**Fall 2014 Senior Project**

**System Requirements**

**Group 2**

**V1.0**

September 7, 2014

**Revision History:**

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| **Version** | **Comments** | **Updated By:** |
| 1.0 | Initial release | P. Kruchko |
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**Overview**: For the Fall 2014 semester, we will build, test, and compete with devices that will count small parts (screws, bolts, nuts and other fasteners) and deliver them upon request, with the goal to immediately deliver the exact number of parts when they are requested.[1]

**Objective of document:** To capture, define, and refine customer requirements to derive a set of specific system level requirements from which the more detailed aspects of the system can be identified to further and more accurately specify the electrical, mechanical, and computational needs of the system that must be met in order to implement a product that satisfies the customer requirements.

**Scope:** To provide the initial framework for Group 2 to further refine the requirements of the system so that an accurate system architecture and model can be subsequently created.

[1] Taken from Senior Design Syllabus, per Dr. Michael Latcha.

**Glossary of terms:**

Architectural Requirements: Describes what has to be done by identifying the necessary system architecture.

Functional Requirements: Describes the functionality that the system is to execute.

Non-Functional Requirements: Describes characteristics of the system that the user cannot affect or immediately perceive.

Constraint Requirements: Identifies the limits imposed upon the design that system must operate within.

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| Acronym | Term | Example |  |
| FR-X | Functional Requirement, numbered X | FR-1 |  |
| AR-X | Architectual Requirement, numbered X | AR-1 |  |
| CR-X | Constraint Requirement, numbered X | CR-1 |  |
| NFR-X | Non-Functional Requirement, numbered X | NFR-1 |  |
| TBR | To Be Refined-Need to know more specific info | Qty.(4) 6 mm hex nuts |  |
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**Table of Requirements:**

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| **Requirements Tag** | **Description** | **Requirement** | **TBR** |
| FR-1 | Types of parts to be dispensed | The system shall dispense a variety of 5-6 different types of small mechanical fasteners such as screws, bolts, nuts, washers and plastic trim pieces | What kind of parts? Need to know the exact types of parts that are going to be included in the spectrum of parts to be dispensed. i.e. hex nuts, wing nuts, flat washers, spring washers, etc. |
| AR-1 | Size and form factor of system | The system shall be small, adaptable, and configurable | How small? What are the minimum and maximum dimensions that the system should be? Adaptable to what type of conditions? How configurable? Manually configurable or automatically configurable? What does it have to be configured for? What does it have to be configured to do? |
| FR-2 | Amount of parts to be dispensed | The system shall dispense between 1-6 of the small parts on a given dispense cycle |  |
| FR-3 | Adjustment for quantity | The system shall be easily adjusted to dispense the desired amount of parts | How adjusted? What is the user interface for part quantity adjustment? |
| FR-4 | Accommodation of size of parts | The system shall accommodate different sizes for the parts to be dispensed | What is the minimum size? What is the maximum size? What are the dimensions of the trim pieces to be dispensed? |
| CR-1 | Dispense Cycle Time | The system shall perform one parts dispense cycle within 30 seconds. With a dispense cycle being defined as beginning with the user interaction with the system and ending when the system dispenses the parts into the hands of the user |  |
| FR-5 | Delivery Mechanism | The system shall dispense the parts to the user's opened hand by mass transport through a chute system | To refine the dimensions and material of the chute system. Also angle of it's major line of axis and position with respect to the base of the system. |
| FR-6 | Method of part storage | The system shall store the parts to be dispensed in a container | What are the dimensions of the container? What material shall the container be constructed from? How is the container fastened to the system's machine frame? |
| CR-2 | Number of dispense cycles | The system shall perform at least 3 dispense cycles |  |
| FR-7 | Total quantity of parts that need to be dispensed from the system | The system shall be able to store enough parts to be able to meet the maximum possible amount of parts that can be dispensed for a given dispense cycle i.e. 3 dispense cycles and 6 parts maximum = 18 parts minimum that the system needs to be able to dispense |  |
| CR-3 | Accuracy of dispense cycle | The system shall be 100% accurate in quantity of parts dispensed per user input 100% of the time. |  |
| AR-2 | System power |  | What is to be the power source for the system? |
| CR-4 | System power constraints |  | What is the maximum voltage that the system should operate at? Minimum voltage? What is max constant current draw of the system? What is the max peak current draw for the system? |