

# 6-Months Internship – 2025

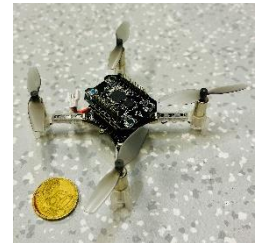
## Swarm countermeasures with intercepting swarms

### Context

Recent events have highlighted a critical problem in modern defense systems: traditional, high-cost systems designed to counter individual threats can be overwhelmed by large numbers of relatively simple and inexpensive agents. To address this challenge, the concept of intercepting swarms has emerged as a promising strategy. A swarm in this context is a group of intelligent, self-organizing unmanned aerial vehicles (UAVs) that are deployed to engage and neutralize incoming enemy swarms.

### Objectives

The goal of this internship is to review approaches for swarm countermeasures using intercepting swarms. You will implement algorithms and evaluate their effectiveness in defending against attacking swarms within a simulation environment. Finally, you will implement the most promising algorithms directly on hardware and perform evaluations with swarms of up to 25 Crazyflie UAVs.



*Crazyflie by Bitcraze*

### Desired skills

The ideal candidate for this position would have skills in the following areas:

- Final year of a degree in mathematics, engineering, or related with experience in complex systems modeling, dynamical systems and multi-agent systems
- Proficient in at least one programming language like Python, MATLAB or C
- Expertise in areas like control theory, graph theory, optimization, and algorithms are helpful, but not a must
- Ability to propose new solutions and enjoyment to work in a dynamic research environment
- Good communication skills in English, knowledge of German or French helpful, but not a must

### What ISL offers to you

This internship offers the opportunity for subsequent PhD research at ISL. Additionally, we offer you:

- Challenging topic with access to state-of-the-art technology
- Compensation depending on qualification
- Employer-subsidized company restaurant
- Flexible time management
- International environment

### Contact

For any further questions, please do not hesitate to contact Dr. Jan-Hendrik Niemann via email at [jan-hendrik.niemann@isl.eu](mailto:jan-hendrik.niemann@isl.eu) or by phone at +33 (0)3 89 69 52 51.



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