Telematics/ITS R&D Opportunity

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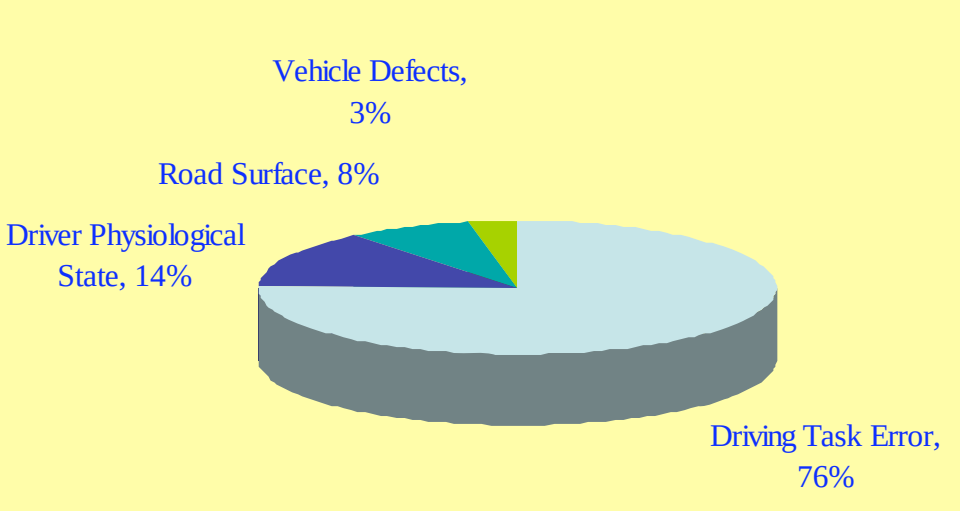
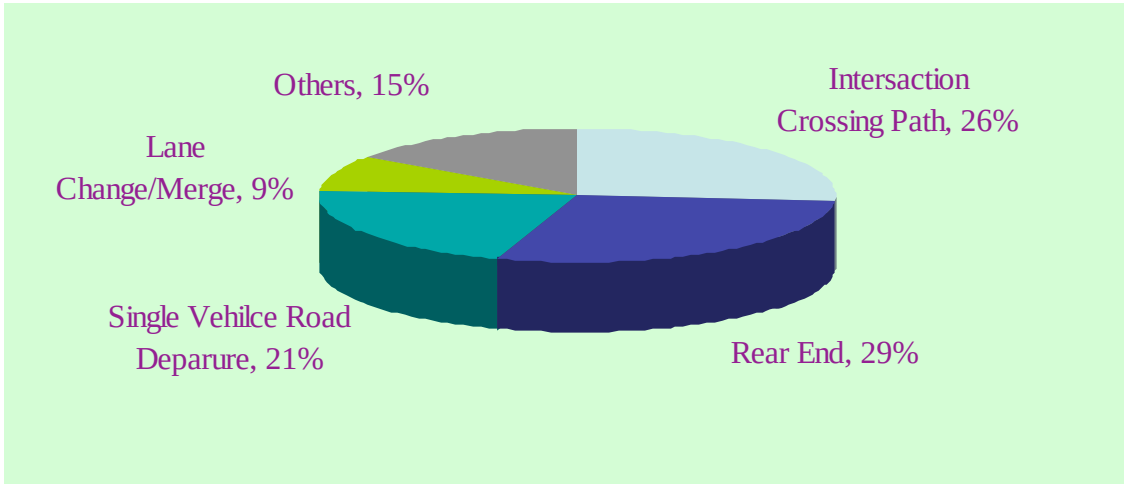
前言 – 車載之交通安全議題



- 歐盟於2005年發生1.3M件道路交通事故，四萬一千人死亡、二百萬人受傷
- 美國每年約有六百萬件行車事故，四萬一千人死亡。
  - 財產損失約為$150 billion
  - 駕駛疏失約為76%事故發生的主因（可用車載技術克服）



Taiwan ITS Industry Development Objectives

- Gas consumption reduced by 20%
- Automobile accidents lowered by 20%
- Usage of public transportation increased by 60%
- OBU worldwide market share: 20%+、DSRC: 30%+

Market Potential

- **Total Revenue**(2010)
  - *全球 Telematics 市場規模 (包括: 硬體製造、軟體設計、內容整合、服務提供) 將達 $42 billion (IDC)*
  - *在理想情況下 (消費者普遍接受、無其他法規限制、應用成熟), 全球 Telematics 市場總值高達 $100 billion (McKinsey)*

Telematics Evolution

- **Telematics 演進**
  - **1G Telematics (V2Zero)**
    - *為獨立運作之系統如車輛多媒體系統，地圖導航系統*
    - *缺乏或僅有少部分無線通訊功能*
  - **2G Telematics (V2S)**
    - *透過通訊裝置與服務提供者互動*
    - *以GPS為基礎提供駕駛行車動態導航、ETC及vehicle Infotainment等應用服務*
    - *GM OnStar, Toyota G-Book, 裕隆 TOBE*
  - **3G Telematics (X2X)**
    - *透過V2I, V2V, P2X 等手段與建置將車、人及服務連結提供安全警示與防護、效率提升、殘障輔助與先進Infotainment服務*

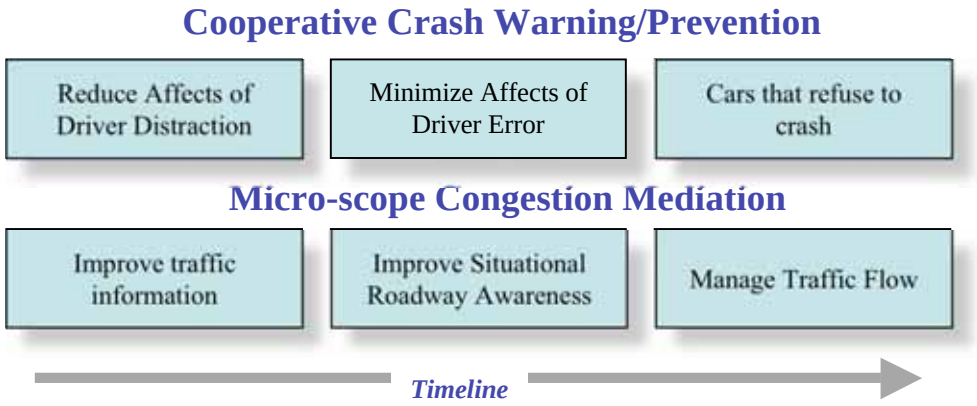
DSRC Applications By V2V or V2I

- Between Vehicles:
  - Approaching Emergency Vehicle Warning
  - Blind Spot Warning
  - Cooperative Adaptive Cruise Control
  - Cooperative Collision Warning
  - Cooperative Forward Collision Warning
  - Emergency Electronic Brake Lights
  - Highway Merge Assistant
  - Lane Change Warning
  - Post-Crash Warning
  - Pre-Crash Sensing
  - Vehicle-Based Road Condition Warning
  - Vehicle-to-Vehicle Road Feature Notification
  - Visibility Enhancer
  - Wrong Way Driver Warning
- Between Vehicles and Infrastructure:
  - Blind Merge & Curve Speed Warning
  - Emergency Vehicle Signal Preemption
  - Highway/Rail Collision Warning
  - Intersection Collision Warning
  - In-Vehicle Amber Alert
  - In-Vehicle Signage
  - Just-In-Time Repair Notification
  - Left Turn Assistant
  - Low Bridge Warning
  - Low Parking Structure Warning
  - Pedestrian Crossing Information at Intersection
  - Road Condition Warning
  - Safety Recall Notice
  - SOS Services
  - Stop Sign Movement Assistance
  - Stop Sign Violation Warning
  - Traffic Signal Violation Warning
  - Work Zone Warning

Source：經濟部技術處車載資通訊先期研究計畫，資策會網多所整理，2008年02月

各國政府發展安全/效率之趨勢 – V2I/V2V

- Why & How Toward "Mandatory" Telematics Service
  - 安全：**Reduce societal costs of CRASHES**
    - *43,000 deaths & 3 million injured/year, $230 billion in property damage in US*
  - 效率：**Reduce societal costs of CONGESTION**
    - *Personal / business hours lost in traffic*
    - *Gasoline wasted*
    - *Inconvenience of missed schedules*



Japan **Smartway**（**04~07**）

- 2006年制定"2012年交通事故死亡人數降至5000人以下"目標，並表示將採用汽車間通信等新技術。
- 目前Focus在V2I、預計2010年全國佈建。
- 正在制定V2V DSRC標準。

US **VII Initiative**

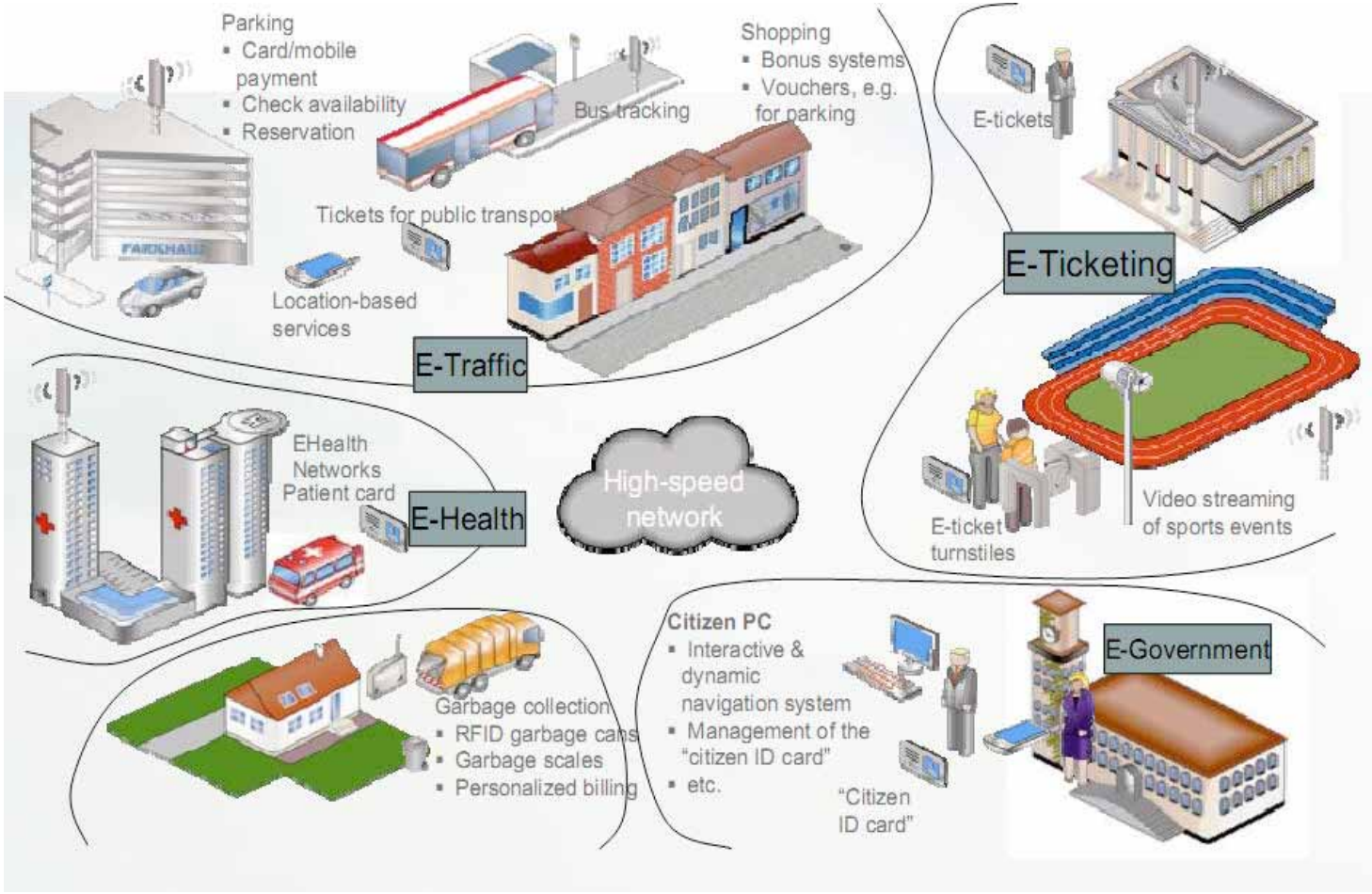
- 採用802.11p/WAVE DSRC標準。
- 2010年後提案呈交國會，2011~2012年全國布建
- 專案成立VII Consortium
- 補助8大車廠開發DSRC, OBE及RSE
- 於加州與密西根州進行field trial（2007-2008）

Europe **eCall Activity**（**06~10**）

- 推動各國於2010年新車款將eCall列為標準配備
- 2008年起進行field tests
- 歐洲由民間組織發展DSRC之標準與應用、eCall只是一例(如Car2Car, PReVENT, GST等)，但採用802.11p機會很高。

Source: Partially from "VII Strategy for Safety and Mobility" Ralph Robison, VII Consortium, 2006

車載應用情境 - 以T-system T-City為例



+ V2I & V2V for Safety Enhancement & Fine Grain Traffic Optimization
+ WSN for pedestrians Telematics

Source: T-City Project - Deutsche Telekom, 2007

Application Development Roadmap (draft)

舒適

- •Enhanced route/travel guide & navigation
- •Fleet Social Networking
- •Drive-Through Payment/Notification
- •Transit vehicle refueling management
- •P2P content sharing
- •MAP & media updates
- •Online media streaming/upload
- • Probe Car to offer localized, real-time information
- • Home Network Content Synchronization
- • Appointment Confirmation / Changes
- •Vehicle computer program online updates
- • Leverage wireless infra (WiMAX) for interactive multimedia/content

便捷、效率

- •Parking lot payment
- •Vehicle transit guide/management
- • Real-Time Congested Traffic Info Distribution
- •ETC
- •Enhanced ETC (VPS-ETC)
- •Multi-mode Toll Payment & Management
- • Just-in-time Road condition warning
- •Emergency Vehicle Warning
- •Specific commercial vehicle fleet management
- •SOS services, response & evacuation
- •Traffic sign/signal violation warning
- •Vehicles as traffic probes & broadcast

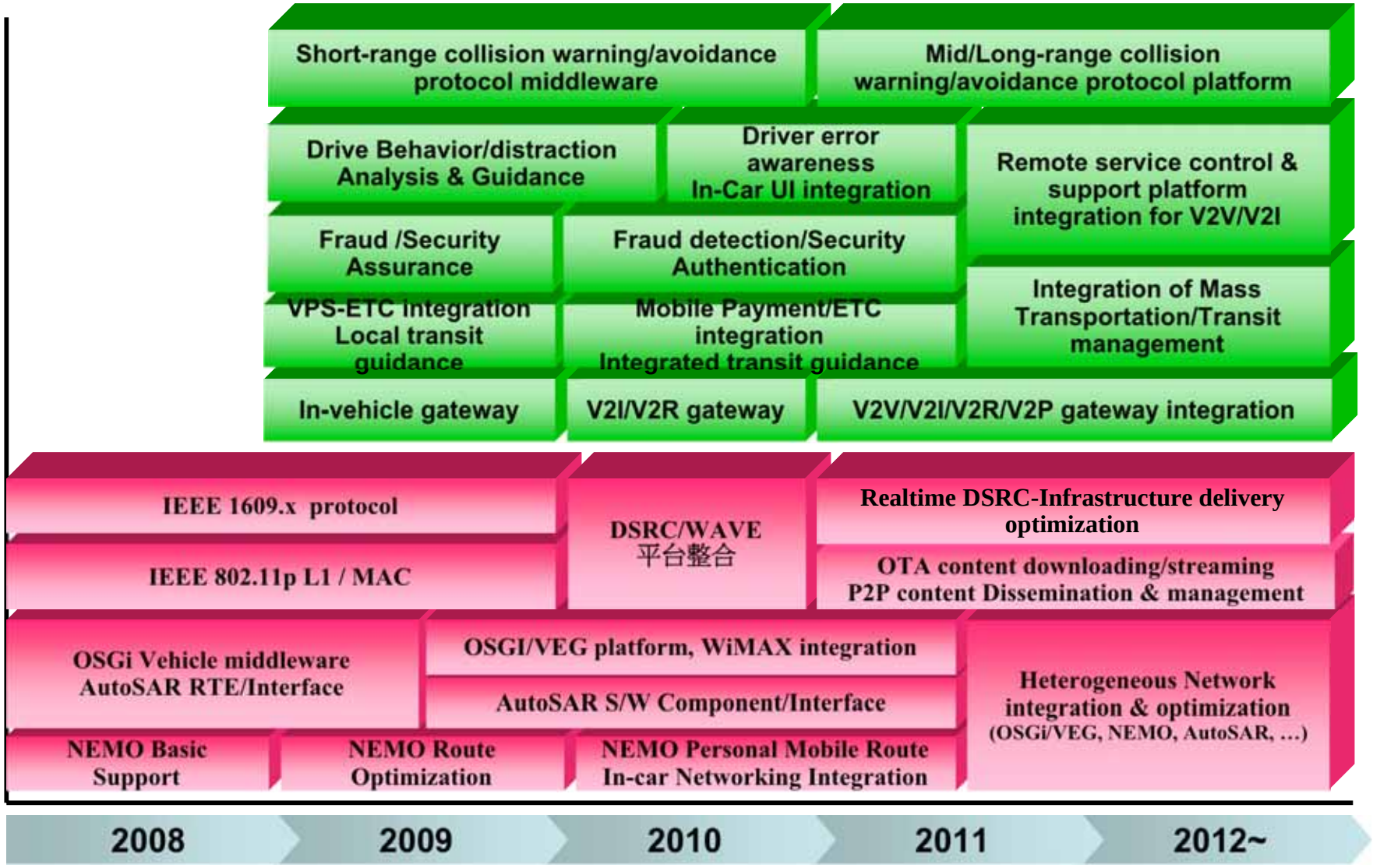
安全

- •Assisted lateral control
- •Curve over-speed/rollover warning
- • Cooperative adaptive cruise control
- •Pre-/Post-crash warning
- •Pre-/Post-crash avoidance
- •Just-In-Time repair notification
- •Intersection collision avoidance
- •Secure access
- •V2V road feature notification
- •In-vehicle signage/diagnostics
- • Lane change/departure/ merge warning
- •SOS services, & evacuation warning
- •Safety recall notification
- •Intelligent Speed Advisory and Control
- •Remote control/diagnostics

2008	2009	2010	2011	2012~

Source：經濟部技術處車載資通訊先期研究計畫，資策會網多所整理，2008年03月

Technology Development Roadmap (draft)



Source：經濟部技術處車載資通訊先期研究計畫，資策會網多所整理，2008年03月

Dependability Challenges

- Reliability:
  - Weather, collision, human error
  - Technologies: Image and voice recognition
- Scalability:
- Security and Privacy:
  - Authentication, Intrusion
  - Information sharing
  - Fraud
- Communication:
  - Multimodal: DSRC, WiFi, WiMax, etc.
  - Ad-hoc
  - Interference

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