Seamless Engineering Milestone 1 - Requirements Template

Team number: Seamless Engineering Group 06

# Requirements

If there is one aspect a project must have in order not to be doomed to failure, it is a reasonable and comprehensive repository of both functional and non-functional requirements. A project's requirements must be well considered, balanced and easily understood by all team-members, but perhaps most importantly, they must not be dropped or compromised during half of the project.

Fill out the following templates according to your requirements.

Definitions

Source: Projektmanagement in der Entwicklung von Produkten für sicherheitskritische Anwendungen, Prof. Nolle, ITIV, 2021

|  |  |
| --- | --- |
| Must | Overriding requirements that must be complied with by both the purchaser and the supplier (by law, standard, rules, ...). |
| Shall | Indispensable requirements; a deviation is not permitted without formal agreement between buyer and supplier. |
| Should | Recommendation or indication of the implementation of a requirement; a deviation is only allowed in justified cases. |
| Will | Statement of intent in connection with a requirement. |
| May | Permitted execution or deviation, no requirement. |

Functional Requirements

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Product requirement | | System Requirement | | | |
| ID | Title | ID | Description | Priority | Remarks |
| **F1** | **Throughput** | **F1.1** | **The throughput of the system shall be XXX** | Shall | **Minimum throughput** |
| **F1.2** | **The throughput of the system will be XXX** | Will | **Desired throughput** |
| **F1.3** | **Two of object A may be placed in the object B slot on the transport platform.** | May | This increases the capacity of the turtlebot to 4 object A and thus the throughput. |
| **F2** | **Reliability** | **F2.1** | **Objects A and B shall only go in their respective slots on the transport platform.** | Shall |  |
| **F2.2** | **The objects shall not be stacked upon one another.** | Shall |  |
| **F2.3** | **Objects shall not be dropped.** | Shall |  |
| **F2.4** | **There shall be a clear indication of the current state of the system, so turtlebot knows.** | Shall | **If the object is being loaded or transported,** |
| **F2.5** | **The system shall operate event driven.** | Shall | **As opposed to being time driven.** |
| **F3** | **Customer Satisfaction** | **F3.1** | **The system shall keep track of all moving objects.** | Shall | **Every part of the system shall know at any point in time which object is where and can thus assure that it doesn’t end up in the wrong delivery box.** |
| **F4** | **Emergency Stop** | **F4.1** | **The system must stop all movements when the emergency stop button is pressed.** | Must |  |
| **F4.2** | **The system must not drop any objects.** | Must | **Vacuum gripper remains active.** |

Non-Functional Requirements

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Product requirement | | System Requirement | | | |
| ID | Title | ID | Description | Priority | Remarks |
| **NF1** | **Easy usability of the system** | **NF1.1** | **We will provide a customer-friendly user interface.** | Will |  |
| **NF1.2** | **We may provide a graphical user interface.** | May |  |
| **NF2** | **Portability of the System** | **NF2.1** | **We shall use ROS as a coding platform, so the system will be easily portable.** | Shall |  |
| **NF2.2** | **Embedded systems shall not be modified.** | Shall | **Example: we shall not install additional packages on the turtlebot.** |
| **NF3** | **Central settings area** | **NF3.1** | **All settings shall be loaded by a single roslaunch file.** | Shall |  |
| **NF3.2** | **All settings shall be contained in a single folder.** | Shall |  |
| **NF3.3** | **Settings may be contained in a single file or split into multiple files.** | May | **Multiple files may be clearer than a single large file.** |
| **NF4** | **Robustness against external interferences** | **F4.1** | **XXX** |  |  |
| **NF5** | **Optimized routes** | **F5.1** | **The turtlebot should follow the optimal path.** | Should |  |
| **F5.2** | **The turtlebot may deviate by up to 10% from the optimal path.** | May |  |
| **NF6** | **Efficient use of sensors and actuators** | **F6.1** |  |  |  |
| **NF7** | **Scalability** | **F7.1** |  |  |  |
| **NF8** | **Reusability** | **F8.1** | **Documentation shall be provided.** | Shall |  |