

出席第 17 屆 ITS 世界年會出國報告

壹、前言

以往面對交通問題，多以硬體建設增加供給來解決，但硬體建設投資成本龐大且曠日廢時，且依據國外的經驗與相關研究，利用硬體建設大量提供運輸供給，不僅無法有效解決交通問題，反而會衍生更多的運輸需求。故目前則改以如何將現有交通建設與運輸系統進行最有效的應用，使其發揮最大效益，提供民眾更具效率、更安全的運輸環境及服務。

因智慧型運輸系統(Intelligent Transportation Systems, ITS)係透過成熟的資訊、通信、電子、控制及管理技術的應用，適切整合運輸系統中的人、車、路等組成單元，並經由資訊蒐集、處理、發佈與控制策略，提供民眾即時且正確的交通資訊，有效發揮運輸系統的整體效能。因此，各國均將 ITS 列為 21 世紀重要的運輸發展政策。

ITS 世界年會(ITS World Congress)係該領域年度盛事，各國之產、官、學、研界可透過年會進行 ITS 策略、規劃及建置等方面之技術與經驗之交流分享，各單位及廠商亦可透過展覽展示其最新研發成果及產品。由於第 17 屆 ITS 世界年會係於韓國釜山(Busan)舉辦，而韓國亦為電子產業之重鎮，勢必會利用該產業優勢，提供 ITS 發展之良好環境，故參與本次 ITS 世界年會將可獲得許多 ITS 最新發展資訊，提供我國未來 ITS 發展或建置之參考。

此外，利用此次前往韓國的機會，亦可考察釜山及慶州的交通狀況，經由實地考察過程，了解目前釜山及慶州的交通設施及大眾運輸的發展狀況，可以其他國家大城市的交通發展經驗，提供我國作為參考。

貳、行程紀要

此次參加 2010 年 10 月 24~31 日於韓國釜山舉辦第 17 屆 ITS 世界年會的成員，本所為運輸資訊組張贊育副組長、綜合技術組朱珮芸研究員及運輸安全組黃明正研究員 3 人參加。因國內有許多機關、學校及公司派員參與此次研討會，且 ITS Taiwan 與經濟部車載資通訊產業推動辦公室(TPO)共同籌設成立「臺灣館」展覽聯合攤位，故該協會籌劃本屆 ITS 世界大會參訪團，本所人員亦參加該參訪團前往本次年會。

此次參加年會以及考察韓國交通設施共 8 天行程，其行程內容如下表。

第 1 天	10 月 24 日	前往韓國釜山
第 2~6 天	10 月 25 ~29 日	1. 參加「第 17 屆 ITS 世界年會」 2. 參加展覽及技術參訪 3. 蒐集資料
第 7 天	10 月 30 日	前往韓國慶州參訪交通設施
第 8 天	10 月 31 日	韓國慶州參訪交通設施，並自韓國釜山返回臺北

年會之會場位於韓國釜山 BEXCO(如圖 1、2)，主辦單位依據 BEXCO 周邊飯店位置，設置 5 條接駁車路線，接送與會人士至會場，與會人員可憑識別證免費乘車。



圖 1 第 17 屆 ITS 世界年會會場 Bexco



A. 會場入口



B. 註冊報到處

圖 2 第 17 屆 ITS 世界年會會場入口及註冊報到處

參、第 17 屆 ITS 世界年會活動

由於運輸部門所排放之二氧化碳量，佔全球總排放量的28%，因此希望透過發展智慧型運輸系統(Intelligent Transport Systems，簡稱ITS)來面對此一挑戰，提供安全、有效率、低排放之運輸系統。此次於韓國釜山所舉辦5天的17屆ITS世界年會主題，即希望透過提供無所不在(Ubiquity)、透明(Transparency)及可信賴(Trustability)之運輸資訊等3個策略，達成安全(Safe)、便利(Convenient)及綠色移動(Green Mobility)之目標，主題概念如圖3所示。本次年會內容主要可分為研討會(Sessions)、展覽(Exhibition)、技術展示(Showcase)及技術參訪(Technical Visits)4大部分。

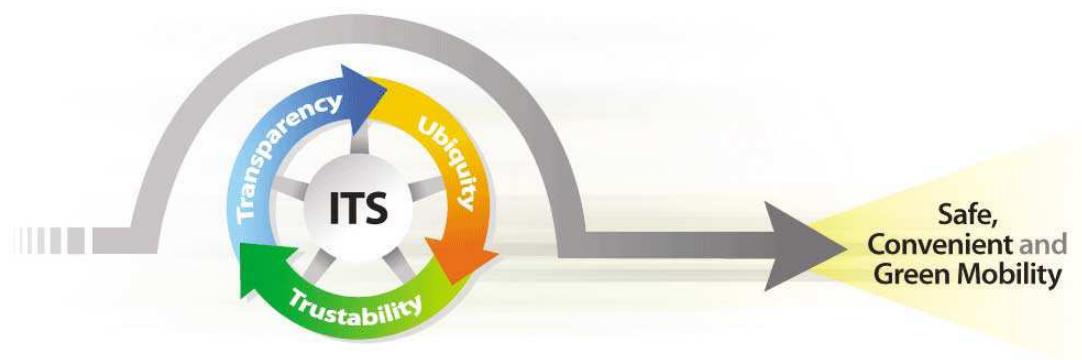


圖3 第17屆ITS世界年會主題概念

3.1 研討會(Sessions)

研討會依其主題性質可分為全體會議(Plenary Sessions)、菁英會議(Executive Sessions)、特別會議(Special Sessions)、科學/技術論文會議(Scientific/ Technical Paper Sessions)、多媒體互動會議(Media Interactive Sessions)等5類。全體會議於開幕式後於大禮堂進行2個場次會議，由全體與會人員參加；菁英會議則進行12場次討論，由政府、研究機構及全球性企業之高層人員討論目前及未來相關計畫之重點與挑戰；特別會議則就政

府、產業或學術界關注之ITS發展及建置，所推動之特定議題研究或計畫進行討論，共計71個場次；科學/技術論文會議則討論科學及技術方面的進展，共計123個場次；多媒體互動會議則於多媒體大廳透過顯示器播放相關論文簡報，提供對特定議題有興趣人士於現場直接與發表人員交換意見，共計9個場次。開幕式及各類研討會實景如圖4。科學/技術論文會議及多媒體互動會議所發表之論文請參見附錄一，以提供有興趣的同仁查閱。

	
<p>A.開幕式</p>	<p>B.科學/技術論文會議</p>
	
<p>C.全體會議</p>	<p>D.多媒體互動會議</p>

圖4 開幕式及各類研討會實景

3.2 展覽(Exhibition)

在展覽部分，此次共有150個政府單位或民間廠商參與(清單詳如附錄二)，在Bexco一樓17,672平方公尺的展覽場，展示他們關於ITS最新的產品、服務、技術與計畫。本次年會在韓國釜山舉辦，因此展覽以韓國政府單位及大企業為主，其他區域及國家之ITS協會，如歐洲、美國、日本、中國及俄羅斯，亦設置相關主題館。此次臺灣亦受主辦單位邀請，由ITS Taiwan與經濟部車載資通訊產業推動辦公室(TPO)共同籌設成立「臺灣館」展覽聯合攤位(如圖5)，與中華電信、臺灣世曦、車輛研究測試中心、臺大土木研究所交通組等產、學界展示臺灣在ITS之相關發展及產品。

此次展覽的主題分為5大部分，包括：




- 一、 交通管理服務(Traffic Management Service)
- 二、 交通/用路人資訊服務(Traffic/Traveler Information Service)
- 三、 電子收費系統及公共運輸服務(Electronic Fare Payment Service & Public Transportation Service)
- 四、 車輛及公路服務(Vehicle and Highway Service)
- 五、 其它(Other)




圖5 展覽場中的臺灣館

本次展覽另一特色，即有多個單位均透過駕駛模擬器，展示其研發技術或相關產品特色，其功能可運用於研究駕駛人行為、教育訓練、道路設計測試及產品技術展示等多方面，各駕駛模擬器一覽詳如表1。各駕駛模擬器之硬體規格，幾乎都為單人座之小型駕駛模擬器，僅有韓國InnoSimulation公司展出一輛實車駕駛模擬器；在螢幕部分，小型駕駛模擬器皆為前方單一LCD螢幕，更多則為前方3面LCD螢幕組成，僅有InnoSimulation公司之實車駕駛模擬器之前方由4面螢幕組成，車內及車外後視鏡則另安裝LCD螢幕模擬後方道路狀況，本所駕駛模擬器亦有相同的後視鏡功能。此外，已有許多駕駛模擬器可透過6軸油壓動作系統，模擬汽車行駛之加減速感覺，希望提供受測者更逼真的模擬環境，其中許多小型駕駛模擬器之油壓部分結構很小，但無損其模擬功能，而前述InnoSimulation公司之實車駕駛模擬器則於4個輪胎下方加裝薄型固定震動裝置，可使駕駛者於行駛中感受輕微的震動。

表1 展覽場各式駕駛模擬器一覽表

公司或機關	特色	現場照片
韓國 InnoSimulation 公司	<ul style="list-style-type: none"> ● i-Drive CDS (Compact-type Driving Simulator) 小型駕駛模擬器。 ● 模擬場景為3D立體畫面，操作者需配戴3D立體眼鏡。 ● 高效益且多用途之小型駕駛模擬器。 	
韓國 InnoSimulation 公司	<ul style="list-style-type: none"> ● i-Drive CDS (Compact-type Driving Simulator) 小型駕駛模擬器，前方有3個液晶螢幕。 ● 具有6軸油壓動作系統。 ● 高效益且多用途之小型駕駛模擬器。 	
韓國 InnoSimulation 公司	<ul style="list-style-type: none"> ● i-Drive FDS (Full-scale Driving Simulator) 實車駕駛模擬器。 ● 前方有4個螢幕，車內及車外後視鏡則另安裝LCD螢幕模擬後方道路狀況。 ● 於4個輪胎下方加裝薄型固定震動裝置，模擬車輛震動情形。 ● 具高臨場感之駕駛模擬器。 	

公司或機關	特色	現場照片
韓國道路安全局(Road Safety Authority)	<ul style="list-style-type: none"> ● 使用韓國InnoSimulation公司開發之小型駕駛模擬器。 ● 用於分析及訓練受測者節能駕駛方式。 ● 前方螢幕畫面隨時顯示目前駕駛行為屬節能或耗能，並於結束畫面顯示能源消耗情形。 	
韓國道路交通局Road Traffic Authority	<ul style="list-style-type: none"> ● 小型駕駛模擬器，前方有3個液晶螢幕。 ● 用於研究評估駕駛人之駕駛行為。 ● 測試後系統會顯示受測者在行駛過程中，是否有超速或事故等不當駕駛行為，並評估整體駕駛行為是否良好。 	
日本Forum 8公司	<ul style="list-style-type: none"> ● 小型駕駛模擬器，前方有3個液晶螢幕。 ● 具有6軸油壓動作系統。 ● 自行開發模擬場景軟體UC-win/Road，曾於2002年獲得經濟產業省頒發的軟體產品年度大獎，擁有大量3D模型資料庫。 ● 用於駕駛模擬或道路、橋梁設計模擬測試。 	

公司或機關	特色	現場照片
Toyota	<ul style="list-style-type: none"> ● 小型駕駛模擬器。 ● 具有6軸油壓動作系統。 ● 用於展示及體驗該公司所開發之車輛偵測技術。 	
Honda	<ul style="list-style-type: none"> ● 小型駕駛模擬器，前方有3個液晶螢幕。 ● 具有6軸油壓動作系統。 ● 用於體驗虛擬交通環境場景。 	

在軟體方面，各駕駛模擬器之畫面都可達到相當擬真的模擬場景，行進時畫面亦很流暢，其中InnoSimulation公司之小型駕駛模擬器甚至開發3D立體畫面，操作者配戴3D立體眼鏡後便能看到較具立體畫面的場景。個人在實際操作時，還因工作人員未將3D立體眼鏡功能開啟，致使一開始所看到的畫面如同未配戴3D立體眼鏡般模糊（如圖6）。各模擬器因設計目的不同，故軟體所記錄之內容亦不盡相同。韓國道路交通局之駕駛模擬器係用於研究駕駛人行為，故測試後系統會顯示受測者在行駛過程中，是否有超

速或事故等不當駕駛行為，並評估整體駕駛行為是否良好；韓國道路安全局之駕駛模擬器則用於分析及訓練受測者節能駕駛方式，前方螢幕畫面隨時顯示目前駕駛行為屬節能或耗能(如圖7)，並於結束畫面顯示能源消耗情形。

實際試乘及操作展覽場各駕駛模擬器，雖然各駕駛模擬器在畫面、模擬汽車加減速及震動都相當逼真，甚至還有3D立體畫面，惟汽車加減速時常有無法與畫面連結，致使速度過快或過慢，過彎時尤其容易衝出車道，無法如同實際開車時的順暢及掌握行車軌跡，本所之駕駛模擬器亦有類似的問題，可能是目前駕駛模擬器尚待克服的技術課題。

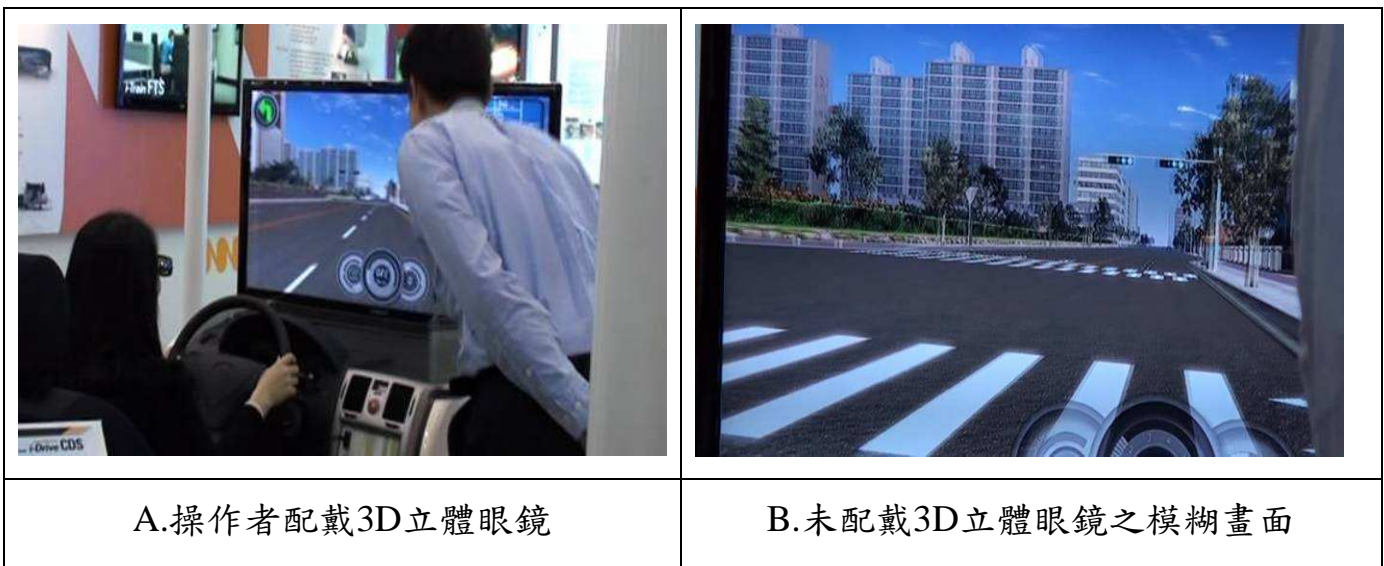


圖6 韓國InnoSimulation公司之3D畫面小型駕駛模擬器

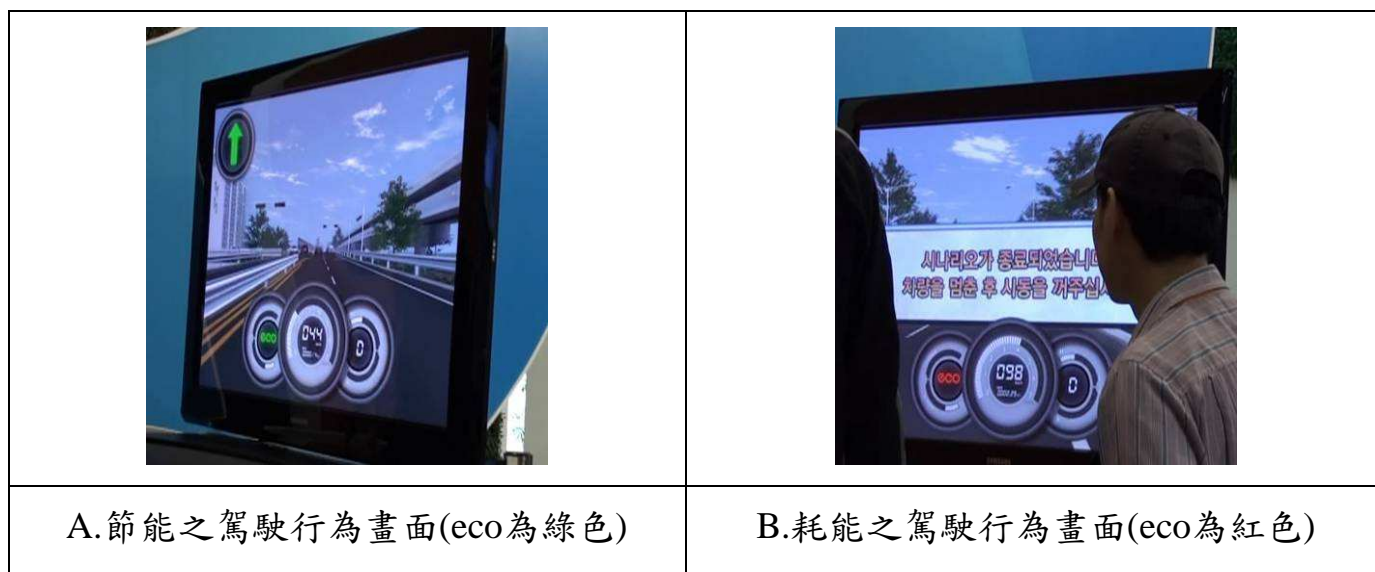


圖7 韓國道路安全局之節能駕駛行為駕駛模擬器

3.3 技術展示(Showcase)

此次年會依據安全、便利及綠色移動之目標，透過3個技術展示介紹ITS之相關應用實例(如圖8所示)。Demo 1為ITS技術應用於手機與網路，Demo 2為使用者導向之大眾運輸服務，Demo 3則為綠色運具體驗，欲參加之與會人員需先至櫃台登記預約時間，櫃台會發給一張登記卡，由與會人員依所列時間至指定地點集合。因Demo 2內容包含捷運系統之盲人導引技術，Demo 3則為搭乘綠能汽車(包括電動汽車或油電混合車)繞會場周邊，故參加此2 Demo體驗行程，並就相關內容介紹如次。

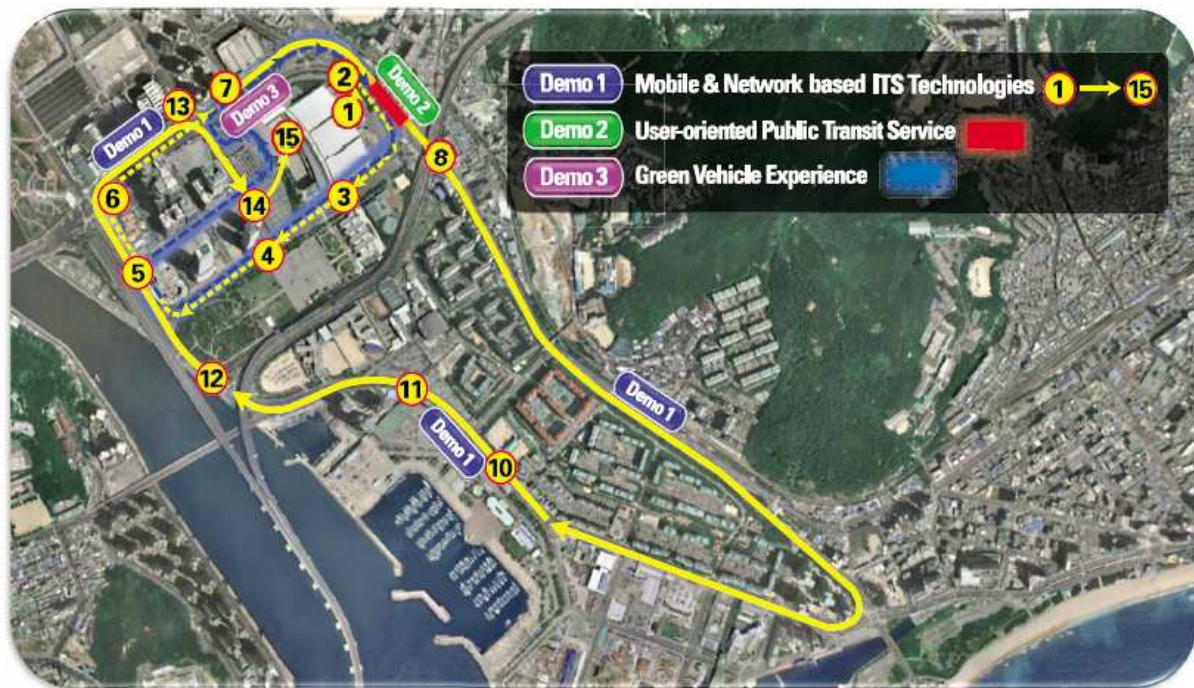


圖8 年會3個技術展示內容及範圍

一、Demo 2：使用者導向之大眾運輸服務

Demo 2之技術展示主要包含3部分，包括公車候車亭資訊看板、公車內資訊看板及步行輔助系統(如圖9)，其中前兩項乘客均可透過遙控器進行操作。一開始參加人員先至解說站集合(如圖10)，由解說人員說明本次技術展示之內容及行程，再分組前往不同地點實際體驗，本小組首先至Bexco會場旁的公車候車亭瞭解資訊看板功能。該資訊看板為觸控式螢幕，解說人員示範如何以互動方式查閱公車路線、站牌及目前行駛位置資訊，其站牌位置及目前行駛位置則標示於google地圖，方便乘客查閱(如圖11)。除了大眾運輸資訊外，該資訊看板亦可查詢天氣、新聞、周邊環境等其他相關資訊。由於乘客均可透過遙控器進行操作，該資訊看板便可依據操作者個人化顯示資訊，提供使用者導向之大眾運輸服務。




		
A.以遙控器操作候車亭資訊看板	B.以遙控器操作公車內資訊看板	C.步行輔助系統

圖9 Demo 2技術展示內容

	
A.行程解說站	B.行程解說看板

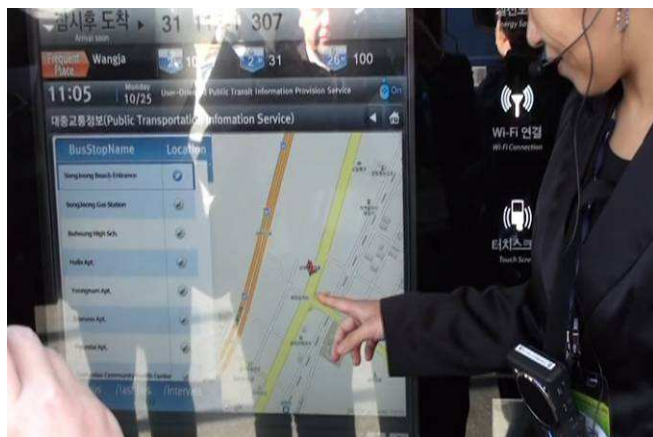
圖10 Domo 2行程解說



A.選取公車資訊



B.選擇公車路線



C.於google地圖顯示公車站牌位置



D.示範遙控器使用方式

圖11 Domo 2之公車候車亭資訊看板操作實況

本小組第2站又回到解說站，示範公車內資訊看板相關功能(如圖12)。該看板亦為觸控式螢幕，但面積較公車候車亭資訊看板為小，主要提供乘客查詢公車路線相關資訊查詢，亦可查詢電視新聞、天氣、股市、匯率等其他資訊。乘客亦可透過遙控器進行操作，個人化顯示資訊，最多可容納3名查詢者。若乘客超過10秒無操作動作，看板便會將該使用者自螢幕移除。



圖12 Domo 2之公車內資訊看板操作實況

因Bexco會場旁為捷運2號線(綠線)之Centum City站，第3站便至該捷運站示範無線射頻識別技術(Radio Frequency Identification，RFID)步行輔助系統(如圖13)。該系統於地面導盲磚鋪設連續的RFID標籤，盲人則手持前端裝設RFID接收器之手杖，透過讀取地面RFID標籤方式，由手杖發出語音導引盲人進入捷運入口匝門；若盲人行走路線離開鋪設RFID標籤的導盲磚或行走方向相反，手杖亦會以語音提示盲人回到正確路線行走。不過由現場設備佈設的情形可發現，本系統僅為本次展示臨時設置，並非已大量建置

之系統，且示範過程中亦發生訊號接收不佳，而由技術人員花了一些時間進行故障排除。同行的鼎漢公司副理亦表示，該公司已於3、4年前進行類似該系統之原型機開發，故相關技術及概念較缺乏獨創性。

	
<p>A.地面導盲磚鋪設RFID標籤</p>	<p>B.天花板裝設訊號接收器</p>
	
<p>C.調校RFID接收器</p>	<p>D.示範透過輔助系統進入捷運匝門</p>

圖13 RFID步行輔助系統實地示範

二、Demo 3：綠色運具體驗

此次年會由廠商提供4種綠色運具給與會人員試乘，體驗綠色運具實際

乘坐感覺，包括3輛電動車及1輛油電混合車，4輛車之型號、廠牌及規格詳如表2所示。4輛車陳列於Bexco會場的廣場，除可檢視相關配備及規格外，亦可於展示時間內預約試乘，每10分鐘一梯次。試乘路線為環繞Bexco會場周邊道路，長度約2~3公里，行程則約8~9分鐘，可及時回到出發之廣場搭載下一位乘客。

表2 4種試乘綠色運具一覽表

車種	型號/廠牌及規格
	<ul style="list-style-type: none"> ● BlueOn /Hyundai Motor Company ● 高速電動車(最高速度：130km/h) ● 5人座
	<ul style="list-style-type: none"> ● Change /AD Motors CO., LTD. ● 低速電動車(最高速度：60km/h) ● 2人座
	<ul style="list-style-type: none"> ● e-Zone /CT&T CO., LTD. ● 低速電動車(最高速度：60km/h) ● 2人座

車種	型號/廠牌及規格
	<ul style="list-style-type: none"> ● Insight /Honda Motor CO., LTD. ● 油電混合車(最大燃油效率：23km/公升) ● 5人座

本次選擇CT&T CO., LTD.製造的e-Zone2人座低速電動車進行試乘(如圖14)，由該公司工作人員駕駛及解說。該工作人員因曾至大陸南京攻讀大學，故可以中文直接溝通。試乘過程感覺良好，除了加減速及行駛穩定度好之外，噪音部分也有電動車安靜的特色。解說人員提到e-Zone雖為低速電動車，但其最高時速可達80km，因法令規定低速電動車最高時速不得超過60km，且低速電動車僅能於一般道路行駛，不得行駛高速公路。

在電池續航力部分，解說人員表示此電動車充電一次可應付一天20次試乘的需求，因此充電一次之續航力約為50km上下。此外，解說人員表示該公司(CT&T CO., LTD.)另有一款高速電動車，最高時速可達120km，但因電池及成本等考量，目前尚未上市銷售。



圖14 Domo 3之綠能車輛e-Zone試乘實況

3.4 技術參訪(Technical Visits)

科技參訪共有7個地點，分別為釜山運輸資訊中心(Transportation Information Center，TIC)、釜山至巨濟(Geogje)之連絡道路工程、Hanjin 新港、雷諾三星汽車釜山工廠、WAVE通訊服務示範、釜山捷運4號線、蔚山(Ulsan)交通管理中心(Traffic Management Center，TMC)。因考量參加年會

相關研討會及活動安排，經篩選後選擇參加行程1釜山運輸資訊中心(Transportation Information Center，TIC)及行程2釜山至巨濟之連絡道路工程。以下分就參訪情況摘錄於後：

一、釜山運輸資訊中心(Transportation Information Center，TIC)

在介紹釜山運輸資訊中心前，首先需瞭解釜山相關資料。釜山位於韓國南部，人口共360萬人，總面積則為766平方公里。截至2010年9月，其登記車輛總數約為114萬輛，其中以小客車約88萬輛為最多。依據2009年12月統計數據，釜山每天約有670萬旅次，其中小客車佔29.9%，公車、捷運及計程車各佔27.3%、13.9%及13.8%。在大眾運輸方面，釜山共有3條捷運線，共計95.8公里長及94個車站；公車則有132條路線及2,532輛公車，另接駁車有140條路線及571輛公車；計程車則有25,065輛，其中11,083輛為公司所有，個人則有13,982輛。

釜山運輸資訊中心為4層樓建物(如圖15)，並於2010年4月完工啟用，共有18名員工。該中心功能為蒐集及分析資訊、即時資訊服務、監控交通狀況、交通突發事件及壅塞警示、交通資訊設施維護等，並整合市區道路、大眾運輸、高速公路等8個機構之交通資訊(如圖16)。中心設備除了交通資訊蒐集系統、公車資訊管理系統、CCTV/VMS管理系統、網站/手機系統，還包括215公里長之ITS獨立網路。



圖15 釜山運輸資訊中心

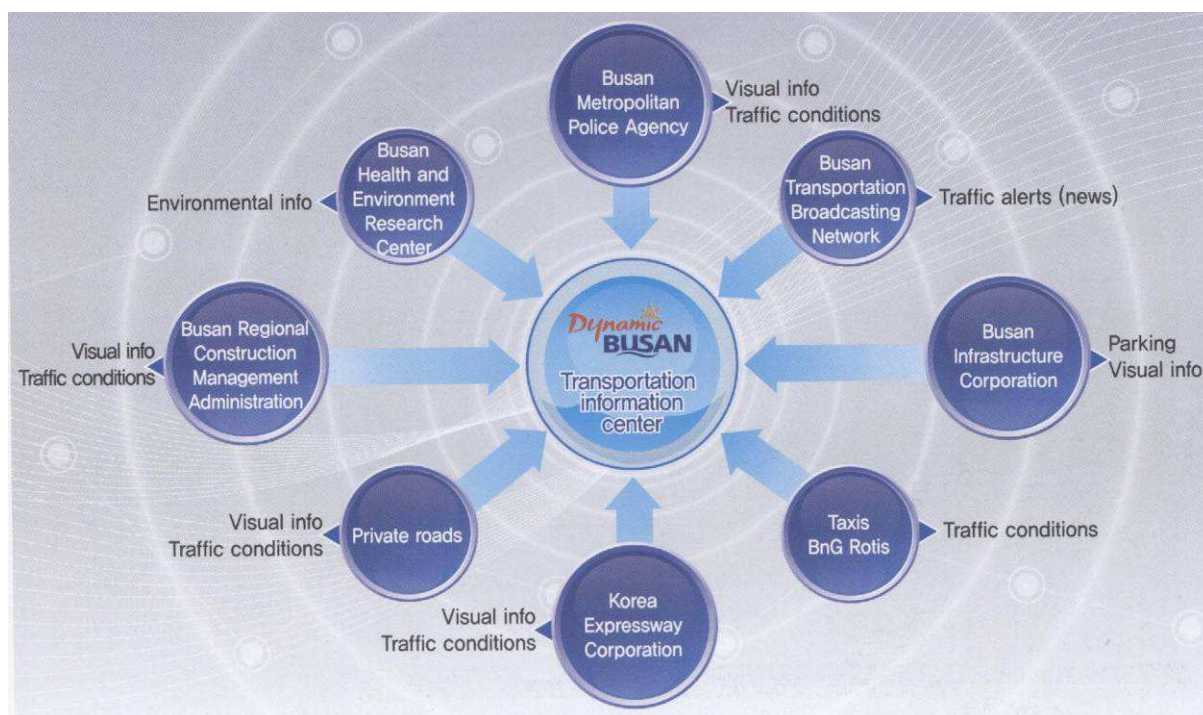


圖16 釜山運輸資訊中心整合8個機構之交通資訊

中心之監控室(situation room)面積有357平方公尺，監控主螢幕由5 x 10個67吋DLP螢幕所組成，下方則另有10個40吋液晶螢幕(如圖17)。其主要功

能包括監控交通狀況、發生事故或交通壅塞時發送警告資訊及交通資訊服務。中心相關ITS設施詳如表3。

表3 釜山運輸資訊中心之ITS設備數量一覽表

通訊網路	216.47km	可變資訊標誌	91座
無線通訊設備(RSE)	200個	公車站資訊看板	506座
交通資訊偵測(DSRC)	49個	捷運停車導引	10座
CCTV	150個	自行車(U-bicycle)租借站	15個



A. 監控室螢幕



B. 監控室螢幕



C. 監控室操作台



D. 監控室操作台

圖17 釜山運輸資訊中心監控室

該中心透過CCTV、DSRC、公車車機及探偵車蒐集相關交通資訊，並透過公共設施(如交通資訊站)、路側發布設施(如可變資訊標誌、公車資訊站)及家戶或個人設施(如有線電視、網路電視、網路、手機、Call center及ARS(自動回覆系統))發布或提供相關交通資訊，讓用路人能隨時透過相關設備掌握交通狀況 (如圖18)。



圖18 釜山運輸資訊中心運作關係圖

該中心為減少民眾使用汽車次數，藉以降低汽車排放量，推動「汽車牌照配給計畫(License plate rationing plan)」，參加計畫之汽車依據其每星期不使用汽車之天數，以不同顏色標籤識別(如圖19)，並給予相關規費折扣，最多可減少10%汽車稅及50%公共停車場之停車費。如果所有67萬輛汽車中

有20萬輛參加該計畫，預估每年可減少1114億韓圓(約新臺幣33.7億)之汽車使用成本、11萬噸溫室氣體及72億韓圓(約新臺幣2.2億)之環境污染成本(如圖19B)；惟該計畫實施時間不久，目前尚無法看到實際的成效。該中心另推動自行車自動租借系統(U-bicycle)，民眾可至租借站租借及歸還自行車(如圖20)。



圖19 釜山推動「汽車牌照配給計畫(License plate rationing plan)」



圖20 釜山之自行車自動租借系統(U-bicycle)

據參訪行程7蔚山(Ulsan)交通管理中心之人員轉述，釜山運輸資訊中心不若蔚山交通管理中心可進行交通控制作業，目前僅能蒐集及發布相關交通資訊，且因其成立僅約半年，各單位之間的協調作業仍處於磨合期。

二、釜山至巨濟之連絡道路工程

該連絡道路為4線道公路，連接釜山Gadeok島及位於慶尚南道(South Gyeongsang Province)之巨濟市，全長8.2公里，包含南端4.5公里斜張橋路段及北端3.7公里之18段沉箱隧道路段，南端斜張橋路段又分別由2座及3座斜張橋路段所組成(如圖21、22)。其總造價高達18億美金，由韓國最大營建廠大宇公司承建。完工後，兩地車程時間將由3.5小時縮短為40分鐘。

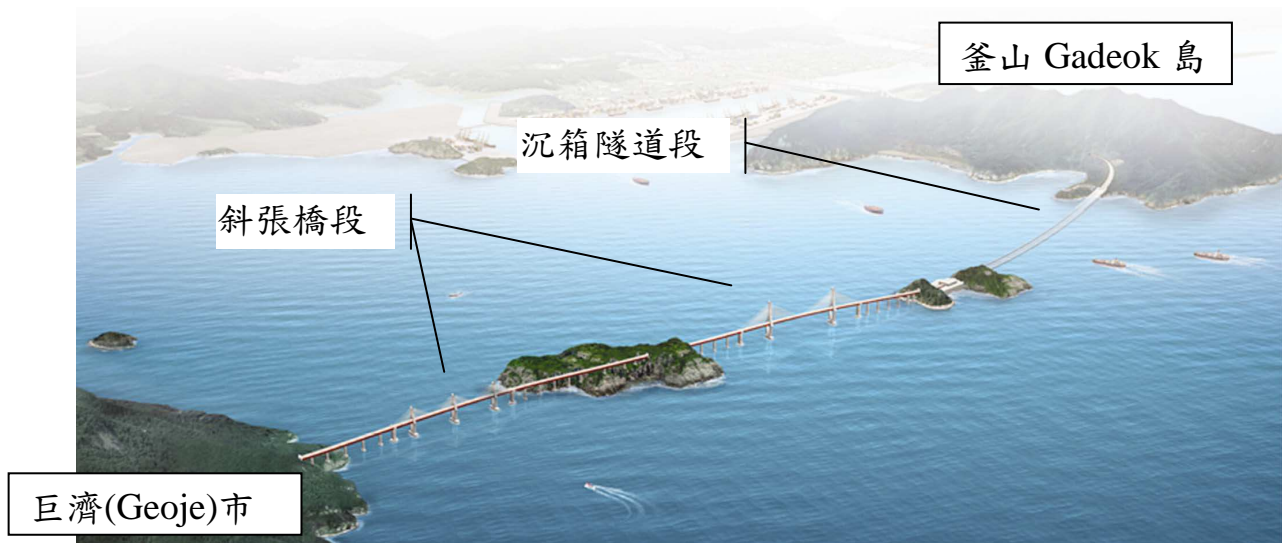


圖21 釜山至巨濟之連絡道路工程路線圖

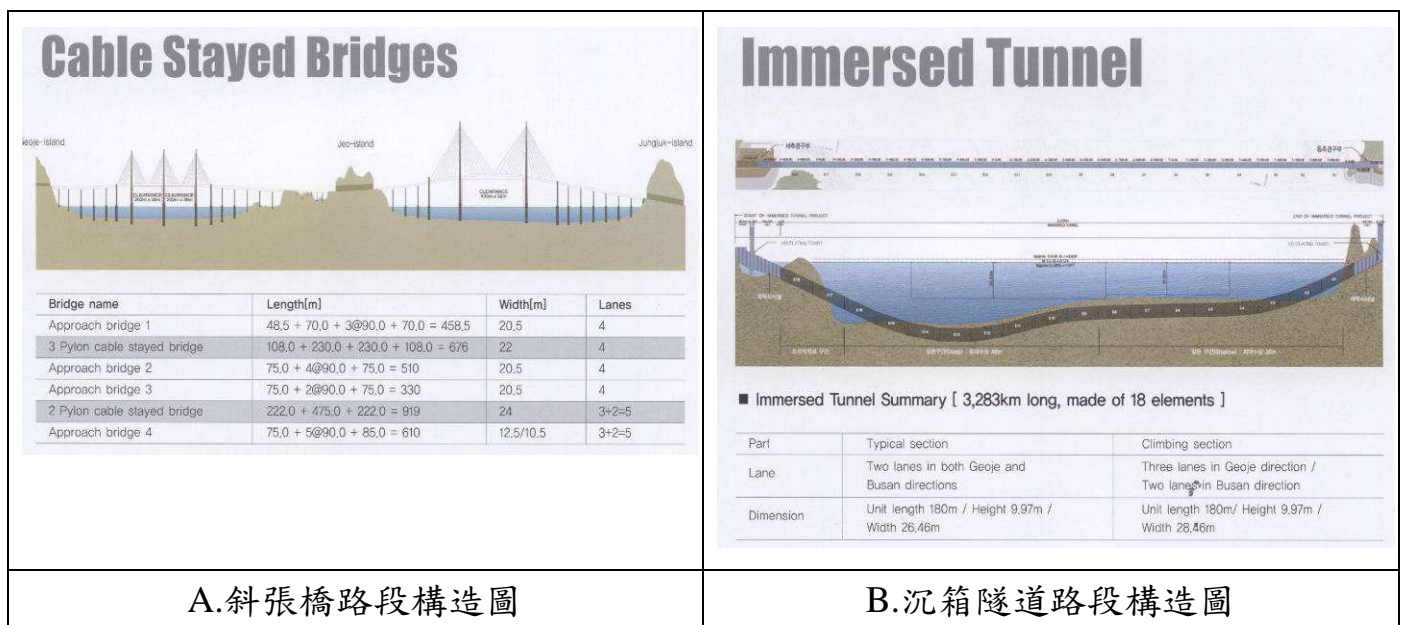


圖22 釜山至巨濟之連絡道路之結構圖

本次參訪先至工程展示中心(如圖23)，由解說人員說明整體計畫內容及相關工法，再開車前往其交通控制中心聽取簡報(如圖24)。由於該道路系統包含斜張橋及隧道，因此對於相關交通順暢及安全之要求較高，其交通控制將涉及車道控制系統(Lane Control System)、快速警告系統(Quick Warning System)、速度控制系統(Speed Control System)及事件偵測系統(Incident Detection System)等議題。

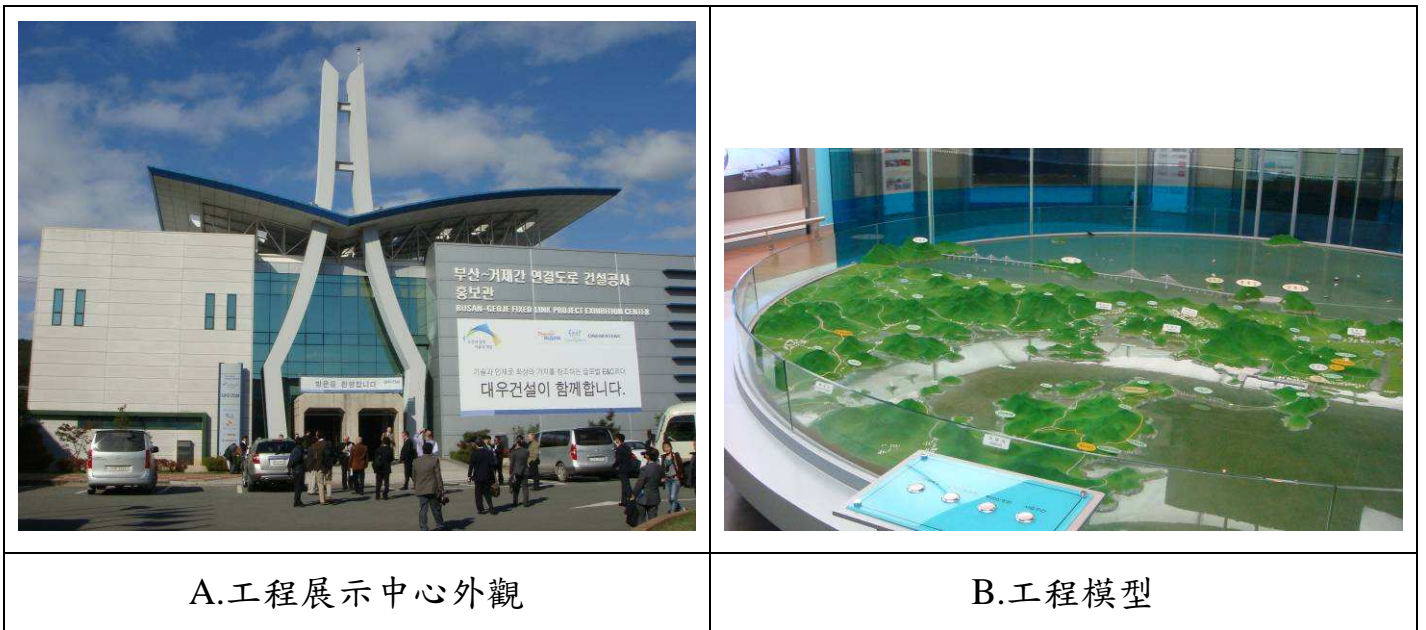


圖23 參訪釜山至巨濟之連絡道路之工程展示中心

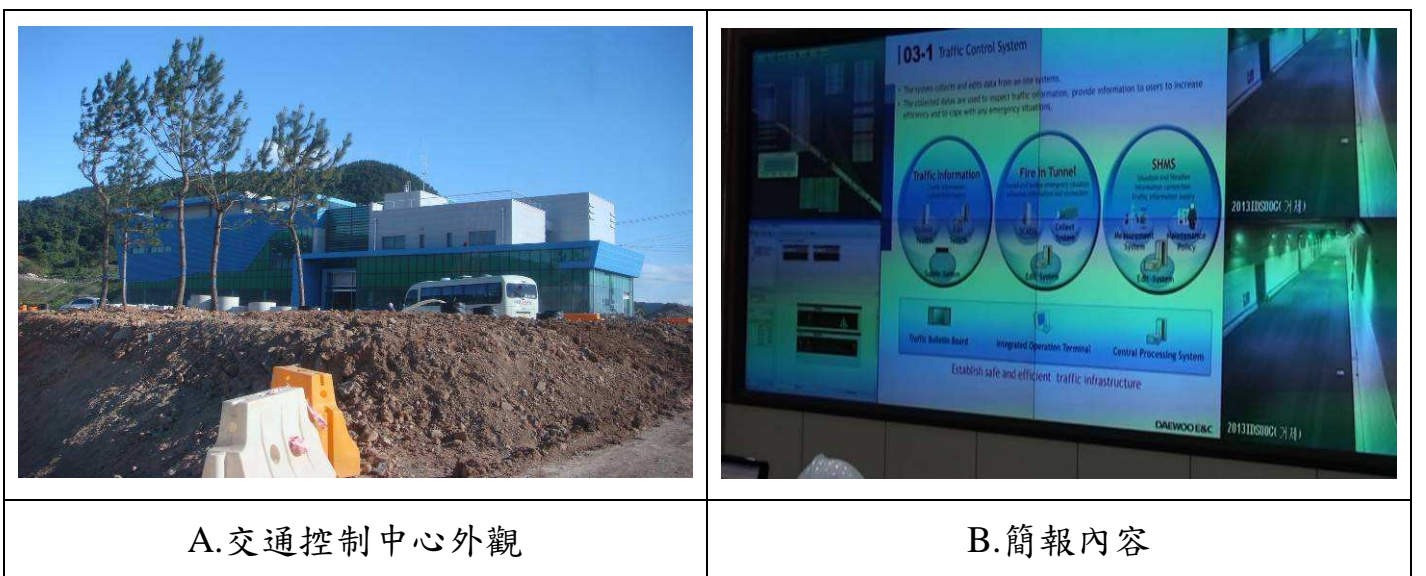


圖24 參訪釜山至巨濟之連絡道路之交通控制中心

該交通控制系統包括交通管理、火災監控及橋梁結構監控3大部分。交通管理經由路側系統(如影像、迴圈及路段偵測器)蒐集相關交通資訊，再提供交通維護中心，經過數據蒐集與監視控制系統(Supervisory Control And Data Acquisition, SCADA)分析及研判，其結果除提供系統管理者參考外，亦透過相關訊息發布設施(如VMS、網頁及廣播)將資訊傳達給用路人；火災監控則透過偵測設備(如火災及濃煙偵測器、緊急電話、事件偵測系統)，蒐集火災相關徵兆，再提供交通維護中心分析及研判，其結果除提供系統管理者參考外，亦透過聯絡系統通知相關單位，包括警察單位、消防單位、迴護管理單位及用路人；橋梁結構監控則透過結構安全監控系統(Structural Health Monitoring System, SHMS)，包括橋梁維護系統、天氣預報系統及設備偵測蒐集相關監控數據，再提供交通維護中心分析及研判，其結果除提供系統管理者參考外，亦通知相關系統(如維護者、用路人)。

由於該工程預計2010年11月底完成，因此10月27日下午參訪時，該連絡道路仍在進行相關工程施作，故尚無法參觀該交通控制系統運作情況，僅能參觀部分路段及斜張橋施工情形(如圖25)。據網路新聞報導，該連絡道路將於2010年12月14日開放通車。



A.收費站施工



B.隧道內施工情形



C.斜張橋路段



D. 斜張橋施工情形

圖25 參訪釜山至巨濟之連絡道路之實際施工情形

肆、釜山及慶州的交通狀況考察

韓國汽車駕駛座的位置靠左，並靠右行駛，皆與我國的開車方向相同。以下就此次考察釜山及慶州的交通設施所見及心得，分成「車輛」、「道路及相關設施」、「大眾運輸」3部分介紹，最後則是小結。

4.1 車輛

1. 機車及自行車

在韓國釜山及慶州所看到的機車數量不多，據詢問導遊得知，除了韓國當地氣候較為寒冷，不適合騎乘機車外，主要係因為韓國人較重視「衣」，也就是外在的形象，故其較會選擇購買汽車以提升自我外在形象，所以機車數量相對非常稀少(如圖26)。

自行車數量亦如機車相對較少，釜山的道路上亦較少看到其專用車道等設施，慶州則因其為觀光勝地，遊客亦常租借自行車騎乘，故自行車道之設施相對較多(如圖27)。



圖26 韓國機車

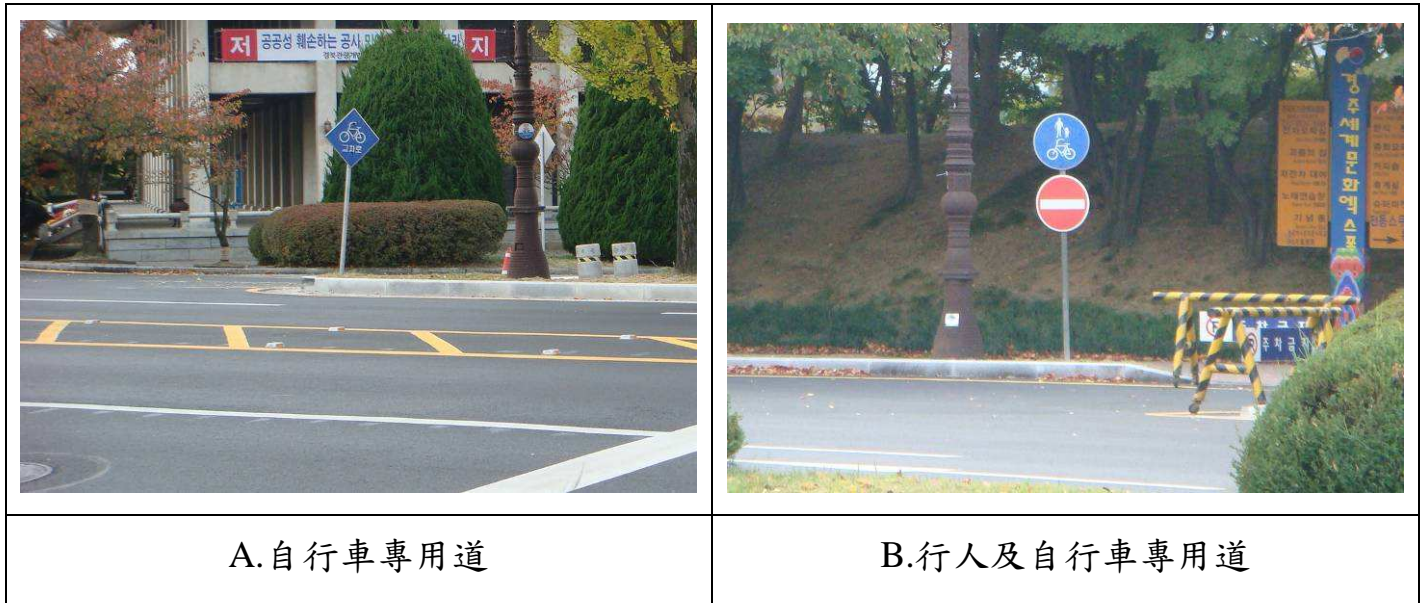


圖27 韓國慶州之自行車道路設施

2. 車牌

依據對於韓國車牌的觀察，其自用車之車牌顏色則新舊車牌有所不同。舊式的車牌為綠底白字，新式的車牌則為白底黑字，且新式車牌高度及寬度會隨牌照固定螺絲位置而增加。在牌照編碼部分，舊式的車牌有2行編碼，第1行為2碼數字加上1個韓文，第2行為4碼數字；新式的車牌則只有1行，以「2碼數字+1個韓文+4碼數字」方式編碼。圖28最左邊車輛為舊式車牌，右側2輛車則為新式車牌。

營業車輛(如計程車、公車、遊覽車等)之車牌顏色則為黃底，字體則有藍色及黑色，可能亦與新舊車牌有關。在車牌編碼部分，大客車車牌編碼為2行，第1行為2個韓文加上2碼數字，第2行為1碼韓文加上4碼數字；計程車車牌編碼則為1行，以「1個韓文+2碼數字+1個韓文+4碼數字」方式編碼，較自用車多出最前面1個韓文(如圖29)。



圖28 韓國自用車之車牌樣式



圖29 韓國營業車之車牌樣式

3. 停車

韓國釜山之一般道路很少劃設路邊停車位，且路邊幾乎都劃設黃線禁止停車，大多數路段皆無車輛違規停車，僅在市區較熱鬧路段看到車

輛於黃線禁停路段停車。路邊停車位大多為公車停靠或計程車停靠之停車空間，僅有部分路段(如釜山光復街)看到路邊停車格位(如圖30)。路邊除了劃設黃線禁止停車外，有時也會看到禁止停車標誌及拖吊車之警示(如圖31)。

除了一般停車外，亦有身心障礙或自行車等專用停車位，其身心障礙專用符碼與我國相同(如圖32)，自行車符碼亦容易辨識得知其代表意義(如圖33)。

	
<p>A.一般道路路邊劃設黃線禁止停車</p>	<p>B.釜山光復街之路邊停車格位</p>
	
<p>C.慶州之計程車停等格位</p>	<p>D.計程車招呼站(右)及禁停標誌(左)</p>

圖30 韓國之路邊停車樣態



A. 豎立式禁止停車標誌



B. 懸掛式禁止停車標誌

圖31 韓國之禁止停車標誌及拖吊車之警示



A. 身心障礙專用停車位



B. 身心障礙專用停車位標誌

圖32 韓國之身心障礙專用停車位



圖33 韓國之自行車專用停車位

4.2 道路交通設施

1. 公車專用道

在韓國釜山許多市區路段設有公車專用道，專用車道多佈設於最外側的車道，相關路段會以標誌及標線標示專用道的範圍(如圖34)。標誌為長方型藍底白圖案，並以白箭頭標示專用車道所在位置，另以白底黑字之附牌標示雙語之公車專用道訊息及專用時段；標線則為藍色之車道線(虛線)，並於專用車道上標繪專用標字及時段。惟在交通尖峰時，會看到部分車輛違規停車占用最外側之公車專用道。



A.公車專用道標誌(兩側車道)



B.公車專用道標誌(下方車道)



C.韓國之公車專用道(道路最外側車道)

圖34 韓國之公車專用道佈設方式

2. 標誌

韓國的標誌在禁制標誌(例如禁止停車、速限等)，其外觀大致與我國相同，但最低速限則於速限標誌之數字下方加上底線，與我國改以藍底

白數字之方式不同；警告標誌形狀與我國相同皆為三角型，但其底色則為黃色，但亦看到少數白底之警告標誌，另對於人行道、兒童穿越及自行車穿越等，其警告標誌則為類似三角形之藍底白圖案標誌(如圖35)。惟其對於進入學校附近道路會加強警示，將藍底之兒童穿越警告標誌嵌入黃底大方框中，加強提示駕駛人注意學童安全，離開學校附近道路時則於警告標誌加上5條黑色斜線，解除上游兒童穿越警告標誌之警示(如圖36)。

	
<p>A. 禁制標誌</p>	<p>B. 高速公路最高(左)及最低(右)速限標誌</p>
	
<p>C. 不同底色之警告標誌</p>	<p>D. 黃底之注意兒童警告標誌</p>

圖35 韓國之禁制及警告標誌

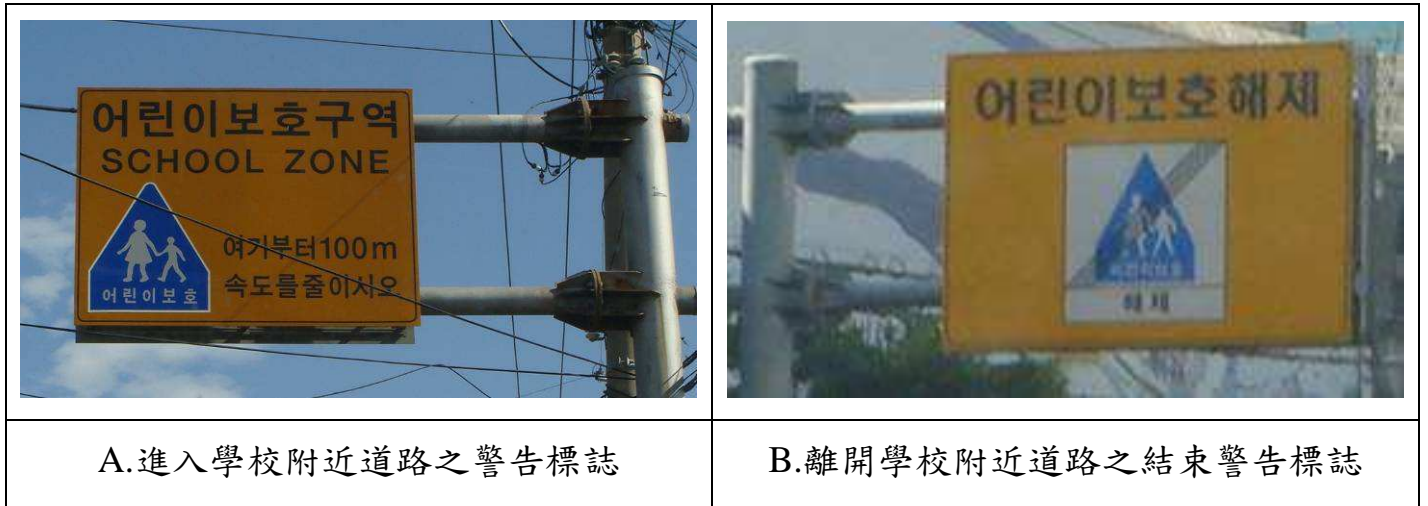


圖36 韓國之進入及離開學校附近道路之警告標誌

在指示標誌部分，一般道路之指示標誌為藍底白字，其預告標誌多以圖形化標示，到了路口行動點再改以分離式文字化標誌，路型複雜者則仍以圖形化標誌標示，其路線編號則均標示於箭身。其圖形化方式類似我國圖形化標誌，惟其各方向通往之地名係標示於箭頭前，故其箭身較短以容納標示地名之空間。韓國之觀光標誌則為棕底白字，指示對象不僅有觀光地區，還包含機場、渡口及車站等運輸場站，有時亦會標示其代表符碼圖案。觀光標誌較少單獨設置，大多以嵌入一般指示標誌方式標示。相關指示標誌如圖37。

除了嵌入觀光標誌外，一般道路指示標誌亦會嵌入綠底之高速公路指示資訊，有時則會與禁制標誌結合標示(如圖38)。雖然韓國之一般道路指示標誌變化程度較我國多，惟設置有時未注意是否遭到上游其它標誌或號誌遮蔽，或是設置過多標誌而影響市容景觀(如圖39)。

韓國在指示標誌多以韓文及英文標示雙語資訊，英文可標示於韓文下方或右側，惟對於運輸場站及觀光地區則會加上中文，形成標示3語之特殊現象。



A.一般道路之指示標誌(預告)



B.一般道路之指示標誌(行動)



C.觀光標誌嵌入一般指示標誌(預告)



D.觀光標誌嵌入一般指示標誌(行動)



E.特殊路型之圖形化標誌



F.嵌入觀光及高速公路之圖形化標誌

圖 37 一般道路之指示標誌樣態



A. 禁止右轉標誌與指示標誌結合



B. 共線之路線編號(2與77)標示方式

圖38 一般道路指示標誌之特殊標示方式



A. 指示標誌遭其它標誌或號誌遮蔽



B. 設置標誌過多影響市容景觀

圖39 不佳的道路標誌設置情形

韓國之高速公路指示標誌顏色為綠底白字，在交流道出口前原則會於距出口2公里處開始設置3道出口預告標誌及1道出口標誌，部分交流道則會於中間再加數道出口預告標誌(如圖40)。其標示內容係橫向方式排列，包括出口銜接道路編號、地名、右箭頭等，箭頭下方則標示該出口預告標誌至出口之距離，地名之英譯則標示於韓文右側。出口預告標誌

右上方另標示該交流道名稱，包含左側黑底白字之交流道序列編號，部分簡化之牌面則會省略英譯及交流道名稱。

除了出口預告標誌外，高速公路主線亦會設置地名里程標誌，其中可能因部分高速公路納入亞洲公路系統中，還會標示其亞洲公路系統之編號，其編號樣式同我國之縣道標誌，為長方形白底黑框黑數字(如圖41)。在進入收費站前，因其設有電子收費車道，故會以藍底白字之電子收費標誌指示車道所在。

韓國之高速公路相關標誌，除了里程碑等小型標誌設置於路側，其它均以懸臂或門架方式設置，並未看到我國於路外邊坡以豎立式方式設置相關標誌。

		
A. 出口預告標誌(2km)	B. 出口預告標誌(1.5km)	C. 出口預告標誌(1km)
		
D. 出口預告標誌(700m)	E. 出口預告標誌(150m)	F. 出口標誌

圖40 韓國高速公路之出口預告標誌

	
<p>A.高速公路主線之地名里程標誌</p>	<p>B.左側牌面標示亞洲公路系統之編號(AH1)</p>
	
<p>C.高速公路主線之電子收費標誌</p>	<p>D.高速公路之收費站</p>

圖41 韓國高速公路之其它指示標誌

韓國高速公路除了相關指示標誌外，還有1項特殊的設施，即於路側設置客運站供乘客上下車(如圖42)。在客運站200公尺前會先以藍底白字的標誌指示，接近時則於主線車道外加設1車道供大客車進入客運站，分流處設置防撞設施、護欄及分流標誌導引及防護車輛，右側則設置交通桿及護欄導引，兩側護欄中間則設置類似警車之紅藍警示燈，而乘客似乎由客運站旁之出入口進出。



A.高速公路客運站上游指引標誌



B.高速公路客運站車道入口處



C.高速公路客運站

圖42 高速公路客運站相關交通設施

除了前述相關標誌，韓國有時會以特殊圖形化標誌處理複雜路口指引，或以可變資訊標誌(CMS)顯示前方道路之順暢程度。在彎道的警示導引部分，除了設置與我國相同之安全方向導引標誌「輔2」黃底黑箭型標誌外，還於每面標誌上加設俗稱九孔之第三類危險標記，並間隔設置危險警告標誌及方形箭頭燈號(如圖43)。雖然顯示對於彎道的警示相當重視，但設置之設施似乎過多且功能重複。

	
<p>A.特殊複雜路口之指示標誌(橋下左轉)</p>	<p>B.特殊複雜路口之指示標誌(左右道路將匯流)</p>
	
<p>C.可變資訊標誌(CMS)顯示道路順暢程度</p>	<p>D.彎道的警示導引設施</p>

圖43 韓國其它特殊標誌及設施

3. 標線

韓國標線大致與我國相同(如圖44)，其中車道線及路面邊線與我國相同，惟市區車道寬度較窄，約僅有3公尺寬，往往可因此多劃1-2個車道，但相對大型車行駛時之兩側淨寬較小；分向線則為雙黃實線或單黃實線，到路口時則以白虛線連接直行或轉彎後之分向線；公車專用車道則以藍色車道線區隔。

據觀察韓國有數種標線與我國差異較大，第1是路口行穿線雖同為枕木紋，但部分行穿線分左右兩側將實、虛部分交錯，且入口處還劃設箭頭指引行人靠右行走；第2是對於禁止轉向或進入雖有相關禁制標誌，但亦會設置相關禁制標線，其作法為指向線之箭身加繪「X」表示禁止轉向或進入；第3是地面標字大多為白色，未見黃色標字，且有多個車道同時標繪相關標字(如速限)時，有時不會標繪於道路同一斷面，而是由右向左車道逐漸將標字往前標繪。相關標線如圖45。

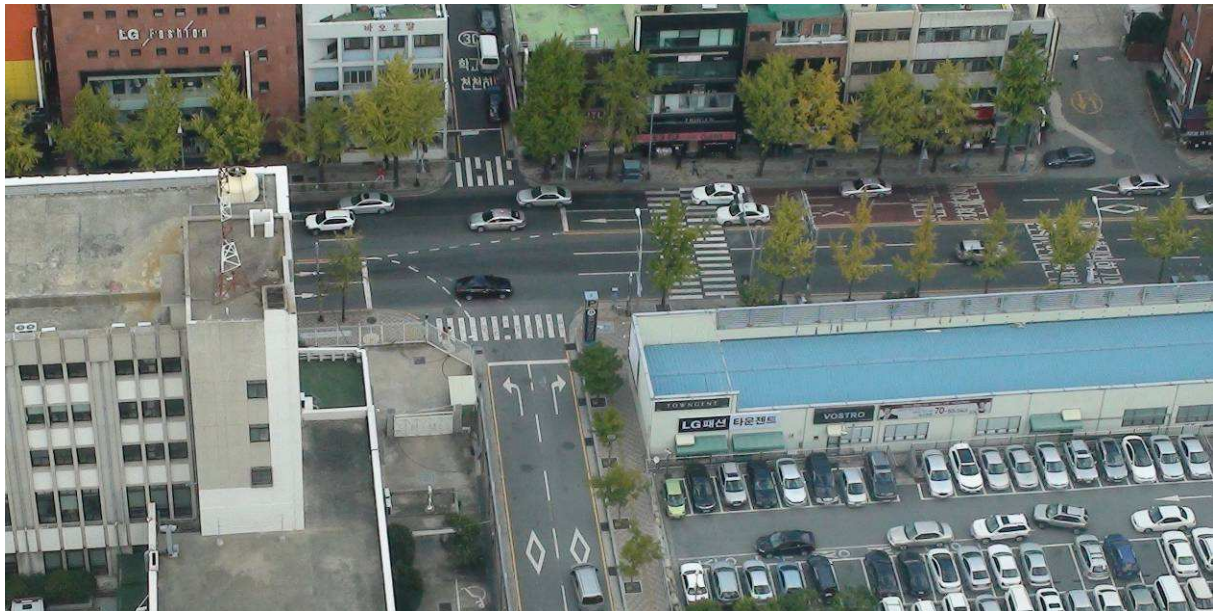


圖44 由高空鳥瞰韓國路口相關標線之樣式及繪設方式



A.行穿線之左右兩側交錯及劃設箭頭



B.禁止右轉標線



C.禁止進入標線



D.地面標字由右自左向前繪設

圖45 韓國與我國差異較大之標線

4. 號誌

路口行車管制號誌之燈面樣式與我國相同，但無紅燈倒數之功能，且設置方式有所不同，大多以懸臂的方式設於路口遠端，且車道數較多之路口還於遠端設置兩組號誌，但不具車道管制號誌功能，又另於對向車道之懸臂桿設置一近端號誌。至於為何以此方式設置近、遠端號誌，經詢問導遊及年會展覽會場相關人員，均因習以為常，而不知為何如此

設置。至於行人專用號誌部分，其型式大致與我國相似，但僅有少數行人專用號誌設有倒數計時功能。路口行車管制號誌及行人專用號誌樣式如圖46。



圖46 韓國之路口行車號誌及行人號誌樣式

4.3 捷運(Metro)

韓國釜山捷運如前述共有3條捷運線，1號為紅線、2號為綠線、3號為棕線，共計95.8公里長及94個車站。車站入口設有捷運圓形識別標示，進入車站後設有售票機等相關設備。售票機可選擇韓、英、中、日4種語言顯示，惟中文係簡體字，乘客可購買單程票或以使用儲值票乘車。因市政府優待老人免費搭乘捷運，故老人可至敬老車票售票機取票，但不清楚購票機以何種方式識別取票者是否合乎資格。售票機旁亦設有防毒面具置放櫃，可提供地下車站發生火災或毒氣攻擊時使用。由於不同乘車方向之入口不同，故入口會指引該方向之終點站及重要站名，站名則以韓、英、中三語標示，乘客則以單程票或儲值卡通過入口旋轉匝門。捷運車站入口相關設施如圖47。



A.捷運車站入口



B.購票機等相關設備



C.購票機可選擇韓、英、中、日4種語言



D.月台入口及相關指引



E.防毒面具置放櫃



F.捷運入口旋轉匝門

圖47 韓國釜山捷運車站入口相關設施

進入月台後，相關指引標示及設施均配合該路線之代表色來標示顏色，例如2號為綠線，相關指標或護欄會以綠帶強調所在路線。月台亦如同入口處設置捷運行車方向及重要站名指引，而月台與軌道邊則以矮護欄避免乘客摔落軌道(如圖48)。進入列車後，車廂兩側之列車門上方分別標示捷運整體路網及該捷運路線之各站與轉運資訊，其中各站除站名外還有編號，而兩端之LED顯示器則會顯示各站資訊及列車門由何側開啟，以利乘客下車。列車之博愛座設置於頭尾兩端，與臺北捷運設置於列車門旁不同，博愛座上方氣窗處則以圖案標示老殘及孕婦可使用博愛座；列車到站後，月台層於列車門開啟對應之牆面設置本站站名及兩方向之重要站名(如圖49)。

捷運車站亦在部分車站設置地下街，例如1號線及2號線交會的西面站及設有地下街，因其鄰接樂天百貨及樂天飯店，還於臨接通道處配合造景，使地下街與百貨公司及飯店周遭景物融為一體，相當有質感(如圖50)。



圖48 韓國釜山捷運月台層設施



A. 整體捷運路網圖



B. 單一路線各站及轉運資訊



C. 列車博愛座適用對象圖案



D. 列車門開啟之月台層站名及方向資訊

圖49 韓國釜山捷運之列車相關資訊



A. 捷運西面站地下街



B. 捷運西面站地下街連接樂天百貨處

圖50 韓國釜山捷運之西面站地下街

伍、心得與建議

5.1 心得

此次前往韓國參加在釜山舉辦的第17屆ITS世界年會，並順道考察釜山及慶州當地交通狀況，除了在年會中蒐集許多ITS最新資訊，瞭解各國及產業界為達成「安全」、「便利」及「綠色移動」之目標所做的努力，並透過參觀展覽內容及參加技術展示與技術參訪之體驗，獲得許多寶貴資訊與經驗。綜整此次出國心得如次：

- 一、本次年會提供各國對於ITS經驗及技術之良好交流平台，相關論文發表篇數超過1,000篇，顯示各國及各界均投入許多研發及建置之資源，才能獲得如此豐碩的成果。參加人員亦可透過此平台，快速瞭解世界各地之ITS發展情形與經驗，並獲得相關資訊，作為後續推動ITS計畫之參考。
- 二、經由年會之技術展示及技術參訪體驗，以及實地考察韓國釜山及慶州當地交通設施，瞭解韓國已將ITS各項技術逐漸融入民眾「行」的方面，並提供ITS各項便利的服務。用路人可透過交通資訊站等公共設施、CMS等路側發布設施及網路或手機等家戶或個人設施，獲得相關交通資訊，讓用路人能隨時透過相關設備掌握交通狀況。
- 三、韓國之道路交通設施雖然大致與我國相同，但仍有些不同樣式或應用方式，例如特殊的標誌、標線或交通設施，可提供我國進行相關道路交通設施之建置或改善時，不同思考方向及參考素材。

5.2 建議

以下歸納3點建議供參考。

- 一、本次年會在研討會部分，有許多安全與節能方面觀念、技術與經驗之論文發表，雖然無法參與每一場論文研討，但透過大會提供之CD資料，可查閱各論文之詳細內容，提供本所未來相關研究之參考與應用。
- 二、本所對於駕駛模擬器已有多年的發展經驗與成果，此次透過年會展覽內容，易對於其他國家或公司發展駕駛模擬器之技術與現況有更深刻的體驗與認識。藉由此次觀摩與學習，可將所蒐集之資料提供本所未來持續發展與改善駕駛模擬器之參考，使駕駛模擬器提供更擬真的駕駛模擬情境，作為本所及各單位進行相關研究之實驗平台。
- 三、韓國在指示標誌部分，依據道路層級將底色區分為藍底及綠底，且一般道路多以圖形化標示，並將觀光標誌及高速公路資訊嵌入同一牌面，甚至會與禁制標誌結合標示，標示路口禁止轉向之訊息，提供用路人更直覺、更便利的行車資訊。故未來可參考韓國指示標誌之設計方式，檢視我國指示標誌之牌面設計是否有再提升行車資訊指引之空間。

附錄1、研討會發表論文清單

場次名稱	論文題目
SP01_ Intelligent Vehicle Safety: Advanced Driver Assistance Systems (I)	Panoramic Vision System for an Intelligent Vehicle Using a Laser Sensor and Cameras
	Pedestrian Detection Using Local Pedestrian Classifiers
	Real-time Recognition of Blue Traffic Signs from Blue Sky Background
	Towards 3D Automotive LIDAR Processing - How to Deal with Vehicle Dynamics
	The Analysis of Potential Cost Saving for Large Trucks with Rearview Video System (RVS)
SP02_ Traveller Information Services	Connected Traveler - Toward the Field Testing of a Mobile Multi-modal Traveler InformationSystem
	Freeway Dynamic Message Sign Evaluation Using Bluetooth Sensors: A Case Study
	Development of a Hybrid Model for Freeway Incident Duration: A Case Study in Maryland
	Empirical Analysis and Modeling of Drivers' Response to Variable Message Signs in Shanghai
	Development of User Satisfaction Models for Traffic Information Devices
SP03_ Simulation & Planning	Traffic Modeling within the Interactive Spatial Planning Tool Urban Strategy
	Smart Transportation System to Support the Freight Transportation Related Information
	Simulation of Mixed Traffic Using Embedded Neural Network Based Vehicle Following Models
	Railway Safety Development in Thailand : An Initiative Concept
SP04_ Traffic Control & Congestion Management (I)	Estimation of Non-recurrent Traffic Congestion Caused by Precipitation Using Archived Weather and ITS Traffic Data
	A Novel Approach of Dynamic Time Warping for Traffic Congestion Detection and Shortterm Prediction
	Examining the Effect of Connecting Auxiliary Lanes on Mitigation of Expressway Traffic Congestion
	Travel Times, Congestion Levels, and Delays at Intersections Calculated on the Basis of Floating Car Data
SP05_ Intelligent Vehicle Safety and Electronics	Multiple Representation Database Model for Real-time Synchronization of Road Networks
	Evaluation of the Applicability of High-speed Camera Data to Full-scale Vehicle Crash Tests
	Wireless Black Box for Real Time Accidental Monitoring of Vehicle
	SAFERIDER HMI Strategies for Motorcycles' ARAS and OBIS
SP06_ Green Mobility	Sustainability Verification of Eco-driving Behavior Based on Driving Simulator Experiments
	A Methodology for Quantification of Fuel Reduction Potential for Different Driving
	User Needs in Green ITS: The Results of a Questionnaire Survey on Dutch and Japanese Drivers
SP07_ Vehicle-infrastructure Cooperation (I)	Accuracy Assessment for Traffic Information Derived from Floating Phone Data
	An Empirical Study of Inter-vehicle Communication Performance Using NS-2
	How to Study the Variability of the Impact of Intelligent Speed Adaptation (The French LAVIA Project) among Drivers: A Data Mining Approach
	Directions for Next Generation Microscopic Traffic Simulation Modeling Tool under the IntelliDrive Environment
SP08_ Intelligent Demand Management	Utilizing Taxi Empty Cruise Time to Solve the Short Distance Trip Problem
	City Planning with Using the Adjusted On-demand Bus Log Data
	Multi-tier Multi-hop Routing in Large-scale Wireless Sensor Networks for Freight-train Monitoring
	An Efficient Implementation of Origin-Destination Demand Adjustment Problem Using Column Generation
SP09_ Policy & Planning	A New Traffic Counting Program for Intercity Roads Based on Integer Linear Optimization
	Impact of Green House Gas Tax on Reducing Green House Gas Emission: A Case Study in Metropolitan Area of Seoul, Korea
	Access to Transportation's Data Cloud
	Proposition of Solutions with Low-cost and Fast Profits to the Continental Gateway and Trade Corridor Quebec-Ontario (CGTCQO): a Benefit-Cost Analysis and a National Planning Methodology
	Building Value in ITS Services
SP10_ Traffic Control & Congestion Management (II)	Combination Method and Multiple Interval Freeway Volume Forecasting
	An Optimal Control Model for Traffic Corridor Management
	Data Fusion Concept to Estimate Vehicle Trajectories on Urban Arterials
	Highway Network Analysis and Detection Assessment Framework
	Identifying Promising Segments for Safety Improvement through Speed Management
	Integrated Route Guidance and Ramp Metering System Consistent with Drivers' Dynamic Diversion Behavior
SP11_ Traveller Information: Forecasting and Information Service	Data Fusion Algorithm for Travel Time Prediction Improvement
	A Spatial Correlation Determining Method for Space-time Traffic Prediction
	Utilisation of Really Simple Syndication for Real-time Traffic Information Distribution
	The Effects of VMS on Driver Detours and Identification of Influencing Factors
	The Impact of Information on Travel Mode Choice: Some Preliminary Results
	The Modification of Logit Model for Traffic Mode Split under the Information Supplying Condition
	Relationship of Vehicle Kilometers Traveled and Social Economic Status - Using Panel Data Analysis
SP12_ Modeling and Simulation	Rule-based Information Extraction from Long Distance Travel Data
	Improvement of Microscopic Traffic Simulation with Driver's Parameter Variation Using Travel Time Estimation
	Microscopic Freeway Traffic Simulation Model Calibration Using Latin Hypercube Experimental Design Approach
	Development of Dynamic Multi-Interval Traffic Volume Prediction Based on System Approach Using Historical and Real-time Data
	Development of SIDRA-TRIP Integrated GPS Model to Evaluate Fuel Consumption/Emission on Expressway and Alternative Road
	A Statistical Method for Assessing the Periodicity of Traffic Flow Time Series
	Introduction to Modeling Experimental Design When Operating SCATS within Simulation
	Development of a New Drowsy Driving Monitoring System
SP16_ Intelligent Vehicle Safety: Advanced Driver Assistance Systems (II)	Research on Pre-Warning Experimental System of Driving Fatigue
	Analysis of Fault Detection and Identification for Heading Control of a Four Wheel Vehicle
	An Inter-Vehicle Geocasting Algorithm for Vehicular Cooperative Collision Warning System Using DSRC

場次名稱	論文題目
	Advantages of Friction Estimation in Collision Avoidance and Mitigation Calculations
SP17_ Intelligent Vehicle Safety: Autonomous Driving & GIS	Lane Detection System for Vehicle Platooning
	Autonomous Driving Based on LQ Path Following Control and Platooning with Front and Rear Information
	Digital Lane Marking for Geo-Information Dissemination
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TP103_ Traveling Greater Distance More Often with Advanced Traveler Systems	Efficiency of Probe Data Acquisition through Vehicle-to-Vehicle Communication
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TP116_ Role of Government in Multi-modal Development Planning	Improvement on the Connection of Express Highways for the Preparation of Emergency Situation
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	A Study for Executive BMS - Case of Daegu Metropolitan City BMS
	Study on Traffic Information System Using DSRC (Based on Expressway)
	Green Traffic Information System in the Master Plan of ITS Development on Suncheon City

附錄2、參加展覽單位及廠商清單

Aisin AW Co., Ltd.	European ITS Congress	Highway Industry Development Organization - HIDO	Nara Controls Inc.
Aisin Seiki Co., Ltd.	ERTICO - ITS Europe		NewCom Technology Co., Ltd.
Alcatel-Lucent	Brintex	East Nippon Expressway Company - NEXCO-E	NIS GLONASS
Arada Systems	European Pavilion		Noptel
ARH Inc.	ERTICO - ITS Europe	Central Nippon Expressway Company - NEXCO-C	OCTACOMM
Asiana IDT Inc.	TISA - Traveller Information Services Association	West Nippon Expressway Company - NEXCO-W	OMNIIJAE Electrical Research Institute
ATEC Co., Ltd.	C-S	Metropolitan Expressway Company	Panasonic Corporation
AustriaTech GmbH	ITS Finland	Hanshin Expressway Company	Parkor Korea Indus Co., Ltd.
Siemens AG Österreich	Trafi - Finnish Transport Safety Agency	Mitsubishi Electric	Pohang Techno Park
Avego Ltd.	Finnish Transport Agency	IHI	Posco ICT
BasisSoft Inc.	VTT - Technical research centre of Finland	VeriServe	PTV AG
Bitcarrier	ITS Sweden	JAFMATE	Ritco
Busan International Motor Show 2012 - BIMOS 2012	Swedish Transport Administration	CBC	Road Korea
Busan Metropolitan City	ITS Council	Ikegami Tsushinki	Road Traffic Authority
Busan Port Authority	EasyWay / VIKING	KDDI R&D Laboratories	RTA & NICTA
Canada Pavilion	Logica	Ministry of Land, Infrastructure, Transportation and Tourism	Road Traffic Authority Australia
Delcan Corporation	NetPort.Karlshamn AB	Jcast Networks Korea, Inc.	National ICT Australia
IBI Group	ITS Dalarna	Jeju Knowledge Industry Promotion Agency	ITS Australia
International Road Dynamics	Sweco	Jeju Special Self-Governing Province	Sensis
ITS Canada	Sensys	JENOPTIK Robot GmbH	Samsung SDS
Ontario Ministry of Economy Development and Trade	ITS Postgraduate School	JINSUNG I&T	SAMWON FA Co., Ltd.
Skymeter Corporation	ITS Norway	Kapsch TrafficCom AG	Seoul Commtech Co., Ltd.
Transport Canada	Firefly AB	Keon-A Information Technology Co., Ltd.	Shanghai Ruishi Machine Vision Technology Co., Ltd.
CCTV Pavilion	Flow Traffic Limited	KI Technology Co., Ltd.	Shanghai Super Electronics Technology Showcase
HuNS	Forum 8 Seoul Office	KICT - Korea Institute of Construction	Signtelecom Co., Ltd.
INTOTECH	Fujitsu Limited	Kistler Korea Co., Ltd.	SK C&C
COMINET	Fujitsu Ten Limited	KNE Corporation	SOLTECH Co., Ltd.
TRUEN Co., Ltd	GBM Inc.	Korea Electronics Technology Institute	STMicroelectronics
COMART SYSTEM CO., LTD	GEO C&I Co., Ltd.	Korea Expressway Corporation	Suhdol Electronic & Communication Company
Center for Urban Maglev Program - KIMM	GEWI	Korea Land & Housing Corporation	SUIROADTECH Co., Ltd.
China Pavilion	GIL Information Systems	Korea Rail Network Authority	Sumitomo Electric Industries, Ltd.
ITS China	Gitsn Inc.	Korea Railroad Research Institute	SurgeLAB
CenNavi Technologies Co., Ltd.	Globaltelecom Ltd.	Korea Traffic Systems Co., Ltd.	Thinkware
Hanwang Technology Co., Ltd.	Hanil Display Co., Ltd.	Korea Transportation Safety Authority	TOPES Co., Ltd.
Neusoft Corporation	HMI Technologies Ltd	KOTI - The Korea Transport Institute	Toshiba Corporation
Hisense TransTech Co., Ltd	Honda Motor Co., Ltd.	KRIHS - Korea Research Institute for Human Settlements	Toyota Motor Corporation
Zhejiang Dahua Technology Co., Ltd.	Hyundai & KIA Motor	KT	Tricornetck Co., Ltd.
Shanghai Donghai Computer Co., Ltd.	IBEO Automotive Systems GmbH	K-water	TSS
CHUNIL RF Co., Ltd.	IBM	LBCSOFT Corp.	TTI - Traffic Technology International
Citilog	Incheon Int'l Airport Corporation	LG CNS Co., Ltd.	UBIZCORE CORPORATION
Continental Automotive Asia Pacific Co., Ltd.	Innosimulation, Inc.	Lifetech Inc.	Ulsan Metropolitan City
CREVIS	Inpeg Vision Co., Ltd.	LOTTE Data Communication Co. Ltd.	Un-Nam Trading Co., Ltd.
DAEYONG UBITECH Co., Ltd.	International Road & Traffic Expo 2011 - ROTREX 2011	LS Industrial Systems	US Pavilion
Daihan Motors	IT telecom Co., Ltd.	M&Soft, Inc.	Eberle Design, Inc.
DB CS	ITronics	Magus Trading Corporation	Econolite
Denso Corporation	ITS Bank Co., Ltd.	MapsiSoft Inc.	ITS America
DILAB	ITS Korea	MatterSoft	OSI LaserScan
DLR - German Aerospace Center	ITS Singapore	Maxfor Technology Inc.	U. S. Department of Transportation
EFKON AG	ITS Taiwan	MediaDevices Co., Ltd.	Wavetronix
ELP Co., Ltd.	Japan Pavilion	MIKOH	Vaisala Oyj
ENARUTNT Co., Ltd.	ITS Japan	Ministry of Land, Transport and Maritime Affairs	Vitronic
ERF-IRF	Universal Traffic Management Society of Japan - UTMS	Mitsubishi Heavy Industries, Ltd.	Vitzrosys Co., Ltd.
Ericsson	Tokyo Metropolitan Government	Morui Industrial Systems	World IT Show 2011 - WIS 2011
ESRI	Nagasaki Prefecture	Movon Corporation	Yeo Myung Systems
Essetel	Vehicle Information and Communication System Center-VICS	MYbi	YONGSUNG HighTECH Co., Ltd.
ETRI - Electronics and Telecommunications Research Institute			Yujin System Co., Ltd.