

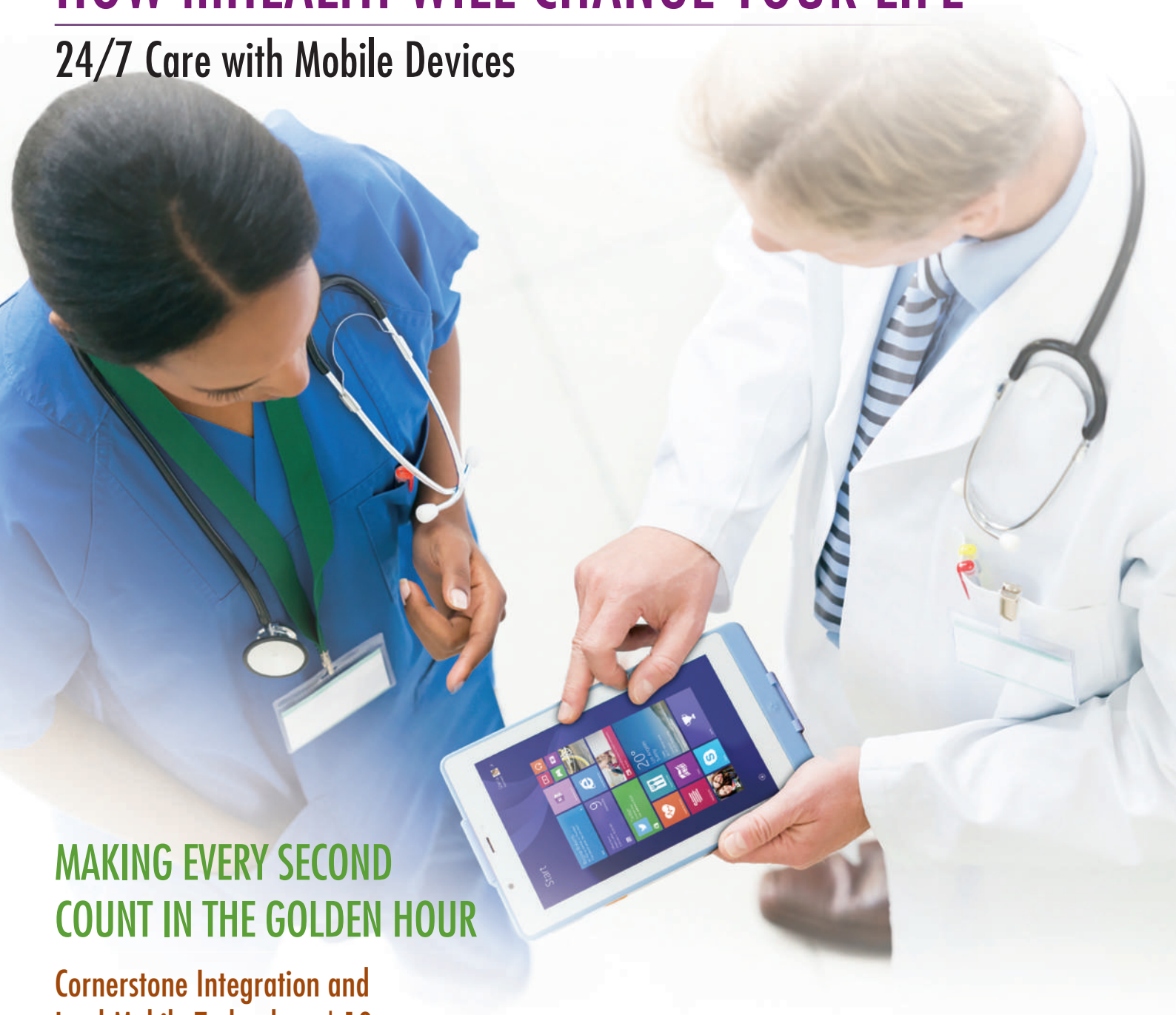
medAdvantech

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the Digital Healthcare journal

HOW mHEALTH WILL CHANGE YOUR LIFE

24/7 Care with Mobile Devices



MAKING EVERY SECOND COUNT IN THE GOLDEN HOUR

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THE COMING ERA OF DIGITAL HEALTHCARE AND THE IoT IN SMARTER HOSPITALS

Information and digital technologies are designed to improve service quality and form a new outlook for digital healthcare. Patients, doctors, and nurses, as well as all relevant medical data, are all linked in this vision of smart medical care. This concept is also central to the Internet of Things (IoT), where all information is integrated into a single platform. How do we transition from traditional medical services to smart services? We must progress sequentially from digitalization to mobilization in order to achieve the goal of remote patient care.

The aim of the first step – digitization – is to reduce costs by integrating electronic medical records (EMRs), picture archiving and communication systems (PACS), and clinical information systems (CIS). The second step is to enhance mobilization to increase the freedom of both patients and caregivers through the integration of computing systems, such as computerized physician order entries (CPOE) and real-time location systems (RTLS). The final step is remote care, where medical care services, such as treatment and monitoring, can be delivered remotely to diverse areas. Mobile and remote healthcare is set to be one of the key areas of focus in the medical field for 2015. Therefore, in this 5th edition of medAdvantech, we have invited several experts to

discuss their innovative ideas and real applications of clinical mobility and remote healthcare.

To facilitate and promote digital healthcare applications, Advantech has developed numerous healthcare solutions for clinical mobility, quality nursing care, and integrated operating rooms. These solutions consider various application scenarios for hospital receptions, nursing stations, patient wards, and operating room equipment to enable the realization of a friendly healthcare environment. In this journal, we also proudly showcase the successful applications of our partners and customers. For example, how Richard Wolf integrated our medical computer into its OR solution, and how mobile medical workstations have benefited OLV Hospital in the Netherlands.

Digital healthcare emphasizes the provision of patient-centric medical services to deliver superior patient care, reduce medical costs, enhance medical services, and prevent treatment errors such as incorrect medication prescriptions. The aim is to provide patients greater freedom and enable caregivers to work more efficiently in a supportive environment. As a proponent of intelligent hospitals, Advantech continues to assist its partners and customers with building hospitals of the future.

Telemedicine

Mobile Vital Collection

Meaningful use

Mobility

HL7

EMR

DICOM

Closed Loop Medication

Stage 7

CPOE

Specialty workflows



David Lin

Director, Advantech Digital Healthcare Division

HOW mHEALTH WILL CHANGE YOUR LIFE

24/7 Care with Mobile Devices

John W.Koon, Publisher of Medical Electronic Device Solutions

Do you remember the last time you visited a doctor? Most likely, you had to drive or take public transportation to get there. Once you arrived, how much time did you spend in the waiting room until you were called? Well, that is all about to change. Instead of traveling to the doctor's office, soon you will be able to receive medical treatment and advice in an electronic visit (e-visit).

According to the research firm Deloitte, the annual cost of in-person doctor visits worldwide amounts to US\$175 billion. In North America, of the 600 million total doctor appointments made in 2014, approximately 75 million were actually e-visits. If this trend applies worldwide, Deloitte estimates that the total number of e-visits in 2014 was 100 million, which equates to savings of US\$5 billion.

e-Visits in Action

The e-visit model was recently enhanced at the University of Pittsburgh Medical Center (UPMC). UPMC is an US\$11 billion healthcare provider and insurer. Its statewide services include 21 hospitals and more than 400 outpatient sites. With the overhaul of its online patient portal MyUPMC (<https://myupmc.upmc.com/>) and the launch of UPMC AnywhereCare virtual visits, UPMC offers patients within the state of Pennsylvania the ability to “e-visit” doctors and advanced practice providers 24 hours a day, 7 days a week. UPMC AnywhereCare is the e-visit service for non-urgent conditions. Thus far, 95% of patients rate the convenience of their visits as “good” or “very good”.



Patients are typically anxious and eager to receive a quick diagnosis to find out what is wrong and regain peace of mind. UPMC AnywhereCare ensures just that. “Our

goal is to provide access to a healthcare provider within a turnaround time of 30 minutes,” said Natasa Sokolovich, executive director of telemedicine at UPMC.

How does UPMC AnywhereCare work? First, patients complete a detailed questionnaire online reporting their symptoms, similar to the registration process for traditional doctor appointments. The questionnaire is then sent directly to a selection of dedicated medical professionals who review the patient’s symptoms and provide a diagnosis and treatment plan. Depending on the diagnosis, a prescription may also be sent electronically to the patient’s pharmacy of choice. This service was initially only available to people with assigned doctors, and the wait time was up to 24 hours. However, as the UPMC AnywhereCare name suggests, the new online service is open to all Pennsylvania residents and is a major improvement to the earlier model. UPMC has reported more than 2,700 e-visits since AnywhereCare was launched in November 2013. The monthly average is approximately 210 e-visits, with an estimated savings of US\$86.80 per online visit compared to emergency room, urgent care clinic, or in-person office visits.

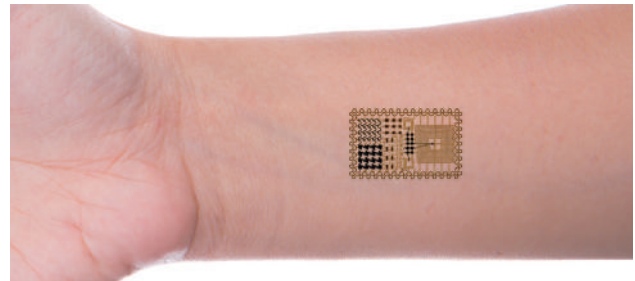
Treatment Challenges

Generally, most patients experience each of the stages in the healing process. The first stage is diagnosis. The second stage is prescription, surgery, or physical therapy. The third stage is recovery. This is a very important stage because patients have usually checked out of the hospital by this point, so tracking their progress is often difficult for caregivers. Occasionally, patients stop following instructions without their caregiver realizing. When patients are re-admitted to hospital, there is often condition worsened and additional associated costs are incurred. However, with e-visits and mHealth, caregivers will be able to access, monitor, and track patient progress and information. (mHealth refers to mobile healthcare that uses wireless technologies to connect patients to healthcare professionals.)

Monitoring and Tracking

Monitoring and tracking patients’ vital signs and activity levels is crucial to the healing and recovery process. If correctly implemented, mHealth enables a quicker recovery while allowing patients to enjoy more personal freedom. MC10, an electronics company based in Cambridge, Massachusetts, announced its vision to develop a stretchable biostamp that adheres to the skin for monitoring temperature and/or motion.

The biostamp will then transmit data wirelessly to a Wi-Fi hub or controller, allowing caregivers to monitor patient conditions. Such a device would also be valuable for new parents by enabling them to get much-needed rest, assured in the knowledge that their newborn is being monitored continually, and if they develop a fever, an alarm will sound.



Another application of mHealth involves the advancement of mobile and wireless technologies. Because of the pressure to reduce healthcare costs, hospitals try to minimize the time patients reside in the facility. Yet, tracking patients’ progress after they have left the hospital using traditional methods has proved challenging. However, this is about to change. Vital Connect, a startup company established in 2011 and based in Campbell, California, have introduced a wireless device called the HealthPatch MD. Weighing only 10 grams, this patch is a compact, multifunctional device with a built-in heart rate monitor, pedometer, thermometer, and fall detector that adheres to the human body, and has been approved by the U.S. Food and Drug Administration (FDA). Additionally, using Bluetooth 4.0, this device can transmit HIPAA-compliant information to a home-based Wi-Fi hub for caregivers to monitor remotely via a tablet or smartphone. With these types of devices, patients will be able to recover at home while receiving remote monitoring and care.

During the recovery process, patients are encouraged to remain active, although exercise should be performed under supervision. This can be challenging to achieve if the patient is recovering at home and not receiving direct supervision. More than 10 years ago, companies began researching this issue. Today, numerous wearable fitness devices are available on the market, although most are not designed for clinical use. In a clinical setting, patients may need to move their bodies at particular angles, so measuring devices must be able to behave like a sensor.

For the last 15 years, Modus Health, a medical device maker, has conducted research in the field of prosthesis

development. Based on their experience and research data, the company introduced StepWatch, a device that can be worn around the ankle. This product is designed to track the activities of patients in a clinical setting.

Unlike most commercial tracking devices, including Fitbit and Jawbone, which use a tri-axis accelerometer, StepWatch uses a more accurate proprietary sensing system. This device has undergone numerous tests involving people wearing prostheses, moving slowly due to Parkinson disease, and recovering from stroke and multiple sclerosis. Because the results were extremely positive, it is one of the few devices granted reimbursement status by the Veterans Administration (VA). (The VA is the American government body that manages the healthcare benefits of military personnel.) The only drawback of the device is the lack of wireless connection capability. Users are required to remove and connect the unit to a docking station in order to transmit data to their caregivers.



Tablets Increase Doctors' Mobility

Ultimately, all these technological advancements should result in increased productivity. Currently, patients who use e-visits enjoy multiple benefits, including 24/7 access to doctors and remote monitoring devices that enhance their personal freedom and peace of mind.

Doctors similarly need to be constantly mobile when consulting patients in order to perform all necessary tasks. For example, one doctor expressed that during patient visits, he often needs to leave the examination room to obtain drug or insurance information. Meanwhile a relevant report indicated that by using tablet devices, the average productivity gain is a significant 1.1 hours per day.

Nowadays, we have the ability to access increasing amounts of data using mobile devices. When responsible for multiple patients, including some with serious conditions and in

need of intensive care, doctors may be required to walk back and forth to their office just to access data regarding the condition of the patients. However, by using a tablet, this information becomes readily available, allowing doctors to continue their duties with minimal interruptions.



What Does the Future Hold?

Despite recently healthcare reforms, chronically ill patients and the world's aging population still require ongoing care, while healthcare providers fight to contain costs by reducing emergency room visits and/or hospitalization. Although mHealth may not resolve all healthcare problems, it can offer a brighter future. The venture capital segment is extremely keen to invest in mHealth. They anticipate that the future of mHealth will continue growing ever brighter. "There will be both startups and well established companies winning in this segment," said Jack Young of Qualcomm Life Fund at Qualcomm Ventures. "Our fund has invested in a number of companies developing remote patient monitoring technologies and services and expects great social and financial returns."

As new medical technologies are being developed independently by many companies, one cannot help but wonder, "How will all this equipment work together?" The good news is that the international, non-profit organization Continua (www.continuaalliance.org) has already established the Continua Design Guideline (2014 edition) to address concerns regarding secure, end-to-end interoperability. These global standards have been ratified by the International Telecommunication Union (ITU), a part of the United Nations, and adopted by the national health ministries of multiple countries, including the United Kingdom and Denmark. Additionally, in 2013, the U.S. FDA recognized a set of IEEE 11073-104xx standards co-developed with Continua. With these new standards and investments in place, you can expect to see many more mHealth offerings reaching the market.

NEW PRODUCT SOLUTIONS FOR INTELLIGENT HOSPITALS WORLD TOUR

Europe:

At the Medica Exhibition held in Düsseldorf, Germany, on November 12-15, 2014, Advantech demonstrated its latest range of medical-grade panel PCs and medical carts, as well as a very efficient 7" handheld medical tablet. Together with our partners, we showcased innovative solutions developed for operating rooms, mobile nursing care, patient rooms, treatment, homecare, outpatient services, and wayfinding. Our co-exhibitors Imatis and TMM also exhibited several patient infotainment solutions.

The medical equipment manufacturers who visited our booth were able to experience specially designed medical tablets, built-in LCD monitors, and sample components suitable for medical use. Finally, the hospitality of our in-booth barista ensured that their visit with Advantech was both memorable and enjoyable.



Middle East:

Advantech served as a Gold Sponsor of the Arab Health 2015 Congress and Exhibition held in Dubai from January 26-29, 2015, on the theme "clinical mobility solutions". Over the four days, Advantech showcased its complete range of 7 and 10-inch clinical pads, medical-grade point-of-care terminals, and mobile nursing carts, attracting more than 700 visitors to its booth. Furthermore, together with local partners Emitac Healthcare Solution, Alminhaj, and SEDCO, Advantech demonstrated its Hospital Patient Management Solution and Hospital Wayfinding Systems. Considering the current construction of several new hospitals in the GCC region, the total solutions provided by Advantech are ideal for achieving the goal of smart hospitals. Advantech's role as a Gold Sponsor of Arab Health 2015 certainly enhanced its reputation and exposure in the Middle East.



April 12-16, 2015
Chicago, IL, United States
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Centre, UAE

CLINICAL GRADE DEVICES ARE THE FUTURE FOR HEALTHCARE

Making Both Clinicians and IT Technicians Happy

Gareth Hall, Director, Industry Solutions, Worldwide Health

It is probably no surprise to you to know that healthcare has been desperate to go “mobile” for many years, and has often been frustrated in its attempts. As Microsoft’s Worldwide Health Mobility Director, I am really glad to see that situation is now changing and I am seeing more and more customers deploying mobile devices in a way that make clinicians AND IT happy – and that is a hard thing to achieve.

Over the last couple of years we have seen many doctors coming to work with consumer-grade tablets and starting to have some success with them – but mainly as companion devices (drug database look ups, protocol advice, patient education, etc). Think about the times you use the health system as a patient – your doctor often has a consumer tablet but still uses a desktop or a laptop in the clinic. The great news is that this has whetted the appetite of health professionals, and they are now interested in the next generation of devices that can really them improve patient care.



Health does have some very specific requirements for devices in many of its workflows. The ability to sanitize a device is critical in many areas, as is the ability to scan barcodes on patient wristbands or pieces of highly specialized equipment. Fitting in a doctor’s coat pocket is another often heard request. With all those requirements in mind, I think the Pocket Pad from Advantech is a really interesting device. It meets all of these specifications and more, and it is really starting to get some attention from health customers around the world.

The PocketPad runs Windows, which means that it runs both the desktop clinical systems used in virtually every health organization in the world, alongside the new touch friendly health apps that are increasingly employed by mobile clinicians. This ability to run both touch first apps as well as traditional enterprise applications is a really strong reason why these sorts of devices are proving more popular. We have many customers using solutions from large EMR partners like Allscripts and Greenway. They love having the ability to use modern touch-friendly apps for as much of their work as possible, but also being able to drop into the desktop system for more complicated workflows that are not yet supported by the touch apps. Doing this on device significantly improves their clinical productivity.

When you combine these features with enterprise level security and manageability (in many cases, IT can simply connect them directly to their existing infrastructure), it leads to clinical-grade devices being deployed at scale across health. This is a trend that is

only going to increase.

Some of my clinical colleagues often describe the “perfect solution” for a physician as being a completely “invisible” system, with a voice service like Cortana acting as the holistic interface into the health system. We all know scenarios like this are still a little while away, but it is encouraging to see how many steps we are taking along that journey already, with small, pocket-sized clinical-grade devices that support pen and voice input in today’s clinical systems.

If you have tried and failed with mobile health, I strongly urge you to look at the new breed of clinical-grade devices, such as the Pocket Pad. Your clinicians will be pleasantly surprised, as will your IT teams. Additionally, I am always interested in great stories of technology being used in health – if you have one, email me at gHall@microsoft.com – we would love to know more.



About the author:

Gareth Hall, Director, Industry Solutions Worldwide Health for Microsoft. Gareth leads the worldwide mobility business in health, setting the device strategy for health and working with numerous stakeholders across the Microsoft to deliver successful mobile solutions and devices in healthcare. This includes sales field education, partner recruitment for app development, and working with customers on their requirements, as well as the strategic impact that has for the future.





MAKING EVERY SECOND COUNT IN THE GOLDEN HOUR

Cornerstone Integration and Intel Mobile Technology

Charles King, Pund-IT, Inc.

Although mobility is a key driver in the IT marketplace, it is a mistake to believe that its influence is limited to the latest/greatest smart phones and tablets, or issues surrounding Bring Your Own Device (BYOD) initiatives. Instead, the impact of mobile technology affects entire IT infrastructures and business environments, literally from the fingertips of employees and customers to the staff who manage and maintain corporate data centers.

With that in mind, what does an ideal mobile computing infrastructure look like? What are its characteristics, its basic strengths and potential weaknesses? That depends in large part on the processes and applications—the IT lifeblood, if you will—of the organization itself. But let's consider an extreme case: businesses in the business of saving lives.

Mobility has been an inherent factor in medicine and healthcare for millennia. The sick and injured are often unable to travel to places of treatment, so medical professionals must go to them. The enduring image of country doctors making house calls, nurses caring for patients in remote surroundings and medics treating the wounded on battlefields are virtually universal.

Making the Most of the Golden Hour

In urban, suburban, and rural locales, mobile first responders, such as emergency medical technicians (EMTs), have key roles in the “Golden Hour” that is so crucial in the treatment of traumatic injury. How can mobile IT better serve doctors, nurses, and EMTs,



along with the patients they care for? That is a question that piqued the interest and imagination of Steven Graves, CEO of Cornerstone Integration, Inc. (CII) during a discussion with officials at Valley Health, a nonprofit healthcare organization that currently operates six hospitals in Virginia and West Virginia: Winchester Medical Center (WMC) and Warren Memorial Hospital (WMH) in Winchester, VA; Shenandoah Memorial Hospital (SMH) in Woodstock, VA; Page Memorial Hospital (PMH) in Luray, VA; Hampshire Memorial Hospital (HMH) in Romney, WV; and War Memorial Hospital in Berkeley Springs, WV.

According to Graves, Valley Health's primary concern was how to improve the care and health of heart attack victims. Given the rural locations where many patients live, lengthy transportation times were impacting patient outcomes. However, alternatives such as helicopter "life flights" were too risky and costly to use in any but the most extreme cases. In addition, communications in the countryside were often problematic due to poor radio and cellular support. Plus, security was a critical concern given the importance of patient privacy and regulatory issues.

They required a framework that securely connected remote EMTs with trauma centers to actively transmit 12-lead electro cardiogram (EKG) data so that staff and laboratories could assess the patient conditions, prepare for their arrival, and accelerate the treatment plan to ensure positive results. Graves realized that the problem and its solution was similar to the work he was doing with another of his businesses, the Corner Group, in providing secure communications solutions to the Department of Defense (DoD).

What they wanted was real-time situational awareness. In military terms, this is known as an OODA (observe, orient, decide, and act) loop. In healthcare, this requires having the skills and tools to improve both service delivery and patient outcomes. To support these and other requirements, Graves saw just one possible IT solution - Intel's vPro.

Made To Fit

According to Graves, he and CII staff developed a solution— Mission Critical Media (MCM)—for

Valley Health by first contacting the people who would be using the systems daily. "We focused first on their needs. We started by talking with nurses, then doctors, then administrators, then IT reps. We did not start with the CIOs, and intentionally did not start with IT requirements, as that would have limited our solution set." Cornerstone's approach is based on a "three-legged stool" model that comprises the following aspects:

1. Security—Must be present from the very beginning, because retrofitting is too costly and complex. This includes the ability to audit, protect, monitor, enforce, enable/disable and activate/deactivate systems whether on or off. This reduces the risk of data loss, leakages, and compromise.
2. Management—Must be able to remotely update, enable, diagnose, repair, and inventory systems from any place at any time, regardless of whether they are on or off, and without a functioning operating system, hard drive, or software agent.
3. Fit—Must fit current needs and yet be adaptable to changing operational environments. This includes the ability to support numerous disparate multi-vendor software applications, hardware environments, multiple OSs and virtual machines, security levels, use cases, users, and locations while also being easy to implement, support, and operate.



Graves explained, "Fit is driven by being adaptable, flexible, scalable, reliable, mobile, and affordable." In essence, Intel's vPro provides the foundation for supporting the fitness of the Valley Health MCM solution.

Intel Core to the Cloud

The reason why Graves chose Intel for the project becomes clear when considering its structure. “Our goal was to create sustainable value and competitive advantages by using commodity, open source, and COTS-based technology platforms. The technology had to be capable of delivering services defined by Valley Health at the lowest TCO, while also necessitating the lowest capital investment up front. Intel supported this approach by providing the means to develop our own “Core to Cloud” management offering.”

In early 2014, CII’s MCM solution transitioned to embedded Intel Core i5 vPro-enabled NUC (Next Unit of Computing)-based fanless platforms. These run as Mobile Cloud Servers that are located on Advanced Life Support units (ambulances). The affordable NUC-based system currently runs VMware ESXi 5.5 while concurrently hosting Microsoft Windows 7 and Ubuntu Linux 11.0 on virtual machines.

By using virtual machines, CII can support a broad variety of applications, both embedded and commercial, while providing secure access over commercial broadband cellular and commercial satellite networks using narrowband M2M communications. CII’s MCM solution also supports geo-positioning and secure real-time streaming video, voice, and image transmission. Communications traffic is managed by hospital IT staff, and the ambulance systems are monitored and maintained by personnel at CII’s Intel-based cloud data center.

Client devices, including tablets, smart phones, notebooks, and Ultrabooks are networked to the on-ambulance cloud server, seamlessly securing data as well. Because the NUC Mobile Cloud Servers are fully virtualized, they can support multiple client operating systems, including Linux, Windows, iOS, and related devices, and diverse applications and suites. In other words, CII’s MCM solution also qualifies as a highly affordable, innovative, mobile BYOD platform.

The vPro Difference

Although Graves emphasized the heterogeneous qualities of the Valley Health solution, he also encourages customers

to adopt Intel vPro-based client devices wherever possible. “Intel vPro is embedded inside the Core architecture. It is proven, reliable and consistent across past, current, and future architectures. In addition, vPro is an 8th generation commodity that’s available on numerous vendor platforms.

We have been actively and successfully using it since 2008 in both U.S. DoD efforts and healthcare solutions.” But the Intel value proposition doesn’t stop there. “Intel freely provides the software management tools required to maximize vPro features and performance, such as AMT Commander, AMT Discoverer, etc. Alternatively, customers can use their existing tools, including HP OpenView, Symantec ALTIRIS, and Microsoft System Center.”

At the same time, Graves noted, “Intel vPro is the only client platform that supports secure remote management whether the system is on or off, improving maintenance efficiency and cost effectiveness.” That is a critical point in situations like Valley Health’s where the remoteness of rural communities and lack of local IT personnel makes system diagnosis and repair expensive.



In fact, management costs can account for as much as 70% of the total cost of owning an IT asset. Graves estimates that by using the Intel vPro platform, CII can often cut those costs in half and deliver significant savings to healthcare customers. “For us, sometimes the equipment is the patient. So we needed to create a solution that allows us to affordably ‘treat in place’ the equipment, as well as the patients. No one else does what Intel does.”

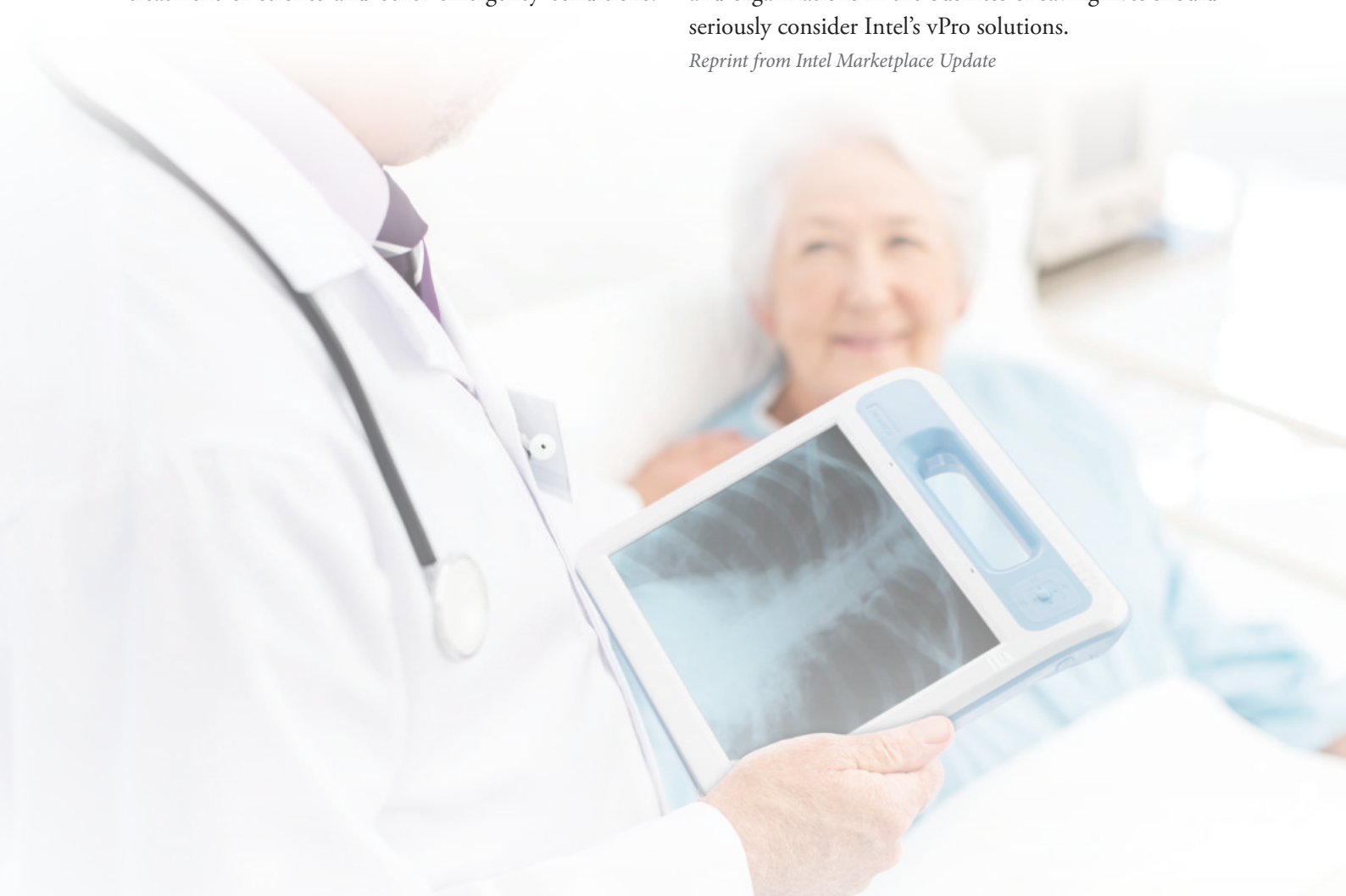
Final Analysis

The Mission Critical Media solution that Cornerstone Integration, Inc. developed for Valley Health is an unqualified success. Facilities using the MCM solution found that it helped accelerate hospital interventions by shortening or eliminating the 30-minute wait time that patients previously faced after arrival. Most impressively, Valley Health found that patients treated with the MCM-based regimen were discharged with their hearts in stronger condition. As a result, Cornerstone’s MCM solution is also being evaluated for in the assessment and treatment of strokes and other emergency conditions.

However, the lessons Graves gained from the experience have wider ramifications. “Healthcare IT must transition from being an in-house cost center to a care delivery service enabler. Much of this is being driven by the Affordable Care Act (ACA) Health Insurance Portability, Accountability Act (HIPAA) compliance, increasing adoption of electronic healthcare records (EHR), and electronic incident reporting. Broadly speaking, care provider organizations must find ways to gather, correlate, and share information, as well as deliver services rapidly, effectively, and at the lowest cost.”

As Cornerstone Integration’s work with Valley Health demonstrates, Intel’s vPro offers a firm foundation for successful solutions addressing these and other healthcare challenges. Mobile technology, whether serving EMTs and ambulances racing to save someone’s life, or the doctors, nurses and other medical staff collaborating on patient care, is poised to alter healthcare in elemental ways. From our own perspective, people and organizations in the business of saving lives should seriously consider Intel’s vPro solutions.

Reprint from Intel Marketplace Update





PATIENT INFOTAINMENT SOLUTIONS FOR BETTER CARE QUALITY

Enable Networked Hospitals via Windows 8

Sabine Hering, ClinicAll Germany GmbH

Patients expect to receive high-quality care during a hospital stay and these days that includes the possibility of using state-of-the-art information and entertainment services. To address this need, ClinicAll Germany was established in 2008 with the aim of developing a software solution that offers maximum security within the context of a networked hospital. The final result was a unique infotainment system platform developed through an exclusive strategic partnership with Microsoft and based on Windows 8. By integrating television, Internet, and phone access into a modern and flexible bedside terminal, the ClinicAll system is ideal for both patients and hospitals. In addition to its infotainment functions, ClinicAll also has substantial potential for numerous telemedicine services; for example, the retrieval of medical records, X-rays, medical information, and videos of treatment, surgical procedures, and/or rehabilitation. With the theme of the MEDICA 2013 healthcare trade show in mind - Networked Hospitals - ClinicAll offers the ideal solution. The flexibility of the hardware and

software mean that the system is future-proof and can be adapted to include new features and requirements and any other applications that are conceivable within the scope of increased networking in hospitals.



User-Friendly Intuitive Operation

ClinicAll is based on the Windows 8 operating system. The interface is designed so that only a maximum of three presses on the touchscreen are needed to access any function. However, in case users still experience issues, a digital manual is also provided and a help function is integrated. The software infrastructure covers three core areas: entertainment, services (for patients and hospital staff), and medical resources (for nurses and physicians). Whether IP-based television, video-on-demand, pay TV, radio (IP radio), or Internet access with direct links to social networks such as Facebook and Twitter - the possibilities for patient infotainment are extremely diverse. Because communication is extremely important, the ClinicAll system supports IP-based telephony, video calls, and the seamless implementation of other Microsoft-based communication services, such as Microsoft Lync.

Intelligent Services Make All The Difference

Because of the system's flexibility, ClinicAll facilitates the integration of customized service options. Such services will not only contribute to the comfort and quality of patients' hospital stays, but also reduce the workloads of hospital staff. A practical example is the "soft nurse call" function. Typically, to request assistance, patients must press the emergency button to call a nurse. However, for requests for specific items, nurses must enter the patient's room twice - first, to listen to the patient's request, and then to bring them the requested item. Using the ClinicAll "soft nurse call" function, patients can specify their desired service; for example, to receive a bottle of water, mild analgesics, or other medical assistance. After receiving the messages, nurses can mark them as read to inform the patient that their communication has been received and will be accommodated as soon as possible, eliminating the need to call for assistance multiple times.

The system can also be used to digitally order, and even customize, food. Additionally, if the patient's medical records are linked, the food provided can be adapted in consideration of allergies, intolerances, or specific conditions, such as diabetes. Alternatively, patients can complete an initial questionnaire that for review by hospital staff, with relevant information being entered into the system and transmitted to the

kitchen. The system can also store hospital-specific information; for example, rehabilitation session times, and patients can use the system to directly control the environmental conditions of the room. This includes raising and lowering the bed, adjusting the room temperature, and opening and closing the windows.

Benefits the Provision of Continuous Healthcare

Providing patients with medical information and health education is an important task for all hospitals. However, such operations are time consuming because they are generally conducted in person. The ClinicAll system has the potential to simplify patient health education significantly by allowing patients to access medical information and videos about specific surgical or anaesthetic procedures from their hospital bed, without necessitating a consultation with a physician or anaesthetist. Patient questionnaires can also be conducted digitally, ensuring that all patient data is stored on the system and easily accessible.

For nursing staff, the system also provides a valuable asset for completing tasks such as wound care. Physicians can directly input instructions regarding when and how often dressings should be changed and what medication to provide the patient. When nurses have finished these tasks, they can mark them as complete. Additionally, if external medical devices are directly connected to the system, patients' blood pressure, pulse, and other vital signs can be automatically recorded.

The system interface enables work processes to be organized for effective execution and time saving, and can reduce the likelihood of friction between physicians and nursing staff resulting from insufficient or missing information. In addition to accessing patient medical records, physicians can use the system to provide documentation detailing the specific medical services and treatments provided, facilitating itemized billing. Regarding security and confidentiality, patient medical records cannot be accessed by patients. Instead, during bedside patient visits, physicians must log into the system using a smart identification card (RFID card) to retrieve laboratory or X-ray results.

Seamless Integration of Additional Applications

All applications developed for Windows 7 or 8, such as PowerPoint, Word, or Excel, can be easily implemented. The default ClinicAll software supports nine languages, specifically, German, English, Italian, French, Armenian, Spanish, Catalan, Russian, and Dutch, although any language can be integrated. For interested clinics or hospitals, ClinicAll offers the following three options for acquiring their systems: purchasing, leasing, or adopting their unique operator model, which enables hospitals to implement the systems without facing investment risks. The operator model involves directly charging patients a daily fee to use the infotainment systems, and patients have expressed willingness to pay for the convenience offered by these systems..

Pocket Pad: Instant Access in Your Pocket

In addition to fixed terminals with 12", 15", 18", or 22" touchscreens, the ClinicAll system is now available as a pocket-sized tablet computing pad. Unlike most tablet computers, the ClinicAll Pocket Pad was specifically developed, together with Advantech, for use in hospitals. Lightweight, flexible, robust, and powerful enough for most hospital-specific tasks, the ClinicAll Pocket Pad is the perfect companion for physicians and



medical staff. Dedicated apps provide physicians with constant access to patient medical records and clinical data. This alone is a significant advantage. The 7" multi-touch display is compact yet delivers a clear image. With the embedded Windows 8 operating system, these devices can also be easily integrated into any hospital information system. Thus, physicians can use a ClinicAll Pocket Pad connected to a bedside terminal via wireless LAN to access clinical findings or radiographic images and discuss them with the patient. Furthermore, the ClinicAll Pocket Pad is IP51 compliant for dust and water tolerance, ensuring durability for daily clinical use.

About ClinicAll

ClinicAll Germany is located in Neuss, North Rhine Westphalia, and is dedicated to the development and distribution of patient infotainment systems for flexible use in hospitals and rehabilitation clinics. Following intensive development together with Advantech, Frank Remih, board member of ClinicAll International, established ClinicAll Vertriebs GmbH in Germany in 2008. Since then, ClinicAll has successfully introduced patient infotainment systems to many hospitals throughout Germany. In response to high demands from the European and American markets, ClinicAll International Corporation was established in the United States in 2010. This was followed by ClinicAll France S.A.S., also in 2010, ClinicAll Austria and ClinicAll Spain SL in 2011, and ClinicAll Swiss AG in 2012.

Another significant milestone for the company was the establishment of a strategic partnership with Microsoft International Corporation in 2012. As the only company that uses a customized version of Windows 8® on all its devices, ClinicAll was officially recognized as a Microsoft Gold Partner and, together with Microsoft, aims to revolutionize the bedside terminals market. Currently, ClinicAll infotainment systems have been adopted worldwide with high patient use. The feedback from patients and hospitals in Germany, Spain, Austria, and Switzerland has been very positive, with the number of users steadily increasing.





Tomorrow's multimedia today

From patient infotainment terminals to connected hospitals

Patients want the ability to access communication and entertainment services throughout their hospital stay. ClinicAll provides Internet, phone, and TV access in a single box equipped with Windows 8. The system also provides medical facilities with an opportunity to deploy a wide range of user applications. Whether integrated with patient services, telemedicine, and/or digital patient records, the ClinicAll system can be customized for specific hospitals and tailored to existing processes. Choose a solution today that will save time, money, and resources tomorrow. Additionally, our unique and cost-effective operator model eliminates the initial capital expenditure.



GAZING TO THE FUTURE

Using Eye-Tracking Technology to Control Multimedia Entertainment Platforms

Mariette Dusseldorp, Advantech

Eye tracking is the process of watching where a person is looking. We do this all the time — it's a natural part of human behavior. With the advent of small, highly accurate and low-cost systems, eye tracking is now being rapidly adopted in devices and applications, both to enhance computer interaction and to understand human behavior.

At the new Intel IoT Ignition Lab in Swindon, England, a recent demonstration showed that eye tracking technology can be used to control an interactive healthcare multimedia platform. This solution was jointly realized by Advantech, Airwave, Ice Middleware, Tobii, and Intel Corporation.

Increased independence for people with limited motor skills due to ALS, spinal cord injuries, or other impairments, was the motivation for Tobii to introduce the Tobii PCEye Go. Together with Ice Software Solutions — a developer of multimedia patient infotainment software products, Airwave Healthcare — a specialist entertainment systems integrator, and Advantech — manufacturer of medical certified touch panel PCs, an efficient and modern system was created to offer users improved social interaction, independent recreation, education opportunities, and even a workplace environment.



Patient bedside multimedia systems are typically controlled by using either physical buttons, a remote control, or a multifunction touchscreen terminal. Despite meeting the needs of most patients, these control functions can

present an access barrier for patients with significantly reduced motor function resulting from, for example, strokes and brain or spinal injuries. Technology plays a key role in the delivery of equal access to all, irrespective of physical limitations.

Efforts to enable TV/PES/multimedia control without physical contact and from restricted bed positions (as required in dedicated spinal injuries units) whilst maintaining patient dignity, comfort, independence, and satisfaction resulted in a market offering by PES-integration specialist Airwave Healthcare, in collaboration with ICE, Tobii, and Advantech. The challenge for this application was to bring together various hardware and software technology companies with the same vision of delivering a product/platform that could meet this specific demand.

A working partnership between Advantech, Airwave Healthcare, and ICE Software Solutions Ltd was already established before this core partnership invited Swedish eye-tracking specialist Tobii to join the partnership. Tobii's provided its PCEye Go eye-tracking hardware and software for development integration with Advantech's HIT series of healthcare touchscreen terminals and the existing ICE middleware configurations utilized by Airwave. The integration of Tobii PCEye Go hardware facilitated visual control, access/use by patients with reduced motor control functionality based on an already proven healthcare touchscreen multimedia system produced by Advantech, Airwave, and ICE.

Advantech's HIT series of healthcare touchscreens use embedded Intel architecture that facilitates the inclusion of Windows-based dedicated healthcare middleware from ICE Software Solutions. These easy-to-use intuitive systems are delivered, installed, and supported by Airwave Healthcare using a range of mounting and delivery infrastructures. Advantech's HIT series products are based on an Intel® Atom D525 or Core i7 processor, which allows for a slim fanless design without compromising performance.

The Tobii PCEye Go is a peripheral eye tracker that improves system accessibility with the speed, power, and accuracy of gaze interaction. The device replaces standard physical control equipment (such as a mouse, touch-screen, remote control, or physical buttons), allowing users to navigate and control a device using only their eyes.

The PCEye Go runs on standard Windows computers and tablets. Users can operate any application that is normally controlled using a standard computer mouse or by touch. The individual hardware/software package features a quick and easy-to-use calibration setup for every user. After calibration, users simply gaze at a specific menu selection icon (e.g., for TV or Internet access) and PCEye Go detects the area of the screen where their gaze is focused and sends an instruction to the system middleware to activate that icon choice. This enables patients to, for example, surf the Internet, access and change television channels, obtain information of key hospital services, use Skype, and even control room lighting, blinds, and ventilation. Furthermore, patients can also use this technology to communicate with clinicians and nurses.

The dedicated collaboration of Advantech, Airwave, Ice Middleware, Tobii, and Intel Corporation has resulted in an integrated hardware and software platform that is expected to significantly enhance the independence, dignity, and comfort of patients who previously had limited access to hospital services. The same services that most of us take for granted.



From left to right: Hector Minto of Tobii, Rod O'Shea of Intel EMEA, Paul Chambers of Airwave Europe, and Manick Choraria of ICE Middleware

DIGITAL INTEGRATED OPERATING ROOMS INCREASE SURGICAL EFFICIENCY

Richard Wolf Creates Touch-Controlled Endoscopy Equipment

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 enhance surgical efficiency.

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

Core Nova is designed specifically for integrated operating rooms, and comprises endoscopy instruments, hardware control units, and the Core, which serves as the management system. The Core operates on the hardware control unit, or on Advantech's POC-W211. Because all connected devices can be accessed using the Core system interface, surgical medical staff can manage images, view procedural documents, and even provide telemedicine using the POC-W211 control device. Additionally, because the Core

is web based, remote healthcare personnel can collaborate with operating room staff and assist with the surgery over the Internet by simply logging into the Core system. 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 integ-

rated 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 40 countries. This indicates that the touch panel control interface is 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 (uses 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, including those related to controllable endoscopes and third-party display equipment. Moreover, no additional wiring is required for system upgrades.

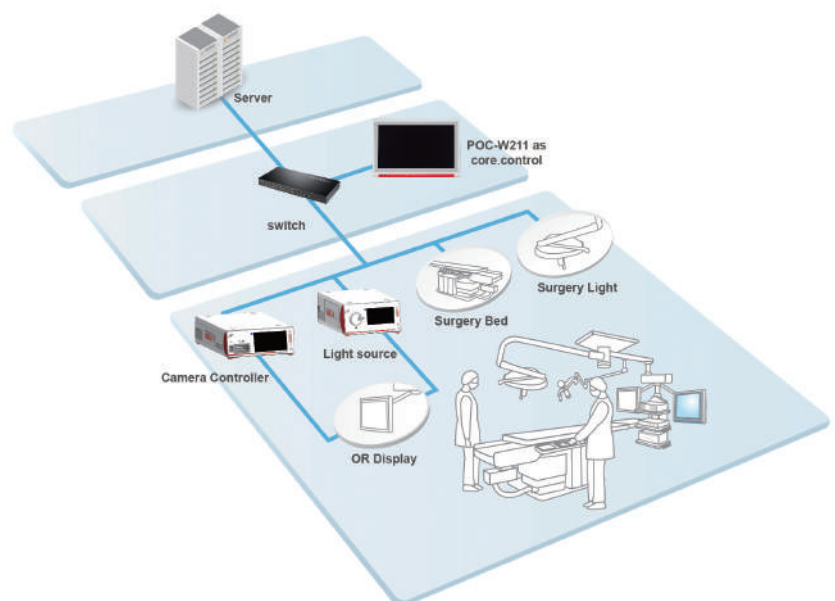
In addition, Richard Wolf GmbH is also very satisfied with the customized services provided by Advantech. Specifically, the color and key visual themes Richard Wolf GmbH specified for the POC-W211 were delivered. This allowed for color consistency between the POC-W211 device and the endoscopic medical 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.

Christoph Kuehn, Advantech Senior Medical Key Account Manager, also highlighted the use of Advantech motherboards in other Richard Wolf GmbH equipment. This demonstrates their high confidence in the quality of Advantech products. 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 customer's expectations.

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.



OLV HOSPITAL ADOPTS AMIS DEVICES FOR INTENSIVE CARE

Durable, Flexible, and Future Proof

Why reinvent the wheel? This was the approach adopted by University Hospitals Leuven when developing a Patient Data Management System (PDMS) using MetaVision software to provide a critical information system for the intensive care unit (ICU) and coronary care unit (CCU) of OLV Hospital in Aalst, Belgium.

Christof Van Den Steen, an IT professional and former ICU nurse, was responsible for implementing this system in the ICU and CCU of OLV Hospital. This necessitated adjusting the existing legacy system to suit the workflow of both units, as well as integrating new hardware that enabled the system to be accessible from bedside terminals. Mr Van Den Steen stated, “The differences between the ICU and CCU became apparent during the initial implementation stage. The CCU is a modern facility located in the new wing of the hospital, and patient rooms have sufficient space to install bedside terminals. By contrast, the ICU is somewhat outdated and the patient rooms are smaller. The space around the bed is sometimes insufficient for the equipment. Thus, we needed a compact bedside system with limited space requirements. We began our investigation in Leuven and Antwerp. Although the most obvious solution was a wall mount, the feedback from other hospitals was that wall mounts have a tendency to wobble and be unstable. So we had to look further. We approached various companies for assistance with determining a solution. Alpatron Medical was one of them.”

Rapid Service

Considering the appropriateness for small spaces and installation flexibility, Alpatron had a more than suitable



solution—the AMiS medical cart. This handy, mobile care workstation equipped with a thin client is specifically designed to support the provision of bedside care. “At our first meeting, it became clear that OLV Hospital in Aalst was looking for something that differed from what we typically provide,” said Alpatron. “Most hospitals in the Netherlands use a wireless system. However, their ICU is situated in the old part of the hospital, where no wireless network is available. So we devised a unique solution for OLV Hospital that involved attaching a flexible mounting pole to the ceiling for the system wiring.” Mr. Van Den Steen was quite impressed by Alpatron’s rapid service. “They immediately provided us with an AMiS device to test in the hospital,” he reported. “The workstation was very stable and easy to use, both when sitting and standing. After consulting bedside personnel, we decided to have a drawer added for storing files.”

Durable Investment

Based on this positive experience, OLV Hospital purchased 25 carts for its ICU - 24 for bedside use and 1 as reserve. "Although the AMiS units are comparatively higher cost, they seem durable. These systems must be able to withstand rough treatment because patient beds are frequently moved around. However, the portability of these units means that we can take them with us if the ICU is relocated. Following a discussion with the head nurses and doctors, we concluded that the AMiS units were a financially justified investment," said Mr. Van Den Steen. Alpatron also asserted that these units were truly a long-term investment, because they are optimized for the future. The main advantage of AMiS workstations is their modular design. With only a few small adjustments, the system can be easily updated. Additionally, for wireless operation, all that is required is the installation of a battery unit.



Ceiling Installation

For certain applications, the AMiS cart can also be installed as a stationary wired unit. Because of their stability and reliability, wired workstations have attracted market interest in the Netherlands. Alpatron reported, "We recently received requests from two hospitals for identical AMiS units, with data connections and power supplied directly from the ceiling. This is considered a very stable solution. If the required radius is not more than 2 meters to the left and to the right, it is an excellent solution. Our service focuses on the customer's wishes." Nonetheless, the ceiling installation proved to be fairly challenging. Mr. Van Den Steen said, "In an ICU, the ceiling cannot be directly demolished, because care must continue. Instead, we dismantled the ceiling in sections in order to install the network wiring and electricity. A cleaning crew was sent in afterwards to clear the area, and Alpatron handled the subsequent ceiling cable installation and AMiS connection."

Tight Schedule

Following the hardware installation and software integration, implementation of the PDMS was initiated. "IteMedical (distributor of MetaVision in the Benelux) had drafted a project plan with a tight schedule, which generated a fair amount of pressure. First, all technical issues had to be resolved. We then scheduled training for super users and end

users. In total, 170 users were trained in three weeks!" By mid-December, the system finally went live. Mr. Van Den Steen continued, "For the first two weeks, people were somewhat confused by the system. It was a particularly busy time for the ICU and on top of that, everything had to be performed on a computer. Several issues arose as the adoption progressed. However, by now, staff have successfully completed all the relevant processes associated with admitting and discharging patients, and are gradually gaining more confidence in using the system. Based on our experience, we are currently making a few adjustments in order to better manage workflows."

System Benefits

Currently, doctors and nurses recognize the benefit of using the PDMS. According to Mr. Van Den Steen, "They see the advantages of the system. Specifically, it ensures a uniform method of registration. Just consider the simple value of being able to read everyone's notes! Nonetheless, the underlying purpose was not specifically to save resources and staff time. Searching for and filling out forms still takes time, especially since all the fields must be complete before the form can be saved and closed. In the past, patients would be given pain medication and that would be it. Now, the system also requires staff to complete a paper evaluation of the patient's pain score. Presently, paperless operation is not viable or even necessary. In the future, however, our goal is to limit the use of paper; but that will take time."

Future Proof

Sufficient foundations have now been established at OLV Hospital. "By working with University Hospitals Leuven, we were able to enhance a number of key elements, which is why the system comprised several items initially. They provided plenty of valuable advice, which was enormous beneficial for us. We still consult them regularly regarding support and administration. Communication is very important. Organizations and people must connect with each other for good cooperation. Fortunately, our collaboration with Alpatron was very positive. The feedback received from the nurses has been fairly positive. The only problems still encountered are hardware-related, such as the occasional blue screen. From an end user perspective, this is not ideal. However, we are confident that this issue will be resolved quickly." For Mr. Van Den Steen, certain challenges still remain. "The departments are only in the initial adoption phase. Plus, the system can never be truly "finished" due to its ongoing development." Nonetheless, the AMiS units are not expected to pose any obstacles because they are proofed for the future!

This project was realized by Alpatron Medical Systems and customized specifically for OLV Hospital in 2012.

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