Title: , Autonomous Helicopter Navigation System, System Level, High level Objectives

*“A Project”*

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**Foreword**

This document is a formal representation of the High Level Objectives for the Queensland University of Technology Autonomous Helicopter Navigation System (AHNS) in 2010. The objectives were formulated through discussions between the project customer, the project manager and team members.

The 2010 AHNS project has been divided into is high level objectifies that must be completed to achieve the overall project objectives. The HLO’s encompass the platform, localisation, state estimation, autonomous hovering flight, ground control station and communications of the project.

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**Definitions**

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| --- | --- |
| AHNS | Autonomous Helicopter Navigation System |
| QUT | Queensland University of Technology |
| HLO | High Level Objective |
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# Introduction

The following document overviews the higher level objectives of the 2010 AHNS project. The HLO’s take into account the project specifications and objectives outlined by the customer. These objectives are required to be fulfilled to meet the customer’s requests, and to complete the project.

## Scope

The purpose of this document is to outline the agreements reached between the project team and customer for 2010. This is a higher level objective document and as such does not contain any specific values or metrics related to the project. These specific details can be located in the AHNS system requirements document [RD/1].

## Background

In 2007 the first QUT AHNS project was created with the aim of developing a helicopter autopilot for indoor use. Over the several years that the project has been running students have attempted to complete this objective with different ideas and designs. The 2010 AHNS project will further seek to achieve the goals of past years; further developing the available technology at QUT Avionics.

# Reference Documents

## QUT Avionics Documents

|  |  |  |
| --- | --- | --- |
| RD/1 | AHNS-2010-SY-SR-001 | AHNS, System Requirements of |
| RD/2 | AHNS-2010-SY-MM-001 | Meeting of Minutes for 20/12/09 |

## Non-QUT Documents

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

In the event of any conflict between this document and any RD referenced herein, such conflict shall be notified to Dr Luis Mejias.

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

# High Level Objectives

The 2010 Autonomous Helicopter Navigation System high level objectives were developed through discussions between the project customer and team members [RD/2]. The project goals have been split into six HLO’s, with encompasses all requirements that must be achieved to complete the project.

## HLO-1 Platform

A platform should be developed and maintained to facilitate flight and on board hardware integration.

## HLO-2 Localisation

The system should be capable of determining its position with the aid of image processing within an indoor environment to an appropriate time resolution.

## HLO-3 State Estimation

A method of estimating the states of the helicopter system should be designed and implemented. The resolution of the estimations should facilitate their employment in the control system design.

## HLO-4 Autonomous Hovering Flight

An autopilot system should be developed to enable sustained indoor autonomous hovering flight. The control system should be designed to enable future ingress and egress manoeuvre to longitudinal and hovering flight.

## HLO-5 Ground Control Station

A ground control station that supports appropriate command and system setting inputs and data display and logging should be developed. The design should be derived from previous AHNS developments and enable future ground station developments.

## HLO-6 Communications

The communications system should enable transfer of control, state and localisation data to the ground control station. It should provide with a flexible wireless data link available on consumer-electronic devices.

# Conclusions

AHNS 2010 encompasses six high level objectives that should be met for the project to be accomplished. The details for these objectives were defined from discussions between the customer, project manager and AHNS group members.

# Recommendations

It is recommended that all HLO’s are implemented on the 2010 AHNS project, and that system requirements are derived illustrating important specific values that the product must abide by.