# Preface
# Special Issue on Advanced Technical Computing Solutions

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The world's first computer is considered to be the Electronic Numerical Integrator and Computer (ENIAC), which began operation in 1946. ENIAC used 17 468 vacuum tubes and was said to need only two hours to complete technical calculations that would take 100 years to solve by manual means at that time.

Last year, Fujitsu joined the "Next-Generation Supercomputer Development Project" as part of Japan's science and technology policy that designates supercomputing as one of the nation's key technologies. In this project, Fujitsu takes up the challenge of developing the world's fastest supercomputer having a computational performance several hundred trillion times that of ENIAC. In the early days of ENIAC's operation, some said it was mere folly to think that nearly 20 000 vacuum tubes, which were prone to failure, could be made to operate simultaneously. In the end, however, the great persevering spirit of the researchers involved, who were hoping to bring about a major breakthrough in scientific research, made the impossible possible. Today, more than 60 years later, it would be no exaggeration to say that it is this same desire for achievement in researchers that has created the modern computer era.

With a target performance of 10 petaflops ($10^{16}$ floating point operations per second), the next-generation supercomputer will have to operate the incredibly large number of 100 trillion transistors simultaneously without error. I think all would agree that this is a very high target even by today's advanced technologies. There appears to be no end to the demands made on information technology in scientific and technical fields even today, more than 60 years after ENIAC.

From the launch of its computer business up to the present,

Fujitsu has been accumulating much technology while responding to the suggestions and needs of its customers in diverse science and technology fields such as space, aviation, meteorology, nuclear power, astronomy, and computer-aided engineering (CAE).

In this special issue, we introduce some of Fujitsu's activities and achievements that span a wide range of science and technology themes including:

- Development of application systems in the fields of space, astronomy, and nuclear power.
- Development of large-scale technical computing systems in support of R&D activities and user-support technologies to make these systems easy to use, operate, and manage.
- Deployment of simulation technologies for research, design, and development work that uses CAE packages in manufacturing.

Since the end of the war, Japan has steadfastly professed itself to be a science and technology nation. Despite a long-term period of economic stagnation, science and technology budgets have been expanded and a policy of maintaining and enhancing industrial competitiveness has been adopted. At the same time, the growth of newly developing countries like China and India has been truly remarkable and they are poised to catch up with Japan in science and technology too. Fujitsu, which has grown together with science and technology in Japan, takes pride in its overall expertise in system-development and hardware/software technologies that has been accumulated over the long term based on guidance received from its customers. To the best of its ability, Fujitsu hopes to contribute to the further expansion of science and technology.

I would like to take this opportunity to extend my appreciation to you, our readers, for your ongoing patronage and interest in Fujitsu's core technologies in science fields. I look forward to your valuable guidance in the years to come.