Technology Drives the Future of Automobile

Takao Asami
Alliance Global Vice President  Research and Advanced Engineering
Issues for Sustainability

Energy

Global Warming

Congestion

Traffic Accidents

出典: NASA earth observatory
(http://www.nasa.gov/vision/earth/environment/arcticice_decline.html)
Environmental Progress

CO₂ emissions in Europe


- 28%
- 30%

Base
Alliance’s Challenge

Energy

Global Warming

Zero Emissions

Congestion

Traffic Accidents

出典: NASA earth observatory
(http://www.nasa.gov/vision/earth/environment/arcticice_decline.html)
Key Technologies

Electrification

Autonomous Drive

Connectivity
Electric Vehicles
Benefits of Electric Vehicle

- Dynamic performance
- Quietness
- Running cost
- Charging at home
Global EV Sales

Global EV sales volume

[ k Units ]

[ 2009 ] [ 2010 ] [ 2011 ] [ 2012 ] [ 2013 ] [ 2014 ] [ 2015 ] [ 2016 ]

- Alliance EV sales (Annual)
- Other OEM EV sales (Annual)
- EV sales (Accumulative)

over 1 million sales

Accumulative

[ k Units ]

0 100 200 300 400 500 600 700 800 900 1,000 1,200

Annual
Potential Growth of EV Market

Global EV sales volume

- 5 million NEVs by 2020 (China)
- 22% ZEVs by 2025 (California)
- Reducing 60% of oil consumption by 2025
- Call for end of ICE by 2030 (Bundesrat resolution)

2010: 0
2015: 1 million
2020: 22
2025: 60
2030: 100

[ M Units ]
Expanding EV Range

- **2010**: 175 km
- **2013**: 199 km
- **2015**: 250 km
- **2017**: 400 km
- **2015**: 240 km
- **2014**: 226 km
- **2010**: 210 km

Range (NEDC km)
Additional Benefit of EV

Utilized EV battery for energy management
Effective use of PV / Wind and power back-up are possible


Vehicle-to-Building (2013 Jul. ~)

Vehicle-to-Community (2016 ~)
Diverse Applications of EV Technologies

- Battery EV
- e-Power
- H₂ FCEV
- e-Bio Fuel-Cell

Core technologies

- e-Powertrain & Battery

Core technologies

- e-Powertrain & Battery

- Electricity
- Gasoline
- Hydrogen
- Biofuels

- Engine
- Fuel Cell

- Battery
Autonomous Drive
Benefits of Autonomous Drive

**Autonomous Drive Mode**

- Safety
- Stress-free
- Free time

**Manual Drive Mode**

- Driving pleasure
Autonomous Drive Technology Introduction Plan

- **Today**
  - 2016
    - Highway
      - Single lane

- **2018**
  - Highway
    - Multiple lanes

- **2020**
  - Urban roads
    - Intersections

- **202X**

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**RENault NISSAN**

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ProPILOT

Launched in August 2016, expanding to global models

Single lane autonomous drive

3D image processing

Intuitive HMI

Front Camera

(Mobileye)
City Driving Development in Progress
Connected Car
Benefits of Connected Car

In-Car Experience

Improved Customer Experience

Autonomous Drive Support

Big Data Utilization
History of Alliance Connectivity

Multimedia

2010
RENault, 1st Integrated and Connected Navigation System: Carminat TomTom Live

R-LINK series

R-LINK 2(2015)

NISSAN MOTOR CORPORATION

CARWINGS

Since 1997

Operator service

Information Channels

City Guide
Weather
News

Operation support of navigation system

NissanConnect

Infiniti InTouch

RENAULT NISSAN
Alliance Connectivity Platform

In Vehicle Infotainment
- Navigation
  - Geolocation via GPS
  - Traffic and real-time information

DRIVER'S SOCIAL APPS
- Continuity of connected digital life
- Infotainment

OFF-BOARD platform

DRIVING AND VEHICLE RELATED APPS AND SERVICES

In Vehicle Connectivity

CAR TO CAR, CAR TO INFRASTRUCTURE
- Security: real-time information and alerts (traffic, road events)

*RSU: Road Side Unit
**WAVE: Wireless Access In Vehicular Environments. Wi-Fi with improved range (1km), adapted to fast moving vehicles
Alliance Global Research Network

Create open innovation with the world’s intellectuals

Renault (France)

Tel-Aviv (Israel)

Nissan (Japan)

Silicon Valley (USA)

Detroit (USA)

Moscow (Russia)

Chennai (India)

Beijing * (China)

(*) Joint research center with TSINGHUA Univ.
Vision for Future Mobility
Zero emissions, Zero fatalities
Thank you for your attention!