

Double Tracking Antennas for UAS Communication

Control and Automation

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Group CA832

16gr832@student.aau.dk

Department of Electronics and IT
Aalborg University
Denmark



AALBORG UNIVERSITY
DENMARK



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Double Tracking
Antennas for UAS
Communication

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Overview

Hardware

Frames

Telecommunication

Methods

Modelling

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Simulation

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Conclusion

The project is about UAS:

- ▶ What ?
- ▶ Why ?
- ▶ How ?
- ▶ State each part and whom will present.



Agenda

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Unmanned Aircraft System (UAS)

1. Unmanned Aircraft (UA)
2. Ground Station (GS)
3. Antennas
4. DC Servomotor

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Geodetic Coordinate System

Earth-Centered Earth-Fixed (ECEF)

North-East-Down (NED)

Body Coordinate System



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Line-Of-Sight (LOS) Propagation

Link Budget

Fresnel Zones

MAVLink Protocol



Modelling

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Moving Angle System (MAS)

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Optimal Angle

Antenna

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Controller

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PID

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Tunning

Comparion



Simulation

LOS Coverage Map

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LOS Coverage Map

1. Terrain elevation
2. Curvature of the Earth
3. Altitude of UA and GS



Simulation

2D UAS

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3D UAS

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Simulation

3D UAS

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3D UAS

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Angle Range

Earth Curvature

Above GS

Mountain

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We did this: ...

We can see that: ...

We conclude that: ...

Further work that can be built on the current project:

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Thank you for flying with us!



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