

# Double Tracking Antennas for UAS Communication

## Control and Automation

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Group CA832

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Double Tracking  
Antennas for UAS  
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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

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# Modelling

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Moving Angle System (MAS)

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Optimal Angle

Antenna



# Controller

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Comparion





# Simulation

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LOS Coverage Map

2D UAS

3D UAS

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## Four different scenarios:

- ▶ Angle Range
- ▶ Curvature of the Earth
- ▶ Above the GS
- ▶ Mountain

## Variables that will be analysed:

- ▶ Azimuth angle (optimal and simulated)
- ▶ Elevation Angle (optimal and simulated)
- ▶ Signal Power

## Goal

Describing the movement of the antennas when the UA is flying far away from the GS.

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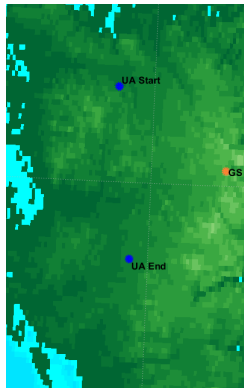
Controller

Simulation

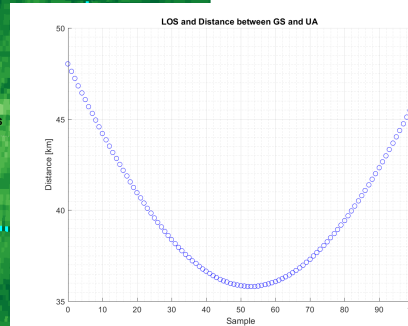
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(a) A gull



(b) A tiger

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# Conclusion

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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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