Autonomous Network Self-Healing in Drone Swarms

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***Abstract*—This research reports the formation control method for a swarm of drones capable, after the loss of communication between a drone and the base station, of autonomously reorganizing to form a multi-hop relay chain.**
The proposed method is based on a virtual spring dumper model, where drones are attracted by preceding and following drones in the multi-hop relay chain, while being repelled by other drones in the swarm to avoid collisions.
The experiment was conducted in *ns-3*, a network simulator, where we modeled a swarm of drones communicating through radio signals and moving in a 3D space.
Results show that the proposed method is feasible and allows the swarm to successfully reorganize itself after the loss of communication of a drone, forming a stable multi-hop relay chain with intermediary drones positioned close to the geometric midpoint between preceding and following ones.

***Index Terms*—Drones, Swarm, Wireless, Flooding, Self-Healing.**