SRS

Are We There Yet?

Names

Version 1 – Date

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# Revision History

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| --- | --- | --- |
| Date | Reason for Change | Version |
| 7 Sep. 2014 | Initial Draft | 0.1.0 |
| 9 Sep 2014 | In-class revision | 0.2.0 |
| 10 Sep 2014 | Added Overall Description | 0.3.0 |
|  |  |  |

# Introduction

## Purpose

The purpose of this document is to define the system requirements of the robot put forth by Are We There Yet (AWTY) to compete in the 2015 Institute of Electrical and Electronics Engineers (IEEE) SoutheastCon student hardware competition. These requirements include the functional and non-functional requirements, system constraints, system interface constraints and standards compliance of the system. This document is intended for the customer of AWTY, the requirements engineering team for AWTY, the design, testing and quality assurance teams, as well as all other teams involved in the development and construction.

## Problem Statement

To create an autonomous robot to compete in the 2015 IEEE SoutheastCon student hardware competition.

## Scope

The system built by AWTY is intended to compete in the 2015 IEEE Southeast Con student hardware competition. The system is envisioned to complete four unique challenges:

* Correctly play Simon for 15 seconds
* Draw “IEEE” on an Etch-a-Sketch
* Twist one row of a Rubik’s cube 180 degrees
* Pick up and carry one playing card across the finish line

The autonomous system is intended to successfully complete the challenges outline above within a time limit of five minutes. **NEED MORE**

The system built by AWTY is not intended to serve any other functions or fulfill any other purposes other than competing in the 2015 IEEE SoutheastCon competition.

## Team Information

|  |
| --- |
| Name |
| Michael Philotoff |
| Brian Powell |
| Alex Senopoulos |
| Brian Sterling |

## Overview

Section 1 of this document serves as introduction to the system designed by AWTY. Section 2 provides an overall description of the system, including stakeholders involved in the project, the functions of the system and proposed use cases for the system. Section 3 describes the functional and non-functional requirements of the system

The Glossary contains definitions of all industry and standard terms as well as ambiguous terms, used throughout this document. A table of acronyms and abbreviations is included in order to dispel ambiguity with any acronym or abbreviation used within this document. A picture of the course is included in Appendix.

# Overall Description

## Stakeholders

The following list describes the individuals and parties involved in, or that have a stake in, the development, productions and operation of Team AWTY’s system.

* + 1. Team AWTY

As the development team has a vested interest as they will be graded on the completion of the system by the customers. Additionally, efforts should be made to apply principles and concepts learned while at Embry-Riddle Aeronautical University (ERAU).

* + 1. Dr. Barott, Dr. Seker and Jorge Torres

As customers of team AWTY, Dr. Barott, Dr. Seker and Jorge Torres are interested in the completion of the product as outlined in this document. Furthermore, Dr. Barott and Dr. Seker are interested in ensuring that the project meets the standards set forth by Department of Electrical, Computer, Software & Systems Engineering (ECSSE) at ERAU.

* + 1. ERAU

Since the University is an indirect sponsor of the project, any actions taken by the development team reflect directly back upon the University.

* + 1. ECSSE Department

As the direct sponsor of the project, the department is interested in making sure the project is delivered both on time and on budget.

* + 1. IEEE

As the sponsor of the competition for which the final system will compete in, the IEEE is interested in making sure that the final system complies with all competition rules and that the development team has conducted themselves in a manner befitting of a professional organization.

## Product Perspective

Are We There Yet’s system is intended to be an autonomous robot whose sole purpose is to compete in the IEEE 2015 SoutheastCon student hardware competition.

## Product Functions

Are We There Yet’s system is broken down into five major subsystems: (1) the line following subsystem, (2) the Simon subsystem, (3) the Etch-a-Sketch subsystem, (4) the Rubik’s cube subsystem and (5) the playing card subsystem. The purpose of these subsystems is to facilitate the requirements engineering process.

## Use Cases

# Functional Requirements

## Movement

* + 1. The system shall move in the two-dimensional playing field.
    2. The system shall identify red [RGB value TBD] LED in starting area.
    3. The system shall wait for red [RGB value TBD] LED to GO OUT (bad) before exiting starting area.

## Navigation

3.2.1 The system shall coordinate its movement along the white line.

3.2.2 The system shall be able to identify the challenge areas in order to stop movement.

## Challenge Completion

* + 1. The system shall play the Simon Carabiner.
       1. The system shall play Simon for 15 seconds.
       2. The system shall initiate Simon game by depressing the start button.
       3. The system shall correctly sense color blue [exact RGB values TBD] when illuminated on Simon board.
       4. The system shall correctly sense color red [exact RGB values TBD] when illuminated Simon board.
       5. The system shall correctly sense color yellow [exact RGB values TBD] when illuminated Simon board.
       6. The system shall correctly sense color green [exact RGB values TBD] when illuminated Simon board.
       7. The system shall not obstruct [TBR] Simon carabineer during play.
       8. The system will respond to Simon within [TBD] amount of time.
    2. The system shall twist one row of a Rubik’s cube 180 degrees.
       1. The system shall not obstruct the Rubik’s cube during play.
    3. The system shall draw “IEEE” on a Pocket Etch-A-Sketch.
       1. The font and size of the “IEEE” letters shall [TBD].
       2. The system shall not obstruct the Etch-A-Sketch during play.
    4. The system shall collect a single playing card.
       1. The system shall carry playing card across finish line.
       2. The system shall keep the card in a usable condition [TBD].

# Non-Functional Requirements

## System Size

* + 1. The system size shall be no greater than 1’ x 1’ x 1’ within the starting area and the finishing area.

## Power Management

* + 1. The system shall operate for a minimum of three consecutive course rounds each having duration of five (5) minutes, on one battery life.

## Start Method/Operation

* + 1. The system shall have a clearly indicated power switch.
    2. The system shall be completely autonomous after being powered on.
    3. The system shall maintain contact with the plywood board at all times.

# Glossary

|  |  |  |
| --- | --- | --- |
| Entry | Definition | Aliases |
| SoutheastCon | SoutheastCon is the annual IEEE Region 3 Technical, Professional, and Student Conference. It brings together Computer Scientists, Electrical, and Computer Engineering professionals, faculty and students to share the latest information through technical sessions, tutorials, and exhibits. It is the most influential conference in Region 3 for promoting awareness of the technical contributions made by our profession to the advancement of engineering science and to the community. As usual, attendance and technical program participation from areas outside IEEE Region 3 are encouraged and welcomed. IEEE Region 3 encompasses the southeastern United States and includes the states of Alabama, Florida, Georgia, areas of Indiana, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia and the country of Jamaica |  |
| ERAU | Embry-Riddle Aeronautical University |  |
| IEEE |  |  |
| Obstruct | SECON rules state that the system cannot obstruct any obstacle [1]. |  |
| Autonomous | Undertaken or carried on without outside control [2]. |  |
| Two-dimensional playing field | The two-dimensional playing field is the plywood board where the competition is being held on. The system must maintain contact with the board at all times. |  |
| Usable Condition | SECON rules state that the playing card must be left in a usable condition [1]. |  |
| Starting Area | A one foot by one foot area on the two-dimensional playing field marked by scotch blue painters tape [1]. |  |
| Course Round | A span of five minutes during which the system is expected to complete the 4 challenges [1]. |  |

# Appendix A



# Appendix B

# References

[2] Autonomous - Definition. (2014). Retrieved from http://www.merriam-webster.com/dictionary/autonomous