

## USER-CENTERED HETEROGENEOUS DATA FUSION FOR MULTI-NETWORKED CITY MOBILITY (NETCITY)

- ▶ Award#1640587
- ▶ Award Date: Aug.20.2016
- ▶ Reza Arghandeh (PI)
- ▶ Eren Erman Ozguven (Co-PI)
- ▶ Jinghui Hou (Co-PI)

PIs are with departments of Electrical and Computer Engineering, and Civil Engineering, and School of Communications in Florida State University. This project is supported by a collaboration with the City of Tallahassee.

### ► CHALLENGES

Urban mobility is a multidimensional characteristic of cities, experienced as layers of interconnected infrastructures, places, people, and information. As a result:

- ▶ The study of mobility should go beyond transportation systems and merge with other infrastructure systems and information networks.
- ▶ There are no indices to measure the urban mobility concept from a sociotechnical perspective, which considers interdependency and interconnectivity among different infrastructure and citizens.
- ▶ There is lack of user-driven approaches for urban mobility management.

### ► CONTRIBUTIONS

- ▶ The NetCity is a novel approach for characterizing and quantifying mobility in a sociotechnical urban system. This approach highlights interdependency and interconnectivity between infrastructure networks.
- ▶ The NetCity also presents a framework for heterogeneous urban data fusion.
- ▶ The NetCity employs a user-centered design approach to promote city residents' adoption of the urban technology platforms, and encourage their engagement with the social platforms.

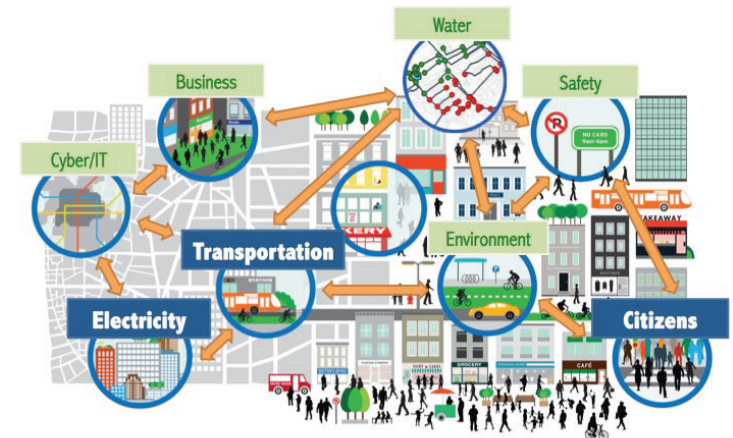
### ► BROADER IMPACT

- ▶ The NetCity will be able to bring measurable mobility benefits and improve Tallahassee residents' experience in terms of lowering energy consumption, reducing congestion, crashes and traveler frustration, and providing a more streamlined and cost-effective system to operate and maintain the city.
- ▶ The PIs will engage students in the literature review, data analysis, modeling tasks, and social sciences methods. The data analysis work will expose (under)graduate students to many engineering and socio-technological issues, including traffic operations, electricity networks, user technology design. We believe such training will contribute to the creation of a well-educated workforce.
- ▶ The PIs will also involve Tallahassee citizens in the research process, providing them introduction and education regarding issues centered around smart city development.

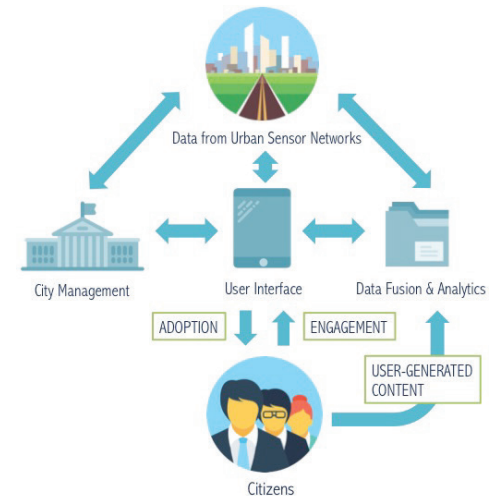
### ► SCIENTIFIC IMPACT

- ▶ The NetCity project provides a mathematical and analytical framework for citizen centric multi-network system such as Urban Cyber-Physical Systems that involve very large volume of heterogeneous data from different layers of the city.
- ▶ The NetCity project also aims to explore a user-centered approach to understand smart city technology adoption and use, which has been highly valued yet largely understudied in previous literature.

### ► URBAN CYBER-HUMAN-PHYSICAL ECOSYSTEM



### ► CITIZEN-CENTRIC CITY MANAGEMENT



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## PUBLICATION ACTIVITIES

J. Cordova, A. Kocatepe,  
 R. Arghandeh, E. Ozguven,  
 M. Olhsen, J. Powell,  
 Integrated transportation  
 and electricity monitoring  
 and management (item2)  
 in the city of tallahassee a  
 case study for a medium  
 size city. Submitted to 20th  
 EURO Working Group on  
 Transportation Meeting,  
 September 2017,  
 Budapest

## ▶ TASK PROGRESS

Task 1. Defining urban mobility in smart cities and develop its measuring indices

- ▶ This task has been started with literature review on exciting methods in transportation and urban planning.

Task 2. Interconnectivity & Interdependency model (i2Model) for Multi-network Infrastructure

- ▶ Several neighborhoods are selected for the case study.
- ▶ Our team is working with the City to acquire transportation and electricity network models.

Task 3. Data mining and data cleaning I

- ▶ Our team is working with the City and Florida Department of Transportation to analyze the electricity load data and traffic data. NDA is in place.

Task 4. Heterogeneous Data Fusion for Multi-networked City Mobility (UHDNetCity) Tool

- ▶ This Task will start in January 2017.

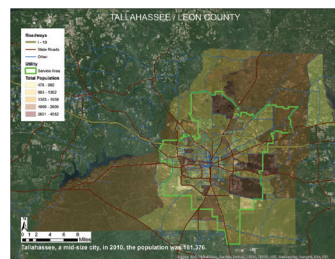
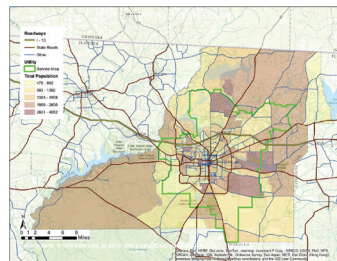
Task 5. Demonstrate and validate the urban mobility characterization tool

- ▶ This task will start in March 2017.

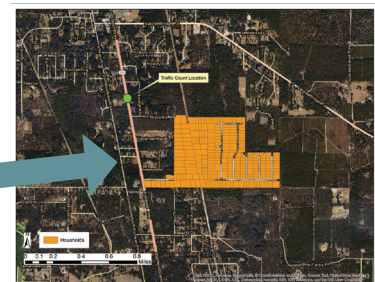
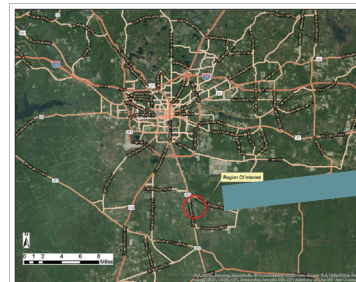
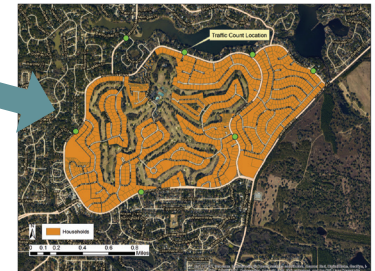
Task 6. A user-driven play-centric design approach for adoption and engagement

- ▶ PI Hou has acquired IRB approval. Hou has also initiated collaboration with the operation management team of the DigiTally Mobile App.
- ▶ Our team has started working on user data collection and focus groups preparation.

## ▶ CITY OF TALLAHASSEE



## ▶ NETCITY NEIGHBORHOODS



## ▶ OUTREACH ACTIVITIES

- ▶ Started collaboration with the FSU Local Governance Research Lab on Smart City
- ▶ Governing Policy using NetCity
- ▶ Reached out to other cities to expand the our use cases in future research

## ▶ MEDIA COVERAGE ON THE NETCITY PROJECT:

Oct 13. 2016" Project is featured on the FSU News.



Oct 24. 2016: Interview with FSU View.



Oct 12. 2016: Interview with Florida Public Radio, WFSU.

