

As Individual as Your Patients – ARTIS pheno



With the introduction of an imaging system developed for today's rapidly changing patient demographics, Siemens Healthineers is advancing the delivery of minimally invasive treatment.



Modern imaging systems in interventional suites and hybrid operating rooms enable physicians across the globe to improve outcomes for patients. The potent combination of robotics and cutting-edge image guidance makes it safer and easier to perform minimally invasive treatments – even at smaller and non-specialized hospitals.

Since every patient and procedure represents a challenge in its own, how can you provide optimal treatment regardless of the situation?

How can you maintain consistently high quality?

Siemens Healthineers™ has engineered a truly inspiring solution to these questions: ARTIS pheno®.

Unconventional and new

Siemens Healthineers has a strong tradition in breaking new ground in the healthcare arena. In the field of imaging solutions for advanced therapy, Artis zeego was the first system to offer the unique flexibility of robotics required for advanced clinical applications. Artis zeego revolutionized imaging by opening up entirely new possibilities, such as intelligent coordination of C-arm and tilted or segmented tables.

The launch of ARTIS pheno marks the start of a new era. Siemens Healthineers has again engineered an entirely new system that pushes the boundaries. This system further extends robotic imaging to drive less-invasive procedures. Its vast

potential for clinical application is as individual as the patients it was built to treat.

ARTIS pheno is an all-in-one solution for interventional radiology and surgery. A well-stocked toolbox at hand is crucial for physicians such as Frank Wacker, MD, who leads the Institute for Diagnostic and Interventional Radiology at Hannover Medical School. “ARTIS pheno’s wide range of acquisition modes supports decision-making during interventions and optimal outcomes,” says Wacker. ARTIS pheno offers exceptional imaging quality in a wide range of clinical use cases. Wacker: “This provides important information during technically challenging procedures, helps us avoid major complications, ensures complete treatment and documents outcomes.” With this novel and unconventional system, medical institutions are equipped to deliver the best possible patient outcomes.

Just in time

The release of the world’s most sophisticated all-in-one imaging system coincides with a growing realization in the medical field that today’s patient demographics require new approaches to treatment. The face of health and illness looks different even to that of ten years ago. Health problems are multiplying as more people live longer lives than ever before. The healthcare system now routinely deals with conditions that used to be rare occurrences. Many patients require complex medical treatment that only physicians with extensive training in their specialization can provide. Advanced skills and proper diligence, however, are



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just one side of the coin when it comes to patient outcomes. Sterile working conditions are key throughout the treatment chain – including hybrid operating rooms and interventional suites – yet hospitals tend to underestimate how significant comprehensive infection control really is.

This is where ARTIS pheno comes into its own: It offers medical institutions the smart blend of advanced robotics and cutting-edge software they need to serve challenging patient groups using the latest development in minimally invasive treatment, along with the ability to maintain state-of-the-art infection control at all times.

Unlimited potential

ARTIS pheno was built with three goals in mind:

ensuring patient-oriented design, readiness for cutting-edge procedures, and a focus on clean working environments.

A host of advantages flow from an imaging system shaped specifically to serve these three aims. Patients benefit from less dose and less contrast agent, more patient comfort, safer treatment approaches, and better clinical outcomes with reduced risk of readmission and

improved quality of life. For healthcare providers, ARTIS pheno means increased competitiveness and the opportunity to build long-term trusting relationships with referring physicians as well as patients from around the world who are looking for optimal medical care for their specific needs.

Treat any patient

Certain patient groups represent a serious challenge for hospitals – and their numbers are growing. More people than ever before are obese (twice as many as in 1980). [1] The number of aging patients with multiple morbidities is rising, as the proportion of the world's population aged 60 and older is set to nearly double by 2050. [2] Fragility due to older age, coupled with an increase in BMI or lifestyle diseases such as diabetes, is producing a patient population in need of highly specialized therapies.

Physicians know that every single patient deserves optimal treatment, no matter how complex the case. ARTIS pheno is designed with this maxim in mind. Its significant advances – both in terms of hardware and software – allow medical institutions to achieve diagnostic images from virtually any patient, regardless of size, condition, or positioning needs. With unmatched 3D soft-tissue imaging – acquisition happens within seconds, right at bedside –



ARTIS pheno with multi-tilt table – ceiling-free installation for optimal working conditions in procedure rooms.

ARTIS pheno ensures consistent intraprocedural quality control ...

... and provides the support medical staff need to feel confident that they can provide next-level treatment for any patient.

Imaging of patients with comorbidities is now less of an issue. Healthcare providers have fast scans, optimized visibility, and superior positioning flexibility at their disposal. As a huge boon to interventional imaging, ARTIS pheno features the new zen40HDR flat detector, which offers unmatched performance with the potential to leverage ultra-low dose imaging during dedicated procedures such as transjugular intrahepatic portosystemic shunt (TIPS). Live 2k imaging for both fluoro and acquisition shows even the smallest details in full resolution on the Large Display at tableside. The new StructureScout permits dose-optimized visualization of all important materials, devices, and gases delivering enhanced image contrast behavior.

syngo DynaCT® scan times are now shorter – and, as Wacker explains, this makes it easier to treat patients with renal insufficiency: “We see a high number of multimorbid patients with impaired kidney function in the angio suite,” says Wacker. “Shorter *syngo DynaCT* scan times help reduce the amount of iodinated contrast agent during 3D angiography in both thorax and abdomen.”

Benefits for patients with renal issues go beyond this: In 2D imaging, CO₂ is preferable to iodinated contrast material. For safe use of this well-known contrast agent – for instance during peripheral procedures – ARTIS pheno allows patients to be positioned with their feet up for a peripheral runoff on a tilted table.

The combination of the multi-tilt table and the uniquely flexible isocenter gives radiologists unprecedented control over patient positioning and improves their own comfort while working. This also means that ARTIS pheno is ideally suited for heavy patients. When physicians can adapt to their own body height, the patient’s weight, and angulation needs, then complex space and positioning requirements become almost effortless tasks. With a maximum permissible patient weight of 280 kg (617 lbs), the multi-tilt table offers high material integrity. Virtually no force is required to position the patient using the easy-float tabletop – even when the table is tilted or cradled. The radial armboard does not limit 2D or 3D imaging in any way. The wide-space usable clearance of 95.5 cm (37.5”) of the C-arm grants more freedom during preparation and the procedure itself.

Even instruments, needles, wires, and devices protruding from the patient pose no serious challenge; the wide-space

C-arm permits easy rotation around complex setups. Patient positioning options and working height adjustments are virtually limitless with the flexible isocenter.

ARTIS pheno fully integrates surgical tables from Trumpf and Maquet, giving healthcare providers greater flexibility during treatments that require a segmented tabletop. The system is also prepared for Artis Freestyle Access, which connects the angio system with the ACUSON Freestyle, the first wireless ultrasound system. Cable-free probes offer comfortable operation and lower the risk of contaminating the sterile field. Patient registration needs only to be completed at ARTIS pheno – data is then transferred to Freestyle, saving time and avoiding typos. All these benefits ease the use of ultrasound guidance for vascular access, which has been shown to reduce complication rates.

Perform any procedure

With constantly evolving medical capabilities, medical institutions today have a wide range of options at their disposal for improving quality of life for patients. Hospitals constantly look for ways to stand out from the crowd and to attract patients and new referrals. Offering the latest minimally invasive procedures is one way to accomplish this, but this

requires medical staff with extensive training focused on highly specialized techniques.

ARTIS pheno is designed to reduce barriers to entry and to simplify routine use of minimally invasive techniques. This allows medical institutions to expand their treatment portfolio with the latest procedures and to offer the most complex procedures.

The dedicated features of ARTIS pheno help reduce complication rates, enhance user experience, and improve procedural outcomes.

Partnering with Siemens Healthineers to deliver minimally invasive treatment enables hospitals to take on the latest procedures, enhancing their reputation among customers and peers alike.

With ARTIS pheno, medical institutions are ready for both standard and complex EVAR procedures. Repairing aortic aneurysms is precision work that requires exact concentration – lengthy planning and preparation can be a distraction. ARTIS pheno avoids all the distractions with EVAR Guidance Engine – the first assisted workflow for endovascular repair, including fenestrated EVAR.

ARTIS pheno allows optimal patient positioning, such as for CO₂ imaging.



During preparation, centerlines are rapidly calculated, ostia rings visualized, and optimal stent landing zones suggested based on a pre-interventional CT scan. Registration of the dataset can be performed at tableside using two fluoro projections, which also saves dose. Fusion imaging provides support throughout the procedure, including easy target vessel selection and automatic C-arm movement to an optimal projection. The results of stent deployment can be assessed using *syngo* DynaCT while the patient is still on the table, allowing for immediate corrections and the ability to confirm optimal treatment results.

Complex transarterial chemoembolization (TACE) is a further cutting-edge treatment that ARTIS pheno simplifies drastically. TACE requires accurate detection of tumor feeders and complete embolization of the tumor to avoid recurrence. With *syngo* DynaCT 360, medical staff benefit from coverage of the entire abdomen – including tumor anatomy and feeding vessels of the whole liver – to enhance interventional oncology procedures. Defining optimal treatment positions for embolization is easier, too, thanks to *syngo* Embolization Guidance with automatic feeder detection. This new planning and guidance tool reduces user interaction to a single click, and enables faster navigation with less

dose and contrast agent via an overlay functionality. To confirm complete devascularization of the tumors – and to check whether patients are suitable in the first place – *syngo* DynaPBV Body offers the opportunity to assess blood volume levels in the tumor before and after embolization.

Optimal infection control

With image-guided procedures cutting down on invasiveness, hospitals are able to better address health concerns in an holistic manner to guarantee optimal health outcomes from the start. Seamless infection control processes are key since there are so many opportunities for bacteria and viruses to spread. 20% of all healthcare-associated infections are surgical site infections, leading to longer hospital stays and poorer patient outcomes. In the U.S. alone, this adds up to annual healthcare expenditures in the estimated range of US \$3.5 billion to US \$10 billion. [3]

The issue is not only surgery, however; radiology is an essential part of the treatment chain and therefore faces similar infection risks. Passive infection control should ideally be integrated into medical devices from the start. Cleaning alone is often not enough because, even if surfaces are kept clean, grooves and hard-to-reach places on medical equipment can be overlooked. ARTIS pheno overcomes these issues, since it was explicitly developed with infection control in mind.

Featuring smooth antimicrobial surfaces and an holistic cleaning concept, the system permits optimal treatment of any patient while meeting state-of-the-art sterility requirements at the same time.

ARTIS pheno encourages medical staff to maintain the highest infection control standards at every step along the treatment chain. Sporting smooth surfaces, the seamless sealed covers protect against spills and simplify cleaning. The clean conditions are improved thanks to the surfaces with a significant antimicrobial effect on non-sporulating microorganisms. ARTIS pheno's tableside pilot module has touch controls and is completely sealed. Internal cable guidance

A comprehensive cleaning concept supports optimal infection control. Ecolab's EnCompass™ Monitoring Program enables the verification of cleaning.





New tableside modules for intuitive operation of ARTIS pheno.

makes cleaning easier, keeps moving parts in the room to a minimum, and ensures a sterile airfield above the patient even when the C-arm is in imaging position.

Since the level of cleanliness in hospital environments significantly affects health outcomes, it is essential that imaging systems simplify cleaning as far as possible and render sterile operation as standard, rather than a complicated extra step. Siemens Healthineers has partnered with Ecolab to develop CleanGuide, a comprehensive cleaning concept for ARTIS pheno. CleanGuide contains recommendations for detergents and suggests cleaning methods and techniques that help to achieve validated results. This helps medical institutions to achieve a defined hygiene state of the system thanks to validated cleaning agents and certain instructions.

Empowering next-level treatment

Innovation is a ubiquitous topic these days; but that does not mean that all new technology is truly ground-breaking. However, ARTIS pheno really does raise the bar: It enables treatment of any patient using any procedure while ensuring state-of-the-art infection control – without having to sacrifice overall treat-

ment quality. No matter which patient, ARTIS pheno allows physicians to safeguard intraprocedural quality. Patient-friendly and at the forefront of medical technology, optimal treatment is possible regardless of the procedure. And, since infection control matters, the seamless sealed covers with evenly smooth surfaces facilitate easy cleaning.

With ARTIS pheno, patients can come as they are, and medical institutions will be able to offer individualized treatment tailored to the patients' needs. Optimally prepared for any patient and any procedure, it sounds futuristic, but is already here.

[1] Fact sheet: "Obesity and overweight", June 2016, World Health Organization, <http://www.who.int/mediacentre/factsheets/fs311/en>, accessed August 2016.

[2] Fact sheet no. 404: "Ageing and health", September 2015, World Health Organization, <http://www.who.int/mediacentre/factsheets/fs404/en>, accessed August 2016.

[3] Deverick J. Anderson et al., "Strategies to Prevent Surgical Site Infections in Acute Care Hospitals: 2014 Update," *Infection Control and Hospital Epidemiology* 35, no. 6(2014): 605 – 627.

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