

MyAdvantech

The Magazine for Global Advantechers and Partners

Spring 2015 No.16



Reaching New Horizons in Digital Healthcare

Innovations Built to Evolve -
UnitingCare Health Sets a New
Benchmark in Patient Care

Implementing Mobile Medical
Applications for Patient-Centered Care

Digital Operating Rooms Increase
Surgical Efficiency

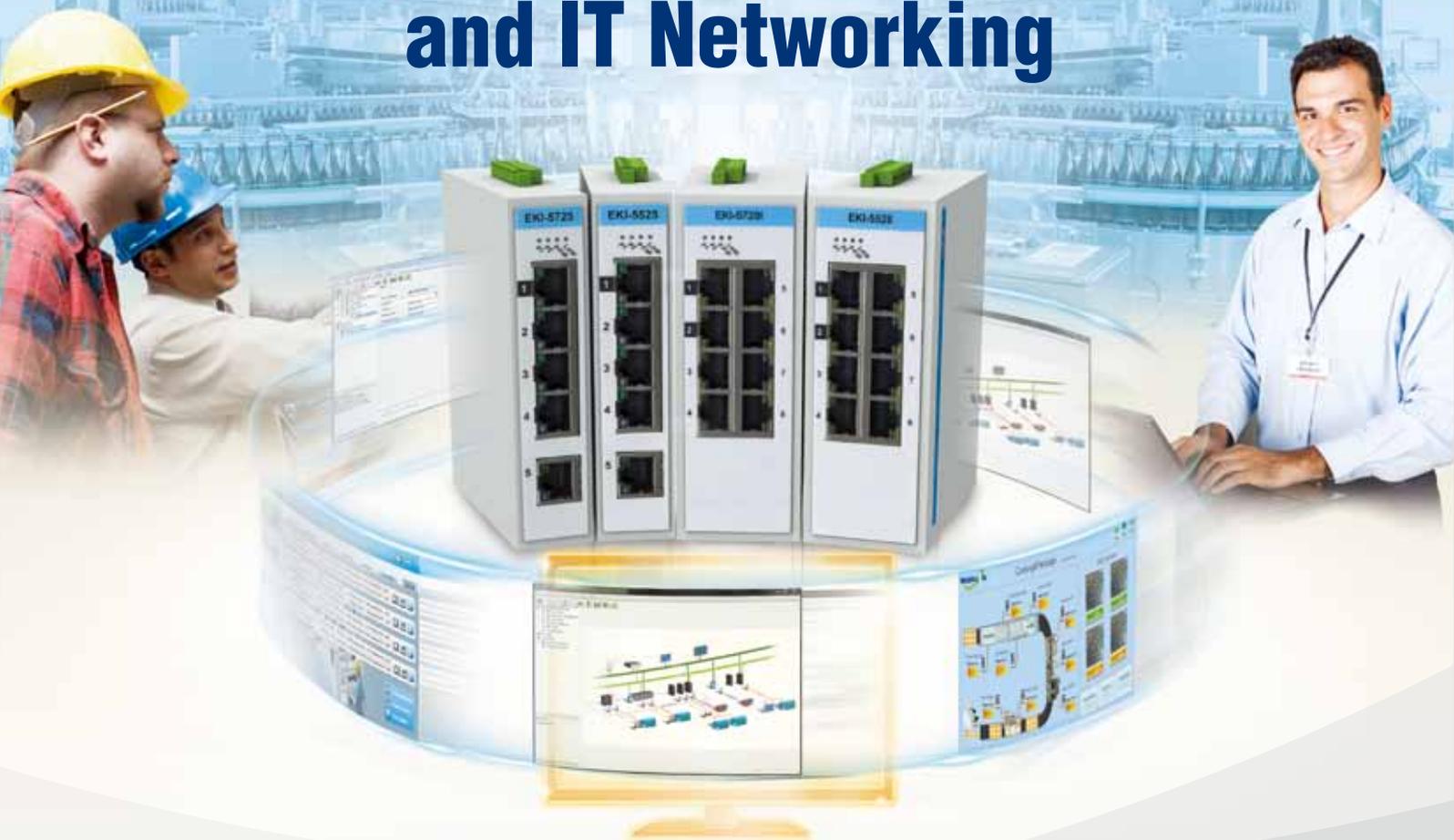


Powerful Network Management

Interview with Advantech Business Development Manager Wesley Chen
Advantech's ProView series of network management switches address the
insufficient control of network communication equipment and generate a new
industrial network communication protocol.



Converging Process Control and IT Networking



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EKI-5525I/EKI-5528I
5/8-port Fast Ethernet
ProView Switch with Wide
Temp.



EKI-5725/EKI-5728
5/8-port Gigabit Ethernet
ProView Switch



EKI-5525/EKI-5528
5/8-port Fast Ethernet
ProView Switch

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Modular iDoor Technology Gives Embedded Automation Computers The Flexibility To Meet Your Needs



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Compact Design with Wide Range of Product Form-Factors

Advantech's UNO-2000 series of fanless highly ruggedized Embedded Automation Computers include an embedded operating system (Windows CE, Windows XPE, WES7, WES8, Linux- Embedded). They also include Advantech iDoor technology which supports automation feature extensions such as industry FieldBus communication, Wi-Fi/3G, digital I/O, including Palm, Small, and Regular-size form-factors with indicated market segments in terms of entry, value and performance product positioning, which can fulfill a diverse range of requirements.



UNO-2362G
AMD® Dual Core T40E
Small-Size Automation
Computer w/ 1 x GbE,
2 x mPCIe, HDMI/DP



UNO-2483G
Intel® Core™ i7/i3/Celeron
Regular-Size Automation
Computer w/ 4 x GbE,
3 x mPCIe, HDMI/VGA



FieldBus iDoor
PCM-26D1PB
Hilscher netX100 FieldBus,
Profibus, DB9 x 1

PCM-26D2CA
SJA1000 CANBus,
CANopen, DB9 x 2



Communication iDoor
PCM-24D2R2 / PCM-24D2R4
OXPCIe-952 Isolated RS-232,
isolated RS-422/485, DB9 x 2

PCM-24D4R2 / PCM-24D4R4
OXPCIe-954 UART,
Non-Isolated RS-232,
Non-isolated RS-422/485, DB37 x 1



DI/DO iDoor
PCM-27D24DI
Digital I/O, isolated 16DI / 8DO, DB37 x 1

Digital Healthcare Enhances the Allocation of Healthcare Resources

With the ever changing demographics and declining birthrates worldwide, many countries are gradually becoming aging societies. Moreover, the growing number of patients with chronic illnesses, combined with other influential factors, has led to annual increases in healthcare spending. Thus, the development of digital healthcare is essential for reducing healthcare costs and improving the quality of medical services.

However, what exactly is digital healthcare? The definition provided by IBM is “all solutions, including technologies related to the Internet of Things (IoT), developed for medical applications”. An example of such technology is big data analytics, which involves collecting and transforming massive amounts of data into useful information through processing and classification, and uploading this information to a cloud. This information can then be used to generate intelligent insights and decision-making references for government and medical institutions, increasing the efficiency and equitable distribution of medical resources and enhancing public satisfaction with medical services.

For example, if big data is used to identify people at high risk of developing chronic diseases and to investigate the reasons why, relevant authorities can propose preventive measures to limit future incidences. Additionally, based on the results of big data analysis, governments can establish community hospitals that offer daily care services for the elderly, while predicting future growth trends to ultimately eliminate the need to visit large hospitals for diagnosis and treatment.

Many people today believe that smart hospitals represent digital healthcare, whereas I consider these items to be different. Nonetheless, smart hospitals are an important foundation of digital

healthcare. Smart hospitals are aimed at providing quality healthcare to patients with severe or acute illnesses. By contrast, digital healthcare is aimed at both healthy and unhealthy people, such as those with chronic illnesses and post-operative patients who require regular follow-up care. The purpose is to prevent major epidemics and reduce the ratio of healthcare costs compared to national GDP, thus enabling more people to maintain good health and minimizing medical expenses.

Considering the current global development of digital healthcare, China is one of the countries showing the most potential. In the past, the Chinese government emphasized economic development and sacrificed environmental protection and public health. Digital healthcare can improve the quality of medical services provided to the elderly, reduce and/or prevent incidence of disease, as well as effectively reduce the overall national healthcare costs. Because China's medical standards are still developing, their medical industry is expected to progress rapidly and substantially because of the lack of existing obstacles. Furthermore, in recent years, the Chinese government has actively promoted healthcare reforms, with the third wave of healthcare reforms set to be initiated in the very near future.

Regarding the development of Taiwan's medical industry, the recent establishment of healthcare standards, implementation of a National Health Insurance program, and enhanced hospital management has been well received, with these experiences also providing a valuable reference for China.

In the future, China and Taiwan will have many opportunities for cooperation, interaction, and the joint promotion of digital healthcare development.



Director of Advantech Digital Healthcare Division

A Coalition for Pioneering Healthcare

Information overload and having to do more with less means digital healthcare must offer real and lasting benefits to healthcare providers. In addition to providing significant value, solutions developed for healthcare must balance the needs of patients with optimized treatment options. This combined with cost constraints means healthcare system integrators are increasingly forming alliances to bring their solutions to market.

By Pearl Wright with images provided by Advantech
Interview with Harald Verloop, Director of Alpatron

Established in the 1970's, Alpatron, a multinational electronics solutions distributor based in the Netherlands, attributes their enduring success to the delivery of ideal solutions. "We like to make things more efficient and easier to adopt", said Harald Verloop, director of Alpatron Medical Group BV, in a recent interview. Experts in human-technology interaction, the core business areas for Alpatron Medical Group are medical imaging and document management, vendor neutral archiving, IT-based medical workspaces, and mobile and stationary clinical workstations.

Current Healthcare Challenges

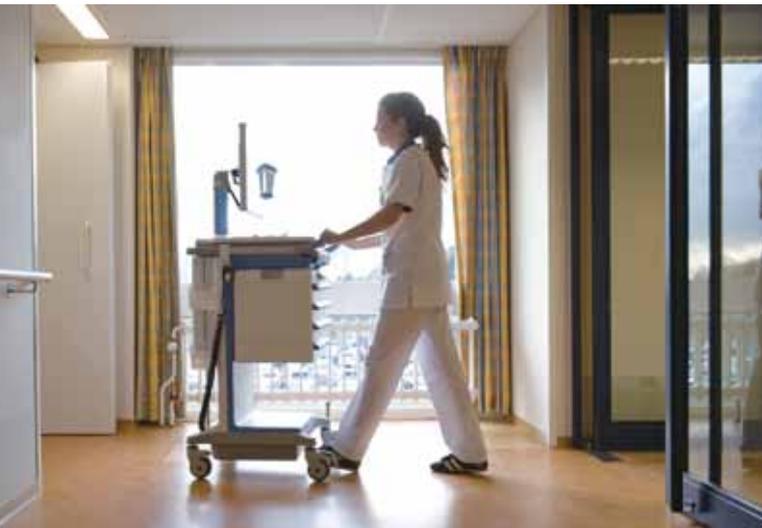
Nowadays, digitization plays a vital role in improving the quality of care provided in hospitals, clinicians are exposed to information overload, and innovations in healthcare technology have also introduced substantial complexity. Every hospital generates an incredible amount of data per patient, from patient records to discharge notes and lab results to vital sign reports. The sheer volume of information to be processed can delay decision making and slow the delivery of patient care. Thus, modern information technology support is essential.

Healthcare e-health seamlessly integrates islands of information across the patient care cycle, transforming volumes of patient data gathered by diagnostic imaging, cardiac testing, and patient monitoring systems into clearly organized clinical information and medical history knowledge. Next, e-health platforms enable this information to be accessed from any location in the hospital and even remote sites. However, this increase in digitization has culminated in the biggest challenge currently faced by the healthcare industry—achieving constant 24/7 device connectivity that can be flexibly deployed to facilitate point-of-care treatment where it is needed most.

Innovation through Partnership

As an industry pioneer, Alpatron Medical is renowned for its continuous innovation to address the challenges faced by healthcare professionals. Seizing the opportunity to respond to this need, Alpatron partnered with Advantech in 2009 to construct an intelligent, responsive, clinical mobile workstation in a joint venture dubbed A2 (Alpatron and Advantech). Both organizations were experienced in working with caregivers, hospitals, and organizations around the world and understood that in





medical situations, immediate and pertinent solutions are vital. Their aim was to develop an innovative solution that was ergonomic, hygienic, and safe while satisfying caregivers' needs for integrated and portable IT technology.

The feedback following the initial round of system installations was distinctly positive. To achieve their objective, they needed to understand the daily responsibilities of medical staff in order to design the ideal solution. Accordingly, the A2 team invited a number of reference hospitals to participate in the product development, with nurses, doctors, pharmacists, and IT staff all providing feedback. The contribution of the caregivers was extremely important in developing a product specifically suited to them.

After many considerations and careful consultation with all parties involved, Alpatron developed their AMiS medical cart. The AMiS mobile care workstation was equipped with a specifically designed thin client to support

the provision of bedside care. Doctors can accurately and immediately provide a diagnosis, and patients stand to benefit from earlier treatment options. Constant and immediate data access also drives information integration across all clinical departments.

Branding AMiS

Through close cooperation with care providers and listening to their needs, Alpatron has developed a number of truly unique and sophisticated solutions, for example, the AMiS multifunctional mobile care workstation. The idea was to develop innovative technologies in a mobile computer to better address the needs of healthcare providers and their patients. Because the product was designed around the daily routine of nurses, doctors and other healthcare professionals, Alpatron decided to brand the cart AMiS. Verloop said, "AMiS functions like a friend that is always available and supports the caregiver no matter what. We have worked with nurses and doctors for many years and could see their frustration with mobile computers because most of the products available in the market were not designed specifically for them."

In terms of future plans, Alpatron expects to remain focused on the continued development of AMiS. Joint ventures such as A2, with Advantech serving as manufacturer and supplier, allow Alpatron to focus its efforts on market developments, service, and customer requirements, while demonstrating its ongoing commitment to providing people-focused and meaningful healthcare solutions. Through this close relationship based on mutual trust and belief in the benefits of a sustainable long-term relationship, Alpatron hopes to achieve their shared goal of becoming a first-tier ecosystem for the healthcare industry. By using the best attributes and resources of each partner, long-term partnerships and collaborations facilitate the advancement of business. ■

ALPHATRON
Medical

Since its establishment as a sole proprietorship in the late 1970s, Alpatron has grown into the Rotterdam-based multinational company it is today. The company is dedicated to developing, producing, and trading in electronics through specialized divisions targeting the logistics, broadcasting, security, defense, and medical industries. Alpatron boasts nearly 300 employees located at more than 25 branches spread across 4 continents.

Alpatron is more than just a supplier, it is a pioneer, and one that leads the drive to increase the quality and efficiency of medical care through digitalization. In this capacity, Alpatron Medical is a key partner for both hospitals and medical equipment manufacturers worldwide. By listening to the needs of medical personnel and gaining an insight into hospital routines, Alpatron has been able to develop sophisticated new solutions. The AMiS mobile workstation is an example solution developed by Alpatron based on their experience collaborating with healthcare providers.



Innovation Build to Evolve

With advanced integrated technologies aimed at generating efficiencies, improving safety and clinical outcomes, and increasing patient and clinician satisfaction, UnitingCare Health's mobile clinical workspace solution promises to deliver a unique healthcare experience.

By Pearl Wright with images provided by Advantech
Interview with Howard Hsiung, Business Development Manager of Advantech Digital Healthcare Sector



Healthcare systems around the world are currently undergoing radical transformation as innovative approaches to healthcare delivery are adopted to reduce cost and improve care quality. With the use of electronic medical records and digital management systems practically ubiquitous nowadays, medical equipment, including diagnostic tools, analysis and laboratory equipment, medication dispensing carts, computerized physiotherapy, and patient monitoring systems, all leverage PC-based architectures as hospitals are becoming increasingly sophisticated digitized medical facilities.

Amid this groundswell of technical innovation and technology integration, the entire medical landscape is experiencing significant developments. Traditional healthcare models are evolving towards organized delivery by teams rather than individuals, care measured on outcomes rather than activity, and total solutions rather than individual systems. Under the new care model, mobility, supported by wireless applications and communication devices, is fast becoming an essential component of healthcare provision. This leveraging of healthcare devices for disease surveillance, treatment support, chronic disease management, and prevention education, continues to push the limits of data acquisition,



access, and integration as big data analytics and remote participation become increasingly important.

Mobile clinical workspace solutions are the future of patient care and underpin a new approach to streamline workflows with data-driven decisions that deliver cloud-based collaborative care. Increased connectivity and data access give rise to continuous learning systems, create feedback loops between medical advances and clinical practice, and empower people to actively participate in health management with the provision of new tools such as health-care related apps for managing chronic conditions; technological advancements that will both enable and drive future changes in healthcare.

UnitingCare Health Delivers Fully Integrated Solution

In 2014, UnitingCare Health, one of the largest providers of health and community services in Australia, partnered with Ascom to develop a Workstation on Wheels (WoW) solution for St. Stephen's Hospital in Queensland, Australia. Their solution comprised of 45 Advantech AMiS-50 medical carts integrated with Elliott Data Systems MedProx dispensary cabinets aimed at drastically enhancing the quality of healthcare through the provision of a fully integrated nursing station that optimizes patient care and enables mobile point-of-care.

The implementation of this solution contributed to St. Stephen's Hospital's official recognition as the first fully integrated digital healthcare facility. However, this state-of-the-art "hospital of the future" goes beyond merely leveraging mobile communication technologies to support existing workflows, and instead transforms the entire healthcare experience. In this new setting, patient medical records, X-ray results, and pathology reports can be remotely accessed from any location in the hospital, including patient bedsides, providing clinicians with instant access to data for faster and more efficient decision making. As the first hospital in Australia to achieve Stage 6 certification from the Healthcare Information and Management Systems Society (HIMSS), St. Stephen's Hospital has become a national benchmark in automated patient care, paving the way for further advancements.

Individually Lockable Drawers

For St. Stephen's Hospital, the AMiS MedProx solution is a patient-specific medication dispensing solution designed to place medication distribution in proximity to patient care to assist in achieving the Five Rights of Medication Administration. Managing medication at the patient's bedside eliminates potential errors and increases patient safety. On the frontlines of healthcare, few tasks are as important as medication administration.

According to the Institute of Medicine, in the United States alone, medication errors including missed consumption and incorrect dosage or infusion rates generate US\$3.5 billion in costs and affect 1.5 million patients every year. Closed-loop medication is the latest medication management process for ensuring patient safety and regulatory compliance. The unique features of MedProx cabinets, such as medication alerts, locks, user logins, provide multiple layers of security and tracks all medication dispensing activity. These cabinets enable nursing and pharmacy staff to better support each other with a workflow that fosters greater communication and accountability.



AMiS Cart Designed for Ease of Use

Because mobility is an essential feature under the new healthcare paradigm, Advantech's AMiS mobile cart was specifically designed to address the mobility challenges of healthcare environments. Unlike conventional medical carts that use lead-acid batteries, AMiS-50 is powered by a lithium iron phosphate battery, which reduces the total cart weight by approximately 50% to a trim 8 kg. This combined with an even weight distribution, large casters, and arched handles make AMiS carts easy to steer and push on a range of surfaces. Additionally, the lithium iron phosphate battery offers an extended runtime of 8-10 hours, with a total recharge time of no more than 3 hours. The intuitive dashboard design is also equipped with an electric height adjustment motor to further enhance convenience and ease of use.

Superior Infection Control

In addition to EN60601-1, and UL60601-1 safety certifications, the AMiS cart boasts a cordless and fanless design that prevents the accumulation of dust and particles for superior infection control. Additionally, all cables are routed through the integrated cable duct built into the neck, eliminating accidental snagging and ensuring easy and convenient cleaning.

Designed for Flexible Integration

Unlike other medical carts, AMiS is developed from the ground up and features comprehensive computer-to-cart technology. Advantech designed, manufactured, and integrated all the cart body and computer components to reduce integration issues and ensure fast and convenient

maintenance. Because the cart is shipped with the computer and battery already integrated, users only need to attach the display to operate the cart. Embedded for greater durability, the industrial-grade computer features USB and Ethernet ports, as well as two built-in 5-dB antennas to ensure constant connectivity.

The AMiS cart also features a DIN rail design with over 30 optional attachments, such as scanner holders, disinfection bottle racks, baskets, folder holders, and storage box attachments, to enable flexible customization according to the demands of specific hospitals and clinical applications. The flexibility of the hardware and software ensure that the system is future-proof and can be adapted to enhance and facilitate increased networking in hospitals.

Empowering a New Era of Mobility

The delivery of high-quality patient care and improved healthcare outcomes is no longer dependent on hospital facilities, instead it is achieved through the provision of sufficient care wherever, whenever, and however. Nowadays, mobile workspaces are critical for healthcare to provide both clinicians and patients with full access to data, services, and applications across locations for truly seamless caregiving. By achieving secure clinical mobility, the healthcare organization gains new levels of agility and performance while improving patient experiences and outcomes.

Finally, the AMiS cart is built for growth and designed to evolve with you. As user needs are identified, the flexible infrastructure and responsive capabilities can be developed and adapted to specific environments. ■

Advantech Intelligent POS Solution

WebAccess+IMM
Interactive Multimedia Solution

WebAccess+IVS
Intelligent Video Solution



Customer Identity
& Flow Analysis



Data Transaction



Digital Menu
Board Management



Advertisement
Dispatch



Image Search

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- Fanless Operation with Intel IVY Bridge Series Processor
- Intelligent Video Analytics (IVA) Embedded
- Ideal for Retail Surveillance Application with 4 Analog 4CIF cameras (Option)
- Unique Stand Base with Color and Logo Customization on the Back Cover (Option)
- Support Three Independent Displays (Option)

Video Surveillance System

- Transaction data history
- Enhance loss-prevention efforts
- Reduce investigation time

People Counter

- Store operation analysis
- Facilitate business evaluation

Intelligent Video Analytics

- Identify age and gender of shoppers
- Obtain customer insights

Interactive Multimedia

- Secondary display for digital signage usage
- Enhanced opportunities for product promotion

Implementing Mobile Medical Applications for Patient-Centered Care

With Advantech's mobile solutions, Peking University People's Hospital (PKUPH) continued to promote its digitization plans at a fast pace with improving results while progressively achieving the goal of patient-centered medical services.

By Lin Long with images provided by Advantech

Interview with Fan Liu , President Assistant of Peking University People's Hospital; Director of Peking University People's Hospital Medical Information Center; Associate Clinical Professor of Peking University People's Hospital Arthritis Clinical & Research Center; Eugene Lin, Business Development Manager of Advantech Digital Healthcare in China and Jun Yang, Key Account Supervisor of Digital Healthcare in China



Amy, who had been hospitalized with leg injuries sustained in a car accident, was finally able to leave hospital due to obtaining physician approval. While thinking how to go to the checkout counter at the first floor to complete discharge formalities, she was surprised to see a nurse pass by with a cart that had a cash register, credit card terminal and printer. She smiled at Amy and said, "Are you ready to leave? Since you can't fully walk properly yet, checkout can be done here".

This situation is not fictional but a real everyday service provided by Peking PKUPH. Founded in 1918, PKUPH is one of the top 10 hospitals in China. In 2014 June, the hospital received the Acute Care Stage 7 award from the American Healthcare Information and Management Systems Society (HIMSS) Analytics (less than 2% of the hospitals have achieved this level currently), and also received the HIMSS-Elsevier Digital Healthcare Award. These awards are the best testimony of PKUPH's medical healthcare quality and management improvement through the hospital's new system.

Fan Liu, President Assistant of Peking University People's Hospital, expressed that with their new enhanced management efficiency, the hospital hopes to better deploy all its patient-centered services. Since 2012 it began to cooperate with Advantech by implementing a wide variety of mobile information devices, including computerized nursing carts, documentation carts, meditation carts for resident physicians and the

previously mentioned mobile cashier cart to improve its overall healthcare services quality.

Eugene Lin, Business Development Manager of Advantech Digital Healthcare in China, stated, “Digitalization of medical records is the first step for an e-hospital.” PKUPH had already adopted PDAs earlier on to help its practices, but the small screens with limited functionality were unable to provide adequate power for applications and as such were only being used to confirm the identity of patients. Both reasons encouraged PKUPH to upgrade its IT applications and adopt the PDAs as an auxiliary tool. By using Advantech’s computerized nursing carts, nursing tasks such as administration, replacing drip bags and measuring patient’s physiological information (blood pressure, body temperature, etc.) could be performed in the ward and be recorded directly into the main system. The cart could also be used as a computer desk at the nursing station because the height could easily be adjusted.

Mobile Workstations in Hospitals

Presently PKUPH receives approximately 8,000 to 10,000 patient visits. However, the buildings of this time-honored hospital are very old so halls and consulting rooms are relatively small. The outpatient service counter is often full of people and such overcrowding affects the service quality. PKUPH has been planning to introduce a mobile temporary billing counter to relieve the long queues, and after evaluating various options, Advantech’s mobile cashier cart was chosen as the ideal hardware solution to provide a stable reliable system that could speed up outpatient services.

Jun Yang, Key Account Supervisor of Digital Healthcare in China, noted that mobile cashier carts are different from mobile nursing carts in a number of ways. The former usually has a lot of power consuming devices installed, including three kinds of credit card terminals and two printers. Some of them use AC (alternating current) rather than DC (direct current), resulting in the power integration being critical for smooth operation of all devices. Being proficient in power integration technology, Advantech

manufactured and assembled the equipment from the trolley body to the computer and battery. Moreover, the modular design also reduced customization costs and time. “After using our mobile cashier cart, PKUPH has significantly decreased the waiting times of patients, and as such its use of time has been expanded from morning only to all day”, Fan Liu said.

The successful implementation of the two projects allowed PKUPH to continue deepening cooperation with

Advantech and adopt mobile medical carts that enable resident doctors to explain conditions to patients and their families during ward rounds, thereby assisting with ward round teaching. Eugene Lin highlighted that every PKUPH mobile medical cart integrates two screens to display PACS images and electronic medical records at the same time so as to better facilitate doctors’ understanding of their patients’ condition. The hospital is planning to further install high-definition cameras for remote consultation to reinforce the doctors’ ability to provide service in faraway and rural areas.

Many manufacturers are able to offer medical equipment to the Chinese market, but the reason why

PKUPH chose Advantech’s solutions was for two main reasons: The first is the capability of providing small carts with good features for flexible movement and operation within the narrow wards and the space-limited nursing stations. Secondly, the whole package was put together by Advantech instead of selecting commercially available self-assembling products. This enabled more convenient and efficient after-service through a single supplier. In addition, Advantech provides on-site maintenance services throughout China. The repairs are usually completed typically within two days, thus diminishing the risk of equipment failure that could affect hospital operations.

In the future, PKUPH plans to fully implement additional mobile medical carts, as well as continue to carry out its program of digitization of its medical services so as to improve its service quality and efficiency while reducing hospital management costs. ■



Digital Operating Rooms Increase Surgical Efficiency

By Pearl Wright with images provided by Richard Wolf
Interview with Frank Huang and Christoph Kuehn, Advantech Digital Healthcare Sector



Endoscopes, originally developed for the photographic examination of internal organs, have been widely used in surgeries in recent years. Contemporary endoscopes are also integrated with medical-grade computers to increase the convenience of managing and controlling endoscopic equipment and to enhance surgical efficiency.

In today's high-tech operating room environment, the need to structure workflows and configurations is growing as more and more innovative operating techniques and increasingly complex instrument systems are deployed. One of the most important functionalities is networking all operating room equipment to increase the efficiency and care quality provided by surgeons and operating room personnel.

In correlation with the development of technology, medical equipment has become increasingly advanced. Richard Wolf GmbH is a German medical device

manufacturer that was founded in 1947; its primary products are endoscopic diagnosis and therapy equipment. Richard Wolf GmbH has 7 branches, 120 offices, and 1400 employees worldwide. To improve the efficiency and quality of endoscopic surgeries, Richard Wolf GmbH launched the **core** nova, a new set of endoscopic diagnostic equipment that uses the Advantech medical-grade POC-W211 computer as a control platform for managing and manipulating endoscopic equipment and inputting and browsing data.

Designed for Integrated Operating Rooms

The aim regarding the development of *core nova* was to reduce the organizational and administrative burdens associated with operating room management. Thus, the system benefits include rapid installation and seamless integration with existing hospital information systems, operating room planning systems, and patient medical records.

core nova is designed specifically for integrated operating rooms, and comprises endoscopy instruments, hardware control units, and the *core.control*, which serves as the management system. The *core.control* operates on Advantech's POC-W211. Because all connected devices can be accessed using the *core.control* system interface, surgical medical staff can manage images, view procedural documents, and even provide telemedicine using the POC-W211 control device. In addition to serving as a control interface, the POC-W211 can be used as an information display platform.

Furthermore, Richard Wolf GmbH can integrate one or more POC-W211 computers with the endoscopic diagnosis and treatment equipment according to a hospital's specific requirements. For example, if two POC-W211s are integrated, one device can be used to display the core system interface while the other device is used to render the images captured by the endoscope.

Frank Huang, Advantech Digital Healthcare Manager, indicated that traditional endoscopy medical devices use general desktop computers, and healthcare workers can only log in to the management system and must input data using a mouse and keyboard. By contrast, *core nova* uses a medical-grade computer. The capacitive touch panel of the POC-W211 replaces the mouse and keyboard as the input tool, thereby eliminating the need for additional peripherals and cables.

For hospitals, there are two benefits to adopting an integrated machine for controlling endoscopy equipment and inputting and browsing data. The first benefit is that this method minimizes the potential increase in bacteria resulting from contaminated dust gathering on wired devices. The second benefit is that this method saves space and ensures that the operating room environment remains clean and tidy. In the year since *core nova*'s market launch, this technology has been incorporated into operating rooms in many countries. This indicates that the touch panel control interface has been well received by hospitals.

Exterior Design Customization

Richard Wolf GmbH chose Advantech products primarily because of Advantech's excellent brand reputation and product quality. The POC-W211's design offers more than integration between the host machine and screen; it also has the advantages of stability, efficiency (Intel x86 chips),

ease of installation, medical safety certifications, and a fanless design. The POC-W211 is capable of satisfying all of Richard Wolf GmbH's functional demands. Moreover, no additional wiring is required for system upgrades.

In addition, Richard Wolf GmbH was also very satisfied with the customized services provided by Advantech. Specifically, the color and key visual themes Richard Wolf GmbH specified for the POC-W211 were delivered. This allowed for color consistency between the POC-W211 device and the endoscopic medical equipment. Furthermore, Richard Wolf GmbH needed the ability to detect the status of various systems in the BIOS settings. For example, if a system malfunction is likely to disrupt operations, the ability to issue an automatic warning is essential. This requirement was met in just one week following intense collaboration between European and Taiwanese engineers.

When designing *core nova* in 2013, Richard Wolf GmbH originally adhered to the standard approach of using conventional computers. However, after considering that conventional computers are not certified to medical safety standards and vendors do not possess software integration capabilities, Richard Wolf GmbH decided to seek an appropriate solution from Advantech. Advantech not only responded quickly, but it also provided a product of appropriate quality. Additionally, the process of initial sample equipment testing through to product shipment was completed in only one year. The short turnaround time indicates that all the test reports and certifications satisfied the customers can use their products without concern.

Frank asserted that when selecting products, the most critical factors for European system integrators are quality and stability, medical safety certifications, and standardized internal R&D processes. These are the aspects most frequently queried by European system integration providers. Advantech recognized this trend as far back as 12 years ago, when they initially began their move into the medical field. Accordingly, the company invested resources to obtain various medical safety certifications and standardized its internal R&D, design, and production processes in order to provide quality assurance and ensure customers can use its products without concerns.

With the rapid advances in medical technology and public expectations for improved healthcare services, hospital administrators are constantly seeking new methods for improving management efficiency, reducing human error, and minimizing operational time. Advantech's POC-W211 applications have enabled Richard Wolf GmbH to transform traditional endoscopy medical equipment into a valuable feature of integrated operating rooms. This increases the accuracy and timeliness of accessed information and satisfies demands for prompt data transfers. ■



Reaching New Horizons in Digital Healthcare

Delivering Superior Medical Services

The first step to realizing intelligentization is the establishment of smart hospitals that provide patient-centered medical services using integrated information and communication technologies (ICT).

**By Long Lin with images provided by Advantech
Interview with David Lin, Director of Advantech Digital Healthcare Division**

Currently, most industries are moving towards intelligentization as networking technologies reach maturity. For governments and operators hoping to increase the efficiency and quality of existing services while reducing future healthcare costs associated with an aging population, digital healthcare has become a crucial topic.

One successful example of digital healthcare is the Danish Patient Centered Medical Home (PCMH) healthcare delivery model. According to estimates by the American

Health Information Management Association (AHIMA), the ratio of healthcare spending to GDP in Denmark is expected to decline year-on-year, for a potential annual savings of up to US\$120 million.

The PCMH healthcare delivery model comprises of two main elements: general practice and health records. In Denmark, people no longer need to visit a clinic or hospital when sick. Instead, they can use products with video functionality to access the health record website and

report their symptoms to a doctor for an initial diagnosis. Prescriptions are then sent to the patient directly or to a nearby pharmacy for collection. All data regarding their diagnosis and prescription is automatically transmitted and stored in the electronic medical record database. The health record website provides every person in Denmark with access their personal medical records and information, as well as the means to consult a doctor for medical treatment and advice.

Smart Hospitals are the Foundation of Digital Healthcare

The success of the PCMH healthcare delivery model in Denmark indicates that the first step to realizing intelligentization is the establishment of smart hospitals. According to David Lin, Director of Advantech's Digital Healthcare Division, smart hospitals involve ICT integrated with healthcare services that deliver patient-centered medical care. The primary purpose is to improve the quality of patient care by expanding the range of services offered and eliminating medication errors and medical negligence to ultimately reduce healthcare costs. The differences between intelligent and traditional hospitals, based on IBM's blueprint for smart hospitals, are explained below.

In the smart hospital outline provided by IBM, all medical resources, including doctors, nurses, medical instruments, diagnosis equipment, pharmaceuticals, and other materials, are integrated into a single platform and used to provide patient care. Upon admission to hospital, patients are given a barcode or RFID tag that can be used to confirm their identity. During treatment delivery, medical personnel can use the integrated system to identify and locate available resources. If patients require an X-ray examination, the system can be used to determine which rooms are unoccupied, thereby shortening the waiting time.

The concept of smart hospitals, much like the Internet of Things (IoT), emphasizes the integration of information sources to support the delivery of patient-centered care. But how can traditional hospitals achieve this goal? David Lin asserts that a gradual progression from digitization to mobility and then to remote care is the key to success.

The first stage is digitization, this involves seamlessly integrating patients' electronic medical records (EMR) with Picture Archiving and Communication Systems (PACS) and Clinical Information Systems (CIS). The second stage is enabling mobility to enhance the freedom and convenience offered to patients and caregivers with the use of Computerized Physician Order Entries (CPOE) and Real Time Locating Systems (RTLS). The final step is remote care, which will enable patients to access remote healthcare services such as telemedicine and telemetry monitoring.

In the United States, digitized and mobile applications are already quite mature, and the development of

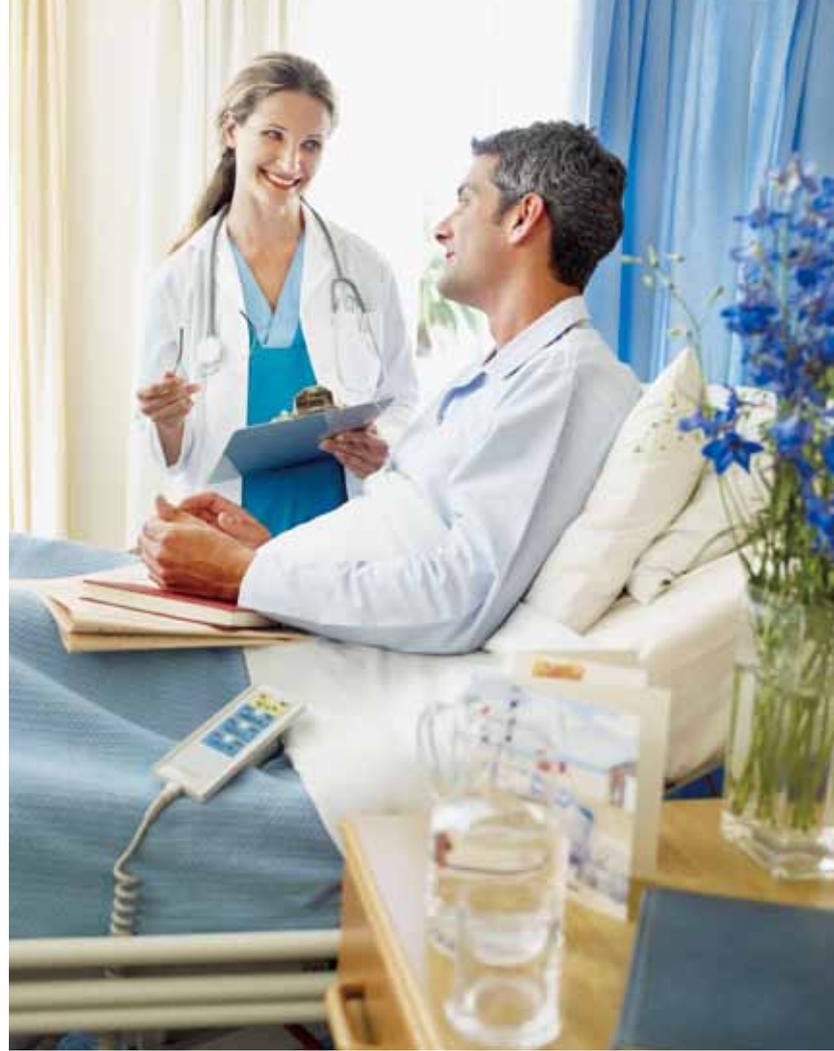
remote care systems is currently underway. In Europe, most countries have completed the digitization phase. Additionally, a number of western European nations have begun investing in mobility solutions and remote care, influencing the investments of many neighboring countries. Meanwhile, China continues to develop in leaps and bounds, with most third-tier hospitals exhibiting some degree of digitization and even a few hospitals beginning to adopt mobilized applications such as mobile medical carts. China's first- and second-tier hospitals still remain in the digitization stage.

Semiconductors and Miniaturization are Transforming Healthcare

In addition to patient care within hospitals, digital healthcare is also focused on public health and disease prevention, particularly in relation to the recent declining birth rates and an increasingly aging population. According to statistics provided by the United Nations Population Fund, the number of people worldwide over the age of 60 was 810 million in 2012 (11% of the total global population). This figure is expected to reach 2.03 billion by 2050, accounting for 22% of the total global population. This estimate highlights the crucial need to establish sufficient healthcare for the elderly and people with chronic illnesses.

The continuous miniaturization of semiconductor technology has drastically influenced the realization of intelligent healthcare by enabling the development of medical sensing devices that consume minimal power and are lightweight, convenient to wear, and capable of measuring physiological data. The most notable example of such sensing devices is the smart watch (e.g., iWatch), which is not only equipped to perform standard time keeping functions, but can also make and receive calls and transmit text messages, but it can also automatically measure users' physiological data (e.g., pulse). David Lin believes that this function will become an essential feature of smart watches. If so, physiological data can be measured by the users themselves and then sent to a hospital's private cloud or a government public cloud for regular monitoring to facilitate the early detection of abnormal conditions.

"Wishes for a long life" is a common salutation in Chinese culture, and one that emphasizes the general desire for health. However, with the increasing adoption of ICT applications, this phrase is no longer a wish; instead, it has become an achievable reality. Besides supporting the development of intelligent healthcare, ICT applications ensure the delivery of high-quality medical services, and encourage the public to conduct routine health checkups to prevent the development of major conditions. The ultimate goal of digital healthcare is increase public health while reducing healthcare costs. ■



Integrating Industries to Promote Digital Healthcare

With the maturity of medical technologies and ICT development, Taiwan is creating excellent intelligent medical solutions and exporting them to international markets; thereby promoting the development of Taiwan's intelligent medical industry.

By Long Lin with images provided by Advantech, Fotolia, Shutterstock, TPG
Interview with Ken Yu, Vice President of Advantech Intelligent Services Group

Digital Healthcare enhances the quality of medical services and hospital management efficiency through Information and Communication Technology (ICT). It can be generally divided into two orientations: healthcare and environmental safety. healthcare refers to the electronic processes in hospitals to improve all aspects of medical treatment such as informatization projects in examination rooms, counters, wards, operating rooms and so on. Environmental safety mainly emphasizes building energy management, equipment management, and environmental control.

Major Orientations: Healthcare and Green Safety

Ken Yu, Vice President of Advantech Intelligent Services Group pointed out that the development process for digital healthcare can be subdivided into three parts. The first part is the adoption of electronic operations for patient visits and various service counters to increase medical efficiency and shorten patient waiting times. For example, patients can self-register by using electronic digital signage in waiting areas. Or, self-service ticket kiosks with display screens on the top of cashier/dispensary counters can effectively manage patient flow to avoid overcrowding

whilst improving workflow. Small touch screens on counter desktops can be used to display relevant information or even conduct patient satisfaction surveys.

The second part concerns digital operations of ward rounds for nurses and physicians. Its main purpose is to enable medical staff to query information, simplify unnecessary data entry jobs, and ensure accurate medical records and medication safety. The most common applications include mobile nursing carts, mobile medical carts, and bedside care systems. Some hospitals also adopted nursing dashboards with electronic billboards in the nursing station to display information. For example, patients often used to call the nursing station if there were problems in wards such as no toilet paper or a broken TV. But now they only need to click the bedside care system and the message will be automatically sent to the responsible unit so nurses no longer need to deal with these every-day matters.

The third element is the information disclosure and management in operating rooms. These applications contain operating room scheduling management, patient surgery procedures (e.g., displaying surgery or recuperation messages on signage in family waiting areas), and built-in surgery report templates for automatically generating reports. These kinds of healthcare applications are already very widespread in larger hospitals right now.

With energy prices growing, hospitals pay more attention to energy management. Ken Yu said that most hospitals have more than one building with higher energy consumption, plus, hospital air conditioning is on almost 24 hours non-stop in order to improve infection control. Through energy management systems that analyze energy consumption, users can identify abnormal situations and make improvements, or adjust the temperature and humidity of the air based on the number of people in hospital in order to maintain good air quality. Therefore, utilizing ICT saves energy usage without sacrificing air quality, thereby reducing operating costs.

Exporting Total Solutions Rather than Medical Services

As we can see, digital healthcare based on ICT improves healthcare quality and efficiency, so when ICT service providers are developing their digital healthcare solutions, the joint participation with medical professionals is the key to integrating new solutions into existing processes. Only in this way, ICT developers are capable of creating valuable innovative total solutions rather than just a bunch of individual software and hardware products. Advantech is planning to advance Taiwan's digital healthcare platform offering by way of alliance. Ken Yu further illustrated the mode of operation, "First of all, by associating with specific system integrators we can develop a variety of digital healthcare applications and invite hospitals to try them

out. The solutions will form an experimental trial while we all constantly refine and adjust functionality according to expert advice, and the final complete solutions can be rolled out to medical centers, hospitals or clinics, and long-term care agencies and other medical institutions. The government, corporations, associations and media can perform as promoters to introduce and inform people about these latest medical trends and practices."

After the successful outcome of digital healthcare solutions in Taiwan, the same model can be exported overseas. As a result, Taiwan's digital healthcare industry will be able to continue to expand and grow. On the current stage of the global digital healthcare market, China is the market with the most potential and entering into this market is relatively easy for Taiwanese companies; and since Taiwan's digital healthcare industry started earlier, a wealth of knowledge and experience in medical technologies and ICT applications has been absorbed and this can become an inspiration for Chinese companies.

In recent years, China actively promoted healthcare reform. In addition to encouraging the implementation of electronic medical records and high quality healthcare services, the authorities have allowed the establishment of private and specialist hospitals and authorized Taiwanese medical institutions to establish local branches. "Such an approach is equivalent to exporting Taiwan's medical services, professional know-how and excellent medical staff. They have to compete with local hospitals so Taiwan should export the whole digital healthcare industry rather than just individual medical services," Ken Yu stressed.

Faced with an aging society, high medical expenses, doctor-patient relationship conflicts, and ICT development, digital healthcare has become an irresistible trend. Through their integrated digital healthcare solutions, Taiwanese companies have to make good use of the dual advantage of digital healthcare expertise and ICT to get a head start on the market. ■



Intelligent Integrated Operating Room Platforms

Intelligent integrated operating room platforms are ideal for improving patient care standards, fostering a positive working environment, and optimizing hospital performance.

By Sharlene Yu with images provided by Advantech
Interviews with Alan Tso, Technical Director of Jaguar Technologies,
and Chiayin Lee, Assistant Manager for Advantech Intelligent Services



Although surgery is a primary treatment modality, the complex processes involved require substantial collaboration, precise equipment, and a clear division of labor to ensure successful completion. Accordingly, operating rooms are among the most labor-intensive and costly hospital facilities. The varying number of surgeries per day, difficulty of accurately predicting operation time, unexpected emergency surgeries, and other variables all contribute to the challenge of managing the assignment of operating rooms, manpower, and equipment.

With the twin goals of maintaining surgical standards and effectively controlling costs, optimization of often-limited resources has always been an important issue for all medical institutions.

Integration Maximizes System Functionality

By making a long-term investment in medical applications, Advantech is currently and actively promoting its Solution Ready Platform (SRP), a total solution that combines hardware with software and allows users immediate access to market-proven and available systems without self-developing or outsourcing their IT projects in bits and pieces. Advantech Intelligent Services Assistant Manager Chiayin Lee stated that last year Advantech launched an intelligent, integrated operating room platform in collaboration with the medical software vendor Jaguar Technology. This platform includes the pre-operative appointment scheduling and coordination control, intra-operative records checking and management, and post-operative review of reports and statistics, thus optimizing the existing surgical management process and improving operating room utilization. In addition, the digitized information and processes help reduce human error or negligence and ensure the safety of patients, and the full text and image data can not only be used as treatment records to decrease medical disputes, but also as teaching materials to pass on professional skills and experiences, or as important references for improvement of future work.

This intelligent management system utilizes several Advantech products: POC-W211, POC-W242, UTC-532 and 7-inch touch Pocket Pad, all of which are dedicated healthcare computers featuring fanless, low noise, dust-proof, water repellent designs, while complying with the medical safety standards. As for the software, it contains many Jaguar Technology subsystems such as mobile intelligent scheduling, intelligent control center, digital surgical records, mobile surgical care system, intelligent management dashboard, Cloud APP services, dynamic broadcasting management, and more.

Alan Tso, Technical Director of Jaguar Technology, indicated that in the past, its systems had to run on customer

hospitals' existing or purchased hardware, and unqualified devices sometimes adversely affected software functionality or usability. When a system went wrong, it was difficult to determine which vendor should be held responsible for resolving the problems. Therefore, Jaguar Technology has been on the lookout for suitable hardware that would enable its systems to deliver more perfect performance. Tso pointed out, "Space-limited operating rooms require high end computers with compact designs and ergonomic operation. A few years ago I saw Advantech's tablet computer in the operating room of Shin Kong Memorial Hospital, and immediately felt that this was what I had been looking for, because its integrated design solved the space-consuming problem of the general PC, and the touch screen eliminated the need for additional devices such as mice, or styli and digitizer pads. And Advantech's wide range of high-quality products, plus their ambition to deepen the medical industry made them very attractive to us".

Intelligent Platforms Enhance Overall Efficiency

Alan Tso said, "Taiwan's medical institutions attach great importance to patient safety, workflow, and quality control, but the combination of text and image has been the biggest bottleneck during their informationization process. Currently, many hospitals still use paper records and documents, and there are some that must write reports by hand due to no computerized systems. Since a picture paints a thousand words, our system enriches the operative report with digital content and graphic images while recording a range of critical surgical information".

As their digital surgical report system continued to win the favor of large hospitals, Jaguar Technology developed more management systems associated with the surgical process through a continuous in-depth study of clinical operations. Tso further explained their features:





First, surgical scheduling is a complex task involving many management principles. For example, each department is in charge of its own operating rooms, and length of surgery time varies depending on the type of disease, patient age, and medical condition; recovery time differs too, depending on patient, procedure, and type of anesthesia. Computers can be used to consult databases to facilitate smooth transitions between operation assignments while minimizing surgical team wait times and maximizing operating theater usage. Digitized scheduling systems also free medical staff from the burden of handwritten data logs.

Prior to the start of any surgical procedure, the confirmation in the operating room is very important. Jaguar's mobile solution provides a touch tablet for nurses to do the final verification with an easy movement rather than handwriting on paper or using a fixed-location PC to enter the data.

Furthermore, some surgical procedures may require use of portable C-ARM X-ray machines, arthroscope, da Vinci surgical system or other apparatus; the Jaguar surgical image workstation acquires images generated by this equipment and adds them directly to the patients' medical records. "When the medical staff depresses the foot pedal to take a picture, the image is transmitted directly to our system, instead of the previous multi-step approach of shooting, capturing, and attaching to the file. The stored images can be used as medical education materials and healthcare audit data, or even as evidence in the unlikely event of a medical dispute," Tso said.

Enabling Big Data to Generate Value-Added Benefits

Tso maintains that the Jaguar management dashboard and regular report systems contribute to hospital decision making. "Like a navigator, the administrator decides whether to accelerate or decelerate based on a variety of information shown on the dashboard. Through complete collection of front-end data, our intelligent management dashboard lets users analyze statistics effectively and do cross comparisons to generate Key Performance Indicators

(KPI) that further improve the effectiveness of their executions".

Apart from allowing the supervisor or the head nurse to allocate operating rooms using a reservation system with a touch device, the current status of all operating rooms can be instantly displayed on the screen by accessing camera feeds from each room. Thus surgical progress can be monitored, and staff and equipment deployment can be quickly arranged if emergency surgery suddenly becomes necessary. All information, including preoperative, intraoperative and postoperative data, is fully digitized and integrated into the Jaguar system via the Cloud platform. This linked structure allows the aggregated information to become a valuable reference resource.

As a software provider, Tso emphasized that "overlapped project development is a significant waste of resources and functional planning is not good enough to meet the different needs of users; hence, we focus on the users' point of view to design systems and optimize processes such as completing a report with a minimum of keystrokes or shortening the time to finish a task. Simultaneously, we take account of the hospital policy and work rules so as to provide different levels of users a hassle-free way of accessing information after digitization. As these key factors are thoroughly understood and resolved, our system platform is capable of achieving the desired functionality and effectiveness considering the multiple needs of the medical staff, patients, and their families".

According to statistics of the Ministry of Health and Welfare in Taiwan, the island has nearly 2,000 operating rooms, and on average tens of thousands of patients undergo procedures daily, including both inpatient and outpatient surgery. Advantech cooperates with Jaguar Technology to introduce the intelligent integrated operating room platforms that let the healthcare industry offer the most complete software systems with the highest quality hardware devices so as to provide appropriate, top performance, healthcare services for patients, and better working environments for medical staff. ■



One-Stop Shopping for Public Transportation

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Enabling an Intelligent Planet

Advantech's rugged design in-vehicle computers are suitable for bus fleet applications. By equipping buses with onboard computers, our customers can proactively monitor vehicle diagnostics and maintain real-time communication between administrators, central dispatch, and driving staff. These systems dramatically increase the safety of public transportation for both drivers and passengers.



TREK-674
compact in-vehicle computer



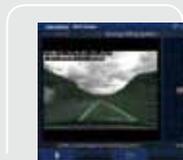
TREK-668
luxury in-vehicle computer



In-vehicle smart display



In-vehicle camera



Intelligent video analysis



Voice recognition





Advantech ARK Self-sensing Intelligent Systems

By Advantech Embedded Core Computing Group with images provided by Advantech

The Internet of Things is the basis for connecting intelligent devices with cloud computing. Advantech's new generation of fanless embedded ARK systems are capable of self-management, seamless communication, and self-protection. They also support real-time monitoring and control of connected peripherals by automatically collecting data and reporting abnormal conditions. The advanced software and hardware design allow the "self-sensing" mechanism of ARK systems to be initiated in a variety of application environments and enable users to rapidly implement IoT applications, thereby maximizing the benefits.

Encouraged by investments from industrial giants and government funds, the Internet of Things (IoT) has become one of the hottest topics in the industrial arena; all industry segments hope to participate, and see what benefits the IoT can bring. However, to actually reap the benefits of the IoT, one must understand it. Then one can get double the result with half the work by using simple, efficient IoT solutions. Advantech's ARK fanless embedded system, a self-sensing and intelligent system integrating advanced technologies, has played a key role in helping our customers realize IoT applications.

Implementing IoT Concepts

Talking about the values of the IoT and the so called "big data" that is collected by IoT, Louis Lu, senior software manager of Advantech Embedded Computing Group, pointed out that with the prevalence of wired and wireless networking, the accumulation and analysis of data acquired from networked devices—be it via the network of a closed intranet within an enterprise or the open internet, or via any kind of communication protocol—can be considered an IoT practice in the broader definition. And the functions and values of big data accumulated from end-devices depend upon how it is analyzed, utilized, and eventually transformed into the most effective commercial values. The results not only help to create maximum benefits for client users but also encourage continual progress on the part of product providers.

Lu took Advantech as an example. Advantech provides devices and solutions that help its customers complete applications in various vertical markets, and the data gathered from the applications can also provide valuable reference to users when it comes to making decisions such as purchases. On the other hand, through analyzing the big data collected from various application areas, Advantech also has better understanding of end-users' responses and OEM customers' requirements in their particular vertical markets, which in turn directs us to improve our soft-and hard-ware designs in the future and likely to bring changes to the whole supply chain—from product designs, to planning,

to production scheduling.

Therefore, the IoT will not only bring a competitive edge to its users, but will also influence manufacturers. The convenient collection and analysis of big data, as well as easier approaches to the construction of the IoT system have become focus issues in the industrial arena. In this discussion framework, Advantech's ARK fanless embedded system, a hard-and soft-ware integrated product with self-sensing capabilities, is an excellent example IoT solution.

Sandy Chen, director of Advantech Embedded Computing Group, said that there is a lot of talk about the IoT but rather little practice. Everybody wants to participate in the IoT, with its seemingly bounteous business opportunities, but plans for actual IoT practice remain vague, partly because the IoT has so many facets involving differing industrial standards, products, and applications, which cannot be easily encompassed. Most users hope that a single, standard product can satisfy all their needs, but that is actually difficult, because there are too many application segments in the IoT, and many applications cannot easily be categorized. However, Chen pointed out, the most important value of IoT lies in the re-utilization of analyzed big data, which helps deal with existing errors and prevents the occurrence of errors in the future; analyzed data helps to predict future behavior modes so as to work out solutions that can be applied now and in the future. Therefore, products like the Advantech ARK, which integrates software and hardware from the inside out to achieve self-sensing and management functions will play an increasingly key role in the IoT era.

Self-Sensing Systems are Key for IoT

The Advantech ARK series is distinguished from other embedded systems in the market by its self-sensing and management capabilities. This new-generation, fanless embedded system family will not only be engaged in data computing but it is also capable of self-diagnosis, reaction, and alarms. It detects and monitors its own system status for temperature, voltage,

system loading, networking, etc., as well as the status of connected peripherals—for example, hard disk read/write cycles and screen health status; when the system or peripheral parameters reach thresholds indicating they are facing End of Life status, the system alerts a user to implement preventive replacement. It also can detect whether OS and applications are operating normally, and automatically make dynamic adjustments according to the user's settings.

Network security is also an important IoT issue. To deal with this, the ARK self-sensing system provides three layers of protection. The first is McAfee white-list screening, which allows only pre-authorized programs to run in the system, and when countering repetitive attacks by unauthorized programs it issues email or SMS alerts to system administrators. Secondly, it has a built-in software Security ID, which is an encryption lock that prevents copycats so that our customers can safeguard the yields on their self-developed programs; even if a hard disk is stolen, protected programs will not run in other machines. Thirdly, it uses open SSL cryptographic protocols for data transport to ensure security over the internet.

With these enhancements, the ARK embedded system can play an independent key role in any IoT application located in any environment, regardless of the presence or absence of on-site support personnel or the conditions of peripheral modules. In addition, to accommodate the range and depth of IoT applications, the whole ARK series of products features a fanless design with resulting high reliability, wide operating temperature, dust prevention, and minimal maintenance costs, as well as computing performance options from low to high end—exactly the features needed for optimizing an IoT system.

The Advantech ARK self-sensing intelligent system is not limited to the traditional embedded system functions of computing and linking peripherals. Now it can implement primary data processing, and send processed data to a backend server instead of merely forwarding raw data collected from the field. In addition, by recording user behaviors, such as system loads, performance efficiency and time of usage, the system can provide important references that optimize future equipment purchases.

Chen said that from the Advantech customer viewpoint, the ARK embedded system is different from other traditional controllers in that it offers intelligent management and information feedback. The role that it ultimately plays in the IoT depends on how OEM customers construct their application architecture. In any case, the self-sensing design of ARK helps expand IoT benefits to

the maximum.

Lu stated that when ARK is used on a large scale or in an open architecture, there are upper layer units such as MIS or servers on top of it; in these cases ARK simply plays a self-monitoring and data transmission role and hands over the jobs of policy-making to the upper control layers; but when the ARK is embedded in a small, closed system that does not have an upper control mechanism, it can take full advantage of Advantech's software-hardware integrated designs to implement management policy and at the same time notify responsible persons of the results. This helps to eliminate unnecessary expenditures and reduce human resource requirements. Therefore, the new generation ARK is an ideal IoT solution for small and medium enterprises that only need small-scale systems; it is also suitable for field deployment in remote areas with limited human support.

The new-generation ARK embedded system can manage, adjust and protect itself in a dynamic situation, and is able to implement real time monitoring and control over peripherals. In addition to modular designs and rich peripheral supports, ARK fanless embedded systems also feature a high degree of integration with Advantech's software products such as SUSIAccess and iManager. Lu explained that all Advantech products, and some third-party peripherals, are provided with an advanced controller chip which takes advantage of Advantech software resources such as SUSI API and SUSIAccess to construct a complete IoT platform, from the front end to the back end; this allows users to obtain more detailed information about the system and its components and thus make more accurate assessments. If the system incorporates non-Advantech products or modules without a similar control chip, it can merely collect basic data via standard interfaces.

Lu emphasized that what Advantech is endeavoring to do is to assist its product users to realize IoT applications and maximize their benefits. The main purpose of the new-generation ARK series is to create an IoT-implementing environment based on well-rounded sensing and management, together with seamless linkage from upper layers to the field. The technologies Advantech uses to meet these purposes form the core of our competitiveness. Looking to the future, Advantech will continue to develop hard- and soft-ware integrated products in order to provide comprehensive support and service for Big Data and IoT applications. ■



Water Quality
Structural Stability

Smart Agriculture
Indoor Air Quality

Mining
Smart Parking

IP-Based Design
Multiple Sensor Combination
Extreme Low Power
Multiple RF Design
Network Security

WISE Gateway & Node Devices

The Next Generation of Wireless Data Acquisition Solutions

ADVANTECH

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Advantech WISE-3000 and 1000 series of gateway and sensor nodes offer customers the most reliable wireless sensor network with robust interconnectivity, ease of installation, and super low maintenance cost. Ideal applications include environmental monitoring and indoor/outdoor data collecting network applications such as air quality systems, smart parking systems, and more. With WISE-Cloud IoT software built-in, Advantech WISE solution provides remote device management, reliable data acquisition and security protection for many IoT applications.

WISE-Gateway



WISE-3310

- Freescale 1.MX6 dual cortex-A9 1.0 GHz
- IEEE 802.15.4e mesh network
- Supports 200 wireless nodes



WISE-3320

- TI Sitara AM3352 dual cortex-A8 1.0 GHz
- IEEE 802.15.4e mesh network
- Supports 100 wireless nodes

WISE-Node



WISE-1020 Communication Node

- Linear/dust LTC5800 cortex M3
- AI x 3, UART x 1, DI x 4, DO x 3



WISE-3150 Series I/O Node

- Linear/dust LTC5800 cortex M3 and TI MSP430
- Analog, RS422/485, DIO, and a relay node



WISE-3010-Parking Sensor Node

- Linear/dust LTC5800 cortex M3 and TI MSP430
- Low-field magnetic sensor

Advantech Headquarters



Powerful Network Management

By MD Wang and images provided by Advantech
Interview with Wesley Chen, Advantech Business Development Manager

Advantech's ProView series of network management switches address the insufficient control of network communication equipment and generate a new industrial network communication protocol.

As the integration speed of automation systems increases, industrial network communication, which plays an important role in system integration, also becomes increasingly comprehensive. Current product types in industrial network communication can be classified into network management and non-network management; the difference between the two is whether the equipment is in the management range. Most network management equipment uses conventional industrial communication systems for connection between equipment. Most non-network management equipment is used for environment monitoring; for example, in a SCADA system, controllers and sensors distributed over different places are connected to each other via a network. The design of this equipment is simple and provides plug-and-play functionality; however, due to the high quantity of distribution points, large layout and poor installation environment, network management personnel can't tell when the equipment malfunctions. To solve these problems, Advantech provides the ProView series of Industrial Ethernet network switches.

Lightweight Design Satisfies Market Demand

There are two current network communication products: network management and non-network management. This is too inflexible and neglects the central requirement of not only needing network management design but that it should also be simple and light. Therefore the ProView series of lightweight network management equipment compensates for these deficiencies in the market.

ProView series industrial Ethernet network switches provide two kinds of network management methods: communication with SCADA via Modbus/TCP and connection by SNMP (Simple Network Management Protocol) and NMS (Network Management System). These two methods are designed for two different groups: Modbus/TCP is designed for system control by network management engineers and SNMP is designed for IT personnel.

The object of these two methods is to solve the issue of the back-end platform not being able to see the operating status of non-network management equipment all the time. For example, the traditional communication protocol of a PLC is Modbus ASCII or Modbus RTU, and the packets are converted into Modbus/TCP before being uploaded via Ethernet; if the PLC is installed with non-network management equipment and the equipment malfunctions, the system cannot detect abnormal conditions because of packet errors. The ProView series is designed to monitor whether the equipment is working normally i.e. the back-end can be configured to send signals to each endpoint to detect whether it's working normally.

Because the ProView series can detect the conditions of all endpoint equipment the method can also detect the reason for the malfunction, including the time that equipment is connected and disconnected. When the end-user equipment malfunctions, the system integrator find the reason and if necessary configure it using the ProView records.

Optimized for Stability and Low Power Consumption

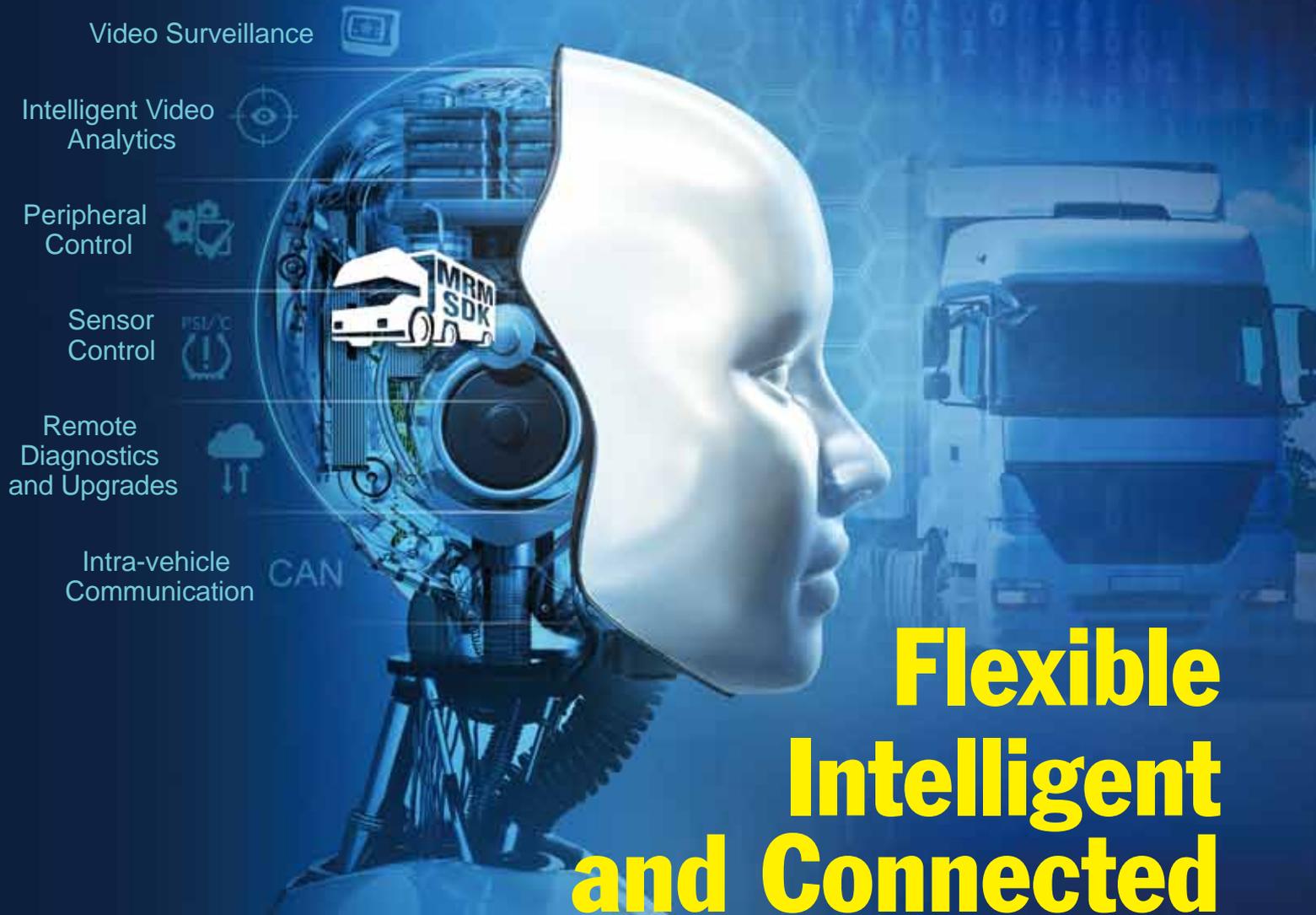
The ProView series also have a VIP Port, for Quality of Service (QoS) bandwidth management. When the user needs to transmit large amounts of data, the user can configure a communication port to be dedicated to the amount of bandwidth. The settings of this port can be modified to suit the user's requirements. For example, in a hospital the data will be divided into two parts: one where the internal hospital information with large amounts of data, such as image archives, Communication System (PACS), Laboratory Information Systems (LIS) and the like; secondly external hospital data includes digital signage or registration desk information. Internal hospital data usually has a large transmission volume and is time-critical; accordingly, the ProView would have one of its communication ports as a VIP Port to satisfy these requirements.

Since industrial network communication equipment operates in tough environments for example factory boiler rooms or in remote locations, and any data loss can be catastrophic than enterprise equipment, the ProView series has been designed for extra stability and can work normally at temperatures of -40 to 70 °C.

The ProView series uses the IEEE 802.3az standard and as such reduces power consumption by 60% compared to common network management equipment which is important in 24 hour factory operation.

The warranty period of most common network communication products is two years; however, Advantech has extended this to five years for the ProView series. The reason for the extra warranty period is that the internal components of ProView series are very special to provide extremely high stability so the components provide have a longer service life and higher stability and the warranty period reflects that.

The ProView series was launched in October 2014 and includes 39 models; including three with Power Over Ethernet (PoE). As the Internet of Things (IoT) becomes more popular, the endpoint network communication product monitoring function will become one of the most important functions for system operation and consequently, the ProView series's features' mean that they will achieve higher performance in a future IoT system. ■



Flexible Intelligent and Connected

Fleets are a logistics service provider's most important asset, and effective fleet management is essential for optimum business efficiency. Advantech's MRM SDK is a flexible and intelligent software development kit that enables system integrators to provide customized fleet management solutions in less time at lower cost.

By MD Wang and images provided by Advantech
Interview with Brian Hsieh, Business Development Manager; Mark Chen, Product Manager; Hades Wang, SW SRP of Advantech Digital Logistics and Fleet Management Sector

Because a fleet is a logistics service provider's most important asset, effective fleet management is vital for optimum, efficient operation. However, because most logistics vehicles are used outdoors, managing them can prove challenging. In the past, operational efficiency was dependent on driver behavior and work ethic. In recent years, embedded technologies such as GPS, Wi-Fi, and 3G have advanced rapidly and are comprehensively applied to fleet management systems. Back-end management platforms enable enterprises to remotely manage vehicle routing, status, and driver behavior over wide areas. Remote monitoring and management not only improve operational efficiency, but also help regulate driver behavior to increase safety and enhance company reputation.

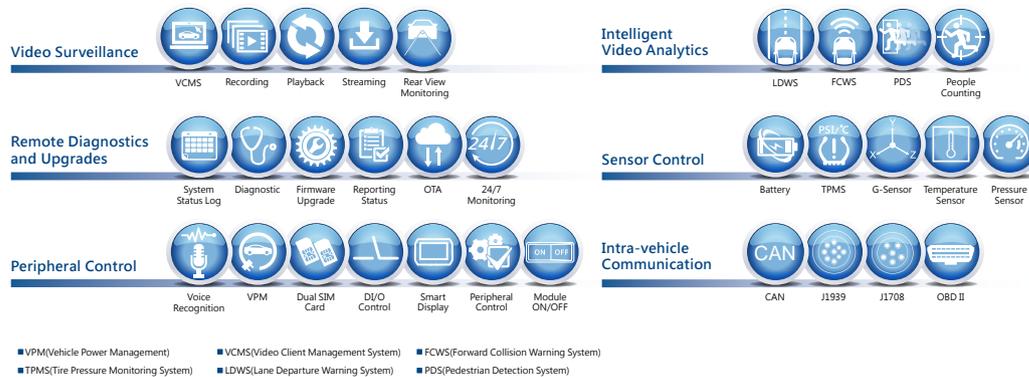
A Brilliant System with Six Functions

While fleet management technology has been available for quite some time and has been adopted by many enterprises, there is still room for enhancing market awareness and increasing penetration rate. Furthermore, for systems integrators (SIs), resource limitations can negatively impact market strategies. Advantech's fleet management solution provides the system integrator with strong technical support. Additionally, the expanded functionality of MRM SDK enables SIs to better allocate their system integration resources.

Compared with the previous SDK, the new MRK SDK has several improved features, including a dedicated design that maximizes hardware efficiency, makes it easier to integrate accessories, reduces application development

MRM SDK Package

Simple and Easy Development



time and cost, allows more complete fleet management integration, and makes physical vehicle information more available. These features enable administrators to manage their fleets more effectively.

The features of MRM SDK are based on configurable firmware and protocols for the following six functionalities: video surveillance, remote diagnostics and upgrades, peripheral control, intelligent video analytics, sensor control, and intra-vehicle communication. These six technologies are integrated into the software, making the fleet management system a closed system regardless of the vehicle type or back-end platform.

Because MRM SDK supports over-the-air (OTA) technology, enterprises can conduct vehicle, system, and firmware updates remotely via a back-end management and control platform. Consider GPS devices for example. In the past, to update stored maps, each device had to be removed from the vehicle and transferred to the IT department where it would be upgraded manually, or IT technicians would personally attend to every vehicle. For relatively small fleets, the amount of time spent updating equipment was feasible; however, for large-scale logistics service providers with fleets comprising hundreds of vehicles, a substantial amount of time was necessary to accomplish an equipment update.

However, with OTA technology, direct equipment updates can be scheduled to occur automatically. Therefore, IT technicians only need to configure the settings at the back-end to execute all updating operations within a predetermined time, significantly reducing operational downtime.

IoT Increases Access to Vehicle Data

The MRM SDK platform adopts the Windows operating system, which allows system video messages to be obtained more easily; further, the SDK also adheres to the major standard vehicle body communication protocol, CAN Bus. CAN Bus connects with the sensors installed inside the vehicle body, which transmit their signals to the main vehicle system and the back-end management platform.

The administrator can infer driving behaviors from these messages. For instance, too much heavy braking would probably raise questions. Moreover, the sensors can automatically diagnose the status of the physical vehicle; the most famous application being the tire pressure monitoring system (TPMS), which detects pressure in every tire and informs the driver of any non-conforming tire or tires in order to prevent accidents. In MRM SDK, the sensing technology extends to the IoT structure; which integrates all important components in the physical vehicle into the monitoring network, adding another layer of intelligence to fleet management.

“Intelligent management” means different things for different applications. Intelligent fleet management strives to make driving behavior and vehicle status more predictable. That is to say, intelligent fleet management works to control as many conditions as possible in advance. Consider the aforementioned TPMS for example: because a substantial number of vehicle collisions are the result of insufficient tire pressure, enterprises have increased emphasis on tire pressure monitoring. However, for fleets, tires are consumables; for even a medium-sized fleet the cost of replacing tires can reach into the millions.

Using MRM SDK’s tire monitoring function, the condition of all fleet vehicle tires can be assessed and managed remotely. The MRM SDK not only notifies fleet managers of tire wear and pressure, but the collection of vehicle data can also facilitate economies of scale.

The advantage of Advantech’s MRM SDK compared to other fleet management SDKs on the market, is system flexibility. For system integrators, no system is flawless, and most design issues typically emerge only during use. Therefore, rather than adopting a single-project solution, the ideal strategy is to implement a platform that enables integrators to address problems immediately. The simple interface and flexible functions of Advantech’s MRM SDK enable developers to rapidly design ideal fleet management systems that increase both operational and cost efficiency. ■



Wang Qi
iSystem Sales, Advantech China

Hello, everyone! My name is Wang Qi. Based at Advantech's Shanghai office, I am responsible for the iSystems sales team in East China. I joined Advantech NCG sales in October 2000, and for the past 15 years have served at the Changsha, Hangzhou, and Shanghai offices.

After years of dedication, we have successfully built a well-established sales network and powerful sales force in East China. Additionally, we have achieved breakthroughs in the ITS, MA, medical, and other key domains. Localized sales and technical forces provide our channel partners and key accounts with comprehensive support, contributing to our ongoing accelerated growth.

In terms of market share, Advantech remains a top player by providing system integrators around the world with trusted ePlatform services and seamless total solutions, and establishing partnerships to develop smart city and IoT solutions.

I spend my spare time traveling, playing sports, and reading. That I have the opportunity to share my joy and progress with Advantech towards achieving a beautiful life is indeed a blessing! Warm regards and I wish you all the best!

Hello everybody! My name is Donato. As an accountant, I support Advantech's offices in France and Italy although I am based at AESC in Eindhoven, Netherlands.

I have worked for Advantech for two years now and have enjoyed every single day. Having the opportunity to meet wonderful people from all over the world and getting to work in such a positive environment are what make this company very special. I believe that as a company, Advantech is constantly moving forward, which inspires me to give the best of myself for my colleagues.

I was born in Italy and lived there until I had completed my studies. Then I decided that the world was too big and too beautiful to remain unexplored. So I began to travel around until I eventually arrived in the Netherlands, where I met the woman who would become my wife.

Traveling is still my favorite hobby. Every place on earth is worthy of exploration! I love to take my car and a tent and go discover different people and places, even underwater areas. In fact, I really enjoy scuba diving. I try to dive every time I travel to a warm place. So wherever you are, one day sooner or later, I hope to visit and explore your area as well!



Donato Urbano
Accountant, Advantech Europe



Jennifer Huang

Brand Development and
Public Relations Manager,
Advantech Taiwan

Four years ago, I stepped into Advantech headquarters for the first time. In the initial stage when I was still a candidate of the Elite 100 program, I met Chaney and KC. After an interview with them both, I was fortunate enough to join the Advantech family in the Brand Development and Public Relations Department, where I have remained to this day.

My job responsibilities have given me the opportunity to meet and become familiar with many Advantechers from around the world. The Advantech philosophy is both easy and somewhat difficult to follow. In the past four years under Chaney's guidance, our team has become stronger and developed clearer goals.

We hope to continue providing our RBU and sector colleagues with not only prompt but also optimal support. I am glad to be a part of Advantech and meet every one of you. Should you ever need assistance, please do not hesitate to contact us.

My name is Cristina Ferreira, and I have worked at Advantech Brazil for two and a half years. Responsible for iService markets, my main objective is to develop new business through partnerships with system integrators, software companies, key account holders, and end customers.

I develop marketing plans, compile market intelligence, and participate in all stages of the sales process, including prospecting, telephone contact, product promotion, demonstrations, project design specification, negotiation, sales, and after sales support. Currently, Advantech Brazil is applying for ISO 9001 certification. As a Quality Multiplier, one of my responsibilities is enabling my colleagues to follow the processes established by management.

I consider the one and a half years I lived in the United States to be one of the best experiences of my life. Experiencing new cultures is wonderful, and I love seeing how people around the world live every day. I have also had the opportunity to visit Advantech Headquarters in Taiwan. During my visit, I learned a lot from my Taiwan-based colleagues and was able to experience a different culture as well.

Being a Key Account Manager at Advantech is great! I face a new challenge every day, and this makes me grow both professionally and personally.



Cristina Ferreira

KA sales of iService, Advantech Brazil



President Ma Visits Advantech Linkou IoT Campus

On a Saturday morning, January 10, 2015, President Ma Ying-Jeou, as well as officials from Taiwan's Ministry of Economic Affairs, visited Advantech's Linkou IoT Campus. Accompanied by Advantech President Chaney Ho and CEO K.C. Liu, President Ma not only experienced Advantech's IoT solutions for smart cities but also joined a symposium with Advantech and other industrial leaders regarding the development of Taiwan's IoT and smart city industries.

At the symposium, officers from Taiwan's Ministry of Economic Affairs, Ministry of Education, and Ministry of Science and Technology, as well as Advantech executives,

discussed the development of key policy directions and talent cultivation. President Ma gave positive feedback and promised that after further research, the Executive Yuan would assist with implementing a number of the policy directions discussed. President Ma also emphasized the solid foundation of Taiwan's semiconductor, electronic component, and industrial computing industries, highlighting the advantages of being in the right place, at the right time, and with the right people. "If we hold onto these advantages, we can remain dominant and continue our role as a leader of the global information and communication industry." ■



Advantech provided the following advice to the Taiwanese government regarding the development of Taiwan's IoT and smart city industries:

1. The government should actively develop large system integrators to secure an advantageous position internationally.
2. Instead of promoting the current Industrial Technology Development Program, emphasize the promotion of projects aimed at "Leading the Industry".
3. Promote large projects for "Industry-Academia Cooperation in the Fields of IoT/Smart City".

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Partnering for Smart City and IoT Solutions

Advantech holds “Enabling an Intelligent Planet” as our corporate vision, and “Partnering for Smart City & IoT Solutions” is our concrete goal; we will continue collaborating with various partners to build new paradigms in each vertical field. Advantech will consistently follow our LITA (Altruistic) spirit, positively cooperating with partners and engaging in innovation to develop every Smart City opportunities.

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