

The next frontier in mobility.

# **Initiatives for Strengthening Competitiveness for Continuous Growth**

**October 31, 2017**

**Yasumori Ihara,  
President of Aisin Seiki Co., Ltd.**



# Business Environment and Direction of Future Initiatives

## Business environment

- World trend - Changes in society caused by advancement of IT
- Automotive industry - Zero Emissions, Automated Driving, Connected Cars
- Changes in lifestyle (Change from owning to using)



**For strengthening our competitiveness in the future, we will advance initiatives to:**  
**unify further as a group, and heighten our ability to address these changes.**

**Wave of rapid structural changes unlike anything we have ever experienced**

## Direction of Initiatives

**Advancing initiatives for new growth according to the Group's policies**

Group's policies	Direction of Initiatives	Initiatives
<b>Accelerating the growth strategy while foreseeing the next generation</b>	Taking measures such as Zero Emissions, Automated Driving, and Connected Cars to cope with rapid changes in the automotive industry	<ul style="list-style-type: none"> <li>Starting the system to develop next-generation technologies by unifying the Group</li> </ul>
<b>Strengthening competitiveness of existing businesses</b>	Advancing reinforcement of competitiveness of the existing businesses that support the present operations and solidifying foundation for securing profits	<ul style="list-style-type: none"> <li>Advancing corporate restructuring to improve competitiveness and activities to solve issues</li> <li>Enhancing the initiatives for the growing businesses</li> </ul>
<b>Reinforcing the management base that supports continuous growth</b>	Reinforcing bases such as safety, quality, and profitability of the operations that support growth strategies and improvement of competitiveness	<ul style="list-style-type: none"> <li>Improving efficiency of operations and sophisticating them through collaboration among the Group companies</li> </ul>

**Virtual company system**

# Initiatives of Each Business

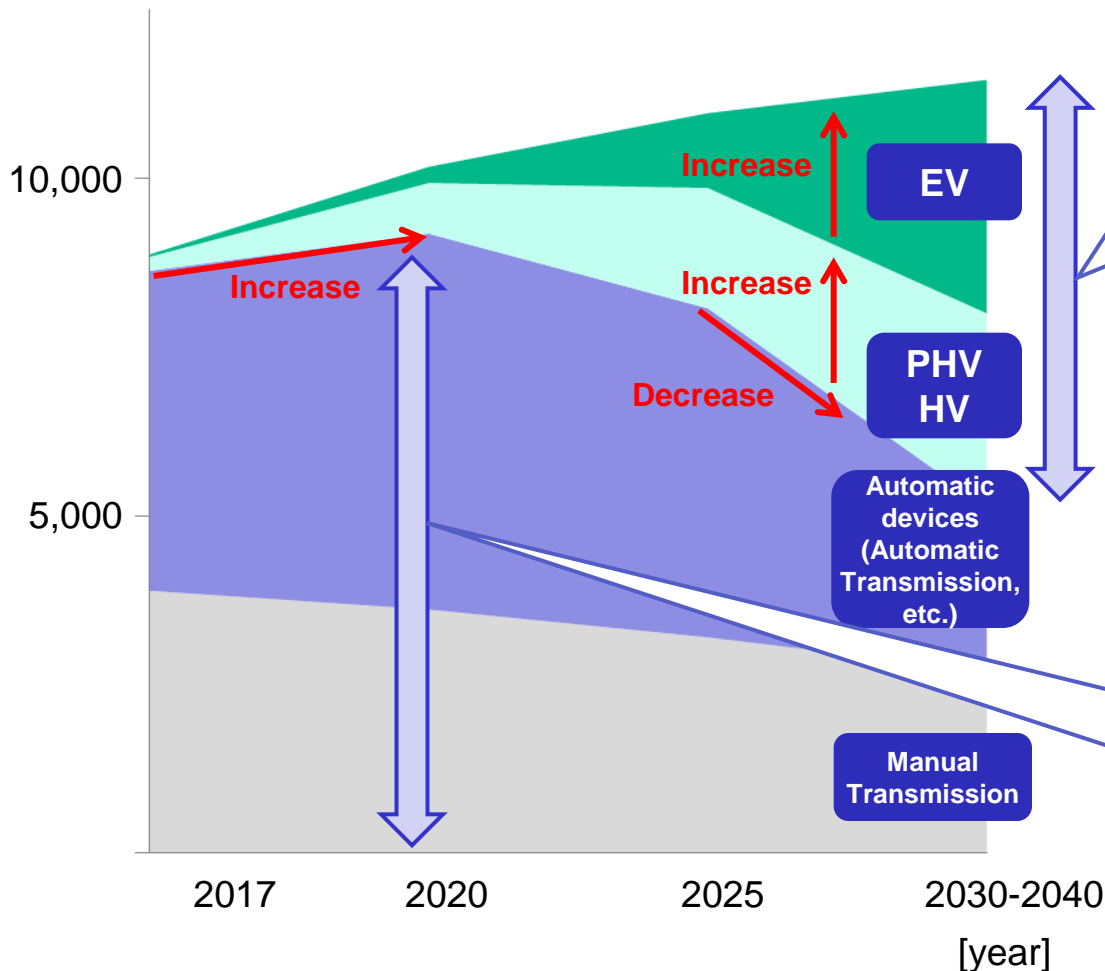
Business	Strengthening competitiveness of existing businesses	Accelerating growth strategies while foreseeing next generation
<b>I Powertrain</b>	(1) Global initiative to the increased demands for Automatic Transmission	(2) Development of the Powertrain units for Electrification
<b>II Chassis &amp; Vehicle Safety System</b>	(3) Initiative to increased production of regeneration /control brakes (4) Enhancing foundation brakes by restructuring businesses	(5) Development of the Vehicle Dynamics Control (6) Development of the Automated Valet Parking
<b>III Body</b>	<ul style="list-style-type: none"> <li>Improving the business efficiency by restructuring the overlapping areas</li> </ul>	<ul style="list-style-type: none"> <li>Development of the Hospitality Services</li> </ul>
<b>IV Information/electronics</b>	<ul style="list-style-type: none"> <li>Improving competitiveness of electronic components (Introduction of ECU simple slim line, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>Development of the Location Based Services</li> <li>Enhancing development of core technologies in view of Powertrain Electrification</li> </ul>

To be explained today

# Market Trend and Direction of Initiatives

## Forecast of automotive market by Powertrain (based on the scenario of popularization of EVs)

[Units: 10 thousand cars a year]



### Accelerating growth strategies while foreseeing next generation

- Establishing the lineup for electrification by utilizing the technological bases that were developed for the 2-motor HV
- (Maintaining the Automatic Transmission production capability by capturing the demands for the 1-motor HV)

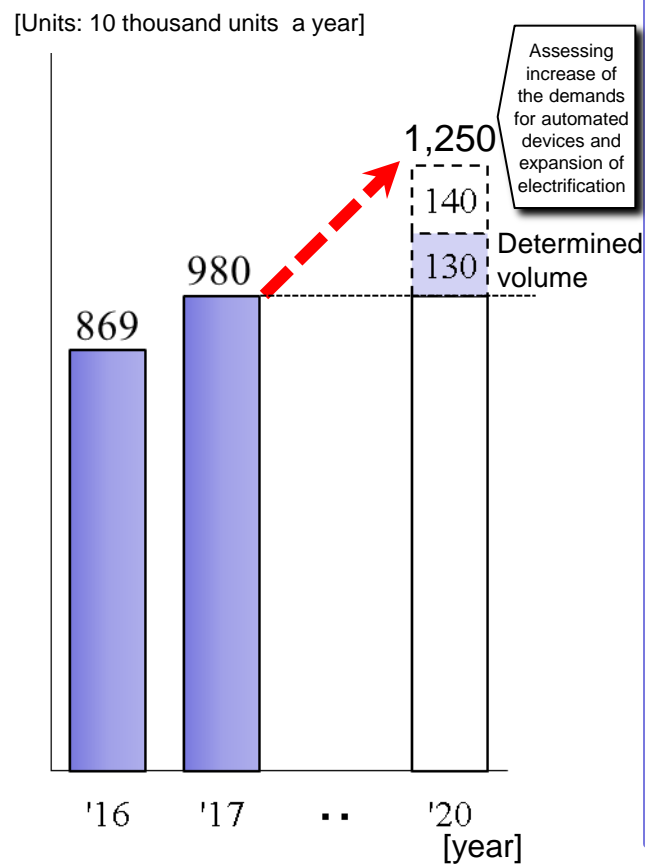
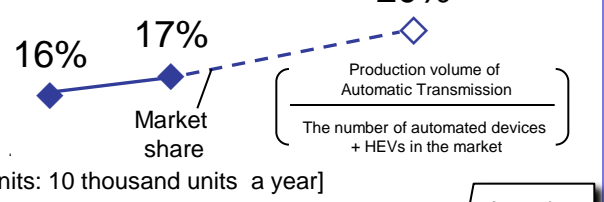
### Strengthening competitiveness of existing businesses

- Improving capability of the global production centering around China and Japan
- Assembly: Increasing further the domestic production capability
- Functional components: Efficiently improving the integrated system of production from rough shape materials by bringing the initiatives of the whole Group

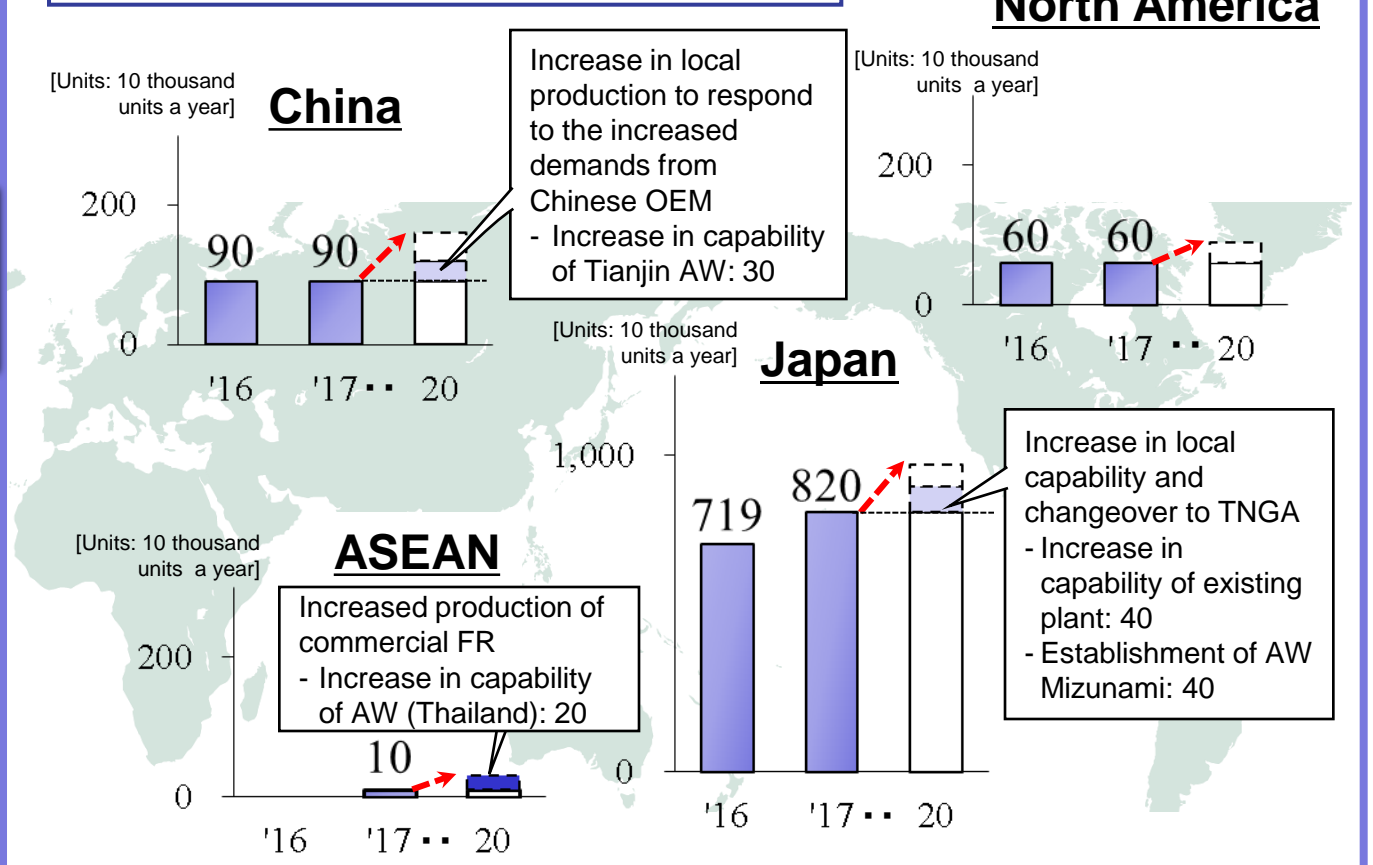
# (1) Global Initiative to Expanded AT Business

## ◆ Increasing the production capability globally centering around China and Japan

Production volume of Automatic Transmission



Production volume of each area



Various methods are considered for improvement of investment efficiency.

# Improvement of Automatic Transmission Production Capability (Assembly)



## AW Mizunami Co., Ltd.

New Company

Location	Mizunami, Gifu Prefecture
Newly installed line	Assembly of FF 8-speed Automatic Transmission (400,000 units per line) Machining the Automatic Transmission components
Start of production	Assembly of Automatic Transmission: Feb. 2019 ~ Machining of components: Dec. 2018 ~

\* Having been released to the press on Sept. 26, 2017  
(Acquisition of land only)



## Increased assembly capability of Tianjin AW Automatic Transmission Co., Ltd.

Location	Tianjin, China
Newly installed line	Assembly of FF 6-speed Automatic Transmission (300,000 units per line)
Start of production	Apr. 2019 ~

# Improvement of Automatic Transmission Production Capability (Components)

◆ Efficiently improving the integrated system of production from rough shape materials by bringing the initiatives of the whole Aisin Group

## Rough shape materials

## Machining components and subassembly

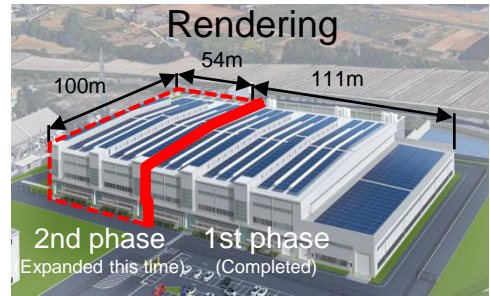
## Assembly of AT

Aisin Seiki

### Aluminum parts (die casting to machining)

Expansion of Nishio Die Casting Plant's south building

Location	Nishio, Aichi Pref.
Production item	Transmission case (Aluminum die casting)
Expanded area	First phase: 11,100 m <sup>2</sup> Second phase: 5,400 m <sup>2</sup>
Start of production	First phase: Aug. 2017 ~ Second phase: Oct. 2018 ~



Aisin Takaoka  
Aisin Sinwa

### Cast iron parts (casting to machining)

Expansion of Aisin Takaoka's main plant

Location	Toyota, Aichi Pref.
Production item	Differential case (machining)
Expanded area	600m <sup>2</sup>
Start of production	May 2018 ~

Expansion of Aisin Sinwa's main plant

Location	Nyuzenmachi, Toyama Pref.
Production item	Differential case (machining)
Expanded area	2,800m <sup>2</sup>
Start of production	Jun. 2018 ~

Aisin AW Industries

### High-functioning parts (press to subassembly)

Press process is conducted in the existing plant.



Acquisition of new plant (tentative)

Location	Wakasa, Fukui Pref.
Production item	Torque converter, etc. (subassembly)
Expanded area	47,100 m <sup>2</sup>
Start of production	May. 2018 ~

Securing competitiveness of Automatic Transmission by bringing the initiatives of the whole Group

# (2) Development of Powertrain Unit for Electrification

◆ Establishing the lineup for Electrification by utilizing the technological bases that were developed for the 2-motor HV

Segment		2-motor PHV	1-motor 48V/PHV	eAxle	EV FCV
FF	Light four-wheel cars / A				
	B				
	C				
	Large-size C				
	D -				
FR	Small-size D				
	D				
	SUV / LDT				
	Truck				

Being mass produced  
 To be mass produced soon  
 Being developed

**1-motor / 48V** Enhancing as a medium-term growth segment

- Accelerating development (Advancing development of 1-motor for starting mass production in 2018)
- Enhancing proposals to Chinese and European OEMs
- Producing locally by using the existing production lines for Automatic Transmissions

**eAxle** Enhancing development in view of application to PHV

- Expanding the lineup for application to premium 4WD vehicle
- Enhancing development while considering also that the products for the high-capacity vehicles are deployed as the electric drive system for PHV by adding batteries

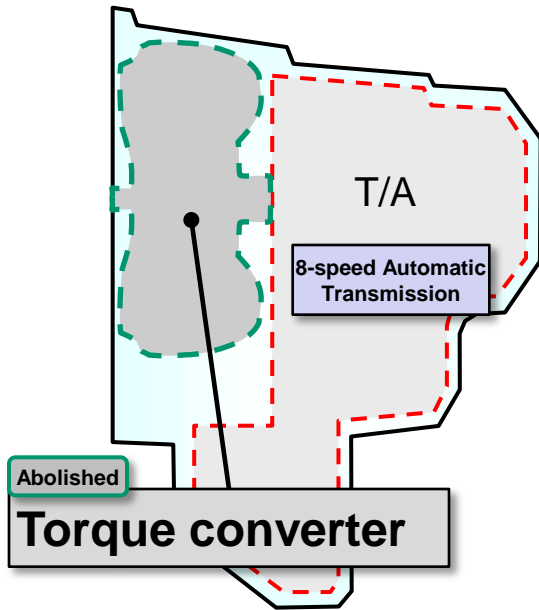
**EV / FCV** Enhancing to make it a long-term core business

- Proposing as the EV unit package containing the motor, inverter, reduction gear and transmission
- Developing the system that enables controlling the drive control system containing the brake such as rear steering, regenerative cooperating braking system, etc.

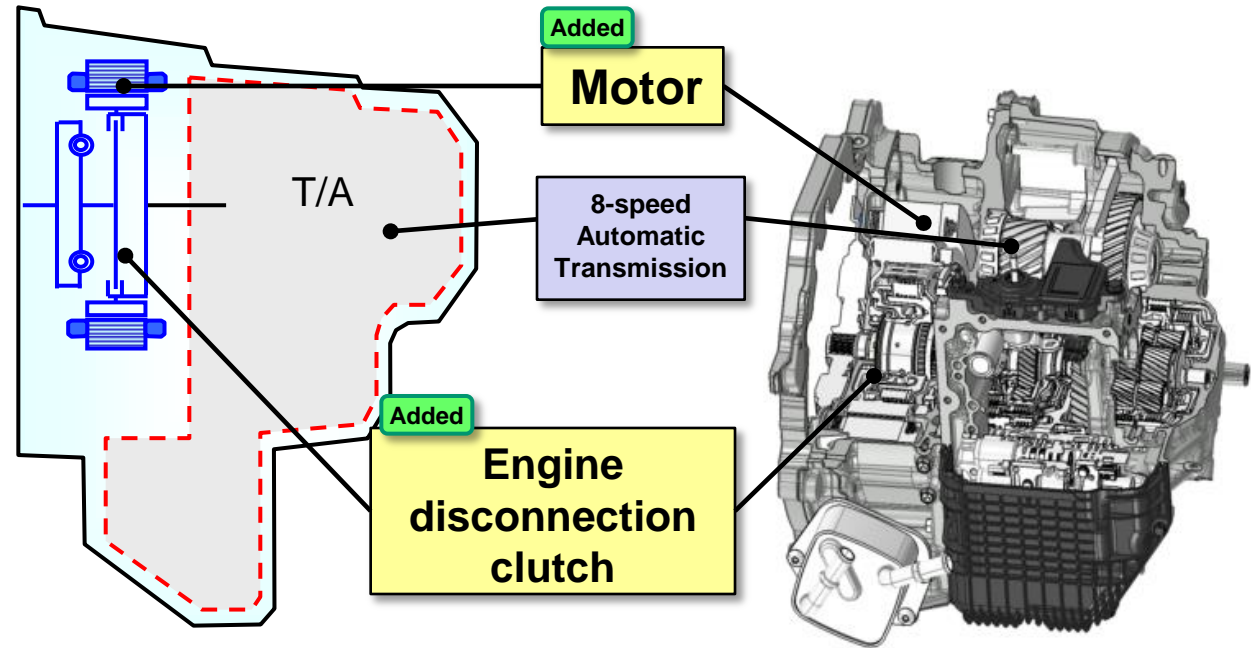


# Initiatives for Development of 1-motor HV

## Conventional Automatic Transmission unit



## 1-motor HV unit



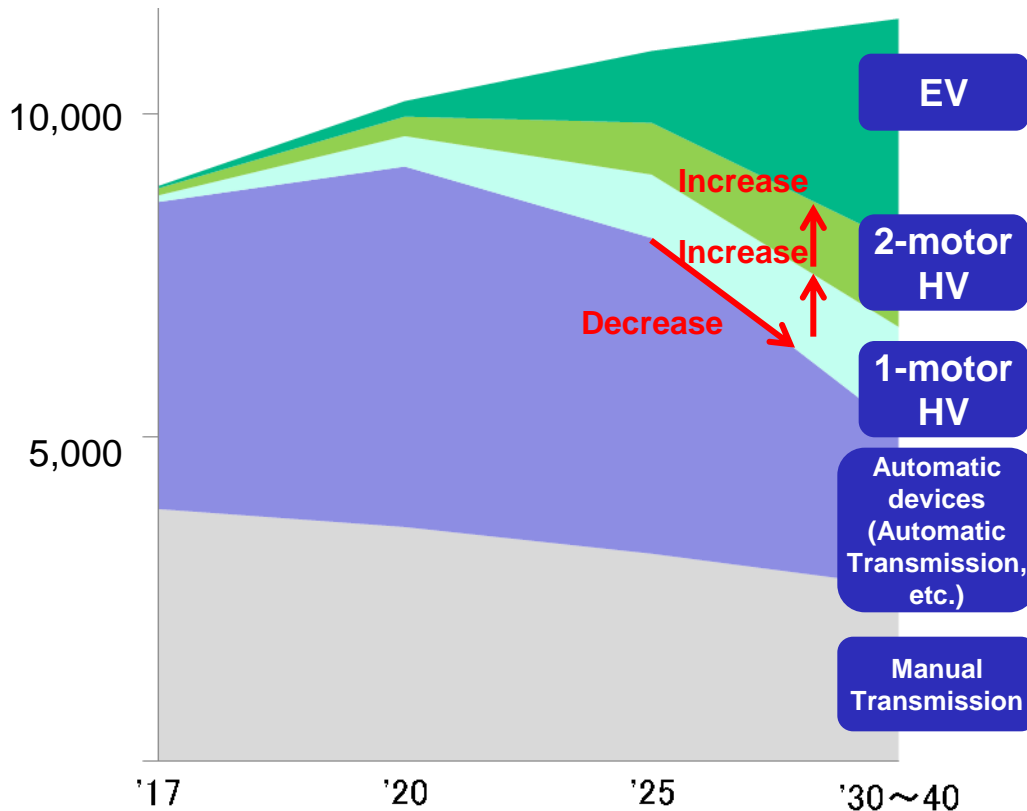
### < Features and good news >

- ◆ 1-motor HV system with the existing Automatic Transmission's torque converter replaced by a combination of a motor and a clutch
  - ⇒ The global existing facilities for production of Automatic Transmission can be used for the 1-motor HV.
- ◆ Drastic improvement of fuel economy is realized by the EV driving using a built-in clutch for disconnecting engine.
- ◆ Add-on motor for the engine output realizes improved starting acceleration performance.
- ◆ We achieved the variable speed feeling being similar to or better than the existing Automatic Transmission.

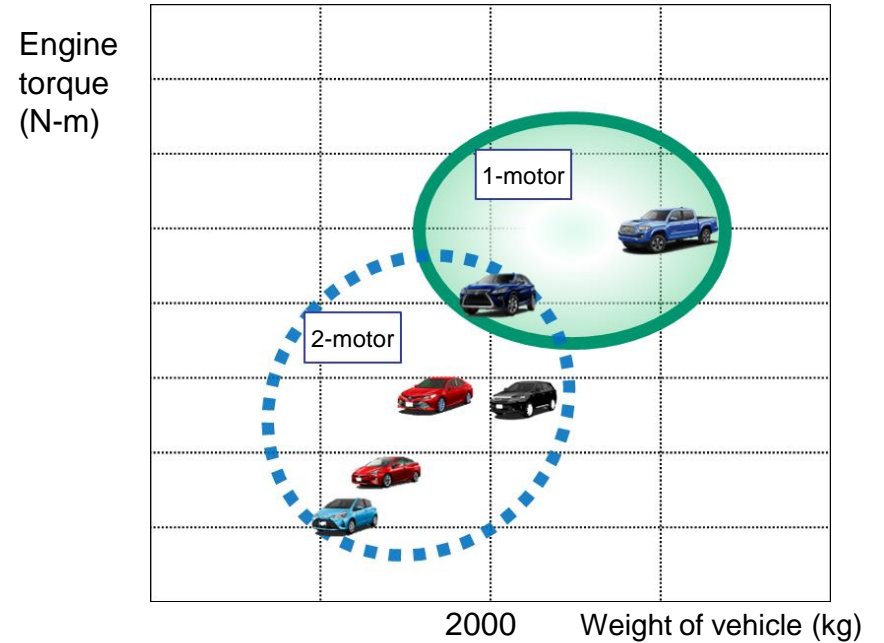
# Initiatives for Development of 1-motor HV

Forecast of automotive market by transmission  
 (based on the scenario of popularization of EVs)

[Units: 10 thousand cars a year]



## Comparison in driving force between 1-motor and 2-motor



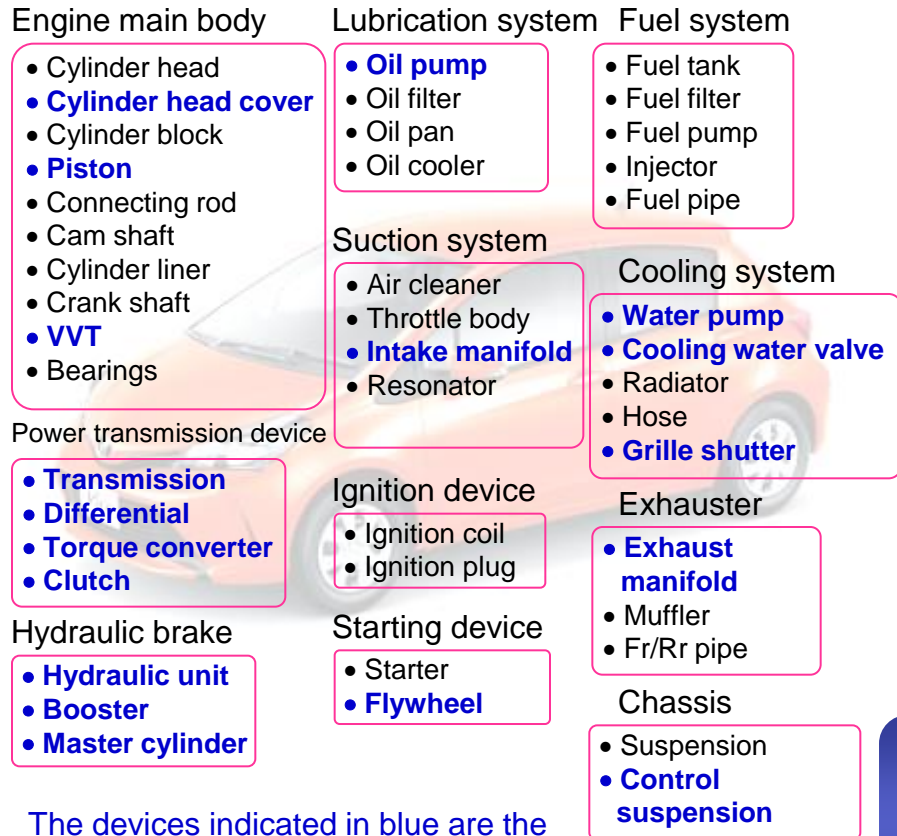
2-motor HV	1-motor HV
<ul style="list-style-type: none"> <li>• Car runs gracefully and flexibly.</li> <li>• Excellent in fuel economy when driving on city streets</li> </ul>	<ul style="list-style-type: none"> <li>• Being compatible with high-torque vehicles</li> <li>• Excellent in fuel economy when driving at high speed</li> </ul>

**Securing a firm position in the hybrid market by having the 1-motor and 2-motor lineups and increasing the ability to make proposals**

# Initiatives for Development for EV

## Changes in components caused by a change to EVs and Aisin's initiatives

### Gas vehicle



The devices indicated in blue are the products supplied by the Aisin Group.

### EV

#### Electric drive unit

Motor

Inverter

Transmission / Reduction gear

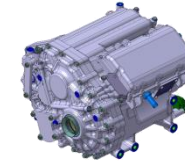
DC/DC converter

Regenerative cooperating braking system

Electric brake

Electric vacuum pump

Electric compressor



Secondary battery

Battery components

Battery frame

Vehicle mounted charger

Contactless power supply during traveling

High-voltage wiring

Lightweight framework

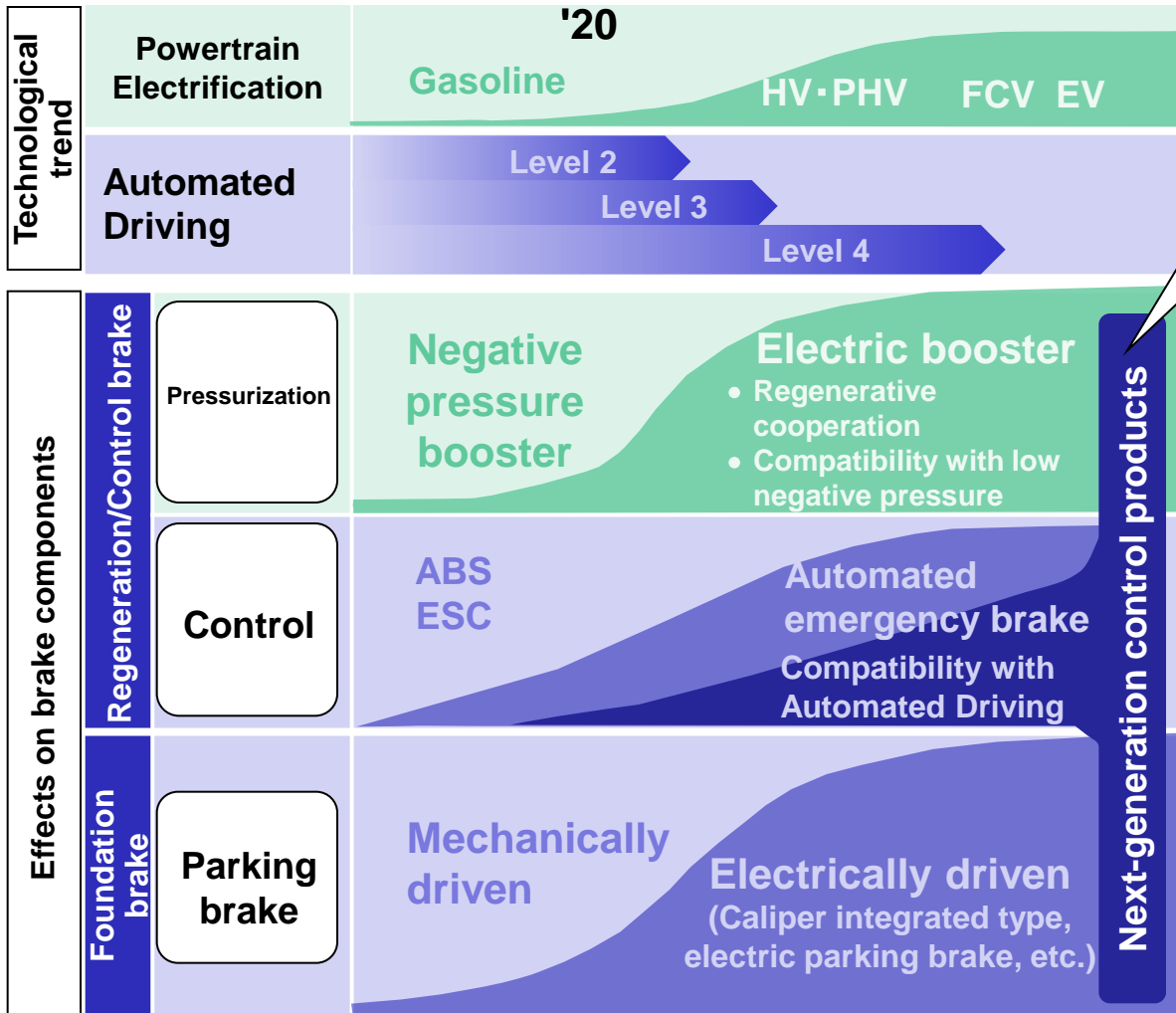
Cooling system

The devices indicated in white are the products supplied by the Aisin Group.

Although the components change drastically because of electrification of internal combustion engine, etc., we start and enhance development of EVs' many major components early.

# Market Trend and Direction of Initiatives

## Changes in major brake components



### Accelerating growth strategies while foreseeing next generation

- Accelerating development in the Vehicle Dynamics Control field and the Automated Valet Parking field for realization of the Automated Driving

### Strengthening competitiveness of existing businesses

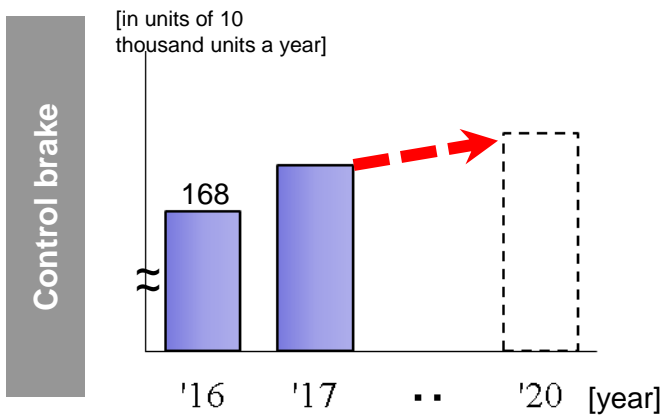
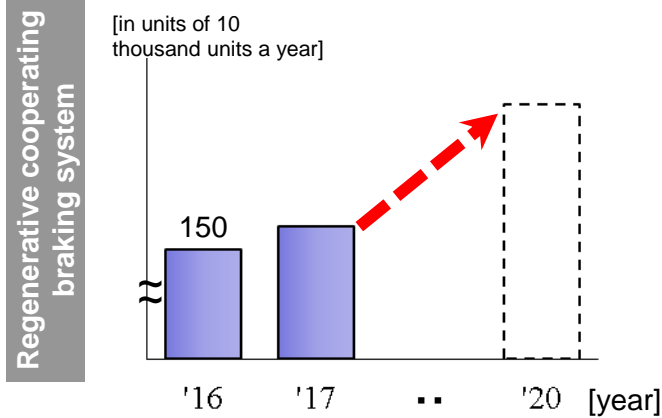
- Advancement for expansion of Electrification and sophistication of the automated emergency brake (AEB)
  - Regenerative cooperating braking system : Improving the domestic production capability
  - Control brake: Development of the next-generation product and expansion of production
- Clarifying role-sharing based on expansion and popularization of the electric parking brake (Business restructuring)
  - Establishing the business operating structure lead by ADVICS

## (3) Measures for Increasing Production of Regeneration/Control Brakes

### ADVICS

Demands for the regenerative cooperating braking system and the control brakes are increasing along with advancement of Electrification and Automated Driving.

#### Estimated production

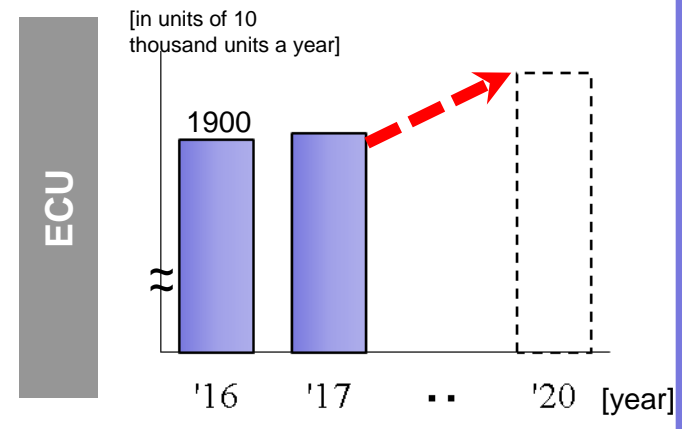
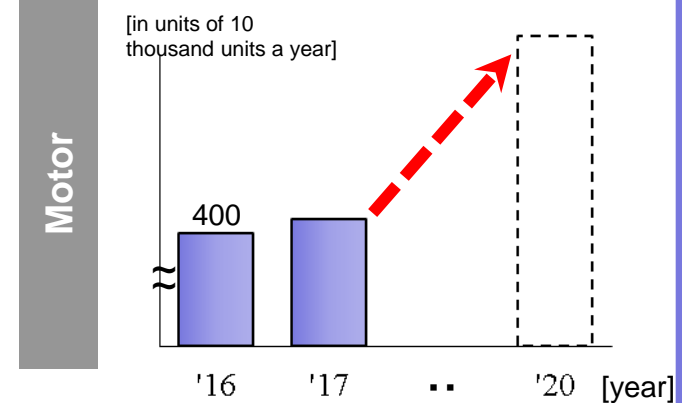


Considering expansion of Handa Plant

### Aisin Seiki

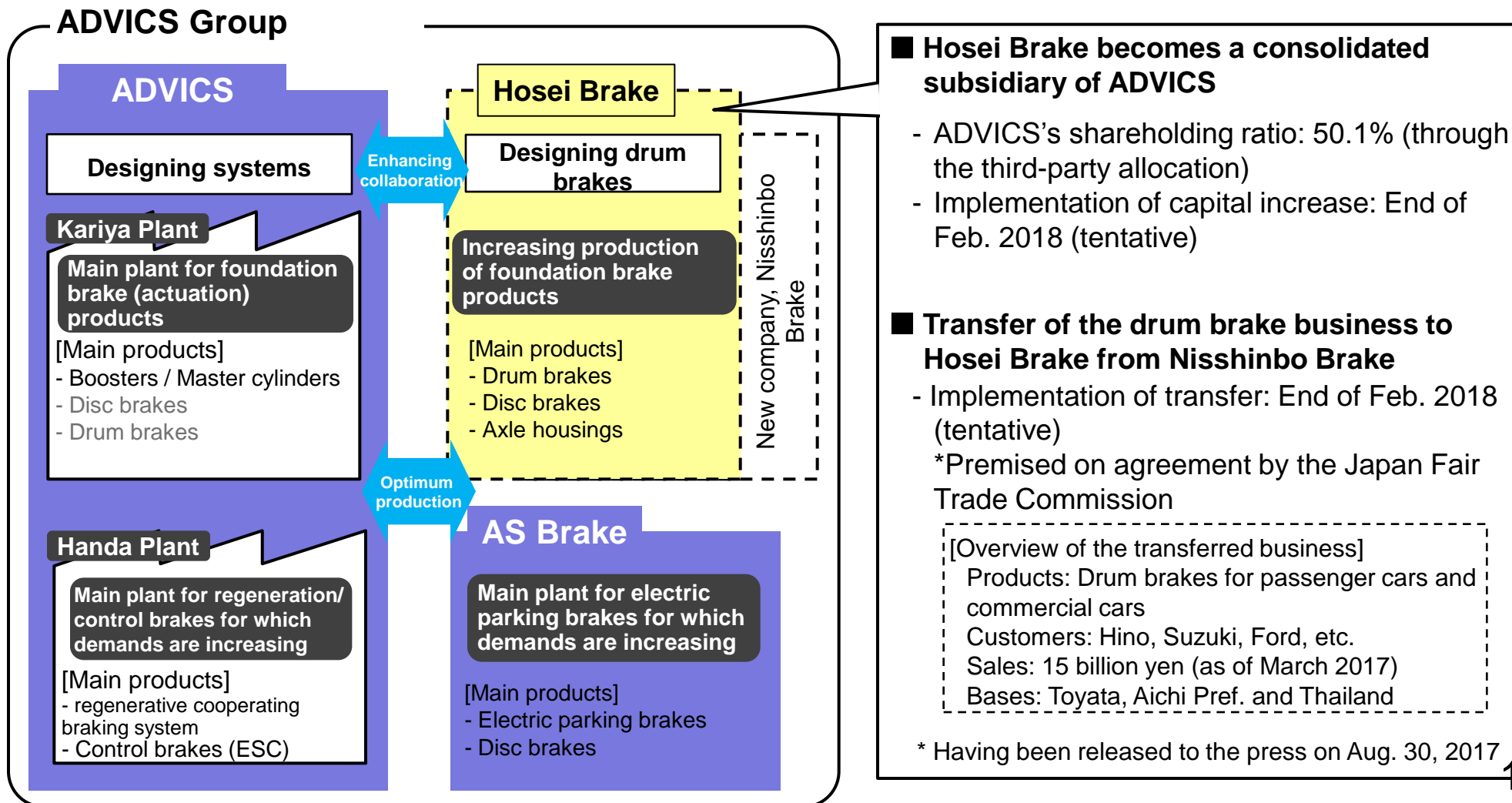
Demands for electronic devices such as motors, ECU, etc. are increasing along with advancement of Electrification.

#### Estimated production



## (4) Enhancement of Foundation Brakes by Restructuring the Business

- ◆ Increasing competitiveness of the foundation brake business by restructuring and converting into the business operating structure lead by ADVICS, establishing the optimum production system, and collaborating in development of new products, etc.



# (5) Development of Vehicle Dynamics Control

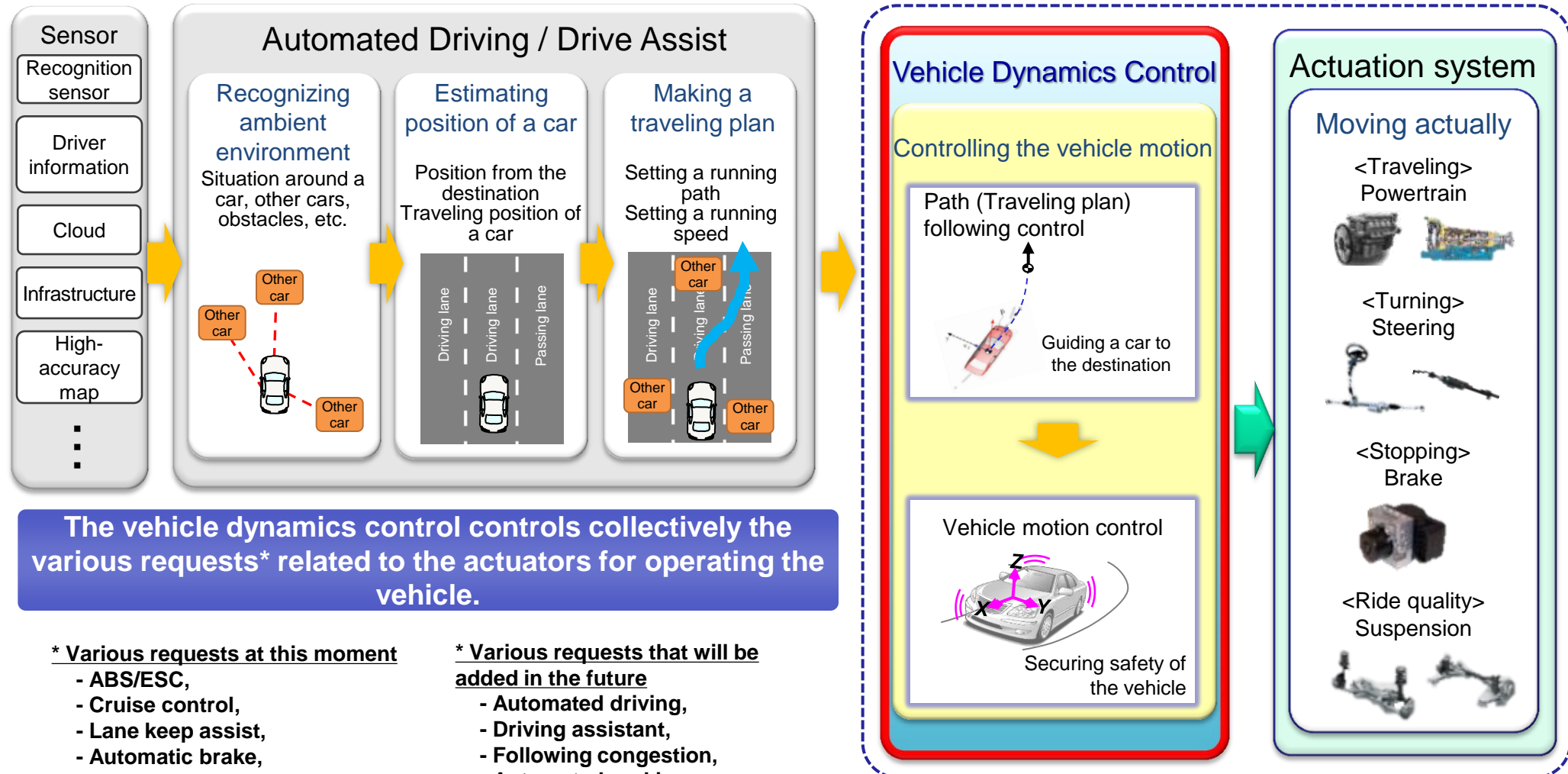
## What is the vehicle dynamics control?

<Recognize>

<Judgement>

<Execution>

Initiatives made by Aisin Group



The vehicle dynamics control controls collectively the various requests\* related to the actuators for operating the vehicle.

**\* Various requests at this moment**

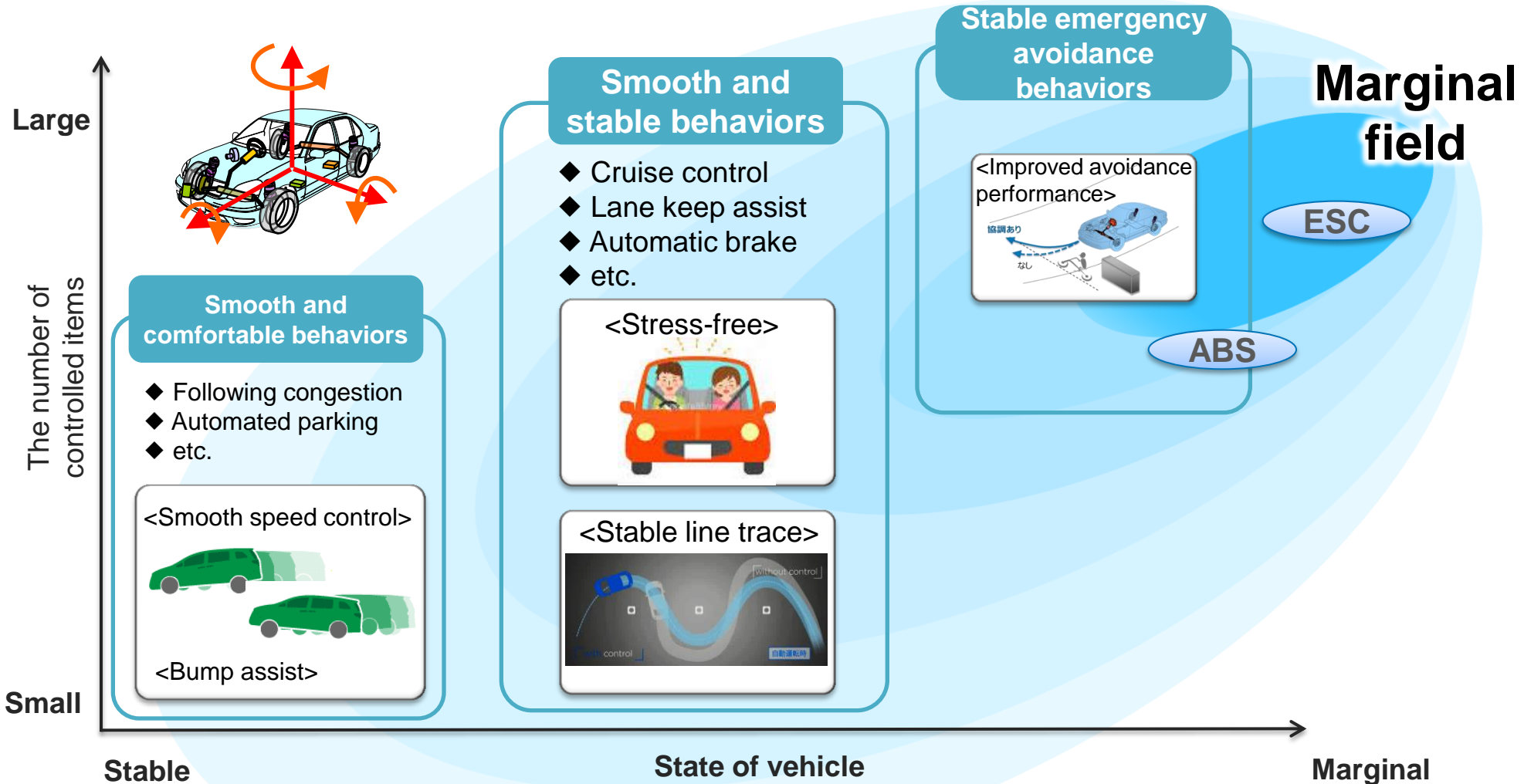
- ABS/ESC,
- Cruise control,
- Lane keep assist,
- Automatic brake,
- etc.

**\* Various requests that will be added in the future**

- Automated driving,
- Driving assistant,
- Following congestion,
- Automated parking,
- etc.

# (5) Development of Vehicle Dynamics Control

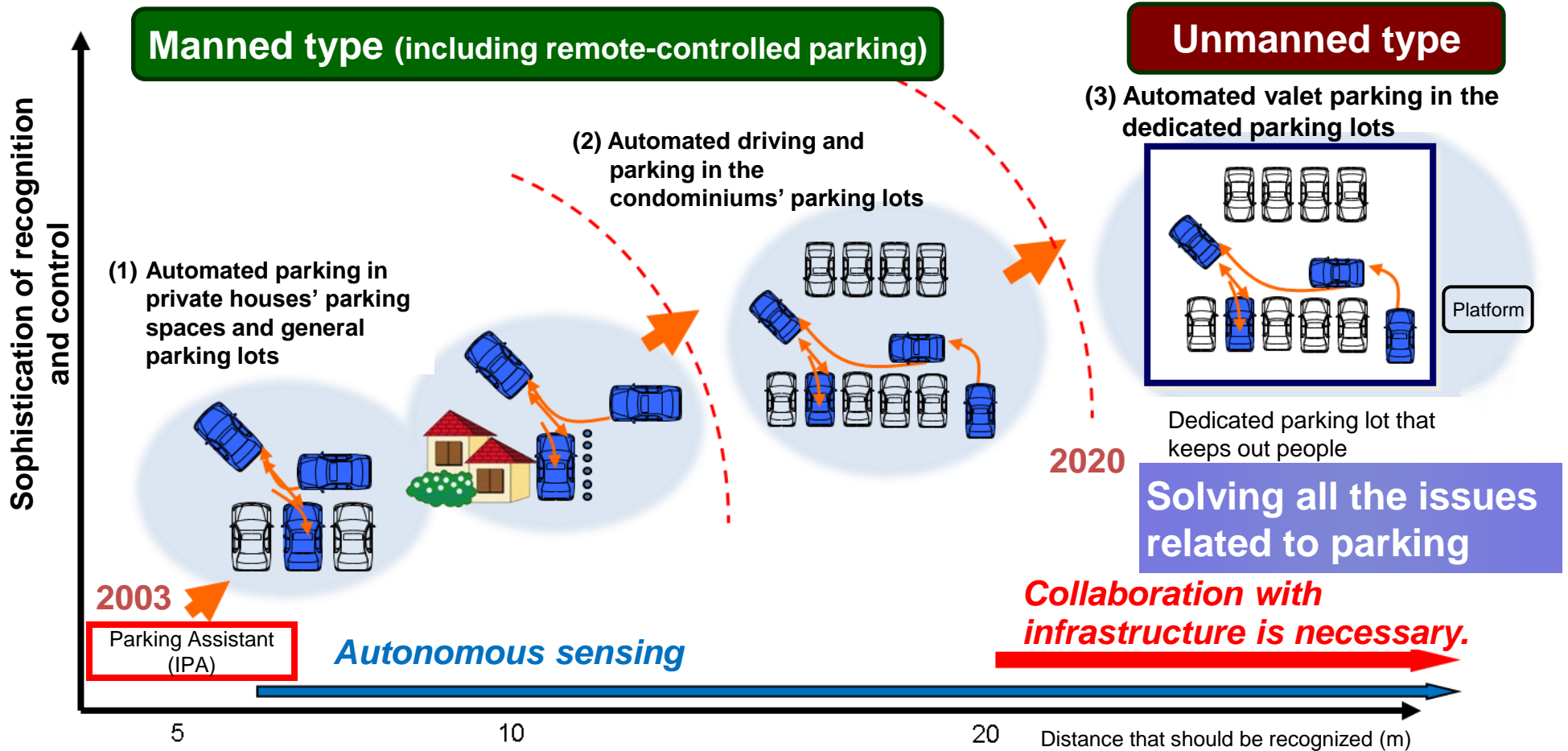
Pleasures that the vehicle dynamics control can provide



Providing safe and secure, high ride quality and pleasure of driving when driving on normal days



# (6) Development of Automated Valet Parking



Developing the core technologies for the integrating Parking Assistant System (IPA) and establishing early the technologies for the completely-unmanned Automated Valet Parking in the dedicated parking lots

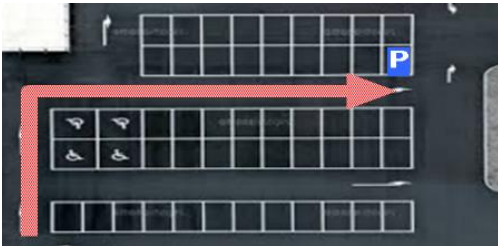
# (6) Development of Automated Valet Parking

## System of the automated valet parking and provided pleasure

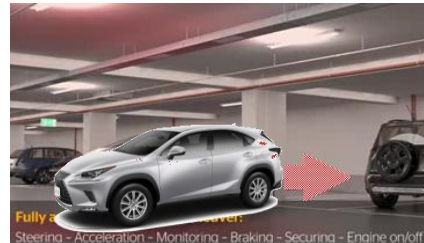
### Parking



By sending remotely the parking request after getting out of a car in the specified place, the car is automatically moved to a parking space.



The car is parked automatically after the unmanned automatic low-speed travel in the parking lot.



### Outbound



Sending remotely the outbound request.



After the automatic low-speed travel in the parking lot, the car is stopped at the specified place for getting in/out of the car.

### Pleasure

Elimination of troublesome parking

Troublesome parking is completely eliminated.

Reduction of burden caused by moving on foot / carrying

Moving between the stores and the parking lots is not required.

Reduction of accidents

Accidents in the parking lots are reduced because of automated driving in the parking lots.

Prevention of crimes

Crimes in the parking lots are prevented as no one enters the parking lots.



*For a Better Tomorrow*

***AISIN GROUP***