

The Effect of Intent on Conflict Detection and Resolution at High Traffic Densities

Marta Ribeiro, Joost Ellerbroek and Jacco Hoekstra
Control and Simulation, Faculty of Aerospace Engineering
Delft University of Technology, The Netherlands

Abstract— The use of drones for applications such as package delivery, in an urban setting, would result in traffic densities that are orders of magnitude higher than any observed in manned aviation. Such densities not only make automated conflict detection and resolution a necessity, but it will also force a reevaluation of aspects such as centralised vs. distributed, coordination vs. priority, or state vs. intent. This paper investigates the use of intent in tactical conflict detection and resolution at high traffic densities in unmanned aviation. Experimental results show that combining both current state and future intent information improved overall safety. Adding intent enables the detection, in advance, of conflicts resulting from future changes of state. A conflict resolution maneuver is optimal for safety when all aircraft deviate only minimally from their current state to solve the conflict. Consequently, they could deviate from the broadcast intent information. Therefore, state projection into the future must still be kept to prevent very short-term conflicts when intruders do not follow their original intent.