

◆ Ecology Network

About ecology networks

An ecology network is an environmental information-sharing system that uses multimedia communications technologies to cope with global environmental problems.

In addition to general environmental information acquired through various sensors, the ecology network collects information on industrial waste and domestic recycling, which is then stored in regional ecology centers and accumulated into databases. This information is then made available to the public to help their environmental conservation actions. Our environmental information is also used for environmental education and academic and other research. We believe that the cooperation between government, industry, and private citizens will help realize a zero-emissions (*1) society – a society based on efficient resource use and minimal environmental loads, and that the ecology network would serve for that purpose.

The IWATE-UNU-NTT environmental network joint project

Inaugurated in September 1998, the IWATE-UNU-NTT environmental network joint project – a cooperation involving Iwate Prefecture, the United Nations University, and NTT – will promote research and development in the ecology network.

This project will monitor the water quality of the Mabechi River, which flows through the northern Iwate Prefecture. It will also involve environmental monitoring for acid rain, carbon dioxide, nitrogen dioxide, and suspended particulate matter (*2), as well as the potential applications and evaluation of the monitored information.

The joint project information is available at:

(URL: <http://ecology.mcon.ne.jp>)

*1 Zero-emissions

A concept supported by the United Nations University for use of waste products from one industry as raw materials in another, to reduce wasteful uses of resources and environmental loads, with the ultimate goal of realizing a society capable of recirculating its resources.

*2 Suspended particulate matters

These minute airborne particles, which damage lungs and tracheae when present for extended periods in high concentrations, are monitored at various sites around the country.

◆ Environmental monitoring/sensing technologies

Since fiscal 1991, NTT <holding company> has engaged in research and development on environmental monitoring technologies for water and air.

In addition to serve for drinking, agricultural, and industrial purposes, surface water such as river, lake, and pond is essential to ecosystems that embrace countless flora and fauna. Preserving such ecosystems must involve continuous monitoring of their conditions. We have started research and development on water-quality sensing network systems that are linked to visual equipment such as cameras, and water-quality sensor modules capable of being operated remotely. The network systems have already undergone field experiments at the Shimanto and Mabechi rivers, and are even scheduled to be marketed from the end of fiscal 1999.

In July 1996, NTT <holding company> initiated research and development on equipment capable of easy measurement of airborne nitrogen dioxide concentrations. This equipment is now scheduled to be available by December 1999. Conventional equipment that measures nitrogen dioxide concentrations has been relationally large and expensive. The equipment developed by NTT is small, light, and inexpensive, enabling easy transportation and installation, and is better-suited to local or spot measurement of nitrogen dioxide than the conventional equipment. This hardware is also capable of remote measurement through telephone networks and of simultaneous measurements at multiple locations.

◆ *Participation in research on flight paths of migratory birds with ultra-small position transmitter*

At the request of the Wild Bird Society of Japan and BirdLife International, we have developed and provided ultra-small position transmitter to help detect migratory birds. We need to ensure their breeding and intermediary migration spots in order to protect the migratory birds. The wintering sites have been studied and are well-known, but information on other sites is so far largely unknown.

Since migratory birds travel long distances, we adopted a satellite-based location detecting system to track their flight paths. Called ARGOS (Automated Research and Global Observation Satellite), this system was originally developed jointly by the U.S. and France to collect information on the global environment.

By incorporating our wireless and materials technologies into ARGOS, NTT Group had by 1990 reduced the weight of a

transmitter (Argosat) from 150 g to 40 g, then to 25 g by 1992, and finally to 15 g in 1997. Weighing only one-tenth of the initial model, Argosat currently holds the world record for lightweight transmitters.

These transmitters have made it possible for researchers to track the flight paths of large migratory birds, such as cranes and whistling swans, and comparatively smaller birds, such as the black-faced spoonbill and Australian curlew.

In 1991, the Department of the Interior of the U.S. presented the NTT Group with the Wildlife Stewardship Award in recognition of achievements in a research project involving migratory birds within the U.S. NTT was the first Japanese organization, and indeed, the first private company in the world, to receive this honor.

◆ *Automated Meteorological Data Acquisition System (AMeDAS™)*

Since February 1993, NTT Data has provided a regional meteorological observation system that automatically acquires environmental data from 1,300 observation stations across the country 24 hours a day and 365 days a year, including data on precipitation, wind direction, wind velocity, temperature, degree of sunshine and snowfall. Every hour, this system automatically transmits the data to a center through telephone lines, then processed and transmitted to the Japan Meteorological Agency. Called AMeDAS*, this system provides quick and accurate assessment of constantly changing weather patterns through a world-leading fine-grid observation network.

The meteorological data collected through AMeDAS is widely used by the Meteorological Agency, local governments, and media. AMeDAS plays an important role in providing us with crucial information, such as on meteorological disasters.

*** AMeDAS is a registered trademark of NTT Data.**

◆ *Ecological survey of albatrosses*

As a part of the environmental conservation efforts, NTT DoCoMo (Mobile Communications Network) has participated in research to prevent the extinction of albatrosses on Tori island, Izu Archipelago. The image transmission capabilities, made possible by mobile communications services, enabled a remote

surveillance system that links the 600 km lying between the island and a mainland laboratory. In the future, we plan to introduce a Mobile View capable of providing clearer images.

◆ *Meteorological survey experiments at the Shiragami mountains, a World Heritage site*

In the Shiragami Mountains in the Tohoku region – designated a World Heritage site for its rich natural environment – NTT DoCoMo has taken part in an academic meteorological research. NTT contribute to the project by providing observation systems, which is capable of operating in heavy snowfall without external power supplies.

Equipped with satellite portable phones, cordless phones, image transmission cameras, and PCs, the unmanned observation system are to operate over a very long period– even decades –through continuous upgrading of equipment.

◆ *An information processing system for greenhouse gases at the Japan Meteorological Agency*

Global levels of greenhouse gases such as carbon dioxide (CO₂) and methane (CH₄) continue to increase. An accurate assessment of their status is essential to forecasting future meteorological changes. It is also very important for taking appropriate actions against global warming. NTT Data administers greenhouse gases data provided by the World Data Center for Greenhouse Gases, the World Meteorological Organization (WMO). Since March 1997, NTT has made this

data available to the relevant organisations as "the Meteorological Agency Information Processing System for Greenhouse Gases". This system enables statistical processing and visual display of accumulated data for evaluations, analyses, and distribution of information on global warming.

◆ *A regional air pollution monitoring system*

As of the end of 1997, local governments throughout the country started to operate 2,135 fixed-point observation stations for the legally prescribed air pollutants such as nitrogen oxides and sulfur dioxide. They are directly harmful to human health, and the potentially dangerous by e.g forming photochemical smog. These substances require continual monitoring.

These stations constantly monitor the condition of pollutants, providing data that is sent to central surveillance centers, where it is statistically processed. Carrying out this process requires the wide deployment of information communications networks.

Some 40 air pollution surveillance systems of this kind are currently at work around the country. Since 1995, the Saitama Branch of NTT East has provided assistance to improve the prefectural system.

By connecting 50 unmanned monitoring stations in the prefecture and the central surveillance station with a ISDN link,

NTT enabled the rapid collection and accurate assessment of the data. Some external pollution data is provided by other prefectures and the final information is displayed on maps to allow pollution conditions to be monitored and forecasted.

When smog incidents occur, warning messages are issued through broadcast fax messages to municipal offices, schools, and residences, while an automatic response system provides necessary information. Twelve warnings were issued in fiscal 1998, and the availability of the right information is recognised to contribute to minimizing potential risks of the smog incidents.

In addition to regulatory uses, this kind of data can be incorporated into multimedia technology to serve for environmental learning and education activities.

Recently, the NTT Group has provided similar assistance to Nagasaki, Mie, Akita, and Aomori prefectures, in addition to Saitama Prefecture.

◆ *Telecommuting (Tele-work)*

Information technology are now beginning to affect not just industrial activity, but individual lifestyles. Unlike conventional work arrangements, in which many people go to work at one location, telecommuting takes advantage of information technologies such e-mail and groupware, in some cases providing even greater productivity compared to traditional communication tools such as the telephone and fax.

The commuting time saved can be used for leisure or recreation, enhancing our quality of life. Although this orientation is eventually expected to take hold in Japan, the new work style has been slow to win the general acceptance, largely due to

reservations on virtual work environments, data security concerns, and an established work culture that emphasizes person-to-person encounters.

To make telecommuting a reality, the NTT Group is promoting information-intensive home environments and corporate information systems with ISDN and optical fiber network services, as well as teleconference and information security technologies. NTT is working toward a computer-based information society in which both employees and companies can benefit.

◆ *Multimedia services, including teleconferencing, etc.*

Multimedia services, such as teleconferences, add visual information to audio information. And it could make our communications more expensive. Ordinary conferences require a host to prepare a site, and the invitees to physically travel to the conference hall. Using multimedia services, resources such as electricity and fuel required for travel (as well as the energy

expenditures required to the host) can be saved. Since no automobiles are required, levels of air pollution will be inevitably reduced. In the conference itself, use of electronic images enable a paperless working environment, conserving paper resources.

◆ *Promoting environmental information-sharing through the Internet: Web site "Kankyo (environmental) goo"*

NTT-X operates the environmental information WWW site "Kankyo (environmental) goo." As environmental conservation efforts intensify in the 21st century, the demand for efficient retrieval of environmental information will rise accordingly. In response, NTT-X has developed sophisticated environmental information query/retrieval services that offer state-of-the-art capabilities.

In addition to information query/retrieval services, the site provides environmental news and information on environmental

books and events. It also offers further information services, including links to other major environmental databases, as well as a glossary of key words. This site attracts more than 800,000 hits per month. Its e-mail information service has more than 14,000 subscribers.

(URL: <http://eco.wnn.or.jp>)

◆ *Electronic commerce*

Electronic commerce in Japan is expected to exceed the ¥7 trillion by 2003. The expansion of the network-based trading will contribute to environmental conservation in terms of paper conservation, protection of the ozone layer, and promoting recycling.

The average number of invoices sent to a household or a company exceeds 130 annually. Providing this information over the Internet could result in significant paper savings. Sending a direct mail on the Internet could also result in significant resource savings, with increased effectiveness.

Exchanging large amounts of data such as engineering drawings and high-resolution photos can now be performed across networks, rather than relying on physical transportation, conserving energy and reducing pollution.

These information services provides some examples of what the NTT Group is doing in partnership with various industry groups.

◆ *Intelligent Transport System (ITS)*

NTT supports a system that provides real-time traffic and other useful information, such as available parking and location of gas stations, through cordless telephone networks to car navigation systems. This system is also capable of automatically reporting the location of an accident to an emergency center. Called the Intelligent Transport System (ITS), the system is designed to realize a safe and smooth traffic environment.

We have also developed simulators to realize the best driving conditions through communications technologies for evaluation and research on various ITS services.