Abstract: There are new vehicle designs proposed for autonomous, on-demand air mobility. However, less attention has been placed on the human-systems engineering challenges that may arise in managing fleets of such vehicles. This is critical to scale operations. Legacy railroad and airline operations centers may be good examples to consider. For over a century, they have relied on remote dispatchers for safe and efficient network management of railroads and flights. Yet, there are few tools available for stakeholders to explore concepts of dispatch operations with humans and automation. We present a novel tool that allows stakeholders to rapidly prototype operations. The basis of the tool is a discrete event simulation model that has been internally and externally validated. We show results of simulating both freight and commuter railroad operations with initial results of airline operations, including short- and long-haul flights. The prototyping tool will be accessible as an open platform for future investigation of any transportation system. Our findings contribute to the theoretical understanding human performance modeling. And finally, we make a practical contribution with this tool that analysts and executives alike can use to support evidence-based design and staffing decisions.

Bio: Victoria Chibuogu Nneji is a PhD candidate at Duke University's Department of Mechanical Engineering in her hometown of Durham, North Carolina. She specializes in robotics, transportation, and human-systems engineering in the Humans & Autonomy Lab there. Victoria earned her Master of Engineering Management also from Duke, and BS in Applied Mathematics, with a minor in Entrepreneurship & Innovation at Columbia University in New York. Working with Professor Missy Cummings, Victoria has led projects with NASA and the DOT on modeling remote operations centers for autonomous vehicle networks in rail and air transportation systems. Victoria is on a mission to design a better future of mobility on Earth and in Space by integrating human factors considerations into strategies for operations with advanced technologies.