Grant Deliverables and Reporting Requirements for UTC Grants

UTC Project Information	
Project Title	Redesigning Mass Transit Systems to better integrate with Mobility-On-Demand Systems
University	Cornell University
Principal Investigator	Samitha Samaranayake
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Funding Source(s) and Amounts Provided (by each agency or organization)	Federal: $73,658 Cornell: $40,063
Total Project Cost	$113,721
Agency ID or Contract Number	Sponsor Source: Federal Government CFDA #: 20.701 Agreement ID: 69A3551747119
Start and End Dates	Start date: 11/30/2016 End date: 08/31/2018
Brief Description of Research Project	The rapid growth of Mobility-on- Demand (MoD) services such as Uber, Lyft and car2go, and more recently ridepooling options such as Via and Bridj, are a clear indication of consumer demand for more flexible and convenient transit services. These services allow users to access a fleet of shared vehicles by simply using a smart-phone to request a vehicle. Thus, MoD services provide the convenience of a private car without the hassles of maintenance, financing, insurance etc. While these services have the potential to improve urban transportation and pave the way for more scalable and sustainable transportation systems, it is not clear that this will in fact be the case in their current form of operating as isolated services. In this work, we wish to develop fundamental theory that may enable MoD systems to integrate and collaborate with mass-transit systems, and provide a more scalable and sustainable unified urban mobility service. In particular, we will develop theory that characterizes the fundamental limitations of a system that intends to leverage both flexibility and dynamic high capacity ridepooling in real-time. We will model this service as a variation of the set cover problem, and we will study the theoretical performance limits of such a model. We will propose a competitive algorithm that enables the real-time operations of

	such MoD system. The intent is to enable the operations of an integrated system that is both more efficient to operate and provides a better user experience.
Describe Implementation of Research Outcomes (or why not implemented) Place Any Photos Here	The research outcomes are fundamental theory that characterize the limits on the operational performance of the proposed real-time mobility system. Since the work is theoretical, the research outcomes do not include an implementation.
Impacts/Benefits of Implementation (actual, not anticipated)	The impact of this work is the development of fundamental theory that expands our understanding of the benefits and limitations of a MoD system that wishes to leverage both route flexibility and dynamic high capacity ridepooling in real-time. We model this as a variation of the set cover problem, and that analysis may also be of independent interest.
Web Links⌷SEP⌷ • Reports • Project website	http://ctech.cee.cornell.edu/final-project-reports/