

Delivering Value to Society Through Our Evolving Technology

Kawasaki Group's Basic Direction on R&D

To improve the Kawasaki Group's enterprise value into the future, business divisions and the Corporate Technology Division concentrate technologies available within the Group, utilize technological synergies and develop new products and new businesses with a competitive edge.

We strive for balanced R&D. This is achieved with new product and new business development as well as activities geared toward the creation of new products and new business for the future in each operating division and with training and reinforcement in the basic technologies needed to realize new products and new businesses.

R&D expenses
 FY2019 (Forecast) **¥50.0 billion**
 FY2018 (Forecast) **¥48.0 billion**
 FY2017 (Actual) **¥43.6 billion**



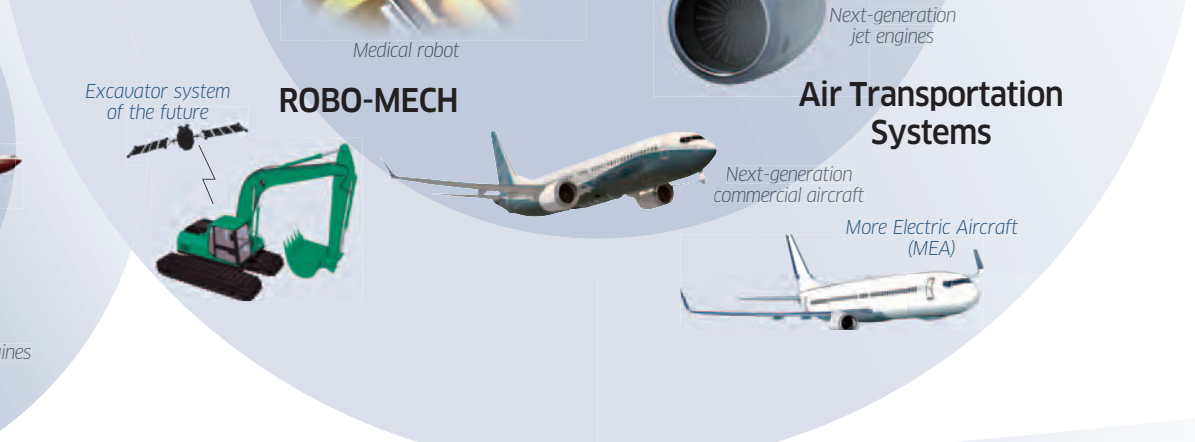
2020

Develop new businesses in existing operating divisions



2030

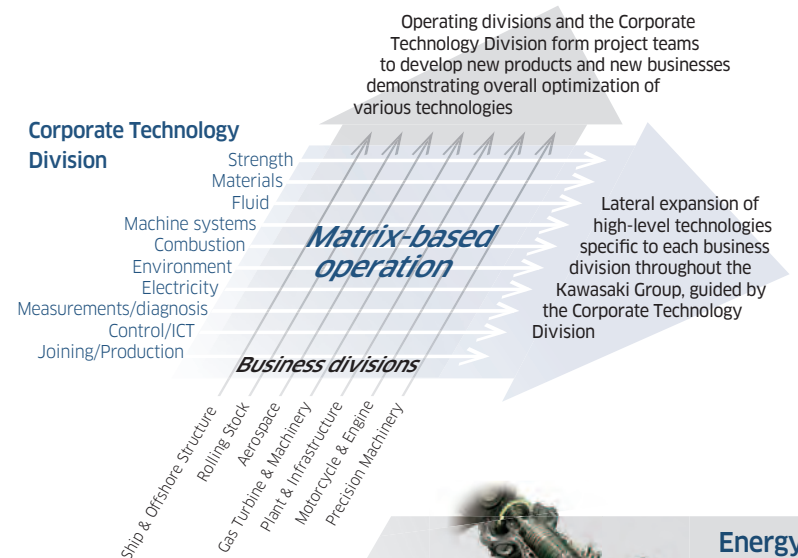
Develop new businesses in future operating divisions



Framework for Creating Technological Synergies –Matrix-based Operation

Engineers from each business division and specialists in the Corporate Technology Division, who have expertise in various fields, form project teams to share issues and work together to develop new products and new businesses. The objective is always to achieve overall optimization of management resources. The Corporate Technology Division acts as an intermediary, facilitating access to the technological core competence that defines each business division so that the inherent value can be applied to products in other business divisions. This promotes multifaceted expansion of technology and demonstrates major synergistic effects.

We will utilize this matrix-based operation to create technological synergies throughout the Kawasaki Group and raise enterprise value even higher.



Strengthening R&D Areas

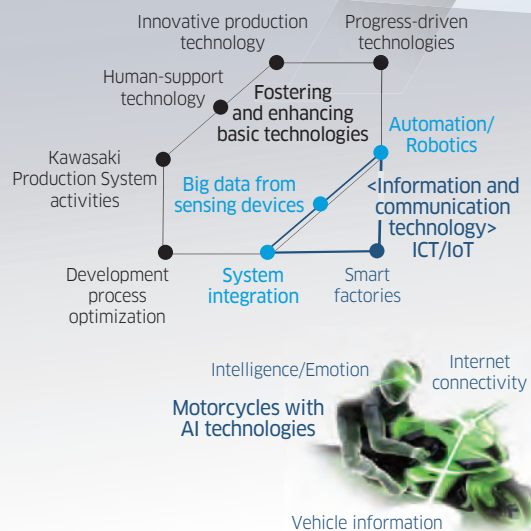
At Kawasaki, we seek to boost the customer value of products with the latest ICT/IoT features and to create new services, and we also look for ways to shorten lead time in production processes and drive down costs as we strive from a companywide perspective to raise profitability over the whole product lifecycle.

For example, we are working on a next-generation motorcycle that has the capacity to grow and develop along with the rider, utilizing AI. We are also actively promoting development of a structure for new services, such as approaches to improve the operating efficiency of power generation plants as well as remote monitoring and malfunction diagnosis for lowering maintenance costs, and status diagnosis for expanded maintenance operations of rolling stock.

In fiscal 2010, we embarked on full-scale participation in hydrogen projects, drawing on Group capabilities to establish these operations as a future pillar of business. We aim to secure a frontrunner position in the market as a supplier of key equipment and facilities spanning all aspects of the supply chain, from hydrogen production to transportation, storage and use.

Currently, we have completed development of a high-pressure hydrogen trailer, a liquefied hydrogen container and a gas turbine using a mixed hydrogen combustion system. Marketing activities are in progress. We are also fine-tuning development of hydrogen liquefaction equipment, a liquefied hydrogen carrier and liquefied hydrogen bases.

Hydrogen supply chain structure verification business
 Details on page 52



Initiatives in Technological Synergies

- Energy & Environmental Engineering:** Hydrogen-driven gas turbine, using low-NOx hydrogen combustion, to power future hydrogen society. Large gas engine boasting world's highest efficiency and environmental performance.
- Land/Sea Transportation Systems:** Motorcycle engine with supercharger balancing high power and eco-friendly performance. Liquefied hydrogen carriers for mass transportation.
- Air Transportation Systems:** Significant lightweight bogie truck with adopted composite materials. High-rigidity, ultra-high payload robots for producing aircraft fuselage panels. Commercial aircraft featuring composite material fuselage and high-efficiency engines.
- ROBO-MECH:** Precision machinery and high-rigidity robots.