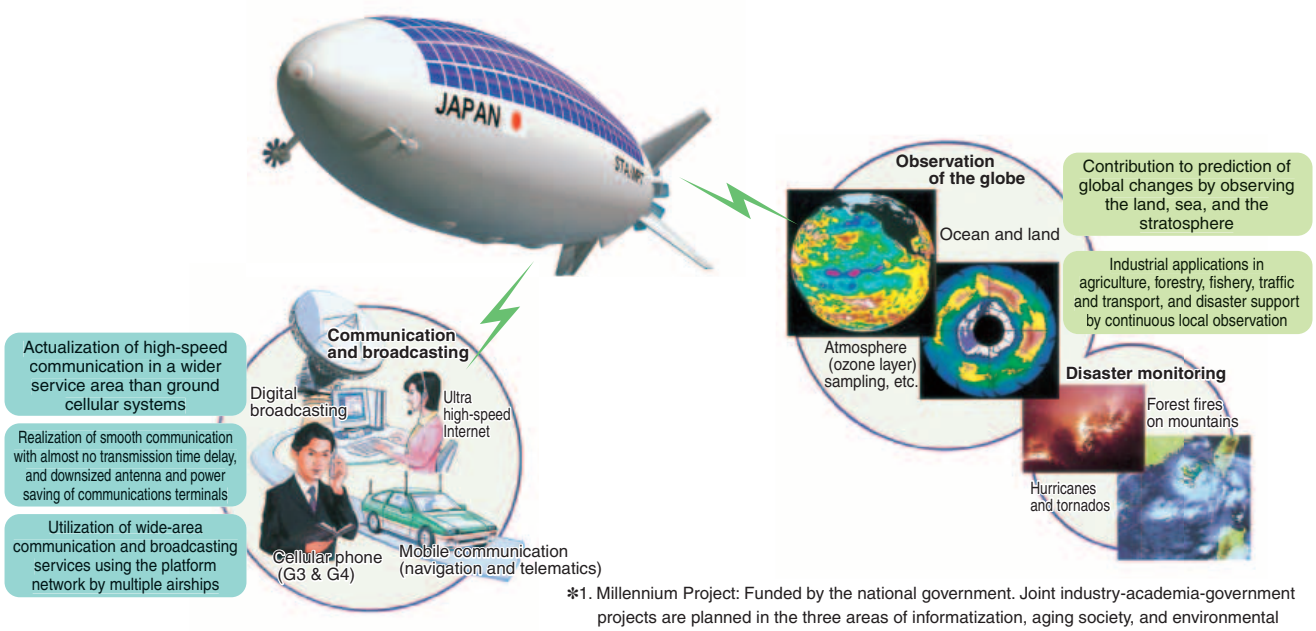
Development Phase/Products —Aerospace, Industrial Products and Eco Technologies Companies—

Aerospace Company

The Aerospace Company has been contributing with a remarkable participation in the national government Millennium Project*1 in Japan, mostly on the meteorological issue of the greenhouse effect, which may cause global warming. We are now developing two unmanned prototype airships to utilize stratospheric platform technology. In the future, the goal of the stratospheric airship is to realize broad applications of telecommunications, broadcasting, and remote sensing observations. The Stratospheric Platform Airship is expected to have a very long geostationary flight duration at an altitude of 20 km by benefiting from the stable, calm winds and sunshine.

Currently, we are going ahead with the design and manufacturing stage for two prototypes of the airship (48-meter, non-powered, balloon-like, high-altitude, flight-testing model and a 68-meter unmanned reusable low-attitude model) under a contract with the National Aerospace Laboratory of Japan. In future production models, which will follow these prototype airships, we will install high efficiency solar and fuel cells for pollution-free power sources, which are mandatory for a long stay in the stratosphere.

It is anticipated that a new type of service business using undeveloped traffic-free airspace in the stratosphere will grow quickly and broadly in areas useful to the public and commercial market. In the information and communications area, advanced information services for next-generation cellular phones, digital high definition television broadcasting, and telematics are strongly expected to develop as new businesses. In the area of global observation, the Stratospheric Platform Airship will enable long, continuous observation in support of rescue/restoration/reconstruction projects by its wide coverage area for serious disasters, as well as monitoring and surveys of land, sea, and atmospheric pollution. After one of the stratospheric airship production models enters service, it will cover an area with a radius of more than 100 km using next generation remote sensing and observation for high resolution and accuracy.

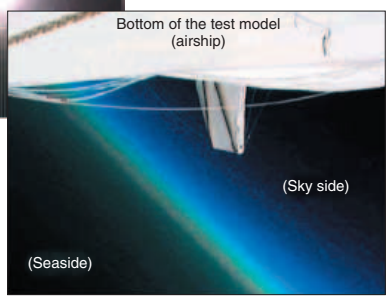


*1. Millennium Project: Funded by the national government. Joint industry-academia-government projects are planned in the three areas of informatization, aging society, and environmental measures, which are very important and urgent to the Japanese economy and society so as to cope with current issues and to keep current with technological innovation that creates new industries.

Flight Test of 48-Meter Model

In August 2003, a flight test of the 48-meter, non-powered, balloon-like, high-altitude flight-testing model was conducted at Hitachi Seaport in Ibaragi Prefecture. Although the test flight had been postponed due to bad weather, it was clear with a mild wind on that day. Under the best conditions, the test model flew stably in accordance with the anticipated simulation: launch (at 3:21 a.m.), climb, stay (reached altitude: about 16.4 km), descend, and land on the water (at 5:15 a.m.). We accomplished a significant goal by checking the performance of the model and the validity of the simulation.

Launching



The horizon was photographed from the stratosphere by a camera mounted on the airship model.

Completed Assembly of the 68-Meter Model

At the end of March 2004, assembly of the 68-meter unmanned reusable low-altitude model, which started in April 2003, was completed. Outside the hangar, the verification test was implemented to check the statistical floating characteristics of the manufactured ship. It floated stably at an altitude of about 12 m during the 10-minute test.

From April to the middle of May 2004, the system functions of the equipment mounted on the ship were tested for verification. After the test linked with the tracking control system in June, the test flight will start in July. We will repeat communication and broadcasting experiments with this test ship during its stationary flight at an altitude of 4 km. We aim to establish the design, manufacture, and operation technologies required for development of the stratosphere platform airship in the future.

Note: Regarding the operational concept of the 68-meter unmanned reusable low-attitude model, see p. 22 of the 2003 Environmental Report.

68-meter model coming out of the hangar
(The front truck is called a mast car)

Floating function verification test

Industrial Products Company

Industrial Products Company produces multipurpose engines. These engines are used in machines that support our life such as construction and agricultural machinery for infrastructures, leisure-related equipment for a more fulfilling life, snow removal equipment, and engine equipped generators for harsh environments. In our brand application equipment, a new series of generators were launched in November 2003.

Main Activities to Reduce Environmental Impacts

Reduction of Environmental Impacts

We promote reduction of environmental impact substances, such as lead and hexavalent chromium, used for multipurpose engines and application equipment. We adopt substitutes such as trivalent chromium for plating and unleaded paint.

Cleaner Exhaust Gas and Improved Fuel Economy in Multipurpose Engines

In fiscal 2003, we produced the following results.

- Fuel economy : Improved 9% compared to 1995
- Exhaust gas : Reduced 38% compared to 1995

The EU will apply new emission standards from August 2004. We have already started production of the EX and other engine series, which had been authorized under the new standards, from January 2004 in sequence.

New Type of Inverter Generator Series

The new inverter generator series is available in six models (SGi14, SGi25, SGi25S, SGi28, SGi28SE and SGi38SE) from 1.35 kVA to 3.8 kVA depending on the purposes. Particularly, the frame type soundproof generator (SGi25s, SGi28SE and SGi38SE), which is equipped with an OHC engine, is light and compact with low noise. It satisfies the requirements from professional users. All of the models conform to the US EPA and CARB exhaust emission standards, as well as the EU exhaust emission standards. In addition, its low noise design meets Stage II of the EU noise standards.

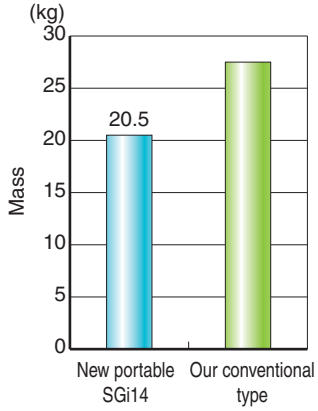
Portable generator (SGi14)

Frame type soundproof generator (SGi28SE)

Light and Compact Design

New type of compact, portable generator (SGi14) equipped with a multipolar generating system is designed for weight reduction. In addition to that, resin is used for the cover and the inverter unit is thoroughly downsized. As a result, its weight is drastically reduced, actualizing a dry weight of 20.5 kg, which is a 25% reduction from the existing generator of the same class.

Weight reduction

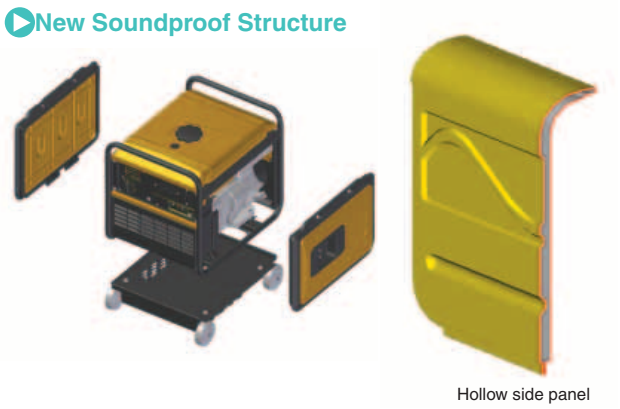


Low Noise and Good Fuel Economy

The frame-type soundproof power generator actualizes high soundproofing by a two-layer structure with hollow side panels, as well as low noise and good fuel economy by mounting the auto power saving system to all models. For smooth recycling, disassembly is facilitated and resin parts indicate their material signs.

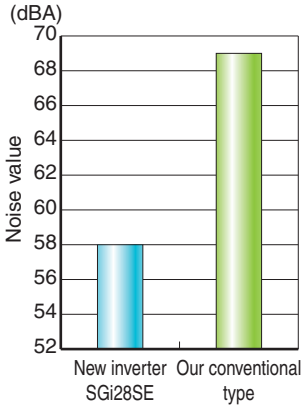
Resin part that indicates its material sign

New Soundproof Structure

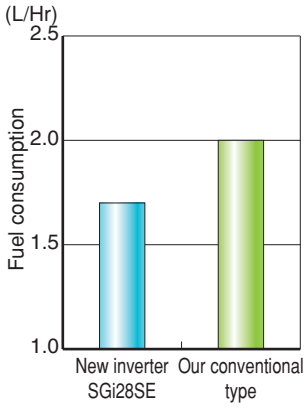


Hollow side panel

Noise in Rated Operation



Fuel Consumption in Rated Operation



Development of Products that Contribute to Recycling-Oriented Society

Refuse Collection Vehicle with a Large Sorting Box (LP200)

We have developed a refuse collection vehicle with a large sorting box (LP200) to cope with areal refuse recycling operations, which have been remarkably promoted. In this vehicle, a large sorting box is arranged at the rear part of the cab. The vehicle efficiently recovers recyclable refuse when garbage is collected.

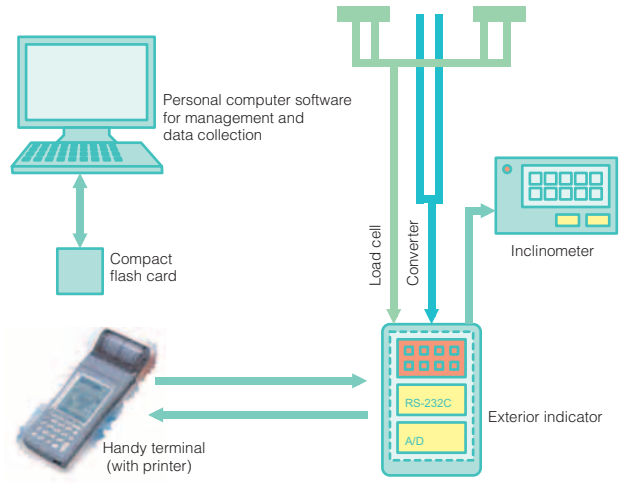
Refuse collection vehicle with a large sorting box (LP200)

Body Weighing System for Refuse Collection Vehicles

Reduction (reuse and recycling) of waste is becoming more and more important in society. Under the circumstances, we developed the body weighing system for refuse collection vehicles that enables efficient measurement of a collected waste load, the issue of slips, and an interface with a personal computer for management and data collection. Under the system, the weight of individual refuse loaded into the vehicle is indicated on the spot, as well as the total weight of the loaded refuse.

Refuse collection vehicle equipped with a body weighing system

Body Weighing System for Refuse Collection Vehicles



Eco Technologies Company

Eco Technologies Company deals with a variety of products that contribute to creating comfortable living environments and a resource recycling society, including a refuse sorting system (intermediate treatment) and the recent refuse disposal system for skyscrapers, as well as various vehicles and equipment for waste collection, transport, and recycling. Handling the wind turbine generator systems to produce clean energy, Eco Technologies Company contributes to conservation of the global environment with its ecological products.

Action Program for Recycling of Commercial Vehicle Body Components

To meet the requirements of the Law on Recycling End-of-Life Vehicles to be enforced in January 1, 2005, we have proceeded with voluntary measures for recycling of body components of refuse collection vehicles. As a part of the Action Program on Recycling of Commercial Vehicle Body Components led by the Japan Auto Body Industries Association Inc., we implement the following.

- Establishment of the guideline for 3R criteria and their release on the Web site
- Preparation of the disassembly manual and its release on the Web site
- Indication of the manufacturer on the body
- Indication of the parts using resin of 100 g or more on the body (attachment of the "material indication plate")

In addition, the environmental standard compliance label issued by the Association is affixed on the rear part of the body. (Started with vehicles shipped from April 1, 2004)

"Material indication plate" attached to the refuse collection vehicle

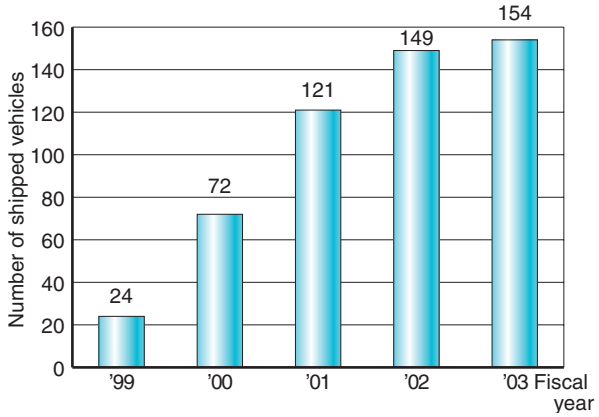
Stamping no. (Different according to each vehicle)

Environmental standard compliance label (attached to the rear part of the body)

CNG Refuse Collection Vehicles

The number of shipped CNG refuse collection vehicles that use compressed natural gas (CNG) as their fuel for clean emissions is increasing year by year.

CNG Refuse Collection Vehicles Adopted



Wind Turbine Generator Systems

Subaru 40 kW Wind Turbine Generator System

Wind power generation contributes to the reduction of CO_2 by using natural energy. Having state-of-the-art technologies, it is also friendly to the environment: easy to install, easy to start at a low wind velocity, and low in noise. Because of these characteristics, it is used by local governments and research institutions for enlightenment, study and monuments.

We are improving products for further environmental conservation by reducing the use of GFRP, a material difficult to recycle, with the weight reduction of the nacell cover*1 (about 110 kg per unit).

*1. Nacell cover: Fairing (cover to smooth the form for reduction of air resistance) to mainly store and protect the generator and its auxiliary equipment.

Achievements in Fiscal 2003 (40 kW)

	Customer	Location
1	Nosegawa Village, Nara Prefecture	Tsuruhime Park, Nosegawa Village
2	Iwaki City, Fukushima Prefecture	Iwaki Municipal Flower Center
3	Ashikaga Institute of Technology	Campus of Ashikaga Institute of Technology (Ashikaga City, Tochigi Prefecture)

Nosegawa Village

Iwaki City

Ashikaga Institute of Technology

Subaru 100 kW Wind Turbine Generator System

FHI started mass production of the 100 kW wind turbine generator systems developed under a research contract with NEDO as a system for isolated islands in its New Sunshine Plan. We are tackling weight reduction of the parts and enhancement of safety and operability by reviewing the prototype specifications and improving design based on the know-how obtained through the 40 kW wind turbine generator system. (Actual installation starts in fiscal 2004 and thereafter.)

Exhibitions

We participated in the New Environment Exposition 2003 (in September in Osaka) and the NEDO achievement exhibitions (in October in Osaka and in November in Tokyo) to have our wind turbine generator systems become well known to the public. We also advocated the value of wind power by attending the academic conferences and events as a panelist.

Giving a lecture on the environment and wind power generation at the outside seminar