Interface Control Document

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**Definitions**

|  |  |
| --- | --- |
| <Abbreviation 1> | <Definition for Abbreviation 1. If no Abbreviations then list “No Definitions” in the first column.> |
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# Introduction

<The Interface Control Document (ICD), sometimes called an Interface Requirements Document, describes in detail the interfaces between each subsystem of the system that is undergoing design. The ICD is an important document, particularly in large and complex projects, because it provides the specifications on how subsystems shall interact with each other, which helps coordinate the design efforts of the different subsystem design teams. Subsystem design engineers will use the ICD to gain an expectation of how inputs shall be delivered to their subsystem and how subsystem outputs shall be designed. The ICD can be used to determine which subsystems will be affected when a change to an interface is considered by a subsystem design team. Proposed changes to the specifications of an interface must be agreed upon by all affected subsystem design teams and the ICD updated accordingly. In this respect, the ICD may be considered as a "living" document since it is always being updated as designs mature. Often, the ICD is managed as a database and is only presented in document form when it needs to be delivered to a project stakeholder.>

## Scope

<The ICD provides a copy of the system architecture where each interface between subsystems is identified. The specifications of each of the identified interfaces are defined by the characteristics of the interface which may include physical, electrical, signal and information characteristics. Note that only interfaces between subsystems are documented here; descriptions of interfaces within subsystems are captured in the subsystem design document.>

## Background

This

<Paragraph 1: Start typing your text here>.

< In one paragraph give a brief description of the project, this should be the same paragraph for all project documents.>

# Reference Documents

## QUT Avionics Documents

|  |  |  |
| --- | --- | --- |
| RD/1 | PROJ-SYS-DES-01 | Project document which is the authoritative source for the system architecture. |
| RD/2 | …… | ………..etc…. |

## Non-QUT Documents

|  |  |  |
| --- | --- | --- |
| None. |  |  |

In the following text, RD/x identifies referenced documents, where "x" denotes the actual document.

# System Overview

An overview of the system, from RD/1, is provided in Figure 3‑1, where each subsystem interface is indentified with a number. Indentified subsystem interfaces are specified in the subsequent section of this document.

Figure 3‑1 - System overview with numbered subsystem interfaces

Subsystem A

Subsystem C

Subsystem D

Subsystem B

# Subsystem Interface Specifications

## Subsystem Interface 1 - Meaningful Interface Name

<Note that Subsystem Interface 1 is the interface between Subsystem A and Subsystem B. Apart from providing the interface with a number, also give it a meaningful name like: Power Bus, Proximity Sensor Data, etc. Then proceed with specifying the characteristics of the interface. Use tables or diagrams where it is appropriate.>

<Characteristics to specify may include:

1. Physical interfaces, for example:
   1. Plug or connector type (DB9, RJ45)
   2. Connector pin configuration
   3. Specific mating surfaces (a specific way Subsystem A should be bolted to Subsystem B).
2. Electrical interfaces **Ignore All this yellow;;; I will do this**:
   1. Voltage levels
   2. Current limits
   3. Frequencies
   4. Power
3. Signal interfaces:
   1. Signal or communications standard (RS232, Ethernet [IEEE 802.3])
   2. TTL signal
   3. Analog signal voltage ranges.
   4. Modulation schemes (Pulse Width Modulation)
   5. Baud rate
4. Information/data interfaces
   1. Data packet structures
   2. Data type>

The following stuff is what you need to do, apart from the conclusion

### Interface #3 – Power supply

The GNC subsystem requires power at 5 volts, in the form of either a DC barrel jack, or a pair of wires. The subsystem may draw up to 5 Watts of power; however, this may be lowered in later revisions.

### Interface #7 – Telemetry and Command

Due to the complexity of the subsystem, and requirements for the communications subsystem, telemetry needs to be generated. This includes kinematic state data, which is composed of position, attitude, velocity, and angular velocity; the current waypoint; the operating mode; and the thrust and torque required from the propulsion system.

The subsystem must also accept commands from the operator, via the ground control station and communications interface. Example commands are travelling to a specific waypoint, or a change of operating mode.

Operating modes are outlined in the OperatingMode enumeration in the GNC design document

### Interface #8 – Propulsion commands

One of the main functions of the GNC subsystem is to provide commands to the propulsion subsystem. This will take place in the form of two vectors; one for linear thrust, and one for torque. In return, it requires the actual thrust and torque generated, in order to feed back into the control system.

### Interface #9 – Proximity control and warning

Since one of the requirements is not to collide with any obstacles, the proximity control subsystem sends a warning to the GNC subsystem when a collision is imminent, in the form of a vector to the approximate direction of the obstacle, and hands control over to the GNC subsystem in the form of a processor interrupt.

### Interface #10 – Payload

The GNC subsystem informs the payload subsystem when it is in position to deliver the rescue package to the survivor.

### Interface #12 – Image processing

The image processing subsystem informs the GNC subsystem of the location of any discovered survivors, so it can store them for when payload delivery takes place.

### Interface #20 – Airframe mounting

The two main components of the GNC subsystem will be placed separately. The guidance computer, not being sensitive to the vibrations from the propulsion subsystem or airframe sway, will be placed in the gondola without any padding. The inertial measurement unit, however, will be strapped directly to the airframe as close to the centre of mass as possible. It will also be cushioned with foam padding to dampen out the vibrations from the propulsion subsystem.

# Conclusions

The GNC subsystem is an interface-heavy subsystem, with both electrical and software interfaces.