Abstract: The main contribution of this paper is the experimental validation of a decentralized Receding Horizon Mixed Integer Nonlinear Programming (RH-MINLP) framework that can be used to solve the Multi-Vehicle Path Coordination (MVPC) problem. The MVPC problem features path-constrained vehicles that begin their transit from a fixed starting point and move towards a goal point along fixed paths so as to avoid collisions with other robots and static obstacles. This framework allows to solve for time optimal velocity profiles for such robots in the presence of constraints on kinematics, dynamics, collision avoidance, and inter-robot communication connectivity. Experiments involving up to five (5) robots operating in a reasonably complex workspace are reported. Results demonstrate the effect of communication connectivity requirements on robot velocity profiles and the effect of sensing and actuation noise on the path-following performance of the robots. Typically, the optimization improved connectivity at no appreciable cost in journey time, as measured by the time of arrival of the last-arriving robot.

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