Rural Cultivation & Atmospheric Emulation Application (RCAEA) URS document

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# INTRODUCTION

## Purpose of URS

This document is the definitive specification of the user requirements for RCAEA Project to be developed by Tanks & Co.™The application allows the user to simulate cultivating specific crop(s) in an area of land during a certain length of time. By using this application they can determine when, where, and what crops to place in a specified piece of land. It will help the user make a cultivation plan for a certain area of land based on real land data. It considers regions factors such as weather whereby the user can select which outdoor agricultural crops to place in an area. The simulation will use real data on the crop and simulate its growth based on external and internal determinate factors. RCAEA will take all these factors into account and determine an estimated cost and production outcome. Data will be saved in a file which the user can load or keep for their own records.

## Index

This part of the document will serve as an explanation of the terminology that will be used throughout the document the client may not be familiar with.

**URS** – User Requirements Specification. Refers to this document which specifies what the user expects the application to be able to do.

**GUI** – Graphical User Interface. A type of User Interface that allows users to interact with the application through graphical icons and visual indicators such as secondary notation, instead of text-based user interfaces, typed command labels or text navigation.

**MoSCoW** – **M**ust have, **S**hould have, **Co**uld have and **W**ill not have. This method is a prioritization technique used to reach a common understanding with the client on the importance that is placed on the delivery of each requirement.

**Input** – In this document is referred to the configurations the user has assigned to the application.

**Functional Requirement** – Defines a function of the application or its component. A function is described as a set of inputs, the behavior, and outputs.

**Non-Functional Requirement** – A requirement that specifies criteria that can be used to judge the operation of the application, rather than specific behaviors. It is contrasted with Functional Requirements that define specific behavior or functions.

**Use Case** – A list of actions or event steps, defining the interactions between the client and the application, to achieve a goal.

**Pre-condition** – Prerequisites needed before the Use Case can be initiated.

**Trigger – Method of initiating the Use Case.**

**MSS – Main Success Scenario. Used to describe the Use Cases of the application and their primary way of completion.**

**Extension** – Used to describe deviations from the Main Success Scenario of a Use Case during a certain step and the alternative ways of executing it.

# PRODUCT DESCRIPTION

## Background Information

SIM Software Inc. is interested in adopting simulation applications and has asked for project proposals. Tanks & Co™ has a simulation proposal and they met with A representative from SIM Software’s board of management, Mr. Johnson. He has accepted their proposal for “Rural Cultivation and Atmospheric Emulation Application”.

Mr. Johnson will be the mediator and ultimately make the decision software.

## Performance

In this project we will create an application to simulate cultivating specific crop(s) in an area of land during a user determined time period. This application will allow users to grow selected crops in a simulated field that will factor multiple variables producing approximated cost and produce over the inputted time period.

## Users

This application can be used by individual production planners as well as by multi-national enterprises, primarily to strategically plan layouts, control logic and dimensions of large, complex production investments. Farmers can also use this application for deciding which crop is more beneficial for them before cultivation.

## Assumptions

Following are some assumptions for this project made by us:

* Fields for cultivation are already bought by users, therefore land costs/rent will not be accounted for.
* Crop diseases will not be factored
* We assume that the weather will follow recent years’ patterns.
* We assume that crop/water and fertilizer costs although seasonal will follow most recent prices.
* When crops are fully rip/grown they will be automatically harvested.

## Constraints

* The application will be created in C# Visual Studio.
* The application will support 25 different types of crops.
* The regions available will be within The Netherlands.
* The cultivating area will be divided into 160 plots.
* Each plot can be adjusted between 50 and 200 square meters.
* Soil selection will be applicable to all soil plots.
* Start date cannot be before the end date and 2014.
* End date cannot be 3 years from the start date, and must be at least 3 months from start dates.

## REQUIREMENTS

In the table below you can find the MOSCOW for every requirement during the project.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ID | Requirement name | Must | Should | Could | Will Not |
| 101 | Add crops | V |  |  |  |
| 102 | Remove crops | V |  |  |  |
| 103 | Update fertilizer | V |  |  |  |
| 104 | Update water resources | V |  |  |  |
| 105 | Generate report | V |  |  |  |
| 106 | Soil selection | V |  |  |  |
| 107 | Display Statistics |  | V |  |  |
| 108 | Growth simulation | V |  |  |  |
| 109 | Set Date | V |  |  |  |
| 201 | Save Simulation | V |  |  |  |
| 202 | Load Simulation | V |  |  |  |
| 301 | Buying/selling land |  |  |  | V |
| 302 | Renting land |  |  |  | V |
| 303 | Encounter crop diseases |  |  |  | V |

## Functional requirements

//Description for at least all MUST requirements

## Non-Functional requirements

Platform compatibility

* Application should work most optimally in the Windows environment. This application should work best on the Windows platform as it was designed for such.

Usability

* The application should be user friendly and incorporate elements of good user interface design. For example, the buttons are easily recognizable and familiar to the user in terms of expressing what function the button serves easily accessible to the user.
* Program is simplified and allows the user to reach his goal without any problems. User must be able to access the program without registration, account etc.

Performance

* The application should respond within 1500milliseconds with each button click, and 4000 milliseconds when loading a report on a modern machine (Processor greater than 1Ghz).

Reliability

* In case of exception or error, the program displays info messages without crashing, allowing user to continue his work.

## Use cases

All use cases have the system and user as the only actors involved. Furthermore, all the use cases are of the sea-level.

### 101: Adding crops

**MSS:**

1. User clicks on a crop category user then
2. User selects field where he wants to cultivate.
3. User clicks on one of the crop buttons, representing the crop type which the user would like to add.
4. User then selected the piece of empty land to cultivate.
5. System updates land space with the type of crop.

**Extensions:**

3a. Land space is already occupied by another crop.

1. System warning box appears to user, to confirm space replacement.

1a. User click yes; system replaces the land space with current selected crop

1b. User clicks no

1. Use case ends

### Removing crops

**Pre-condition:** The screen must have at least one field, cultivated with crops.

**MSS:**

1. User willselect a field, where he wants to remove crops.
2. User will right click on the selected land space.
3. System will show right click menu with appear with the option to delete.
4. User clicks on the delete option from the menu.
5. System deletes the crop from the space.

### Updating water resources

**Pre-condition:** The screen must have at least one field, cultivated with crops.

**MSS:**

1. User willselect a field, where he wants to update water.
2. User will click on water numeric up/down.
3. System will update water resources of selected field.

**Extensions:**

4.a User clicks on upper button.

1: System will increase water resources of that field

2: Continue from step 3 in MSS.

4.b User clicks on lower button.

1: System will decrease water resources of that field.

2: Continue from step 3 in MSS.

### Updating fertilizers to crops

**Pre-condition:** The screen must have at least one field, cultivated with crops.

**MSS:**

1. User willselect a field, where he wants to update amount of fertilizer.
2. User will click on fertilizer numeric up/down.
3. System will update amount of fertilizer of selected field.

**Extensions:**

4.a User clicks on upper button.

1: System will increase fertilizer of that field.

2: Continue from step 3 in MSS.

4.b User clicks on lower button.

1: System will decrease fertilizer of that field.

2: Continue from step 3 in MSS.

### Simulating growth of crop:

**Pre-condition:** The screen must have at least one field, cultivated with crops. Start Date and end date are filled.

**MSS:**

1. User clicks start simulation.
   1. System runs simulation from beginning to end
2. User scrolls on the timeline bar.
   1. System actively runs simulation according to the timeline bar position.

### Retrieving profit/loss report

**Pre-condition:** The screen must have at least one field, cultivated with crops.

**MSS:**

1. User will select field, for which he wants to retrieve report.
2. User will click Report button from right side of form.
3. System will show report with calculated profit/loss.

### Exit application

**Pre-condition:** The user has the main form of the RCAEA app open on his PC.

**Trigger:** User will click on the close button of the main form.

**MSS:**

1.System prompts users asking if he wants to quit the application.

2.System closes application.

### Saving Application

**MSS:**

1. User clicks on the Save button
2. System brings up the Save File Dialog
3. System saves data in a text file.
4. System saves data in the database.

**Extension:**

2a. User Selected a file to overwrite

1. System will ask user to confirm overwriting file.
   1. User confirms
      1. System connects to data-base and finds the current instance of the file to overwrite
      2. System deletes the current instance of data located in the database.
      3. Use-Case continues from step 3
   2. User cancels overwriting
      1. Use-Case ends

2b. User creates a new file.

1. Use-Case continues from step 3.

### Save statistics

**Pre-condition:** The screen must have at least one field, cultivated with crops.

**MSS:**

1. User selects a field

2. System displays statistics for the selected field on panel located on the left side of app.

**Extensions:**

1. User clicks on an empty field
2. Exit the use case

# APPROVALS

## 

## Sign-off Sheet