

Design of a Vertiport Design Tool

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Abstract: Advances in technology are enabling the deployment of an Urban Air Mobility (UAM) transportation system for congested metropolitan areas. A key element of UAM are vertiports, the infrastructure that electric vertical takeoff and landing vehicles (eVTOLs) use to land and take-off. A Vertiport Design Tool (VDT) was developed for use by architecture firms designing vertiports to evaluate operational trade-offs between vertiport surface area and vehicle throughput. A stochastic Monte Carlo simulation was developed to calculate vehicle throughput for different vertiport design alternatives, safety risk, and noise constraints. Results show that for every 420 m² increase in vertiport surface area, the throughput increases by one vehicle per hour while the smallest allowable vehicle interarrival rate decreases by 5 minutes. Complex designs with staging areas decrease throughput but improve safety risk.

Keywords: Urban Air Mobility, Stochastic Simulation, eVTOL, Vertiport Operations