



# AVS2015 参加報告

AVS: Automated Vehicles Symposium

2015年7月29日

国際連携WG 主査

天野 肇

# 開催概要

## AUTOMATED VEHICLES SYMPOSIUM 2015

*DRIVERS. VEHICLES. INFRASTRUCTURE.*

**SYMPOSIUM:** JULY 21-23, 2015

**ANCILLARY MEETINGS:** JULY 20 and 24, 2015

Ann Arbor Marriott Ypsilanti at Eagle Crest Hotel and  
Conference Center | Ann Arbor, Michigan | USA



**会期:** 2015年7月21日～23日

**場所:** Ypsilanti, Michigan, U.S.A.

**共催:** Transportation Research Board  
Association of Unmanned Vehicle System International



# 参加状況(全体)

AUTOMATED VEHICLES SYMPOSIUM 2014	550 attendees
AUTOMATED VEHICLES SYMPOSIUM 2015	862 attendees





# 参加状況(米国内)



## Top 4 States by Attendance

AUTOMATED VEHICLES SYMPOSIUM **2014**

California	123
Michigan	45
Wash D.C.	41
Virginia	24

AUTOMATED VEHICLES SYMPOSIUM **2015**

Michigan	253
California	86
Wash D.C.	54
Virginia	43



# プログラム 7月21日 (1/2)

8:00 AM - 8:10 AM	<b>Symposium Welcome - AUVSI and TRB</b> <b>Brian Wynne</b> , President and CEO, AUVSI and <b>Jane Lappin</b> , Chair, TRB Intelligent Transportation Systems Committee and Volpe National Transportation Systems Center
8:10 AM - 8:15 AM	<b>Welcome to Michigan</b> <b>Kirk Steudle</b> , Director, Michigan department of Transportation – <i>No Slides Available</i>
8:15 AM - 8:45 AM	<b>Opening Keynote Address</b> <b>Dr. Mark R. Rosekind</b> , Administrator, National Highway Traffic Safety Administration
8:45 AM - 9:45 AM	<b>Vehicle Manufacturer and Supplier Briefings</b> 8:45 AM - 9:00 AM   <b>Delphi</b> <b>Michael Pozsar</b> , Vice President, Electronic Controls, Electronics & Safety, Delphi 9:00AM - 9:15 AM   <b>Bosch</b> <b>Dr. Kay Stepper</b> , Vice President, Head of Regional Business Unit Driver Assistance & Automate Driving, Robert Bosch LLC 9:15 AM - 9:30 AM   <b>General Motors</b> <b>Dr. Cem U. Saraydar</b> , Director, Electrical and Controls Systems Research Lab, General Motors 9:30 AM - 9:45 AM   <b>Panel Session</b> Moderator: <b>Bob Denaro</b> , Chair, TRB Joint Subcommittee on Challenges and Opportunities for Road Vehicle Automation and ITS Consultant
9:45 AM - 10:15 AM	Break
10:30 AM - 11:50 AM	<b>Identifying and Addressing Key Research Questions</b> 10:15 AM - 10:30 AM   <b>Legal Issues Addressed in the EU Adaptive Project</b> <b>Andreas Knapp</b> , Daimler AG 10:30 AM - 10:45 AM   <b>Key Safety Principles for Automation by Automation Level</b> <b>Levasseur Tellis</b> , Technical Specialist, Functional Safety, Ford Motor Co. 10:45 AM - 11:00 AM   <b>Michigan Mobility Transformation Center Research Roadmap</b> <b>John Maddox</b> , Assistant Director, Michigan Mobility Transformation Center 11:00 AM - 11:15 AM   <b>Ethical Considerations for Vehicle Automation Systems</b> <b>Dr. Chris Gerdes</b> , Professor, Mechanical Engineering, Stanford University 11:15 AM - 11:30 AM   <b>EU-US Collaboration in Road Transport Automation</b> <b>Dr. Peter Sweatman</b> , UMTRI 11:30 AM - 11:50 AM   <b>Panel Session</b> Moderator: <b>Dr. Steven Shladover</b> , Chair, TRB Vehicle-Highway Automation Committee and University of California PATH Program



# プログラム 7月21日 (2/2)

11:50 AM - 12:25 PM	<p><b>Panel Session: Private Investment in Vehicle Automation – No Slides Available</b> <i>Moderator: <b>John Casesa</b>, Vice President of Global Strategy, Ford Motor Co.</i> <i>Panelists: <b>Philipp von Hagen</b>, Member of Executive Board, Porsche Automobil Holding SE; <b>Zach Barasz</b>, Kleiner Perkins Caufield &amp; Byers; <b>Glenn Mercer</b>, Industry Analyst; <b>Chris Thomas</b>, Founder and Partner, Fontinalis</i></p>
12:25 PM - 12:30 PM	Breakout Session Instructions
12:30 PM - 1:45 PM	Lunch
1:45 PM - 5:30 PM	<p><b>Breakout Sessions</b> <i>More information including session locations and detailed agendas will be available soon.</i></p> <ol style="list-style-type: none"><li>1. Human Factors In the Design of Road Vehicle Automation</li><li>2. Early Deployment Opportunities For Connected Automation Systems</li><li>3. Beyond Single Occupancy Vehicles: Automating Transit and Shared Mobility</li><li>4. Wireless Connectivity For Automated Vehicles: What Concepts Need It? What Technologies Provide It?</li><li>5. Energy and Demand</li><li>6. Integrated Traffic Flow Models and Analysis For Automated Vehicles</li><li>7. Legal Pathways to Automated Vehicles</li><li>8. Truck Automation</li><li>9. Prioritizing Public Policy Challenges for Automated Vehicles</li><li>10. Physical and Digital Infrastructure</li><li>11. Vulnerable Road Users: How Can Automated Vehicle Systems Help to Keep Them Safe and Mobile?</li><li>12. Verification and Validation of On-Road Automated Vehicles</li></ol> <p><b>PLEASE NOTE: ALL BREAKOUT SESSIONS ARE CLOSED TO THE MEDIA</b></p>



# プログラム 7月22日 (1/2)

8:00 AM - 8:15 AM	<b>Symposium Welcome/Opening Comments</b> <b>David Agnew</b> , R&D Strategy & Intelligence, North America, Chassis & Safety Division, Continental Automotive Systems Inc.
8:15 AM - 8:45 AM	<b>Keynote Address</b> <b>Dr. Chris Urmson</b> , Director, Self-Driving Cars, Google [x] – <i>No Slides Available</i>
8:45 AM - 10:00 AM	<b>International Automated Vehicle Initiatives</b> 8:45 AM - 9:00 AM   <b>CityMobil2</b> <b>Dr. Adriano Alessandrini</b> , University di Roma La Sapienza and Project Coordinator, CityMobil2 9:00 AM - 9:15 AM   <b>The Pathway to Automation &amp; Connectivity: Meaningful Momentum in the UK</b> <b>Michael Hurwitz</b> , Director, Energy, Technology & International, Department for Transport 9:15 AM - 9:30 AM   <b>Drive Sweden</b> <b>Jan Hellaker</b> , Head of Automation, Lindholmen Science Park AB 9:45 AM - 10:00 AM   <b>World Economic Forum</b> <b>Alex Mitchell</b> , Director, Head of Automotive Industry, World Economic Forum
10:00 AM - 10:30 AM	Break
10:30 AM - 10:45 AM	<b>Automated Vehicles and Public Perception</b> <b>Kristin Kolodge</b> , Executive Director, Driver Interaction, J.D. Power
10:45 AM - 11:15 AM	<b>Automated Vehicles and Human Factors</b> 10:45 AM - 11:00 AM Human Factors Evaluation of Level 2 and Level 3 Automated Driving Concepts <b>Dr. Myra Blanco</b> , Director, Center for Automated Vehicle Systems – Virginia Tech Transportation Institute 11:00 AM - 11:15 AM <b>Patrice Reilhac</b> , Innovation & Collaborative Research Director, Comfort & Driving Assistance Business Group, Valeo
11:15 AM - 11:30 AM	<b>Automated Trucking Applications</b> <b>Josh Switkes</b> , Founder and CEO, Peloton Technology Inc.



# プログラム 7月22日 (2/2)

11:30 AM - 11:45 AM	<b>Digital Infrastructure</b> <b>Ogi Redzic</b> , Senior Vice President, Automotive, HERE
11:45 AM - 12:30 PM	<b>Panel Session: Automated Vehicle Verification</b> <i>Moderator:</i> <b>John Maddox</b> , Assistant Director, Mobility Transformation Center <i>Panelists:</i> <b>Stephanie Dougherty</b> , Chief of Enterprise Planning and Performance, California Department of Motor Vehicles <b>Ibro Muharemovic</b> , Continental Automotive Systems Inc. <b>Felix Fahrenkrog</b> , Manager Active Safety ADAS, Driver Assistance, RWTH Aachen University
12:30 PM - 1:45 PM	Lunch
1:45 PM - 5:30 PM	<b>Breakout Sessions</b> <i>More information including session locations and detailed agendas will be available soon.</i> <ol style="list-style-type: none"><li>1. Human Factors In the Design of Road Vehicle Automation</li><li>2. Early Deployment Opportunities For Connected Automation Systems</li><li>3. Implications of Vehicle Automation for Planning</li><li>4. Beyond Single Occupancy Vehicles: Automating Transit and Shared Mobility</li><li>5. Cybersecurity For Automated Vehicles</li><li>6. Enabling Technologies</li><li>7. Impact of Connected and Automated Vehicles on Traffic Management Systems and Operational Strategies</li><li>8. Legal Pathways to Automated Vehicles</li><li>9. Traffic Signal Control With Connected and Automated Vehicles</li></ol> <b>PLEASE NOTE: ALL BREAKOUT SESSIONS ARE CLOSED TO THE MEDIA</b>





# プログラム 7月23日 (1/2)

8:00 AM - 8:15 AM	<b>Symposium Welcome</b> <b>Mark Norman</b> , Director of Development & Strategic Initiatives, Transportation Research Board
8:15 AM - 9:30 AM	<b>Public Agency Automated Vehicle Initiatives</b> 8:15 AM - 8:30 AM   <b>Japan</b> <b>Hajime Amano</b> , President, ITS Japan 8:30 AM - 8:45 AM   <b>European Commission</b> <b>Ludger Rogge</b> , Research Programme Officer, DG Research & Innovation, European Commission 8:45 AM - 9:00 AM   <b>U.S. Department of Transportation</b> <b>Kevin Dopart</b> , Program Manager, Connected Vehicle Safety and Automation, Intelligent Transportation Systems Joint Program Office 9:00 AM - 9:15 AM   <b>National Highway Traffic Safety Administration</b> <b>Nathaniel Beuse</b> , Associate Administrator, Vehicle Safety Research, National Highway Traffic Safety Administration 9:15 AM - 9:30 AM   <b>U.S. Department of Energy</b> <b>Reuben Sarkar</b> , Deputy Assistance Secretary for Transportation, U.S. Department of Energy
9:30 AM - 10:15 AM	<b>Panel Session: State and City Level Issues</b> <i>Moderator:</i> <b>Jane Lappin</b> , Chair, TRB Intelligent Transportation Systems Committee and Volpe National Transportation Systems Center <i>Panelists:</i> <b>Dr. Johanna Zmud</b> , Senior Research Scientist, Texas A&M Transportation Institute <b>Paul Steinman</b> , District Secretary, Florida Department of Transportation <b>Leon Daniels</b> , Managing Director, Surface Transport, Transport for London
10:30 AM - 10:45 AM	Break
10:45 AM - 12:25 PM	Breakout Session Presentations
12:25 PM - 12:30 PM	Closing Comments



# プログラム 7月23日 (2/2)

1:30 PM - 3:00 PM

## **USDOT Listening Session**

Bringing together automated vehicles experts from around the world, the 2015 Automated Vehicles Symposium offers a great opportunity for the USDOT Automated Vehicles Program Managers to present research plans and findings, and discuss current issues with AVS participants. To that end, the USDOT has developed a two-part "Listening" exchange. First, USDOT program managers will present their work as part of the AVS15 poster sessions. Second, the program managers will take to the stage on Thursday afternoon to discuss key information they learned during AVS15.

Join the USDOT on Thursday afternoon at 1:30pm for a "Listening Session". The session is free and all are welcome to attend.



## 米国政府

- 車車間通信装置の装着義務化に向けた動きを加速
- 義務化後の路車間サービスへの活用に向けた実証実験を推進
- 課題は、法制化、セキュリティ確保、周波数帯安定確保

## 欧州委員会

- FP7プロジェクトの推進 (AdaptIVe、CityMobil2)
- Horizon2020プロジェクトの始動 (2016-2017公募)
- グローバル連携の強化 (米国への共同プロジェクト働きかけ)

## 欧州各国独自プロジェクト

- 英国、スウェーデン、フランス、オランダで公道自動走行
- 国策として自国内企業や研究機関を中心に推進
- 制度・認証などの国際調和でのプレゼンス確保がねらいか？

## 企業の動き

- 6月に内村副主査から報告済みの内容



# USDOT NHTSA Rosekind局長 講演要旨

NHTSA: National Highway Traffic Safety Administration

## 最近の主な話題

- 財源確保難(7月末に暫定陸上交通予算の期限切れ)
- ビジョン 'Grow America'、国民的議論 'Beyond Traffic 2045'
- 車車間通信機器搭載義務化の加速(次ページ参照)
- Cyber security(添付「NHTSA and Cybersecurity」参照)

## 民間へのメッセージ(エアバッグ問題を例に)

- 業界横断の連携の必要性
- 人を救うための技術が人を逆に傷つけることの危険

エアバッグは、米国で毎年40,000人を救っているが傷つけてしまう事例が発生してしまった。技術者は、安全に対する責任を全うする努力を。



# 米政府の動き

## 連邦運輸省 Anthony Foxx 長官の発言 2015年5月13日

Pushing V2V forward, modernizing regulatory framework aimed at speeding up technologies that can save lives, reduce crashes

### **Accelerating the schedule of NHTSA's proposal to require V2V equipment on new vehicles.**

Last year, the agency published an advance notice of proposed rulemaking and planned to send a proposed rule to the Office of Management and Budget (OMB) for review in in 2016. Foxx announced the Department has accelerated its goal and plans to send the proposal for OMB review by the end of this year.

### **Developing an expedited test plan on interference with V2V signals.**

Members of Congress and the Federal Communication Commission, which controls radio spectrum, have expressed interest in testing whether the 5.9GHz spectrum reserved for V2V communications can be “shared” with unlicensed users. The Department is committing to complete a preliminary test plan within 12 months after industry makes production-ready devices available for testing.

### **Ensuring that the Department's regulatory framework accelerates safety innovations.**

Innovation makes America's roads safer, and the Department is working to identify obstacles in the current framework to better understand where problems can be addressed internally and where we will need Congressional action.



# U.S. DOT 自動運転システム開発計画

**Goal: Enable safe, efficient, and equitable integration of automation into the transportation system**

Area	Example Applications	Research Emphasis
<b>Connected Driving Assistance</b> <i>Level 1-2</i>	Platooning, merge/weave assist, speed harmonization, and eco-approach and departure	<b>Benefits</b> (safety, mobility, sustainability) and <b>Application Development</b>
<b>Conditional Automation</b> <i>Level 2-3</i>	Highway autopilot, traffic jam assist, etc.	<b>Safety Assurance</b> (human factors, control system reliability, testing procedures, and cybersecurity)
<b>Limited Driverless Vehicle Operations</b> <i>Level 4</i>	Low-speed automated shuttles, first-last mile transportation	<b>Feasibility</b> (concept development, testing, evaluation)





# U.S. DOT 2016年度研究テーマ案(1)

Track	Agency	Project Name
Safety	FHWA	Driver Acceptance of Vehicle Automation Applications
Perform.	FHWA	Effects of Road Weather on Automated Vehicles
Perform.	FHWA	CACC Enabling Research (cont'd)
Perform.	FHWA	Automated Speed Harm. – Testing & Evaluation (cont'd)
Perform.	FHWA	Universal Automated Community Transport (cont'd)
Testing Eval.	NHTSA	Functional Testing of Varying Levels of Automation (cont'd)
Testing Eval.	JPO	Development and Validation of VA Benefits Model (cont'd)
Policy	JPO	AV Policy Issue Evaluation (cont'd)
Policy	JPO	PM Support and Outreach (cont'd)
Policy	JPO	Standards Planning for Automation(cont'd)
Policy	FMCSA	Low Speed Automated Truck Queue at Ports and Warehouses



# U.S. DOT 2016年度研究テーマ案(2)

Track	Agency	Project Name
Enabling	FHWA	Assessment of Digital Infrastructure for Vehicle Automation (cont'd)
Safety	NHTSA	Naturalistic Study of L2 AV Functions (cont'd)
Safety	NHTSA	Extension of Technical and Operational Cybersecurity Requirements to Avs (cont'd)
Safety	NHTSA	Refinement of DVI Principles for Level 2 and Level 3 Systems
Safety	NHTSA	Electronic Control System Gap Analysis for Automated Vehicles
Safety	NHTSA	Assessment of Intelligent Vehicle Health Management Systems for Automated Vehicles
Safety	NHTSA	Evaluation of the Use and Effectiveness of Failure Response Mechanisms for Automated Vehicles
Safety	NHTSA	Artificial Intelligence Performance Research for Automated Vehicles





# 欧州 Horizon 2020 の動き

## ❑ Transport is a main priority

- Budget: 6,339 b€

## ❑ 4 broad lines of activities

- Resource efficient transport
- Better mobility, less congestion, more safety and security
- Global leadership for the European transport industry
- Socio-economic and behavioural research and forward looking activities for policy making

## ❑ Implemented by

- Long-term Public-Private Partnerships
- Collaborative Research Projects following Open Calls for Proposals (annually)





# Horizon 2020 自動運転関連 公募2016-2017

## 乗用車

- レベル3の自動運転技術の効果を評価
- 混合交通の多様な交通環境下(交通量、天候、照度など)で評価
- ドライバー、クルマ、交通環境の相互関係を分析し交通行動を研究

## トラック

- 隊列走行システムを試験し、コンセプト、技術、機能を検証
- 複数メーカー車両による協調型隊列走行を公道で実施し、耐環境性を実証

## 都市交通

- 完全自動都市交通システムの安全性、信頼性、耐故障性を、マニュアル運転車、歩行者、自転車、自動二輪車などの混合交通下で実証
- 既存の公共交通システムとの統合運用を実証

## 自動運転車両の協調動作を向上させるためのICT技術

- 最先端技術を統合したICTインフラの開発と実環境での実証

## ユーザの期待と懸念

## 安全なHMI

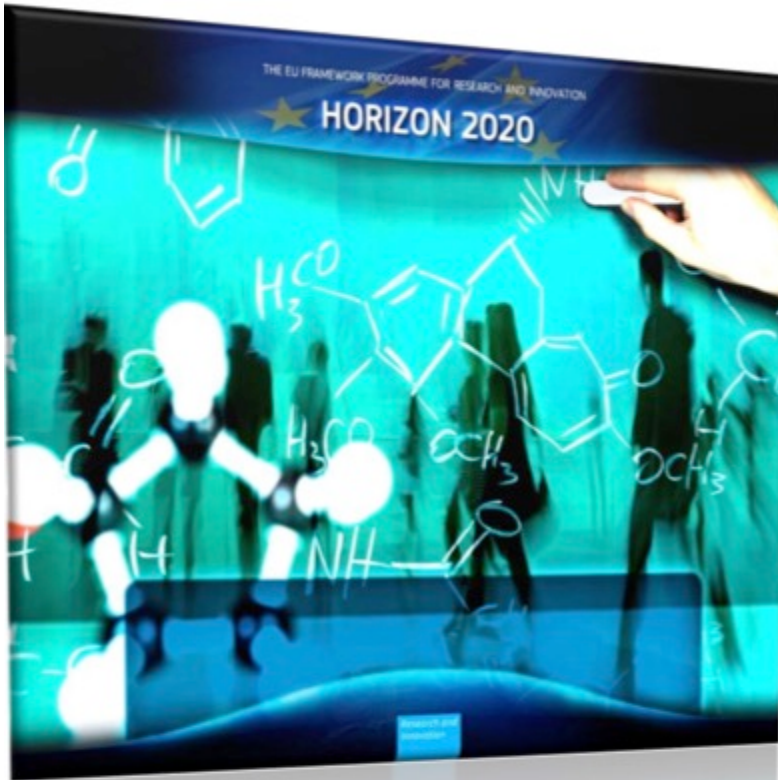
## 多様で複雑な混合交通環境下での自動運転の安全性の確保

## 自動運転の実用化のための道路インフラの革新的設計とエンジニアリング

## 実用化のための連携支援



# Horizon 2020 への域外からの参加も推奨



- ❑ All Horizon 2020 projects can include international partners
  - **Applicants from non-EU countries are eligible to take part in Horizon 2020 programmes, even as coordinator**
- ❑ Targeted Opening
  - **In some topics, identified in the calls, proposals are encouraged to include international partners**
- ❑ Twinning
  - **In some topics, proposals should foresee twinning with entities participating in projects funded by US DOT**



# 欧州-米国-日本の政府間国際連携

- Trilateral Working Group on Automation in Road Transportation
  - European Union
  - Japan
  - United States
- Complementary EU-US Research Programming on selected issues of shared interest.

EU★US★JAPAN  
ITS COOPERATION



Automation in  
Road  
Transportation  
Working Group

Digital  
Infrastructure

Accessible  
Transportation

Evaluation

Human Factors

Connectivity

System Reliability

Certification/  
Roadworthiness  
Testing



# EU-USの研究開発における連携 “Twinning”

欧州、米国がそれぞれ独自に実施する研究開発プロジェクトにおいて、類似テーマに連携して取り組むことを欧州委員会がUSDOTに提案。具体的内容について検討中。日本(SIP-adus)も参加の対象になり得る。

## 欧州委員会と米連邦運輸省が検討中の”Twinning”の方法

- 共通の関心テーマを選定
- Horizon2020の公募では”Twinning”を推奨、米国内の公募で整合をとったテーマを取り上げる方法もあり
- 欧州、米国の公募機関が”Twinning”対象テーマを設定し接触を開始
- 合意形成できたプロジェクトで”Twinning”活動を推進
- ”Twinning”の具体的な内容は、情報交換、データ共有、相互訪問、手法の共有、研究者の交流、成果の共有、共同ワークショップ開催、共同出版など幅広い形態を想定
- 研究開発費用などのリソースは、欧州、米国がそれぞれのプロジェクトに独自に提供し、相互の提供はしない



# 欧州委員会の”Twinning”テーマ候補

- ❑ **Knowledge base on all ongoing research and demonstration activities, best practices, automated driving scenarios**
- ❑ **Strategy for sharing and exploiting collected data in National, European and International FOTs**
- ❑ **Safety and end-user acceptance aspects of road automation**
- ❑ **Innovative modelling, design and engineering of road infrastructure**
- ❑ **Standards & certification (minimum performance standards, testing regime)**
- ❑ **Full-scale demonstration of urban road transport automation**
- ❑ **SAFETY**
  - Protection of all road users in crashes
  - Innovative design, upgrading and maintenance of Transport infrastructure to increase the transport system safety at modal and intermodal level
  - Behavioural aspects for safer transport
- ❑ **ITS**
  - Large-scale demonstration(s) of cooperative ITS
  - Roadmap, new business models, awareness raising, support and incentives for the roll-out of ITS
- ❑ **INFRASTRUCTURE**
  - Resilience to extreme (natural and man-made) events
  - Optimisation of transport infrastructure multi-modal corridors and terminals