



**Merry Christmas to
all our partners and
contributors**

NEWSLETTER



Mixed Reality for medical applications Photo: The Intervention Center

In this number

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FOR-IVS applies for NorMIT2



The NorMIT research infrastructure between the partners The Innovation centre, Oslo university hospital and The Operating Room of the Future at St. Olavs hospital in Trondheim has applied the Research Council in Norway for another 5-year project funding. NorMIT phase 1 (2014-19) is on the national roadmap of research infrastructures and its value is demonstrated through a survey

amongst its users you can read more about in this newsletter .

The main objective of NorMIT2 is to further improve patient care by development of medical technology giving less trauma for patients, improve safety and quality in treatment. By exploiting AI technology and the value in high quality medical data , NorMIT2 aims to optimize many aspects of treatment and organization of health care deliveries.

NorMIT2 will improve successfulness and competitiveness of Norwegian companies and increase industrial employment in a growing market of medical technology and minimal access diagnostics, treatment and follow-up.

Outcomes and Impact



NorMIT2 will have impact on research within the entire innovation chain in medical technology used for diagnostics and therapy, from idea to product development, including testing and approval for market. NorMIT2 will expand the research activity as proven by the partners in NorMIT phase 1, both for technological and clinical researchers as well as industry, which will have access to and collaborate with end users and competent clinical and technological staff at all stages of research and innovation. This will ensure research meeting patient/clinical user needs and improve quality and safety of patient treatment as well as optimizing efficiency and resource allocations in hospitals. The quality of

research facilities also has a high impact on recruitment of students and researchers within technological and clinical science and research in general. The NorMIT2 infrastructure will make it possible for Norwegian researchers to take greater part in the international research agendas.

«Research is to see what everybody else has seen, and to think what nobody else has thought»

~Albert Szent-Gyorgyi~



NorMIT infrastructure is essential in the development and testing of new ultrasound methods and transducers at SINTEF



Senior Research Scientist Sigrid Berg, SINTEF Digital, Dept. of Health Research

The research infrastructure related to ultrasound imaging which is available through NorMIT is valuable for several research projects in SINTEF. The Verasonics Vantage system enables fast implementation of new imaging methods, and the possibility of using custom made ultrasound transducers, which are not compatible with clinically approved systems. In addition, the Onda AIMS III water tank system gives the opportunity to do acoustic transducer characterization and safety measurements, which are important in the process towards clinical testing of new methods and transducers.

An example is the ERA-Net project “XploreCAD - Mechanisms of early atherosclerosis and/or plaque instability in Coronary Artery Disease”, where a new dual frequency transducer with a Verasonics connector has been developed and produced in collaboration with the French company Vermon SA. The transducer has separate high and low frequency elements with center frequencies of 18 MHz and 4 MHz respectively, and is mounted as a linear array side-looker on a catheter with a diameter of 2.3 mm. The goal of the project is to image and characterize atherosclerotic plaques in a pre-clinical rabbit model.

The research ultrasound scanner Verasonics Vantage 256 from NorMIT is used to implement imaging schemes for B-mode and contrast enhanced imaging, and the Onda AIMS III water tank system with 3D robotic stage has been used to characterize the pressure field at various voltages and frequencies. Images of the transducer and an example from the acoustic characterization is shown in Figure 1.

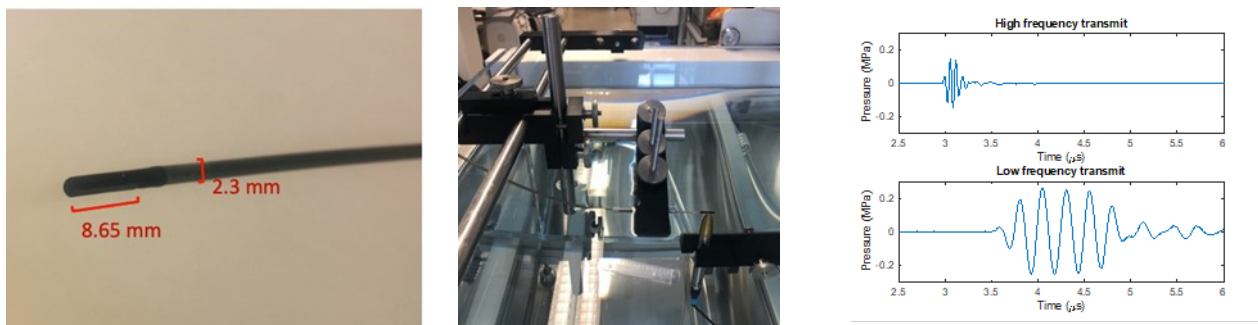


Figure 1: Left: Image of the dual-frequency linear transducer with an aperture of 8.65 mm mounted on a 2.3 mm diameter catheter. Middle: The mounting of the transducer and hydrophone in the Onda AIMS III water tank. Right: An example of recorded waveforms at high and low frequency from the dual-frequency transducer



B-Mode beamforming methodologies

- Conventional line mode
- Flash imaging (flat phase “plane-wave” imaging)
- Multi-angle flash imaging
- Overlapping beams
- User programmable beamforming techniques

Doppler sampling methodologies

- Very high frame rate imaging (“ultrafast” imaging) color Doppler
- Conventional color Doppler
- Plane wave color Doppler
- Vector Doppler imaging capable
- Conventional spectral Doppler
- Wide-area, multi-point spectral Doppler



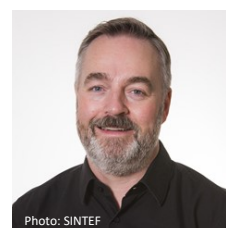
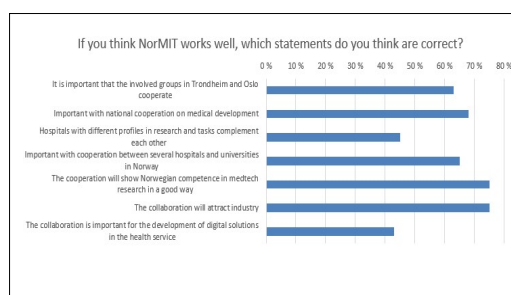
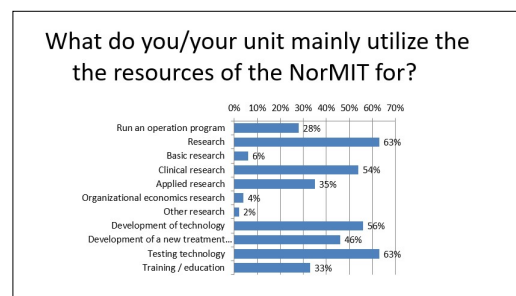
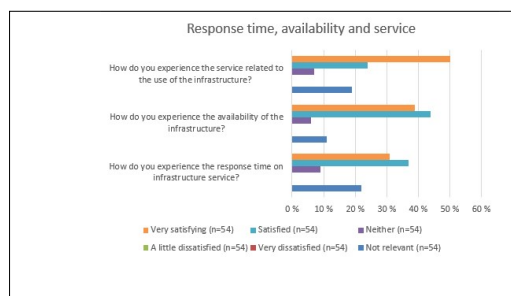
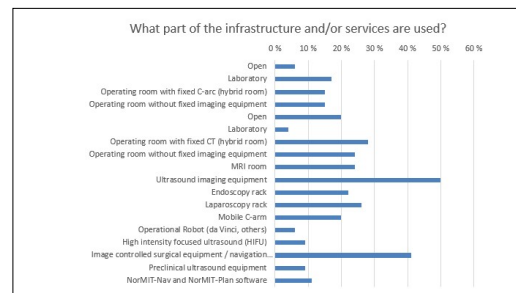
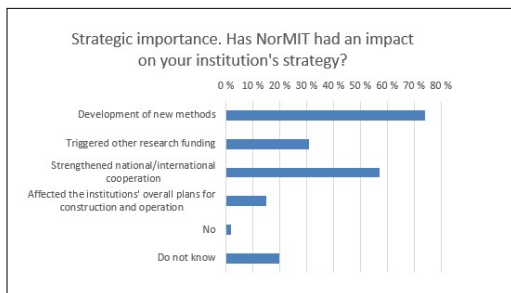
Development of new methods and strengthened national and international cooperation most important impact on strategy, the NorMIT 2020 User survey reveals

The 2020 NorMIT User Survey was performed to get feedback from the users of the infrastructure how the cooperation between the business, industry and users work. Almost all answers indicate that NorMIT has been an **important infrastructure** regarding **development of new methods, triggered other research funding, strengthened both national and international cooperation** and affected the institution's over all plans for construction and operation.

Professors and supervisors without academic positions, were the main respondents (n=54). The ones that use NorMIT for research, are mainly in a PhD or Postdoc program, secondly part of a national or EU project. The three main equipments used by the respondents are Ultrasound Imaging Equipment, Surgical Navigation Systems and OR with Cone Beam (C-arm). The top 4 uses of NorMIT are **Research, Testing new technology, Develop new technology and Clinical research.**

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Key Findings—graphics



Thomas Langø is a chief researcher at SINTEF Digital, Health dept. responsible for the research activity at the Trondheim node in NorMIT and responsible for the survey



Integration between BK-5000 Ultrasound scanner and Brainlab Curve navigation system



Photo: Gunnar Gjeldnes

Researchers has for a while been able to take advantage of the integration of BK Medical's ultrasound skanner BK-5000 and Brainlab's Curve navigation system. The scanner software is recently updated and new probes has been purchased. Brainlab's regional manager in Scandinavia, Robert Oskarsson (to the left) visited us to perform the calibration for one of the probes towards the navigation system. The director of FOR, Jan Gunnar Skogås (to the right), is happy to get the equipment up-to-date.

Brainlab Curve Image Guided Surgery optimizes navigation with pre-op planning and surgical visualization.

Surgeons are guided by images from multiple views helping increase decision-making confidence

Features:

- Two 27" touch monitors with 16:9 screen ratio provide more space to display and efficiently organize information
- Capacitive touch technology decreases display deterioration, enhances 3D software images and produces higher contrast for crystal clear tissue differentiation
- 1920 x 1080 pixels per display for 2D and 3D images offer more anatomical detail in full HD
- Latest image guidance software powers advanced 3D displays and hallmark Brainlab image enrichment
- Shifts easily between applications with a touch of the virtual 'Home' button

Book the equipment at www.normit.no

New research coordinator FOR/NorMIT in Trondheim



Photo: St. Olavs Hospital

From September Gunnar Gjeldnes is taking the position as research coordinator at FOR/NorMIT in Trondheim. He will also be the editor of this newsletter. Gunnar is registered nurse, with experience from dept. of cardiology at the former Regionsykehuset in Trondheim back to the 80's. He

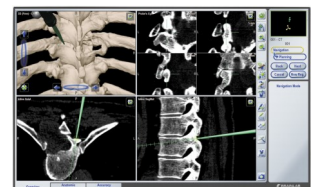
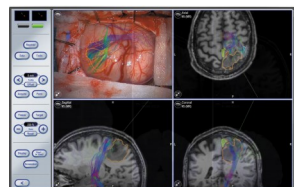
has broad experience from the pharmaceutical industry and medical device industry in various positions the last 30 years.



Brainlab Curve Image Guided Surgery



BK-5000 Ultrasound scanner



Unimed Innovation becomes St. Olavs hospital FOR –Contract research

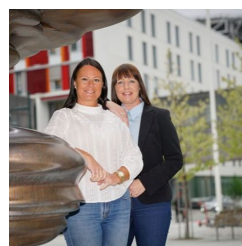


Photo: St. Olavs Hospital

Department of research, innovation and education at St. Olavs hospital and Operating Room of the Future (FOR) at St. Olavs hospital possesses special competence and long experience in collaboration with the commercial industry including technological companies. In November 2019 it was decided that the tasks that so far have been carried out by Unimed AS on behalf of St. Olavs hospital will be taken care of by FOR under the name St. Olavs hospital Research and Contracts, with a more distinct focus on contract research, drug trials

and medical technology. The transition took place in June 2020. The contractual and project accounting issues for a total number of 83 studies is for the time being handled by Marianne Haugvold (to the left) and Ingrid Granbo (to the right).



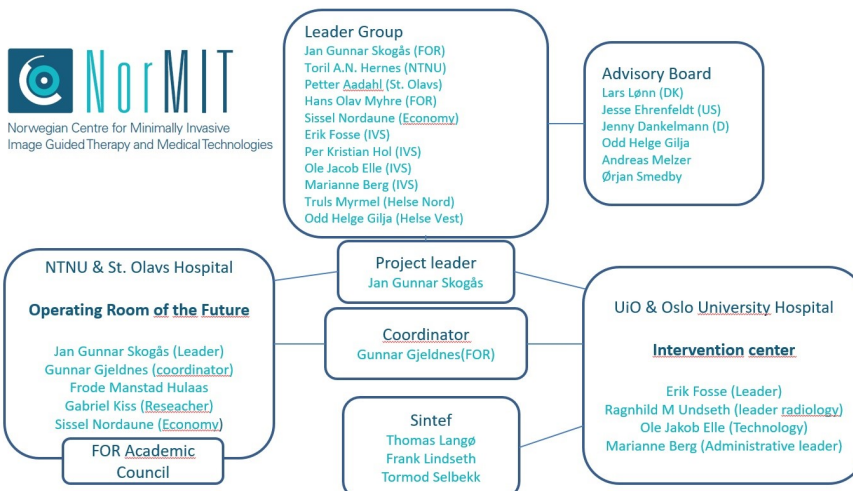
NorMIT infrastructure

Trondheim

Navigation Brainlab Kick Optic	Visualization lab Visualization lab	Camera & Media publishing Camera & Media publishing	 Verasonics Vantage 256 Research scanner	Ultrasound Verasonics Vantage 256 Research scanner
Navigation Brainlab Kick EM	Minimally Invasive Surgical System Da Vinci Surgery	EBUS Bronco EBUS Bronco	Laparoscopic UL-probe Vernon	Ultrasound BK-100
Navigation Brainlab CURVE	3D-print lab 3D-print lab	Interventional X-ray imaging Artis Zeego DynaCT	Ultrasound BK-5000	Ultrasound SURF

Oslo

Laparoskopi stue Stasjonært Utstyr/info: - Olympus 3D videoskopi rack	Angio stue Stasjonært Utstyr/info: - Simens Artis Zeego, fluoroskopi - Hjerter/Lunge-maskin - GE Ultrafyd	Operasjon/MR stue Mobilt Utstyr/info: - Brainlab navigasjon - C bue (x ray) Stasjonært Utstyr/info: - Philips 3T
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Go to normit.no for more information!

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