Researchers at the University of South Florida have developed tools and methods for distributed spatial control of swarms via multiplex information networks.

Currently, autonomous vehicles are growing in popularity and usage. The need to perform operations with dramatically increasing levels of complexity is growing as well. Multiple autonomous synchronized vehicles require advanced distribution information exchange rules in order to adapt to dynamic environments, which leads to control issues, such as spatial distribution. There is much room for improvement of the networks that control swarms of autonomous vehicles to provide more accuracy, control, and projection.

USF researchers have developed a novel generalized multiplex information network architecture which utilizes multiplex information networks for formation density control of multiagent systems. This novel approach is a great way to improve the network operating multiple autonomous vehicles and provide for more precise density, spatial distribution, and control. The novel information network architecture allows for an evolving spatially for adapting to dynamic environments, in turn effectively responding to human interventions. The novel approach also allows capable agents to spatially alter density of the resulting formation while tracking a target of interest without requiring any global information exchange ability.

**ADVANTAGES:**
- Increased density and spatial control among multiple autonomous vehicles
- Control of multiagent systems
- General linear dynamics

**Tools and Methods to Increase Distributed Spatial Control of Swarms of Autonomous Vehicles**

*Response of the multiagent system in Figure 1 with the proposed distributed control architecture (square denotes the capable agent, circles denote the other agents, solid lines denote the connected, undirected graph topology, and dashed lines denote trajectories of agents on a two dimensional space)*

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