

IV. Research and Development

1. R&D System

1.1. Hitachi Group R&D Structure

Within Hitachi, each business group and Group company has a department directly responsible for product development based on individual business strategy. The Hitachi Group has a total of 30 research laboratories with some Group companies having their own independent research laboratory and structure. As of FY 2004, the Group has a consolidated total of 5,995 people working in research and development.

The consolidated R&D budget for FY 2004 was 388.6 billion yen, which equals 4.3% of sales. The R&D budget for FY 2005 will be 404 billion yen, 4% higher than FY 2004.

1.2. R&D Headquarters

The structure of corporate R&D Headquarters includes six corporate research laboratories with 2,950 employees (See Fig. 4.1). In FY 2004, the R&D budget was 64.2 billion yen.

R&D Organization (as at 1st April 2005)

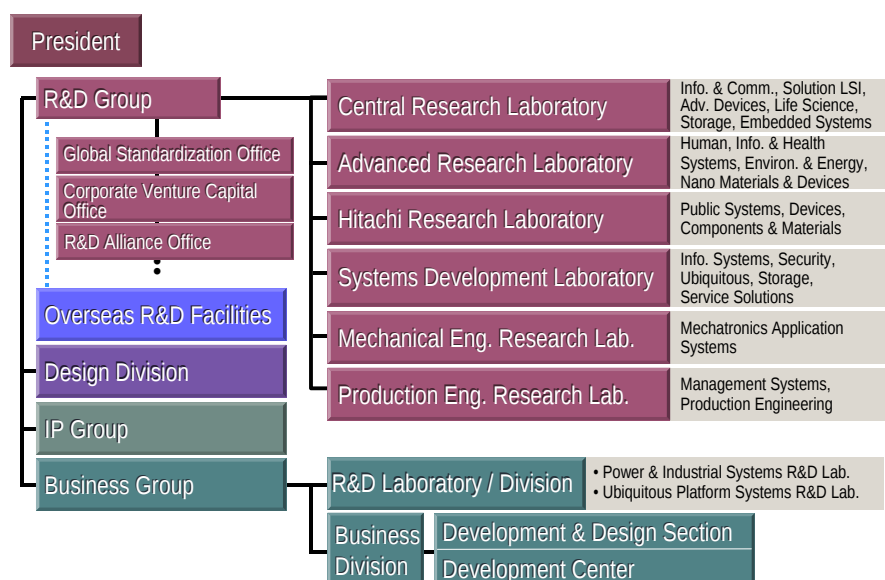


Figure 4.1 Hitachi R&D Structure

1.3. R&D Global Development

In 1989 Hitachi established R&D bases in the US and Europe to support global business development and the creation of new business in the global marketplace. In the US, research centers were established in San Jose, Santa Clara, and Detroit. In Europe, centers were established in Cambridge, England; Sophia Antipolis, France; Dublin, Ireland; and Milan, Italy. In 2000 an R&D center was established inside Hitachi (China) Investment Ltd. Based on technology surveys, Hitachi R&D activity in China has started with development of air-conditioning equipment for the Chinese market and technology research related to IT. In October 2002, a laboratory was established at Tsing Hua University to perform joint research related to ubiquitous IP network technology. In 2004 Hitachi established a laboratory in Shanghai to perform joint research with Fudan University, Shanghai Jiao Tong University and other institutions. In April 2004, an office was established in Singapore, which strengthen the formation of Hitachi's worldwide R&D Structure.

April 2005 saw the opening of a laboratory in Singapore. The laboratory will focus research on the storage sector in collaboration with a local Research Institute and universities. (See Figure 4.2)

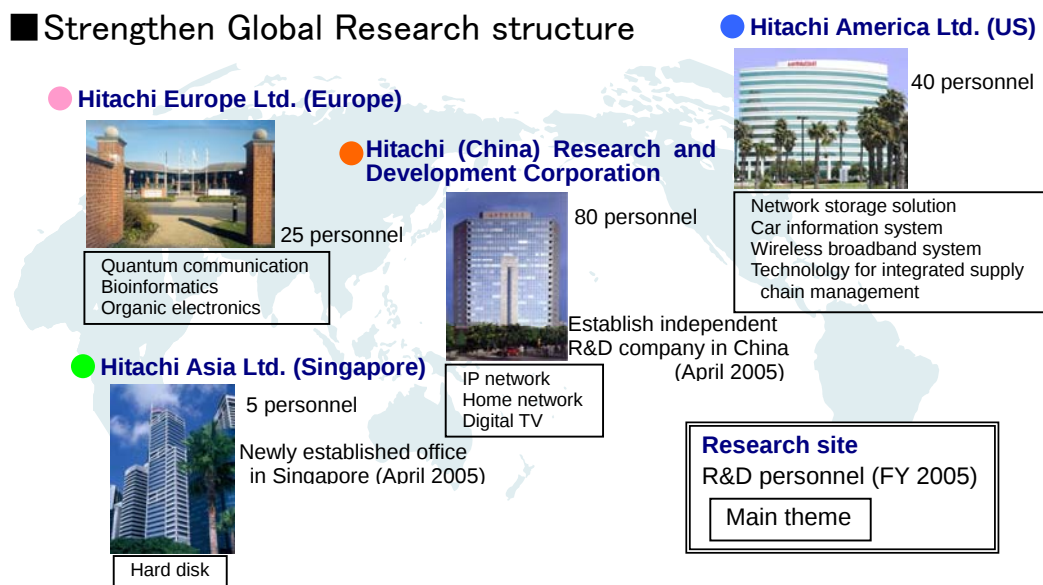


Figure 4.2 Global R&D

2. R&D Strategy

The Research and Development Group is concentrating research staff in main target business sectors based on a management strategy called “i.e. Hitachi Plan II.” The Plan calls for the development of powerful technology to support advanced global products and the promotion of direct market R&D to create solutions that support the lifelines of tomorrow. (See Figure 4.3)

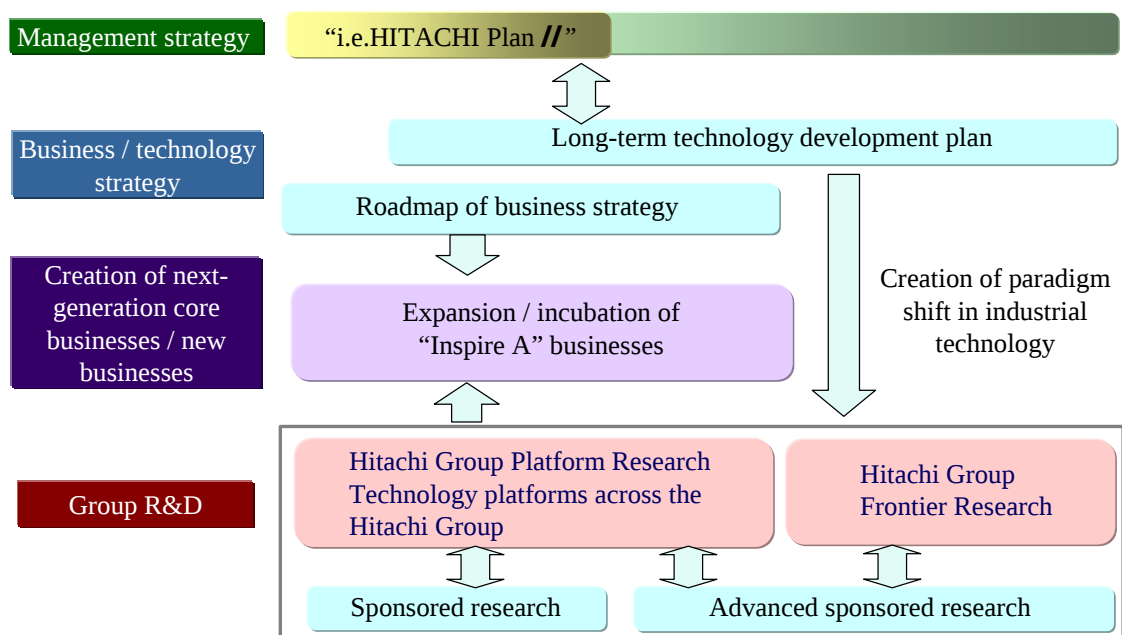


Figure 4.3 R&D Program

The R&D Group is aware of the need to understand the influence R&D has on the environment. A top priority is given to harmony between R&D and the environment. To work towards harmony, The R&D Group has established an environment management system in which all employees participate to advance a recycle-oriented society and environmental preservation and improvement. In addition to a lower environmental burden for R&D activities, Hitachi is working on solutions to environmental problems like lead-free soldering, fuel cells, and drive systems for hybrid automobiles. Through products that lower the environmental burden and promote preservation, Hitachi is making an important contribution to a more recycle-oriented society.

The main mission of the R&D Group is to create new businesses. In recent years, a number of organizations have been formed as main research targets for new business creation. In the future, the R&D Group will continue to take positive steps to promote such venture companies founded by Hitachi.

- Life Science Group (established in October 1999)
- Mu-Solutions Venture Company (established in July 2001, becoming Mu-Solutions Division in January 2004)
- Personal Health Care Venture Company (established in September 2002)
- Wireless Info Venture Company (established in January 2004)

3. Group R&D Strengthening

Currently corporate research laboratories employ about 2,400 researchers and about half of all researchers work for Group companies.

To strengthen Group R&D further, Hitachi introduced a Group system for Hitachi Group Frontier / Platform research in April 2004. This system strengthens joint Group technology (Group Platform Research) and future Group business development (Group Frontier Research) by splitting the R&D cost evenly among each Group company. Hitachi now has nearly 300 researchers participating in this system. This R&D system will contribute to future core business development and enhance manufacturing strength through new business models, the addition of intellectual property, and new, paradigm-shift technologies. Patents that result from Group Frontier / Platform Research are managed by the Hitachi Group. Each Group company that participates in the R&D system will be entitled to use any relevant patent royalty free. The CTO Meeting is convened to decide Group Frontier / Platform Research operations of the Group as well as to formulate research themes and evaluate results. Chief technology officers from 30 Group companies participate in the CTO Meeting.

The core organization to promote Group Frontier research is the Advanced Research Laboratory. Based on collaboration with industry, academia, and government, the Hitachi Group is taking positive steps to cooperate with outside research institutions. Projects are allocated to the appropriate laboratory, including the Central Research Laboratory, based on R&D content.

The objective of Group Platform Research is to strengthen manufacturing R&D at mainly the Production Engineering Research Laboratory, the Hitachi Research Laboratory, the Mechanical Research Laboratory, and the System Development Laboratory. In addition to manufacturing technology, a wide-range of R&D is conducted in product and service productivity from upstream processes (plan and design) to software development. The manufacturing technology divisions (MONOZUKURI Engineering Division) also support the Hitachi Group to utilize accomplishments of Group Platform research and to enhance product competitiveness.

In April 2004, to assemble concentrations of researchers and to utilize resources to the fullest, the Hitachi Group established the Materials Research Laboratory, the Embedded Systems Platform Technology Laboratory, the Advanced Measurement and Analysis Center, and the Advanced Simulation Center as a Technology Platform Across the Hitachi Group. In March 2005, the Mechanical Engineering Research Laboratory moved to Hitachi-Naka City, Ibaraki Prefecture. At this time a new Mechanical Innovation Center was erected. The facility provides a place where researchers, staff from relevant business departments, and customers assemble to work on basic R&D and technology development.



Figure 4.4 Mechanical Innovation Center

4. Industry-Academia Collaboration

To accelerate the speed of R&D and new business creation, the Hitachi Group is taking the initiative to collaborate with institutions from government and academia. The effective use of outside resources is more important than going it alone. In particular, the Hitachi Group takes a strategic approach to budding technologies to turn them into business opportunities, creating new products and services through the merger of technologies from multiple areas, and increasing its business portfolio.

In the past, collaboration with Japanese academia was based on cooperation with individual university professors. Now that national universities have become corporate entities, the Hitachi Group can collaborate with a university institution on a contract basis. Hitachi is taking the initiative to collaborate with universities by forging comprehensive collaborative

Basic Policy

- ◆ Promote comprehensive collaboration with academic and government institutions.
◆ Level up individual-based cooperation to team efforts.
- ◆ Incorporate collaboration results into business portfolios.
◆ Introduce a manifest-type joint-research model.
- ◆ Cooperate on raising MOT expert.
◆ Evolve into a collaborative innovation society.
◆ Build up a win-win collaboration system based on intellectual property.

Comprehensive Collaboration	Business Portfolio
Kyoto Uni. University of Electro-Communications Hokkaido Uni. Keio Uni. Tsukuba Uni. University of Tokyo (2 divisions) Ritsumeikan Uni. Waseda uni. Osaka Uni.	Tohoku Uni. : perpendicular magnetic recording University of Tokyo and others: SH Forum Kyoto Uni.: Develop organic electronics through collaboration with different types of business.

Figure 4.5 Collaboration between Industry and Academia

agreements.

Hitachi considers comprehensive collaborative agreements a quick and efficient method to collaborate with outside institutions to complete mutual tasks and projects. Already the Hitachi Group has collaborative agreements with Kyoto University, University of Electro-Communications, Hokkaido University, Keio University, Tsukuba University, University of Tokyo, Ritsumeikan University, Waseda University, Osaka University, Yokohama National University, Kyushu University, and Tohoku University in Japan after August 2002 as well as brilliant institutions outside Japan. Exploiting the value of intellectual property created through industry-academia collaboration, we will build up a win-win partnership with each institution.