Scaling constraints for UAM operations on air traffic control, ground infrastructure and noise

Parker D. VASCIK

MIT

Short bios

Parker Vascik is an aerospace systems engineer whose research interests concern the intersection of emerging technologies, business, and policy. While rapidly advancing technology is enabling the development of a new generation of increasingly electric and autonomous aircraft, Dr. Vascik's research concentrates on the critical role that the systems and economics surrounding aircraft operations play in the ultimate viability and timeline for new aerospace products. Dr. Vascik is a research engineer at the International Center for Air Transportation at MIT. He previously served as a technical consultant supporting emerging mobility companies, airport operators, and government agencies and was a nominated expert to ICAO CAEP working group 4 where he contributed to the development and sustainment of international environmental policies. Key contributions to the aerospace industry include twenty technical papers, over a dozen invited presentations, and contributions to white papers including the Uber white paper on urban air mobility and Regent white paper on seagliders.

Abstract

The potential scale of Advanced Air Mobility (AAM) networks, and the resultant feasible market penetration for the many electric aircraft in development, will be limited by the ability of the operational system to accommodate the significant increase in flights envisioned by these AAM concepts. The key operational constraints to AAM scaling include air traffic control, takeoff and landing infrastructure, and community noise. The principal mechanisms through which each of these constraints limit the number of AAM operations in an area (i.e., the scale of the service) will be discussed as well as technical, ecosystem, or operational factors that influence these mechanisms. The overall objective of this work is to provide an abstraction of the workings of the key AAM operational constraints so that researchers, developers, and practitioners may guide their efforts to the mitigation approaches that are most likely to increase achievable AAM system scale.