One PACS for all
all for one

- All about PACS II in The Netherlands and Italy
- Strong partnership for PACS solutions in Finland and Hungary
- Think global, act regional – Spain focuses on centralized PACS architecture
- Challenges – the lack of radiologists in Europe
When in Rome, do as the Romans do. This little piece of advice will not only help you “do” Rome – or any other place for that matter – on holidays but also on business. In healthcare IT business for example national differences in the PACS market are mind-boggling. The same holds true for differences in distribution channels and practices. Thus, taking your business across the border can be quite a challenge. We at VISUS are prepared to master the challenge with flexible products and strong partners that know their way around.

While in Germany we have our own sales organization, internationally we count on business partners whose product portfolio and market strategies are in sync with our own objectives. Currently, we focus our efforts on Europe, a small market with huge potential. To PACS providers this market appears to be split into two distinct entities – a mature market and an emerging market. The former comprises inter alia Belgium, the Netherlands and Luxembourg (Benelux) with a PACS coverage of close to 100 percent. In these countries, hospitals are entering the next phase of digitising where step by step different clinical departments and areas are being integrated into the PACS. These facilities require a so-called PACS II solution – and VISUS can deliver. Our product, we are proud to say, is miles ahead of the competition and thus it is no surprise that our partnerships in the Benelux countries are outstandingly fruitful. We hope to be able to take our experience and know-how across the Channel to the UK where the NHS is currently sourcing replacement PACS that will go beyond radiology.

At the other end of the PACS coverage spectrum is for example France where the reimbursement system has long favored analogue recording and archiving solutions for radiology data. Consequently, today the French PACS market is characterized by high demand. Very promising indeed! And: the French healthcare system now promotes the establishment of regional archives, another VISUS core competency. We are busy forging regional partnerships to spread our know-how in France. Spain has similar plans for regional archives.

In Eastern Europe JiveX is already a major player: in Poland and the Czech Republic the VISUS mammography solution is very popular and in Hungary JiveX Enterprise has many happy customers.

You see, our JiveX developers ensure that we can do as the Romans do, wherever we are. This strategy gives us as a mid-sized company an edge over the competition. The user reports that we have collected in this second international issue of VISUS VIEW show that our strategy is successful.

Enjoy!

Peter Rosiepen
VISUS Vice President

Dear readers,
dear friends of VISUS,

When in Rome, do as the Romans do. This little piece of advice will not only help you “do” Rome – or any other place for that matter – on holidays but also on business. In healthcare IT business for example national differences in the PACS market are mind-boggling. The same holds true for differences in distribution channels and practices. Thus, taking your business across the border can be quite a challenge. We at VISUS are prepared to master the challenge with flexible products and strong partners that know their way around.

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Peter Rosiepen
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Real-time, real life: Teleradiology network fully in service

After a one-year long pilot phase led by MedEcon Ruhr on 1 January 2012 the Teleradiology Network Ruhr went fully into service. The initiators of the network – MedEcon Ruhr, contec, Fraunhofer ISST, ZTG and VISUS – aimed at establishing an infrastructure that allows vendor-neutral, barrier-free and safe exchange of DICOM data within the Ruhr region in Germany. The project is headed by Professor Dr. Lothar Heuser, Director of the Institute for Diagnostic and Interventional Radiology, Neuroradiology and Nuclear Medicine at Knappschaftskrankenhaus Bochum.

“During the pilot phase 35 hospitals and doctors’ offices successfully participated. Now, after the full launch, more will join us. In the pilot phase more than 100 gigabyte of image data were sent and received per month. The network is being used for a variety of tasks – to obtain second opinions or to transfer image data down the treatment chain to specialized physicians and institutions or to rehabilitation facilities”, says Marcus Kremers, Project Coordinator at VISUS, summarizing the results of the test phase and three user meetings.

The technical foundation of the network is provided by VISUS’ JiveX DICOM Mail including a directory service. This solution complies with the recommendations of the German Röntgen Society and enables the participants to exchange DICOM images in diagnostic quality safely and quickly and without major technical and financial burden. Building upon widely used e-mail technology and existing infrastructures, networks can be easily established and expanded.
Number of customers: up. Revenue: up. Strategy: successfully implemented. Outlook for 2012: very positive. That is the VISUS fiscal year 2011 in a nutshell. Regarding the technical trends, particularly PACS II is playing an increasing role as last year’s MEDICA has shown the clear trend towards image management outside radiology. “In addition to PACS migrations, several large dentistry departments at university hospitals were equipped with our solutions. Thanks to our product philosophy – JiveX for radiology, full image management, mammography screening and teleradiology – we are excellently positioned to benefit from this trend”, says Guido Bötticher, Sales Director Germany.

Internationally as well PACS II is playing an increasingly important role. Case in point: Maasstad Hospital in Rotterdam. “The 600-bed facility is fully digitised and paperless. JiveX is being used in all departments as Enterprise PACS. It is linked to more than 160 imaging devices and to the radiology PACS of a third party vendor. More than 200,000 examinations per year are being managed and archived with the help of JiveX and even legacy paper files are scanned and transferred to our product”, says Peter Rosiepen, Vice President International Sales and Business Development.

Another trend that will continue in 2012 is the integration of non-DICOM data, for example electrocardiograms (ECGs). “Our JiveX ECG Modality Gateway obviously meets an urgent need of hospitals and manufacturers. It ensures smooth integration and storage of vital data and offers specialized measurement and analysis tools”, Jörg Holstein, Managing Director at VISUS concludes.

MIR 2012 in Genoa

Management in Radiology (MIR) is among the most important annual events for those responsible for running a successful radiology department because of the interesting subjects, innovations and topics that are discussed during the sessions. In addition, it is also a very attractive event due to the high concentration of expert knowledge – and the scenic and sunny spots that are chosen by the organizers.

From Nice in 2011, the congress will move to Genoa in 2012 and as in recent years, VISUS is the sponsor of the event. As part of the scientific program Radiologist Dr. Mark Kämmner, Product Manager at VISUS, will encourage the attendees for a vital discussion with his speech PACS II – Enterprise-wide Imaging.

MIR, formerly EMGWR, was established in 1999 as a working group to develop ideas for greater involvement and the training of radiologists in the management of radiological departments. The group introduced an annual congress on management with a mixture of invited and proffered papers and a winter workshop on aspects of management led by academics in management. Since 2009, a junior course has been held annually.

MIR provides a forum for education and exchange of ideas and state-of-the-art concepts on management within Europe aimed at enhancing the contribution of Radiology to medicine.

The current head of the Management Subcommittee of the Professional Organisation Committee, Professor Peter Mildenberger from Mainz, Germany, said that he expected that “some hot issues in 2011” – such as reporting – will continue to be aired this year. Other subjects will be new on the agenda or resurface, such as radiation exposure and examination management, error registries, leadership training and coaching of radiologists.
Dutch hospital’s paper-free healthcare environment

The Maasstad Hospital in Rotterdam is an ambitious forward-looking centre of healthcare, adopting innovative approaches to medicine and treatment of patients. Yet it has gone beyond many other hospitals in the way it has embraced new technology. A partnership between VISUS and Dutch system-integrated-solution firm Alphatron has enabled it to benefit from advances in IT to achieve an environmentally-friendly goal that many other healthcare institutions still aspire to.

As hospitals have embraced new systems and new technologies in recent years, one of the great goals is to achieve a totally paper-free environment.

Those advances have seen reports being available to be read in a digital format on-screen; imaging is now available on-screen whenever and wherever the clinician requires it; and there is rapid exchange of imagery, data and information between authorized users.

Many hospitals are getting very close to the sought-after paper-free goal and many more are continually striving to achieve a totally paperless environment.

But one unit that has been successful in reaching that landmark is the Maasstad Hospital in South Rotterdam in the Netherlands.

‘No more paper’

This has been achieved with the crucial and innovative support of the JiveX PACS II solution, supplied by Dutch system-integrated-solution providing company Alphatron, which has established close links with VISUS since 2005.

The PACS II solution has been installed for the whole hospital, meaning a PACS facility is available for all the pictures from units – such as surgery, intensive care, cardiology, and the laboratories – apart from radiology, which has an existing PACS.

Maasstad Hospital has more than 600 beds and 26 different departments, and all are connected through JiveX PACS II.

All data that comes in from doctors such as reports and imagery are digitalised and go into the JiveX PACS II system, explained Maurice Rijnen, who is the Team leader Internal Desktop Support & Service Desk and Team leader of Technical Application and Database Management in the Department Information and Communication Technology at the hospital.

“So that means no more paper,” he said, “We are completely digital. There may be some paper – there are always people that like to print something from their e-mail – but we can do everything without paper.”

While that is a clear technological milestone that has been passed, it is also an advance that has positive implications for the wider global environment in terms of sustainability.

He said that everything is now in JiveX with something like 1.3 million images currently stored in the system in the widely-accepted DICOM standard.

Achieving full potential from investment in technology

Working with Alphatron, JiveX and VISUS to ensure that the full potential was realised from its investment in the technologies, Maasstad Hospital has developed the ‘tree structure’ which consists of three basic elements: documents, investigations and archive.

Below that are further easily identifiable and accessible structures containing all documents and images and enabling doctors to easily trace and retrieve a specific image whenever they require it right across Maasstad Hospital, which is a large general hospital with a diverse patient population.

It sees about 400,000 patients a year in its numerous clinics, offering a wide range of medical care covering virtually every specialty with a number of basic and special functions for complex specialist clinical care. The Maasstad Hospital has a specialist burns unit, a dialysis center, heart center and HIV/AIDS treatment center. In addition, it has a Level III intensive care unit and also offers perinatal care and IVF treatments.

The hospital runs three separate technical systems: the Hospital Information System containing all the written information; an existing PACS for its radiology imaging and reporting, and JiveX PACS II for all other departments.
Via the HIS, a clinician can click on JiveX PACS II, and have all images and documents that are digitalised – and not from radiology – at his disposal.

One of the impressive benefits of JiveX is that it connects to all modalities and communicates easily with existing systems and those from other manufacturers.

Open access to PACS

As with any hospital or healthcare unit, there are standard operation procedures to decide who has access to the data. These protocols have been developed at Maasstad Hospital between ICT and the medical board.

Mr. Rijnen said: “These, and a number of other specific confidential areas, remain accessible only to those staff with particular authorisation but apart from that the hospital operates a relatively open access system to PACS with a log-in for every authorized use and transparent user traceability features to control this.”

These, and a number of other specific confidential areas, remain accessible only to those staff with particular authorisation but apart from that the hospital operates a relatively open access system to PACS with a log-in for every use and transparent user traceability features.

With the development of the ‘tree structure’ and education and training for staff, Maasstad Hospital is now beginning to see the full benefits of the JiveX system and see it achieve its full potential as the hospital embraces the paper-free care environment.

The hospital brought in the JiveX PACS towards the end of 2009 and went totally digital in May 2011 after an implemen-
Mr. Rijnen said: “That is one of the big issues we are facing. At present you need to have confirmation from the patient that the hospital can share their images with outside units or ‘with only this doctor, or with only this hospital.’”

“The problem is: how do I make a system that has that intelligence that knows ‘this picture you can share with everybody, but this picture you cannot share.’”

However, it is an issue that is being actively discussed in the wider healthcare context within the Netherlands at present and steps are being taken to try to address and overcome the obstacles for the benefits of patients and clinicians. Once addressed, Maasstad will be able to use the full potential of JiveX to easily exchange images.

**Challenges over exchanging images**

One area that Maasstad Hospital is particularly keen to improve its performance on is the facility for exchanging images with other hospitals and units elsewhere in the country. At present the options are relatively limited, either via the internet with limited authorised access or encryption, or the less attractive option of burning the images onto a CD and sending them on to the relevant clinician or unit with the inevitable risks that the data may potentially get lost along the way.

Another issue within the Netherlands – and one beyond the jurisdiction of the hospital and any advances in technology – are regulatory restrictions currently in place in the country on sharing information and images with other hospitals.

Mr. Rijnen said: “We now sit on an average of 4,000 to 5,000 images per day, which we are putting into the system. We also have an ECG management system with all the cardiologists using the JiveX with authorisation.”

The next step for the hospital is to update its radiology PACS and allow greater access and archiving of older images as well as quicker retrieval.

At present, there are five companies that are in the race to supply that PACS.

**Leading the way with innovation**

Maasstad Hospital is an ambitious and forward-looking hospital equipped with the latest technologies and is striving to become one of the leading hospitals in the Netherlands by offering a high level of professional skills from its staff and clinicians, introducing the latest technological advances and maintaining an important concentration on customer focus.

It is set in a unique location, with the hospital site also incorporating the so-called Care Boulevard which includes numerous related health-care facilities across a gross floor area covering 132,000 square metres.

Some 84,000 square metres of this area is taken up for the hospital site, which is surrounded by other health activities that are either directly, or indirectly, linked with the activities of the hospital. These include a psychiatric center, rehabilitation centers and a GP care hotel.

But already the Maasstad Hospital is proving that it is leading the way in innovation and technology with its achievement in managing to reach the level where it is operating in a paper-free environment.

That has been supported by VISUS, working with Alphatron, to successfully implement the JiveX PACS II system in a hospital that has a drive and determination to offer the highest levels of care in a technologically-advanced and environmentally-friendly way.
Hospitals need their equipment to work efficiently and effectively, but sometimes require expert advice and support to help them achieve the best results.

Dutch system-integrated-solution providing company Alphatron has emerged as specialists in this area but has recognised the expertise VISUS offers through the JiveX concept and the role it can play in benefitting hospitals and healthcare organisations.

Getting the most out of existing technology
Based in Rotterdam, Alphatron has divisions in shipping, marine communications, security and broadcast technology, as well as medical systems.

Director Harald Verloop explained: “The core business of Alphatron is that we use mostly existing technology and try to adapt that to the user in a more convenient, user-friendly way.”

With a flat management structure, which keeps the customer close to the development and manufacturing process, Alphatron can quickly and efficiently adapt a solution to the customer’s needs.

Solutions for healthcare settings
It provides hardware solutions, such as medical work stations, desks and computers with healthcare-oriented characteristics to 80% of Dutch hospitals, installing them in operating theatres, intensive care units and nursery departments where there are electrical safety, ergonomics and hygienic considerations.

In November, Alphatron introduced the totally new concept of the mobile care station for the nurse – a wireless computer with an eight-hour battery that adapts to the need of the nurse with caps, needle container, and a medication box to dispense the pills to the patient.

VISUS enables niche opportunity
Alphatron Medical Systems is also providing software solutions, such as PACS through VISUS, to about 15-20% of hospitals in Holland. The Dutch market is well advanced in IT terms, with radiology already covered in terms of PACS, but Alphatron has found a niche through the link-up with VISUS, which began in 2005 after seeing its PACS solution.

Mr Verloop added: “To have a solution which unifies radiology images, surgery images, pathology images, endoscopic images and ECG data and to come up with one view is happening right now. It all goes into a PACS, and for that PACS we have used VISUS since 2005. We call it PACS II.”

JiveX offers flexible solution
Alphatron Manager product group PACS Patrick Zondag said hospitals already have an existing radiology PACS – often from another manufacturer – with the JiveX system serving all other departments such as cardiology, orthopaedics, surgery, and pathology. But the two systems still communicate effectively with each other.

Alphatron offers JiveX software to store and file the images in the DICOM format, linked to the EPR for retrieval by authorised users at any place and at any time.

Mr Zondag said: “A surgeon who wants to see the solution from PACS II can do so, as can the radiologist who wants to see images from outside the radiology system.”

Images from both systems are available on one screen in one application, in a secure environment, with VISUS capable of putting both elements together.
Nordic by nature – JiveX, the work horse of Finnish radiology

In a medical environment, things have to run without a hitch. This holds true for public healthcare facilities and even more so for private institutions that are deliberately chosen by the patients. Well aware of the complex needs and requirements of their customers, the radiologists at Koskiröntgen, the largest private radiology practice in Finland, located in Tampere, chose only top-of-the-line equipment. With regard to PACS they opted for VISUS JiveX which is distributed by OneMed Oy, the Finnish market leader for medical equipment. Koskiröntgen is closely connected to Koskiklinikka Oy, a private clinic, and obviously there is a lively exchange of patient data between the two institutions which makes a stable and comfortable PACS connection essential.

Dr. Matti Lehto
Medical Chief Officer
at Koskiröntgen

“Koskiklinikka is not the only institution that uses our radiological service, but it is definitely our closest partner. We also provide examinations for public hospitals and other private clinics, two of which have access to our PACS archive.”, says Dr. Matti Lehto, Medical Chief Officer at Koskiröntgen. Altogether the team performs almost 35,000 examinations per year: 6,000 MRI scans, 3,500 mammograms, 4,000 ultrasound diagnostic exams and 21,000 X-ray exams, both DR and CR.

Back in 2003 the team started to look for a suitable PACS solution with the goal of going digital. A Koskiröntgen team visited several hospitals to compare systems and observe them in “real life” situations. Since at that time OneMed had already been a reliable VISUS partner for years, JiveX was a contender from the very beginning and the one that by the end of the day turned out to be the best.

“The system was implemented in 2004. It is integrated in the patient information system and the RIS which was bought later. The system was stable from day one and continued an uptime of more than 99 percent”, reports Timo Vainio, systems specialist at Koskiröntgen. Timo, by the way, is the only person taking care of the in-house JiveX maintenance. He is impressed by the system’s reliability, ease-of-use and workflow friendliness. Equally important for Timo: OneMed and VISUS provide exceptional service.

Last autumn Koskiröntgen implemented a system update that pushed the team into the PACS II era: Today also non-radiological data can be managed and archived. “This is important for our colleagues from Koskiklinikka who have a lot of ECG data, videos from endoscopy or jpg files from dermatology to be stored. Thanks to the integration into the PACS handling of these data has become much more convenient because we do not have to deal with separate systems. Moreover, patient administration is easier and safer now”, Matti Lehto points out.

Koskiröntgen, OneMed Oy and VISUS are a trio in perfect harmony because they share the philosophy of providing the best possible service in every environment.

Timo Vainio
Systems Specialist
at Koskiröntgen

Juha Seppälä
Managing Director
at Koskiröntgen

Dr. Matti Lehto
Medical Chief Officer
at Koskiröntgen
Onemed Oy
One partner - many advantages

It is the VISUS philosophy to cooperate with strong local partners in the international business. In Finland, VISUS chose OneMed Group to distribute the JiveX product portfolio. The leading supplier of medical supplies, equipment and services in the Finnish market has been working with the Bochum-based PACS specialist since 2002. A perfect match, says Tapio Teppo, Business Unit Director Medical Equipment at OneMed, as it offers his company the possibility to provide their customers with comprehensive state-of-the-art solutions.

“Onemed Oy has two business units: medical supplies and medical equipment and services. Our medical imaging sales team, one of our three sales teams in the medical equipment and services division, takes care of the VISUS products”, says Teppo explaining the position of the JiveX range within OneMed.

During the last ten years, PACS has become an integral part of the product and service portfolio offered by OneMed which includes products from the leading brand manufacturers as well as high-quality own-branded products. While the primary care division covers protection and wound care, sampling and self-care, the acute care division covers anesthesia, sterilization and surgery. In Finland and the Baltic countries the acute care division also provides equipment for anesthesia, imaging and diagnostics from many renowned manufacturers.

OneMed Group was formed between 2006 and 2009 by combining six companies that were operating in the medical supplies market in the Baltic Sea region. Additional acquisitions have grown the Group to its current leading presence in the Northern European markets. In 2010 OneMed was the leading medical supplies company in Northern Europe with sales of approximately EUR 380 million and approximately 660 employees.

The company operates in thirteen countries around the Baltic Sea and in Eastern Europe: Finland, Sweden, Norway, Denmark, Poland, Estonia, Latvia and Lithuania, Czech Republic and Slovakia. Its customers include hospitals, health centers, senior citizen facilities, home care and private healthcare operations while the suppliers are international and local manufacturers of medical supplies and equipment.

OneMed Group serves healthcare professionals and their patients with reliable, top quality products and services that make the healthcare process safe, efficient and comfortable. So does VISUS – a major reason why this partnership is more than efficient.
Across Europe, radiology is at a critical point in terms of recruiting new people to the profession. In some countries, it is already accepted that there is a shortage of radiologists, while in others the problem exists in particular sub-specialties. Elsewhere, forward-thinking recruitment, better workforce planning and pro-active attempts to make the profession more attractive have been taken to try to avoid shortages.

While a number of factors have been pinpointed as the cause of shortages – a gap between trained radiologists joining the profession and those retiring, greater demands on the radiologist’s time, and increased demand for radiology services – this has been countered by advances in technology and through teleradiology.

There are also geographical variations: a European Society of Radiology (ESR) survey in 2007 showed an average of 104 radiologists per one million population in Europe, but this number varied from 15 to 215.

Professor Malgorzata Szczerbo-Trojanowska, Chair of the Department of Radiology and Head of the Department of Interventional Radiology and Neuroradiology at the University Medical School in Lublin, Poland, said: “The workload imposed upon radiologists is growing faster than new specialists enter the field, therefore it is becoming difficult to meet workload demands.”

She said there are various reasons for the shortages; one of the main reasons is the development of new imaging technologies and their central position in the diagnostic workup; another is with imaging procedures increasingly split up into additional areas, such as molecular, cellular, genetic or functional applications.

She added: “Nearly 70% of those imaging procedures performed by today’s radiologists did not exist 10–20 years ago. Introduction of new imaging technologies incited a great demand for radiological services. Statistics show that the numbers of imaging procedures performed are increasing about 10% every year.”

More shortages are anticipated, triggering concerns that radiology departments may be unable to provide some services because of the lack of personnel. As most diagnostic and therapeutic procedures involve radiology, there are concerns that could lead to longer hospital waiting times.

It is recognised that IT can never totally replace the role of the radiologist. But in times when many hospitals and health systems are under financial constraints – and struggling to recruit radiologists – new technology, IT and telemedicine have a clear and important role to play.

Improved IT tools are improving the quality of radiological service, enhancing its efficiency and accelerating workflow and offering solutions through PACS, computer-aided diagnosis or speech recognition software.

These save time for the radiologist and also help speed up access to images and allow them to share them with col-
leagues remotely if a second opinion is needed, particularly in a specific area of expertise that is not available in-house.

The shortage of radiologists has seen more hospitals use remote radiology services to overcome specific difficulties. Teleradiology centers can provide services to many hospitals, using the internet to exchange diagnostic images. In this way they improve patient care by interpreting radiology cases quickly and efficiently around the clock.

But there must always be safeguards, and the ESR is anxious that teleradiology remains “defined as a medical act” and the clear responsibility of the radiologist.

Professor Szczerbo-Trojanowska stressed: “The primary goal of teleradiology is not to create new business opportunities, but to improve the quality of services, to alleviate staff shortage and, most importantly, to improve patient care by referral for a specialist judgment.”

In addition to IT and teleradiology, several other approaches have been advocated to cope with the shortage – from more advanced training for radiographers to allow them to perform routine procedures usually performed by radiologists, along with improving rewards for radiologists in terms of salary, training and incentives encouraging residents to choose radiology.

National radiological societies are actively attempting to attract more young people to the discipline. Norway, for example, has introduced a mandatory national training programme and offers free attendance at national radiology meetings as well as taking positive steps to maintain high job satisfaction among new recruits with relevant support and mentoring. Some parts of Europe are seeing senior radiologists retire without enough coming through the training system to replace them.

In the UK, senior radiologists believe that sufficient radiologists are being trained but some consultant vacancies are not being advertised by hospitals for cost-saving reasons. Problems have also arisen in recruiting to some subspecialties – the UK for example has a particular shortage of pediatric and interventional radiologists.

But it is technology which has significantly advanced the role of radiologists in recent years.

It has added new dimensions and modalities to the discipline and helped offset increasing workloads – at a time the radiologist is a scarce commodity – while improving the service patients receive.
Major challenges for Hungary’s healthcare system

Hospitals across Hungary are facing a number of significant challenges. The changing structure of ownership, lack of physicians and dissatisfaction with pay and remuneration for those physicians, as well as a rapidly changing macro-economic environment, are adding to these challenges.

However, the Semmelweis Plan - the governmental plan of the reform of the healthcare system of Hungary – has highlighted a number of goals that it is hoped will lead to improvements in healthcare and better retention of physicians, particularly radiologists, in Hungary.

The goals that could change Hungarian healthcare

The Semmelweis Plan goals include: the re-allocation of funds based on new priorities such as new hospitals and healthcare centers for geographical regions; a broader role for the state in the healthcare sector; re-structuring the in-hospital and outpatient services; restarting the national healthcare program for prevention; improving patients’ rights; establishing a ‘career model’ in healthcare; a complete reconstruction of healthcare IT with centralized and structured handling of patient data; setting new priorities in the system for medication and its distribution in Hungary; investment in the healthcare tourism, education and healthcare industry.

Teleradiology helps with staff shortages

As with the rest of Europe, Hungary suffers from a lack of radiologists.

But as Dr. Gabor Csiba, President of the Alliance of Strategical Hospitals of Hungary, said the situation is made worse by the migration of the young and middle-aged specialists to Scandinavia and the UK.

Many older radiologists in Hungary work even after retirement and often have second or third jobs to maintain a favourable living standard.

He said: “Recently, the current state of the specialized education of the radiologist has improved but it is not possible to resolve the serious lack of radiologists in the recent years in such a short time.

Teleradiology is definitely a tool that can help in this situation but it cannot resolve the origins of the problem.

The real issues are specialized radiologist education, postgraduate education, improvement of the parameters of the quality work, and decreasing the waiting-list for CT and MRI examinations.”

At this stage, teleradiology is the best solution but there are moves to improve the rewards for radiologists in Hungary and there is political support in Hungary towards this.

JiveX offers a solution for Miskolc Hospital

In Hungary as everywhere in Europe several teleradiology solutions are available. Dr. Csiba, Director of Miskolc County Hospital, decided to implement the JiveX Enterprise PACS from VISUS in his institute. The entire staff working with this solution is very satisfied.

Modern technologies such as the JiveX Enterprise PACS are crucial for providing better medical care for the population and they are essential for the establishment of a modern healthcare system in Hungary”, says Dr. Csiba. The telemedicine applications offered by JiveX help Dr. Csiba and his colleagues to ensure top quality patient care even when fewer specialists are available.
Established in 2008, European Medical Distribution (EMD) provides innovative medical software solutions to hospital and pre-hospital customers in Central & Eastern Europe (CEE). EMD operates all across the CEE region. This allows EMD to offer its customers unmatched field-tested expertise in implementing complex healthcare software projects. EMD is a specialist company. EMD focuses on a narrow selection of complimentary products that it knows thoroughly. This way EMD can offer its customers the knowledge and skills that a successful healthcare software implementation requires.

EMD understands that only strong technical support would allow its customers to enjoy full benefits of the sophisticated medical informatics solutions. This is why EMD puts a special emphasis on building up the most competent customer support team in the industry. EMD ensures the efficient product installation and provide 24-hour local-language technical support.

The company employees have many years of experience in the world’s largest medical technology companies, so EMD combines the best of corporate practices with the flexibility and result-orientation of a local operator.

EMD operates directly in Croatia, Czech Republic, Hungary, Poland, Slovakia, Ukraine and Russia and has a network of partner companies in the other countries of the CEE region. The core product of EMD is VISUS JiveX PACS. The first installation of JiveX in CEE took place in 2003. Currently more than 75 customer have JiveX PACS in the CEE, approximately two third of them started to use JiveX since EMD started its operation in 2008.

Another solution in the EMD portfolio is the pre-hospital electronic patient-care record (ePCR) system. This fairly new solution for emergency medical services provides wireless data collection of patient care records from ambulance cars, and handles patient care data interfaced to computer aided dispatch (CAD) systems, ERP and HIS. EMD is the leading ePCR systems provider in the CEE.

Besides its two main products, EMD also offers tailor-made RIS-PACS solutions for teleradiology, as well as 3D image reconstruction solutions for in-hospital use.
With a total of 1319 beds, the Kenézy Kórház hospital serves a population of more than 260,000 in Hungary’s second biggest city Debrecen and is one of the country’s busiest hospitals.

It has 19 in-hospital and over 80 outpatient departments and has the facilities to meet the healthcare needs of the population of its catchment area. As one of the country’s 19 so-called county hospitals, it is the centre of the healthcare system of its geographical region.

Following a cut in government funding in 2009, a non-profit based new legal entity was formed, which is the current Kenézy Kórház Nonprofit Kft. This is a competitive healthcare organization that puts emphasis on implementing modern technologies and ways of operation.

For the Central Diagnostic Department, that capability has recently been significantly bolstered with a public procurement based investment which saw the installation of a PACS from VISUS to connect all the imaging modalities in the hospital buildings and provide a complete image archiving, distribution, diagnostic and viewing solution.

**Imaging capacity**

The Kenézy Kórház conducts on average 800 imaging examinations a day, 365 days a year, which generates 21 GB DICOM data everyday on 22 Fuji/Shimadzu/GE/Siemens/Philips/Toshiba DICOM modalities. This means 7.3 TB of DICOM data, which requires approximately 3.8 TB online image storage capacity yearly.

The radiologists use 10 dual monitor diagnostic workstations and two dual monitor diagnostic mammography workstations simultaneously, with three of them equipped with a shared patient CD feature. In addition, another 28 review clients are usually used at the same time by the other departments.

The Quality Assurance Policy of Kenézy Kórház Nonprofit Kft states that one of the safeguards of achieving its quality assurance goals is “applying an IT system supported by the modern technology.”

**The workflow behind all examinations**

With the hospital, all examinations requests are generated in the Hospital Information System (HIS) by the administrators and sent to the PACS in HL7 standard.

The VISUS PACS generates the worklist for all DICOM modalities, where the technicians complete the studies. The generated DICOM data is archived and distributed by the VISUS PACS to radiologists for diagnosis and other departments for review.

At the heart of the PACS is a dual Linux server system with 30 TB online storage. The 1 GB network in the complete
PACS environment with the dual server system provides a highly-reliable and fast system.

The PACS installed in Kenézy Kórház is a classical enterprise PACS including all modalities, the complete radiology department, sophisticated online and long-term picture archiving and image distribution to all other departments and is an almost filmless operation.

**Why VISUS PACS in Kenézy Kórház?**
The hospital says there are a number of factors which led Kenézy Kórház to select VISUS to offer PACS.

**Experience:** Through experience in recent years, VISUS with its Hungarian partners, has proved that the VISUS PACS supported by local sales and technical support has resulted in smooth implementation and reliable operation. The hospital feels that no other PACS vendors have been able to show as extensive experience in enterprise PACS as VISUS and its partners have in Hungary.

**Flexibility:** The flexibility was also appealing. In Kenézy Kórház – as with all other enterprise PACS installations before – VISUS with its Hungarian partners has been able to offer a flexible campus license package that allows the decision-makers, both at the radiology and budgeting levels, to plan a system without compromise.

**Reliability:** Reliability has also been an important factor. VISUS PACS has established a remarkable reputation on the Hungarian market and prior to the Kenézy PACS installation, three other county hospitals had already used VISUS as an enterprise PACS. In all three hospitals, the system was used with almost no malfunction and excellent technical support, which included sophisticated user training.

**Trust:** As the VISUS PACS was always offered to hospitals in cooperation with modality vendors for complete radiology digitalization projects, both the end-user and the professional cooperative partners trusted the VISUS PACS.

**Reputation:** VISUS has 10 installations in Hungary and so far all have proved very reliable and are popular to use with medical staff. As a result, VISUS has an outstanding reputation in both the public and the private sector in Hungary.

**Support:** The technical support and system operating partner of VISUS for the Kenézy Kórház enterprise PACS project has been provided by Fujifilm Magyarország Kft, which has a long history in JiveX PACS related services. Fujifilm Magyarország has an outstanding knowledge base in the Linux based setup for the JiveX PACS and has provided the hospital with dedicated support personnel for its daily operations.

**DICOM modalities connected to Kenézy Kórház PACS:**
- 8 single-plane computed radiography systems and 1 multi-plane mammography CR-System from Fuji
- 2 multifunctional X-ray systems from Shimadzu
- 1 CT, 2 conventional mammographs and ultrasound systems from GE
- 1 CT and 2 ultrasound machines from Siemens
- 1 fluoroscopy system and 2 ultrasound devices from Philips
Save costs, go regional – Spain focuses on centralized PACS archives

When Spain decided to reorganize its medical image data banks by centralizing hospital PACS into one or two data centres, one of the biggest challenges to meet was the fact that each hospital worked with a different solution and different standards. JiveX Server Sync Manager was the answer – a solution which meets all the requirements to provide image management on a regional basis.

All for one and one for all – that is the motto of the Spanish regional governments for the reorganization of the country’s medical image data banks. In order to make Spanish radiology departments more efficient and to save costs, the regional governments intend to centralize the hospital PACS in one or two data centers per region. In total 17 regions are concerned, two of which have already implemented a central archive. Thus, 15 regions are looking for a smart solution to store their medical images in one archive and share it between hospitals and the General Practitioners. One company that might be able to deliver the hardware as well as the infrastructure services for such a project should be Fujitsu, as Juan Carlos Muria Tarazón, healthcare consultant at Fujitsu Spain, is convinced.

“Our portfolio covers the hardware, such as servers and storage solutions, the enterprise application services that handle system integration and implementation as well as the infrastructure services providing data center and managed services. Moreover, here in Spain, we are very strong in interoperability and standards such as HL7. We have already successfully implemented messaging between applications in primary care and in specialized departments such as pathology, also with laboratories”, he explains. Those experiences are an advantage when integrating PACS data with those of the information service systems of the regional healthcare services.

One challenge when centralizing the PACS data into one regional system of course is the fact that each hospital works with a different solution and different standards. This not only affects the architecture of the “overall” PACS but, even more importantly, the interface. Thus, the first step could be to find a vendor-independent solution to reduce coupling with the different systems; in a second step the data have to be migrated into the centralized system. “These migration processes as well as the necessary hardware could be provided by Fujitsu, this touches upon our core business”, the healthcare consultant explains.

But providing the hardware and migration services is only part of the story. In addition, there must be a PACS solution that allows migration of different sources. “You can imagine, it would be neither possible nor efficient to replace all PACS systems in order to work with the same standard”, Juan Carlos Muria Tarazón knows, “therefore, a vendor-neutral PACS, offering the upper level software platform to collect, archive and administer all images would be the basic requirement.”

JiveX Server Sync Manager is such a solution: it meets all requirements to provide image management on a regional basis due to its comprehensive functionality with the ability to synchronize data throughout the network.

Juan Carlos Muria Tarazón
Healthcare Consulting, Business Consulting Unit, Fujitsu Technology Solutions, Spain

Fujitsu Healthcare Solutions

Worldwide, Fujitsu Healthcare Solutions delivers innovative information and communications technology (ICT) solutions that accelerate business change. The company supports its customers to assess, redesign, update, maintain and increase the value of business, and deliver extra benefits to staff and patients.

In Spain, more than 200 people are employed in the Fujitsu healthcare division. Leading interoperability projects for example in Valencia and Balearics with the integration of EHRs and images have already proven the company’s claim to make data access in healthcare easier and safer. In January 2012 Fujitsu was awarded the Spanish Healthcare IT Society’s prize (www.seis.es) for organizations that have developed outstanding technology solutions for the healthcare sector.
The three pillars of a regional PACS solution

Like the tightly fitting pieces of an intricate puzzle the products and services provided by Fujitsu and VISUS form a complete entity: a regional multi-site PACS. JiveX 4.5 offers the software components required to make wide area networks successful. The main features of this versatile solution are JiveX Server Sync Manager, JiveX Storage Service (SSP) and JiveX DICOM PACS Gateway.

JiveX Server Sync Manager for data consistency in multi-site scenarios
JiveX Server Sync Manager automatically synchronizes changes to DICOM objects, annotations, results and user profiles on multiple, independent server systems at different locations. This component, which ensures that changes performed on one system are transmitted to all other systems, is thus the foundation of any data exchange between different sites that share one archiving solution.

JiveX Server Sync Manager allows real-time synchronization of database content and DICOM data via a remote server. It handles for example changes to key images, reports, annotations, captures or DICOM delete requests. A reception and transfer service enables the synchronization of multiple server systems. In case messages cannot be sent, for example because the receiving system is unavailable due to hardware failure or maintenance, the messages are buffered and sent later. A corresponding service receives data change notifications and performs the specified changes on the local system. A graphic user interface allows the service to be viewed, configured and monitored.

JiveX Storage Service for PACS (SSP) for highest availability and a transparent pricing structure
The synchronization capability is complemented by an external digital long-term archiving service. JiveX Storage Service for PACS includes professional supervision and control of the long-term archive, software update and maintenance, a telephone and e-mail hotline, a fault-cleaning service with guaranteed response time and backup/recovery of archiving software.

The digital images are administrated by the JiveX Communication Server and are available online for 2 to 4 years. All data in the online archive are tagged with an expiry date and transferred to the long-term archive.

A major advantage of SSP is the pay-by-volume option: the fee is based on the actual volume used. As an external service at a fixed price per data unit SSP offers a transparent cost structure. When the required volume drops the user fee also decreases. A contract period of five years provides cost accounting reliability.

JiveX Gateways for complete data integration
Of course, standardized DICOM data from other PACS providers can be stored in the long-term archive and retrieved as needed. The JiveX Archive Gateway automatically transfers all images into a telearchive and thus serves as the connection between the PACS server and the JiveX Data Center. The JiveX DICOM PACS Gateway allows JiveX to link with DICOM-compliant archiving systems by third party vendors. Data from other PACS vendors can be handled; those other PACS products can also be connected online to form a department solution.
How exactly does image data communication with IHE XDS in the PACS work? The physician requests images from the registry. The registry is searched based on the search terms for relevant images. The physician receives information on the location of the images. He can now call up, display and view these images, if he has the relevant access privileges. And if unambiguous matching of request and patient data is possible. Problems might arise for example when a patient is registered in different hospitals with different IDs. In order to ensure unambiguous matching, a Master Patient Index (MPI) needs to be created – one of the core tasks in today’s health-care systems.

Another challenge for wide-spread implementation of IHE XDS are privacy regulations. Any data exchange requires the patient’s consent. This is a difficult issue to solve. Much easier in comparison is maintaining data consistency in IHE XDS. An update message containing changes and all necessary linking information such as patient name, date of the examination etc. is sent to the registry.

Centralized? Decentralized? Who cares?
For XDS it is entirely irrelevant how and where the data are stored. If the data are stored in a central hospital archiving system that contains all information, they are converted into a vendor-neutral format upon transfer. This scenario which requires huge storage capacities might have been chosen by regional or closed organizations. If on the other hand the data are stored in a decentralized manner with the individual healthcare service provider an external agency creates an index which manages access to these data.

With both approaches the data and the registry are in separate locations. The healthcare facilities register their data using a patient name with the registry. The search is performed in the registries and covers all documents that are recorded there. To support this procedure IHE XDS offers a definition of all players involved, defines the workflow of the data exchange as well as the individual transactions based on the most frequently used standards. The actual data exchange is web-based.
Potential and real cases

In Germany, the application of XDS-based technologies seems most likely in closed networks such as hospital groups. Mammography screening programs which work with unambiguous patient IDs are another potential user of XDS.

Several software providers worldwide support IHE XDS, in some countries such as France, the USA or Austria IHE XDS is already being used in certain contexts. Austria’s health@net is the best known project in Europe: it aims at establishing an IHE-compliant, highly secure health network. In short: an electronic patient record (EPR). The exchange of medical data is based on CDA Release 2. health@net mirrored the IHE processes and adapted its own, partially proprietary architecture accordingly.

And finally IHE XDS offers the foundation for the image data exchange between radiology centers that act as service providers for different hospitals. Moreover, XDS potentially allows the exchange of data in regional multi-site healthcare facilities where even patients can access their data. Such a project is currently being considered in the Dutch province of Friesland.
Maggiore Carlo Alberto Pizzardi hospital and Bellaria hospital in Bologna, Italy, have taken the innovative step to integrate their operating rooms into PACS with the help of VISUS, HCI Healthcare Integration and the Italian OR integrator Videomed in Padova.

Adopting DICOM standards, their OR data and imagery is now available at the push of a button, offering additional efficiency and time-saving capabilities to both hospitals, which are part of the AUSL-group – Azienda Unità Sanitaria Locale di Bologna (Bologna Local Health Unit).

The search for an integrated approach

The two hospitals were looking for an integrated approach for managing their new operating rooms, with senior surgical staff evaluating the market to assess the offers from the different OR integration vendors.

Maggiore Carlo Alberto Pizzardi hospital, with 725 beds, is the second largest hospital in the region. The recently activated new tower (Building D) features a helipad on the roof for major emergencies and will add another 227 beds and 18 operating rooms.

Its 12 newly-built ORs are integrated with Videomed digital OR integration systems, as are the eight renovated ORs of the 372-bed Bellaria hospital, which covers more than 20 medical and surgical disciplines and features a renowned department of neurosurgery with attached neuroradiology, as well as a brand-new hall for neuroscience.

Benefits of an integrated PACS

While most digital OR integration utilizes the image and video management systems provided by the different manufacturers, some are not so efficient at integrating the captured data into the hospital-wide image and data management system as it requires unambiguous patient assignment and modern IT-standards/interfaces.

That often means OR patient data having to be entered and stored manually, consuming a lot of time, but more importantly there is no unambiguous match between patient and image data.

With 20 ORs between them, the two Bologna hospitals are gaining the benefit of an integrated PACS: saving time as only one system has to be managed, plus achieving improved patient safety as the data is always clearly assigned to the correct patient.

What does the Videomed digital OR integration solution offer

Videomed provides an integrated solution for the management of all sources of image and other data in the OR, be it images from endoscopy or microscopy equipment, or from any surgical camera. The documentation component of the system converts all these OR-generated data into DICOM format and transfers them to the surgery PACS, the so-called PACS II. All integrated image data pertaining to a certain patient can be easily called up from the OR using the existing hospital image distribution mechanisms and the

DICOM opens the door to the OR

The operating rooms within a hospital are among the busiest units within any healthcare complex with surgeons needing to make critical decisions, often based on the latest imagery that is available. Two hospitals in the Italian city of Bologna, which have both seen their operating rooms upgraded, have enhanced their imaging capability by installing PACS II from JiveX to ensure DICOM standard imagery is available on demand in their operating rooms.
software the physicians are already familiar with from PACS access to radiological images. The solution has an integrated HL7-communication gateway that connects to the hospitals’ surgical management and scheduling software and automatically reads the demographical patient data from the actual OR-plan in real time and sends them to the matching OR.

**Tracking the physician**
A special feature of the Videomed system is the ad hoc video conference function. Video streaming has been around for a while but Videomed has combined this technology with an innovative unified communication and messaging system. The idea was to create a system which always knows exactly where each physician is, whether a physician can be reached by telephone or whether he or she is busy in an OR. In the latter case, the physician receives a text message.

If a surgeon needs a second opinion during an intervention, he activates the call, the colleague receives a message and can access the OR where he is needed in real-time from any monitor. The system works not only in single site hospitals but also across sites and across hospitals and is well-suited for networked facilities.

Another benefit of the solution is the fact that the OR table, the OR lighting system and air conditioning, and even the iPod can be controlled via a touch screen.

**Synchronizing patient data into the PACS**
An important factor for the Bologna hospitals was the fact that this system is vendor-independent and imports existing images and studies from their existing radiology PACS.

The overarching query mechanism – in most cases by the HIS/clinical workstation – searches not only PACS I but also PCAS II for data on the particular patient. This is the key that allows the solution to use existing PACS structures, no matter what brand.

The images and videos in the PACS II do not occupy expensive storage and archiving resources from the radiological PACS I and can be handled matching the policies of the hospital, i.e. automatically deleted after use for OR-reports or copied to the Electronic Patient Record (EPR). That ensures that surgical DICOM-data does not influence the resources, capacities or security policies of the radiological DICOM-data, but can be integrated similarly into the clinical workflow.

**PACS II – highly-flexible with advanced features**
Videomed and HCI looked at several PACS vendors but decided to partner with VISUS because its system is highly-flexible and has advanced features, such as the inclusion of all medical image formats, integration of ECG, visualization of vessels and support of High-Definition video as well as surgical planning capabilities. In addition, JiveX adapts perfectly to the diagnostic workflow of clinicians and allows them to obtain results quickly.

Images are stored in an audit-proof manner, especially with ATNA, the new IHE security framework for patient’s data access traceability. As this solution is entirely DICOM-based, it is a future-proof investment.
The audience in Nice was particularly interested in the practical implementation and the data security issues surrounding DICOM e-mails. How exactly are the huge data sets of volume images transmitted quickly and safely? Pretty easy, Marc Kämmerer said: “The Teleradiology Network Ruhr has a dedicated e-mail server whose only function is the distribution of the DICOM e-mails. Theoretically this could be handled by a department mail server but the sheer size of the individual mails would very likely cause a certain loss. The dedicated server has been especially configured for the transfer of huge data volumes—which is a big advantage.” VISUS developed a procedure which limits the size of an e-mail to 10 MB in order to ensure smooth transfer. Thus the e-mails are cut into smaller byte-bites always according to the current server capacity. The split occurs in the background, completely out of sight of either sender or recipient. What the recipient does notice though is the speed at which the e-mail is accepted and loaded to the mailbox. Since all mailboxes are located on the same hardware there is no forwarding to an e-mail server. This procedure guarantees controlled transfer times and a robust system. “It goes without saying that the data are encrypted for safe and secure transfer. The encryption certificates are handled by a directory service which allows us to manage the currently 35 network participants and to communicate any change to the certificates”, Kämmerer explained in Nice. An additional signature, which is attached to the DICOM data, helps to identify and delete spam. Nevertheless a denial of service attack can never be entirely precluded. “Sending the e-mails via a server is a deliberately chosen procedure that enables us to handle the data volumes. That means we have to open up the server. Experience has shown however that denial of service attacks are rare in such projects and when they happen a second server catches them easily”, the product manager reports.

The IT experts’ verdict after the pilot phase was very positive: they were particularly pleased by the fact that the systems implementation did not require any holes to be torn in the firewalls but that ports were used that had already been configured and that are opened only from the inside to the outside.

Sending, receiving and display are handled by the PACS. A plug-in converts the DICOM data into e-mail data prior to...
sending and vice versa e-mail data are converted back into DICOM data upon reception. The recipient’s work station is in charge of the entire display functionality. Doctors’ offices have a separate e-mail reception client that includes display capabilities.

The success of the pilot phase was made possible by the fact that 35 participants took part which meant the network idea could really be put to the test. In order to achieve this “critical mass” VISUS offered the hardware and software as well as the project management services free of charge during the pilot phase. For regular operation of the network a fee schedule was developed. Moreover, the network platform will be made available to the PACS systems of other vendors which will broaden its range of use. Marc Kämmerer: “The teleradiology project is not a proprietary endeavor but vendor-neutral in its basic communications capabilities. All images can also be viewed on a laptop or with a regular work station client.”

Basically the network platform has to pay for itself. The financing model is made up of three modules: If a DICOM-compatible system exists a one-off installation fee and a monthly flat fee are charged. If the necessary infrastructure needs to be established, VISUS offers a complete package including gateway and software. In addition healthcare facilities can also acquire the server with the JiveX software as a stand-alone solution. A third option was especially designed for large multi-site facilities Kämmerer explains: “If many work stations and modalities of different manufac-

turers need to be integrated, a web-based service is recommended that picks up all these different threads.”
**Integration platform for management of all images in the hospital JiveX DICOM Platform**

Having an effective image platform that seamlessly crosses departmental boundaries is extremely important within the modern hospital setting. However, as ever increasing numbers of images are taken and stored, that process can become more and more complex. The JiveX DICOM Platform effectively breaks down those boundaries to consistently cover all image-related processes and ensure images are available when and where required.

Within the modern hospital data is communicated, displayed and stored in a variety of information systems.

Yet HIS, PACS, EMR and DMS usage means that while modern image management is extremely comprehensive, it is also complicated.

To facilitate effective integration into clinical routine, a unified basis is required and JiveX – made available by VISUS – can provide that as a comprehensive management platform for all image-related processes in the hospital.

JiveX consistently applies the DICOM standard, which has become the established standard in medical image data communication archiving over the years.

Active in cross-department image-based processes for hospitals for a decade and with extensive expertise concerning integration into clinical workflows, VISUS is also committed to the Integrating Healthcare Enterprise (IHE) initiative.

The search for an integrated approach

The JiveX system crosses all departmental boundaries, stretching well beyond the demands of radiology. Imagery from all other clinical departments – such as Endoscopy, Sonography, ECG and Wound Documentation – where data is generated in image or document formats such as JPEG or PDF is stored along with bio signals, photographs and videos which also need to be integrated.

The efficiency potentials are found in the management and optimization of campus-wide workflows in the context of reading, reporting and image distribution.

Hanging protocols serve as a clear example. They allow the physician in his reading/reporting work to arrange exams
automatically on the screen as well as offering reading protocols which enable him to automatically chain steps in a workflow.

The solution platform integrates into the processes of the Hospital Information System (HIS) as well as with dedicated systems for reading/reporting. In this context, communication is based on standards (such as DICOM, HL7) and on the realization of IHE profiles, safeguarding the cross-departmental management of processes and allowing for seamless quality assurance.

Through the JiveX platform, VISUS also offers a campus-wide DICOM worklist for all departments and function wards, covering all imaging for an entire healthcare organization irrespective of whether it is available in DICOM format or not. NON-DICOM data is imported via a special module and stored as DICOM data by JiveX.

**Unified viewer for all image data**

JiveX concentrates on all image-based processes, whatever the source, with modalities from all usual manufacturers in the market able to be integrated.

By offering a unified viewer across systems, VISUS makes the image management platform a central access point to all image data in the clinical workflow via one graphic user interface and is integrated into the HIS via a call interface.

For effective results, it is crucial for an efficient interplay between all relevant information systems in a healthcare organization.

As an example, a ward may create an order for “sonography of the abdomen” in the HIS. To ensure processing is in compliance with standards, the order is communicated as an ORM message and – via the DICOM Worklist Broker – the PACS will create a worklist for the sonography device. The process is simultaneously scheduled in the service facility management of the HIS.

Following the exam, the relevant image and video material is automatically handed over to the PACS with the Study Verification Manager attributing current data about the specific patient.

The system confirms this to the HIS via an HL7 message making the newly-added exam data available for retrieval directly from the HIS.

**Easy access to all images**

During reading/reporting, the physician can retrieve and view the images from the HIS or the electronic medical record (EMR) with the link between the patient and the images safeguarded via the unique order number.

As the viewer displays all images, the physician can directly access any existing information from the patient record – such as ECG, Endoscopy, CT – and consult that information for the subsequent treatment strategy.

When reading/reporting, or writing a letter, the physician can copy the relevant images from the viewer directly into his report. These documents can be printed automatically as PDF files to the JiveX PACS and input into that system and are archived together with the right patient and process.

**Flexible archiving of all image data**

With JiveX archiving the data in DICOM format in a consolidated manner, the hospital no longer needs to take care of storing the data from various dedicated systems in multiple locations. This has clear legal, organizational and financial benefits. The flexible archive is adapted to meet the customer’s specific requirements. Storing and archiving data options include online storage, Storage Area Networks (SAN), Network-Attached Storage (NAS), and directly attached hard disk systems (RAID, DAS). Offline storage on DVDs, BluRay discs, or magnetic tapes is also supported.

As a separate product for long-term archiving, VISUS offers JiveX Storage Service for PACS (SSP), enabling the customer to store data in an external archive operated by a service provider contracted by VISUS. Based on a pay-per-use model, this method is cost effective with no additional investments or long-term tie-up of capital required. Thus cost can be planned because there are no additional expenditures for migration, administration, or maintenance.
Whether a patient is in the operating room as an emergency or for a planned procedure, having the radiological exam data readily available is of the utmost importance. Not only must it be possible to retrieve and display the relevant images in the OR, but also for images acquired during the procedure to be integrated seamlessly into the Hospital Information System (HIS).

Effective planning of the intervention
In planning an intervention, the physician will want to draw on images in advance from a variety of modalities to integrate into the process. That may often include images from referring physicians on CD or exams scanned from conventional images passed on as celluloid. VISUS recognises the importance of having these images in the PACS, designing a system offering a link to the HIS to allow the physician to access all additional relevant information. Furthermore, VISUS integrates special OR planning software into its systems, providing further support to the physician. The complete intervention plan can be stored with all notes, and retrieved at any time for modification.

For the procedure, the physician selects the required images and stores them as a ‘capture’ in the central PACS enabling display in the OR, or at a later date. That process is supported by hanging protocols, ensuring a homogeneous representation, meaning the surgeon can see the images whenever required to ensure optimal processes in the OR.

Image management in the OR and post-operatively
During the intervention, images are repeatedly acquired from various sources – endoscopic, sonographic, x-ray devices, the C-arm, or videos from OR cameras. These diverse ‘captures’ are integrated into the PACS and are available for retrieval at anytime, anywhere on the hospital campus during the intervention or afterwards for post-operative checks. The VISUS system also supports the user in generating the procedure report into which images can be integrated via image export from the PACS. For post-operative image processing, an integrated video cutting workplace with export functions is available to physicians to easily produce DVDs.

Storage made easy
Archiving images and reports can be adapted to the needs of the individual customer and be stored on CD or DVD in a single media archive, in networked structures in the Storage Area Network (SAN) or more recently via Storage Service Providing (SSP), which enables the customer to store data with an external provider. Whichever method is chosen, as soon as the report is approved, it is available in the PACS to all authorized users on the hospital campus.
Integrating ECG waveforms into campus-wide image management **JiveX ECG**

Electrocardiogram examinations are among the most important that are carried out within a hospital setting and can offer clinicians an excellent insight into a patient’s condition and help shape treatment protocols. Having them available, when and where they are needed, is a crucial part of that process. JiveX ECG from VISUS integrates electrocardiogram waveforms effortlessly into the hospital workflow to facilitate high-quality comprehensive image management.

Technological advances now allow the display of an electrocardiogram (ECG) – among the most frequent examinations currently carried out in healthcare – on computer screen, whereas it could previously only be done on paper.

But today, to ensure optimal workflow, ECG devices should not only inherit patient information from a Hospital Information System (HIS) but also enable completed exams to be stored in an image management system (PACS) which can be accessed from anywhere on the hospital campus. This permits the efficient retrieval of all images and films and facilitates homogeneous, comprehensive image management.

**Standardized integration**

The VISUS system meets all these requirements and is capable of integrating ECG devices from all major manufacturers into the communication flow. VISUS has extensive experience with the DICOM standard for communication and utilises it to integrate the ECG waveforms seamlessly into the workflow through an interchange with the HIS, with patient and exam information inherited from the HIS via established HL7 interfaces.

**Rapid and effective reporting**

The physician reporting on a patient’s ECG waveform is primarily interested in irregularities in the rhythm of the heart. Wherever signal characteristics are unclear, he can enlarge the wave by a click, induce a different presentation of the waves on the screen, and make comparisons with previous exams at the same work station. Other images or a heart catheter video for example, can support the evaluation. As well as saving time, diagnostic certitude is increased.

All measurement results are documented and stored in an audit-proof manner and subsequently become available to all authorized users on the hospital campus by way of integration into the patient record. The images can also be printed in a 1:1 format, while ECGs can be passed on in electronic format by creating patient CDs, as has been common usage for radiology exams for a number of years.

**Flexible archiving, rapid access**

The archiving of images and reports is flexible and adapted to the specific needs of the individual customer. Data can be stored on CD or DVD in a single media archive or in networked structures in the Storage Area Network (SAN). A more recent option is Storage Service Providing (SSP) which enables the customer to store data in an external archive operated by a service provider. SSP is cost-effective for the user and with full orientation of fees towards use and no capital investment required it allows better cost planning because there is no additional expenditure for migration, administration, or maintenance.
Is your mobile workstation driving you mad?

The old mobile workstation is enough to drive you mad. That’s why AMIS (Alphatron Mobile intelligent careStation) is introducing a revolutionary new concept. A total solution in which everything, including the computer, is now integrated into one care station. The intelligent new design means no ventilation is required, while the powerful Lithium battery will save you energy too. Thanks to its modular design, the AMIS offers limitless potential for the addition of new applications, accessories and extensions. Ideal as a mobile workplace for access to EMRs, as a medicine dispensing system or as an echo or heart-monitoring unit. AMIS improves care and enhances efficiency. Equipped with today’s technology and totally ready for tomorrow’s.

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