

Total Solution Provider for Medical Treatment

Solutions for Wide Range of Needs in Medical Field

KURA Hiroyuki

Medical Solutions to Achieve Clinical Benefits, Low Patient Burden, and Economy

TOKI Yusuke

As a total medical solutions provider, Toshiba Medical Systems Corporation is promoting the development of diagnostic imaging technologies and the dissemination of medical equipment and information systems that realize early diagnosis, less-invasive treatment, and more effective diagnostic workflow, in accordance with its management slogan of "Made for Life™" embodying the philosophy of respect for life and the creation of further value. We are also making efforts to provide economic efficiency for the customer by both improving diagnostic efficiency through the integration of various types of medical information in the hospital, and securing the reliability of medical equipment based on our high-level support services.

High-Quality X-ray Imaging Technologies for Advanced Medical Care

SAKAGUCHI Takuya / OCHIAI Rie / TANAKA Hideaki

With their notable features such as simplicity, a large field of view, high spatial resolution, and high temporal resolution, X-ray imaging systems are applied to diagnosis of and treatment support for a broad range of diseases. X-ray imaging is required to provide both high image quality that allows accurate diagnosis and treatment in clinical practice, and minimized dose to the patient and operator.

Toshiba Medical Systems Corporation has been contributing to the realization of advanced medical care by developing new technologies based on cutting-edge digital technologies and supplying new X-ray imaging systems equipped with these technologies. We are making continuous efforts to innovate technologies in order to meet various requirements in the clinical setting.

Aquilion ONE™ CT Scanner Contributing to Diagnosis and Treatment of Three Major Classes of Disease

KAZAMA Masahiro / IKEDA Yoshihiro / ARAKITA Kazumasa

Computed tomography (CT) scanners continue to evolve to realize the rapid acquisition of high-resolution images, particularly for the diagnosis and treatment of three major classes of disease: cerebrovascular disease, cardiovascular disease, and cancer. With the introduction of helical CT systems providing continuous scanning in addition to multislice CT systems providing simultaneous scanning of multiple slices, the usefulness of CT scanners has markedly increased.

Toshiba Medical Systems Corporation has developed the Aquilion ONE™ CT scanner, which can cover a scanning range of up to 160 mm at a gantry rotation speed of 0.35 s/rot. The Aquilion ONE™ makes it possible to analyze cerebral blood flow and visualize blood vessels during a single contrast study in the assessment of cerebrovascular disease, and allows the diagnosis of cardiac disease ranging from the observation of coronary arteries to the assessment of blood flow in the myocardium. As the assessment of cancer is not affected by respiratory movement, we are also engaged in research to evaluate the effects of cancer treatments using the Aquilion ONE™.

Ultrasound Diagnostic Systems Contributing to Noninvasive Examinations in Clinical Settings

KAMIYAMA Naohisa / ABE Yasuhiko / YOSHIDA Tetsuya

Ultrasound diagnostic systems are used to perform real-time, noninvasive examinations and are employed for diagnostic imaging at a large number of medical institutions.

Toshiba Medical Systems Corporation has been developing advanced image-processing technologies, including myocardial wall motion analysis in patients with heart disease, elastographic imaging and MicroPure for early detection of breast cancer, and "four-dimensional" (4D) ultrasound technologies to support therapy for abdominal cancers and to evaluate therapeutic effects. Ultrasound diagnostic systems incorporating these technologies are widely applied in clinical practice.

Vantage Titan™ 3T 3-tesla MRI System with Enhanced Serviceability and Comfort

KANAZAWA Hitoshi / OKAMOTO Kazuya / Yamamoto Takao

Since 3-tesla magnetic resonance imaging (MRI) systems appeared on the market, in addition to their clinical usefulness a variety of issues have been pointed out in the clinical setting. The 3-tesla MRI system has therefore gained a reputation as a difficult system suitable only for hospital facilities including university hospitals that specialize in medical research.

To rectify this situation, Toshiba Medical Systems Corporation has developed the Vantage Titan™ 3T, which is expected to not only improve the MRI examination environment, but also to be applicable to patients with claustrophobia and those with large physiques for whom MRI examination has not been appropriate until now, while maintaining the clinical usefulness of the 3-tesla MRI system. The Vantage Titan™ 3T system also incorporates the Pianissimo™ noise reduction mechanism, which has already been introduced in our 1.5-tesla MRI system and has been highly evaluated by the market. This reduces the stress of patients by providing a quieter and more open examination environment compared with conventional MRI systems.

X-ray Flat Panel Detectors and X-ray Tubes Contributing to Development of X-ray Diagnostic Systems

FUJITA Terutoshi / ANNO Hidero

X-ray flat panel detectors (FPDs) and X-ray tubes are key devices allowing X-ray diagnostic systems to support more sophisticated medical care. FPDs provide valuable information for the diagnosis of various diseases through the conversion of X-ray images of the human body into electronic signals, while X-ray tubes are used in a wide range of applications such as computed tomography (CT), angiography, fluoroscopy, mammography, and dental systems.

Toshiba Electron Tubes & Devices Co., Ltd. has developed and commercialized FPDs providing high-quality diagnostic X-ray images with low dose exposure through the development of cutting-edge technologies including a fine crystal formation technology for cesium iodide (CsI) scintillators, thin-film transistor (TFT) arrays with photodiodes, and so on. In the field of X-ray tubes that can generate a high output of X-rays, we have developed a liquid metal hydrodynamic bearing (LM bearing) technology for various diagnostic systems including medical CT systems with a long lifetime and high rotation speed, and cardiovascular imaging systems with quiet operation. Furthermore, LM bearing technology reduces the burden on the environment by replacing insulating oil with water coolant for the cooling system and making the X-ray tubes more compact.

Healthcare IT Solutions to Realize Safe and Secure Medical Services

OSADA Masakazu / TANIZAWA Yoichi / OKA Kazuhiko

There is an increasing need for prevention of disease and improvements in the quality and efficiency of medical care by the effective use of treatment and health information accumulated through healthcare information technology (IT).

Toshiba Medical Systems Corporation and Toshiba Sumiden Medical Information Systems Corporation have developed innovative healthcare IT solutions to support safe, secure, more accurate, and more efficient medical treatments through the use of advanced healthcare IT integrating hospital and clinic information systems and diagnostic imaging systems for medical examination, tests, diagnosis, and treatment, respectively.

Automated Clinical Chemistry Analyzer Offering Improved Testing Speed and Efficiency

SHINOHARA Hiroo / ONUMA Takehiko

Automated clinical chemistry analyzers are in widespread use for the measurement of biological fluid samples such as serum, urine, and so on in clinical laboratories. With the changes in the health care environment in recent years, strong demand has arisen for instruments offering high-quality data, prompt and efficient testing, benefits for patients, and environmental compatibility.

To meet these requirements, Toshiba Medical Systems Corporation has developed the TBA™-c series advanced automated clinical chemistry analyzer that makes it possible to improve workflow and efficiency in clinical laboratories by performing measurements combining both the clinical chemistry assay and immunoassay methods, and allows reagent and sample volumes to be decreased while maintaining data quality. We have also expanded the capabilities of automated clinical chemistry analyzers through the development of an automated pre-treatment function for whole blood and packed cells.

Environmentally Friendly Service Solutions for Medical Equipment

OOSAWA Hiroyuki / HAMANO Tsutomu / TAKAHASHI Jun

In order to improve customer satisfaction, Toshiba Medical Systems Corporation is introducing a new maintenance system based on the RPP™ (reactive, proactive, and predictive) concept. RPP™ is targeted at achieving fast repair services through the simple and immediate transmission of information in the event of problems, providing remote prediction and prevention services for problems, and supplying periodic inspection reports, support of applications, and information services by e-mail, using the InnerVision™ remote maintenance system.

We are also promoting the improvement of both network security and the 3R (refurbish, reuse, recycle) trade-in system for medical equipment to reduce the load on the environment.

FEATURE ARTICLES

High-Power Near-UV LED for Realization of Next-Generation LED Lighting Systems

KATSUNO Hiroshi / KANEKO Kei / KUSHIBE Mitsuhiro

White light-emitting diodes (LEDs) using a near-ultraviolet (UV) LED as an excitation source are a focus of high expectations as a light source with not only high color rendering performance but also high power due to their characteristic of low efficiency degradation with increasing current.

Toshiba has developed a near-UV LED that holds promise as a key device for next-generation LED lighting systems. The new LED achieves similar efficiency to that of regular visible LEDs through the application of a high-quality gallium nitride (GaN) growth technique using high-temperature-grown aluminum nitride (AlN) as a buffer layer and a chip structure with superior current uniformity. Experiments on a prototype of the near-UV LED confirmed that it achieves higher power characteristics compared with conventional gallium indium nitride (GaNN)-based LEDs due to optimization of the quantum well structures.

Information Retrieval Support with Touch Operation for Mobile Terminals

OKAMOTO Masayuki / WATANABE Nayuko / OMURA Sumi

Opportunities to search for information on websites using mobile terminals without a keyboard, such as smartphones and slate terminals, have been increasing in recent years.

With this trend as a background, Toshiba has developed the NX!™ Search information retrieval support technology that can automatically extract query keywords with a high probability of retrieval from the webpage currently being browsed, allowing users to search for related information using only touch operation. The features of NX!Search include a body-text extraction technology, a keyword extraction technology that estimates query terms with a high probability of retrieval from the body text, and a related-information search technology requiring only touch operation. The results of performance evaluations and experiments by trial subjects have confirmed the effectiveness of NX!Search for the support of information retrieval activities.

Bubble Detection Technology for Piezo-Driven Inkjet Heads to Improve Reliability of Inkjet Process

SATO Tsuyoshi / SOEDA Katsuyuki

In the manufacturing of electronic devices including semiconductors and flat panel displays, the inkjet method has been attracting increasing attention as a technology to minimize material loss. However, the inkjet method has not been widely used in mass-produced manufacturing lines due to the difficulty of achieving jetting stability control in piezo-driven inkjet heads.

Toshiba has developed a jetting failure detection unit and a detection algorithm that actualize real-time in-situ monitoring of all jetting and improve the reliability of the inkjet process by the use of piezo actuators in the piezo-driven inkjet heads as sensors to detect jetting failures caused by air bubbles.

Server Platform for IPedge™ Unified Communication System

KASHIMOTO Shinichi / NAITO Yoichi / KIMURA Shingo

The rapid progress and expansion of Internet Protocol (IP) technologies in recent years have led to a paradigm shift in various fields such as financial services, the distribution industry, medical services, and so on, in addition to telecommunication systems. Demand is therefore increasing for unified communications (UC) functions to improve business productivity. In response to this situation, Toshiba has developed the IPedge series unified communication system not only to take advantage of the features of IP networks, but also to enhance interoperability and improve scalability, maintainability, and reliability by applying our proprietary technologies cultivated through our experience in the development of business communication systems.

TC-net™ 1G Information and Control Network for Comprehensive Monitoring and Control of Large-Scale Plants with Data Transmission Rate of 1 Gbit/s

OKABE Motohiko / KONO Shinya / NOJIMA Akira

Toshiba has released the TC-net™ 1G information and control network, as a key highway of intercommunications among controlling devices for supervisory and control systems in the general industry, social infrastructure, and power utility fields. In response to the market demand for high efficiency and labor-saving operation in recent years, TC-net™ 1G achieves a data transmission rate of up to 1 Gbit/s based on TC-net™, our field-proven technology utilizing Real-Time Ethernet (RTE), and features highly advanced communication performance and engineering capabilities for the control of large-scale plants. The specifications of TC-net™ 1G have also been proposed to the International Electrotechnical Commission (IEC) as an international standard for fieldbuses with a data transmission rate of 1 Gbit/s in order to incorporate it into the IEC 61784-2 CPF11 standard, in which TC-net™ series was registered.

Frontiers of Research & Development

Multilanguage Text Processing Based on Statistical Methods to Deal with Unknown Languages