

# CHAOS - Configurations Analysis of Swarms of Cyber-Physical Systems

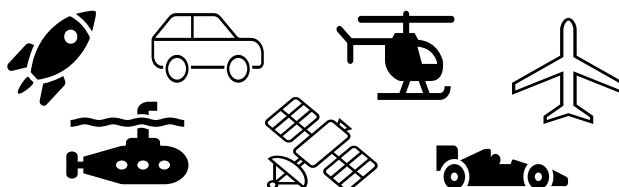
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## Cross - Configurations of Swarms of CPS

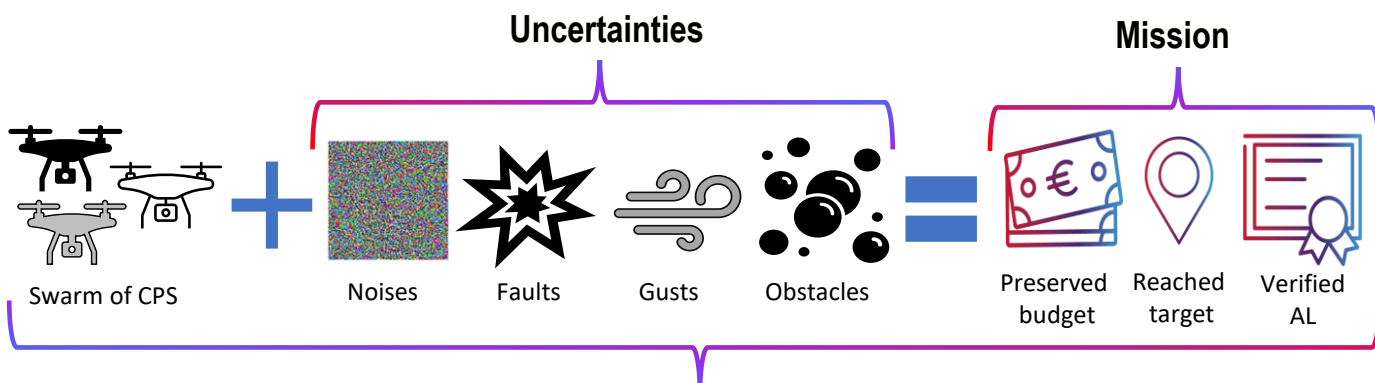
As core element of **Industry 4.0**, Cyber-Physical Systems (CPS) aim to represent a real system and when the latter is not available, engineers rely on **realistic simulations** of such systems.



Simulations reproduce their **authentic behavior**, but this latter can be unpredictable in case of **uncertainties** which are naturally present in real environments.

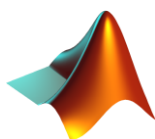
Given a mission it is essential to evaluate the **best configurations** and **features** that Swarms of CPS must have to ensure **the success of a mission** with a **high Assurance Level (AL)**, as well as to **minimize costs**.

## Simulation Scenarios



### Contributions

- ✓ A framework easy-to-use and extendable to tailor experiments as well as to model further models.
- ✓ A totally customizable case study which includes a huge set of scenarios.
- ✓ All of these entirely developed adopting MATLAB® and Simulink®, **de-facto industry standards**.



### Experimental Results

- ➔ An appropriate configuration was identified out of the 12264 analyzed that minimizes budget expense and ensures mission success with **96%** probability in all scenarios.

### Future Extensions

- ➔ Addition of Run-Time Reconfiguration, extra models and scenarios.
- ➔ Validation w.r.t. multiple Safety Industrial Standards.

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