C-ITS in Taiwan

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Outline

• Introduction to Taiwan
• Current Status of C-ITS in Taiwan
• Taiwan Telematics Industry Association (TTIA)
• Move to the Next
Area: 36,000 square kilometers
Population: 23 million
Capital: Taipei
Ranked 1st in worldwide major ICT product market share for more than 20 product categories²

Tourism¹:
- Tourist: 9.91 million
- Tourism Revenue: 21.2 billion

Current Status of C-ITS in Taiwan

- **C-ITS in highway**
  - Electronic toll collection (ETC)
  - Weigh-in motion (WIM)

- **C-ITS in railroad**
  - Level-Crossing safety application

- **C-ITS in urban road**
  - Bus rapid transit (BRT)
  - YouBike
  - Intersection collision avoidance

- **C-ITS in tourist attraction**
  - Electric car rental service
Electronic Toll Collection

• In 2014 the Taiwan Highway Commission is officially discontinuing the highway toll ticket system in favor of the eTag
  – Distance-based toll system:
    • Road users are charged according to the distance of driving on the highway
  – More than 6 million vehicles have installed eTag (94%), 13.5 million daily transactions
  – Total 319 gantries (1,246 ETC lanes), support multi-lane free flow scenario

• System performance
  – Tolling Accuracy Rate: 99.9999%
  – Vehicle Detection Accuracy Rate: 99.9800%

RFID antenna

AVI module to capture the vehicle ID
Vehicle Sharing Services

Electric Car Rental Service

**Target user:** Tourists at Sun-Moon Lake  
**Service model:** The tourist could rent the electric car with the use of electronic ticket (Easycard). The card is also the key to open the door and start the car. 
**Reduce 18% private vehicle usage**  
**Reduce 50% carbon emission**

YouBike

**Target user:** Taipei residence and tourists  
**Service model:** YouBike uses an electronic automated management to provide a bike rental system. It also provides the service of “A Leases B Returns”.  
**Service rounds:** 40,081,184 rounds  
**Turnover rate per bike per day:** 9 times
Bus Rapid Transit

- For the first year (2014-2015), there is no surcharge when using it.
- Since 2014 Oct, the passenger number of BRT increase to 50,000 per day.
- Mechanical and electrical systems are integrated and include video cameras set up both inside and outside of the buses for vehicle safety and surveillance purposes.
- Global Positioning System (GPS) is installed in the BRT buses to operate alongside the dispatching and priority signal systems to allow the BRT network to operate as rapidly and on-time, and buses arrive every 3 minutes during rush hour, and 6 minutes outside rush hour.
A demand in the use of transit signal priority to increase transit ridership and reduce traffic congestion
Use of the WAVE/DSRC communication technology to control traffic signals to improve travel times at intersections
Design real-time control logics dedicated to bus priority that manages green signal extensions and early green recalls
Compatible with current traffic signal controller
DSRC-based Weigh-In-Motion System

System Operation on Freeway No.3, Taiwan
- Collaborated with National Freeway Bureau (MOTC, Taiwan) and Taiwan large logistics companies including the HCT Logistics and CPC (the Tao-Yuan Division)
- The second WAVE/DSRC-based WIM system test site in the world

Features
- Bidirectional HMI without causing driver distraction
- Extensible for future V2I application/service and fleet management
- Simplify the inspection process for the police
Collaborated with Taiwan Railways Administration for developing Level-Crossing Emergent Event Warning System (LCEEWS).

When LCEEWS detects illegal intruders or obstacles on the railway, it will broadcast level crossing video streams to the train driver for early warning.
The project, V2V Mandate Product and Field Trial, founded by Taiwan’s Ministry of Economic Affairs (MOEA), is aim to build up DSRC-based collision avoidance field trial system at Hsinchu in Taiwan.

The project, Vehicle Infrastructure Integration (VII) of ITS in Taiwan, founded by Taiwan’s Ministry of Transportation and Communications (MOTC), is to build up VII field trial system and prove the VII concept through a structured testing program and experimental design, and identify recommendations for future work. MOTC has also started to discuss the radio spectrum allocation for ITS.
With Taiwan’s Ministry of Economic Affairs’ support, ITRI is one of the few organizations in the world having complete V2X solutions, with up-to-date and robust IEEE 802.11p/1609 and ETSI TC-ITS compliant 5.9GHz DSRC devices and systems, and with experiences in product interoperability testing in US and Europe.
TTIA was established in December 2010 and the mission of TTIA is to expedite the development of the Taiwan telematics industry and to strengthen its global competitiveness. TTIA is committed to integrating resources, creating added value and business opportunities, and promoting industrial standardization in order to help the telematics industry take deep roots in Taiwan and stay abreast with international developments.

- **Working Groups**
  - WG 1: Intelligent Buses
  - WG 2: Integration of Mobile Navigation and Application Systems Technologies
  - WG 3: Exchanging and Sharing Information Platform on Points of Interest (POI)
  - WG 4: Integration of Telematics Technologies
  - WG 5: Convenient Application Technologies for Telematics
  - WG 6: Advanced Telematics and Service Platform in Transport & Logistics
  - WG 7: Smart Internet of Vehicle Service Platform
  - WG 8: Integration of Intelligent Telematics System Application Research
  - WG 9: Green Travel Management Platform
  - WG10: RDS-TMC
  - WG11: Telematics Convergence Technologies
  - WG12: GNSSPA Alliance
Move to the Next

• With Taiwan’s government support, Taiwan has C-ITS solutions for foreseeable needs of future connected vehicles market
• Taiwan is ambitious to realize the next generation ITS and ICT development in Taiwan and Europe
• We are looking for further partnership and cooperation in Europe
  – Enhance new technology, services and business opportunities