愛・地球博
EXPO 2005 AICHI JAPAN

Results and Assessment of EXPO 2005 Aichi (Theme Realization by Area)

Reference III-1

September 24, 2005

Japan Association for the 2005 World Exposition

Theme Realization by Area

• Application of cutting-edge technology (Technological breakthroughs)	Adoption of • new social behaviors and systems	Sharing of diverse cultures and values	Participation by NGOs and citizens
➢Energy ➢Environmental technologies ➢New transportation systems ➢Next-generation robots ➢Information technology ➢Advanced image systems	➢Garbage segregation in nine types ➢Eco-money ➢Environment-conscious construction and universal design ➢Park and ride ➢Eco tours and nature experience programs ➢Information technology	➢Exhibits and events demonstrating the diversity of histories, cultures, and peoples ➢National days and voluntary events ➢Friendship • programs ➢Staff interaction ➢Academic conference (e.g., EXPO 2005 International Forums)	➢NGO Global Village ➢Civic Pavilion ➢Kaisho Plaza ➢Civic participation events ➢Volunteer activities

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Application of Cutting-Edge Technologies (Technological Breakthroughs)

Energy

Environmental technologies

New transportation systems

Next-generation robots

Information technology

Advanced image systems

When looking forward into the twenty-first century, the most important issues that can be cited include the exhaustion of fossil-fuel energy resources and global warming. As means of resolving these problems, much is expected of clean and efficient power generation systems and fuel-cell generation.

At EXPO 2005 we have developed a full-fledged, large-scale, and autonomously distributed type of new energy generation system and are carrying out a demonstration test.

The first scheme utilizes the raw waste produced by on-site restaurants and so forth as raw material and operates fuel cells using the methane gas obtained by fermentation.

The second scheme utilizes the wood chips obtained from felling at the time of the formation of the site and waste plastic, such as PET bottles, discharged on the site as raw material and uses the gas obtained as the fuel for generation.

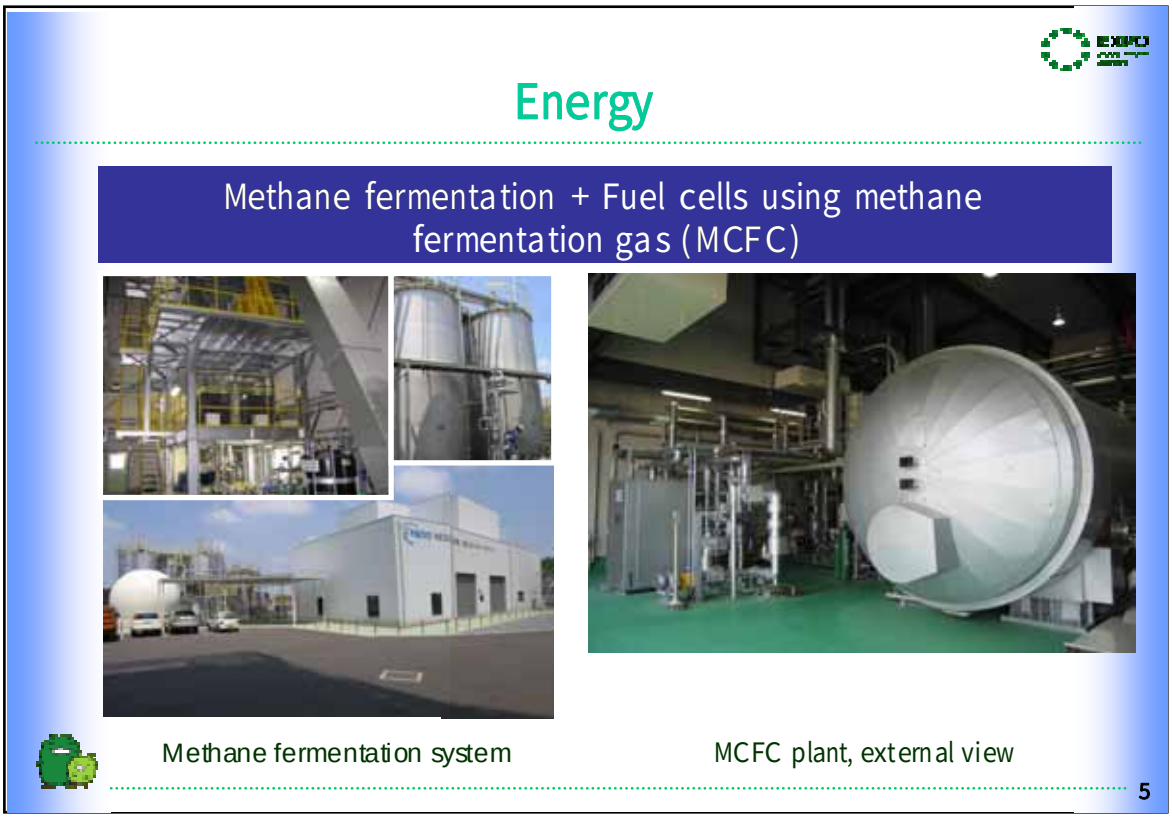
Furthermore, we are controlling generation in accordance with the electricity demand balance by adding solar power generation, which is a naturally fluctuating source of energy, and NaS batteries, which are a fluctuation-adjustment type. This is the first ever attempt in the world to combine these multiple new energies and to create a system to control them. It is also the largest scale in the world.

The Japan Pavilion Nagakute is the largest pavilion at the EXPO, covering approximately 500 square meters and envisioning 4 million visitors. All of this pavilion's electricity is covered by using this energy system.

The power generation plant is located outside Global Common 5 so that visitors can see it.

As of August 16, the number of visitors to the Tour of Energy Sources of the Future operated by NEDO was 22,506 persons. As well as general visitors, many VIPs have also inspected the facility.

The residue from the methane fermentation system is turned into fertilizer outside the site and distributed to visitors, together with flower seeds, as a souvenir of NEDO's new energy plant tour.



Raw waste recycling (new energy system)
Methane fermentation system + fuel cells using methane fermentation gas (MCFC)

The methane gas obtained from anaerobic fermentation utilizing the raw waste discharged by on-site restaurants and so forth is used as fuel for the molten carbonate fuel cell (MCFC).

By using the electricity and waste heat obtained from the MCFC again as energy on the exposition site, we aim to create an energy system that recycles in the community.

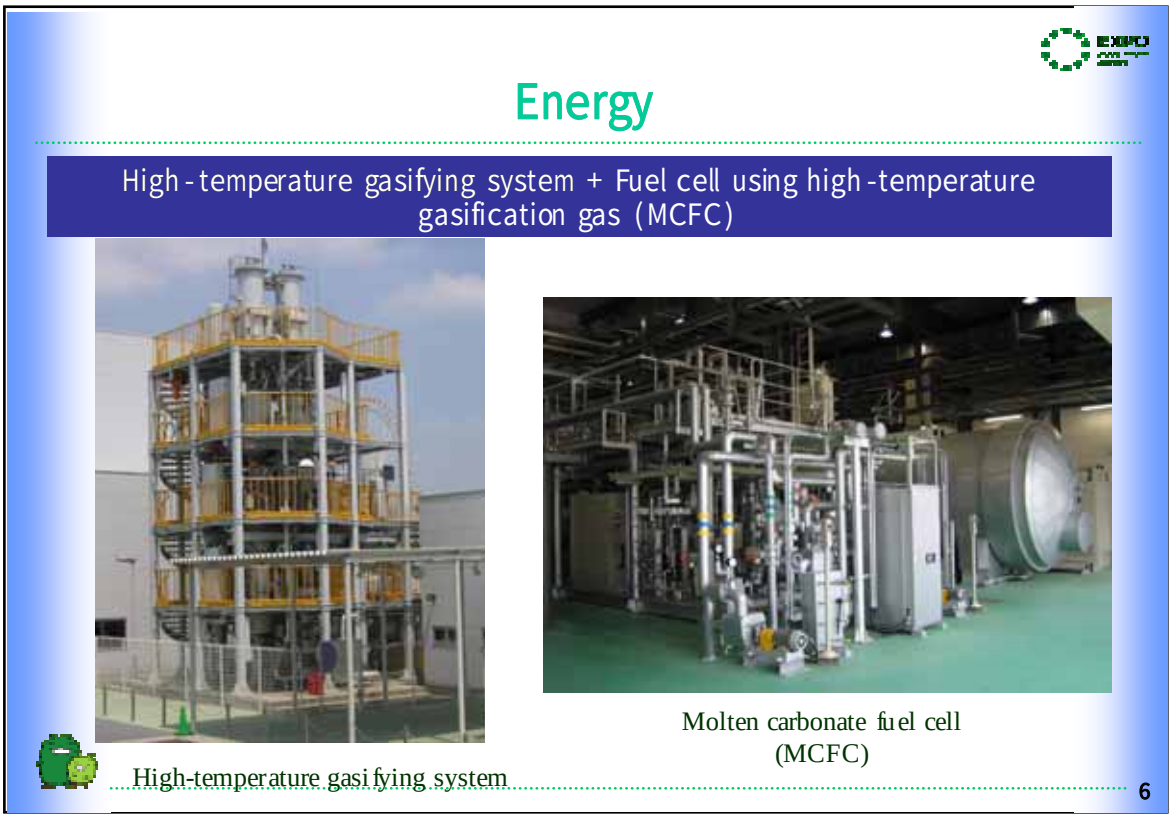
The features of the MCFC that has been introduced in the demonstrative research are that it has a large output and a high degree of energy efficiency, so much is expected of it as an environment-friendly power generation device.

Outline of the methane fermentation system

Raw waste processing capability: 4.8 tons per day
Methane gas production volume: 1,000 cubic meters per day
Heat quantity: 5,000 kilo-calories per cubic meter

Outline of the MCFC

Generation output: 350 kW
Generation efficiency: 50%
Waste heat recovery ratio: 20%



New energy system

High-temperature gasification system + fuel cell using high-temperature gasification gas (MCFC)

The gas obtained from the high-temperature gasification system utilizing wood chips felled at the time of site formation and waste plastic, such as PET bottles, discharged on the site as raw material is used as MCFC fuel.

Outline of the high-temperature gasification reactor

Wood chip and waste plastic processing capability: 20 kg per hour

Produced gas volume: 70 cubic meters per hour

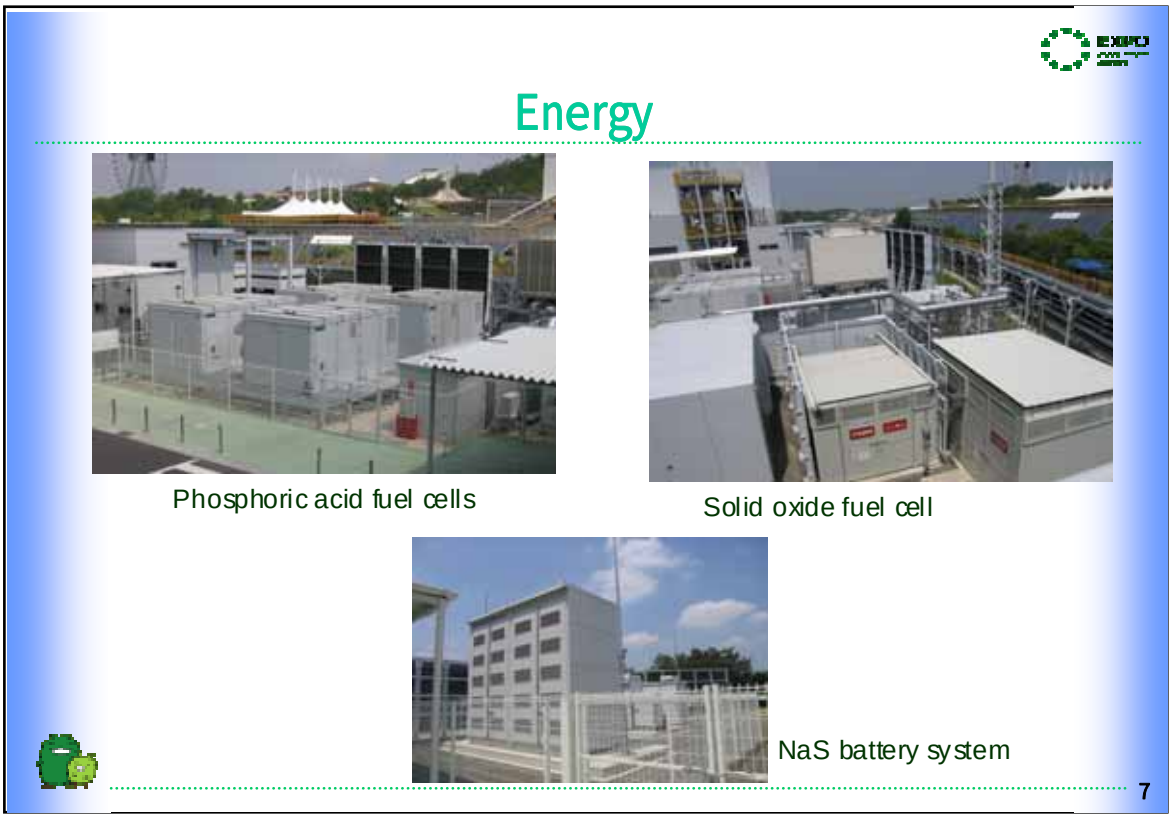
By using the electricity and waste heat obtained from the MCFC again as energy on the exposition site, we aim to create an energy system that recycles in the local community.

Outline of the MCFC

Generation output: 370 kW

Generation efficiency: 55%

Exhaust heat recovery ratio: 15%

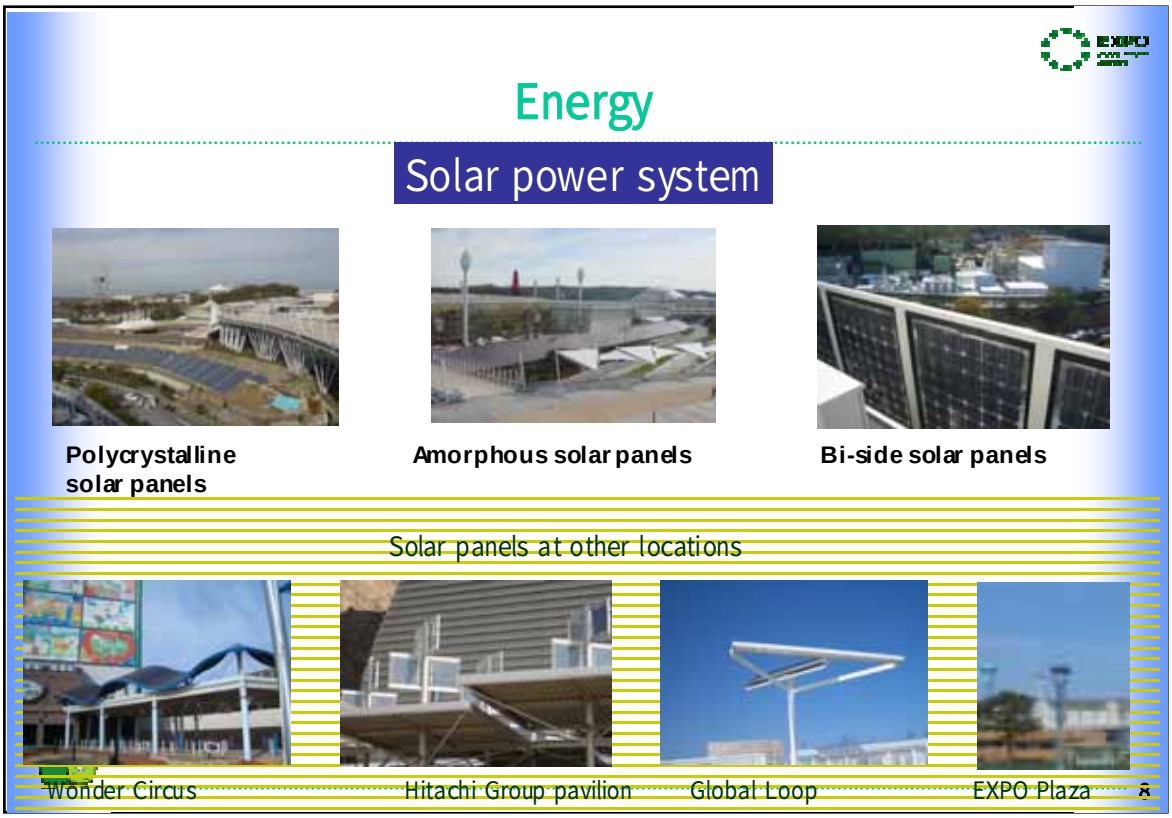


New energy system
Phosphoric acid fuel cell
Electricity is made from hydrogen and oxygen. At present, this fuel cell is used most widely in the world.

Solid oxide fuel cell
Electricity and heat are generated efficiently, since this fuel cell moves at high temperature. The heat is sent to an absorption refrigerator.

NaS battery electricity storage system
The NaS battery has a high energy density operating at a high temperature of approximately 300 degrees Celsius. A special ceramic called beta alumina, which indicates sodium ion conductivity, is used as a solid electrolyte. The sulfur at the positive electrode and the sodium at the negative electrode are separated by the solid electrolyte, which allows only the positive sodium ions to go through it and act, thereby storing and discharging electricity.

Thanks to this storage of electricity by the NaS battery, it is possible to absorb fluctuations in electricity generation by solar power and surplus electricity at nighttime and therefore ensure a stable supply of electricity.



These solar panels that have been set up at the EXPO site have been installed as one factor in the new energy generation plant, together with fuel cells and so on, as a part of the community-centered demonstrative research on new energies and so forth that is being implemented by NEDO.

These three types of solar panels have a total generation output of 330 kW, so they are scheduled to account for about 15% of the scheduled total electricity generation output of the new energy generation plant. Most of this electricity is used in the Japan Pavilion Nagakute.

Solar panels are already no longer unusual, but various technological innovations are being made, so we hope that visitors to the EXPO site will look, listen, and experience them.

Environmental Technologies

Photocatalysis

Titanium oxide as a photocatalyst

•Becomes superhydrophilic when exposed to light
(antonym of hydrophilic is hydrophobic)

Thin film of water→easily evaporates

→・uses vaporization heat→lowers temperature

Experimenting with running water
(Japan Pavilion Nagakute)

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When water is sprinkled on ordinary steel-sheet roofs, it forms globes. However, on a steel sheet that has been coated with titanium oxide, which is a photocatalyst, the surface tension of the water becomes smaller, and instead of globes the water forms a thin film. As a result, evaporation by the sunlight is quicker, taking away the surrounding heat of vaporization and working to lower the temperature inside the house under the roof more quickly.

In the Japanese Government Pavilion, the amount of water discharged is adjusted so as to maximize the heat of vaporization. In addition, the results are being monitored and data made public.

There many eating and drinking establishments, from restaurants to fast-food shops, that have set up outlets on the EXPO site. The cutlery used by these facilities amounts to a huge volume. If this cutlery were to use conventional plastic made from fossil fuels, the waste after use would have to be buried as landfill or incinerated, which would certainly not be good for the global environment.

At EXPO 2005, biodegradable plastic has been used for the cutlery in these establishments, which amounts to more than 10 million items. In terms of one business, the introduction of biodegradable plastic for such a vast amount of cutlery represents an experiment on a scale unprecedented in the world.

Biodegradable plastic is also used on the outer wall on the northern side of the Japan Pavilion Nagakute. The raw materials for this biodegradable plastic are starch, such as corn, and food waste. As you can see from the photo, the biodegradable plastic comes in transparent panels measuring 1.5 meters by 2.0 meters each. The wall uses 220 of these panels and is fixed in a wooden frame. The inside is packed with a foam cushioning material to provide heat insulation. In addition, outside light pours generously through the gaps in the cushioning material, so interior lighting energy can be saved in the daytime.

Environmental Technologies

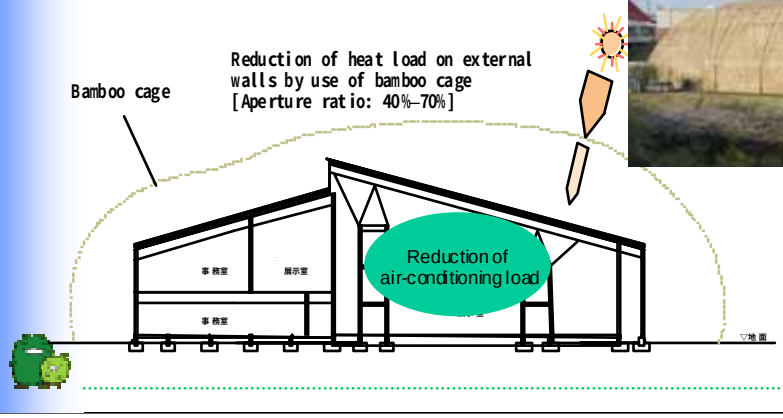
Biodegradable plastic

Signboards on the site also use a sheet made from a fiber that utilizes biodegradable plastic as its material. This is a first trial, and there were several questions, such as whether the ink indicating maps and so forth on the biodegradable sheets would set properly and whether it would have durability. But using biodegradable material to meet demand that is short term can be said to be a very meaningful challenge.

Environmental Technologies

Bamboo cage (Japan Pavilion Nagakute)

The building's huge double-cover structure reduces direct sunlight and the air-conditioning load. The bamboo cage serves a role similar to that of a cocoon or the earth's atmosphere. As a three-dimensional *brise soleil* (sun-shading grille), the cage creates a pleasant semi-outdoor space as well as an attractive evening view.



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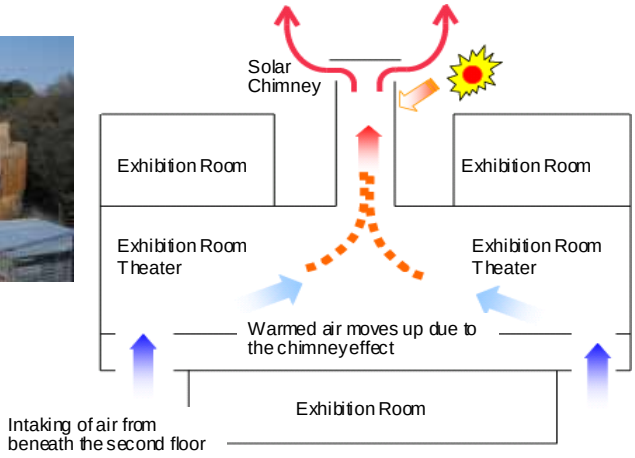
The Japan Pavilion Nagakute is covered by a huge bamboo cage measuring 90 meters in length, 70 meters in width, and 19 meters in height. This bamboo cage reduces the amount of sunshine entering the building, controls the heat, and fuses with the natural environment.

The bamboo has undergone a special reforming process to overcome its weak points, such as mold and cracking.

The intersecting parts of the bamboo cage are like a kind of knitted composition, so it is indeed a natural structure without parallel in the world.

Environmental Technologies

Solar chimney (Japan Pavilion Seto)



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The Japan Pavilion Seto has a chimney-shaped space on the top. This space is actually a system that promotes natural ventilation using the temperature difference that occurs as a result of heating by sunlight. This system prevents the erosion of parts caused by local temperature rises, high humidity, condensation, and so on and creates a comfortable interior environment.

Amid the emergence of such environmental problems as global warming and the heat island phenomenon, the promotion of environment-friendly and pleasant urban development is becoming increasingly important. As an experiment to try and solve these issues, a huge wall of greenery called the Bio-Lung has been built at the EXPO Plaza, the place on the EXPO site where most festivals and events are held.

Bio-Lung is a combination of "bio," meaning vegetation, and "lung," the basic respiratory organ of the human body, and it has the meaning of "giving a breathing function to cities through the power of vegetation." The greening wall, which measures 150 meters in length and 12 meters in height, has a total area of greenery of 3,500 sq. meters and is covered with 200,000 plants of 200 types. It has been a real oasis for people visiting the EXPO.

While creating a pleasant environment and landscape, the Bio-Lung also demonstrates the fact that plants have the strength to improve the urban living environment and reduce the environment load, for example by absorbing and fixing carbon dioxide, supplying oxygen, and reducing the temperature in the summer. This is indeed a manifestation of "nature's wisdom," which human knowledge cannot surpass.

New Transportation Systems

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Intelligent Multi-mode Transit System – a new transport system utilizing state-of-the-art IT and ITS technology (a fusion of automobile driving control technology and railway operation safety system)

The IMTS is a new transport system that fuses Toyota Motor's driving control technology and the railway operation safety system. Unlinked procession driving is possible through unmanned operation. Other outstanding features include the possibility of flexible routing by combining special lines and ordinary lines.

At EXPO 2005, the system is operating after receiving permission for the IMTS EXPO Line under the Railway Business Law.

Operation record

(1) Operation routes

Automatic operation route: Total length of 1.6 km linking the North Gate, the West Gate, and the EXPO Dome on the southern edge of the site

Manual operation route: Total length of 0.8 km linking the West Gate with Morizo-Kiccoro Messe-mae

(2) No. of carriages: 13 (operated as four buses, 2–3 carriages each); capacity of 50 passengers per carriage

(3) Operation timetable

Automatic operation route: 10 min. intervals; 4 buses of 2–3 carriages each

Manual operation route: 40 min. intervals; 1 carriage

(4) Transportation capability

Automatic operation route: 18,400 passengers (maximum roundtrip)

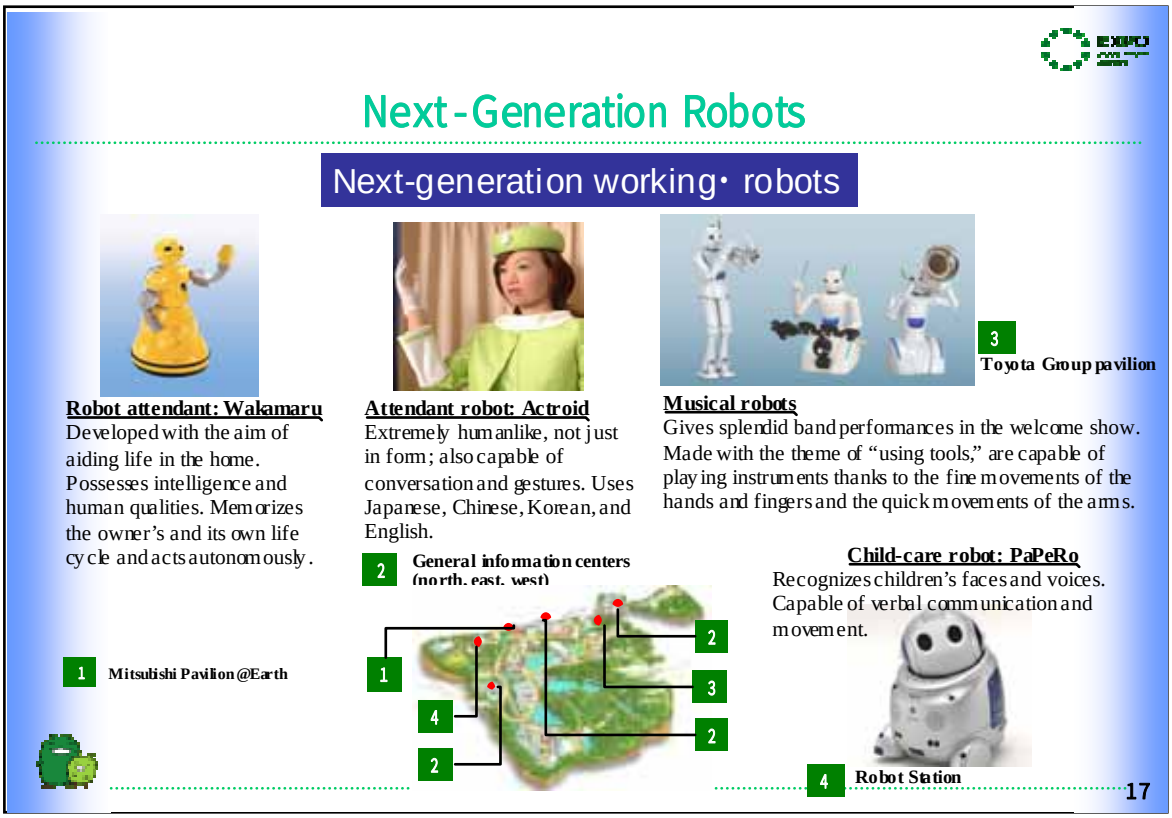
Manual operation route: 1,500 passengers (maximum roundtrip)

(5) Average no. of users

As of August 30: 9,322 passengers per day (target: 6,000 passengers per day)

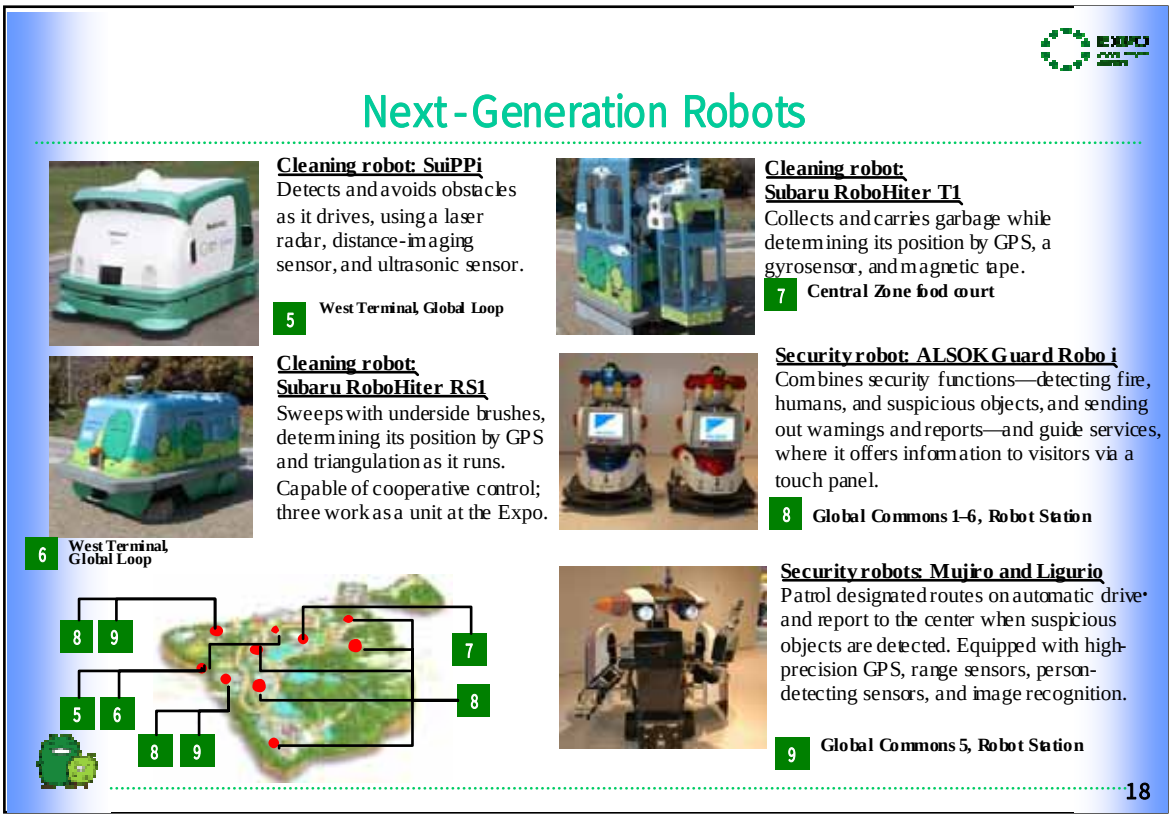
Fuel-cell hybrid bus
This hybrid system, developed jointly by Toyota Motor and Hino Motors, uses a fuel-cell battery (hydrogen-nickel battery) fueled by high-pressure hydrogen gas to drive its motor. As well as not emitting any nitrogen dioxide or harmful substances, this outstanding bus has a high energy efficiency and is extremely quiet.

Operation record
(1) Operation route: Seto Area – Nagakute Area (approx. 4.4 km)
(2) No. of buses: 8
(3) Journey time: Approx. 10 min. one-way
(4) Operation timetable: Approx. every 8 min.
(5) Transportation capability: 800–1,000 passenger per hour, roundtrip
(6) Average no. of users (as of August 30): 4,670 passengers per day (target: 3,200 passengers per day)



No discussion about future technology would be complete without a reference to robots. Recently there has been noteworthy progress in the development of humanoid robots designed to assist people in the tasks of daily living.

At the World Expo 2005 in Aichi, next-generation robots not only are on display in various locations, but also are helping to run the event. The robots working at the Expo include child-care robots, visitor reception robots, wheelchair robots, security-guard robots, and outdoor cleaning robots.



The robotic presence at the Expo offers visitors a variety of unique experiences. The robots at the Aichi Expo are superior to previous Expos' robots in terms of social skills like shaking hands and carrying on a conversation. And members of the general public are sure to be impressed at how well the robots blend in on the streets and in everyday life. After seeing the robots at the World Expo 2005 in Aichi, many kids will surely want to grow up to be robotics scientists.

For the scientists who developed the robots, the Expo presented an unparalleled opportunity to have their robots interact with tens of thousands of people over a 185-day period. During that time, the scientists gathered data that is sure to be invaluable in the development of robots that coexist with humans in ever more productive ways.

Next-Generation Robots

・Prototype Robot Exhibition・

Morizo and Kiccoro Exhibition Center

June 9–19, 2005 (11 days)

ROBOT PROJECT

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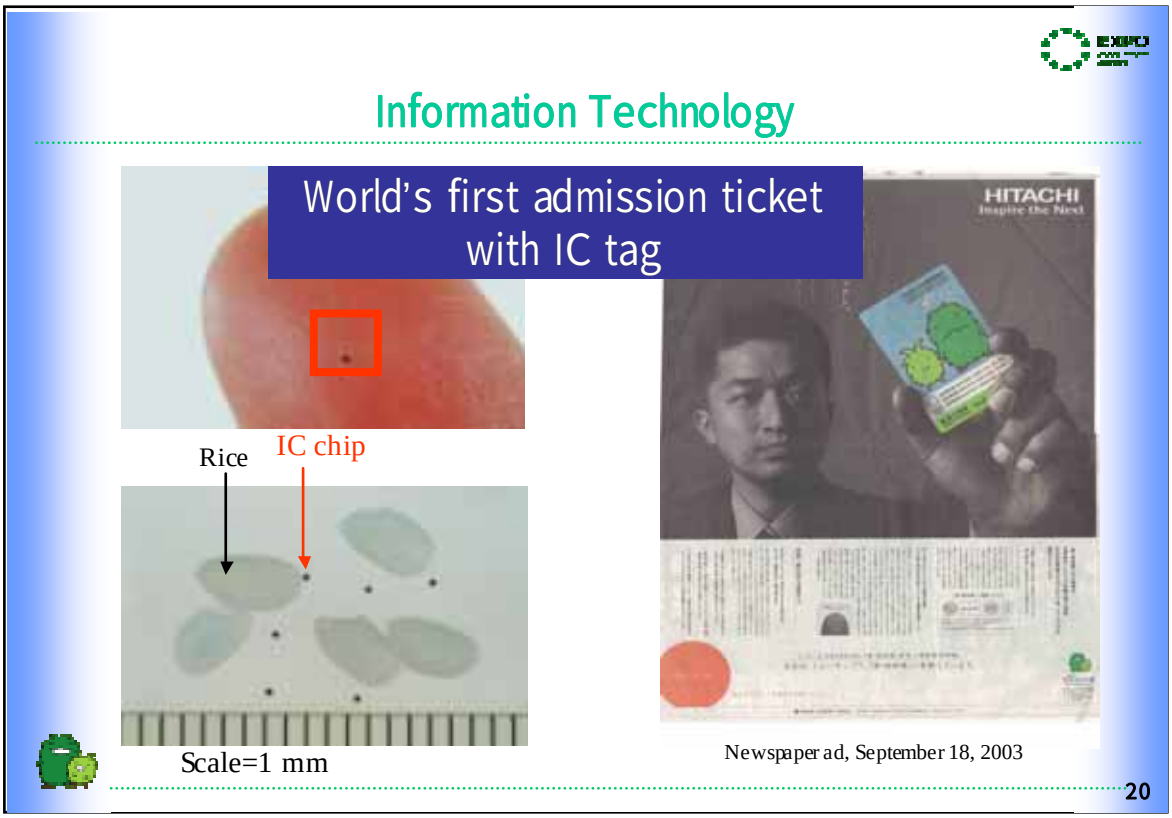
For the 11 days from June 9 through June 19, the Morizo & Kiccoro Exhibition Center hosted an exhibition of prototype robots. The collection of 67 prototypes--which fell into categories like medical and welfare robots, partner robots, and humanoid robots -- attracted a total of about 123,000 people. The exhibition looked ahead to a time when robots will be even more advanced than the ones in practical use at the Expo. Universities, corporate laboratories, and other entities engaged in robotics research unveiled their most cutting-edge creations, giving visitors a taste of what it will be like to live and work alongside robots that will come into use in the not-too-distant future.

The prototype robots, designed to assist humans in various areas of everyday life, are expected to come into practical use by around 2020. On the stage of an appropriately futuristic streetscape encompassing stores, hospitals, factories, and disaster scenes, the robots performed an array of tasks before visitors' eyes. Among the more unusual robots were one that drew facial portraits on sticky rice cakes, one that performed comic monologues, and one that traveled freely through water with a snakelike motion.



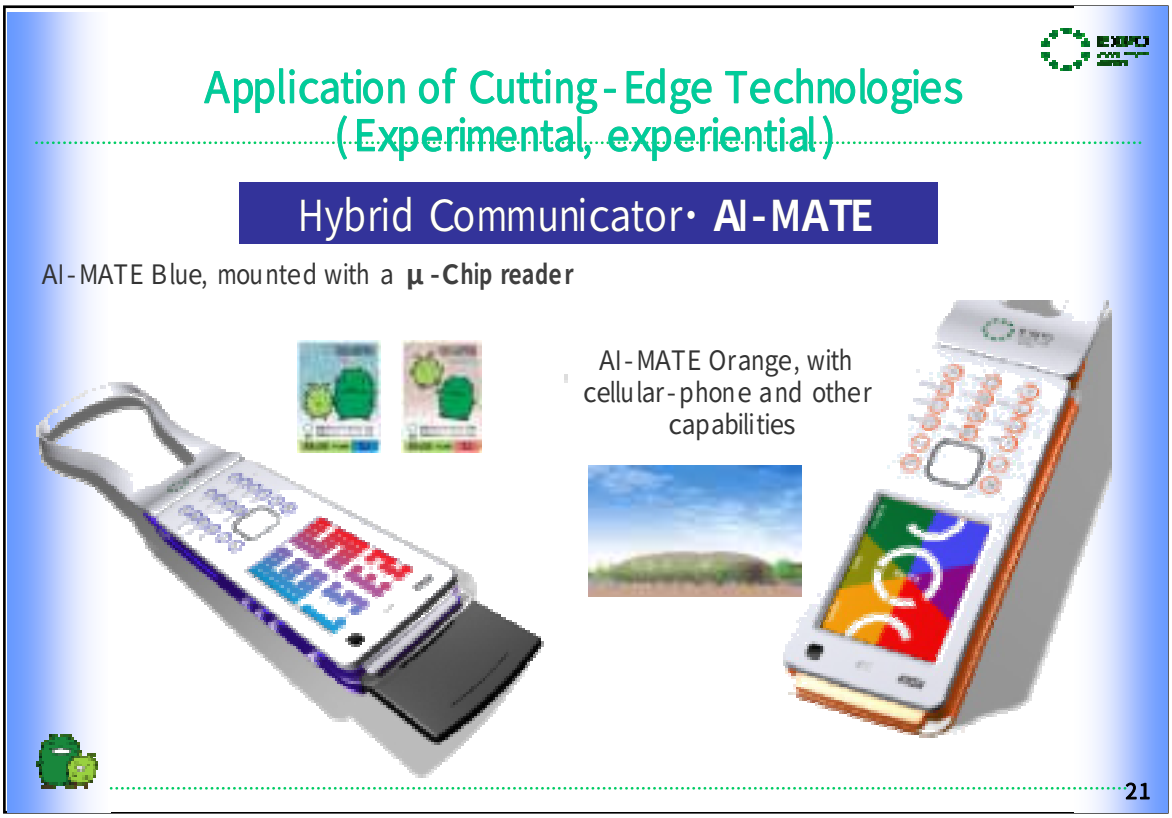
World's first large-scale implementation of IC chip-based ticketing

By building microchips into the tickets, EXPO organizers were able to incorporate sophisticated counterfeit-prevention and admission-control features. In addition to the usual function of verifying that the bearer had paid the price of general admission to the Expo, the tickets also served as a means for providing an array of services personalized to visitors' needs: reservations for admittance to pavilions and special events; EXPO Eco-Money; and more.

This technology had an impressive impact in terms of fostering positive interactions between people. In one case, a visitor's ticket had been damaged by fire, rendering it illegible. But by machine-reading the chip inside, Expo staff were able to verify that the ticket had not yet been used, and the visitor's ticket was reissued.

The IC chip-based ticketing system also displayed its power in many areas crucial to the logistics of running the Expo. The use of chips speeded up many operations including entry processing, demographic analysis of visitors, ticket issuance control, ticket sales, and ticket sales monitoring. The chips also made it possible to verify the identities of individual visitors.

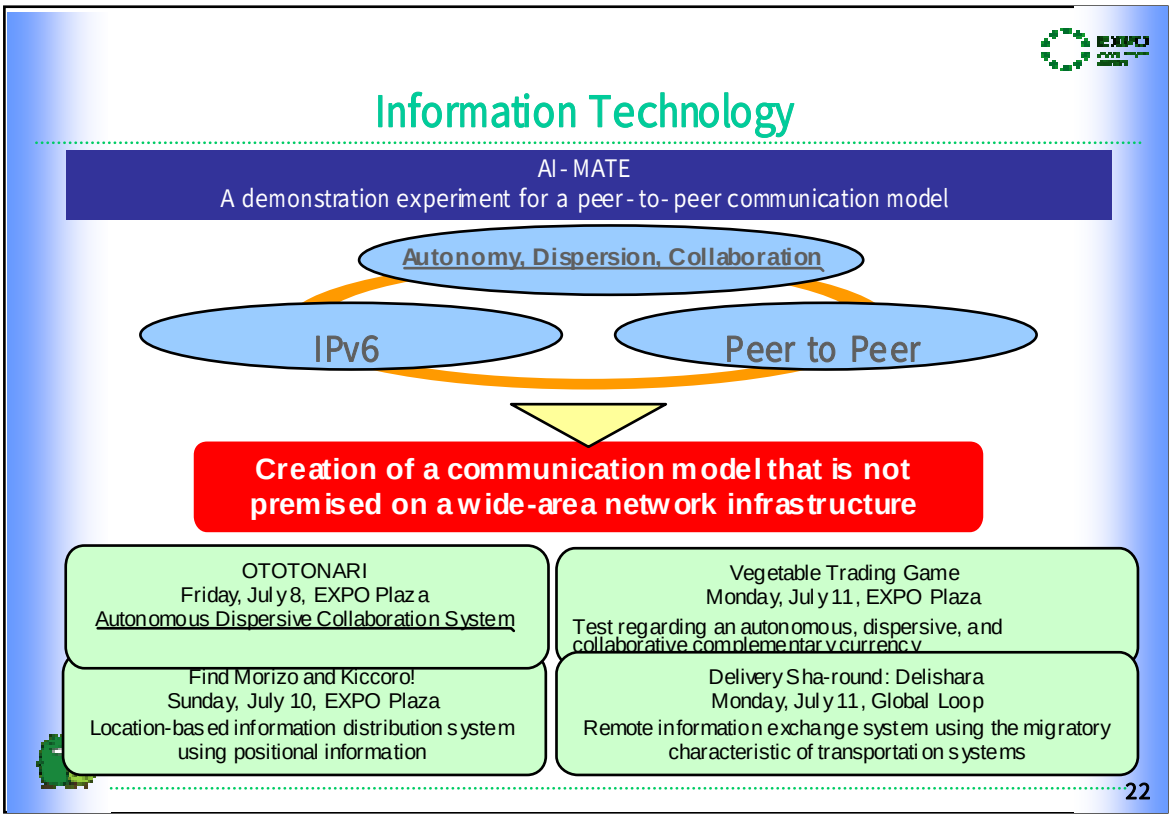
Ultimately, a total of 25.5 million tickets were produced, making the Expo the world's largest-scale example of IC chip-based ticketing to date. The IC chip-based system also demonstrated its effectiveness in terms of anti-counterfeiting technology: During the approximately two years since ticket sales began, not a single case of counterfeiting has been confirmed.



Leading-edge information technology is an important field poised for further growth, and its role in the Expo's success extended well beyond its use in the ticketing system. Information technology was also used extensively in the exhibits, visitor services, and the overall management of the Expo.

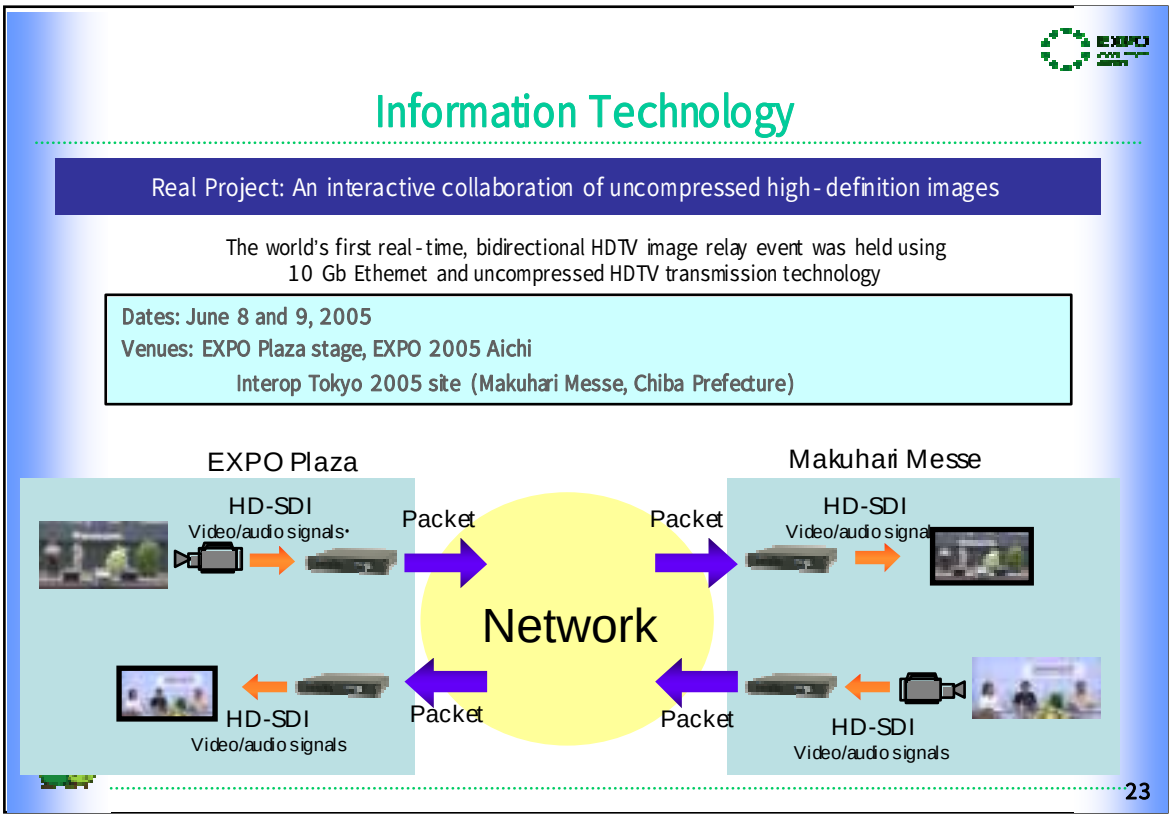
Examples include the reservation system that allowed people to make pavilion reservations up to a month in advance over the Internet; the Intelligent Transportation System that guided visitors smoothly to and from the venue; and the system for distributing pavilion information to visitors via their mobile-phone handsets.

This is a picture of the AI-MATE. It is a hybrid of two kinds of information devices: an information terminal and a mobile-phone handset. These AI-MATE terminals were used for operations such as reading the IC chips on the admission tickets; confirming pavilion reservations; and allowing event staff to exchange information about conditions such as crowd conditions at the pavilions.



Expo staff maintained contact with one another via the AI-MATE, a state-of-the-art communication device that combines the features of mobile-phone handsets and data terminals. Trial runs of the AI-MATE were conducted at Nagakute Area.

AI-MATE terminals can connect directly with one another wirelessly. The terminals can also be used as relay stations for transmitting information among multiple terminals. By taking full advantage of the AI-MATE's features, users can build their own terminal-to-terminal networks that, unlike conventional wireless networks, require no base station. This feature is expected to dramatically expand the possibilities for telecommunication networks. The AI-MATE experiments were devised by a group of researchers representing Keio University, Nagoya Institute of Technology, and other organizations. Starting July 8, many volunteers from the general public helped the researchers put the AI-MATE through its paces in three areas within Nagakute Area: the Japan Plaza, the Expo Plaza, and the Global Loop.



An Interactive collaboration of uncompressed high-definition images (June 8, 9)

An uncompressed interactive high-definition television (HDTV) connection was established between the EXPO 2005 site (EXPO Plaza) in Aichi Prefecture and the Makuhari Messe International convention center in Chiba Prefecture.

This connection enabled interactive collaboration via HDTV that had virtually no delay. Earlier technologies required compression that resulted in a delayed signal that inhibited collaboration efforts.

This presentation compared uncompressed HDTV to compressed HDTV by conducting a “rock, paper, scissors” match over the two connections, and this clearly demonstrated the absence of a significant delay in the uncompressed signal.

This presentation used the following cutting-edge technology.

10Gb Internet connection.

Uncompressed HDTV transmitter.

2. EXPO Plaza Twilight Concert—Message from the Subaru Telescope (August 2, 3)

A lecture on astronomy was delivered by Mr. Fuse from the Subaru Telescope located on Mauna Kea summit on the Island of Hawaii (elevation 4200 meters) to elementary school children at the plaza.

The two locations were connected via interactive television over the Internet, demonstrating that education and collaboration is possible between remote locations. A compressed HDTV signal was transmitted over the Internet connection used by the Subaru Telescope.

Despite the delay introduced by the compressed HDTV signal, the lecture ran smoothly.

The success of this demonstration shows that, with an Internet connection, anything can be taught anywhere, even astronomy using the Subaru Telescope.

EXPO 2005 Tourist Guide Experiment

Summary

The Ministry of Land, Infrastructure and Transport has been conducting the Visit Japan Campaign to promote tourism in Japan, and as part of that program, they are testing a Tourist Information System that uses ubiquitous network technology.

Description

As part of this test, select visitors to EXPO 2005, both foreign and Japanese, were given an IC tag transmission device and a portable terminal that provides tourist information in six languages (Japanese, Chinese, Korean, English, French, German).

Testing Method (Materials and System Features)

Wireless markers and IC tags were installed at key points within the EXPO grounds.

Each participant was given a mobile terminal, which responds to each key location with graphics, text, and audio information for tourists.

The information included information on the pavilions and other facilities and directions to various locations.

Participants

Japanese and non-Japanese visitors

Testing Areas

From the West Entrance to the southern part of the Global Loop, and the Global Commons 3 area.

Test Periods

One: August 1 to 12

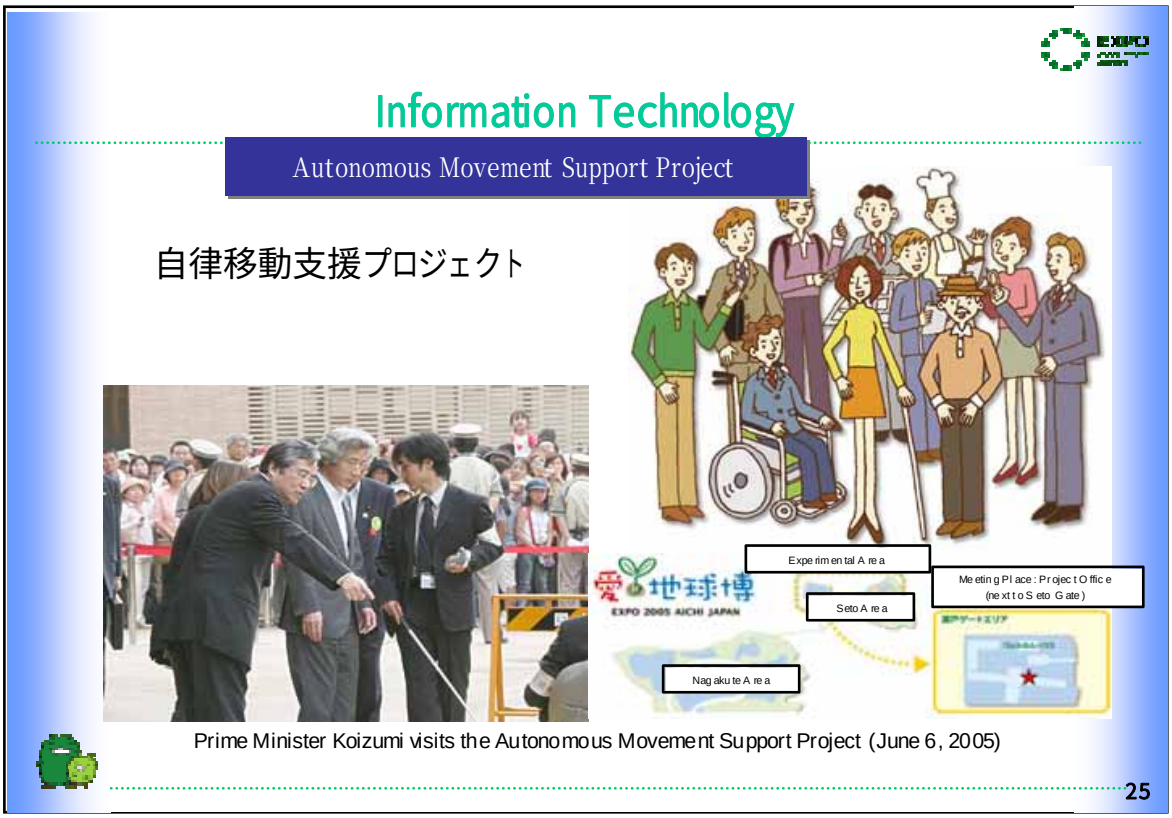
Two: August 26 to September 9

Results

Participants in test one: 182

Test two is still in progress. It ended on September 9.

A report is scheduled to be issued sometime during this fiscal year.



Prime Minister Koizumi visits the Autonomous Movement Support Project (June 6, 2005)

Autonomous Movement Support Project

Summary

Ministry of Land, Infrastructure and Transport has been conducting the Autonomous Movement Support Project, the goal of which is to find ways to achieve a "universal society." As part of this project, they tested an autonomous movement support system using ubiquitous network technology for people with disabilities.

Description

Select visitors with disabilities (those in wheelchairs or with impaired vision) were asked to participate in the test and were given an IC tag transmitter and mobile terminal that provided information to help them get around. Feedback from participants will be used to improve the system.

Testing Method (Materials and System Features)

Wireless markers, infrared markers, IC tags, and raised tactile markers for the blind with IC tags were installed at key points and on key paths within the EXPO grounds.

Participants were given a mobile terminal and customized walking stick or a wheelchair equipped with an antenna for receiving information.

At each of the key spots, participants used their mobile terminals to receive graphic, text, and audio information that would help them move about more freely.

This information included the location of each facility; descriptions and locations of toilets, elevators, and stairs; and directions to them.

Participants

People with disabilities (those in wheelchairs or with visual impairment), welfare workers.

Testing Areas

Seto Area gate area and Civic Pavilion area.

Test Periods

1st: : June 7 to 19, 2nd: : July 25 to August 7, 3rd: August 26 to September 9

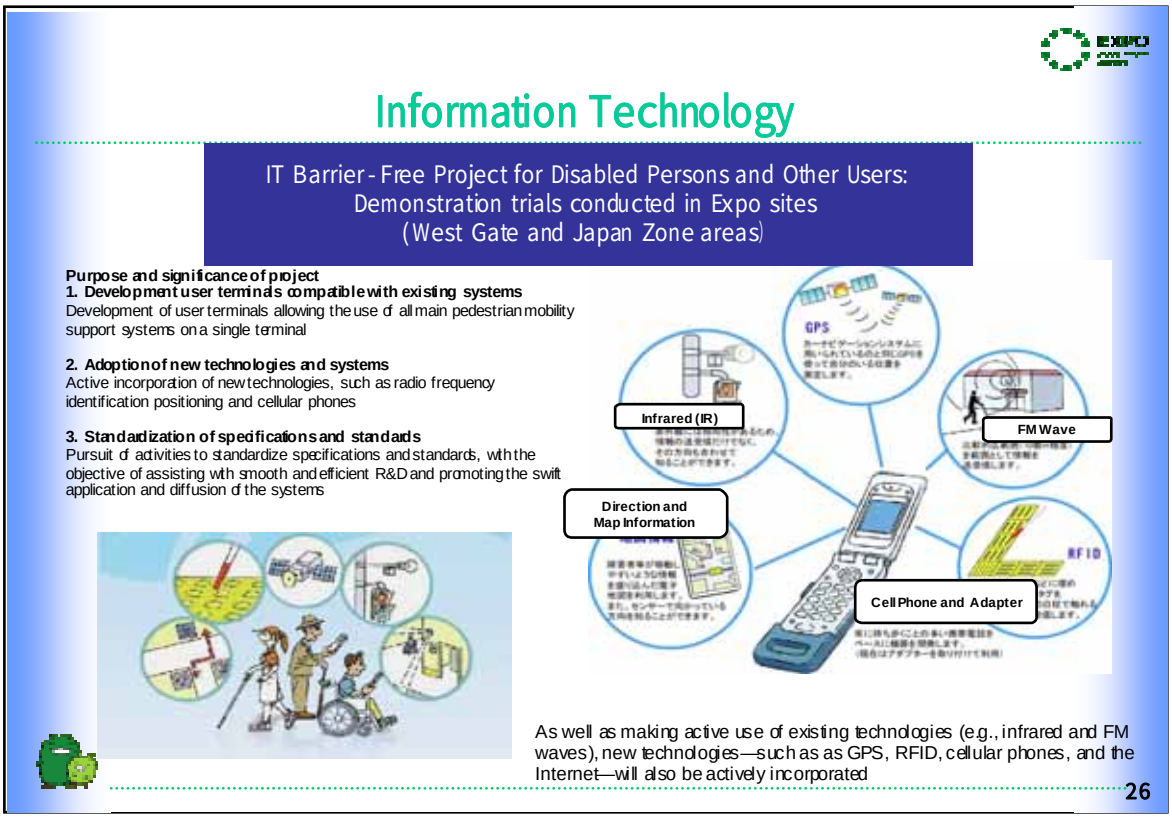
Results

Participants in test one and two: 66 and 107, respectively

Total of 173 people (117 used a cane, 56 used a wheelchair).

Test three ended on September 9.

A report is scheduled to be issued sometime during this fiscal year.



Summary of the IT Barrier Free Project for People with Disabilities

To create a society in which people with disabilities can have a say and have a purpose, something must be done to facilitate their mobility and make it easier for them to participate. However, there are several mobility support systems being developed and operated, and there are many issues about compatibility and usability to address. This project seeks to develop standard specifications and a user terminal that integrates these systems, which will make these systems practical and promote their use.

The mobility support system developed as part of this project integrates several systems into a mobile telephone that displays information on the user's location and environs and directions for moving to a target location using graphics and audio communications. This allows people with visual or hearing impairments and elderly people to move about safely and confidently.

From June 21 to August 25 (excluding weekends and holidays), a testing route was established at the EXPO grounds from the West Gate to the West Entrance and Japan Zone, and demonstrations were available for all visitors.

Advanced Image Systems

Earth Vision (Japan Pavilion Nagakute):
World's first 360˚ spherical image system

Version 1 ("Blue Brilliance")

Version 2 ("Green Murmur")

Version 3 ("Luster of Life")

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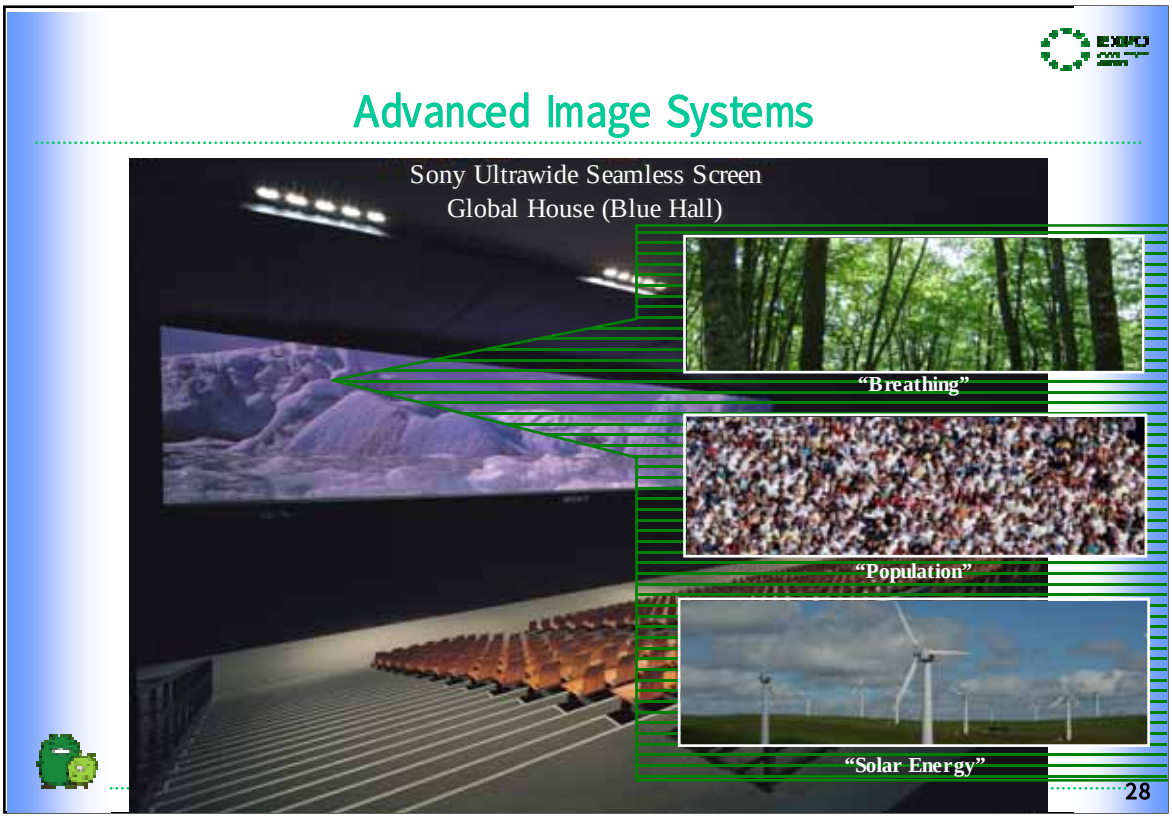
In the Japan Pavilion Nagakute, there is the Earth Room, a theater with a completely spherical screen that shows the world's first 360-degree view of the world from the inside.

The sphere is 12.8 meters in diameter, which is one millionth the size of the earth. For two and a half minutes, visitors feel like they are actually floating in space as they experience the soul of, the amazing power of, and a deeper connection with the earth.

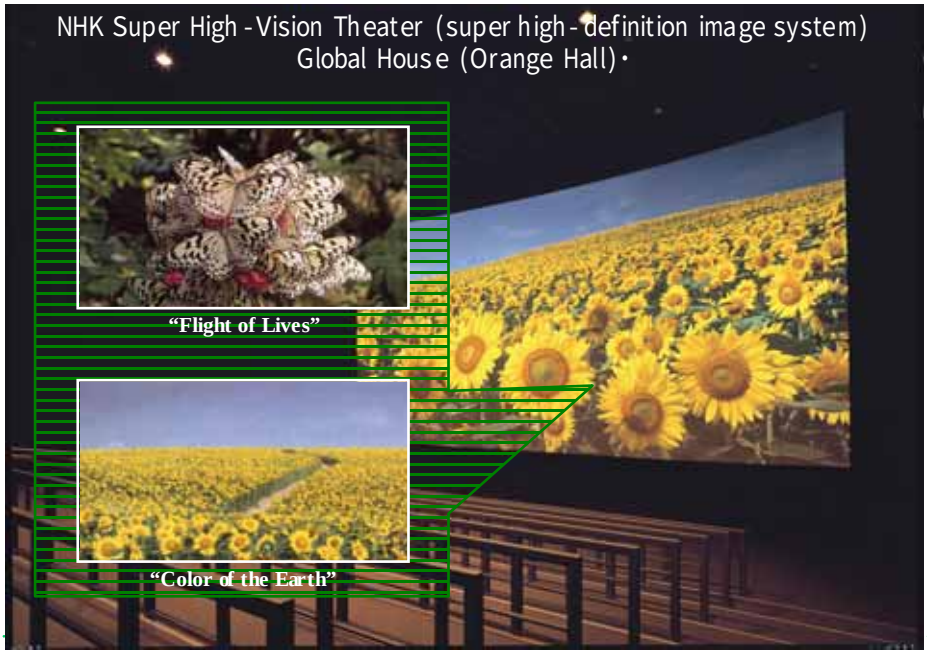
Version 2 started on June 1. Version 3 started on July 21. (The final showing of version 3 is August 31.)



An ultra-wide theater with a 2,005-inch screen (50 meters wide and 10 meters long), the largest in the world, was unveiled at EXPO 2005 Aichi. The theater features a cutting-edge high-resolution projection system with red, green, and blue lasers as its light source.

Specialized camera systems were brought to locations around the globe to capture ultra-wide, high-definition images not possible with conventional equipment. These images were combined with clips generated by computer graphics to create breathtakingly realistic visuals for the screen and give visitors the experience of a futuristic mode of theater.

Advanced Image Systems



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High-resolution television broadcasts with four times more vertical and horizontal scan lines than high-vision TV and an unprecedented clarity have also been aired. An acoustics system with 22.2 channels of specialized three-dimensional sound was developed, enhancing the feeling by viewers that they are part of the scene. Visitors have been particularly struck by the sharpness of their own image on screen, taken as they enter the pavilion, and they come away with a strong sense of the extraordinary made possible by state-of-the-art technology.

Adoption of New Social Behaviors and Systems

Garbage segregation in nine types

Eco-money

Environment-conscious construction and universal design

Park and ride

Eco tours and nature experience programs

Information technology

Garbage Segregation in Nine Types

31

Nine types of trash

At EXPO 2005 Aichi, active efforts have been made to promote the three Rs—reduce, reuse, and recycle—in the aim of creating a recycling-oriented society. Visitors were asked to separate their garbage into nine categories, and the official participants were asked to sort trash into 17 categories. The goal was to reuse 85% of the garbage generated on the grounds.

The nine categories of trash for visitors were:

Plastic bottles made out of polyethylene terephthalate (PET)

Paper cups and paper containers

Plastic materials

Disposable chopsticks

Paper

Food waste

Burnable garbage

Nonburnable garbage

Leftover drinking water

The 17 categories of trash for the official participants include aluminum cans, steel cans, bottles, cardboard boxes, and used cooking oil.

Visitors sort and dispose of their trash at one of more than 80 “waste stations” set up on the Expo grounds. The garbage collected here is brought to one of 16 “sub stockyards,” the name given to intermediate collection sites, and subsequently hauled to the “main stockyard,” the final disposal area, along with the 17 categories of trash from the official participants. Here, cans and PET bottles are crushed and compressed into blocks, cardboard boxes are packed together, and other work done so that the materials can be turned over to outside disposal facilities.

Eco-Money

EXPO 2005 Aichi's Eco-Money program constitutes an experiment in a new type of social system that promotes the reduction of CO2 emissions through "ecoactivities" initiated by individual citizens.

The program works in the following way. First, visitors earn "EXPO Eco-Money," or points, for bringing their own shopping bag, buying environmentally friendly products, or taking "environmentally friendly action." The points are saved and traded in for a product or service or donated to an afforestation or other environmental conservation program. In this way, EXPO Eco-Money serves as an experiment in a new social system that gives weight to the environment and recycling.

As many as 180,000 people became "ecocitizens," receiving and using "ecopoints," after the start of EXPO 2005.

The use of Eco-Money at EXPO 2005 enabled a 8,000-ton decrease in CO2 emissions. Moreover, about 230,000 "ecopoints" were donated to tree-planting programs.

On September 5, a symposium titled "EXPO Eco-Money: After EXPO 2005" was held at Roppongi Hills in Tokyo. During the symposium, the Japan Association for the 2005 World Exposition reported on the success of the program in preventing global warming, a problem that affects the entire world, and creating a recycling-oriented society. It also announced plans for a new program that builds on the success of the EXPO undertaking in preserving the environment, educating the public, and promoting environmentally friendly actions at the level of individual consumers. EXPO Eco-Money has been carried out by the association in collaboration with the Eco-Design Civil Society Forum and is the first world exposition program to start at the grassroots' level. It was designed to inspire people to do what they can for the environment, which is a key to reducing CO2 emissions, and to spread from Aichi to the rest of the country.

The eastern hills of Nagoya, which serve as the venue for EXPO 2005 Aichi, are home to a number of rare species, such as the northern goshawk and *Nannophya pygmaea* dragonfly. When the preparations for the site got underway, consideration had to be given to the ecosystems of native plant and animal life, and an environmental assessment covering 217 items was undertaken in tandem with the work. The process could be described as the creation of an EXPO venue in accordance with nature.

Environment-Conscious Construction and Universal Design

Global Loop: An elevated walkway connecting the world
(Nagakute Area)

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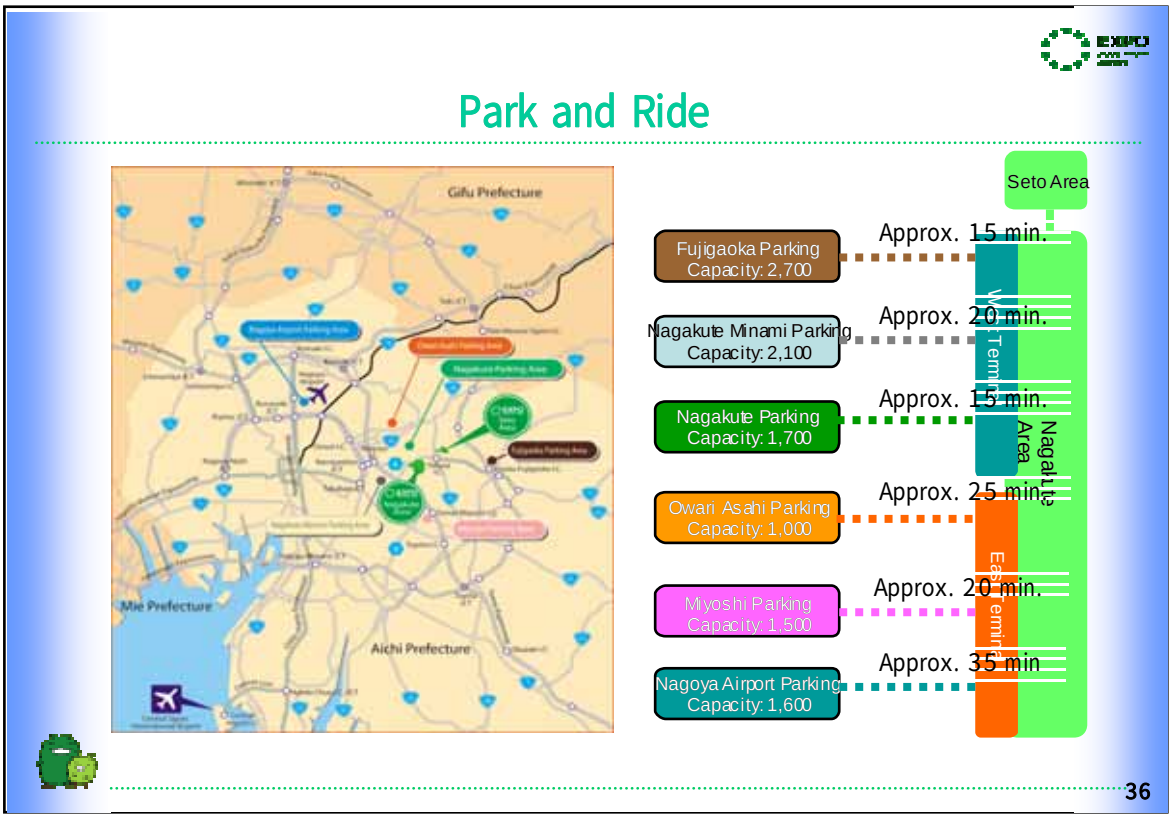
The idea of “coexisting with nature” served as a guiding principle when choosing and building the site. Alterations to the natural environment were kept to an absolute minimum, and a venue dotted with forests was readied for the arrival of more than 15 million visitors. In all probability, no other world exposition has given such emphasis to preserving the natural environment of its venue.

An elevated walkway named Global Loop made it possible to minimize changes to the hilly terrain, preserve the 13 ponds on the site, decide on an appropriate placement for the many pavilions, and ensure accessibility to all pavilions. The Global Loop served as a main street in a venue with a 50-meter gap in the highest and lowest points, making it easy for elderly people and people with disabilities to get around and giving visitors the feeling that they were traveling around the world as they made their way along the loop. In many senses, it was the ultimate in universal design.

Until now, the pavilions at world expositions have been unique structures, the product of original designs by individual countries. At EXPO 2005, Aichi, Japan however, all participating countries were asked to use standardized modules that could easily be reused after the end of the event. The units, which measure 18 meters wide, 18 meters deep, and 9 meters high, were built by the association and made available to participating countries. The countries were free to redecorate the exterior and interior of the units, as long as certain rules were observed.

The size of the country determined how much space it received. Some countries share a single module, while others have a complex of five. The use of modules enabled a large number of countries to participate, since building costs were minimized.

After the conclusion of EXPO 2005, the modules will be dismantled and reused, probably either as warehouses or sheds for building materials. A large percentage of the materials is expected to be recycled, far more than if each country had designed its own pavilion. The modules are the product of a new way of thinking that aims to avoid the generation of an enormous volume of scrap materials. Though the structures are not fancy, they provide a way to achieve the three Rs, and the plan constituted a groundbreaking endeavor in an age when priority must be given to the environment.



"Park and ride" was implemented in the aim of alleviating congestion around the venue and reducing the burden such traffic would place on the environment. Under the system, visitors park their cars and motorcycles (including motorized bicycles and mopeds with a displacement of more than 50 cc) and ride a shuttle bus to the EXPO grounds. There are six designated parking areas, Fujigaoka, Nagakute South, Nagakute, Owari Asahi, Miyoshi, and Nagoya Airport. EXPO 2005 Aichi is probably the first world exposition to implement a park and ride system on such a large scale.

Eco Tours

Three types of tours were organized during EXPO 2005 Aichi to offer an explanation by specialists of behind-the-scenes, state-of-the-art environment-related technology not visible in the displays.

Backyard Tour: Designed for civil servants, company employees, and students with a strong interest in environment-related technology, the Backyard Tour covers futuristic technology, such as an innovative power plant that produces all the electricity used at the Japan Pavilion Nagakute from food leftover at restaurants on the grounds and a facility for refueling vehicles run on hydrogen fuel cells.

A total of 4,071 people participated in the Backyard Tour as of the end of July.

Kids' Eco Tour: Open to elementary and junior high school students, the generation responsible for the earth's future, the Kids' Eco Tour takes participants to various facilities to teach them about the environment.

A total of 11,647 children took part in the Kids' Eco Tour as of the end of July.

Self Eco Tour: Open to all visitors, the Self Eco Tour is a self-guided tour using an "eco map" covering more than 50 EXPO relevant facilities.

Eco maps are available at all general information counters on the grounds.

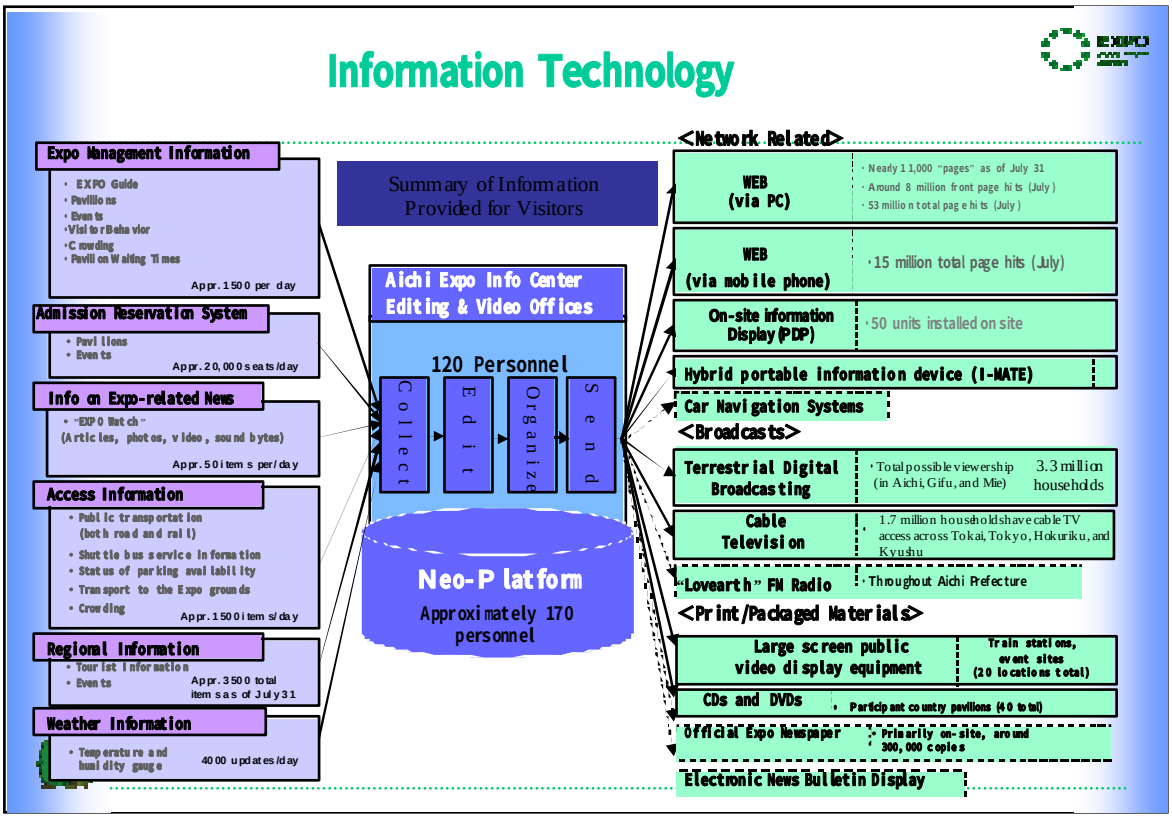
EXPO 2005 Aichi's "Nature Experience Program" provides an opportunity to experience the nature at the venue, half of which has been left in its original state, and think about "Nature's Wisdom" the theme of EXPO 2005. In conjunction with this, symposiums, volunteer activities to plant trees outside the EXPO, and a United Nations' International Children's Conference on the Environment have also been organized.

Nature School Forest

The forest is the setting for encounters among nature, people, and earth and art. By participating in programs that make use of the five senses and creativity and experiencing the forest firsthand, participants can learn about the workings of nature and acquire insight into the relationship between nature and people.

Village Nature School

By working with soil and experiencing the nature of *satoyama* lands, participants in the programs learn about the amazing mechanism of environmental coexistence inherent in *satoyama* and the wisdom and skills possessed by their predecessors. They can also come to understand the connection between people and the nature of *satoyama*.

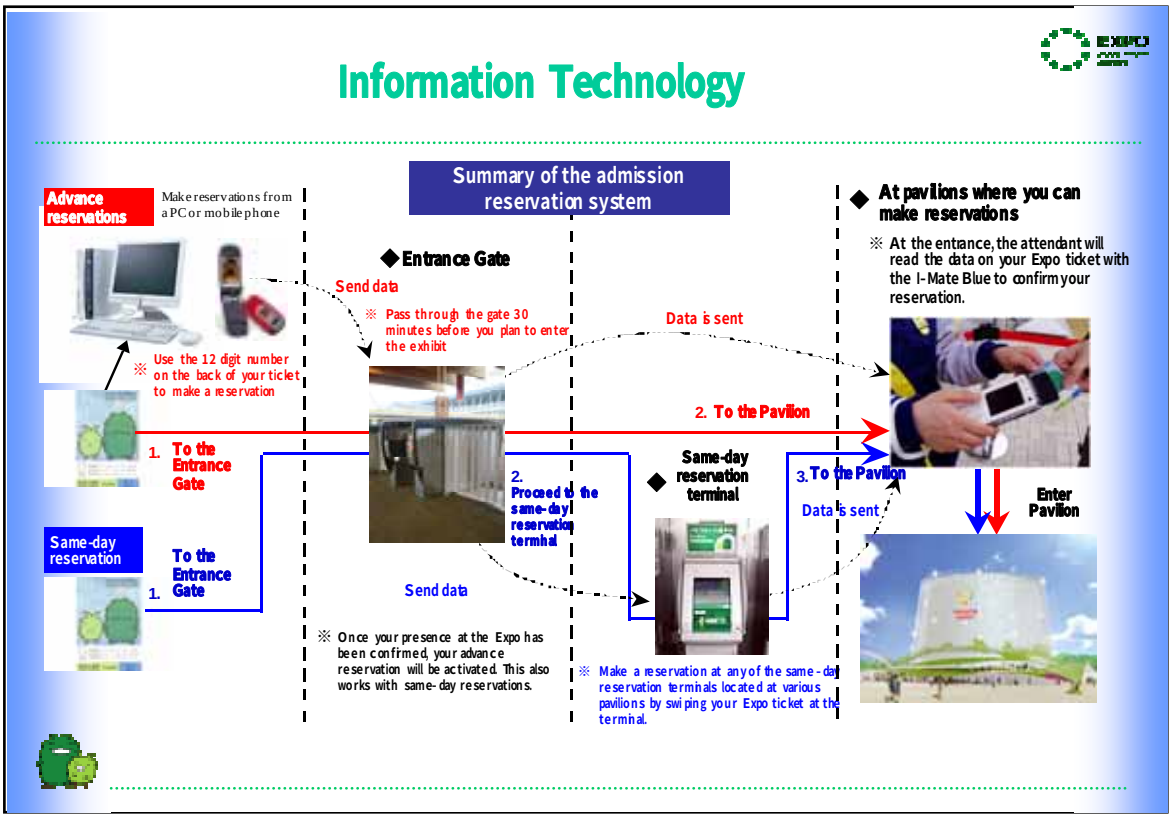


Goals/Concept

This is a full-fledged attempt to summarize a wide range of information (on organizations' management, media coverage, traffic, tourism, events, etc.); integrate it in the editing room (for editing and organizing); and distribute it among various types of media (computer Web sites, cell phones, terrestrial digital broadcasting, on-site information displays, etc.) in the optimal form for the people who request it. A Neoplatform (NP) has been developed and built as the system to underpin this project.

Current Situation

- Data from various sources of information is being summarized.
- Organizations' management information: Basic information about EXPO, obtained through EXPO employing intra-management.
    - EXPO Watching: Information in the four main forms of news articles, photographs, motion pictures and audio, while the editing room and film management room, made up of newspaper, TV stations and others, were consolidated and carried out reporting.
    - Traffic information: Information that was collected and consolidated through the ITS system, including information about public transport, parking availability and road congestion.
    - Regional information: Information that summarized the individual situations in different prefectures, such as sightseeing and events in Aichi, Gifu and Mie prefectures.
- Distribution to Various Types of Media
    - The Web (personal computers), cell phones, on-site information displays (PDP), hybrid information terminals (Ai-Mate).
    - Terrestrial broadcasting, CATV.
    - Large-format screen equipment operated by local governments (Aichi and Gifu Street Vision), CDs, DVDs.
- The Two Advantages
    - No need for an editing team for every transmission source (public Web sites and cell phones, on-site display panels, etc.) (Sending information is possible even with little manpower.)
    - Consolidation of information makes it possible to transmit accurate information quickly.



Goals/Concept

- This is the first attempt at a large-scale international event to fully use the Internet to make reservations for admission to pavilions and events by linking the reservations with admission tickets containing IC chips.

- This is taking place on a trial basis on admissions for 20 percent of pavilions' capacity. Consideration is given for environments where not everyone can use the Internet.

- In connection with the idea of "day by day improvements," visitors' movements can be quickly reflected in EXPO's management.

Current Situation

- Reservations can be made as often as twice a day per visitor, and reservations are handled from 1 month to two days before the visitor arrives. Visitors can select the pavilion and time.

- A total of 20,000 seats are handled in a day.

- Approximately 1 million requests (from 100,000 to 200,00 people) are made each day, and the system has proved popular every day. Popular facilities have been filled within 10 minutes.

- There is a correlation between number of enquiries on the first day and number of visitors. This correlation is used to predict the number of visitors one month in advance.

Further Development

- Plans are under way to improve the computer system's ability to deal with surges of Internet access stemming from public knowledge of what's going on at the EXPO.

- Countermeasures are under way for technological tricks and robotic tools, as well as with public knowledge of the computer system.

- Making the system compatible with popular developments, such as Internet auctions, is being studied.

IT

Summary of Support Navigation System

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Goals/Concept

- Improvements are planned to boost visitors' enthusiasm. Visitors would use various types of information offered by public Web sites and create their own EXPO itineraries (called "My Plan") for accessing the EXPO site and visiting their chosen attractions.

- Improvements are planned to enhance visitors' convenience. Links would be established with personal computers and cell phones, and information required while at the site and for going to the site would be made available to cell phones.

Current Situation

Planning:

A service is available that projects viewable images so that visitors can create their own itineraries (called "My Plan") in advance using personal computers, while referencing information about congestion forecasts on planned visiting days, transport, pavilions and events.

Cell phone navigation:

- Updated information is being provided outside and within the site on traffic conditions on planned visiting days, waiting time for pavilions, and various events. This service uses cell phones that can access desired information regardless of time or place, and is linked to personal computers and based on My Plan.

- Management support tools

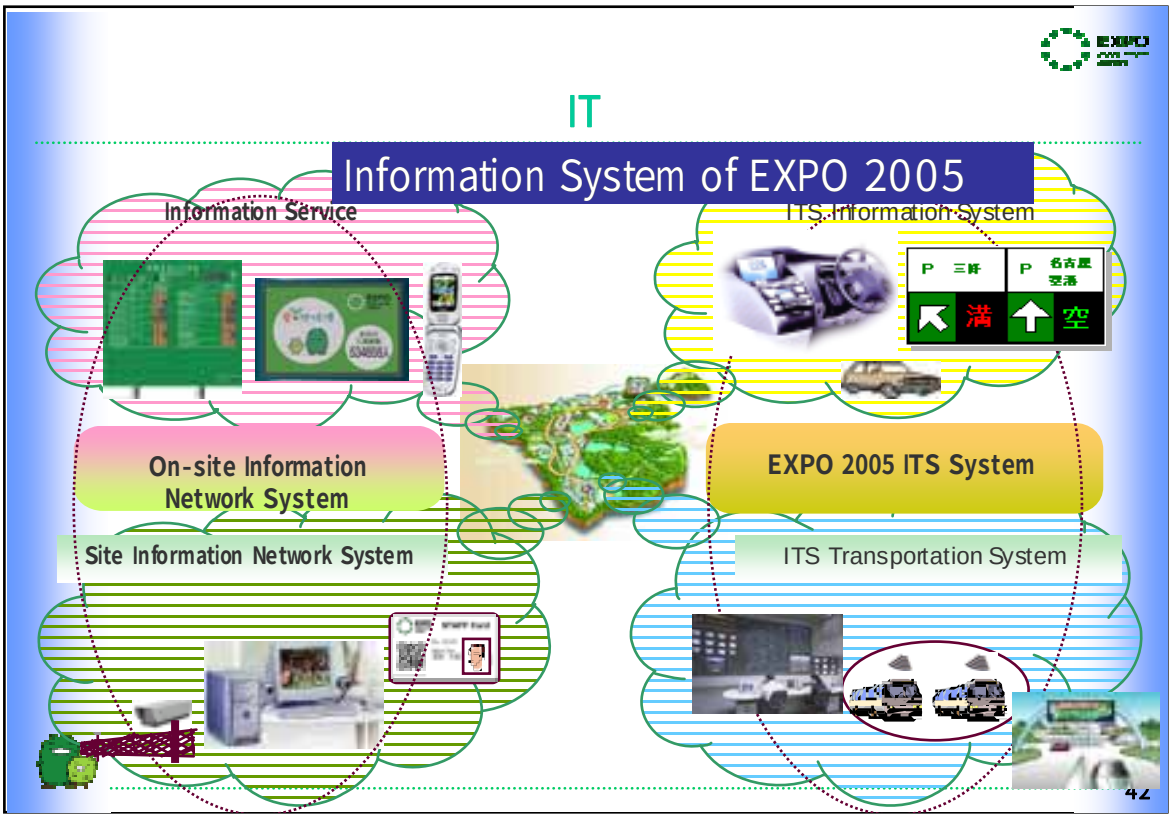
My Plan makes 1,000 to 2,000 registrations a day. There appears to be a correlation between these numbers and the number of visitors. The correlation used as a basis for visitor projections, transportation logistics and so on.

Further Development

- Offering optimized travel routes based on the movements of visitors among the pavilions they want to visit.

- Improving the accuracy of visitor projections taken from the number of My Plan registrations.

- Enabling GPS to offer information that corresponds to visitors' locations, should GPS come into common use.



- Official Web page receives 53 million hits a month, cell phone Web page 15 million.

Internet access in April is about double that of the sites for Tokyo Disney Resort.

- Reservations for admission per day number around 20,000, compared to 1 million requests per day.

Popular facilities are filled within 10 minutes. Data is used to make forecasts on the number of visitors for one month in advance.

- Release of information:

- Information concerning EXPO operations (waiting time to enter pavilions, EXPO Guides, etc.): approximately 1,500 enquiries a day.

- Viewing reservations (for pavilions and events): approximately 20,000 seats a day

- Transportation information (rail and roads, shuttle buses, parking, etc.): approximately 1,500 enquiries a day.

Others (weather, etc.): 4,000 transmissions a day.

- E-commerce

Electronic commerce was introduced as a pilot case, after it was studied by the EXPO's BIE Rules Committee. This e-commerce is limited to the period that EXPO runs. Although a large number of countries expressed interest, currently three countries are involved: Switzerland, Turkey and the Republic of Korea. Zimbabwe is planned to take part in the future.

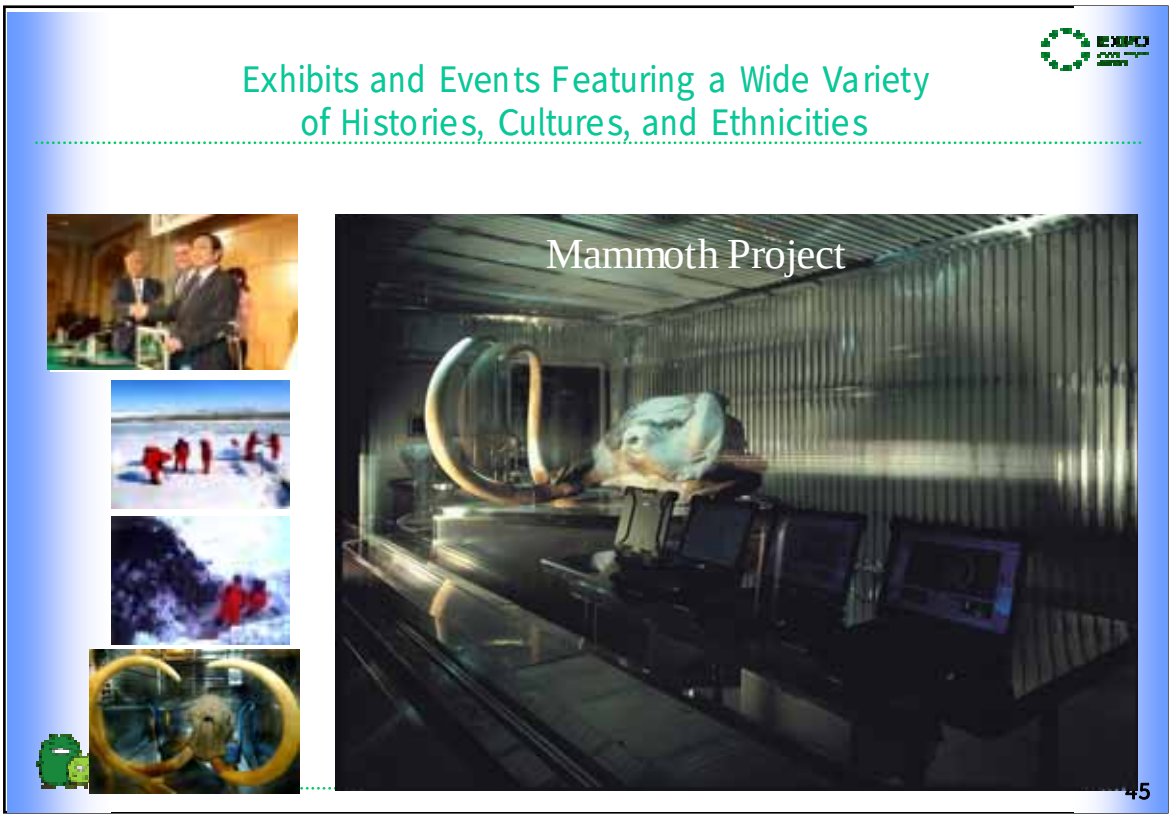
Sales as of the end of August totaled approximately 40 million yen.

Sharing in the Diversity of our Different Cultures and Values

-Exhibits and Events Featuring a Wide Variety of Histories, Cultures, and Ethnicities

- National Day and Independence Parties
- Friendship Projects
- Sharing and Exchange Among Staff

-Academic Conference (Expo 2005 International Forums)



The mammoth's extinction was apparently due to rapid changes in the global environment at the time and overhunting by humans. The frozen mammoth, which was found in Siberia, is being displayed as a reminder of effects that changes in the global environment can bring and the effects that humans have on the ecosystem.

This exhibit has been promoted jointly by Japan and Russia. The project is the first research of its kind on mammoths, involving CT-scan analysis and a complete analysis of the animal's genome sequence. Valuable data has been obtained on specific details of the connection between elephants and mammoths, and the differentiation between the two. The Japan-Russia project achieved success after surmounting various hurdles and resulted in creating a new level of academic exchange between the two countries, including having officials visit Japan from the Sakha Republic.

Exhibits and Events Featuring a Wide Variety of Histories, Cultures, and Ethnicities

Argentine

New Zealand

China

Yemen

Cameroon

Exhibits and Events Featuring a Wide Variety of Histories, Cultures, and Ethnicities

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Republic of Korea Pavilion

With the theme of “Light in Life,” the facility is divided into five zones. Video of culture, crafts and industry can be seen.

Saudi Arabia Pavilion

A new world of Islam can be experienced at this facility, whose three themes are wisdom, harmony and hope.

Exhibits and Events Featuring a Wide Variety of Histories, Cultures, and Ethnicities

Pavilion of the United States (Global Common 2)


Pavilion of the United Mexican States (Global Common 2)

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U.S. Pavilion

Benjamin Franklin, a politician and scientist who contributed to America's freedom, is commemorated on the 300th anniversary since his birth. America's nature and technological achievements are introduced. A 3D representation of Franklin acts as the pavilion's host.

Mexico Pavilion

The diversity of Mexico's wildlife and many native tribes, which have occupied the country's distinctive natural environment since ancient times, is spotlighted. In the pavilion, the wisdom of that nature is expressed through cultural and environmental trends.

Exhibits and Events Featuring a Wide Variety of Histories, Cultures, and Ethnicities

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Canada Pavilion

The Canada Pavilion highlights the abundant natural mystery and biodiversity of this vast nation. Six Canadian guides and technologically enhanced humans ("Teku-jin") offer visitors a virtual tour of the Pavilion.

Spain Pavilion

The Spain Pavilion features 16 supersize video screens and a variety of programs and events. Attractions include the Tapas Bar, where visitors can sample this country's diverse cuisine.

Exhibits and Events Featuring a Wide Variety of Histories, Cultures, and Ethnicities

50

Italy Pavilion

The unveiling of the bronze statue *Dancing Satyr* is the main attraction. Along with exhibitions showcasing the country's history, art, and new technology, the Italy Pavilion also features an authentic Italian bar (café).

Turkey Pavilion

The Turkey Pavilion introduces visitors to the culturally and historically rich land that straddles Asia Minor and the southeastern part of the Balkan Peninsula.

Exhibits and Events Featuring a Wide Variety of Histories, Cultures, and Ethnicities

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Switzerland Pavilion

The main attraction at the Switzerland Pavilion is the virtual "Walking Tour" of five great Swiss peaks.

Poland Pavilion

The Poland Pavilion features over 10 video screens showing images inspired by native son Frederic Chopin's Etude, a work comprising over 10 pieces.

Exhibits and Events Featuring a Wide Variety of Histories, Cultures, and Ethnicities

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Nordic Pavilion

Footage of the Northern Lights is the visual centerpiece of this pavilion, which highlights the natural wonders, the cuisines, and the unique social-welfare systems of the Northern European nations. There is also a glass studio where visitors can experience the fun of creating handcrafted glass art.

Egypt Pavilion

The Egypt Pavilion showcases the country renowned for its pyramids and other ancient ruins. Here visitors can steep themselves in the history, culture, and classical aesthetic tradition of this timeless land.

Exhibits and Events Featuring a Wide Variety of Histories, Cultures, and Ethnicities

53

Africa Pavilion

Booths representing the individual countries of the African continent are arranged in order from north to south and feature visual images from each country. There is also a common booth where displays of masks, pottery, and textiles offer insight into the continent's history and customs.

Australia Pavilion

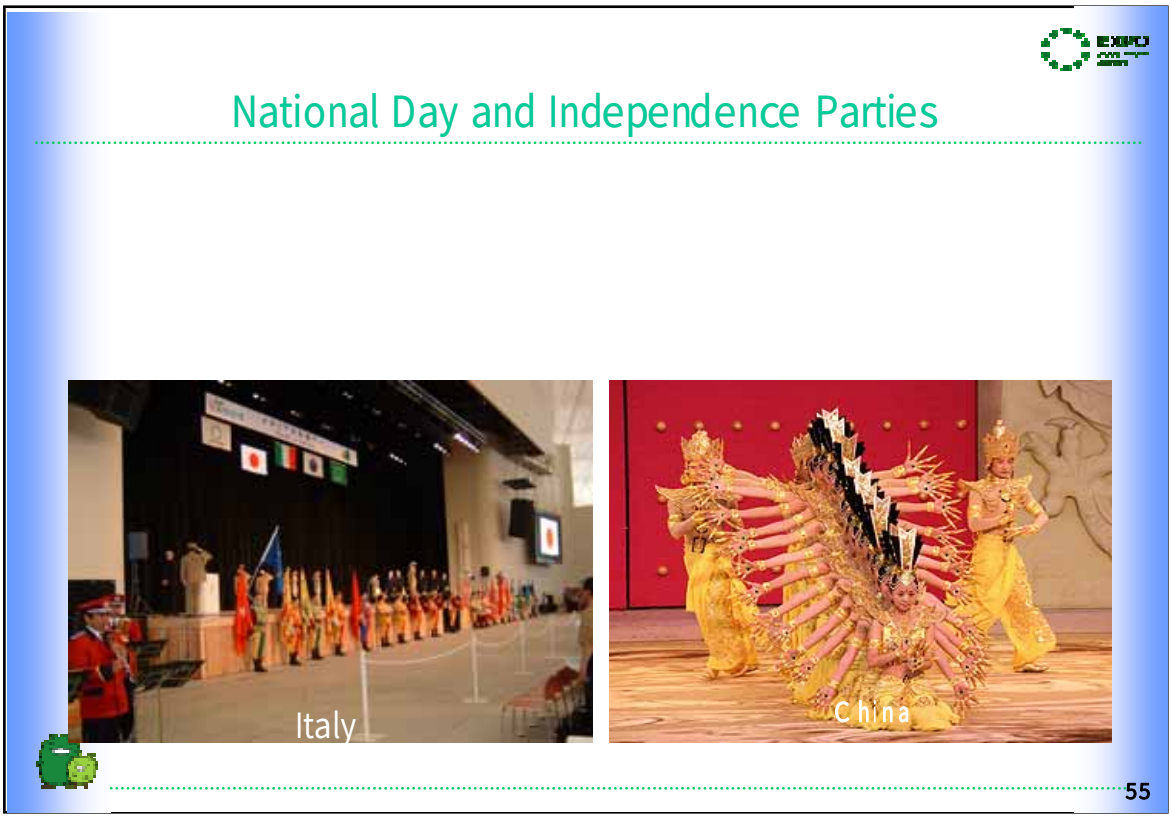
Visitors to this pavilion can experience the traditional culture of Australia's original inhabitants, the Aborigines, and glimpse the country's unique natural environment. Highlights include a living baobab tree, member of a species unique to Australia's desert region, and nearly 80 plasma screens showing a dizzying array of images.

Philippines Pavilion

The exterior of the Philippines Pavilion looks like a cross-section of a coconut, the symbol chosen to represent the pavilion's theme of "Usbong: Seeds of Life." Multiple projectors show images highlighting the country's natural beauty and rich culture.

Malaysia Pavilion

Malaysia is one of the few places in the world where old-growth tropical rainforest remains intact. The Malaysia Pavilion offers a glimpse into the natural wonders of this land, home to numerous rare plants and animals including the world's largest flower and the world's smallest squirrel (the pygmy squirrel).



National Days

A program of National Days highlighting the countries participating in the Expo 2005 began on March 31. Royal family members, presidents, and prime ministers from various countries have given high marks to the Expo after attending on their National Days.

National Days not only highlight traditional culture but serve as powerful channels for embodying the Expo's theme and for creating new culture.

First-class performers from each country interpret the Expo's theme, "Nature's Wisdom," through the cultural lenses of their homelands. The performances not only teach audiences about the world's cultural diversity but also spark a rich range of emotions.

Friendship Projects

大使一行を出迎える鳳来町の子供たち

フラメンコを楽しむ清洲町の人々

56

Cities, towns, and villages of Aichi Prefecture pair with participating countries to extend hospitality to and promote international exchange with foreign guests. The cities, towns, and villages will come up with their own ideas, but following are some examples:

Participation of cities and towns in National Days throughout the Expo period (official events, official ceremonies, etc.)

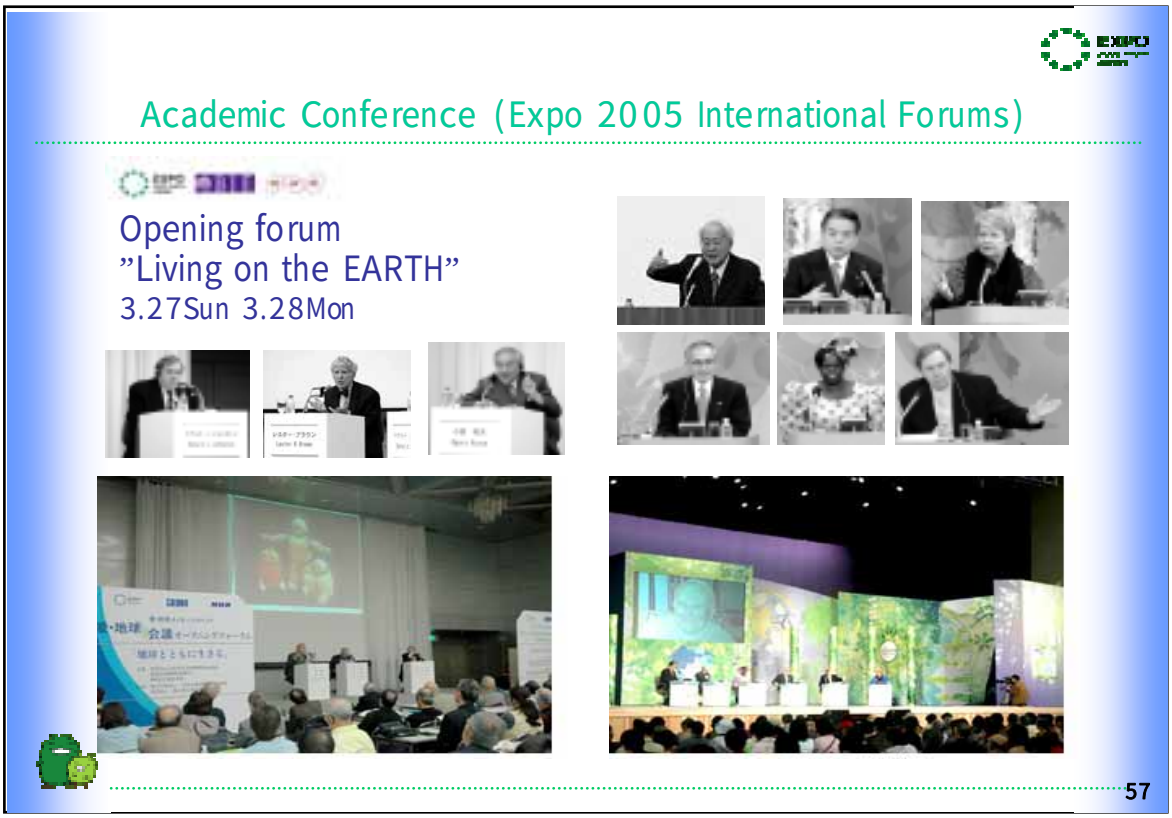
Example 1. Leaders of participating countries, together with local city and town officials, conduct tape-cutting ceremonies or other gate opening ceremonies at the entrance.

Example 2. Various groups from each local city or town march around the Global Loop bearing the flags of their partner countries.

Example 3. After official ceremonies, local city and town representatives visit their partner countries' pavilions and sing or play the partner country's national anthem in front of its pavilion.

Grass-roots exchange in the local region (cities, towns, villages)

Example 1. Representatives may invite officials of the partner country to their region and hold a welcome ceremony and reception with local residents.



On March 27 and 28, for the first time ever in World Expo history, a series of symposiums "EXPO 2005 International Forums" were held. Experts from around the world participated in the first symposium, which focused on the theme of "Creating Sustainable Society."

EXPO 2005 International Forums are held monthly at the Expo as a means of broadcasting messages from Aichi to the world. The results of the symposiums will be broadcast worldwide in September of this year. The monthly symposiums, which also feature special programs such as concerts and workshops, are being conducted under the overall supervision of Shosaburo Kimura, a professor emeritus at the University of Tokyo who also served as executive producer of the Expo 2005.

NGO and Citizen's Participation

NGO Global Village

Civic Pavilion

Kaisho Plaza

Citizen Participation Event

Volunteer Activity

NGO Global Village

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Teams of a Japanese NPO/NGOs and foreign partners participated in the NGO Global Village. The theme was “Learning for Sustainability,” and a total of 30 teams took part, five teams in various fields each month.

The BIE Convention has no express provision for official participation by NPOs/NGOs in expositions. Expo 2005 was the first time that such bodies systematically took part in an exposition as autonomous participating entities. They did so as participants for EXPO 2005 Association Programs.

The NGO Global Village was conceived and executed very much as a “pavilion for dialogue,” utilizing to the full the respective characteristics of the NPOs/NGOs involved. By making it not simply an exhibition area but a place where visitors and staff can hold workshops and discussions to gain a deeper understanding of the theme, we were able to promote the concept of “Nature’s Wisdom” to many visitors in a way not seen in other pavilions or in previous expositions.

One example is the message of peace to the “Yellow Butterfly” organized by the Japan Campaign to Ban Landmines. Visitors’ participation in this exceeded our expectations, with over 10,000 people adding their thoughts to the message. Public participation has developed outside the bounds of the Exposition in both time and space: there are plans for a “Second NGO Global Village” to be created, after the Exposition has closed in a location outside the exposition grounds, by the Okazaki Takumi no Kai, the Whole Earth Research Institute, and other organizations.

Civic Pavilion

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Description of the project

The Civic Pavilion in the Seto Area is a stage where exhibitions created from the viewpoint of ordinary citizens on the theme of "Nature's Wisdom" can be presented.

There were 235 Japanese and foreign project applications that were accepted, all of them planned and executed by ordinary people. Dialogue-type events were held designed to promote understanding for citizens' voluntary activities and environmental activities. Their exhibits and workshops were of a kind that only ordinary citizens would think of—practical in nature and open to public participation. In these projects people can experience "Nature's Wisdom" from the point of view of ordinary persons.

Specific results

Over 200 persons involved in citizens' voluntary and environmental activities took part as guests in a "talk event".
A daily average of over 6,000 people visited the pavilion, and by actually taking part in talk events and workshops gained a greater understanding for such voluntary activities.

New activities and activities receiving an impetus from the Exposition

At the initiative of some Japanese young people, collection of street children's paintings and poems was undertaken in the Philippines, Cambodia, Rwanda, Mexico, Paraguay, Zambia, and Bangladesh in collaboration with NGOs in these countries. It is planned to produce a charity calendar using these materials.

Mr. Kato of Aichi Welfare Workshop (Fukushi Kobo Aichi) lost four fingers at he age of 56 when his right hand was caught in a machine. He made a prosthetic device for himself and then started making prosthetic and other aids for disabled people. He took part in the Exposition as an exhibitor and was able to meet with and give encouragement to many disabled people. He has also received many requests for various kinds of aids. The workshop's activities now extend to overseas by way of NGOs providing aid for artificial limbs, etc.

Saori is a distinctive Japanese hand-woven fabric. Workshops on the *saori* technique were held throughout the Expo period at the NPO Saori Plaza to promote this traditional art. The number of participants in these workshops was in excess of 20,000. The target was to weave 2005 meters of *saori* cloth. This also was exceeded and the looms are still working even now. At the same time the *saori* weavers are continuing to support poor children in Thailand and the ripples of this support are spreading in ever increasing circles.

Kaisho Plaza

August 12, 2005

Peace Ring 2005: everyone joining hands in a ring of peace

On the night of August 8 visitors to the Exposition and staff formed a great human ring on the 2.6 kilometer Global Loop of the Nagakute Area to send out a message of world peace from the NGO Global Village and the Expo 2005 as a whole.

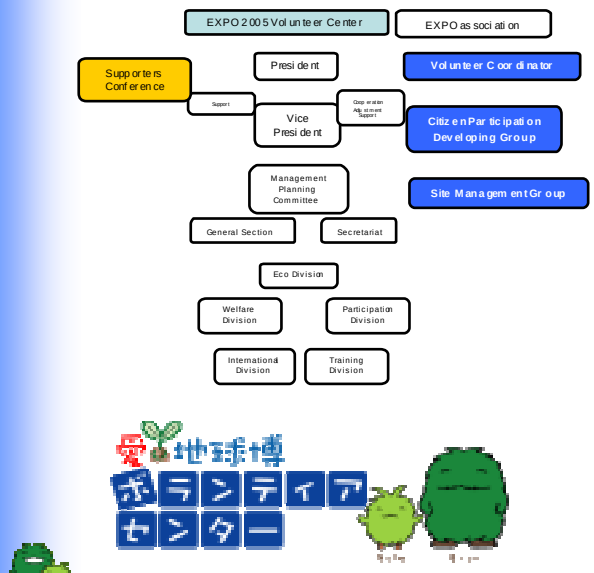
About 200 girl scouts helped distribute green baton lights to participants. The Global Loop was metamorphosed into a ring of light, with everyone joining hands in a common prayer for world peace.

The staff of the pavilions dressed in their national costumes and attendants in their uniforms also took part in the ring. Everyone had a common thought in their hearts.

Unfortunately, one section of the participants did not receive the signal to start, which resulted in a gap in the ring. Yet it seems that there were also places where people formed a small ring on their own initiative, cementing friendship through song.

The idea of the NGO Global Village was to seek world peace and heart-to-heart contact. Following the terrorist bombings that took place in London on July 7, some people taking part in the village asked themselves whether Expo 2005 as a whole could not do something to contribute to world peace. They came up with the idea of the Peace Ring as a way of making August 8 ("8/8" or "double infinity" [∞/∞]) a day to be celebrated as a symbolic of the desire for infinite world peace.

Volunteer Activity



The Expo 2005 Volunteer Center was set up on December 10, 2002, by 29 people including representatives of citizens' volunteer groups and experts in various fields. Hans-Jurgen Marx, President of Nanzan University, is chairman of the Center.

During the course of the Exposition, a total of 100,000 volunteers (some 30,000 of them registered) have been serving visitors in a spirit of service and hospitality in various ways:

(1)Guiding visitors

Guiding visitors to pavilions, restaurants, service facilities, etc. so that they have an enjoyable visit.

(2)Assistance for the elderly, people with disabilities, and visitors accompanied by young children

Providing support in various ways so everyone can enjoy their visit without exception.

(3)Assistance for lost children

Providing badges for young children separated from their parents and generally looking after them.

(4)Information service in foreign languages and sign language

Volunteers use their respective skills to provide information and guide foreign visitors and those with hearing problems around the exposition.

(5)Promoting clean grounds and advising on separating different categories of waste

Explaining about the different waste categories to visitors in order to promote the "3 Rs" ("reduce, reuse, recycle").

(6) Kids' Eco Tours

Volunteers act as guides for children's tours around the buildings and facilities in the exposition grounds that incorporate special consideration for the environment.