

TOSHIBA REVIEW

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Special Reports

Total Solutions in Medicine

Solutions for a Wide Range of Medical Needs

YAMANOI Toshio

Trends in Healthcare Solutions

ASAHINA Hiroshi / NOBUTA Yasuo

Due to the increase in aging population in Japan, the advanced healthcare services in the areas of preventive medicine, diagnosis, treatment, and follow-up are required in order to realize a healthy and lively society. In addition, information technology (IT)-oriented healthcare is being promoted in connection with structural reforms of the medical system. Toshiba Medical Systems Corp. offers value-added and creative solutions based on the philosophy of "Made for Life" as a total healthcare solutions provider. We are making continuous efforts to develop innovative medical equipment with the aim of materializing advancements in diagnosis and treatment. We also provide sophisticated medical information systems to improve the quality and efficiency of medical services. Moreover, we promote service solutions for medical equipment and information systems to maintain security and safety.

X-ray Imaging Systems: Exploring New Roles

MANIWA Yuji / NISHIKI Masayuki

Although X-ray diagnostic imaging has been used for more than 100 years in the medical imaging field, it is still developing. While the principle of the imaging has remained the same, its role is changing inspired by the introduction of new devices and the rapid evolution of other modalities in recent years. One direction of change is the progress in cancer diagnosis due to the introduction of flat panel detector (FPD) digital images. Another direction of change is in the area of vascular diagnosis; that is, since X-ray imaging is being replaced by computer tomography (CT) and/or magnetic resonance imaging (MRI) for the diagnosis of vascular diseases, it is finding its main role in supporting interventional radiology (IVR) procedures. X-ray diagnostic imaging is expected to further evolve in the rapidly changing medical imaging field by finding additional new roles.

CT Scanner for Diagnosis of Three Most Common Diseases

KURA Hiroyuki / OKUMURA Miwa / TSUYUKI Masaharu

Conventional computed tomography (CT) scanners generate cross-sectional images of the human body and render three-dimensional images of organs. However the scanning of moving organs such as the heart and lung was unsuitable. Recently, however, multislice helical CT scanners have appeared with dramatically improved performance and functions, including the capability to render three-dimensional images of moving organs. Accordingly, the functions of the latest CT scanners for diagnosing the three most common diseases (cancer, cardiac disease, and cerebrovascular disease) are changing.

Diagnostic Ultrasound System for Early Detection, Diagnosis, and Therapy

KAWASAKI Shuichi / HIRAMA Makoto / MUTO Yoshimi

Diagnostic ultrasound systems are indispensable imaging equipment in various medical settings because of their safety and real-time imaging capability. Their areas of application have been expanding to encompass not only morphological and functional diagnosis, but also differential diagnosis, guidance for therapy, and follow-up. Toshiba Medical Systems Corp. has developed the Aplio™ XG as a premium diagnostic ultrasound system. This new system features user-friendly operating functions and high image quality using advanced computer and signal processing technologies.

MRI System Enabling Wide-Area Scans Concurrently with High-Resolution Imaging

HINO Masaaki / YOSHIDA Tomoyuki / OKAMOTO Kazuya

The low invasiveness of magnetic resonance imaging (MRI) has led to the recent expansion of MRI applications from diagnostic imaging to treatment support. Examples of treatment support applications include cancer cell imaging for the detection of lymph node metastases throughout the body and non-contrast-enhanced coronary artery imaging. As the applications have expanded, demand has increased for MRI systems capable of imaging wide areas in addition to imaging specific smaller regions. Now, there is growing demand for MRI systems capable of imaging wide areas with high resolution. Using conventional radio frequency (RF) coil technologies, however, it has been difficult to cover wide areas while maintaining high resolution for specific smaller regions.

Toshiba Medical Systems Corporation's new coil technology, which was developed from the viewpoint of clinical work flows, has addressed this important issue. It achieves coverage of a wide area while maintaining high resolution and excellent image quality, and also achieves high operability.

IT-Assisted Solutions to Healthcare Problems

OSADA Masakazu / OKA Kazuhiko

Information technology (IT) has built up a solid position in the healthcare field in Japan by offering solutions that reduce costs or increase efficiency while maintaining the quality of healthcare services.

Toshiba Medical Systems Corp. has developed several innovative IT-assisted solutions comprising an electronic medical record (EMR) system named HAPPY CLIOSTM-ER, a picture archiving and communication system (PACS) named Rapideye™ with a hyperlink reporting system, a cardiac workflow solution named CardioAgent™, and a teleradiology system.

Toward Comprehensive Medical Solution Provider

AIDA Satoshi / OKITA Ryuji / YAMAMURO Rikiya

The rapid reorganization of medical care system in Japan requires hospitals and clinics to quickly improve the quality and efficiency of medical services.

Toshiba Medical Systems Corp. is providing innovative total solutions to assist such customers. Modality solutions and clinical solutions can support the entire process from screening and diagnosis to treatment and follow-up. We have also developed total partnership solutions to offer more comprehensive support for customers' major projects from planning and implementation through to operation.

Service Solutions to Support Medical Safety and Security

MATSUBAYASHI Takayuki / OSAWA Hiroyuki / KONDO Yasuhira

Medical institutions' expectations and requirements regarding medical equipment have changed in recent years. Whereas reliability and safe operation were, and still are, demanded, they are now seeking service solutions that improve both their level of patient care and the efficiency of their workflow.

The RPP™ concept aims at converting Reactive service to Proactive, and eventually to Predictive service. On the basis of RPP™, Toshiba Medical Systems Corp. is introducing a center-driven operation that focuses on improvement of uptime and cost control. An example of this operation is the dispatch of customer engineers (CEs) with parallel arrangement of spare parts. At this stage, work is in progress to further develop and expand premium service solutions.

Feature Articles

Preparation of Monodisperse FePt Nanoparticles and Magnetic Films

MATSUI Isao

Nanoparticles have been attracting considerable attention because they are expected to be useful as novel materials for various devices such as memories, batteries, and displays. In particular, the field of magnetic media is considered to be one of the most promising applications for nanoparticle technology. An IBM group has reported the possibility of using chemically synthesized nanoparticles in the liquid phase for terabit-scale high-density magnetic storage media, in which they showed that chemically synthesized FePt nanoparticles have a large coercivity compared with conventional cobalt alloy magnetic materials. Toshiba has studied an FePt nanoparticle film for high-density magnetic storage media prepared by plasma chemical vapor deposition (PCVD). As-synthesized nanoparticles did not exhibit a loop-shaped magnetization curve. Annealing in atmospheric hydrogen was conducted to transform the crystals from a face-centered cubic (fcc) structure to a face-centered tetragonal (fct) L10 ordered structure. A higher annealing temperature resulted in more ordered L10 phase formation and larger coercivity. A sample annealed at 750 °C exhibited a roomtemperature coercivity of 10 kOe. It was also confirmed that the interaction between nanoparticles and substrate has a crucial effect on the control of nanoparticle crystal axis orientation to attain perpendicular recording.

Current Status of and Future Prospects for Standardization of Network Home Appliances

KANDA Mitsuru / TERASHIMA Yoshiki / AJITOMI Daisuke

An increasing number of network home appliances, namely, network-connected white goods and audiovisual (AV) devices, have entered the consumer market in recent years. However, technical difficulties related to interconnectivity may sometimes be encountered because so many standards are provided for network home appliances. In addition, networking needs to be confirmed as safe when network communication is established. These issues can be stumbling blocks to the dissemination of network home appliances.

Toshiba has contributed two technologies to the development of network home appliances: the "ECHONET-universal plug and play (UPnP) gateway" to improve the interconnectivity of network home appliances, and the "ubiquitous open platform forum (UOPF)" to offer safe networking for network communication. These two technologies work cooperatively for the realization of consumer-friendly network home appliances.

MAGNIA™ 2500/2505R Entry Class IA Servers

TAKEYAMA Hidetoshi / TANAKA Kazuyuki / WATAKABE Takeshi

Toshiba has developed two new servers, the MAGNIA™ 2500 and 2505R models, as additions to the MAGNIA™ series of Intel® architecture (IA) servers. Featuring the dual-core Intel® Xeon® processor, both models are small entry servers that inherit the three major characteristics of MAGNIA™ machines — high performance, high reliability, and high expandability — from the MAGNIA™ 3000 series. The new models are enhanced by the new version of MAGNIA™ ATA RAID (advanced technology attachment/redundant array of inexpensive disks) technology with a Web browser-based remote management add-in feature.

Optoelectronic LSI Package with Bandwidth Capacity Exceeding 1 Tbps

FURUYAMA Hideto / HAMASAKI Hiroshi / NUMATA Hideo

Toshiba has developed a novel high-performance large-scale integrated circuit (LSI) package that is adaptable to ultrawide-bandwidth system-on-chip (SoC) technology, which will be used for next-generation PCs or next-generation high-performance game consoles. The novel LSI package allows data transfer exceeding 1 Tbps because it has a densely integrated optical interconnection with a wiring bandwidth of more than 10 Gbps per line. In addition, the package has a structure that permits the optical interface module to be separated when the board is assembled. This means that the solder reflow process can be applied to standard FR-4 boards without requiring any change in the conventional mass-production line, thus securing mass-productivity and reliability.

The emergence of this type of optoelectronic (OE) LSI package will facilitate the realization of high-capacity systems that are reasonably priced.

Hot Gas Flow Simulation in Hybrid-Puffer Type Gas Circuit Breakers

IWAMOTO Katsuharu / MORI Tadashi / FURUTA Hiroshi

A gas circuit breaker (GCB) is an apparatus that interrupts electric currents to control or protect a power system. Puffer type sulfur hexafluoride (SF6) GCBs are the most widely used type due to the excellent insulating and arc-quenching properties of SF6 gas and the simple structure of the puffer unit. The hybrid-puffer type GCB is an improved and downsized type of ordinary GCB requiring less driving energy.

Toshiba is developing a higher performance, more reliable, and more compact hybrid-puffer type GCB that will be realized through investigations of arcing phenomena based on hot gas flow simulation technologies. For this purpose, we have developed and are further improving a simulation program to analyze hot gas flows in GCBs. We have applied this program to the analysis of hot gas flow behavior in hybrid-puffer type GCBs and obtained a large amount of useful simulation results.

Development of Small-Sized and Highly Power-Efficient DC-to-DC Converter

NOMURA Fujio / AOKI Yoshiro / THAN TRONG Long

Ordinary DC-to-DC converters with a range of 200-500 W can be easily procured on the domestic Japanese market. However, to satisfy the requirements for heavier environmental conditions, there has been no choice but to depend on specific overseas manufacturers. Moreover, the Restriction of Hazardous Substances (RoHS) Directive of the European Union prohibits lead soldering even in highly reliable devices, thus requiring the development of lead-free soldering techniques.

Toshiba has developed a small-sized but highly power-efficient 400 W DC-to-DC converter that conforms with the RoHS Directive and is suitable for severe environmental conditions. Evaluation of a prototype converter confirmed that its performance values are equal to or higher than those of equivalent overseas models. We are therefore ready to begin commercialization of this converter based on reliability assurance and proven environmental resistance.

Intellectual Property Strategy Solution

OHTA Akihiro

Reflecting the growing importance of patents, there is a strong need for each company to efficiently manage its own patents and develop an effective patent strategy. In the replacement market, there is demand for reasonably priced systems that conform with the latest legislative revisions. Offices are required to plan patent strategies for their intellectual property, and there is strong demand for a comprehensive solution system for corporate business promotion, R&D, and management strategy sections.

In order to offer a solution to these problems in the market, Toshiba Solutions Corp. has launched a patent management engine that assists in the processing of both domestic and overseas patent applications in addition to conventional clerical tasks and patent article information management. We also offer an intellectual property strategy solution centering on this patent management engine, to support intellectual property creation and management strategy activities.

Frontiers of Research & Development

DLNA Solutions for Toshiba Multimedia Networked Products

Specification Checking System for Chinese Offshoring