dedication (optional)

Summary

Write your summary here...

Preface

Write your preface here...

Table of Contents

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Abbreviations

Symbol	=	definition

Introduction

1.1 Background and motivation

Unmanned aerial vehicles (UAVs) have long been used by the military, but is now becoming increasingly more popular in the civilian sector. UAVs is a cheaper alternative in some situation like . Today manned helicopters and aircraft in jobs like aerial photography, and large area inspections. That increase the cost of such operation, and have the limitation that aircraft and helicopter mostly needs an airport to operate from. UAVs do not have the same limitation. A fixed wing drone can be launched from a catapult, and can be design such that it do not need a runway to land.

UAVs are predicted to be more applied in the industry. In the maritime sector they can be used in iceberg management, monitoring of oil spills, search and rescue and maritime traffic monitoring.

UAV operations from ship is considered more challenging compared to land operation. Launching UAV from a maritime platform can be done with a catapult, witch is a common way to launch UAV even on land. However, landing the UAV poses several problems. A ship has usally limited space, and if it's not design as an aircraft carrier landing on the deck is not an option. Existing system today relay on a net placed somewhere on the ship that caches the UAV. The problem with this solution is that it requires a guiding system either on the ship or in the UAV to hit the net.

Talk some about GPS system. It is nesesary to enable the UAV to land

Today UAVs are mostly used on land, but the possibility to apply them in maritime sector is something that are being develop. Fixed wing UAVs has the advantages that they can cover huge areas, compared to unmanned helicopters. The drawback of fixed wing is the recovery phase. There exist landing system, but they are limited to a few UAVs, and expensive to install (need reference). UAVs can be used to track icebergs or applied in search and rescue.

What is the problem with flying from a ship

A automatic recovery system for UAV on a ship would over time remove the need of a pilot on-board the ship. (maybe in emergency) could ask about that.

How should this thesis help solve that problem

This project theises is about implement and test a nett landing system using RTK-GPS for position measurement.

1.2 Previous work

On the landing subsject: The UAV lab community; direct link to Frlich work.

Other master thesis, paper on visual aid landing system. Frlich did the same research.

1.3   Goal of thesis

Implement a automatic landing system on a x8 fixed wing UAV, and safely land it in a net.

1.4   Layout of thesis

```
\begin{eqnarray}\label{eq1}
F = m \times a
\end{eqnarray}
```

This will produce

$$F = m \times a \qquad\qquad (1.1)$$

To refer to the equation

```
\eqref{eq1}
```

This will produce (1.1).

1.5   Figures

To create a figure

```
\begin{figure}[h!]
  \centering
    \includegraphics[width=0.5\textwidth]{fig/pikachu}
  \caption{Pikachu.}
\label{fig1}
\end{figure}
```

To refer to the figure

```
\textbf{Fig. \ref{fig1}}
```

This will produce **Fig. 1.1**

1.6   References

To cite references

```
\cite{1,2,3}
```

or

```
\citep{1,2,3}
```

This will produce: Sarma and Chen (2008); Brouwer and Jansen (2004); Muskat (1937) or (Sarma and Chen, 2008; Brouwer and Jansen, 2004; Muskat, 1937), respectively.
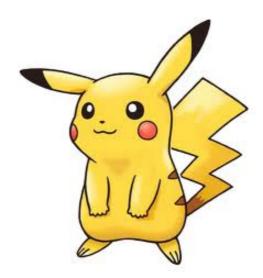
Figure 1.1: Pikachu.

1.7   Tables

To creat a table

```
\begin{table}[!h]
\begin{center}
    \begin{tabular}{ | l | l | l | l | l |}
    \hline
    \textbf{No.} & \textbf{Data 1} & \textbf{Data 2} \\ \hline
     1 & a1 & b1 \\ \hline
     2 & a2 & b2 \\ \hline
    \end{tabular}
\end{center}
\caption{Table 1.}
\label{Tab1}
\end{table}
```

This will produce

No.	Data 1	Data 2
1	a1	b1
2	a2	b2

Table 1.1: Table 1.

To refer to the table

```
\textbf{Table. \ref{Tab1}}
```

This will produce **Table. 1.1**.

Chapter 2

Background Theory

2.1 Path generation

2.1.1 Dubins path

2.2 GPS

Chapter 3

System Components

3.1   Software

3.1.1   Dune

3.1.2   Netpus

3.1.3   Ardupilot

3.1.4   RTKGPS

3.2   Physical system

3.2.1   x8 with all components

Chapter 4

Method

What is implemented. How does it work. How it is connected. How was the system tested.

Chapter 5

Experimental testing

5.1   SIL testing

5.2   Physical testing

5.2.1   Fly test

5.2.2   GPS test

Chapter 6

Conclusion and Discussion

Bibliography

Brouwer, D. R., Jansen, J. D., 2004. Dynamic optimization of waterflooding with smart wells using optimal control theory. SPE Journal 9 (4), 391–402.

Muskat, M., 1937. Flow of Homogeneous Fluids. McGraw Hill.

Sarma, P., Chen, W. H., 2008. Applications of optimal control theory for efficient production optimization of realistic reservoirs. In: Proceedings of the International Petroleum Technology Conference. Kuala Lumpur, Malaysia.

Appendix

Write your appendix here...