HACKATHON CONCEPT OVERVIEW

This years' Swarm & Search AI event is a Capture the Flag competition – head-to-head, AI versus AI. Just like in the real world, you won't know what your opponent might do until the battle begins – how will your AI agent respond?

You'll be given a small swarm of drones, of different types and with different capabilities, and the challenge is to build an AI agent that can balance competing objectives to find and capture your opponent's flag and bring it home, whilst also defending your own flag. You will need to develop collaborative behaviors for your swarm that are resilient to whatever your adversary might do, and quickly learn from experience to avoid repeating mistakes. The team with the most flags captured within a set time limit will win.

It'll be exciting to watch, and fascinating see how the AI agents perform against each other. How you create the agent is up to you – whether rules-based, pure machine learning, or a hybrid approach, we want to see what you can do!

HACKATHON CONCEPT & RULES

The Hackathon will make use of the Multi-Agent Simulation Suite (MASS), being developed for Air Force Research Lab (AFRL) for this event by Georgia Tech Research Institute (GTRI). It builds on GTRI's established Scrimmage simulator, but refined for ease of use and integration with autonomous AI agents.

The challenge will be to build autonomous agents to control a small swarm of simulated drones, and compete head-to-head against other agents to "Capture the Flag" of the opposing team. Each time a flag is captured and returned to the capturing team's home zone, new flags are randomly placed and play continues. After a set amount of time, the team that has captured the most flags wins.

Teams will be given a number of platforms, of different types each with different capabilities. Some will have more effective sensors for searching, others will be capable of actually carrying the flag, whilst others may have an offensive or defensive capability to interact with your opponent – and the maximum speed will vary across your swarm.

At the start of each game teams will know the position of their own drones and their own flag, but nothing about the wider landscape or your opponent – your swarm must be used to build that picture. The scenarios have been carefully designed to ensure realistic and perhaps complex behaviors are needed to win – AI agents will need to learn when to use speed versus stealth, when to attack versus defend, and remember recent events in order to adapt their strategies accordingly. Collaboration across the swarm will be critical – using the right types of drone in the most appropriate roles, and sharing information and tasks across the swarm.

For the early stages of the competition teams will be given a sample agent – developed by Dstl and AFRL – to develop and benchmark against, prior to coming up against your real competitors. But teams should expect much more sophisticated opponents once the real competition begins, so your AI agents will need to be resilient and adaptable, continuing to perform well in the face of disruption, uncertainty and failure. As the competition progresses we may add additional complexities to the scenario – for example fuel limitations, disrupted communications with your drones, or a changing landscape.

We're really excited about this challenge. It's a big step up from FireHack, and we hope teams will find it challenging but rewarding – and it's a fantastic opportunity to see what we expect will be a huge variety of different approaches. And expect some tension in the grand final when the best of the US will be playing the best of the UK!