##### **Laboration** **3.1**

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| 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.  The system be customizable to meet specific user needs  Stimulus: Default settings are modified  Environment: Storage files  Response: Modifications saved and limits checked  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  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  Stimulus: Sensors triggered  Environment: Normal system  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.  Stimulus: Access code (modify functionality)  Environment: Recovery mode (runtime)  Response: System will normally operate  Adding new functionalities  Stimulus: Code re-written  Environment: New system  Response: Modules functionality should fit |
| Availability | Uptime start, continues operations | System available when ignition starts.  Stimulus: Engine started  Environment: Normal usage  Response: Real time  Data and processes be protected from intruders.  Stimulus: Storage files compromised  Environment: Compromised system  Response: Authentic user  Fast recovery from errors in sensor  Stimulus: Min. 1 Sensor fails  Environment: Normal usage  Response: 1/5 sec recovery |
| Security | Integrity, confidentiality | No intruders  Stimulus: Access system services compromised  Environment: Open system  Response: authentic user; block access    Non allowed modifications  Stimulus: User wants to modify safety variables  Environment: Modified system  Response: Check |
| Reliability | Mean time between failure, support cost, motor temperature limits | Anomaly management  Stimulus: Changes/Faults  Environment: Sensor  Response: Avoid false positives  Air bag response time  Stimulus: Crash  Environment: Air bag +Collision avoidance  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**

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| --- | --- | --- | --- | --- |
| 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  Back up storage. | Modules are trigger based and operate on other modules output.  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.**