

**Automatic collision avoidance in commercial aircraft three dimensional flights, using neural networks and non-linear programming**

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In recent years there has been a great effort to convert the existing Air Traffic Control system into a novel system known as Free Flight. Free Flight is based on the concept that increasing international airspace capacity will grant more freedom to individual pilots during the enroute flight phase, thereby giving them the opportunity to alter flight paths in real time. Under the current system pilots must request, then receive permission from air traffic controllers to alter flight paths. Understandably the new system allows pilots to gain the upper hand in air traffic. At the same time, however, this freedom increase pilot responsibility. Pilots face a new challenge in avoiding the traffic shares congested air space. In order to ensure safety, an accurate system, able to predict and prevent conflict among aircrafts is essential. There are certain flight maneuvers that exist in order to prevent flight disturbances or collision and these are graded in the following categories: vertical, lateral and airspeed. This work focuses on airspeed maneuvers and tries to introduce a new idea for the control of Free Flight, in three dimensions.