Hybrid Room
Revolutionizing
Trauma Treatment
in Sweden

By Nils Lindstrand
Karolinska University Hospital in Stockholm built the world’s first hybrid room with a Siemens Artis zeego system dedicated to treating trauma patients. The project was linked to the decision from the Stockholm region to concentrate trauma treatment to this hospital. The only system available that met all the criteria set up by the hospital was the Artis zeego, the multi-axis C-arm system based on robotic technology from Siemens Healthcare.

Dr. Linus Blohmé, you are Head of Trauma Surgery at Karolinska University Hospital in Stockholm. Why did you first choose to work with Siemens and Artis zeego when you started planning this project in 2006? We had three critical demands for the hybrid room. We needed high-quality advanced imaging in combination with open floor space to make it possible for all involved personnel to move around freely. Further, we decided we needed to create an extremely clean atmosphere. To achieve this we needed to keep the ceiling clear of equipment. The solution with the robot-based multi-axis C-arm of Artis zeego, which is a floor-mounted system, was the only solution to give us all this. This way we could build a hybrid room without compromise. The bar for hybrid rooms has been raised.

You have now worked in the hybrid room for some months since the startup in summer of 2009. What are your experiences so far? How is the room used today? The room functions very well. We believe we have achieved all the goals we were aiming for. Surgeons and other staff can move around the room without risk of hitting the C-arm. The imaging
systems are working very well, and the environment for the entire staff involved in procedures is very good. Images are distributed to a number of screens, providing up-to-date information visible all over the hybrid room. We are also very satisfied with the communication between the hybrid room and the control room, and also with an observation room close by. This system gives anyone coming into an ongoing procedure the chance to get up-to-date information without entering the room. One can also get additional expert advice from people outside the room. In this way, we avoid a lot of traffic in the hybrid room during procedures. The laminar air flow system provides an extremely clean atmosphere without the risk of contamination that any equipment attached to the ceiling would bring.

Have you had a lot of attention from other hospitals?
Yes, quite a lot. We have had visits from many other hospitals. There are a number of hospitals in Sweden already using hybrid rooms, but we are the first to use it with a focus on trauma treatment.

Why did you choose to build a hybrid room in the trauma center? So far, hybrid rooms were far away from emergency cases and have mainly been used for treatment and research in well-planned cases. Using a hybrid room for trauma treat-

Continuing to improve hybrid interventional methodology in Oslo

The hybrid room at Rikshospitalet in Oslo, Norway, one of the first Artis zeego installations in a hybrid environment, continues to focus primarily on developing methods for treating patients within a wide range of needs, and on testing devices (e.g., stents or valves for endovascular use, etc).

“Testing methods and devices is made more efficient using the advanced imaging possibilities provided by Artis zeego,” says Per Kristian Hol, M.D., Manager of Radiology Research at the Interventional Center. “We get fuller and more detailed information by using this technology.”

The Interventional Center at Rikshospitalet is a cutting-edge imaging department and a reference facility for a number of hybrid rooms built in recent years, including the Karolinska University Hospital.

“Yes, we’ve had a lot of interest from other hospitals,” says Dr Hol. “We’ve had guests from all over the world, mainly from Scandinavia, Europe and the USA, but also from China and Japan.”

Dr. Hol is very pleased with the functions of the Artis zeego and the enhanced support advanced imaging means for critical decisions.

“Today we’re using this equipment and the hybrid room to develop a large number of procedures. Cardiology and angioplasty are still in focus, but we get a lot of interest from other fields such as audiology, where imaging technology is very useful for developing methods for cochlear implants in the inner ear for example.” Examples can be given for most medical areas, and the hybrid room at Rikshospitalet is still being further developed in many ways. One is the “stage light” OR lighting system, in which the center is developing software to provide perfect lighting at any moment of any treatment. “The next challenge will be to develop methods within neurology,” says Dr. Hol.
Artis zeego in the OR Surgery

Artis zeego in the OR surgery has advantages that may very well save many lives. People with trauma injuries often have major damage to blood vessels. Getting the optimal treatment for injuries like this is vital, and time is often of absolute critical importance. When a patient is bleeding inside we need to find the optimal treatment as fast as possible. The expression “the golden hour” holds true, and the hybrid room means we have a much better chance of saving patients’ lives, and to minimize their suffering, by using advanced imaging to get a picture of the damage and a reasonable chance to choose exactly the right treatment. And we maintain this chance throughout the procedure.

What has been the major challenge in this project?
Probably the education and training task. We are in the process of teaching 300 of the hospital staff to work in the hybrid room. Obviously all of these 300 will not be able to do everything a specialist can do; the aim is to make all these people confident working within the hybrid room, helping the patient to breathe and to limit bleeding. This way we can push the time limit forward for specialists to arrive, and can also provide these doctors with a better chance to get detailed information about the case as they approach the hospital.

How is the hybrid room with the Artis zeego used today? Is it focused solely on trauma care, or is it used for other purposes as well?
The hybrid room at Karolinska University Hospital is focused on trauma patients; this is the major task for us. But to make the work in the hybrid room efficient, the staff needs to use it as much as possible. This is, of course, also important to reach a good level of economic efficiency, and to use the advantages of the hybrid room to give patients the optimal treatment.

In the future, we also have other possible ways to use this technology. One is to use it in maternity care, for example to treat problems with the placenta. By using the hybrid room, we may solve these problems more easily and without using dramatic solutions such as removing the uterus.

Dr. Pär Olofsson, you were Head of Surgery during the whole planning and implementation phase, and you were also the project leader in building the hybrid room. How would you describe the difference in trauma treatment, if you compare the situation with the hybrid room and the way you worked before you built this room?
The trauma center at Karolinska University Hospital was designed according to earlier standards: a helicopter pad, a triage room with a CAT scan unit and an OR. The distance to the operating suite was 20 meters, which is quite good. The distance to the intervention suite, however, was about 600 meters. This distance may still be okay. The problem is that with this distance you want to be very sure that’s where you need to go. You don’t want to push a severely traumatized patient that distance and then back again, which might be necessary if you don’t have the imaging equipment to make a definite decision between interventional treatment and a surgical one. In practice, this meant that we sometimes probably chose surgery to save a life, when we should have chosen a less invasive procedure given more information. With a hybrid room we can use minimal-impact procedures in every single case.

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Linus Blohmé, Head of Trauma Surgery (right) and Pär Olofsson, retiring Head of Surgery (left) recognized the advantages of a hybrid OR for trauma treatment.