

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.

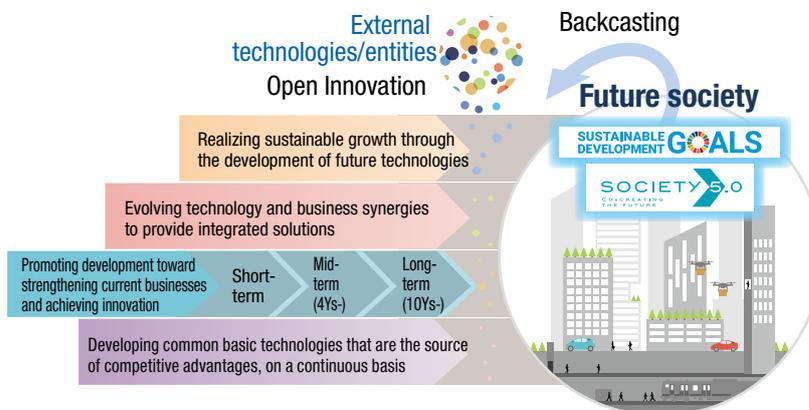
In addition to promoting research and development toward strengthening current businesses and achieving innovation, and continuous development of common basic technologies, the Company is striving to evolve technology and business synergies to provide integrated solutions that will solve increasingly diverse social issues, while also working to realize sustainable growth through the development of future technologies.

Furthermore, the Company will promote enhancement of efficiency of development and creation of new value, through proactive utilization of open innovation in collaboration with universities and other external R&D institutions.

During fiscal 2020, the total R&D expenses for the entire Group have amounted to 206.8 billion yen (3% decrease compared to the previous fiscal year). Representative achievements are as follows.

R&D policy

Well balanced short-, mid- and long-term R&D



SDGs: "Sustainable Development Goals" adopted by the United Nations as goals to achieve towards 2030
Society 5.0: It is contained in the 5th Science and Technology Basic Plan approved by the Government of Japan in Jan. 2016.

Major R&D Achievements in Fiscal 2020

Development of New Technology Controls In-Building Mobilities and Facilities, Supported with Building Dynamic Maps

In recent years, with the aim of improving added value of buildings, studies have been underway to reduce the workloads of building-management personnel through the use of in-building mobile robots for cleaning, security, deliveries, and guidance, as well as to realize safe and secure movement within buildings by users of personal mobility devices, including next-generation electric wheelchairs.

The Company has developed a technology for controlling in-building mobile robots as well as personal mobility devices, using building dynamic maps^{*1} to achieve cooperative interaction between the robots, etc. and building facilities, such as elevators and access control systems. In addition, the Company has built systems that work with animated lighting guidance systems^{*2}.

This supports the safe, efficient movement of people and In-Building Mobilities in buildings, thereby reducing the workloads of building-management personnel and realizing smart buildings^{*3} in which people and robots coexist safely.



Example: Animated lighting indicates movements of the service robot

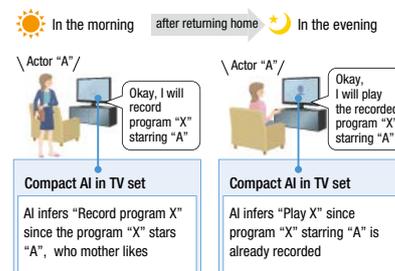
*1 A new three-dimensional map for buildings that shows the status of building facilities (e.g. elevators and access control systems), location of mobility devices and passable route
*2 The animated lighting guidance system "Terasu Guide" (released April 2020) that allows facility users to intuitively understand guidance and warning with lighting animations projected on the floor
*3 Buildings in which advanced IoT is deployed to energy-saving and labor-saving work environments through the building

Development of Compact AI Knowledge Representation and Reasoning Solution for Human-Machine Interfaces

Devices with complex features, such as home appliances and car navigation systems, require humans to understand how they operate and devise controls. However, in recent years, AI that supports operation of such devices by using big data on the cloud has become widespread. On the other hand, there is a growing need to complete information processing on stand-alone devices without communication with external devices, in order to enhance response speed.

The Company has developed the Compact AI Knowledge Representation and Reasoning Solution for HMI (human-machine interfaces) based on its proprietary AI technology "Maisart", which enables devices to understand vague user commands through the reasoning of missing information, according to the situation.

It achieves this by means of a "knowledge graph" which integrates user information, device specification and functionality and external information, and will allow responsive and easy-to-use human-machine interfaces to be embedded in stand-alone consumer products such as home appliances and car navigation systems.



Example: The TV's AI integrates necessary information according to the situation and understands ambiguous commands.



*Mitsubishi Electric's AI creates the State-of-the-ART in technology
Mitsubishi Electric's AI technology brand aimed at making every device smarter

For labor-saving building management and smart buildings where people and robots coexist safely

The device understands ambiguous commands from people for quick operations.