Computer Assisted Control of a Helicopter Model

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Project Code: QL2-05  Supervisor: Prof. QIU, Li
Introduction

Flying of a helicopter model is an exciting and challenging activity for the interested groups. However, stabilizing control of a helicopter model is a difficult task and a lot of training and practice is required. In reality, un-stable control for aviated machines may soon lead to serious damages and could be a disaster. The computer plays an important role in piloting and navigation systems in order to achieve stable and flying safely hence, to simplify the control interface.

Aim and Objectives

This project aim is to make a helicopter model use for surveying, surveillance and reconnaissance applications and provide economical solution to make an auxiliary control system for the helicopter model by computerizing the human control unit.
System Block Diagrams

Wireless Transmission

Encoder

Main controller

Sampling module

A/D Converting

Gyroscopes X, Y, Z axes

Tri-axis Accelerometer

Wireless Receive Module

Decoder

Up & Down link Forwarding Module

D/A Converting Module

RF Remote Control

RS232

Wireless Transmission

Encoder

Main controller

Sampling module

A/D Converting

Gyroscopes X, Y, Z axes

Tri-axis Accelerometer

Downlink System

Uplink System
Simulation Results

A flight simulation test is performed to check the function of the control system. The simulation results are shown in the follow table:

<table>
<thead>
<tr>
<th>User Remote Position</th>
<th>Control Parameter</th>
<th>Simulator Result</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X axis : 14</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Y axis : 7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tail : 15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Throttle : 12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>X axis : 10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Y axis : 14</td>
<td></td>
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<tr>
<td></td>
<td>Tail : 15</td>
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</tr>
<tr>
<td></td>
<td>Throttle : 13</td>
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</tr>
<tr>
<td></td>
<td>X axis : 15</td>
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<td></td>
<td>Y axis : 15</td>
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<td></td>
<td>Tail : 15</td>
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<tr>
<td></td>
<td>Throttle : 15</td>
<td></td>
</tr>
</tbody>
</table>

Software Interface

The main control program enables real-time monitoring capability to the pilot. It has a simple user interface and is an integrated platform for rule-based decision making, manual operation and communication to the Ground Station.