



Modeling aircraft routes in thunderstorm conditions

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We extend the existing deterministic research type global aviation model NAVSIM (developed by Prof. Rokitansky, University of Salzburg) by the effect of adverse weather with primary focus first on thunderstorms. Radar based observed thunderstorm developments are used, including the generation of new cells, cell growth and propagation deviation from the mean wind direction. We mimic the current way how thunderstorms are circumnavigated which emerges from a collaborative decision making process between ATC and pilot. Seemingly, there is a wide range of resulting 4d-trajectories, including complete ignorance of storms, very close passages, and also extremely cautious routes. The navigation algorithms to be presented use elements of robot theory to define the new route around the hazardous weather. We allow for various levels of environmental weather knowledge, ranging from common weather radar fields of view, over optimum visual conditions to “God’s” view, to study the benefit of additional knowledge. Results will be compared with actual observed routes in thunderstorm situations.