

Kooperatives Air Traffic Management



Joined initiative with focus on co-operative air traffic management

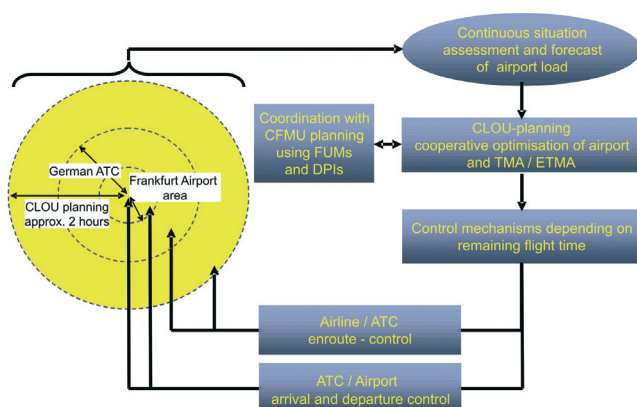
3rd National Aeronautical Research Programme

Federal Ministry of Economics and Technology, German Government

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Within the joined initiative 'Kooperatives Air Traffic Management', sponsored by the German 3rd National Aeronautical Research Programme and led by DFS Deutsche Flugsicherung GmbH, a consortium of eleven partner organisations representing an airport (Frankfurt), an airline (Lufthansa), an ATC provider (DFS), system manufacturers (Thales, Delair), an air framer (Airbus) and different research institutes (DLR, universities) is developing a co-operative planning mechanism, which will allow an optimal use of air traffic system resources in bottle-neck situations. Additionally, it is aiming for the reduction of the controllers' work load in cases of high demand.

The work focuses on the traffic processes of a major hub airport, accordingly Frankfurt was chosen as an example for applications. A coordinated arrival and departure sequence is provided by a new planning system **CLOU (Co-operative Local Resource Planner)**, that is adapted to actual traffic situations, based on airline, airport and ATC optimisation criteria or constraints. Core result of the optimisation will be runway use strategies, and arrival and departure target times at the runway system for the pre-tactical planning horizon of a couple of hours. The proposed process of handling air traffic around an airport is supposed to be a first step towards an 'On Time Service Concept' versus the usual practice 'First Come First Serve'.



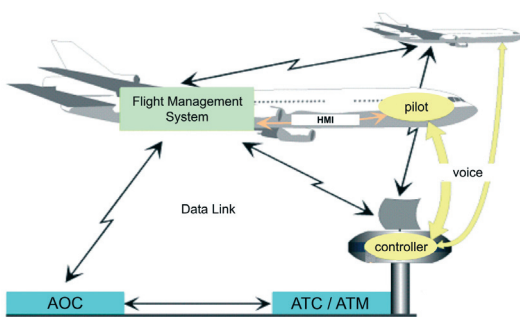
Process of co-operative planning and control

In addition to the co-operative planning device as a core aspect which is conducted in the sub-project named KOPLAN, the joint initiative also investigates how to implement the planned sequence, involving all possible actors (ATC, airport, airlines, aircraft). Due to the split-up of the joined initiative into sub-projects (SP), the SP KOPIM-ATC focuses on the development of a coordinated arrival- and departure manager, taking into account airline preferences as well as airport constraints.

To enhance the interaction between airside and ground processing, the airport-operator generates models to determine and consistently provide reliable and precise data concerning In-Block-Times, capacities and demand which is conducted in SP KOPIM-Airport.

The prime objectives of future Air Traffic Management systems for the air transport industry are to improve safety, increase system capacity, efficiency and predictability of Air Traffic Management processes and contribute to the maximising of airport operating capacity. This is to be achieved through a co-ordinated and balanced planning process, in which airspace users develop their schedules and preferred 4D profiles based on airspace information and a subsequent co-operative process to resolve commercially driven schedule imbalances is undertaken. The SP KOPIM-Aircraft focuses on a collaborative air and ground integrated ATM system for arriving traffic in the extended TMA that is predictive and coherent, aiming to deliver aircraft consistently according to user schedules and agreed trajectory sequences. 4D plans and trajectory coordination is provided or amended where feasible via data exchange through controller/pilot data link communications and trajectory exchange. Particularly with regard to the arriving traffic in the extended TMA the goal of the arrival manager (AMAN) is to collaboratively plan a target arrival sequence and aircraft target times of arrival aligned to expected aircraft operations as well as reducing operator work load by introduction of enhanced tools for conflict management and conformance monitoring. A Cost Benefit Analysis of K-ATM results will be supplied and requirements for future aircraft will be captured.

The work is accompanied by the investigation of safety related aspects within the SP 'Safety through Transparency' and by the SP GBAS (Ground Based Augmentation System), which will provide a basis for flexible approaches.



Air-ground collaborative mechanism for trajectory negotiation

The German K-ATM Partner organisations are:

- Airbus Deutschland GmbH
- Delair Air Traffic Systems GmbH
- Deutsche Lufthansa AG
- DFS Deutsche Flugsicherung GmbH
- DLR Deutsches Zentrum für Luft- und Raumfahrt
- Fraport AG
- Thales ATM GmbH
- Technische Universität Berlin
- Technische Universität Braunschweig
- Technische Universität Darmstadt
- Technische Universität Dresden

AT-One combines the strength of NLR and DLR in ATM Research

DLR

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