

My WISE-PaaS

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WISE-PaaS
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Power Insight

Building a Smart Healthcare Clinical Validation Environment in Taiwan with Interdisciplinary Co-Creation



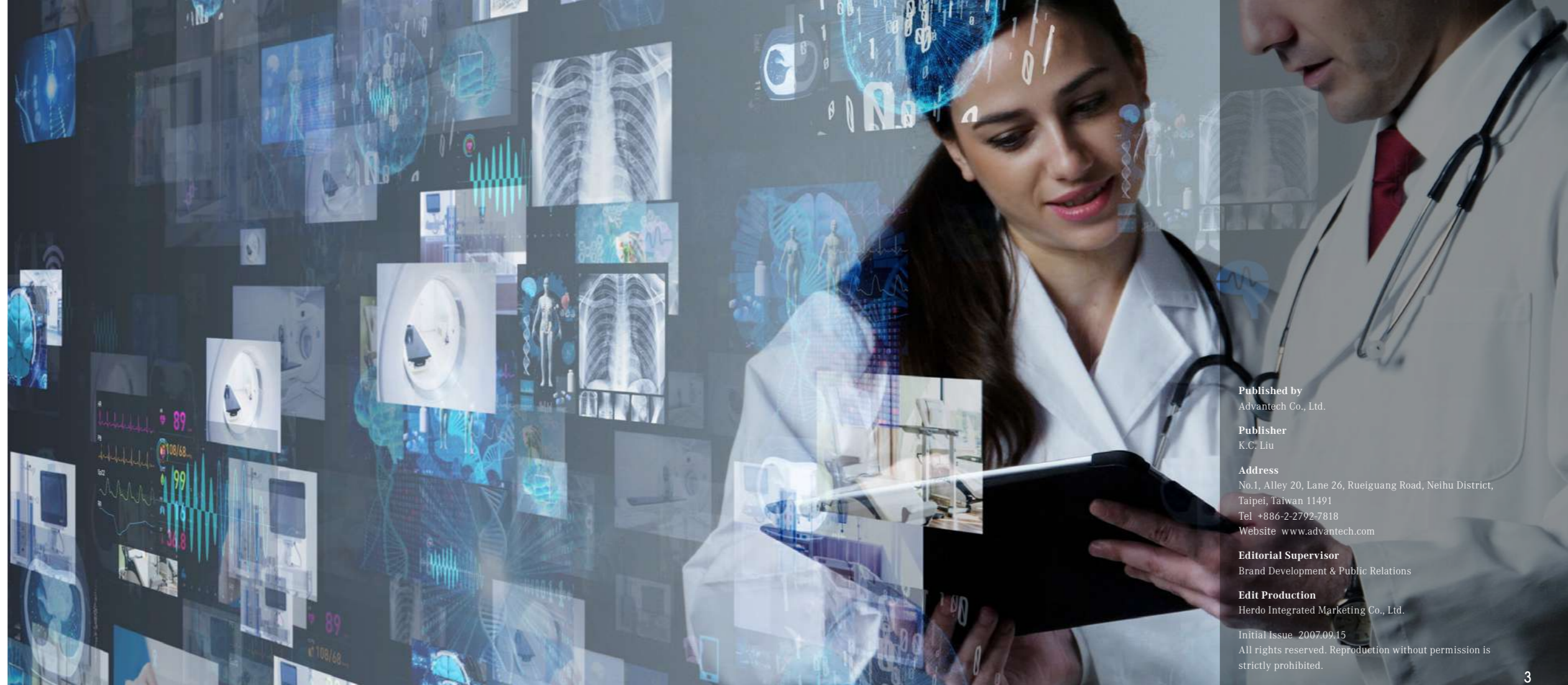
Application Story

Tobii Dynavox and Advantech Deliver a Cutting-Edge AAC Product



Customer Partnership

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Utilizing Intelligent Solutions is the Future of Healthcare



Telehealth Cart Real-time Access to Physicians

Features

-  Multi-clinician conferencing with remote camera control
-  Bi-directional screen sharing and annotation capabilities.
-  Connectivity for digital diagnostics tool sets for ENT, dermatology, audiology, and other general exams
-  Ergonomic design with mobility for easy transport



PTZ camera and high-quality speakerphone



HIPPA-compliant video conferencing platform



Multidisciplinary digital diagnostic tool set

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The use of telemedicine, telehealth, and digital medical devices has increased rapidly with the COVID-19 pandemic. According to a survey conducted by McKinsey in April of this year, consumer adoption of telehealth has skyrocketed, from 11% of U.S. consumers using telehealth in 2019 to 46% in 2020. The same can be said about healthcare providers—after exposure to COVID-19, 57% have a more favorable opinion regarding the use of telehealth, and 64% are more open to the idea of working remotely. In keeping with the trend of healthcare digitalization, the theme of this MyWISE-PaaS iHealthcare is innovative eHealth applications and technologies. In this issue, several industry professionals share their views regarding the practical aspects of application development. Additionally, we provide eight case studies detailing Advantech’s co-creation efforts with global partners to educate readers about the latest developments in telemedicine and telehealth.

David Lin, Director of Advantech’s Intelligent Healthcare Division, also provides insight into how Advantech is using comprehensive software, hardware, and cloud platform services to break through bottlenecks and create innovative business-to-business-to-consumer (B2B2C) business models that promote telemedicine.

For the Power-Insight feature, Professor Meng-Ru Shen, Dean of National Cheng Kung University Hospital, discusses how smart technologies can improve the quality of healthcare and patient safety and calls for the adoption of cross-field co-creation in order to jointly establish clinical verification standards for eHealth in Taiwan.

The eight case studies included in this issue introduce various innovative healthcare applications. Tobii Dynavox and Linari Medical, providers of cutting-edge rehabilitation and assistive devices, have co-created smart devices with Advantech aimed at benefiting people with physical disabilities.

Meanwhile, Hamad Medical Corporation and Ramkhamhaeng Hospital adopted Advantech’s AMiS series of intelligent medical carts to improve patient services and safety. These successful application case studies demonstrate how telemedicine and telehealth services and devices can make a significant difference that benefit patients, medical professionals, and hospitals around the world.

In the Customer Partnership section, we outline how Advantech’s partnership with the healthcare IT security company Imprivata has enhanced digital access management in the healthcare industry, and how Advantech’s medical-grade devices equipped with Imprivata technology improves the visibility of staff interaction with patient health records, thereby satisfying industry compliance regulations.

These latest technologies have the potential to create new applications for telemedicine and telehealth and make healthcare services more accessible for everyone. As a leading provider of medical devices, Advantech has witnessed the digital transformation of the healthcare industry and plans to continue co-creating a variety of smart medical services and devices together with global partners. ■

Advantech Builds an Ecosystem to Accelerate the Development of Telemedicine Worldwide

As the COVID-19 pandemic continues to have a global impact on the medical industry, Advantech has leveraged its experience of promoting healthcare digitalization and smart development to build telemedicine ecosystems in collaboration with global partners. Using suitable business models, Advantech continues to facilitate application innovations and the rapid promotion of telemedicine worldwide.

Photos provided by Shutterstock
Interview with David Lin, Director of Intelligent Healthcare division, Advantech

With advancements in ICT, telemedicine started becoming commonplace approximately 10 years ago. However, due to bottlenecks in establishing standardized regulations and user acceptance of the technology, as well as a lack of feasible business models, the promotion of telemedicine has been relatively slow. But with the American Medical Association recently including telemedicine services into its Current Procedural Terminology (CPT) codes, allowing patients insurance coverage for these services, the development of telemedicine has accelerated significantly in the U.S. Additionally, in its efforts to tackle the COVID-19 pandemic, the U.S. government announced its intention to expand telemedicine services. Moreover, with countries worldwide also discussing the possibility of loosening relevant regulations, the telemedicine market is expected to undergo exponential growth in the near future. According to Global Market Insights, the compound annual growth rate from 2019 to 2025 is expected to reach approximately 19%.

Advantech's software and hardware makes it ideal for telemedicine

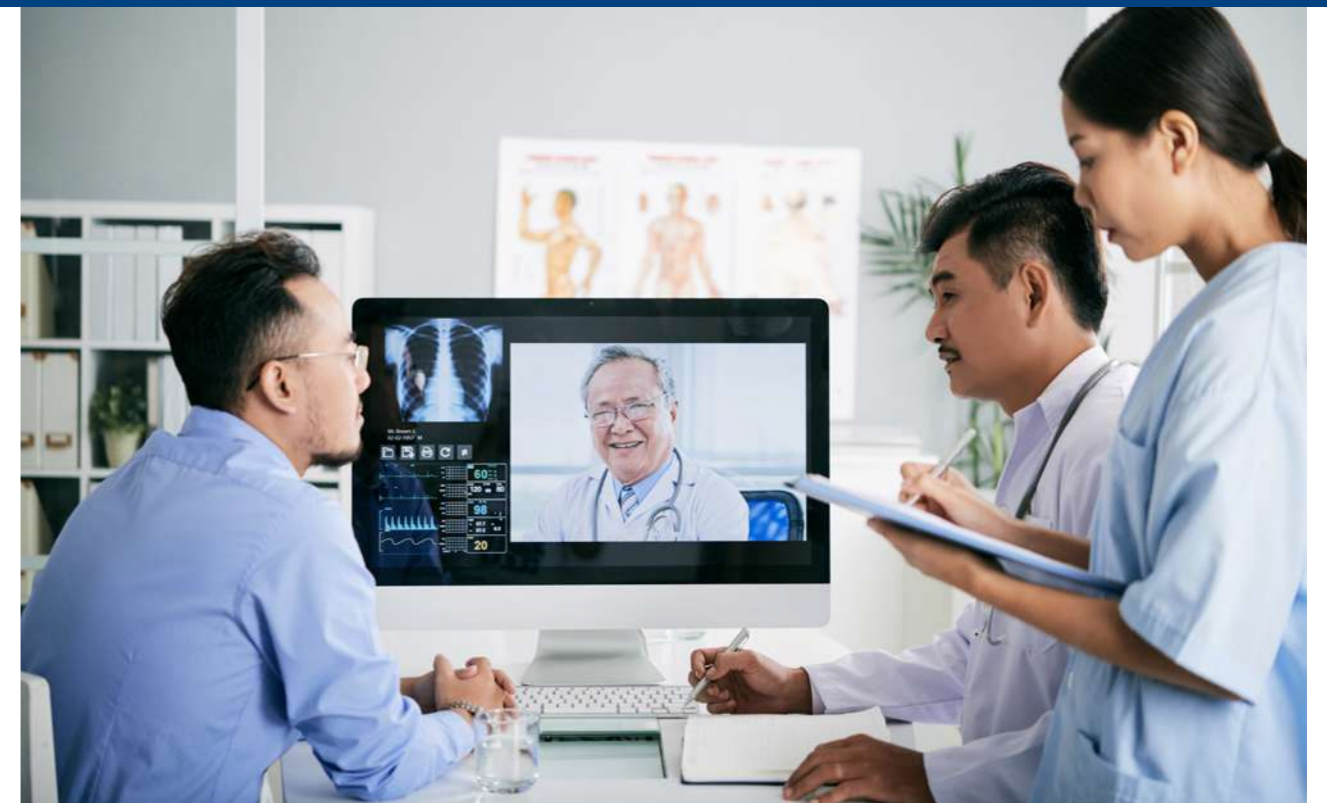
David Lin, director of Advantech's Intelligent Healthcare division, pointed out that Advantech has actively contributed to the digital transformation and smart development of the healthcare industry in recent decades. With significant experience of developing software and hardware

technologies for healthcare and its WISE-PaaS cloud platform, Advantech is more than adequately prepared to meet future telemedicine trends. The company's experience goes beyond facilitating the delivery of traditional healthcare services and has already moved toward "beyond-hospital" services.

To realize beyond-hospital services, Advantech actively utilizes comprehensive software, hardware, and cloud platforms with global partners to collaboratively build a telemedicine ecosystem. With this collaboration, Advantech can promote the co-creation of healthcare services and accelerate the implementation of telemedicine around the world.

According to Mr. Lin, in the past, many technology companies invested in the telemedicine sector and collaborated with hospitals to establish telemedicine services. They used a hospital-to-consumer business model, which allowed doctors to offer healthcare services to remote areas. However, some issues were encountered with this model, which hindered the promotion of such services.

First, relevant regulations specify that doctors must provide in-person diagnoses and consultations. Second, patients are often unwilling to pay for healthcare services if doctors do not diagnose them in person. To overcome this, Advantech utilized a hospital-to-business-to-consumer model to promote telemedicine and break through the bottlenecks presented by the healthcare-to-



customer model. In other words, Advantech was able to use technology to connect hospitals, clinics, and other care facilities and related medical businesses to provide healthcare services to patients. Thus, patients can attend any local clinic or medical center to obtain healthcare services typically provided by hospitals. This not only overcomes the restrictions of relevant regulations, but offers services that increase patient trust.

Advantech enables comprehensive medical services worldwide

To develop innovative application, Advantech is actively collaborating with global partners to develop a telemedicine ecosystem. In Taiwan, Advantech is currently working with the International Integrated Systems Inc. software company, Chunghwa Telecom telecommunications operator, and Medimaging Integrated Solutions Inc. medical equipment vendor to begin telemedicine service verifications at various healthcare institutions. For example, Advantech and its partners have helped establish a telemedicine consultation system at the Show Chwan Memorial Hospital in Chunghua and Pu Ren Clinic in Nantou, as well as a system to connect the Shimen and Sanzhi Public Health Centers to MacKay Memorial Hospital. This allows patients in Shimen, Sanzhi, and Nantou to access the many healthcare services and resources provided at large hospitals via telemedical consultations.

In the U.S., Advantech has collaborated with software partners, such as the telemedicine solution provider Vsee and the turnkey virtual care company VeeMed, to promote smart healthcare and services. In regards to telemedicine, Advantech has initiated a three-year plan in the U.S. and expects to connect with at least three software companies or domain-focused solution integrators to co-create innovative telemedicine services. Additionally, Advantech is seeking partners to promote co-creation in the Middle East as well as Southeast Asian countries, including various outlying islands, in order to accelerate the promotion of telemedicine services in additional regions.

Mr. Lin has worked at Advantech for more than 20 years, during which time he has witnessed the healthcare industry shift from manual paper-based processes to digitalized smart operations, and the doctor-patient relationship shift from being doctor-centric to a more patient-centric approach.

Mr. Lin believes that in the future, as telemedicine services become ubiquitous for hospitals, shared decision-making strategies will mature and patients will receive improved diagnoses and treatment. From a patient perspective, improved healthcare services that allow greater autonomy will be more convenient. Considering these benefits, it is easy to believe telemedicine will provide unlimited possibilities for improving human health and wellbeing in the future. ■

Building a Smart Healthcare Clinical Validation Environment in Taiwan with Interdisciplinary Co-Creation

Healthcare is about taking care of people using the best practices, the latest knowledge, and the best technology possible. National Cheng Kung University Hospital (NCKUH) is actively implementing smart healthcare solutions to create people-centric healthcare services. The hospital plans to connect with partners in various sectors, including Advantech, to build a smart healthcare clinical validation environment. NCKUH aims to perfect their smart healthcare ecosystem in Taiwan and co-create a brighter future for the healthcare services industry.



Photos provided by National Cheng Kung University Hospital (NCKUH)
Interview with Meng Ru Shen, superintendent of NCKUH

“No matter how comprehensive healthcare services are, there will always be issues which cannot be taken into account, but this phenomenon is not unsolvable,” pointed out Professor Meng Ru Shen, superintendent of NCKUH. Patients have confidence in medical staff when they are treated with care and empathy. However, the journey for patients admitted to hospital can be unpredictable and involve outpatient services, admission, surgery, postoperative care, and discharge. There may be problems such as too many outpatients or staff shortages, which can affect the quality of treatment provided. In turn, this can make it difficult for medical staff to give patients the time and attention they need. Fortunately, with the continued evolution of information and communication technology (ICT), healthcare institutions are better able to implement smart solutions in the areas of infection control, medicine, inpatient facilities, patient flow, and asset monitoring and location. This significantly improves healthcare quality and patient safety, both of which are crucial for people-centric healthcare services.

Smart technology promotes healthcare quality and patient safety

NCKUH has built various smart applications in departments such as the emergency room (ER) and intensive care units (ICU) which improved healthcare service quality, but it also allows medical staff to devote more time and energy to patient care. In ER for example, the results of a tomographic examination for intracerebral hemorrhaging will quickly indicate how dangerous the patient’s condition is. For high-risk cases, the doctor will be notified right away to enable immediate treatment.

Professor Shen stated that to ensure every high-risk patient receives a prompt diagnosis, NCKUH has adopted an AI interpretation module for its tomographic examination system. The AI checks the tomogram every two minutes, and if the patient is determined to be high risk, the system automatically notifies the examiner and doctor immediately. The 97.9% accuracy rate of the AI makes it highly effective for ensuring patient safety.

In the ICU, there are various instruments that

enable close monitoring and life support. Although the data collected by most of these instruments is collated and organized, some degree of fragmentation remains because the information is scattered across different systems. When attending doctors make their rounds, they have to click more than 120 times to retrieve the information they need to formulate a diagnosis. The resident doctors are often unable to understand all the information because of their lack of experience and thus, are even less able to understand the patient’s condition.

“This model made people wonder whether doctors are taking care of the information system or the patients,” said Professor Shen. To address this issue, NCKUH integrated patient data collected from various instruments and presented it in a unified format, which was then visualized using charts to provide a comprehensive overview of a patient’s physiological condition. This allows both attending and resident doctors to have a complete understanding of a patient’s condition when making their rounds, giving them more time to exchange opinions regarding diagnosis and treatment. Overall, this significantly improves the quality of the healthcare delivered.

Building a smart healthcare clinical validation environment in Taiwan

Based on NCKUH’s years of promoting smart healthcare, Professor Shen believes that interdisciplinary collaboration is necessary to implement smart healthcare services successfully; specifically, hospital staff must work closely with external professionals, such as IT engineers. For Taiwan, if its strengths in healthcare management and ICT can be combined, the

country would be in a strong position to develop a world-leading smart healthcare industry.

The strategy would involve hospitals connecting with partners in academia, technology, and biotechnology industries to collaboratively use ICT, such as blockchain, AI, wearables, high-end computing, sensing, and IoT technologies, to build a smart healthcare clinical validation environment. Collaboration on a variety of smart applications in precision diagnosis, treatment, care, prevention, and healthcare will not only facilitate the achievement of people-centric care but also improve the competitiveness of Taiwan’s healthcare services, technology, and biotechnology industries as a whole.

“In regards to collaboration, the greatest challenge for medical staff is whether they have a high level of technology acceptance. For ICT professionals, the greatest challenge is breaking away from technology itself,” asserted Professor Shen. He urges professionals from both sides to work with an open mind on existing expertise and combine knowledge from other sectors in order to create smart innovations that meet the needs of all parties. Like the smart healthcare collaboration between NCKUH and Advantech, which benefited from both parties having the same vision, establishing a shared vision eliminates miscommunication issues despite differences in expertise.

Looking forward, Professor Shen hopes to see more partners participate in co-creation to realize a new era of smart healthcare that establishes Taiwan as an important base for developing innovative smart healthcare services in order to create a healthier and brighter future for smart healthcare. ■



RCare Deploys Rapid End-to-End Nurse Call System to Help Fight COVID-19

RCare integrated Advantech's industrial PC products into its Rapid Deployment Kit (RDK) nurse call system. This system has been widely adopted by US hospitals treating COVID-19 patients, and become a vital tool to combat the pandemic.

Photos provided by Shutterstock
Interview with Nick Garofoli, Director of Operations and Technology, RCare

Audio communication systems are indispensable tools which help medical staff communicate with quarantined patients suffering from COVID-19. Due to its easy deployment and management, the RCare nurse call system was discussed as a possible solution during a meeting between White House officials, the US Army, and Johnson Controls. It was considered as part of a larger solution aimed at managing field hospitals being set up in New York City during COVID-19. Presently, more than 30 field hospitals across the US are leveraging the RCare nurse call system to care for COVID-19 patients. Indeed, the system has been a critical part of medical environments tasked with containing the pandemic in the US.

Important contributions to fighting the pandemic

Six years ago, RCare developed the RDK nurse call system in response to the Ebola outbreak in the US. According to Nick Garofoli, RCare's Director of Operations and Technology, the company's nurse call system is a comprehensive end-to-end solution. The plug-and-play and user-friendly RDK nurse call system is an all-in-one touchscreen caregiver console and server. It gives administrators the ability to conduct both on-site and remote hospital monitoring. Administrators can also manage multiple systems through the remote MyAdvantech 13 web interface. Mr. Garofoli pointed out that the RDK system, developed six years ago and widely used in hospitals and medical centers, is a proven, field-tested, and mature product. In fact, it only takes customers fifteen minutes to complete the deployment of this nurse call system. This has made RCare a leading provider in the fight against COVID-19.

RCare's RDK system includes a small touchscreen; 40 waterproof, sterilizable, and reusable call button

pendants; and 40 clip-on bed signs that correspond to the call button pendants. When patients push a call button, medical staff receive the call immediately and provide appropriate assistance as required. Garofoli explained that the COVID-19 pandemic has led to a severe shortage of medical personnel in the US. Retired medical professionals have therefore been recruited, or have voluntarily offered to help. RCare's nurse call system has helped alleviate some of the problems associated with the personnel shortage, since it allows nurses to understand patients' needs without going back and forth between wards, and to gain detailed information through the touchscreen. The system has greatly eased workloads for medical personnel and significantly reduced the level of physical exertion and fatigue.

Currently, RCare's system has been deployed to 31 hospitals and field hospitals that treat COVID-19 patients in the US, including convention centers such as the TCF Center in Michigan and Worcester's DCU Center in Massachusetts, which were transformed into field hospitals. Because of the enormous space of these venues, multiple caregiver consoles were implemented, while a single back-end server efficiently manages and maintains the nurse call systems in the center, and allows the system to serve a large number of patients.

Advantech provides comprehensive and diverse services

The first-generation RDK system, developed six years ago, integrated Advantech's HIT-W121 Embedded Computer with an 11.6" screen that provided a stable and high-performance platform. To accommodate COVID-19, the RCare system adopted Advantech's new HIT-W153 Embedded with a 15.6" screen.

In terms of hardware, Advantech's HIT-W153 is in

compliance with ITE's dual certifications: EN 60601-1 and IEC62368. It is equipped with an emergency button and LED light, and its circuit design conforms to stringent safety requirements. The device successfully helped Rcare pass Nurse Call Equipment Standards UL1069, allowing medical staff to provide better healthcare services. According to Mr. Pluto Kao from Advantech, one of Rcare RDK's peripherals is a headset, which serves as an excellent tool for communication between staff and patients. To ensure stable signals for the headset, specifically for output of the sound source signal, Advantech implemented a two-stage noise-canceling feature to significantly reduce ambient noise, providing clear communication.

Advantech also wrote a corresponding software development kit (SDK) on the host system while assisting Rcare with the project. This allowed the system integrator (SI) and hospital IT staff to develop required functions for their application fields in the shortest time possible. Pluto stated that through the SDK, the SI can configure the switch function of the channels according to the ambient condition. For the LED light, the SI can quickly develop various lighting modes that fit application needs. And for maintenance purposes, IT staff can take advantage of the Watchdog timer—used to detect system abnormalities—to carry out remote configuration without disturbing staff or patients.

There were tremendous material shortage problems caused by the pandemic when Rcare implemented the system for field hospitals in the United States. Advantech's R&D, production, and purchasing departments worked tirelessly to fulfill RCare's product needs in the shortest possible time. Additionally, as an all-in-one (AIO) medical-grade computer, the HIT-W153 is extremely easy to clean and disinfect. This feature is

very helpful for field isolation hospitals as disinfection and cleaning tasks need to be performed regularly. These tasks shouldn't cause damage to the industrial-grade materials of the computer.

Advantech's products play key role in RCare's system

"The high quality and cost-effectiveness of Advantech's products brought critical advantages to the RCare systems. At least 60% of RCare's systems are equipped with Advantech products and all of our COVID-19 systems use an Advantech device," explained Mr. Garofoli. The outbreak of the COVID-19 pandemic has unified RCare, Advantech, and other partners' missions: to accelerate the deployment of advanced technology systems.

The industrial computers designed by Advantech are based on market needs for different sizes and system configurations. They therefore fulfill RCare's need for rapid system building. Additionally, it is imperative that medical care systems are stable and reliable. Advantech's high-quality products meet these criteria. The fact that Garofoli has never had to contact Advantech's support team for equipment issues has made a deep impression on him.

In addition to the RDK nurse call system, RCare integrates Advantech technology in its core product line, including the HCube and the BCube Plus—call systems that serve RCare's primary market: the senior citizen industry. The COVID-19 pandemic has changed the way in which people live and work. It has also reaffirmed the importance of technology for good healthcare delivery.

RCare is dedicated to fighting the COVID-19 pandemic with Advantech. Together, they will continue to use smart technology to win this battle, and to create better and healthier lives in the post-pandemic world. ■



Taipei Veterans General Hospital Collaborates with Advantech to Build a Smart Management Center

To implement data management, Taipei Veterans General Hospital used Advantech's WISE-STACK 300 cloud data platform server to consolidate various information systems and assist management in gaining a better understanding of the operational status of their systems and to monitor healthcare quality.

Photos provided by Taipei Veterans General Hospital and iStock
 Interview with Dr. Yuan-Hwa Chou, Director of Taipei Veterans General Hospital's Center, Quality Management



In a conference room, several senior executives are looking at a large screen. “The screen shows the bed occupancy data of the 15 intensive care units at the hospital,” said the meeting chairman John, while pointing at a chart onscreen. Then John moved onto another chart and explained, “and these are the trend changes for ICUs of every department.” These charts prompted an intense discussion between the senior executives.

This meeting was held at the Taipei Veterans General Hospital's Smart Hospital Management Center established in June 2020. To implement data management, the Taipei Veterans General Hospital revamped an unused

space into a conference room and installed two 55-inch screens and one 86-inch digital signage display provided by Advantech. The data, indicators, and charts presented on the display screens were supported by Advantech's WISE-STACK 300 cloud data platform server, which consolidates multiple information systems to help management gain a better understanding of the operational status of the system and monitor the quality of healthcare.

Information consolidation and real-time presentation

According to Dr. Yuan-Hwa Chou, Director of Taipei

Veterans General Hospital's Center for Quality Management, indicators in the following key areas are essential for the smart hospital management center: operational management, healthcare quality, and administration. The data indicators measuring operational management and healthcare quality were among the first to be implemented. These included revenue, number of patients in the emergency room, number of patients undergoing treatment, number of admitted patients, number of beds for admission, admission charts, and real-time trends for all ICUs in the hospital.

In addition to providing accurate, real-time information, the Smart Hospital Management Center also enables data analysis and comparisons. Dr. Yu-Cheng Luo, attending physician at the Center for Quality Management, asserted that if the data collected is suitable for presentation, the system will automatically update it daily for review by administrators. Administrators can also use the interactive query mechanism to compare data across months, quarters, and years. This allows them to extract insights from the data.

The Smart Hospital Management Center offers two main benefits. First, all data is automatically updated and verified, reducing the time staff spend writing reports and increasing the accuracy of data. Second, accurate and real-time information is streamed and visualized to provide administrators with a real-time overview of hospital operations in order to improve management efficiency.

Private cloud with a one-stop software and hardware solution

Because medical data is highly confidential, the Taipei Veterans General Hospital decided to use a private cloud architecture and implement Advantech's software and hardware solution for the Smart Hospital Management Center. Advantech's solution is easy to install and operate, enabling the rapid creation of a private cloud that delivers excellent stability. Additionally, Advantech has dealt with customers from a wide range of industries and has extensive experience of business transformation, which provides a valuable reference for assisting the Taipei Veterans General Hospital with implementing high-level data management practices.

The cloud data platform server WISE-STACK 300 employed in this project is an industrial-grade server



Advantech designed especially for data applications. It satisfies all data acquisition, storage, management, and analysis needs; has passed strict performance verification tests; and only requires minimum cabinet space to support a private cloud.

In addition to hardware, the Taipei Veterans General Hospital also implemented featured software platforms from Advantech's WISE-PaaS platform—WISE-PaaS/SaaS Composer (process visualization configuration tool), WISE-PaaS/SignageCMS (digital signage content management software), and WISE-PaaS/Dashboard (dashboard with data analysis and visualization tool). Using these software tools, the data, indicators, and charts presented on the signage displays can be dynamically adjusted according to administrator requests.

Dr. Chou believes that in order to effectively use data as the basis of management and decision-making, more needs to be done than just implementing a system. A culture of data analysis must be fostered internally to encourage every administrator to develop the habit of reviewing data before making decisions. After cultivating such a culture, various equipment can be installed in anticipation of future management needs. The purpose of all of this is to improve the quality of operations and management and the efficiency of healthcare through data analysis and smart development.

The Taipei Veterans General Hospital wanted its collaboration with Advantech to have a wider purpose for the healthcare industry; that is to provide an example for other medical centers and hospitals. In effect, it hopes to help Taiwan's healthcare industry improve healthcare efficiency in hospitals and become a role model for advanced healthcare around the world. ■

Televisual Rehabilitation Program Developed by Advantech and Linari Medical Offers Tremendous Benefits for Patients

Advantech and Linari Medical co-created AvDesk™ as a turnkey neuro-rehabilitation package suitable for use at clinics or in private homes to assist patients experiencing from visual field defects due to conditions such as hemianopsia and quadrantanopsia. Personalized neurological rehabilitation programs delivered through AvDesk™ significantly accelerate rehabilitation progress and help children and adults retain key visual functions.

Photos provided by Linari

Hemianopsia and quadrantanopsia are the loss of, respectively, one half or a quarter of the visual field in one or both eyes. These conditions can be caused by

neurological diseases, strokes, epilepsy, or trauma. For example, visual field loss occurs in about 50 percent of stroke patients, making everyday activities such as



reading, watching television, shopping, and cooking much more difficult. For patients with visual field defects, making regular trips to hospitals, clinics, or rehabilitation centers for assessments and visual training can also be challenging. Due to vision loss, many such patients cannot drive and have difficulty using public transportation. Unfortunately, rehabilitation programs usually take weeks, months, or even years.

To make rehabilitation more accessible and convenient, Linari Medical—an innovative maker of medical devices—adopted IoT technologies to create its patented AvDesk™ tele-rehabilitation device, a unique multi-sensorial device for stimulating the untouched subcortical structures throughout the brain. Leveraging Advantech’s embedded computing platforms and IoT software, Linari Medical’s development team was able to realize AvDesk™ as a turnkey package solution suitable for use at clinics or in private homes.

The right combination of capabilities needed to guide projects to completion

With in-house solution architects, software developers, business development managers, and solution experts, Advantech’s European IoT Select Team can guide new projects through the pre-sales, proof-of-concept, and mass rollout stages. Therefore, Advantech was ideally suited to serve as a development partner for Linari Medical.

Linari Medical’s strengths lie in the conception and development of the AvDesk™ therapy program and its ability to bring together and certify a team of neuroscience specialists, ophthalmologists, and tutors who support the care process. However, to accommodate the AvDesk™ therapy program, many non-core competencies were needed to develop the hardware platform powering the graphics and data-collection system, configure cloud services, securely connect remote devices, and manage devices throughout their lifespan.

Linari Medical also took advantage of Advantech’s WISE-PaaS industrial cloud platform. The WISE-PaaS platform offers a comprehensive edge-to-cloud toolkit that can streamline customer projects and accelerate development by encompassing database services and data analytics functions and including machine learning tools, visualization dashboards, and secure data acquisition.

Furthermore, Linari Medical subscribed to the WISE-

PaaS/DeviceOn service, which solved important device management challenges related to device on-boarding, management dashboard visualization, security, device monitoring, troubleshooting, and over-the-air (OTA) software and firmware updates.

WISE-PaaS services provide added value to both patients and medical staff

The compact desktop device comprises a curved horizontal screen and a data collection and processing unit. Visual stimuli are displayed onscreen and the patient presses a wireless button to indicate detection. Illuminated arrows guide the patient’s gaze towards the center of the screen to gently direct them through therapy. An Advantech embedded industrial computing terminal running Windows and powered by an Intel® Core™ processor with integrated HD graphics is built into the AvDesk™ data collection and processing unit and handles all patient-facing tasks and functions.

WISE-PaaS enables AvDesk™ to deliver personalized remote assistance and supervision by qualified doctors. Doctors define the therapy, retain control of the program, and adapt the therapy plan depending on the results of each session. The Linari Medical cloud software continuously updates new therapy algorithms on all AvDesk™ devices through the WISE-PaaS/DeviceOn dashboard.

WISE-PaaS services have enabled Linari Medical to offer its innovative AvDesk™ treatment solution on an equipment-as-a-service basis to healthcare practices, with competitive rental terms that ultimately increase patients’ access to effective restorative therapy.

As a result, evident recovery of visual skills is accomplished within the first few days and reading speed increases 100 percent after just 20 hours of treatment. Patients can build on these initial improvements to further improve their visual range and navigate busy streets, avoid unexpected obstacles, and even obtain a driving license.

Advantech is devoted to delivering the best possible outcomes to patients, medical staff, and hospitals using the latest IoT technologies backed by system integration experts in the medical field. Linari Medical’s AvDesk™ televisual rehabilitation solution co-created with Advantech gives medical professionals a powerful tool that can make a real difference to patients’ quality of life. ■



Advantech Assists HMC with Deploying Ergonomic Telemedicine Solution Featuring VSee Telemedicine Software

Advantech helped Hamad Medical Corporation (HMC) develop the best medical teleconsultation and point-of-care services in Qatar by combining its AMiS mobile medical carts with the VSee Telemedicine Solution.

Photos provided by Advantech and HMC
Interview with Swati Verma, Sales and Marketing Manager Qatar, Allarch Healthcare Technalitics

Telemedicine overcomes geographical barriers by providing medical assistance to patients who lack access to healthcare services and medical specialists. For example, high-risk infants who require specialist neonatal care in the form of resuscitation procedures, can avoid costly, time-consuming transfers to specialist hospitals. Instead, care can be provided by other hospitals

using telemedicine solutions. These solutions enable specialists to guide general practitioners through delicate procedures via live webcam video streams.

Deploying telemedicine solutions enhances point-of-care services

HMC, the main provider of secondary and tertiary

healthcare in Qatar, manages 12 hospitals (nine specialist hospitals and three community hospitals), the National Ambulance Service, and Home Health Care Services. HMC has earned the significant distinction of becoming the first healthcare organization in the world to have all its hospitals accredited by the Joint Commission International (JCI) under the Academic Medical Center accreditation program.

All of HMC's hospitals have received the official Gold Seal of Approval® for accreditation under the JCI Academic Medical Center Hospital standards. Indeed, HMC has remained committed to delivering safe, effective, and compassionate care to patients. Their excellent reputation is supported by their innovative mobile medical service offerings. Advantech and VSee played important roles in developing these offerings as solution partners.

Ms. Swati Verma, Sales and Marketing Manager Qatar at Allarch Healthcare Technalitics, said that HMC initially used Microsoft Lync followed by Skype for Business and Cisco Video Conferencing, before settling on VSee's Telemedicine Solution. After considering the importance of security and low bandwidth video for connecting doctors and patients online, HMC searched for a flexible platform that could be exponentially scaled up. This resulted in them adopting the VSee Telemedicine Solution.

VSee is a comprehensive telehealth platform designed specifically for healthcare applications. It complies with standards specified in the Health Insurance Portability and Accountability Act and is hosted in Qatar. The platform offers simple and secure video conferencing, text chat, document-sharing, and peripheral streaming functions. Additionally, VSee allows patients, partners, and internal staff to communicate as though they were meeting in-person. The platform software can be integrated with other workflows, such as that from TeleStroke care, emergency medical services, and patient portals. HMC incorporated the VSee Telemedicine Solution into Advantech's mobile medical carts to deliver portability and facilitate enhanced point-of-care services.

Enhanced telemedicine solution with a powerful computerized mobile medical cart

Ms. Verma stated that HMC's decision to introduce Advantech and VSee's co-created mobile medical carts to its hospitals and facilities ensured the security of patient



information, enabled future system expansion, and streamlined long-term maintenance.

In an effort to improve patient care processes and ease staff workloads, Advantech's AMiS mobile medical cart was equipped with the VSee Telemedicine Solution, a pan-tilt-zoom (PTZ) camera, and an audio system. AMiS carts feature a rugged industrial-grade design, high-performance Intel® processor, and are certified for medical safety. All cart components are designed without sharp edges to minimize the risk of pinched fingers or stubbed toes. The VSee API enabled Advantech to easily implement VSee's video conferencing and screen sharing functions to provide an innovative telehealth platform. The AMiS cart+VSee mobile medical solution supports single-click real-time sharing with live annotations, remotely controlled PTZ cameras, and call answering from other mobile devices. This advanced functionality allows physicians to examine patients and share/modify medical documents, images, test results, and CT scans remotely.

The majority of AMiS mobile medical carts are used in trauma, emergency, and intensive care units. For easy telemedicine consultations, the AMiS cart+VSee mobile medical solution provides information security, system sustainability, and operational efficiency to HMC's array of medical facilities.

Ms. Verma emphasized that HMC will continue promoting the use of mobile medical services at new hospitals and facilities. As a leading medical device innovator, Advantech was able to offer HMC robust and ergonomic products, system integration, customization services, and after-sales support. Overall, Advantech helped HMC establish the best point-of-care services in the whole of Qatar. ■



Advantech Collaborates with Brandon Medical and Entoli Medical to Improve Operation Room Efficiency and Safety

Advantech cooperated with Brandon Medical and Entoli Medical to create the Entoli™ Medical Controller – a highly-efficient 4K integrated operating room (OR) medical controller. These three parties co-created a smart zero-latency OR platform.

Photos provided by Brandon Medical and iStock
Interview with Adrian Hall, Chief Operating Officer, Brandon Medical

Time is critical for active surgical teams. Working in the OR, where every second matters and details affect outcomes, is exceedingly stressful. Multitasking in a precision-oriented and fast-paced environment for hours at a time requires careful teamwork. Professionals need to be organized yet flexible, capable of communicating non-verbally, highly skilled, and share a same sense of urgency. Unfortunately modern ORs are often cramped

– comprising multiple surgical platforms and several operating staff. These conditions make it difficult to maneuver and can yield communication delays. To address these issues, surgical teams use modern technology to monitor patients’ vital signs, critical body functions, and operating procedures on various screens. The use of such screens reduces communication errors and improves treatment.



4K technology progresses into the operating theatre

As display and video capture technologies progress from HD to 4K resolution, medical visualization technology and minimally invasive surgery (MIS) equipment has been upgraded to 4K to provide sharper images of tissues, blood vessels, and human anatomy. “We are seeing much greater use of minimally invasive surgery. These cameras, which are inserted into the body, guide surgeons through endoscopy. At present, the majority are HD video but are rapidly moving to 4K. When surgeons are performing minimally invasive surgery, they need the best images to guide them. These cameras are essentially their eyes,” Adrian Hall, Brandon Medical’s Chief Operating Officer said.

As a result, screens in modern ORs are getting bigger. On one hand, 4K screens allow every team member to see the same live image from a distance without compromising viewing quality. This ability eliminates crowding around monitors. On the other hand, having more screens means more devices to manage during surgery. Even if medical devices can capture 4K images and video, difficulties arise when managing a 4K data source – processing 10 ~ 20-gigabit data streams is exceedingly challenging. Additionally, MIS necessitates zero latency and compression video to create an immersive and precise viewing experience.

Brandon Medical has 30 years of experience designing and manufacturing medical products in the UK. Conversely, Entoli™ Medical has expertise in providing medical control platform software solutions. To address modern OR equipment and data management issues, Advantech cooperated with these two partners to create the Entoli™ Medical Controller, a highly efficient a 4K integrated OR medical controller.

Advantech’s zero-latency immersive 4K viewing experience

Entoli™ Medical developed a simple, intuitive, and cost-effective control suite aimed at integrating devices and equipment. This suite provides full control of video switching, recording, cameras, and lighting from a single tablet computer. Entoli™ simplifies staff training by streamlining OR work and equipment into a single concise system. Using Entoli™ every OR functions the same regardless of individual attributes.

Advantech cooperated with Brandon Medical to offer a cutting-edge 4K integrated OR medical control

solution using proven technologies. This control solution is aimed at helping the Entoli™ Medical Controller manage and display images and videos collected from multiple sources. Advantech’s AVAS medical-grade 4K ultra-HD video recorder can transfer live video into an IP data stream with near zero latency, providing a real-time immersive viewing experience with zero video compression. With the help of Advantech’s 10G-per-minute transmission technology, and zero-latency 4K ultra-HD videos and images, surgeons can easily maneuver inside body cavities with enhanced fine pattern and structure observation. This improves the safety and efficiency of MIS and enables long-distance surgery training. This system has been adopted at Sheffield Teaching Hospital in the UK and is positively received by clinical teams.

Using the Entoli™ Medical Controller, AVAS helped integrate complex data for viewing through two PAX touch screens, all on a user-friendly interface. The intuitive tablet interface allows surgeons to manage the video sources – either an endoscopic screen, an operating room monitor, or information feeds from other equipment. Surgeons are able to customize the interface according to their needs and make better use of the OR space. AVAS is also future-proof as it fits the demands for standardization and can be customized according to different information requirements for varied hospitals and physicians. The system is flexible and extendable. Indeed, other functions and devices, such as surgical light control and AI data management, can be added.

The Entoli™ Medical Controller leverages Advantech’s excellent product reliability and quality, and Brandon Medical’s 30 years of experience in design and innovation for OR environments. This makes a winning combination for future smart ORs. The value of co-creation is mirrored in the successful business model created by these three parties. ■



Advantech's Cold Chain Management Solution Ensures the Quality of Vaccines, Medicines, and Blood Bags

To ensure temperature control of vaccines, medicines, and blood bags, a clinic and blood donation bus are among the many facilities that have adopted Advantech's cold chain management solution to improve management efficiency and storage quality.

Photos provided by iStock
Interview with David Yang, Product Manager of Intelligent Logistics SRP, Advantech

As the clinic closes at 9 p.m., the person responsible for registration is getting ready to leave work. When she opens the door on her way out, a thought pops into her mind, "I must record the temperature of the refrigerator before leaving!" But she quickly dismisses the thought, remembering that the clinic recently installed a temperature sensor in the refrigerator that automatically records temperatures. "No more daily checking and recording of temperatures," she smiles to herself as she leaves the clinic.

Replacing manually-written records with automatic temperature recording

According to regulations established by Taiwan's Food and Drug Administration, the storage of vaccines and medicines must be done at certain temperature and humidity levels; the error margin for temperature is +/- 0.5 °C and for humidity +/- 5%. In the past, staff had to manually check and record refrigerator temperatures every day in the morning, noon, and evening. Although there are many disadvantages to this type of manual record keeping, the risk of human error is the most significant. For example, staff may be too busy and forget to check and record the temperature, inaccurate or fraudulent values could be recorded, and paper-based records are difficult to read and log.

To solve these issues and reduce staff workloads, the clinic implemented Advantech's TREK-120 LoRa wireless temperature sensors, installing a sensor on each shelf of the refrigerator. Via NFC connectivity, staff can access

related data from a handheld device that automatically uploads data to a cloud platform. Additionally, the daily temperature records can be used for further analysis to predict when temperature fluctuations that exceed the margin of error are likely to occur.

David Yang, Intelligent Logistics SRP Product Manager at Advantech, stated that after seeing the analysis reports, staff at the clinic started to reduce the frequency with which they opened and closed the refrigerator, improving the storage environment for vaccines and medicines.

Implementation of TREK-120 sensors and TREK-530 in-vehicle LoRa gateway

In addition to the clinic, the blood donation bus of a blood donation center also adopted Advantech's TREK-120 LoRa wireless temperature sensors and TREK-530 in-vehicle LoRa gateway. These products were deployed to safeguard the quality of blood bags stored in the bus refrigerator by collecting and uploading temperature data to the cloud platform for real-time monitoring.

Yang pointed out that the blood donation bus was initially equipped with wired sensors that were calibrated at least once a year. However, the sensor cables were embedded inside the bus frame, making calibration extremely troublesome.

A specialist was required to locate and dismantle the sensors—a process that can take at least 30 minutes for each sensor. The sensors were then sent to a third-party inspection unit for calibration, during which time, all

operations of the blood donation bus would be suspended.

By implementing Advantech's TREK-120 sensors, the complicated calibration and wiring of sensor cables throughout the blood donation bus could be eliminated. The administrator just needs to install the sensors inside the refrigerator, turn them on, and they will start to detect temperatures.

The TREK-530 in-vehicle LoRa gateway automatically uploads the temperature data collected to the cloud platform for real-time management and monitoring. This significantly reduces the difficulty of maintenance and greatly enhances the scheduling flexibility of the blood donation bus.

Realizing uninterrupted temperature monitoring from transportation to storage

Yang revealed that Advantech's cold chain management solution has been implemented not only in clinics and blood donation buses, but also in medicine inventories at medical centers and hospitals. One of the main advantages of Advantech's temperature sensors is that they support wireless data transmissions, which ensures

convenient installation and maintenance. The 24/7 uninterrupted temperature detection and recording, coupled with big data analysis, can assist medical professionals with identifying blind spots in inventory management and improve the quality of stored vaccines and medicines in line with Goods Distribution Practice (GDP) standards.

Furthermore, Advantech's solution helps safeguard the quality of vaccines during transit. Yang added that in the past, most temperature monitoring systems used in the transport of vaccines employed maximum-minimum thermometers or disposable thermometer strips, which can only detect whether temperatures exceed legal standards but cannot indicate when temperature abnormalities occur and which boxes are affected.

With Advantech's complete solution, medical professionals can have total control of the temperature at which vaccines are stored from the moment they arrive at the hospital refrigerator. Only with uninterrupted temperature monitoring can high-quality vaccines and medicines be effective for safeguarding health and treating disease. ■





Ramkhamhaeng Hospital Enhances Patient Safety Using Advantech's eMedication Solution

Ramkhamhaeng Hospital in Thailand integrated Advantech's AMiS-850 Intelligent Medication Cart into their health information systems (HIS) to help reduce medication errors and harm through the "five rights" of medication safety: the right patient, the right drug, the right dose, the right route, and the right time. This improves medication safety and overall efficiency in patient wards.

**Photos provided by Ramkhamhaeng Hospital
Interview with Dr. Patrick, Board of Management, Ramkhamhaeng Hospital**

Explosive growth in both data and technology utilization have led to the development and promotion of eHealth in many countries. eHealth is aimed at improving healthcare safety, efficiency, and quality, as well as reducing costs.

Over the last two decades, the Ministry of Public Health in Thailand has implemented projects and policies aimed at improving accessibility and enhancing healthcare services. These policies include a universal

healthcare scheme and a nationwide electronic health record (EHR) system. In fact, Thailand, has higher medical expenditures than most South East Asian Countries. Likewise, its hospitals are certified by the Joint Commission International (JCI) organization. Therefore, all major hospitals in Thailand have implemented electronic health record (EHR) systems and HIS, including Ramkhamhaeng Hospital—a client of Advantech.

System integration flexibility for various healthcare environments

Ramkhamhaeng Hospital, which is among the top five largest private hospital groups in Thailand and certified with JCI accreditation, has a dedicated health IT team and developed their own HIS. To further improve services and reduce medication errors in their inpatient department (IPD), Ramkhamhaeng Hospital sought solutions that can be integrated into their HIS.

Medication errors are common in many healthcare systems, and can occur in the prescription, dispensing, storage, preparation, and administration of medicines. ePrescribing functions in Ramkhamhaeng Hospital's HIS have minimized the risk of prescription errors, but neither the nursing workload nor errors in the IPD were significantly reduced. Dr. Patrick, Board of Management at Ramkhamhaeng Hospital, stated that the hospital would like to improve the system by connecting the HIS with eMedication carts for safety and accuracy of medication administration in inpatient wards.

To achieve the Five Rights of Medication Safety, the hospital commenced eMedication solution evaluation and tested several products from several suppliers around 2018. However, they soon found that the tested products had many issues, such as being incompatible with their workflows, lacking system integration flexibility, having a high total cost of ownership, and not being designed for intensive usage in IPD, particularly in terms of durability and ergonomic design.

During Advantech's visit in late 2019, the AMiS-850 Intelligent Medication Cart was introduced to Ramkhamhaeng Hospital. They were impressed by its reasonable price, durability, intelligent management API, and flexible SDK. Advantech's support team helped the hospital's health IT team successfully integrate the AMiS-850 with their HIS, without major modification to their workflows. This saved them a considerable amount of time and reduced their total cost of ownership.

Robust and ergonomic design with an intelligent lock mechanism

The AMiS-850 is built with a robust industrial computer and is medical-certified to ensure safety. With the inclusion of medication storage boxes, the AMiS-850 serves as a mobile medication dispensary, enabling easy administration of the right medication at the right dosage to the right patient. Its motorized height

adjustment function and ergonomic design, which has no sharp edges, offers comfortable and convenient usage. Moreover, the cart can be used as a nursing workstation and be easily cleaned to ensure strict hygiene while preventing infection and contamination.

Integrated with RFID, each medication bin can be encoded with patient ID and medication ID via Advantech's medication bin setting station in the nurse station. Medication is then locked in the medication cabinet of the AMiS-850, ensuring that medications are dispensed to the right patient. Nurses can use barcode scanners to scan a patient's wristband and unlock the medication bin assigned to that patient. At the same time, each dispensation is recorded and the data is added to the patient's EHR, which reduces time spent on medication preparation and paperwork.



After using these highly functional mobile workstations, IPD nurses have reduced their workload and thus have much more time for patient care. This reassures patients and their families. Additionally, the overall efficiency and level of patient safety in Ramkhamhaeng Hospital has been greatly improved. Ramkhamhaeng Hospital plans to implement AMiS-850 Intelligent Medication Carts into all the hospitals in their group.

Furthermore, they are also evaluating how to apply similar eMedication solutions to outpatient departments (OPDs). According to Advantech's deep experience in intelligent healthcare applications, for patients requiring more complex medical prescriptions, such as those with chronic illnesses, a large eMedication dispensing cabinet with similar functions to the AMiS-850, like Advantech's AMiS-870 automatic dispensing cabinets, would be ideal for patients and free up more time for physicians and pharmacists in OPDs, while providing greater patient healthcare at the Ramkhamhaeng Hospital. ■



Tobii Dynavox and Advantech Deliver a Cutting-Edge AAC Product

To better serve people living with ALS, cerebral palsy, autism, Rett syndrome, or speech disorders caused by injury or illness, Tobii Dynavox and Advantech co-created a next-generation I-Series AAC device.

**Photos provided by I-Series launch 2019
Interview with Mr. Anders Malnes Mathisen, product manager, Tobii Dynavox**

Nowadays, people communicate in so many ways. With the help of technology, we not only communicate, but also connect and interact with others on social networking sites, through apps, in online games,

and more. However, for people with ALS, cerebral palsy, autism, Rett syndrome, or speech disorders, communication can be difficult. Additionally, they may not have the physical coordination necessary to operate

technology. Thus, to assist physically challenged people with communicating, Tobii Dynavox, the global leader of eye tracking-enabled and touch-based augmented and alternative communication (AAC) devices, and Advantech co-created a next-generation I-Series AAC device that stands out from the competition.

Eye tracking is a sensor technology that enables a computer or machine to determine what the user is looking at, also known as the gaze point. Eye tracking has revolutionized assistive technologies and offers substantial potential for many other healthcare devices, such as bedside terminals, nursing stations, diagnostic imaging equipment, hospital information kiosks, and surgical robots.

With eye tracking-enabled AAC devices, a basketball coach with ALS, for example, can generate synthetic voice commands to coach children; a civil engineer who is paralyzed from the neck down can work and live an independent life; and a 5-year old girl with Rett syndrome can express her feelings and build a relationship with her family. AAC devices provide severely disabled people with a voice, as well as a means, to better engage with society and live a more rewarding life.

Dedicated AAC devices empower people

AAC devices can be as simple as symbol cards, or as advanced as communication boards and speech-generating devices (SGDs). For over 30 years, Tobii Dynavox has been helping people with special needs live a free and independent life by integrating and digitizing several important AAC methods into their product offerings. With Tobii Dynavox’s eye-tracking devices and software tools, disabled people can use the Internet, social media, e-mails, and messaging apps just like everyone else. Tobii Dynavox also provides software for education, training, and literacy development to meet the specific needs of people with different types of disabilities.

However, for people who have medical complications and multiple disabilities, consumer mobile devices are not suitable for their needs. The Tobii Dynavox slogan – “Power to Be You” – describes solutions that allow users to express themselves easily, control electronic products in their homes, explore the world, and reach their full potential. Thus, a dedicated rugged tablet that is also slim and lightweight was essential.

Although Tobii Dynavox’s I-Series eye-tracking-

enabled SGDs have helped many physically challenged people, the company’s enthusiasm for helping others didn’t stop there. In 2017, they began researching and preparation work to develop a new generation of I-Series products. Being in a niche market and serving unique users, Tobii Dynavox’s requirements from a manufacturing partner were very clear—stable, high-quality, and long-term service. Mr. Anders Malnes Mathisen, Tobii Dynavox’s product manager asserted, “For us, quality is very important. We need a reliable and competent design manufacturing partner who can provide robust and reliable products. That’s our key metric for supplier evaluation.”

As a global supplier of medical and industrial tablets for more than 30 years, Advantech has a dedicated Design and Manufacturing Service (DMS) team that provide customizable ODM products. Their services include collaborative design, flexible manufacturing, tailored software, and global technical support. For this project, Advantech’s mobile DMS team did not just meet the criteria; they went the extra mile to provide a sustainable solution with customized software, global logistics support, and after-sale services.

Sustainable products are the key to long-term services

During the initial product development process, Tobii Dynavox and Advantech spent about 6 months establishing the industrial design specifications. During this time, the mobile DMS team flew to Tobii Dynavox’s U.S. office in Pittsburgh twice in order to meet with Tobii





Dynavox and better understand their design concept.

Unlike Advantech's previous industrial applications that focused on tablet size and weight, the priority for this project was robustness. For Tobii Dynavox's users, the tablets needed to be lightweight without compromising operational efficiency, robustness, and water resistance. The tablets also needed to be ergonomically designed to support eye tracking and ensure face-to-face communication is as natural as possible. Mr. Anders Malnes Mathisen commented, "It's very important to deliver features that are different from the average consumer-grade tablet. We can provide a lot of value by offering powerful and unique features, such as the partner window for face-to-face communication."

To achieve Tobii Dynavox's design requirements, Advantech made many pioneering manufacturing decisions, from designing a unique printed circuit board, sourcing extra-small components, and even selecting a specific industrial touch panel. Industrial-grade touch panels are typically thicker than consumer-grade panels because of their impact-resistant and vandal-proof features. To achieve Tobii Dynavox's aesthetic design concept, the mobile DMS team took advantage of Advantech's global supply chain and found a thin panel that not only passed drop tests, but also complied with medical safety and EMC regulations.

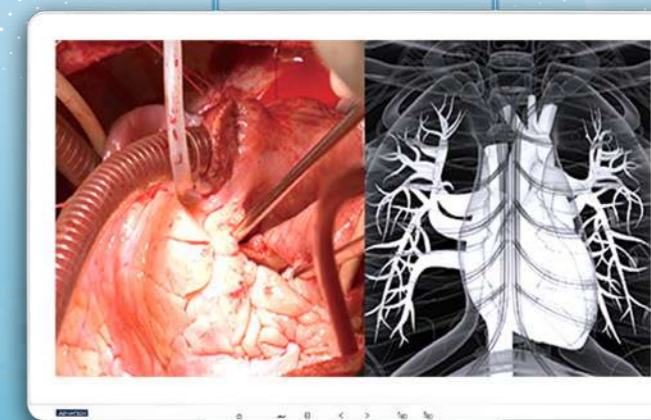
When the product development was nearly finished, component shortage issues unexpectedly occurred. For the average person, learning how to use a new phone or laptop every now and then is easy. However, for Tobii Dynavox's users, being trained on and getting used to a new AAC device can take several months. After which,

the AAC device becomes a lasting companion. To ensure long-term service for the new I-Series products, Tobii Dynavox made a difficult decision to alter the design, which delayed the project by one year. But thanks to Advantech's global sourcing ability and understanding of sustainable product design, the new I-Series devices were finally delivered in the last quarter of 2019.

According to Mr. Anders Malnes Mathisen, "The beginning of the project was very challenging. But considering the new I-Series products, we are very satisfied with our partnership with Advantech." Since their launch at the end of 2019, the new I-Series products have helped thousands of physically challenged individuals in several countries. However, sales of I-Series products are still heavily reliant on medical professionals to increase patient awareness of advanced and dedicated AAC devices. Nonetheless, Tobii Dynavox have a thorough understanding of national health insurance schemes and subsidies for medical assistive devices in Europe and North America, and have strong connections with local authorities, special-needs schools, and patient groups, contributing to the promotion of the latest I-Series products.

In addition to Europe and North America, Tobii Dynavox is also promoting I-Series products in Japan and China. Undoubtedly, Tobii Dynavox's efforts will attract the attention of medical professionals and local governments in many more countries. In the future, Tobii Dynavox and Advantech will continue using the latest technologies and developments to design solutions for people with physical disabilities in order to empower them to live independent and fulfilling lives. ■

Advantech PAX-3 Series Surgical Displays Optimizing Image Quality and Precision



Dual-Modality Imaging

Medical-grade displays for surgical centers and operating rooms

- True-flat monitor with AR filter
- High-brightness display with a high contrast ratio
- Full HD/Ultra HD resolution
- DVI and RGB support resolutions of up to 1920 x 1200 @ 60 Hz
- HDMI 2.0, DP 1.2, and SDI support resolutions of up to 3840 x 2160 @ 60Hz
- Multi-standard (NTSC, PAL, SECAM) video input receiver
- Equipped with video-enhancement features
 - 14-bit LUT processing
 - DICOM Part 14 GSDF compliant
 - DICOM, clear, blue modes supported
- Optional touch panel



ADVANTECH

Enabling an Intelligent Planet



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Advantech WISE-PaaS iBuilding Solution for Smart Building Management Optimizes Hospital Management

To resolve the issue of isolated data islands resulting from large information systems composed of separate subsystems, Advantech used its WISE-PaaS iBuilding smart building management solution to integrate data, unify analysis, and facilitate smart energy conservation, which improved operational efficiency as well as optimized resource utilization.

Photos provided by iStock, Shutterstock

Interview with Hans Lee, manager of WISE-PaaS business development, Advantech

According to research by IHS Markit, smart building revenue for the healthcare sector is higher than that for

the commercial sector and is expected to reach a 12.6% compound annual growth rate (CAGR) between 2018

and 2023. This suggests that demand for smart building management solutions will increase substantially in the future. But what is the reason for the strong demand for smart buildings in healthcare? Some believe it is because the many long-standing pain points require urgent solutions.

Hans Lee, manager of WISE-PaaS business development at Advantech, pointed out that the information systems used by healthcare institutions comprise numerous complex subsystems that function as stand-alone systems, forming data islands. This makes it difficult to understand the operating status of each subsystem at a glance, which negatively impacts operational and management efficiency. Moreover, to ensure infection control, healthcare institutions must keep the air conditioning system on for 24 hours a day to control temperatures. This consumes substantial energy and places a heavy financial burden on healthcare institutions, with electricity costs rising per year. Accordingly, hospitals are keen to have a solution for collecting real-time energy consumption data in order

to better manage their energy use and conservation policies.

Hospital design is trending away from spatial planning and moving toward service process improvement. Previously, emphasis was placed on the functional design of large spaces. Looking forward, hospitals will put a greater emphasis on accommodating various medical specialties in order to establish integrated strategies and operations. Consequently, the ecosystem now relies on coordinated planning by both architects and solution providers to satisfy hospital requirements. The goal is to construct intelligent healthcare environments through the implementation of on-site sensors connected to existing IT systems that can continuously optimize resource distribution.

Advantech WISE-PaaS iBuilding is a smart building management solution that has been expanded to enable AIoT data-driven smart building management for healthcare environments. The platform automates data collection and processing, which eliminates manual record keeping and generates reports for administrators, significantly improving operational efficiency.

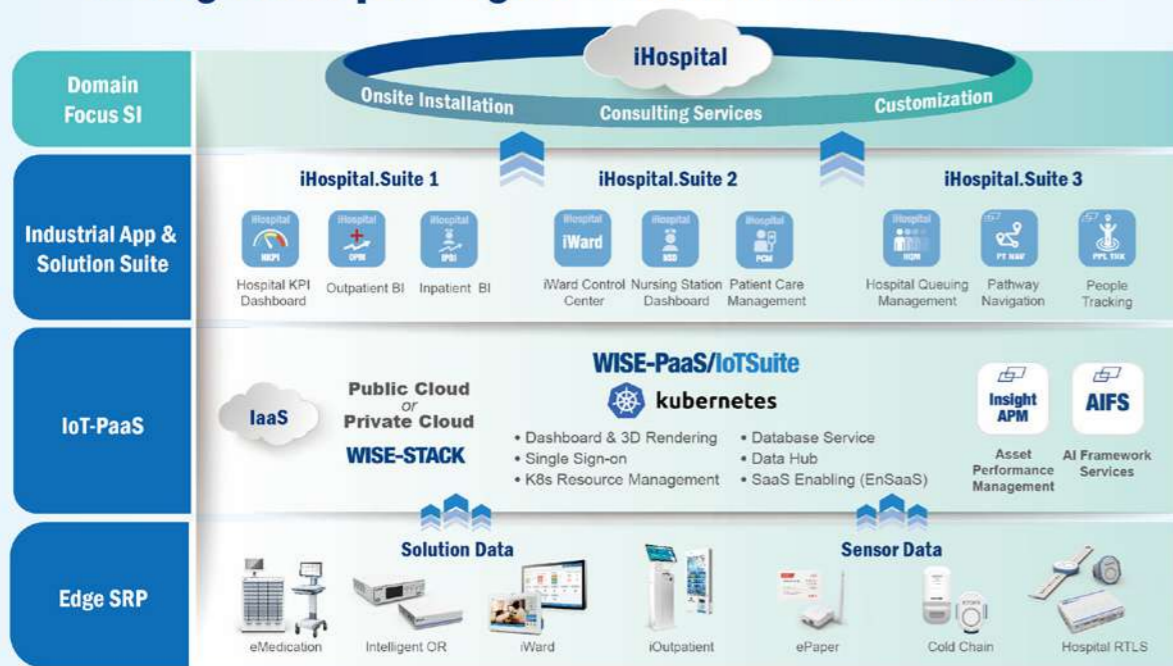
Data collection and visualization for centralized management

According to Mr. Lee, a smart healthcare building is a large-scale facility that supports a wide range of medical functions and includes emergency rooms, outpatient rooms, various departments, medical equipment, medical staff, and patients. With building information modeling (BIM), healthcare institutions can design and manage physical infrastructure and assets, such as nurse carts, oximeters, tablet computers, and bedside care systems, in a virtual space. When connected to the iBuilding platform, data can also be collected and presented in a virtual space for management configuration.

Advantech's iBuilding solution features a cloud-native architecture and allows healthcare managers to monitor buildings, facilities, and equipment. Asset data, such as patient records, bed availability rates, and emergency room resources can be collected via a single system. In other words, iBuilding is a powerful monitoring platform that enables centralized data collection, monitoring, and analysis to provide a comprehensive visualized overview of all healthcare operations. The platform can also be integrated with AI or a programmable rule engine to automatically carry out specific tasks, such as uploading



Intelligent Hospital Digital Transformation Architecture



ward round information, generating maintenance reports, and transmitting real-time notifications.

Four key functions for optimizing operations and efficiency

Starting from the bottom layer, the architecture of the iBuilding solution comprises edge devices, WISE-PaaS platform, and industrial AI, with industrial applications as the top layer. Advantech's iBuilding supports four major applications categories aimed at facility management (Facility Mgmt), building energy management (BEMS), surveillance management, and management.

Mr. Lee explained that the Facility Mgmt application offers outstanding functions such as equipment monitoring, equipment information management, equipment alarm configuration, 2D/3D visualization, asset performance management, and access management. Healthcare environments typically involve a wide range of equipment and data, all of which can be incorporated into the Facility Mgmt application with the use of sensor inputs.

The BEMS application supports basic functions such as energy management, AI-based energy conservation,

and usage analysis. These functions facilitate the monitoring of energy consumption, identification of excessive energy use, and formulation of improvement strategies. After energy conservation goals are established, KPIs can be entered into the BEMS to enable dynamic monitoring. Data collected is then analyzed to evaluate energy conservation initiatives and optimization strategies are determined going forward.

Meanwhile, the surveillance management application combined with the WISE-PaaS/VideoService service portal supports facial recognition-based access control, people counting, and event notification functions to enable enhanced security for hospitals.

Finally, with the management, if the system detects any abnormalities in within a specific location, an automatic alert is triggered to notify the responsible party. This enables relevant personnel to be immediately dispatched to resolve the issue and submit a detailed report, including photographs and documents.

In summary, Advantech's iBuilding solution allows healthcare institutions to update and optimize their operations better and manage energy consumption and resource allocation via a centralized smart building management platform. ■

Transforming Healthcare with iWard Solutions

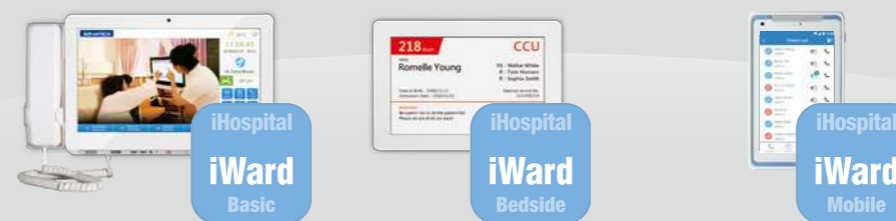
Optimize Nursing Care and Patient Outcomes



Digital Transformation of Hospital Wards

Advantech's iWard solutions digitalize hospital ward processes for improved treatment efficiency and increased patient and staff satisfaction. Using cloud technology, microservices, and AI applications, iWard solutions enable real-time communication between patients and nursing staff, bedside access to hospital information systems and EHR records. This streamlines hospital workflows and optimizes care quality for improved patient outcomes.

iWard Solution Software



iWard Basic

- Nursing Control Station
- Nursing Dashboard
- iWard Nursing Cart

Bedside iWard

- Bedside ePaper
- Bedside Terminal
- Doorside Terminal

Mobile iWard

- iWard Mobile



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Advantech Partners with Imprivata to Provide Seamless Healthcare Authentication Solution

In today's digital world, nothing is more paramount than privacy and data security. To respond to the increasing demands for data security in the smart healthcare industry, Advantech partnered with Imprivata to validate the technology for a seamless healthcare authentication solution.

Photos provided by Advantech

Nowadays, devices are increasingly employed to capture, aggregate, transmit, and analyze data in real time. However, because of their interconnectivity, each device represents a point of potential risk to the confidentiality of patient information. However, implementing user authentication as an access security measure can cause workflow bottlenecks that impede or delay the delivery of care. This can discourage healthcare providers from implementing authentication measures, leaving them vulnerable to unauthorized access and data losses. To address this issue, healthcare IT security company Imprivata partnered with Advantech to validate its identity and multi-factor authentication technology on Advantech's medical-grade devices in order to provide a solution for enhanced digital access management.

Convenient and seamless user authentication

Since 2002, Imprivata has sought to simplify the complexities of user authentication and access security. The company provides healthcare organizations around the world with a security and identity authentication platform that delivers ubiquitous access, positive identity management, and multi-factor authentication functions. Imprivata enables healthcare security by establishing trust between people, technology, and information to address critical compliance and security challenges while improving productivity and patient care.

Interconnected medical-grade devices, such as patient monitoring systems, are becoming more and more valuable to the delivery of quality patient care. Such devices are largely used to collect data and facilitate the electronic exchange of patient information and medical records. To address related security risks, Imprivata developed Imprivata OneSign, an access management solution for clinicians worldwide. Imprivata OneSign is a comprehensive identity and multi-factor authentication platform that eliminates the manual entry of usernames and passwords. With Imprivata OneSign, more than 8 million medical professionals in thousands of hospitals have been able to enjoy fast and convenient access to computing endpoints, patient information, as well as mobile and medical-grade devices by simply tapping a proximity badge or having their fingerprint scanned.

A single Imprivata OneSign authentication instance will work across all medical-grade devices through seamless API-level integration and SaaS-based applications. The technology increases operational efficiency by simplifying access and streamlining workflows. This integration also gives organizations better visibility into how, when, and where medical professionals access and interact with patient health information on medical-grade devices, which is key to satisfying industry compliance regulations.

For example, Summa Health, one of the largest health



systems in northeast Ohio, implemented Imprivata Medical Device Access, which offers direct integration with point-of-care medical-grade devices, in order to streamline clinician authentication. The solution was implemented across 48 departments and has provided over 1,400 medical staff with convenient and secure access to medical-grade devices.

Co-creating complete smart healthcare solutions in collaboration with Advantech

To deliver more smart innovations in healthcare, Imprivata is actively connecting with partners in the smart healthcare industry. The company was especially impressed with Advantech and its position as a leading manufacturer of medical-grade computing devices. Advantech's tablets and all-in-one computers are often deployed as mobile workstations, providing crucial support for healthcare workers by increasing the mobility of data access. Accordingly, Imprivata decided to collaborate with Advantech to improve user authentication and access security in healthcare.

The partnership between Imprivata and Advantech involved validating Imprivata's authentication platform on Advantech's medical-grade devices. Advantech provided authentication modalities, such as RFID and fingerprint scanning hardware, which were found to be compatible with Imprivata's digital identity authentication platform. Moreover, Advantech's fingerprint scanner also

satisfies the Federal Information Processing Standards - Publication 201 (FIPS-201) requirements and is approved for use in the prescription of controlled substances within the U.S.

In regards to the platform application, enabling fast and reliable user authentication and creating an auditable chain of trust across the entire enterprise workflow can improve security by allowing convenient access to patient records and other sensitive data. Moreover, by streamlining the authentication workflow, this joint solution can improve operational efficiency and allow clinicians to spend more time focusing on patient care.

Advantech's medical-grade devices validated and equipped with Imprivata OneSign technology enable tighter security protocols, such as locking down network-connected devices and enforcing stricter password complexity, session timeout, and auto-locking protocols, without impacting productivity. This allows healthcare organizations to improve the security and management of protected health information while ensuring convenient data communication across networked devices for increased service efficiency and enhanced patient care.

As leaders in the healthcare IT industry, Advantech and Imprivata have a range of products that offer unique potential for future collaborations and innovations. Both parties hope to co-create more forward-looking smart healthcare security solutions together in order to build a brighter and better future with smart healthcare. ■

Advantech's Contactless Solution in BIO Asia 2020

Photos provided by Advantech

The 2020 BIO Asia-Taiwan International Conference and Exhibition was held at the Taipei Nangang Exhibition Center in July 2020. Advantech showcased its medical products developed in collaboration with partners. Given the success of these products, Advantech plans to continue co-creating telemedicine solutions for diverse healthcare applications. ■

Products exhibited at 2020 BIO Asia-Taiwan: POC-624, HIT-W101C, AIM-75H, USM-500, AMIS-72, SKY-8201.



Watch Video



iHealthcare Online Conference

Advantech's online 2020 iHealthcare Conference was held on October 14-16, 2020. The conference focused on innovative surgical interoperability, medication safety, telehealth, and hospital management. Together with our healthcare IoT partners, we discussed the latest AIoT technologies and how they can be used to increase business and attract more customers.

Don't worry if you missed the conference. All the sessions have been archived and are available online. Stay up to date with the latest AIoT trends related to digital transformation! ■



Catch-up Archive



Real-Time Location System | RTLS | For iHospital

Enabling operational intelligence in healthcare



Application Advantages

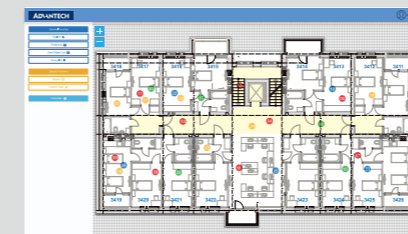
- ✓ Asset Management
- ✓ Patient and Visitor Processing
- ✓ Efficient OR Management
- ✓ Infection Control
- ✓ Quality Care

ADVANTECH

Enabling an Intelligent Planet

Advantech's real-time location system (RTLS) is a solution-ready package (SRP) enabling the immediate location tracking and status monitoring of medical equipment, staff, and patients. Using RTLS, healthcare providers can identify, locate, and track assets and resources; yielding a productive, efficient, and safe work environment.

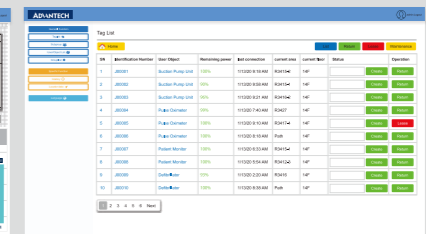
Software Functionality for RTLS



Basic Location Tracking



Quick Sorting and Classification



Movement Record Analysis



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