Summary of Workshop

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Participants		
	International	88
	Domestic	428
	Total	516
Speakers / Moderators		
	International	36
	Domestic	28
	Total	64
Breakout Workshop		
	International	52
	Domestic	93
	Total	145

General Overview 1 of 2

- Deployment of connected and automated vehicles (CAV) is becoming a reality. Focuses are shifting from validation of technologies to measures for diffusion of new technologies, including assessment of positive and negative impacts, establishment of regulatory and legal framework, and more importantly, public acceptance.
- Recognizing huge potential of CAV technologies, national and regional projects are vigorously conducted with more systematic approaches to establish well structured and sustainable framework for real world operation across the boundaries.
- Expected benefits from the CAVs have been said to be enhanced safety, mitigation of congestion, provision of mobility for underserved population. In addition, compensation of shortage of labor forces is addressed for a variety of reasons; overwhelming demand of transportation or declining and ageing population.

General Overview 2 of 2

- The highest priority is given to safety assurance. International collaboration to establish dependable and feasible safety requirements and development of verification technologies for harmonized standards and regulations is being accelerated.
- SAE definition of levels of driving automation is internationally recognized common language. However, it is pointed out for further discussion that evolutionary path of automated driving may not simply follow the order of the numbers, depending on type of vehicles, type of services and operating environment.
- Significant progress in all aspects for deployment of CAVs are observed.

Dynamic Map

- International stakeholders are actively engaging in standardization of high definition map and development of common functional and organizational structure.
- ISO and OADF are the platforms for further international collaboration.
- Maintenance of the database and integration with dynamic data, such as traffic condition, road closure, weather condition and safety critical information, are another important steps forward.
- At SIP-adus, high-definition map database for more than 700km stretch of field operational test roads was developed and distributed to the test participants for review. To integrate with existing connected services, equipment to receive dynamic data are also distributed for evaluation together with international participants.

Connectivity

- Connectivity is essential for safety critical applications, information provision to enhance situation awareness, updating on-board database and software.
- Different type of applications have different set of requirements. While it is recognized that combination of technologies will be a feasible solution, different countries or regions have other factors to consider, such as spectrum allocation, technology migration and market penetration.
- SIP-adus is conducting field operational tests, integrating all available connected services, which have been operating for decades with different communication technologies selected at the time of deployment.

Cybersecurity

- Draft cybersecurity recommendation was compiled at UNECE WP29/GRVA.
- Dependency on software and electronics is dramatically increasing cyber risks and product development process is changing.
- At SIP-adus, assuming common structure of vehicle control system, threat analyses and cyber vulnerability tests were conducted to produce security design guidelines.
- Connected features of vehicles significantly expands "attack surface"; increases vulnerability.
- Tools to analyze potential risks and mitigate the risks based on the accumulated cases will prevent incidents from happening. Propagation of incident information is equally important to minimize damages caused.

Next Generation Transport

- A number of field tests of Low Speed Automated Shuttles are being conducted and still in a learning process to identify transportation problems to be solved, financial feasibility and legal framework to be implemented.
- Step-wise implementation of trial, pilot and partial to full deployment based on a grand design of business districts and residential areas is being carried out in Singapore. Public acceptance is fostered and legal framework will be implemented along the way.
- Government and industries are promoting truck platooning for cost saving, compensation of labor shortage, in addition to safety and efficiency, keep up with growing demand.
- Integration of multi-brand truck platooning with service layer operations is systematically investigated for freight industry wide deployment.

Impact Assessment

- Multi-agent simulator with models of system, driver, traffic environment and other road users is a effective tool to assess safety impacts.
- Data from large scale field operational tests, such as euroFOT, AdaptIVe and L3Pilot, are rich source of input data to simulation.
- An Operational Design Domain is not an enclosed seamless area. It has voids where automated driving system disengages caused by limited on-board equipment performance, traffic condition or human factors, which will result in deterioration of traffic flow. Enhanced physical and digital infrastructure will minimized such disturbance.
- Advanced Driver Assistance System and CAVs are beneficial for vehicles without such functions. Incentive measure to accelerate market penetration needs to be considered for societal benefits.

Human Factors

- At the first SIP-adus Workshop, three research topics on human factors were identified; 1) information provision to drivers, 2) driver's takeover of control and 3) communication with other road users.
- Accumulated knowledge on human factors is not fully utilized, causing undesired consequences.
- Proper understanding of system function, operating status and its limitation is very basic requirement for a driver to use advanced vehicle systems.
- Transition time required for a driver to take over control of the vehicle significantly varies depending on what the driver is doing at the Take Over Request by the vehicle.
- Communication behaviors between the human driver and other road users was analyzed. Further research needs to be carried out.