

# X-Ray Filmless Hospitals

Hospitals must preserve various diagnostic X-rays for a minimum period of five years. In larger hospitals, storage and efficient retrieval of several hundred thousand X-ray films pose problems. However, introduction of a new X-ray image data management system will reduce the space needed for storing X-ray films to only a two-hundredth that currently needed.

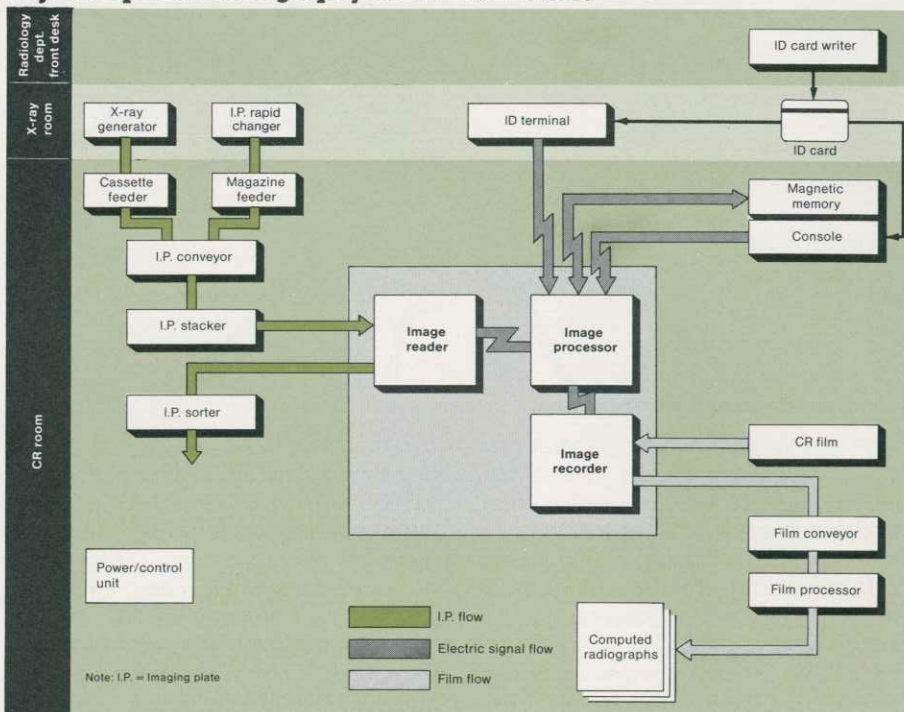
Fuji Photo Film Co., a major film and camera maker, has developed this X-ray image data management system, which enters data from 10,000 human X-rays onto a single optical disk. This system went on trial sale in May, and is used in tandem with the computed radiography (CR) digital X-ray diagnostic system developed by the company in 1983.

In CR, an X-ray image is first recorded on an imaging plate, replacing the conventional film and screen. The plate is then fed into an image reader, which converts the variations of X-ray energy absorbed by the plate into light. The light is first turned into analog and then into digital signals. These digital signals are fed into an image processor attached to a computer, resulting in an easy-to-read, high-diagnostic-quality image on the display.

The newly developed X-ray image data management system selects the digital signals from the CR and compresses the data, for instance, by expressing all portions of an image of the same color as a single signal. The compressed data are recorded on an optical disk.

The optical disk has a memory capacity of 2 gigabytes (2 billion bytes). The

## Fuji Computed Radiography Basic Flow Chart



disk is capable of storing data equivalent to only 500 CR images unless the data are compressed. However, in the new system, the disk can store data equivalent to 10,000 compressed images.

Such information as patients' identification numbers, names and X-ray dates are entered on a magnetic disk. The new system can instantaneously retrieve images, filed according to individual patient names or X-ray dates, even if the patient card is submitted at a hospital in a remote village.

Image data from complicated images

such as X-rays may require nearly an hour to transmit over telephone lines, with concomitant high costs. This is a major reason why telephone transmission of X-ray data is not done more commonly. According to Mr. Masao Takano, a senior researcher who played a leading role in developing the new system, now X-ray image data can be transmitted over telephone lines in several minutes when the data have been compressed beforehand.

(Akira Shoji, staff writer with Kyodo News Service)

## Better Bonding

A research team at Mitsubishi Electric Corporation has recently made a breakthrough in developing a bonding process that does not change or impair the functions of the bonded materials. The process is called "interfacial bonding at normal temperatures" technology, and will have wide applications in a variety of fields.

Unlike previous bonding methods, the new process does not require heat or pressure, opening the way for the bonding of amorphous materials and metal-ceramic and metal-semiconductor bonding, previously difficult to carry out because of their poor resistance to heat and/or pressure.

The Mitsubishi group focused on three areas of research in creating this new technology: developing ultrahigh vacuum conditions; removing contaminants from the surface to be bonded and reactivating the "coupler" electrons on the surface of solids so that two substances can be bonded at the lattice level under normal temperature and pressure conditions; and diamond grinding the surfaces to make them atomically perfectly flat, thus assuring the strength and evenness of the bond. After extensive tests, the research team succeeded in bonding 25-micron-thick silver foil to copper.

Future applications of the technology in space station factories are envisioned,



A recent technological breakthrough: the bonding process called "interfacial bonding at normal temperatures"

in addition to its uses for amorphous and semiconductor materials. (Tsukasa Fukuma, staff writer with Kyodo News Service)