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出國報告(出國類別:其他)

出席「第 94 屆美國運輸研究委員會(TRB)年會」出國報告

服務機關：交通部運輸研究所
姓名職稱：湯儒彥研究員
派赴國家：美國
出國期間：104 年 1 月 8 日至 1 月 18 日
報告日期：104 年 3 月 27 日

出席「第 94 屆美國運輸研究委員會(TRB)年會」

出國報告

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出國地區：美國華盛頓哥倫比亞特區

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關 鍵 詞：TRB、ITS、交通運輸

內容摘要：

美國運輸研究委員會(Transportation Research Board, 簡稱 TRB)為全美非營利性之最高運輸研究機構，每年 1 月在首都華盛頓 D.C.所舉辦之年會更為國際間運輸學術與實務領域最大且最重要之研討會議，吸引世界各地超過 1 萬人以上之專家學者頂著冬天凜冽天氣前來參加，今(2015)年則更有超過 1 萬 2 千名以上之學者專家參加，會議場次 750 場，共發表學術及專業論文 5,000 篇以上。

本屆(94 屆)年會主題為「通往未來之路：運輸與科技(Corridors to the future: Transportation and Technology)」。透過年會的參與，不但可迅速知悉世界各地專家學者之最新研究成果，了解世界各國運輸科技或政策實務之發展方向及成效，並能與世界各國頂尖之學者交流經驗、分享心得。本報告摘記此次參與年會的過程與內容，並提出相關心得與建議，以供本所及國家未來相關課題研究與推動之參考。

本文電子檔已上傳至公務出國報告資訊網

目　錄

壹、前言

1.1 出國目的

美國運輸研究委員會(Transportation Research Board, 簡稱 TRB)為美國全國非營利性之最高運輸研究機構，其每年在首都華盛頓 D.C.所舉辦之年會會議更為國際間運輸學術與實務領域最大且最重要之研討會議，吸引世界各地超過 1 萬人以上之專家學者頂著冬天凜冽天氣前來參加，會議中並有超過 4,500 篇以上之論文發表，500 場以上的研討或座談會舉辦。直到今年，該會議舉辦已屆第 94 屆，顯見其歷史之悠久與重要性。今(2015)年更有世界各國專家學者 1 萬 2 千人以上參加，會議場次 750 場，學術及專業論文 5,000 篇以上之發表。

由前述可知，TRB 年會已為全球運輸界最重要的一項國際會議，因此，透過該年會之參與，不但可迅速知悉世界各地專家學者之最新研究成果，了解世界各國運輸科技或政策實務之發展方向及成效，並能與世界各國頂尖之學者交流經驗、分享心得。

本所職司運輸研究工作，為國內僅有之專業運輸研究機關，亟需確實掌握國際上各國家運輸實務與政策之發展方向，同時更需在學術上力求與國際運輸研究無縫接軌，因此，為充分了解國際上交通運輸研究成果、政策方向、實施經驗與未來發展趨勢，本所每年均會編列預算並指派適當之同仁參加，並蒐集各類最新運輸學術與實務資訊，以做為本所及國家未來相關課題研究與政策推動之參考。

1.2 行程概要

本次出國參加國際會議之名稱為「第 94 屆美國運輸研究委員會年會(Transportation Research Board 94th Annual Meeting，簡稱 TRB 年會)」，並順道參加由美國華人所舉辦之「2015 TRB 台灣運輸專家學術交流會(2015 TRB Taiwanese Transportation Professionals Technical Information Exchange，簡稱 TIE 會議)」。兩項會議分別於美國首都華盛頓哥倫比亞特區(Washington, District of Columbia，簡稱華盛頓 D.C.)的「華盛頓會議中心（The Walter E. Washington Convention Center）」及「馬奎斯萬豪飯店(Marriott Marquis Washington, D.C.)」舉行，其中「第 94 屆美國運輸研究委員會年會(TRB 94th Annual Meeting)」會議期間自民國 104 年 1 月 11 日至 1 月 15 日(當地時間)，會議為期 5 天舉行;「2015 TRB 台灣運輸專家學術交流會(TIE 會議)」則於民國 104 年 1 月 11 日下午 17-19 時(當地時間)舉行，會議時間 2 小時。

本次出國行程自 104 年 1 月 8 日中午由桃園機場搭乘達美航空(Delta Airline)班機出發，下午於日本東京成田國際機場(Narita International Airport)轉搭同公司班機飛往美國紐約，因時差關係，於紐約當地時間 1 月 8 日晚間時分抵達紐約甘迺迪國際機場(John F. Kennedy International Airport，簡稱 JFK 機場)(見圖 1.1 及圖 1.2)。於紐約休整並觀摩當地運輸系統，繼於 1 月 10 日上午(當地時間)搭乘美國長途客運巴士-Mega Bus(圖 1.3)，前往美國首都華盛頓 D.C.。

1 月 11 日至 1 月 15 日於華盛頓 D.C.之華盛頓會議中心（The Walter E. Washington Convention Center）參加「第 94 屆美國運輸研究委員會年會(TRB 94th Annual Meeting)」，同一時間，1 月 11 日下午則在華盛頓會議中心（The Walter E. Washington Convention Center）旁之馬奎斯萬豪飯店(Marriott Marquis Washington, D.C.)參加由在美華人所舉辦之「2015 TRB 台灣運輸專家學術交流會(TIE 會議)」。

此外，1 月 14 日上午更抽空前往美國聯邦公路總署(Federal Highway Administration，簡稱 FHWA)進行一次參訪，並拜訪任職該署主任橋梁工程師(Principal Bridge Engineer)之華裔學者顏文輝博士(W. Philip Yen Ph.D.)。

會議後，於 1 月 16 日返回紐約，隨即於 1 月 17 日中午搭乘達美航空班機飛往日本。由於時差關係，至日本當地時間 18 日傍晚時間始抵達日本成田機場，並繼續轉搭同公司班機於同日晚間飛抵桃園國際機場。本次行程概要整理如表 1-1。

圖 1.1　美國甘迺迪國際機場一景

資料來源：https://tw.images.search.yahoo.com/images/view ；擷取日期：民國 104 年 2 月 5 日。

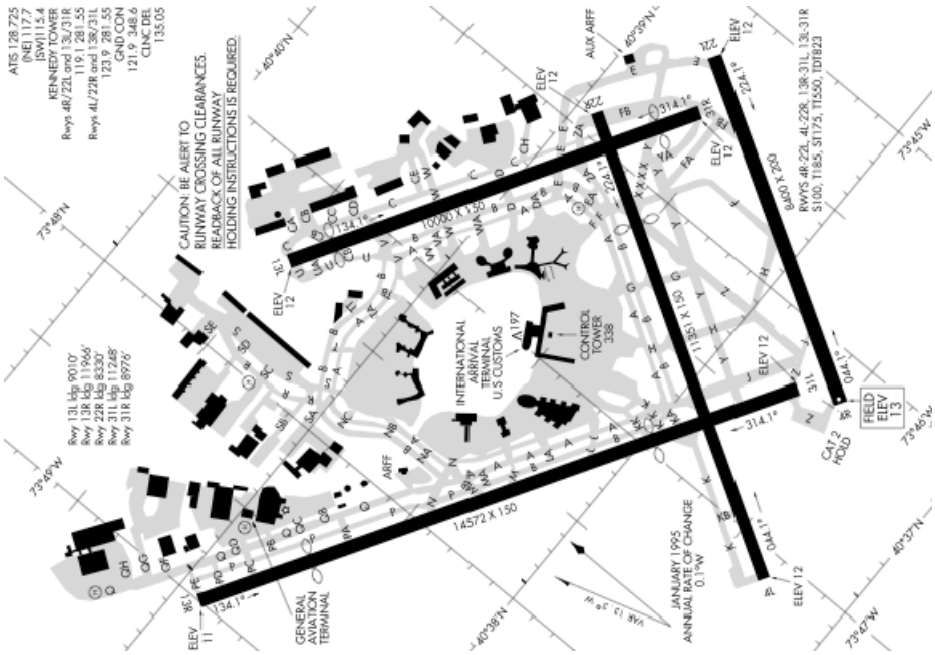


圖 1.2 美國紐約甘迺迪國際機場平面佈設圖

資料來源：https://tw.images.search.yahoo.com/images/view ；擷取日期：民國 104 年 2 月 5 日。

(a)寒風刺骨中的候車乘客

(b)場站設備簡陋

圖 1.3 美國紐約長途巴士(Mega Bus)候車站

表 1-1 出國行程摘要表

日期	地點	預訂行程
1/8	桃園-日本東京-美國紐約	起程，於日本東京轉機，於紐約時間 1/8 日晚間抵達。
1/9	紐約	觀摩當地運輸系統及相關交通設施
1/10	紐約-華盛頓 D.C.	經由陸運轉往華盛頓 D.C.
1/11-1/15	華盛頓 D.C.	參加「第 94 屆 TRB 年會」暨華人「TIE 會議」
1/16	華盛頓 D.C.-紐約	返回紐約
1/17-1/18	美國紐約-日本東京-桃園	返程，於日本東京轉機，繼於台北時間 1/18 日晚間抵達桃園。

1.3 美國及華盛頓哥倫比亞特區簡介

1.3.1 美國簡介

美國全名為美利堅合眾國(The United State of America，以下簡稱「美國」)。哥倫布於 1492 年發現美洲新大陸，於是西班牙自 1493 年開始殖民美洲。1607 年，英國於北美洲切薩皮克灣的詹姆斯敦建立英國的第一個殖民地，並陸續擴建其殖民地之範圍與數量，嗣後荷蘭亦曾於哈德遜河口附近(即現今之紐約曼哈頓地區)建立荷屬殖民地，繼因戰敗，為英國驅離。至 1775 年時，英國已於北美大陸的東北地區建立了 13 個殖民州，包括新罕布夏(New Hampshire)、馬薩諸塞(Massachusetts)、羅得島(Rhode Island)、康乃狄克(Connecticut)、紐約(New York)、賓夕法尼亞(Pennsylvania)、紐澤西(New Jersey)、德拉瓦(Delaware)、馬里蘭(Maryland)、維吉尼亞(Virginia)、北卡羅來納(North Carolina)、南卡羅來納(South Carolina)和喬治亞(Georgia)等。

1776 年英國與北美地區殖民州間爆發戰鬥。13 個殖民州代表齊聚賓州費城(Philadelphia)共議北美人民的未來，於 1776 年 7 月 4 日共同簽署「獨立宣言(Declaration of Independence)」，宣示自大英帝國中獨立而出，共組「美利堅合眾國(The United State of America)」，因而引發舉世矚目之「美國獨立戰爭」。經過 7 年戰鬥，英國於 1783 年戰敗並承認美國的獨立地位，美國亦自此確立其獨立國家地位，成為世界上第一個民主共和國。之後一百餘年間，美國大幅擴張領土，至 1894 年夏威夷共和國（原為夏威夷王國）併入美國，並於 1959 年正式成為美國第 50 個州，而成美國今日領土之範圍(圖 1.1)。

目前美國共有 50 個州(states)、華盛頓哥倫比亞特別行政區(Washington, District of Columbia)及關島、波多黎各等幾個海外領地，國土總面積約 982.6 萬平方公里，為世界上國土面積第二大的國家，相當於臺灣（面積約 3 萬 6 千平方公里）的 273 倍；人口約 3.19 億人，相當於臺灣（人口約 0.23 億人）的 14 倍，為世界上第三大人口國，其中以白種人及黑種人居多，分別佔總人口數之 64%及 13%左右。

美國國體採聯邦制，聯邦政府則採行政、立法、司法三權分立的政治體制。聯邦政府及聯邦政府之權限內容係由 50 個州(不含華盛頓 D.C.

及海外領地）在共同合意狀態下同意組成並決定，因此，聯邦政府只能在各州同意授權聯邦的事務權限範圍(即憲法規定事項)內行使權力，其餘部分都仍屬州及其住民保留之權利，換言之，州土地領域內的事務包括政治體制、司法事務、稅制、工業活動、商業活動、交通活動、公用事業及公共設施...等法規，均由各州自定，而事實上 50 個州各州的規定內容也確實並不相同。此與我國採單一國國體，先有國家之中央政府，再由中央政府於國家之下劃設各級政府及行政區域明顯不同，尤其實務上，我國的中央政府位階明顯高於地方，憲法上雖稱中央地方均權，但實際上中央對地方權限範圍具有全然解釋權，亦一定程度的涉入地方事務之決定，與美國國體確實迥然不同。

美國經濟高度發展，人均 GDP 已達 5 萬美元以上，是世界上最大也是最重要的經濟體。更在歷經兩次世界大戰及冷戰之後，無論是國際政治、軍事、工業、科技及研發技術等各方面之發展與影響力，均已居全球領先之地位，為世界公認的強國之首，也是各國取經學習之首要對象。

圖 1.1　美國地圖

資料來源：https://tw.images.search.yahoo.com/images/view ，擷取日期：民國 104 年 2 月 25 日

1.3.2 華盛頓哥倫比亞特區簡介

華盛頓哥倫比亞特別行政區(Washington, District of Columbia，簡稱華盛頓 D.C.)為美國首都，聯邦政府所在，更是美國政治的中心，位於東北部馬里蘭州(Maryland)和維吉尼亞州(Virginia)兩州交界之處，土地形狀大致成菱形，西側則有波多馬克河(Potomac River)自北而南流過，是美國聯邦政府唯一直屬管轄之土地領域。

華盛頓 D.C.面積 177 平方公里，尚不及臺北市（面積約 272 平方公里）的三分之二；人口 64 萬餘人，更僅有臺北市（人口 270 萬人）的四分之一不到，其中 60%為黑種人，白種人則僅佔 30%左右。雖然華盛頓 D.C.人口不多，但整個都會地區的人口則高達 5、6 百萬，且博物館林立，其中史密斯桑尼爾學會（Smithsonian Institution）所有的史密斯桑尼爾博物館系統最為有名，不但內容豐富，且完全免費，每年都吸引無數國內外的民眾前往參觀。而華盛頓 D.C.的國家廣場(National Mall)兩側聚集了美國國會大廈、白宮、華盛頓紀念碑、傑佛遜紀念堂、林肯紀念堂、羅斯福總統紀念碑、二戰紀念碑、韓戰紀念碑、越戰紀念碑等等重要人文建築景點(見圖 1.2)，更是來到華盛頓 D.C.者所必去的地方，也已成為華盛頓 D.C.的重要觀光資產。

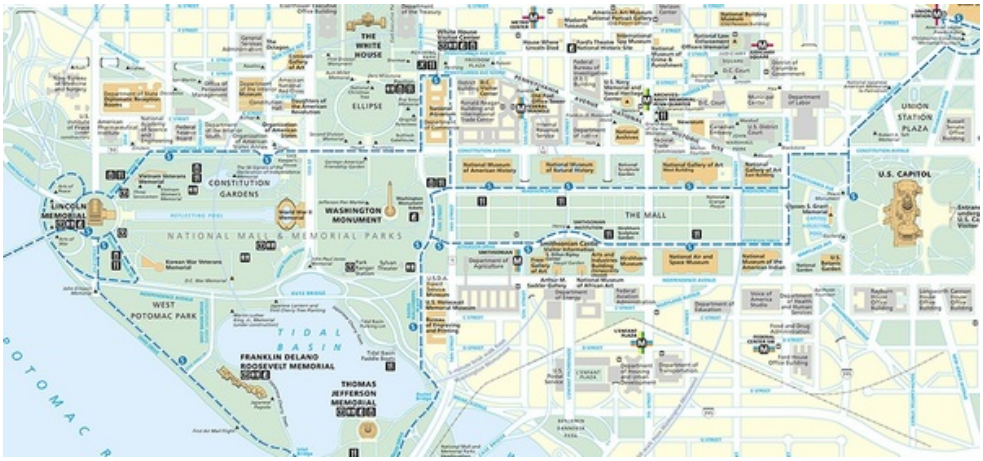
華盛頓 D.C.特區政府的政府體制相當特別。由於該特區係鑑於國體上各州係自治主體，聯邦政府無處落腳，故乃於 1791 年由馬里蘭州(Maryland state)與維吉尼亞州(Virginia state)共同同意將其各自位於兩州邊界地區的一塊菱形土地捐贈給聯邦政府，作為聯邦政府所在之土地，直接隸屬聯邦，而不受任何一州管轄或行政管理牽制，因此而成為美國境內唯一由聯邦政府直接管轄的土地領域。

華盛頓 D.C.特區最早有三個行政區域或稱城市，包括喬治城鎮（George Town）、華盛頓市（Washington City）及華盛頓郡（Washington County）。至 1878 年合併成為「華盛頓哥倫比亞特別行政區(Washington, District of Columbia）」。

雖然，華盛頓 D.C.特區為美國的一部分，但因美國國家組成之主體為州，而華盛頓 D.C.特區與美國的其他海外領地一樣，並不具有州之地位，因此，華盛頓 D.C.特區在美國國會兩院中並無投票權，即便在眾議

院亦僅有一席無投票權之代表。尤其為免地方政府透過地方自治權力牽制，甚至掣肘聯邦政府行使聯邦權力，華盛頓 D.C.特區直到 1974 年才有第一位民選市長，且目前雖有特區政府及議會，但其自治地位甚至低於海外領地，美國國會可直接否決代表華盛頓 D.C.特區居民議會之決議或法規，聯邦政府亦可直接干涉特區政府的行政行為。在事事講求人權與平等的美國，竟有一個地區及 60 多萬合法國民不具有與其他地區及國民相同或等值的參政權利，而這個地方就是首都，確實令人難以想像。

（a）空照全景



（b）四週地圖

圖 1.2　名聞遐邇的華盛頓特區國家廣場（National Mall）

資料來源：https://tw.images.search.yahoo.com/images/view ，擷取日期：民國 104 年 2 月 28 日。

貳、出席會議紀要

2.1 TRB 簡介

2.1.1 TRB 成立沿革

美國國家研究協會(National Research Council，簡稱 NRC)係由美國國家科學院(National Academy of Science)、美國國家工程學院(National Academy of Engineering）及美國醫學研究所(Institute of Medicine）三者所共同管理之研究機構，為一民間之非營利機構。而美國運輸研究委員會（Transportation Research Board，簡稱 TRB）即為美國國家研究協會(National Research Council）下轄的 6 各主要部門之一。

美國運輸研究委員會（TRB）最早係源自於 1920 年所設立之國家公路研究諮詢委員會(The National Advisory Board on Highway Research)，該委員會成立之主要任務在提供一個公路資訊交換及公路技術研究成果交流展示的機制平台。不久後，於 1925 年更名為公路研究委員會(Highway Research Board，簡稱 HRB)，任務增加並擴充包括出版事務及舉辦年度會議，隨後組織不斷成長擴大，而於 1974 年再次改組，成為目前之運輸研究委員會(TRB)。

美國運輸研究委員會（TRB）承繼並擴充其前身國家公路研究諮詢委員會(The National Advisory Board on Highway Research)及公路研究委員會(HRB）之職掌內容，主要任務即在進行全方位的運輸領域方面研究，冀圖透過研究增近交通運輸技術的創新與進步，並藉由研究人員與實務人員分享運輸研究、實務與政策資訊，激發研究潛力，促進技術進步，提供政府及社會運輸政策的專業諮詢與建議，同時也鼓勵並協助推動落實相關之運輸研究成果。

美國運輸研究委員會（TRB）已為國際上公認具運輸研究領導地位之組織，每年運輸研究委員會（TRB）所舉辦的年會會議更吸引上萬名來自全球各地運輸專業人士與研究人員之參加，彼此交流心得與研究成果。換言之，美國運輸研究委員會（TRB）年會已非僅只是美國國內運輸界的重要盛事，更是國際上運輸科學學術與實務領域共同之重要會議。

2.1.2 TRB 組織

美國運輸研究委員會(TRB)最高權力機構為 TRB 執行委員會(TRB Executive Committee)，該委員會成員由美國國家研究協會(National Research Council)所指派，業務的推動與執行則由 TRB 執行辦公室(TRB Executive Office）負責。

運輸研究委員會（TRB）下設 5 個分支部門及一個海洋委員會：

1、技術活動部門(Technical Activities)：負責辦理運輸研究委員會（TRB）年會及其他各項工作會議及研討會，並進行交通運輸機構、組織和研究機構的實地考察。

2、研究及特殊計畫部門(Studies and Special Programs)：負責 TRIS 資料庫維護、提供圖書資源服務以及管理特殊之政策研究計畫審查工作等。

3、合作研究計畫部門(Cooperative Research Programs)：負責管理及執行國家公路研究計畫(The National Cooperative Highway Research Program)、大眾運輸研究計畫(The Transit Cooperative Research Program)、機場研究計畫(The Airport Cooperative Research Program)、國家貨運研究計畫(The National Cooperative Freight Research Program）與危險物品研究計畫(The Hazardous Materials Cooperative Research Program）等之合作研究項目。

4、公路策略研究部門(Strategic Highway Research Program 2)：負責管理有關先進公路(advance highway）績效與安全課題等具特定目標、短期且成果導向的研究計畫。

5、行政與財政部門(Administration and Finance)：負責財務、資訊技術及其他行政支援。

6、海洋委員會(Marine Board)：海洋委員會設立於 1965 年，於 1999 年時自美國國家科學委員會(NRC）下之另一個機構中分割並歸併進入運輸研究委員會（TRB)，負責有關海上運輸之經濟、環境和技術等課題之交流。

2.2 TRB 年會議題與議程

2.2.1 TRB 年會概況

美國 TRB 年會每年均於一月中旬在華盛頓 D.C.舉辦，今年則選定於2015年1月11日至1月15日在華盛頓會議中心(The Walter E. Washington Convention Center）及馬奎斯萬豪飯店(Marriott Marquis Washington, D.C.)舉行，且絕大部分之會議均在華盛頓會議中心（The Walter E. Washington Convention Center）進行，會議地點、華盛頓會議中心及馬奎斯萬豪飯店(Marriott Marquis Washington, D.C.)會場外觀如圖 2.1、圖 2.2 及圖 2.3 所示。

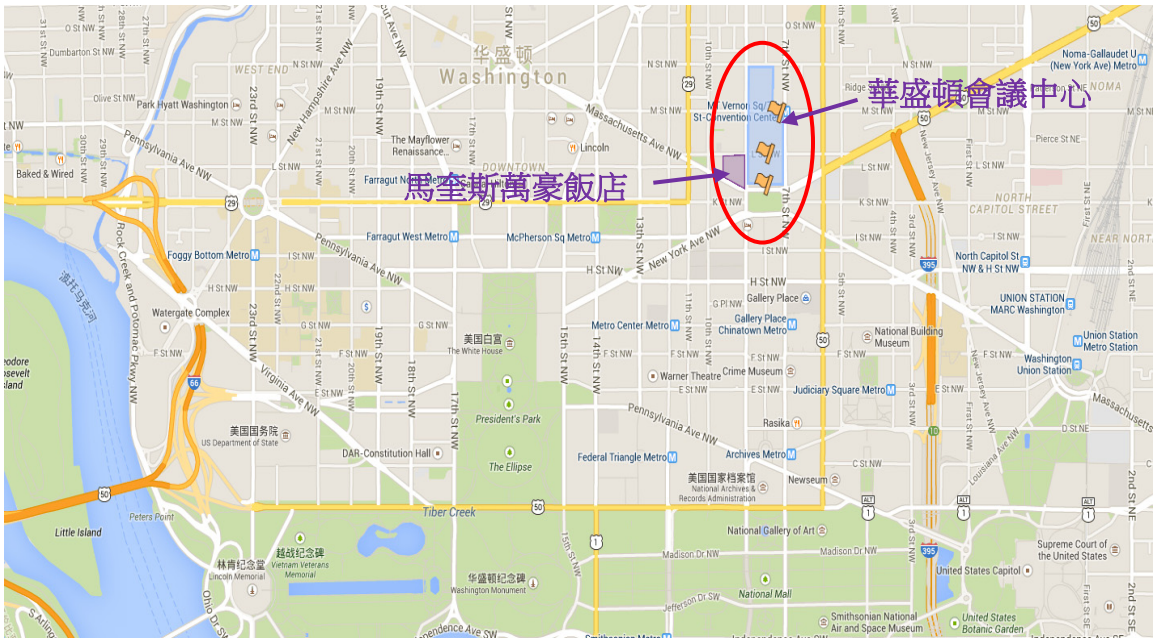


圖 2.1　華盛頓會議中心及馬奎斯萬豪飯店會場位置圖

(a)

(b)

(C)

(d)

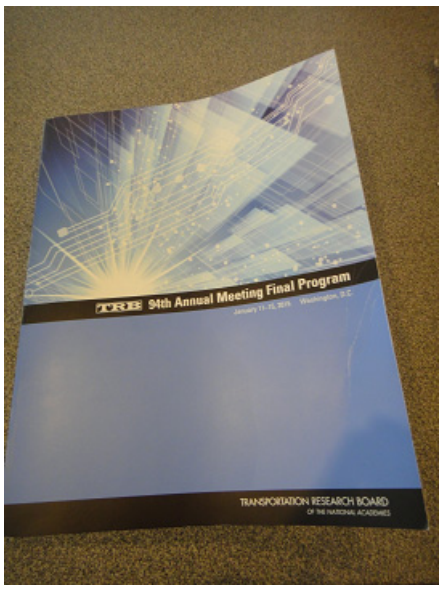
圖 2.2　華盛頓會議中心外觀

圖 2.3　馬奎斯萬豪飯店外觀一景

本屆年會會議形式與以往年會之安排大致相同，有學術性論文研討會（Sessions）、專題研討會（workshops）、委員會議（Committee）、論文海報展示（Poster Sessions）及相關廠商參展（Exhobits）等。其中，論文海報展示（Poster Sessions）及相關廠商參展（Exhobits）係集中在華盛頓會議中心 2 樓(level 2)舉辦，其他學術性論文研討會(Sessions)、專題研討會（workshops）及委員會議（Committee）會議分別安排於華

盛頓會議中心及馬奎斯萬豪飯店中的各種大小會議或研討室中舉行，各樓層及會議室之平面位置圖詳如附錄 1 所示，圖 2.4 至圖 2.12 為包括會場門口指引標示、年會手冊、年會報到處、中廊、大廳、休息區、研討室內及論文海報展示等會場各處情景。

圖 2.4　TRB 會場一出入口之指示牌



(a)年會手冊外觀

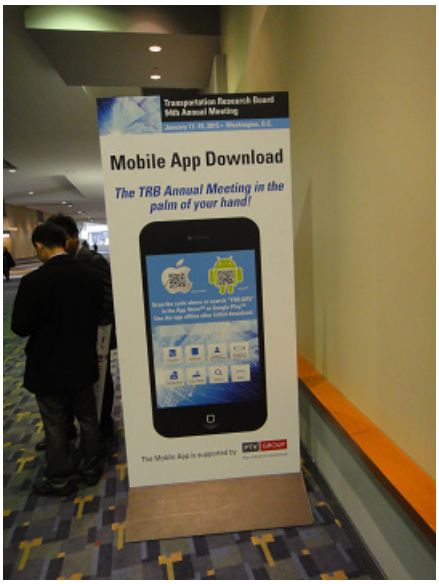
(b)年會手冊內頁

圖 2.5　TRB 年會手冊

(a)報到櫃台

(b)廠商會展服務櫃台

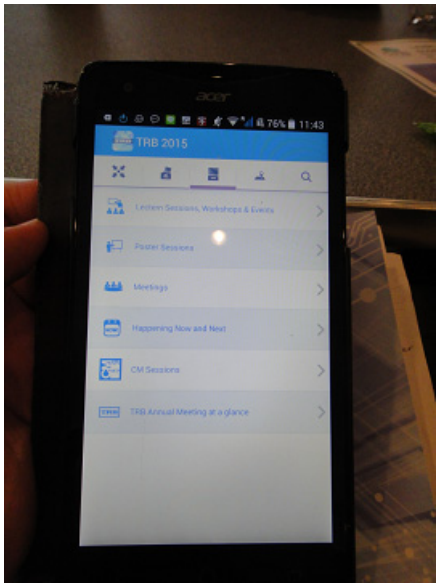
圖 2.6　年會報到處與其他服務櫃台

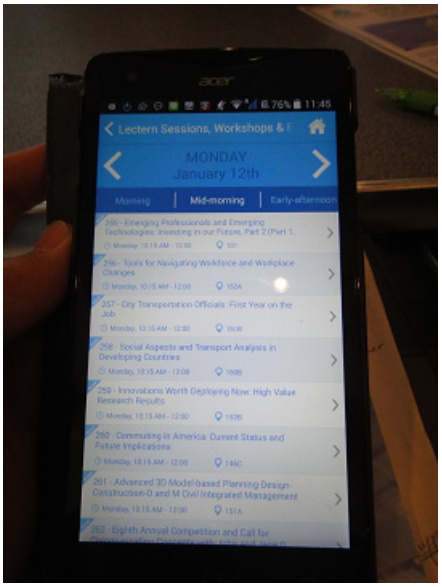


(a)會場上手機 App 程式說明

(b)年會會場樓層與會議室介紹

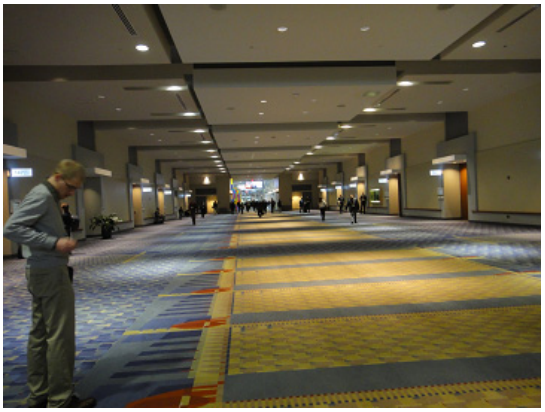
圖 2.7　年會各式指示標牌



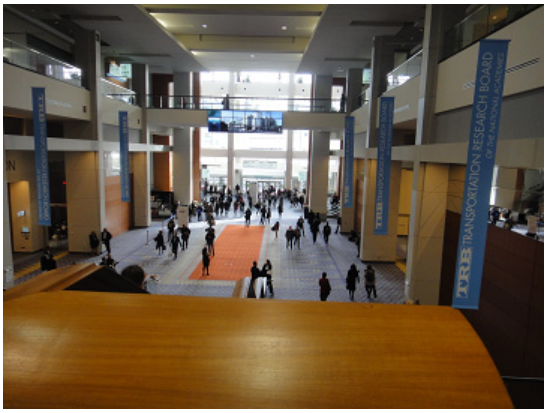


(a)年會 App 程式之使用情形一　　(b) 年會 App 程式之使用情形二

圖 2.8　年會提供之手機應用程式使用情形

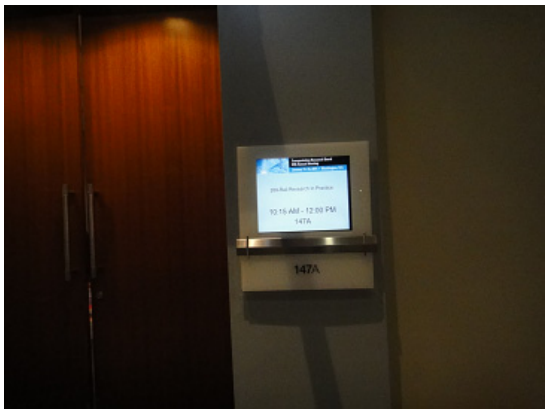


(a)會場中廊-兩側均為研討室　　(b)與會人員休息區



(c)會場大廳一隅　　(d)會場大廳一隅

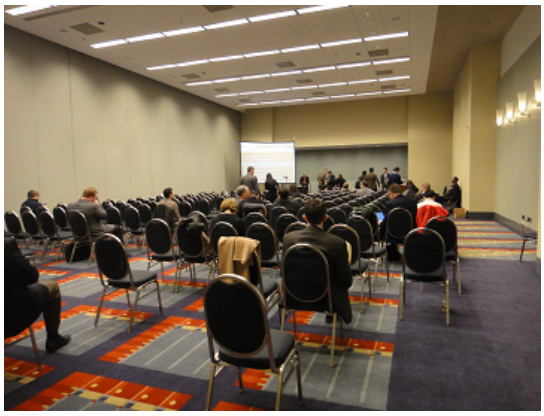
圖 2.9　年會會場各處情景



(a)研討室外電子告示牌

(b)研討室外觀與會議情形

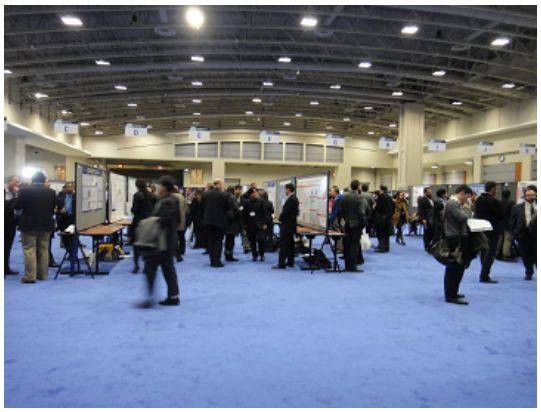
圖 2.10　研討室外一景



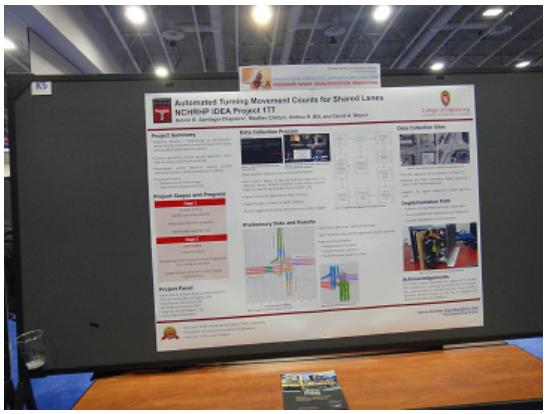
(a)研討室內一景

(b) 研討室內一景

圖 2.11　研討室內情形



(a)論文海報展示會場一隅



(b) 論文海報展示一景

圖 2.12　論文海報展示會場情形

連續 5 天的時間將進行進 750 場的論文研討或專題討論，同時大會亦安排一諾大的展覽會場，由運輸相關科技、產品或服務部門、單位、機構或私人企業展示其產品，圖 2.13 至圖 2.15 為展場內外之情形。

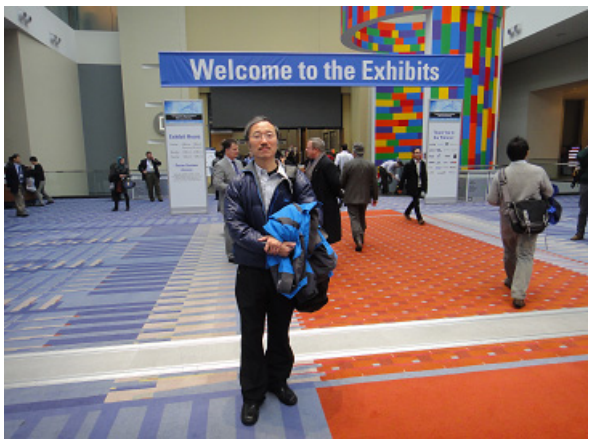


圖 2.13　廠商參展會場入口

(a)自動駕駛智慧車展示

(b)橋樑檢測車展示

(c)參展攤位一景

(d)新型 LED 路面標記展示

圖 2.14　參展廠商之產品展示情形

(a)參展會場一隅

(b)參展會場內交流區一隅

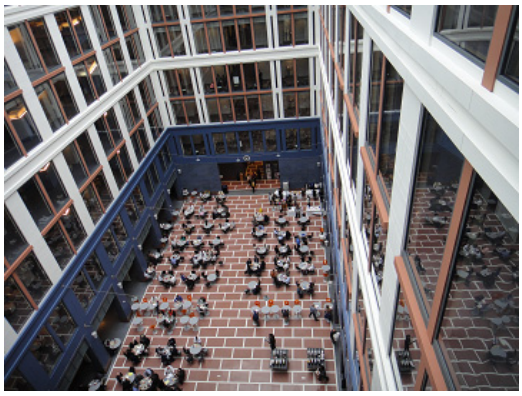
圖 2.15　產品展示會場情景

本次會議共有來自世界各國 1 萬 2 千多位學者專家、研究人員及實務工作者參與，共計發表論文超過 5,000 篇，並舉辦 750 場次以上之研討、討論及工作會議。會議期間因參與人數眾多，人流川席，研討會議眾多，確實較國內所舉辦之研討會規模大過許多，而為解決個別參與者的需求，大會提供之個人手機 App 程式(見圖 2.8)，讓與會人員可隨時查閱已進行、正進行及將進行之會議場次與論文主題，隨時掌握會議進行狀況，確實助益頗大，讓會議得以順利進行，大會籌辦單位的用心與運籌，實屬不易。然大會所安排之交流及休息區域與空間太少，許多人為翻閱資料或小作休憩，常被迫在會場中廊、川堂席地而坐，甚至中午用餐也難覓座位，讓人感到美中不足。

此外，研討會期間，另於 1 月 14 日抽空前往美國聯邦公路總署參訪，並與該署主任橋梁工程師顏文輝博士(W. Philip Yen Ph.D.)進行為時 2 小時之交流座談(見圖 2.16、圖 2.17)，了解聯邦公路總署與州政府間的運作方式及目前橋樑署的研究發展進程。

(a)會議情形　　(b)雙方合影

圖 2.16　與華裔聯邦公路總署人員會談情形



(a)辦公區　　(b)中庭休息區

圖 2.17　美國聯邦公路總署內部辦公環境

2.2.2 研討會議題

TRB 年會為一綜合性、全面性之運輸研討會，因此，每年會議議題內容均幾乎涵蓋所有與交通運輸有關之學術與實務領域，今年第 94 屆年會，大會共設定了 38 項議題如下：

1、 經營與管理(Administration and Management)

2、 航空(Aviation)

3、 橋梁與其他結構(Bridges and Other Structures)

4、 施工(Construction)

5、 資料與資訊技術(Data and Information Technology)

6、 設計(Design)

7、 經濟(Economics)

8、 教育與訓練(Education and Training)

9、 能源(Energy)

10、環境(Environment)

11、財務(Finance)

12、貨物運輸(Freight Transportation)

13、一般運輸(General Transportation)

14、地工(Geotechnology)

15、歷史(History)

16、自動車輛(Hot Topic: Connected-Automated Vehicles)

17、水利與水文(Hydraulics and Hydrology)

18、國際活動(International Activities)

19、法律(Law)

20、維護與保存(Maintenance and Preservation)

21、海運(Marine Transportation)

22、材料(Materials)

23、營運與交通管理(Operations and Traffic Management)

24、鋪面(Pavements)

25、行人與自行車騎士(Pedestrians and Bicyclists)

26、管道運輸(Pipelines)

27、規劃與預測(Planning and Forecasting)

28、政策(Policy)

29、公共運輸(Public Transportation)

30、軌道(Rail)

31、研究(Research (about research))

32、安全與人因(Safety and Human Factors)

33、保安與緊急狀況(Security and Emergencies)

34、社會(Society)

35、運輸技術的未來(Spotlight Theme: Corridors to the Future: Transportation and Technology)

36、場站設施(Terminals and Facilities)

37、其他運輸課題(Transportation, General)

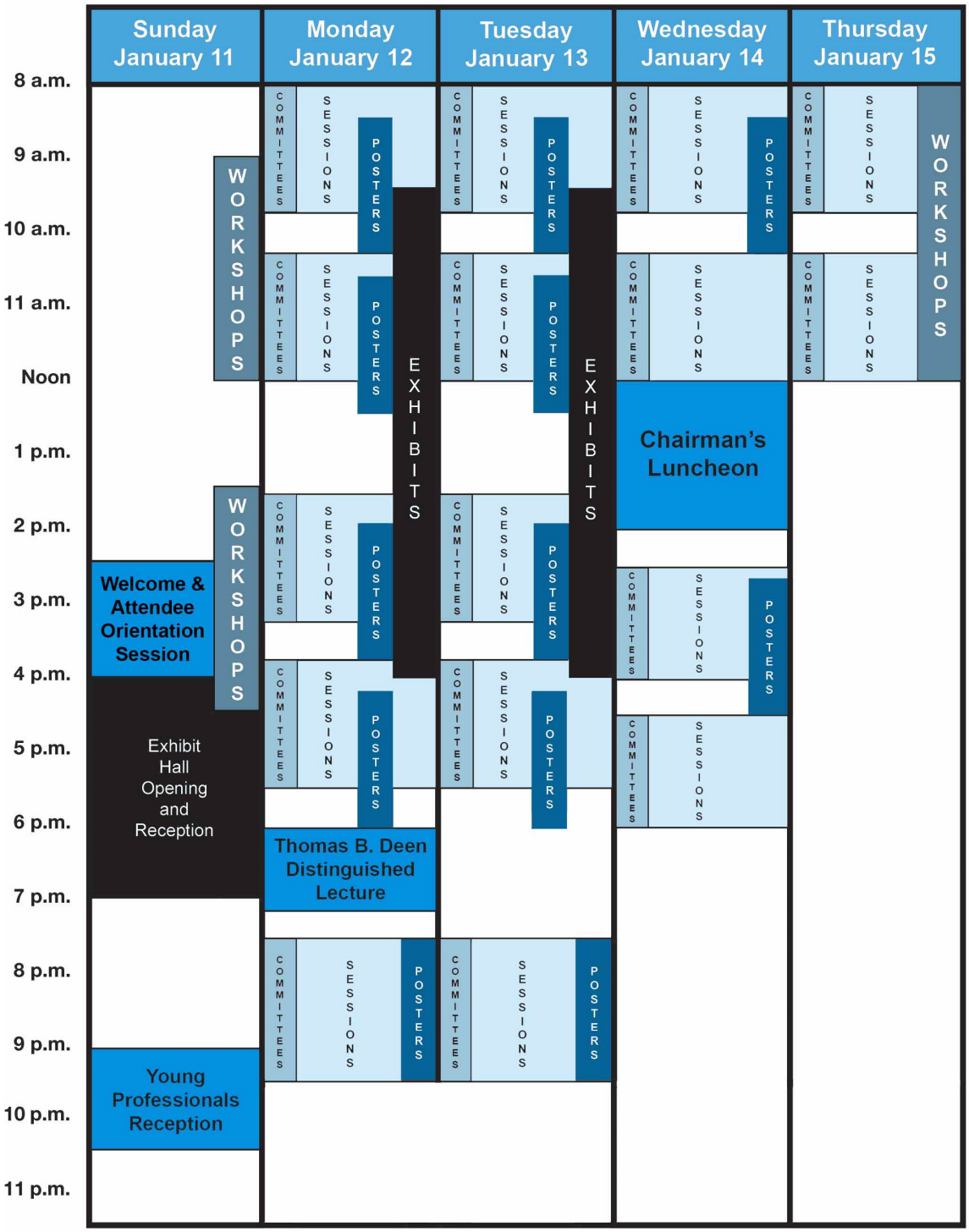
38、車輛與配備(Vehicles and Equipment)

每項議題下則又有數個到數十個研討會或工作會議主題（見附錄2)，每個主題內則包含數篇到十數篇的研究論文或專題論文，共計 5,000 餘篇。

2.2.3 研討會議程

研討會自民國 104 年 1 月 11 日下午 2 時 30 分開始接受報到，並特別為首次參加 TRB 年會者安排一場為時 1.5 小時的 TRB 介紹活動，舉凡未曾參加過 TRB 年會者均可報名參加。之後連續 5 天的時間將進行進 750 場的論文研討，詳細議程如表 2-1 所示。

表 2-1 TRB 第 94 屆年會議程表



2.3 TIE 會議紀要

2.3.1 TIE 會議簡介

TIE 會議全名為「2015 TRB 台灣運輸專家學術交流會(2015 TRB Taiwanese Transportation Professionals Technical Information Exchange，簡稱 TIE 會議)」，係旅居北美之運輸界華人鑒於每年美國運輸研究委員會(TRB)年會均吸引許多散居臺灣、美國及其他世界各地區之臺籍或臺裔教授、學者、專家及學生等專業人士參加，這些運輸界的前輩與專業人士平常在各自的工作崗位，難得相見，其中許多人每年均會不遠千里前來參加 TRB 年會，TRB 年會便成為大家難得可以聚首之機會，因此，旅居北美之運輸界華人乃苦心籌辦於華盛頓 D.C.之 TRB 會議期間舉辦乙場北美學人與台灣產官學界技術交流會議。希望藉由此一機會，建構一個學術交流平台，讓來自世界各地的臺灣教授、學者、專家及學生能夠共聚一堂，互相認識、分享研究經驗、交換學術資訊，同時亦裨益台灣與世界先進國家的直接交流。換言之，會議的目的即在建構一個交流平台，提供國內產、官、學界與北美運輸界華人了解彼此新近之發展動向，同時相互交流心得、分享資源，以達互助互惠之目的。

今年 TIE 會議由亞利桑納大學(University of Arizona)助理教授吳耀然(Tao-Jan Wu) 博士與喬治亞理工學院(Georgia Institute of Technology)博士生王介 (Chieh (Ross) Wang)先生負責籌辦聯絡，國內外許多學者、專家均參與籌備(見表 2-2)。會議地點在華盛頓會議中心（The Walter E. Washington Convention Center）旁之馬奎斯萬豪飯店(Marriott Marquis Washington, D.C.) (見圖 2.18)舉行；會議時間則為當地時間 1 月 11 日(星期日)下午 17 時開始，維時兩個小時，於 19 時結束。

表 2-2　TIE 會議之籌備人員

顧問團	S.K. Jason Chang, Ph.D.(Professor at National Taiwan University) Clayton Chen, Ph.D. (Federal Highway Administration) Chis-Pei Chou, Ph.D. (Director of Scienceand Technology Division at TERCO in Wasjington DC) Shou-Ren Hu, Ph.D. (Associate Professor at National Cheng Kung University) David Yang, Ph.D. (Federal Highway Administration)
籌備人員	Yao-Jan Wu, Ph.D.(Assistant Professor at University of Arizona) Cheih (Ross) Wang, Ph.D. student (Georgia Institute of Technology) Ju-Yin Chen, AICP (Travel Demand Modeling Coordinator at Virginia Department of Transportation) Kuan-Yu Ko, EIT (Civil Engineering at Applied Research Associates) Yu-Tin Hsu, Ph.D. (Assistant Professor at National Taiwan University)
聯絡人	Yao-Jan Wu, Ph.D.(Assistant Professor at University of Arizona)
網站管理	Cheih (Ross) Wang, Ph.D. student (Georgia Institute of Technology) Kuan-Yu Ko, EIT (Civil Engineering at Applied Research Associates)

(a)

(b)

圖 2.18 TIE 會場外觀–馬奎斯萬豪飯店

2.3.2 TIE 會議概況

會議於當地時間 1 月 11 日(星期日)下午 17 時假馬奎斯萬豪飯店(Marriott Marquis Washington D.C.)之 Liberty I 廳 M4 室舉行，由行政院

科技部派駐當地之台大教授周家蓓女士主持，主要出席者除本所外，尚有成功大學土木系陳建旭教授、美國馬里蘭大學張金琳教授、美國運輸統計局(BTS) Patricia Hu 女士及 KOA 公司執行長 Jimmy Lin 先生等，其他出席者則有旅居美國之學者、專家、在學學生及本次由台灣前往當地之學者、專家與機關代表等，總計參加人數約 50 人左右(見圖 2.19)。

會中除與會所有人員簡單的自我介紹外，主要出席者亦各自簡述自己的學習、生活心得與工作經驗以為交流。會議時間 2 小時，至當日 19 時結束，詳細議程見表 2-3 所示。主辦單位同時於馬奎斯萬豪飯店附近之 Nandos Peri Peri 餐廳安排晚餐，與會人士得自由參加繼續做更進一步的交流。

圖 2.19　TIE 會議與會人員合影

表 2-3　TIE 會議議程

時間 Time	活動 Activity	演講者 Presenter / Panelist	職稱 Title	單位 Association
5:00 | 5:30	Poster, Expo & Networking	All		All
5:30 | 5:45	Welcome & Introduction	Dr. Yao-Jan Wu Mr. Cheih (Ross) Wang	Assistant Prof. Ph.D. Student	University of Arizona Georgia Institute of Technology
5:45 | 6:45	Panel Discussion Topic: Career Development Moderator: Dr. Chia-Pei Chou	陳建旭 博士 湯儒彥 先生 Dr. Gang-Len Chang Ms. Patricia Hu Mr. Jimmy Lin	特聘教授 研究員 Professor Director President & CEO	成功大學土木工程系 交通部運輸研究所 University of Maryland Bureau of Transportation Statistics (BTS) KOA Corporation
6:45 | 7:00	Adjourn and Dinner (start at 7:00 pm)	All attendees		All

參、研討論文重點摘述

一、透視隱私：智慧型運輸系統與隱私權保護（"Private Eye: Intelligent Transportation Systems and Personal Privacy"）

作者：Jaimee Lederman, Mark Garrett, Brian D. Taylor (UCLA 運輸研究中心)

摘要：

智慧型運輸系統(Intelligent Transportation System, 簡稱 ITS)是透過電子、通訊、電信等科技技術提升交通運輸系統之運作效率與安全，而經過多年的發展，ITS 技術確實提高了運輸系統的運作效率與安全性，也提供了交通運輸活動上許多經濟、環境與社會問題的解決方法，但該項研究認為，美國在 ITS 發展的過程中，一直忽略，甚至未處理有關個人隱私權保護規範的建立問題，導致隱私權課題在 ITS 發展過程上，一直存在爭議。

該項研究調查美國法規現況及ITS技術中有關個人隱私保護部分的作法，進而發現美國現有法律規範在有關交通活動者的資料蒐集、儲存與使用等部分都欠缺對個人隱私的保護規定。然而 ITS 的許多技術（如行車導航、道路電子收費...等技術）早已廣泛在道路上使用，其間所存在的問題確實迫切需要社會與政府的關心注意。該項研究之目的即在針對 ITS 技術對於個人資料蒐集、儲存與使用上所存在的問題作檢討，並對於隱私保護所應有的作為提出建議，以符合社會與一般民眾對於隱私權保障之期待。

(一) ITS 的隱私權保護課題

該項研究針對 ITS 中的隱私權保護問題提出幾點思考方向：

1、 隱私權需要保護到何種程度？

2、 如何防止資料的外洩或錯用？

3、 怎樣的行為會造成個人與資料蒐集人、儲存人或使用人間的互信遭到破壞？

4、 誰能接觸到這些資訊？該資訊應保存多久？該資訊的運用應給予何種限制？

這些問題交錯在運輸工程、法律與公共政策之間，難以一下釐清，也正是 ITS 發展過程中，有關隱私權保護所應面對的困難課題。

(二)ITS 技術之發展現況

ITS 的技術發展係建立在大量的個人資料或旅次資料(individualized data)蒐集、分析與應用之上，例如，行車導航系統即須蒐集個別旅次所在位置、目的地與交通系統中其他用路人旅次或用路行為等資料，作為系統預估、分析與規劃路線的基礎。雖然，表面上目前 ITS 系統所使用之資料多屬單純的旅次特性資料，並不會也不需要觸及個人的基本資料，但是，不容否認的，個人資料在蒐集過程中已被取得，而一旦有心人將這些中性的個人用路行為特性資料與該旅次之個人基本資料做聯結，則許多個人私密或個人特徵的隱私資料便可一覽無遺，這是個 ITS 發展上必須嚴肅面對的課題。從長遠發展的角度觀之，倘若個人隱私保護無法得到適當解決，勢必造成使用人的疑慮，進而影響未來 ITS 技術發展與應用上的限縮或阻礙。

該文作者認為目前 ITS 所開發之技術系統中，屬政府操作的技術類型包括：

1、 紅燈照相(Red-light cameras)

2、 速率偵測(Speed-detectors)

3、 交通監視系統(Traffic monitors)

4、 自動收費系統(Automatic tolling devices)

5、停車收費系統(Parking meters)

6、停車資訊服務(Parking information services)

7、大眾運輸智慧卡(Smart transit passes)

而私人企業為提供更多更優質化的服務與精確的計價，常常也會透過這些先進的運輸技術所蒐集各種個人化資料加以加值或分析，舉例而

言，車上行動裝置可蒐集個人駕車習性，包括速率、剎車頻率及駕駛行為模式等資訊，而這些資訊均有助於解決或預防交通事故或其他旅次問題之發生，甚至個別車輛故障原因、維修紀錄及駕駛人以往車上設備所記錄之駕駛行為特性等，亦可作為保險費率減增的依據。據此，顯示 ITS 資料確實具有商業化之高度價值。

此外，GPS 或智慧手機的導航系統，固然可協助駕駛人到達目的地，但卻也同時蒐集記錄了駕駛人常去、偏好去或曾去的地方與行經路線，都是相當有價值的資訊。而事實上，這些技術早已被貨運業者應用在自家貨車與車隊的行蹤掌握，成為車隊管理的一環。

(三)美國法規現況

1、聯邦部分

美國是西方國家中，唯一至今尚未有廣泛性或全面性隱私權保障法律立法的國家，現有的法律均僅針對部分特定領域，如醫療、個人財務金融等領域的隱私保護有所著墨及立法，也因此，讓 ITS 發展過程中，隱私權保護問題更顯嚴重。

美國於 1974 年通過隱私權法（Privacy Act），但此法所規範之對象係聯邦政府，而非一般廣大社會民眾，其主要原因係由於聯邦政府乃全國持有最多、最完整詳實個人資料的地方，倘若出現弊病，將可能造成民眾權益的嚴重傷害。嗣後，許多州亦仿效聯邦，而有類似之州法律通過。而由於該法律的適用範圍不足，歐巴馬（Obama）政府已將隱私權保障的立法列為其重要政策目標之一，並於 2012 年公布「消費者隱私權保障法案（Consumer Bill of Privacy Right）」，惟該法案仍未被列為優先法案，聯邦政府目前也只能以呼籲方式，希望網路公司在該法立法完成前，能自行先行採用，以提高民眾隱私權之保護。

此外，聯邦貿易委員會（Federal Trade Commission）為保護其本國人民，亦自訂有一系列關於隱私權保護的模範法律（model laws），也使聯邦貿易委員會（Federal Trade Commission）成為美國少數具有實際執行隱私權保護的執法機關。

2、州部分

美國各州對於隱私權保障之立法情形也不相同。加州是第1個出現有關ITS技術隱私權保障法律的州，其在2004年以州法律立法要求車輛製造商必須在車輛上，對於車上電子產品標示有關電子資料蒐集的警語，並告知該資料將會如何被使用。之後，許多州也起而效法加州建立EDR（Electronic Data Recorders）法規。此外，加州也要求業者在將個人資料揭露給第三方前，必須先向消費者提出請求並獲得同意，且須正確告知第三方對象為誰。

而除隱私權保障外，各州透過侵權行為法律亦可對隱私權加以保障，只是各州侵權行為法律之保障規範不同，影響其保障之效果。以加州為例，加州雖較重視隱私權保障，但當加州車輛行駛跨越州界線時，便會出現兩州對隱私權保護之內容與方式不同而發生爭議。因此，有關此類問題的整合與立法規範，也是未來ITS隱私權保護立法時所必須注意的地方。

3、民間企業部分

由於法規與政策跟不上ITS技術之發展速度，導致民間企業在有關使用者隱私權保護的處理上大門洞開。美國ITSA（Intelligent Transportation Society of America）雖是民間團體，但鑑於此問題之嚴重，業已自發性的推出一些模範規範（model laws）與指引（guideline）提供業者參考，以填補聯邦與州法律的不足，並逐漸成為產業的標準，甚至影響一部分州的立法。

ITSA所建立隱私權規範原則之內容包括：

（1）個人隱私權範圍

（2）得公共開放使用之資料及使用限制

（3）資料保全（data security）

（4）個人或個別旅次資料得蒐集的範圍

（5）資料使用應予匿名

（6）限制加工或加值使用（secondary use），並不得有個人識別資訊（Personally Identifiable Information，簡稱 PII）

（7）建立考核機制

ITSA 規範雖不具強制拘束力，且在實際執行上仍有許多模糊空間，但企業為降低風險多有參採，因此作者建議美國未來在國家法律建構時，應可與 ITSA 進行合作。

(四)隱私權課題所應關注的事項或資料內容

該項研究認為，有關隱私權課題，未來應注意的事項與資料內容包括：

1、 個人識別資訊（PII）

2、 關注誰蒐集資料並擁有或持有（儲存）該資料

3、 使用者對個人資訊保護的偏好。此項課題常與使用者對科技發展的接觸程度與接納參與使用情形有關。

4、 增進使用者的信賴

5、 注意技術開發目的

6、 加工或加值使用問題

(五)未來發展方向

1、隱私權的保護，最重要的就是要求 ITS 系統運作時，應在一開始就避免或減少對個人識別資訊（PII）的蒐集，並對已蒐集到的資料，加以嚴格的保護。

2、鼓勵 ITS 技術開發時，在資料蒐集及處理元件的設計上，必須思索如何獲得消費者的信賴。唯有讓消費者了解 ITS 系統將蒐集哪些資料及如何進行保護，才能建立消費者信心，並有助於 ITS 技術的進一步發展。

3、為使 ITS 系統的運作正確性提高，政府或業者常會鼓勵大眾多參與 ITS 系統，以獲取更全面的旅次資料，但 ITS 系統中大量的資料與資料轉換，常使得資料的運用變得更加複雜，進而導

致隱私權保護的複雜度隨之大增，政府必須留意此一發展方向所可能帶來之問題。

(六)結論

ITS 的發展正站在十字路口之上，隱私權問題是 ITS 系統發展過程中必須面對的嚴肅問題。然而目前的 ITS 技術在隱私權保障上，因欠缺明確的規範指引，難以落實建立，因此，許多技術在開發時應特別留意保留更多的彈性空間，以因應未來法律規範的變化與要求。

現階段 ITS 系統開發者及管理者，可先行採行一般對於隱私權保護的建議策略，例如在行車導航技術上，永久刪除個人交通路線資料中有關個人識別資訊（PII）的內容。此部分雖很重要，但以現況觀之，卻未必能在系統技術開發或設計時便一定能夠做到，因此，系統管理者便應適時介入加以作為，尤其是政府部門在與民皆業者合作時，必須注意。

最後，該研究認為有關 ITS 系統隱私權保障課題上，目前最基本也最重要的一件事情是對於個人資料（personal data）欠缺清楚明確的定義，尤其個人資料（personal data）的內容與屬性常需視資料蒐集或儲存時所處之主客觀環境條件作判斷，準此，在一特定情形條件下，對於可識別個人資料的保護措施，並不盡然就一定可以轉換適用到其他情形或環境條件下，也增加了 ITS 隱私權保障的複雜度。然而，無論如何，預防 ITS 資料蒐集與使用所可能發生的問題，都應在政策上嚴肅看待，並重視及加強使用者或消費者的信心與信任，才能讓 ITS 得以持續的發展。

二、混合運用敘述性偏好與顯示性偏好資料以評價公共運輸系統之擁擠度：以聖地牙哥為利（"Valuing Crowding in Public Transport Systems Using Mixed Stated/Revealed Preferences Data: The Case of Santiago"）

作者：Marco Batarce (Univ. Diego Portales，智利), Juan Carlos Munos (Pontificia Univ. Catolica de Chile，智利), Juan de Dios Ortuzar (Pontificia Univ. Catolica de Chile，智利), Sebastian Raveau (Pontificia Univ. Catolica de Chile，智利), Carlos Mojica (美洲開發銀行), Ramiro Alberto Rios (美洲開發銀行)

摘要：

一般均認同，鼓勵並促進使用高乘載效率的大眾運輸系統，有助於紓解交通擁擠及改善空氣品質，因此各國政府大都致力於 BRT、軌道運輸或捷運系統之開發建構。但是此文作者認為，要有效吸引民眾搭乘，這些系統在設計時就應考慮如何增進對乘客的吸引力，並從乘客角度建立公共運輸舒適度的評量方法，才能有效達成目的。

該項研究採用敘述性偏好與顯示性偏好研究方法建構公共運輸(含公車及軌道運輸)舒適度(comfort)的評量機制，研究並以智利聖地牙哥(Santigo)的公共運輸(含公車及軌道運輸)為研究之調查對象，進行分析研究。

(一)聖地牙哥(Santigo)市公共運輸基本資料：

1、 聖地牙哥每日有 950 萬旅次，其中大約 60%為大眾運輸旅次，其中，使用公車及捷運之比例大約各佔一半，即約 230 萬旅次/日。

2、 公共運輸旅次之平均旅行時間(in-vehicle)約 28.5 分鐘。

3、 公共運輸旅次之平均旅行距離約為 12 公里。

4、 公車之平均旅行速率為 17 公里/小時；捷運之平均旅行速率則為 33.4 公里/小時。

(二) 研究方法

該項研究採敘述性偏好(Stated Preferences)、顯示性偏好(Revealed Preferences)及混合敘述性偏好與顯示性偏好(Stated/Revealed Preferences)法，建立邏吉特模式(logit model)，再透過效用函數中各變數係數之相對關係，以找出影響旅客對於公共運輸舒適度評價之重要關鍵因素。

表 3-1　聖地牙哥(Santigo)公共運輸概況

每日總旅次	950 萬旅次
大眾運輸市佔率	60% (公車：約 230 萬旅次/日 捷運：約 230 萬旅次/日)
平均旅行時間	28.5 分/旅次
平均旅行距離	12 公里/旅次
平均旅行速率	公車：17 公里/小時 捷運：33.4 公里/小時

研究中設定 6 個公共運具上的載客情境(圖 3.1)，調查乘客搭乘公共運輸時對該 6 情境中，下列各項因素之實質資料，以做為公共運輸系統舒適度評價之依據，其中並取得樣本數共 580 個：

1、 運具模式

2、 旅行時間

3、 旅行成本

4、 平均等車時間

5、 等車時間變異量

6、 車上擁擠度

(三)研究假設

1、任一旅次之運具選擇均非單一，而有其他替代方案。

2、個人偏好可以運具屬性及個別旅次特性因素建立其效用函數。

3、個別旅次運具之選擇原則：取效用值最大者。

4、個別旅次之效用函數均屬可觀察之變數項，因此，不同旅次產

生者之效用決定因素相同。

5、其他無法觀察之影響因素，係以獨立之隨機分配形態呈現。

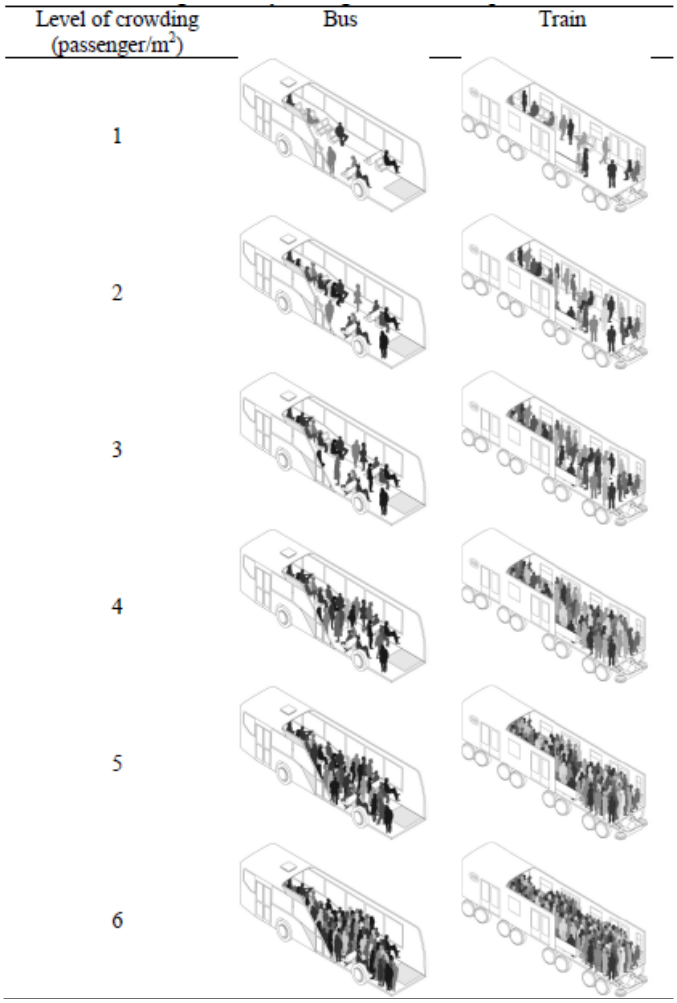


圖 3.1 研究預設之 6 種車上擁擠度情境

(四)模式建立

該研究所建立之效用函數為：

SP Data: $V_m = \alpha_m + \beta C_m + \sum_j \gamma_j D_{jm} T_m + \delta WT_m$

RP Data: $V_m = \alpha_m + \sum_j \gamma_j D_{jm} T_m + \delta WT_m + \rho W_m + \theta TR_m$

其中，C_m：第 m 種運具的旅行成本

T_m：第 m 種運具的旅行時間

D_{jm}：第 m 種運具在第 j 種擁擠情境下的虛擬變數

WT_m：第 m 種運具的等候時間

W_m：第 m 種運具的步行時間

TR_m：第 m 種運具轉乘捷運所花費時間

表 3-2 為模式建立之各項參數結果。

表 3-2 效用函數中各項參數結果

	SP Data		RP Data		SP/RP Data	
Parameter	Estimate	t-test	Estimate	t-test	Estimate	t-test
Monetary Cost	-0.001	-3.67	-	-	-0.0008	-4.37
Travel Time at 1-2 pax/m^2	-0.042	-6.41	-0.117	-51.17	-0.035	-9.24
Travel Time at 3-4 pax/m^2	-0.054	-8.41	-0.132	-56.65	-0.045	-8.87
Travel Time at 5-6 pax/m^2	-0.091	-11.71	-0.194	-43.99	-0.078	-8.63
Waiting Time	-0.098	-9.69	-0.183	-8.24	-0.079	-13.18
Walking Time	-	-	-0.257	-13.00	-0.076	-7.65
Transfers	-	-	-0.698	-10.26	-0.241	-5.13
Bus Constant	0.000	-	-	-	0.000	-
Metro Constant	0.017	0.21	-	-	0.031	0.44
Car Constant	1.64	2.39	-	-	1.93	8.37
SP Scale Factor Design 1	1.000	-	-	-	1.000	-
SP Scale Factor Design 2	0.692	3.62	-	-	0.692	3.62
SP Scale Factor Design 3	1.150	9.35	-	-	1.150	9.35
SP Scale Factor Design 4	0.519	4.05	-	-	0.519	4.05
RP Scale Factor	-	-	1.000	-	3.821	8.84
Sample Size	3,380		28,961		32,341	
Log-Likelihood	-1,870		-13,480		-15,609	
Corrected ρ^2	0.567		0.382		0.403	

(五)分析結果

表 3-3 為聖地牙哥公共運輸過程中不同時段之時間價值分析結果。研究結果發現：

1、 車廂擁擠度(the level of crowding in vehicle)是公共運輸舒適度的最大負效用影響因素：當車上乘客密度自 1-2 人/平方公尺升高到 3-4 人/平方公尺時，其效用值將減少 29%；若是車上乘客密度自車上乘客密度自 3-4 人/平方公尺升高到 5-6 人/平方公尺，其效用值降低更高達 73%。

2、 在高擁擠度的車廂中(乘客密度：5-6 人/平方公尺)，旅行時間每增加 1 分鐘其效用值之減少，是低擁擠度車廂(乘客密度：1-2 人/平方公尺)的 2.3 倍。

3、 擁擠度自 5-6 人/平方公尺降低到 3-4 人/平方公尺，對車上乘客效用值的改善有明顯助益。

4、 當擁擠度高時，等候車時間對效用值之影響與旅行時間者相

同。

5、 轉乘次數與轉乘過程中之步行時間是轉乘旅次效用改善之重要因素

表 3-3　搭乘公共運輸過程中不同時段之時間價值分析結果

Parameter	Valuation
Travel Time at 1-2 pax/m^2	2,626 CLP/hr
Travel Time at 3-4 pax/m^2	3,389 CLP/hr
Travel Time at 5-6 pax/m^2	5,894 CLP/hr
Waiting Time	4,903 CLP/hr
Walking Time	4,642 CLP/hr
Transfers	250 CLP/transfer

註：CLP：智利披索

三、以機械學習法運用智慧型手機自動偵測旅次之運具選擇：以德黑蘭市為例（"Automated Transportation Mode Detection Using Smart Phone Applications via Machine Learning: Case Study Mega City of Tehran"）

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摘要：

過去幾十年，德黑蘭(Tehran)市之交通旅次行為複雜度大幅提高，決策者需要更多更正確的統計資料，以幫助其作為規劃及進行決策之依據。

相對於以往面對面訪問及電話訪問，運用新近資訊科技技術，將可更迅速有效獲得大量更正確的資訊，其中以 GPS 技術為基礎而產生的資料，甚至具有追蹤旅次路徑的能力，若可正確有效的加以運用及蒐集，將對未來交通規劃及決策帶來巨大的助益。因此，該研究認為透過個人行動裝置的智慧型手機，獲取每個旅次資料之詳細內容，是據以建立運輸規劃及決策所需之有效資料及資料庫的最佳途徑。

然而，透過智慧型手機的 GPS 系統，雖可追蹤個人的旅次活動路徑與行為，獲得個別旅次之詳細資料。但每個旅次之過程與內容均相當複雜，例如一個旅次目的下可能同時串連使用不同之運具模式，但此對 GPS 系統而言，都僅只是一連串的數據資料，無法直接運用於交通規劃、分析及決策，必須對該 GPS 資料加以判讀，轉換成交通運輸上可資運用的資料，才能有效提升此類 GPS 資料之可應用性。該項研究即在嘗試運用機械學習法(machine learning method)來判讀各旅次所使用之運具種類，以幫助旅次資料庫的有效建立。研究結果顯示該方法判讀結果之正確性高達 96%，相當具有實務上之應用價值。

(一)採用 GPS-based 資料之優勢與理由

以往對於追蹤旅次路線均僅侷限於利用車上裝置，且對於公共運輸旅次部分，亦僅能獲得該車路線上之旅次數量資料，對於乘客個別旅次之旅次特性內容完全無法分析，換言之，即便是以往的 GPS 技術，亦

僅限於小汽車旅次才可獲得較完整詳細的旅次資料，對於整體交通系統相關問題之資料蒐集仍然相當受侷限。而為蒐集旅運資料所特別裝置的車上 GPS 設備，其設置成本相當高，若欲獲得全面性的旅運資料，成本更難以計數。然智慧型手機係個人行動裝置，可完整顯示個別旅次的完整資料，且個人行動裝置原即屬個人所有，其設備之設置費用非常有限，因此，該研究認為採智慧型手機之 GPS-based 資料具有多項其他資料蒐集方式所沒有的優勢：

1、 精度高

2、 可靠度高

3、 蒐集及使用效率高

4、 資料效果佳

5、 省時

6、 可獲得大量的有效資料

(二)分析方法選擇

以往對於追蹤解讀 GPS 資料之方法有二。

1、 程序法(Procedural method)

程序法在旅次的運具模式判斷上，係在過程中加入部份的人為邏輯判斷，以協助資料判讀，例如旅次路徑係前往大眾運輸場站，且在場站後之旅行速率出現明顯提高，則判定該旅次採大眾運輸工具，藉此以判讀該旅次所採用之運具型態。

2、 機械學習法(Machine learning method)

透過旅次路徑上之速率、加速度及其他運具間特性之差異因素，以判讀該旅次所採用之運具型態。

由於，以往許多研究結果顯示機械學習法(Machine learning method)更適用於深奧、複雜及結構性差之資料，因此，此法尤其對於運具型式的判讀上具有成效，並以應用在步行(walking)、公車(bus)及小汽車(car)的判讀最為常見，且依以往研究顯示應用在 GPS 資料分析上之正確性

達 93.8%(見表 3-4)，是故該研究選擇以此方法做為旅次運具型態判讀之模式。

表 3-4 近年運用機械學習法所進行之研究及其成果

First Author	Year	Methodology	Accuracy (%)	Modes					Sensors				
				Car	Walk	Bike	Bus	Train \subway	GPS	GIS	GSM	Wi-Fi	Accelerometer
Feng (*22*)	2013	Bayesian Belief Network	96	×	×		×	×	×				×
Feng (*22*)	2013	Bayesian Belief Network	81	×	×		×	×	×				
Feng (*22*)	2013	Bayesian Belief Network	96	×	×		×	×					×
Bolbol (*10*)	2012	Support Vector Machine	88	×	×	×	×	×	×				
Stenneth (*23*)	2011	Bayesian Network	74.9	×	×	×	×	×	×				
Stenneth (*23*)	2011	Decision Tree	66.9	×	×	×	×	×	×				
Stenneth (*23*)	2011	Random Forest	75.4	×	×	×	×	×	×				
Stenneth (*23*)	2011	Naïve Bayesian	71.8	×	×	×	×	×	×				
Stenneth (*23*)	2011	Multilayer Perceptron	59.1	×	×	×	×	×	×				
Stenneth (*23*)	2011	Bayesian Network	92.5	×	×	×	×	×	×	×			
Stenneth (*23*)	2011	Decision Tree	92.2	×	×	×	×	×	×	×			
Stenneth (*23*)	2011	Random Forest	93.7	×	×	×	×	×	×	×			
Stenneth (*23*)	2011	Naïve Bayesian	91.6	×	×	×	×	×	×	×			
Stenneth (*23*)	2011	Multilayer Perceptron	83.3	×	×	×	×	×	×	×			
Manzoni (*27*)	2011	Decision Tree	82.14	×	×	×	×	×	×			×	×
Zhang (*31*)	2011	Support Vector Machine	93	×			×	×	×				
Xu (*32*)	2010	Fuzzy Logic	93.8		×	×	×	×	×				
Reddy (*12*)	2010	Decision Tree followed by first-order discrete Hidden Markov Model	93.6		×	×			×				×
Zheng (*33*)	2008	Support Vector Machine	51.7	×	×	×	×		×				
Zheng (*33*)	2008	Decision Tree	72.1	×	×	×	×		×				
Zheng (*33*)	2008	Bayesian Net	57.7	×	×	×	×		×				
Zheng (*33*)	2008	Conditional Random Field	61.7	×	×	×	×		×				
Gonzalez (*34*)	2008	Neural Network	91.23	×	×		×		×				
Mun (*35*)	2008	Decision Tree	83	×	×		×				×	×	

(三)資料收集

1、於 2013 年 12 月在德黑蘭市進行為期兩週的調查。

2、運用個人智慧型手機之個人行動裝置進行資料蒐集。

3、受測者每日 6:00 至 21:00 均必須不間斷開機以蒐集全日完整之交通活動旅次資料。

4、受測者有 25 名男性及 10 名女性，均為年齡介於 19 歲至 25 歲間之學生。

單一旅次原始資料呈現之結果如圖 3.2 所示。

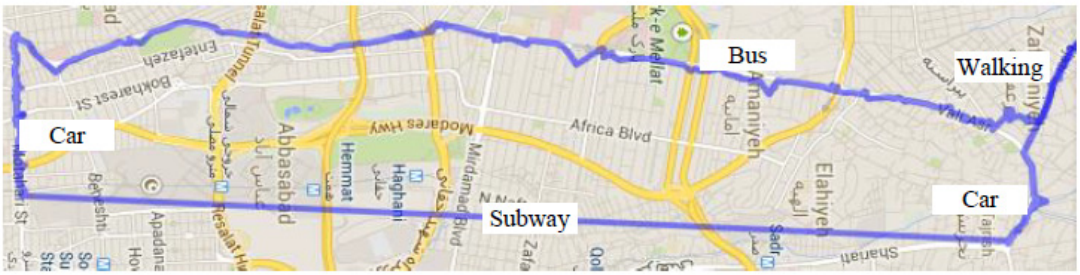


圖 3.2 智慧型手機上對於持有人旅次 GPS 資料追蹤之結果

(四)資料分析

表 3-5 為智慧型手機 GPS 資料判讀之巨觀統計資料分析結果。由表中可發現公車之平均旅行速率高於小汽車及步行，此係由於德黑蘭市中有 BRT 系統等道路設施，導致公車之速率高於小汽車；其次，小汽車最高速率高於公車與步行者，符合一般之經驗知識；至於步行速率之標準差值較小汽車與公車者小，則係因行人速率本即有限所致，亦符合一般之經驗知識。

表 3-5　智慧型手機 GPS 資料判讀之巨觀資料結果

Attribute		*Average*	*Std.Dev.*	*Min*	*Max*
Delta Bearing (deg)	Bus	-0.447 E-01	29.324	-357	358
Accuracy (m)		6.610	2.201	3.194	47.994
Speed (m/s)		23.346	10.535	0.251	31.618
Delta Speed (m/s)		-0.670 E-01	1.187	0	12.005
Acceleration (m/s^2)		-0.257 E-01	0.535	-19.78	4.729
Delta Acceleration (m/s^2)		-0.359 E-02	2.257	-12.244	126.960
Delta Bearing (deg)	Car	-0.661 E-01	43.316	-359	359
Accuracy (m)		6.413	4.913	1.478	49.999
Speed (m/s)		10.376	6.181	0.250	35.237
Delta Speed (m/s)		-0.503 E-02	0.968	0	29.088
Acceleration (m/s^2)		0.395	0.718	-13.258	28.690
Delta Acceleration (m/s^2)		-0.107 E-01	0.820	-39.120	28.762
Delta Bearing (deg)	Walking	-0.537	75.086	-359	359
Accuracy (m)		12.805	10.398	1.706	49.999
Speed (m/s)		1.572	0.933	0.25	5.490
Delta Speed (m/s)		-0.514 E-01	1.085	0	4.954
Acceleration (m/s^2)		0.596	0.589	-8.435	4.408
Delta Acceleration (m/s^2)		0.251 E-01	0.881	-19.539	10.561

(五)研究結果

表 3-6 為機械學習法判讀智慧型手機 GPS 資料之分析結果。由表中可發現：公車旅次因複雜性高，走走停停，判讀不易，而為各種運具中最難分析者，但其判讀之正確性仍達 86.14%，小汽車旅次判讀之正確性則高達 97.31%，步行旅次判讀之正確性亦達 90.79%，整體旅次判讀之正確性為 96.91%。由此結果顯示，機械學習法(Machine learning method)確實為 GPS 資料之有效判讀方法，未來若能擴大運用，將有助於運輸旅次基本資料之蒐集與資料庫建立。

表 3-6　機械學習法判讀智慧型手機 GPS 資料之分析結果

Mode	Bus	Car	Walk	Accuracy (%)
Bus	870	124	16	86.14
Car	6	11200	295	97.38
Walk	1	210	2071	90.79

四、你會如何運用 APP 程式？即時載客資訊對公車乘客搭乘決策方式之研究（"What Do You Do with Your APP? A Study of Bus Rider Decision-Making with Real-Time Passenger Information"）

作者：Achille Fonzone (Edinburgh Napier 大學，英國)

摘要：

即時旅客資訊(Real-Time Passenger Information，簡稱 RTPI)已逐漸成為大眾運輸業者提供乘客或消費者的重要服務項目。RTPI 技術的引進，促進乘客對大眾運輸即時服務狀態的了解，也直接改變了乘客的旅次選擇行為及大眾運輸系統的營運績效。

該項研究基於現有 RTPI 的服務內容，探討 RTPI 對於公車乘客搭乘行為的決策模式，研究分析了乘客對於不同 RTPI 的使用、決策目的、旅次選擇及其相互間之關聯，並以愛丁堡(Edinburgh)市的 Lothian 公車(簡稱 LB 公車)乘客為例進行分析。該研究強調大眾運輸是一高效率的運輸系統，應鼓勵其成為民眾生活的一部分，政策上也應強化其在運輸系統上的角色，而該研究結果發現 RTPI 確實會讓乘客的旅次行為更加富有彈性，也證明支持大眾運輸業者提供乘客更優質 RTPI 系統的重要性。

(一)愛丁堡(Edinburgh)市公共運輸背景

1、愛丁堡市為蘇格蘭(Scotland)首府，面積 264 平方公里，現有居民 46 萬 7 千餘人，居住密度為每平方公里 1800 人，其中 51.2%為女性， 35 歲以下人口佔 50%，且居民中 71%屬工作人口。

2、愛丁堡除當地居民外，尚有 6 萬名大學學生及觀光旅客 370 萬人次/年，居民平均年收入 1 萬 7 千英鎊。

3、愛丁堡的大眾運輸為 LB 公車，路線總數 73 條，大部分屬輻射型路線，部分則為環狀路線，每日營運時間自上午 4 時至午夜，班車頻率約每小時 2~6 班，採固定費率制收費。

4、愛丁堡 40%的家庭沒有小汽車，因此，工作旅次中 30.8%係選擇以公車通勤。

5、2013 年愛丁堡 LB 公車的全年載客人數為 1.15 億人次。

6、LB 公車擁有 600 輛公車，每輛公車均裝置有公車動態資訊系統(Real-time information，稱 BusTravker(BT))，此系統透過公車站上顯示系統、LB 網站及手機 APP 程式等等多重管道提供公車動態資訊，各管道提供之資訊如表 3-7 所示。

表 3-7　LB 公車乘客獲得公車動態資訊之管道與內容

Source of information	**Type of information**	**Availability** [Local (i.e. only at stops): 0[a], Ubiquitous (i.e. via web): 1]	**Up-to-dateness** [Scheduled: 0, Real-time: 1]	**Content** [Bus Arrival Time and/or Route only: 0, +Itinerary[b]: 1, +Mode[c]: 2]	**Versatility[d]**
Printed timetables and maps at stops	Descriptive	Local	Scheduled	Bus Arrival Time and Route	0
Bus Tracker at stops	Descriptive	Local	Real-time	Bus Arrival Time and/or Route	1
Bus Tracker at LB website	Descriptive	Ubiquitous	Real-time	Bus Arrival Time and/or Route	2
Mobile apps	Descriptive	Ubiquitous	Real-time	Bus Arrival Time and/or Route	2
Journey Planner at LB website	Prescriptive	Ubiquitous	Real-time	Bus Arrival Time and/or Route + Itinerary	3
Google maps	Prescriptive	Ubiquitous	Scheduled	Bus Arrival Time and/or Route + Itinerary + Mode[d]	3

[a] Versatility score of the attribute (see note [d] below for more details)
[b] Here "Itinerary" means a combination of walking and on-board segments (possibly including the use of different lines) suggested by the source to get from the origin to the destination of the journey
[c] Here "Mode" means that the source suggests also travel solutions which do not involve public transport
[d] The versatility index measures the ability of an information source to support real-time route generation and assessment. The index is the sum of the versatility scores of the information source attributes.

(二)調查資料

該項研究以問卷方式調查乘客在使用 RTPI 系統時的選擇偏好：

1、調查期間：2013.8.7~2013.9.27

2、由 2 位訪問員在 6 個公車站位上及 2 條公車路線上隨機抽樣進行訪問，其問卷內容如表 3-8 所示。

3、取得 613 個有效樣本，樣本取樣之時段如表 3-9 所示。

表 3-8　LB 公車乘客使用 RTPI 系統之調查問卷

Question	Available answers [a]	Statistic
Please answer the following questions regarding the journey you are currently making. In the following, by "origin" we mean the place where you were before going to the bus stop. The "destination" is the final place you are going to. A place can be your home, a school, a shop, a park, etc.		
I. How frequently do you make this journey, i.e. how frequently you travel between the origin and the destination of this travel (considering also other means of transport)? Please choose one of the following.	1: Usually every weekday 2: Not every weekday but at least once a week 3: Less than once a week 4: Very few times/it's my first time	50.6[b] 31.7 10.7 7.1
II. What is the destination of your journey? Please choose one of the following.	1: Home 2: Work or study place 3: Personal or family business place (i.e. shop, GP, nursery) 4: Leisure place (i.e. gym, theatre, park) 5: Other	30.3[b] 41.3 7.5 16.2 4.7
III. What source of travel time information have you used or are you going to use? Please select all that apply.	1: None 2: Printed timetables and maps at stops [Printouts] 3: Bus tracker at stops [BT_stops] 4: Bus tracker at Lothian Buses website [BT_web] 5: Journey planner at Lothian Buses website [JP_web] 6: Mobile apps [BT_apps] 7: Google maps [Google] 8: Others [Other]	9.0[c] 30.9 74.7 12.5 7.4 41.1 8.1 1.5
IV. Where have you consulted or are you going to consult your information sources (if any)? Please select all that apply.	1: More than half an hour before starting travelling 2: Less than half an hour before going to my departure stop [Less_half] 3: At the departure stop 4: At each stop involved in my journey (if you have to transfer) 5: On board	15.7[c] 37.1 64.2 7.6 7.0
V. What have you decided or are you going to decide using the information (if you use it)? Please select all that apply.	1: Whether to make my journey [Journey] 2: Whether to use public transport [Transit] 3: The time at which I left from my origin [Origin_time] 4: The departure time of my bus [Bus_time] 5: The departure stop [Dep_stop] 6: The bus line(s) [Line_ch] 7: The alighting point [Alighting] 8: The final destination of my journey [Final_des] 9: I have not changed/I will not change my plans [Nothing]	6.8[c] 10.5 24.3 46.8 28.1 30.9 3.7 12.1 18.1
VI. What are your goals in deciding your itinerary? Please rank the three criteria most important to you listing them from the most to the least important.	1: Getting to my destination as soon as I can [Get_to_des] 2: Reducing my travelling time [Red_trav] 3: Reducing my wait at stops [Red_wait] 4: Reducing the distance to walk [Red_walk] 5: Reducing the number of transfers [Red_trans] 6: Spending more time at the origin [More_orig]	32.1;22.0;21.1[d] 27.2; 26.8;19.1 23.7;24.5;21.8 7.0 ;12.3;14.9 5.0;7.0;13.6 5.1;7.4;9.4
VII. If when you consulted information sources you realised you had some spare time before the arrival of your bus, how did you use it? Please select one of the following.	1: I spent more time at the origin of my journey 2: I did business on my way to the stop or nearby the stop 3: I walked to a further bus stop 4: I did not do anything but I felt more relaxed whilst walking/waiting	26.9[b] 15.1 27.0 31.0
VIII. Who are you travelling with? Please choose one of the following.	1: Alone 2: With children 3: With children and other adults 4: With other adults only	78.4[b] 2.8 4.0 14.8
IX. What line are you going to take?		
X. Are you male or female?	1: Male 2: Female	53.2[b] 46.8
XI. What's your age?		24; 32; 45[e]
XII. How familiar are you with the city of Edinburgh? Please select one of the following.	1: I live and/or work here 2: I am a frequent visitor 3: I am an occasional visitor	86.4[b] 5.6 8.0

[a] The abbreviations in square brackets are used to indicate the attributes in the remaining of the paper. The abbreviations are also used as names of binary variables equal to 1 if the attribute has been selected in the response: e.g., JP_Web=1 if in Question III the respondent said that s/he used Journey planner at Lothian Buses website. The meaning will be made clear by the context.
[b] Percent of valid responses
[c] Percent of cases
[d] Since respondents were asked to rank the goals and there are 6 possible goals, 6 variables are defined from this question: the first considers the choice concerning the most important goal, the second the replies regarding the second most important goal, and so on. The percentages here are the frequency with which the attribute has been selected as 1st; 2nd; 3rd choice respectively.
[e] 25th; 50th; 75th percentile respectively

表 3-9　LB 乘客有效問卷調查之時段一覽

時段	樣本數百分比(%)
7:00~9:00	22.5%
10:00~12:00 及 14:00~15:00	40%
17:00~19:00	24.5%
21:00~22:00	13.1%

(三)問卷結果

1、僅 6%的公車乘客搭乘 LB 公車前不會查詢公車之動態資訊。

2、最常使用之公車動態資訊入口是站上顯示系統，選擇使用手機 App 程式者，亦相當普遍。

3、仍然有相當多人會取用 LB 公車公司所提供的紙本時刻表，至於 LB 網站資訊則鮮少人使用。

4、使用 BT 系統上所提供的路線規劃功能者並不多，非尖峰時段為 5.5%，尖峰時段則為 10.6%，尖峰時段為非尖峰的一倍。

(四)分析結果

該研究採群落分析方法，並得研究最終之分析結果如圖 3.3 所示，而由圖中之結果顯示：

1、Google 工具最常被使用在未確定的旅次(undefined trips)上，例如旅次者尚未決定旅次路徑或旅次目的地。

2、使用 App 程式的目的主要是為了減少等車時間，所以也會利用此改變旅次路徑或公車路線。

3、App 程式使用與旅次起始時間的關係強烈，顯示乘客會運用 App 程式並選擇適當的時間再出門或出發。

4、公車的書面時刻表與旅次的路線選擇及出發時間關係密切，而這類旅次通常是屬於對該公車系統較不熟悉的乘客。

該作者透過該研究之結果認為：RTPI 確實會讓乘客的旅次行為更

加富有彈性，政府及大眾運輸業者均應強化提供更優質的 RTPI 系統。

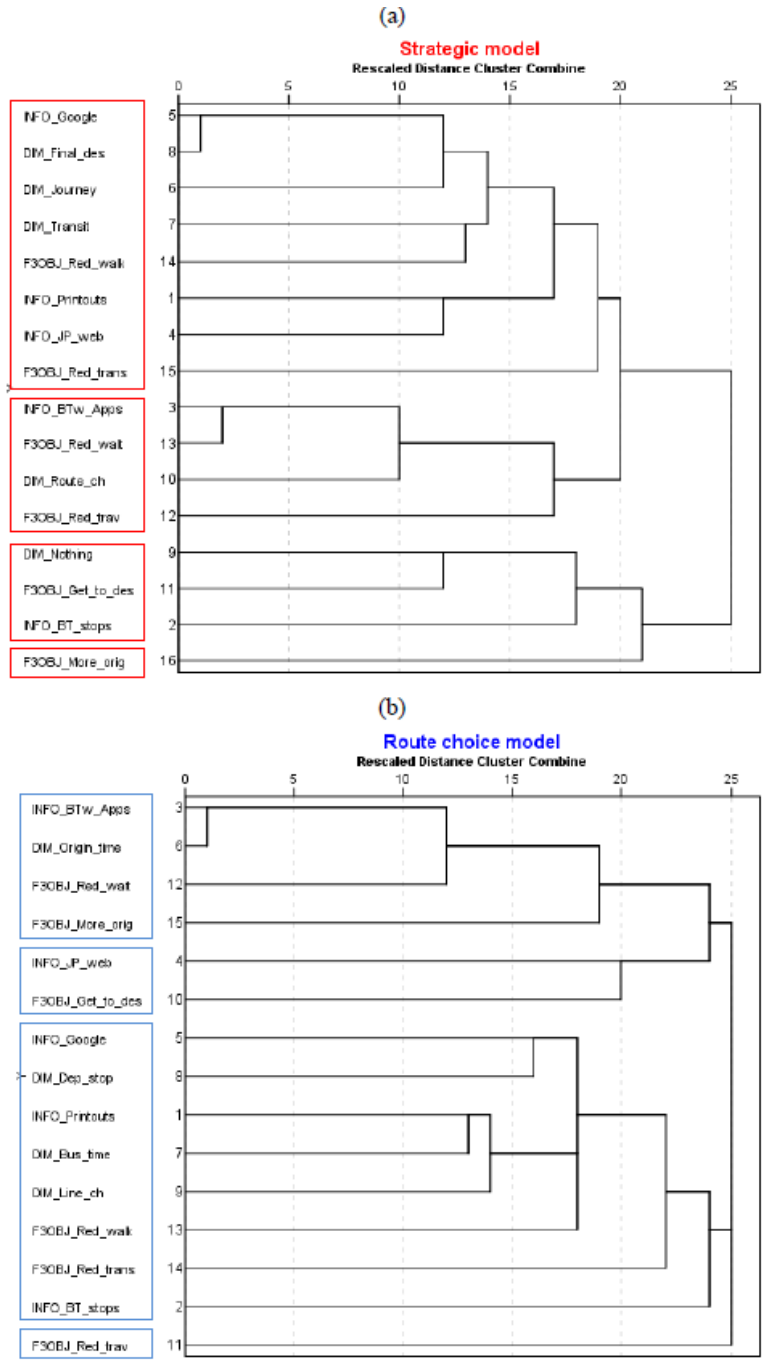


圖 3.3　LB 公車乘客路線決策分析結果

肆、心得與建議

茲將本次與會心得及相關建議綜整如下。

4.1 心得

一、鼓勵並幫助同仁參與大型國際研討會，有助公務視野之開展

TRB 年會，形式上雖為美國單一國家學術機關所舉辦之會議，但其規模、參加人數及參與者國籍數均遠勝一般之國際性研討會，且會議期間不但可當場聆聽各國頂尖學者所發表的研究心得，更可與各國專家學者共聚一堂聽取高論，尤其臨場體會各國頂尖學者面對問題、提問問題與討論問題的態度與方法，更為一般書本上所無法學習到的經驗。

本所為全國唯一專業運輸研究機關，是許多交通運輸界年輕學子嚮往參與投入研究工作的地方，為培養同仁研究視野與觀察、分析問題能力，應多多鼓勵並提供同仁參與此類國際性研討會的機會，以開拓視野、增進研究能力，對深植本所研究能力與未來研究領域開拓，相信均具有相當正面積極的幫助。

二、踏實的進行研究工作，才可培養國家或都市具有解決自己問題及開拓自己未來方向的能力

此次參與 TRB 年會，深感 TRB 年會雖然僅只是美國一個國家所舉辦之研討會，甚至 TRB 亦僅只是一個美國國內非政府的學術研究機構，但其卻受到全球運輸領域學術與實務界人士的一致認同與肯定，更勝於許多如世界道路協會、國際智慧型運輸協會…等國際性交通運輸組織所舉辦之研討會。此絕非僅只導因於美國之國力因素，TRB 及美國各級政府多年來對於提升運輸系統效能與效率上所作的資源、人力投入與努力，及所獲得之研究成果，相信才是讓全球專業人士所嚮往與推崇的根本原因，進而每年願意支付高額報名費，並在天寒地凍的冬季裡，不遠千里自世界各地奔赴華盛頓參與會議。

在拜訪美國聯邦公路總署時，該署人員所提供的一份美國運輸

部年度檢討報告書上，開宗明義即揭櫫：研究是一個國家強健其運輸系統所不可或缺的一環[1]，只有堅持投入研究發現問題，運輸系統才能持續不斷的尋求改善進步，強健的運輸系統也才有被期待建構的可能，在在顯示美國這個國家與政府對於研究工作的重視與對研究人員的期待。

然而交通運輸畢竟是一個自古就存在的活動型態，各個國家或地方的交通運輸活動均必然建立在該地方的社會價值、社會需求與社會文化之上，解決當地的交通運輸問題，自然就必須先研究了解該地方的問題特性與形成原因，以我國的機車交通問題為例，即非美國或其他西方國家所能體會或了解，而必須藉助我們自己的研究資源與研究人力的投入，因此，放眼國家與社會的未來發展，積極面對並投入更多的研究資源與人力，才能有助於我國運輸系統未來的發展，也期待有朝一日臺灣的運輸研究實力與成果亦能獲得世界的認同。

三、網路設備與科技技術已是研討會上的重要輔助工具

此次會議中，無論是學術論文研究所使用的實證技術或廠商參展產品，甚至大會提供與會人士的即時服務中，均不斷出現網路技術與高科技產品的身影，尤其利用個人行動裝置與網路系統，讓大會與與會人士間的訊息流通無時差，也節省大會服務人員的人力需求，值得國內各機關或民間團體舉辦研討會時效法。

四、謹慎使用「使用者付費」原則，勿使收費成為弱勢者進入社會的門檻

本次往返華盛頓 D.C.，刻意安排搭乘美國陸路運輸的長途巴士。過程中發現一般美國人的長途旅次多使用航空運輸系統，長途客運巴士的搭乘者則多為學生與社會上收入較低的族群，其票價低廉，甚至常態性的出現 1 美元促銷票價，以吸引消費者。但是客觀觀察之，美國長途客運之票價低廉全係肇因於本身市場客群的經濟能力，而非政府補貼或支持所致，因此，為成本考量計，業者所提供之服務亦相對非常簡陋。其中為節省人力及設備成本，限定旅客

[1] US DOT, “ITS2015-2019 Strategic Plan”, US Dot, Sep. 2013.

必須以網路訂票，造成無能力負擔網路使用費者及中老年不熟悉網路使用者無形的搭乘障礙，導致該類族群難以跨入門檻，進而喪失進入社會參與社會活動的機會。此外，巴士上下車地點未必臨近當地接駁之交通系統及站場設施簡陋，既無遮蔽風雨的站屋，亦無提供休息的候車座椅，更使得長途客運乘客必須自己手提或背負大件行李，站立在寒風刺骨、白雪飄零的街道上候車(見圖 1.3)，讓人深刻體會到資本主義所形成的社會階級現實。然究其根本原因，其實正是在公共事業的經營上，也強調市場機制與使用者付費原則的必然發展結果。

然而，無論是哪一個國家或社會，交通運輸系統均是民眾進入社會參與經濟及其他活動的最重要管道，所有在此管道上所設置的有形與無形門檻，均將可能成個人進入社會參與活動或參與社會公平競爭機會的障礙，進而形成社會世代內的不公平問題，我們的政府與社會必須有所警悟。

五、ITS 技術發展應注意法律與人權保障問題

ITS 概念最早源自於美國，至今已逾 20 年。初始階段，大家均較關注於 ITS 技術開發的可能性，亦確實掀起學術界一片的研究熱潮。但隨著科技的發展，ITS 技術開發問題已持續獲得解決，甚至落實實現，但關於 ITS 技術所引發法律與人權保障問題，卻因交通領域人士欠缺此一領域的認識與知識，而遭到忽略。

本次會議中驚喜發現美國學者提出相關論文探討此一問題，雖然數量非常有限，但很顯然的可以感受到，當 ITS 技術接近完成之時，ITS 的發展進程也將進入深水區域。新的道路交通活動與人際互動關係即將隨之展開，相信這是 ITS 發展過程中所無法避免的趨勢與課題，而相關法律與人權保障問題的探討，也必將漸次出現，甚至越來越多，國內在引進 ITS 技術與建置系統之時，相關研究人員與政府機關或可及早思考對策及屬於我們自己的法律規範制度，以為因應準備。

4.2 建議

一、運用通訊技術協助提升改善交通系統

交通系統因涉及大量使用者，且個別使用者之特性與使用行為差異頗大，若欲精確掌握，就必須藉助充足的原始資料蒐集。然而，一直以來，或因成本問題，或因技術問題，交通系統上的大量資料蒐集卻存在著高度的困難，更遑論即時資訊的蒐集。而隨著通訊技術的發展，許多資料已可即時透過通訊網路傳送或流通，使得旅次資料的原始資訊得以具體呈現並保存，這是傳統系統所無法達成者。

目前國內在此方面尚有相當大的進步空間，有關機關可隨時注意國內外之技術發展，適時引進，以期更進一步協助運輸系統的績效提升。

二、善加運用網路及網路資訊以提升交通系統之服務

在心得第三點中曾提及，此次會議中，處處可見網路技術與高科技產品的身影，尤其利用個人行動裝置與網路，讓大會與與會人士間的訊息流通無時差，也節省大會服務人員的人力需求。

事實上，大量完整的交通資料蒐集一直是交通主管機關與研究人員難以突破的瓶頸，但隨著科技的發展與個人行動裝置的普及，這個問題已然出現解決的曙光，尤其是個人行動裝置的普及，更讓每個旅次的即時行止動線得以完全掌握，且無論在精確度上與樣本數量上，均非以往所可比擬。

本次研討會中，許多論文均在探討如何運用個人行動裝置、網路資訊、電子收費系統與各種道路或大眾運輸場站監視設備協助交通系統的營運管理及蒐集更精確、更完整的即時旅次資訊，且從其研究成果發現，透過一些判讀方法與判讀系統的改善，資料結果的正確性已顯著提高，且可相信在技術與方法論益加成熟的未來，資料的高度正確性與可應用性應已不再成為問題。

我國擁有世界領先的高科技產業，個人行動裝置之普及度亦相當高，相關機關或研究人員應可善用此一優勢，善加運用網路及網路資訊，以提升國內交通系統之服務績效。

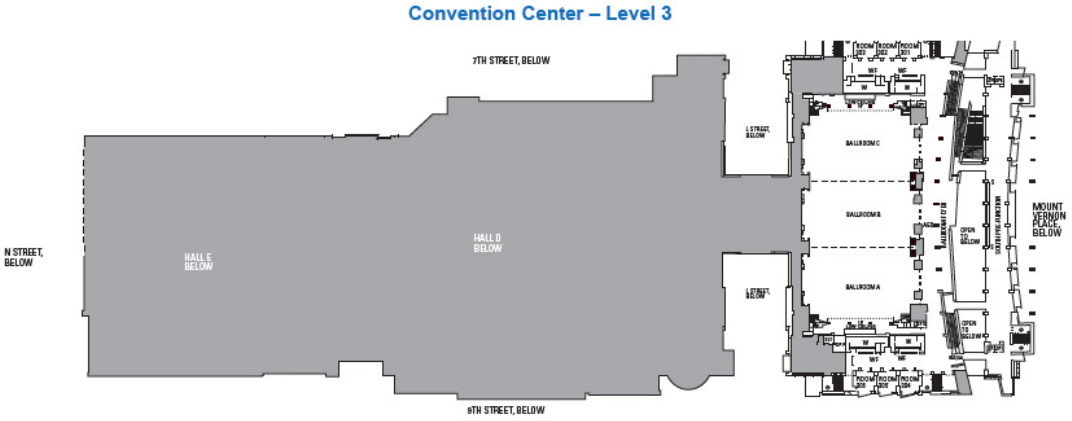
三、落實交通上個人資訊運用的隱私權保障制度

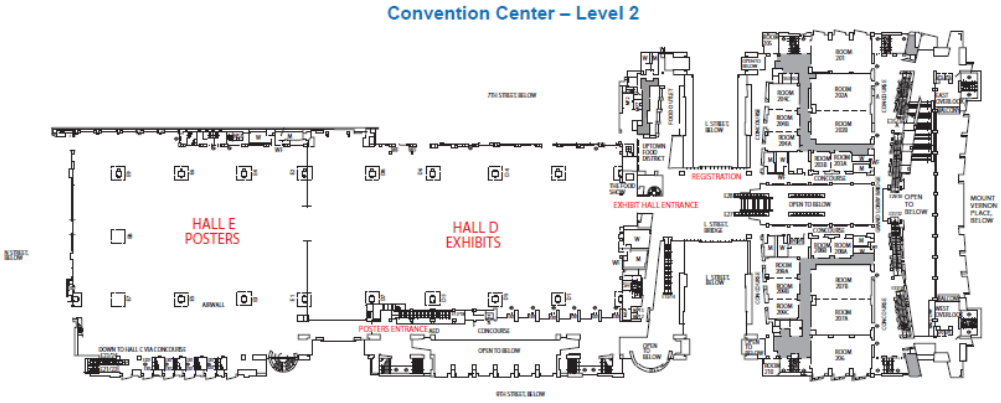
高科技技術與網路系統的引進，以提高運輸系統之效率與效能，是現代交通系統發展無法改變的趨勢。但高度運用高科技產品的目的，不外協助交通系統管理者與駕駛人更安全、迅速的完成旅次活動，於是對於駕駛人或用路人資訊的大量蒐集已是勢所難免。然而在保障人權的憲法精神下，如何在資料蒐集的過程中，防止對個人隱私權的侵害，確實是個重要且必須面對的嚴肅課題。

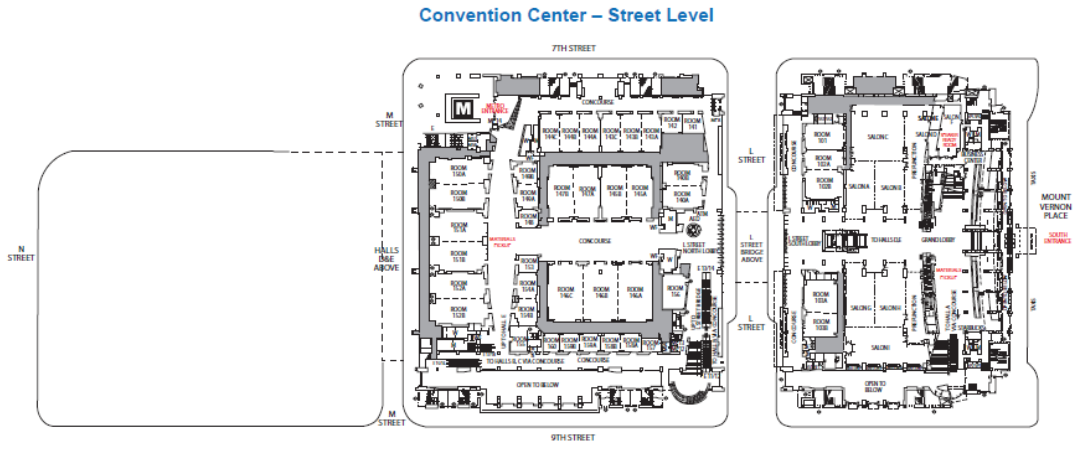
此次會議中發現，美國雖居 ITS 發展領導地位，但聯邦及州政府至今尚缺乏廣泛性或通則性的隱私權保護法律，對 ITS 長遠之發展恐有嚴重妨礙，而顯然美國學者已開始注意此一問題，並提出建議方案。在我國亦然，ITS 技術應用與開發亦是國內無法改變的趨勢，小從個人的行車導航、You Bike 使用，大到高速公路的 ETC 系統及網路大數據應用等，均無法脫離個人資訊之蒐集、儲存與使用，看見美國反省自己，我國在引進高科技與個人行動裝置等設備來強化交通系統服務績效之同時，亦應注意建立適當的法律規範，以確保資訊蒐集、儲存及使用過程中的隱私權保護，確保人民權益不受侵害。

附錄 1

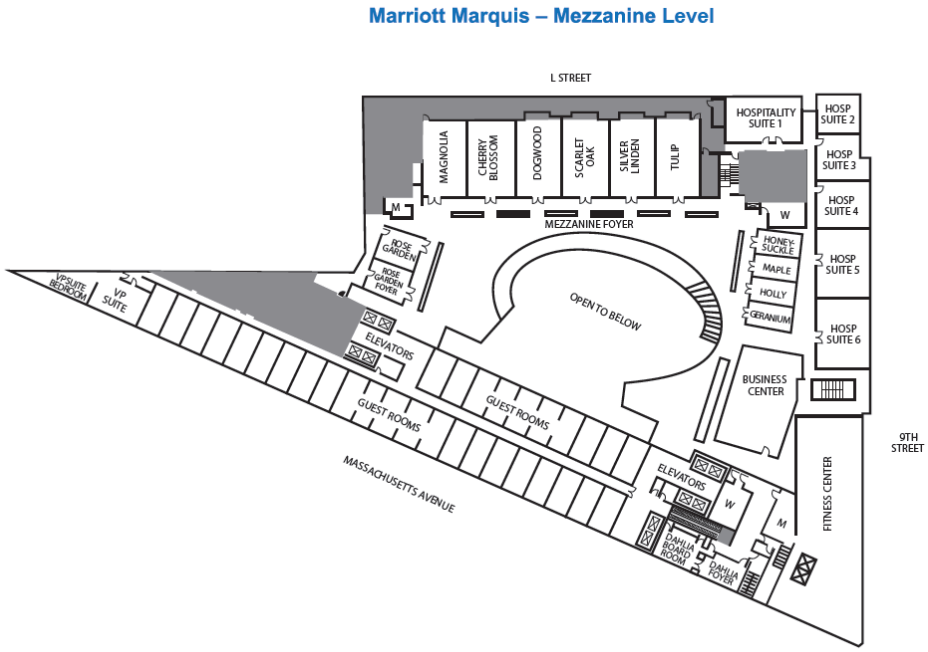
TRB 年會會場平面圖



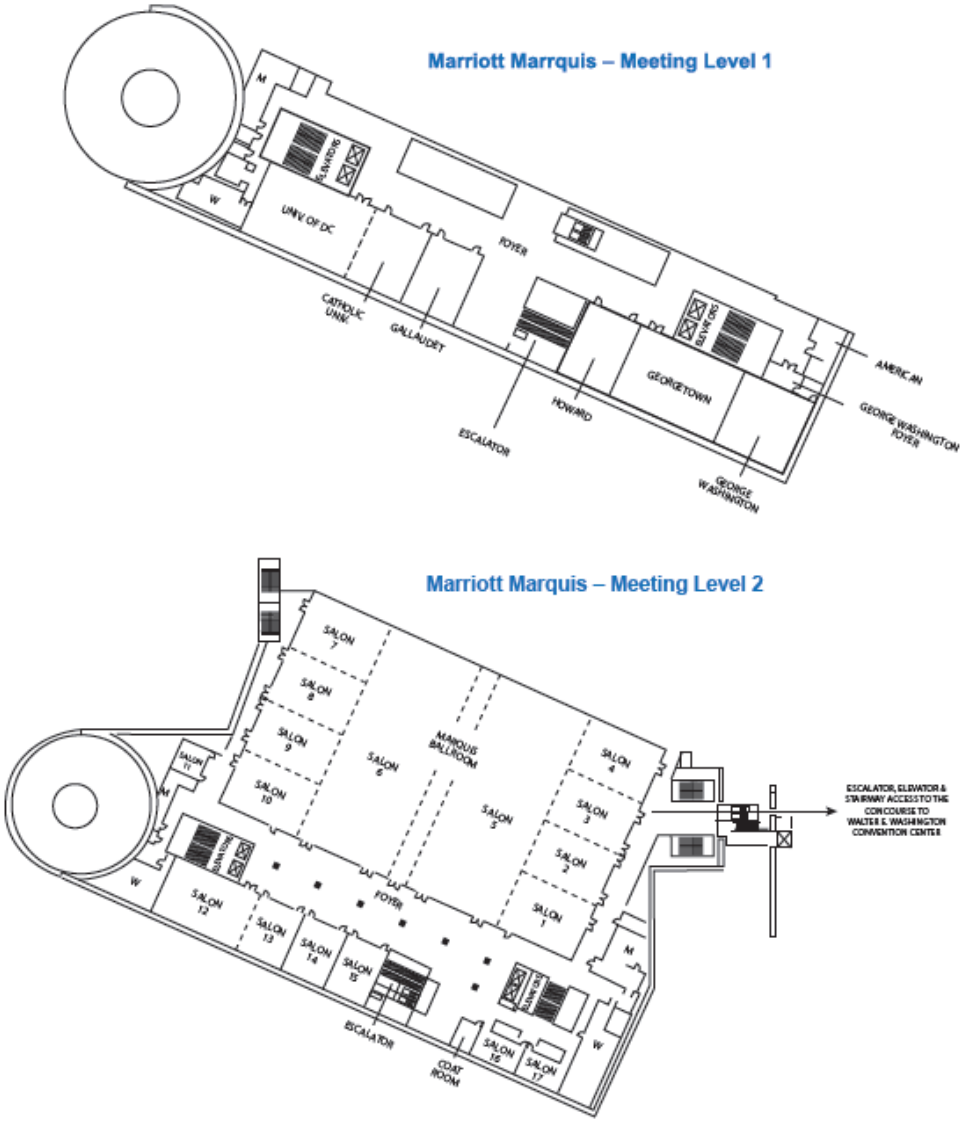




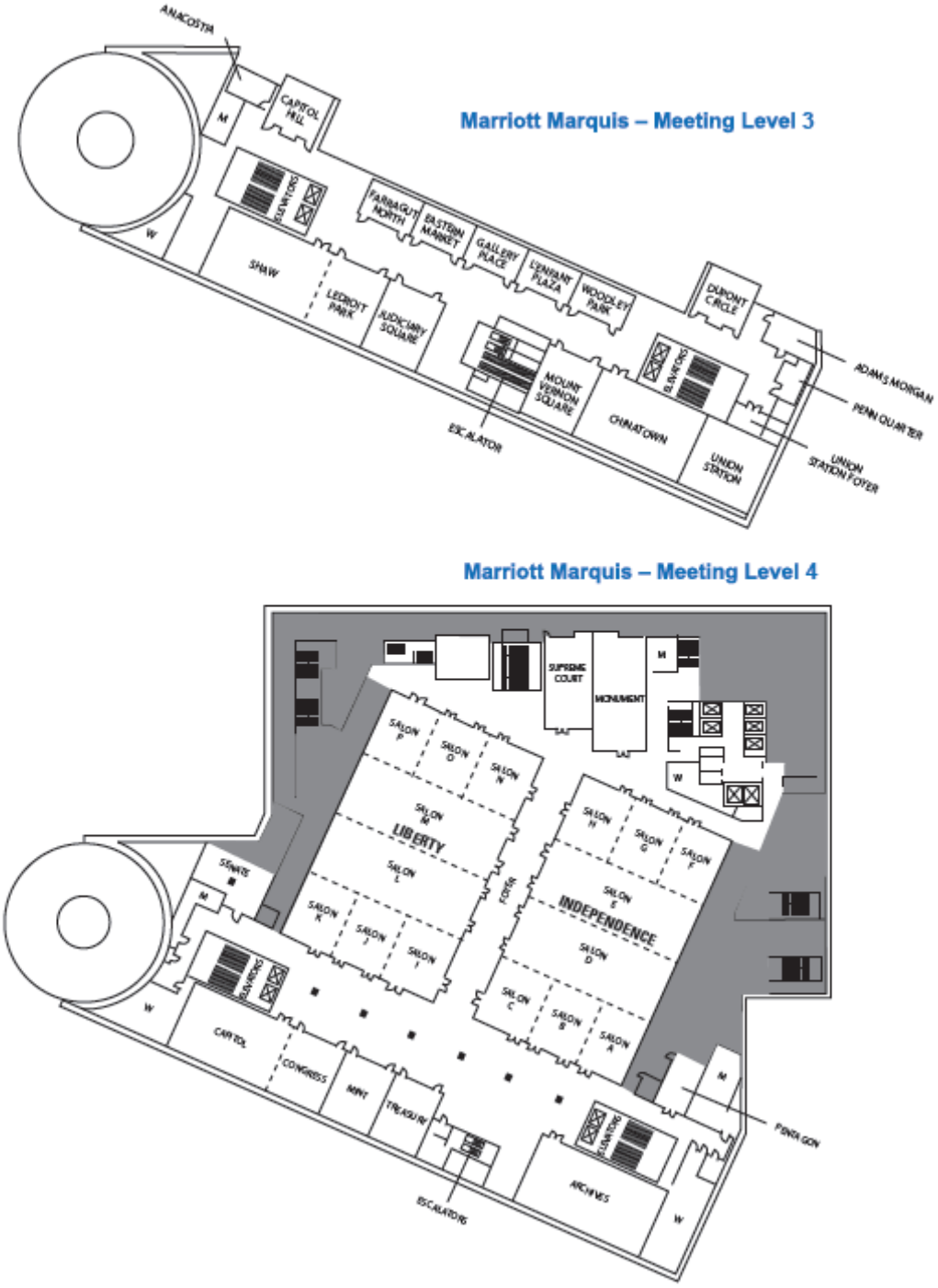
附圖 2.1 華盛頓會議中心會場各樓層對應位置及平面配置圖



附圖 2.2 馬奎斯萬豪飯店 Mazzanine 層之平面配置圖



附圖 2.2 馬奎斯萬豪飯店會議 1 及會議 2 層之平面配置圖



附圖 2.3 馬奎斯萬豪飯店會議 3 及會議 4 層之平面配置圖

附錄 2

TRB 年會各議題下之研討主題

1、經營與管理(Administration and Management)：

	主　題：經營與管理
1	Hitting the Ground Running: Choosing and Navigating a Successful Career Path—A Workshop for Young and New Transportation Professionals
2	Using Knowledge Management as Tool for Successful Succession Planning
3	Keys to Transportation Research Innovation: Managing Intellectual Property
4	Beyond MAP-21: Data Needed to Put MAP-21 Efforts to Work for Your Agency
5	Staying Ahead of the Game—Delivering Results in an Ever-Changing Workplace
6	Strategies for Improved Communication Between Traffic Data Practitioners and Transportation Decision-makers
7	More Than Roads and Bridges: Incorporating Other Assets in Transportation Asset Management Planning
8	Improving Safety Programs Through Data Governance and Data Business Planning
9	Tools for Navigating Workforce and Workplace Changes
10	Advances in Performance Metrics for Context-Sensitive Solution Projects
11	Analysis and Modeling in Asset Maintenance/Management
12	Emerging Ideas in Performance Management
13	New Approaches and Strategies for Infrastructure Management
14	Innovations in Asset Management - Best Papers from AISIM
15	Innovations in Asset Management - Best Papers from AISIM
16	The Future Is Here: Autonomous Vehicles and Us
17	Transportation's Written Word: Issues for Publication, Search, and Lasting Impact
18	Are You Ready? Signposts, Insights and Tools to Help You Navigate Immediate and Long Term Transportation Changes
19	To MAP-21 and Beyond: Implementation Efforts Across the Country
20	Effective Literature and Search Reviews: Tools and Tricks for the Trade
21	Managing Different Risks in Bridge Maintenance
22	Fleet Management: Safety, Prioritizing, and Planning
23	Strategic Management
24	Passing the Torch in State Departments of Transportation: Innovation in Asset Management Through Leadership Transitions
25	You Get What You Measure – Innovative Techniques to Realize Good Performance from Our Partners
26	Managing Pavement Assets and Their Performance, Part 1 (Part 2, Session 557)
27	Advice for Authors: Topics in Transportation Publishing and Research Dissemination

	主　題：經營與管理
28	Value of Transportation Infrastructure and Transportation's Contribution to the Economy
29	Managing Pavement Assets and Their Performance, Part 2 (Part 1, Session 497)
30	Changing Landscape of Disadvantaged Business Enterprise Program and Small Business Set-Asides
21	The Pain of Being Proactive: Reframing the Conversation on Change
32	Shared Challenges and Ideas for Implementing Innovations
33	National Performance Measures for Assessing Pavement and Bridge Condition: NPRM Presentation
34	Pathways to Automated Transit and Shared Mobility
35	Tools and Techniques for Motivating Department of Transportation Executives to Use Performance Management Practices
36	Lessons Learned In Effective Implementation of Research: Case Studies from the EU and US
37	Sustainable Transportation Indicators and Measures - From Meta to Local Perspectives
38	Pavement Preservation Strategy Selection and Cost Impacts
39	Tools for Trade-off Analysis to Support Resource Allocation Decisions
40	Climate Change and Asset Management Global Exchange
41	Innovative Transportation Workforce Development Models
42	Managing and Maintaining Non-Pavement, Non-Bridge Highway Assets
43	How Do We Manage What We Know? Preserving Institutional Integrity and Viability
44	Developing the 21st Century Maintenance Workforce
45	Stakeholder Input for New Regional Surface Transportation Workforce Centers
46	Developing a Performance Management Research Roadmap
47	Ahead of the Curve: Mastering the Management of Transportation Research and Innovation
48	Revenue and Finance Committee
49	Conduct of Research Committee
50	Maintenance and Operations Management Committee
51	Tort Liability and Risk Management Committee

2、航空(Aviation)：

	主　題：航空
1	NextGen, Part 1: Portfolios, Plans and Performance (Part 2, Session 190, Sunday, January 11, 1:30 p.m.-4:30 p.m.)
2	Influence of Airfield Surface Irregularity on Aircraft Life
3	NextGen, Part 2: The Road Ahead (Part 1, Session 142, Sunday, January 11, 9:00 a.m.-noon)
4	Viewpoints on the Emerging Ridebooking Phenomenon
5	Current Issues in Airfield and Airspace Capacity and Delay
6	Air-Rail Connectivity: Today and into the Future
7	Impacts of Airline Consolidation on Airport System Planning
8	Narcotics Smuggling Operations as Portal for Introduction of Terrorist Devices into Commercial Aviation Aircraft
9	Accident Investigations by National Transportation Safety Board
10	Tools to Assist in the Assessment of Environmental Impacts at Airports
11	Converging Runway Operations
12	Emerging Aviation Research for Emerging Aviation Scholars and Practitioners
13	International Aviation and Global Connectivity
14	Unmanned Aerial Systems and Remotely Piloted Aircraft: Can They Fly with the Rest of Us?
15	International Aviation Issues and Perspectives
16	Adoption of Light-Emitting Diode Lighting by Airports: Planning and Design Issues
17	UAS - The Saga Dialogue Continues - Feasibility of Utilizing UAS Technology at the DOTs
18	Nontraditional Relationships and Nonaeronautical Land Use: Leveraging the Airport for Economic Development
19	Accommodating Aging and Disabled Passengers in Airport Terminals
20	Current Issues in Aviation
21	The Latest in General Aviation System Planning
22	Securing the Air Cargo Value Chain
23	Funding Shortfalls and New Mechanisms to Address Changing Aviation Financial Dynamics
24	Air Traffic Management: Applied Research Opportunities in Security, Emergency Management, and Safety
25	Malaysia Airlines Flight 370: Implications for Applied Research in Security, Emergency Management, and Safety
26	Your Neighborhood Spaceport Here Today
27	How Climate Change Affects Aviation
28	Maintenance and Monitoring Program Issues at Non-Hub and General Aviation Airports
29	Aviation System Planning Committee
30	Aviation Water Resources Subcommittee, AV030(3)

	主　題：航空
31	Aviation Economics and Forecasting Committee
32	Airport Terminals and Ground Access Committee
33	Airfield and Airspace Capacity and Delay Committee
34	Aviation Security and Emergency Management Committee

3、橋梁與其他結構(Bridges and Other Structures)：

	主　題：橋梁與其他結構
1	Climate Resilience: Results and Lessons Learned from the FHWA Climate Resilience Pilots
2	Accelerated Bridge Construction (ABC)
3	Emerging and Implementation-Ready Technologies to Control Cracking of Concrete Transportation Infrastructure, Part 1 (Part 2, Session 172)
4	Low Volume Road Bridges: Critical Issues
5	Advancement of the State-of-the-Art in Traffic Structures
6	Reliability of Nondestructive Evaluation Technologies
7	Emerging and Implementation-Ready Technologies to Control Cracking of Concrete Transportation Infrastructure, Part 2 (Part 1, Session 128)
8	Pile Capacity Assessment with Cone Penetration Test (CPT) Data
9	Topics in Design and Rating of Concrete Bridges
10	Concrete Properties: Recent Advancements in Materials and Testing
11	Innovations Worth Deploying Now: High Value Research Results
12	Panel Discussion on Hot Topics Related to Seismic Design and Performance of Bridges
13	Systems and Technologies to Improve Service Life of Metallic Elements in Low-Resistivity Soils
14	TRB's NCHRP IDEA Program: Sponsoring Innovation in Highway Transportation
15	Aggregates and Ashes in Concrete Mixtures
16	Concrete and Curing in Mixtures
17	Damage, Repair and Damage Prevention in Concrete Bridges
18	Lessons Gleaned from San Francisco-Oakland Bay Bridge
19	Design and Installation of Large-Diameter Open-Ended Pipe Piles in Different Soil Types
20	Case Studies on Use of Buried Structures for Accelerated Bridge Construction
21	Forecasting Performance to Loads and Environmental Factors for Bridge Management
22	Culvert Field Installation Case Studies
23	Case Studies with Phased-Array Ultrasonics for Inspection
24	Managing Different Risks in Bridge Maintenance
25	SHRP 2 Renewal: Legacy, Principal Products, and Outcomes
26	Bridge Preservation Practices
27	LRFD Seismic Design of Structural Foundations and Geotechnical Transportation Features
28	Durability, Strength, and Rehabilitation of Hydraulic Structures
29	Fiber-Reinforced Polymer Composites in Infrastructure, Part 1 (Part 2, Session 743)
30	Best Practices for Implementation of Accelerated Bridge Construction
31	Special Topics in Steel Bridges

	主　題：橋梁與其他結構
32	Instrumentation and Monitoring for Constructing Transportation Tunnels in Urban Environments
33	Innovations in Bridge Construction
34	New Developments in Self-Consolidating Concrete
35	Advances in and Case Histories of Mechanically Stabilized Earth Structures
36	Advances for Filling Ducts and Monitoring Techniques for Corrosion Protection and Evaluation of Tendons in Posttensioned Bridges
37	Steel Bridge Fatigue and Fracture
38	Freeze-thaw and Electrical Resistivity of Concrete
39	Emerging Topics in Seismic Design and Performance of Bridges
40	Modeling of the Pipe-Soil System
41	National Performance Measures for Assessing Pavement and Bridge Condition: NPRM Presentation
42	Current Issues in Bridge Management
43	Advancements in Structural Systems
44	Field Testing for Highway Bridges
45	Risk Models and Deck Assessment for Bridge Management
46	Pile Testing and Analysis
47	Design and Analysis of Foundations for Bridges and Other Structures
48	Performance of Buried Culverts
49	Emerging Issues in Structures Maintenance and Bridge Management
50	Fiber-Reinforced Polymer Composites in Infrastructure, Part 2 (Part 1, Session 458)
51	Why Spin Dirt at 200 mph? Centrifuge Modeling of Transportation Geosystems
52	Nondestructive Evaluation for Highway Bridges
53	New Technologies and Case Histories for Foundation Reuse and Enhancement
54	Tunnels and Underground Structures – Design, Evaluation and Performance
55	Alternative Contract Delivery Methods for Procuring Transportation Projects with Tunnels and Underground Systems
56	New Technologies for Foundation Reuse and Enhancement: Lake Mary Road Bridge, Arizona
57	Implementation of Load and Resistance Factor Design for Geotechnical Design of Foundations
58	Status of Long-Term Bridge Performance Program
59	General Structures Committee
60	Concrete Bridges Committee
61	Structures Maintenance Committee
62	Bridge Preservation Committee

4、施工(Construction)：

	主　題：施工
1	Best Practices for Creating Design Data to Support Digital Project Delivery
2	Concrete Overlays As a Rehabilitation Alternative, Part 1: Design (Part 2, Session 170)
3	Accelerated Bridge Construction (ABC)
4	The Revolution of Analog to Digital Project Delivery
5	Improving Processes for Characterization of Soil Corrosion Potential of Buried Metallic Elements
6	Low Volume Road Bridges: Critical Issues
7	Techniques to Identify, Manage, and Resolve Utility Conflicts in Transportation Projects
8	Digital Design Data Standards
9	Concrete Overlays as a Rehabilitation Alternative, Part 2: Construction (Part 1, Session 122)
10	Best Practices of Tack Coats for Asphalt Pavements
11	Performance-Based Contracting: Toward More Efficient and Effective Road Maintenance
12	Construction Management: Recent Advances
13	Raising the Bar on Collaboration: Public-Private Partnerships and Alliance Contracts
14	Accelerating Project Delivery by Using Alternative Contracting Methods
15	Integrated Visualization Techniques for Transportation Planning and Multisensor Data for 3-D Surface Information
16	Recent Developments in Portland Cement Concrete Pavement Construction and Rehabilitation
17	Advanced 3D Model-based Planning-Design-Construction-O and M Civil Integrated Management (CIM) Best Practices, Lessons Learned, and Case Studies for Transportation Project Delivery
18	Strategies for Effective Management of Utilities in the Right-of-Way
19	Precast Concrete Pavement Innovation and Case Studies
20	Risk Management in Construction: You Cannot Ignore It!
21	Rapid Asphalt Pavement Construction
22	New Developments in Concrete Durability
23	Lessons Gleaned from San Francisco-Oakland Bay Bridge
24	Disadvantaged Business Enterprises Final Rule
25	Case Studies on Use of Buried Structures for Accelerated Bridge Construction
26	Using Geospatial Technologies to Perform Department of Transportation Activities
27	Case Studies with Phased-Array Ultrasonics for Inspection
28	Simplifying Complexities of DBE Final Rule
29	Asphalt Pavement Recycling
30	Construction Manager/General Contractor (CM/GC) Contracting: Perspectives from the Field
31	Measuring, Monitoring and Evaluation of Thin Asphalt Pavement Layers

	主　題：施工
32	What You Can't See Can Hurt You
33	Best Practices for Implementation of Accelerated Bridge Construction
34	Innovations in Bridge Construction
35	Buy America for Utilities
36	UAS - The Saga Dialogue Continues - Feasibility of Utilizing UAS Technology at the DOTs
37	Steel Bridge Fatigue and Fracture
38	Building It Right: Recent Developments in Construction Quality Assurance
39	Changing Landscape of Disadvantaged Business Enterprise Program and Small Business Set-Asides
40	Moisture Measurement to Reduce Risk and Improve Performance
41	SHRP 2 Project R05 Precast Concrete Pavement Technology Implementation
42	Field Performance of Transportation Earthworks
43	Benefits of Geotechnical Instrumentation for Performance Measurement
44	Handing over Digitally Constructed Projects to Operations and Maintenance
45	Delivering and Constructing the Digital Project
46	Value-Added Geotechnical Solutions: Case Studies of Numerical Modeling Successes
47	Digital Project Delivery
48	Durability Performance Tests for Asphalt Mixtures: Moving Toward Implementation
49	Rail Transit Infrastructure Committee

5、資料與資訊技術(Data and Information Technology)：

	主　題：資料與資訊技術
1	The Art of Urban Street Performance Metrics
2	Beyond MAP-21: Data Needed to Put MAP-21 Efforts to Work for Your Agency
3	Sensing Technologies for Transportation Applications
4	Driving Simulators or Naturalistic Observation—Synergies and Conflicts
5	Best Practices for Creating Design Data to Support Digital Project Delivery
6	Advancing the Statewide Transportation Planning and Analysis: Statewide Dynamic Traffic Assignment (DTA) and Agent-Based Models (ABM)
7	Analyzing, Validating and Visualizing Results from Modeling: The Role of Big Data and New Technologies
8	Parallel Computing in Traffic Simulation and Assignment: Moving from Innovations to Practice
9	Geospatial Tools and Applications to Optimize Multidiscipline and Multi-Jurisdictional Decision Making
10	The Revolution of Analog to Digital Project Delivery
11	Communication Trends: The Shift to Mobile
12	Strategies for Improved Communication Between Traffic Data Practitioners and Transportation Decision-makers
13	Making Bicycle and Pedestrian Data Programs Count
14	Emerging Data Technology and Analytic Frontiers in Integrated Land-Use and Transport Modeling
15	Revisiting Model Validation: An Assessment of Needs and New Opportunities
16	Digital Design Data Standards
17	Impacts of New Data and Information Technologies on Transforming Traveler Experience
18	The Future of Freight Analytics, Modeling, and Planning with Truck Probe Data
19	Freight Data Meets Innovative Technologies—An Interactive Workshop
20	Doctoral Student Research in Transportation Modeling
21	Pandora Was Right: Hopeful Experiences with Opening Access to Data
22	Improving Safety Programs Through Data Governance and Data Business Planning
23	Collaborative Visualization in Analytics and Operations
24	Advances in Traffic Assignment and Equilibrium
25	Modality and Mode Choice Preferences
26	Transformative Applications of Transit Data
27	Artificial Intelligence and Advanced Computing Applications
28	Commuting in America: Current Status and Future Implications

	主　題：資料與資訊技術
29	Advanced 3D Model-based Planning-Design-Construction-O and M Civil Integrated Management (CIM) Best Practices, Lessons Learned, and Case Studies for Transportation Project Delivery
30	What's Going on in Local Mixed-Use and TOD Environments
31	Analysis and Modeling in Asset Maintenance/Management
32	Actionable Analytics That Drive Replacement and Preventive Maintenance Practices for Fleet Equipment
33	Human Factors Insights From Railroad Data Analysis
34	Statewide Data and Information Systems
35	Innovative Analyses of National Household Transportation Survey
36	Research in Statistical Methods in Transportation
37	Transportation Visualization Hot Topics: Evacuations, Simulation, National Performance Management Research Data Set, and More
38	Learning from the Winners: Competition Results for Best Practices Communicating Data to Support Decisions
39	Transportation's Written Word: Issues for Publication, Search, and Lasting Impact
40	Extracting Information from Images: Technology Innovations in Sensing and Detection
41	Advances in Geospatial Technology Applications in Transportation
42	Transportation Planning Applications: It’s all about the Data!
43	Will the Promise of Inland Waterway Communication Networks Actually Improve Commercial River Operations?
44	Not Your Mother's Parking Meter: Parking in the 21st Century
45	Tour de Data: Advances in Urban Data and Information Systems
46	Applications for Small-Area American Community Survey and Census Transportation Planning Package Data: New Data, New Challenges
47	Travel Time and Speed Data Applications, Methods, and Performance Measures
48	Highway Traffic Monitoring Innovative and Advanced Methods and Technologies
49	Information Technology Applications in Transportation 2015
50	Using Geospatial Technologies to Perform Department of Transportation Activities
51	Data-Driven Safety Management: Multidisciplinary Approach
52	Fast-forward 10 Years: How Information Technology Is Changing Transportation Planning, Engineering, and Operations
53	Activity Scheduling
54	Dynamic Network Modeling
55	Bicycle and Pedestrian Information: Practical Application of Data Collection and Technology
56	Innovations in Statewide Transportation Planning
57	Transportation Planning Applications: Tips and Tools

	主　題：資料與資訊技術
58	Activity and Travel: New Understandings and Models
59	New Year--New Issues, Methods, and Applications in Travel Modeling: Lightning Session
60	Prevention and Modeling of Severe Crashes
61	Transportation Means Access: Can Everyone Get There? Eleventh Annual Travel Data Users Forum
62	New Applications of Travel Time Data from Probes
63	Optimization and Network Design
64	Towards a Better Understanding of Transportation and Land Use Connections
65	What You Can't See Can Hurt You
66	SHRP 2 Safety: Legacy, Principal Products, and Outcomes
67	Transportation Issues and Solutions in Major Cities
68	Advice for Authors: Topics in Transportation Publishing and Research Dissemination
69	Crash-Based Safety Analysis and Modeling
70	Intercity Travel Analysis in Developing Countries
71	Traffic Data Collection and Analysis
72	Developing Truck Origin-Destination Flows from GPS Data
73	Information and Communication Technologies and Travel: An International Scan
74	UAS - The Saga Dialogue Continues - Feasibility of Utilizing UAS Technology at the DOTs
75	Emerging Technologies and Methods for Travel Data
76	Panel, Continuous, and Cross-Sectional Travel Surveys: Lessons Learned and Successes Achieved
77	Legends (and Future Legends) of Travel Demand Modeling Present Their Latest Work on Integrated Model Systems
78	Dwight David Eisenhower Transportation Fellowship Program, Part 1 (Part 2, Session 712)
79	Transformative Transit Data Research and Applications
80	Prioritizing Data for Transit Management and Performance Decisions
81	Advances in Travel Survey Methods
82	Advanced Traveler Information and Behavioral Patterns
83	Transportation Planning Applications: Trips or Tours, Spaces or Places, Directions or Connections – It's all about the Models!
84	Data Applications to Support Transit Quality of Service Analysis
85	Tools for Trade-off Analysis to Support Resource Allocation Decisions
86	Transit and Logistics
87	Handing over Digitally Constructed Projects to Operations and Maintenance
88	Is It Safe to Use Surrogate Measures of Safety?

	主　題：資料與資訊技術
89	Decisions are Made on Tuesday Mornings: The Role and Requirements for Data in the Decision-Making Process
90	Bicycle and Pedestrian Data Collection Methods, Technologies, Accuracy and Warehousing
91	Life Course and Life Cycle Effects in Travel Behavior
92	Innovations in Travel Surveys
93	Travel Demand Models R Us Poster Session
94	How Do We Manage What We Know? Preserving Institutional Integrity and Viability
95	Data Needs for the Future – The Big Picture
96	Digging Deeper: New Insights from Existing Freight Data Sources and Methods
97	Delivering and Constructing the Digital Project
98	Using Technology to Enhance Hazardous Materials Transportation Safety and Security
99	Social Networks and Activity-Travel Behavior
100	Dynamics in Travel Behavior Analysis and Modeling
101	GPS and Smartphone Tracking of Travel Behavior
102	Activity and Travel Behavior
103	Technology, Time Use, and Travel
104	2012 Commodity Flow Survey – Status and Plans
105	Digital Project Delivery

6、設計(Design)：

	主　題：設計
1	Best Practices for Creating Design Data to Support Digital Project Delivery
2	Innovative Doctoral Research from Dwight David Eisenhower Transportation Fellowship Program
3	Concrete Overlays As a Rehabilitation Alternative, Part 1: Design (Part 2, Session 170)
4	Accelerated Bridge Construction (ABC)
5	The Revolution of Analog to Digital Project Delivery
6	Marking and Signing Practices at Roundabouts
7	Freeway and Interchange Design: Applying the Science and Art of Engineering Innovation
8	Low Volume Road Bridges: Critical Issues
9	To Tree or Not To Tree — Strategies for Answering a Roadside Question
10	Techniques to Identify, Manage, and Resolve Utility Conflicts in Transportation Projects
11	Digital Design Data Standards
12	Concrete Overlays as a Rehabilitation Alternative, Part 2: Construction (Part 1, Session 122)
13	Rockfall and Debris Flow Modeling Workshop
14	Pile Capacity Assessment with Cone Penetration Test (CPT) Data
15	Mechanistic–Empirical Pavement Design Enhancements in South Africa
16	W-Beam Guardrail Design
17	Geosynthetics in Erosion and Sediment Control
18	Integrated Visualization Techniques for Transportation Planning and Multisensor Data for 3-D Surface Information
19	Advanced 3D Model-based Planning-Design-Construction-O and M Civil Integrated Management (CIM) Best Practices, Lessons Learned, and Case Studies for Transportation Project Delivery
20	Advances in Performance Metrics for Context-Sensitive Solution Projects
21	Strategies for Effective Management of Utilities in the Right-of-Way
22	Precast Concrete Pavement Innovation and Case Studies
23	Safety Management Data Analytics
24	Low-Volume Road Management, Performance, and Design
25	Characterizing Unsaturated Soil Behavior - Part 1 (Part 2, Session 562)
26	Design and Installation of Large-Diameter Open-Ended Pipe Piles in Different Soil Types
27	Case Studies on Use of Buried Structures for Accelerated Bridge Construction
28	Hydraulic Research for Pavement Runoff and Infrastructure Vulnerability
29	Using Geospatial Technologies to Perform Department of Transportation Activities
30	Applications of Context-Sensitive Solutions
31	SHRP 2 Renewal: Legacy, Principal Products, and Outcomes

	主　題：設計
32	Pavement Surface Characteristics
33	Impact of Access Management Research
34	Hydraulics Research for Runoff, Scour, and Erosion
35	What You Can't See Can Hurt You
36	Advances in and Case Histories of Mechanically Stabilized Earth Structures
37	Dwight David Eisenhower Transportation Fellowship Program Research Showcase
38	Transportation Issues and Solutions in Major Cities
39	Roadside Safety Design
40	Livable Arterials: Urban Elixir or Oxymoron?
41	Horizontal and Vertical Alignment Design Research
42	Characterizing Unsaturated Soil Behavior - Part 2 (Part 1, Session 344)
43	Evaluation of Geosynthetics in Roadway Design with GeoTech Tools
44	Substructure Improvement Design for High-Speed Rail and Heavy-Axle-Load Freight Service
45	Wrong-Way Driving Incidents, Detection, and Countermeasures on Limited-Access Highways
46	Roadway Departure Risk
47	Reimagining the Design of Streets and Highways as Sustainable Environmental, Economic, and Active-Living Assets
48	Water Quality Technolgy Improvements and Research
49	Modeling of the Pipe-Soil System
50	Railroad Wheel-Rail Interaction
51	Reimagining Rights of Way and Roadside Development
52	Wrong Way Driving: What We Know, What We Are Doing, and Where Are We Going
53	Design and Modal Considerations for Roundabout Capacity
54	Railway Vibrations, Fastening Systems, Undersleeper Pads, and Ballast Modification
55	Dwight David Eisenhower Transportation Fellowship Program, Part 2 (Part 1, Session 642)
56	Geometric Design Research
57	Benefits of Geotechnical Instrumentation for Performance Measurement
58	Pile Testing and Analysis
59	Design and Analysis of Foundations for Bridges and Other Structures
60	Design and Performance of Asphalt and Concrete Overlays
61	Safety and Speed Effects of Geometric Design Decisions
62	All About Roundabouts
63	Is Transportation Infrastructure Ready for Driverless Cars?
64	Bicycling Perspective on Roadway Design and Operations
65	Delivering and Constructing the Digital Project

	主　題：設計
66	Value-Added Geotechnical Solutions: Case Studies of Numerical Modeling Successes
67	Operationalizing Resilience in Transport
68	Implementation of Load and Resistance Factor Design for Geotechnical Design of Foundations
69	Digital Project Delivery
70	Surface Properties - Vehicle Interaction Committee
71	General Structures Committee
72	Concrete Bridges Committee

7、經濟(Economics)：

	主　題：經濟
1	Critical Infrastructure Resilience and Cost-Effective Adaptation and Operations
2	Funding and Financing Vital Corridors: A Workshop on the What, Why, How, and Who of Value Capture Methods
3	Measuring What Really Matters: Accessibility and Connectivity, Economic Competitiveness, and Health
4	Let's Get to the Triple Bottom Line: The Next Generation of Benefit-Cost Assessments
5	SHRP 2 Capacity: Legacy, Principal Products, and Outcomes
6	Transportation Funding and Financing Showcase
7	Transportation and Sustainability
8	Research in Transportation Economics
9	Economic Analysis of Environmental Impacts in Transportation
10	Shortening Supply Chains and U.S. Trucking: The Facts and the Implications
11	Transportation Economic Growth and Development Linkage Assessments: International Examples
12	Working Across Boundaries: Emergence and Evolution of Metropolitan Planning Organizations
13	Accessibility, Commuting, and Income Dynamics
14	Freight Transportation Investment for Economic Development
15	Value of Transportation Infrastructure and Transportation’s Contribution to the Economy
16	Current State of Public Opinion and Polling on Transportation Funding Options
17	Role of Transit Investments in Promoting Development and Resilience
18	New Developments in Labor Economics: Safe Rates and Chain of Responsibility
19	Research on Social and Economic Factors of Transportation
20	Innovations and Incentives for Reducing Auto Travel
21	Transport Investments and Economic Impacts: Multimodal Perspectives
22	What's in Your Pocket? Technology Trends and Revenue Capture for Transportation
23	Pricing in Transportation
24	The Elusive Three E's: Economy, Equity, and Environment--Can Green Infrastructure Rating Tools Save the Day?
25	Funding Shortfalls and New Mechanisms to Address Changing Aviation Financial Dynamics
26	SHRP 2 Reliability: Legacy, Principal Products, and Outcomes
27	The Role of Freight Transportation in Economic Competitiveness: The 8th UTC Spotlight Conference
28	Innovations in Delivery and Logistics
29	Department of Transportation Experience with Sustainability Tools
30	Transportation Expenditures and the Future of Automobility

	主　題：經濟
31	Transportation and Economic Development Committee
32	Freight Transportation Economics and Regulation Committee
33	Aviation Economics and Forecasting Committee

8、教育與訓練(Education and Training)：

	主　題：教育與訓練
1	Hitting the Ground Running: Choosing and Navigating a Successful Career Path—A Workshop for Young and New Transportation Professionals
2	Using Knowledge Management as Tool for Successful Succession Planning
3	Communication Trends: The Shift to Mobile
4	Environmental Training: Preparing the Transportation Workforce
5	Emerging Professionals and Emerging Technologies: Investing in our Future, Part I (Part 2, 255)
6	Pandora Was Right: Hopeful Experiences with Opening Access to Data
7	Emerging Professionals and Emerging Technologies: Investing in our Future, Part 2 (Part 1, 195)
8	Tools for Navigating Workforce and Workplace Changes
9	Bridging the Gap Between Travel Model Research and Practice: Moderated Discussion
10	Effective Literature and Search Reviews: Tools and Tricks for the Trade
11	Passing the Torch in State Departments of Transportation: Innovation in Asset Management Through Leadership Transitions
12	Innovative Teaching of Highway Capacity Manual Procedures
13	Strengthening cross national networks of research, education and technology transfer
14	Formal Training Courses in Road Safety Workforce Development
15	Innovative Transportation Workforce Development Models
16	How Do We Manage What We Know? Preserving Institutional Integrity and Viability
17	Developing the 21st Century Maintenance Workforce
18	The Role of Freight Transportation in Economic Competitiveness: The 8th UTC Spotlight Conference
19	Stakeholder Input for New Regional Surface Transportation Workforce Centers
20	Ahead of the Curve: Mastering the Management of Transportation Research and Innovation
21	Transportation Education and Training Committee

9、能源(Energy)：

	主　題：能源
1	Environmental Training: Preparing the Transportation Workforce
2	Clean Truck Corridors: Understanding the Barriers and Opportunities
3	Crude Oil by Rail Shipments: Logistics and Community Impacts
4	Department of Transportation Rights-of-Way and Infrastructure for Energy Production
5	Plug-in Electric Vehicle Infrastructure and Driver Behavior: Issues and Solutions for Continued Market Growth
6	Energy-Sector Transportation: Driving the Economy
7	Tools to Assist in the Assessment of Environmental Impacts at Airports
8	Economic Analysis of Environmental Impacts in Transportation
9	Railroad Energy Management Systems
10	Climate Change and Transportation: Best Papers of 2015
11	Adoption of Light-Emitting Diode Lighting by Airports: Planning and Design Issues
12	Current Issues in Transportation and Air Quality
13	Current Issues in Transportation Energy
14	Current Issues in Alternative Transportation Fuels and Technologies
15	Cellulosic Biofuels for Transportation: Growth Through Linking Feedstocks, Supply Chains and Policies
16	Crude Oil Transportation Challenges: Market Dynamics and Emergency Response
17	Environmental Implications of Marine-Based Energy Production
18	Advanced Vehicle Technologies and Energy Use: Uncertainty and Individual Differences
19	Freight Day, Part 4: Will the Changing U.S. Energy Mix Transform Multimodal Freight Systems? (Part 1, Session 519, Part 2, Session 580)
20	Achieving More Sustainable Pavement Materials, Systems, and Management Approaches
21	Energy Use and Greenhouse Gas Emissions from Non-Automotive Transport Modes
22	Best Practices for Deploying Corridor-Based Alternative Fuel Infrastructure
23	Vehicle Emission Reduction Strategies: Electric Vehicle Adoption and Taxation
24	How Climate Change Affects Aviation
25	Evaluating Environment and Energy Benefits: When Does Greenhouse Gas Reduction Make Sense Anyway?
26	Tools for Evaluating Greenhouse Gas Reduction Strategies
27	Transportation and Air Quality Committee
28	Climate Change Joint Subcommittee of ADC70, ADC80, ADD40

10、環境(Environment)：

	主　題：環境
1	Climate Resilience: Results and Lessons Learned from the FHWA Climate Resilience Pilots
2	Integrated Land-use, Travel Demand, Air Quality, and Exposure Modeling: the Future of Regional Transportation Planning?
3	Geospatial Tools and Applications to Optimize Multidiscipline and Multi-Jurisdictional Decision Making
4	FTA Noise and Vibration: Updates to Guidance and Requirements for Environmental Documentation
5	International Experience and Perspective of Pavement Texture Measurements and Evaluation
6	Floodcast: A Framework for Enhanced Flood Event Decision Making for Transportation Resilience.
7	Beyond the Barrier: Consideration of Transportation-Related Noise Mitigation for Historic Properties and Native American Cultural Sites
8	Environmental Training: Preparing the Transportation Workforce
9	Clean Truck Corridors: Understanding the Barriers and Opportunities
10	To Tree or Not To Tree — Strategies for Answering a Roadside Question
11	Mainstreaming Climate Change and Extreme Weather Resilience into Transportation
12	Let's Get to the Triple Bottom Line: The Next Generation of Benefit-Cost Assessments
13	Post-1945 Common Bridges: Federal Highway Administration's Program Comment
14	Department of Transportation Rights-of-Way and Infrastructure for Energy Production
15	Advances in Understanding of Road Salt and Winter Maintenance Materials
16	Innovative Freight Research: Sustainability Strategies Addressing Supply-Chain Air Emissions
17	California Environmental Innovations: New Ways of Assessing Transportation Environmental Impacts and Mitigation
18	Plug-in Electric Vehicle Infrastructure and Driver Behavior: Issues and Solutions for Continued Market Growth
19	Actionable Analytics That Drive Replacement and Preventive Maintenance Practices for Fleet Equipment
20	Fracking Up the Highway and Other Modes of Transportation: Current Legal Challenges to Cargo Size, Weight, and Safety
21	Transportation and Sustainability
22	Physicochemical Behavior of Soils and Industrial Byproducts
23	Completing Projects Within the Regulatory Framework of the National Environmental Policy Act (NEPA) and Section 106
24	Characterizing Unsaturated Soil Behavior - Part 1 (Part 2, Session 562)
25	Weather Effects on Roadways

	主　題：環境
26	Forecasting Performance to Loads and Environmental Factors for Bridge Management
27	Railroad Environmental Issues
28	Tools to Assist in the Assessment of Environmental Impacts at Airports
29	Weather Impacts on Surface Transportation
30	Performance and Selection of Winter Maintenance Materials
31	Economic Analysis of Environmental Impacts in Transportation
32	Highway-Related Noise Issues
33	Best Practices to Prevent and Control Salt Contamination
34	Changing Environmental Mitigation Policies with a Teaspoon of Law
35	Climate Change and Transportation: Best Papers of 2015
36	Current Issues in Environmental Analysis in Transportation
37	Current Issues in Transportation and Air Quality
38	Current Issues in Ecology and Transportation
39	Current Issues in Transportation-Related Noise and Vibration
40	Current Issues in Historic and Archeological Preservation in Transportation
41	Current Issues in Waste Management and Resource Efficiency in Transportation
42	Characterizing Unsaturated Soil Behavior - Part 2 (Part 1, Session 344)
43	Current Issues in Transportation Energy
44	Current Issues in Alternative Transportation Fuels and Technologies
45	Learning from the Curve: Effective Strategies Used to Prevail in Recent FHWA and FTA NEPA Litigation
46	Cellulosic Biofuels for Transportation: Growth Through Linking Feedstocks, Supply Chains and Policies
47	Reimagining the Design of Streets and Highways as Sustainable Environmental, Economic, and Active-Living Assets
48	Water Quality Technolgy Improvements and Research
49	Adverse Weather Impacts on Urban Areas
50	The Elusive Three E's: Economy, Equity, and Environment--Can Green Infrastructure Rating Tools Save the Day?
51	On-road and Not-on-Road Truck Activities and Emissions
52	Advanced Vehicle Technologies and Energy Use: Uncertainty and Individual Differences
53	Reimagining Rights of Way and Roadside Development
54	Blending Interests in an Intermodal Facility
55	Achieving More Sustainable Pavement Materials, Systems, and Management Approaches
56	Federal Lands Tools to Understand and Address Livability, Climate Change, and Sustainability into the Future

	主　題：環境
57	Rail-Related Noise and Vibration Issues
58	Energy Use and Greenhouse Gas Emissions from Non-Automotive Transport Modes
59	Best Practices for Deploying Corridor-Based Alternative Fuel Infrastructure
60	Meeting Environmental Commitments in Design-Build Projects
61	The Effects of Weather on Mobility and Roadway Conditions
62	Vehicle Emission Reduction Strategies: Electric Vehicle Adoption and Taxation
63	Emerging Environmental Issues from Increases in Arctic Marine Transport
64	Innovations in Delivery and Logistics
65	How Climate Change Affects Aviation
66	Development of Drive Schedule/Operating Mode Distribution Input to MOVES Modeling
67	Department of Transportation Experience with Sustainability Tools
68	Evaluating Environment and Energy Benefits: When Does Greenhouse Gas Reduction Make Sense Anyway?
69	Tools for Evaluating Greenhouse Gas Reduction Strategies
70	HF-H Human Factors of Green Driving
71	Transportation Issues in Major U.S. Cities Committee
72	Transportation and Air Quality Committee
73	Transportation-Related Noise and Vibration Committee
74	Climate Change Joint Subcommittee of ADC70, ADC80, ADD40
75	Environmental Justice in Transportation Committee
76	Aviation Water Resources Subcommittee, AV030(3)

11、財務(Finance)：

	主　題：財務
1	Funding and Financing Vital Corridors: A Workshop on the What, Why, How, and Who of Value Capture Methods
2	Transportation Funding and Financing Showcase
3	Congestion Pricing and Managed-Lane Showcase
4	Current State of Public Opinion and Polling on Transportation Funding Options
5	State Department of Transportation CEO Roundtable 1: Funding Transportation Investments in an Uncertain Federal Fiscal Environment
6	System Optimization and Externality Reduction Through Pricing Systems.
7	Freight Day, Part 3: Setting the Table--How Overarching Policies and Strategic Initiatives Affect the Treatment of Freight Transportation (Part 1, Session 519, Part 2, Session 580
8	What's in Your Pocket? Technology Trends and Revenue Capture for Transportation
9	Parking Pricing
10	Revenue and Finance Committee
11	Revenue and Finance Committee
12	Congestion Pricing Committee
13	Transportation and Economic Development Committee

12、貨物運輸(Freight Transportation)：

	主　題：貨物運輸
1	Freight Corridors: International and Domestic Approaches and Experiences
2	Clean Truck Corridors: Understanding the Barriers and Opportunities
3	The Future of Freight Analytics, Modeling, and Planning with Truck Probe Data
4	Critical Infrastructure—From Protection to Resilience: An Evolution to Meet the New Threats
5	Freight Data Meets Innovative Technologies—An Interactive Workshop
6	Innovative Freight Research: Sustainability Strategies Addressing Supply-Chain Air Emissions
7	Emerging Issues and Best Practices in Agricultural Transportation
8	Freight Rail Transportation Research
9	Hazardous Materials Transportation Research
10	Innovations Worth Deploying Now: High Value Research Results
11	Rail Research In Practice
12	Logistical Innovations at Land and Sea Ports of Entry
13	Bringing Home the Bacon: Advancing Economic Vitality Through Performance-Based Regional Transportation Planning and Programming
14	Railroad Environmental Issues
15	Research Advances in Freight Rail Transportation
16	Current Trucking Industry Research
17	Balancing Resiliency Needs with Cost-efficient Operations and Environmental Goals
18	The Future of Domestic Intermodal Freight Transportation
19	Food Supply Chain: What It Takes to Get Food to the Table
20	Military Transportation System Lessons Learned from Recent Conflicts and Future Implications from End of Overseas Wars and Budget Reductions
21	Advances in Intermodal Freight Terminal Design and Operations
22	Shortening Supply Chains and U.S. Trucking: The Facts and the Implications
23	Contemporary Theories and Practices in Freight Planning and Logistics
24	Railway Capacity Research-Advancing the State of Knowledge
25	Innovative Methods to Improve Operational Efficiency of Heavy Vehicles
26	Federal Motor Carrier Safety Administration (FMCSA) Safety Activities and Priorities
27	Freight Day, Part 1: Consumer Preference and Manufacturing Effects on Corridors (Part 2, Session 580, Part 3, Session 634)
28	Freight Transportation Investment for Economic Development
29	Developing Truck Origin-Destination Flows from GPS Data
30	Federal Motor Carrier Safety Administration (FMCSA) Research Findings: Driver Use of New Technologies
31	Marine Highways: Developing a Solid Alternative for the Future of Domestic Shipping

	主　題：貨物運輸
32	Freight Day, Part 2: Freight Infrastructure and Operations (Part 1, Session 519, Part 3, Session 634
33	New Developments in Labor Economics: Safe Rates and Chain of Responsibility
34	Domestic Humanitarian Assistance and Disaster Relief: Military, FEMA, and Transportation Provider Perspectives
35	Freight Modeling Paper Highlights
36	Incorporating Urban Freight Innovations: Selected Best Practices in the U.S. and Abroad
37	Crude Oil Transportation Challenges: Market Dynamics and Emergency Response
38	Securing the Air Cargo Value Chain
39	Freight Day, Part 3: Setting the Table--How Overarching Policies and Strategic Initiatives Affect the Treatment of Freight Transportation (Part 1, Session 519, Part 2, Session 580)
40	Logistics of Disaster Response and Business Continuity
41	On-road and Not-on-Road Truck Activities and Emissions
42	Managing Pavement Use Under Heavy Vehicle Loads
43	Logistics of Refugee and Displaced Persons Humanitarian Relief
44	Freight Day, Part 4: Will the Changing U.S. Energy Mix Transform Multimodal Freight Systems? (Part 1, Session 519, Part 2, Session 580)
45	Current Issues in International Ocean Shipping
46	State Department of Transportation CEO Roundtable 3: Moving the Goods--Accommodating Major Changes in Freight Flows
47	Advanced Research and Practices in Urban Freight Transportation
48	Urban Freight Parking Research: To Curb or Not To Curb
49	Current Trends in Trucking Industry Research
50	International Intermodal Capacity Analysis
51	Truck and Bus Safety
52	Contemporary Issues in International Trade and Transportation
53	New Research in Intermodal Freight Transport
54	Contemporary Issues in Intermodal Freight Terminal Design and Operations
55	Freight Fluidity: Integrating Supply Chain Concepts and Performance into Freight Planning and Programming
56	The Role of Freight Transportation in Economic Competitiveness: The 8th UTC Spotlight Conference
57	China's World Trade Perspective
58	Innovations in Delivery and Logistics
59	Port Drayage and Chassis Management, Part 1: Current Issues (Part 2, Session 837)
60	Digging Deeper: New Insights from Existing Freight Data Sources and Methods

	主　題：貨物運輸
61	Using Technology to Enhance Hazardous Materials Transportation Safety and Security
62	Port Drayage and Chassis Management, Part 2: Potential Solutions (Part 1, Session 825)
63	New Research on Inland Water Transportation
64	Networking Modeling
65	2012 Commodity Flow Survey – Status and Plans
66	Freight Transportation Economics and Regulation Committee
67	Transportation of Hazardous Materials Committee
68	Intermodal Freight Transport Committee
69	Intermodal Freight Terminal Design and Operations Committee
70	Logistics of Disaster Response and Business Continuity Committee
71	Inland Water Transportation Committee

13、一般運輸(General Transportation)：

	主　題：一般運輸
1	Corrosion Committee

14、地工(Geotechnology)：

	主　題：地工
1	Improving Processes for Characterization of Soil Corrosion Potential of Buried Metallic Elements
2	Lessons Learned from More than 10 Years of using Full-Depth Reclamation (FDR) for Road Rehabilitation
3	Rockfall and Debris Flow Modeling Workshop
4	Pile Capacity Assessment with Cone Penetration Test (CPT) Data
5	Sustainable Uses of Aggregates in Pavement Foundation, Asphalt, and Concrete Layers
6	Geosynthetics in Erosion and Sediment Control
7	Systems and Technologies to Improve Service Life of Metallic Elements in Low-Resistivity Soils
8	Incorporation of Cementitiously Stabilized Materials in Mechanistic-Empirical Pavement Design Guide
9	From Underground to Space: Managing, Modeling, and Mitigating Geologic Hazards
10	Subgrade Characterization for Roadways and Railroads and Vibratory Compaction for Resistance to Liquefaction
11	Physicochemical Behavior of Soils and Industrial Byproducts
12	Seasonal Effects on Soils and Pavements
13	Aggregate Properties Influencing Behavior of Reclaimed Asphalt Pavement
14	Unbound Aggregate Base Behavior
15	Impact of Seasonal Climatic Effects on Pavements and Other Infrastructure
16	Characterizing Unsaturated Soil Behavior - Part 1 (Part 2, Session 562)
17	Design and Installation of Large-Diameter Open-Ended Pipe Piles in Different Soil Types
18	Dialogue with Leaders in Design and Construction of Transportation Facilities
19	Transportation Corridors Through Karst Terrain: Applying Multidisciplinary Technologies to Challenging Geology
20	Utilization of Excess Quarry Fines for Sustainable Highway Construction Projects
21	Advances in and Case Histories of Mechanically Stabilized Earth Structures
22	Characterizing Unsaturated Soil Behavior - Part 2 (Part 1, Session 344)
23	Evaluation of Geosynthetics in Roadway Design with GeoTech Tools
24	Substructure Improvement Design for High-Speed Rail and Heavy-Axle-Load Freight Service
25	Moisture Measurement to Reduce Risk and Improve Performance
26	Modeling of the Pipe-Soil System
27	New Developments in Noncementitious Stabilization
28	Status of Field Exploration Programs in State Transportation Agencies
29	Field Performance of Transportation Earthworks

	主　題：地工
30	Benefits of Geotechnical Instrumentation for Performance Measurement
31	Pile Testing and Analysis
32	Design and Analysis of Foundations for Bridges and Other Structures
33	Performance of Buried Culverts
34	Chemical and Cementitious Stabilization
35	Why Spin Dirt at 200 mph? Centrifuge Modeling of Transportation Geosystems
36	New Technologies and Case Histories for Foundation Reuse and Enhancement
37	Use, Applicability, and Effectiveness of Subsurface Drainage Features
38	New Technologies for Foundation Reuse and Enhancement: Lake Mary Road Bridge, Arizona
39	Accounting for Horizontal and Vertical Subsurface Drainage in Structural Pavement Design
40	Advances in Cementitious Soil Stabilization
41	Value-Added Geotechnical Solutions: Case Studies of Numerical Modeling Successes
42	Implementation of Load and Resistance Factor Design for Geotechnical Design of Foundations
43	Engineering Geology Committee

15、歷史(History)：

	主　題：歷史
1	Past As Prologue: What History Tells Us About the High Tech Future of Transportation
2	Lessons Learned from Transportation History
3	Learning about Our Past from Novel Historical Data and Methods

16、自動車輛(Hot Topic: Connected-Automated Vehicles)：

	主　題：自動車輛
1	NextGen, Part 1: Portfolios, Plans and Performance (Part 2, Session 190, Sunday, January 11, 1:30 p.m.-4:30 p.m.)
2	Ignite! Emerging Technologies in Traffic Signal Systems. State of the Art and Predicting the Future.
3	Shared-Use Mobility: What Does the Future Hold? Part 2 (Part 1, Sunday, January 11, 9:00 a.m.-noon)
4	NextGen, Part 2: The Road Ahead (Part 1, Session 142, Sunday, January 11, 9:00 a.m.-noon)
5	Advanced Vehicle Technology: Vehicle Choice and Travel Behavior
6	Traffic Flow Aspects of Automated Vehicles Including Mixed Traffic Considerations
7	The Future Is Here: Autonomous Vehicles and Us
8	Intelligent Transportation Systems: State of the Industry
9	National Road Vehicle Automation Research and Demonstration Programs from Around the World
10	Connected Vehicles
11	Recent Progress in Vehicle-Highway Automation
12	Current Projects and New Developments in Vehicle-Highway Automation Showcase
13	Unmanned Aerial Systems and Remotely Piloted Aircraft: Can They Fly with the Rest of Us?
14	Progress Toward Resolving Institutional Challenges to Deployment of Automated Driving Systems
15	Alternative Deployment Strategies for Using Vehicle Automation to Produce Transportation Benefits
16	Hazards, Crashes, and Automated Driving
17	State Department of Transportation CEO Roundtable 2: Connected and Automated Vehicles--Challenges and Opportunities for State Departments of Transportation
18	Automated Transit Systems
19	User Information Systems in the Context of Autonomous and Connected Vehicles
20	Traffic Signal Control in a Connected Vehicle Environment
21	Is Transportation Infrastructure Ready for Driverless Cars?
22	The Vision and Potential Impacts of Automated Transit Systems in the United States

17、水利與水文(Hydraulics and Hydrology)：

	主　題：水利與水文
1	Floodcast: A Framework for Enhanced Flood Event Decision Making for Transportation Resilience.
2	Geosynthetics in Erosion and Sediment Control
3	Hydraulic Research for Pavement Runoff and Infrastructure Vulnerability
4	Hydraulics Research for Runoff, Scour, and Erosion
5	Water Quality Technolgy Improvements and Research

18、國際活動(International Activities)：

	主　題：國際活動
1	Harnessing the Potential Payoff of Research Implementation Across Borders
2	Public Transport Policy and Practice in the Developing Countries
3	Social Aspects and Transport Analysis in Developing Countries
4	Impaired Driving in Low and Middle Income Countries: Challenges and Opportunities for Progress
5	Innovative urban mobility planning. Experiences from around the world
6	Bus Rapid Transit, Rickshaws, Motorcycles, Pedestrians, and Impossible Traffic in Developing Countries
7	Implementing TDM Strategies - International Perspective
8	Transportation Economic Growth and Development Linkage Assessments: International Examples
9	Public and Semipublic Transport in Developing Countries
10	Strengthening cross national networks of research, education and technology transfer
11	Intercity Travel Analysis in Developing Countries
12	International Benchmarking on Road Safety
13	Bikesharing in Developing Countries
14	Transport Planning, Safety, Surveys, and Analysis in Developing Countries
15	Traffic Safety and Traffic Management in Developing Countries

19、法律(Law)：

	主　題：法律
1	Keys to Transportation Research Innovation: Managing Intellectual Property
2	How Federalist Are We, Anyway? Transportation Law, Marijuana, and the Changing Drug Enforcement Environment
3	Risk Management in Construction: You Cannot Ignore It!
4	Fracking Up the Highway and Other Modes of Transportation: Current Legal Challenges to Cargo Size, Weight, and Safety
5	A Walk on the Wild Side
6	Changing Environmental Mitigation Policies with a Teaspoon of Law
7	Recent Progress in Vehicle-Highway Automation
8	Buy America for Utilities
9	Changing Landscape of Disadvantaged Business Enterprise Program and Small Business Set-Asides
10	Learning from the Curve: Effective Strategies Used to Prevail in Recent FHWA and FTA NEPA Litigation
11	Pathways to Automated Transit and Shared Mobility
12	Blending Interests in an Intermodal Facility
13	Tort Liability and Risk Management Committee

20、維護與保存(Maintenance and Preservation)：

	主　題：維護與保存
1	Lessons Learned from More than 10 Years of using Full-Depth Reclamation (FDR) for Road Rehabilitation
2	Reliability of Nondestructive Evaluation Technologies
3	Track Inspection Practices and Developments in the Inspection of Special Trackwork.
4	Mainstreaming Climate Change and Extreme Weather Resilience into Transportation
5	Collaborative Visualization in Analytics and Operations
6	Performance-Based Contracting: Toward More Efficient and Effective Road Maintenance
7	Pavement Markings:predicting service life, evaluation of duplex paint systems, effectiveness maintenance contracts,and safety aspects of markings on low volume roads.
8	Advances in Understanding of Road Salt and Winter Maintenance Materials
9	Railway Track Structure Maintenance and Design
10	Analysis and Modeling in Asset Maintenance/Management
11	New Approaches and Strategies for Infrastructure Management
12	Weather Effects on Roadways
13	Forecasting Performance to Loads and Environmental Factors for Bridge Management
14	High-Friction Surface Treatments, Color Pavement Demarcation, and Polymer Concrete Bridge Deck Overlays: Best Practices, Part 1 (Part 2, Session 415)
15	Weather Impacts on Surface Transportation
16	Advances in Winter Performance Measures and Surface Condition Monitoring
17	Performance and Selection of Winter Maintenance Materials
18	Key Issues in Winter Maintenance Technology and Operations
19	Key Role of Low-Volume Roads in Emergencies and Disasters
20	Managing Different Risks in Bridge Maintenance
21	High-Friction Surface Treatments, Color Pavement Demarcation, and Polymer Concrete Bridge Deck Overlays: Best Practices, Part 2 (Part 1, Session 353)
22	Treatment Methods for Pavement Preservation
23	Analytical Tools and Methods for Maintaining Pavements and other Highway Infrastructure Assets
24	Bridge Preservation Practices
25	Fiber-Reinforced Polymer Composites in Infrastructure, Part 1 (Part 2, Session 743)
26	Fiber-Reinforced Polymer Composites in Infrastructure, Part 1 (Part 2, Session 743)
27	Pavement Preservation Testing Methods and Material Selection
28	Pavement Maintenance: Patching and Repair Part 1
29	Advances for Filling Ducts and Monitoring Techniques for Corrosion Protection and Evaluation of Tendons in Posttensioned Bridges

	主　題：維護與保存
30	Railway Maintenance Research
31	Pavement Maintenance: Patching and Repair Part 2
32	Effect of Moisture on Crack and Joint Sealant Properties
33	New Developments in Noncementitious Stabilization
34	Adverse Weather Impacts on Urban Areas
35	Research and Applications in Rail Transit Infrastructure
36	Current Issues in Bridge Management
37	Advances in Work Zone Safety
38	Pavement Preservation Strategy Selection and Cost Impacts
39	Risk Models and Deck Assessment for Bridge Management
40	Managing Pavement Use Under Heavy Vehicle Loads
41	Field Performance of Transportation Earthworks
42	Emerging Issues in Structures Maintenance and Bridge Management
43	Fiber-Reinforced Polymer Composites in Infrastructure, Part 2 (Part 1, Session 458)
44	Handing over Digitally Constructed Projects to Operations and Maintenance
45	Assessment of Traffic Control and Motorist Speed Selection in Work Zones
46	The Effects of Weather on Mobility and Roadway Conditions
47	Evaluation of Driver Behavior and Capacity in Work Zones
48	Managing and Maintaining Non-Pavement, Non-Bridge Highway Assets
49	Developing the 21st Century Maintenance Workforce
50	Hot-Poured Crack Sealant and Patching Materials
51	Advances in Technology, Facilities, and Operations for Winter Maintenance
52	Maintenance and Monitoring Program Issues at Non-Hub and General Aviation Airports
53	Operationalizing Resilience in Transport
54	Status of Long-Term Bridge Performance Program
55	Maintenance and Operations Management Committee
56	Structures Maintenance Committee
57	Rail Transit Infrastructure Committee

21、海運(Marine Transportation)：

	主　題：海運
1	Ensuring Ferry and Passenger Boat Safety in the Wake of Continuing Occurrences of Catastrophes
2	Freight Data Meets Innovative Technologies—An Interactive Workshop
3	Innovative Freight Research: Sustainability Strategies Addressing Supply-Chain Air Emissions
4	Current Issues in Ferry Transportation
5	Contemporary Research in Port Operations
6	Current Trends in Inland Waterway Transportation
7	Contemporary Research in Marine Safety
8	Logistical Innovations at Land and Sea Ports of Entry
9	Liquefied Natural Gas as a Marine Fuel: Operations and Infrastructure
10	Balancing Resiliency Needs with Cost-efficient Operations and Environmental Goals
11	Will the Promise of Inland Waterway Communication Networks Actually Improve Commercial River Operations?
12	Military Transportation System Lessons Learned from Recent Conflicts and Future Implications from End of Overseas Wars and Budget Reductions
13	Advances in Intermodal Freight Terminal Design and Operations
14	Freight Day, Part 1: Consumer Preference and Manufacturing Effects on Corridors (Part 2, Session 580, Part 3, Session 634
15	Current Research and State of the Art in Port Operations
16	Safety Risk Assessment and Modeling for Inland Waterways
17	Marine Highways: Developing a Solid Alternative for the Future of Domestic Shipping
18	Freight Day, Part 2: Freight Infrastructure and Operations (Part 1, Session 519, Part 3, Session 634)
19	Environmental Implications of Marine-Based Energy Production
20	Freight Day, Part 4: Will the Changing U.S. Energy Mix Transform Multimodal Freight Systems? (Part 1, Session 519, Part 2, Session 580)
21	Current Issues in International Ocean Shipping
22	Urban Ferry Systems: Emergency Planning Efforts
23	International Intermodal Capacity Analysis
24	Contemporary Issues in International Trade and Transportation
25	Emerging Environmental Issues from Increases in Arctic Marine Transport
26	China's World Trade Perspective
27	Port Drayage and Chassis Management, Part 1: Current Issues (Part 2, Session 837)
28	Port Drayage and Chassis Management, Part 2: Potential Solutions (Part 1, Session 825)
29	New Research on Inland Water Transportation

	主　題：海運
30	Ferry Transportation Committee
31	Logistics of Disaster Response and Business Continuity Committee
32	Inland Water Transportation Committee
33	Marine Safety and Human Factors Committee (AW040)

22、材料(Materials)：

	主　題：材料
1	Innovative Additives for Asphalt Materials
2	Doctoral Student Research in Asphalt Materials and Mixtures
3	Emerging and Implementation-Ready Technologies to Control Cracking of Concrete Transportation Infrastructure, Part 1 (Part 2, Session 172)
4	Improving Processes for Characterization of Soil Corrosion Potential of Buried Metallic Elements
5	Best Practices of Tack Coats for Asphalt Pavements
6	Emerging and Implementation-Ready Technologies to Control Cracking of Concrete Transportation Infrastructure, Part 2 (Part 1, Session 128)
7	Pavement Materials and the Urban Climate: Technologies Worthy of Future Consideration, Part 1 (Part 2, Session 306)
8	Design and Laboratory Evaluation of Open-Graded Asphalt Mixtures
9	Concrete Properties: Recent Advancements in Materials and Testing
10	Sustainable Uses of Aggregates in Pavement Foundation, Asphalt, and Concrete Layers
11	Pavement Markings:predicting service life, evaluation of duplex paint systems, effectiveness maintenance contracts,and safety aspects of markings on low volume roads.
12	State Department of Transportation High-Value Research Projects
13	Recent Developments in Portland Cement Concrete Pavement Construction and Rehabilitation
14	Precast Concrete Pavement Innovation and Case Studies
15	Rapid Asphalt Pavement Construction
16	Systems and Technologies to Improve Service Life of Metallic Elements in Low-Resistivity Soils
17	Incorporation of Cementitiously Stabilized Materials in Mechanistic-Empirical Pavement Design Guide
18	Long-Term Pavement Performance Data Analysis Findings and New Features in LTPP InfoPave
19	TRB's NCHRP IDEA Program: Sponsoring Innovation in Highway Transportation
20	Pavement Materials and the Urban Climate: Technologies Worthy of Future Consideration, Part 2 (Part 1, Session 208)
21	Low-Volume Road Management, Performance, and Design
22	Advances in Concrete for Transportation
23	Concrete Materials and Nanotechnology
24	Innovations in Concrete Materials and Test Methods
25	New Developments in Concrete Durability
26	Aggregates and Ashes in Concrete Mixtures
27	Concrete and Curing in Mixtures

	主　題：材料
28	Seasonal Effects on Soils and Pavements
29	Aggregate Properties Influencing Behavior of Reclaimed Asphalt Pavement
30	Unbound Aggregate Base Behavior
31	Progress in Asphalt Binder Fatigue Cracking
32	Impact of Seasonal Climatic Effects on Pavements and Other Infrastructure
33	High-Friction Surface Treatments, Color Pavement Demarcation, and Polymer Concrete Bridge Deck Overlays: Best Practices, Part 1 (Part 2, Session 415)
34	Dialogue with Leaders in Design and Construction of Transportation Facilities
35	Short-Term Aging of Asphalt Binders
36	High-Friction Surface Treatments, Color Pavement Demarcation, and Polymer Concrete Bridge Deck Overlays: Best Practices, Part 2 (Part 1, Session 353)
37	Treatment Methods for Pavement Preservation
38	Asphalt Pavement Recycling
39	Fiber-Reinforced Polymer Composites in Infrastructure, Part 1 (Part 2, Session 743)
40	Measuring, Monitoring and Evaluation of Thin Asphalt Pavement Layers
41	Rubber in Asphalt Mixtures
42	Utilization of Excess Quarry Fines for Sustainable Highway Construction Projects
43	Pavement Preservation Testing Methods and Material Selection
44	New Developments in Self-Consolidating Concrete
45	Pavement Maintenance: Patching and Repair Part 1
46	Dwight David Eisenhower Transportation Fellowship Program Research Showcase
47	Significant Advancements of the Understanding of Asphalt Pavements though Full Scale Accelerated Pavement Testing
48	Steel Bridge Fatigue and Fracture
49	Freeze-thaw and Electrical Resistivity of Concrete
50	Pavement Maintenance: Patching and Repair Part 2
51	Effect of Moisture on Crack and Joint Sealant Properties
52	Innovations in Design and Construction of Roller-Compacted Concrete Pavements
53	Moisture Measurement to Reduce Risk and Improve Performance
54	Asphalt Binder Rheological Studies
55	Asphalt Binder Analysis or Testing with Other Than Standard Rheological Testing
56	Sustainable Technologies in Asphalt Mixtures
57	Design and Construction Issues for Asphalt Surface Mixtures
58	Characterization and Modeling of Fine Aggregate Asphalt Matrix
59	Evaluation and Testing of Asphalt Concrete Mixtures
60	SHRP 2 Project R05 Precast Concrete Pavement Technology Implementation

	主　題：材料
61	Dwight David Eisenhower Transportation Fellowship Program, Part 2 (Part 1, Session 642)
62	Asphalt Mixtures and Tests
63	Aging of Asphalt Binders
64	Nontraditional Additives in Asphalt Binders
65	Mechanical Testing to Evaluate Asphalt Mixture Components
66	Measurement and Prediction of Asphalt Concrete Dynamic Modulus
67	Experimental and Numerical Modeling of Asphalt Mixtures and Pavements
68	Chemical and Cementitious Stabilization
69	Design and Performance of Asphalt and Concrete Overlays
70	Fiber-Reinforced Polymer Composites in Infrastructure, Part 2 (Part 1, Session 458)
71	Warm-mix Asphalt
72	Research on Perception and Effectiveness of Visual Information and Safety Systems
73	Multiaxial Characterization of Asphalt Concrete Mixtures
74	Innovative Pavement Findings as a Result of Full Scale Accelerated Pavement Testing
75	Relationship Between Field Performance and Properties of Asphalt Mixtures
76	Accounting for Horizontal and Vertical Subsurface Drainage in Structural Pavement Design
77	Advances in Cementitious Soil Stabilization
78	Hot-Poured Crack Sealant and Patching Materials
79	Use of Re-refined Engine Oil Bottoms as Asphalt Binder Modifier
80	Methodologies to Evaluate Skid Resistance of Asphalt Roadways and Airport Runways
81	Durability Performance Tests for Asphalt Mixtures: Moving Toward Implementation
82	Recent Advancements in Mechanistic Evaluations of Flexible Pavements
83	Resistivity Measurements of Concrete
84	Status of Long-Term Bridge Performance Program

23、營運與交通管理(Operations and Traffic Management)：

	主　題：營運與交通管理
1	Innovative Doctoral Research from Dwight David Eisenhower Transportation Fellowship Program
2	Doctoral Student Research in Transportation Operations and Traffic Control
3	Traffic Incident Management: Expanding the Conversation to Identify New Research Needs
4	Marking and Signing Practices at Roundabouts
5	Freeway and Interchange Design: Applying the Science and Art of Engineering Innovation
6	Communication Trends: The Shift to Mobile
7	Ignite! Emerging Technologies in Traffic Signal Systems. State of the Art and Predicting the Future.
8	Recipes for Successful System Management When There Are a Lot of Cooks in the Kitchen
9	Using Simulation for Decision Support Systems: Past, Present, and Future
10	Understanding the Traffic Incident Management (TIM) Capability Maturity Model Framework
11	Pavement Markings:predicting service life, evaluation of duplex paint systems, effectiveness maintenance contracts,and safety aspects of markings on low volume roads.
12	Advances in Understanding of Road Salt and Winter Maintenance Materials
13	State Department of Transportation High-Value Research Projects
14	Regional Transportation Systems Management and Operations
15	Freeway Operations
16	Research In Railroad Operating Technologies
17	Traffic Flow Aspects of Automated Vehicles Including Mixed Traffic Considerations
18	Weather Effects on Roadways
19	Intelligent Transportation Systems: State of the Industry
20	Establishing Transportation Systems Management and Operations as a National Commitment, Part 1: Enabling Change and Performance Management (Part 2, Session 411)
21	Car Following and Microscopic Simulation
22	Best Papers from the 2nd International Conference on Access Management
23	Emerging Research in Emergency Evacuation
24	Rail Transit Efficiency and Congestion Management
25	Current Trucking Industry Research
26	Converging Runway Operations
27	Travel Time and Speed Data Applications, Methods, and Performance Measures
28	Highway Traffic Monitoring Innovative and Advanced Methods and Technologies
29	Weather Impacts on Surface Transportation
30	Congestion Pricing and Managed-Lane Showcase
31	Advances in Winter Performance Measures and Surface Condition Monitoring

	主　題：營運與交通管理
32	Performance and Selection of Winter Maintenance Materials
33	Key Issues in Winter Maintenance Technology and Operations
34	Implementing TDM Strategies - International Perspective
35	Establishing Transportation Systems Management and Operations as a National Commitment, Part 2: Executive Commitment (Part 1, Session 349)
36	National Road Vehicle Automation Research and Demonstration Programs from Around the World
37	Highway Capacity Level of Service: Love It or Leave It?
38	Fleet Management: Safety, Prioritizing, and Planning
39	Examining Roundabouts: A Closer Look at Access Management, Crosswalks and Trucks
40	Incident Management
41	Traffic Flow Theory, Part 1 (Part 2, Session 539)
42	Contemporary Theories and Practices in Freight Planning and Logistics
43	Connected Vehicles
44	Safety of Intelligent Transportation Systems
45	Travel Time, Speed, and Traffic State Estimation
46	Traveler Information and Control
47	Network Design and Deployment
48	Recent Progress in Vehicle-Highway Automation
49	Current Projects and New Developments in Vehicle-Highway Automation Showcase
50	Impacts of Traffic Control Devices on Speed and Road User Behavior
51	Operational and Safety Effects of Geometric Designs
52	Impact of Access Management Research
53	Modelling Traffic Flow for Motorcycles and Mopeds
54	Railway Capacity Research-Advancing the State of Knowledge
55	Innovative Methods to Improve Operational Efficiency of Heavy Vehicles
56	Progress Toward Resolving Institutional Challenges to Deployment of Automated Driving Systems
57	Innovative Teaching of Highway Capacity Manual Procedures
58	Safety Impacts of Road Lighting
59	BRT, Busways and Preferential Treatments
60	Multimodal Traffic Control
61	Signal Control at Alternative Intersection Designs
62	Traffic Flow Theory: Part 2 (Part 1, Session 445)
63	Various Aspects of User Information Research
64	Traffic Data Collection and Analysis

	主　題：營運與交通管理
65	Alternative Deployment Strategies for Using Vehicle Automation to Produce Transportation Benefits
66	Perception of Roadway Signs, Signals and Delineation
67	When Will I Get There? Transit Travel Time Reliability
68	Wrong-Way Driving Incidents, Detection, and Countermeasures on Limited-Access Highways
69	Signal Timing Design and Optimization
70	Highway Capacity Analysis for Interrupted Facilities
71	Traffic Control Device Research
72	Case Studies in Performance-Based Analysis of Geometric Design
73	Research and Applications in Evacuation Planning
74	Adverse Weather Impacts on Urban Areas
75	Programming for Regional Transportation Systems Management and Operations – Experiences from Across the U.S.
76	Research on Flashing Traffic Control Devices
77	Designing Better Turn Lanes
78	Incorporating Urban Freight Innovations: Selected Best Practices in the U.S. and Abroad
79	Transit Capacity and Quality of Service
80	Transit Operations
81	Rail Transit Congestion Management
82	Parking: Getting the Prices Right
83	Wrong Way Driving: What We Know, What We Are Doing, and Where Are We Going
84	Advances in Work Zone Safety
85	Alternative Intersection Designs
86	Design and Modal Considerations for Roundabout Capacity
87	Air Traffic Management: Applied Research Opportunities in Security, Emergency Management, and Safety
88	Geometric Design Research
89	Advanced Research and Practices in Urban Freight Transportation
90	Urban Freight Parking Research: To Curb or Not To Curb
91	Current Trends in Trucking Industry Research
92	Signal System Operational Performance and Driver Behavior
93	Highway Capacity Analysis for Uninterrupted Facilities
94	Traffic Flow Modeling and Analysis of Merging
95	Assessment of Traffic Control and Motorist Speed Selection in Work Zones
96	Research on Perception and Effectiveness of Visual Information and Safety Systems
97	The Effects of Weather on Mobility and Roadway Conditions

	主　題：營運與交通管理
98	Traffic Signal Control in a Connected Vehicle Environment
99	Crowd Dynamics: Empirical Analyses, Modeling, Simulation, and Management
100	Evaluation of Driver Behavior and Capacity in Work Zones
101	All About Roundabouts
102	Is Transportation Infrastructure Ready for Driverless Cars?
103	Performance Measures and Evaluation of Traffic Signal Systems
104	Modeling and Traffic Management on Large-Scale Urban Networks
105	Advances in Technology, Facilities, and Operations for Winter Maintenance
106	Bicycling Perspective on Roadway Design and Operations
107	Transportation and Technology Applications on Managed Lane Corridors
108	Traffic Simulation and Network Considerations
109	Operationalizing Resilience in Transport
110	Experience in Implementing Managed Lane Policy Changes
111	Traffic Control Devices Committee

24、鋪面(Pavements)：

	主　題：鋪面
1	Concrete Overlays As a Rehabilitation Alternative, Part 1: Design (Part 2, Session 170)
2	International Experience and Perspective of Pavement Texture Measurements and Evaluation
3	Emerging and Implementation-Ready Technologies to Control Cracking of Concrete Transportation Infrastructure, Part 1 (Part 2, Session 172)
4	Lessons Learned from More than 10 Years of using Full-Depth Reclamation (FDR) for Road Rehabilitation
5	Influence of Airfield Surface Irregularity on Aircraft Life
6	Long-Term Pavement Performance State Coordinators' Meeting
7	Toward More Sustainable Pavement Systems
8	Concrete Overlays as a Rehabilitation Alternative, Part 2: Construction (Part 1, Session 122)
9	Best Practices of Tack Coats for Asphalt Pavements
10	Emerging and Implementation-Ready Technologies to Control Cracking of Concrete Transportation Infrastructure, Part 2 (Part 1, Session 128)
11	Mechanistic–Empirical Pavement Design Enhancements in South Africa
12	Pavement Materials and the Urban Climate: Technologies Worthy of Future Consideration, Part 1 (Part 2, Session 306)
13	Pavement Surface Friction Measurements and Modeling
14	Design and Laboratory Evaluation of Open-Graded Asphalt Mixtures
15	Concrete Properties: Recent Advancements in Materials and Testing
16	Sustainable Uses of Aggregates in Pavement Foundation, Asphalt, and Concrete Layers
17	Advances in Pavement Management Systems
18	Recent Developments in Portland Cement Concrete Pavement Construction and Rehabilitation
19	Innovations Worth Deploying Now: High Value Research Results
20	Toward a True Feedback Loop: Pavement Management, Structural Assessment and Design
21	Rapid Asphalt Pavement Construction
22	Incorporation of Cementitiously Stabilized Materials in Mechanistic-Empirical Pavement Design Guide
23	Long-Term Pavement Performance Data Analysis Findings and New Features in LTPP InfoPave
24	TRB's NCHRP IDEA Program: Sponsoring Innovation in Highway Transportation
25	Pavement Materials and the Urban Climate: Technologies Worthy of Future Consideration, Part 2 (Part 1, Session 208)
26	Low-Volume Road Management, Performance, and Design
27	New Developments in Concrete Durability
28	Aggregates and Ashes in Concrete Mixtures
29	Concrete and Curing in Mixtures

	主　題：營運與交通管理
30	Seasonal Effects on Soils and Pavements
31	Aggregate Properties Influencing Behavior of Reclaimed Asphalt Pavement
32	Unbound Aggregate Base Behavior
33	Backcalculation of Pavement Section Properties
34	Progress in Asphalt Binder Fatigue Cracking
35	Impact of Seasonal Climatic Effects on Pavements and Other Infrastructure
36	High-Friction Surface Treatments, Color Pavement Demarcation, and Polymer Concrete Bridge Deck Overlays: Best Practices, Part 1 (Part 2, Session 415)
37	Concrete Pavement Design and Analysis
38	Dialogue with Leaders in Design and Construction of Transportation Facilities
39	Characterization of Pavement Layer Properties
40	Short-Term Aging of Asphalt Binders
41	High-Friction Surface Treatments, Color Pavement Demarcation, and Polymer Concrete Bridge Deck Overlays: Best Practices, Part 2 (Part 1, Session 353)
42	SHRP 2 Renewal: Legacy, Principal Products, and Outcomes
43	Pavement Surface Characteristics
44	Treatment Methods for Pavement Preservation
45	Analytical Tools and Methods for Maintaining Pavements and other Highway Infrastructure Assets
46	Asphalt Pavement Recycling
47	Measuring, Monitoring and Evaluation of Thin Asphalt Pavement Layers
48	Rubber in Asphalt Mixtures
49	Utilization of Excess Quarry Fines for Sustainable Highway Construction Projects
50	Pavement Preservation Testing Methods and Material Selection
51	Managing Pavement Assets and Their Performance, Part 1 (Part 2, Session 557)
52	New Developments in Self-Consolidating Concrete
53	Pavement Maintenance: Patching and Repair Part 1
54	Managing Pavement Assets and Their Performance, Part 2 (Part 1, Session 497)
55	Significant Advancements of the Understanding of Asphalt Pavements though Full Scale Accelerated Pavement Testing
56	Building It Right: Recent Developments in Construction Quality Assurance
57	Freeze-thaw and Electrical Resistivity of Concrete
58	Pavement Maintenance: Patching and Repair Part 2
59	Effect of Moisture on Crack and Joint Sealant Properties
60	Mechanistic-Empirical Pavement Design Guide: Climatic Data and Local Calibration for Flexible Pavements

	主　題：營運與交通管理
61	Innovations in Design and Construction of Roller-Compacted Concrete Pavements
62	New Developments in Noncementitious Stabilization
63	National Performance Measures for Assessing Pavement and Bridge Condition: NPRM Presentation
64	Automated Crack Detection: How and Why?
65	Sustainable Technologies in Asphalt Mixtures
66	Design and Construction Issues for Asphalt Surface Mixtures
67	Characterization and Modeling of Fine Aggregate Asphalt Matrix
68	Evaluation and Testing of Asphalt Concrete Mixtures
69	LTPP InfoPaveTM 2015
70	Condition Assessment and Data Analysis in Pavement Management Systems
71	Pavement Surface Condition: New Approaches
72	Performance and Material Models for Mechanistic-Empirical Analysis of Flexible Pavements
73	SHRP 2 Project R05 Precast Concrete Pavement Technology Implementation
74	Pavement Preservation Strategy Selection and Cost Impacts
75	Managing Pavement Use Under Heavy Vehicle Loads
76	Achieving More Sustainable Pavement Materials, Systems, and Management Approaches
77	Asphalt Mixtures and Tests
78	Mechanical Testing to Evaluate Asphalt Mixture Components
79	Measurement and Prediction of Asphalt Concrete Dynamic Modulus
80	Experimental and Numerical Modeling of Asphalt Mixtures and Pavements
81	Chemical and Cementitious Stabilization
82	Design and Performance of Asphalt and Concrete Overlays
83	Pavement Macrotexture, Roughness and Roughness-Induced Issues
84	Warm-mix Asphalt
85	Pavement Distress: AASHTO Protocols and Structural Evaluation
86	Multiaxial Characterization of Asphalt Concrete Mixtures
87	Use, Applicability, and Effectiveness of Subsurface Drainage Features
88	Structural and Functional Performance of Flexible Pavements
89	Relationship Between Field Performance and Properties of Asphalt Mixtures
90	Accounting for Horizontal and Vertical Subsurface Drainage in Structural Pavement Design
91	Hot-Poured Crack Sealant and Patching Materials
92	Use of Re-refined Engine Oil Bottoms as Asphalt Binder Modifier
93	Methodologies to Evaluate Skid Resistance of Asphalt Roadways and Airport Runways
94	Durability Performance Tests for Asphalt Mixtures: Moving Toward Implementation
95	Recent Advancements in Mechanistic Evaluations of Flexible Pavements

	主　題：營運與交通管理
96	Surface Properties - Vehicle Interaction Committee

25、行人與自行車騎士(Pedestrians and Bicyclists)：

	主　題：行人與自行車騎士
1	Innovative Doctoral Research from Dwight David Eisenhower Transportation Fellowship Program
2	Marking and Signing Practices at Roundabouts
3	Freeway and Interchange Design: Applying the Science and Art of Engineering Innovation
4	Making Bicycle and Pedestrian Data Programs Count
5	Modeling Pedestrian Behavior and Capacity Analysis in Multimodal Environments
6	Pedestrian and Driver Behavioral Influences on Pedestrian Safety
7	A Walk on the Wild Side
8	Bus Rapid Transit, Rickshaws, Motorcycles, Pedestrians, and Impossible Traffic in Developing Countries
9	Determinants of Bicycling: Neighborhood and Bicyclist Characteristics
10	Bicycle and Pedestrian Information: Practical Application of Data Collection and Technology
11	Impact of Access Management Research
12	Bicycle Transportation, Part 1: Behavior and Policy (Part 2, Session 849)
13	Highway/Rail Grade Crossing Research
14	Pedestrian Safety Evaluation and Measurement
15	Understanding the Gender Gap in Urban Biking, Part 1 (Part 2, 735)
16	Suicide Prevention on Railroad Rights of Way
17	New Research in Car and Bikesharing
18	Wrong-Way Driving Incidents, Detection, and Countermeasures on Limited-Access Highways
19	Reimagining the Design of Streets and Highways as Sustainable Environmental, Economic, and Active-Living Assets
20	Evaluation of Innovative Pedestrian Crossing Treatments
21	Intermodal Passenger Facilities: Design and Modeling (8)
22	Wrong Way Driving: What We Know, What We Are Doing, and Where Are We Going
23	Design and Modal Considerations for Roundabout Capacity
24	Understanding the Gender Gap in Urban Biking, Part 2 (Part 1, Session 527)
25	Characteristics of Pedestrian Interactive Behaviors under the Different Level of Service on Walkways
26	Bicycle and Pedestrian Data Collection Methods, Technologies, Accuracy and Warehousing
27	Location, Location, Location: Safety, Access, and Placement Features of Intermodal Passenger Facilities
28	All About Roundabouts
29	Innovative Pavement Findings as a Result of Full Scale Accelerated Pavement Testing
30	Bicycling Perspective on Roadway Design and Operations

	主　題：營運與交通管理
31	Pedestrian Safety Policy, Planning, and Design Issues
32	Pedestrian Safety and Operational Performance Measurement
33	Bicycle Transportation, Part 2: Safety and Infrastructure (Part 1, Session 477)
34	The Urgent Need for Improved Pedestrian Infrastructure and Options: Issues, Solutions, and Gaps
35	HF-B Look right! Look left! Where? Accommodating Pedestrians at Alternative Intersections ABE30
36	Transportation Issues in Major U.S. Cities Committee

26、管道運輸(Pipelines)：

	主　題：管道運輸
1	Techniques to Identify, Manage, and Resolve Utility Conflicts in Transportation Projects

27、規劃與預測(Planning and Forecasting)：

	主　題：規劃與預測
1	Using Knowledge Management as Tool for Successful Succession Planning
2	Measuring the Performance of Vehicle Trip Reduction and Mode Shift Strategies
3	Interactive Communication About Complex Concepts
4	Advancing the Statewide Transportation Planning and Analysis: Statewide Dynamic Traffic Assignment (DTA) and Agent-Based Models (ABM)
5	Analyzing, Validating and Visualizing Results from Modeling: The Role of Big Data and New Technologies
6	Parallel Computing in Traffic Simulation and Assignment: Moving from Innovations to Practice
7	Integrated Land-use, Travel Demand, Air Quality, and Exposure Modeling: the Future of Regional Transportation Planning?
8	Shared-Use Mobility: What Does the Future Hold? Part 1 (Part 2, Sunday, January 11, 1:30 p.m.-4:30 p.m.)
9	Freight Corridors: International and Domestic Approaches and Experiences
10	Emerging Data Technology and Analytic Frontiers in Integrated Land-Use and Transport Modeling
11	Revisiting Model Validation: An Assessment of Needs and New Opportunities
12	Using Simulation for Decision Support Systems: Past, Present, and Future
13	The Future of Freight Analytics, Modeling, and Planning with Truck Probe Data
14	Doctoral Student Research in Transportation Modeling
15	Mainstreaming Climate Change and Extreme Weather Resilience into Transportation
16	Collaborative Visualization in Analytics and Operations
17	Measuring What Really Matters: Accessibility and Connectivity, Economic Competitiveness, and Health
18	Let's Get to the Triple Bottom Line: The Next Generation of Benefit-Cost Assessments
19	Advances in Traffic Assignment and Equilibrium
20	Modality and Mode Choice Preferences
21	Car- and Rideshare Use and Public Policy
22	Designing for LRT Success
23	Integrated Visualization Techniques for Transportation Planning and Multisensor Data for 3-D Surface Information
24	Commuting in America: Current Status and Future Implications
25	Eighth Annual Competition and Call for Communicating Concepts with John and Jane Q. Public
26	Advanced Vehicle Technology: Vehicle Choice and Travel Behavior
27	What's Going on in Local Mixed-Use and TOD Environments

	主　題：營運與交通管理
28	Traffic Flow Aspects of Automated Vehicles Including Mixed Traffic Considerations
29	Car- and Rideshare Operations
30	The Two Worlds of Transit Planning Practice and of Academic Research: Growing Gulf or Possible Bridges?
31	Impacts of Airline Consolidation on Airport System Planning
32	New Approaches to Planning and Evaluating Transportation Demand Management Strategies
33	Innovative Analyses of National Household Transportation Survey
34	Transportation and Sustainability
35	Factors Affecting Transit Mode Choice and Ridership
36	Transit Ridership Forecasting Methodologies
37	Analytic Tools for Transit Service Planning or Analyzing Network Flows and Connectivity
38	Equity Analysis of Transit Service
39	Innovative urban mobility planning. Experiences from around the world
40	Advances in Geospatial Technology Applications in Transportation
41	Bringing Home the Bacon: Advancing Economic Vitality Through Performance-Based Regional Transportation Planning and Programming
42	Bridging the Gap Between Travel Model Research and Practice: Moderated Discussion
43	Transportation Planning Applications: It's all about the Data!
44	Intelligent Transportation Systems: State of the Industry
45	Research in Transportation Economics
46	Congestion Pricing and Managed-Lane Showcase
47	Are You Ready? Signposts, Insights and Tools to Help You Navigate Immediate and Long Term Transportation Changes
48	Innovations in Planning for Small and Medium-Sized Communities
49	Activity Scheduling
50	Dynamic Network Modeling
51	Key Role of Low-Volume Roads in Emergencies and Disasters
52	Highway Capacity Level of Service: Love It or Leave It?
53	Changing Environmental Mitigation Policies with a Teaspoon of Law
54	Innovations in Statewide Transportation Planning
55	Fresh Ideas in Statewide Transportation Planning
56	Latest Research in Metropolitan Policy, Planning, and Processes
57	Advances in Mega-Region Planning
58	Transportation Needs of National Parks and Public Lands
59	Multimodal Investment Decision Making
60	Public Involvement

	主　題：營運與交通管理
61	Transportation Planning Applications: Tips and Tools
62	Contemporary Theories and Practices in Freight Planning and Logistics
63	Beyond Crowdsourcing 101: Applications for Future Public Involvement in Transportation
64	Activity and Travel: New Understandings and Models
65	New Year--New Issues, Methods, and Applications in Travel Modeling: Lightning Session
66	Recent Progress in Vehicle-Highway Automation
67	Research and Experience in Commuter Rail Service Planning
68	Transportation Means Access: Can Everyone Get There? Eleventh Annual Travel Data Users Forum
69	Working Across Boundaries: Emergence and Evolution of Metropolitan Planning Organizations
70	Optimization and Network Design
71	Accessibility, Commuting, and Income Dynamics
72	Towards a Better Understanding of Transportation and Land Use Connections
73	Innovative Teaching of Highway Capacity Manual Procedures
74	Public Transportation Planning and Development: Food for Thought on Networks Design, Accessibility, and Investment Policy
75	Public Transportation Marketing: User Perception, Satisfaction and Segmentation
76	Innovative Practices in Collaboration Between State Departments of Transportation and Metropolitan Planning Organizations
77	Developing Truck Origin-Destination Flows from GPS Data
78	Information and Communication Technologies and Travel: An International Scan
79	Innovations and Incentives for Reducing Auto Travel
80	Emerging Technologies and Methods for Travel Data
81	Panel, Continuous, and Cross-Sectional Travel Surveys: Lessons Learned and Successes Achieved
82	Understanding Visitors and Enhancing Their Transportation Experiences
83	Performance Measures to Evaluate the Effectiveness of Public Involvement
84	Legends (and Future Legends) of Travel Demand Modeling Present Their Latest Work on Integrated Model Systems
85	Freight Modeling Paper Highlights
86	Incorporating Urban Freight Innovations: Selected Best Practices in the U.S. and Abroad
87	The Latest in General Aviation System Planning
88	Transit Capacity and Quality of Service
89	Carsharing: Public Policy and Operations
90	Advances in Travel Survey Methods

	主　題：營運與交通管理
91	The Elusive Three E's: Economy, Equity, and Environment--Can Green Infrastructure Rating Tools Save the Day?
92	Advanced Traveler Information and Behavioral Patterns
93	Transportation Planning Applications: Trips or Tours, Spaces or Places, Directions or Connections – It's all about the Models!
94	Special Topics in Rural and Small Urban Public Transportation
95	Community Impact Assessment
96	Advanced Research and Practices in Urban Freight Transportation
97	Urban Freight Parking Research: To Curb or Not To Curb
98	Federal Lands Tools to Understand and Address Livability, Climate Change, and Sustainability into the Future
99	Transit and Logistics
100	Veterans' Transportation Needs - Strategic Thinking on Ways to Close the Gap
101	Life Course and Life Cycle Effects in Travel Behavior
102	Transport Planning, Safety, Surveys, and Analysis in Developing Countries
103	Innovations in Travel Surveys
104	Travel Demand Models R Us Poster Session
105	Contemporary Research in Land Use and Transportation Planning
106	Data Needs for the Future – The Big Picture
107	Best Transportation Planning Tools from the 14th National Tools of the Trade Conference
108	Methodological Advances in Travel Behavior Research
109	Is Transportation Infrastructure Ready for Driverless Cars?
110	Social Networks and Activity-Travel Behavior
111	Dynamics in Travel Behavior Analysis and Modeling
112	GPS and Smartphone Tracking of Travel Behavior
113	Activity and Travel Behavior
114	Technology, Time Use, and Travel
115	Networking Modeling
116	Metropolitan Policy, Planning, and Processes Committee
117	Aviation System Planning Committee

28、政策(Policy)：

	主　題：政策
1	The Art of Urban Street Performance Metrics
2	Measuring the Performance of Vehicle Trip Reduction and Mode Shift Strategies
3	Shared-Use Mobility: What Does the Future Hold? Part 1 (Part 2, Sunday, January 11, 1:30 p.m.-4:30 p.m.)
4	Public Transport Policy and Practice in the Developing Countries
5	Funding and Financing Vital Corridors: A Workshop on the What, Why, How, and Who of Value Capture Methods
6	Shared-Use Mobility: What Does the Future Hold? Part 2 (Part 1, Sunday, January 11, 9:00 a.m.-noon)
7	Future Taxis: The Evolution of On-Demand Transport: Taxis, Transportation Network Companies, and the Implications of New Technologies
8	Mainstreaming Climate Change and Extreme Weather Resilience into Transportation
9	Car- and Rideshare Use and Public Policy
10	Transportation Funding and Financing Showcase
11	Car- and Rideshare Operations
12	Innovative Analyses of National Household Transportation Survey
13	Learning from the Winners: Competition Results for Best Practices Communicating Data to Support Decisions
14	The Future Is Here: Autonomous Vehicles and Us
15	Assessing the Transportation Needs of Seniors, Veterans, and People with Disabilities
16	Establishing Transportation Systems Management and Operations as a National Commitment, Part 1: Enabling Change and Performance Management (Part 2, Session 411)
17	When Seniors Transition From Driving
18	Not Your Mother's Parking Meter: Parking in the 21st Century
19	To MAP-21 and Beyond: Implementation Efforts Across the Country
20	Native American Tribal Transportation Issues
21	Climate Change and Transportation: Best Papers of 2015
22	Past As Prologue: What History Tells Us About the High Tech Future of Transportation
23	Understanding the Gender Gap in Urban Biking, Part 1 (Part 2, 735)
24	Transportation Issues and Solutions in Major Cities
25	Current State of Public Opinion and Polling on Transportation Funding Options
26	State Department of Transportation CEO Roundtable 1: Funding Transportation Investments in an Uncertain Federal Fiscal Environment
27	The Pain of Being Proactive: Reframing the Conversation on Change
28	System Optimization and Externality Reduction Through Pricing Systems.

	主　題：營運與交通管理
29	Shared Challenges and Ideas for Implementing Innovations
30	Freight Day, Part 3: Setting the Table--How Overarching Policies and Strategic Initiatives Affect the Treatment of Freight Transportation (Part 1, Session 519, Part 2, Session 580
31	Critical Transportation Infrastructure Protection
32	Inclusive Transportation: Infrastructure and Services
33	Native American Transportation Issues
34	Carsharing: Public Policy and Operations
35	Tools and Techniques for Motivating Department of Transportation Executives to Use Performance Management Practices
36	What's in Your Pocket? Technology Trends and Revenue Capture for Transportation
37	Pricing in Transportation
38	Parking: Getting the Prices Right
39	Lessons Learned In Effective Implementation of Research: Case Studies from the EU and US
40	Special Topics in Rural and Small Urban Public Transportation
41	Understanding the Gender Gap in Urban Biking, Part 2 (Part 1, Session 527)
42	Parking Pricing
43	Veterans' Transportation Needs - Strategic Thinking on Ways to Close the Gap
44	Changes in Gender Roles Related to Household Travel and Time Use
45	Data Needs for the Future – The Big Picture
46	Exploring the Role of Taxis in a Rapidly Changing Environment
47	China's World Trade Perspective
48	Gender Differences and the Built Environment
49	Transportation Cybersecurity: Are We Hanging by a Thread?
50	Revenue and Finance Committee
51	Revenue and Finance Committee
52	Congestion Pricing Committee
53	Metropolitan Policy, Planning, and Processes Committee
54	Transportation and Economic Development Committee
55	Environmental Justice in Transportation Committee

29、公共運輸(Public Transportation)：

	主　題：公共運輸
1	FTA Noise and Vibration: Updates to Guidance and Requirements for Environmental Documentation
2	Shared-Use Mobility: What Does the Future Hold? Part 1 (Part 2, Sunday, January 11, 1:30 p.m.-4:30 p.m.)
3	Passenger and Freight Corridor Segregation Within Urbanized Regions
4	Ensuring Ferry and Passenger Boat Safety in the Wake of Continuing Occurrences of Catastrophes
5	Public Transport Policy and Practice in the Developing Countries
6	Shared-Use Mobility: What Does the Future Hold? Part 2 (Part 1, Sunday, January 11, 9:00 a.m.-noon)
7	Future Taxis: The Evolution of On-Demand Transport: Taxis, Transportation Network Companies, and the Implications of New Technologies
8	Rail Station Congestion Management and Capacity Expansion
9	Modality and Mode Choice Preferences
10	Transformative Applications of Transit Data
11	Car- and Rideshare Use and Public Policy
12	Designing for LRT Success
13	Innovations in the Passenger Rail Equipment Industry
14	Current Issues in Ferry Transportation
15	Innovations in Intercity Passenger Rail
16	Car- and Rideshare Operations
17	The Two Worlds of Transit Planning Practice and of Academic Research: Growing Gulf or Possible Bridges?
18	Air-Rail Connectivity: Today and into the Future
19	Intercity and High Speed Rail Passenger Demand Forecasting
20	Factors Affecting Transit Mode Choice and Ridership
21	Transit Ridership Forecasting Methodologies
22	Analytic Tools for Transit Service Planning or Analyzing Network Flows and Connectivity
23	Equity Analysis of Transit Service
24	Bus Transit, Part 1
25	Bus Transit, Part 2
26	Assessing the Transportation Needs of Seniors, Veterans, and People with Disabilities
27	Research and Best Practices in Regional and Intercity Bus Transportation
28	Rail Transit Efficiency and Congestion Management
29	Light Rail and Streetcar Performance and Safety

	主　題：營運與交通管理
30	Intercity Passenger Rail Transportation Research
31	Technologies for Improving Accessibility and Mobility of Transportation Services
32	Tell Me About It! Real-time Customer Feedback to Improve Transit System Performance
33	Multimodal Investment Decision Making
34	Research and Experience in Commuter Rail Service Planning
35	Rail Transit Infrastructure Systems Issues
36	Public and Semipublic Transport in Developing Countries
37	Working Across Boundaries: Emergence and Evolution of Metropolitan Planning Organizations
38	Public Transportation Planning and Development: Food for Thought on Networks Design, Accessibility, and Investment Policy
39	Public Transportation Marketing: User Perception, Satisfaction and Segmentation
40	BRT, Busways and Preferential Treatments
41	Rail Transit Safety and Access
42	Role of Transit Investments in Promoting Development and Resilience
43	New Research in Car and Bikesharing
44	When Will I Get There? Transit Travel Time Reliability
45	Bus Operations and Technology
46	Inclusive Transportation: Infrastructure and Services
47	Inclusive Transportation: Infrastructure and Services
48	Transformative Transit Data Research and Applications
49	Prioritizing Data for Transit Management and Performance Decisions
50	Transit Capacity and Quality of Service
51	Transit Operations
52	Carsharing: Public Policy and Operations
53	Public Transportation Marketing and Fare Policy (11)
54	Automated Transit Systems
55	Intermodal Passenger Facilities: Design and Modeling (8)
56	Recent Developments in Paratransit
57	Rail Transit Congestion Management
58	Using Data to Enhance Rail Transit Operations and Planning
59	Light-Rail Transit Priority and Ridership Planning
60	TRB's Transit IDEA Program: Sponsoring Innovation in Transit
61	Data Applications to Support Transit Quality of Service Analysis
62	Developing the Customer Experience
63	Special Topics in Rural and Small Urban Public Transportation
64	Rail-Related Noise and Vibration Issues

	主　題：營運與交通管理
65	Automated Transit System Experiences Abroad
66	Veterans' Transportation Needs - Strategic Thinking on Ways to Close the Gap
67	Public Transportation Fares: Policy, Collection and Evasion
68	Location, Location, Location: Safety, Access, and Placement Features of Intermodal Passenger Facilities
69	How Do We Adapt Demand Responsive Service to Our Markets?
70	Urban Ferry Systems: Emergency Planning Efforts
71	The Vision and Potential Impacts of Automated Transit Systems in the United States
72	Exploring the Role of Taxis in a Rapidly Changing Environment
73	Networking Modeling
74	Transportation Issues in Major U.S. Cities Committee
75	Ferry Transportation Committee
76	Intercity Passenger Rail Committee

30、軌道(Rail)：

	主　題：軌道
1	FTA Noise and Vibration: Updates to Guidance and Requirements for Environmental Documentation
2	Passenger and Freight Corridor Segregation Within Urbanized Regions
3	Crude Oil by Rail Shipments: Logistics and Community Impacts
4	Track Inspection Practices and Developments in the Inspection of Special Trackwork.
5	Rail Station Congestion Management and Capacity Expansion
6	Designing for LRT Success
7	Innovations in the Passenger Rail Equipment Industry
8	TRB's Safety IDEA Program: Sponsoring Innovation in Railroad Safety and Performance
9	Innovations in Intercity Passenger Rail
10	Research In Railroad Operating Technologies
11	Freight Rail Transportation Research
12	Railway Track Structure Maintenance and Design
13	Intercity and High Speed Rail Passenger Demand Forecasting
14	Rail Research In Practice
15	Human Factors Insights From Railroad Data Analysis
16	Rail Transit Efficiency and Congestion Management
17	Light Rail and Streetcar Performance and Safety
18	Intercity Passenger Rail Transportation Research
19	Railroad Environmental Issues
20	Research Advances in Freight Rail Transportation
21	Railroad Energy Management Systems
22	The Future of Domestic Intermodal Freight Transportation
23	Research and Experience in Commuter Rail Service Planning
24	Railway Capacity Research-Advancing the State of Knowledge
25	Rail Transit Infrastructure Systems Issues
26	Highway/Rail Grade Crossing Research
27	Rail Transit Safety and Access
28	Railway Maintenance Research
29	Suicide Prevention on Railroad Rights of Way
30	Substructure Improvement Design for High-Speed Rail and Heavy-Axle-Load Freight Service
31	Human Factors and Railroad Operations
32	Railroad Wheel-Rail Interaction
33	Research and Applications in Rail Transit Infrastructure
34	Rail Transit Congestion Management

	主　題：營運與交通管理
35	Using Data to Enhance Rail Transit Operations and Planning
36	Light-Rail Transit Priority and Ridership Planning
37	Railway Vibrations, Fastening Systems, Undersleeper Pads, and Ballast Modification
38	Rail-Related Noise and Vibration Issues
39	Research on Perception and Effectiveness of Visual Information and Safety Systems
40	New Research in Intermodal Freight Transport
41	Intercity Passenger Rail Committee
42	Intercity Passenger Rail Committee
43	Rail Transit Infrastructure Committee

31、研究(Research (about research))：

	主　題：研究
1	Harnessing the Potential Payoff of Research Implementation Across Borders
2	Keys to Transportation Research Innovation: Managing Intellectual Property
3	Pandora Was Right: Hopeful Experiences with Opening Access to Data
4	The Two Worlds of Transit Planning Practice and of Academic Research: Growing Gulf or Possible Bridges?
5	Transportation's Written Word: Issues for Publication, Search, and Lasting Impact
6	Effective Literature and Search Reviews: Tools and Tricks for the Trade
7	Advice for Authors: Topics in Transportation Publishing and Research Dissemination
8	Strengthening cross national networks of research, education and technology transfer
9	Lessons Learned In Effective Implementation of Research: Case Studies from the EU and US
10	Developing a Performance Management Research Roadmap
11	Ahead of the Curve: Mastering the Management of Transportation Research and Innovation
12	Conduct of Research Committee
13	Transportation Education and Training Committee

32、安全與人因(Safety and Human Factors)：

	主　題：安全與人因
1	Driving Simulators or Naturalistic Observation—Synergies and Conflicts
2	Traffic Incident Management: Expanding the Conversation to Identify New Research Needs
3	Ensuring Ferry and Passenger Boat Safety in the Wake of Continuing Occurrences of Catastrophes
4	To Tree or Not To Tree — Strategies for Answering a Roadside Question
5	Reliability of Nondestructive Evaluation Technologies
6	The Present and Future of Speed Limits in a Toward Zero Deaths (TZD) Framework
7	Understanding the Traffic Incident Management (TIM) Capability Maturity Model Framework
8	Impacts of New Data and Information Technologies on Transforming Traveler Experience
9	Crude Oil by Rail Shipments: Logistics and Community Impacts
10	Track Inspection Practices and Developments in the Inspection of Special Trackwork.
11	Improving Safety Programs Through Data Governance and Data Business Planning
12	Young Victims of Impaired Driving: An examination of Child Passenger Deaths in the United States involving an Alcohol-Impaired Drivers
13	Mobility Limitations for Older Persons and Insights for Improvement
14	Exploring Factors in Motorcycle Crashes, Injuries, and Fatalities
15	State Department of Transportation High-Value Research Projects
16	Research on Safe and Unsafe Driving
17	TRB's Safety IDEA Program: Sponsoring Innovation in Railroad Safety and Performance
18	Hazardous Materials Transportation Research
19	Contemporary Research in Marine Safety
20	Advances in Performance Metrics for Context-Sensitive Solution Projects
21	Strategies for Effective Management of Utilities in the Right-of-Way
22	Safety Management Data Analytics
23	Advanced Vehicle Technologies and Occupant Protection
24	Impaired Driving in Low and Middle Income Countries: Challenges and Opportunities for Progress
25	Pedestrian and Driver Behavioral Influences on Pedestrian Safety
26	Human Factors Insights From Railroad Data Analysis
27	Intelligent Transportation Systems: State of the Industry
28	A Walk on the Wild Side
29	Private Sector Perspectives on Safety Culture
30	Accident Investigations by National Transportation Safety Board
31	When Seniors Transition From Driving
32	Emerging Research in Emergency Evacuation

	主　題：營運與交通管理
33	Light Rail and Streetcar Performance and Safety
34	Data-Driven Safety Management: Multidisciplinary Approach
35	School Transportation Research
36	Methods to Evaluate Programs to Help Law Enforcement: Automated Enforcement, Speeding, Crash Reports, and Policy
37	Current Issues in Seat Belt Use
38	National Road Vehicle Automation Research and Demonstration Programs from Around the World
39	Evaluation of Automated Enforcement Programs, Police Officer Safety, and Accuracy of Crash Reports
40	Examining Roundabouts: A Closer Look at Access Management, Crosswalks and Trucks
41	Pavement Surface Characteristics
42	Current Projects and New Developments in Vehicle-Highway Automation Showcase
43	Impacts of Traffic Control Devices on Speed and Road User Behavior
44	Transforming the Future of Safety with a Vision Towards Zero Deaths
45	Prevention and Modeling of Severe Crashes
46	Bicycle Transportation, Part 1: Behavior and Policy (Part 2, Session 849)
47	Modelling Traffic Flow for Motorcycles and Mopeds
48	Progress Toward Resolving Institutional Challenges to Deployment of Automated Driving Systems
49	Highway/Rail Grade Crossing Research
50	Advancing the Science of Highway Safety Performance
51	Federal Motor Carrier Safety Administration (FMCSA) Safety Activities and Priorities
52	Pedestrian Safety Evaluation and Measurement
53	Rail Transit Safety and Access
54	Safety Risk Assessment and Modeling for Inland Waterways
55	SHRP 2 Safety: Legacy, Principal Products, and Outcomes
56	Dwight David Eisenhower Transportation Fellowship Program Research Showcase
57	Crash-Based Safety Analysis and Modeling
58	Distracted Driving: Methods, Patterns, and Impact
59	Driver Behavior, Cognition, and Decision Making
60	Various Aspects of User Information Research
61	Driving Simulators: More Methods and Applications
62	Livable Arterials: Urban Elixir or Oxymoron?
63	Alternative Deployment Strategies for Using Vehicle Automation to Produce Transportation Benefits

	主　題：營運與交通管理
64	Suicide Prevention on Railroad Rights of Way
65	Occupant Protection in Work Environments
66	Federal Motor Carrier Safety Administration (FMCSA) Research Findings: Driver Use of New Technologies
67	Information for Travelers: Inside and Outside of Vehicles
68	Perception of Roadway Signs, Signals and Delineation
69	Human Factors and Railroad Operations
70	New Developments in Labor Economics: Safe Rates and Chain of Responsibility
71	Research and Applications in Evacuation Planning
72	Roadway Departure Risk
73	Formal Training Courses in Road Safety Workforce Development
74	Learning to Drive: Theory and Practice
75	Hazards, Crashes, and Automated Driving
76	Evaluation of Innovative Pedestrian Crossing Treatments
77	The Role of Technology in Motorcycle and Moped Safety
78	Dwight David Eisenhower Transportation Fellowship Program, Part 1 (Part 2, Session 712)
79	Advances in Work Zone Safety
80	International Benchmarking on Road Safety
81	The Road Safety Implications of Unlicensed Driving and Strategies to Address the Problem
82	User Information Systems in the Context of Autonomous and Connected Vehicles
83	Driving Simulators: Methods and Applications
84	Recent Research, Best Practices, and Implementation of Zero Death Goals and Plans
85	Meet the Author: Ezra Hauer, "The Art of Regression Modeling in Road Safety"
86	Bikesharing in Developing Countries
87	Assessment of Traffic Control and Motorist Speed Selection in Work Zones
88	Exploring Safety and Risk of Nonmotorized Vehicles
89	Is It Safe to Use Surrogate Measures of Safety?
90	Understanding Risk Factors for Older Drivers and Pedestrians
91	Research on Perception and Effectiveness of Visual Information and Safety Systems
92	Characteristics of Pedestrian Interactive Behaviors under the Different Level of Service on Walkways
93	Malaysia Airlines Flight 370: Implications for Applied Research in Security, Emergency Management, and Safety
94	Safety and Speed Effects of Geometric Design Decisions
95	Evaluation of Driver Behavior and Capacity in Work Zones
96	Urban Ferry Systems: Emergency Planning Efforts

	主　題：營運與交通管理
97	Transport Planning, Safety, Surveys, and Analysis in Developing Countries
98	Highway Safety Performance
99	Truck and Bus Safety
100	Traffic Safety and Traffic Management in Developing Countries
101	Teenage Driving: Latest Findings on Key Topics
102	Rural Road Safety Research and Practical Applications
103	Using Technology to Enhance Hazardous Materials Transportation Safety and Security
104	Pedestrian Safety Policy, Planning, and Design Issues
105	Pedestrian Safety and Operational Performance Measurement
106	Bicycle Transportation, Part 2: Safety and Infrastructure (Part 1, Session 477)
107	Distraction, Attention, and Driver Performance
108	HF-B Look right! Look left! Where? Accommodating Pedestrians at Alternative Intersections
109	HF-H Human Factors of Green Driving
110	Traffic Control Devices Committee
111	Tort Liability and Risk Management Committee
112	Alcohol, Other Drugs, and Transportation Committee
113	Transportation of Hazardous Materials Committee
114	Marine Safety and Human Factors Committee (AW040)

33、保安與緊急狀況(Security and Emergencies)：

	主　題：保安與緊急狀況
1	Critical Infrastructure Resilience and Cost-Effective Adaptation and Operations
2	Critical Infrastructure—From Protection to Resilience: An Evolution to Meet the New Threats
3	Narcotics Smuggling Operations as Portal for Introduction of Terrorist Devices into Commercial Aviation Aircraft
4	Emerging Research in Emergency Evacuation
5	Balancing Resiliency Needs with Cost-efficient Operations and Environmental Goals
6	Key Role of Low-Volume Roads in Emergencies and Disasters
7	Role of Transit Investments in Promoting Development and Resilience
8	Domestic Humanitarian Assistance and Disaster Relief: Military, FEMA, and Transportation Provider Perspectives
9	Research and Applications in Evacuation Planning
10	Crude Oil Transportation Challenges: Market Dynamics and Emergency Response
11	Securing the Air Cargo Value Chain
12	Critical Transportation Infrastructure Protection
13	Logistics of Disaster Response and Business Continuity
14	Logistics of Refugee and Displaced Persons Humanitarian Relief
15	Malaysia Airlines Flight 370: Implications for Applied Research in Security, Emergency Management, and Safety
16	Urban Ferry Systems: Emergency Planning Efforts
17	Transportation Cybersecurity: Are We Hanging by a Thread?
18	Transportation of Hazardous Materials Committee
19	Logistics of Disaster Response and Business Continuity Committee
20	Aviation Security and Emergency Management Committee

34、社會(Society)：

	主　題：社會
1	Interactive Communication About Complex Concepts
2	Tools to Support Health and Transportation Planning and Analysis
3	Emerging Data Technology and Analytic Frontiers in Integrated Land-Use and Transport Modeling
4	It is more than skin deep: what we need to know about each other's culture
5	Eighth Annual Competition and Call for Communicating Concepts with John and Jane Q. Public
6	Innovative mitigation
7	Assessing the Transportation Needs of Seniors, Veterans, and People with Disabilities
8	When Seniors Transition From Driving
9	Technologies for Improving Accessibility and Mobility of Transportation Services
10	Implementing TDM Strategies - International Perspective
11	Public Involvement
12	Native American Tribal Transportation Issues
13	Beyond Crowdsourcing 101: Applications for Future Public Involvement in Transportation
14	Activity and Travel: New Understandings and Models
15	Accessibility, Commuting, and Income Dynamics
16	Understanding the Gender Gap in Urban Biking, Part 1 (Part 2, 735)
17	Research on Social and Economic Factors of Transportation
18	Performance Measures to Evaluate the Effectiveness of Public Involvement
19	Inclusive Transportation: Infrastructure and Services
20	Native American Transportation Issues
21	Community Impact Assessment
22	Where Transportation Meets Public Health
23	Environmental Justice in Transportation
24	Understanding the Gender Gap in Urban Biking, Part 2 (Part 1, Session 527)
25	Life Course and Life Cycle Effects in Travel Behavior
26	Contemporary Research in Land Use and Transportation Planning
27	Changes in Gender Roles Related to Household Travel and Time Use
28	Methodological Advances in Travel Behavior Research
29	Gender Differences and the Built Environment
30	Department of Transportation Experience with Sustainability Tools
31	Transportation Expenditures and the Future of Automobility
32	Environmental Justice in Transportation Committee

35、運輸技術的未來(Spotlight Theme: Corridors to the Future: Transportation and Technology)：

	主　題：運輸技術的未來
1	NextGen, Part 1: Portfolios, Plans and Performance (Part 2, Session 190, Sunday, January 11, 1:30 p.m.-4:30 p.m.)
2	Clean Truck Corridors: Understanding the Barriers and Opportunities
3	Ignite! Emerging Technologies in Traffic Signal Systems. State of the Art and Predicting the Future.
4	Future Taxis: The Evolution of On-Demand Transport: Taxis, Transportation Network Companies, and the Implications of New Technologies
5	NextGen, Part 2: The Road Ahead (Part 1, Session 142, Sunday, January 11, 9:00 a.m.-noon)
6	Pavement Materials and the Urban Climate: Technologies Worthy of Future Consideration, Part 1 (Part 2, Session 306)
7	Viewpoints on the Emerging Ridebooking Phenomenon
8	Advanced Vehicle Technology: Vehicle Choice and Travel Behavior
9	Plug-in Electric Vehicle Infrastructure and Driver Behavior: Issues and Solutions for Continued Market Growth
10	Traffic Flow Aspects of Automated Vehicles Including Mixed Traffic Considerations
11	Energy-Sector Transportation: Driving the Economy
12	Establishing Transportation Systems Management and Operations as a National Commitment, Part 1: Enabling Change and Performance Management (Part 2, Session 411)
13	Technologies for Improving Accessibility and Mobility of Transportation Services
14	National Road Vehicle Automation Research and Demonstration Programs from Around the World
15	Unmanned Aerial Systems and Remotely Piloted Aircraft: Can They Fly with the Rest of Us?
16	Progress Toward Resolving Institutional Challenges to Deployment of Automated Driving Systems
17	BRT, Busways and Preferential Treatments
18	Information and Communication Technologies and Travel: An International Scan
19	Evaluation of Geosynthetics in Roadway Design with GeoTech Tools
20	State Department of Transportation CEO Roundtable 1: Funding Transportation Investments in an Uncertain Federal Fiscal Environment
21	Current Issues in Alternative Transportation Fuels and Technologies
22	State Department of Transportation CEO Roundtable 2: Connected and Automated Vehicles--Challenges and Opportunities for State Departments of Transportation
23	Automated Transit Systems

	主　題：營運與交通管理
24	Advanced Vehicle Technologies and Energy Use: Uncertainty and Individual Differences
25	Freight Day, Part 4: Will the Changing U.S. Energy Mix Transform Multimodal Freight Systems? (Part 1, Session 519, Part 2, Session 580
26	State Department of Transportation CEO Roundtable 3: Moving the Goods--Accommodating Major Changes in Freight Flows
27	Automated Transit System Experiences Abroad
28	Traffic Signal Control in a Connected Vehicle Environment
29	Your Neighborhood Spaceport Here Today
30	Emerging Environmental Issues from Increases in Arctic Marine Transport
31	The Vision and Potential Impacts of Automated Transit Systems in the United States
32	Exploring the Role of Taxis in a Rapidly Changing Environment
33	Freight Fluidity: Integrating Supply Chain Concepts and Performance into Freight Planning and Programming
34	Innovations in Delivery and Logistics

36、場站設施(Terminals and Facilities)：

	主　題：場站設施
1	Contemporary Research in Port Operations
2	Air-Rail Connectivity: Today and into the Future
3	Logistical Innovations at Land and Sea Ports of Entry
4	The Future of Domestic Intermodal Freight Transportation
5	Military Transportation System Lessons Learned from Recent Conflicts and Future Implications from End of Overseas Wars and Budget Reductions
6	Advances in Intermodal Freight Terminal Design and Operations
7	Current Research and State of the Art in Port Operations
8	Accommodating Aging and Disabled Passengers in Airport Terminals
9	Intermodal Passenger Facilities: Design and Modeling (8)
10	Blending Interests in an Intermodal Facility
11	Developing the Customer Experience
12	Location, Location, Location: Safety, Access, and Placement Features of Intermodal Passenger Facilities
13	Contemporary Issues in Intermodal Freight Terminal Design and Operations
14	Advances in Technology, Facilities, and Operations for Winter Maintenance
15	Port Drayage and Chassis Management, Part 1: Current Issues (Part 2, Session 837)
16	Port Drayage and Chassis Management, Part 2: Potential Solutions (Part 1, Session 825)
17	Intermodal Freight Terminal Design and Operations Committee

37、其他運輸課題(Transportation, General)：

	主　題：其他運輸課題
1	Hitting the Ground Running: Choosing and Navigating a Successful Career Path—A Workshop for Young and New Transportation Professionals
2	Using Knowledge Management as Tool for Successful Succession Planning
3	Measuring the Performance of Vehicle Trip Reduction and Mode Shift Strategies
4	Communication Trends: The Shift to Mobile
5	Transit Asset Management and the ISO-55000 Asset Management Series of Standards
6	Emerging Professionals and Emerging Technologies: Investing in our Future, Part I (Part 2, 255)
7	How Federalist Are We, Anyway? Transportation Law, Marijuana, and the Changing Drug Enforcement Environment
8	Emerging Professionals and Emerging Technologies: Investing in our Future, Part 2 (Part 1, 195)
9	Fracking Up the Highway and Other Modes of Transportation: Current Legal Challenges to Cargo Size, Weight, and Safety
10	New Approaches to Planning and Evaluating Transportation Demand Management Strategies
11	Research in Statistical Methods in Transportation
12	Transportation and Sustainability
13	Bringing Home the Bacon: Advancing Economic Vitality Through Performance-Based Regional Transportation Planning and Programming
14	Establishing Transportation Systems Management and Operations as a National Commitment, Part 1: Enabling Change and Performance Management (Part 2, Session 411)
15	The Six-Minute Pitch: Transportation Start-up Challenge
16	Latest Research in Metropolitan Policy, Planning, and Processes
17	Past As Prologue: What History Tells Us About the High Tech Future of Transportation
18	Buy America for Utilities
19	Value of Transportation Infrastructure and Transportation's Contribution to the Economy
20	Seeing Around the Curve: Anticipating and Managing Legal Risk in the National Environmental Policy Act Process
21	Seeing Around the Curve: Anticipating and Managing Legal Risk in the National Environmental Policy Act Process
22	The Pain of Being Proactive: Reframing the Conversation on Change
23	Innovations and Incentives for Reducing Auto Travel
24	Critical Transportation Infrastructure Protection
25	Lessons Learned from Transportation History
26	Dwight David Eisenhower Transportation Fellowship Program, Part 1 (Part 2, Session 712)

	主　題：營運與交通管理
27	Developing the Customer Experience
28	Dwight David Eisenhower Transportation Fellowship Program, Part 2 (Part 1, Session 642)
29	Managing and Maintaining Non-Pavement, Non-Bridge Highway Assets
30	Learning about Our Past from Novel Historical Data and Methods
31	Transportation Expenditures and the Future of Automobility

38、車輛與配備(Vehicles and Equipment)：

	主　題：車輛與配備
1	Transit Asset Management and the ISO-55000 Asset Management Series of Standards
2	Innovations in the Passenger Rail Equipment Industry
3	Actionable Analytics That Drive Replacement and Preventive Maintenance Practices for Fleet Equipment
4	Bus Rapid Transit, Rickshaws, Motorcycles, Pedestrians, and Impossible Traffic in Developing Countries
5	Fleet Management: Safety, Prioritizing, and Planning
6	Current Projects and New Developments in Vehicle-Highway Automation Showcase
7	Innovative Methods to Improve Operational Efficiency of Heavy Vehicles
8	Pathways to Automated Transit and Shared Mobility
9	Hazards, Crashes, and Automated Driving
10	Exploring Safety and Risk of Nonmotorized Vehicles
11	Intercity Passenger Rail Committee