may need to be taught how to set up and use GradeCaster.

5.2.10 Cost (CT)**5.2.11 Quality (QL)****5.2.11.1 Reliability (RL)***5.2.11.1.1 RL1: Privacy protection*

The system will contain measures to prevent sensitive information from being sent to the wrong person.

Rationale: Protecting sensitive information will help to prevent FERPA violations from occurring.

5.2.11.2 Availability (AL)

None

5.2.11.3 Maintainability (ML)

The system does not guarantee any maintainability.

5.2.11.4 Usability (UB)

None

5.2.11.5 Enhanceability/Extendibility (EN)

None

5.2.11.6 Portability (PT)

None

5.2.12 V&V Activities (VV)

The users did not specify any V&V activities.

5.2.13 Database (DB)

The system does not rely on a database.

5.2.14 Adaptability (AD)

None

5.3 Requirements Models

Requirements models were developed for the system, but it was determined that they were not beneficial.

6 Future Enhancements (FE)

It is not expected that there will be any future enhancements to this product.