SHIMADZU

INNOVATION

SHIMADZU GROUP 130th

SHIMADZU INFORMATIONAL FORUM

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No.37

Shaping the Future with Science and Technology

–130 Years of Shimadzu Innovation–

Challenges in Our 130th Year

Committed to "Contributing to Society through Science and Technology" in a manner that meets today's evolving needs, Shimadzu continues to take on new challenges.

Hidetoshi Yajima *Chairman, Shimadzu Corporation*

Shimadzu's roots extend all the way back to 1875, just after the Meiji Restoration, when the company was founded in Kiyamachi, Kyoto.

Japan's opening itself to the West brought in a flood of science and technology from overseas. The government, seeking to make science the cornerstone of the country's economy, set up a number of academic institutions to support and promote industry. Genzo Shimadzu, one of many Japanese youths consumed with a passion for science, set about manufacturing instruments for use in physics and chemistry laboratories.

Fortunately for Genzo, near his workshop there were a group of foreign lecturers who had been invited to Japan to teach engineering. Under their tutelage, Genzo gained a wealth of knowledge in science and technology as he manufactured the instruments they requested.

This knowledge served as the background for a number of later inventions by Genzo. He didn't even bother to apply for patents on products he invented; he simply provided them to high schools and universities out of a sincere desire to support education in the sciences throughout the country.

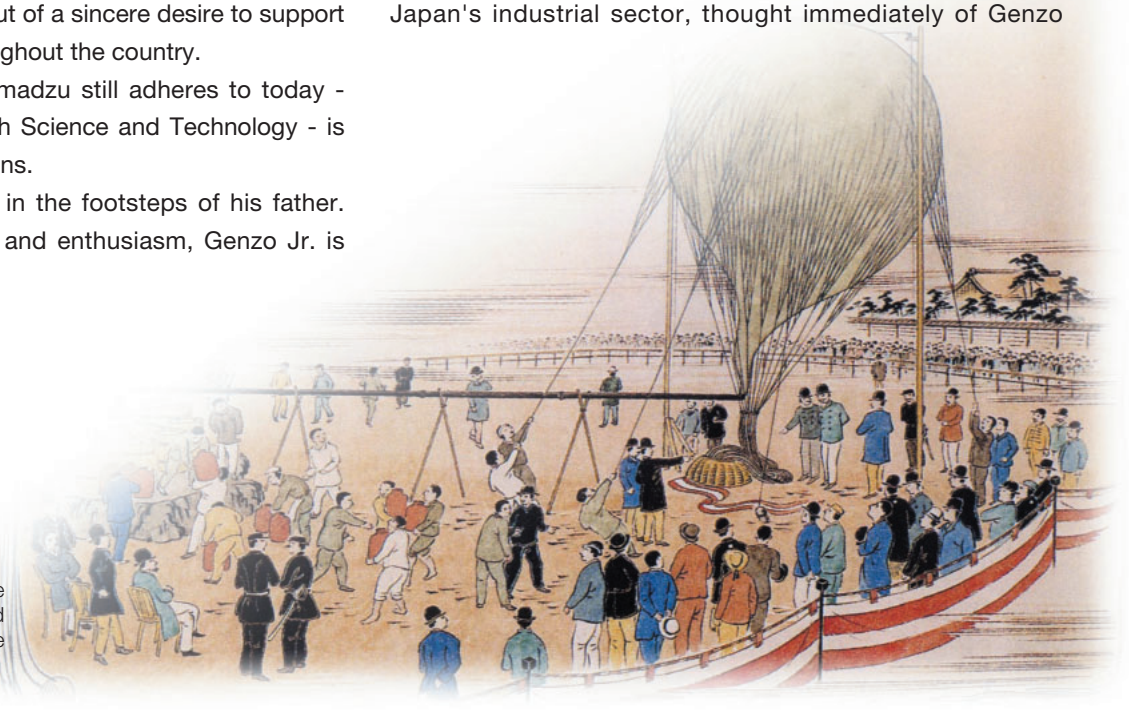
The corporate philosophy Shimadzu still adheres to today - Contributing to Society through Science and Technology - is rooted in Genzo's selfless actions.

Genzo Shimadzu Jr. followed in the footsteps of his father. Blessed with the same talent and enthusiasm, Genzo Jr. is credited with a number of developments, including induction machines, lead storage batteries and X-ray apparatus. For these accomplishments, Genzo was named one of Japan's top ten inventors of the Showa Era and invited to dine with the emperor. It was telling that each of the other nine top inventors had PhD degrees, leaving Genzo as the only one whose roots were planted firmly in industry.

Since these early years, Shimadzu as a company has continued to develop state-of-the-art analytical and medical products, systems and technologies. Many of these were the first of their kind in Japan, and some were first in the world - paving the way for Japan's continued industrial and academic development.

The company's continued dedication to breaking new ground led to a dramatic achievement in 2002, when staff researcher Koichi Tanaka was awarded the Nobel Prize in Chemistry.

I'm sure I'm not the only one who, when considering that Mr. Tanaka was the first Nobel laureate ever to come from Japan's industrial sector, thought immediately of Genzo



In 1877, Genzo Shimadzu Sr. became the first person in Japan to build and fly a manned hydrogen balloon. The balloon rose 36 meters into the air.

Hidetoshi Yajima

Shimadzu Jr., one of Japan's top ten inventors.
After the war, Japan embarked on a period of rapid economic growth that led to its becoming one of the world's science and technology superpowers. We owe a deep debt of gratitude to our forefathers for the hard work that made this possible.
As a member of this historic company, I take immense pride in knowing that for some 130 years, Shimadzu has made a significant contribution to our society by developing high-quality instruments that meet the most advanced research needs.

At the time I was named president, in an effort to keep the company moving forward in the face of increasing globalization and advances in information technology, our company's management chose to follow a course of strategically selecting and focusing its business activities. We also knew we would have to compete in the global arena to continue making progress. And to compete effectively, we needed to redesign the company, making it leaner and more streamlined.
Fortunately, the reform programs we have undertaken have proven to be a success. One after another, we have introduced innovative products that were well received in the global marketplace, and our business performance has soared.
The mass spectrometer developed by Koichi Tanaka is now an essential tool at state-of-the-art life-science laboratories. I'm sure that this instrument will help researchers make continued progress in drug discoveries and disease diagnosis, leading to new products that help people everywhere enjoy longer, healthier lives.
Also, our fully digital X-ray system, with its superior image quality and ease of use, is helping to revolutionize practices at medical institutions.
Our film coating systems help increase the power-generating efficiency of solar batteries. Once these systems are popularized, we believe they will be part of the solution to global warming.
Shimadzu has developed more new products, systems and technologies than I have time to mention here. Even as I speak, new pace-setting instruments and systems are being developed and commercialized at Shimadzu laboratories.
The enterprising, pioneering spirit of company founder Genzo Shimadzu and the creativity, imagination and determination of Genzo Shimadzu Jr. live on in the employees of Shimadzu Group companies. We'll do our best to reflect these same qualities in the work we do today and to pass them on to the generations that follow, so that Shimadzu will forever remain a company that boldly and energetically tackles the challenges of the future.

Genzo Shimadzu

Born in Kyoto in 1839, the second son of Seibei Shimadzu, a maker of Buddhist altars. At age 35, Genzo dedicated himself to elevating the study of science in Japan. He left the family business and opened a workshop in Kyoto's Kiyamachi-Nijo area for manufacturing instruments used in physics and chemistry laboratories.

Genzo Shimadzu Jr.

Born in Kyoto in 1869. At age 25, Genzo Jr. became head of the family when his father suddenly passed away. He developed a succession of new products over the course of his career, leading to his being honored as one of the top ten inventors in Japan.

Shaping the Future Step by Step Becoming a Truly Global Company

Backed by inquisitive minds and a venture business spirit, Shimadzu is helping to shape important fields in the 21st century. Holding onto its proud traditions, the company continues to forge ahead in this era of transformation.

For 130 years now, Shimadzu has created a steady stream of highly innovative products. Today, it is evolving into a truly global corporation as it implements sweeping management reforms to strengthen itself and its activities. What have these 130 years meant to Shimadzu? What course will it take in the future? These are some of the questions we put to Shimadzu President Shigehiko Hattori.

Driving Industrial Progress

Interviewer: *Shimadzu Corporation reached its 130th anniversary this year, since its founding in the early years of Japan's Meiji Era (1868–1912). What kind of company was it back then?*

Hattori: Shimadzu started as a manufacturer of scientific instruments. We still have a product catalog from the middle of the Meiji Era, called the "Science Equipment Catalog List" that contains mainly scales, electric power

generators, and instruments for conducting physics and chemistry experiments in elementary and middle schools. Later, Shimadzu produced Japan's first X-ray machine.

Interviewer: *It's surprising that the company was able to recognize the importance of science in that day and age, and that it had the foresight to start a business based on technology. Do you still see this kind of pioneering spirit at Shimadzu?*

Hattori: Yes, our company has been blessed with a number of pioneers. Of course, Koichi Tanaka, who received the 2002 Nobel Prize in Chemistry, is one of them. Our history shows consistent contributions to science and technology. That's what led to our reputation for technical expertise.

Unfortunately, though, not many of our products are used directly by consumers, so we're not as well known by the general public as we might be. Many of our customers are researchers or doctors, and our role is to support their work. Our analytical instruments let them see material structures that can't be viewed with the naked eye, and our X-ray equipment lets them see inside the human body.

In the same way, we support industries like steel, which used to be a Japanese specialty and, of course, automobiles. Without measuring instruments to determine the quality and strength of their materials, these industries wouldn't be able to manufacture their components. We develop measuring instruments together with our customers to promote development in their industries. We take great pride in this.

Nobel Prize, Japan's Confidence Builder

Interviewer: *Mr. Tanaka's Nobel Prize was the first to be received by a person involved in Japanese industry, and had a substantial impact. What was it like for the company?*

Hattori: Oh, it was huge. Just imagine having a colleague who works right next to you receive one of the world's highest honors. People were saying things like, "You mean *our* Tanaka received the Nobel Prize?" It gave an enormous amount of self-confidence to everyone.

Interviewer: *I'd say it boosted the confidence of Japanese industry too. After all, it came at a time when Japan, which had been a few steps ahead in the area of technology,*

was suddenly being overtaken by the U.S. and Europe, and countries like China were rising quickly. It seemed like Japanese corporations were losing confidence.

Hattori: That's one of the things I'm happiest about. Craftsmanship is a steadfast Japanese tradition, but the country's extended recession weakened our ability to support the drive for new technology. I think the Nobel Prize helped us to recognize its importance once again.

Shigehiko Hattori

Continuous Innovation

Interviewer: *Research & Development outlays are generally said to be about 5% of total sales for most companies. What is it at Shimadzu?*

Hattori: It's about 8% on a non-consolidated basis. I think this is higher than most companies. Of course, our basic stance is to produce a diverse range of products in small lots, so our R&D budget has to be about that level. If we simply did the same thing as everyone else, we'd never be a winner on a global scale. We have to keep innovating. For the same reason, we can't afford to reduce our investment in R&D. The breakdown, though, is gradually changing. In the past, about 70% of our researchers were engaged in what we call "seeds-oriented" basic research. This kind of research doesn't lead directly to new products, but may be beneficial some day in the future. Mr. Tanaka's research was also in this area, and it brought forth such wonderful results we'll naturally continue along that path. Still, faced with today's intense competition, we have to think about our ongoing sales as well. As a result, our "needs-oriented" research currently accounts for 60% of the total, and our seeds-oriented research stands at 40%. This balance is something we'll have to keep adjusting long into the future.

Development that Starts with a Catalog

Interviewer: *It sounds like it's vital that you combine your technological capabilities to generate sales and profit.*

Hattori: In the past, there was a strong tendency to make whatever our engineers wanted to make. The engineers thought they knew exactly what our customers wanted. I was an engineer, so I know how they feel, but that kind of thinking is incorrect. Customers want more than just better performance. They want things like, for example, larger switches that are easier to use and displays that are easier to see. These little enhancements are very important. And only the people who actually use the products know what's necessary.

For this reason, it's essential that we collaborate with our customers. To do this, our first job was to revamp our in-house systems. Now, when we start developing a new product, our salespeople join in right from the beginning because they know what the customer wants. Then we create a catalog that clearly identifies the selling points. This lets us develop products that truly make our customers happy, while requiring less time and money.

Interviewer: *That's an interesting approach. Does it work well?*

Hattori: It's been a year and a half since we revamped the system, and it's starting to work very well indeed. Eventually, I hope to reach an operating income of 10%. With this in mind, we're basing our next medium-term management plan, which began this in April, on the need to restructure both our production and our sales and service. On top of that, we'll be actively accelerating globalization, concentrating on growth businesses, and continuing to obtain advanced technologies.

Revolutionizing Preventive Medicine

Interviewer: *When you talk about concentrating on growth businesses, what kind of businesses do you mean?*

Hattori: Well, for example, life science. The life science market is undergoing

rapid growth right now, particularly in the area of protein analysis. In the near future, drug discovery, clinical diagnosis, and medical therapies based on protein analysis will all come to the fore. Our mass spectrometry technology is top-notch worldwide and we want to use this as a basis to supply systems that support researchers working on the cutting edge of life science. We may also enter the area of clinical laboratory testing.

Something of prime importance here is a technology called molecular imaging. As we enter the postgenomic era, we're seeing the clarification of numerous biological molecules and genomic sequences. To speed up the early detection of diseases, many people have high expectations for technologies that will allow us to directly monitor the proteins within tissues and cells. This calls for instruments that actually let us see the workings of the body on a molecular level. In other words, we need instruments that can show us which molecules interact, at what exact time and location, and in what way.

Fortunately, Shimadzu is in an excellent position to develop molecular imaging by combining our medical technologies, such as positron emission tomography (PET), our analytical and measuring technologies, such as microscopes and mass spectrometers, and our life science technologies.

Interviewer: *And you're also a pioneer in X-ray devices.*

Hattori: Yes, that's right. In the medical field, our fully digital X-ray diagnosis system, which uses a direct-conversion type flat panel detector (FPD), has been well received in Japan and is now being introduced to the global market. We're also the only PET manufacturer in Japan. The most important feature of this device is its preventive capability. It can reveal early-stage cancer, before it begins to grow. At that stage, it can often be treated with pharmaceuticals alone.

The importance of preventive medicine is widely recognized today. Our clinical analysis instruments cover a broad spectrum in this area, with genetic, protein, and PET instruments to monitor functional changes, and X-ray devices to monitor morphological changes. By combining these elements together in a system, we'll be able to make major contributions to preventive medicine.

New Steps Toward a Healthier Planet

Interviewer: *I understand you're also active in the environmental field.*

Hattori: Yes, that's an area in which we're applying some newly obtained technologies. Our original approach in the environmental field was to market analytical instruments for measuring air and water pollution. Of course, these sales are important, but our current activities are aimed at taking us a step further into the field.

You could say that we were originally monitoring things considered harmful to people and to the planet and then sounding an alarm to halt the damage. Now, we're expanding our efforts to make things cleaner by restoring the environment. One example is soil remediation. Until now, soil that was contaminated with heavy metals could only be taken somewhere and disposed of. There was also machinery for cleansing it, but the process was extremely expensive. To solve this problem, Shimadzu has introduced a method of inserting electrodes into the soil and eliminating heavy metals by the action of ionization.

We're also developing technology that can lead directly to the prevention of global warming by capturing carbon dioxide from the air, separating the carbon from the oxygen, and then solidifying the carbon. The business scale is not very large in the environmental field, but these activities fulfill our management principle, "Realizing Our Wishes for the Well-being of Mankind and the

Earth." For this reason, we will continue to work aggressively in this area as we move forward.

Globalization = Localization

Interviewer: *What would you say is your global strategy?*

Hattori: Right now we're putting our main efforts into the U.S. and the rest of North America, Europe, China, and Southeast Asia. The Chinese market, of course, is huge and continues to grow. We're aggressively expanding our business in analytical and measuring instruments, medical instruments, and semiconductor production instruments. The U.S. influence, however is also very large. Many companies around the world want to use the same measuring instruments that are being used in U.S. labs. This makes it very important for us to be successful in the U.S. market.

Our international and domestic sales ratio is currently 3:7, with 3 being international, however, we want to raise this to 5:5 within ten years. The Japanese market is a large one, representing 1/7 of the world market, but this also shows that we still have plenty of room to grow.

Of course, this won't be easy. We can't do it by simply carrying on with business as usual. That's why one of the main points in our next medium-term plan is to work toward becoming a top brand worldwide.

Interviewer: *What specific strategies do you have in mind?*

Hattori: I think globalization is largely localization. By that I mean, making things locally. Until now, the business model for most Japanese corporations has been to develop and manufacture products in Japan, and then export them to other countries. This might have been acceptable up to now, but things have changed. Today you have to closely match your development, production, sales promotion, and support systems to each country. This is the only way you can offer products that are well received all over the world.

Employee training is the most important point in this process. With this in mind, we're encouraging our young employees to gain experience by working overseas. Of course, we also can't depend on Japanese employees alone. It's vital that our future sales, planning, and eventually development be done by the people of each country.

So, at the same time, we're actively transplanting the Japanese tradition of craftsmanship to our overseas centers. The old idea that you can always profit by simply holding on to core technologies is unraveling. We need to move quickly to build systems that will lead us to coexistence and mutual prosperity.

Shimadzu Corporation - Steeped in Tradition

Hattori: In our 130 year history, we have never once changed our company name. We might appear to be old-fashioned in some respects, but we have been blessed with a tradition of a venture business spirit. Our founder, Genzo Shimadzu, originally launched the business during the stormy period of Japan's Meiji Restoration. After that second-generation Genzo Shimadzu created a host of inventions and split the company into functional units during the 1910's. As you can see, our ancestors had a fierce enthusiasm for their work. Today, we're doing everything we can to reignite this tradition in our employees. My greatest hope is that we'll find a number of present-day Genzo Shimadzus among us.

Shigehiko Hattori
President & Chief Executive Officer
Shimadzu Corporation

Born in 1941, Mr. Hattori entered Shimadzu Corporation in 1964. He was appointed President of Shimadzu Scientific Instruments in 1989 while working in the U.S. He became a Director of Shimadzu Corporation in 1993, then assumed the post of Managing Director in 1997. Mr. Hattori has served as President and CEO since 2003.

Forging Ahead Hand-in-Hand with 130 Years of Shimadzu Innovation

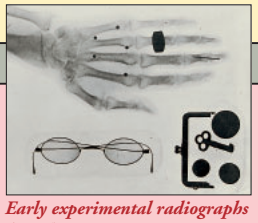
Begun in 1867, the Meiji Restoration brought waves of modernization to Japan. Shimadzu Corporation was founded seven years later, and the history of Shimadzu has closely followed the development of modern industry in Japan. When the Japanese government introduced the latest technology and equipment from the West in a bid to promote industrial development, Shimadzu manufactured a variety of physics and chemistry instruments, supporting the spread of science and technology throughout the country. Later, when the mining and steel industries began to flourish in Japan, Shimadzu's spectrographs were in great demand for quality inspections. And Shimadzu magnetic and X-ray inspection systems became a common sight on production lines for inspecting both machine parts and assembled electrical appliances.
Innovative offerings from Shimadzu continued after WWII

	Japan / World Events		Scenes in Shimadzu
Dawn of Industrial Japan	1868	Meiji period begins	
	1876	Bell invents the telephone	
	1879	Edison invents the incandescent lamp	
	1889	Paris International Exposition	
	1895	Roentgen discovers X-rays	
	1898	Curies discover radium	
	1907	Japan's first gasoline car manufactured	
	1914	WWI breaks out	
Era of Industrial Growth	1915	Einstein announces the general theory of relativity	
	1918	WWI ends	
	1925	Radio broadcasts start in Japan	
	1929	The Great Depression	
	1937	World's first TV broadcast	
	1939	WWII breaks out	
	1945	WWII ends	
Era of Rapid Economic Growth	1953	Japan's first TV broadcast	
	1956	"The postwar period is over," states Japan's economic white paper	
	1964	Maiden flight of domestically-developed propeller plane YS-11 Shinkansen (bullet train) service starts	
	1969	Apollo 11 lunar landing	
	1970	Osaka International Exposition	
	1971	The Environment Agency of Japan established	
	1973	First oil crisis	
Era of Maturity	1981	First Space Shuttle flight	
	1986	US Department of Energy launches Human Genome Project	
	1990	Reunification of East and West Germany	
	1992	UN Convention on Environment and Development	
	1994	Internet reaches Japan	
	1995	Great Hanshin-Awaji Earthquake	
	1997	Kyoto Protocol adopted at COP3 in Kyoto	
	2000	Human genome analysis complete	
	2004	Indian Ocean Earthquake	
	2005	Kyoto Protocol comes into effect	

Industrial Development

as well: gas chromatographs for the then-emerging petrochemical industry; liquid chromatographs for the pharmaceutical and biotechnology industries; and air and water pollution monitoring equipment, as environmental issues began to catch public attention. Shimadzu has provided a steady stream of products to help burgeoning industries assure the quality of their products, often placing itself in a position to lead that industry's development. On the medical front, Shimadzu has developed state-of-the-art medical systems, including diagnostic X-ray systems, and PET (positron emission tomography) and CT scanners.
Today, Shimadzu is still very much on the move, working hard to provide better health for future generations of mankind.

Shimadzu Products



Early experimental radiographs (1896)

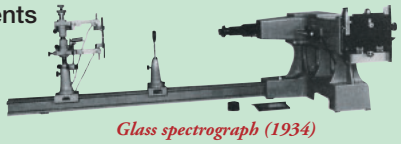
1875 Established and starts manufacture/sale of physics and chemistry instruments
1877 Succeeds in Japan's first manned balloon flight
1896 Succeeds in taking radiographs

Medical X-ray apparatus "Diana" (1918)

1909 Builds Japan's first medical X-ray apparatus

Industrial X-ray apparatus "WELTES"

1915 Starts manufacture of optical measurement instruments



Glass spectrograph (1934)

1929 Develops Japan's first industrial CO_2 gas recorder
1933 Starts manufacture of industrial X-ray apparatus "WELTES"
1934 Develops Japan's first glass spectrograph

First commercial electron microscope (1947)

1947 Starts manufacture of electron microscope

Direct reading balance "DODIC" (1950)

1950 Starts manufacture of Japan's first direct reading balance
1952 Develops the world's first photoelectric spectrophotometer

1956 Develops Japan's first gas chromatograph
1957 Starts manufacture of air-conditioning systems for jet airplanes
1961 Develops the world's first remote-controlled X-ray fluoroscopy system

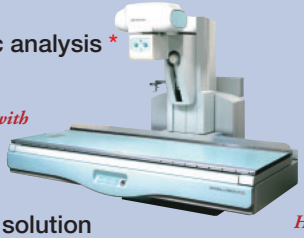
General-use gas chromatograph GC-1A (1957)

1966 Starts manufacture flue gas analyzer
1967 Starts manufacture of TOC water quality analyzer

World's first remote controlled fluoroscopy system (1961)

1973 Starts manufacture of liquid chromatograph

1985 Discovers soft desorption ionization methods for mass spectrometric analysis *



X-ray diagnostic system with direct conversion FPD

High-performance liquid chromatograph "Prominence"

2000 Focus starts on life science, semiconductor/FPD, and environmental solution businesses
2001 MALDI mass spectrometer AXIMA Series launched
2002 Koichi Tanaka awarded Nobel Prize in Chemistry for his achievement in 1985 *
2003 Starts manufacture of world's first X-ray diagnostic system equipped with direct conversion flat panel detector (FPD)

Laser ionization quadruple ion trap time-of-flight mass spectrometer "AXIMA-QIT"

* *Awarded the Nobel Prize in Chemistry for the development of soft desorption ionization methods for mass spectrometric analyses of biological macromolecules.*

Origins of the Shimadzu Spirit

The Founder's Spirit

In March, 1875, Genzo Shimadzu began manufacturing scientific instruments in a small house just 6.4 meters wide in the Kiyamachi-Nijo district of central Kyoto. He had just founded Shimadzu Corporation, at the age of 36.

Scientific Instrument Pioneer

Genzo Shimadzu began his business based on a strong conviction that Japan, a country with few natural resources, should work towards becoming a leader in science. He wanted to contribute to Japan by spreading scientific knowledge. To that end, he was determined to try his luck at manufacturing the kind of educational scientific instruments that had earlier stimulated his own inquisitive mind. In the beginning, of course, there were no orders pouring in and simply keeping the business alive was extremely difficult. As Japanese culture became increasingly enlightened, however, strong calls were made for the dissemination of scientific knowledge. According to a description of Japan's educational system that was distributed in 1872, considerable time was to be allotted to natural science subjects, and teachers were to "combine their teaching with practical experiments." In reality, however, most classes simply involved memorizing what the teacher said. As a result, at the time he launched his business, Genzo Shimadzu's work consisted mainly of visiting the Kyoto Prefectural Physics and Chemistry Research Institute to repair imported instruments and to manufacture apparatus for use in experiments.

Kyoto Prefectural Physics and Chemistry Research Institute

In August 1877, Japan's 1st National Industrial Promotion Fair was held in Tokyo to encourage industrial development. Genzo exhibited a cylindrical medical instrument, called a bougie, that was made of tin and was used to dilate a tubular passage of the body, such as the esophagus. He received a certificate of honorable mention, which enhanced the standing of his products and improved his prospects at a time when he was desperately struggling to stay in business.

A Successful Manned Balloon Flight

In the early summer of 1877, a department head in the Kyoto Educational Affairs Office named Sennosuke Harada brought the idea of launching a hydrogen balloon to Genzo. Genzo was asked to manufacture the balloon as part of a project to heighten people's interest in scientific education. In addition to having no knowledge of balloon manufacture, he was only given a few months to complete it. Genzo didn't know where to start, but knowing that it would promote scientific knowledge, he was determined to succeed and accepted the job.

After a period of trial and error, he finally created a balloon with a special silk fabric that was coated with rubber that had been melted in oil. He then filled the balloon with hydrogen that he generated from a reaction of metal scraps and sulfuric acid. On December 6, at a festival called Shokonsai, the balloon rose from a plaza inside Kyoto's Sento Imperial Palace. The general admission for this big event was the equivalent of a few pennies, and the palace grounds were packed with 50,000 spectators.

The manned balloon rose about 36 meters off the ground and was a huge success. Genzo's entrepreneurial spirit, which was fueled by the idea of contributing to society by disseminating scientific knowledge, together with the balloon, rose to new heights.

Disseminating Scientific Knowledge

Evacuation apparatus

The family business finally became busier in 1881 and Genzo expanded his factory. At the 2nd National Industrial Promotion Fair in April of that year, he exhibited a variety of products, including a still apparatus, a ventilator, a Magdenburg hemisphere, a test tube for falling body experiments, and an Atwood's machine. Fortunately the still apparatus received second prize and in the following year, 1882, business had developed sufficiently to publish a product catalog, called the "Science Equipment Catalog List," with a total of 110 products for use in the field of physics. This catalog, considered to be the first scientific instrument catalog in Japan, contained all of the instruments required at the time for scientific education in Japan's elementary and middle schools. In addition to physics instruments that covered five subjects (physical properties and dynamic and still solid objects, water and the atmosphere, sound, heat and light, and magnetism and electricity), there were also a number of molds, chemical apparatus, medical instruments, and various pumps and metal casting products. This amply demonstrates the diverse range of products that Genzo was able to manufacture.

Genzo Shimadzu's abilities as a scientific instrument manufacturer and his extensive knowledge and technical skills came to be highly regarded. He was even invited to teach in the metalworking department of the Kyoto Prefectural Normal School.

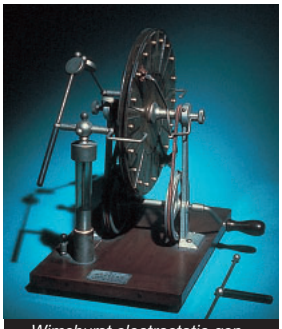
The Torch Is Passed to Genzo Shimadzu Jr.

When Genzo Shimadzu passed away suddenly from a stroke on December 8, 1894 at the age of 55, the business that he founded 20 years earlier in his tiny house had grown to cover his entire neighborhood.

His eldest son, Umejiro, who took the name of Genzo Shimadzu Jr., followed in his father's footsteps and became owner of the company at the age of 26. In addition to taking over as head of the family, Genzo Jr. inherited his father's enthusiasm for manufacturing scientific instruments and worked together with his younger brothers Genkichi and Tsunesaburo to develop the family business into a true corporation. He also ventured into a number of new fields, creating the basic framework for today's Shimadzu Group. In many respects, his talents exceeded even those of his father.

Genzo Jr. had previously displayed a hint of this talent in 1884, when he was only 16 years old and still named Umejiro. At the time, an important teaching tool for science education was a small desktop friction generator that was used to demonstrate power generation. The Holtz friction generator was commonly used for this, however, in 1883, England's James Wimshurst had successfully produced an induction electrostatic generator that performed better. Umejiro, who read about this in a book, sat down and built a Wimshurst machine on his own, using a diagram as a model. This electrostatic generator amazed people by discharging sparks up to 20 centimeters in length. Records show that the following year, when the generator was exhibited at the Kyoto Exhibition, the minister of education, Arinori Mori, was astonished by Umejiro's talent. He found it difficult to believe that such a machine could be built by a 16 year old and strongly encouraged Umejiro to continue his studies. The machine was nicknamed "Shimadzu Electricity" and was subsequently used in science classes for many years to perform static electricity experiments.

In 1887, at the age of 19, Umejiro took over for his father by teaching in the metalworking department of the Kyoto Prefectural Normal School. He continued to teach science for over five years while also tending to company business. In May of 1895, the year after he assumed leadership of the company, he established a department for scientific specimens, such as anatomical models of humans, and animal, plant, and mineral specimens. The specimens department opened up totally new areas of business for the company. In response to orders from schools and other organizations it produced a variety of specimens and models, including human skeletons and the taxidermy of rare birds and animals .



Wimshurst electrostatic generator made by Genzo Jr.

The Successful Radiograph

During this same period, Shimadzu enjoyed another groundbreaking event: early success in X-ray photography.

On November 8, 1895, Professor Roentgen of the University of Wurzburg in Germany discovered what he called X-rays, which were introduced as "a new type of radiation" in the university's academic journal on physics and medicine. Early in the following year, research on X-rays began in Japan. One of these researchers was Professor Hanichi Muraoka of the Daisan Senior High School in Kyoto (predecessor of Kyoto

University). However, because of the difficulty of conducting these experiments with only the school's equipment, Professor Muraoka asked for Shimadzu's help, which had sufficient power supply facilities. The experiments were conducted by Professor Muraoka and his assistant Sosuke Kasuya, together with Genzo Jr. and his brother Genkichi.

The early stages of these experiments were fraught with failure. Then one day, Genzo used a Wimshurst electrostatic generator equipped with an improved 1-meter-diameter glass rotor plate and hung the vacuum tube from the ceiling. He placed a photographic plate in its frame, then put a wooden box containing a silver coin on top of the photographic plate and turned on the generator. About 30 minutes later, a faint X-ray image appeared on the plate. The group had successfully taken a radiograph. That was on October 10, 1896, just 11 months after Professor Roentgen's X-ray discovery.

Through this research, Genzo gained considerable knowledge and skills in the manufacture of X-ray machines and began to make improvements to the induction coil. In 1897, he produced and started marketing an X-ray machine for educational use. The sale of an X-ray machine that could be used to perform actual experiments was an epoch-making event for the academic community.

Japan's First Medical X-ray Machine Developed

When large-capacity electrical current became available in cities in the early 1900s, practical X-ray machine use became prossible and machines for medical use imported from Europe and the U.S. began to reach Japan. X-ray machines were gaining acceptance at some of Japan's advanced hospitals and Shimadzu immediately began R&D on medical X-ray machines.

In September 1909, Shimadzu completed a large-scale, direct-current X-ray machine with a Wehnelt interrupter induction coil. The power source consisted of a storage battery that was charged by generating DC current with a motor generator operated by a benzine motor. Delivered to the Chiba Kokufudai Eisei Hospital, this was the first medical X-ray machine produced in Japan.

In 1911, Shimadzu delivered an induction-coil X-ray machine to Ohtsu Hospital, which was operated by the Japan Red Cross. This machine used a rectifier to convert alternating current to direct current, which served as the power supply. This was the first domestically produced, large-scale medical X-ray machine using alternating current. Since that time, Shimadzu has advanced steadily in its efforts as a pioneer of medical X-ray machines in Japan.

Genzo Shimadzu Jr. continued his activities as industrialist and inventor until his death at the age of 82 on October 3, 1951, eventually registering patents for 178 inventions in twelve countries.

Medical X-ray machine delivered to Ohtsu Hospital

Genzo Shimadzu Honored as a Great Inventor

In addition to medical X-ray machines, Genzo Shimadzu was particularly enthusiastic about his storage battery inventions. A typical example is a device that he developed to produce reactive lead powder, the main material used in storage batteries. A stable supply of good-quality, low-cost lead powder is essential for producing storage batteries, and Genzo took up the development of this new production method himself. After considerable trial and error, he devised a method of placing lead pellets in a drum, rotating it to produce powder and then removing the powder together with the air, thus cheaply producing large quantities of lead powder. Also, the lead suboxide that resulted from this method reacts easily with oxygen, making it an ideal storage battery material in terms of both properties and cost. This method later found applications in other fields as well, including the production of glass for optical uses and a variety of coating materials. Patents were granted for the method both in Japan and overseas.

In recognition of his achievements, in 1930 Genzo Shimadzu was designated one of the top ten inventors in Japan, an honor bestowed on him at a dinner party given by the emperor on December 11 of the same year.

Genzo Shimadzu (Front row, far left)

SHAPING THE FUTURE

SHIMADZU GROUP 130th

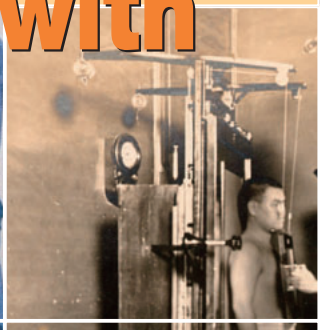
Shimadzu Technologies Shape the Future

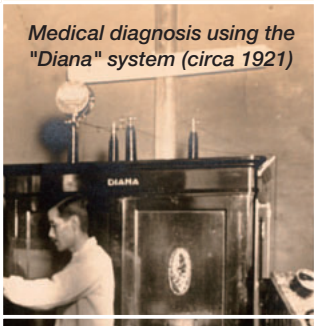
During the 130 years of our history, Shimadzu Corporation has been bolstered by three main pillars of business: the Medical Systems Division, the Analytical & Measuring Instruments Division, and the Aircraft Equipment Division.
Today, Shimadzu also focuses on life science, environmental solutions, and semiconductors/flat panel detectors (FPDs) as new fields of business.
We continue to add exciting new chapters to our history.

Medical Systems Division

Advancing in Step with Diagnostic X-Ray Systems

Shaping the Future





Medical diagnosis using the "Diana" system (circa 1921)

High-Resolution Digital X-ray Images and Easy Operation

Direct Conversion FPD X-ray Systems

X-ray systems are one of Shimadzu's specialties. In the history of X-ray imaging equipment, spanning more than 100 years, Shimadzu has developed an impressive number of new products. Many of these were industry firsts, both for Japan and the world, and supported important medical advances. Today, Shimadzu is combining the latest digital and X-ray technologies to create a new generation of innovations.

Tomographic Images that Stunned the World

The Radiological Society of North America hosted a conference in Chicago in November 2004. The venue drew almost 50,000 visitors, and the Shimadzu booth was constantly crowded. The display showed slice images of a human body captured by a new X-ray system. Unlike conventional cross-sectional images obtained with a CT scanner, they were continuous longitudinal cross-sectional images. In fact, they were so groundbreaking that they stunned many of the doctors who had come to the conference from around the world.

Another surprising fact is that the system needs to take only one exposure to obtain these images. This advanced imaging operation was made possible by the direct conversion flat panel detector (FPD) developed by Shimadzu. The system obtains high-resolution images of the inside of the body, and uses its unique ability to digitally reconstruct images to focus on any desired depth. The system then saves the

Hidefumi Suzuki,
Senior R&D Manager, Research and Development Department, Medical Systems Division

resulting image data.

"This system performs tasks that no other machine in the world can. The new applications made possible by the system are bringing about breakthroughs in medicine," explained Hidefumi Suzuki, Senior R&D Manager.

Tremendous Brand Image

Shimadzu supplies X-ray systems for a variety of medical applications, together with cutting-edge diagnostic and examination systems, including PET and CT scanners. Medical system sales account for roughly 20% of Shimadzu's business. Shimadzu medical systems provide essential functions for the early discovery of medical problems and the prompt administration of precise treatments.

Among these medical products, X-ray systems are special for Shimadzu.

Mr. Suzuki recalls, "When I entered the company, Shimadzu X-ray systems already had a solid brand image. They were known for their high-precision, high-quality imaging performance and superb reliability, which was reflected in many years of dependable operation. Many radiologists and doctors have told me that they hope to have a Shimadzu system someday."

This level of user confidence was created thanks to Shimadzu's long history of involvement in X-ray system development.

In 1895, soon after Dr. Roentgen discovered the X-ray, Shimadzu was asked to cooperate in an X-ray experiment. The request came from Professor Hanichi Muraoka at Daisan Senior High School. (Daisan Senior High School later merged with Kyoto University.) Earlier, when Professor Muraoka was in Germany, he studied directly under Dr. Roentgen. When Professor Muraoka heard that Dr. Roentgen had discovered the X-ray, he immediately began his own research. However, Disan Senior High School did not have an adequate power supply at the time to perform full-fledged experiments. This led Professor Muraoka to look to Shimadzu, which was delivering physics and chemistry instruments to the school and had power supply equipment. Using today's jargon, this was an early form of industrial-academic collaboration.

Keiichi Fujii,
R&D Manager, Research and Development Department, Medical Systems Division

Genzo Shimadzu Jr., who was in charge of the family company at the time, was very enthusiastic about the offer and immediately began development. Ultimately, Shimadzu succeeded in taking radiographs only eleven months after Dr. Roentgen discovered the X-ray. Since then, Shimadzu has continued to develop state-of-the-art X-ray systems and peripheral equipment, carving out a leading role in the market.

In 1909, Shimadzu developed Japan's first medical X-ray system and delivered it to the Chiba Kokufudai Eisei Hospital. The second system was delivered in 1911 to Ohtsu Hospital, operated by the Japan Red Cross. Then, in 1918 the company developed the "Diana" X-ray system, which used an AC transformer in place of the conventional induction coil. This product enjoyed phenomenal sales and was

Outline of the Shimadzu Medical Systems Division

Main products:

Diagnostic X-ray systems
PET systems
CT scanners
Diagnostic ultrasound systems
Systems related to medical treatment and surgical operations
Near-infrared imaging equipment
Medical information systems

Overview:

In 1896, the Division succeeded in taking radiographs for the first time in Japan. In 1911, it introduced a medical X-ray imaging system. Since then, the Division has continued to develop a steady stream of advanced diagnostic imaging systems, including X-ray systems, PET systems and peripheral devices, each of which contributes to the early discovery of abnormalities and improves recovery rates.

also exported overseas.
Later, in 1961, Shimadzu commercialized the world's first remote-controlled X-ray TV system. This system contributed to the early discovery of stomach cancer. Recently, Shimadzu developed a mobile X-ray system that is able to take radiographic images at a patient's bedside. This product has also earned widespread acclaim overseas. These groundbreaking products have established Shimadzu as a leading manufacturer of X-ray systems.

Recovering Lost Ground

In the 1990s, however, Shimadzu's X-ray business slowed. The dip was caused by a growing number of cases in which products that the company thought would meet clinical needs were not exactly what doctors and other medical specialists wanted.
"Although people working in medical services were seeking X-ray systems that were easy to use and compact, we focused our development efforts on improving image sharpness and making equipment more solid. We were probably a bit overconfident about the products we produced," Mr. Suzuki reflected.
Shimadzu also faced another challenge in developing new X-ray system devices. The radiological imaging market started to shift towards "full digitalization" by replacing the conventional film and image intensifier tube (similar to a classic vacuum tube) with newly developed devices. Digital images are not only easier to manage, but also they can be instantly viewed for quick diagnosis, and transferred over a data network, helping to eliminate differences in the level of services available to outlying communities. The newly developed flat panel detector (FPD) maximizes these digital advantages. X-ray system manufacturers are now working to develop the FPD in order to gain a leading position in the emerging digital X-ray market.

Goro Hirata,
Assistant Manager, Research & Development Department, Medical Systems Division

Shimadzu began developing the FPD for digital X-ray applications in 1995. Currently, there are two distinct FPD systems: direct conversion and indirect conversion. The indirect conversion system uses a fluorescent screen (scintillator) to receive X-rays that have penetrated a patient's body, converts them to light, and then changes the light to an electric signal using photodiodes. Because this system was created by combining conventional technologies, it is relatively easy to develop an indirect conversion X-ray system. Many of our competitors have opted to develop this type of system.

Meeting the Challenge for New Technology

Shimadzu, on the other hand, adopted the direct conversion system, which converts X-ray signals directly to electric signals and uses an amorphous selenium (a-Se) screen, which reacts with X-rays. Since digital image processing is simpler, it provides much clearer images than the indirect conversion system. It also makes it possible to reduce the radiation dose. Although the direct conversion system was widely believed to be theoretically possible, it was not easy to develop the amorphous selenium screen, which was an essential part of the system.
Shimadzu was confident of its ability to develop digital X-ray systems using an indirect conversion FPD that would offer a level of quality as high as that of any other manufacturer. However, while other companies were introducing products one after another based on the indirect conversion method, Shimadzu was examining carefully what was truly needed by medical professionals. As a result, it embarked on the challenge of developing a direct conversion system.
"The history of Shimadzu Corporation and its founder Genzo Shimadzu is one of innovative technology. Through relentless effort, Shimadzu has achieved what had been thought to be impossible. This kind of don't-give-up attitude has made Shimadzu what it is today," explains Mr. Suzuki.
Needless to say, it was no easy task. "We were able to display images, but they had so much noise we didn't know where to start. It was brain racking," says Keiichi Fujii, R&D Manager.
A prototype was finally produced, then discarded, a process that was repeated over and over. Meanwhile, other companies who chose the indirect conversion system released FPD-equipped X-ray systems, and those systems gradually spread throughout the market. In 2002, when Shimadzu began feeling the pressure mount, the development staff reported that a satisfactory panel had at last been developed. The precision of the images taken by the newly-developed panel was not only better than that of the indirect conversion

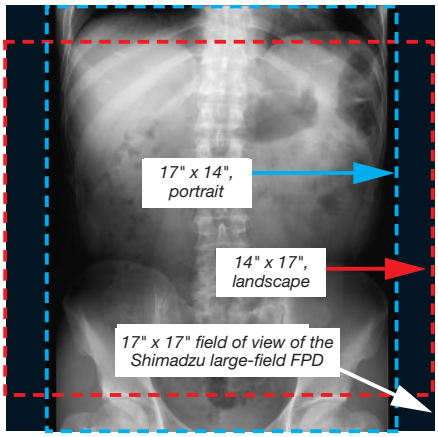
method, it was actually superior to that of conventional silver halide film in both still images and in each frame of moving images. At the time, silver halide film was considered to provide the best possible quality.

"Exceeding the sharpness and sensitivity of film with a digital system has been a long-cherished dream for many engineers," said Mr. Suzuki. Mr. Fujii added, "There were countless difficulties to overcome before completing the system, but our development has expanded the possibilities of diagnostic imaging systems."

Aiming to be the World's No. 1 X-ray System Manufacturer

In the spring of 2003, Shimadzu launched the DIGITEX Safire cardiac and vascular X-ray system featuring a 9-inch (9 x 9-inch) direct conversion FPD. This system provided higher resolution images than anyone had ever seen and had a major impact on the market. In autumn 2004, Shimadzu released a new version with an expanded imaging range of 17 inches (17 x 17 inches). This expanded the field of view beyond that offered by film. As soon as the product hit the market, inquiries poured in from all over Japan, and soon production could not keep pace with demand.

Next, Shimadzu introduced the Sonialvision Safire digital table system, a product that has the potential to change the style of conventional diagnosis, since it enables observation of the entire esophagus, without moving the viewing area. This system's wide field of view can also be used for effective functional diagnosis, and its large 17 x 17-inch imaging area can be applied to ordinary abdomen and DIP (drip infusion pyelography) radiography. Shimadzu's product line also includes the RADIOTEX Safire general radiographic vertical X-ray system, designed for general radiographic applications such as bone fracture examinations. This system not only offers superb image quality and reduced radiation dosages, but also is equipped with an X-ray tube that moves in coordination with the stand, an LCD touch panel that is easy to operate and see, and many other convenient features and functions.



The 17-inch FPD is large enough to cover any region that can be captured on a maximum-size film. While maintaining extremely high 150-μm resolution, Shimadzu's X-ray system achieves a large viewing field of 17 x 17 inches. It provides distortion-free, ultrahigh-resolution images of large body areas for abdomen observation and orthopedic examination.

"There was a time when we didn't conduct sufficient market surveys, and delivered products to customers without closely checking whether they offered the easiest possible operation. Naturally, customers weren't satisfied with products that were still rough around the edges. Realizing this, we began to conduct extensive studies and tests to create easy-to-use products," reflects Goro Hirata, Assistant Manager.

Shimadzu is now striving to become the world's top X-ray system manufacturer.

"We've achieved the world's highest level of quality. Now, we plan to improve our applications and strengthen our support system to gain the top market share worldwide. And there's nothing better than knowing that our products are helping to improve people's health around the world," explains Mr. Suzuki.

Who knows? The day Shimadzu becomes No. 1 may not be so far away.

17-inch Direct Conversion FPD X-Ray System

New Digital Table System
Sonialvision Safire

Sonialvision Safire allows the observation of an entire esophagus without moving the viewing area. This wide field of view can be effectively used in functional diagnosis. The 17 x 17-inch field of view allows ordinary abdomen radiography and DIP imaging. As such, Sonialvision Safire has the potential to change the style of conventional medical diagnosis.

General Radiographic X-Ray System
RADIOTEX Safire

RADIOTEX Safire combines superb image quality and reduced radiation dosages with a variety of easy-to-use and convenient features and functions, such as an X-ray tube that moves in coordination with the stand and an LCD touch-panel that is easy to operate and see.

Non-Destructive Inspection Machines

Using X-Rays to Keep an Eye on Quality

Industrial X-Ray Television System
SMX-160LT

Capable of inspecting the internal structure of industrial products without damaging them, non-destructive inspection machines are an essential part of the industrial product quality improvement process. Shimadzu utilizes its X-ray technologies to develop X-ray inspection systems for the industrial market.

The SMX-160LT Micro-Focus X-Ray TV System boasts top-level precision and a 0.4-micron resolution

Shimadzu is Japan's top brand in industrial X-ray inspection machines, with a market share of over 20%.

"When I went to an electric equipment manufacturer to repair a machine we had delivered, the customer said, 'We count on you because your products support the reputation of our brand.' This comment made me realize the importance of my work," recalls Kenichi Maeda, Assistant Manager, Non-Destructive Inspection Business Unit.

Akira Hirakimoto,
General Manager, Non-Destructive Inspection Business Unit, Analytical & Measuring Instruments Division

The history of Shimadzu's X-ray inspection machines dates back to 1930. When metals are welded, the heat generated during the process can sometimes produce air bubbles in the material. This can lower the strength of the material, even though there is no change in its external appearance, which often causes problems in the steelmaking industry. Non-destructive X-ray inspection machines are essential for preventing problems like this. Shimadzu utilizes a wealth of X-ray technologies, accumulated since Japan's Meiji Era (1868–1912), to develop and produce a variety of X-ray inspection systems that meet the needs of the steelmaking industry.

While there is still a need for non-destructive inspection machines for steelmaking, the greatest demand today in the global non-destructive inspection equipment market, which has grown to approximately US$450 million, comes from the semiconductor manufacturing field.

Numerous soldering operations are performed when manufacturing semiconductors or when mounting them onto substrates. Minor soldering equipment problems can cause soldering defects. More than 200 pins are tightly arranged on an LSI that measures only 10 mm on a side and the solder applied to the tip of one pin is only 60 microns in diameter. Since soldering must be performed with micron-level accuracy, the "eye" that monitors the operation must have the same high level of resolution.

Shimadzu presently provides micro-focus X-ray TV systems with 0.4-micron resolution to semiconductor manufacturers. These systems provide excellent clarity even when fluoroscopic images are taken at a magnification rate of 2,700x, thus allowing accurate observation. Micro-focus X-ray TV systems are equipped with control panels that allow pin-point display of enlarged images for target sections, and precision mechanisms that enable viewing of the same location from different angles.

As PCs and similar devices become increasingly smaller and faster, the sizes of the contacts used in those products also shrink. Inspection equipment manufacturers are compelled to meet stricter requirements, as well as facing intense competition. Unique, proprietary technologies and the ingenuous application of engineering skills are the keys to surviving in this field.

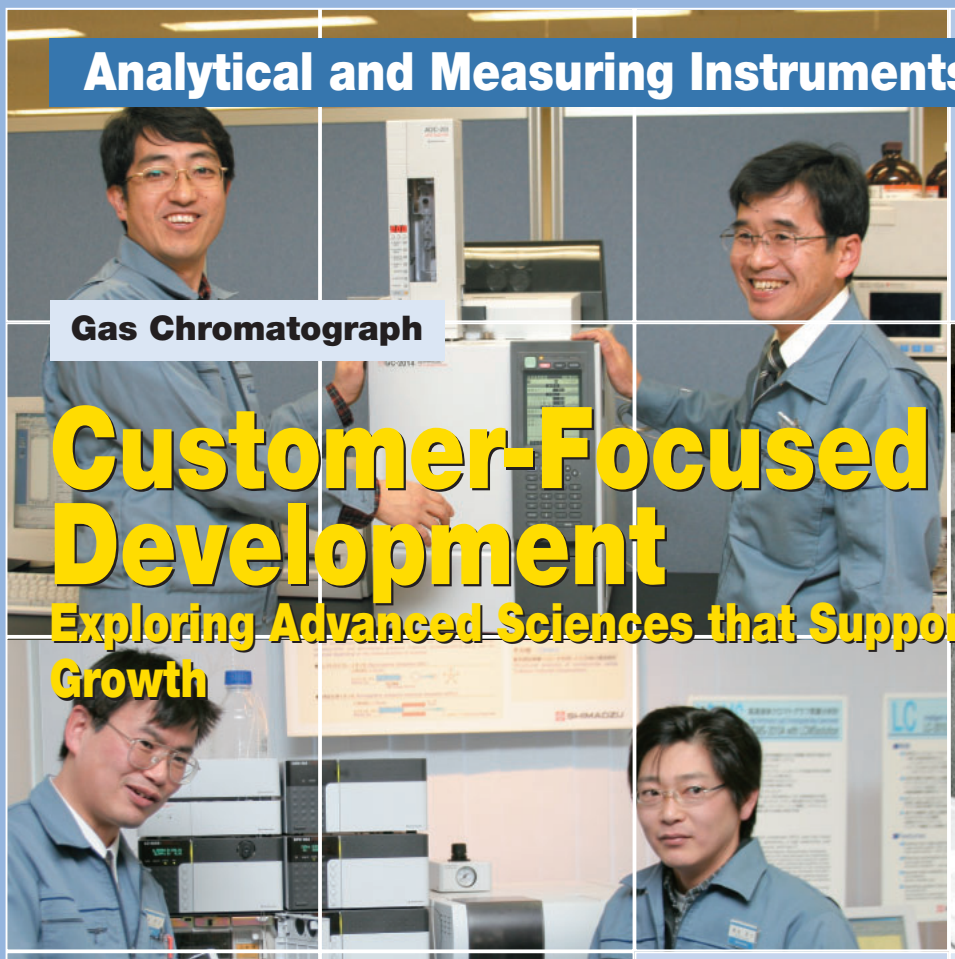
"We created an application for producing 3-dimensional X-ray CT images of cellular phones, and it was very well received. Naturally, we plan to continue developing and marketing unique applications that only Shimadzu can offer," explains Akira Hirakimoto, General Manager.

Many semiconductor companies are now establishing manufacturing bases in China and in East Asian countries. Shimadzu's next challenge is to earn the same high evaluation in these regions as it did in Japan, by making sure that its products serve as essential tools for manufacturing plant quality control.

Kenichi Maeda,
Assistant Manager, Non-Destructive Inspection Business Unit of the Analytical & Measuring Instruments Division
Here, he explains the SMX-160LT, a system with 0.4-micron resolution.

Analytical and Measuring Instruments Division

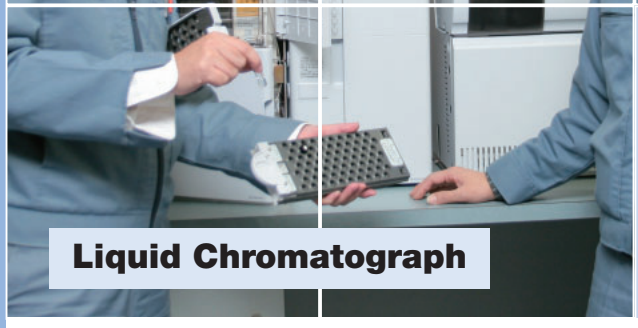
Shaping the Future



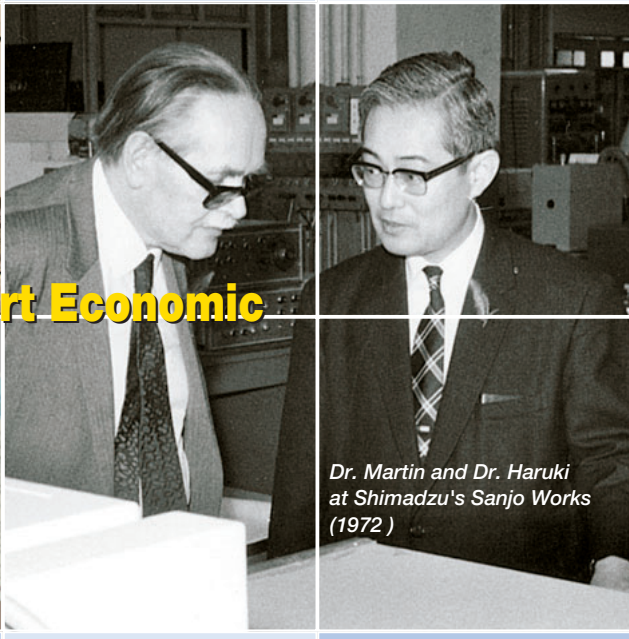
Gas Chromatograph

Customer-Focused Development

Exploring Advanced Sciences that Support Economic Growth



Liquid Chromatograph



Dr. Martin and Dr. Haruki at Shimadzu's Sanjo Works (1972)

Gas and liquid chromatographs are vital analytical instruments used in many fields, such as medicine, foods, fine chemicals, and environmental analysis. Ranking first in Japan and among the top corporations worldwide in market share, Shimadzu Corporation has gained its reputation in the field of analysis on the strength of these key products. Most importantly, Shimadzu has never lost sight of the customer with each new chromatograph we develop, from our very first unit to our latest model.

Peering into an Unseen World

At the turn of the 20th century, Russian botanist Mikhail Tswett immersed himself in the study of chlorophyll and came up with the at the time unthinkable theory that chlorophyll had more than one component.

Chlorophyll is a collection of compounds, as every scientist knows today. The mixture is very complex, however, and it would have been difficult for scientists in Tswett's time to separate the individual components. This is why the scientific community did not immediately embrace his theory.

Later, when Tswett passed chlorophyll through a liquefied medium using a device he had been developing, amazingly, clearly-defined layers appeared in the liquid, making Tswett the first person ever to separate a complex chemical mixture into its component compounds.

This historic event single-handedly overturned many long-held beliefs and altered the course of botany forever. The analytical technique that Tswett used was named chromatography.

Many more years passed before two Englishmen, named Archer Martin and A.T. James, finally brought the term chromatography to the attention of the world when they published their paper on gas-liquid chromatography in 1952. That same year Archer Martin shared the Nobel Prize with Richard Synge for developing partition chromatography based on their earlier collaboration in 1941. Many would argue that the 1952 report marked the starting point of chromatograph equipment development.

Precision measurement is a vital tool

without which science could not advance.

Shimadzu is a leader in measuring and analytical instruments and first began developing precision scales in the early 1990s. Then in 1934, Shimadzu built Japan's first spectrograph for analyzing and identifying elements in metals and other materials. Shimadzu subsequently developed Japan's first gas chromatograph, which bolstered Japan's fledgling domestic petrochemical industry. This industry soon grew to become the driving force behind Japan's strong economic growth following the Second World War. Shimadzu has always kept pace with the demands of industry and it was no different when the company developed a liquid chromatograph that analyzed higher boiling point liquid samples. This trend has continued up to the present, with the development of the mass spectrometer that led to the Nobel Prize in Chemistry for Mr. Koichi Tanaka.

In a world-wide chromatograph market that currently tops US$4.5 billion, Shimadzu is No. 1 in Japan and consistently in the top 3 internationally with our flagship liquid and gas chromatograph models. Our products are used in a wide range of fields, including product development, quality control, food product safety inspections, environmental analysis and life sciences. The factor that has cemented Shimadzu's position in the market is the customer-oriented sprit of our engineers and salespeople.

Outline of the Analytical and Measuring Instrument Business

Main products:

- Photometric analysis instruments
- Chromatographs
- Scanning probe microscopes
- Electromagnetic analyzers
- Laboratory automation systems
- Bio-related analyzers
- Total organic carbon (TOC) analyzers
- Optical devices
- Balances
- Particle size analyzers
- Air quality analyzers
- Water quality analyzers
- ISO-14001 standard support equipment and software
- Material testing machines
- Structure testing machines
- Dynamic balancing machines
- Nondestructive inspection machines

Overview:

- Developed precision scales in the early 1900's.
- Developed Japan's first spectrograph in 1934.
- Developed the first Japanese-built gas chromatograph in 1956 to which the petrochemical industry owes much of its success.
- Developed an array of products used in wide ranging fields like food safety, environment-related issues, and life science.

Gas Chromatographs

Getting Answers from the Workplace

As Masato Ueda, Manager of the MS/GC Business Unit gazed at the GC-2014, Shimadzu's newest gas chromatograph, he insisted that "Customer workplaces are full of hints. Only locations where the products will eventually be used can tell us what we need to know for development."

The world's first gas chromatograph was sold in the United States in 1955. A year later in 1956 Shimadzu produced Japan's first gas chromatograph. This product offering symbolically marked the start of brisk economic growth for Japan and was a key element in the rapid expansion of the nation's petrochemical industry.

Scrambling to Meet Market Needs

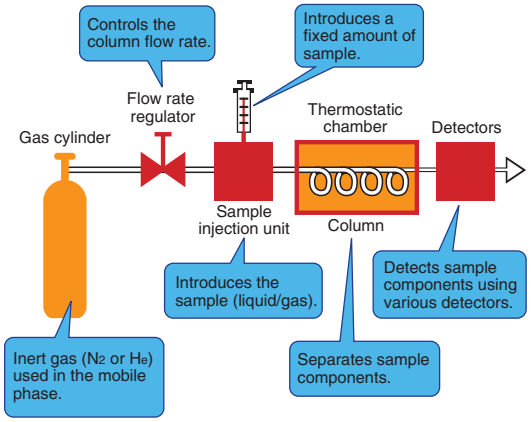
In spring of 1955, Shimadzu staff members, including Tatsuro Haruki of Shimadzu's Scientific Instruments Plant, were busy traveling from coast to coast. Japanese industries had finally recovered from the war and were just getting up to speed. Among these, the petrochemical industry seemed to have the brightest future, and many new products were being developed specifically for that industry. To determine what products were required and what was needed in the field, Dr. Haruki and other staff members spent many days on fact-finding missions at universities, public research facilities, petrochemical company research laboratories and refineries. In those days, extremely high separation ability and short analytical times were needed to help the petrochemical field advance. The answer that Dr.Haruki and other staff members came up with was a gas chromatograph with the highest resolution possible at the time.

This new method heated a sample to vaporize it and then passed the sample through a separating tube called a column, where the components were separated out and detected. This revolutionary instrument offered separation accuracy 100 times greater than previous separation analysis methods and, equally important, completed its analy-

Masato Ueda *Manager, MS/GC Business Unit*

Principle of Gas Chromatography

In paper chromatography, ink is dropped on a piece of paper and one end of the paper is then dipped in water. As the water rises up through the paper, the ink is carried with it and naturally separates into bands of colors, including yellow, green and red. This is the basic principle of the chromatograph. With gas chromatography, a tube called a column contains packing (partitioning agent or adsorbent) that replaces the paper. Liquid or gas is injected into one end of the column under pressure and, as they separate out, they reach the opposite end at different times. The separated components can be measured with a detector to identify them, along with their concentrations.



sis in 1/100th of the time.

Dr.Haruki and his team immediately set to work developing the instrument and worked all year round. One special-order unit was developed and delivered to a petroleum company in February 1956. Then, in April 1957, the prototype of Japan's first general-purpose gas chromatograph, the GC-1A, was exhibited at the Chemical Society of Japan where it created quite a sensation among the academics and researchers in attendance. The story is still told today of how waves of spectators filled the aisles, trying to catch a glimpse of Shimadzu's new instrument.

Tirelessly Listening to Customers

Strong gas chromatograph sales have not stopped Shimadzu from constantly updating its products and incorporating customer requirements and feedback as it is received. Other companies have entered the market by developing their own gas chromatographs, however, over time Shimadzu has steadfastly remained the undisputed leader. This is due, first and foremost, to the fact that Shimadzu products have been highly regarded for the accuracy of their analysis and stable baselines ever since the first model came off the production line. Second is because the company has constantly thought of new ways to make its products easier for researchers to use. One such innovation came early in 1980, when a microcomputer was added that allowed measurements to be stored as digital data. This was followed soon after by full digitalization, which was introduced in the early 1990s.

This same philosophy has been applied once again to enhance Shimadzu's latest model, the GC-2014. Here, a large display has been added to make data easier to read and flow rates can now be digitally controlled. This means that after reading a simple manual, anyone will be able to take precision measurements, with reproducibility rivaling our top-of-the-line GC-2010.

Kyoichi Komori
Senior Product Manager, MS/GC Business Unit, Analytical and Measuring Instruments Division

Masato Ueda, in charge of product design, went to our parts manufacturing plant to review each and every part in an all-out effort to reduce costs. Plant workers were impressed, since no one of Mr. Ueda's stature had ever visited a production plant. It proved to be well worthwhile, however, as it allowed the price of the GC-2014 to be lower than the GC-2010, without sacrificing performance. This achievement was a great source of pride for Mr. Ueda and his team.

It is now nearly 50 years since the first gas chromatograph was manufactured. Demand for this product has steadily grown over the years from its humble beginnings in the petrochemical industry to present-day applications in environmental analysis, trace level impurity analysis for fuel cell development, and in food product analysis to satisfy consumers concerned about food safety. This increased product demand is driving efforts to provide greater ease of use, as well as improved accuracy and versatility.

Kyoichi Komori is Product Manager in charge of the GC for the MS/GC Business Unit. He put it most succinctly when he said, "The needs of customers boil down to basically three things: higher precision, faster analysis, and easier operation. With market demands like these, we still have a long way to go with gas chromatographs, regardless of the argument that the gas chromatograph is a mature product."

Liquid Chromatographs

Affordable, Compact, and Easy to Operate

Shimadzu began selling liquid chromatographs 15 years after releasing its first gas chromatograph.

A liquid chromatograph, as its name implies, uses liquid instead of gas as the carrier. While the gas chromatograph uses a gas to separate a sample into constituent components, the liquid chromatograph does the same thing with a liquid. A column that separates components efficiently and liquid transport technology that can move the liquid at a constant speed are critical for accurate separation analysis.This turned out to be difficult and product development took longer than expected. However, thanks to its strong product development ability, Shimadzu surged back and in 1978 released the LC-3A that propelled the company into the position of being Japan's leading liquid chromatograph manufacturer. The company enhanced usability with a series of improvements, including development of a new modular model that allowed the flexible arrangement of the pump, injector, column, and detector. The mantra at the time was "affordable, compact, and easy to operate." These words clearly described the product's advantages to customers and represent the history of Shimadzu's liquid chromatograph.

Shimadzu products have been consistently ranked among the best in areas such as separation ability and soon gained an excellent reputation around the world.

Significantly Improved Reliability

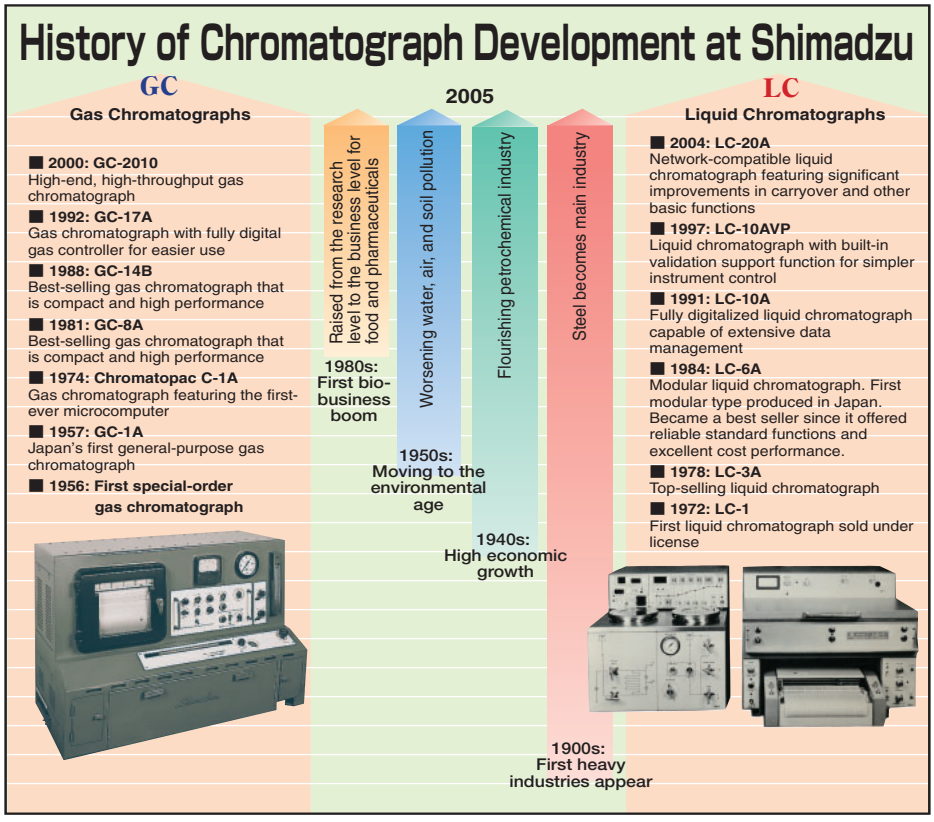
Today's liquid chromatographs have become formidable tools, offering extremely high resolution and the ability to analyze samples without vaporizing them with heat. Characteristics like these have prompted a shift in user clientele to pharmaceutical and bio-related industries. Now that they have become essential analytical tools for both structural analysis and quantitative analysis of trace components, demand for these machines has kept pace with industry expansion. This now includes the field of life science, rising concerns about the safety and potency of food products and pharmaceuticals, and a growing interest in environmental protection. These developments led Shimadzu to release the full-featured Prominence Series LC-20A liquid chromatograph last year.

Shuzo Maruyama *General Manager, LC Business Unit of the Analytical and Measuring Instruments Division*

Today's liquid chromatographs feature significantly lower "carryover", which is contamination due to residue from a previous sample left in the sample injection unit. Since a liquid carries the sample along in the liquid chromatograph, a minute amount of each sample will inevitably be left in the injection unit. When another sample is subsequently analyzed, it will be contaminated by trace amounts left over from the previous sample.

Obviously any residue left on the tip of the syringe from the previous sample will be mixed in with the next sample, making the resulting data highly suspect. This is why, in the past, the syringe was cleaned after every injection. However, times are changing quickly.

Recent advances in liquid chromato-



graph mass spectrometers have meant that mass spectrometers are now replacing conventional absorbance detectors in areas such as pharmaceutical metabolism analysis. Highly sensitive mass spectrometers that are increasingly being used as detectors for compounds in even smaller quantities have brought light to issues like carryover that could previously be ignored.

Shimadzu's development team has often heard from major pharmaceutical makers that liquid chromatographs cannot be used in their current state for pharmaceutical metabolism analysis. Even though a number of agents were tested for cleaning the syringe and the thought arose of even developing a completely new cleaning method, none of the results were satisfactory.

Nobuyuki Tatsumi *Assistant Manager, LC Business Unit of the Analytical and Measuring Instruments Division*

Nobuyuki Tatsumi, Asst. Manager of the LC Business Unit, stated, "If the syringe cannot be washed, then the best solution would be to avoid contamination of the nozzle in the first place. This approaches the problem from the completely opposite direction."

A special coating was applied to the syringe needle and a new adsorption-resistant material was used for the flow lines. The results measured up perfectly with expectations. Carryover was reduced to 1/10th the standard level at the time and customers were elated.

Partnering with Customers

Shuzo Maruyama, General Manager of the LC Business Unit, described it this way, "While this development started out as a product complaint, it provided an opportunity for us to take a step or two forward, and the result was a newly developed product. We are sincerely grateful to our customers."

The Prominence Series is an example of our partnering efforts with customers. This series was optimized to produce substantially better results when a mass spectrometer is used as the detector. In the meantime, information technology (IT) began to spread around the world and demand skyrocketed for analytical instruments that could operate on a computer network. To satisfy this demand, web server functions were built into the LC unit's controller and a new function was added to enable the status of all analytical equipment to be monitored over the Internet.

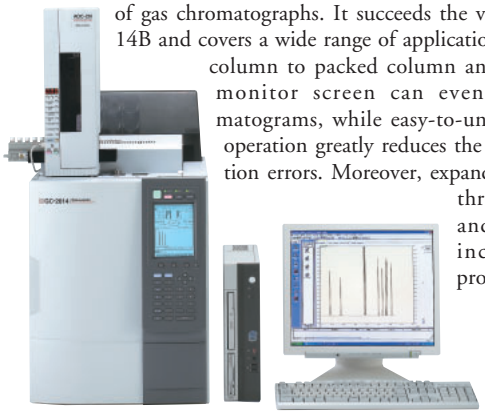
Mr. Maruyama put it this way, "The goals set for liquid chromatographs, from their very inception up to the present day, have always been to improve functionality and make the equipment smaller, faster, and more advanced. Now system connectivity has become the newest priority on this list."

Mr. Tatsumi expressed the renewed corporate enthusiasm when he said, "We have to do all we can to satisfy our customers. At the same time, we have to make analytical instruments that are not only easy to operate, but actually enjoyable to use."

To that end, Shimadzu remains 100% committed to producing the right tools for the job.

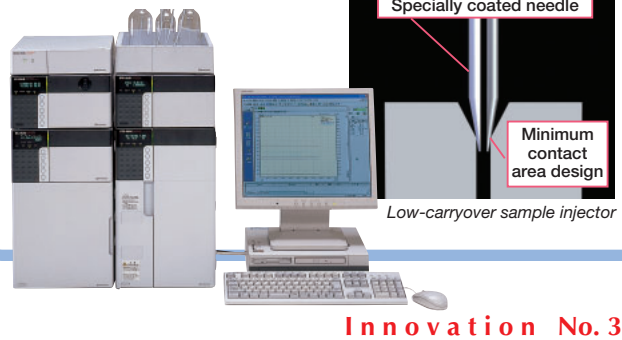
GC-2014 High-Performance, General-Purpose Gas Chromatograph

The GC-2014 is the newest addition to Shimadzu's lineup of gas chromatographs. It succeeds the very popular GC-14B and covers a wide range of applications from capillary column to packed column analysis. The large monitor screen can even display chromatograms, while easy-to-understand button operation greatly reduces the chance of operation errors. Moreover, expandability for up to three injector units and four detectors increases analysis productivity.



LC-20A Prominence Modular-type High-Speed High-Throughput Liquid Chromatograph

The LC-20A is the newest addition to Shimadzu's liquid chromatograph lineup. The modular format is ideal for expandability, giving the user the freedom to select the components best suited to their application. Network compatibility means that the LC-20A can be connected to a network and collect data from remote locations using Internet Explorer. The LC-20A's standard functions make it an international frontrunner with the fastest sample injection, minimum carryover, and best detection sensitivity in the world.



Low-carryover sample injector

Entering Global Markets Backed with Reliability and Proven Track Records

Shimadzu utilizes state-of-the-art technology to improve aircraft operation safety and cabin comfort and to reduce pilot load. Building on a long and distinguished track record, Shimadzu is now taking its first steps as a true system integrator.

Facing New Challenges as a System Integrator

Shimadzu started to produce aircraft equipment in 1936 and established its Aircraft Equipment Division in 1957. Since then, it has continued to develop superior products for ensuring aircraft flight safety and onboard comfort. In 2001, it began to focus resources on three fields: air management systems, cockpit display systems, and flight control systems. Shimadzu is infusing increasing amounts of energy into the development and manufacture of highly reliable equipment, and its technical expertise and skills enjoy a favorable reputation both in Japan and overseas.

Building on a base of technology cultivated through component design and manufacturing, Shimadzu is looking to open up new markets as a system integrator and expand the scope of its aircraft business to a global level. With this business strategy clearly in mind, the division is currently working all-out on system development.

Three Central Areas of Shimadzu's Aircraft Equipment Business

First are air management systems, designed to control the cabin environment and ensure passenger comfort. Second are cockpit display systems that help reduce pilot load during flights. Third are flight control systems that ensure and maintain flight safety. These three systems are central to Shimadzu's aircraft equipment business. Let's have a look at Shimadzu's history and track record in each of these fields.

Air management systems are designed to ensure the overall control of aircraft onboard systems, including air conditioning, cabin pressurization and air bleed systems, and to provide the optimum onboard environment. In air conditioning systems, for example, Shimadzu enjoys both a successful 50-year track record and a domestic market share of over 90%.

Designed for highly mobile aircraft flying at high speeds, Shimadzu's cockpit display systems are equipped with advanced optical indicators that allow pilots to easily ascertain both flight and

Overview of Aircraft Business

Main products
- Air management systems
- Cockpit display systems
- Flight control systems
- Engine starting & power system
- Electronic control equipment
- Magnetic detection systems
- Hydraulic/electric/mechanical control equipment
- Space rocket valves and control equipment

Division Outline

Established in 1957, Shimadzu's Aircraft Equipment Division initially produced air conditioning equipment for the National Jet Development Plan. Later, in the latter part of the 1970s, this division then began developing space equipment.

external condition information. One of these systems is installed directly in front of the pilot, where it projects altitude, speed, direction, and other vital flight information.

Production of these displays began in the late 1970s and Shimadzu now boasts 100% of the Japanese market. Cockpit display systems are now being installed in various type of commercial aircraft, and Shimadzu is now striving to expand its overseas share of these products.

Even though initially air management and cockpit display system development was performed through technical collaboration with overseas manufacturers, Shimadzu has now grown to where it can develop and produce these products independently.

The role of flight control systems is to ensure the stable control of takeoff and landing, and of flight altitude and attitude as well. This field involves the manufacture of gearboxes, valves, and actuators used to control wing flap movement. For flight control system mechanical, hydraulic and electric components, Shimadzu has delivered self-designed products to aircraft manufacturers both in Japan and overseas for nearly 30 years, with a consistent track record of safety and reliability.

Commitment as a System Integrator

In air management systems, cockpit display systems, and flight control systems, Shimadzu is striving to transform itself from a component manufacturer to a system developer.

Yutaka Nakamura, Deputy General Manager of the Aircraft Equipment Division, describes this transition, saying “In the past, we have produced a wide variety of components for aircraft equipment, a field that demands an extremely high level of reliability. In the past few years, however, huge manufacturers that can handle both aircraft equipment and overall systems have emerged. These manufacturers can produce all required components through their own subsidiaries and sub-tier partners, which means that in the future doing business purely as an equipment manufacturer will become increasingly difficult. In this new type of business environment, we too must make the transition to system integrator. For this reason, we are currently investing our resources into air management systems, cockpit display systems, and flight control systems. I feel that we have sufficient capacity as a system integrator to play a central role in these three fields.”

Currently, the field where Shimadzu comes closest to the role of system integrator is in the area of flight control systems. Here, Shimadzu develops flap control systems that ensure the safe takeoff and landing of aircraft, and its high-quality mechanical and high-reliability electronic control technology is a major contribution to flight safety.

“We can now independently develop all of the primary aircraft equipment technology we need, and have a framework for combining this technology and delivering it in the form of systems. Recently, we have been conducting independent R&D and have now reached the practical application stage of hydraulic control valves that can be used for 5,000-psi hydraulic systems and also high-output actuators that use electric motors to operate flaps. Whatever our customers’ needs are, we can start development immediately using the fruits of earlier R&D,” says Kiyotaka Ihara, Product Manager, Flight Control Systems.

In the field of flight control systems, Shimadzu now has the design know-how required to integrate a wide variety of previously-

Yutaka Nakamura
Deputy General Manager, Aircraft Equipment Division

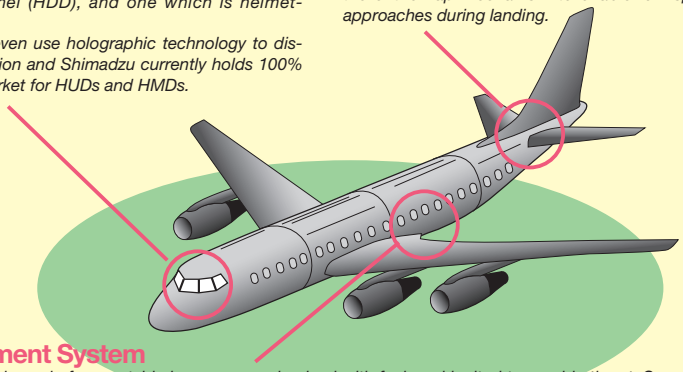
Shimadzu Products Used to Enhance Aircraft

Cockpit Display Systems

Shimadzu electro-optical systems display a variety of flight information to improve navigation and aircraft safety. These include three types of systems, one which is installed directly in front of the pilot (HUD), one which is mounted in the instrument panel (HDD), and one which is helmet-mounted (HMD). Our latest models even use holographic technology to display image information and Shimadzu currently holds 100% of the Japanese market for HUDs and HMDs.

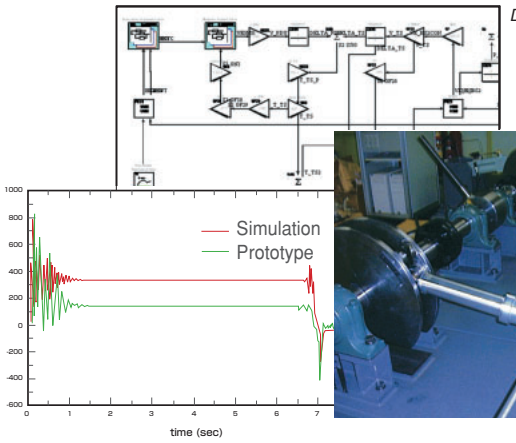
Flight Control Systems

Shimadzu manufactures the gearboxes, valves, and actuators that are used to control the motion of aircraft flaps. Shimadzu's highly acclaimed high-lift system provides integrated control over the entire flap mechanism to enable low-speed approaches during landing.



Air Management System

In a jet engine, air drawn in from outside is compressed, mixed with fuel, and ignited to provide thrust. Some of that air is also diverted to the cabin of the aircraft for air conditioning. Shimadzu manufactures a variety of aircraft systems, such as the bleed air system that draws air from the engine, the cabin pressure control system that maintains the cabin pressure at ground level, the air conditioning system that cools and circulates the air drawn into the cabin, and the anti-icing system that prevents ice from forming on the wings. Shimadzu also holds 90% of the market for the air management systems that provide integrated control over all of the air systems.



Dynamic Simulation

System Evaluation Test

created components into individual systems. Also, Shimadzu is currently conducting dynamic simulations using computers in order to improve the accuracy of design and of predictions during the development and design stages.

Business Performance and Partners in Japan and Overseas

One of Shimadzu's major strengths is the wealth of technology and independently developed components accumulated over the years. Another strength is Shimadzu's many manufacturing partners both in Japan and overseas who can, when required, form collaborations to respond to market needs.

"In the aircraft industry, which shoulders an enormous responsibility for human life, reliability is of paramount importance. With civilian aircraft in particular, business performance is also a major element and we intend to fully utilize domestic and international partnerships to create an efficient system," says Mr. Nakamura.

Mr. Ihara continues, "When operating within a limited timeframe and budget, even with equipment or systems that can be developed independently, we have found it is more efficient to conduct development in collaboration with other organizations. This approach also makes it easier to win the trust of aircraft manufacturers."

While we value all collaborations with specialized manufacturers, Shimadzu will, as the primary contractor of systems-related business, lead each project and assume overall responsibility for system development.

"In the past, we concentrated on designing and manufacturing components that conformed as closely as possible to the given specifications and were not really able to participate in the creation of any optimized systems created from these components. Now, equipped with a clear idea about the overall system, we can independently determine the optimal specifications for individual components. This gives us a great advantage as a system integrator," explains Mr. Ihara.

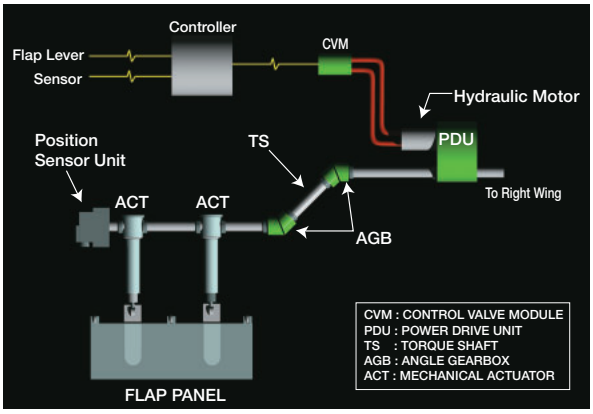
Total Commitment to Software Development

An important issue in system development is how to validate base technology. For this reason, Shimadzu is now working to develop highly reliable analysis methods. This will be done by customizing our computer-based design/system performance analysis to conform to hardware parameters that truly reflect our manufacturing skills.

"The most important part of a system is the software that controls the aircraft equipment itself. The amount of effort you put into software development and how you validate the software are key issues. To ensure aircraft safety, validating the adequacy of the software with established methods is a hurdle that, in applications for civilian aircraft, cannot be avoided. I would therefore like to focus our efforts in this area and establish a know-how base as quickly as possible," stresses Mr. Nakamura.

Over the past 10 years, the number of system integrators in the aircraft industry has increased to nearly 20. All of these are giant manufacturers with globally recognized names. Through its aircraft equipment business, Shimadzu is attempting to join their ranks. Building on a proven track record in the Japanese market and on technical skills and ability spanning more than half a century, the day will soon arrive when Shimadzu can serve all three key fields and participate as a fully-fledged system integrator in global markets.

Kiyotaka Ihara
Product Manager,Flight Control Systems, R&D Dept., Aircraft Equipment Division



Flight Control System

SHIMADZU GROUP 130th

Developing Technology That Satisfies the Needs of 21st Century High-Growth Industries

The life science, environmental solutions, and semiconductor/flat panel display markets are clearly the high-growth industries of the 21st century. Shimadzu is moving aggressively into these markets backed by its management principle "Realizing Our Wishes for the Well-being of Mankind and the Earth." The question Shimadzu faces today is how to apply the company's unique technologies and expertise to these highly volatile growth industries. We believe the answer lies in what Shimadzu has accomplished to date and in the challenges that the company has faced along the way.

Life Science

Environmental Solutions

Semiconductors/Flat Panel Displays

Life Science

Discovering What Lies Ahead for Life Science

Creating an R&D System that Integrates Some of the Most Advanced Equipment and Best Minds in the World

Exploring New Frontiers

The successful decoding of the human genome has placed life science on the fast track for growth. This means that applications in this field are rapidly developing in a variety of areas, such as fundamental research, gene therapy, drug discovery, and disease diagnosis. Shimadzu has been on the cutting edge of bio-business for over 20 years and first ventured into the business in 1984, together with the development of bio-support equipment. Later, in 2000, the company added out-sourcing services for genetic and protein analysis. Next, as part of an overall strategy to develop and provide analytical equipment and system solutions for life science researchers, in 2001 Shimadzu established the Life Science Laboratory to conduct research on reagents and analytical techniques.

Decoding the Essence of Life

Research institutes and corporations around the world are conducting extensive research on protein analysis. It is widely believed that understanding how proteins work will tell us what causes disease as well as the types of drugs and treatments that should be administered. Perhaps it will also help us decode the fundamental structure of life. If genes are the blueprints for life, then proteins are the products made from those blueprints. Proteins produced from information stored in genes are used to create the cells and cellular systems that form a unique tapestry. We could go so far as to say that proteins are the essence of life.

Research in this area, however, has never been easy. It would have been simple if one gene always manufactured the same protein, but it is now understood that one gene can produce a multitude of proteins. Since there are more than a hundred thousand proteins in the human body, it is virtually impossible to grasp the overall picture, particularly in light of the staggering number of possible protein interaction combinations.

Shimadzu's life science program has a two-fold mission that is essential to protein research. The first is to develop the most advanced reagents and life science support equipment. The second is to deploy out-sourcing services for gene and protein analysis.

Pooling the Best and Brightest for Protein Research

The Life Science Laboratory at Shimadzu has brought together a group of highly talented individuals who are among the top in their field. The leader of the Laboratory, Osamu Nishimura, came to Shimadzu from the pharmaceutical industry and serves as the Deputy General Manager of the Analytical and Measuring Instruments Division. Dr. Nishimura began supervising the Life Science Laboratory four years ago and, prior to his appointment, had specialized in drug discovery at a major pharmaceutical firm. Dr. Nishimura was among the first to stress the importance of protein research just when genome-based drug discovery was taking over the mainstream in the pharmaceutical industry. He theorized that the inner workings of proteins had to be studied to produce really effective medicines. Since Shimadzu was already committed to protein research as a matter of policy, the move to Shimadzu made perfect sense for Dr.

Nishimura.

Susumu Tsunazawa is a Senior Manager at the Life Science Laboratory who has been conducting protein-related research non-stop for 40 years, including the analysis of amino acid sequences in proteins. This was an ideal pairing since Dr. Nishimura was interested in developing new medicines from proteins and Dr. Tsunazawa was an expert in protein analysis. Dr. Tsunazawa watched as one colleague after another headed into genome research during the genome boom, however he resolutely believed in his theories and refused to give up protein research. He dreamed that the analytical techniques he had devoted his life to would eventually be incorporated into practical devices, which is what brought him to Shimadzu three years ago.

Tsutomu Nishine is an R&D Manager at the Life Science Laboratory. He majored in pharmaceutical science and joined Shimadzu in 1986. Mr. Nishine was involved in developing and evaluating the RISA-384 Multi-capillary DNA Sequencer when genome research came of age.

Koji Tanimizu is a Product Manager at the Life Science Laboratory who joined Shimadzu in 1981. Mr. Tanimizu has spent his entire career at Shimadzu on the manufacturing side producing primarily clinical testing equipment. His job is to turn successful research results into practical devices. Mr. Tanimizu sees to it that completed devices conform to applicable laws and regulations, and that the devices are 100% user-friendly before they are shipped to actual clinical laboratories. His extensive first-hand knowledge of customer sites makes him an invaluable member of the Shimadzu team.

Shimadzu has recruited personnel with different backgrounds and different areas of expertise from inside and outside the company to take on the very ambitious goal of unlocking the biomechanics of proteins. They are without question the best and the brightest. Dr. Tsunazawa describes it aptly this way, "Our greatest strength is right here, where day in and day out you see researchers working side-by-side with instrument builders."

Securing the Most Powerful Equipment Available

No one questions the important role that equipment plays. After all, proteins are formidable adversaries for analysts and cannot be taken on without some kind of help. At Shimadzu that help came in the form of a mass spectrometer.

In the past Japan lagged behind the U.S. in genome analysis. Right from the early development stage, American equipment manufacturers pooled a team of distinguished geneticists and a group of highly-talented engineers to work together on the project. This joint effort produced superior analytical systems that were easy to use and it was not long before genome research took off in the U.S.

Tsutomu Nishine (left) *R&D Manager and* *Koji Tanimizu* (right) *Project Manager, Life Science Laboratory, stand in front of the Xcise Automated Gel Processing Platform for proteome analysis.*

The Transdirect Insect Cell is a cell-free protein synthesis kit that greatly simplifies in-vitro protein synthesis using insect cell extract.

Around the world, everyone seems to be heading down the exact same road in protein analysis. This stage is a critical juncture for creating an environment sooner rather than later where research specialists are working side-by-side with equipment specialists.

Dr. Nishimura notes enthusiastically, "It's hard to believe that we are using cutting-edge measuring instruments that are so new that they are still prototypes. We can peer into worlds where no one else on the planet can go. This is a huge advantage that will give us the edge for years to come."

Letting the Development Cycle Take Its Course

While Shimadzu's Life Science Laboratory has successfully integrated the production and academic worlds into a cohesive research program, the Laboratory is also conducting this same research in cooperation with various outside research institutions. Mr. Nishine explains, "Equipment sales are not the end of the story for manufacturers. The real concern comes after the sale. Manufacturers will hold serious discussions and entertain suggestions to address the concerns of researchers who have done such a great job against

worldwide competition. These researchers have said that while they really enjoyed the work, they were wondering what was next for them. Others wanted to do more extensive research, but were not sure how to go about it. Still others were concerned about the significance of their data. Additionally, Shimadzu and other manufacturers must also accommodate customer demands and will likely find the best solution is by feeding back information about difficult issues to specialists from various fields. New analytical techniques and equipment are sure to be created from this type of back-and-forth exchange."

New drug discovery and analytical techniques have already yielded an array of innovations. One was a cell-free protein synthesis reagent. This was the first time ever that a reagent was developed using an extract derived from cultured insect cells and that genes were used to artificially synthesize proteins. The development has drawn considerable interest since it was first announced because it produces proteins more efficiently than conventional products.

Entering the Diagnostic Business

These achievements show that Shimadzu is more than just an instrument manufacturer. Shimadzu provides integrated systems that combine the newest analytical techniques and equipment that the company has to offer. And now Shimadzu is looking to take these systems to the next level by entering the diagnostic and drug discovery support markets.

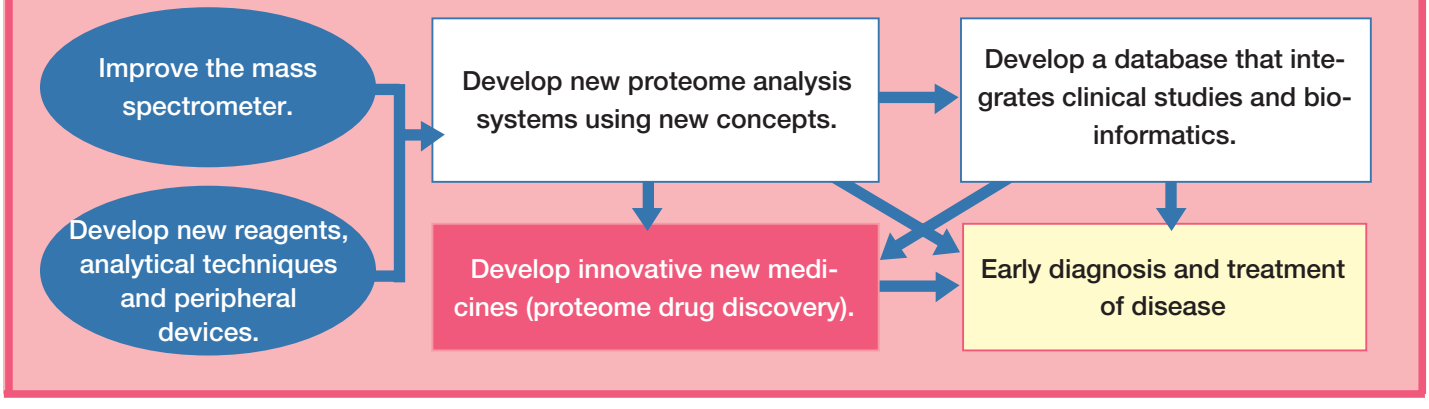
Dr. Nishimura stresses that "protein analysis will be elevated to the level of a diagnostic business in the next five years."

A protein database must first be created to establish a diagnostic business, a database that begins with mapping. Mapping is used to determine what differences there are in the proteins that are found in healthy people versus those in people who are not healthy, and how proteins interact in a healthy body. The mapping process will identify proteins specific to an illness. If these proteins can be accurately cataloged in a database, diseases can be diagnosed early or the progress of the disease can be monitored, and a definitive treatment can be determined simply by analyzing the proteins in blood drawn from patients. This would be welcome news for healthcare services.

Mr. Tanimizu states unequivocally that "Protein analysis is still in its infancy. It is where biochemistry was some 20 to 30 years ago. New products were being developed then while researchers groped about in the dark. Life science is at that point today. Right now, Shimadzu is committed to developing new 'needs and seeds' products and technologies." At Shimadzu, obviously the life science business is getting a lot of attention these days.

Pictured from the left are Senior Manager Dr. Susumu Tsunazawa of the Life Science Laboratory in the Analytical and Measuring Instruments Division, Product Manager Koji Tanimizu, R&D Manager Tsutomu Nishine, and Division Deputy General Manager Dr. Osamu Nishimura.

The Future of Proteome Analysis



Koichi Tanaka Mass Spectrometry Research Laboratory

Paving the Way for Mass Spectrometry Research with Keen Intellect and Hard Work

The mass spectrometer is an integral part of today's life science research. The Mass Spectrometry Research Laboratory aims at producing world-leading technology by developing innovative mass spectrometry methods and instruments. Shimadzu Fellow Koichi Tanaka leads the Laboratory as its General Manager, while keeping an eye on the future of the mass spectrometer in his role as an engineer.

While the purposes of the Mass Spectrometry Research Laboratory are manifold, one of the most important is to conduct fundamental mass spectrometry research. The Laboratory primarily develops mass spectrometers, instruments that ionize samples with a laser beam, weigh the ions, and determine how many of each molecule is present. The capabilities of these instruments are now being expanded to include structural analysis of molecules as well.

Proteins consist of fairly large, complex molecules that are easily damaged. Twenty years ago it was quite an accomplishment to observe molecular weights on the order of several hundred. The mass spectrometer developed by Koichi Tanaka et al successfully bombards proteins with a molecular weight of several tens of thousands with a high-energy laser beam that ionizes particles with absolutely no damage to the protein structure. This was a huge advance in protein analysis.

Shimadzu is currently developing fundamental device technologies and is conducting closely coordinated application research that includes the Life Science Laboratory, Technology Research Laboratory, and other divisions inside Shimadzu and elsewhere. The aim of this effort is to simplify, speed up, and improve the operation of mass spectrometry instruments.

Mr. Tanaka describes it this way, "When a pretreatment reagent is developed, for example, the reagent is evaluated and the results are fed back to further improve the reagent. This generates a lot of positive results that are then used to enhance software and hardware products. The relationship between the Mass Spectrometry Research Laboratory and the Life Science Laboratory is particularly close since over 50% of mass spectrometer usage is devoted to life science projects."

Pictured from left are Shinichi Iwamoto Asst. Manager , Sadanori Sekiya Asst. Manager , Koichi Tanaka General Manager , and Yuko Fukuyama Asst. Manager .

Future-Oriented Research Also Proceeds

Mr. Tanaka explains, "We are trying to develop a mass spectrometer where you simply press a button to identify a disease and can check a person's health condition from a single drop of blood. The first step must be where we determine the specifications that are required. Then we can upgrade the hardware accordingly. However, this goal cannot be achieved by simply developing new hardware. The cause-and-effect relationship between proteins and diseases must also be understood in order to diagnose a disease. This is a problem that researchers around the world are working on today."

Many issues, including specifications, remain to be worked out. The mass spectrometer must be simple enough that novice and expert alike can operate it and achieve the same results. It must also be completely redesigned, to make it small enough to fit on a desk.

Light at the End of the Tunnel

Mr. Tanaka continues, "A number of ideas have come from people inside Shimadzu and from elsewhere. The common thread running through all those ideas has provided a very hopeful clue that should allow us to announce some achievements within a year."

The Mass Spectrometry Research Laboratory was established well over two years ago, and the size of the staff has grown as the Laboratory has matured. Today the staff, mainly in their twenties and thirties, has a youthful enthusiasm that has helped produce no less than ten significant papers this past year alone.

Mr. Tanaka states "I appreciate it when staff members take their own initiative rather than having to be told what to do. After all, there's a lot more work that lies ahead."

Mr. Tanaka often makes comments to junior staff members like "That's pretty interesting. Let me take the measurement." He sometimes volunteers to do the actual work. He goes on to say, "This might sound strange, but I simply want to do things that any engineer would be proud of doing."

This meticulous, step-by-step approach to research that earned Mr. Tanaka his Nobel Prize promises to bring forth innovation once again.

Environmental Solutions

Exploring New Frontiers

Looking Ahead to the Future of the Earth

Turning Soil Remediation and Carbon Dioxide Fixation Technologies into Business Opportunities

The field of environmental solutions is one of the three new business fields to which Shimadzu is committed. One of these business opportunities ready to be launched is an electro-kinetic soil remediation system that will have minimum impact on the environment.
Carbon dioxide fixation technology has also garnered quite a lot of attention since the Kyoto Protocol went into effect. Demonstration plant development has been completed and Shimadzu is already looking forward to the next phase.

Shimadzu Management Principles in the Real World

The environment and related issues are top corporate concerns at Shimadzu. Shimadzu's corporate activities ever since have strived to realize our wishes for the "Well-being of Mankind and the Earth" as outlined in our management principle. By the fall of 2002, Shimadzu had brought its business interests in line with its management principle and had officially launched the Environmental Solution Development Department.
Mr. Junzo Ose, who is the first General Manager of the Environmental Solution Development Department*, put it this way, "It's only fitting these days that corporations invest in environmental protection. Environmental problems demand the use of analytical equipment at the input end to diagnose environmental conditions and again at the output end to verify the results of processing. Since this equipment is one of Shimadzu's core business areas, we should be developing decontamination and processing technologies across the entire spectrum, from input to output, in a more comprehensive approach to environmental issues." He goes on to say that, "We have to prevent our corporate philosophy and management principles from becoming merely catch phrases by making them vehicles for exploring new ideas and enhancing forward-looking business opportunities."
In the two and a half years since the Department's inception, Shimadzu has held over 300 free seminars for the general public, corporations, students and children as an environmental solution. At the same time, Shimadzu is developing technologies for new environmental projects.

Contaminated Soil under Buildings

One of the technologies Shimadzu is promoting is an electrokinetic remediation system that uses direct current to remove contaminants from polluted soil. Cathode and anode electrodes comprising part of a forced electrolytic solution system are inserted in soil contaminated with heavy metals and a DC current is applied. The heavy metals in the soil are ionized and migrate to one of the electrodes where the heavy metals are dissolved in an electrolytic solution to remove them.

Pictured from the right in a containerized plant used for soil remediation system research are Environmental Solution Development Department General Manager Junzo Ose, Manager Fumihiko Sato, and Manager Tatsuo Choso*

*As of Oct. 2005, the Environmental Solution Development Department was re-named the Global Environmental Management Department. Here, Junzo Ose was appointed General Manager,while Fumihiko Sato and Tatsuo Choso were transferred to the newly created Environmental Remediation Business Promotion Group in the Corporate Strategy Planning Department.

With conventional soil remediation methods, the contaminated soil is excavated and removed for remediation elsewhere. This method cannot be used if a building is already standing on the contaminated site. Electroremediation is a far better method because it can be used to remediate soil on land below existing structures.

Hak Milieutechiek B.V. developed the system in its native Holland, which today is one of the leading countries on the environmental front. Looking to conclude a licensing agreement with Hak Milieutechiek B.V., Shimadzu ran the system through a battery of demonstration trials.

"Instead of using artificially polluted soil to collect data during the trials, Shimadzu chose instead to check the efficacy of the system at an actual site in Japan. The logical choice was the soil below Shimadzu's plating plant at Sanjo Works in Kyoto, and that is where an experimental plant was built to test the system," explained the test supervisor, Mr. Fumihiko Sato (Manager of the Environmental Solution Development Department*). As a result of trials conducted over a six-month period, the system proved to be highly effective in removing hexavalent chromium from the soil. This was proof enough for Shimadzu to conclude a formal licensing agreement with Hak Milieutechiek B.V. upon completion of the trials.

The overall effectiveness of decontamination depends on a variety of factors, such as the concentration and type of contaminants in the soil, however the system was able to decontaminate an area measuring approximately 100 x 100 x 5 meters deep. Shimadzu has already received a number of inquiries about the system and has introduced an advanced-level, fully operational version of the plant this spring. This will mark the start of the company's first soil remediation business venture.

The CO_2 fixation technology demonstration plant that produces reusable carbon nanofibers.

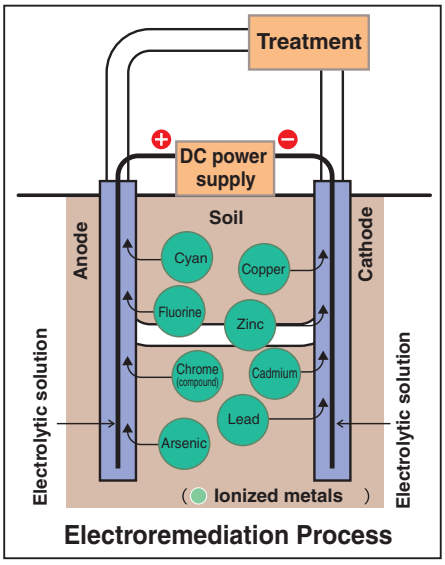
Future of Carbon Dioxide Fixation

Another area where Shimadzu has committed resources is in developing carbon dioxide fixation technology. The Kyoto Protocol designed to reduce carbon dioxide and other greenhouse gas emissions was adopted at the Third Session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP3) held in Kyoto in 1997. Since 1997, Shimadzu has investigated carbon dioxide fixation in collaboration with the Research Institute of Innovative Technology for the Earth (RITE) .

Tetsuo Choso, who was temporarily stationed at RITE at the time, subsequently became involved in Technology Research Laboratory projects and worked on developing catalysts that later became pivotal technologies.

He described the situation this way, "In the beginning, we reacted carbon dioxide with hydrogen to produce carbon and water. The problem was, unfortunately, that the commercial steam reforming process used to produce the hydrogen gas for the reaction generated more carbon dioxide than the process could fix. Then the idea of using methane as an alternative came to our attention."

Shimadzu tested hundreds of catalysts to see if they could make methane react with carbon dioxide and successfully developed new fundamental technologies in the process.



The diagram shows how heavy metals ionized by a DC current are drawn out. Nearly six months of demonstration testing proved the process to be a highly effective method of remediating soil.

Shimadzu moved quickly to start building a pilot-test plant as a step toward commercialization. Demonstration tests ended by spring 2004, completing the development phase.

Armed with this technology, Mr. Choso was then transferred to the Environmental Solution Development Department*. There he is currently working closely with the Technology Research Laboratory to develop other forward-looking technologies. One of these derived from carbon dioxide fixation technology: hydrogen production. Hydrogen gas has caught the eye of many as a next-generation clean energy source, and today it is of tremendous interest as fuel for fuel cells.

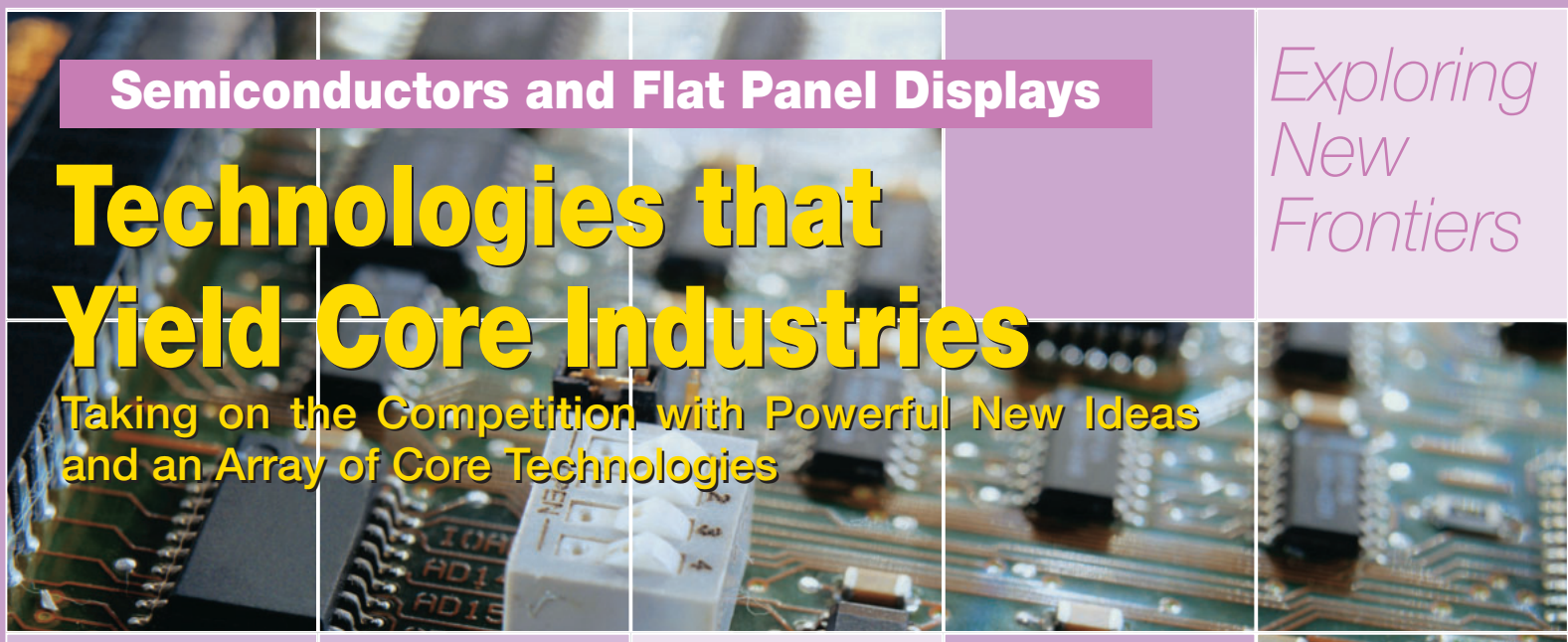
Mr. Choso stated "Shimadzu is planning to build a demonstration plant at one of its factories to test hydrogen produced by waste conversion. We hope that in the next couple of years, the factory forklifts will all be running on clean energy and that the amount of carbon dioxide emissions from the factory will be cut significantly."

There are countless ideas for environmental solutions and Shimadzu's program has now taken a giant leap forward.

Semiconductors and Flat Panel Displays

Technologies that Yield Core Industries

Taking on the Competition with Powerful New Ideas and an Array of Core Technologies



With the IT revolution now in full swing, the semiconductor industry is one of the core industries of the 21st century. It was three years ago that Shimadzu launched its Semiconductor Equipment Division. Shimadzu has been involved with semiconductor production equipment for over 50 years and created this division to meet the needs of a semiconductor market that was expanding and changing at incredible speed.

Integrating Highly Developed Expertise

Shimadzu has developed a variety of products that are critical to the production and inspection of semiconductors and flat panel displays. This makes Shimadzu a power player in the semiconductor industry. The scope of Shimadzu's expertise is impressive, ranging from chamber vacuum pumps and equipment for manufacturing and finishing LCDs, to an array of devices used to inspect semiconductor elements. The Semiconductor Equipment Division in Shimadzu has only been in existence for about three years. Prior to that time, its technologies were spread over several separate divisions, including the Industrial Machinery Division and the Analytical Instruments Division.

Shimadzu has always enjoyed tremendous support from customers because of the high quality of its products. It was difficult, however, to come up with aggressive sales strategies because important technologies were spread over several departments. Meanwhile, semiconductor industry demands had intensified and there were stirrings from researchers and management teams alike that the time was right for Shimadzu to go full bore into the semiconductor business by establishing the Semiconductor Equipment Division.

Takashi Nishimura, who is deputy general manager of the Division, described it this way, "Many of our competitors were already in the semiconductor business, and we felt like latecomers. We had to work hard and create unprecedented added value for our products to have any hope of leading the industry."

A number of development directions became possible simply by consolidating technologies from several departments. The first step was to re-evaluate the situation.

Power and Flexibility in a Turbomolecular Pump

A direct result of that re-evaluation was the turbomolecular pump. Silicon wafers are where semiconductors begin and every process in the manufacture of silicon wafers must be isolat-

The above photograph shows a large-capacity TMP-3403LMTC turbomolecular pump being assembled in a clean room. On the right is Tatsuhiro Taguchi *Asst. Manager of the Instrument Group in the Research & Development Department, and on the left is* Shingo Tsutsui *Asst. Manager of the Component Group.*

ed from air. A vacuum pump is essential for creating an airless environment.
Shimadzu's newest high-flowrate turbomolecular pump, TMP-3403LMTC, is 2.1 times more powerful than Shimadzu's conventional products. It also ranks among the top in the world for exhaust speed. This turbomolecular pump is highly acclaimed by customers and can be used in the manufacture of even the largest silicon wafers.
Ongoing R&D is aimed at creating new turbomolecular pumps with additional functions, such as pressure levels that can be adjusted by the customer.
Shingo Tsutsui, Asst. Manager of the Component Group in the Research and Development Department, explains, "We asked our customers what they wanted and listened carefully to their answers. In some case they wanted us to produce a semiconductor using different pressures. Conventional products only operated at fixed pressures, however, with the new turbomolecular pumps that are currently being developed, the customer will be able to set the exhaust rate and operate at any pressure."
This will make it easier for device manufacturers to configure systems that are even more user friendly.

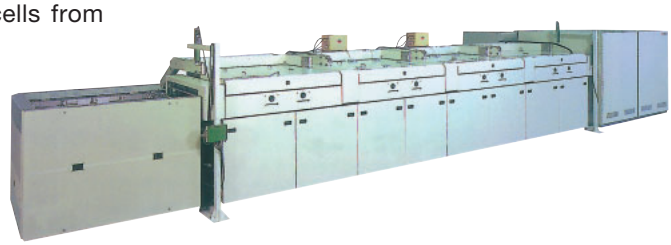
Protecting the Environment with New Solar Cells

The Semiconductor Equipment Division has another ace in the hole. It is the plasma CVD (Chemical Vapor Deposition) system that is used to manufacture solar cells. At first glance, semiconductors and solar cells seem to have nothing in common, but semiconductors are actually used as solar cell light receptors. Light excites the electrons in the semiconductor to generate a voltage. This is photovoltaic power generation.
The plasma CVD system is installed on production lines that are used to manufacture bulk polycrystalline silicon solar cells. The type of solar cell is determined by the materials and production methods that are used. Bulk polycrystalline silicon solar cells can be made from lower grade silicon to save costs, and they are ideal for commercial solar cells. The downside of these solar cells is that they are not as efficient as other solar cells. This inherent problem is caused when a portion of the generated electrons recombine with holes and are lost. Shimadzu's plasma CVD system takes care of that problem by applying an anti-reflective layer on the silicon substrate. As a result, less of the sunlight that strikes the silicon is reflected and more sunlight can be absorbed. At the same time, the silicon undergoes a structural change internally when the coating is applied. This prevents electrons from being lost so they can flow unimpeded to produce electricity. This system increases the efficiency of bulk polycrystalline silicon solar cells from 12% to 15% and has helped to commercialize solar cells.
Tatsuhiro Taguchi, Asst. Manager of the Instrument Group in the Research & Development Department told us that "With European demand now starting to rise, by the year 2010, the cost of solar cells will likely fall to 1/3 their present levels. Shimadzu will be part of the effort to lower costs and improve efficiency through the company's commitment to ongoing research."

Takashi Nishimura,
Deputy General Manager of the Semiconductor Equipment Division.

Aiming for Significant Advances

Vacuum pumps and solar cells are two success stories that have boosted the image of the Semiconductor Equipment Division, but there is much more. Another excellent example is the high-speed electron-beam TFT array inspection machine.
This machine is used to inspect transistors on a TFT-LCD substrate used in televisions and other products. It uses a high-precision electron gun to conduct inspections and can repair any defective transistors that it finds. The result is a higher yield and lower cost for LCDs. With the current exploding popularity of large-screen LCD televisions, Shimadzu is hoping to raise the bar by concentrating on developing new versions of this machine.
Shimadzu's corporate history stretches back some 130 years, but it is still a novice in the field of semiconductors. This means, however, that we are not restricted by worn out concepts, which is proving to be a driving force behind our fresh new ideas. Shimadzu is like a breath of fresh air in the semiconductor industry.



This shows the SLPC-series inline plasma CVD system for applying non-reflective coatings on solar cells.

This is the Pixel Scope high-speed electron-beam TFT array inspection machine.

Shimadzu Foundation Memorial Hall

Introduction

The Shimadzu Foundation Memorial Hall was established in 1975 to commemorate the company's centennial anniversary. The Hall is located in Kiyamachi-Nijo district of Kyoto, where company founder Genzo Shimadzu set up his original business, an area that still retains the unique look and feeling of old Kyoto. The building that houses the Hall is a traditional townhouse structure that recalls the days when the company founder lived and worked here.

On permanent display at the Hall are some 600 exhibits which show the origins of science and technology in Japan. These include physics and chemistry instruments and medical X-ray equipment – products the company has been manufacturing and marketing since business began in 1875.

Many of the products on view here were the first of their kind in Japan and, in some cases, the first in the world, proof that Shimadzu has lived up to its time-honored philosophy of "Contributing to Society through Science and Technology." This ideal has guided Shimadzu Corporation since its inception, much in the same way that Japanese tradition has been a guiding force throughout Kyoto's long history, whose history of being Japan's capital extends back some 1,200 years.

Background

After flourishing for some 1,000 years, Kyoto was faced with the prospect of decline in the late 19th century when the capital was moved to Tokyo. Instead of despairing, however, Kyoto began to revitalize itself by introducing state-of-the-art Western technology.

Around this time an idealistic young man named Genzo Shimadzu, committed to the idea of helping to make science and technology the foundation of Japan, opened up a small factory. His son, who eventually took the name of Genzo Shimadzu, followed his father in the business and helped the company grow. The many accomplishments and pioneering spirits of these two men still serve as an emotional anchor for the company today.

Genzo Shimadzu once attributed his success simply to the coincidental intersections of time, place and people in his life. His son, on the other hand, lived by a motto of "soul searching when in bed, working hard when awake," and believed that effort was eventually rewarded. Taken together, these twin ideas describe a philosophy where hard work and preparation turn opportunity into success – a spirit that guides the company even today.

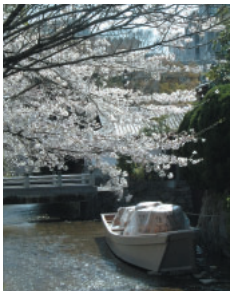
Walking through the Hall gives you a real feeling for this spirit and a sense of how it still echoes in the culture of the company Genzo Shimadzu founded.

Exhibit Highlights

One important aspect of Shimadzu's business activities is the role they played in Japanese school education. The company manufactured a variety of instruments that were designed to illustrate the principles of science for students and promote the country's growth in this field. You'll see many instruments that feature small "surprises", designed by Shimadzu's engineers to make the study of physics and chemistry – subjects many people find difficult – fascinating and fun. In fact, you are allowed to touch and handle some of the instruments on display here.

Location

The Shimadzu Foundation Memorial Hall is located to the north of the Takase River's Ichinofunairi anchorage, a historically significant site. The Hall's close proximity to central Kyoto makes it an ideal stop during any tour of Kyoto. We warmly invite all visitors to Japan to stop by our museum and learn about Japan's industrial and scientific history.



SHIMADZU FOUNDATION MEMORIAL HALL
Kiyamachi Nijo Minami, Nakagyo-ku, Kyoto 604-0921, Japan
Phone : +81-75-255-0980 Fax : +81-75-255-0985
Open : 9:30 to 17:00 Closed : Wednesday

Tracing the Footsteps of Shimadzu's Overseas Activities


Berlin Office (circa 1931)


Late 1960s Universal Testing Machine (Australia)


Shimadzu Scientific Instruments, Inc. (late 1970s)


Shimadzu Precision Instruments, Inc. (early 1980s)


Shimadzu Scientific Instruments, Inc. (1983)


Analytical equipment in France (early 1980s)


Pittsburg conference exhibition (1984)


Customer Training and Education Center of Shimadzu Scientific Instruments, Inc. (1994)


Shimadzu Vietnam Medical Hi-Teck Co. Ltd. (2000)

1875	Genzo Shimadzu began to manufacture physical and chemical equipment
1917	First company in Japan to export medical X-ray apparatus to Argentina, then, subsequently, to China and Russia in 1918
1920	Tsunesaburo Shimadzu (younger brother of Genzo Shimadzu Jr.) visited Europe and the United States and began importing scientific equipment
1923	Opened office in Berlin to introduce advanced European technology and products to Japan
1931	Opened field office in Taipei
1956	Participated in international product fairs in Beijing and Shanghai
1963	Opened office in New York for promotion and sales of analytical and measuring equipment
1966	Opened office in San Francisco, primarily for sales of aircraft equipment (moved to Los Angeles in 1969)
1968	Established Shimadzu (Europa) GmbH in Dusseldorf, Germany
1975	Established Shimadzu Scientific Instruments, Inc. in Maryland, USA
1977	Opened office in Cairo (moved to Istanbul, Turkey in 1995)
1979	Established Shimadzu Precision Instruments, Inc. in California, USA
	Opened Beijing service and repair center
1980	Beijing service and repair center expanded to Beijing office
	Opened office in Buenos Aires
1981	Opened office in Singapore
1983	Shimadzu Scientific Instruments moved to Columbia, Maryland and started analytical instrument assembly
1987	Shimadzu (Europa) GmbH moved to Duisburg and started assembly of analytical instruments
1988	Established Shimadzu do Brasil Representacao, Ltda. in Sao Paulo, (renamed Shimadzu do Brasil Comercio, Ltda. in 1997)
1989	Acquired Kratos Group Plc. in Manchester, UK
1989	Established Shimadzu (Asia Pacific) Pte Ltd. in Singapore
1991	Established Shimadzu Oceania Pty Ltd. in Sydney, Australia
1992	Opened Moscow office
	Established Beijing Shimadzu Medical Equipment Co. Ltd. in Beijing, China
	Established joint venture Toshbro-Shimadzu Pvt Ltd. in India (operated until 2003)
1994	Established Shimadzu Australia Manufacturing Pty Ltd. in Melbourne (operated until 2003)
	Established Tianjin Shimadzu Hydraulic Equipment Co. Ltd. in Tianjin, China
1996	Established Shimadzu Philippines Manufacturing Inc. in Cavite
	Established Shimadzu USA Manufacturing, Inc. in Oregon
	Established Shimadzu Research Laboratory (Europe) Ltd. in Manchester, UK
	Established Shimadzu Vietnam Medical Hi-Teck Co. Ltd. in Hanoi
	Established Shimadzu (Hong Kong) Ltd. and incorporated all other China offices (completed 1999)
1998	Established Shimadzu Philippines Corporation in Manila
	Established Shimadzu (Suzhou) Instruments Manufacturing Co., Ltd. in Suzhou, China
2000	Established Joint venture Dong-Il Shimadzu Corporation in Seoul, Korea
2004	Shimadzu International Trading (Shanghai) Co., Ltd. a subsidiary of Shimadzu (Hong Hong) Ltd. assumed responsibility for all sales and technical support in China


Beijing Shimadzu Medical Equipment Co. Ltd. (2002)


Tsunesaburo Shimadzu (on left) in Leipzig, Germany (1920)


Taipei Office (circa 1937)


Late 1960s medical X-ray system (Philippines)


President of Shimadzu with Chinese Prime Minister at Beijing exhibition (1973)


Shimadzu (Europa) GmbH (early 1980s)

Kratos Group Plc. (early 1990s)


Shimadzu (Asia Pacific) Pte Ltd. (1990) (First floor)


Shimadzu Australia Manufacturing Pty Ltd.(1995)

Shimadzu USA Manufacturing, Inc. (1997)

Shimadzu's Global Activities

Shimadzu is a player on the world stage in many industries. Based on a 5-block overseas network consisting of North America, Central and South America, Europe, China, and Asia-Oceania, we have established marketing and production bases all over the world. We have created business organizations that can respond to the varying needs of different countries and regions, and are actively working towards greater internationalization of technological development through greater cooperation in the areas of research, development, and marketing. Shimadzu is striving to develop its business in a way that reflects the importance of our partnerships with customers all over the world.

Concerning the global issue of environmental conservation, we produce a wide variety of environmental products, such as exhaust-gas analyzers and water-quality monitoring systems, and also actively promote their production overseas.

Technical training for service engineers in Singapore

Medical equipment service training in Kyoto

Analytical equipment application training in Kyoto

- Overseas subsidiaries
- Overseas offices
- Joint ventures

Training for Middle East and African customers in Lebanon

Customer Support Center in Beijing

in North and South/Central America

Shimadzu Scientific Instruments, Inc. (SSI) covers all of North and Central America via a network of direct sales offices and distributors/dealers for analytical and scientific equipment sales and support. SSI performs business activities that emphasize the importance of our partnership with customers, and also offers a global account program to major pharmaceutical and chemical corporations based on Shimadzu's solid technical support reputation.
Shimadzu USA Manufacturing Inc. (SUM) in Oregon produces most of the Shimadzu analytical equipment sold in North America.
Shimadzu Precision Instruments, Inc (SPI) is primarily involved in the supply, procurement and local production of parts for aircraft equipment. SPI's medical system division (SMS) provides sales, marketing and support throughout the US for Shimadzu medical equipment via a network of direct sales offices and dealers. The vacuum technology division markets vacuum equipment, such as turbomolecular pumps, to major semiconductor production equipment suppliers.
In South America, Shimadzu has set up a customer support laboratory in Sao Paulo, Brazil to enhance the strength of our Brazilian regional center (Shimadzu do Brasil Comercio) Ltda.



①Shimadzu Scientific Instruments, Inc.-USA
②Shimadzu Precision Instruments, Inc.-USA
③Shimadzu do Brasil Comercio Ltda.-Brazil

in China

China has been recently labeled "the world's factory" and its rapid economic expansion is continuing. In China, Shimadzu provides sales and technical support through a total of 11 offices in Beijing, Shanghai, Guangzhou and other cities, in addition to our strengthened dealer network.
We have also prepared ourselves for further market expansion via strong investment from the automobile, electronics and semiconductor industries. Additionally, higher Chinese government budget allocations are being made for university research & educational facilities and equipment.
We are also expanding our production facilities in China, specifically, in Beijing for medical equipment, in Tianjin for hydraulic equipment and in Shuzhou for analytical and environmental instruments. This will allow us to accommodate increases in demand, both from within China and throughout the world.



①Shimadzu (Suzhou) Instruments Manufacturing Co., Ltd.
②Shimadzu International Trading (Shanghai) Co., Ltd.
③Tianjin Shimadzu Hydraulic Equipment Co., Ltd.

in Europe and Russia

Centered around our European operation headquarters in Germany, we are upgrading and enhancing our direct sales and support activities in the UK, France, Benelux, Italy, Switzerland and Austria.
Eastern Europe, Russia and other CIS countries are expected to enjoy rapid economic expansion. In response to this Shimadzu is expanding its sales and support network, which now includes 6 offices throughout Russia.
Kratos, located in Manchester, England is leading brand for surface analysis instruments and TOF mass spectrometers. Shimadzu Research Laboratory (Europe) Ltd., also in Manchester, promotes joint international research and development, to provide state-of-the-art beam technology for surface analysis and mass spectrometry.



①Kratos Group PLC.-UK
②Shimadzu Deutschland GmbH-Germany
③Shimadzu Research Laboratory (Europe) Ltd.

in South-East Asia and Oceania

Shimadzu (Asia Pacific) Pte Ltd in Singapore covers both South and South-East Asia, serving as the regional headquarters for sales, technical support, and international procurement in conjunction with satellite centers in Vietnam, Philippines, Malaysia and India.
Shimadzu Philippines Manufacturing Inc. produces precision scales for the global market, which significantly reduces costs, while maintaining a high level of quality.
To handle India's rapid and continuing market expansion, we are strengthening our support of Indian customers and distributors, as well as expanding our existing medical product production facility.
Our Australian direct-sales subsidiary has earned a high reputation for technical support of X-ray systems and for their wide-range coverage of analytical equipment products.



①Shimadzu Scientific Instruments (Oceania) Pty Ltd. and Shimadzu Medical Systems (Oceania) Pty Ltd.
②Shimadzu (Asia Pacific) Pte. Ltd.-Singapore
③Shimadzu Philippines Manufacturing Inc. -Philippines

2005 no. 37

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