



UTC Project Information – Center for Transportation, Environment, and Community Health	
<i>Project Title</i>	Modeling and Evaluating Multimodal Urban Air Mobility
<i>University</i>	University of South Florida
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<i>Total Project Cost</i>	\$264,386
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<i>Start and End Dates</i>	10/01/2019 – 09/30/2021
<i>Brief Description of Research Project</i>	<p>Traffic congestion has been one of the leading issues around the world. The emerging concept of urban air mobility (UAM) is expected to provide a new solution by making use of the three-dimensional airspace to transport passengers and goods in urban areas. UAM application is based on a new type of electric aircraft that is enabled to take off and land vertically (eVTOL) and embedded with advanced autonomous and distributed propulsion technology. Compared to traditional aircraft like helicopters, eVTOL will provide safer, more efficient, and quieter air transportation service in urban areas. One of the greatest identified challenges for UAM application is to build well-distributed infrastructure to support eVTOL aircraft operations, specifically vertiports (or sky ports), where eVTOL aircrafts takeoff and land, onboard or disembark passengers, and get charged. Vertiport locations should be carefully selected with consideration of its connection with the existing multimodal transportation system, impact on potential UAM demand, and system performance.</p> <p>In this project, researchers developed an integrated mathematical model to design an on-demand UAM operation network and estimated the diverted demand from ground transportation to UAM. Specifically, they solved the problem of vertiport optimal location and travelers’ mode choice simultaneously. The choice of using UAM takes selection of access and egress modes into the generalized travel cost formula and compares that with the cost of using pure ground transportation. The results of this integrated model include the optimal locations of the vertiports, the diverted demand that UAM</p>

will attract from ground transportation, allocation of users to each vertiport, and access and egress modes of users reaching and leaving vertiports.

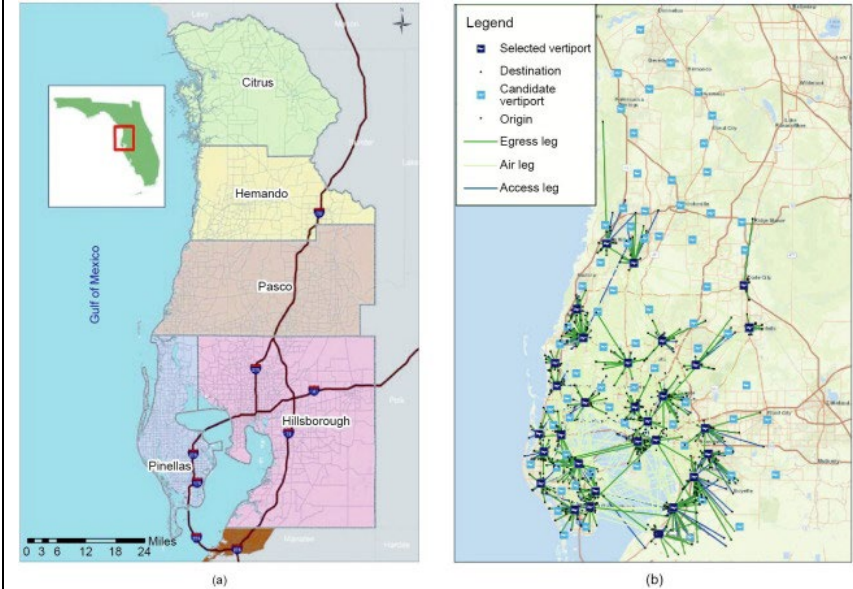
Tampa Bay was used as the case study and sensitivity analysis was applied to understand the impacts of different parameters on the model results. They have tested the number of vertiports, pricing schemes, and the compounding effect of both. From the sensitivity analysis, we can see that for the Tampa Bay region, there is an upper limit on how many vertiports need to be constructed for on-demand UAM. It also provides insights for operators to determine pricing schemes while introducing the service.

*Describe Implementation of Research Outcomes (or why not implemented)*

*Place Any Photos Here*

From a methodological point of view, this study extended the existing literature on UAM by introducing an integrated network and mode choice modeling framework.

Florida has been a hot area attracting multiple, potential UAM operators to explore future implementation of on-demand UAM service. This study provides information to regional transit agency, MPO, and other stakeholders while discussing with the UAM operators for developing a UAM network in Florida.



*Impacts/Benefits of Implementation (actual, not anticipated)*

This study advanced the literature in vertiport siting while considering mode choice of potential users. It is the first integrated model developed for merging on-demand urban air mobility (UAM).

This work has been presented at Florida’s FSUTMS users’ group meeting. FSUTMS (Florida Standard Urban Transportation Model Structure) is used to represent a formal set of modeling steps, procedures, software, file formats,



	<p>and guidelines established by the Florida Department of Transportation (FDOT) for use in travel demand forecasting throughout the state. The users' group includes modelers from industry and public agencies. The presentation increased the UAM knowledge of attendees and triggered an in-depth discussion on how to model UAM in FSUTMS.</p>
<p><i>Web Links</i></p> <ul style="list-style-type: none"><li>• <i>Reports</i></li><li>• <i>Project website</i></li></ul>	<p><a href="http://ctech.cee.cornell.edu/final-project-reports">http://ctech.cee.cornell.edu/final-project-reports</a></p>