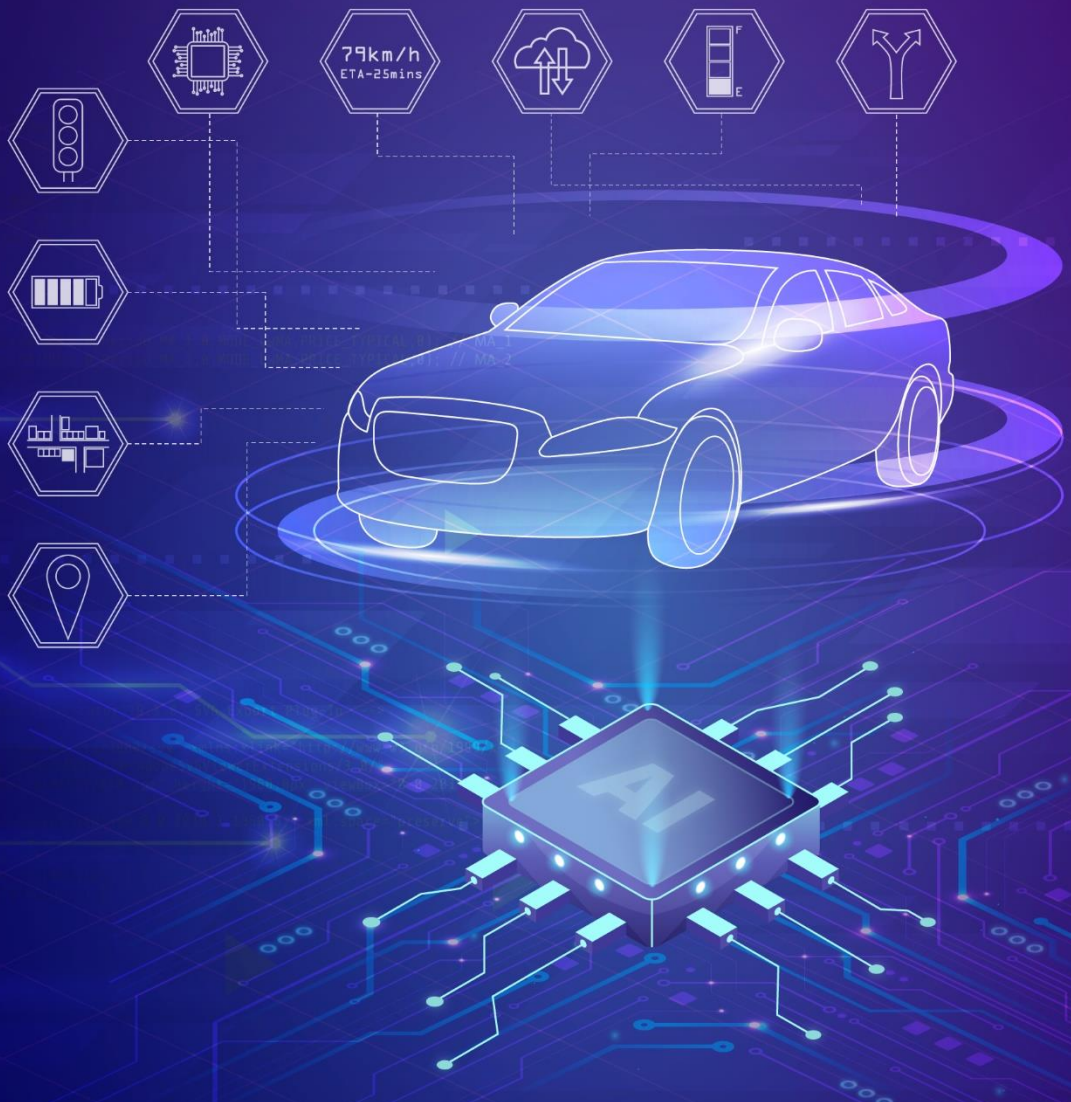
2024 International Forum on EV/AV/AI Safety & Technology

電動車、自駕車及人工智慧安全技術國際論壇

August 19-20, 2024



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Welcome Message

Dear Esteemed Guests,

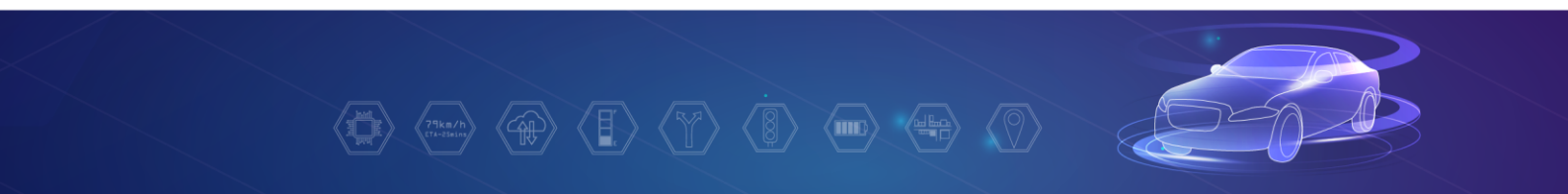
It is my great pleasure to extend the warmest welcome to all of you on behalf of the Taiwan Transportation Safety Board.

The rapid development of emerging transportation technologies and artificial intelligence, driven by government policies and industry innovation, has set electric vehicles and autonomous vehicles on course to become the mainstream of future transportation. To facilitate technological exchange and expand opportunities for collaboration among industry, government, academia, and research institutions, we have continued our partnership with the University of California, Berkeley, building upon the Memorandum of Understanding signed in 2023. Together, we have co-organized the "2024 International Forum on EV/AV/AI Safety & Technology," focusing on two main themes: electric vehicles and autonomous vehicles, along with artificial intelligence. This forum will explore key topics such as battery technology, EV safety, autonomous vehicle development, AI technologies, as well as related policies and safety issues. Through the sharing of professional knowledge and experience among participants, we aim to enhance safety technologies in the field of advanced transportation, improve the safe use of emerging transportation modes, and promote the development of domestic industries.

I sincerely thank all our distinguished guests for your support, which has made this international forum possible. I wish you all good health and every success in your endeavors!

Lin Shinnder

Chairman, Taiwan Transportation Safety Board



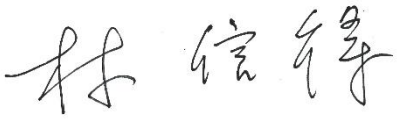
主委歡迎詞

敬愛的與會嘉賓，大家好：

首先，我謹代表國家運輸安全調查委員會，向所有與會貴賓表達最誠摯的歡迎。

鑑於近年新興運具及人工智慧快速發展，在各國政策推動及產業創新之推波助瀾下，電動車與自駕車將成為未來運輸工具之主流。為促進產業界、政府機關（構）、學術及研究單位之技術交流並拓展合作機會，本會延續 2023 年與加州大學柏克萊分校簽訂之瞭解備忘錄，邀請該校先進交通技術研究中心與本會合辦「2024 年電動車、自駕車及人工智慧安全技術國際論壇」(2024 International Forum on EV/AV/AI Safety & Technology)，並聚焦於電動車與自駕車及人工智慧兩大主題，探討電池技術、電動車安全、自動駕駛車輛開發、人工智慧等技術以及政策與安全之相關議題。期盼透過與會者之專業知識與經驗分享，提升先進交通領域之安全技術，進而增進新興運具安全使用環境，並促進國內產業發展。

由衷感謝所有與會嘉賓的支持，使本次國際論壇得以順利舉辦，敬祝各位嘉賓　身體健康、萬事如意！

國家運輸安全調查委員會主任委員  謹

中華民國 113 年 8 月 19 日

2024 International Forum on EV/AV/AI Safety & Technology

電動車、自駕車及人工智慧安全技術國際論壇

Executive Introduction

首長介紹

Mr. Shinn-Der Lin (Charles)

Chairman, Taiwan Transportation Safety Board

Academic Qualification

- Master of Business Administration, College of Management, National Taiwan University
- Bachelor of Science, Department of Electronic Engineering, National Taiwan Ocean University

Brief Biography

Charles Lin is the Chairman of the Taiwan Transportation Safety Board (TTSB), a position he has held since May 2023. With a deep commitment to enhancing transportation safety, Mr. Lin leads efforts to investigate transportation accidents and promote safer travel across all modes of transportation in Taiwan.

Mr. Lin's career is marked by significant leadership roles across the transportation sector. Prior to his appointment at TTSB, he served as the Chairman of the Board of Directors at Taoyuan International Airport Services Co. He also held the position of Director General at the Institute of Transportation, Ministry of Transportation and Communications, where he oversaw major policy developments and transportation research initiatives for the Government.

His other notable roles include Director of the Board at Taoyuan International Airport Corporation Ltd and Kaohsiung Rapid Transit Corporation Ltd, as well as the CR Classification Society, where he contributed to the strategic direction and governance of these significant entities. His earlier experiences as Deputy Director General of the Civil Aeronautics Administration (CAA), President of the Flight Safety Foundation, Taiwan, Managing Director of Taipei International Airport, Director of the Air Transport Division and Air Navigation Facility Division at the CAA provided him with deep insights into aviation safety and airport management.

林信得

國家運輸安全調查委員會 主任委員

學歷

- 國立臺灣大學管理學院商學研究所碩士
- 國立臺灣海洋大學電子(機)工程系畢業

簡介

林信得先生自民國 112 年 5 月起，接任國家運輸安全調查委員會（運安會）主任委員，並發揮其交通運輸決策之統合協調、運輸安全計畫與管理、民用航空業管理等專長，帶領運安會以獨立、公正、專業的方式執行事故調查，致力於營造安全之運輸環境。

其過去亦曾擔任桃園航勤股份有限公司董事長、交通部運輸研究所所長、桃園機場股份有限公司董事、高雄捷運股份有限公司董事、財團法人中國驗船中心董事、交通部民航局副局長、財團法人中華民國台灣飛行安全基金會董事長、交通部民航局臺北國際航空站主任、交通部民航局空運組組長、交通部航政司空運科科長等職務，在交通運輸領域累積深厚的航空安全及機場管理經驗。

Dr. Ming-Shan Yeh

Vice Chairman, Taiwan Transportation Safety Board

Academic Qualification

- Doctoral Degree, Department of Civil and Environment Engineering, Michigan State University
- Master Degree, Department of Civil Engineering, University of Southwestern of Louisiana

Brief Biography

Ming-Shan Yeh is the Vice Chairman of the Taiwan Transportation Safety Board (TTSB), contributing his extensive expertise to enhancing transportation safety. His career is marked by a remarkable combination of academic leadership and practical experience in the transportation sector.

Prior to his appointment at TTSB, Dr. Yeh served as Professor of the Department of Transportation and Logistics, Associate Professor and Chairperson of the Department of Traffic Engineering and Management at Feng Chia University. Dr. Yeh also served as the Associate Dean of Student Affairs, the Director of the Development Center for Leadership, and the Director of the Research Center of Traffic Accident Authentication.

Dr. Yeh's deep understanding of transportation systems is rooted in his early career at the Office of Taipei Railway Underground Construction, where he gained valuable hands-on experience in railway engineering. This foundation, coupled with his academic achievements, has positioned him as a leading authority in highway and railway safety, traffic accident investigation, and traffic accident reconstruction.

Throughout his career, Dr. Yeh has made substantial contributions to the field through his research, publications, and active involvement in professional organizations. His work has primarily focused on identifying factors contributing to transportation accidents, developing innovative safety measures, and advancing transportation policies.

葉名山

國家運輸安全調查委員會 副主任委員

學歷

- 美國密西根州立大學土木工程博士
- 美國路易士安納西南大學土木碩士

簡介

葉名山博士係國家運輸安全調查委員會 (運安會) 副主任委員，擔任運安會專任委員期間，即以其豐富的專業知識貢獻於提升交通安全。

其過去亦曾擔任交通部臺北市區鐵路地下化工程處工程司科長、工區副主任，以及逢甲大學交通工程與管理學系教授、系主任、副學務長與領導知能發展中心、行車事故鑑定研究中心主任，除了累積鐵道工程之實務經驗，其學術成就亦促使其成為公路與鐵道安全、交通事故調查與事故重建之領導權威。

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Agenda

August 19th Monday		
Time	**Topic**	**Speaker**
08:30-09:00	Registration	-
09:00-09:05	Opening and Welcome	**Mr. Shinn-Der Lin** Chairman, TTSB
09:05-09:25	VIP Speech	**Mr. Yen-Po Chen** Political Deputy Minister, MOTC **Ms. Hui-Min Chen** Deputy Director General, ADI, MODA **Mr. Xui-Long Liao** Vice President, ARTC
09:25-09:40	Group Photo and Thank-you Gift to Sponsors	
09:40-10:50	**Keynote Speech I** Powering the Future: Innovations in Batteries, Electric Vehicles, and Safety	**Mr. Scott Moura** Faculty Director, PATH, UC Berkeley
10:50-11:10	Coffee Break	
11:10-12:20	**Keynote Speech II** Technology, Innovation, and Smart Transportation	**Mr. Ching-Yao Chan** Co-Director, BDD, UC Berkeley
12:20-13:30	Lunch Break	
13:30-15:00	**Breakout Session I: Policy, Safety, and Technology of Electric Vehicles** Moderator: **Mr. Ming-Shan Yeh**, Vice Chairman, TTSB Speakers: **Mr. Scott Moura**, Faculty Director, PATH, UC Berkeley Electric Vehicle & Battery Safety **Mr. Pierce Huang**, Assistant VP, ARTC Smart Electric Vehicle Testing Plan **Mr. Lucky Yu**, Vice President, Master Transportation The Application and Upgrade for Fast-charging Public Transportation **Mr. Michael Kuo**, Special Assistant, Foxtron Vehicle Technologies Advanced Technology and Safety Configurations of Electric Bus **Mr. Tien-Tzu Chen**, Board Member, TTSB TTSB Investigation Experiences on Electric Vehicle & Autonomous Vehicle Occurrence	
15:00-15:30	Coffee Break	
15:30-16:20	**Panel Discussion: Policy, Safety, and Technology of Electric Vehicles** Moderator: **Mr. Ming-Shan Yeh**, Vice Chairman, TTSB Panelists: **Mr. Kuei-Yuan Chan**, Professor, Dept. of Mechanical Engineering, NTU Quantifying Risk and Managing Uncertainty in Electric Vehicle Automation **Mr. Kelly Shyu,** Deputy GM, Delta Electronics Empowering Smart Homes and Resilient Grids in the EV Prosumer Era **Mr. Dmitry Belov**, Chief Scientist, ProLogium Technology Next Generation Batteries: Driving Electric Vehicles Toward a Net Zero Future	
16:20-17:10	**Q & A** Mr. Moura, Mr. C.Y. Chan, Mr. K.Y. Chan, Mr. Shyu, Mr. Belov, and Mr. Yeh	
17:10	End of daily program	

August 20th Tuesday	
Time	**Topic**
08:30-09:00	Registration
09:00-10:25	**Breakout Session II:** **Policy, Safety, and Technology of Autonomous Vehicle and Artificial Intelligence** Moderator: **Mr. Ming-Shan Yeh**, Vice Chairman, TTSB Speakers: **Mr. Ching-Yao Chan**, Co-Director, BDD, UC Berkeley AI Applications for ADS and Safety Issues **Mr. En-Tzu Wang,** Deputy Division Director, ICL, ITRI FAST AI One-Stop Software System for Smart Transportation Applications **Ms. Renee Lin**, Vice President, Kingwaytek Technology V2V Metro-Like Technology: Cost-Effective Autonomous Driving Solution in Taiwan **Mr. Chih-Keng Chen**, Chairman, Dept. of Vehicle Engineering, NTUT On the Application and Development of Digital Tachographs **Mr. Chin-Wei Tsao**, Senior Executive Officer, MOTC Taiwan's Roadmap of Autonomous Vehicle Regulatory Adjustment
10:25-10:55	Coffee Break
10:55-12:00	**Panel Discussion:** **Policy, Safety, and Technology of Autonomous Vehicle and Artificial Intelligence** Moderator: **Mr. Ming-Shan Yeh**, Vice Chairman, TTSB Panelists: **Mr. Ja-Ching Chou**, Senior Transportation Analyst, Inst. of Transportation, MOTC Development of Connected Vehicle Technology and Its Role in Automated Driving **Mr. Jiun-In Guo**, Distinguished Professor, Inst. of Electronics Engineering, NYCU Embedded AI Technology Design and Its Applications on Automated Vehicle **Mr. Chieh-Chih Wang,** Chief Digital Officer, MSL, ITRI Autonomous Vehicles on Public Roads in Taiwan and Australia **Mr. Tzu-Hsiung Wang,** Director, STLI, III Autonomous Vehicles in Taiwan: From Regulatory Sandbox to Regulations in the Near Future
12:00-12:30	**Q & A** Mr. Moura, Mr. Chan, Mr. Chou, Mr. Guo, Mr. C.C. Wang, Mr. T.H. Wang, and Mr. Yeh
12:30	End of daily program

議程表

8 月 19 日 星期一			
時間	**議程內容**		**講者**
08:30-09:00	註冊		-
09:00-09:05	開幕與致詞		國家運輸安全調查委員會**林信得主任委員**
09:05-09:25	貴賓致詞		交通部**陳彥伯政務次長** 數位發展部數位產業署**陳慧敏副署長** 車輛研究測試中心**廖學隆副總經理**
09:25-09:40	大合照及致贈感謝禮		
09:40-10:50	**專題演講 1** 驅動未來：電池、電動車及安全之創新		**Scott Moura 主任** 加州大學柏克萊分校先進交通技術研究中心
10:50-11:10	茶敘		
11:10-12:20	**專題演講 2** 科技、創新與智慧交通		**詹景堯共同主任** 加州大學柏克萊分校深度駕駛中心
12:20-13:30	午餐		
13:30-15:00	**專題場次 1：** **電動車政策、安全與技術**	主持人	**葉名山副主任委員** 國家運輸安全調查委員會
	電動車及電池安全	引言人	**Scott Moura 主任** 加州大學柏克萊分校先進交通技術研究中心
	智慧電動車測試計畫		**黃品誠協理** 車輛研究測試中心試車場與整車安全處
	快充系統導入大眾運輸的應用及提升		**游子弘協理** 成運汽車製造股份有限公司海外業務部
	電動大客車先進技術及主被動安全		**郭耀聰總經理特助** 鴻華先進科技股份有限公司
	運安會電動車、自駕車之重大事故調查經驗		**陳天賜專任委員** 國家運輸安全調查委員會
15:00-15:30	茶敘		
15:30-16:20	**綜合討論：** **電動車政策、安全與技術**	主持人	**葉名山副主任委員** 國家運輸安全調查委員會
	電動車自動化系統之 不確定性與風險評估	與談人	**詹魁元教授** 國立臺灣大學機械工程學系
	智慧家庭與強韌電網 - 電動車的 Prosumer 世代		**徐瑞源副總經理** 台達電子工業股份有限公司 能源基礎設施暨工業解決方案事業群
	次世代電池： 推動電動車邁向淨零排放的未來		**Dmitry Belov 首席科學家** 輝能科技股份有限公司
16:20-17:10	**Q & A** Moura 主任、詹主任、詹教授、徐副總、Belov 博士、葉副主委		
17:10	賦歸		

8 月 20 日 星期二			
時間	**議程內容**	**講者**	
08:30-09:00	註冊	-	
09:00-10:25	**專題場次 2： 自駕車及人工智慧政策、安全與技術**	主持人	**葉名山副主任委員** 國家運輸安全調查委員會
	人工智慧於自動駕駛系統及安全議題之應用	引言人	**詹景堯共同主任** 加州大學柏克萊分校深度駕駛中心
	FAST AI 一站式軟體系統於智慧交通應用		**王恩慈副組長** 工業技術研究院資訊與通訊研究所
	車路雲整合，V2V 帶動自動駕駛邁向類捷運應用		**林映帆副總經理** 勤崴國際科技股份有限公司
	數位式行車記錄器之應用與發展		**陳志鏗教授** 國立臺北科技大學車輛工程系
	臺灣自駕車法規調適路徑		**趙晉緯專門委員** 交通部公共運輸及監理司
10:25-10:55	茶敘		
10:55-12:00	**綜合討論： 自駕車及人工智慧政策、安全與技術**	主持人	**葉名山副主任委員** 國家運輸安全調查委員會
	車聯網技術發展與其在自動駕駛角色	與談人	**周家慶高級運輸分析師** 交通部運輸研究所
	嵌入式人工智慧技術與其智慧車應用		**郭峻因特聘教授** 國立陽明交通大學電子研究所
	臺灣與澳洲自動駕駛車輛之現況		**王傑智數位長** 工業技術研究院機械與機電系統研究所
	自駕車在臺灣：從監理沙盒到未來規範框架		**王自雄主任** 資訊工業策進會科技法律研究所
12:00-12:30	**Q & A** Moura 主任、詹主任、周博士、郭教授、王數位長、王主任、葉副主委		
12:30	賦歸		

2024 International Forum on EV/AV/AI Safety & Technology

電動車、自駕車及人工智慧安全技術國際論壇

Keynote Speech

專題演講

Keynote speakers

Dr. Scott Moura

Associate Professor | Director of eCAL | PATH Faculty Director |
Chair of Engineering Science, University of California, Berkeley

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Academic Qualification

- Postdoctoral Fellow, University of California, San Diego, 2013
- Ph.D., Mechanical Engineering, University of Michigan, Ann Arbor, 2011
- M.S.E, Mechanical Engineering, University of Michigan, Ann Arbor, 2008
- B.S., Mechanical Engineering, University of California, Berkeley, 2006

Brief Biography

Scott Moura is the Clare and Hsieh Wen Shen Endowed Distingiushed Professor in Civil & Environmental Engineering, Director of the Energy, Controls, & Applications Lab (eCAL), PATH Faculty Director, and Chair of Engineering Science at the University of California, Berkeley. He received the B.S. degree from the University of California, Berkeley, CA, USA, and the M.S. and Ph.D. degrees from the University of Michigan, Ann Arbor, in 2006, 2008, and 2011, respectively, all in mechanical engineering. From 2011 to 2013, he was a Post-Doctoral Fellow at the Cymer Center for Control Systems and Dynamics, University of California, San Diego. In 2013, he was a Visiting Researcher at the Centre Automatique et Systèmes, MINES ParisTech, Paris, France. His research interests include control, optimization, and machine learning for batteries, electrified vehicles, and distributed energy resources.

Dr. Moura is a recipient of the National Science Foundation (NSF) CAREER Award, ASME Dynamic Systems and Control Divisoin Young Investigator Award, Carol D. Soc Distinguished Graduate Student Mentor Award, the Hellman Fellowship, the O. Hugo Shuck Best Paper Award, the ACC Best Student Paper Award (as advisor), the ACC and ASME Dynamic Systems and Control Conference Best Student Paper Finalist (as student and advisor), the UC Presidential Postdoctoral Fellowship, the NSF Graduate Research Fellowship, the University of Michigan Distinguished ProQuest Dissertation Honorable Mention, the University of Michigan Rackham Merit Fellowship, and the College of Engineering Distinguished Leadership Award.

Keynote speakers

Dr. Ching-Yao Chan

Co-Director, Berkeley DeepDrive | Researcher, CALIFORNIA PATH,
University of California, Berkeley

Academic Qualification

- Ph.D., Mechanical Engineering, University of California at Berkeley, 1988
- M.S., Mechanical Engineering, University of California at Berkeley, 1985
- B.S., Mechanical Engineering, National Taiwan University, 1981

Brief Biography

Dr. Ching-Yao Chan is Co-Director of Berkeley DeepDrive (BDD). Dr. Chan leads research projects on intelligent autonomy of dynamic systems. His recent projects involve machine learning/AI applications on autonomous systems.

Dr. Chan has three decades of research experience in a broad range of automotive and transportation systems. His research ranges from automated systems, sensing and wireless communication technologies, data analytics and safety assessment, to applications of artificial intelligence on autonomy.

Dr. Chan is a Research Faculty at California PATH (Partners for Advanced Transportation Technology). At PATH, Dr. Chan leads research projects in automation, advanced technologies, human factors, and transportation systems. He is the recipient of the Team Leadership Award from Berkeley Institute of Transportation Studies in 2020 and the Distinguished Legacy Award in 2024.

ScholarGPS recognizes Dr. Chan' s strong publication record, the impact of work, and the notable quality of scholarly contributions and places him in the top 0.5% of all scholars worldwide.

Dr. Chan serves as a member of the board of directors for the School of Computing, National Cheng-Kung University, Taiwan. He is also an advisory board member of the Unmanned Vehicles Research and Development Center, National Taiwan University. Dr. Chan was a Visiting Professor at National Taiwan University in 2022 and a Visiting Professor at University of Tokyo in 2006-2007.

Powering the Future: Innovations in Batteries, Electric Vehicles, and Safety

Scott Moura

Associate Professor | Director of eCAL

PATH Faculty Director | Chair of Engineering Science

University of California, Berkeley

Abstract

This keynote speech discusses the technological frontier of battery, electrified vehicle, and safety innovations. By the end of this talk, you will be able to identify the opportunities and challenges of transitioning the transportation fleet to electrified powertrains. We begin by identifying what societal-scale problems can be solved by electrifying transport. Next we provide a brief overview of various electric powertrain technologies and battery technologies. In the final section of the speech, we review safety challenges with electrified vehicles, and innovation trends to address those challenges.

Technology, Innovation, and Smart Transportation

Ching-Yao Chan

Co-Director

Berkeley DeepDrive Industrial Consortium

University of California, Berkeley

Abstract

The transportation field has seen the rise of ride hailing, delivery of online ordered goods, and availability of traveler information in the past decades. Currently, we are witnessing trend-setting forces, including climate change, electrification, automation, connectivity, and the merging AI technologies. These powerful trends will drive the next wave of transition to smarter, more efficient, and safer mobility. The continuing progress of technology and innovation will lead to impactful and profound paradigm shifts in transportation.

2024 International Forum on EV/AV/AI Safety & Technology

電動車、自駕車及人工智慧安全技術國際論壇

Session I
Policy, Safety, and Technology of Electric Vehicles
電動車政策、安全與技術

Electric Vehicle Safety

Scott Moura
Associate Professor | Director of eCAL
PATH Faculty Director | Chair of Engineering Science
University of California, Berkeley
加州大學柏克萊分校先進交通技術研究中心主任

Abstract / 摘要

This breakout session talk reviews the top technology and policy issues related to electrified vehicle safety. The topics include battery fires, charging infrastructure, crash safety, and cyber security.

Smart Electric Vehicle Testing Plan
智慧車輛測試計畫

Pierce Huang / 黃品誠
Assistant Vice President
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Abstract / 摘要

The testing plans for traditional vehicles (internal combustion engine vehicles), electric vehicles (EVs), and smart vehicles (autonomous or connected vehicles) differ significantly, reflecting the unique characteristics and technical requirements of each type. Vehicle development testing plans serve as detailed guidelines to ensure that new vehicle models meet design and performance goals at various stages of testing. These tests cover various aspects of vehicles, including safety, reliability, durability, performance, and regulatory compliance. Smart vehicles, which integrate features like environment perception, planning and decision-making, and multi-level driver assistance, present a comprehensive challenge in terms of safety during testing. To address this challenge, advanced testing techniques, simulations of diverse driving environments and scenarios, and purpose-built autonomous vehicle testing facilities are essential to ensure the safety and reliability of vehicle.

傳統內燃機車輛、電動車輛和智慧車輛的測試計畫在許多方面有所不同，這些差異反映了各種類型車輛的獨特特性和技術需求。車輛開發測試計畫是一個詳細的指南，用於確保新車型在各個階段的測試中達到設計和性能目標。這些測試涵蓋了車輛的各個方面，包括安全性、可靠性、耐久性、性能和法規符合性。智慧車輛是一個集環境感知、規劃決策、多等級輔助駕駛等功能於一體的綜合系統，因此，智慧車輛的安全性在測試計畫的實施上是一個綜合性的挑戰，需要先進的測試技術、模擬各種駕駛環境和情況專門設計和建造的自駕車測試場地，確保車輛在進入公共道路之前經過充分測試和驗證，提高其安全性和可靠性。

The Application and Upgrade for Fast charging Public Transportation
快充系統導入大眾運輸的應用及提升

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Abstract / 摘要

The whole world is moving towards the goal of Net-zero Emissions, and each country has set its own target year and related policies for achieving Net-zero Emissions. Taiwan is no exception, setting a goal of Net-zero Emissions by 2050, with the full electrification of public buses by 2030 as one of the main policies. Master Bus, one of Taiwan's national team for electric buses, has been manufacturing buses for over 20 years. The group also includes fleet operators, after-sales service, and parts supply companies, providing customers with a complete Total Solution. In terms of electric buses, it uses a unique 15-minute fast charging technology, which allows the daily operating mileage of over 1,000 kilometers per vehicle without affecting the existing depots and fleet planning of operators, making it the best solution for the introduction of electric buses in cities and countries.

全世界都朝著淨零碳排的目標前進，每個國家也相對應的訂定了目標淨零碳排的年限及相關 政策台灣也不例外，訂定了 2050 淨零轉型目標，並以 2030 公共巴士全面電動化 作為主要推動政策之一。成運汽車為台灣電動巴士國家隊，打造巴士超過 20 年，集團內更有車隊營運業者、售後服務及零件供應公司，提供客戶完整的 Total Solution。在電動巴士方面採用獨步全球 15 分鐘快充技術，能在不影響營運業者現有場站及車隊數規劃下導入，每車每日營運里程 超過 1000 公里之電動巴士，為都市國家導入電動巴士最佳解決方案。

Advanced Technology and Safety Configurations of Electric Bus
電動大客車先進技術及主被動安全

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Abstract / 摘要

To reduce casualties caused by traffic accidents, the EU will update GSR2 (General Safety Regulation) in July this year. The update includes eight advanced software technologies to assist driving, and various manufacturers' advanced technologies and safety configurations will gradually need to comply with these emerging international standards. These include blind spot detection systems, fatigue detection systems, and tire pressure warning systems, enhancing driving safety. In recent years, EEA systems have also tended to be developed independently by car manufacturers, as they can monitor the status of various electronic components in real-time. Additionally, car manufacturers have developed many active safety systems (such as hill ascent and descent assist, inner wheel difference warning, surround view imaging, and handbrake warning) and passive safety systems with high structural rigidity developed through CAE software analysis and field testing. These active and passive technologies, along with rigorous safety testing, ensure the reliability and safety of future electric buses under various driving conditions.

為了降低車禍意外導致之人員傷亡，歐盟即將於今年 7 月更新 GSR2(車輛安全法規)，內容涵蓋 8 大先進軟體技術去輔助駕駛，而各廠商的先進技術和安全配置也逐漸需對應此新興之國際規範，包括盲點偵測系統、疲勞檢測系統和輪胎壓力警告系統等，提升了行車安全。而近年來 EEA 系統也傾向由各車廠能有能力自行開發，因其能即時監測各電子零件之狀況。此外，各車廠也自我開發許多主動安全系統（如上下坡輔助、內輪差警告、環景影像及手煞車未拉警示等），以及透過 CAE 軟體分析及實地測試發展出之高結構剛性的被動安全系統。這些主被動技術和嚴格的安全測試確保了未來電動巴士在各種駕駛條件下的可靠性和安全性。

TTSB Investigation Experiences on Electric Vehicle & Autonomous Vehicle Occurrence
運安會電動車、自駕車之重大事故調查經驗

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Abstract / 摘要

Electric and autonomous (including Advance Driver Assistance System, ADAS) vehicles emerge and thrive across the world nowadays. Simultaneously people concern safety issues about these developing technologies. Taiwan Transportation Safety Board (TTSB) files investigations for transportation occurrence, the aim of TTSB is to prevent the similar occurrences from happening again. This lecture is based on the “Tamshui Bus Company, Ltd. E-Bus Battery Fire Occurrence (TTSB didn’t file for investigation, only collected factual data for the occurrence)” and “National Highway Truck Mounted Attenuator (TMA) Rear-end Occurrence” by briefly introducing how the TTSB collecting data on electric and autonomous (ADAS) vehicles related occurrences, including battery burning condition and cause analysis on electric vehicle; through event data recorder (EDR) to understand vehicle driving condition and driver’s reaction before crash on autonomous (ADAS) vehicle, to demonstrate capabilities and techniques on emerging vehicle occurrence investigations that established by the TTSB.

電動車及自駕車（含駕駛輔助）為國際間蓬勃發展之新興運具，而快速科技的發展衍生的運輸安全課題，亦為大眾所關注。國家運輸安全調查委員會（運安會）從事重大運輸事故調查，主要目的是預防類似事故的再發生。本演講係以「淡水客運電動巴士起火案（運安會僅蒐集事實資料，未立案調查）」及「1121130小客車國道1號往北大雅路段追撞緩撞車事故」為例，說明運安會對於電動車及自駕（駕駛輔助）車相關案件之資料收集及調查方向，包含電動車電池燃燒狀況及分析等；透過事故車輛事件紀錄器（Event Data Recorder, EDR）資料解讀，了解自駕（駕駛輔助）車輛事故前行駛狀況、駕駛應變情形等，據以呈現目前運安會針對新興運具事故調查已建置之能量與技術。

Quantifying Risk and Managing Uncertainty in Electric Vehicle Automation
電動車自動化系統之不確定性與風險評估

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Abstract / 摘要

Vehicle electrification and automation introduce significant complexity into vehicle design, increasing the potential for failure as the number of electric components and their interactions grow. This talk explores the challenges of managing this complexity, focusing on the critical aspects of uncertainty and risk in automated vehicle systems. Uncertainty, defined as deviations from a component's predicted value—including errors and variations—must be quantified and managed in automation schemes like cruise control and lane change systems. The ISO 26262 standard provides a framework for risk quantification, yet it often includes imprecise descriptions. Using cruise control as a case study, we will demonstrate a systematic approach to describing and managing risk. Additionally, we will discuss the importance of incorporating risk into automated driving decisions to ensure vehicles are suitable for public roads. Without effective risk management, automated vehicles risk becoming overly conservative, impairing their functionality in current traffic situations. In conclusion, the increasing complexity of vehicle systems underscores the critical need for robust uncertainty management and risk assessment, as naive approaches can significantly impact the safety and reliability of automated vehicles.

車輛的電動化和自動化讓車輛設計與維護的難度又提高了一個層次，隨著電子元件數量及交互影響的增加，車輛的故障風險也隨之上升。本演講主要針對各種不確定性問題對車輛決策的影響進行探討。我們所提及之不確定因素主要是零件本身的規格或感測偏離原設定目標值，如誤差或變異。雖 ISO 26262 之標準明訂此類風險的評估方式，然而許多的細節仍仰賴主觀的人為判定，缺乏客觀的量化基準。因此我們以定速巡航跟車和變換車道兩者為例，說明在這樣的自動化駕駛模式中，不確定因素如何影響最後的性能。除了系統性能對車輛的影響外，我們也探討自主駕駛決策中加入風險的重要性，文獻顯示缺乏有效的風險管控，或設置過於保守的風險策略，自主駕駛車進入一般混流交通中反而造成其他車輛的危害。整體而言，隨著車輛的電子與控制複雜化，我們更需要建立更健全的風險評估機制，避免過度簡化的評估而形成實際執行上的危害。

Empowering Smart Homes and Resilient Grids in the EV Prosumer Era
智慧家庭與強韌電網 - 電動車的Prosumer世代

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Abstract / 摘要

The widespread adoption of electric vehicles (EVs) presents a challenge to the stability of power grids, as their intermittent and large-scale energy demands strain grid resilience. V2X technologies, particularly V2H (Vehicle-to-Home), offer a promising solution to this challenge. V2H enables EVs to function as both transportation and home energy storage systems, discharging power to meet household electricity needs or optimizing energy usage based on solar power generation, time-of-use electricity pricing, and real-time consumption patterns. This integration transforms EVs into integral components of smart homes, enhancing energy efficiency and overall grid resilience. This presentation delves into V2H technology, the Prosumer concept, and real-world applications, exploring how these advancements are shaping the future of the energy landscape.

隨著電動車的普及，電網面臨了新的挑戰，因為大量且不定時的取電行為對其強韌性構成影響。V2X技術為解決這一問題提供了新的路徑。其中，V2H技術允許電動車在作為交通工具的同時，也作為家用儲能設備，在家庭需求電力時進行放電，或是搭配太陽能發電、時間電價與實際用電需求作電力調度。這將使得電動車成為智慧家庭應用的一環，讓能源管理更有效率，同時也增強整個電網的強韌性。本次演講將介紹V2H技術、Prosumer概念與實際應用案例，並探討相關技術如何影響未來的能源產業。

Next Generation Batteries:
Driving Electric Vehicles Toward a Net Zero Future
次世代電池：推動電動車邁向淨零排放的未來

Dmitry Belov
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Abstract / 摘要

ProLogium Technology is the world's first enterprise to mass-produce next-generation batteries, disrupting over 30 years of tradition and introducing a completely new platform.

Our technology features:

1 High product technology ability, suitable for various form factors, anode materials, and battery pack technologies.

2 High manufacturing ability, significantly reducing costs, improving production speed and yield rates.

These advancements facilitate:

1 Rapid technological evolution.

2 Rapid cost reduction.

3 Recycling and reuse capabilities.

It represents the only solution that balances between "Performance," "Cost," and "Resource Circulation".

輝能科技是全球首家量產次世代電池的企業，顛覆30多年傳統，開創全新架構平台，具

1 高度擴充性，適用多種形式/多種負極/電池包技術。

2 高度量產性，可大幅降本、提高產速和產量，提升良率。

利於

1 技術快速迭代。

2 快速降價。

3 回收再利用。

是唯一可兼顧「性能」、「成本」與「資源循環」的解決方案。

2024 International Forum on EV/AV/AI Safety & Technology

電動車、自駕車及人工智慧安全技術國際論壇

Session II
Policy, Safety, and Technology of Autonomous Vehicle and Artificial Intelligence
自駕車及人工智慧政策、安全與技術

AI Applications for ADS and Safety Issues
人工智慧於自動駕駛系統及安全議題之應用

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Abstract / 摘要

AI/machine learning can be applied to various functions for automated driving systems. Due to the complexity of operating conditions, it is quite challenging to meet the stringent safety requirements of automated operations. In this briefing, some safety issues relate to the characteristics of AI capabilities and implementation will be highlighted and discussed.

FAST AI One-Stop Software System for Smart Transportation Applications
FAST AI一站式軟體系統於智慧交通應用

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Abstract / 摘要

FAST AI is a one-stop AI development platform, offering key features for data preparation, AI model creation, and AI model deployment. The platform includes functions such as data cleaning, data annotation, feature extraction, AI model creation, AI performance validation, and AI model deployment. Fast AI is designed with low-code and no-code concepts; it lowers the entry barrier for users, enabling them to create AI models without programming. FAST AI provides various project templates for AI models, such as object detection, image classification, time series forecasting, and so on, assisting small and medium-sized enterprises in quickly building domain-specific AI application models. This presentation will explain the application of the FAST AI one-stop software system in smart transportation, such as assisting in vehicle type recognition and vehicle counting.

FAST AI是一站式AI建模開發平台，平台提供完整資料整備、AI模型建立與部署功能，包括資料清理、資料標註、特徵萃取、AI模型建立、成效驗證和模型部署，以Low code, No Code設計，降低使用者使用門檻，免程式完成AI模型建立。FAST AI提供多種AI模型的專案模板，如物件偵測、影像分類、時間序列預測等，協助中小企業可以快速建立領域AI應用模型。本演講將說明FAST AI一站式軟體系統於智慧交通應用，如協助車種辨識、車輛計數。

V2V Metro-Like Technology:
Cost-Effective Autonomous Driving Solution in Taiwan
車路雲整合，V2V 帶動自動駕駛邁向類捷運應用

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勤崴國際科技股份有限公司副總經理

Abstract / 摘要

Kingwaytek provides comprehensive smart transportation solutions, leveraging AI for autonomous driving and ADAS. Our offerings include HD maps, autonomous systems, fleet management platforms, V2X communication, and roadside units. Our autonomous electric buses operate in over 13 locations across Taiwan, including the Southern Taiwan Science Park and various cities. Committed to green transportation, we will continue advancing the commercialization of autonomous driving and ADAS platforms.

勤崴國際提供完整的智慧交通解決方案，透過AI大量學習與應用，我們提供自動駕駛及ADAS整體解決方案，包括高精地圖、自動駕駛系統、車隊管理平台、車聯網和路側設備解決方案。勤崴國際的自動駕駛電動巴士已成功在全台13處以上的場域進行應用，並於南部科學園區及各縣市導入自駕電動巴士接駁。長期以來，我們致力於推動綠色運輸鏈，未來將持續深化自駕車及ADAS管理平台的商業化應用。

On the Application and Development of Digital Tachographs
數位式行車記錄器之應用與發展

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Abstract / 摘要

The presentation introduces digital tachographs and details their evolution from mechanical versions to modern devices that record speed, location, and driving routes. It emphasizes their role in enhancing road safety and regulatory compliance, compares them with event data recorders, and discusses challenges such as data accuracy and cybersecurity. Future directions include AI integration and improved data security.

該展示介紹了數位行車記錄儀，並詳細介紹了它們從機械版本到記錄速度、位置和行駛路線的現代設備的演變。它強調了它們在增強道路安全和監管合規性方面的作用，將它們與事件數據記錄器進行了比較，並討論了數據準確性和網路安全等挑戰。未來的方向包括人工智慧整合和提高資料安全性。

Taiwan's Roadmap of Autonomous Vehicle Regulatory Adjustment
臺灣自駕車法規調適路徑

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Abstract / 摘要

Taiwan's vehicle safety regulations are harmonized and implemented with UNECE regulations. In US, Germany and Japan, there are already mature ADAS technology being applied on road vehicles. Taiwan had the Unmanned Vehicle Technology Innovative Experimentation Act in 2018, and there were 16 Autonomous Vehicle sandbox experiments and three are still undergoing. Taiwan has developing management strategies through the feedback from sandbox experiences The Ministry of transportation and Communication (MOTC) has started works since 2023: monitoring international development trend, check the regulations need to be adjusted, and keeping up with the need of application and management of future AVs. MOTC will keep planning for short/mid/long-term regulatory adjustment development and continuously advanced to establish a comprehensive management framework for AVs.

臺灣車輛安全法規是接軌國際調和聯合國UNECE法規導入國內實施，車輛駕駛輔助系統甚或是進階的自動駕駛系統現階段國內外都尚在技術及系統自動等級提升發展階段，而國內為因應自駕車輛技術發展趨勢，並支持國內創新科技結合車輛產業投入自駕系統或車輛的開發應用，在經濟部「無人載具科技創新實驗條例」架構下，迄今共有16案自駕車計畫申請沙盒實驗，3案仍在實驗中。為探討後沙盒時代銜接發展路徑及預作相關法令調適準備，交通部2021年9月就成立「自動駕駛車輛發展策略委員會」，目前是優先聚焦自駕公車為推動政策方向，已經委請專業機構團隊研議制訂「自駕公車運行安全指引」中，同時也展開未來自駕車法令調適準備的規劃作業。

Development of Connected Vehicle Technology and Its Role in Automated Driving
車聯網技術發展及其在自動駕駛角色

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Abstract / 摘要

Connected vehicles or cooperative ITS (C-ITS) connect people, vehicles, and roads through short-range communication technology. It provides V2X services which include Vehicle-to-Vehicle (V2V), Vehicle-to-Infrastructure (V2I), Vehicle-to-Pedestrian/Cyclist (V2P), and Vehicle-to-Network (V2N). These services enhance traffic safety by offering real-time and effective alerts, as well as supporting traffic management and sustainable transportation goals. Connected vehicles facilitate the sharing of real-time traffic information, enabling the integration of Advanced Driver Assistance Systems (ADAS) and autonomous driving technologies to tackle safety requirements in complex road environments. In response to connected vehicles development needs in Taiwan, the Ministry of Transportation and Communications (MOTC) initiated the “Smart Transportation Field Test and Research Project” in the Tamsui New Town area. This project not only adopted major international standards but also developed the “Taiwan C-ITS Roadside Open Standards (TCROS)” for the standard harmonization purpose.

車聯網藉由短距通訊技術將運輸系統的人、車、路組成串聯起來，提供車與車(V2V)、車與路側設備(V2I)、車與行人/自行車(V2P)、車與核心網路(V2N)等的V2X服務，透過更即時與有效的交通安全警示，以及衍生的交通管理與低碳運輸服務，以支援智慧運輸在交通安全、運輸服務、永續運輸的目標。經由車聯網的即時資訊分享，不單可以落實前述的智慧運輸目標，同時可以結合先進駕駛輔助(ADAS)與自動駕駛技術，來積極回應複雜道路環境下的安全駕駛需求。國內在因應車聯網發展需求，交通部推動「淡海新市鎮智慧交通場域試驗研究計畫」，該計畫除積極導入主流國際標準外，同時研擬「臺灣協同智慧運輸車聯網路側設施資通訊開放標準(Taiwan C-ITS Roadside Open Standards, TCROS)以利標準調和。

Embedded AI Technology Design and Its Applications on Automated Vehicle
嵌入式人工智慧技術與其智慧車應用

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Abstract / 摘要

This talk discusses our in-house embedded AI design methodology and some use cases for intelligent vehicle applications. The proposed methodology comprises an automatic model pruning method to simplify the model complexity according to user's demand in terms of different pruning ratios and then followed by an automatic self-learning method to fine tune the simplified model to be adapted to field applications without labeling datasets. Then, an automatic model quantization method is applied to refine the fine-tuned model from 32-b float weights to 8-b/4-b weights before being deployed on an embedded AI SoC with limited quality degradation. Finally, some intelligent vehicle application use cases applying the proposed embedded AI design methodology are introduced to show its model compression performance.

本演講討論我們所研發的嵌入式人工智慧設計方法與其智慧汽車應用實例，此方法包含可依照使用者需求來設定模型剪枝優化比例的自動化模型剪枝方法，隨後是可自動進行模型場域調教訓練的AI模型自我學習方法，使用者無需標記大量圖資，即可完成模型場域調教訓練，接下來是8位元/4位元定點數模型優化訓練方法，可將浮點數AI模型優化成為8位元或4位元定點數模型，並確保模型準確度，並可進行模型移植到AI SoC晶片。最後，我們將呈現採用此嵌入式人工智慧設計方法來進行模型壓縮之智慧汽車應用案例。

Autonomous Vehicles on Public Roads in Taiwan and Australia
臺灣與澳洲自動駕駛車輛之現況

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Abstract / 摘要

The autonomous vehicles group at MMSL, ITRI has been conducting testing and verification on public roads in Taiwan since 2019. In this talk, the AV operations at Taoyuan International Airport, Taiwan and on M1 freeway in Melbourne, Australia will be described.

自 2019 年獲得台灣第一張自駕車開放道路試車牌以來，工研院機械所自駕車團隊已經在新竹、台中、桃園等地進行自駕車系統測試與驗證。這個演講將分享我們在台灣桃園國際機場與澳洲墨爾本高速公路上的自駕車測試驗證經驗。

Autonomous Vehicles in Taiwan: From Regulatory Sandbox to Regulations In The Near Future
自駕車在台灣：從監理沙盒到未來規範框架

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Abstract / 摘要

The Unmanned Vehicles Technology Innovative Experimentation Act establishes a regulatory sandbox mechanism, temporarily exempting certain regulations under specific conditions to accelerate the validation of autonomous vehicle technologies, services, and business models. So far, 16 autonomous vehicle trials have been approved, including logistics, last-mile shuttles, sightseeing shuttles, employee shuttles, urban transportation, and vehicle-to-vehicle (V2V) communication verification. However, the commercialization of autonomous vehicles involves various regulatory aspects related to road users, vehicles, roads, industries, insurance, and accident investigation. Therefore, it is crucial to prioritize legislative amendments based on sandbox experiences and to formulate a feasible regulatory adjustment timeframe.

《無人載具科技創新實驗條例》建立監理沙盒機制，在特定條件下暫時排除法規限制，加速技術、服務與商業驗證。至今已核准包括物流、最後一哩路接駁、觀光接駁、員工接駁、都會運輸與車聯網驗證等 16 案。然而，自駕車落地商用涉及人、車、路、業、保險、事故調查，如何從沙盒驗證立修法的輕重緩急，進而訂定具體可行之法規調適期程，實為關鍵。

Note

Organizer 主辦單位	Taiwan Transportation Safety Board 國家運輸安全調查委員會
Co-organizer 協辦單位	Ministry of Transportation and Communications 交通部
	Highway Bureau, MOTC 交通部公路局
	Administration for Digital Industries, MODA 數位發展部數位產業署
	Master Transportation Bus Manufacturing Ltd. 成運汽車製造股份有限公司
	RAC Electric Vehicles Inc. 華德動能科技股份有限公司