PROJECT OBJECTIVES

ID4CS is a software environment dedicated to solve Multi-Disciplinary, Multi-Objective, Multi-Criteria Optimisation problems under uncertainties

- Based on Adaptive Multi-Agent Systems
  - Reacts to change on constraints or objectives or variables values during the execution
- Natural Domain Modelling for Optimization
  - Does not require problem reformulation
- Co-design
  - Enables interaction with designers at runtime and takes into account any changes provided by engineers. ID4CS does not restart from scratch and can take benefits from the previous solution
- Generic
  - Enables the designer to build his customizable workspace
- Numerous application domains
  - Complex systems design for aircrafts, engines, submarines, helicopters, cars, …

MODEL AGENT

- Model Agent ➔ a model of the problem
  - Goal: to maintain consistency between inputs and outputs
  - Relies on external optimizers
  - Receives and sends information and requests
- Variable Agent ➔ a design variable of the problem
  - Goal: to find a value which is the best equilibrium among all the requests it can receive
  - Receives requests and sends information
- Output Variable Agents ➔ an output of a model
  - Goal: to find a value which is the best equilibrium among all the requests it can receive
  - Receives and sends information and requests
- Objective Agents ➔ an objective of the problem
  - Goal: to reach its objective
  - Receives information and sends requests
- Constraint Agents ➔ a constraint of the problem
  - Goal: to satisfy the constraint
  - Receives information and sends requests

METHODOLOGY AND RESULTS

Adaptive Multi-Agent System Theory

- Decentralized problem solving
- Cooperation between interacting agents: try to help other agents which are less satisfied than themselves
- Local decision at the agent level

CONCLUSION AND PERSPECTIVES

Objectives of ID4CS reached

Future developments:
- To improve the MAS management tool
- To experiment the co-design with engineers
- To experiment optimization under uncertainties
- To take into account multi-level optimisation