Real time interception of multiple targets by autonomous swarms of mobile robots (Ariel)

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There are situations that require capabilities beyond the scope of a single agent, such as a multitude of mobile targets being deployed where it is desired to intercept them. Man-in-the-loop situations are not sufficient to deal with monitoring, directing and communicating with a swarm of interceptors. Time and process constraints may also require the use of multiple cooperative autonomous agents working simultaneously, for example, as a swarm. In cooperative teams, individual members that appear to be independent, may work together to create a complex performance, e.g., where the whole is greater than the sum of its parts.

The autonomous mobile agents may be required to intercept a set of targets, e.g., static or dynamic targets, while avoiding collisions with dynamic obstacles. Until now, only very limited solutions exist for autonomous robots to intercept targets, and these are not guaranteed to reach all of them within a fixed time. They also lack effective internal communication in order to work cohesively in real time. There is thus a need for an optimized solution for deploying real time decision-making mobile robots able to converge on a set of moving targets.

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