

ALMA MATER STUDIORUM UNIVERSITÀ DI BOLOGNA  
DEPARTMENT OF ELECTRICAL, ELECTRONIC AND INFORMATION ENGINEERING  
MASTER'S DEGREE IN AUTOMATION ENGINEERING

# Control of an autonomous aerodynamic airshield for training Olympics 100m sprint athletes

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**ETH** Zürich

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# Introduction

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## Motivations

In athletics the **overspeed training** makes possible to enhance the competition performances.

It can be achieved by isolating the runner from the air resistance using an **aishield**.

The usage of an **autonomous go-kart**:

- ▶ simpler maneuvering
- ▶ safer maneuvering



## Contributions

## Modeling of the go-kart with the aishield attached

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# Gain Scheduling Linear Quadratic Regulator

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# Model Predictive Control

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# Offset-free Model Predictive Control

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# Simulation tests and Controllers comparison

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# Hardware-in-the-loop tests

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