lowing components, (1) Inputs; a multiple data acquisition mode system, i.e., multi-channel spectrum analysers, time-sequenced scalers and scanner-type/camera-type image analysers, (2) Data processor; a small general purpose digital computer with 4096 words core memory system, (3) Analog outputs; a CRT display and a X-Y recorder, (4) Digital outputs; a typewriter and a tape puncher, (5) Supplement memory; a high speed magnetic tape recorder, which is used for the storage of man yprocessing programs as well as for the RI data accumulation, (6) Controller; the system is partially operated by a panel-button handling, although the most of controlling and applied programming were directed through the typewriter. The latter method provided a widely flexible data processing.

Data Acquisition and Processing of a Human whole Body Counter by On-line Computer System

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Recently, a human whole body counter has a tendency to develop more simple or complicated structure.

We have attempted to install a system of data acquisition and automatic post processing of data by an on-line computer system for a human whole body counter in National Institute of Radiological Sciences.

1. New system of the human whole body counter

Pulses from detector are sent to a computer center through impedance converter by on-line cable and are connected analogue to digital converter. The output of the analogue to digital converter is changed by an input format converter in such a format that is defined by program and is connected to INC units or SEQ unit. Energy pulse height distribution is collected at an INC mode. At a SEQ mode, pulse height information from the analogue to digital converter is collected in time sequence corresponding to the detection time of each γ-ray pulse.

A cathode ray tube as a monitor and input-output type-writer for communication with computer are established in the human whole body counter site.

2. Soft-ware of the new system

A soft-ware consists of programs of gain control of the detector (HCI-01), data acquisition by the INC mode (HCI-02) and the SEQ mode (HCS-01) and post processing of the data.

The HCI-02 program collects the data in one of two INC areas alternatively, and the collected data in another INC area are transfered to a disk pack storage unit. Switching of the two INC areas are made by timing signals from a timer that can generate an interrupt signal at a fixed time interval. Those data in disk pack are pulse height distribution of the fixed time interval, in other words whole body distribution of radioisotopes. Those data include all data that could be obtained with a past human whole body counter system, in addition to the information of scattered γ-rays. Therefore, it is possible that we can make a correction of degraded γ-rays in human body using the information of scattered γ-rays.

The HCS-01 program collects all data from the detector. We can pick up freely essential

information and also make a correction similar to that used in the HCI-02 program.

This new system of the human whole body counter and its soft-ware show one of the direction of human whole body counter in the future.

NIRS On-line Computer System for R.I. Image Data Acquisition and Processing

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Output pulses from image detectors in radioisotope imaging are those from a NaI (Tl) scintillation detector caused by γ-quanta. Thus, output signals are essentially a digital information and so are feasible to be collected by means of a digital computer. We have developed an on-line computer system to collect all informations from various image detectors such as recti-linear scanner and Anger camera without loss of information and to process them into an analog pattern from which doctors can extract useful diagnostic information.

The on-line system consists of a central computer and three on-line experimental sites which are connected by several co-axial cables for signal transmission. Two sites of the three are recti-linear scanner room and whole-body counter room respectively. On-line input/output devices that are attached to the experimental sites are impedance converter (IC), input/output typewriter (I.O.T.) and cathode-ray tube display unit (CRT). Output pulses from the detector are transmitted via IC to an analog to digital converter (ADC) located at the computer room. The ADC converts height of each pulse into digital clock pulses which are connected to an increment unit (INC) and or a sequence unit (SEQ). The INC has an ADD-1 function to a memory word of which address corresponds to the number of the clock pulses. Since we have three INC, three-dimensional pulse height analysis is possible with our system. On the othe rhand, the SEQ has a function to write a number of the clock pulses to a memory word of a preassigned buffer regions in time sequence, and the information are transfered to a magnetic disk. Using these units, multi-parametric information can be gathered.

For image visualization, we have developed display software for the CRT, a curve plotter and a line printer. We are also making various software for image processing and for pattern recognition.