C-25

1/2-inch Digital VTR

In the later half of the 1980s when digital picture recording and the reproduction of high-definition moving images was needed, the standard of digital VTR used a width of 3/4-inch. There were many problems—news gathering activities, an all-in-one camera and recorder not being available, bloated media storage space, and the parallel use of several standards. It was required to develop a high-density recording system using 1/2-inch tape so as to make VTR equipment a compact recoding system which could be used with a single standard covering everything from all-in-one cameras and recorders, studio recorders, and automatic sending systems. In 1989, Y. Ohba realized a composite digital VTR which had about fivefold the recording density of conventional use of the world's first 1/2-inch tape with a track width of 10μm, and the shortest recording wavelength of 0.76μm by going through steps—improving the performance of high density recording of the medium and magnet head, the invention of the 8-14 modulation method, and the optimal new modulation for tape/head systems, resulting in the improvement of signal quality, and the development of error correction code concealment technology which have powerful correction capacity against dropouts intrinsic to VTR for short wave/long-hour recording. Because of this, reporters were able to use a single standard for recording media for reporting, editing, and sending, and eventually, compact/lightweight digital tape became available. This standard was widely used as VTR for common high definition (for studio live recording and for editing) and in 1991 was named D-3, and then in 1993, it was standardized as SMPTE 263M －265M and became the international standard D-3 format.

C-26

Electron Microscopes

Electron microscopes were used as an indispensable tool for natural science including material science and biological science, however, there was a problem— an inability to use for thick samples. In order to overcome this problem and to remarkably improve the functions of electron microscopes, ultrahigh accelerating voltage started and electron microscopes with some one-million accelerating voltage started operation at home and abroad.

As needed for upgrading ultrahigh accelerating voltage arose, from 1969, the group of E. Sugata, K. Ura, H. Kimura, et al. started designing a 3-million-V electron microscope. In acceleration tubes, the heart of ultrahigh electron microscopes, often micro discharges occur.

In order to control these as much as possible, they tried one way after another—the design of the shape of acceleration tubes to realize a high vacuum in addition to the electrode. Eventually, they succeeded to imply a 3-million-V ultrahigh voltage.

In 1970, test operation was carried out at the central research laboratory, Hitachi, Ltd., and March 1972, and was handed over to Osaka University as special equipment of the Ministry of Education, Science, Sports and Culture, and its operation started in April 1972.