



# SNT

## PCOG lightning talks

Universal experimentation framework to simulate and test swarm of autonomous robots.

# Context

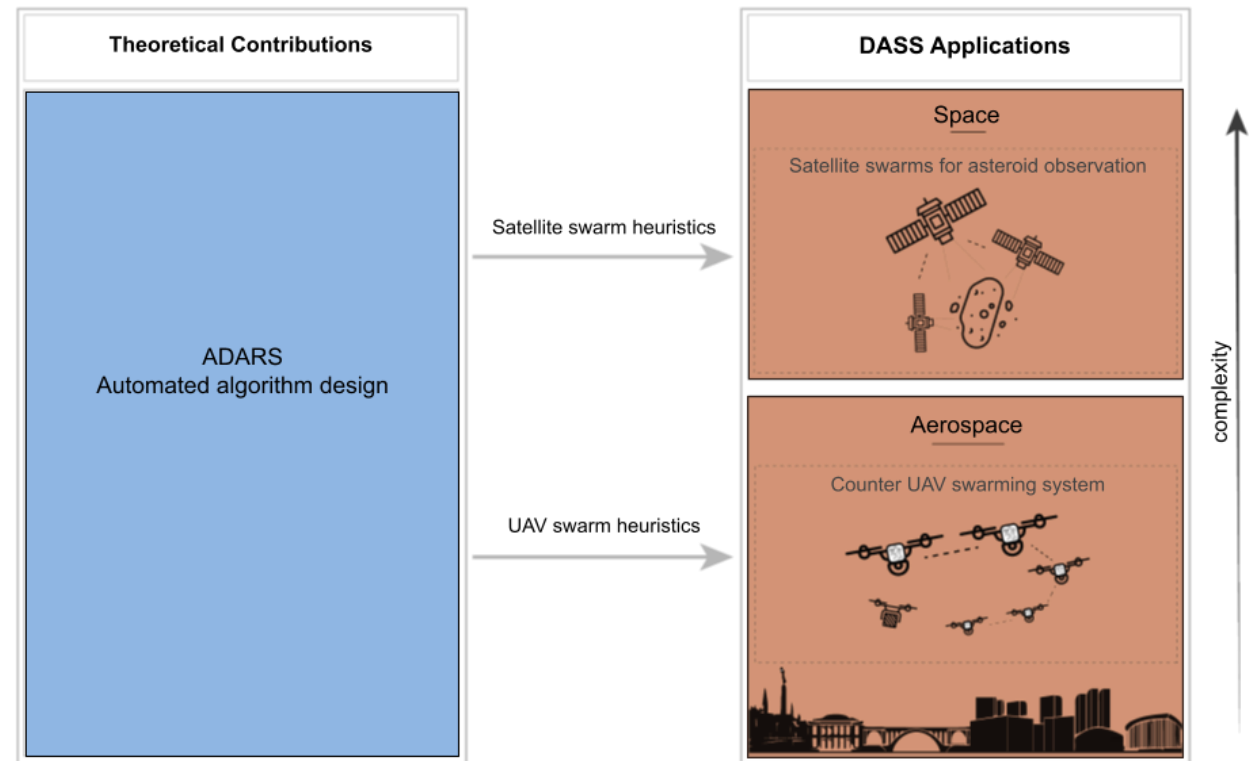
- Automating the **D**esign of **A**utonomous **R**obots **S**warm (ADARS)
- Distributed Aerospace and Space Systems simulation and testbed framework
- Validate generated swarming heuristics



# ADARS

A project at uni.lu

[adars.uni.lu](http://adars.uni.lu)



# SwarmLab and devices



## **GCtronic Epuck-2**

Little ground robots  
Well-Known on the research world  
Compatible model on Simulator ARGoS

## **Bitcraze Crazyflie 2.1**

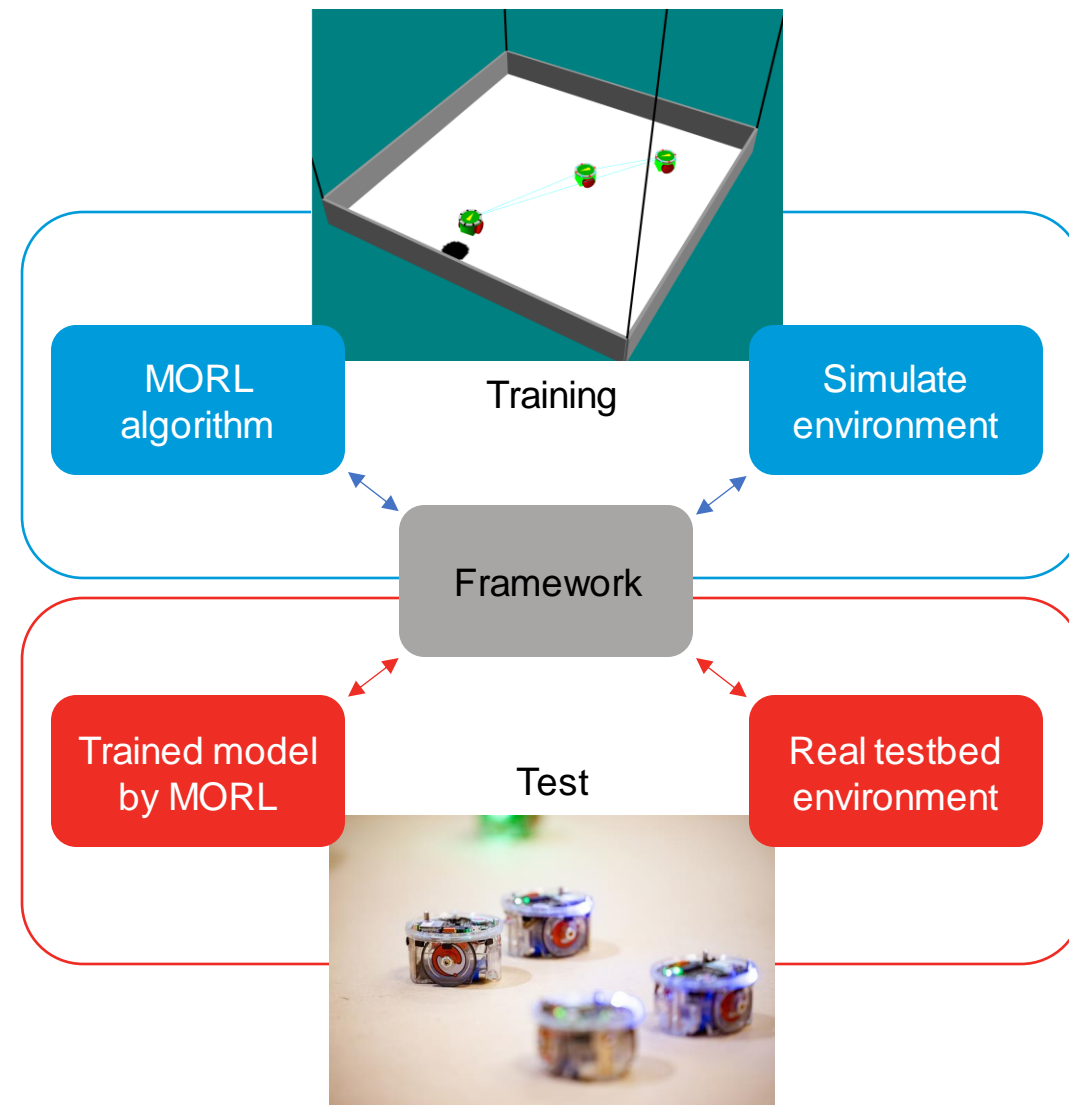
Tiny UAVs  
Well-known on the researcher world  
Simulate benchmark model under development

## **DJI M210 & M300**

Professional UAVs  
Famous in industrial sector  
No benchmark model for RL  
Integration on ARGoS in progress

# Universal Python Framework

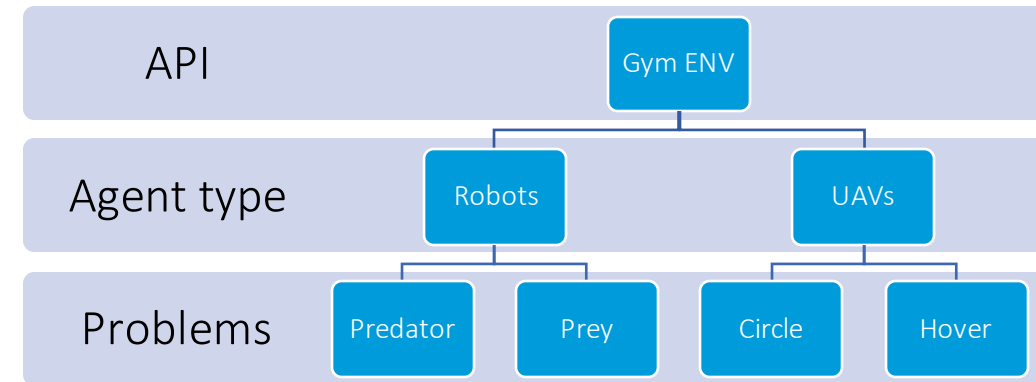
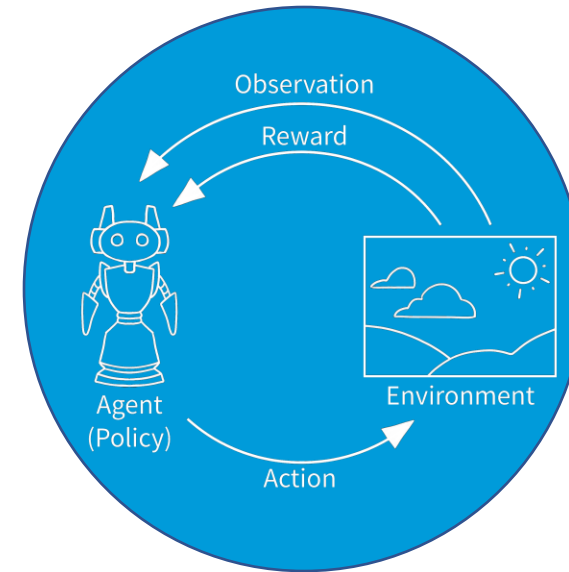
- One API for all environments (type of devices, numbers, physics).
- Multi-Objective Reinforcement Learning algorithm train on simulation through HPC
- The best trained model can perform action on real devices
- Based on Gymnasium Standard API for RL



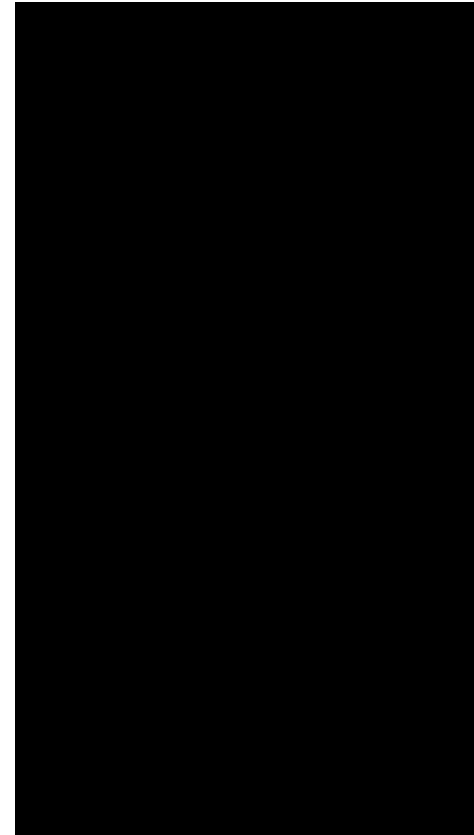
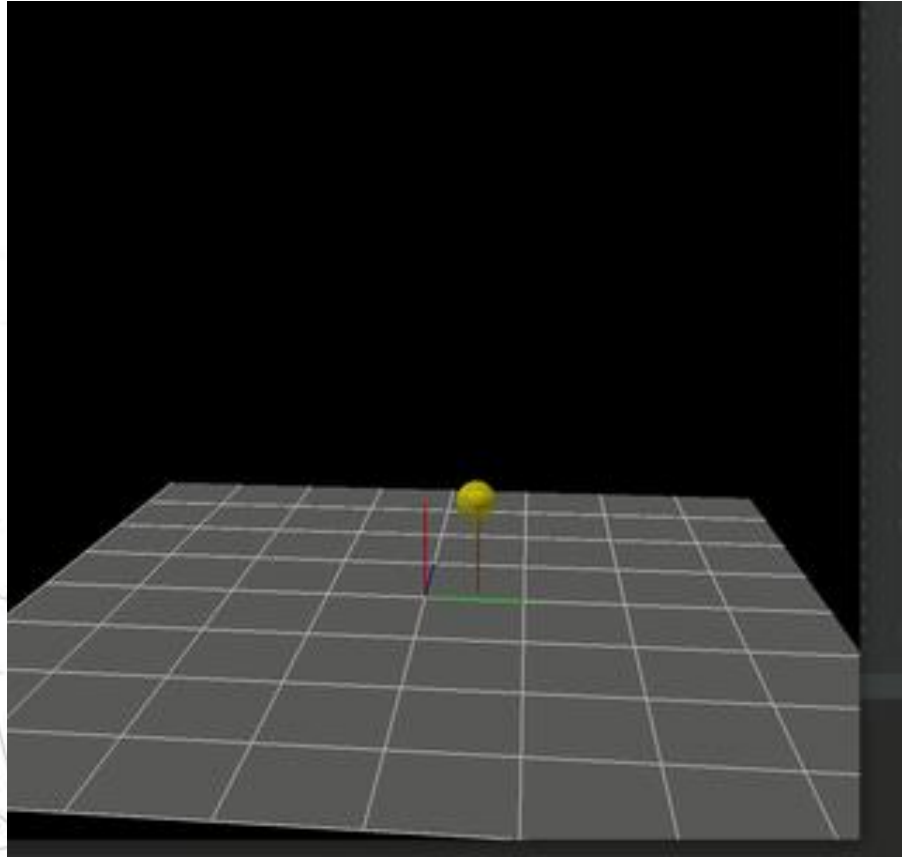
# Gymnasium standard API

In each problems we can define :

- Action space and computing
- Observation space and computing
- Reward computing
- Information feedbacks
- Terminated flag



# Demonstration



# Demonstration





# Thank you for your attention ! Take care of them !

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