## Laboration 3.1

| Quality attribute | Attribute Refinement | Scenarios |
| --- | --- | --- |
| Usability | Consistency, attractive, operable, serviceability | Easy to use: Stimulus: Driving actions Environment: Normal usage Response: Every action must be as automatic as possible.<br><br>The system be customizable to meet specific user needs<br><br>Stimulus: Default settings are modified Environment: Storage files Response: Modifications saved and limits checked<br><br>In case of certain errors the application hangs up and needs complete restart. Stimulus: Non predicted usage Environment: Storage + Sensor Response: Re-deployment To change a simple parameter you need to restart the application. That takes time, and reduces the uptime. |
| Performance | Latency, capacity, handling, log reports, ease of use, resource utilization | High usage<br><br>Stimulus: Many use cases at the same time (periodic events) Environment: High load system Response: Prioritize safety first in less second. |

| | | |
|---|---|---|
| | | Handle many sensors information<br><br>Stimulus: Sensors triggered<br>Environment: Normal system<br>Response: Pass info to respective modules |
| Modifiability | Code flexibility, Maintenance cost, Tools | The cost for modifying and reconfiguring the system after initial deployment, during the maintenance phase.<br><br>Stimulus: Access code (modify functionality)<br>Environment: Recovery mode (runtime)<br>Response: System will normally operate<br><br>Adding new functionalities<br>Stimulus: Code re-written<br>Environment: New system<br>Response: Modules functionality should fit |
| Availability | Uptime start, continues operations | System available when ignition starts.<br>Stimulus: Engine started<br>Environment: Normal usage<br>Response: Real time<br><br>Data and processes be protected from intruders.<br><br>Stimulus: Storage files compromised |

| | | Environment: Compromised system<br>Response: Authentic user<br><br>Fast recovery from errors in sensor<br><br>Stimulus: Min. 1 Sensor fails<br>Environment: Normal usage<br>Response: 1/5 sec recovery |
| --- | --- | --- |
| Security | Integrity, confidentiality | No intruders<br>Stimulus: Access system services compromised<br>Environment: Open system<br>Response: authentic user; block access<br><br>Non allowed modifications<br>Stimulus: User wants to modify safety variables<br>Environment: Modified system<br>Response: Check |
| Reliability | Mean time between failure, support cost, motor temperature limits | Anomaly management<br>Stimulus: Changes/Faults<br>Environment: Sensor<br>Response: Avoid false positives<br><br>Air bag response time<br>Stimulus: Crash<br>Environment: Air bag +Collision avoidance<br>Response: Time increased |

**Time spent: 1 working day was necessary for doing this as most of the time was spent on related scenarios.**

## Laboration **3.2**

| Quality attributes | How Description | Architectural decision as sensitivity point | Effect | Trade point |
|---|---|---|---|---|
| Usability | Wrong interaction with the system. | Relations can't handle error | Negative. System restart | Usability vs Availability |
| Performance | Number of active use cases will give high system load | Many modules use other modules | Negative. System has to prioritize. Related in reliability, since it leaves less resources in the memory for the reliability modules. | Performance vs Reliability |
| Modifiability | Request to update something passes through storage module | Default parameters in storage module | Positive. Possibility to restore to default settings in storage if during file manipulation error | Modifiability vs Reliability |
| Availability | Failures cannot be handled | Relationship between classes is not protected. | Negative. System restart since when the system is requested it cannot be modified. | Availability vs Modifiability |
| Security | Modification in the alarm signal, by many devices | Controller /Sensor should not relay fully on other hardware. | Negative. Sensor should have a control hardware parameter in the control | Security vs Availability |

| Reliability | Sequentially dependent<br><br>Back up storage. | Modules are trigger based and operate on other modules output.<br><br>Space parameter not as a controller | Negatively in performance, as it consumes resources | Performance vs Reliability |
|---|---|---|---|---|

**Time spent: 0.5 working day was necessary as most of the time was spent on reviewing the Lab 2 Designs to understand the sensitivity points.**