Foreword

Live with the Times

KOMAKINE Takashi*

While I tell myself on a daily basis that people who live alongside science and technology must continue learning, society demands technologies that everyone can use without studying. However, in order to at least benefit from such technologies, understanding and getting used to advancement are necessary. 157 years ago in 1864 when the Ikedaya Incident took place at the end of the Edo Period in Japan, the U.S., which was in its third year after the transcontinental telegraph system was completed, was in the middle of the Civil War. This year, Maxwell formulated a mathematical theoretical formula regarding electromagnetic waves in the U.K. In the beginning of the 1900s, Marconi succeeded with an Atlantic wireless transmission. In Japan, Dr. Uichi Torigata, who is from Odate of Akita Prefecture, carried out successful two-way wireless telephone communication in 1917. Today, 100 years later, we are enjoying the benefit of communication technologies, including mobile phones. In such a generation of technological development, the timing in which one lives their life greatly affects his/her technological life. I would like to reminisce how my life has taken its steps in this era of technologies by reviewing the technologies that I have learned and have been familiar with in chronological order.

50 years ago in 1968 when the pager service started in Japan, I remember that my late father, who was an engineer with Nippon Telegraph and Telephone Public Corporation (now NTT), showed me a sample pager when I was still in elementary school. In the following year, I obtained an amateur radio license and found a technical field to strive for. Although pagers came to an end in response to the demands of the times, technologies shifted to mobile phones/smartphones.

40 years ago in 1976, NEC released the one-board microcomputer TK-80, starting the era of personal computers. This enabled us to easily perform digital processing of signals with microcomputers. This was the year in which I started studying electronics at university. Following my graduation, I majored in computer science in graduate school and obtained one more field of technical specialty. The shift to high-performance and high-functioning personal computers accelerated, and the built-in microcomputer technology has been applied to a wide variety of electric products. The fusion of communication and information is supporting the era of IoT and the client-server system.

30 years ago, I had the opportunity to research human auditory functions in a research center in Kansai Science City, and I had the chance to be present in the forefront of speech recognition/speech synthesis technologies. These were the forerunners of technologies, such as machine translation, that have become commonly available now. This experience has always supported my research to follow.

25 years ago, I was part of research and development of the densification of magnetic recording devices in a prefectural research center in Akita, where I grew up. The volume of common regular hard disks for PCs was approximately 10GB back then, but it is not uncommon for them to exceed 1 TB now, thanks to the practical application of vertical magnetic recording. The wave measurement technology, with which I worked during this research, has become a great source of motivation for my research activities since then.

20 years ago in 1996, HONDA's autonomous bipedal robot "ASIMO®" was released. Development of robots, which had a hard time standing up until then, rapidly advanced after ASIMO®.

15 years ago, I finally turned my 20-year-long hobby into action and started enjoying motorcycle circuit runs with people who share kindred spirits in my area. The technological advancement of motorcycles surprises me. Standard implementation of ABS has been advancing, and ETC/navigation systems now come as standard equipment. While tightening of exhaust gas and noise regulations is accelerating, sport vehicles are being made lighter and with higher power/more electronic control. A recent topic is application of a robotics mechanism that doesn't fall even while stopping, and motorizing is also possible. However, these machines directly show the skills and sense of the driver, which is one of their attractions. It is (I hope) not possible that the direction of future advancement will only lean toward technologies.

Let's return to the main subject.

I have been inspired by a number of technologies that I have encountered in a mere half century and have made my living by responding to demands. Most of these encounters were by chance, but seeing it from another point of view, the technologies that I create may affect someone's fate and change society. History teaches us that technologies that were meant for good sometimes lead to negative legacies. I hope to strive to solve issues of the time so that the results are worth passing down to the future generations.

* Professor, National Institute of Technology, Akita College