

# ULVAC's Value Creation <Research & Development and Global Expansion>

## Research & Development

### Ongoing value creation from a medium- to long-term perspective

ULVAC has long been a source of vacuum-technology-based products and materials indispensable for wide-ranging industries. We will continue to promote innovative, pioneering R&D capable of addressing actual and potential needs and create high-added-value products and technologies, thus contributing to the progress of society.

To continue to provide innovative technologies and products in the everchanging market, our R&D projects undergo selection and focus by making a clear distinction between "development for improvement of existing products" and "development of fundamental technologies in preparation for the future" based on analysis of customer needs and market trends. Moreover, our development structure leverages business partnerships with various companies and research institutions.

We are also striving to equip ourselves with the advanced technologies necessary to respond swiftly to the progress of 5G and IoT in line with the establishment of global network infrastructure and the smart society while flexibly addressing social issues such as global warming and climate change, thus establishing a foundation for long-term sustainable growth.

#### Principal themes

- Next-generation non-volatile memory
- High-density packaging
- Electronic devices, MEMS/sensors
- Hyperfine wiring
- Next-generation displays
- Power devices
- Next-generation batteries
- High-efficiency solar cells
- High-functional films
- The environment
- New energy
- Medical

**TOPICS** Relevant SDGs

**ULVAC-Osaka University Joint Research Laboratory for Future Technology opens at Osaka University**  
Establishment of a base for fundamental research and initiatives for human resources development

On November 1, 2018, ULVAC, Inc. and the Graduated School of Engineering at Osaka University established the ULVAC-Osaka University Joint Research Laboratory for Future Technology (hereafter referred to as the "Joint Research Lab") in the Central Terrace Building of the University's Suita Campus. Through Osaka University's industry-academia collaboration framework, the Joint Research Lab aims to promote mutual exchange among researchers and build an R&D network, contribute to scientific advancement and the resolution of technical issues in the medical engineering field, and develop highly creative university human resources. ULVAC aims to employ its own in-house technologies to create new value, which include applications for next-generation FPDs, fabrication of semiconducting quantum dots for artificial photosynthesis and technology for their mass-production, as well as ultra-high-speed freeze-drying technology for medical applications such as cell preservation.

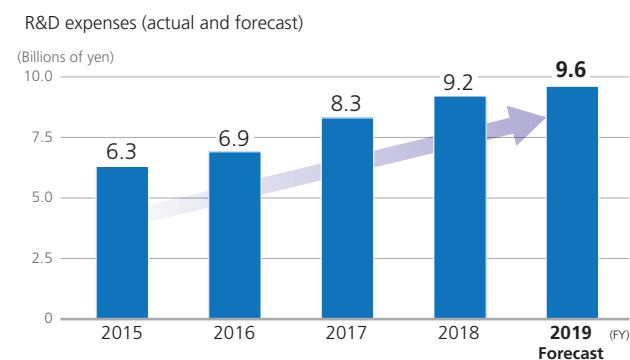
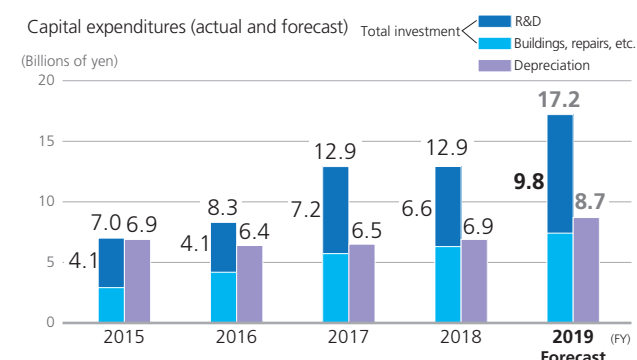
**Research themes**

- 1) Development of cryogenic cold storage materials using rare-earth nitride
- 2) Development of alloy powder that is anisotropic and property-controlled
- 3) Establishment of a cell preservation technique using ultrafast freeze-drying technology, etc.

Central Terrace Building at the Suita Campus of Osaka University

## Capital Expenditures and R&D Expenses (Actual and Forecast)

R&D investments (capital expenditures for R&D and R&D expenses) are expected to continue increasing. Active development is expected to lead to future growth, along with efforts in next-generation displays/logic and next-generation non-volatile memory.

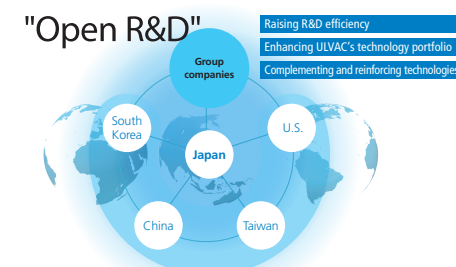


## Global Network

### Solution networks offering solutions to support industrial development worldwide

ULVAC has established optimal networks covering development, sales, manufacturing, and services not only for Japan but also for the United States, Europe and Asia.

#### "Open R&D"



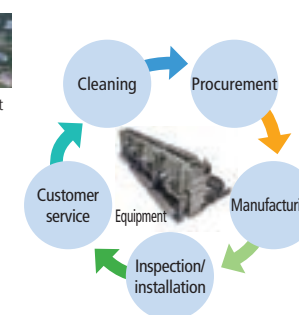
ULVAC conducts R&D near customers and shares the outcomes throughout the Group.

#### Global production system



ULVAC has an extensive production system in Japan, China, South Korea, and Taiwan and has established a supply chain for each site.

#### Regional supply chain



## Customer Support

### ULVAC's customer support solutions pool the Group's knowledge

Our customer support network (66 bases in 13 countries) in Japan and around the world underpins our customers' production operations in a manner that meets their needs throughout the lifecycle. We offer comprehensive maintenance service covering components and make proposals for improvement and refurbishment covering customers' processes. Furthermore, by using information on customer needs as feedback for the development of new equipment, we aim to offer even more sophisticated vacuum technologies and service.

