

Identification of Significant Impact Factors on Arrival Flight Efficiency within TMA

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Abstract— An important step towards improving the flight performance within Terminal Maneuvering Area (TMA) is the identification of the factors causing inefficiencies. Without knowing which exact factors have high impact on which performance indicators, it is difficult to identify which areas could be improved. In this work, we quantify the flight efficiency using average additional time in TMA, average time flown level and additional fuel consumption associated with the inefficient flight profiles. We apply statistical learning methods to assess the impact of different weather phenomena on the arrival flight efficiency, taking into account the current traffic situation. We utilize multiple data sources for obtaining both historical flight trajectories and historical weather measurements, which facilitates a comprehensive analysis of the variety of factors influencing TMA performance. We demonstrate our approach by identifying that wind gust and snow had the most significant impact on Stockholm Arlanda airport arrivals in 2018.