Eye Gaze and Action Coupling in Paragliding

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1 INTRODUCTION – RESEARCH QUESTION

Paragliding pilots control the trajectory of their glider by continuously modifying its aerodynamic shape through both brake inputs and shifts in body weight, while simultaneously adapting to changing atmospheric conditions. The coupling between gaze direction and motor actions is a well-established mechanism in the study of human movement and locomotion. It is therefore reasonable to assume that, in paragliding as well, the pilot's visual behavior directly influences motor control processes.

A substantial proportion of paragliding incidents and accidents occur during the take-off and landing phases. Improving our understanding of the relationships between gaze behavior, pilot control actions, and the resulting flight trajectory could help optimize instructional guidelines provided to trainee pilots and, ultimately, contribute to enhanced flight safety and a reduction in accident rates.

The main research question of this internship is:

To what extent does the pilot's gaze behavior provide a direct and predictive account of the motor actions implemented to control flight trajectory during critical phases of paragliding flight?

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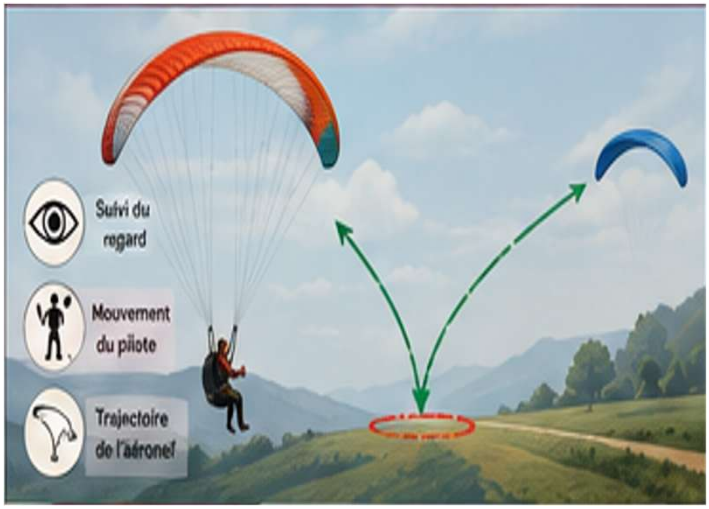

2 AIMS OF THE INTERNSHIP

Addressing this research question requires the investigation of relationships among three categories of variables: gaze-related variables, motor control variables (e.g., brake inputs and body position adjustments), and movement-related variables describing the flight itself (e.g., trajectory and velocity).

The first objective of the internship will be to identify the variables that appear most relevant to the research question and to determine the most robust methods for measuring or estimating them. The initial proposal is the use of video recordings to analyze motor actions and a mobile eye-tracking system to characterize gaze behavior; however, this proposal remains to be validated through a preliminary review and feasibility assessment.

A second phase will involve the design and implementation of an experimental protocol aimed at investigating the coupling between these different variables under real-world paragliding conditions during both take-off and landing phases.

3 INTERNSHIP KEY POINTS

The student will focus on the following tasks:

1. Bibliography
2. Development and deployment of measurement tools and instrumentation (sensors, communication systems, etc.)
3. Design and drafting of an experimental protocol
4. Execution of experimental testing sessions. Participants may include either expert pilots or novice pilots enrolled in paragliding training programs
5. Analysis of results

4 ABOUT SUPERVISION

The internship will be supervised by members of EuroMov DHM research unit and also by paragliding experts.

References
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