

IR DAY 2020

**MinebeaMitsumi**  
*Passion to Create Value through Difference*

# Our Technology and Advantage to Support the growth

December 3, 2020

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## Generating new value based on 10 core technologies

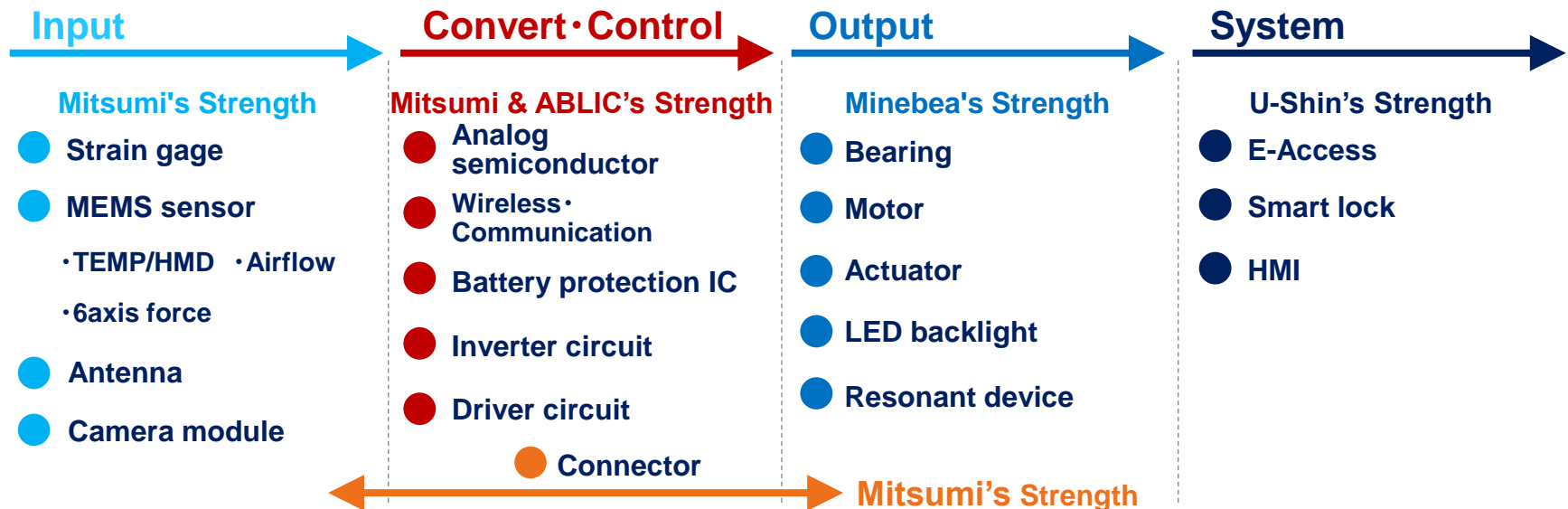
Generating value as **Electro mechanics solutions®** provider who has advantage for both **ultra precision machining** and **electronics technology** including motor, sensor, semiconductor and wireless technology

### 10 core technologies

Ultra-precision machining technology	Mass production technology	Sensor technology	Optical technology	MEMS technology	High-frequency technology	Electronic circuits technology	Semi-conductor technology	Mechanism design technology	System Design technology
Minebea	Minebea	Minebea · Mitsumi	Minebea	Mitsumi	Mitsumi	Minebea · Mitsumi	Mitsumi · ABLIC	Mitsumi · U-Shin	U-Shin

### Product lineup

▶ U-shin's system devices were added on our originally possessed any input / conversion · control / output devices



## Enforcement and expansion of technology development activity

### 1 Research and development spending

- ▶ Increasing project number and scale



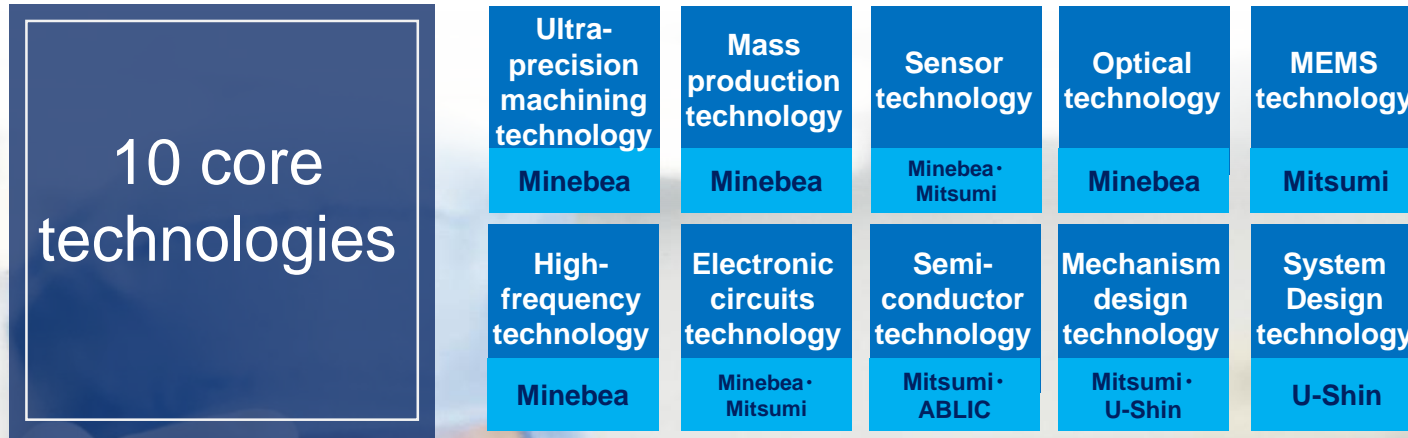
### 2 Resource of basic technology development

- ▶ Launching oversea R&D site as well as expansion of domestic R&D sites

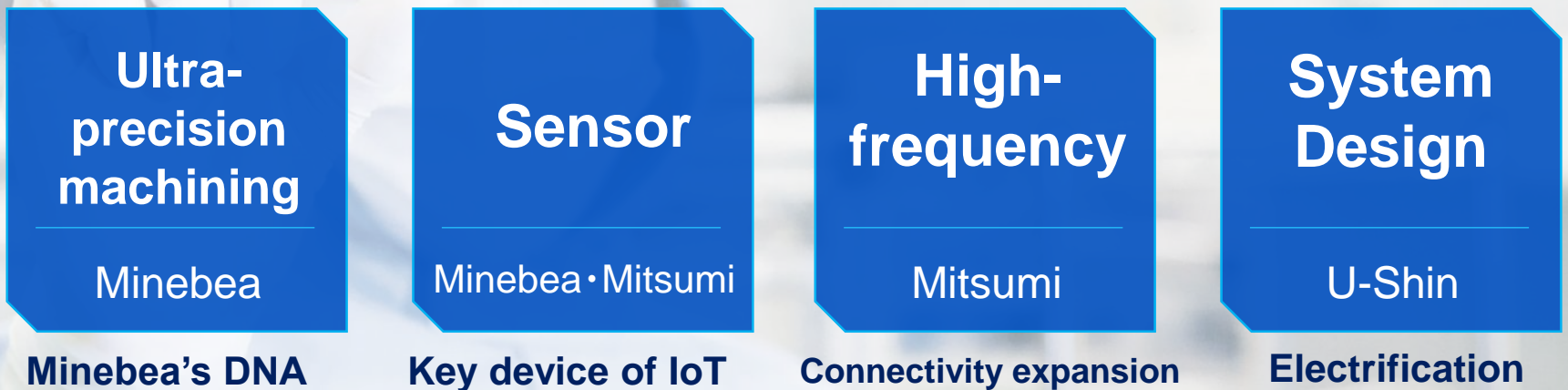


## Products evolution by using and merging 10 core technologies

Minebea Mitsumi U-shin's honed core technologies



## Explaining representative 4 core technologies out of 10

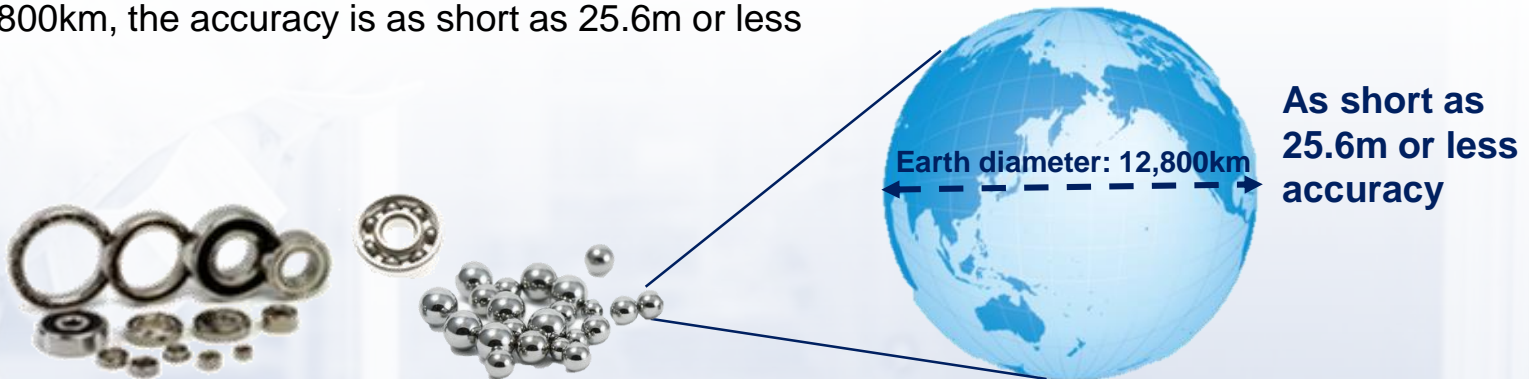


## Ultra-precision ball bearing supported by artisan skill

### Extremely small unit processing technology for ultra-precision

Each ball used in miniature bearing is almost an exact sphere

If compare the accuracy to the earth size ball which diameter is about 12,800km, the accuracy is as short as 25.6m or less



**Artisan skill** ➔ **Mass production technology**

**Advantage of MinebeaMitsumi**

Production capacity of the ultra-precision miniature ball bearing is **monthly 300 million units!**

Achieved by all in house efforts such as designing, developing, component manufacturing, tool making and component assembling.

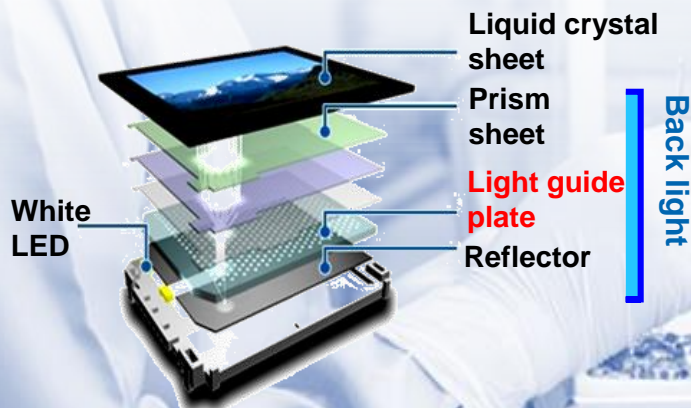
## Small·thin·high efficiency(minimize rotational load) bearing using ultra-precision machining technology

### ▶ Three Guinness world records enabled by artisan skills

**1 Ultra small** ▶ 「World smallest mass producible steel ball bearing」  
Outer diameter 1.5mm, the half length of rice grain width

**2 Light Slim** ▶ 「World smallest hand spinner」  
Outer diameter 5.09mm

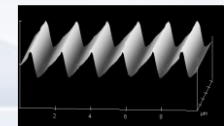
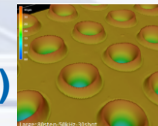
**3 High efficiency** ▶ 「The longest duration spinning a fidget spinner on one finger」 Duration 24min. 46.3sec.



Realize **world thinnest**(less than 0.3mm) wave guide plate and **highest appearance quality backlight** by merging **ultra fine process** and **optical simulation technology**

▶ Form fine accuracy optical element on mold tool by using ultra precision machining

(about 5μm)



## Expansion of sensors as keys of IoT

Developing unique and variety sensors using MEMS technology

### Sensor device Market\*

2019 6.6 trillion yen  
2030 12.0 trillion yen

\*Our estimation



**Automotive**



**Society infrastructure**  
FA·Robotics



**Healthcare**



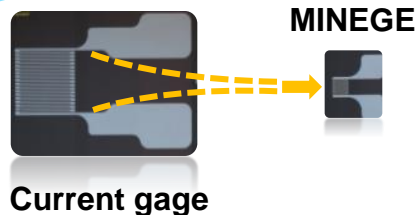
**Consumer**

<p>Sheet sensor</p>	<p>TEMP/HMD sensor</p>	<p>Force sensor</p> <p>FA·Robotics</p>	<p>Airflow sensor</p> <p>Society infrastructure</p>	<p>Bed sensor</p>	<p>Blood pressure sensor</p>	<p>High performance strain gage</p> <p>MINEGE®</p>	<p>Strain gage</p>
<p>mmWave sensor</p>	<p>Ranging camera</p>	<p>Nejicame (Ultra-small camera)</p> <p>FA·Robotics</p>	<p>Environmental sensor</p> <p>Society infrastructure</p>	<p>Pulse wave sensor</p>	<p>MEMS mirror for eye ware</p>	<p>Haptic sensor</p>	<p>Doppler sensor</p>

## Succeeded to develop innovative high sensitivity strain gage

### Potential of fantastic strain gage 『MINEGE®』

Only1



1 Sensitivity → More than 5 times higher

2 Resistance → More than 40 times higher

3 Compact → Smaller by 1/10<sup>th</sup>

- Incubating new application by detecting minute movement which had never achieved
- New market development with high speed, high resolution AD converter



Wearable Device



Robot



Smart Phone



Car



IoT Device

Mech. Physical sensor market\*

2019 1.0 trillion yen

Targeting 10 billion yen order sales

\*Our estimation

### Measuring deformation of hard glass bottle

- ▶ This sensor can measure deformation of hard glass which caused by human force. It had been considered as difficult to detect.





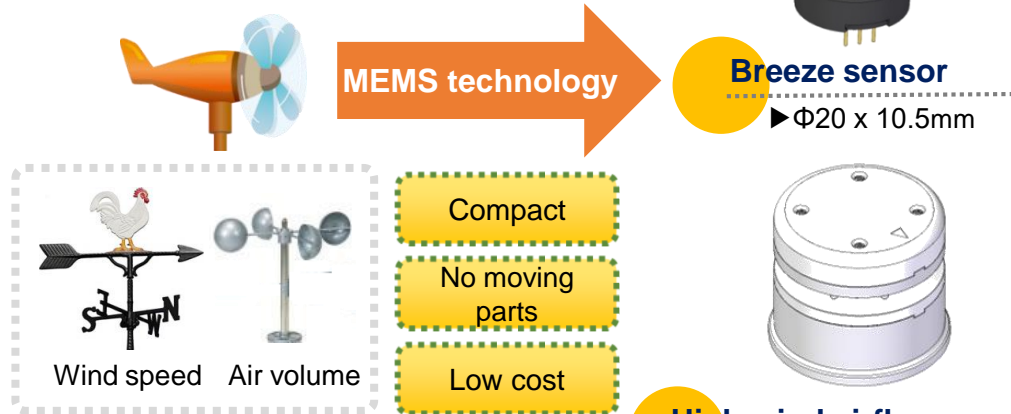


## Compact environmental sensor to modularize variety of sensors

### Sensing airflow and wind direction

#### 1 Overview

- 1 ▶ To measure wind speed and direction
- 2 ▶ Breeze sensor for indoor air conditioner
- 3 ▶ Airflow sensor for out door environment



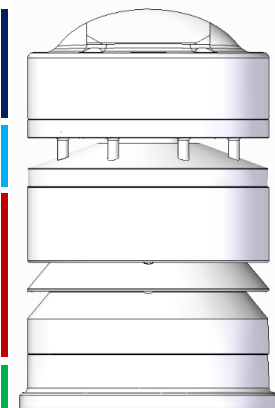
#### 2 Advantage · Application

- 1 ▶ Compact, Waterproof, Dustproof
- 2 ▶ Detecting breeze using high sensitivity element
- 3 ▶ Available for both indoor and outdoor

#### <Market potential>

- Mountable on store facility or utility pool
- Environmental data becoming more important due to the world wide climate change
- 100 billion yen domestic and 1trillion yen worldwide market are expected when installed in every area

- ① Rain sensor
  - ② Illuminance sensor
  - ③ UV sensor
  - ④ Airflow sensor
  - ⑤ TEMP sensor
  - ⑥ HMD sensor
  - ⑦ AP sensor
  - ⑧ Acceleration sensor
- Attachment parts etc.

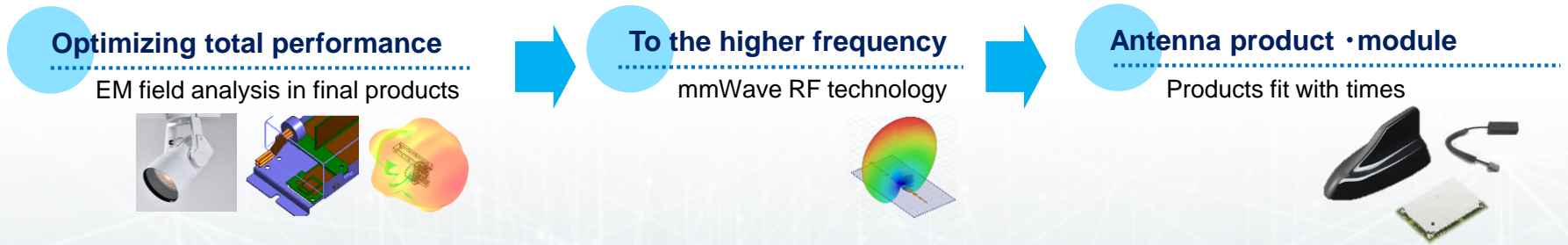


#### Environmental sensor unit

▶ Φ50 x 91mm

## Leading edge technology to support society to connect everything

### Expansion of accumulated high frequency technology



## Network technology and Integration Smart City Solution



- 1 Application case**
  - ▶ All Cambodia province
- 2 Demo. experiment**
  - 1 ▶ Suginami city of Tokyo
  - 2 ▶ Osaka Prefecture
  - 3 ▶ Japan Weather Association

## Electrification of the Key mechanism as a U-shin's base technology

Accelerating electrification and differentiation by INTEGRATING MinebeaMitsumi's technology

### 1 Automotive

#### ▶ Value addition of E-access\*

\*E-Access: Safer and comfortable car access method

Flash Handle



CSD



E-handle



E Latch



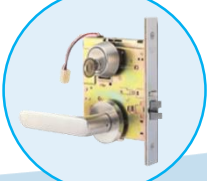
E-Shifter



### 2 Home

#### ▶ Smart house concept with high level security lock

Electric Lock



Electric smart lock  
(for Hotel)



Electric smart lock  
(with remote controller)



Up to date    Near future

Electric smart Lock



Electric smart lock



+ Small · Quick turn  
+ Authentication device

+ small  
+ work with smart phone

## (Automotive example) Generate new biz. opportunity for CASE generation

### Connected

- 5G antenna/Combo antenna
- WiFi/BT,GNSS,LTE module
- High speed transmission connector
- HMI, etc.

### Shared

- Smart Key (UWB)
- E-latch
- Flash handle, etc.

### Autonomous

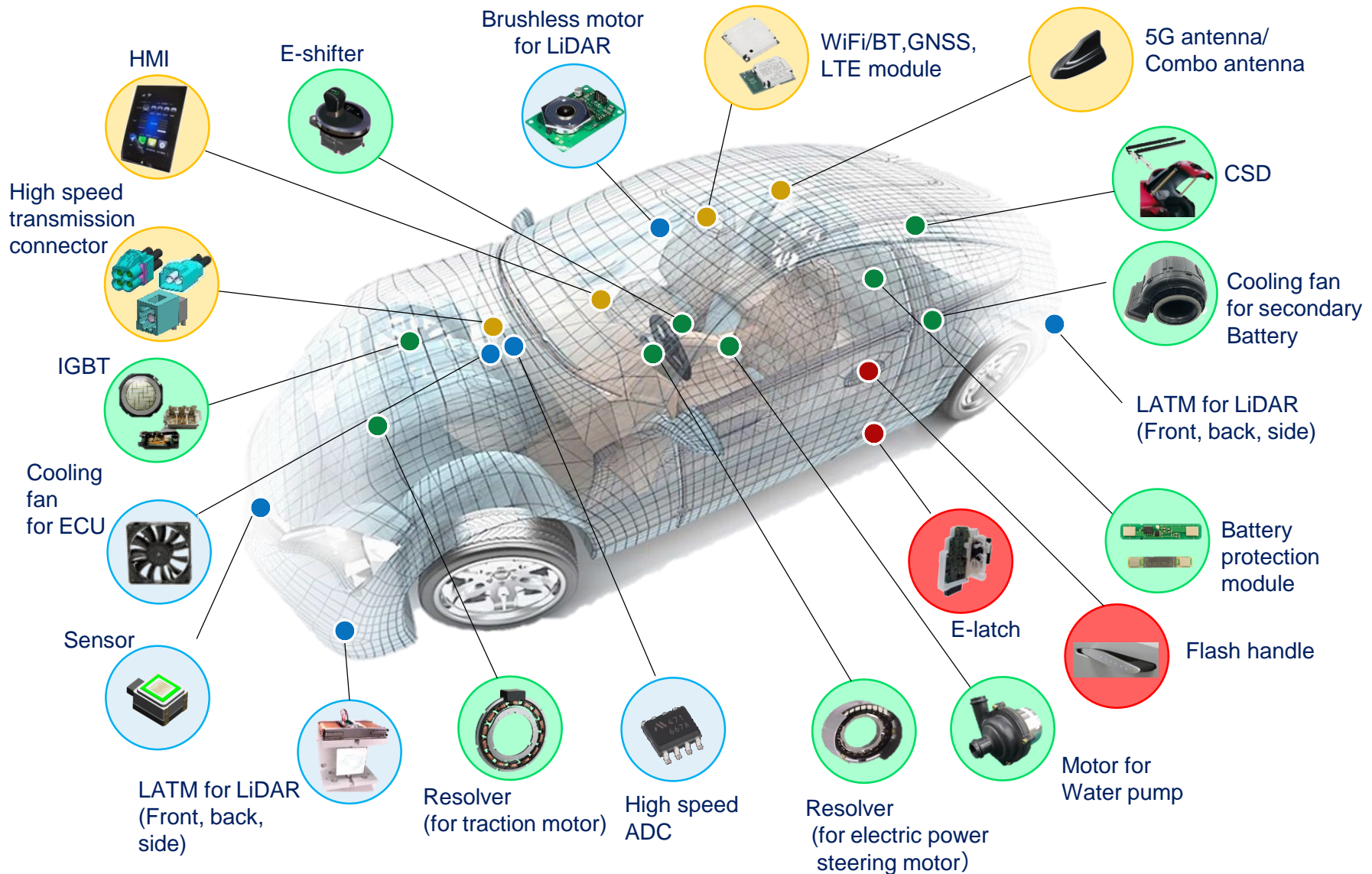
- Brushless motor for Lidar
  - LATM for LiDAR ※1
  - Cooling fan for ECU
  - Sensor
  - High speed ADC, etc.
- ※1 LATM : Limited Angle Torque Motor

### Electric

- Motor for water pump
- Cooling fan for secondary battery
- Resolver
- Battery protection module
- IGBT
- CSD
- E-shifter, etc.

# Automotive products for CASE generation (An example)

● Connected    ● Autonomous    ● Shared    ● Electric



## 1 Haptic device

(25~50billion yen/lot)

- ▶ Launching mass production for a game console

## 2 Resolver

(8~10billion yen/year)

- ▶ To be adopted in traction motor for a car OEM customer

## 3 Resonant (Vibration element)

(15~20billion yen/year)

- ▶ To be used for automotive application

## 4 Many other new projects are in process

## Maintain organic growth based on core technologies

**1 ▶ Promoting differentiation by further deepening of our own core technology to create competitive products**

**➡ Enhancement of 8 spears**

**2 ▶ Pursuing the target of creating new technology, products and business with the INTEGRATION activity for our own technologies**

**➡ Generating new spear**





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Please note that actual performance may vary significantly from any particular projection due to various factors.

Factors affecting our actual performance include but are not limited to: (i) changes in economic conditions or demand trends related to MinebeaMitsumi's business operations; (ii) fluctuation of foreign exchange rates or interest rates; and (iii) our ability to continue R&D, manufacturing and marketing in a timely manner in the electronics business sector, where technological innovations are rapid and new products are launched continuously.

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