

An Autonomous Free Airspace En-route Controller using Deep Reinforcement Learning Techniques

Joris Mollinga

University of Amsterdam
Amsterdam, The Netherlands
jorismollinga@gmail.com

Herke van Hoof

University of Amsterdam
Amsterdam, The Netherlands

Abstract—Air traffic control is becoming a more and more complex task due to the increasing number of aircraft. Current air traffic control methods are not suitable for managing this increased traffic. Autonomous air traffic control is deemed a promising alternative. In this paper an air traffic control model is presented that guides an arbitrary number of aircraft across a three-dimensional, unstructured airspace while avoiding conflicts and collisions. This is done utilizing the power of graph based deep learning approaches. These approaches offer significant advantages over current approaches to this task, such as invariance to the input ordering of aircraft and the ability to easily cope with a varying number of aircraft. Results acquired using these approaches show that the air traffic control model performs well on realistic traffic densities; it is capable of managing the airspace by avoiding 100% of potential collisions and preventing 89.8% of potential conflicts.