

Fujitsu-SMU Urban Computing & Engineering (UNiCEN) Corporate Lab 都市计算工程企业研究所

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Overview of UNiCEN



Part of the Fujitsu-ASTAR-SMU Centre of Excellence (CoE) in Urban Computing & Engineering

- Established on 15 Oct 2014
- Objectives
 - Joint capabilities in data analytics and computing to meet urban and urban-related social needs
 - Public-private partnership involving A*STAR, SMU and Fujitsu
 - Develop solutions to address local urban challenges and conduct test-bedding in Singapore for future Fujitsu capabilities and commercial solutions

New \$54m centre to study congestion in Singapore

By LESTER HIO

CROWDS and congestion – these are two words familiar to people living in Singapore. Many often grapple with how to get in and out of crowded events and places in the fastest and smoothest way.

Fittingly, congestion and its solutions are some of the things to be studied at the \$54 million Urban Computing and Engineering Centre of Excellence launched in Singapore yesterday.

The centre is a five-year partnership between the Agency for Science, Technology and Research (A*Star), Singapore Management University (SMU) and Japanese information and communication technology company Fujitsu. It will study the flow of traffic, both human and vehicular, and model simulations to test how Singapore can ensure smooth traffic flow in crowded areas.

Straits Times, Oct 16 2014

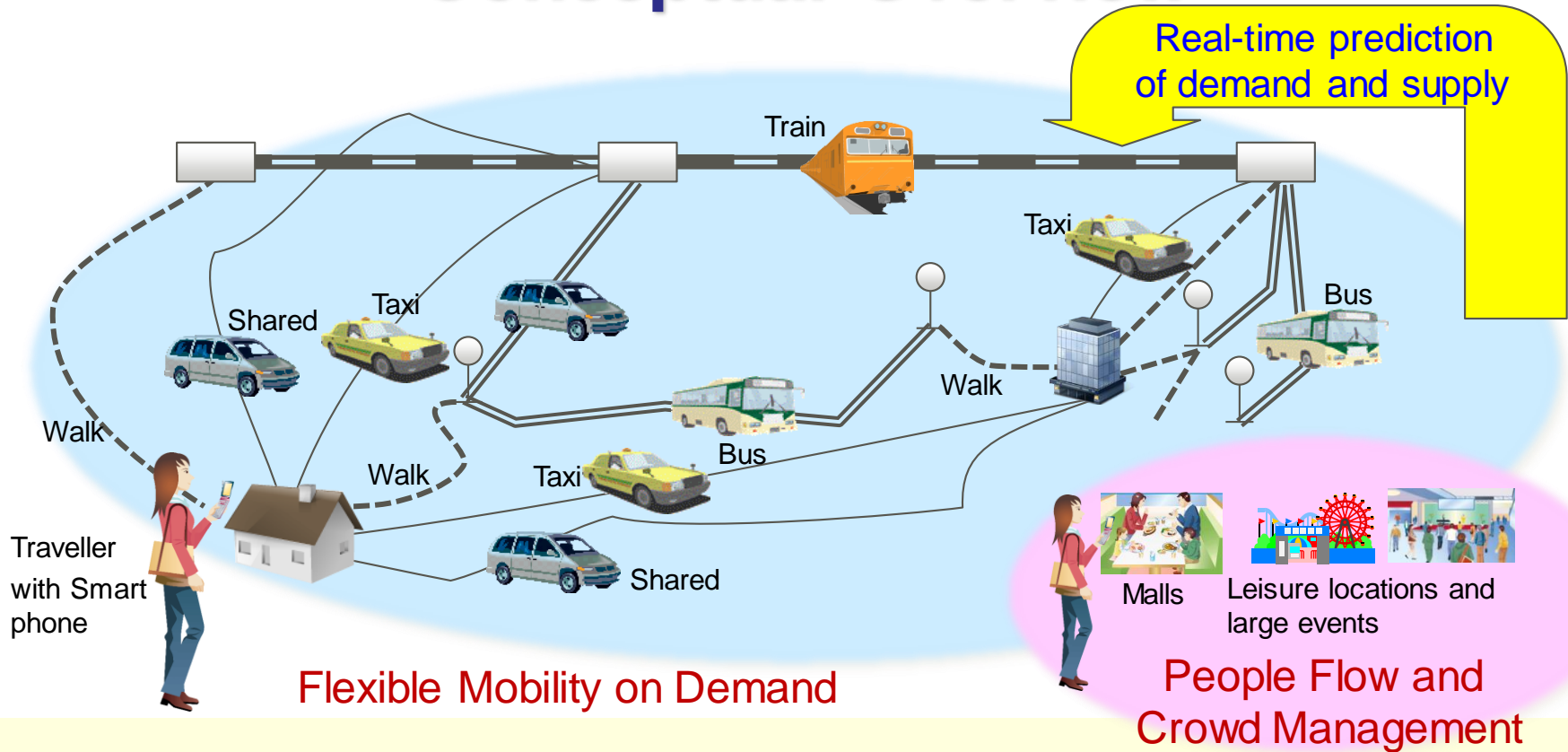
Overview of UNiCEN

- Funded by Fujitsu Ltd and the Singapore National Research Foundation (NRF)
- **Mission:** To develop methods and tools for managing resources in crowded cities or urban spaces with sudden buildup of crowds and freight
 - *“Adding Capacity without Building Capacity”*
- **Test-bedding** in real-world settings with partners in Singapore and Japan
- From sense making to decision making

Research Areas (Phase 1)

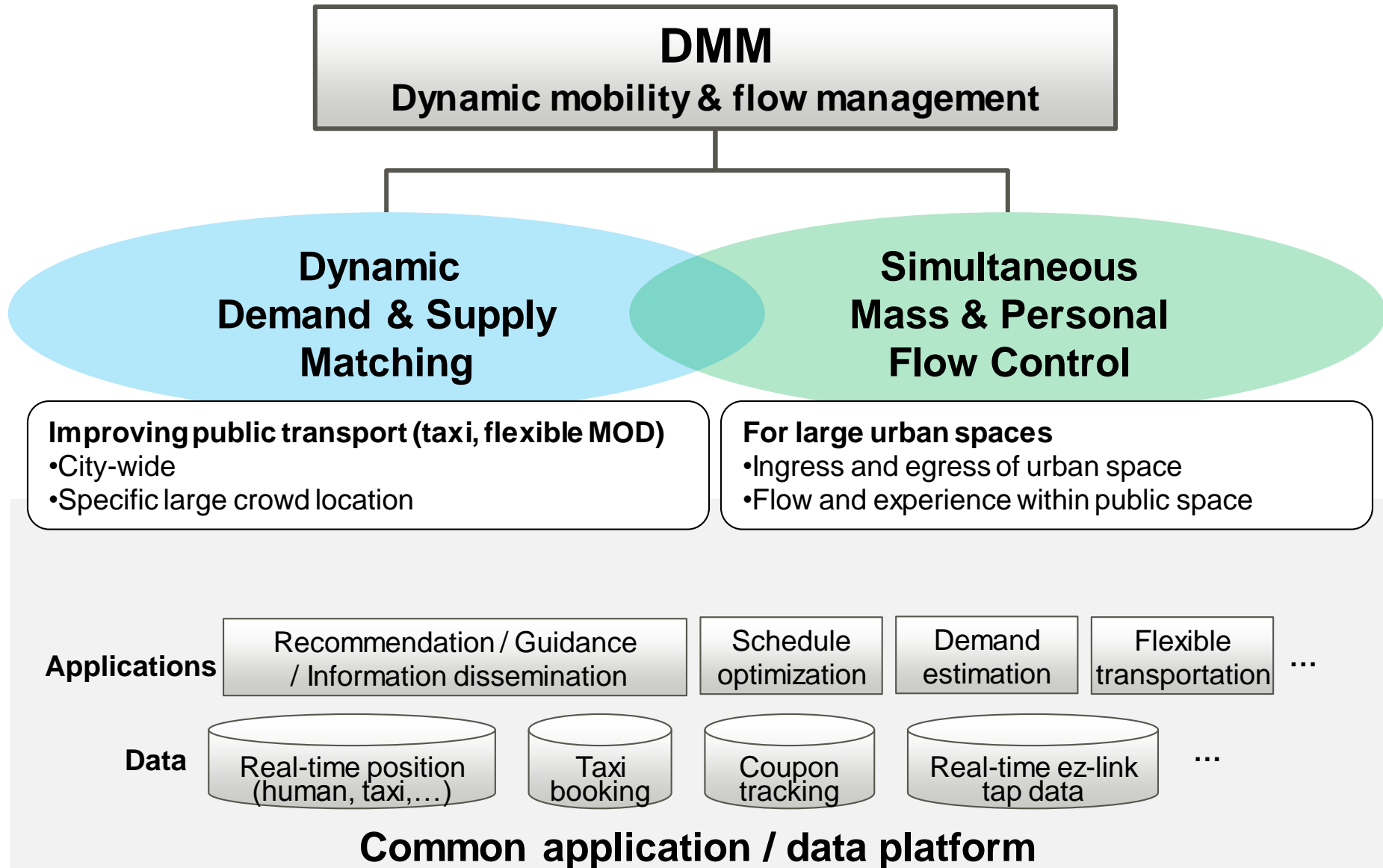
- Dynamic Mobility and Flow Management (DMM)
- Maritime, Port and Logistics Optimization (MPO)

Dynamic Mobility and Flow Management: Conceptual Overview



- To understand and improve people **mobility** and **experience in large urban spaces**, especially under extreme conditions and surges
- To develop methods and a new service platform, combining research in data and decision analytics, modeling and simulation, and behavioral modeling, mechanism designs and experimentation

Dynamic Mobility and Flow Management: Research Overview



Dynamic Mobility and Flow Management: Research Perspective

- Large-scale multi-agent planning, applied to crowd coordination and dispersion in dynamic/uncertain environments
- Integrated sense and response
 - **Operational/Real-time analytics**: identify patterns, anticipate irregular demand surges, detect imbalance in mobility demands and supplies
 - **Decision making**: take into account predictions based on real-time and historical analytics, and produce plans and schedules for individual travelers and enterprise resources
- Address extreme demand scenarios, using existing infrastructure designed for steady-state demand

Dynamic Demand and Supply Matching (of Taxis)

- Movement **recommendation** for taxi drivers
 - Goals: Improve taxi availability for customers, improve number of jobs/revenue for taxi drivers
 - When to move?
 - Where to move?
 - How to provide decision support to drivers?
- Design of **incentives & mechanisms** for the fleet
 - Goals: Better serving remote locations, hiring and retaining taxi drivers
 - What kinds of mechanisms?
 - What kinds of incentives?

Simultaneous Mass and Personal Flow Control

- Ingress:
 - Parking
 - Wayfinding
- Egress:
 - Crowd management through to guidance to the right transport mode so as to maximize the disperse rate
 - Ride-sharing
 - Post-event/Emergency [shuttle buses bridging](#)
- Flow *within* facility:
 - [Agent-based simulation of crowds](#)
 - Personalized planning of activities and recommendation for shopping and F&B

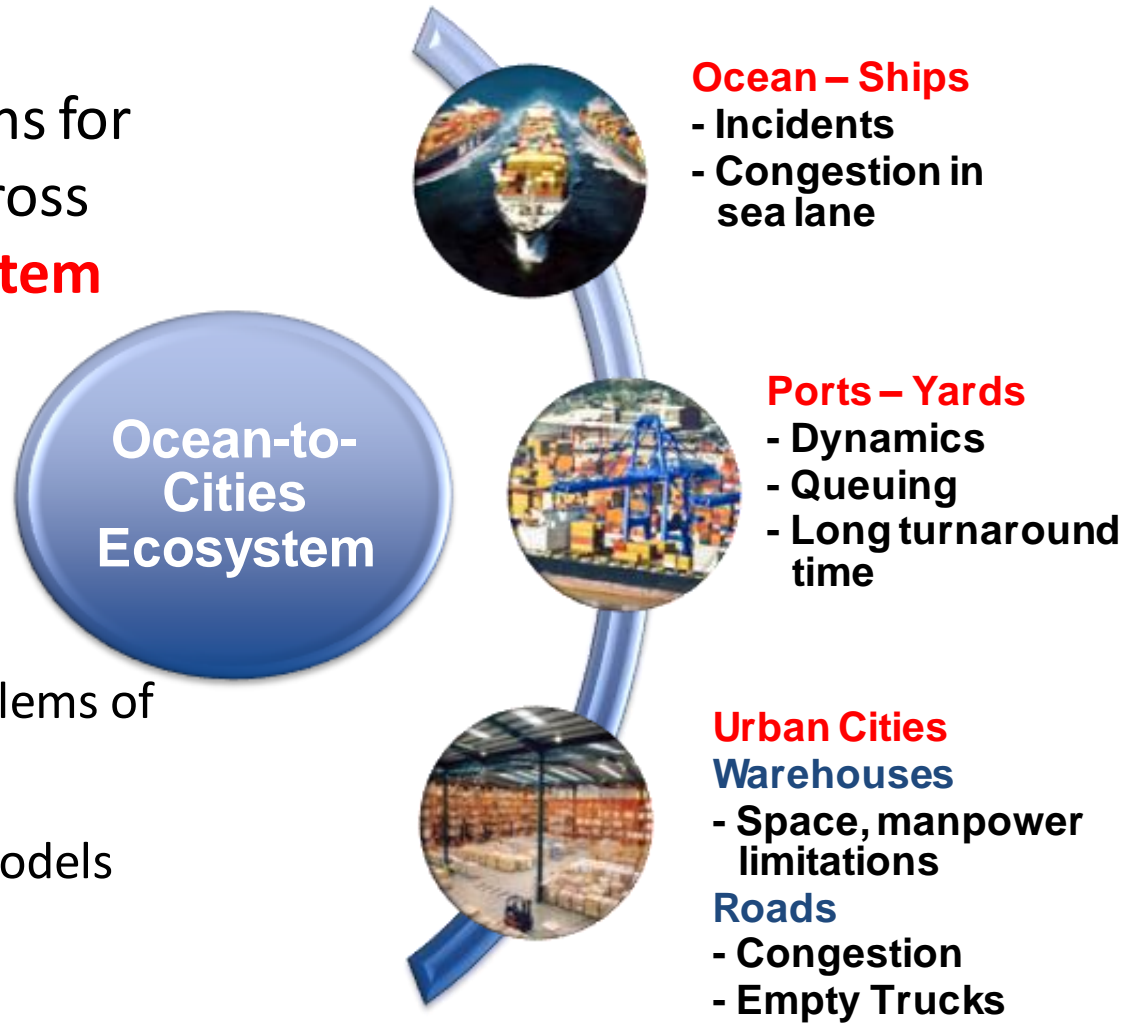
Research Areas (Phase 1)

- Dynamic Mobility and Flow Management (DMM)
- Maritime, Port and Logistics Optimization (MPO)

Maritime, Port and Logistics Optimization: Conceptual Overview

Develop innovative solutions for managing the problems across the **Ocean-to-Cities Ecosystem** with the foci on enhancing safety, efficiency, and productivity

- Study and understand problems of efficiency and safety
- Develop new algorithms, models and an integrated platform



Maritime, Port and Logistics Optimization: Research Perspective

- Maritime
 - Modeling and simulation for safer and efficient navigation of maritime traffic
 - Intelligent coordination of maritime traffic
- Port
 - System dynamics modeling in a port to understand the impact and influencing factors, recommendation for operation decision making
 - What-if' scenarios simulation for traffic optimisation and planning
- Logistics
 - Matching of shippers and carriers through market mechanisms to optimize last mile logistics

Questions and Comments

- For more information, visit <http://unicen.smu.edu.sg/>
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