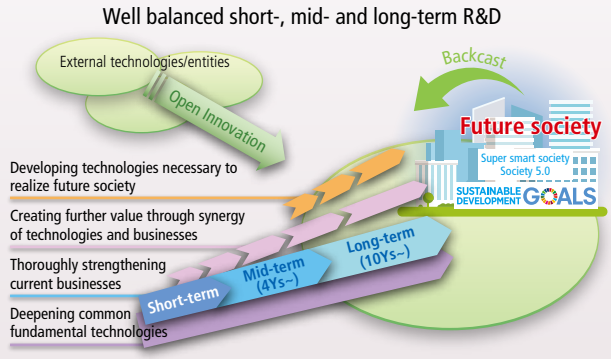
## Basic Policy on Research and Development

As the cornerstone of its growth strategy, the Mitsubishi Electric Group will promote short-, medium-, and long-term R&D themes in a balanced manner.

In addition to thoroughly strengthening current businesses, the Group is striving to leverage its accumulated strengths as an innovative, diversified electrical equipment manufacturer to create greater value through technological and business synergies and is engaging in R&D of future technologies needed to realize its ideal vision.

At the same time, the Group is also focused on research into fundamental technologies that support all of its products. Furthermore, the Group will maximize achievements by promoting enhancement of efficiency of development through proactive utilization of open innovation in collaboration with universities and other external R&D institutions.

**R&D policy**




Society 5.0: It is contained in the 5th Science and Technology Basic Plan approved by the Government of Japan in Jan. 2016.
SDGs: A set of 17 "Global Goals" with 169 targets as the sustainable development goals toward 2030, adopted by the United Nations in Sep. 2015.

## Major R&D Achievements in Fiscal 2018

### Development of Object-Recognition Camera Technology for Coming Mirrorless Cars

Mitsubishi Electric Corporation has developed what is believed to be the industry's highest*1 performing automotive camera technology for coming mirrorless cars*2 that instantly detects various object types at distances of up to 100 meters using Mitsubishi Electric Corporation's proprietary Maisart*3 -brand artificial intelligence (AI) technology.

As a result of the approval of mirrorless cars for use in Europe and Japan in June 2016, the market is expected to rapidly expand in the future.

This technology instantly detects approaching objects and identifies the type of object at the same time, which is expected to help prevent accidents, especially when drivers change lanes, by warning drivers. As such, the development of this technology will contribute to the realization of a safe and secure automobile society.

*1 As of January 17, 2018 (survey conducted by Mitsubishi Electric Corporation)
*2 System that replaces rearview and side mirrors with camera-monitoring systems
*3 Mitsubishi Electric's AI creates the State-of-the-ART in technology Mitsubishi Electric's AI technology brand aimed at making all equipment smart


Maisart

**Instant recognition of distant objects to help ensure driving safety**

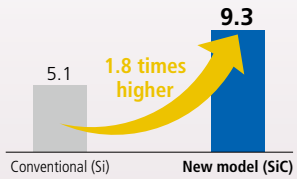
### Development of 6.5 kV Full-SiC Power Semiconductor Module*1

Mitsubishi Electric Corporation has developed a 6.5 kV full-SiC*2 power semiconductor module featuring the world's highest*3 power density*4 of 9.3 kVA/cm$^3$ (1.8 times compared with Si*5 module) enabled by insulating substrate with both thermal conductivity and heat tolerance, and by high reliable bonding technology.

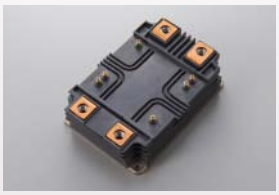
Since the replacement of Si modules with full-SiC modules substantially reduces switching loss and makes it possible to conduct high frequency operations, which had been difficult to carry out with Si modules, this technology can realize energy-efficient power electronics equipment as well as compact peripheral components. The application of this module will lead to smaller and more energy-efficient power electronics equipment for high-voltage electrical equipment for railcars and power system and transformer equipment.

*1 This development is subsidized by the New Energy and Industrial Technology Development Organization (NEDO).
*2 SiC: Silicon Carbide (a compound of carbon and silicon)
*3 As of January 31, 2018, as high-voltage power semiconductor module (survey conducted by Mitsubishi Electric Corporation)
*4 The magnitude of power generated by a certain volume at the time of standard operation
*5 Si: Silicon

**Power density rating (kVA/cm$^3$)**




Improved power density rating



6.5kV full-SiC power semiconductor module

**Contributing to advances in railcar- and power facility-related equipment in terms of energy efficiency and miniaturization**