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***Abstract*—Detect-and-avoid is a crucial challenge in the autonomous navigation of single or multiple agent systems. For safe and reliable autonomous navigation in unknown and dynamic environments, obstacles should be sensed using onboard sensors and the trajectory should be adjusted accordingly. Additional challenge is introduced in the case of multi-agent systems, where the adjusted trajectory could introduce collisions between agents, for example in satellite swarms in Low Earth Orbits (LEO). The increasing amount of occupancy of the low orbit and the presence of space debris gives high risk of damaging satellites due to collisions. With communication between nearby satellites, cooperative methods enable the avoidance of collisions with dynamic obstacles while simultaneously finding an optimal trajectory of the cooperative agents. Drone swarms equipped in industrial settings encounter the challenge of navigating through a dynamic environments in a similar way. The dynamic obstacles are now other autonomous systems as well as humans, performing tasks simultaneously.**

In this work, we propose a detect-and-avoid method for multi-agent system, where a distinction is made between cooperative agents and non-cooperative agents, i.e., non-stationary obstacles. A factor graph approach is used to simultaneously estimate the state of both agent categories, followed by an optimal control method in order to adjust the trajectory of the cooperative agents, such that the non-cooperative agents are avoided. This method is fully distributed employing an ADMM approach for consensus on the control strategy.

In our poster, we would show through preliminary results that inclusion of the non-stationary behaviour of objects by distinguishing non-cooperative agents and cooperative agents, decreases the risk of collision. Anticipating the trajectory of the non-cooperative agents within the sensing region leads to an improved trajectory in terms of average direction changes compared to methods assuming stationary obstacles. Reaching consensus between cooperative agents on the control strategy has a similar effect on the average direction changes compared to non-cooperative methods.