

HITACHI TECHNOLOGY

2007-2008

# Life Infrastructure Business

---

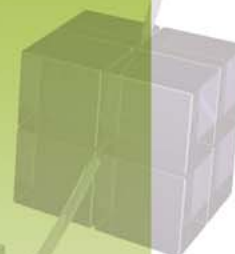
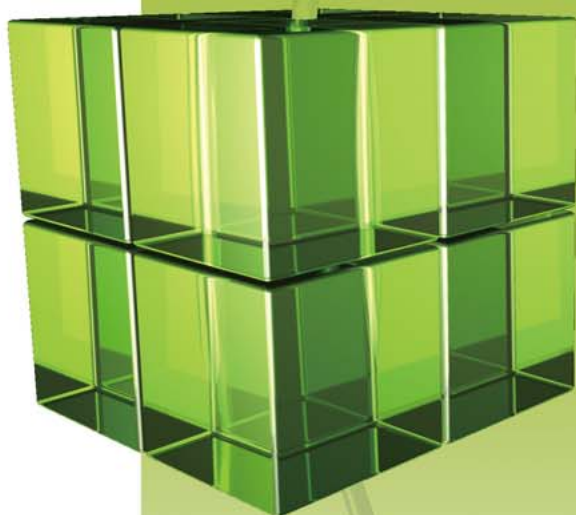
Digital Media Devices

Consumer Appliances

Welfare

Healthcare Systems

Building Systems





## Latest Series of Hybrid Cams from Hitachi Offering Generous Recording Capacities and Easy Dubbing: DZ-HS500, DZ-HS501, DZ-HS300, and DZ-HS301

Since releasing the world's first DVD (digital versatile disk) cameras in 2000 out of its confident belief in the upcoming transition of video camera recording media from tape to disk, Hitachi devised HDD (hard disk drive)- and DVD-based hybrid cams in 2006 as part of its continued emphasis on the pursuit of easier-to-use disk cameras. These newly released hybrid cams are high-performance, compact video cameras developed with a higher level of user convenience.



Hideaki Imachi (upper left), Engineer, Market Relation & Research Dept., Product Strategy, Consumer Business Group; Akinobu Ishizuka (upper right), Senior Engineer; Morio Aoki (lower left), Engineer; Keisuke Masuda (lower right), Camcorder Engineering Dept., Storage Products Business, Digital AV Products Division, Consumer Business Group

### Hybrid Cams Evolving from Synergy of the Hitachi Group

We have eliminated the need to decide whether to purchase a DVD camera or HDD camera by developing hybrid cams featuring a built-in HDD and DVD, to offer a self-contained solution for all the needs of a video camera user.

These hybrid camcorders evolving from the synergistic effects of the Hitachi Group's extensive capabilities incorporate an HDD manufactured by Hitachi Global Storage Technologies, renowned in the industry for its high product reliability, as well as Hitachi's advanced proprietary technologies.

### HDD Comfortably Fits in the Palm of Your Hand

The DZ-HS500 and DZ-HS501 state-of-the-art hybrid cams with a 30-Gbyte HDD each provide a maximum of about 23 hours of recording and up to about six hours for the DZ-HS300 and DZ-HS301 with an 8-Gbyte HDD. A rather large development team worked to verify the benefits of extended periods of video recording by these video cams, partly because this involved long playback time. But we are proud to announce that the development work

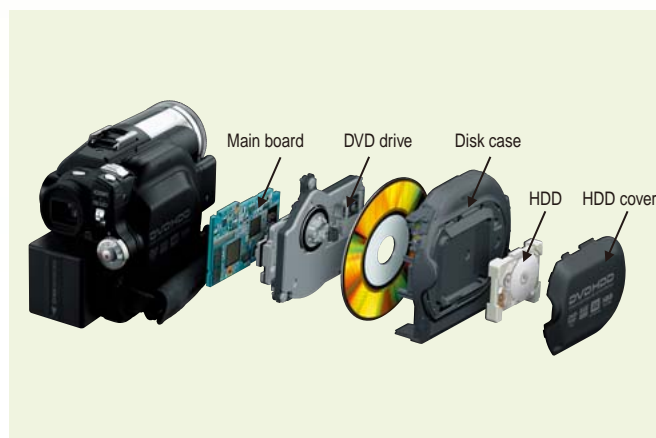
was successfully completed in a short time without delays.

The hybrid cams feature an HDD mounted in the cover of the DVD camera due to a lack of internal space, and we expect that this outside location will help dissipate the effects of heat. Given the impressively compact size of the HDD that comfortably fits in the palm of your hand, a fingerhold is provided to make the product easier to carry and handle. Should the video camera be accidentally dropped, a built-in sensor detects the falling motion and automatically retracts the heads, and a rubber damper absorbs the impact to help protect the HDD against damage.

### Hybrid Cams Broaden the Horizons of Your Enjoyment

The hybrid cams not only allow you to record subjects with confidence since both DVD and HDD media are supported, but also offer a host of advantages. With a quick shoot mode that immediately readies the hybrid cams for recording, you won't miss any chance moments. The DZ-HS500 with 30x optic zoom/1,500x digital zoom capability and the DZ-HS301/DZ-HS501 with 15x optic zoom/800x digital zoom capability enable magnified shots of remote subjects. What's more, the hybrid cams allow you to edit or dub videos to DVD at a click of a button, without needing additional accessories. You can take videos during a party or on a trip and then dub it to DVD on the spot, and thus present your family members or friends with the DVD as the latest memories. Needless to say, the original videos are saved on the HDD.

Hitachi remains committed to the ongoing concept of developing easier-to-use, more convenient products through the synergy of the Hitachi Group, and in so doing offers glimpses of new horizons of enjoyment as a leading technology company.



DVD and HDD structure



## Hitachi Clinical Analyzer S40 Automatic Analyzer that Achieves Compactness, Speed, and High Reliability

The increase of lifestyle-related disease has become a major social problem accompanying changes in lifestyles and an aging society. Hitachi Personal Healthcare Venture Company has developed a compact automatic analyzer to help prevent as well as treat lifestyle-related disease. This analyzer allows blood examination data to be quickly and accurately obtained, even at small medical clinics, and thus supports the healthcare provided by personal physicians for local residents.



Teru Yoshida (left), Manager, Tsuyoshi Uchida (right), Senior Engineer, Personal Healthcare Venture Company

### What is the Background of Establishing the Venture Company?

The keys to preventing and treating the metabolic syndrome, which is a “reserve troop” for lifestyle-related disease that has increased in recent years, lie in long-term healthcare in daily life. Supporting such healthcare requires the following: simple examination at home, easy consultation and quality treatment at local clinics, and more specifically, the spread of POCT (point of care testing). Personal Healthcare Venture Company was established in September 2002 to contribute to future medical services by provid-

ing POCT. Since this represented a new field of business for Hitachi, the company assumed a venture-style organization. Our mission is to provide POCT products as the company's primary devices for use by both individuals at home and by small medical clinics. The first product released in April 2006 was a compact automatic analyzer “Hitachi Clinical Analyzer S40.”

### What are the Features of the Clinical Analyzer S40?

The mainstream compact analyzers conventionally used at clinics are the so-called dry type that adopt methods of conducting measurements that are proprietary to individual manufacturers, and for which there is no compatibility of measurement data with that obtained from larger analyzers used at bigger medical institutions. Given this situation, the analysis of blood samples was often outsourced to external institutions in order to ensure accurate examination data, and for which much more time was needed to receive the results. The Hitachi Clinical Analyzer S40 employs a wet reagent just like larger analyzers. Therefore, small medical clinics can also obtain accurate examination results in a short time of about 30 minutes.

Although such a device had been long awaited, the handling of wet reagents still posed an issue. In addition, since reagents are subject to slight variance depending on the lots to which they belong, expert clinical technologists were forced to adjust and set complex devices to obtain accurate results. To address these issues, we developed a method of encapsulating the reagents into proprietary cartridges and setting the devices automatically by using two-dimensional codes on the cartridges. Another main feature of this device is its capability to examine up to 40 items once a patient's blood and the required reagent are easily set.

Since regular checkups at medical examination sites are widely recognized as being very important in Japan, the national government added the item of quick sample examination to amended medical insurance plans, effective April 2006. This is also a tail wind for the wider spread use of the Hitachi Clinical Analyzer S40.

### What will be the Perspective?

First, the number of examination items is to be increased. In particular, LDL (low-density lipoprotein) cholesterol and HbA1c (hemoglobin A1c) could be examined at a stage as early as possible, and thus making available all eight items of blood examination at medical checkups for metabolic syndrome. An expansion of sales is planned not only in Japan, but also in regions including Europe and the United States where POCT is advanced, and in BRICS (Brazil, Russia, India, China, and South Africa) where growth is anticipated. We will thus be globally contributing to the enrichment of healthcare, particularly in the prevention and treatment of lifestyle-related disease.



Compact Automatic Analyzer “Hitachi Clinical Analyzer S40”



# Large-size Full HD Plasma Television with Removable HDD (iVDR)

Hitachi released a new 50-inch terrestrial/BS (broadcast satellite)/CS (communication satellite) digital high-definition plasma television in May 2007. This television is equipped with "Full HD (high definition) ALIS (alternate lighting of surfaces method) Panel" and "iVDR slot," which is a slot to store a portable and removable hard disk drive called "iVDR\*" (information versatile disk for removable usage)."

"iVDR slot" uses an iVDR-Secure disk which supports the copyright protection technology called "SAFIA (security architecture for intelligent attachment)," and enables recording of "Copy Once" digital broadband content. Hitachi has always been in the pursuit of convenience by developing a "recordable television" with a built-in HDD (hard disk drive). The enhanced "iVDR slot" enables users to easily increase the disk space, even if the disk capacity of the built-in HDD approaches its maximum. Users can enjoy having

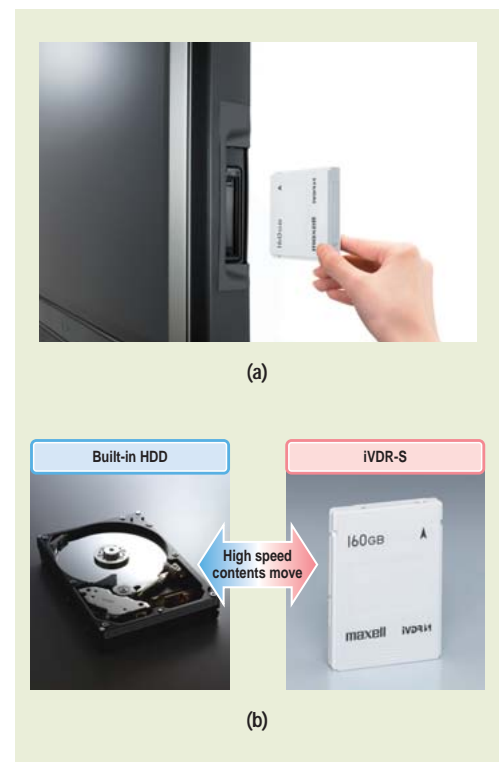
their own disk or creating disks for each program category, which provides much more ways to enjoy watching television.

Additionally, this television contains the world's first single-scanned full HD panel "Full HD ALIS Panel," which provides high brightness (1,100 cd/m<sup>2</sup>) and high contrast (10,000:1), and the plasma's self-emissive, high motion picture responsiveness enables more than 900 lines of motion picture resolution. Furthermore, this television includes "Movie Frame rate converter"—the world's first image processing technology of high definition signals that enables movie pictures created in 24 fps (frames per second) to be converted to natural and smooth pictures of 60 fps with Hitachi's original motion interpolating algorithm.

\* See "Trademarks" on page 86.



Large-size full HD plasma television P50-XR01



iVDR slot (a) and high speed contents move (b)



## Hitachi's World First Hybrid DVD/HDD Camcorder

The world's first hybrid DVD (digital versatile disc)/HDD (hard disk drive) camcorder of Hitachi's model DZ-HS303 achieved top sales for five months from its launch in August 2006 in Japan.<sup>\*1</sup> Hitachi believes the main reason for this top sales figure is that the concept fits the customer's needs. The concept used is "record for long enough and dub to DVD easily."

Hitachi released the world's first DVD camcorder in 2000. DVD media has advantages, including no need to wait to rewind/fast forward tape media, playback compatibility with ordinary DVD players. Users can store recorded video memories on DVD discs. The DVD camcorder ratio in Japan has been continually increasing from year to year. On the other hand, the HDD camcorder runs after DVD camcorder because of its longer recording capability since around 2004. In the case of the Japanese market, these device ratio are DVD 45% and HDD 20%.<sup>\*2</sup>

DVD camcorders can record around 30 minutes on each side and have 1.4 Gbyte capacity. This provides enough time to record significant events in daily lives, such as a baby laughing, or eating, or when they walk for the first time. However, in the case of some events, several DVD discs need to be prepared, and each disc must be changed when each one is filled up. The advantage of the HDD is its longer recording capability. A recording time of around three or 11 hours is possible when the capacity is 8 Gbyte or 30 Gbyte. Unfortunately, this device also has disadvantages. For example, it needs to be connected to a PC (personal computer) or an optional DVD recorder unit to move large amounts of video images when the camcorder's HDD fills up.

Hitachi considered customer requirements for recording, play back, editing, and storing during the evolution of the camcorder. In the development of the DVD camcorder, Hitachi increased the DVD format compatibility [DVD-RAM (random access memory), DVD-R (recordable), DVD-RW (rewritable), +RW].

Hitachi has reduced camcorder size, improved picture quality, and shortened the time between turning on and recording (the latest model needs only around one second). In 2006, Hitachi introduced

the hybrid DVD/HDD camcorder, which has both the advantages of DVD and HDD. Therefore, blank DVD discs do not need to be prepared because users can record onto a built-in HDD. After that, they can simply copy video images from HDD to DVD by only using the camcorder itself.<sup>\*3</sup> Just imagine some private party, users can give some copy of video as a memory to their friends or relatives. They will be glad to have their copy and enjoy it in their home on their own DVD player.

The Hitachi Global Storage Technologies contributed to developing the hybrid camcorder. It supplied the "microdrive" camcorder—this device has 8-Gbyte capacity and is very compact and lightweight ( $30 \times 40 \times 5$  mm and 17 g). Therefore, Hitachi has developed a hybrid camcorder with minimum volume as compared to current models. Combining the experiences of both engineers enabled Hitachi to share detailed information during the camcorder development. As a result, Hitachi developed hybrid camcorder in a very short term.

In the spring of 2007, Hitachi evaluated the hybrid camcorder line-up and improved the dubbing functions based on sales results and a user survey. For example, 2x speed dubbing and four-way dubbing capability was developed. Hitachi introduced three models to the line-up for the Japanese market for the spring sales season. An 8-Gbyte and 3 Mega Pixel CCD (charge-coupled device) model and a 30-Gbyte and 3 Mega Pixel CCD model was developed as the flag ship and compact sized 8-Gbyte and 1-Mega Pixel CCD model.

For the overseas market, Hitachi introduced a powerful competitive line-up, including the DZ-HS300 (8 Gbyte) series and DZ-HS500 (30 Gbyte) series, and is now promoting a hybrid camcorder.

\*1: As camcorder in consumer market in February 2007.

\*2: Source Hitachi, February 2007.

\*3: An AC (alternating current) power supply is needed when dubbing from built-in HDD to DVD drive.



(a)



(b)

Hybrid camcorder with 8-Gbyte HDD (a) and 30-Gbyte HDD (b)

# Big drum-type Washer/Dryer with Leading-edge Technology for Reducing Vibration

Hitachi has marketed a drum-type washer/dryer that employs a drum featuring the industry's largest diameter\*<sup>1</sup> to provide a high-quality finish in washing and drying, while achieving the industry's lowest noise level and offering exceptional water-saving performance\*<sup>2</sup>.

[Main features]

(1) The product features a big drum with the industry's largest diameter of 60 cm and a capacity of 75 L. It offers big drum washing that beats and washes clothing firmly with a large drop, and big drum drying that effectively separates clothing to minimize wrinkling and ensures soft drying, resulting in a high degree of cleaning and drying performance.

(2) Hitachi has developed three epoch-making technologies to reduce vibration for which computer simulation is used to conduct analysis, thereby enabling vibration-proof support, inhibiting imbalance, and providing optimal operation control. Vibration-proof support requires two features: (a) a hard suspension in response to large motions upon rotor activation, and (b) a flexible

suspension in response to minor motions when the rotor enters a steady state of stable rotation. The developers then conducted joint research with the Automotive Systems of Hitachi, Ltd. and successfully developed a twin action suspension that optimally inhibits both major and minor vibrations by using a single suspension based on advanced technology cultivated in the handling of automotive suspensions. The product also adopts a five-ply fluid balancer that incorporates five layers of balancers provided width-wise in the drum to inhibit imbalance. This significantly increases balance precision and reduces vibration amplitude. For optimal operation control, the product employs a double vibration sensor to increase the precision of vibration detection control. This enables to detect the magnitudes and directions of vibrations accurately by using two vibration sensors. The product incorporates three technologies for reducing vibration, each of which represents an industry first\*<sup>1</sup>, and reduces vibration stemming from the use of a larger drum and achieves the industry's lowest noise level\*<sup>2</sup>.

(3) Only 60-cm deep, the machine offers the thinnest body in the industry\*<sup>2</sup> and can easily be fitted neatly together with a washbasin unit.

(4) The product adopts a new technology for increasing washing power and new technologies for increasing drying efficiency, and thus enables the washing of 9 kg of clothing and the washing and drying of 7 kg of clothing (which is the largest capacity model of the drum type in the industry) and reducing the time of the washing and drying by half\*<sup>3</sup>.

(Hitachi Appliances, Inc.)

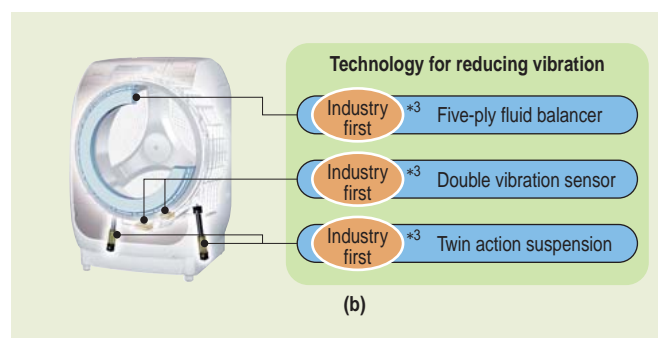
\*<sup>1</sup> As of November 9, 2006. For household washers/dryers in Japan

\*<sup>2</sup> As of November 9, 2006. For household washers/dryers in Japan [when washing 9 kg of clothing (standard option)]

\*<sup>3</sup> As compared to Hitachi's drum-type washer/dryer WD-74B (2002 model)



Big drum-type washer/dryer (a), and key technologies developed (b)





## Vacuum Cleaner Capable of Capturing House Dust, Bacteria, and Viruses

Hitachi has released a new paper bag type vacuum cleaner. This cleaner has a highly efficient dust collection of 99.999% and an unprecedented level of clean exhaust that maintains a suction power of 600 W.

[Main features]

(1) Highly efficient dust collection of 99.999%<sup>\*1</sup> achieved by using a high-performance paper bag (GP-2000F) and a HEPA (high-efficiency particulate air) filter that has a plasma function. It has been shown to collect house dust, bacteria, and viruses.<sup>\*2</sup>

(2) Automatic dust removal of the paper bag with vibration from the top, rear, and bottom of the paper bag. It can prevent the paper bag from clogging up and a strong suction power is constantly maintained.

<sup>\*1</sup> -Testing organization: Sumika Chemical Analysis Service, Ltd.

-Test item: Particle measurement

-Test method: Measure the amount of discharged particles as small as 0.3 micrometer in diameter (1 micrometer = one-millionth of a meter).

<sup>\*2</sup> -Testing organization: Kitasato Research Center of Environmental Sciences

-Microbe species tested and collection rate: Coccus, 99.999%

-Virus species tested and collection rate: Bacteriophage, 99.99%



Vacuum cleaner capable of capturing house dust, bacteria, and viruses

## Top-class Triple-power IH and Double All-metal-compatible IH Cooking Heaters with Wide and Large Smoke-free/Water-free Grill

Hitachi has added triple-power IH (induction heating) HT-A9TWS and double all-metal-compatible high thermal power HT-A20WS and other models to its series of silent and smoke-free IH cooking heaters equipped with the industry's leading wide and large smoke-free grills<sup>\*1</sup>, and successively marketed these new models.

[Main features]

(1) Triple-power IH

(a) The models incorporate a central heater instead of a radiant heater (that becomes red-hot) for thermal power as high as 1.6 kW, and thereby improve stability and cleanability. Both IHs generate thermal power as high as 3.0 kW, among the highest in the industry.

(b) The products can be used with four heat sources simultaneously: three IH heaters and a grill (first in the industry<sup>\*2</sup>). This makes full-fledged cooking possible where various delicious dishes can be prepared simultaneously.

(2) Double all-metal-compatible IH

The evolution of Hitachi's unique PAM (pulse amplitude modulation) technology has achieved thermal power as high as 2.6 kW, highest in the industry<sup>\*3</sup>, when using an aluminum or copper pot.

(Hitachi Appliances, Inc.)

<sup>\*1</sup> As of July 13, 2006

<sup>\*2</sup> Household-use IH cooking heater bound for the Japanese market (as of July 13, 2006)

<sup>\*3</sup> When using an aluminum or copper pot (as of July 13, 2006)



IH cooking heaters HT-A20WS (left) and HT-A9TWS (right)



## Large-capacity Refrigerator with New Cooling System Developed

Hitachi has released a newly developed, large-capacity refrigerator featuring a new cooling system.

[Main features]

(1) 685-mm wide models offering the largest capacity

The product is basically designed with a mid-level freezer compartment that offers enlarged overall capacity, saves energy, and provides a greater degree of user-friendliness. This new, 685-mm wide model adopts the use of newly developed and highly fluid urethane to achieve the industry's largest capacity\* of 535 L for this class of refrigerator.

(2) New cooling system

Cooling is achieved by combining the air cooled by the cooling panel installed at the back of the refrigerator compartment with the cooling air circulated from the sides for maintaining a constant and uniform distribution of temperature, and thereby preserving even the food items placed in all the corners.

(3) High-humidity freezing

This product adopts freezing technology that maintains humidity as high as about 65% to preserve foods stored in the top freezer drawer, and thus inhibits drying and condensation. The humidity can be switched to about 45%.

(Hitachi Appliances, Inc.)

\* As of September 4, 2006

In household refrigerators sold by Japanese manufacturers



Large-capacity refrigerator with newly developed cooling system (R-SF54WM)

## Room Air Conditioners of Classy Designs, Enhanced Deodorization, and Cleanliness

Hitachi marketed a new series of room air conditioners featuring high-quality classy designs to complement room interiors and offering high deodorization performance.



Room air conditioner of classy design and high deodorization performance

(1) The front panel of the indoor unit is equipped with a wood-patterned frame and metallic coating, along with a urethane coating also used in the surface finishing of upscale furniture to give it a high gloss and profound texture.

(2) Ionized mist not only removes odors that settle in fabrics and odors in the air, it also eliminates about 99.99% of all airborne viruses and mold spores in the room.

(3) The filter, air passage, and horizontal deflector are with stainless steel material, while the indoor fan and blowout port are coated with silver ions, and the heat exchanger is coated with titanium for disinfecting inside the indoor unit and warding off dirt and molds.

(4) The pre-filter is cleaned automatically by using a filter coated with stainless steel and a wiping system that securely removes oil dirt and ensures quiet operation.

(Hitachi Appliances, Inc.)





## Overseas Trial of the Kokoro Gatari Communicating Device Based on Changes in Cerebral Blood Flow

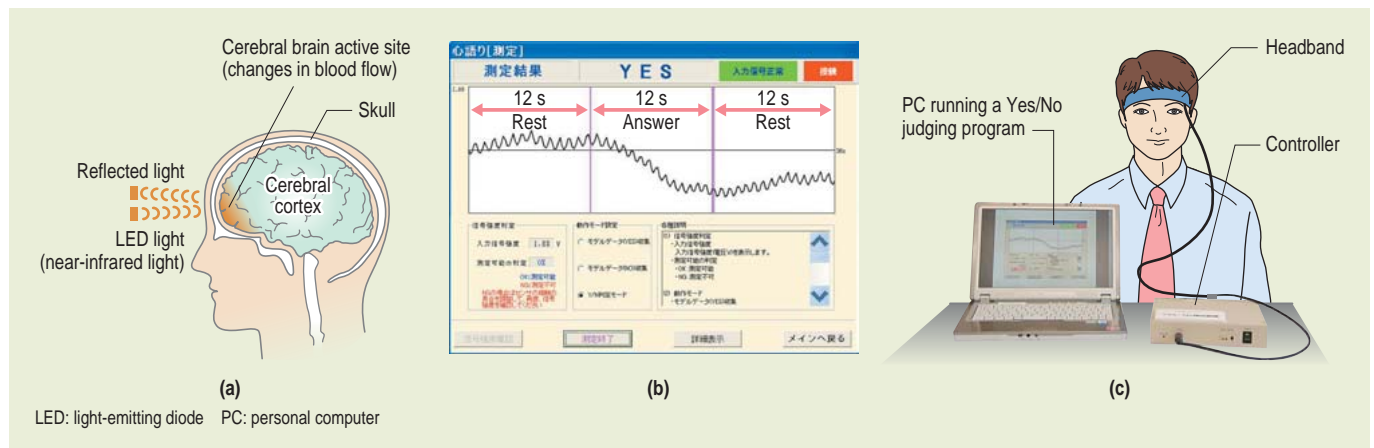
ALS (amyotrophic lateral sclerosis) is a progressive and neurodegenerative disease that afflicts victims throughout the world. There are an estimated 350,000 people afflicted with ALS worldwide and 7,000 in Japan. Since the disease is progressive, a patient eventually becomes totally paralyzed (and enters a totally locked-in state or TLS) and can no longer communicate with their caregivers.

In 1997, Hitachi, Ltd. developed the communicating device for ALS patients who are not yet totally paralyzed. For patients in the TLS condition who cannot use the device, the corporation launched research and development in 1999 on the Kokoro Gatari ("mind teller") communicating device that utilizes changes in cerebral blood flow as shown in Figure (a). While wearing a headband device, patients can answer "Yes" by working their brain to stimulate blood flow [Figure (b)]. By leaving their minds blank and relaxing their brains to reduce blood flow, patients can answer "No" (based on optical topography). EOM (Excel of Mechatronics Company) commercialized this technology in December 2005 [Figure (c)]. The corporation ships about 30 units a year domestically.

This product is unique in the world and has been presented not only on TV (television) in Japan but also on TV in the USA and on

websites. Consequently, product inquiries have been received from the USA, Norway, Peru, and other countries. Initially the corporation did not consider producing an international version. However, in response to many requests regarding "compassionate use" from the families of ALS patients, Japanese-version units have been sent by EOM to three patients in the USA and one patient in Norway for trial use. At the International Symposium on ALS/MND (motor neuron disease) held in Yokohama in November 2006, Hitachi presented its Kokoro Gatari device and confirmed the presence of some patients abroad who need the product. Hitachi is now developing a North American version in cooperation with EOM and Hitachi Keiyo Engineering & Systems, Ltd. and will produce it in September 2007. USA-based Hitachi Group member corporations and American corporations interested in Hitachi's Kokoro Gatari communicating device plan to order 30 units of the North American version and donate the products to The ALS Association.

\* Part of the study presented herein includes the results of research commissioned by the New Media Development Association.



Principle of measuring blood flow (a), typical waveform of a change in blood flow resulting in a Yes answer (b), and overview of the Kokoro Gatari device (c)

## 1.5-T High Magnetic Field MRI System

A 1.5-T high magnetic field MRI (magnetic resonance imaging) system was developed that is highly practical and reliable by improving the use and operation of high magnetic field MRI.

The system's design and coloring were determined by considering a patient's anxiety during examinations, and thus, the system provides added value to high magnetic field MRI.

This system was developed to have practical use and to be able to be extended in the future.

Furthermore, this is an unusual MRI system that was developed in pursuit of high performance and easy operation, while taking into account patient anxiety and imaging technology acquired through the open MRI development.

The newly developed console incorporates a user interface and allows easier use of high performance required for 1.5-T high magnetic field MRI.

The application software has the ability to be extended in the future and incorporates leading edge diagnostic functions to pro-

vide a more comprehensive MRI.

[Main features]

**Design:** The system has a compact design that is short and has a gantry aperture that is wide and for minimizing a patient's anxiety. In addition, consideration was paid to its coloring.

**Interface:** One of Hitachi's reputable, newly designed, more sophisticated, and easy-to-operate console was installed into the system. This console enables operations that minimize stress on the operator.

**Imaging:** Powerful software that allows more precise, rapid, and clear imaging has been incorporated into the system. This allows the system to have future upgrade, support accurate examination and, at the same time, improve usability and reliability.

**Support:** Incorporated with the latest support system, the system allows 24-hour remote monitoring using a broadband circuit. Automatic software update allows high practicality.

(Hitachi Medical Corporation)



1.5-T high magnetic field MRI system



## Development of Large-capacity, Ultra-high-speed Elevators

A rapid increased demand has recently occurred for large capacity, ultra-high-speed elevators in large-scale buildings in Japan and overseas. One such order for the Hitachi Group is the delivery of elevators to the Shanghai World Financial Center. The Hitachi Group has developed large capacity, ultra-high-speed elevators that are ranked alongside the world's largest and most powerful elevators. Specifications of the development have a loading mass of 4,500 kg, a speed of 480 m/min, and a lifting stroke of 400 m.  
[Main order specifications]

### (1) Traction machine

The maximum suspension load is 110 t (70 t for conventional elevators), the motor output is 240 kW, and the braking torque is 70 kNm, all of which are the largest figures for the Hitachi Group. To reduce the size of the traction machine, a PM (permanent magnet synchronous) motor was used and a disk brake consisting of four large capacity magnets arranged in parallel was developed.

### (2) Control panel

The Hitachi Group developed 1,100-kVA class conversion equipment to incorporate a synchronous control and fault protection system for the control panel of a PM motor unit that has parallel cross current control and unit parallel control. The main unit is intended to be used in common with a low ranking model to

improve parts procurement ability and productivity.

### (3) Safety device

A new material has been developed that has excellent heat and wear resistance for use in large elevator systems that have rated speeds of 480 m/min and car capacities of 26 t. Using this new material enabled braking characteristics for the safety gear to be obtained that satisfy international standards. Continuation of these development efforts should lead to new materials that can cope with even higher speeds and capacities.

### (4) Elevator car

The weight of double-deck cars, for which there is an increasing demand, has been reduced. Moreover, their lateral swing which is caused by ultra-high speeds and long lifting stroke has been reduced, and an active guide roller has been developed that can halve the level of vibration inside the car.

### (5) Traveling performance

The development of elevator ground equivalent test equipment and an emulator has enabled simulation of an overall elevator system, thus enabling evaluation of traveling performance characteristics.

(Scheduled completion date: Spring 2008)

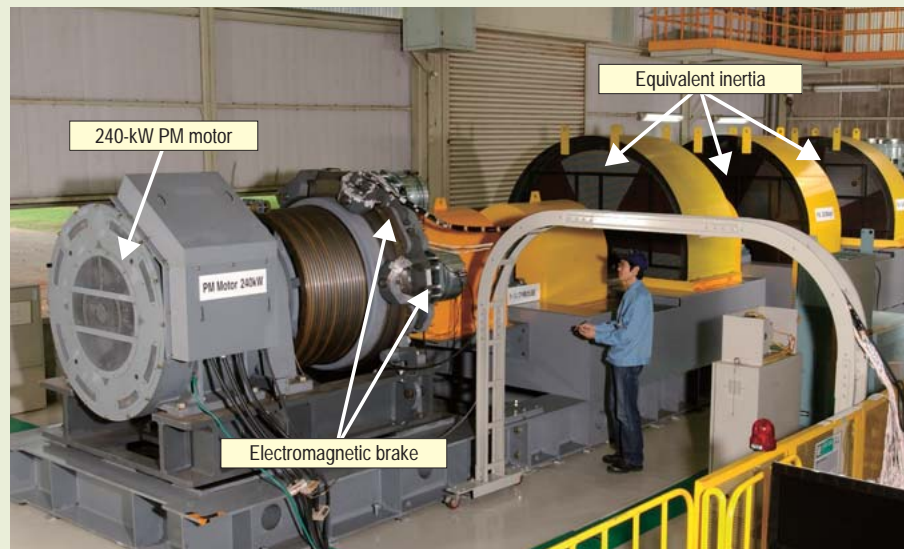


Image of completed Shanghai World Financial Center (courtesy of Mori Building Co., Ltd.) (left), and 240-kW large capacity traction machine and elevator ground equivalent test equipment (right)

## Next-generation Elevator Group Control System Using Advanced Forecasting Trajectory Technique

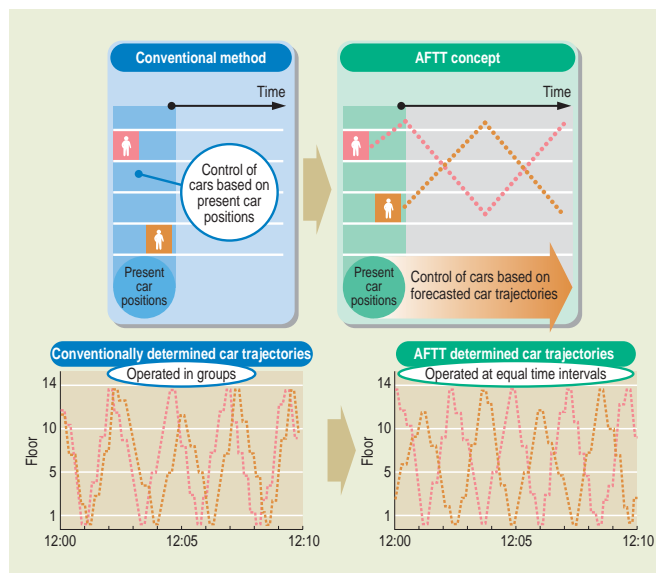
Elevator group control systems are used widely to efficiently operate multiple elevators in an increasing number of high-rise buildings and large-scale multipurpose buildings.

To reduce passenger waiting time, it is important to operate elevator cars at equal time intervals. Conventional methods used to operate cars are based on the present car position of the cars, so cars are frequently operated in groups during heavy traffic conditions.

A new elevator group control system was developed using the AFTT (advance forecasting trajectory technique) to forecast the future trajectories of elevator cars and control the cars based on the forecasted car trajectories. The system operates elevator cars at equal time intervals and minimizes long waiting time.

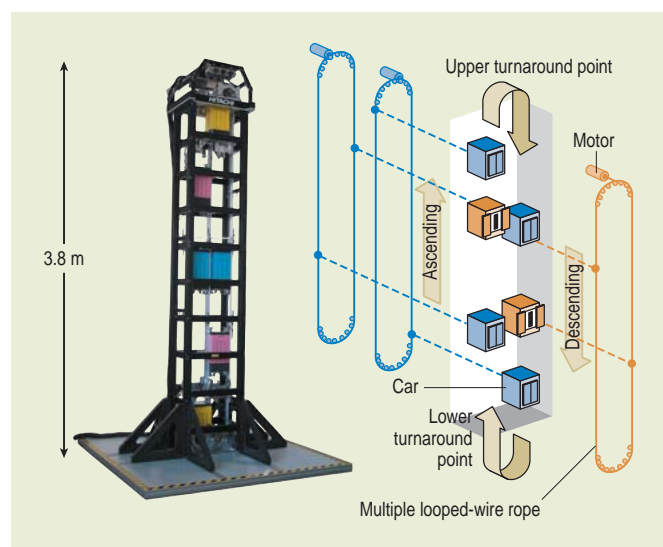
As a result, the average waiting time when using the AFTT was reduced by 5—10% as compared to conventional methods, and the percentage of passengers whose waiting time exceeded 60 seconds when using the AFTT was decreased by 6—12%.

Hitachi will focus on developing more efficient and comfortable transport system for passengers than existing conventional methods.



Concept of AFTT and images of AFTT effect

## Circulation-type Multi-car Elevator



1/10-size prototype and its drive technology

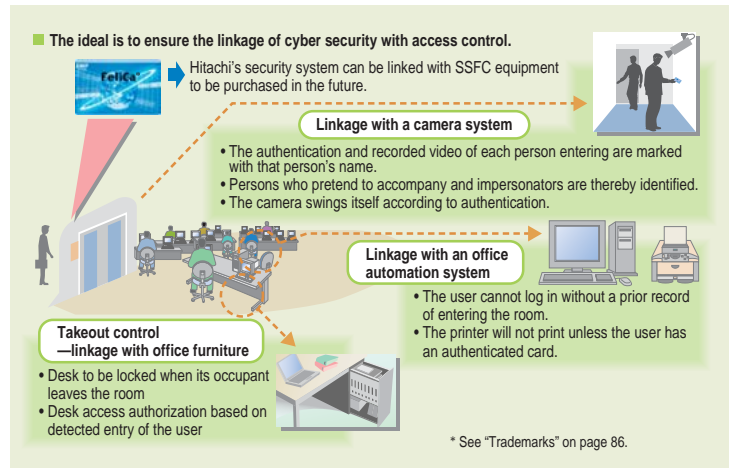
Hitachi, Ltd.'s Mechanical Engineering Research Laboratory developed the basic drive technology for a circulation-type multi-car elevator system and checked its effectiveness using a 1/10-size prototype. As buildings become taller, more elevators are required because of increasing vertical traffic of passengers. As a result, office and residence space is decreased to make space for elevators. A circulating multi-car elevator makes it possible to expand the usable space of buildings by decreasing the number of elevator shafts without raising congestion and waiting times. It has a significantly higher transport capacity, which is more than double that of conventional elevators. This technology enables multiple cars to be circulated independently within the space of only two shafts. A multiple looped-wire rope drive system was developed to enable the independent operation of each car. This flexibility has dramatically reduced the waiting time caused by passengers getting on and off. Combining this technology with that of conventional elevators and optimizing floor layout, building owners can expect to increase the income from rentable space and offer the convenience of vertical transportation in high-rise buildings. Hitachi is now developing related practical technologies towards creating a commercially viable product.





## Security System for SSFC

The corporate alliance SSFC (Shared Security Formats Cooperation adopted by Dai Nippon Printing Co., Ltd.) aims to become a new standard for office security based on the use of a single non-contact IC (integrated circuit) card for controlling the entry to and exit from offices, business rooms, and other facilities, and also regulating authentication for PC (personal computer) log-in and data output to a network printer using the same IC card. The same card can also be used for authentication regarding office equipment and setting up a system where desks are locked automatically when the employees leave the office. In a situation where work is performed in a series of office environments, monitor cameras acquire the relevant images of each environment for recording on a digital recorder. The only keys used conventionally for subsequent image playback are place and time. In contrast, SSFC makes it possible to retrieve images by using “who performed what operation?” as a key. More, since such SSFC-approved devices are expected to be adopted at different times, the system can be configured according to one's budget.

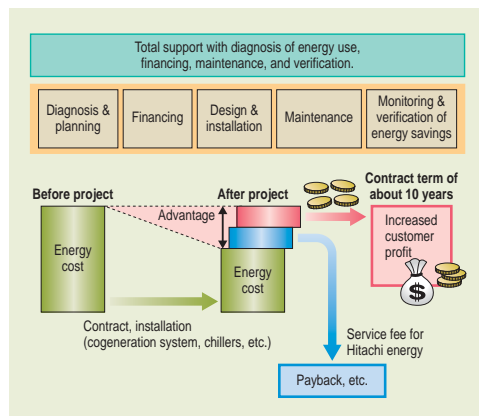


SSFC image diagram

## Reducing Carbon Dioxide Emission by Using ESCO

Hitachi has started three projects with Hitachi Asia Ltd. in the Philippines, Thailand, and Singapore with the goal of reducing CO<sub>2</sub> output to 5,284 ton/year by using a high-efficiency air conditioning system and a heat recovery system. Hitachi has installed a monitoring system and will monitor the

condition of the equipment throughout the year in Japan. ESCO (energy service company) has a new business scheme that offers comprehensive services for energy savings to customers and that covers the cost required to repair energy-saving equipment with the money saved by energy savings.



Concept of ESCO business

