

III. Intellectual Property and R&D in Main Target Businesses

1. High-definition "Wooo" TVs for digital broadcasting

By December 2006, digital terrestrial TV broadcasting will be available in the main cities in Japan. For the domestic television market, this will mark the start of the digital high-definition era of large flat-panel displays. 2006 is also Hitachi's 50th year of activity in the TV business. Since selling the first TVs in 1956, Hitachi has been developing TVs with the latest technologies to build large-screen with higher resolution. In 2001, Hitachi marketed the world's first 32V high-definition PDP (plasma-display panel) TV to enjoy the digital high-definition experience more fully. In 2003 Hitachi created a new market in household flat-panel TVs with the launch of the Wooo brand, which included a flat-panel TV equipped with an HDD (hard disk drive).

On April 29, 2006, the Wooo brand released a new series (the 9000 series) of digital high-definition PDP TVs (42V and 37V) and digital high-definition LCD (liquid-crystal display) TVs (32V) made up of six models.



Figure 3.1 Wooo 9000 Series of High Definition TVs

The PDP TVs incorporate "Picture Master HD" technology, a newly developed engine that performs image analysis and conversion processing. The "Picture Master" processor combined with the "1080 ALIS Panel (1,080 vertical lines of resolution)" made by Fujitsu Hitachi Plasma Display, Ltd. (FHP), enables vivid colors such as reds to be reproduced on screen as they really are. The LCD TVs combine the above-mentioned "Picture Master" engine with a newly developed "Super Impulse Driving Method" that achieves superior moving-image display performance and the wide-viewing angle "IPS Alpha Panel" made by IPS Alpha Technology, Ltd., enable high-motion sports events to be viewed in more vivid detail.

Each of the three models in the PDP TVs and the LCD TVs has a built-in 250 gigabyte HDD made by Hitachi Global Storage Technologies. These models can record 50 hours (equivalent to 500 gigabytes) of digital high-definition programming through the use of high compression technology and Hitachi's proprietary hard disk controller technology. In addition, each model is combined with two digital tuners made by Hitachi Media Electronics Co., Ltd., which enables viewers to watch one program while conveniently recording another program on a different channel.

Looking ahead to next-generation models, FHP has developed the world's first module for 42V plasma display panels that has the same number of pixels (1,920H × 1,080V) as digital high-definition broadcasting. The module refines even further the superiority of the ALIS method,

which has super-fine detail even on small screen sizes. The result is a display with high-brightness, high contrast, and a high-density cell structure.

Hitachi is combining the collective Group strengths of each company to develop high-definition "Wooo" TVs. With the launch of digital broadcasting in the U.S., Europe, and China, global markets for digital high-definition TVs will continue to grow. Based on platforms comprising infrastructure hardware and software developed through the above-mentioned period, Hitachi will expand business abroad by making efficient use of global R&D facilities and by accelerating the development of high-definition TVs in line with regional specifications and needs.

Hitachi is actively engaged in intellectual property activities to create and develop patents under a strategy that integrates business and research objectives. The aim of the integrated IP strategy is to form a network of patents that can withstand international competition. By the end of 2005, Hitachi had 1,230 registered patents in Japan and overseas related to high-definition TV technology. In the future, we want to increase the number of patent registrations. To do so, Hitachi will further strengthen activities related to patent creation and development.

2. "Secure client solutions" for offices anywhere

The Privacy Protection Law, which took effect in April 2004, highlights the real need of companies in the IT age to safeguard individual privacy. However, even with the new law, incidents of private information leaks are still being reported the same as before. According to a survey by the Japan Network Security Association (JNSA), the average amount of damages per case related to the leak of private information in Japan was 1.38897 billion yen in 2004. In addition to individual damages, information leakage can harm the good name of an enterprise, which is a matter of vital importance.

To deal with the threat of private information leakage, Hitachi continues to promote ubiquitous access while offering a "secure client solution" (SCS) that prevents leaking of information, resulting from theft or loss of a personal computer. In a secure client solution, a user operates a "security PC" that has no hard disk. The security PC communicates with the office PC or server through keyboard and mouse operations. All applications and business data are processed in a management center, therefore no information and data is actually stored on the security PC.



Figure 3.2 Secure Client Solution

Based on this remote access, it is possible to prevent the leaking of information if the security PC is lost or stolen. Adding the "KeyMobile" authentication device and digital certificates safeguard against identity fraud, and enables a user to work in his familiar computing environment from any security PC. For the central system, a "client blade" was developed where multiple PCs can be consolidated with few restrictions on application use.

The secure client solution makes it possible to consolidate

information management, to access a remote office environment, to prevent information from leaking, and to create a flexible mobile work style. A universal environment inside the office transforms the fixed seating boundaries of the conventional office into a dynamic boundary less space where teams and projects can freely organize and change composition.

Hitachi is promoting the use of security PCs within the Group. Already over 10,000 employees are using the system for everyday work. With so many in-house users, Hitachi has implemented a feedback system to help improve usability, operability, and manageability. The secure client solution is made possible through the melding of technologies such as authentication, encryption, and hardware that were developed in various Group companies. In the future, Hitachi will accelerate business development by giving full play to these collective strengths. In related intellectual property activity, Hitachi has already filed over 100 patent applications in Japan and overseas. Combining expertise from in-house use of the secure PC and a Group security business based on preventing information leakage, Hitachi will strive to increase market share as the leader in the ubiquitous office environment sector.

3. Global advance of car information and navigation systems

To develop car information systems (CIS), in April 2005 Hitachi established the CIS Division, which consists of a systems solution business and a product solution business. The systems solution business is giving full play to the collective strengths of the Hitachi Group to build up CIS service and support operations. By 2008, the product solutions business aims to market products related to new navigation equipment, car electronic control, and outside network access, which are all necessary for success in the CIS

business. The product solution business is jointly developed and advanced by the CIS Division, Xanavi Informatics Co., Ltd., and HCX Co., Ltd. Xanavi Informatics has been active in navigation system development since 1991. In 1995, Xanavi introduced the world's first "Birdview" navigation system, which displays topological features from a "bird's eye view." Also in 1995, Xanavi received the Good Design Interface Award (Ministry of International Trade and Industry) for the "Birdview Navi." After that, Xanavi



Figure 3.3 Nissan Motor Navigation System

began to expand into North America, Europe, Korea, and China, gaining recognition from car manufacturers worldwide. In 2004 Xanavi developed a new navigation system for Nissan Motors for markets in Japan, Europe and North America. The navigation system has a Nissan-Xanavi product concept that establishes a dual brand identity in the design of operation switches and screen display. Further, Hitachi has given full play to collective Group strengths in developing a traffic information system. The system is full of cutting-edge technologies and platform technologies, such as the industry's first Bluetooth functionality, a precise route guide, a screen display with excellent visibility, and other cutting-edge infrastructure technologies. In 2005 the traffic information system received the Global Innovation Award from Nissan Motors. Currently,

Hitachi is actively working on combining the navigation system with car operations such as moving, stopping, and turning to reach a new level of sophistication. A series of new products will start appearing soon. "Fighting patent" activity to obtain a portfolio of related patents began the moment Hitachi started to develop navigation systems. Hitachi has 780 patents (including patents pending) in Japan and 240 patents overseas (including patents pending). Hitachi will continue to obtain strong patents worldwide and strive to expand business. In particular, Hitachi is focusing patent applications on "Birdview" display technology, a traffic information service that can accurately predict delay and arrival times, and a map update delivery service. By building and making use of a "picket fence" patent portfolio around these strong technologies, Hitachi is striving to establish a high-earning system and to expand market share.