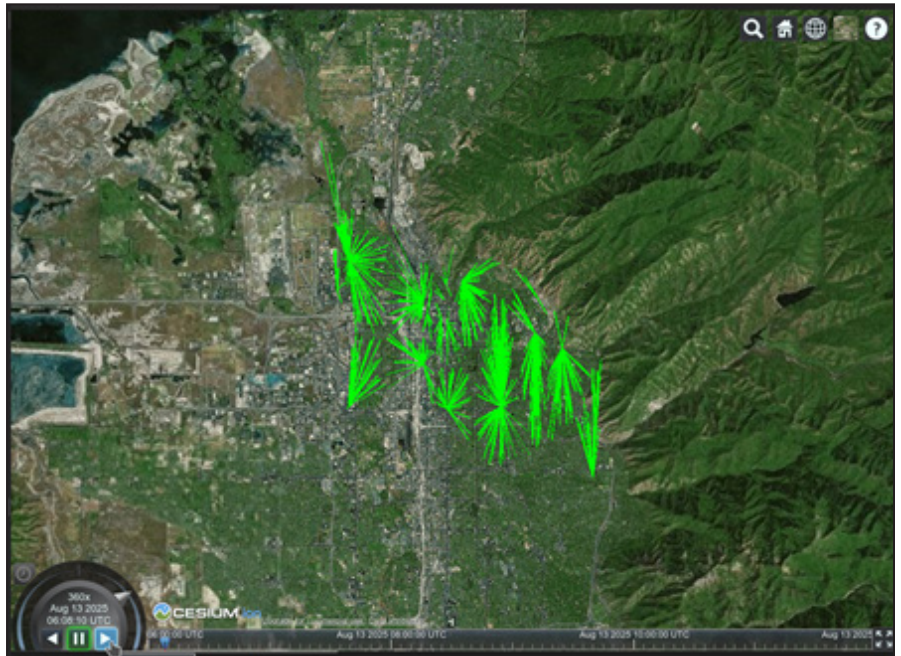


MOUNTAIN-PLAINS CONSORTIUM

RESEARCH BRIEF | MPC 24-512 (project 636) | January 2024

Strategic Deployment of Drone Centers and Fleet Size Planning for Drone Delivery in Utah



the ISSUE

Regulators, policymakers, and industry stakeholders need a data-driven framework for assessing the energy costs and trade-offs of large-scale drone delivery in the state of Utah.

the RESEARCH

The primary objective of the research was to produce a web-based platform that takes inputs of a statewide road network, the total number of (drone-deliverable) packages to deliver on a given day and their destinations, and energy and cost assumptions per vehicle and produces a statewide airspace network, delivery schedule, and truck/drone fleet mix. A secondary objective is to understand the impact of such truck/drone fleet mix models to determine whether such a hybrid approach is more cost and energy efficient when compared with the current truck-only delivery model. This is built upon the optimization framework developed in this project to ensure that drones are strategically deconflicted as required by NASA and that the total energy over a day is minimized. This research involves three major components: data collection, optimization model development, and web-based platform development.



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Colorado State University
North Dakota State University
South Dakota State University

University of Colorado Denver
University of Denver
University of Utah

Utah State University
University of Wyoming



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Project Title

Strategic Deployment of
Drone Centers and Fleet Size
Planning for Drone Delivery
in Utah

Sponsors | Partners

Utah Department of
Transportation

USDOT, Research and
Innovative Technology
Administration

the FINDINGS

Researchers developed a web-based platform, named the Utah Advanced Air Mobility Simulator (UAAMS) to enable researchers, planners, and practitioners to record and update assumptions about the distribution of vertiports, traffic, population, and other requirements that may affect the operation of the transportation network. These parameters are important, not only for considering the feasibility of unmanned aircraft systems (UAS) package delivery within the state, but also for determining the impact and ultimately the efficient operation of drone delivery. UAAMS allows UDOT to assess different assumptions of the model and run “what-if” scenarios by generating animations of the optimized airspace network.

the IMPACT

The UAAMS platform provides the state with more clarity about the energy impacts of large-scale drone delivery, as well as a viable airspace network. The tool can further inform the UDOT Division of Aeronautics to develop policies and negotiate with industry stakeholders.

For more information on this project, download the Main report at <https://www.ugpti.org/resources/reports/details.php?id=1154>

For more information or additional copies, visit the Web site at www.mountain-plains.org, call (701) 231-7767 or write to Mountain-Plains Consortium, Upper Great Plains Transportation Institute, North Dakota State University, Dept. 2880, PO Box 6050, Fargo, ND 58108-6050.



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