

FACT SHEET

SMART Autonomous Vehicle

Concept of Mobility-on-Demand

- Fleet of lightweight Electric Vehicles
- Strategically distributed charging stations throughout city
- Solve the “first and last mile” problem of public transit

Advantages

- Does not require fixed infrastructure
- Fewer vehicles meeting the needs of many
- Solution to peak hour periods
- **Personalized** mobility whenever and wherever you need it
- Vehicles are better utilized

Autonomous Vehicles for Mobility-on-Demand

- **Safety** - Traffic accidents are the leading cause of death in the 20-30 year range. Most accidents occur due to human errors.
- **Accessibility** - Provide mobility to people who *cannot, should not, or prefer not* to drive (elderly, youth and disabled).
- **Productivity** - “Commodity” driving is a *chore* that absorbs a large fraction of people’s time, which could be better used.
- **Efficiency/Throughput** - Automated vehicles can cooperate to minimize the effects of congestion.
- **Environment** - Automated driving can reduce emissions by 20-50%, and efficiently interface with smart power grids.

Research Aim

To allow a fleet of autonomous vehicles to provide Mobility-on-Demand which will complement the existing transportation system, so as to reduce the overall commuting time by solving the “first and last mile” problem. This solution will thus reduce the traveling time from the starting location (e.g. commuter’s house) to the start of the transportation network (e.g. MRT station) and reduce the traveling time from the end of the transportation network to the final destination (e.g. commuter’s workplace).

Our research integrates existing technologies with fresh methodologies to allow driverless vehicles to intelligently provide Mobility-on-Demand, with the goal of making this future transportation paradigm a reality.

The SMART autonomous vehicle is a collaborative project between the Singapore-MIT Alliance for Research and Technology (SMART) and NUS; and has been running driverlessly on the NUS campus since 2011.

Golf Cart Specifications

- Max speed: 24km/h
- Max autonomous speed with crowds: 7 km/h
- Max autonomous speed without people: 10 km/h
- Vehicle localization using laser sensors, and not dependent on GPS
- Obstacle detection using laser sensors
- Real-time path planner
- Dynamic safety zone

(Photographs are available on request. Information is correct as of 6 Nov 2013)

About SMART

The SMART Centre is a major research enterprise established by the Massachusetts Institute of Technology (MIT) in partnership with the National Research Foundation of Singapore (NRF) since 2007. It is the first entity in the Campus for Research Excellence and Technological Enterprise (CREATE) developed by NRF.

The SMART Centre serves as an intellectual hub for research interactions between MIT and Singapore. Cutting-edge research projects in areas of interest to both Singapore and MIT are undertaken at the SMART Centre. SMART comprises an Innovation Centre and five Interdisciplinary Research Groups (IRGs): BioSystems and Micromechanics (BioSyM), Center for Environmental Sensing and Modeling (CENSAM), Infectious Diseases (ID), Future Urban Mobility (FM) and Low Energy Electronic Systems (LEES).

'Autonomy in Mobility-on-Demand Systems' is one of the projects under the FM IRG. More on FM can be found at: <http://smart.mit.edu/research/future-urban-mobility/future-urban-mobility.html>

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