

## Digitalization of Operation Technology to Achieve Sustainable Society



Corporate Officer, Corporate Senior  
Vice President

**SATA Yutaka, D.Eng.**

Many historic events occurred in 2024 including the collapse of Syria's Assad regime, the Russo-Ukrainian War that has stretched into its third year, and the Israel-Gaza conflict. Many countries now place special priority on economic security, and amid escalating geopolitical risks in the Far East, Japan must enhance its strategic indispensability in the international community.

Additionally, weather-related disasters that are presumably linked to climate change are increasing in frequency and intensity, as represented by torrential rainfalls in the Noto Peninsula and Spain. The United Nations Office for Disaster Risk Reduction (UNDRR) reports that there were 2.3 times more floods globally in the 2000-2019 period than in the 1980-1999 period. These circumstances underscore the need to make infrastructure more resilient and to accelerate the development and deployment of innovative technologies required to achieve a carbon-neutral society.

Adhering to the Basic Commitment of the Toshiba Group, “Committed to People, Committed to the Future,” we are pursuing a three-stage strategy to overcome these serious social issues—digital evolution (DE), digital transformation (DX), and quantum transformation (QX). More specifically, we are committed to combining operational technology (OT) developed in the energy and social infrastructure fields with digital technology and the power of data to enhance the resilience, efficiency, and decarbonization of the infrastructure sector, for example, through automation of products, services, and customer operations.

To ensure the success of these strategic initiatives, our efforts must not be confined to the Toshiba Group. Efforts aimed at co-creation with customers and business partners, as well as collaboration among engineers and researchers in the OT and digital fields, are also crucial. With this in mind, we opened Innovation Palette in February 2024, a state-of-the-art R&D facility that offers co-creation spaces and a live experimental site.

*TOSHIBA REVIEW Science and Technology Highlights 2025* provides snapshots of our initiatives and achievements to contribute to carbon neutrality and a circular economy, including technology for optimal bidding in electricity markets, development and demonstration of next-generation solar cells, and delivery of a new static synchronous compensator (STATCOM), a device suitable for regulating a power grid with a high renewable energy ratio.

In the domains of social infrastructure resilience and automation, we have developed AI technology for interactively generating software from ambiguous requests, a picking robot capable of handling a wide variety of items at high speed, and technology for long-distance quantum key distribution (QKD) necessary to achieve absolutely secure cryptographic communication.

Furthermore, our R&D achievements include a double-transmon coupler that dramatically enhances the accuracy of superconducting quantum computers and a compact high-precision inertia sensor module capable of sensing the movement and posture of objects.

The Toshiba Group released *Toshiba's Revitalization Plan* in May 2024, starting anew to become an entity needed by society. It is said that now is an era of VUCA—volatility, uncertainty, complexity, and ambiguity. Even in this time of VUCA, the restless curiosity and passion of Toshiba's founders still live on in our hearts and souls. We believe that the key to achieving renewed growth and success lies in contributing to resolving global social issues through technological innovation. We hope that you will enjoy reading *TOSHIBA REVIEW Science and Technology Highlights 2025*, and would appreciate your feedback, suggestions, and comments.