



**UNIVERSITÀ
DEGLI STUDI
DI BERGAMO**

Dipartimento
di Ingegneria Gestionale,
dell'Informazione e della Produzione

Networking Seminars Series

A.Y. 2023-2024 2nd Term

February, 15th 2024, 1:00-2:00 pm (CET)
Room C001, Via Pasubio 7/B, Dalmine (BG)
Online on Microsoft Teams ([Link](#))

Presenter:

Wayne Ng

PhD Candidate

@ Singapore University of Technology and Design

TITLE – “An Optimization Approach for the Terminal Airspace Scheduling Problem”

ABSTRACT – Effective air traffic management within the Terminal Manoeuvring Area (TMA) is imperative for mitigating delays, minimizing fuel consumption, and reducing emissions in the aviation sector. While existing research has predominantly focused on optimizing runway sequencing, the Terminal Airspace Scheduling Problem (TASP) has been relatively understudied. This work addresses this gap by proposing an innovative matheuristic algorithm (TMAOpt) that concurrently optimizes both runway aircraft sequencing and decisions within the TMA, including runway selection, speed control, utilization of holding patterns, vectoring, and point merges. The proposed approach combines a Linear Programming (LP) model with metaheuristic algorithms, providing a unique solution approach that balances rapid generation of feasible solutions and convergence. Validation of our approach involved extensive evaluations using real-world data from the congested terminal airspace of Changi Airport in Singapore. Comparative analyses with existing methods, including commercial microsimulation models like AirTOP, showcase the performance of our algorithm, yielding sequences that reduce delays by up to 27%. A sensitivity analysis, exploring varying degrees of permitted TMA interventions, underscores the benefits of their balanced utilization.

METHOD – Linear Programming Model; Matheuristics

JOURNEY OF THE PAPER – Ng, W., Ribeiro, N. & Jorge, D. (2024). An Optimization Approach for the Terminal Airspace Scheduling Problem. *Transportation Research Part C* (In review).

Discussant – Paolo Malighetti

For further information please refer to: seminars.digip@unibg.it