Automated Driving Systems

Overview of International Cooperation

Takahiko Uchimura, Vice-Chair
SIP-adus International Cooperation Working Group
ITS Japan
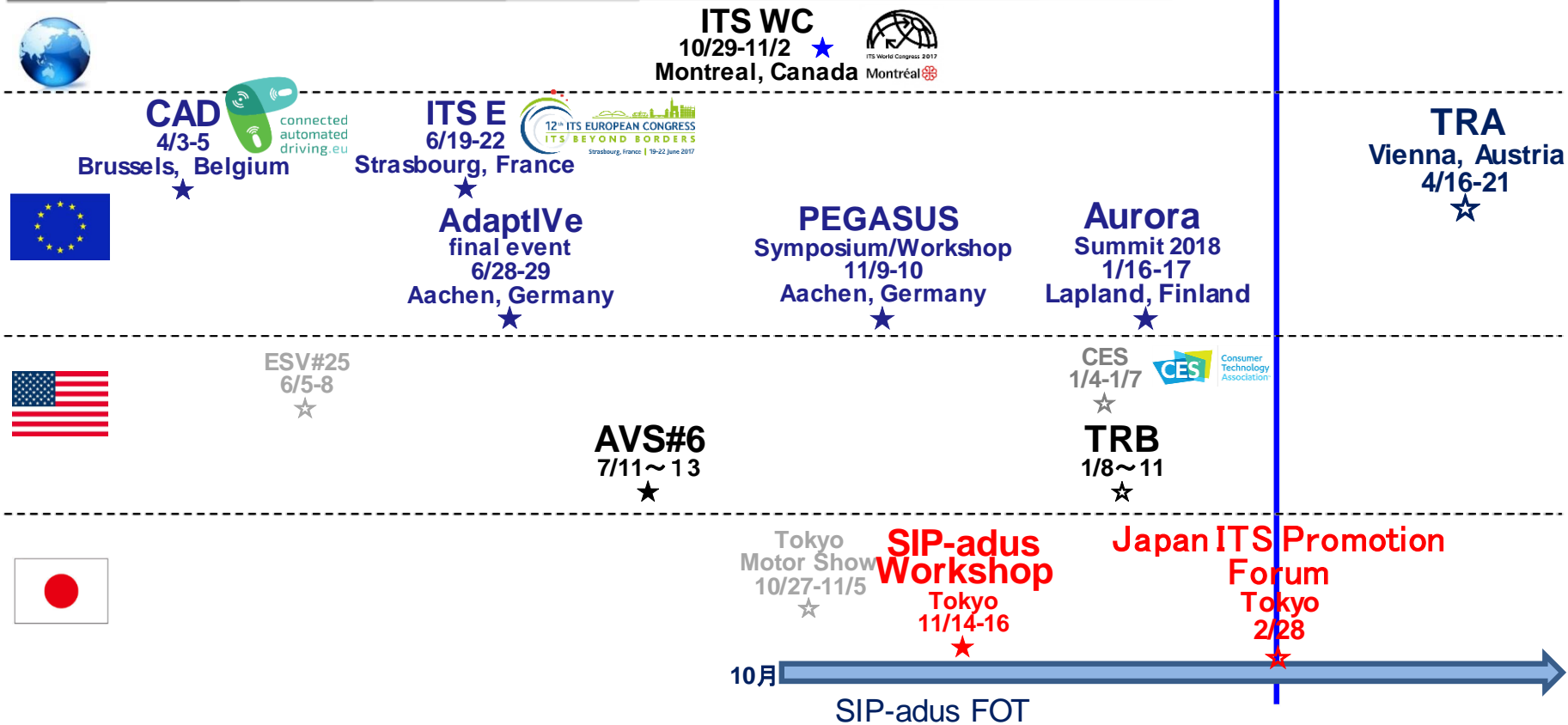
<Translated Version>

INDEX

◆ Participation in Lectures and Discussions

February

2017

ITS WC
10/29-11/2 ★
Montreal, Canada

CAD
4/3-5
Brussels, Belgium ★

ITS E
6/19-22
Strasbourg, France ★

TRA
Vienna, Austria
4/16-21 ☆

AdaptIVe
final event
6/28-29
Aachen, Germany ★

PEGASUS
Symposium/Workshop
11/9-10
Aachen, Germany ★

Aurora
Summit 2018
1/16-17
Lapland, Finland ★

ESV#25
6/5-8 ☆

CES
1/4-1/7 ☆

AVS#6
7/11～13 ★

TRB
1/8～11 ☆

Tokyo
Motor Show
10/27-11/5 ☆

SIP-adus Workshop
Tokyo
11/14-16 ★

**Japan ITS Promotion Forum**
Tokyo
2/28 ★

10月

SIP-adus FOT

◆ **Continuing development of C-ITS and infrastructure**
  - Europe: Progressing the comprehensive C-ITS initiatives led by EC
  - United States: Progressing the Connected Vehicle Pilot Program

◆ **Automation of shared urban mobility is in the lead**

◆ **Field operational tests of truck platooning are proceeding, but limited beneficiaries hold the key to deployment.**

◆ **Initiatives aimed at Level 3 for private vehicles are progressing but facing many difficult challenges.**
  - Performance to be achieved
  - Means for confirming performance
  - Acceptance
  - Responsibility for unforeseen circumstances

- **The 3 domains of automated driving**
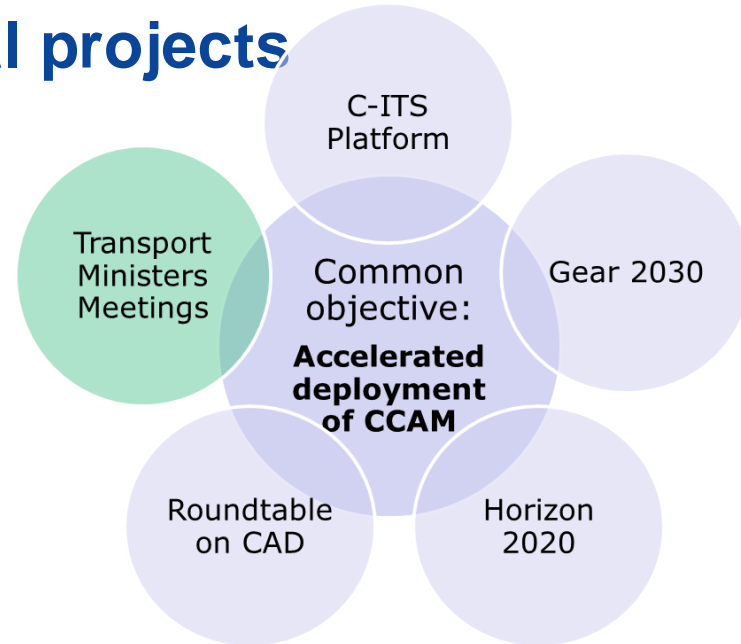 - Passenger cars
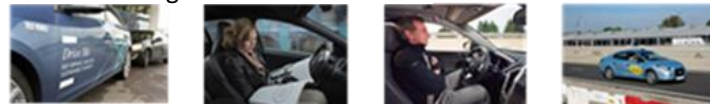
  - Truck platooning

  - Shared urban mobility

Developments in Europe

◆ **Cooperative Connected Automated Mobility (CCAM)**
◆ **Initiatives for C-ITS development**
◆ **Horizon 2020**
◆ **National projects**

◆ Advancement of comprehensive initiatives by the EC and others

- Europe-wide initiatives for CCAM deployment
- Horizon 2020
  - Initiatives toward field operational tests and deployment
- Initiatives targeting legal, certification-related, and ethical issues

◆ Advancement of national projects

- PEGASUS: Aiming to achieve Level 3 with private vehicles

Level	Name
Level 0	No automation
Level 1	Driver assistance
Level 2	Partial automation
Level 3	Conditional automation
Level 4	High automation
Level 5	Full automation

ADAS — Level 1, Level 2

ADS — Level 3, Level 4, Level 5

- AURORA: Aiming to achieve automated driving in severe environments

CCAM: Cooperative Connected Automated Mobility
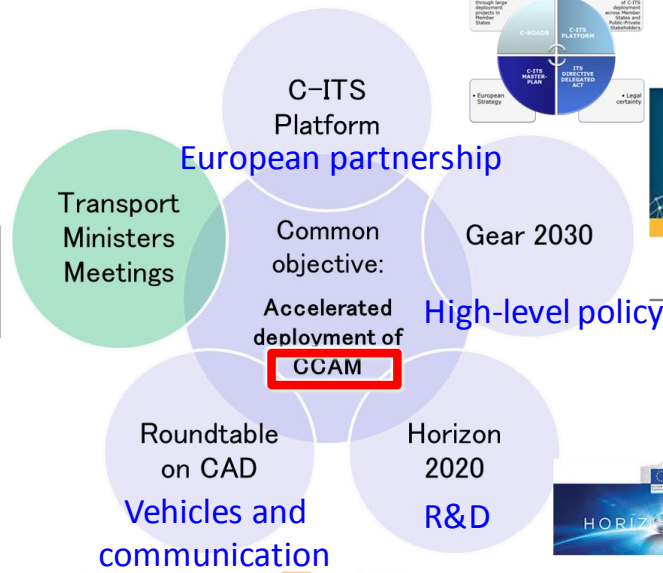**ADAS: Advanced Driving Assistance System**
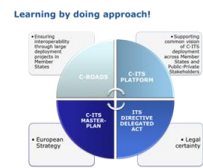**ADS: Automated Driving System**

◆ **Common objective: Acceleration of CCAM development**

- C-ITS Platform: European partnership
- Gear 2030: High-level policy
- Horizon 2020: R&D

- Roundtable on CAD: Vehicles and communication
- Transport Ministry Meeting

◆ Achieving objectives through CCAM-based convergence

C-ITS

CV

AV

Source: European Commission

◆Progress from Day 1

Towards Cooperative, Connected and Automated Mobility

	Day 1 Awareness starts	Day 2 Automation starts	Day 3 Cooperation starts	Day 4 Future Mobility
C-ITS (Cooperative)	"I share where I am and what I hear"	"I share what I see"	"We share our intentions"	"We coordinate all manoeuvres"
CV (Connected)	Hybrid connectivity 4G + ITS-G5	Hybrid + 5G	Hybrid + new technologies	Hybrid + new technologies
AV (Automated)	Advanced Driver Assistance Systems	Some Roads human backup	Most Roads NO human backup	Fully automated

Cooperative, Connected and Automated

2017   2019   2021   2025   2030   2035   2040   2045

Source: European Commission

Initiatives Toward CCAM

◆ Action Plans for the Stakeholder Platforms

Stakeholder Platforms for shared Visions

| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | ... | 2025 | ... | 2030 |

C-ITS (Cooperative): Launch C-ITS platform; Launch C-ROADS; C-ITS DAY 1 deployed; Cooperative driving

CV (Connected): Launch dialogue automotive-telco; Letter of Intent Rome; Large scale 5G trials; 5G on main corridors; High Automation

AV (Automated): Launch GEAR 2030; GEAR 2030 conclusions; Conditional Automation

Cooperative, Connected and Automated

Source: European Commission

◆ Development of cross-border field operational tests conducted with massive investment

C-ITS Initiative	Start/End	EU Member States involved	Budget
Nordic Way	2015 - 2017	Finland, Sweden, Norway, Denmark	5,2M€
SCOOP@F Part2	2016 - 2018	France, Spain, Portugal, Austria	20M€
C-Roads France	2016 - 2020	France	14,4M€
InterCor	2016 - 2019	France, Belgium, The Netherlands, UK	30M€
C-Roads Austria	2016 - 2020	Austria	19,1M€
C-Roads Czech Republic	2016 - 2020	Czech Republic	18,9M€
C-Roads Germany	2016 - 2020	Germany	9,9M€
C-Roads Slovenia	2016 - 2020	Slovenia	2,3M€
C-Roads Belgium	2016 – 2020	Belgium / Flanders	3,1M€
CITRUS	2016 - 2019	Belgium	1,8M€
AUTOCITS	2016 - 2018	Spain, France, Portugal	2,6M€
		TOTAL BUDGET	**127,3M€**

| C-ITS Initiative	Start/End	EU Member States involved	Budget
Nordic Way Part 2	From 2017	Finland, Sweden, Norway, Denmark	18,9M€
C-Roads Spain	From 2017	Spain	18M€
C-Roads Portugal	From 2017	Portugal	8,3M€
C-Roads Czech Republic	From 2017	Czech Republic	18,9M€
C-Roads Italy	From 2017	Italy	20,8M€
C-Roads Slovenia Part 2	From 2017	Slovenia	3,1M€
C-Roads Belgium Part 2	From 2017	Belgium / Wallonia	4,3M€
CONCORDA	From 2017	Belgium, Germany, Greece, Spain, France, Italy, The Netherlands	20M€
		TOTAL BUDGET	**112,3M€**

Source: SIP-adus Workshop 2017

◆ Study of issues that will arise when introducing automated driving to urban areas
  1. How will automated driving be used?
  2. Motivation to move forward for urban stakeholders
  3. 3. Clarification of the complementary relationship between C-ITS and high advanced automated driving in urban areas

◆ Studies to include negative environmental changes brought by changes in transport modes, etc.
  ■ Establishment of urban automation and examination of issues

Urban automation scenarios
1. Fully automated vehicle car-sharing/car-pooling services in urban areas
2. Fully automated taxi services
3. Fully automated vehicle car-sharing on established routes in established areas
4. Fully automated vehicle car-sharing in suburban areas
5. Fully automated vehicle car-sharing as a feeder connecting regional public transport systems
6. Fully automated driving-based public transportation services
7. Fully automated driving-based transport systems

Source: SIP-adus Workshop 2017

◆ Progress since FP 7

- ■ EU-supported projects: Full-scale progress in the 2020 project (FP 8)
- ■ Individual national projects: Progress by a broad range of projects

Source: ERTRAC
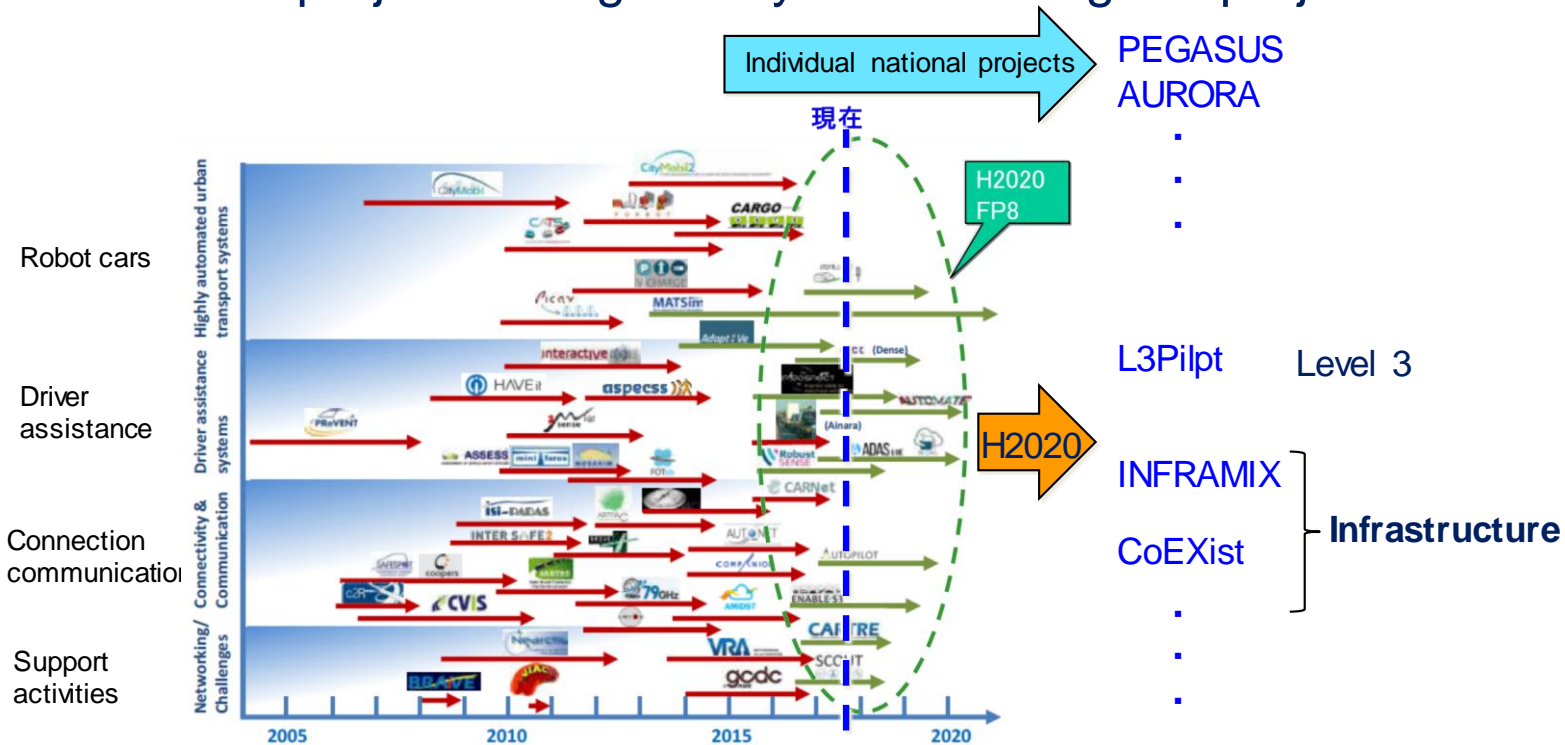
◆ R&D on Road Traffic: Horizon 2020

2016 Call

	Automation Pilots for Passenger Cars
Automation pilots for passenger cars	•L3Pilot •AutoPilot
Safety and end user acceptance	Safety and end user acceptance •InterAct •TrustVehicle •BRAVE
Road infrastructure to support automation	Road infrastructure to support automation •CoExist •InfraMix •TransAid

2017 Call

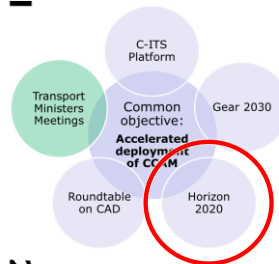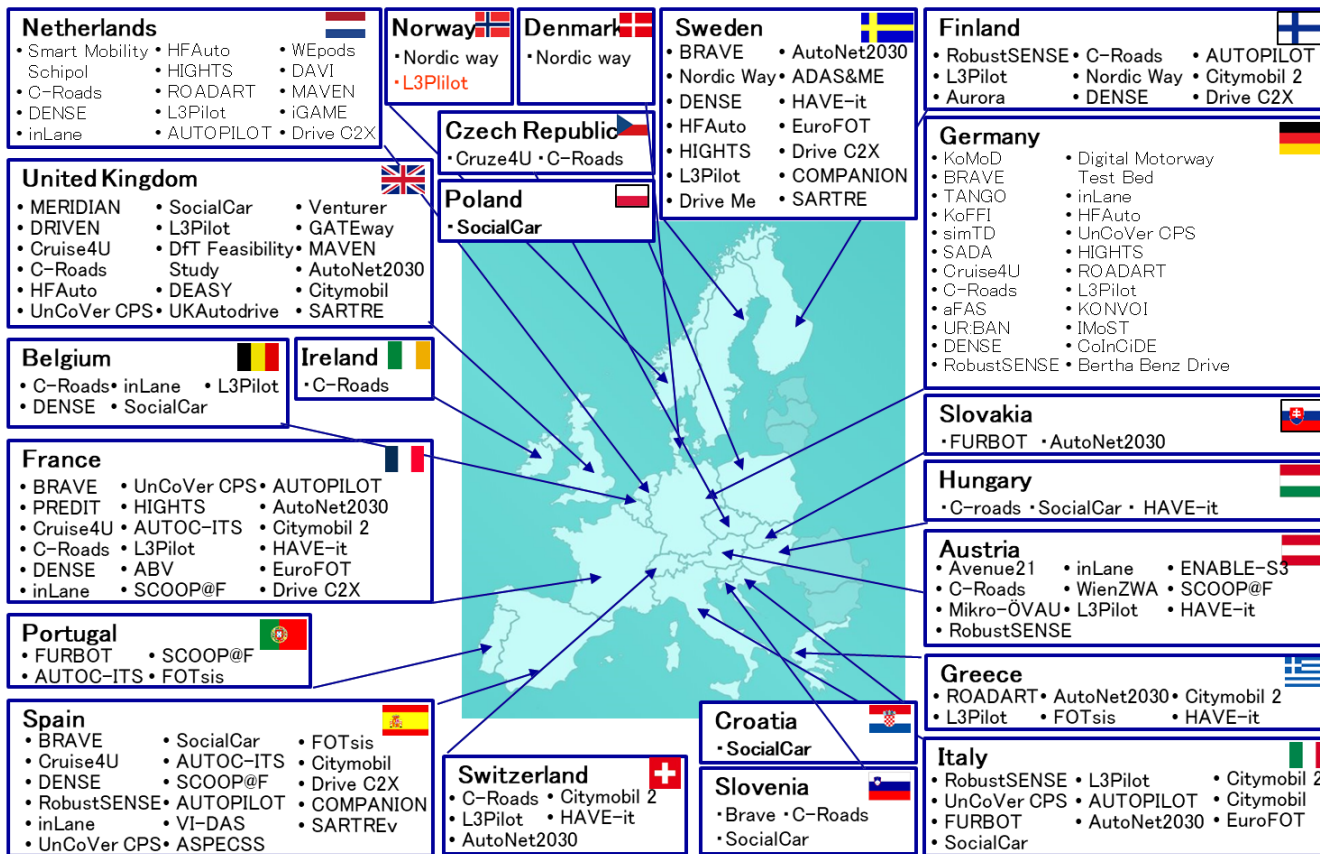|	
ICT infrastructure to enable road transport automation	ICT infrastructure to enable road transport automation
Multi-brand platooning in real traffic conditions	Multi-brand platooning in real traffic conditions
Automated urban transport systems	Automated urban transport systems

Source: European Commission

◆ The number of independent national projects is also expanding

Netherlands
- Smart Mobility
  Schipol
- C-Roads
- DENSE
- inLane
- HFAuto
- HIGHTS
- ROADART
- L3Pilot
- AUTOPILOT
- WEpods
- DAVI
- MAVEN
- iGAME
- Drive C2X

Norway
- Nordic way
- L3Pilot

Denmark
- Nordic way

Sweden
- BRAVE
- Nordic Way
- DENSE
- HFAuto
- HIGHTS
- L3Pilot
- Drive Me
- AutoNet2030
- ADAS&ME
- HAVE-it
- EuroFOT
- Drive C2X
- COMPANION
- SARTRE

Finland
- RobustSENSE
- L3Pilot
- Aurora
- C-Roads
- Nordic Way
- DENSE
- AUTOPILOT
- Citymobil 2
- Drive C2X

United Kingdom
- MERIDIAN
- DRIVEN
- Cruise4U
- C-Roads
- HFAuto
- UnCoVer CPS
- SocialCar
- L3Pilot
- DfT Feasibility
  Study
- DEASY
- UKAutodrive
- Venturer
- GATEway
- MAVEN
- AutoNet2030
- Citymobil
- SARTRE

Czech Republic
- Cruze4U
- C-Roads

Poland
- SocialCar

Germany
- KoMoD
- BRAVE
- TANGO
- KoFFI
- simTD
- SADA
- Cruise4U
- C-Roads
- aFAS
- UR:BAN
- DENSE
- RobustSENSE
- Digital Motorway
  Test Bed
- inLane
- HFAuto
- UnCoVer CPS
- HIGHTS
- ROADART
- L3Pilot
- KONVOI
- IMoST
- CoInCiDE
- Bertha Benz Drive

Belgium
- C-Roads
- DENSE
- inLane
- SocialCar
- L3Pilot

Ireland
- C-Roads

Slovakia
- FURBOT
- AutoNet2030

France
- BRAVE
- PREDIT
- Cruise4U
- C-Roads
- DENSE
- inLane
- UnCoVer CPS
- HIGHTS
- AUTOC-ITS
- L3Pilot
- ABV
- SCOOP@F
- AUTOPILOT
- AutoNet2030
- Citymobil 2
- HAVE-it
- EuroFOT
- Drive C2X

Hungary
- C-roads
- SocialCar
- HAVE-it

Austria
- Avenue21
- C-Roads
- Mikro-ÖVAU
- RobustSENSE
- inLane
- WienZWA
- L3Pilot
- ENABLE-S3
- SCOOP@F
- HAVE-it

Portugal
- FURBOT
- AUTOC-ITS
- SCOOP@F
- FOTsis

Greece
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- Citymobil 2
- HAVE-it

Spain
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- SocialCar
- AUTOC-ITS
- SCOOP@F
- AUTOPILOT
- VI-DAS
- ASPECSS
- FOTsis
- Citymobil
- Drive C2X
- COMPANION
- SARTREv

Switzerland
- C-Roads
- L3Pilot
- AutoNet2030
- Citymobil 2
- HAVE-it

Croatia
- SocialCar

Slovenia
- Brave
- SocialCar
- C-Roads

Italy
- RobustSENSE
- UnCoVer CPS
- FURBOT
- SocialCar
- L3Pilot
- AUTOPILOT
- AutoNet2030
- Citymobil 2
- Citymobil
- EuroFOT

◆ Project outline

- ■ Period: January 2016 to June 2019 (42 months)
- ■ Contracted organizations: OEM (Audi, BMW, Daimler, Opel, VW), tier-one suppliers, research institutes, SMEs, science institutes, etc.
- ■ Funds: Approx. 34,500,000 euros; subsidies: 16,300,000 euros

◆ Project purpose

What level of performance is expected in self-driving cars? How can the achievement of demanded performance be confirmed?
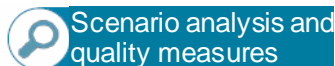
Scenario analysis and quality measures	Deployment process	Testing	Result reflection and embedding
What human and technical capabilities are needed in applications?	What tools, methods, and procedures are required?	What will be tested in laboratories, simulations, test courses, and roads?	Is the concept sustainable?

PEGASUS
Project for the establishment of generally accepted quality criteria, tools and methods as well as scenarios and situations for the release of highly-automated driving functions

Source: http://pegasus-projekt.info/en/about-PEGASUS

◆ Background of the Automated and Connected Driving (ACD) strategy
- ■ Sustained competitiveness of Germany's auto industry
- ■ Initiative addressing global challenges
  - Challenge 1: Environmental protection
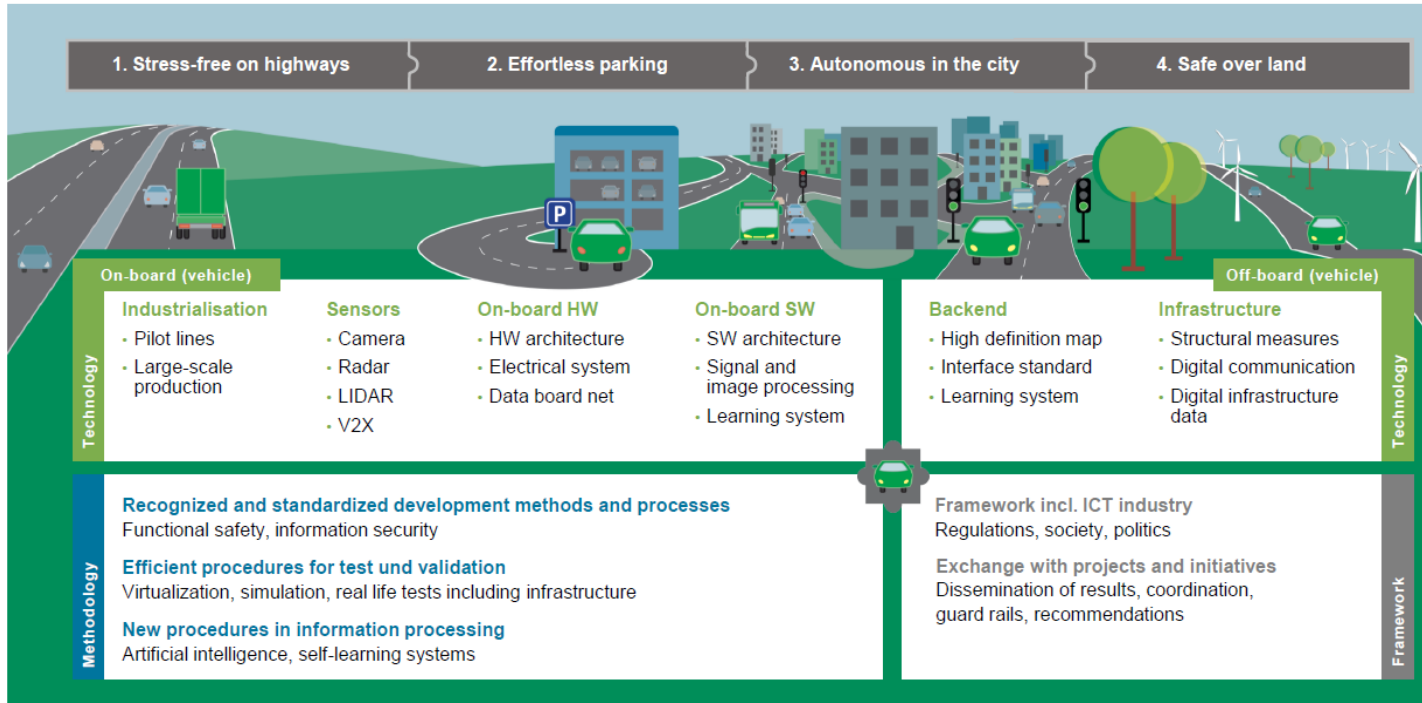 - Challenge 2: Digitalization

◆ Social changes brought by ACD
- ■ 46% of the world's consumers would not buy a car if they could use a fully autonomous automated vehicle for less cost than their own car.
- ■ ACD presents a tremendous market opportunity.

◆ The German government's intentions
- ■ To achieve second-generation advanced automated driving (Level 3) on expressways with speed limits of 130 km/h
- ■ To develop innovative driver assistance systems for cooperative driving
- ■ To develop innovative automated systems for urban areas
- ■ To establish quality criteria, evaluation tools, evaluation methods, and approval procedures for advanced automated driving functions

Source: PEGASUS Symposium of November, 2017

◆ **Key measures and initiatives**
  ■ A broad range of initiatives covering on-board systems, ancillary technologies, verification methods, policy, law, etc.

| 1. Stress-free on highways | 2. Effortless parking | 3. Autonomous in the city | 4. Safe over land |

On-board (vehicle)

Technology

Industrialisation	Sensors	On-board HW	On-board SW	Backend	Infrastructure
· Pilot lines	· Camera	· HW architecture	· SW architecture	· High definition map	· Structural measures
· Large-scale production	· Radar	· Electrical system	· Signal and image processing	· Interface standard	· Digital communication
	· LIDAR	· Data board net	· Learning system	· Learning system	· Digital infrastructure data
	· V2X				

Off-board (vehicle)

Technology

Methodology

Recognized and standardized development methods and processes
Functional safety, information security

Efficient procedures for test und validation
Virtualization, simulation, real life tests including infrastructure

New procedures in information processing
Artificial intelligence, self-learning systems

Framework incl. ICT industry
Regulations, society, politics

Exchange with projects and initiatives
Dissemination of results, coordination, guard rails, recommendations

Framework

Source: PEGASUS Symposium of November, 2017

◆ Automation and connected driving must address a broad range of fields.

Verification	Active Safety	Data availability	System architecture
Validation / test methods (release tests), simulation	Emergency manoeuver: brake, avoid, stop	Digital Maps, V-2-Server	Redundancy, failures

Infrastructure	Standardisation	Legal framework	Network coverage
The roll-out of communication technology into the traffic infrastructure	Communication protocols, data formats and interfaces for hardware and software integration	Regulations (nat./int.) governing behaviour in road traffic and the homologation of vehicles	Blanket coverage with communication technology (mobile / broadcast / WLAN)

Source: PEGASUS Symposium of November, 2017

◆ **Achieving safe and secure automated transport under all environmental conditions**

■ Arctic Challenge 2017-2019
- Five development topics
  1. Physical infrastructure
  2. Communication
  3. Location data and positioning
  4. Impact assessment
  5. Data

■ The Infra and 5G/Cyber Challenges
- Evaluation of intelligent infrastructure management
- Big Data
- Tires and automated driving
- Which roads should be developed, and how?
- Pre-5G network test

E8 - the Aurora Borealis Corridor
European digital cross-border corridor for CAD testing

NORWAY   FINLAND

Tromsø
E8
Hetta
Muonio
Kittilä
Kolari
Test sections
Arctic Circle
1 November 2017
Rovaniemi
Europe

Information services
5G test network, precise positioning with reference stations and HD map services available.

Connected vehicles
Advance traffic safety and automated driving by collecting and forwarding information of road, traffic and weather conditions as well as disturbances and disruptions on the road.

Automated driving
In snowy and icy extreme weather conditions.

Intelligent Road
Digital and physical infrastructure support testing of automated driving, ITS and intelligent infrastructure asset management solutions.

1 Aurora facilitates testing of automated driving, ITS and intelligent infrastructure asset management solutions.
2 Automated vehicle trials are allowed in road traffic in Finland.
3 Test ecosystem enables testing on public roads and on closed tracks.

◆ Summary of the Aurora Summit

- Site of the Aurora Project: The summit was held in Lapland, Finland
- Information was shared on issues to be tackled in severe winter environments, evaluation circumstances, etc.
- Although the extent to which results will be achieved remains unknown, a broad range of activities—including those focused on the infrastructure needed to achieve automation—are moving forward.
- Start-ups receiving government assistance were among the participants.
- Some 250 people from 22 counties attended.

Automated driving demonstration →
↓

Road sign indicating the Aurora Project area ↑
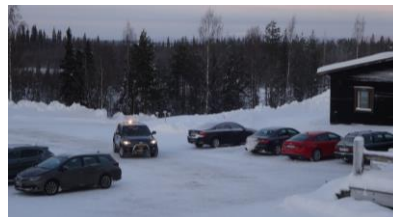
◆ Table of Contents

I. Introduction: Description of the study's background

- Study of the ethical guidelines that are socially and legally required; as in, "do decisions concerning automated driving systems have ethical responsibility?"

II. Procedure adopted by the Ethics Commission on Automated and Connected Driving

- Reports on activities by participating members and others

III. Ethical rules for automated and connected vehicular traffic

- Rules covering 20 items

IV. Outcome of the discussions and unresolved issues

- Items requiring further discussion

V. Bibliography

Federal Ministry
of Transport and
Digital Infrastructure

ETHICS COMMISSION
AUTOMATED AND
CONNECTED DRIVING

REPORT (EXTRACT)
JUNE 2017

WWW.BMVI.DE
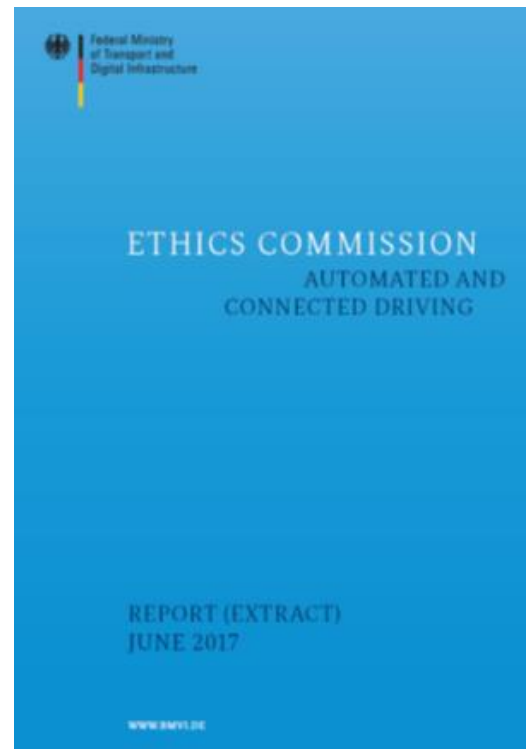
Organized in September 2016; issued in June 2017

Source: http://www.bmvi.de/EN/Meta/News/news.html

◆ Outline of the 20 ethical rules: Key components only

1. Purposes are to improve safety and increase mobility opportunities
2. The protection of individuals takes precedence
3. Responsibility for guaranteeing safety and licensing
4. Decisions based on the personal responsibility of human beings
5. Prevention of accidents wherever practically possible
6. Automated collision prevention systems should be mandated if they have the potential to limit damage
7. Programming in unavoidable situations
8. Decisions between one human life and another
9. Decisions in unavoidable situations
10. Accountability of the human being: Shifts from the motorist to the manufacturers and operators
11. Liability for damage
12. Responsibility to inform the public about technology
13. Central control of motor vehicles
14. Outside attacks and response to system weaknesses
15. Use of data
16. Driverless systems
17. Software and technology for handover of driving control and ease of understanding
18. Self-learning systems
19. Response to emergency situations
20. Proper handling

◆ Outcome of the discussion and unresolved issues: Key components only

1. The licensing of automated driving systems is a risk decision
2. Taking animal welfare interests into account
3. Overruling by humans
4. Technology in the case of divided responsibilities
5. Legal requirement to use fully automated transport systems?
6. Technical assistance systems to assist or guide the driver
7. No irreversible subjugation to technical systems
8. Dependence of society on technological systems
9. "Total" connectivity of infrastructure
10. Utilization of data between security, personal autonomy, and informational self-determination
11. The problems associated with the scope of responsibility of software and infrastructure

The Ethics Commission's members

◆ **Outline of the 20 ethical rules**

2. The protection of individuals takes precedence

5. Prevention of accidents wherever practically possible

7. Programming in unavoidable situations

10. Accountability: Shifts from the motorist to the manufacturers and operators

14. Outside attacks

◆ **Unresolved issues**

3. Overruling by humans

5. Legal requirement
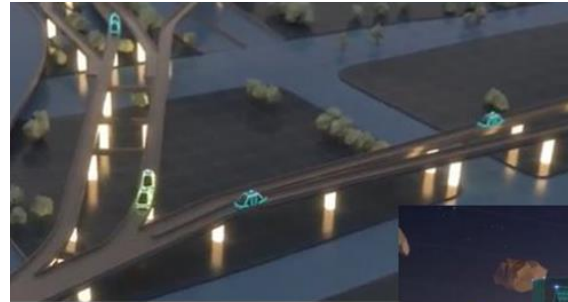
7. No irreversible subjugation to technical systems

The Ethics Commission's members

Developments in the United States

◆ Government initiatives for CAV
◆ CAV development scenarios
◆ Connected Vehicle Pilot Program
◆ Field operational test trends
◆ Improvement of traffic environments

U²C : Ultimate Urban Circulator
People Mover A new "people mover" being studied in Jacksonville, Florida

◆ **Movements toward CAV introduction**
- ■ CV: Government-led
- ■ AV: OEM-led
  - • No conspicuous efforts by OEMs toward achieving Level 3 for private vehicles are apparent.

◆ **Activities independently led by the federal government and state governments**
- ■ Vision for Safety 2.0
- ■ State governments prepare scenarios and begin developing environments by building the infrastructure needed for CAV, etc.

◆ **Efforts to improve traffic environments that are also effective for CAV (e.g., congestion reduction and protection of the mobility-impaired) are also progressing.**

Level	Name
Level 0	No automation
Level 1	Driver assistance
Level 2	Partial automation
Level 3	Conditional automation
Level 4	High automation
Level 5	Full automation

ADAS covers Level 1 and Level 2.
ADS covers Level 3, Level 4, and Level 5.

CV: **Connected Vehicle**
AV: **Automated Vehicle**
CAV: **Connected Automated Vehicle**
ADAS: **Advanced Driving Assistance System**
ADS: **Automated Driving System**

◆ **From Connected Automated Vehicles to "Smart City"**

Autonomous Vehicle

Strategic plan 2015-2019
- Realizing CV Implementation
- Advance Automation

Beyond Traffic 2045
TRENDS AND CHOICES

Smart City

Connected Automated Vehicle

Connected Vehicle

CV Pilot Program
- NYC, Tampa, Wyoming

Source: DOT website

◆ "Accelerating the Next Revolution in Roadway Safety" (issued in 2016) has been issued as "A Vision for Safety 2.0"

- ■ "Automated Driving Systems 3.0" is scheduled for release in summer 2018.
  - • Targets multimodal systems not only to passenger vehicles.
  - • The federal government does not issue any instructions or orders for specific technologies.
  - • Pursuit of "technical neutral " for innovation (handling of DSRC also suggested)
  - • Broad inspection of federal regulations, application of public comment (currently underway) and promotion of innovation
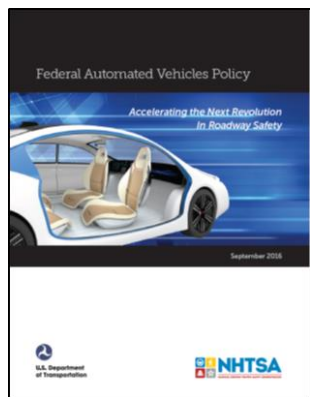
September 30, 2016
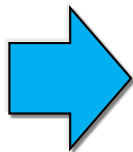
September 12, 2017

◆ **Many states have legislation, regulations, or policy frameworks concerning CAV and AV.**

■ **Autonomous vehicle laws**

- 18 states have passed laws concerning AV.
- Government agencies in Arizona, Massachusetts, Washington, and Wisconsin have issued execution orders concerning AV.

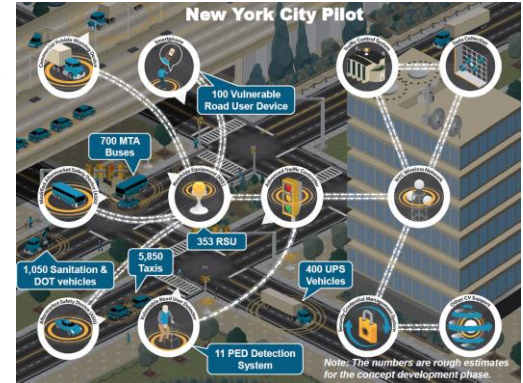States with Enacted Autonomous Vehicle Legislation

| Legislation | (blue) |
| Execution order | (green) |

Source: National Conference of State Legislatures (NCAL)

◆ Six scenarios

Source: ITFVHA 2017 FHWA
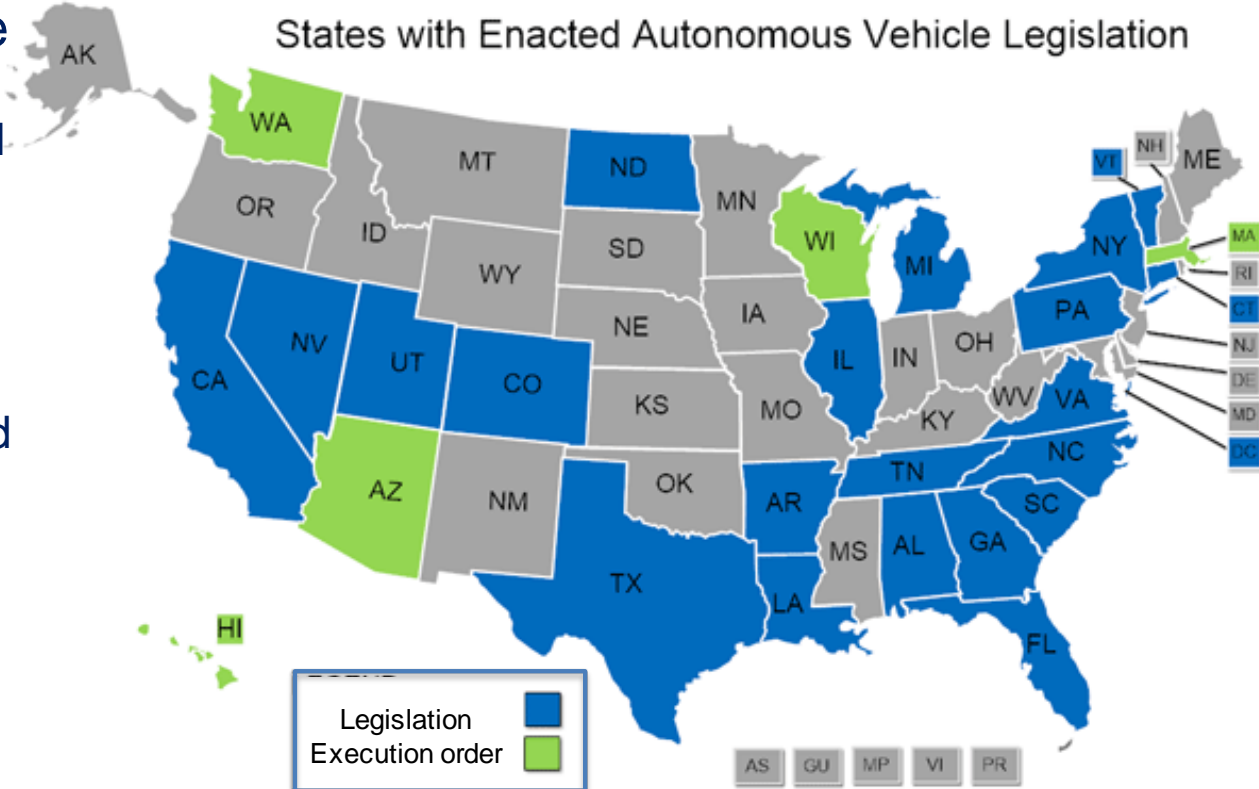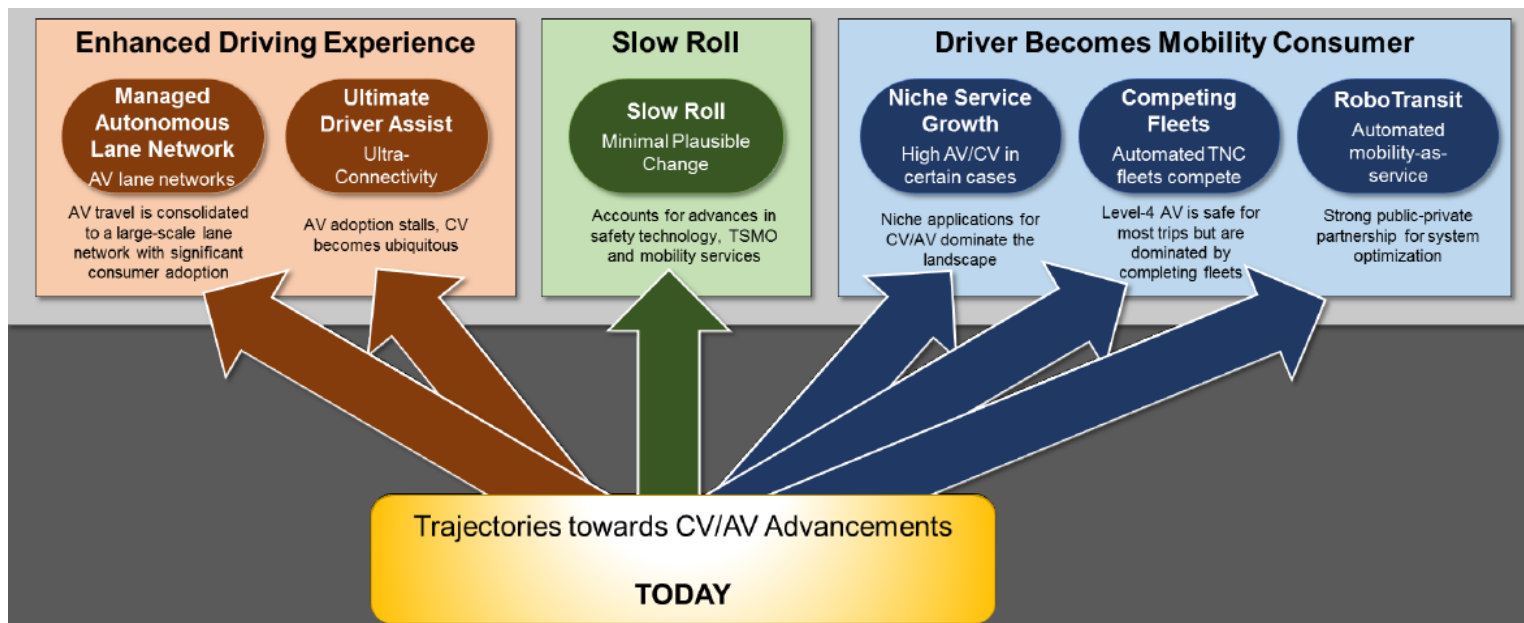
◆ Pilot programs in 3 regions

New York City
- Use of over 10,000 official vehicles
- Intersection safety, pedestrian protection, etc.

Tampa
- Reduced congestion during rush hours
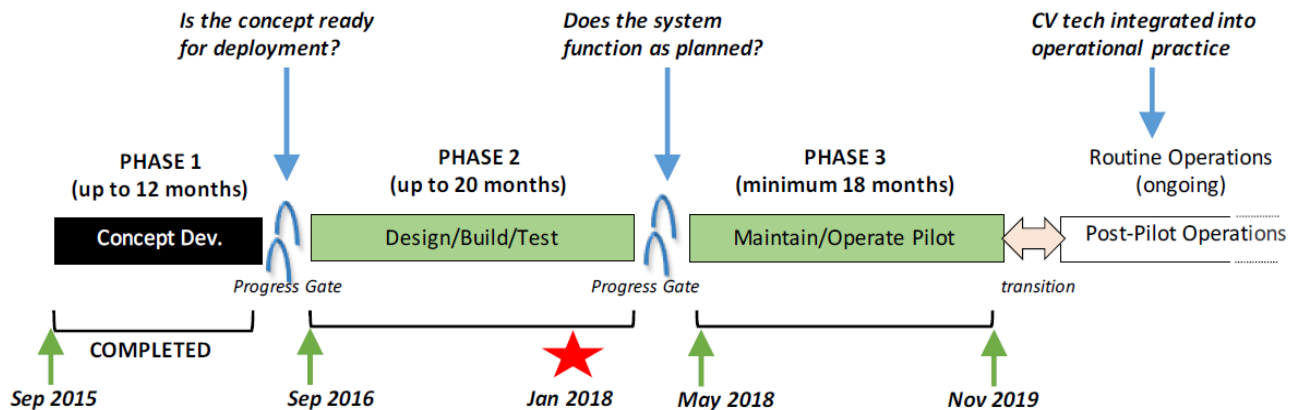- Pedestrian and bicycle safety, etc.

Wyoming
- Supply of weather and traffic information to trucks

Source: DOT website
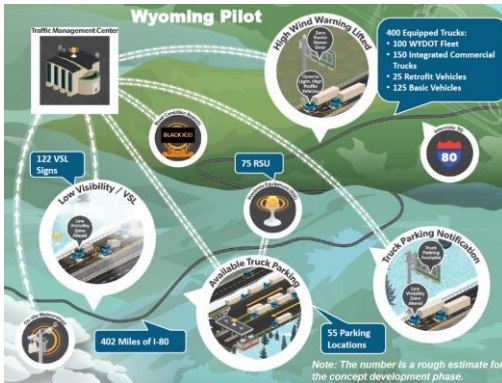
◆ **Field operational tests and demonstrations for 2018 and beyond**
- ■ NYC : November 2018
- ■ Tampa : August 2018
- ■ Wyoming : March 2019

Is the concept ready for deployment?

Does the system function as planned?

CV tech integrated into operational practice

PHASE 1 (up to 12 months)	PHASE 2 (up to 20 months)	PHASE 3 (minimum 18 months)	Routine Operations (ongoing)
Concept Dev.	Design/Build/Test	Maintain/Operate Pilot	Post-Pilot Operations

Progress Gate — Progress Gate — transition

COMPLETED

Sep 2015 — Sep 2016 — Jan 2018 — May 2018 — Nov 2019

Visit CV Pilot and Pilot Site Websites for More Information:
- ▪ CV Pilots Program: http://www.its.dot.gov/pilots
- ▪ NYCDOT Pilot: https://www.cvp.nyc/
- ▪ Tampa (THEA): https://www.tampacvpilot.com/
- ▪ Wyoming DOT: https://wydotcvp.wyoroad.info/

NYCDOT   Tampa (THEA)   WYDOT

Starting from May 2018, these deployments are scheduled to enter an operational phase.

Source: USDOT website

◆ Projects currently underway

Source: USDOT website

◆ A broad range of regional activities
  ■ Regions implementing AV shuttle/bus services
  ■ Regions implementing connected vehicle testing
  ■ Regions implementing truck platooning
  ■ Regions implementing leading initiatives
  ■ DOT-certified proving grounds

AV Shuttle/ Bus Service
- ✓ St. Louis
- ✓ Kansas City
- ✓ Las Vegas
- ✓ Tampa
- ✓ Jacksonville
- ✓ Knoxville
- ✓ Minnesota

Connected Vehicle Testing
- ✓ Detroit
- ✓ NYC
- ✓ Buffalo
- ✓ South Carolina
- ✓ Massachusetts
- ✓ Arizona, New Mexico and Texas I-10 corridor

Pilot / Deployment
- ✓ Georgia
- ✓ Wyoming
- ✓ Pennsylvania
- ✓ New York
- ✓ Michigan
- ✓ Colorado

Truck Technology /Platooning
- ✓ Missouri
- ✓ Florida
- ✓ Utah
- ✓ Oregon
- ✓ California
- ✓ Wyoming
- ✓ Texas

U.S. DOT Automated Vehicle Proving Grounds
- ✓ City of Pittsburgh and Pennsylvania Transportation Institute
- ✓ Texas AV Proving Grounds Partnership
- ✓ U.S. Army Aberdeen Test Center
- ✓ American Center for Mobility (ACM) at Willow Run
- ✓ Contra Costa Transportation Authority (CCTA) & GoMentum Station
- ✓ San Diego Association of Governments
- ✓ Iowa City Area Development Group
- ✓ University of Wisconsin-Madison
- ✓ Central Florida Automated Vehicle Partners
- ✓ North Carolina Turnpike Authority

Source: USDOT website

◆ Vigorous last-mile transportation field operational tests are taking place around the nation.

Fast Act: ATCMTD

◆ Development of cutting-edge traffic technologies to reduce congestion and improve traffic system safety
 ■ Maximum of $60 million between 2016 and 2020

ATCMTD : Advanced Transportation and Congestion Management Technologies Deployment Program

◆ **Measures starting with areas where the introduction of AV technologies can be anticipated**
  ■ Implementation of measures to prevent pedestrian and bicycle accidents on roads, intersections, sidewalks, bicycle paths, etc.

Characteristics of Los Angeles

The ratios of pedestrian and bicyclist casualties is extremely high among all forms of mobility.

18%
5%
76%
1%
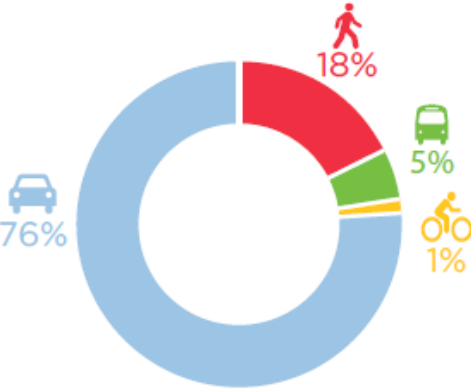
Ordinary mobility forms

33%
56%
11%
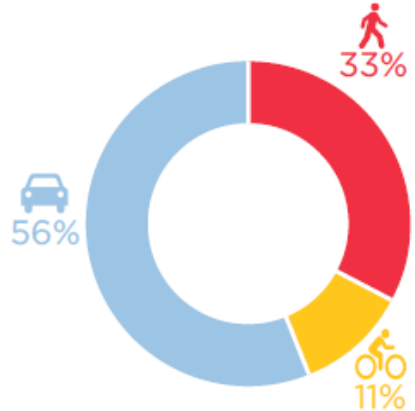
Mobility forms when fatality or serious injury occurs
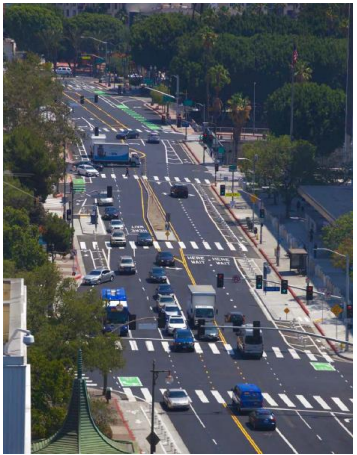
◆ The website provides information on programs, speakers, announcements, trip reports, and so on.

■ SIP-adus Workshop 2017

http://www.sip-adus.jp/evt/workshop2017/

Thank you