



Master Thesis:

Air Traffic Flow Management with Reduction of Conflict Probabilities in a Rolling Time Horizon

Task-Description:

The European airspace is one of the most congested airspaces in the world. Subsequently, there are many potential separation conflicts between planned trajectories. To reduce the number of conflicts, flight plans should be adapted without jeopardizing efficiency. Due to numerous disturbances, like missed baggage and late passengers, flights deviate from the planned schedule. During the course of a day, prediction of departure time becomes better the closer departure time gets. Air Traffic Flow Management (ATFM) in Europe is simulated over the course of a day with a rolling time horizon and optimized successively. This work shall extend the existing rolling time horizon by updated departure time forecasts. More exact departure predictions will be used to improve conflict probability reduction. The Institute of Air Transportation Systems provides a research model for the European ATFM, the Network Flow Environment (NFE), which provides system capacities, functions to compute conflict probabilities and a powerful solver for the optimization problem. The following tasks should be worked on:

- Get familiarized with ATFM and flight plan deconfliction
- Compute conflict probabilities depending on forecast-times
- Extend the rolling horizon with conflict probabilities
- Reduce conflict probabilities with the provided solver
- Study the conflict probability reduction over the course of a day
- Discussion and documentation

Requirements:

- Studies in Aerospace Engineering, Economic Mathematics, Operations Research, etc.
- Good knowledge in Air Traffic Management topics
- Motivation and ability to work independently and collaboratively
- High language proficiency of English and German
- Good programming skills (Matlab preferred, but not necessary)
- Accurate and reliable working style

Begin and duration:

From now on, for approximately 6 month.

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