

Autonomous Travel: Is it on the Horizon?

Group Research Project

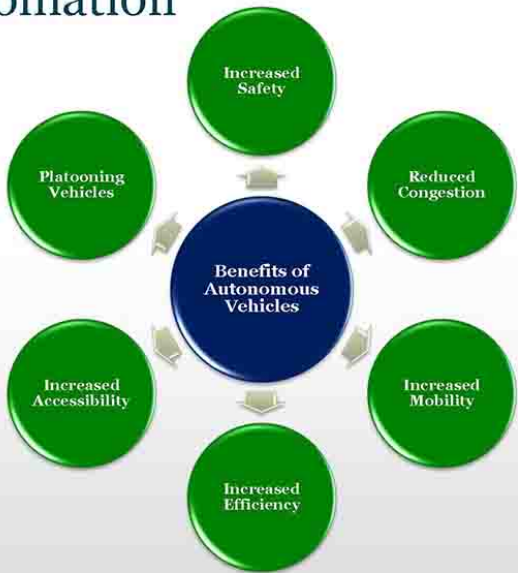
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21 June 2016

Background

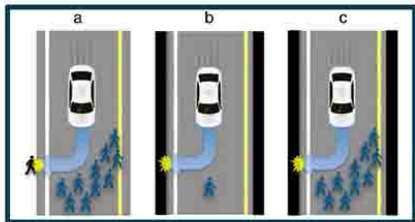
- **Road** – Most high profile, still within prototyping stages
- **Rail** – Lines have operated at GoA4 for several decades
- **Maritime** – Vast majority of cargo transits are under auto-helm
- **Aviation** – High resistance to unmanned passenger planes



Advantages of Automation



Barriers to Implementation



Segregated or Integrated?

- Current autonomous systems are segregated from the existing transport network and infrastructure



Aims of the Project

- The current state of technology and its future direction
- Barriers to implementation:
 - Technological
 - Psychological
 - Infrastructure
 - Financial
 - Political
- Public perception of Autonomous Travel

Is it possible, is it necessary, is it desired?

Aims of the Research Trip

- To experience the various autonomous transportation systems
- To assess the current state of technology development within different countries and industries
- To investigate the differences in culture, acceptance and deployment of autonomous systems
- To set up a collaborative study to investigate public perception of autonomous travel

Research Trip

Tokyo, Japan

Abu Dhabi & Dubai, UAE



Japan

Agenda

- Toyota Research & Development
- Railway Technical Research Institute
- University of Tokyo
- Yurikamome GoA4 line

Getting Around Japan



Toyota City

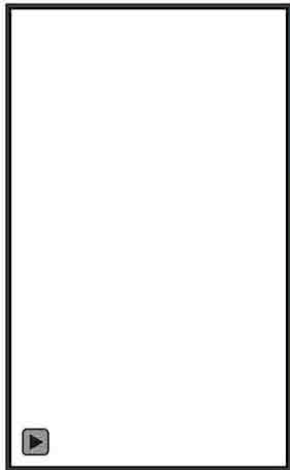
- Toyota Guardian Angel
 - Advanced anti-collision assistance system
 - Driver always in control until a collision scenario is detected



Toyota Assembly Line



Toyota Kaikan Museum



Yurikamome line: Tokyo's first fully automated transit system



Railway Technical Research Institute

- Institute dedicated to research and development activities of the Japanese National Railways

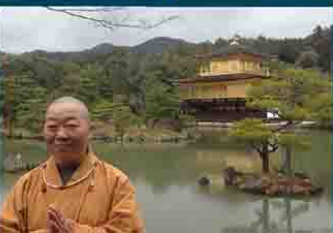


K.Nakano Lab, University of Tokyo

- Previous research has highlighted:
 - Human-oriented Mobility Engineering
 - Human-machine-interface
 - Haptic guidance control
 - Driverless cars for 2020 Olympics







UAE

Agenda

- Masdar Research Institute
- Abu Dhabi University
- Dubai Metro

Getting Around UAE



Masdar Research Institute

- World's first planned sustainable city (zero carbon)
- Construction began 2006, expected completion 2014
- Entire city built on a raised platform
- Initial plan to ban private vehicles and utilise:
 - Group Rapid Transit (GRT)
 - Personal Rapid Transit (PRT)

Masdar Research Institute

- Expectations



Masdar Research Institute

- Reality
- Footprint completion: 5%



Masdar Research Institute

- Expected completion now 2030; massively over budget
- No longer on a raised platform
- Private vehicles now allowed
- PRT system very basic; Automated Guided technology

Many of the unique, visionary and trend setting factors of future city design have been removed

Abu Dhabi University

- Previous research has highlighted:
 - Autonomous cars are not desired
 - Fast rate of infrastructure approval and construction
 - Aspire to be at the forefront of futuristic design and innovation



Dubai Metro

- Japanese technology
- Longest automated metro network
- Most punctual driverless metro >99%





Implicit Association Test

Previous studies

- Opposition to driverless cars:
 - University of Michigan 44%
 - Institute of Mechanical Engineers <50%
 - Smart Witness 52%
 - Chubb Insurance Group 67%
 - American Automobile Association 75%
- Large psychological ‘fear’ barrier
- Resistance is often overcome through experiencing the system
- Younger generations are more likely to trust “driverless”

International Collaboration

UNIVERSITY OF
Southampton



東京大学
THE UNIVERSITY OF TOKYO



جامعة أبوظبي
ABU DHABI UNIVERSITY

Implicit Association Test

- Six Studies in Three Countries/Continents
- Two Studies per Country
- One Questionnaire
- One Implicit Association Test
- Comparisons Will Reveal Unconscious Bias

Implicit Association Test

- What is an Implicit Association Test?
- What does it Measure?
- How Does it Work?
- Why use Indirect Measures?

Reflection

Reflection

- Research trip challenged our preconceptions and ultimately changed our opinions and research direction
- Collaborated and shared research internationally
- IAT is finalised and we will begin collecting data next week
- Preliminary results suggest:
 - Rail & Maritime: Already feature high levels of autonomy
 - Aviation: Unlikely due to public opposition
 - Road: Numerous studies suggest that autonomous vehicles are not currently desired

Thank you

