



# swarm21 x GhostPlay



## MISSION

**swarm21 x GhostPlay aims to quickly generate both AI-based tactics of SEAD swarms and defense systems defending against SEAD swarms.**

To aim at this mission, we develop and operate swarm21 x GhostPlay, a high-performance habitat („Ghost“) to host and train different AI paradigms to learn smart and powerful AI-based defense tactics („Play“) – independent of operational platforms. At swarm21 x GhostPlay, the learned AI-based battlefield tactics are being evaluated for their effectiveness before they are being released for field operations and integrated to enhance existing or new platforms for defense.

## VISION

To transform the battlefield into an environment of ambient intelligence by leveraging AI to its full future capabilities, especially for mission-centric intelligent autonomous unmanned systems.

## swarm21 x GhostPlay FEATURES

01

**Model of the battlefield for AI training purposes.** An offline simulation and AI training environment (*“habitat”*) for AI developers that models real world battlefields with swarming and defense entities and their capabilities of sensing and fusing data into a situational awareness, of reasoning and of suppressing, defending and destroying the adversary.

02

**Contests of different AI paradigms to train optimal AI battlefield tactics.** In the *habitat*, different AI paradigms are being hosted and contested against each other to generate the most effective operational behaviour even in unknown and unexpected field operations. Called *“control strategies”*, AI-based tactics are being tested, with their effectiveness being evaluated in the Habitat before being released for integration and operations, e.g. in combat training systems. This is what a field operator would deal with in real life: the released control strategies.

# 03

**Red teaming.** In the *habitat*, AI will use offensive techniques not like those expected or used by a potential adversary. Effective evaluation of such techniques provides both insight into AI-based adversarial behaviour potentially different from existing RoE and exposes vulnerabilities of defense operations.

# 04

**Integrated ethical, legal, and societal impact assessment (ELSA).** The training and evaluation of AI tactics is accompanied by ELSA to validate AI behaviour against requirements of International Law and potential new societal requirements for defense AI. Insights are being considered as constraints of the AI training under a standard value-based design approach.

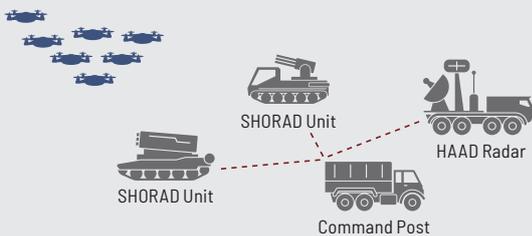
## BENEFITS

- Obtain context-aware, complex, and optimal multi-stage decision-making procedures for defense units
- Understand AI-based swarming tactics
- Understand vulnerabilities of both adversaries and defense units in an AI-enabled battlefield
- Become familiar with AI-based tactics when deployed in combat training systems
- Augment sensor-to-effector networks with platform-independent and mission-based AI tactics
- Applicable to multiple domains: air, sea, space

## SCENARIOS

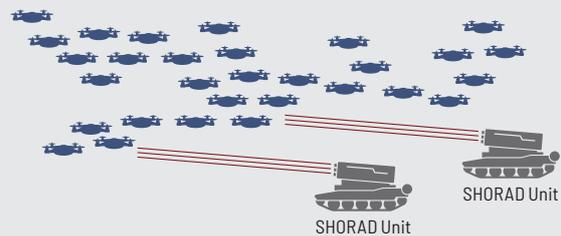
### SCENARIO 1:

SEAD swarm drones on a reconnaissance, operating autonomously in radio silence to avoid detection.



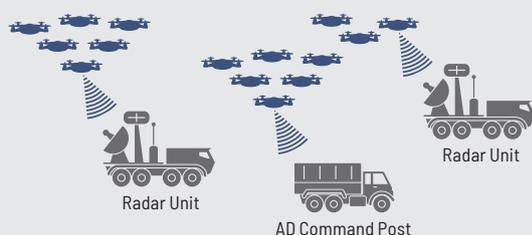
### SCENARIO 2:

Large number of SEAD swarm drones on a decoy mission aiming to saturate adversarial SHORAD system.



### SCENARIO 3:

SEAD swarm drones with EW capabilities performing a coordinated jamming mission against radar and communications units of adversarial AD system.



### SCENARIO 4:

SEAD swarm UAVs with effectors and EW capabilities performing a coordinated attack on the ground elements of adversarial AD system.

