

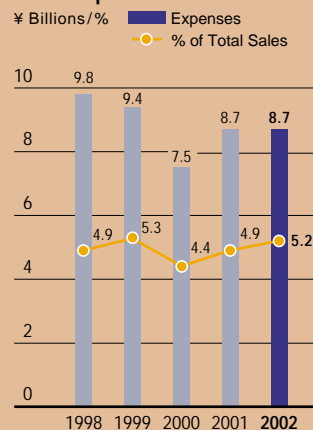


Research & Development



Cinderella IV
High-speed image Processor

R&D Expenses



The Yamatake Group's research and development activities comprise Yamatake Corporation's R&D Headquarters — the Group's core R&D unit — plus product development departments in each business section and the Technology Committee, which helps to formulate and direct Group-wide research and technology strategies.

During the reporting period, we reorganized our R&D Headquarters and launched the Micro Device Center (MDC). The latter was established not only to strengthen R&D into micro-device technology and products, but also to focus resources on internationally competitive sensor products and raise the efficiency of our research over the medium term. The R&D Headquarters is collaborating with the MDC to explore applications in new fields for our micro-electro-mechanical systems (MEMS) technology developed for sensors. It is also creating technology for control, sensors, measurement data analysis, computer systems and IT, communication and next-generation applications. The Headquarters not only support efforts of Group companies to develop new business and products, it also creates new businesses utilizing its own intellectual property as a world-class research center.

PERFORMANCE

In fiscal 2001, we expanded our technology for a corrosion- and heat-resistant pressure sensor constructed with artificial sapphire. In the field of microflow sensors, we produced experimental microflow meters for liquids and corrosive gases. In the field of miniaturization, we introduced silicon micromachining technology for photoacoustic CO₂ sensors. We also developed a binocular range image sensor for real-time 3-D measurement of very small objects, as well as IP-based remote surveillance and control technology. Water treatment plants began using Yamatake technology for forecasting water-flow fluctuation based on topological case-based modeling (TCBM) technology and weather data. The technology offers promising applications in the fields of environment, public services and disaster prevention. In the semiconductor field, we continued our R&D into control systems, measurement data analysis and sensor technology.

In the nursing care field, we developed air-mattress

sensors that monitor for an irregular heartbeat or breathing by detecting slight changes in air pressure. We also manufactured robots for mental health treatment for older people, which are now being used on a trial basis in healthcare facilities.

In the fields of environment and energy, we focused on developing new business based on intellectual properties involving MEMS technology (from sensor chip development), TCBM and remote IP-based monitoring.

Some of our most advanced research was performed by engineers dispatched to Ball Semiconductor Inc. in the U.S., where they achieved further progress in developing spherical wireless temperature sensor technology and related manufacturing equipment.

OUTLOOK

We have made an important shift in our R&D program. Unlike in the past, when the major emphasis was providing support for the Group's main lines of business, we are now placing greater weight on responding to new business opportunities, a reflection of our Group's primary strategy of concentrating resources in fields offering the greatest promise.

In our core businesses, our R&D will focus on enriching technologies for control, measurement and sensing. Closer cooperation between our R&D and business sectors will facilitate the development of more competitive products.

In new businesses, we will concentrate on developing technology and products for environmental energy and nursing care. R&D in highly advanced fields will include the ongoing development of spherical wireless temperature sensor technology, which is expected to become an important source of growth for the company in the future.

We will continue to accelerate our R&D through close cooperation with universities, both in Japan and abroad, as well as organizations in a wide range of fields and public undertakings.

In addition, we are taking steps to accelerate the pace of our R&D. The aim is to increase the productivity and efficiency of our R&D operations, including through organizational restructuring if required, to respond suitably to the increasing rate of technological progress in the market.