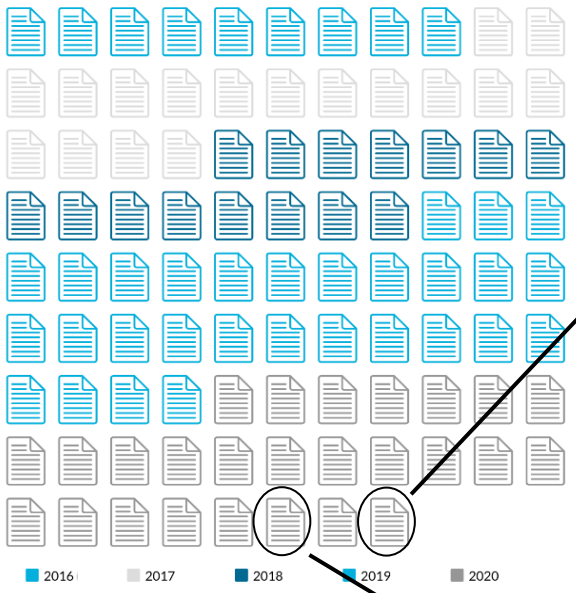
Radboudumc

MITeC Newsletter

Since November 2020, it has been five years since the official opening of MITeC. In this newsletter we would like to look back with you on those first five years. What have we achieved, how have internal and external parties experienced the MITeC facilities and what could possibly become even better in the future?

The **Medical Innovation and Technology expert Center (MITeC)** consists of a number of specially equipped operating rooms that are connected to each other. The operating rooms contain innovative *on the spot* diagnostic and intervention techniques, such as MRI and conebeam CT, which are of interest to surgical and diagnostic disciplines. In addition, the facilities are frequently used for clinical research, often in collaboration with other partners, such as various companies, health insurers and various medical specialist departments, including interventional radiology, urology, neurosurgery, ENT and surgery.



> 95 publications

Verhoeven RLJ, Fütterer JJ, Hoefsloot W, van der Heijden EHFM. ***Cone-Beam CT Image Guidance With and Without Electromagnetic Navigation Bronchoscopy for Biopsy of Peripheral Pulmonary Lesions.*** J Bronchology Interv Pulmonol. **2021** Jan 01. doi: *101097/LBR.0000000000000697.*

This is how the technique works

Patel S, Lindenberg M, Rovers MM, van Harten WH, Ruers TJM, Poot L, Retel VP, Grutters JPC. ***Understanding the Costs of Surgery: A Bottom-Up Cost Analysis of Both a Hybrid Operating Room and Conventional Operating Room.*** Int J Health Policy Manag. **2020** Jul 27. doi: *10.34172/ijhpm.2020.119.*

Retrospective with Prof. Evidence-Based Surgery Maroeska M. Rovers and Prof. Medical Imaging Jurgen J. Fütterer

How do you look back on the last five years?

Prof. Jurgen Fütterer and prof. Maroeska Rovers: "The startup did not go as fast as we would have liked; it took time and effort to initiate projects. Especially the projects in the hybrid OR, which was new at the time, took time to get started. Fortunately, the good cooperation with Siemens helped us a great deal. On the MRI side it went smoother, we got off to a flying start—a number of studies were already underway, including ablation of the prostate and liver."

What are some MITeC success stories these last five years?

"We were able to fund a few pilot projects carried out through *seed funding*, many of which ultimately led to larger projects. Examples are two feasibility studies led by Prof. Camiel Rosman, which investigated the detection of lymph nodes in esophageal cancer. These studies have been further elaborated, resulting in Didi de Gouw's thesis. Another success story concerns the *deep brain stimulation* in Parkinson's patients by our neurosurgeon Dr. Saman Vinke. Aside from the successful collaborations with the industry, such as with Profound Medical. Men with prostate cancer can now receive focal treatment, so that they have less side effects (incontinence and erection problems) compared to usual care."

What were the challenges?

"It remains a challenge to obtain external grants, although we have been quite successful so far. Our mission and vision, namely: *to develop and improve effective, precise, affordable and minimally invasive image-guided interventions beneficial to the patient*, will remain the same in the coming years. We would like to improve healthcare using innovative image-guided interventions, in combination with health technology assessments (HTA), based on the **IDEAL framework**. Over the past 5 years, we have seen the number of studies at MITeC increase exponentially. Our internal and external partners know where to find us for innovative technology, HTA's and clinical studies."

Read more about Prof. Maroeska M. Rovers.
Read more about Prof. Jurgen J. Fütterer.

MITeC was represented during the 2020 Impact Days of Radboudumc.

Check it **here** (Dutch).

2020 is the one year collaboration anniversary with Quirem Medical.

Read more about our **collaboration**.

More news? Check our news page.

Take a virtual tour in the MITeC Operation Rooms on our website.

Since 2020 MITeC has become a part of NWO Large Scale Scientific Infrastructure

ENCAPSON
ultrasound visibility for medical devices

"MiTec offers a unique opportunity to facilitate and accelerate the development of a medical device. The expertise and infrastructure available within the MiTec organization provide excellent support in testing and improving a new product, from concept through to clinical evaluation. More importantly the consortium members are always open to discuss ideas, and provide feedback. This high quality, open interaction, means that critical clinical feedback can be incorporated into a device in the early stages, improving the quality of the medical device, and ultimately the patient outcome." - **Encapson**, partner of MITeC

> 20 grants honored

19 industry partners

> €9 million

Interview with Dr. Michiel Warlé, medical specialist

Can you tell us something about your relation to MITeC?
"As a vascular surgeon, I regularly work on the Zeego to place aortic stents in patients with an abdominal aneurysm or perform a hybrid procedure on patients with peripheral arterial disease. Due to the high image quality, working on the Zeego has a great added value compared to using the standard mobile C-arm. As a researcher I am (co) project leader involved in various studies in which we use the MRI at MITeC."

When looking back at five years MITeC, what stands out?
"Almost all endovascular aortic reconstructions have been performed at MITeC in the past 5 years. In addition, we have increasingly started to perform hybrid procedures. For patients this has the great advantage that angioplasty and vascular surgery can be combined at the same time. As more OR personnel and intervention laboratory technicians have been trained on the Zeego, it has become possible to perform acute procedures at MITeC more and more often."

What makes MITeC unique in your opinion?
"The possibility to conduct studies in which a patient can undergo a MRI scan in the OR under general anesthesia. And the option to scan patients undergoing a procedure on the Zeego for the MRI."

Read more about Dr. Michiel Warlé.

"MITeC is an ideal testing ground for DEMCON, including its customers and partners, especially for the interface between image-guided interventions and robot-assisted surgery. A good example is the collaboration between MITeC and DEMCON in the field of a CT-controlled needle placement robot. In the future, we see many opportunities to develop and validate innovative surgical technologies using MITeC. Think of instruments with haptic feedback or robotic support for MRI-controlled interventions." - Demcon, partner of MITeC

Interview with Martin Jansen, MITeC coordinator

What is your role within MITeC?

"As project manager I am responsible for all equipment and its use in the OR's. I was already involved in the preparations several years before the start of MITeC, and together with Hein Gooszen (head of the operating room department at the time), I had discussions with many different specialists about the vision for MITeC. We discussed what the major challenges are for the specialists, and how these could be addressed. Of course, things had to be made concrete, such as how we will use advanced techniques and what the OR's will look like in the future. We asked ourselves the question, how to develop MITeC in such a way that we will soon make those dream treatments possible? The unique MITeC OR's are the result of the collaboration between many different disciplines and for me that is what MITeC is all about.

The approach that we had to follow for MITeC, we still use to introduce new operating techniques and new equipment in the other OR's. To build MITeC we had to know exactly how specialists were going to work. We first worked it out on paper and then we performed simulations (so-called mock-ups) before we started building MITeC. Now we follow that same approach for all new procedures. We work it out on paper, perform mock-ups and evaluate whether all involved parties are ready. You have to involve the entire team, because teamwork in the OR is very important for the safety of the patient."

What has been your personal highlight of the past five years of MITeC?

"The official opening day. A large innovation fair that we organized for that day, the many different medical doctors that attended, companies and researchers involved who showed each other what they were working on, that was impressive. And of course the visit of our queen."

How many people have you given a tour of MITeC?

"I have done about 200 to 250 tours over the last five years. They were often groups of 12-15 people, local or international interested parties, for example for a science day or people from other medical centers. Sometimes it was just a few people. In total, I estimate about **1500-2000 people**.

It is special to have given the queen a tour on opening day! As far as other tours, ordinary people have been patients at MITeC as well. Sometimes I don't know before the tour starts. Sometimes they unexpectedly tell me how they, as a patient, experience the story of MITeC. Goosebumps, very powerful."

Read more about Martin Janssen.
Siemens Healthineers interviewed Martin Janssen in 2015 regarding the setup of MITeC, read it here (Dutch)

23 PhD candidates

5 completed PhD theses

The official opening of MITeC on November 12th 2015 with Queen Máxima.

Interview with Prof. Henri A.M. Marres, department head ENT-Surgery

How did you get involved with MITeC?

"I was on the advisory committee when prof. Maroeska Rovers was appointed. I have short lines of communication with her because she obtained her PhD in the ENT department. I come across issues that are relevant to the medical future. Many techniques are currently used in chronological order, while many can be done simultaneously. Initially, using MITeC could at times be opportunistic, but the added value in regular care soon became obvious."

What is a current development you are involved in?

"Via MITeC we can try out various new techniques. Now the challenge is to move to robotics. In this area, you are highly dependent on fast real-time image processing. Take the Robosculp, for example, a surgical robot for bone surgery — we can automate this through 3D imaging. Eindhoven Medical Robotics is now further developing that idea, in collaboration with us, with the first CE-certified and validated small robot. These kinds of steps are very important for further developments and innovations. In the medical world, you have to take certain paths together to improve healthcare: minimizing surgery and maximizing its effects."

Read more about Prof. Henri A.M. Marres.

The collaboration with Siemens Healthineers

What is the added value of your collaboration with MITeC?

MITeC performs a broad spectrum of clinical research projects with the goal of improving treatment precision and effectiveness. Clinical and research competences of the entire MITeC team provides a valuable platform for exchangeof the new ideas and innovative concepts. Especially the deep knowledge in the field of evidence-based medicine and health technology assessment drives research in a way that benefits not only patients but the healthcare delivery system in general. In addition, their expertise in translation research, in for example MR guided prostate interventions, makes MITeC unique.

How can MITeC (and our collaboration) contribute to developments in healthcare in the future?

Partnerships with excellent collaboration sites such as MITeC supports Siemens Healthineers not only to develop, to test and to validate our new solutions for minimally invasive image guided interventions in the clinical environment, but also to evaluate its success rate from the clinical and economical point of view in the earliest stages of development. Together we building the components in support of the ultimate goal of MITeC : "one day surgery for oncology patients".

We are proud of the inspiring collaboration with Prof. Maroeska Rovers and Prof. Jurgen Fütterer and their team. They bring concrete, demonstrable improvements in minimally invasive treatments, as well as the shortening of care processes. Patients can be treated faster and more effectively and therefore rehabilitate better. In addition, the health technology assessments ensure that the new procedures and techniques are more cost-efficient than the existing ones. In this way we keep high-quality care affordable now and in the future.

Rebecca Fahrig, **Vice President Innovation Advanced Therapies at Siemens Healthineers**
Arne Hengerer, **Head MRI guided Therapies at Siemens Healthineers**
Kees Smaling, **Algemeen Directeur Siemens Healthineers**
Sjaak van der Pouw, **Directeur Innovatie Siemens Healthineers**

"The TULSA-PRO® system, developed by Profound Medical, is designed to provide customizable, and predictable radiation-free ablation of a physician-defined region of prostate tissue while combining real-time Magnetic Resonance (MR) Imaging, directional thermal ultrasound, and closed-loop thermal feedback control. The physicians at MITeC Radboudumc facility are able to actively monitor and control tissue heating throughout the prostate and nearby critical structures under real-time MRI guidance during targeted prostate ablation, or whole gland prostate ablation. Profound Medical is proud to have th e brilliant team at MITeC Radboudumc facility carryout the TULSA Procedure with the site's ability for efficacy, efficiency, safety, and feasibility of innovative surgical procedures." – **Profound Medical**, partner of MITeC

Vision for the future

What is your vision for the future of MITeC?

Prof. Jurgen J. Fütterer and Prof. Maroeska M. Rovers: "We would like to make MITeC even more widely deployable, and in view of the new legislation (MDR) that will take effect in Europe in May 2021, we would like to realize an early phase (first in human) unit within MITeC. In our opinion, the core remains 50% production and 50% science. Some of the developed interventions can navigate to the normal OR's, especially now that we have new C-arms available there. Innovation is central and we want to stay ahead."

Prof. Henri A.M. Marres: "We should move towards dedicated science and overlapping goals in specialties. This is where we can achieve quality improvement within all medical disciplines. We may have to build to a second MITeC. A second MITeC as a dedicated experimental platform will have added value. Maybe we were too modest. We were one of the first to have these facilities that now have already been operationalized in many other places. A combination of surgery, pathology and radiology will be a new step forward and should focus on minimalizing treatments leading to maximal individualized effect."

Dr. Michiel Warlé: "In my opinion, MITeC can contribute to the further development of *precision surgery*. In other words, operating more effectively with less complications."

Want to know more about MITeC?

Interested in making use of the MITeC facilities or collaborating with us?
Check the possibilities **here**!

Would you like to be up to date on MITeC? Subscribe by sending an e-mail to anne.geijsen@radboudumc.nl.

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