

PENGLI ZHAO

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RESEARCH INTERESTS

Air Traffic Management, Sequencing and Scheduling, Trajectory Optimization, Air Traffic Simulation.

EDUCATION

Nanjing University of Aeronautics and Astronautics, Nanjing *September 2017 - Present*
M.S. Candidate in Transportation Planning and Management, College of Civil Aviation
Research focus: Arrival Sequencing and Scheduling.
Advisor: Prof. Junfeng Zhang

Nanjing University of Aeronautics and Astronautics, Nanjing *September 2013 - June 2017*
B.S. in Air Traffic Management, College of Civil Aviation

FELLOWSHIPS & AWARDS

Foundation of Graduate Innovation Center in NUA	2018
Third-class Scholarship for Graduate Freshmen	2017

PROJECT EXPERIENCE

AMAN Performance Evaluation *December 2017 - November 2019*
Collaboration with Central South Air Traffic Management Bureau, CAAC

This project was aiming to analyze historical radar data to evaluate the potential benefits after using AMAN in Changsha Approach. I cooperate with a partner, my work focuses on radar data decoding and AMAN structure research. His work focuses on indicator selection and evaluation.

- Design and development of tool for radar data decoding and visualization.
 - Studied radar-encoding documentation.
 - Development of automatic decoding tool and trajectory visualization tool for analysis.
- Design of test scenarios for AMAN functions verification.
- Research based on KPI and arrival flight tightness.
 - Analyzed and clarified the KPIs and modeling for multi-objective optimization under CDO.
 - Research about the relationship between arrival tightness and computation time.

DST for AMAN under CDO *December 2017 - July 2019*
Collaboration with Boeing (China) Research and Technology and COMAC

This project was aiming to develop a Decision Support Tool (DST) for AMAN under Continue Descent Operation (CDO). It could receive real-time data from ATC simulator and make real-time sequencing and scheduling. My work focuses on functions development and experiment verification.

- Integration of trajectory prediction method for multi-type aircrafts.
 - 4D trajectory prediction for step-down and CDO based on BADA3 model.
 - Development of online trajectory prediction function.

- Design and development of sequencing algorithm and functions.
 - Algorithms development for sequencing with different objectives. FCFS and SA can be alternative according to the volume of arrival flights.
 - Support sequencing under different mode of operations and special case.
- Design and development of trajectory generation strategies.
 - Trajectory allocated suggestion based on Scheduled Time of Arrival (STA).
 - Trajectory generation strategies (route, height and speed scheduling).
 - Function realization of continually trajectory monitoring and deviation detecting.
- Design and development of AMAN
 - Missed-approach scheduling function and holding suggestion function.
 - Interface developed for timeline and aircraft display.
 - Programming with UDP sockets for AMAN and simulator connection.
 - Proficient with function development on Qt platform using C++.

RESEARCH EXPERIENCE

Criteria Selection and Multi-Objective Optimization for ALP

July 2018 - July 2019

- Criteria selection, reduction and model development of Multi-Objective Optimization.
- Algorithm design to solve the problem.
- Demonstration about the relationship between arrival flight tightness and computation time.

Multi-Objective Optimization Under CDO

March 2019 - July 2019

- Modeling based on the KPIs of terminal operation under CDO context.
- Experimented use public data and real case.

Composite Dispatching Rule-Based Method for Multi-Objective ALP

January 2018 - September 2018

- Adopted two stages method for sequencing and scheduling
- First, using Composite Dispatching Rule (CDR) to decide the sequence.
- Then, using CPLEX to calculate to scheduled time of arrival.

Sequencing of Arrival and Departure Flights on Parallel Runways

March 2017 - June 2017

- Algorithm based on Tabu search is implemented on single and parallel runways with arrival and departure flights.

PUBLICATIONS

Zhang, Junfeng, Pengli Zhao, Yu Zhang, Ximei Dai, and Dong Sui. "Criteria selection and multi-objective optimization of aircraft landing problem." *Journal of Air Transport Management* 82 (2020): 101734.

Zhao, Pengli, Junfeng Zhang, Songwei Liu, Dong Sui and Rong Hu. “Scheduling Landing Aircraft with Multiple Objectives under Continuous Descent Operation” In TRB 2020(**Poster Presentation**)

Zhao, Pengli, Junfeng Zhang, and Lubao You. “A Composite Dispatching Rule-Based Method for Multi-Objective Aircraft Landing Problem.” In CICTP 2019, pp. 4902-4913. 2019.

Zhang, Junfeng, Zhixiang Zheng, **Pengli Zhao**, and Rong Hu. “Multi-objective integrated arrival departure aircraft sequencing under the influence of sequential flights.” In 2018 Integrated Communications, Navigation, Surveillance Conference (ICNS), pp. 3B3-1. IEEE, 2018.

Zhang, Junfeng, **Pengli Zhao**, Dong Sui and Ximei Dai. “A new meta-heuristic approach for aircraft landing problem” *Journal of Computational and Applied Mathematics*, 2019 (Under Review)

SKILLS

Programming Language	C++, MATLAB, Python, SQL
Tools	Qt, Git, L ^A T _E X, Google Earth
Opearating System	Windows, Linux

LANGUAGE

Chinese & English	
TOEFL	93 (R28 \ L23 \ S20 \ W22)
GRE	V149 \Q167 \AW2.5

COURSE TAKEN

Flight Procedure Design, Air Navigation Study, Human Factors, Aeronautical Meteorology, etc.
 Mathematical Optimization Modeling, Operations Research, etc.

PERSONAL TRAITS

Highly Motivated and eager to learn new thing
 Strong determination and enforcement
 A stable personality and high sense of responsibility