Unmanned Aerial Vehicles (UAV) are expected to be used in many applications in the following years. However, autonomous flight is a real challenge, particularly UAV-to-UAV collision avoidance.

This report focuses on cooperative path planning algorithms developed during a semester project at Distributed Intelligent Systems and Algorithms Laboratory. The project aims to, at first, implement a path finding algorithm. For that, A*, a graph-based path finding algorithm was used. An optimization needed to be done on the graph used to be able to find the best path possible in the least time. A second optimization was done on the algorithm itself to reduce the number of turn in the final path.

The second objective of the project was to create a cooperation algorithm to allow multiple quadrotrors to flight to their respective goal the quickest possible while avoiding the others drones in flight. This was done in two different ways: a simple path booking algorithm at first and an aerial road creation algorithm in second. For the first solution, a simple penalty was added to each node in a path. This penalty was then used in the A* algorithm to find the shortest path with the least penalty. For the second solution, a directional penalty was added on each node part of a path. This penalty depends on the direction the drone is heading. That way, the algorithm can encourage drones to take a path a drone heading the same way took.

For the algorithms performance comparisons three metrics were used: the distance flew by each drone, the number of collisions and the number of potential collisions.