

Radiology Japan

Japan Industries Association of Radiological Systems

July 2001, No. 43

New JIRA Organization Put In Operation

History

The "Japan Industries Association of Radiological Systems (JIRA)" grew out of the 'Roentgen 20th Day Meeting', which consisted of seven members from among the X-ray tube manufacturers, equipment manufacturers, import dealers, etc. in the Kanto district in 1924. As the society developed, the "Japan Industries Association of Radiation Apparatus" was established in 1967.

In 1980, the association was incorporated, and renamed the "Japan Industries Association of Radiological Systems (JIRA)" to better match its activities.

Throughout these changes, our association strove to provide high-quality and -operability medical equipment by collaborating to establish domestic/international standards and to promote standardization in the industry, while observing the Pharmaceutical Affairs Law, Good Manufacturing Practice (GMP), and Product Liability (PL) law. In addition, JIRA also held exhibitions with a view to promoting the industry.

Furthermore, we have supported development of medical science and contributed to society through many disease eradication activities, in cooperation with the Japan Radiological Society and the Japanese Society of Radiological Technology.

Environmental situation

The medical care and industry environment in Japan has changed with the recent rapid aging of society. The biggest problem is the increase in medical expenses.

The percentage of elderly people in Japan reached 17.2% in 2000, and will exceed 25% in 2020, making Japan the most aged country in the world.

As a result, national medical spending has already reached approximately 30 trillion yen. It is estimated that the growth rate in medical expenses exceeds the growth rate in national income. This problem is not peculiar to Japan, but common throughout the world.

In this environment, innovations in industrial technology and computers have occurred, as has technical innovation in the medical field, with rapid progress.

Based on technical innovation, we at JIRA think that our most important task is to place emphasis not only on disease prevention and healthcare, but also on early disease identification, diagnosis, treatment, and management, and to expand the field in which medical equipment and associated services can contribute to the whole of the healthcare, medical care, and welfare fields.

Renovation

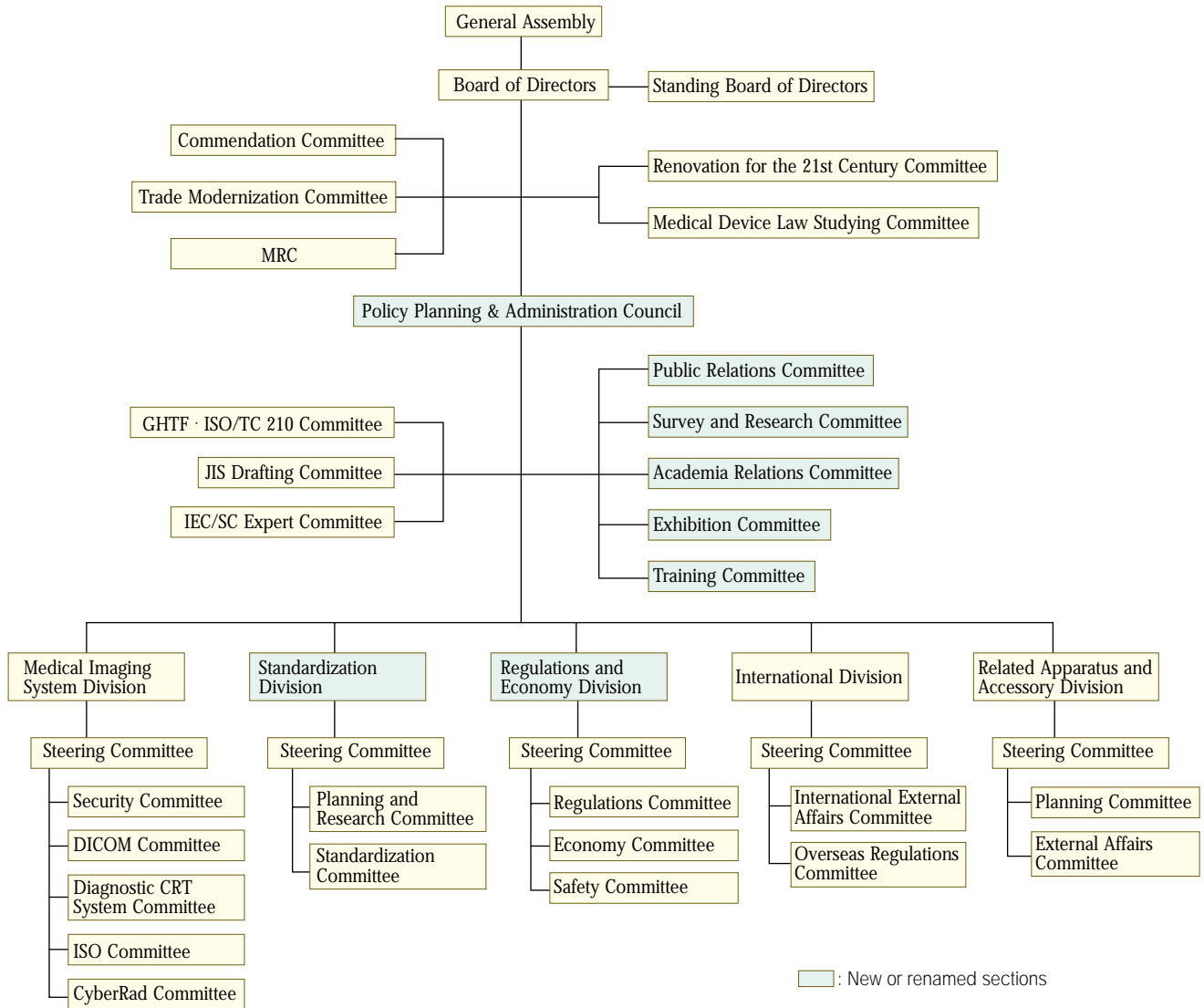
Therefore, the idea that it was an opportune time for re-organization spread throughout JIRA, and its prospective form and new organization were reviewed at the "Renovation for the 21st Century Committee". Based on the basic policies, "Infrastructure services for member companies", "Creating/suggesting ideas in the industry", and "Creating dynamism in the industry", a new organization (as shown in the following figure) was implemented on April 1st this year.

The roles of specialized divisions and committees of the new organization will be introduced in the article "Profile of JIRA" in the next issue.



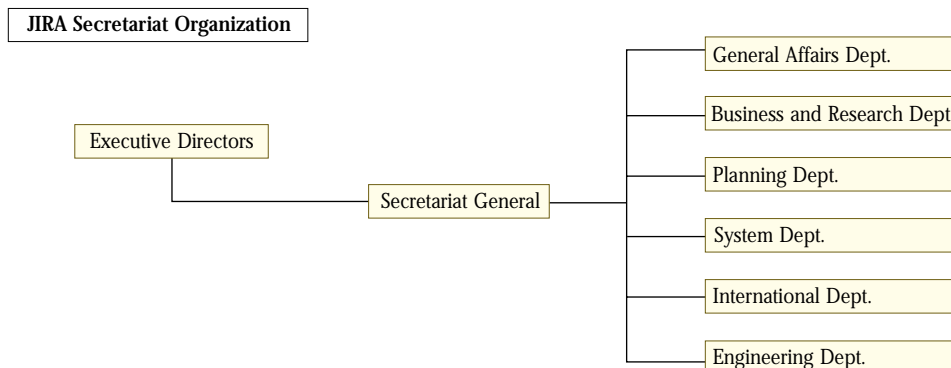
General Assembly of JIRA, 2001

New JIRA Organization



□ : New or renamed sections

Total Number of Committee Members: Approx. 830



Report on JMCP 2001*

(Ref: Radiology Japan No. 42, Feb. 2001)

The International Technical Exhibition of Medical Imaging (ITEM 2001) was held in Kobe from April 5 to 7 in conjunction with the congresses of the Japan Radiological Society (JRS) and the Japanese Society of Radiological Technology (JSRT).

In the opening address, the president of JRS, Prof. Masuda, gave the following encouragement, "In the near future, I expect that JMCP will become a global exhibition so that new technology born in Japan will be announced here and radiological people from around the world will attend to catch up with new trends."

The president of JSRT, Prof. Kodera, stated, "Though there have been remarkable developments in medical imaging technology, I expect that progress will accommodate people's needs and will bring technology closer to people in the future."

At ITEM 2001, which was promoted by JIRA under the theme "Clinical Images created for the new millennium", 114 companies presented booths (10 more companies compared to last year) and 3 companies presented five vehicles. These companies promoted their latest diagnostic image equipment, software, and network products aiming at technical contribution for medical innovation. More than 30,000 visitors attended throughout the three days of the exhibition, which was a very satisfactory attendance.

ITEM 2002 will be held in Kobe from April 4 (Thu) to 6 (Sat) in Kobe International Exhibition Hall, the same as in 2001. The president of JRS is Prof. Yamada of the Department of Radiology of Osaka City University Medical School. The president of JSRT is Mr. Nakanishi, Technology Executive of the Department of Radiology of the Osaka University Hospital.

DICOM Standards Committee held concurrently with JMCP in Japan

The DICOM Standards Committee (DSC) and its three working groups, WG14 (Security), WG10 (Strategic Advisory), and WG21 (Multi-Frame CT) met in Kyoto and Kobe concurrently with JMCP. In particular, JIRA served as secretariat for WG21.

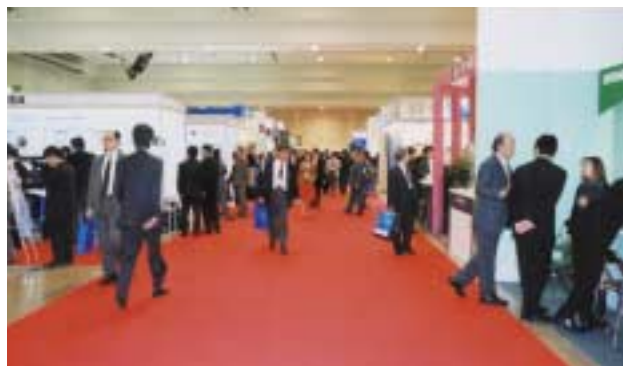
The main discussion themes in each committee and working group are shown below.

- WG14: Supplement 41 (Digital signature), Supplement 51 (Media security), and information exchange about privacy protection laws in each country
- WG10: Discussion about DICOM Strategic Documents, adjustment of relations with the other standards organizations (HL7, ISO/TC215, etc.)
- WG21: Comment statement for Supplement 49 (Multi-frame MR data definition), review of Supplement 58 (Multi-frame CT data definition)
- DSC: Introduction of IHE Year 3 & 4, activity report in Europe and Japan (introduction of IHE.jp of JIRA, etc.), activity report of each WG

| Events | Congresses | | Exhibition |
|----------------------------|--------------------|---------------------|--------------------------|
| | JRS Apr. 5 to 7 | JSRT Apr. 5 to 8 | ITEM 2001 Apr. 5 to 7 |
| Participants | | | |
| Radiologist | 3184 (3319) | | 4209 (4411) |
| Radiological-Technologists | | 2910 (3225) | 12125 (12241) |
| Paramedical Personnel | | | 1031 (1184) |
| Others | | | 12846 (14675) |
| Total | 3184 (3319) | 2910 (3225) | 30211 (32511) |

Note: 1) The numbers of visitors to the exhibition include repeat visitors.
2) The numbers in parentheses are corresponding figures from Y2000.
3) The number of registered exhibitor staff members was 4230 (3993).

* The combined assembly name of the JRS and JSRT scientific sessions and the ITEM technical exhibits supported by the JMCP (Japan Federation of Medical Congress Promotion).



ITEM 2001 Exhibition

Development of Japanese Radiological Equipment in the Post-World War II Period (8)

Development of stomach mass screening equipment

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Advisor, JIRA



Summary up to the previous issue

The fight against tuberculosis, which was rampant throughout the pre- and post-war period as the so-called "national disease" of Japan, began around 1935 using an X-ray fluorographic technique pioneered by Professor Yoshihiko Koga. This technique, which was referred to as "X-ray indirect radiography", was presented at various academic meetings in 1936. X-ray fluorography subsequently played a major role in improving the health of the Japanese people, who were at that time living in great poverty. In the post-World War II period, in which a reliable power supply was not available because Japan was lying in ruins, capacitor-discharge-type X-ray systems were developed to combat the "national disease" of Japan. We have already discussed the history of the development of such X-ray systems and X-ray chest fluorographic equipment, which eventually led to the introduction of mirror camera systems. Although tuberculosis can no longer be considered Japan's "national disease" due to great advances in medical care, stomach cancer has emerged as a new "national disease", leading to active research in the early diagnosis of stomach cancer.

Studies were conducted using the X-ray TV systems that first became available around 1960 or 1961 and were expected to be the most suitable for the detection of stomach cancer. In this issue, I would like to discuss the history of the development of X-ray fluorographic systems for the examination of the stomach as well as vehicle-mounted fluorographic systems for the early detection of stomach cancer.

Research into X-ray examination methods for the early detection of stomach cancer

Such research had already begun in the period from 1951 to 1955. First, Dr. Hikoo Shirakabe (1921-1994) and Dr. Heizaburo Ichikawa (1923-) at Chiba University started research and development work in the area of X-ray double-contrast radiography, which eventually led to the establish-

ment of global standards for the X-ray examination of the digestive tract. The fascinating story of their ground-breaking research and development work will be presented in a later issue. In this issue, I would like to continue the discussion begun in previous issues and to focus on the research involving X-ray fluorography conducted by the group at Tohoku University.

Introduction of gastric X-ray fluorography

Research and development work on X-ray fluorography had already been initiated by a group at Tohoku University that included Dr. Toshio Kurokawa (1897-1988, then president of Tohoku University), Dr. Masaharu Nishiyama (1922-1993, then vice-director of Kakunodate Municipal Hospital), and Dr. Shoei Hasegawa (a lecturer in the Third Department of Internal Medicine of the Tohoku University School of Medicine at that time).

According to the writings of Dr. Hasegawa entitled "The Achievements of Dr. Toshio Kurokawa -- Reminiscences and Significance in the Present Day" (edited by the Third Department of Internal Medicine of the Tohoku University School of Medicine and published by Shojinkai on December 25, 1999):

"One day at the end of 1955, Dr. Masaharu Nishiyama, the vice-director of Kakunodate Municipal Hospital, visited his former teacher Dr. Kurokawa in the professor's rooms at Tohoku University."

Dr. Nishiyama, who was working on the development of new X-ray diagnostic methods for the examination of the stomach at that time, brought with him a test image on 35-mm film obtained using a primitive prototype X-ray indirect

radiography system in order to obtain Dr. Kurokawa's opinion. This moment was the beginning of the cooperative development of X-ray indirect radiographic diagnosis by Dr. Kurokawa and Dr. Nishiyama.

The book continues:

"Dr. Kurokawa faced me after a time, and to encourage me, said with deep emotion, 'You have succeeded!...If better images can be obtained, it may be possible to use this method for mass screening for stomach cancer. You must continue with your work!' (Quoted from the private papers of Dr. Nishiyama.)"

(Author's note: The initial experiments were conducted using an experimental device to determine whether or not an X-ray image on a fluorescent screen could be obtained using a conventional 35-mm camera. It appears that this conversation with Dr. Nishiyama was when Dr. Kurokawa initially did not think of that such imaging might be possible.)

Dr. Hasegawa's description continues:

"I was sent as an assistant to Dr. Nishiyama in Kakunodate from 1954. However, it appeared that, as a result of the above conversation, it was decided that I should return to Dr. Kurokawa's department of internal medicine to engage in this work. I returned to Dr. Kurokawa's department in April 1956. When I went to the professor's rooms to greet him, he said to me, 'You must perfect your system and perform mass screening for stomach cancer!'"

This is the historical record of the establishment of a project to develop a mass screening program based on gastric X-ray fluorography by Dr. Kurokawa, Dr. Nishiyama, and Dr. Hasegawa.

Incidentally, why was Dr. Kurokawa so strongly devoted to X-ray examination methods? The personal reflections of Dr. Kurokawa, which appeared as a preface in "MEDIX", published by Hitachi, Ltd., in October 1975, are presented below.

Reminiscences of Dr. Kurokawa:

"In 1931, I studied the X-ray diagnosis of the digestive tract under Professor Holzknach of Vienna University. Mainly, I worked with an assistant professor, Dr. Presser, to perform fluoroscopy of the stomach every morning. In Japan in those days, no equipment was available that permitted rapid switching between fluoroscopy to radiography. In addition, when X-ray images of the stomach were reviewed, the image quality was not very good, making it difficult to observe the subtle defects associ-

ated with progressive cancer. Therefore, I was amazed to see Dr. Presser observe images of the mucous membrane in relief and radiograph them. After returning to Japan, I improved our X-ray equipment in cooperation with the X-ray technicians at Tohoku University Hospital in order to permit switching between fluoroscopy and radiography."



Dr. Toshio Kurokawa at that time

Dr. Kurokawa continued his research "whenever and whenever he could", including the development of hand-made spot radiography equipment and so on. His reminiscences continue:

"Taking a hint from 25 × 25 mm indirect radiography, which had previously been used by Professor Kumagai and his coworkers and found to be effective in mass screening for TB, I also evaluated a 70 × 70 mm indirect radiography unit for stomach mass screening. At that time, I installed this equipment in a large vehicle in cooperation with Hitachi, Ltd., which led to the first vehicle-mounted mass screening system in Japan. The first vehicle was named the "Hitachi" and was used for stomach mass screening all the way out to the backcountry of the Tohoku region..."

After this, Dr. Kurokawa focused his efforts on the establishment of a national cancer society in Japan. I will return to Dr. Hasegawa's descriptions later for reference.

Establishment of the Japanese National Cancer Society

"Dr. Kurokawa thought that sufficient progress had been made with regard to indirect gastric radiography and therefore prepared for the establishment of mass screening programs. At the General Meeting of the Japanese Cancer Association held in Osaka in December 1957, Chairman Hiroshige Shioda proposed the establishment of a national association to fight cancer in Japan, and the Japanese National Cancer Society was founded on August 1, 1958. "Thus, while Dr. Nishiyama and Dr. Hasegawa were involved in developing systems for performing mass screening examinations, Dr. Kurokawa was helping to create an organizational structure for instituting mass screening programs. As a result, the Miyagi Prefectural Cancer Society was founded on September 1, 1958."

The system development work conducted by Dr. Nishiyama and Dr. Hasegawa then evolved into a cooperative development project with a group from Hitachi, Ltd.

Trial manufacture and development of an X-ray TV system by Dr. Kurokawa, Dr. Nishiyama, Dr. Hasegawa, and group members from Hitachi, Ltd.

In the previous issue, the history of the development of X-ray TV systems by Shimadzu Corporation in the Kansai region and Toshiba Corporation in the Kanto region was described. Here, I would like to present information taken from Hitachi's records concerning the history of the development of X-ray TV systems by a Hitachi research group in those days.

First, there is a description regarding the development of the "Oide-type X-ray TV system", which was a major advance at that time:

"In the following year, 1961, the XTV-O-2, in which an image intensifier was combined with a high-sensitivity image orthicon tube, was introduced, making it possible to perform more advanced fluoroscopic examinations using an X-ray TV system. In the next year, 1962, the XTV-V-2, incorporating a Vidicon tube, was developed. Then, in 1963, a very popular X-ray TV system, the XTV-O-1, was developed based on cooperative research with the Shiba Electric Corporation (now Hitachi Electronics, Ltd.) under the guidance of Dr. Ryohei Oide (1919-1995), who was with the Self-Defense Forces Central Hospital at that time. This was an X-ray TV system with a good cost-performance ratio in which the fluorescent screen was imaged directly using a high-sensitivity camera tube, the "image orthicon tube", rather than an image intensifier, since image

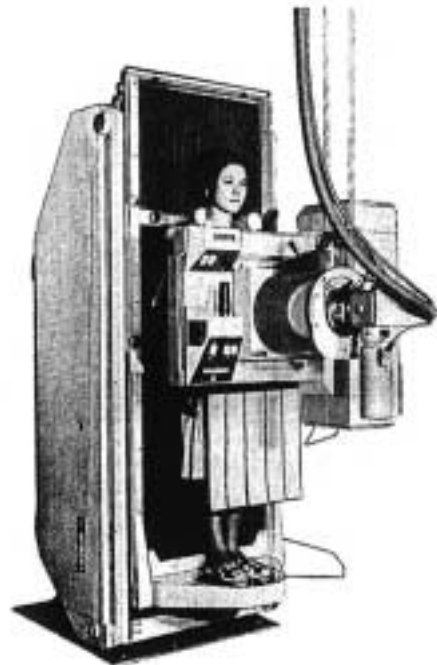
intensifiers were very expensive in those days. Thus, we entered the era of X-ray TV systems."

(Author's note: Although this X-ray TV system combining a fluorescent screen and an image orthicon tube was called an "Oide-type X-ray TV system" and was popular for a time, X-ray TV systems incorporating an image intensifier and a vidicon tube soon became the mainstream, supplanting Oide-type systems.)

The description continues:

"The introduction of these X-ray TV systems led to the development of a remote-controlled radiographic/fluoroscopic table with an X-ray TV system, the TH-500, in 1966. The TH-500 allowed the operator to perform fluoroscopic and radiographic procedures under remote control using the X-ray TV system. In the same year, a high-end radiographic/fluoroscopic table with an X-ray TV system for detailed examinations, the TD-VA (Figure 1), which supported remote control as well as local control, became commercially available.

As described above, we were entering the era of X-ray TV systems, and the application of such system to cardiovascular X-ray diagnosis and stomach mass screening was expanding."



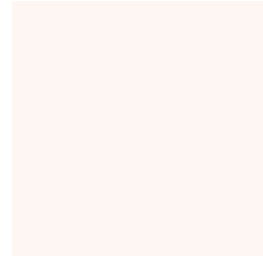
(Figure 1) X-ray TV radiographic/fluoroscopic table model TD-VA

Summary of this issue

By 1966 or 1967, the performance and stability of image intensifiers had been improved to the point that they were suitable for practical application. The development of gastrointestinal diagnostic equipment employing X-ray TV systems, as well as research and development work to develop new diagnostic methods, reached a high point.

With regard to direct fluorography systems, the ring stand-type remote-control method developed in Japan had undergone further evolution, as discussed previously. With regard to indirect fluorography systems, as discussed in this issue, significant progress was made in Japan, such as the development of fluorographic systems installed in vehicles for stomach mass screening. Systems of both types were developed to fight the "national diseases" of Japan.

The next issue will discuss the development and performance capabilities of gastrointestinal indirect mirror cameras, which were expected to achieve further improvements in image quality by the adoption of the indirect imaging method.



"Gion" Festival in Kyoto

Dear readers!

*Contribution of your personal opinions or comments
that might be interesting to international readers
of Radiology Japan is very much welcome.
Please contact the editor.*



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