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Multirobot Temporal Logic Optimal Control

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Behavior/Task Integration



UxV NCS



Human-Robot Interaction

Atomic primitives:

- Path planning
- Obstacle Avoidance
- Position Estimation



- Hierarchy Protocol – manages vertical conflict resolution
- Priority Protocol – manages horizontal conflict resolution
- Behavior Tree manages execution

Components for Behavior Automation of a UxV NCS

Impact

- The ability to rapidly integration horizontal and vertical behaviors offers the potential to rapidly increase autonomy in UxV NCS.
- While designed initially for expeditionary forces this applies to a wide set of DoD missions.
- Abstract behavior with UxV NCS specification permits independent behavior development.

Problem Statement

- With a hybrid autonomous/semi-autonomous UxV Networked Control System is it possible for rapid integration of user-defined behaviors?
- How to define abstract behaviors for a UxV NCS?
- How to simultaneously retain system performance while integrating many potential behaviors?

Candidate Solutions:

- AI/ML Behavior Trees and Robust Logistical Dynamic Systems

Transition

- USSOCOM is aggressively looking at integrating UxV NCS into Special Operations missions
- PMS-406 Unmanned Systems has a variety of systems that can be combined to form an UxV NCS to improve a wide selection of maritime mission objectives
- USMC is actively pursuing UxV teaming for expeditionary mission objectives