



AUTHOR:	SBOGAERT	PAGE:	1/89
DATE:	2025-03-24	VERSION:	1
TITLE:	USER MANUAL SIEMENS Syngo MR XA60		

GifMI MRI user manual

SIEMENS Syngo MR XA60

Stephanie Bogaert, MSc
Ing. Pieter Vandemaele, MSc
Prof. Dr. Ir. Pim Pullens
© Ghent Institute for functional and Metabolic Imaging
March 2025

OVERVIEW

I.	CONTACT	6
	Address.....	6
	Website	6
	GifMI Director	6
	GifMI Operational Team	6
	Important phone numbers (with Facility phone).....	6
	Emergency phone numbers (only with Facility phone)	6
II.	MRI FEATURES.....	7
III.	MRI EDUCATION.....	8
	MRI PHYSICS.....	8
	MRI IN PRACTICE.....	8
	MRI Safety	8
	MRI Coil positioning	8
	MRI Planning	8
	MRI Software and Interface	8
IV.	POLICIES	9
	Policy regarding requirements for personnel	9
	Policy regarding access	9
	Policy regarding pregnancy.....	9
	Policy regarding obese participants.....	9
	Policy regarding children.....	10
	Policy regarding patient populations.....	10
V.	EMERGENCY PROCEDURES	11
	Main hazards.....	11
	Use of the MR compatible stretcher.....	11
	Medical crash cart, medical gases and AED.....	12
	Performing an emergency magnet quench: Magnet Stop switch	12
	Situations requiring a Magnet Stop:	12
	Quench procedure	12
	Fire safety.....	13
	Table movement in the event of a power failure	13
	Performing a table stop	14
	Reporting of safety incidents or near-incidents	14
VI.	THE GIFMI MRI FACILITY	15
	MRI Control room	15
	MRI scanner room.....	16

Equipment in the MRI scanner room.....	17
Preparation room.....	21
Meeting room Hippocampus	22
VII. MRI GENERAL KNOWLEDGE AND CONCEPTS	23
Switching ON the MRI system.....	23
Switching OFF the MRI system.....	24
Tidying up the GfMI MRI Facility.....	25
MR Scanner room	25
Communication.....	26
Siemens intercom	26
OptoAcoustics OptoActive system (ANC)	27
Squeeze ball (participant’s alarm).....	28
Video camera and display	30
The 64 channel head coil	30
Installing the 64 channel head coil (head support).....	31
Table Operation	31
The display	31
Control panel.....	32
Moving the participant in the bore.....	33
Moving the participant out of the bore	35
SIEMENS Dual Monitor concept.....	36
The keyboard	36
Left monitor	37
Right monitor	39
Exam fields	40
Guide around the colour code of the EXAM CARD	41
Guide around the buttons of the EXAM CARD	42
VIII. PARTICIPANT REGISTRATION IN RIS.....	43
Generating a unique identification number for a participant (QP-number)	43
Creation of an MRI application form with the QP identification number	46
Retrieval of participant on the scanner console	48
CLOSING THE EXAMINATION ADMINISTRATIVELY.....	50
IX. PARTICIPANT PREPARATION	51
Administration	51
Clothing.....	51
X. PARTICIPANT POSITIONING (FOR STANDARD BRAIN IMAGING)	52
Comfort	52

Coils	52
Positioning a participant	52
Landmarking a participant for a typical brain scan.....	53
How to get the participant out of the 64 channel head coil:.....	54
XI. Data acquisition	55
Pop-ups	55
Localizer (AAHead_Scout_64ch-head-coil)	56
Sagittal 3D-T1 structural imaging.....	57
MPR (Multiplanar Reconstruction)	59
Axial EPI functional imaging (gre field map, ep2d bold fMRI)	61
Axial EPI functional imaging (ep2d_DTI)	63
Axial EPI functional imaging (ep2d_DTI_PA).....	64
Multiplying sequences	64
XII. DATA TRANSFER.....	65
Anonymizing data	65
Exporting data	66
Importing data	67
XIII. Protocol transfer	68
Exporting the parameter file of a protocol as a pdf.....	68
XIV. FAQ.....	70
Why is the head of the participant upside down?.....	70
How can I check whether the head coil is recognized by the scanner?	72
How long will the scan take (time of acquisition, TA)?.....	73
How do I multiply sequences?	73
How do I check the positioning of the FOV when that sequence is already running or even ready.....	73
How do I check the parameters when a sequence is already running or even ready.	74
How do I change the parameters when the sequence is already running or even ready.	74
I want more volumes in my EPI time series. How do I do that?	74
How do I build my own protocol?.....	75
How do I apply changes to my protocol?.....	77
How much participant movement is too much for fMRI?	78
Why do I get a SAR warning?	79
Can I add 5 kg to the participant's weight to overcome the scanner's SAR limit?	79
Why does the scanner warn for nerve stimulation?.....	80
What to do with incidental findings?	80
XV. Technical Problem / Error solving.....	81
Upon arrival, there is an audible alarm coming from the alarm box.....	81

There is no chirping/heart beat from the cooling system when I enter the scanner room.	81
Problem: the wall lighting in the scanner room is off – what to do?	81
The scanner doesn't seem to be working properly. How can I tell what is wrong?	81
The scanner doesn't seem to be working properly. What can I do (in general)?.....	82
The scanner table freezes	83
What to do when the User Interface is frozen?.....	84
.Helium is too low	84
Pop-up messages	85
How to make a system log file after a serious error	87
Image artifacts (spikes, lines, graininess, ...).....	88
XVI. Reporting incidents.....	89

I. CONTACT

Address

Ghent Institute for functional and Metabolic Imaging (GlfMI)
Campus UZ Gent - Entrance 55
Corneel Heymanslaan 10
BE - 9000 Gent

Website

[GlfMI - Ghent Institute for Functional and Metabolic Imaging](#)

GlfMI Director

Prof. Dr. Wim Fias 09 264 64 11

GlfMI Operational Team

Prof. Dr. Ir. Pim Pullens pim.pullens@ugent.be	09 332 8975	MR Physicist MR sequence licenses and optimization Quantitative MRI optimization
Ing. Pieter Vandemaele, MSc Pieter.vandemaele@ugent.be	09 332 4820	MR Lab Manager & engineer Peripheral equipment and coding
Stephanie Bogaert, MSc Stephanie.bogaert@uzgent.be	09 332 5062	MR Research Assistant MR Safety Responsible Structural MRI optimization and operational training

Important phone numbers (with Facility phone)

(Add [09 33] when calling with your own phone)

MR scanner room	2 1240
Radiologist on duty	2 4158
Clinical MRI K12	2 4761
Veolia (cooling water)	2 4317
Electrician	2 2552
Electrician (after hours)	2 6800 / 2 6801
Security (fe you forgot your key)	2 3092
Siemens Service Center	02 536 46 00

Emergency phone numbers (only with Facility phone)

Cardiac arrest	81
Fire, aggression	88

II. MRI FEATURES

When publishing an article, key features of the scanner have to be mentioned.

The GfMI Facility houses a Siemens Magnetom Prisma FIT (Siemens Healthineers, Erlangen, Germany).

- 3.0 Tesla magnet
- 80mT/m @ 200 T/m/s gradients
- TimTX TrueShape parallel transmit architecture
- Tim 4G integrated coil technology
- Syngo XA60 software

For more information, check

- the Siemens Healthineers website: <https://www.siemens-healthineers.com/>
- Siemens Magnetom Prisma folder: [MRI-MAGNETOM-Prisma-product_brochure_180000000277793.pdf](#)

III. MRI EDUCATION

For the novice user, using a multi-million euro device may be overwhelming. Don't worry, support is available from the GIfMI Operational Team to tailor your project and to get you scanning safely and independently. As long as you treat its components with care and comply with the MRI Safety Rules, built-in safety features will support you in protecting the system and the subject. Knowledge will empower you in the process of data-acquisition; here are some suggested sources.

MRI PHYSICS

The **GIfMI MRI Physicist** is happy to support you in the optimization of your MRI protocol. However, to be able to discuss parameters, we do need you to expand your general knowledge on MR physics. We highly recommend:

- MRI from Picture to Proton. Donald W. McRobbie, Imperial College of Science, Technology and Medicine, London, Elizabeth A. Moore, Philips Medical Systems, Martin J. Graves, University of Cambridge and Addenbrooke's NHS Trust, Martin R. Prince, Cornell University, New York
Publisher: Cambridge University Press
ISBN: 9780511545405 DOI: <https://doi.org/10.1017/CBO9780511545405>
- [MR Physics - Generating and Acquiring the MR Signal Online Training \(siemens-info.com\)](#)
- [MR Pulse Sequences \(siemens-info.com\)](#)

MRI IN PRACTICE

The **GIfMI MRI Research Assistant** is happy to support you in the process of learning how to handle the MRI scanner, the coils and the participant, tailored to your project. We do need you to expand your general knowledge beforehand, using the following sources.

MRI Safety

To be granted access to the MRI Facility, you are obliged to follow an MRI Safety Course. Please check the GIfMI website to reserve your spot for the next training.

MRI Coil positioning

[Coils \(siemens-info.com\)](#)

[Magnetic Resonance Imaging Patient Positioning - StatPearls - NCBI Bookshelf \(nih.gov\)](#)

MRI Planning

[MRI Brain Protocols , Planning , Positioning and Indications \(mrimaster.com\)](#)

We condensed the essential information to scan a participant from A to Z in the GIfMI Facility in this manual. It was created with great care. It might occur however, that some screenshots do not fully match the view on the scanner console due to updates. The information in the screenshot is still valid. Should you scan other body parts, the GIfMI Research Assistant will be happy to help you out with a manual tailored to your project.

MRI Software and Interface

[MAGNETOM Prisma / MAGNETOM Prisma fit \(siemens-info.com\)](#)

[syngo.via View&GO \(siemens-info.com\)](#)

[Medical Imaging and Therapy](#) (Siemens PEPconnect, an online education experience)

IV. POLICIES

Policy regarding requirements for personnel

Please check the website to learn more about the different steps you need to take when registering a new project.

Solo scanning of participants is not allowed; in order to perform emergency procedures in an MRI environment, it is necessary to have 2 people present: the operator (often the PhD-student) and an assistant (often Master students). Every contributor must have followed the GifMI MRI Safety Training before the first scan session.

Policy regarding access

Used properly, the magnetic resonance imaging equipment contained within the MRI lab is safe, however it poses serious risks to the unwary. Therefore

- The MR system may be operated only by personnel who has completed the GifMI MRI Safety Training;
- Observers who have not been safety trained are not permitted to the MRI suite without notification to the MRI Site Manager and MRI Research Assistant. Resist the temptation to show visitors the scanner 'up close' as this introduces unnecessary risk of exposing people to potential hazards. Tours that would involve having non-safety trained personnel in the scanner room, must be authorized in advance by the GifMI Site Manager or Research Assistant.

All the concepts necessary to work safely in an MRI Facility are taught in the GifMI MRI Safety Training. Please check the GifMI website to reserve your spot for the next training.

Policy regarding pregnancy

- **Pregnant participants** may not undergo MR studies unless the study itself is specifically designed to investigate pregnancy with Ethics Committee approval. It is not laboratory policy to require pregnancy testing for research subjects.
- **Pregnant mentors** (parent or spouse of a research participant) are not at all allowed into the scanner room, at any time.
- **Pregnant personnel** follows the advice of the employer's occupational physician. Although there is no evidence that participation in an MR study by a pregnant woman would be harmful to her fetus, the advice may vary between physicians from no scanner room access during the first trimester only (fe Ghent University Hospital) to no access during the whole pregnancy (fe Ghent University). In any case, it is never allowed for pregnant personnel to stay in the scanner room while scanning during the whole pregnancy.

Policy regarding obese participants

The scanner bed is designed to support weights up to 200 kilograms. Subjects weighing more than 200 kilograms should not be scanned. Also at lower weights it can happen that the participant does not fit into the diameter (60 cm) of the bore. To avoid burns or peripheral nerve stimulation, a minimum distance of 5 mm should be maintained between the subject's body and the wall of the scanner tunnel; MR pads or cotton sheets available in the MR scan rooms can be used to assure this distance is maintained.

Policy regarding children

Children may only enter the scanner room as participants in an Ethics Committee approved research study of children. Children not involved in the research study (e.g. the child or sibling of a research subject) may not enter the scan room and may only be present in the control room if under direct adult supervision. Equipment room doors must be kept closed whenever children are present. All safety precautions applicable to adult subjects are applicable and if anything, more important in children. Careful metal screening, accurate entry of age, sex and weight are important steps in minimizing risks to this population.

Policy regarding patient populations

Located on the campus of Ghent University Hospital, the hospital provides emergency services for patients undergoing studies in the GIfMI MRI suite. To reduce the likelihood of adverse outcome in the event of a medical emergency, the following policies apply to all patient studies:

- Scanning of patients is only allowed in the presence of a recognized medical radiographer. Contact the GIfMI Research Assistant for more information.
- Solo scanning of patients at significant risk of a life threatening medical event on nights or weekends is not acceptable.
- Careful attention must be given to metal screening of patients with impaired cognitive abilities.

V. EMERGENCY PROCEDURES

Main hazards

The main hazards in the lab are:

- The **projectile effect** when ferromagnetic objects are hurled into the scanner bore. The impact of heavy objects on a subject can be lethal. Only 'MR safe' labeled objects can be moved from the preparation room into the MR scanner room. Always ask the permission of the GIfMI Research Assistant/Site Manager before you bring new equipment into the scanner room.
- Under no circumstances should participants with **active implants** (implants that are electrically, magnetically, or mechanically active such as cardiac pacemakers and implanted drug pumps) or participants with intracranial aneurysm clips enter the MRI suite; correct functioning of the implants may be affected by the magnetic and electromagnetic fields and therefore these participants have to be excluded.
- **Suffocation**: in extreme cases, the imaging magnet may release large volumes of helium gas that can rapidly force all air out of the scan room. Normally, the helium gas would be vented through the roof. However, there is a small but significant risk that the venting system could fail.
- Use hearing protection (ear plugs -35dB + headphone is mandatory) to protect participants against noise injury. Ensure that mentors and personnel in the examination room wears hearing protection during the examination.

Use of the MR compatible stretcher

The stretcher is used to transport immobile participants directly from and to the scanner bed. The stretcher is labeled 'MR safe'.

- Free the stretcher of magnetic objects (oxygen bottles, scissors, ...) before bringing it into the scanner room. Leave the slide board on top. Move the scanner bed out of the gantry. Adjust its height to match the stretcher. Position the side of the stretcher next to the scanner bed. Lock all four wheels of the stretcher!
- With at least one person on each side of the subject, move the participant towards the feet end so that the head is no longer in the head coil.
- Roll the participant towards you and slip the edge of the slide board under the side of the participant. Slide the participant across the slide board towards the stretcher. The person standing next to the stretcher should use his or her weight to hold the stretcher firmly against the scanner bed during the transfer.
- Once the participant is well situated on the stretcher, remove the slide board from beneath the participant from whichever side is most convenient. Put up the stretcher side rails and unlock the wheels. Move the stretcher away from the scanner bed and out of the scanner room.



Medical crash cart, medical gases and AED

A medical crash cart and Automated External Defibrillator (AED) are available in the preparation room. The crash cart, associated equipment and AED are not MR safe and should NEVER be brought into an MR scan room. A subject in need of resuscitation must be removed from the scan room using the MR compatible stretcher before crash cart equipment and supplies can be safely used.

Performing an emergency magnet quench: Magnet Stop switch

Turning off the power will not remove the magnetic field. To do this, all the helium must be removed (called a 'quench' by pressing the quench button).

Situations requiring a Magnet Stop:

Users of the GifMI Facility should only quench in the event that the magnetic field poses an immediate risk to life and there is no way to evacuate the person in need of medical help from the MRI room. Two such circumstances are:

- Risk of a participant death or major injury (e.g. a metal object is lodged in the scanner in a way that poses an immediate serious threat to a person or **a person is pinned to the magnet by a metal object**).
- **Fire** in the scanner room that cannot be extinguished with the MR Safe fire extinguisher. Only quench in case the fire personnel determines that there is no other alternative than to entering the room with axes or other heavy gear when fighting a fire.

In the absence of a major emergency, GifMI Facility users should never quench the magnet by themselves, even if they are convinced that a magnet quench will ultimately be necessary (e.g. if a large object has been drawn into the magnet, but poses no immediate risk to a person). Immediately notify the GifMI Site Manager and Research Assistant.

Quench procedure

- Lift the glass cover and press the Magnet Stop switch in the control room or in the scanner room.
- The magnetic field strength will fall to a level of 20 mT within 20 seconds.
- The helium is released via an exhaust vent line (controlled quench). The helium vent ducts become dangerously cold during a quench. Do not touch them.
- Rescue participants immediately. If emergency medical assistance is needed, call in the emergency team of Ghent University Hospital (call 81 with the local phone). For minor injury, accompany the participant to the emergency department of the Hospital (building K12).
- Immediately notify the GifMI Site Manager and Research Assistant.

The magnet may be put back into operation only by Siemens personnel. At best it will take two days before the scanner can be returned to service.



Fire safety

In the event of fire in zone IV, the scanner room:

- Attempt once to extinguish the fire. The fire extinguishers are MRI safe (labeled).
- Call 88 with the local phone and press the fire alarm button.
- Evacuate the participant from the scanner room and the building.
- Close the scanner room door.
- The scanner will automatically shut down when smoke in the scanner room is detected.
- Evacuate and leave the MRI building.
- Wait for the intervention team to arrive. They will assess the situation and call the fire brigade if necessary. In the absence of the MRI Safety Responsible, it is your duty to withdraw them from entering the MRI scanner room and to
 - remind the intervention team that the magnetic field is always on
 - to screen them for implants
 - remove ferromagnetic loose objects from their clothing before lending them access to the scanner room.
- Wait for the firemen to arrive. In the absence of the MRI Safety Responsible, it is your duty to withdraw them from entering the MRI scanner room and to
 - remind the intervention team that the magnetic field is always on
 - to screen them for implants
 - remove ferromagnetic loose objects from their clothing before lending them access to the scanner room.

Only quench in case of

- An exhaustive fire in zone IV, the scanner room;
- And the fire personnel determines that there is no other alternative than to entering the room with axes or other heavy gear when fighting a fire.

Table movement in the event of a power failure

- Pull the participant table and participant manually out of the magnet bore (use your weight). Use the handle at the foot end of the participant table.



Performing a table stop

There are two Table Stop buttons for stopping the motorized movement of the participant table in case of an emergency.

- Press the Table Stop button on the participant table; there is a button on both the right and the left side of the magnet.
- Press the Table Stop button on the intercom.

The tabletop comes to an immediate stop. The control panel starts to flash and the STOP button lights up red on the display. The brakes are released. The tabletop may be moved horizontally by hand using the handle at the food end.

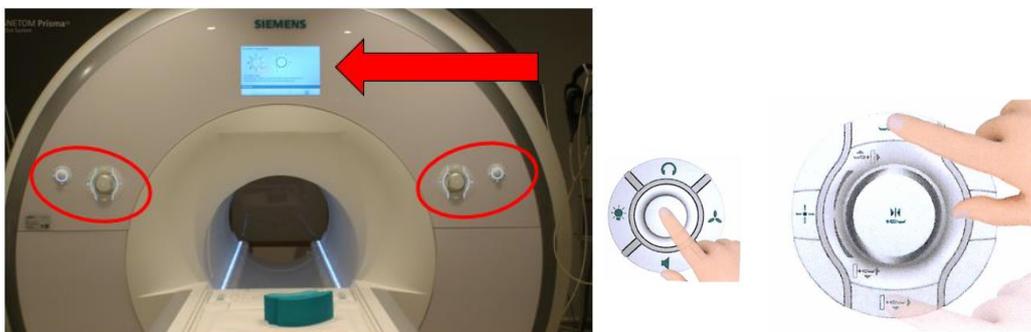


Situations requiring a table stop:

- In case of an accident
- In case of risk of injury or damage to IV lines/cables due to table movements

Releasing the Table Stop - After the danger has been identified and eliminated, participant table operation may be resumed. The display on the MRI scanner above the gantry explains you what to do: *“To release the table, press the jog wheel and then press the up and the down buttons simultaneously.”*

If the control panel stops flashing and you hear the table connecting, the table stop was successfully released.



Reporting of safety incidents or near-incidents

All incidents or near-incidents must be reported in person or by email to the GifMI Site Manager/Research Assistant as soon as possible and no more than 24 hours after the incident.

VI. THE GIFMI MRI FACILITY

MRI Control room

This is where research team (operator + assistant) operate the MRI scanner and peripheral equipment.



- (1) Window to examination room.
- (2) Siemens Alarm box: to switch the MR system on and off, display of alarm signals, quench button.
- (3) MR Acquisition Workplace to control and monitor the main functions of the MR system: participant registration, MR imaging, Image reconstruction and Image display. The MR images and all interactive dialog boxes are displayed on a high-resolution 18" LCD color monitor.
- (4) Communication system: allows personnel and participants to communicate from a distance during the examination (obligated). It is used for transmitting live announcements to the participant in the scanner and for transmitting the participant's responses. There is one system by Siemens and one ANC (Active Noise Control) System. There is an LCD video display as well that ensures a view of the participant during the scan.
- (5) Stimulation station: where you set the paradigm that needs to be presented to the participant.
- (6) Peripherals: materials that can be used for functional imaging and physiologic monitoring.
- (7) Personal Computer with auto log-on to create QP-numbers for participants.

MRI scanner room

This room is used for the scanning of the participant by means of an MRI scanner.



Receiver coils, a projector and peripherals are available.

The door to the MRI scanner room

- should be closed when the scanner is not in use, as the most effective way of preventing anyone to enter the scanner room.
- should be locked when the scanner is off. The key is saved on a hook near the intercom system.



To use the MRI control and scanner room, it is mandatory to make a reservation on the GifMI website.

Equipment in the MRI scanner room

MRI coils

The default coil for neuroimaging is the 64 channel head coil; many other dedicated MRI receiver coils are available.



Put every coil back in place (see the labels on the closet) and peripheral equipment after use. Phantoms are stored in the closet. They often contain carcinogens, handle with care. Phantoms can be used to test sequences without having to put a participant in the scanner.



Supportive equipment (cushions, sand bags, ...)

Cushions and sand bags may be used to stabilize the position of the participant. Use of these materials may not lead to any discomfort for the participant.



BOLD screen

A BOLD screen 32 UHD monitor is used for the presentation of paradigms for functional MRI.



Safety - The monitor and trolley are safe to use in the 3.0 T field (safe for field strengths up to 7.0T). Under no circumstances should the hybrid or DC cable be inside the magnet bore, be touching, or be within reach of the patient/participant being scanned.



Figure 5. Hybrid cable (not to scale).

Moving the trolley - When pushing the trolley with the monitor attached, do this slowly and carefully. Note that eddy currents near the magnet may cause resistance to motion in some directions.

Position of the monitor - The optimal position of the monitor relative to the magnet will depend on the visual angle required from the display and/or the area of the display required to be visible. The active region of the monitor, i.e. the area filled by the video, is 698.4 x 392.9 mm (see Figure 16). The diagonal is 801mm.

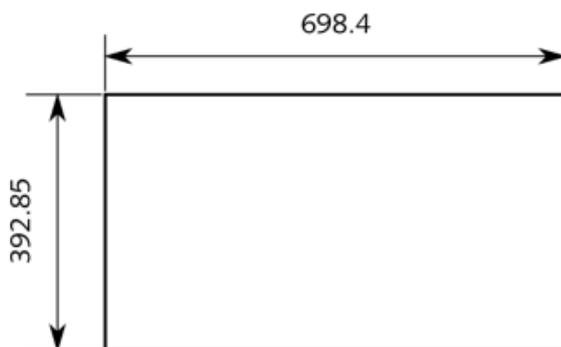
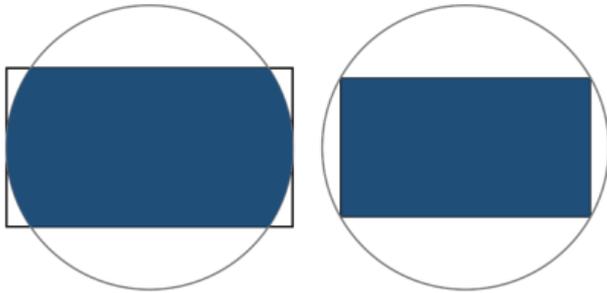


Figure 16. Dimensions of the active area of the monitor, in mm.

Optimal offset from end of the bore – Examples of how the position of the monitor (black rectangle) relative to the exit of the magnet bore (grey circle) affects the visible region (blue) when viewed from inside the bore. Top left: monitor positioned so that full width is visible.



Bore diameter	Screen area visible	Approximate offset from end of bore	Horizontal visual angle
60cm	Full width	16cm	33.4°
60cm	Full area	34cm	29.3°

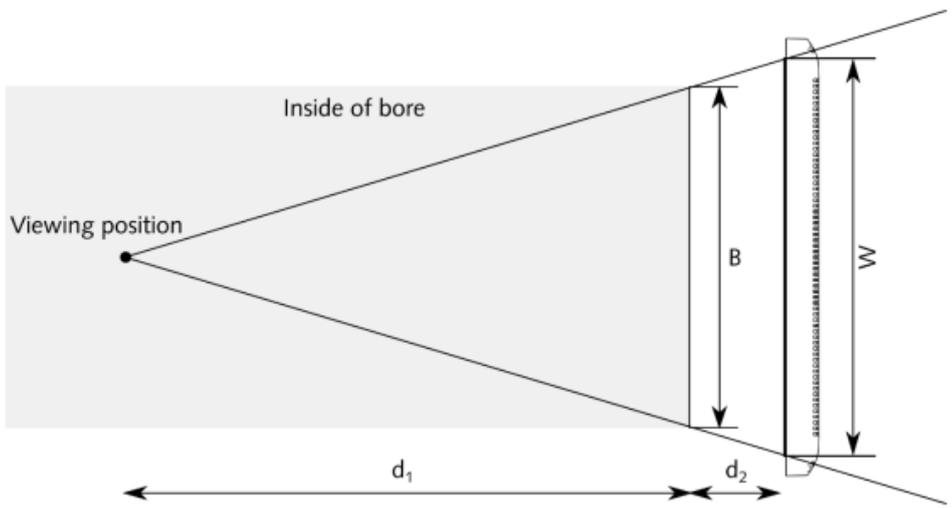


Figure 17. Geometry of the position of the monitor relative to the bore.

Turning ON - The BOLDscreen 32 UHD has three power states. Pressing the Monitor POWER button will cycle the monitor through the three power states.

State	Description
Standby	The monitor is in low power mode. The LCD panel and backlight are not powered, but some of the internal electronics are still active. The status LED will blink green. This is the default state when power is connected.
On	All components of the monitor are powered on. The status LED will be solid green. If the monitor receives a valid video signal, an image will be displayed and the status LED will turn solid blue.
Off	All but the minimum electronics required to power on the monitor are off.

- Press the POWER button on the LCD monitor in the scanner room; the status LED will blink green when the monitor is in standby (default state). A single press is required to switch from standby to ON before an image can be seen.
- Press the POWER button on the AVI hub. Pressing this button will toggle the AVI hub from standby to ON. It also sends these commands to the monitor so the system can be toggle from the AVI hub only.
- The system can be left in OFF state.



For an extensive description, check the documentation on the website.

Preparation room

This room is used for

- storage of the AED and crash cart (1)
- storage of MR safe fire extinguishers (2)
- the preparation of participants; MRI compatible stretcher available (3)
- storage of medical care equipment (4)
- waste management (5)
- access to the toilet (6)
- access to the department of Radiology of the hospital (7)
- access to the MRI scanner room (8)



Meeting room Hippocampus

This room is used for

- organizing MRI-related meetings; a beamer and screen are available.
- the preparation (information, cognitive testing, ...) of participants.



To use the MRI control room, it is mandatory to make a reservation on the GifMI website.

VII. MRI GENERAL KNOWLEDGE AND CONCEPTS

Switching ON the MRI system

The user who arrives first in the morning is responsible for the start-up of the scanner.

1. **Alarm Box:** Turn the key clockwise to the 'open lock' symbol and press **SYSTEM ON**

Estimated booting time: 3 minutes.

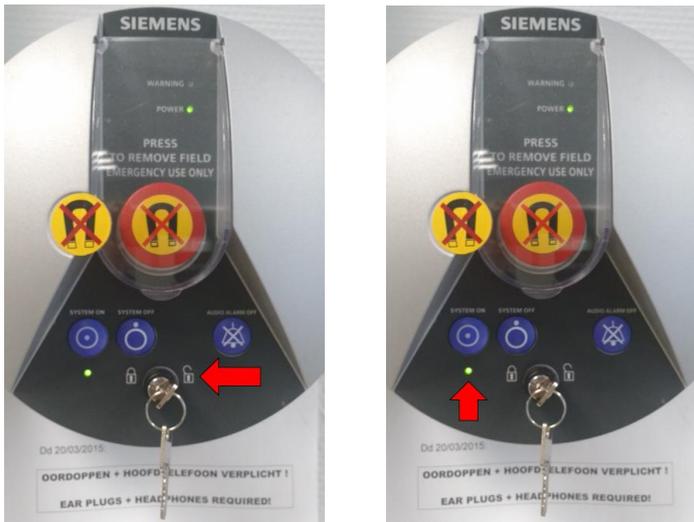


Fig. Key turned to the 'open lock' symbol / Blue button SYSTEM ON

2. **System Check**

Wait for the HOME screen to appear before performing preliminary examination steps (e.g., moving the participant table, connecting coils).

SYSTEM CHECK > Green arrow = the system is ready for scanning! It is now safe to manipulate the table, to put the coil of your choice in place and measurements may be performed.

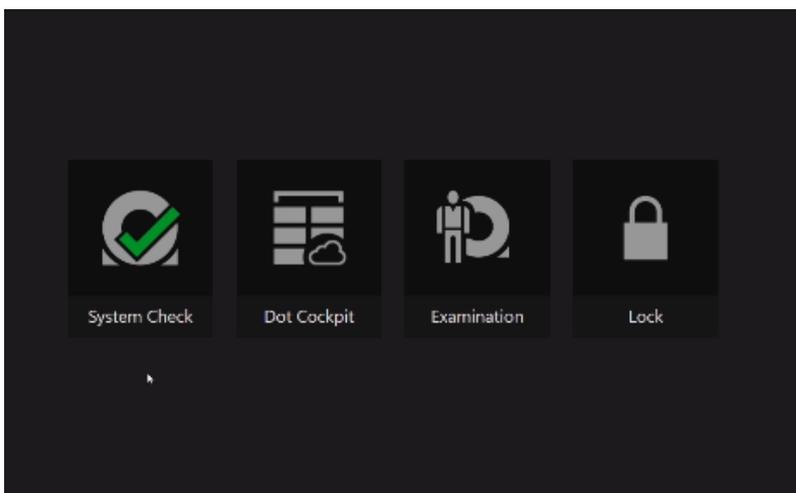


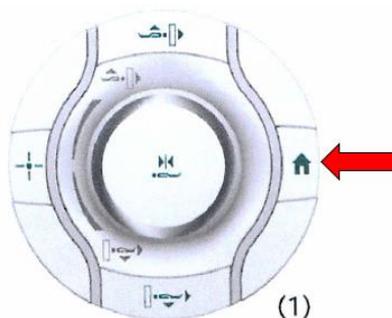
Fig. HOME screen with green arrow for System Check.

Switching OFF the MRI system

The last user of the day is responsible for the shut-down of the scanner.

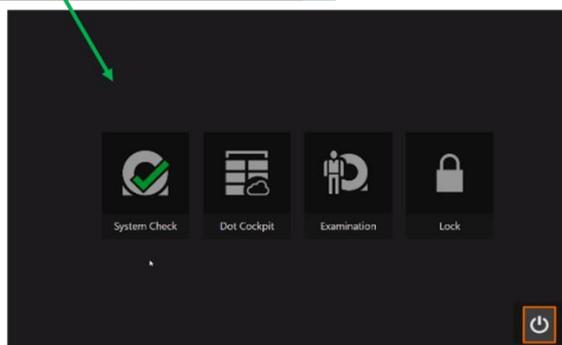
1. Scanner bed conditions

- Scanner table in the HOME position (press the HOME button on the control panel) = maximum out, maximum height.



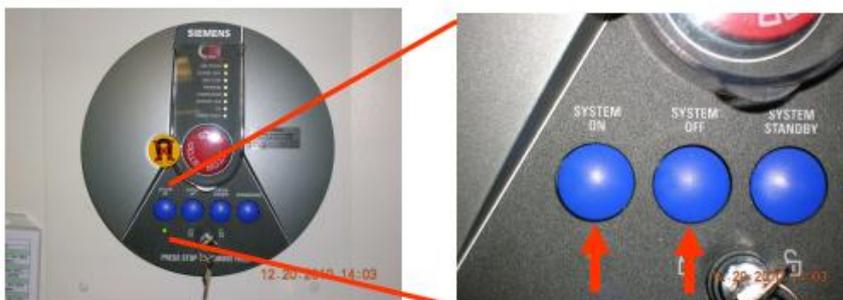
2. LEFT MONITOR

- Go to HOME screen - Shutdown button – ‘Shut Down system’.
- Wait for red lights flickering on the Siemens intercom unit AND a completely black screen.
- Estimated shutdown time: 7 minutes.



3. ALARM BOX

- Turn the key counter clockwise towards the ‘lock’ symbol and press ‘SYSTEM OFF’.



➤ **!!! BEWARE THAT THE MRI SCANNER IS OFF, BUT THAT THE MAGNET IS STILL (AND ALWAYS) ON!!!**

Tidying up the GfMI MRI Facility

MR Scanner room

- All supportive equipment (sand bags, cushions, ...) in the assigned cabinet.
- All coils on the assigned counter tops.
- Waste (table paper, ear plugs, tape, ...) in the blue bins.
- Disinfect equipment that came in direct contact with participants (coils, wires, table, headphone, ...) with the wipes and products provided. Put used linen property of the hospital in the white laundry bag.



Console room

- Switch off every component of the peripheral equipment.
- Switch off the scanner at the end of the day; leave it on when someone else has booked the scanner that same day.
- Chairs in place.

Closing the MRI Facility

- Turn off all the lights.
- Lock the door of the scanner room (put the Siemens key on the intercom system), the console room and the MRI building (same key).
- Leave the MRI scanner Facility as neat as you found it.

Communication

Siemens intercom

Note: this system doesn't fit in the 64 channel head coil. Move towards the ANC.

The Siemens intercom allows operators and participants to communicate during the examination. In addition, some important operations like signaling patient alert and stopping the patient table can be managed from the intercom. It also allows to play music in the examination room via the loudspeaker or the headphones. **This system provides only moderate noise reduction and has to be combined with the use of earplugs (available at the facility)!**

It works with air conduction and must be connected at the foot end of the scanner bed (1).



The Intercom system is a half-duplex system which means that only one communication channel is open at the time. This means that it is not possible to talk and listen to the participant simultaneously. The default open channel is from participant to operator.

Talking to participant 1. Press **2** to open the communication channel, keep pressed to keep the channel open. 2. Adjust the volume by pressing the + or – buttons. If the buttons are pressed for about one second, the volume increases/decreases until the button is released. This is the volume for the participant.

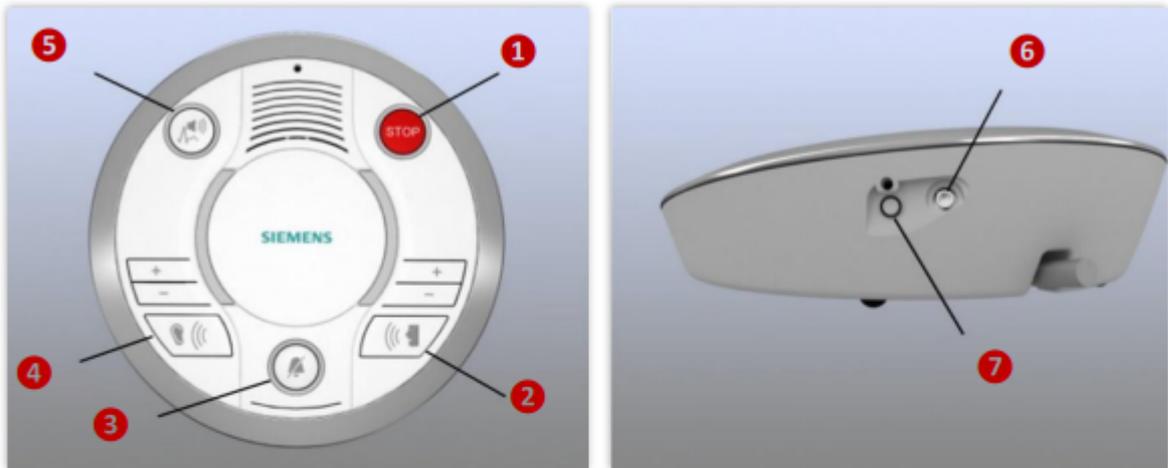
Listening to participant 1. If applicable, release **2** to open the communication channel. 2. Press **4** to open the communication channel, releasing the button will have no effect. 3. Adjust the volume by pressing the + or – buttons. If the buttons are pressed for about one second, the volume increases/decreases until the button is released. This is the volume for the operator.

Transmitting music 1. Connect a suitable cable from the audio source (stimulus PC, smartphone, computer, ...) to the audio input connector **6**. 2. Start the music at the audio source.

Patient alert Participants may use the squeeze bulb to alert the operating personnel (patient alert):

- Acoustically
 - Continuous tone over the intercom
 - Brief feedback signal via the participant's headphones and loudspeaker in the examination room
- Visually:
 - Blinking button on the intercom
 - Message on the Dot display in the examination room

The alert can be reset by pressing the Reset Patient Alert **3** or the Talk button **2** on the intercom. Alternatively, the alert reset is possible at the control unit in the examination room



Button/Connection	Description
1 Stop button	Stop the table movement and the measurement immediately
2 Talk button	Allows speaking to the patient (when holding button press)
3 Reset Patient Alert button	Resets the patient alert
4 Listen button	Enables listening to the patient in the examination room
5 Physio Signal button	Switches the transmission of physiological signals on/off
6 Audio input	3.5 mm jack input from audio source
7 Reset Stop button	Resets the table stop

OptoAcoustics OptoActive system (ANC)

Note: This system can be used in combination with any coil, especially the head coils.

This system has to be combined with the use of earplugs (available at the facility)!

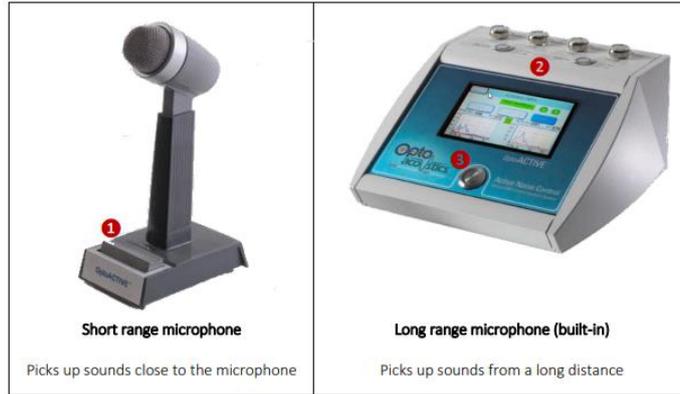
Switch on the ANC system with the **POWER BUTTON** on the back.



The OptoActive system is a half-duplex system which means that only one communication channel is open at the time. This means that it is not possible to talk and listen to the participant simultaneously. The default open channel is from participant to operator.

Talking to participant The system is equipped with two microphones. The instructions below are valid for both microphones. 1. Press **3** to open the communication channel, keep pressed to keep the channel open. 2. Adjust the volume by turning the right knob (see user manual).

Listening to participant 1. If applicable, release **3** to open the communication channel. 2. Adjust the volume by turning the right knob (see user manual)



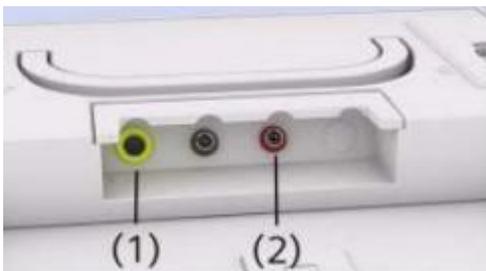
Tips

- Make sure that the large button **1** in the front is pressed and locked! If not, the participant will not hear the operator. Use only button **3** to talk to the participant
- Position the headphones on the participant and be sure to use pads or paper towels to take up the extra space between the headphones and coil (this is especially important for active noise cancellation).
- This system can be used together with the Siemens Intercom system. Use both systems simultaneously to have full-duplex communication.
- To reboot the system, turn off the power switch on the back of the console – wait at least 20s – then turn it back on
- Read the manual on the GfMI website.

Squeeze ball (participant's alarm)

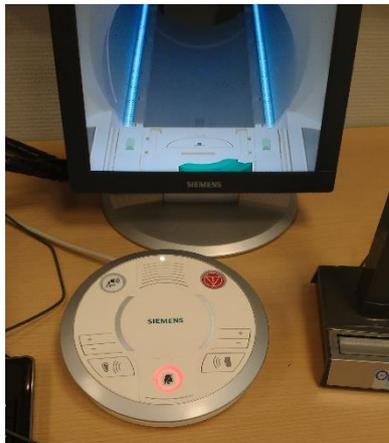
The scanner is equipped with a squeeze ball that allows the participant to set off an audible alarm to attract the operator's attention. Making the squeeze ball available to participants is mandatory during the entire protocol. Show the participant how to activate the alert by pressing the squeeze bulb.

The squeeze ball is connected at the foot end of the bed (2, red).



Responding to a squeeze ball alarm

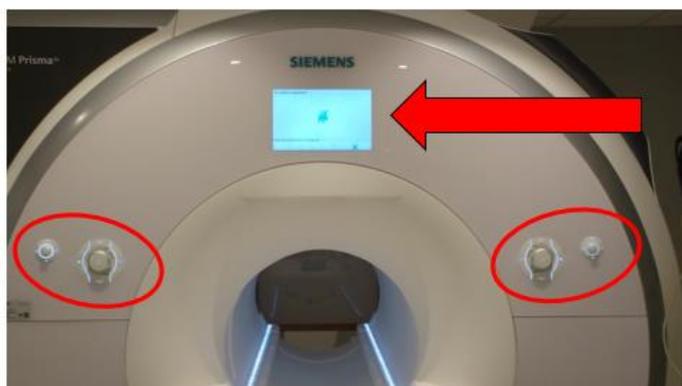
- If the participant alert is activated, a continuous audible alarm is emitted via the Siemens intercom and the red alarm button LED lights up.



- If a scan is ongoing, stop the sequence.
- Press the alarm button (4) to deactivate the alert, ask the participant why he/she requests to stop the scan (1) and listen to the participant (2). Make sure that the volume is turned up so that you can hear the subject's response. If necessary, enter the room to further investigate and correct the problem.



If the participant alert is activated when you are still in the scanner room yourself, you may as well turn off the alarm while you remain with the participant. The display on the MRI scanner above the gantry explains you what to do: *'Press jog wheel to turn off nurse call!'*



Video camera and display

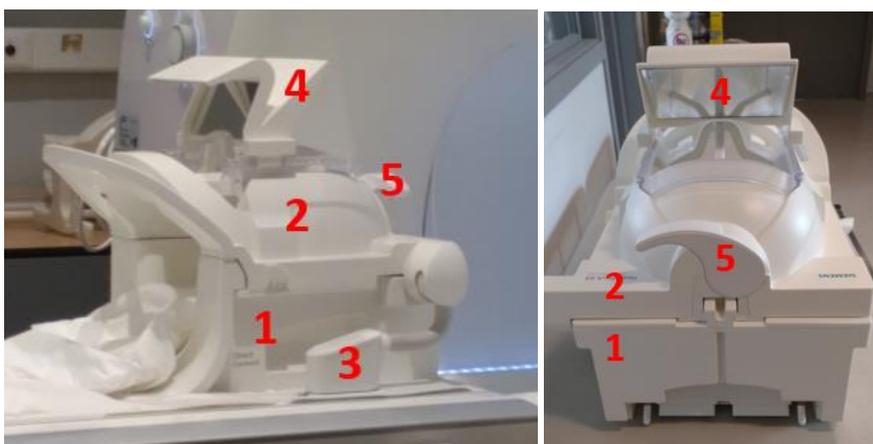
At the foot side of the magnet bore, a video camera ensures the best possible view of the participant. The image taken by the video camera is displayed on the LCD video display in the control room.



The 64 channel head coil

The 64 channel head coil consists of the following components:

1. Head support
2. Front panel
3. 1 external pug that fits in a coil socket
4. Mirror
5. Lever to open the head coil



Practical issue:

- The 64 channel head coil ensures the smallest possible distance between the coil and the participant's head and is therefore the default head coil to use for neuroimaging. If a participant's head doesn't fit in, try the 20 channel head coil instead; be aware of the lower SNR.

Installing the 64 channel head coil (head support)

- The coil sockets for the head coil are located at the head end of the table (closest to the bore).
- Position the head support at the head end of the table.

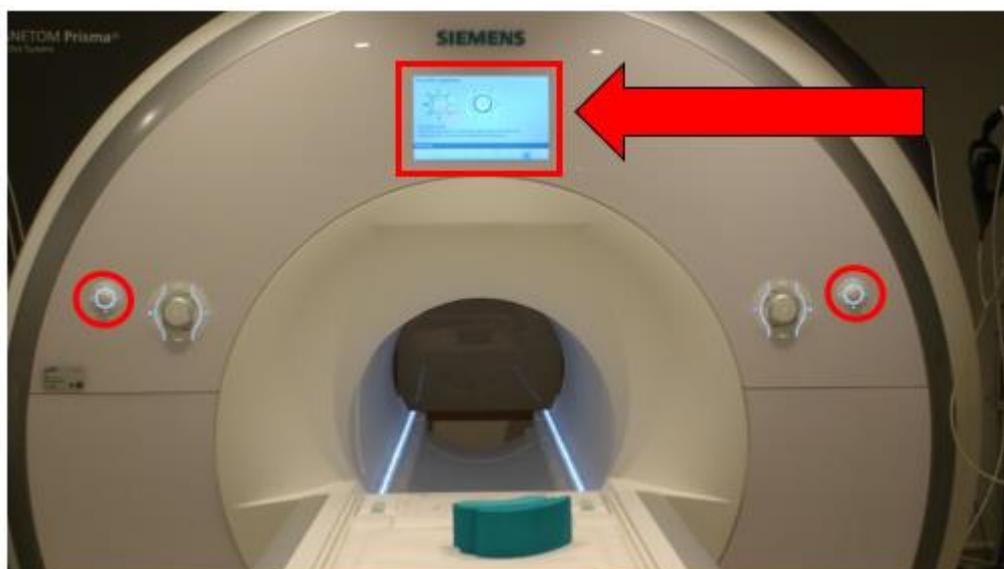


Push towards the magnet bore to connect the coil with the socket. Check on the display to confirm good connection: *'Head/Neck 64 posterior'*.

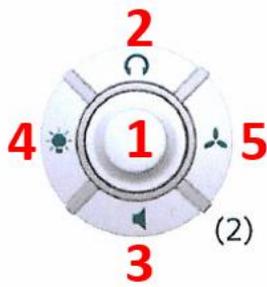
Table Operation

The display

The display is found above the magnet bore on the front side of the magnet.

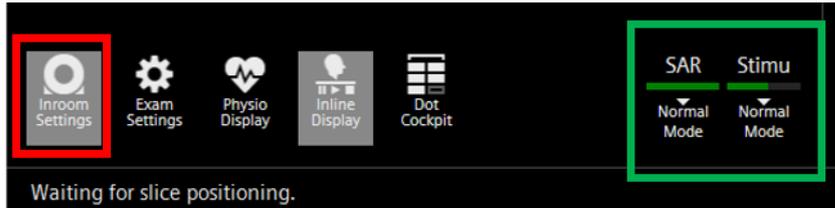


This display contains a lot of information on the participant, the position of the table relative to the isocenter, the connection of the selected coils, how to solve problems (release a table stop, release alarm, ...). Press the jog wheel to navigate.



1. Press to navigate on the display
2. Speakers in the scanner room / bore
3. Volume in the headphone
4. Light intensity in the scanner bore
5. Ventilation intensity in the scanner bore

You can also set this from a distance, from the MR acquisition workplace – Inroom Settings.



Control panel

Two control units are available at the magnet bore opening to move the tabletop into and out of the magnet bore, once the participant is positioned on the tabletop. The display indicates the status of the functions performed via the control units and gives error indications.

	<p>A. Control Panel B. Jog wheel C. Display</p>
	<p>CONTROL PANEL</p> <ol style="list-style-type: none"> 1. TABLE UP/IN 2. TABLE DOWN/OUT 3. CENTER 4. LASER LIGHT 5. HOME <p>JOG WHEEL (ambient conditions)</p>

Moving the participant in the bore

1. MOVE THE TABLE UP TO MAXIMUM HEIGHT

There are 3 ways to do this

- HOME automatically moves the table to maximum height;
- UP until the desired height has been reached;
- CENTER rotate until the desired height has been reached;

Once the maximum height is reached, the table will move inward into the magnet bore, unless you release the button.

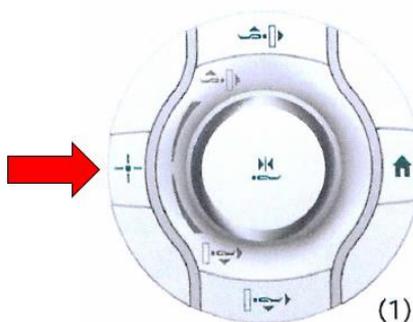


2. POSITION THE COIL ON THE ANATOMY OF INTEREST

3. CROSSMARK THE REGION OF INTEREST (ROI)

- IN to move the table slightly inward;
- LASER LIGHT to switch the laser light ON and crosshair the center of the ROI;
- LASER LIGHT to switch the laser light OFF, this marks the center slice.

(Ask participants to keep their eyes closed during the positioning procedure as the laser beam can cause eye injury)



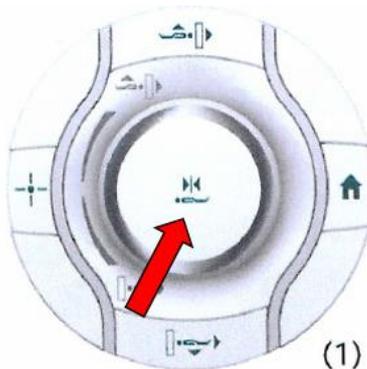
4. MOVE THE ROI TO THE ISOCENTER

The center slice of the ROI has to be aligned with the isocenter of the magnet bore.

- **SLOWLY – IN** - The speed increases as the knob is turned further. The table immediately stops moving when you release the rotary knob.



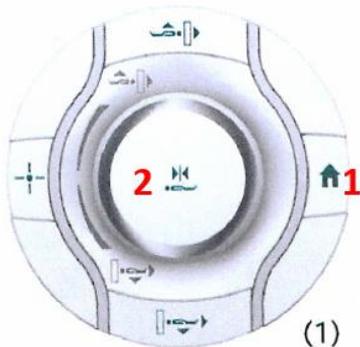
- **QUICKLY AND AUTOMATIC** - Press the CENTER knob for two seconds. The tabletop moves into the magnet bore



- **ULTRAQUICK**

Docked coils such as the head coil only require to

- a. Press the HOME button to move the table to maximum height.
- b. Press the CENTER knob for two seconds to move the table automatically into the magnet.



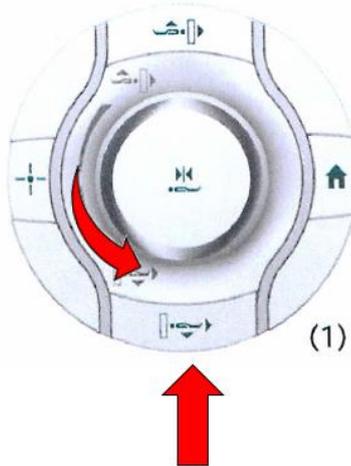
Remark: Correct positioning of the participant in the head coil is required: eye brows aligned with the center of the coil (mark).

Moving the participant out of the bore

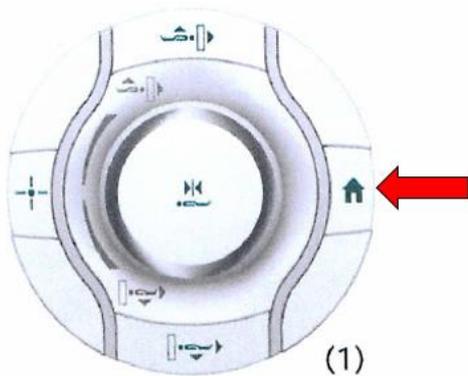
1. MOVE THE TABLE OUT OF THE BORE TO THE HOME POSITION

There are 3 ways to do this

- HOME automatically moves the table completely out;
 - OUT;
 - CENTER knob;
- SLOWLY – Press OUT or rotate CENTER knob ; the speed increases as the knob is turned further. The table immediately stops moving when you release the rotary knob.



- QUICKLY - Press the Home button once. The table will move out of the bore at a constant speed until the home position is reached.



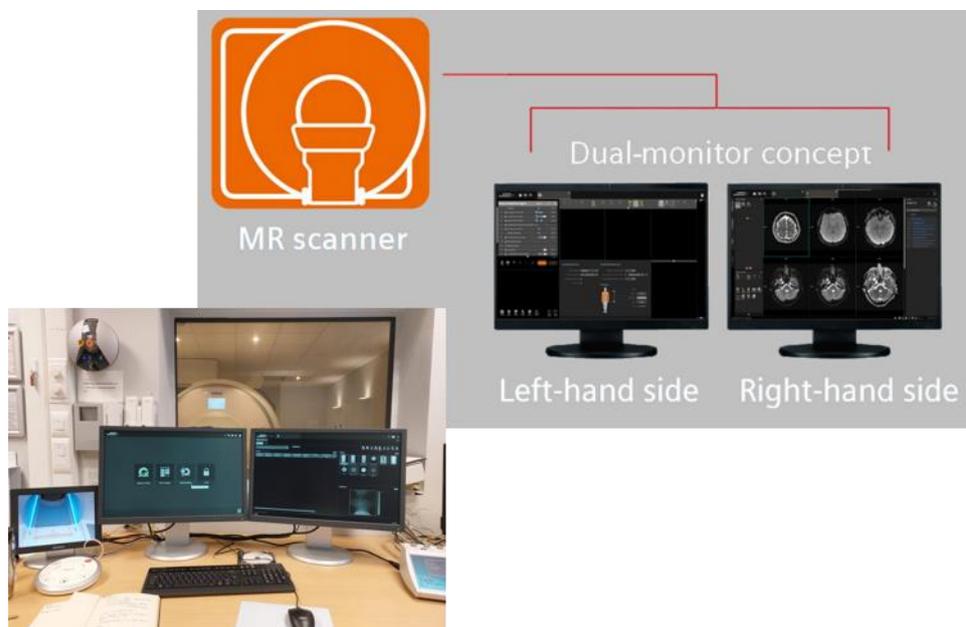
2. MOVE THE TABLE DOWNWARDS - To do this, there are two options:

- OUT or rotate CENTER knob.

SIEMENS Dual Monitor concept

Left screen = SCHEDULER + ACQUISITION

Right screen = VIEWING + POSTPROCESSING + TRANSFER



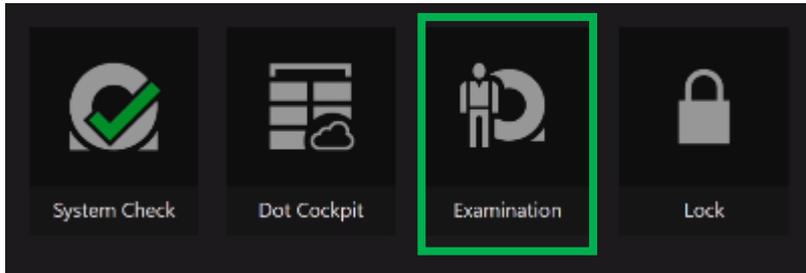
The keyboard

The MR system comes with an original Siemens keyboard. This keyboard is a modified Windows keyboard where the numeric keys have been replaced with symbol keys to access frequently used functions.

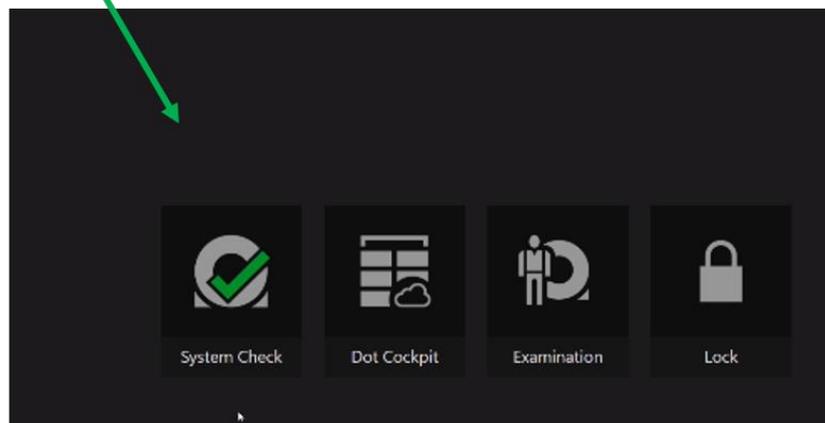
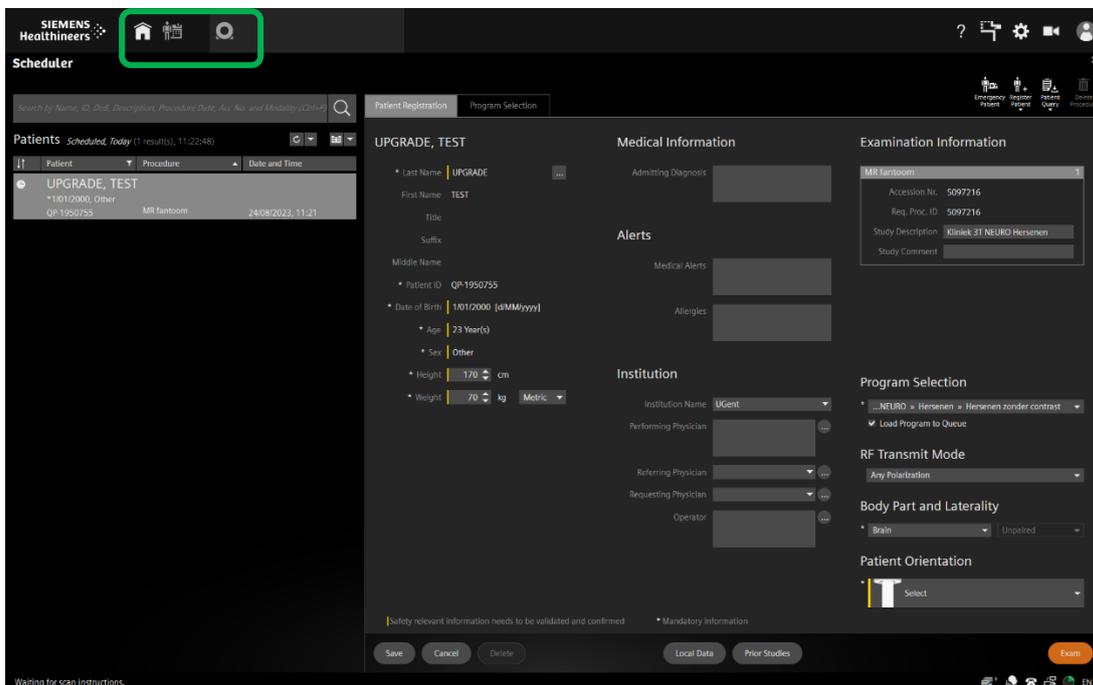


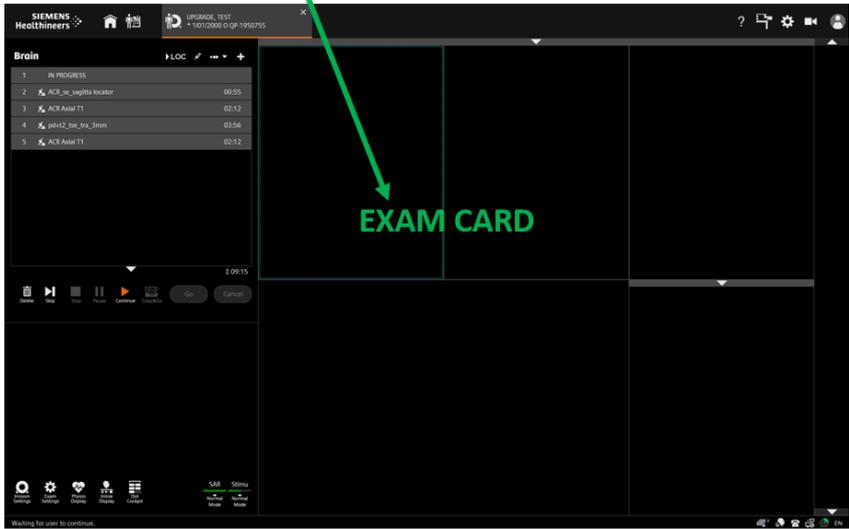
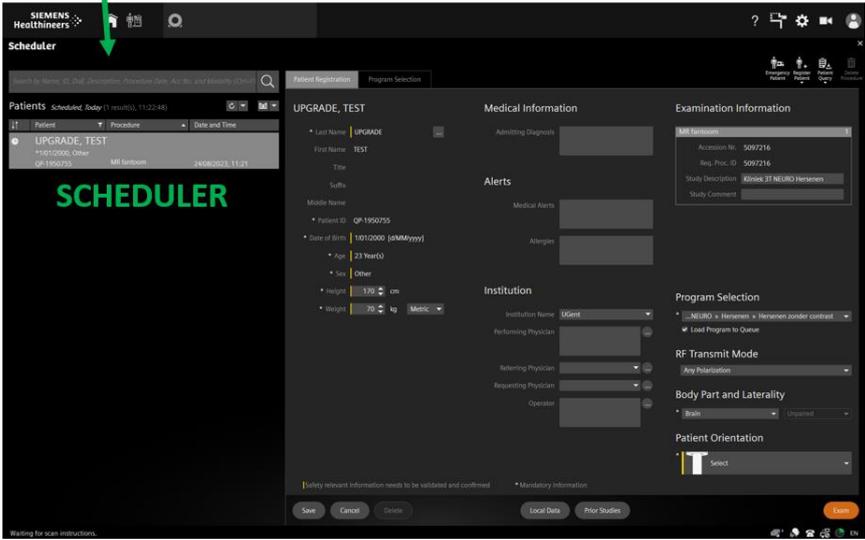
Left monitor

To start scanning, select EXAMINATION.



You can switch between HOME (fe to shut down the system), SCHEDULER and EXAM in the access bar.





Exam fields

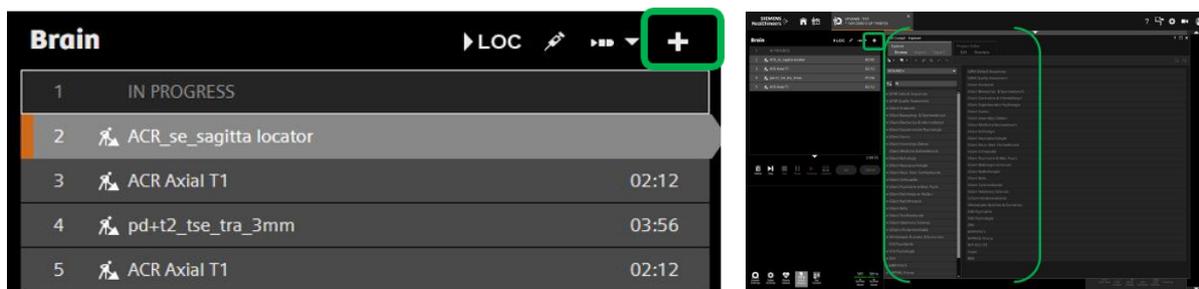
1. Presaved protocol sequences – if the protocol is selected correctly during the registration (by browsing in the RESEARCH tree), the sequences will be loaded automatically. It is good practice to check whether this is indeed your protocol. (*)
2. Toolbar
3. Positioning of FOV in 3 directions
4. Parameters files per sequence (the parameters of the opened sequence are displayed)
5. Inline display for live evaluation of the image quality
6. thumbnails of acquired data



(*)

In case you didn't select the correct protocol or in case you would like to add extra sequences to the loaded protocol:

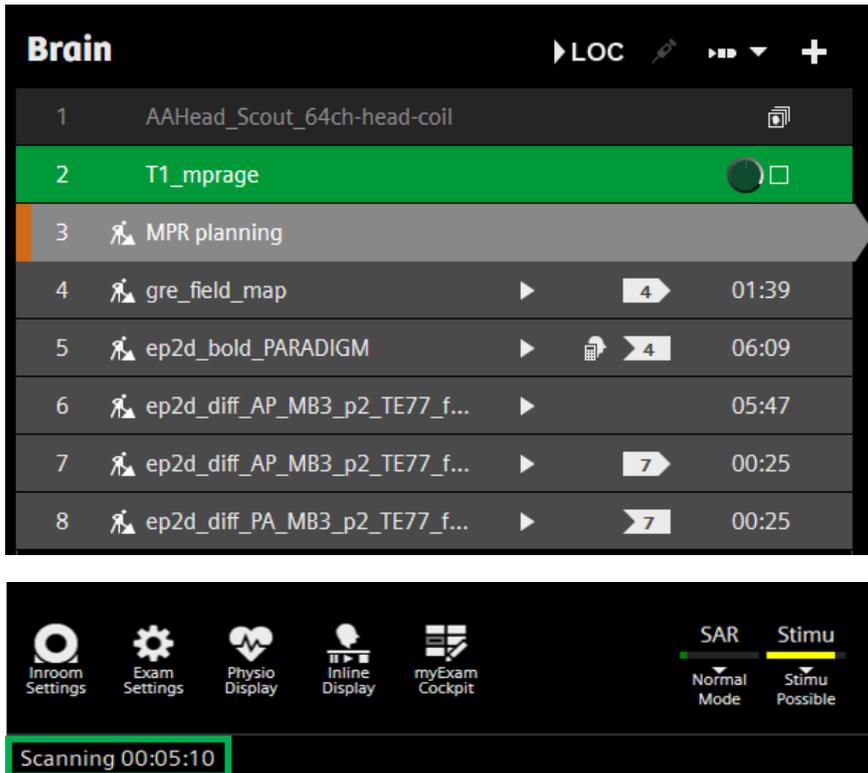
- Delete the listed sequences (select and press delete-button or right click and select delete)
- Click on the 'plus'-sign
- Browse to your protocol
- Drag to the examfield



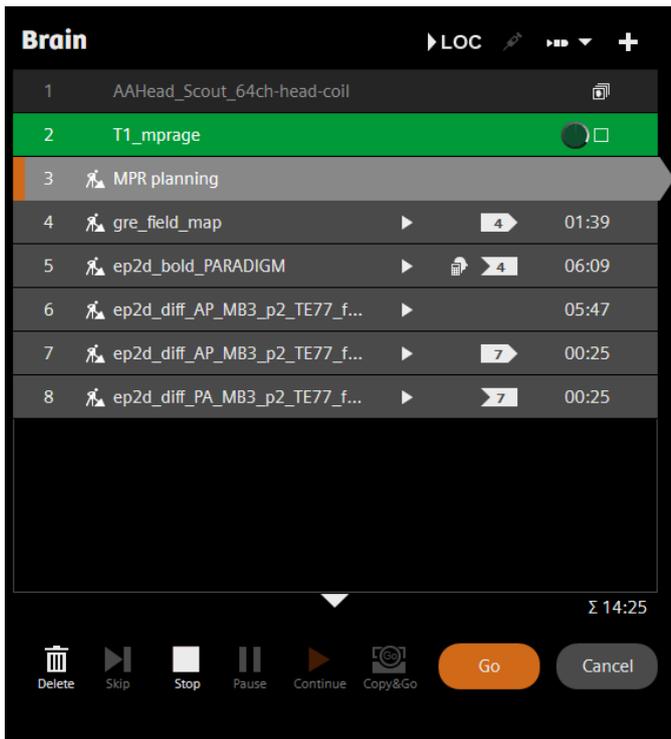
Guide around the colour code of the EXAM CARD

Sequences can have different colours, according to their status:

- Darkest grey Sequence is finished
- Green Sequence is currently running – the remaining scan time is at the bottom left
The next sequence in line will automatically open (light grey + arrow)
- Light grey Sequence is opened for positioning
- Medium grey Sequence has not been adapted (yet)



Guide around the buttons of the EXAM CARD



'Working man' - this sequence needs positioning before it can be run.



'Continue' - this sequence will require an extra press on the orange continue-button to proceed. This allows for preparative communication with the participant.



The orientation and slice position of the first sequence is copied to the second sequence.



Data is acquired and can be dragged and dropped in the positioning area.



A hollow head icon behind a sequence's name indicates that the reconstruction of those acquired data is still going on. When the reconstruction has completed, the head profile icon becomes solid. Add Program/Add Step - Press if you want to add sequences to your protocol.



To apply the positioning settings and changes to a sequence and to start a sequence.



Duplicates opened step and inserts it before the next opened step.



VIII. PARTICIPANT REGISTRATION IN RIS

Every participant being scanned at the MRI Facility must be registered in the Radiology Information System (RIS) from the hospital by means of a QP identification number. All images are back-upped in the Picture Archiving and Communication System (PACS) of the hospital.



Generating a unique identification number for a participant (QP-number)

Attention: one QP number per participant per study!!

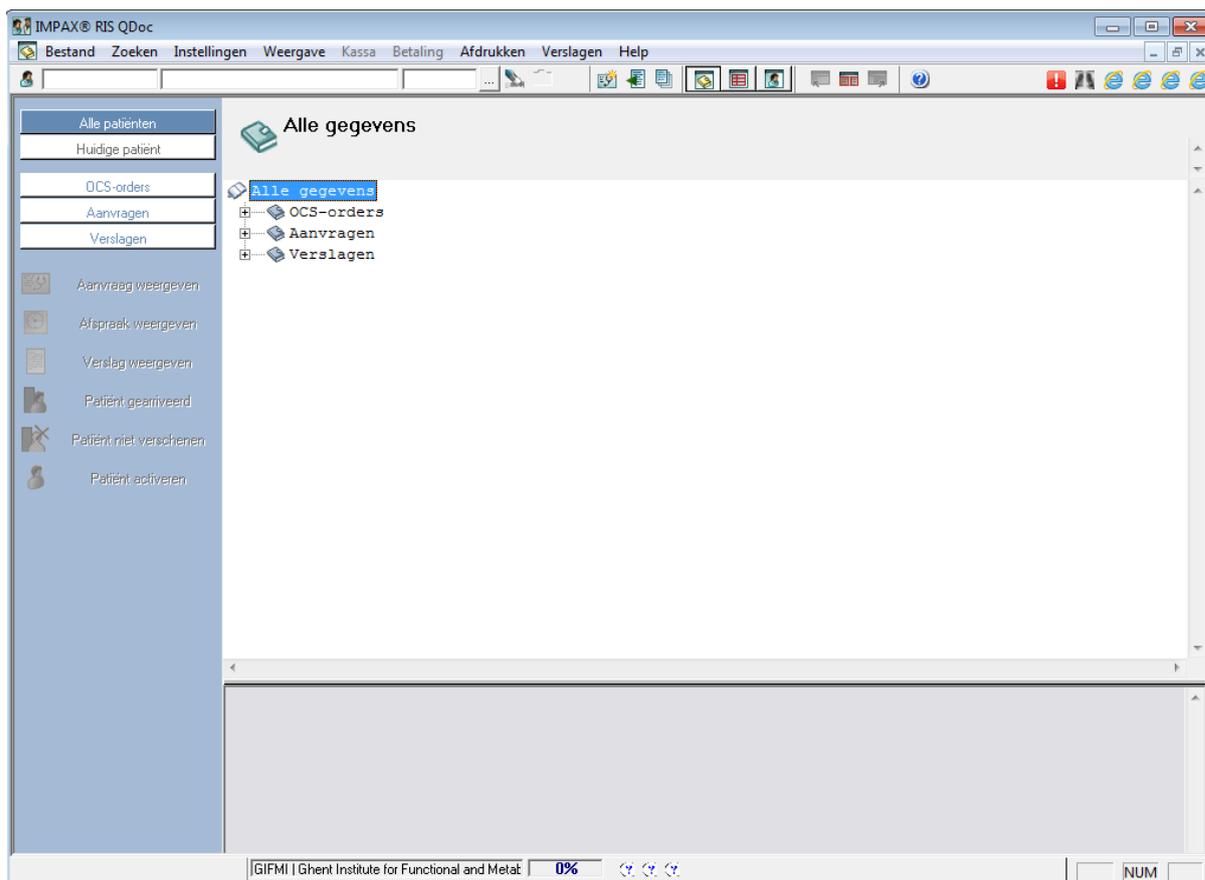
1. Start the personal computer (PC number UZ-11815). Auto log-in: no password or log-in needed.
2. Double-click on the desktop on the QDoc (shortcut).



3. Log in
 - Gebruiker: GIFMI (user name) No Caps lock
 - Wachtwoord: GIFMI (password) No Caps lock
 - Affiliatie: /

Database	QDOCP
Gebruiker	GIFMI
Wachtwoord	xxxxxx
Affiliatie	
<input type="button" value="OK"/> <input type="button" value="Annuleren"/>	

The browser of IMPAX® RIS Qdoc opens.



4. Click on the icon '...' and subsequently on 'Voeg toe' (Add).



5. Complete these fields only:



Due to GDPR it is not at all allowed to fill out personal data of the participant!

- **Familienaam (last name)** GSBxx.xxx f.e. GSB25.008
- **Voornaam (first name)** PIL (pilot), SUB (subject), CTRL (control), ... + number eg. SUB001
- **Geboortedatum (date of birth)** 01/01/birth year truthfully
- **Geslacht (sex)**

Confirm with 'OK'.

Patiënt

Algemeen | Info | Adressen | Artsen | Relaties | Extra | Verzekeringsgegevens | Opname | Dossier | Domein-ID's

UZ nummer: AUTOMATIC

SIS Kaartnummer

UZ nummer

UZ nummer extra

SIS-Code

DPI

Telefoonnummer

2de telefoon

Fax

Beroep

Titel

Gehuwd met

Familienaam partner

Voornaam partner

Aantal kinderen

Personeel VIP

Huisarts

Status: normaal

Familienaam: GSBxx.xxx

Voornaam: SUB001

Middelste naam

Geboortedatum: 1/01/2000 Geslacht: M

Adres

Extra straat

Woonplaats

Provincie

Regio

Land

Taal

Nationaliteit

OK Annuleren Toepassen

6. This generates the QP-number - record this in your files and use this number for every follow-up scan.

Confirm with 'OK'.

Kies patiënt

Patiëntcode zoals: QP-2057632

Familienaam: Voornaam: Middelste naam: Ook inactieve

Geb. datum: Geslacht: Patiënttype: Weergeven: Onbeperkte resultaten weergeven

Enkel patienten

Naam	G	Geboort...	Patiëntcode
Gsbox.xxx, Sub001,	M	1/01/2000	QP-2057632

Automatisch nieuwe patiënt selecteren

Voeg toe Wijzigen Verwijderen OK Annuleren

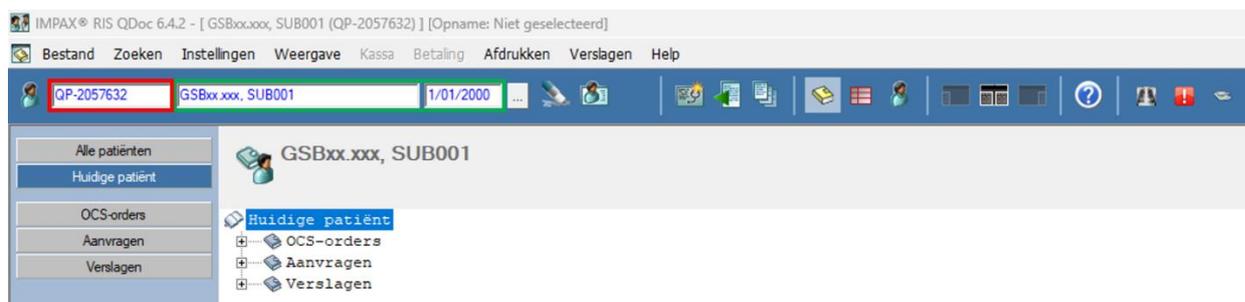
NUM

Creation of an MRI application form with the QP identification number

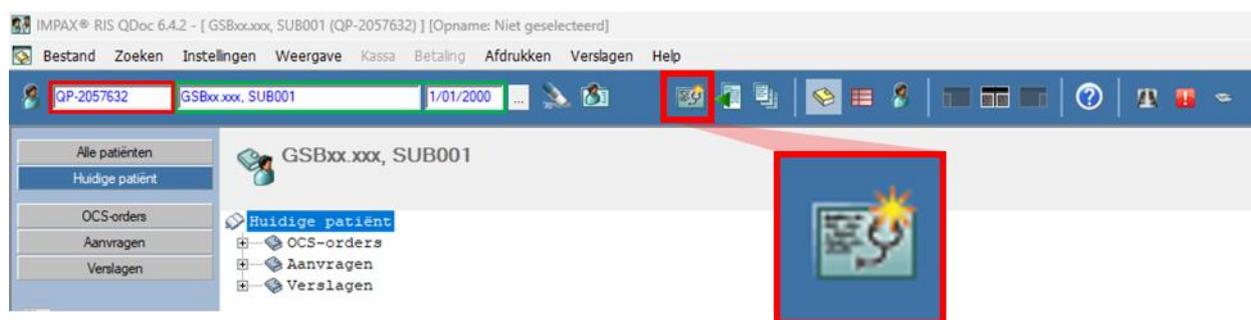
1. Red field: Fill out the QP-number and press TAB.

Subject name and birth date appear in the green field.

Remark: If a QP identification number has already been generated in the past for this participant but you cannot find it in your administration, enter the participant's name (type GIFMI_STUXXX, SUBJYYY) (green field) and press the tab key. The QP identification number will be displayed.



2. Click on the icon 'nieuwe aanvraag' (new application form).



3. INVOICING INFORMATION (A)

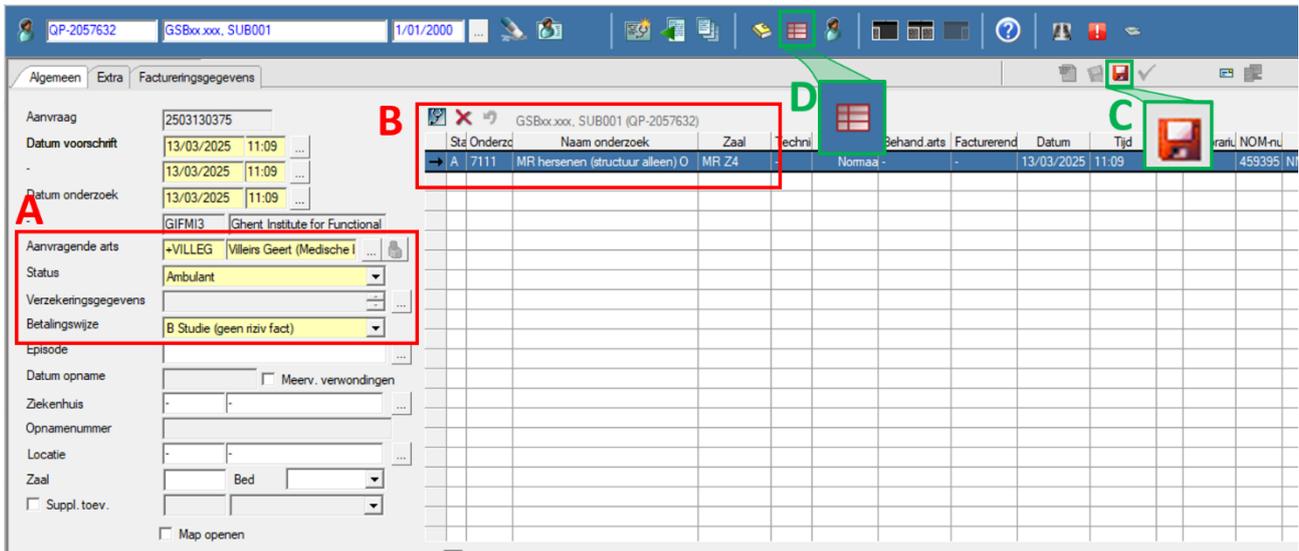
- Aanvragende arts +VILLEG (+tab)
 - Prof. Geert Villeirs (Head of Radiology) will be entered automatically.
 - If the PI is the referring physician, then you fill out his/her name here.
- Status Studies en dergelijke
- Betalingswijze B Studie

EXAMINATION (B)

- Add examination 
- Onderzoek 7111 (+ tab) MR hersenen structuur alleen
 - For other scan regions, position the cursor in the field 'Onderzoek' and press F3 to make a choice from the decision tree. Contact the GifMI research assistant for more information.
- Zaal MR Z4

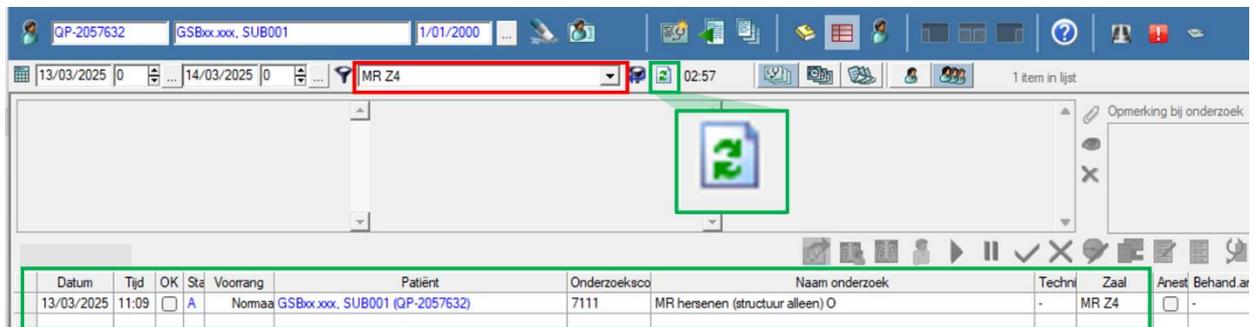
PRESS (C) to save the order.

Press (D) to return to the work list.



4. Select 'MR Z4' from the dropdown box and click on the icon 'verversen' (refresh).

Your examination is now scheduled in IMPAX® RIS QDoc and will be visible in the scheduler of the MRI scanner.

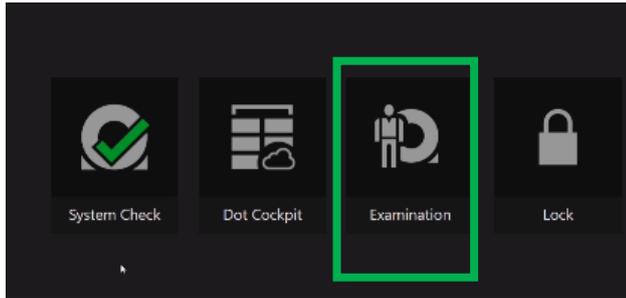


All administration is finished. You can now proceed to the scanner console (partim IV).

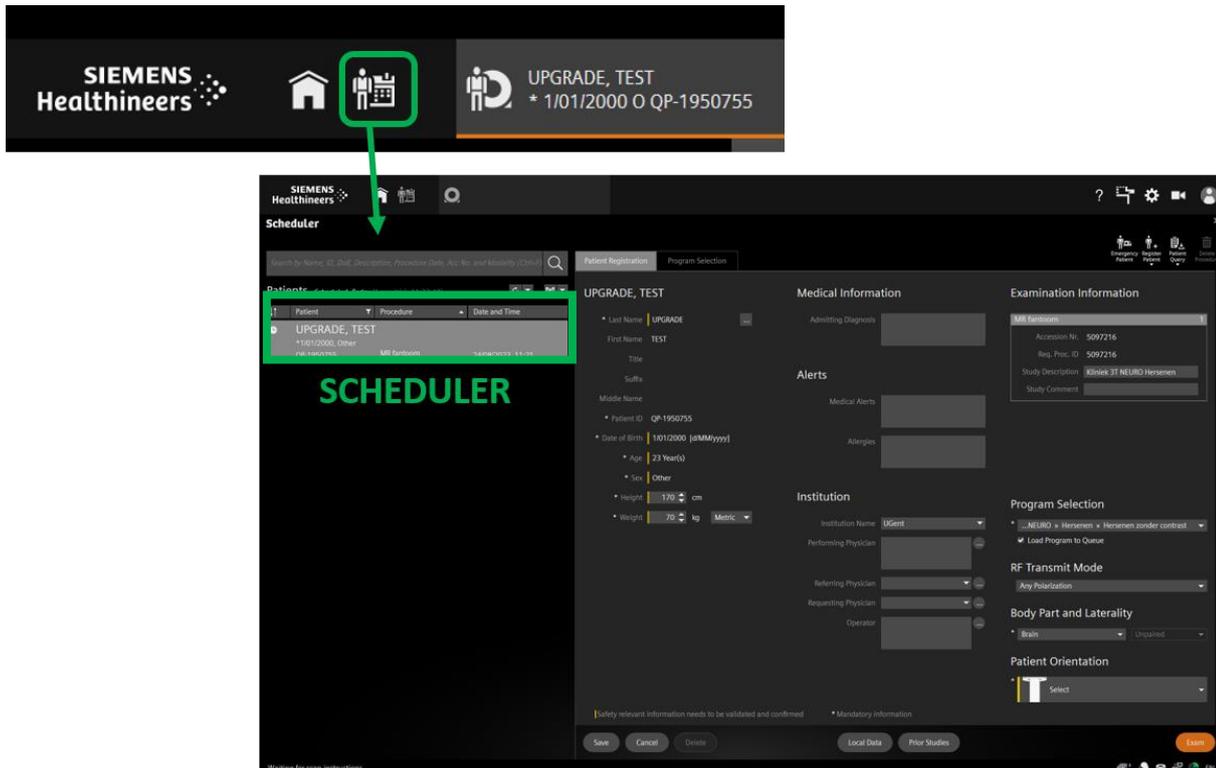
Retrieval of participant on the scanner console

Given that the participant is already registered in RIS, you no longer have to enter all the data manually on the MR scanner console. You can access the registered participant on the MR scanner console as follows:

HOME page – Select EXAMINATION.



SCHEDULER – Patient Registration - Select your participant from the scheduler that lists all the participants that are preregistered in RIS (QDoc).



Fill out the mandatory fields in the Patient Registration form.

1. Length and weight
2. Change Institution name to what suits best.
3. Program selection: roll out folder > other examination > browse through RESEARCH to select your study.
4. Transmit mode: 'any polarisation'
5. Body Part & Laterality: Brain
6. Patient Orientation: Head First Supine

The screenshot shows the 'Patient Registration' form with the following fields and callouts:

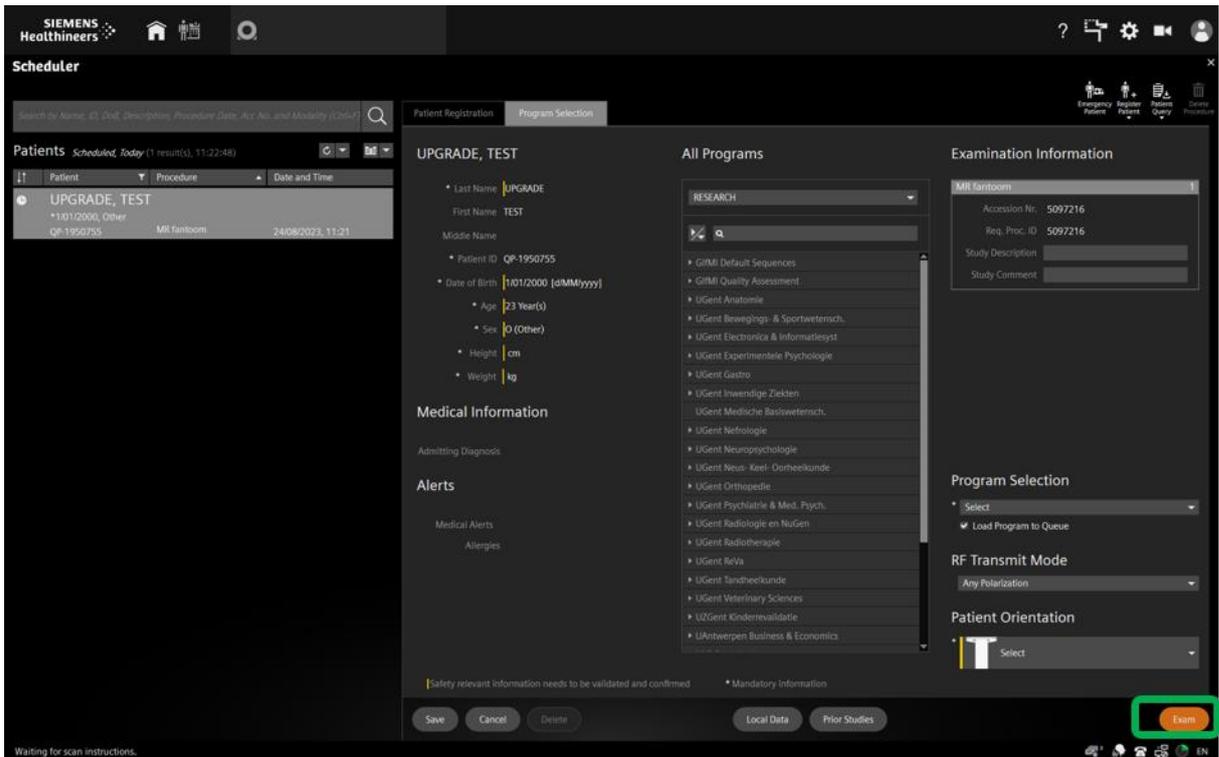
- 1:** Patient personal information (Last Name: UPGRADE, First Name: TEST, Patient ID: QP-1950755, Date of Birth: 1/01/2000, Age: 23 Year(s), Sex: Other, Height, Weight).
- 2:** Institution Name: UZ Gent.
- 3:** Examination Information (MR fantoom, Accession Nr.: 5097216, Req. Proc. ID: 5097216, Study Comment).
- 3:** Program Selection: ...NEURO » Hersenen » Hersenen zonder contrast.
- 4:** RF Transmit Mode: Any Polarization.
- 5:** Body Part and Laterality: Brain, Unpaired.
- 6:** Patient Orientation: T Select.

Callout boxes provide additional details:

- All Programs:** A list of programs including 'RESEARCH' and various clinical sequences.
- Patient Orientation:** A grid of orientation options:

P	Head First Supine	Feet First Supine
*	Head First Prone	Feet First Prone
R	Head First Lateral	Feet First Right Lateral
B	Head First Right Lateral	Feet First Left Lateral
*		
*		
P	Special Orientations ...	
*	Select	

- Click **EXAM** to move to the EXAMINATION CARD and to start scanning.



CLOSING THE EXAMINATION ADMINISTRATIVELY

- Select your MRI examination in the list.
- Change the *Status* field from 'S' (Started) to 'F' (Finished) by checking the box of the 'OK' field .

Datum	Tijd	OK	Status	Voorrang	Patiënt	Onderzoekscoo	Naam onderzoek	Technicus	Zaal	Anest.	Behand.arts
13/03/2025	11:09	<input checked="" type="checkbox"/>	F		Normaa GSBxx.xxx, SUB001 (QP-2057632)	7111	MR hersenen (structuur alleen) O	GIFMI	MR Z4	<input type="checkbox"/>	-

- Close IMPAX® RIS Qdoc.
- Shutdown the PC.

IX. PARTICIPANT PREPARATION

Administration

Each MRI study conducted at the GifMI MRI Facility needs approval of the Ethical Committee. Every participant has to read, confirm to have understood and sign the informed consent before the start of the scan session.

Every participant

- has to fill out the GIFMI_3T pre checklist and must be questioned orally to ensure that he/she doesn't carry any MRI-incompatible implants.
- must be registered in RIS (see section below).

Clothing

- Hair and clothing should be visually inspected for metal parts. Pockets must be emptied.
- Jewelry, bobby pins and bras are not allowed in the scanner!
- Shoes are not allowed on the scanner table!
- Careful with sportswear that could contain metal infused fibers to prevent sweat odor.

It is advisable to inform the participant in advance that clothing containing metal parts will not be allowed and therefor, to wear or bring comfortable warm, cotton clothing (long trousers, T-shirt or light jumpers with long sleeves), warm socks, a bra without metal for the ladies. This will improve comfort, but also prevents skin to skin contact to comply with which MR safety rules regarding the positioning.

It is good practice to let participants go to the toilet as the scan can take substantial time.

X. PARTICIPANT POSITIONING (FOR STANDARD BRAIN IMAGING)

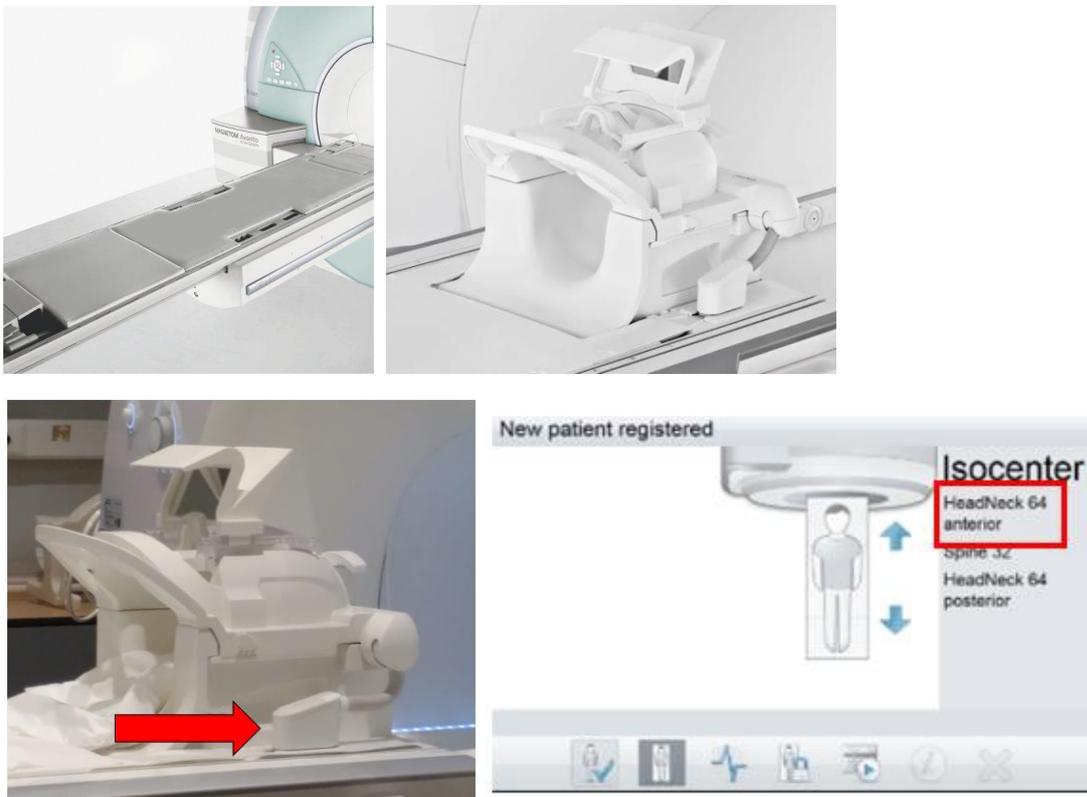
Comfort

- Place supportive cushions in the head support for comfort .
- Put the rest leg on the table for comfort and cover with paper. Prepare peripherals if needed.
- Get the earplugs ready.

Tip: Maximize the comfort, the slightest head movement will degrade image quality.

Coils

- Spine 32 coil – is standardly docked in the table; it remains installed for all examinations with the 64 channel head coil.
- 64 channel head coil – consists of 2 parts, displayed on the scanner monitor as 'Head/Neck 64 posterior' and 'Head/Neck 64 anterior'. Separate the parts, dock the posterior part in the table.



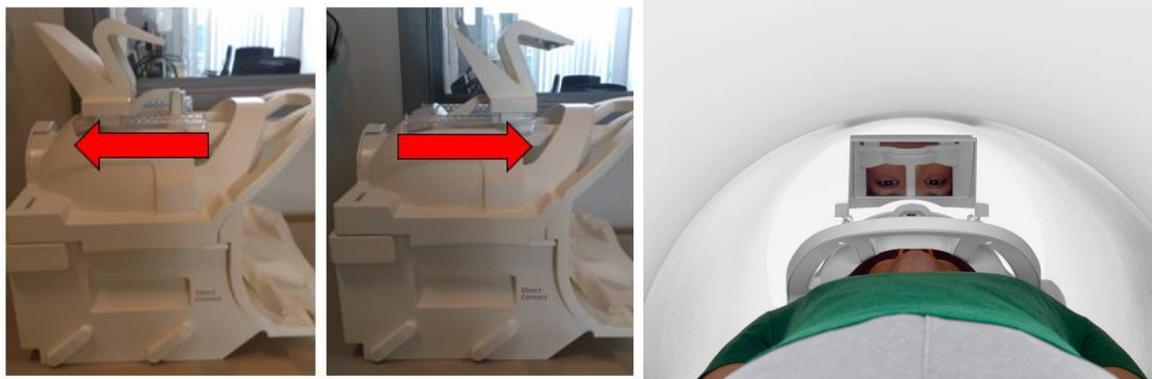
Positioning a participant

- Provide ear plugs.
- Have the participant lie down on the table, head as high up as possible in the in the head coil (posterior part).
- Place the leg rest in the knee crease.
- Place the ANC head phone.
- Secure the head with supportive cushions (but not too tight as this will start to hurt after ten minutes of scanning, causing more rather than less motion artefacts).
- Squeeze ball (alarm) in the hand; demonstrate how to use it.
- Put the head coil (anterior part) in place.

- Connect the external coil plug in the coil socket ('click!'). Check on the display to confirm good connection: 'Head/Neck 64 anterior'.
- The eyes should be centered in the holes of the front panel, the nose well centered. If it doesn't fit (participant's head is too big), let the participant move slightly downwards.

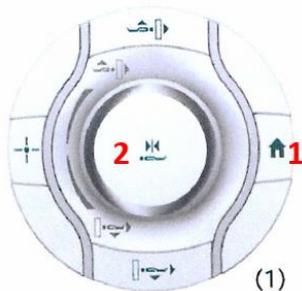


- Position the mirror so that the participant can either view the examination room or the fMRI screen.



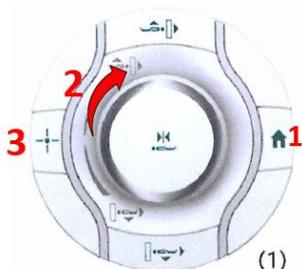
Landmarking a participant for a typical brain scan

Press the HOME button (1) once to move the table to maximum height.



QUICKLY

- Press the CENTER knob (2) for two seconds to move the table automatically to the isocenter of the bore.



SLOWLY

- Move IN slightly (2).
- Set the laser light (3) on the mark on center mark of the anterior part. Ask participants to close the eyes to prevent laser light eye injury.
- Turn off the laser light. (3)
- Rotate the knob to move the land mark to the; you can choose the speed by pulling harder or softer until the isocenter is reached (mentioned on the display).

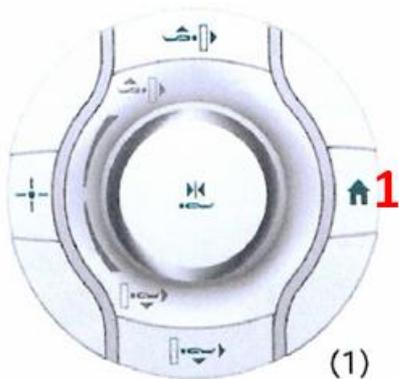
Before you leave the scanner room and close the MRI scanner room door, check whether

- the participant feels comfortable in the scanner.
- the participant can either see the fMRI screen if necessary or the control room, a mentor,

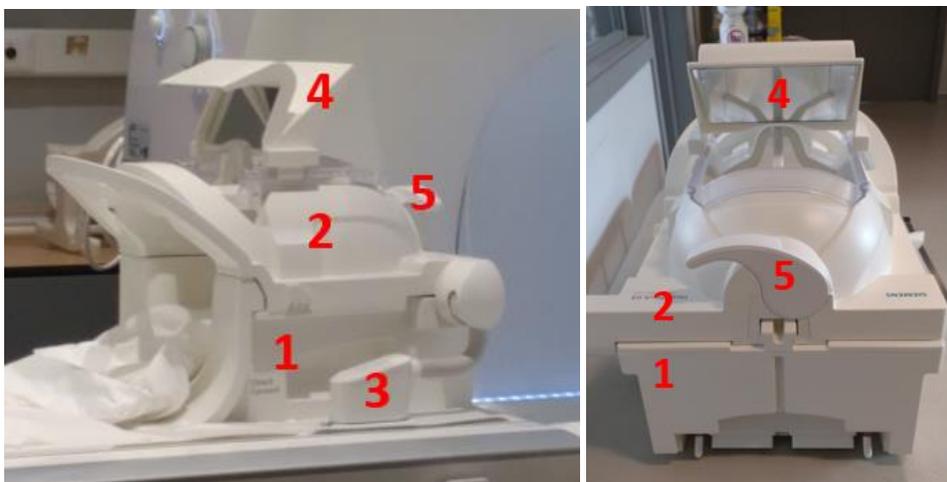
Blankets can be used for a participant's comfort if needed. Please note that only cotton, linen or paper should be used for covering, since radiofrequency energy may cause heating of synthetic fibers.

How to get the participant out of the 64 channel head coil:

- Press the home button to move the table out of the bore.



- Unplug the external coil plug (3) from the socket.
- Release the locking mechanism by pulling (moving counter clockwise) the handle (5) on the back of the coil.



- Remove the anterior part of the head coil.
- Remove the supportive cushions and headphone.

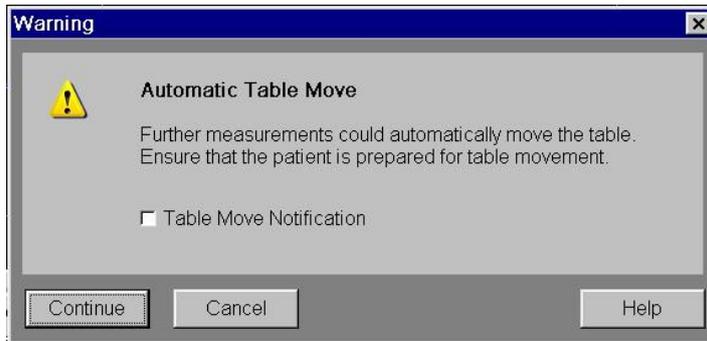
If you want information on how to use other coils than the 64 channel head coil, please contact the GfMI Research Assistant.

MRI coils are very expensive (tens of thousands of dollars) - handle RF coils with care! If there is any damage to an RF coil, inform the GfMI assistant and Site Manager immediately! Do not use RF coils with mechanical damage!!

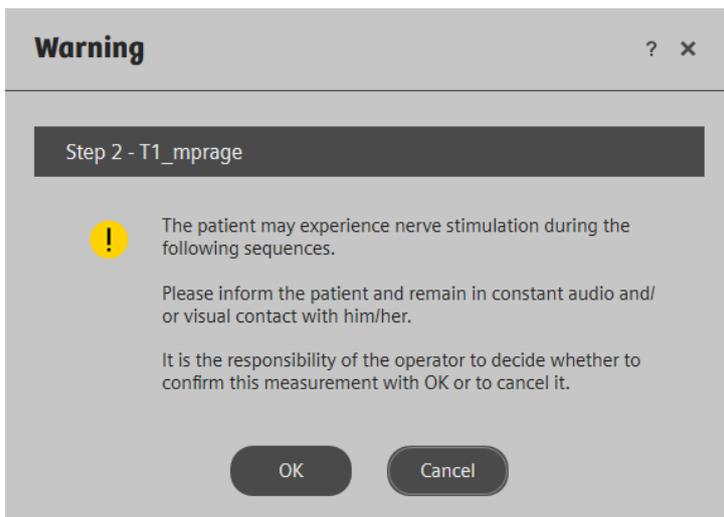
XI. Data acquisition

Pop-ups

- The scanner might instruct you that the participant bed might move during the examination to align the center of the FOV with the isocenter - the geometric center of the magnetic field to gain the highest quality.
- Inform the participant and click Continue.



- The scanner might warn you that the participant may experience peripheral nerve stimulation (see MRI Safety Training). Inform the participant about the possibility of a painless sensation such as involuntary muscle contractions (twitching).



Localizer (AAHead_Scout_64ch-head-coil)

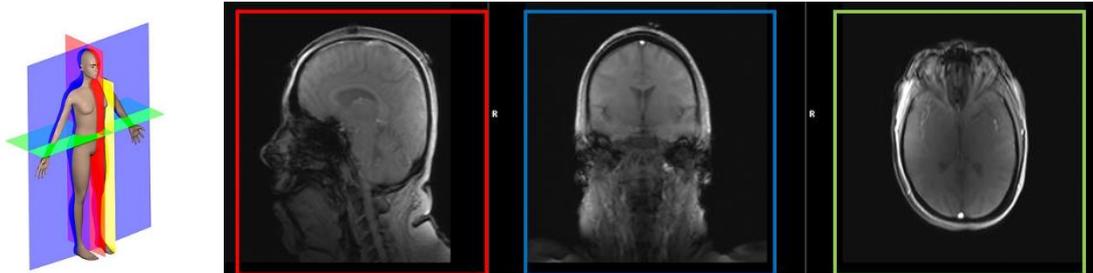
The first sequence obtained is always a 'localizer':

- a set of three low-resolution, large field-of view images in the three radiological planes (sagittal, coronal, axial);
- to 'localize' where exactly the participant's head is in the bore;
- and as a starting point for plotting of the next sequences.

Sequence Number	Sequence Name	Duration
1	AAHead_Scout_64ch-head-coil	00:14
2	T1_mprage	05:14
3	MPR planning	
4	gre_field_map	01:39
5	ep2d_bold_PARADIGM	06:09
6	ep2d_diff_AP_MB3_p2_TE77_f...	05:47
7	ep2d_diff_AP_MB3_p2_TE77_f...	00:25
8	ep2d_diff_PA_MB3_p2_TE77_f...	00:25

These are anatomical imaginary planes that divide the body into parts and that are perpendicular to each other.

- Sagittal: divides the body into right and left sections (red).
- Coronal: divides the body into ventral and dorsal (belly and back) sections (blue).
- Transverse or axial plane divides the body into superior and inferior sections (green).



CONTINUE - Press the orange 'GO' button to run the localizer. Inform the participant that the scanner will now start to make noise. In case this would not be active, double click on the line '1 localizer' (this will open the sequence), then click the 'apply' button to close, and continue.

Once the localizer is finished, a sagittal, coronal and axial image will automatically appear in the positioning segment of the screen (if this doesn't happen automatically, click on the icon 'head' behind the line 'localizer' and drag and drop to the upper half of the screen).

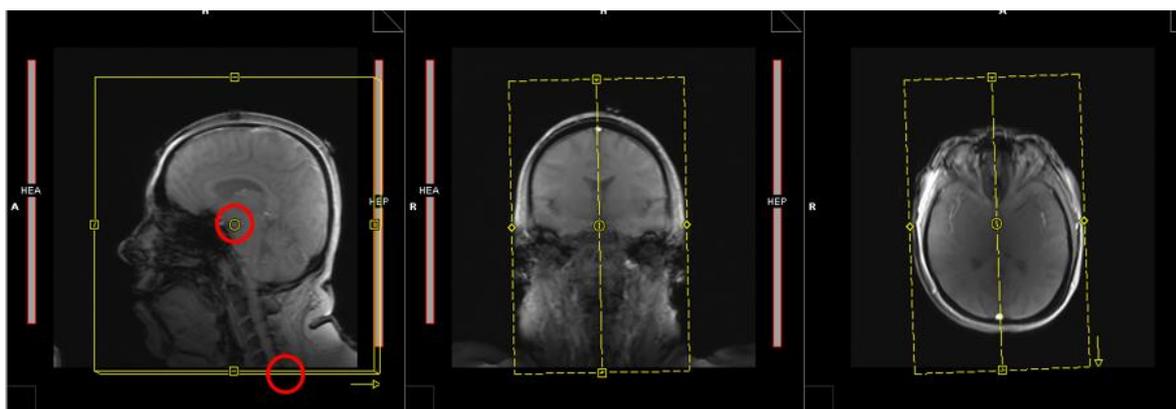
Sagittal 3D-T1 structural imaging

The second sequence is most often a 3D T1-weighted structural image, called 'MP-RAGE'.

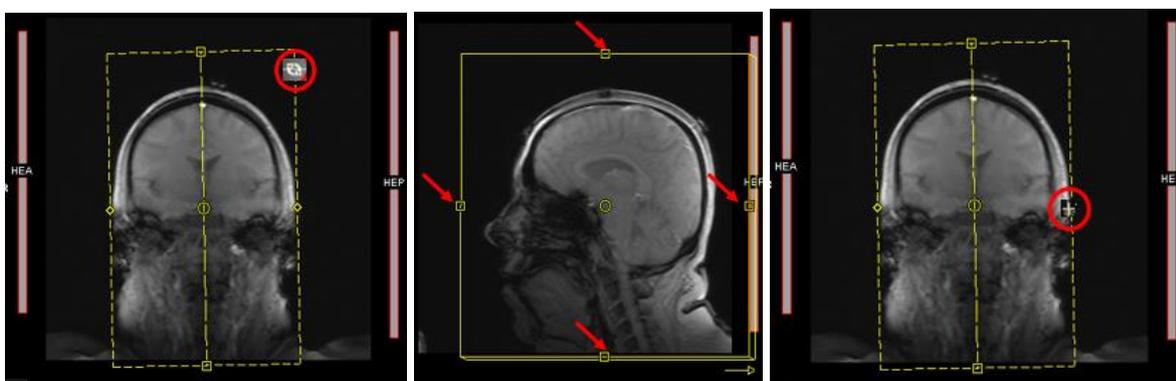
- Three Dimensional Magnetization Prepared Rapid Acquisition GRAdient Echo.
- In the sagittal plane.

The yellow boxes show the default position of the field-of-view (FOV, the area to be scanned) for this sequence on the localizer. It is now up to you to position this volume.

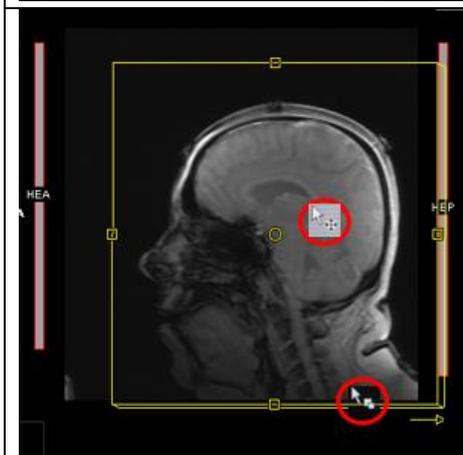
- Drag the FOV by left clicking and moving the center dot of the Field of View (FOV). Include the brain in the 'anterior to posterior' (AP) and 'head to feet' (HF) direction. Leave some air above the skull.



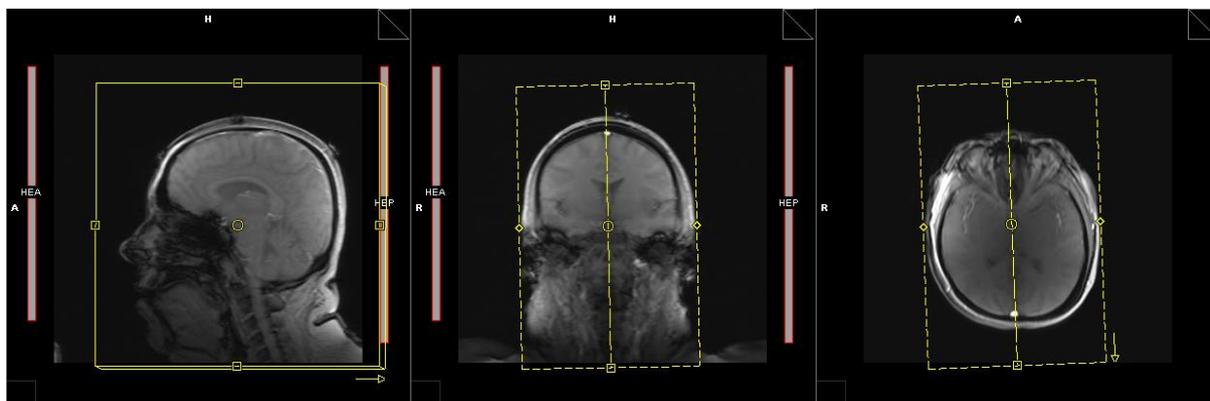
- Tilt the slices to align with the sagittal sine by moving the cursor over the lines until you see a double arrow, click and rotate as needed. Never pull the lines outwards or inwards as this will change the FOV or the number of slices, while you need a very strict protocol.



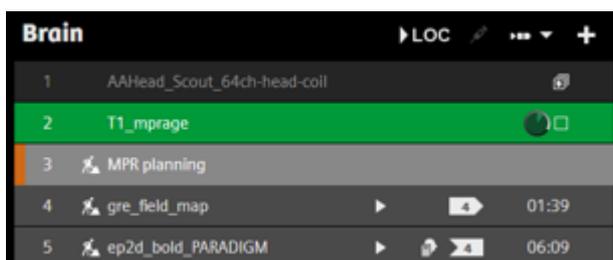
Tip

	<p>You can rotate the FOV in the imaging plane by pressing 'Alt' and moving the cursor over the outer line until you see a double arrow; hold the Alt-button and the left mouse button and rotate as needed.</p>
	<p>You can zoom by clicking in the border of the image and moving up/down.</p>

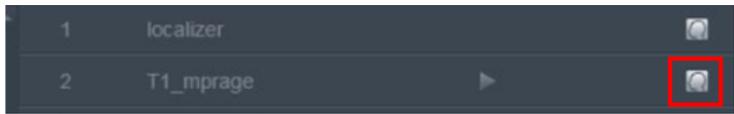
A well positioned sagittal sequence looks like this:



Tell the participant that the sequence is about to start, instruct him/her not to move and click 'GO', then 'Continue'. The MPRAGE line will appear green when the acquisition has started.



- When finished the MP RAGE will automatically be loaded to the left of three window segments. The middle and right segment is the coronal and transversal slice of the localizer, as no other coronal or transversal images have been acquired. If this doesn't happen automatically, click and drag the solid icon with the left mouse button into the left one of the three window segments.



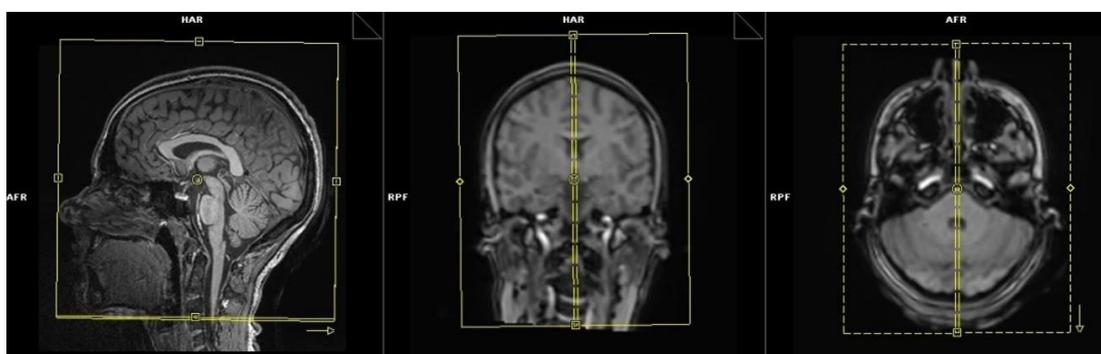
- The slice displayed is always the center slice of the sagittal series. To see the other images, you have to 'scroll' through this sagittal series, by scrolling with the mouse wheel.

Tip: always scroll through the entire series to check for motion artefacts before moving on to the next acquisition.

MPR (Multiplanar Reconstruction)

In case of an incidental finding, the radiologist requires reformatting of the 3D T1-dataset into 2D slices in the 3 directions. This doesn't require more scan time as this is not an extra acquisition but a post-processing step for which you can already set-up the thickness and angles (therefore called 'MPR planning') while scanning and waiting for the result of the MP RAGE.

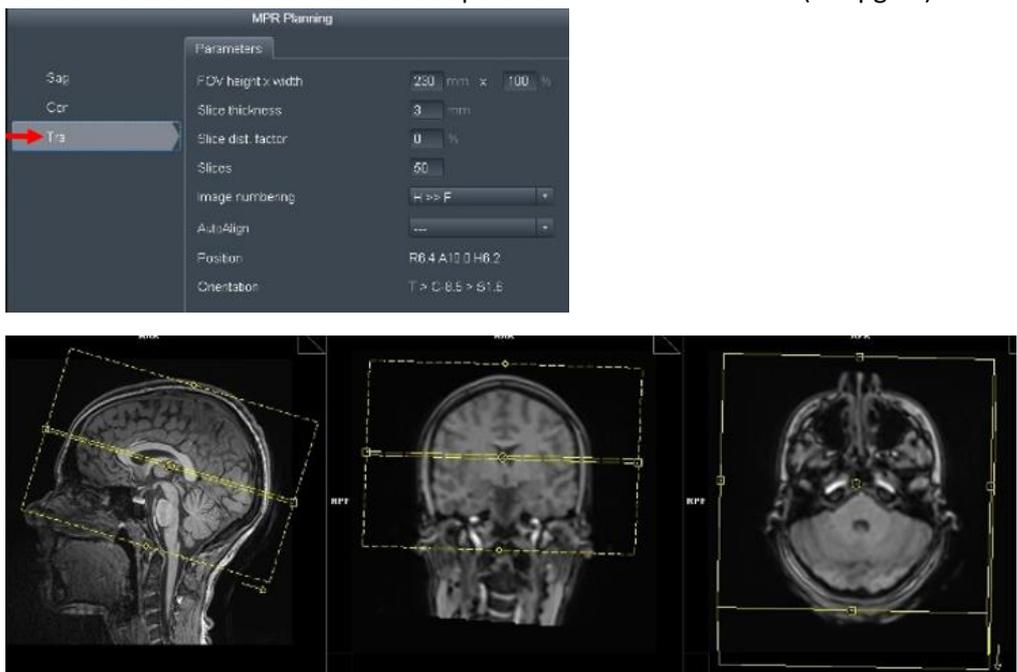
- The line 'MPR planning' opens automatically once the MP RAGE is running. If not, by double clicking. In the right panel you see three lines: sag, cor and tra. You will have to define exactly how the computer should reconstruct the 3D data into 2d sagittal, coronal and transversal images.
- Position the sagittal reconstruction FOV as a sagittal MP RAGE.



- Position the coronal reconstruction slices perpendicular to the ACPC-line* (see pg 63).

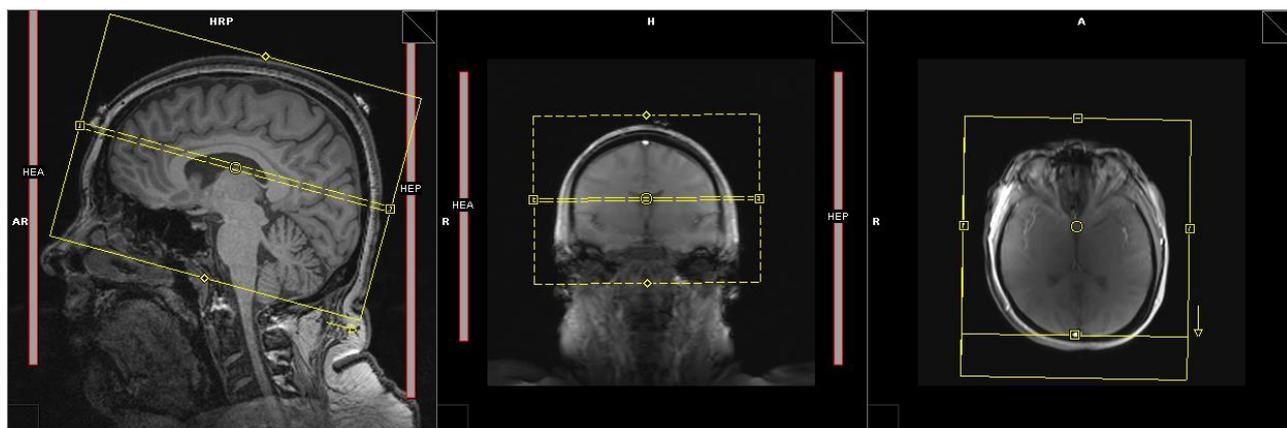


- Position the transversal reconstruction slices parallel with the ACPC-line* (see pg 63).



Axial EPI functional imaging (gre field map, ep2d bold fMRI)

- Drag the FOV by left clicking and moving the center dot of the Field of View (FOV). Include the brain in the 'anterior to posterior' (AP) and 'right to left' (RL) direction, look for symmetry.
- Tilt the slices to align with the ACPC* line or the corpus callosum by moving the cursor over the lines until you see a double arrow, click and rotate as needed. When the temporal lobe is of particular interest, it is important to scroll to the lateral images. Never pull the lines outwards or inwards as this will change the FOV or the number of slices, while you need a very strict protocol.



Tilt the slice box parallel to the ACPC*-line or corpus callosum.

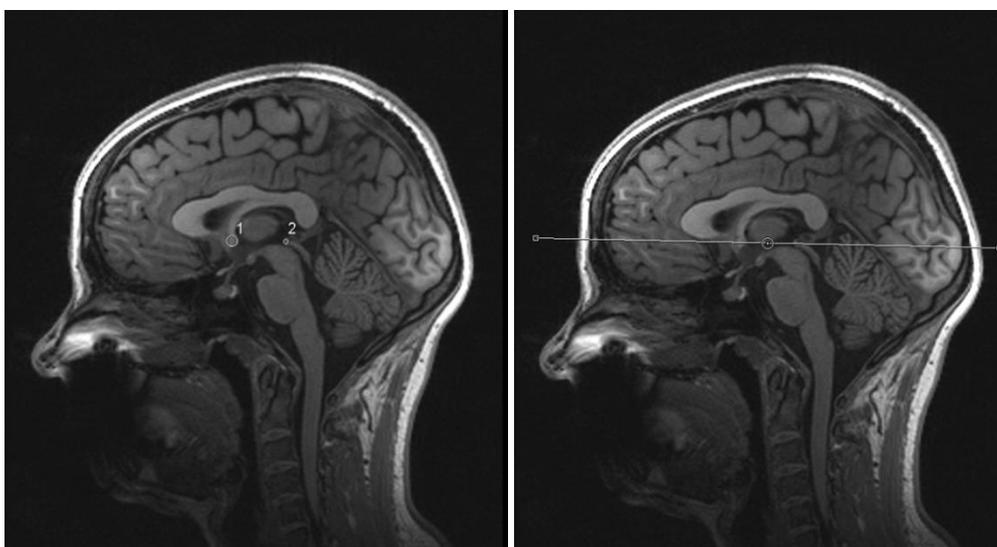
Move the slice box forward/backwards and up/down so that the region of interest is covered.

Scroll to the center slice. Right click > perpendicular.

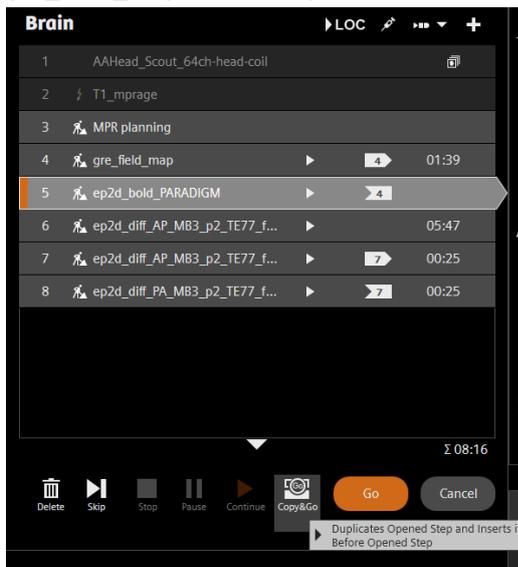
Position the slice box perpendicular to the falx cerebri (this happens automatically when you click 'perpendicular' in the sagittal image, but you can correct this manually if necessary).

Tilt (Alt) the FOV perpendicular to the falx cerebri.

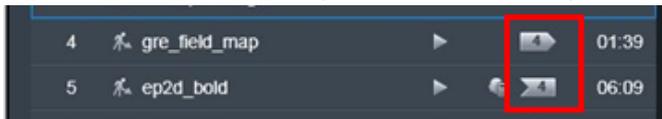
*For research purposes, you have to tilt the FOV parallel to the imaginary line connecting the upper rim of the commissura anterior (AC, 1) with the lower rim of the commissura posterior (PC, 2), the so called 'ACPC' line.



- When set as desired, click 'GO'. The 'working man' will now disappear. This begins the pre-scan routine of frequency and shim check, but it will not start scanning until you press 'Continue' as well and the gre_field_map will be acquired. This takes about 1.5 minutes; instruct the participant not to move!

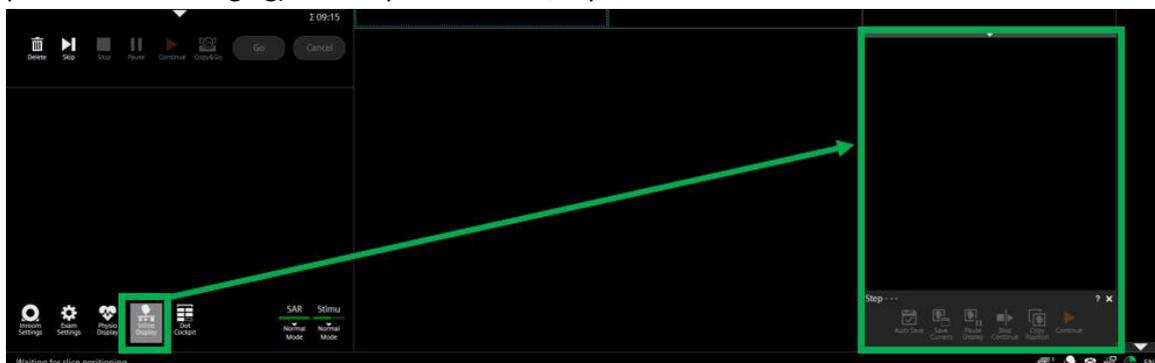


- The position of the FOV of the gre_fieldmap and the ep2d_bold have to be identical to be able to correct for field inhomogeneities afterwards. The flags indicate that the position of the field map will automatically be copied to the ep2d_bold, but do double check that the tiny bit smaller FOV of the ep2d bold also covers the brain and cortex. If not – reposition the field map.



- The scanner waits for you to press 'continue' before it starts the ep2d_bold_fMRI. Now is the time to set-up the stimulus computer and peripherals as the ANC-earphones and to instruct the participant (wait until the shimming is finished – this also makes a lot of noise, the participant will not understand you). When the stimulus PC is set and the participant has received all necessary instructions, click 'Continue' to start acquisition of the ep2d bold sequences.

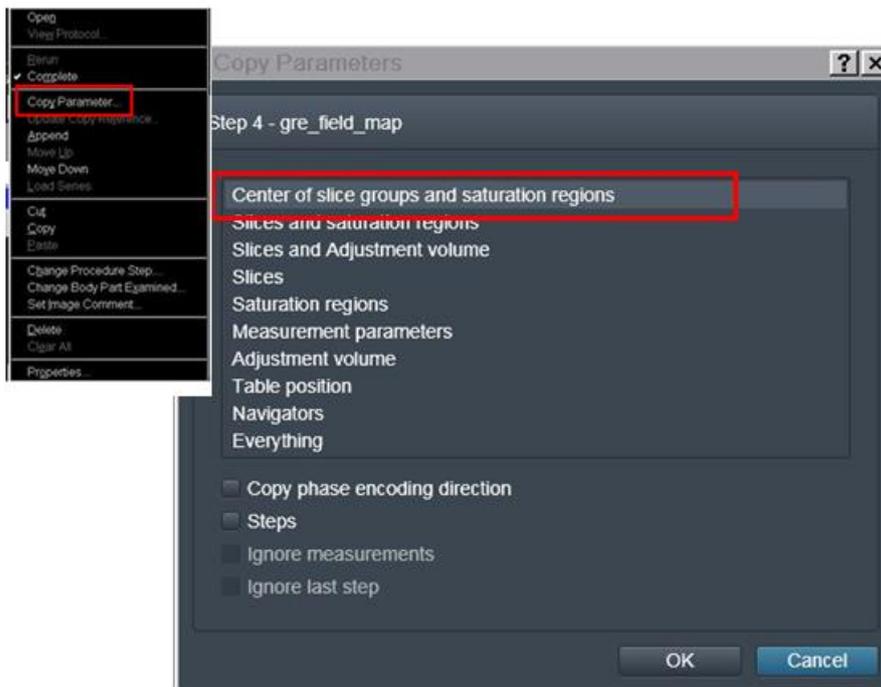
- Tip worth gold:** make it a habit to open the Inline Display to check for artefacts in real-time (indeed, this is possible in EPI imaging) so that you can abort, reposition and restart the measurement if necessary!!



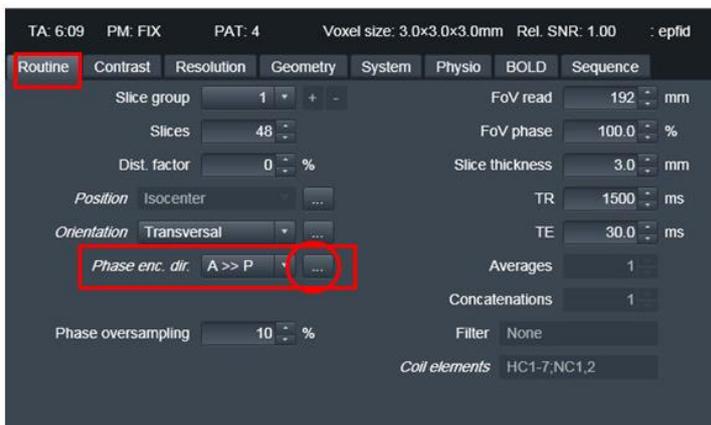
Axial EPI functional imaging (ep2d_DTI)

As the DTI-sequence is also an axial acquisition, you can ask the Research Assistant to order the scanner to automatically copy the center slice and positioning of the gre_fieldmap/ep2d_bold or you can do this manually. To do this manually, copy the position of the FOV of the gre_fieldmap/ep2d_bold:

- Double click on the DTI line to open.
- Right click the sequence with the proper slice positioning (in this case the gre_fieldmap/ep2d_bold) and select 'Copy parameter' from the menu. From the list of parameters, select the first option: this will copy the center of the slice box.



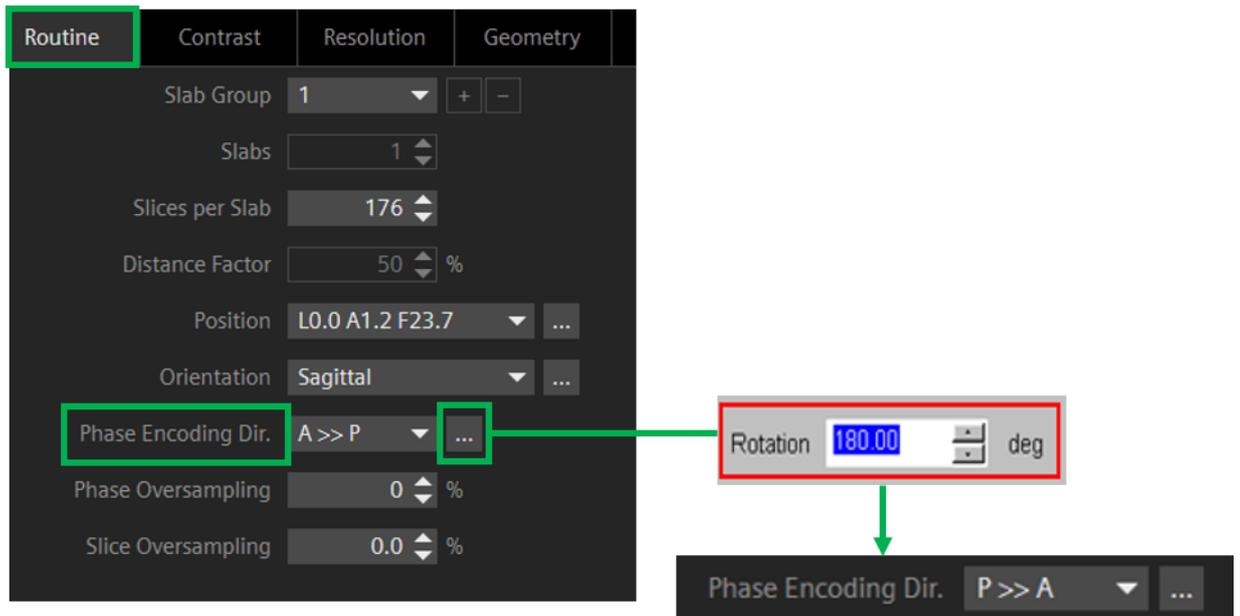
- The center slice, the position of the FOV and the tilting of the slices will be copied, but this sequence could consist of less slices than the sequence you copy from, so you will have to double check if the region of interest is still covered!
- ALWAYS double click to check the phase encoding direction: it should be A>>P (anterior to posterior)!



Axial EPI functional imaging (ep2d_DTI_PA)

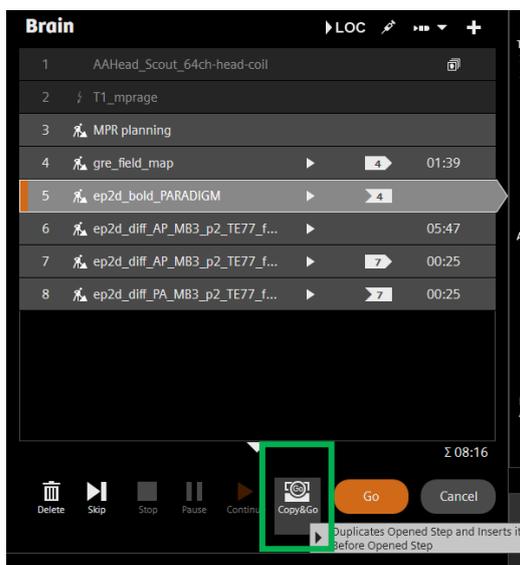
This sequence is added to a DTI protocol, to correct for inhomogeneities. Copy the position of the DTI sequence

- Double on the DTI_PA line to open.
- Right click the on the DTI and select 'Copy parameter' from the menu. From the list of parameters you want the first option: this will copy the center of the slice box.
- Double check the phase encoding: it should be P>>A (posterior to anterior). If you have to correct this manually, then choose tab 'Routine', look for 'phase enc dir', set to A>>P. Then click on the dots and fill in rotation: 180 degrees followed by enter!



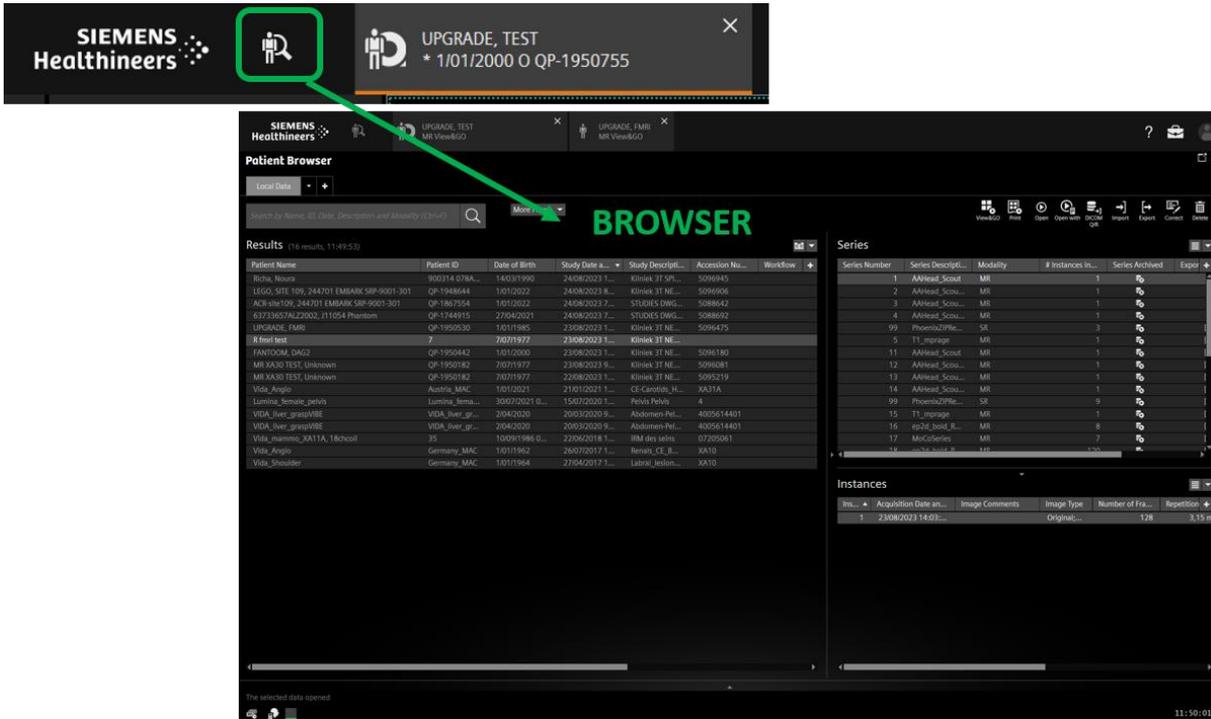
Multiplying sequences

If you are running a bunch of the same BOLDs in a row, you can right click on the current one and multiply with the "COPY & GO"-button. This will place another copy of the run in the list, and will include the updated slice information.



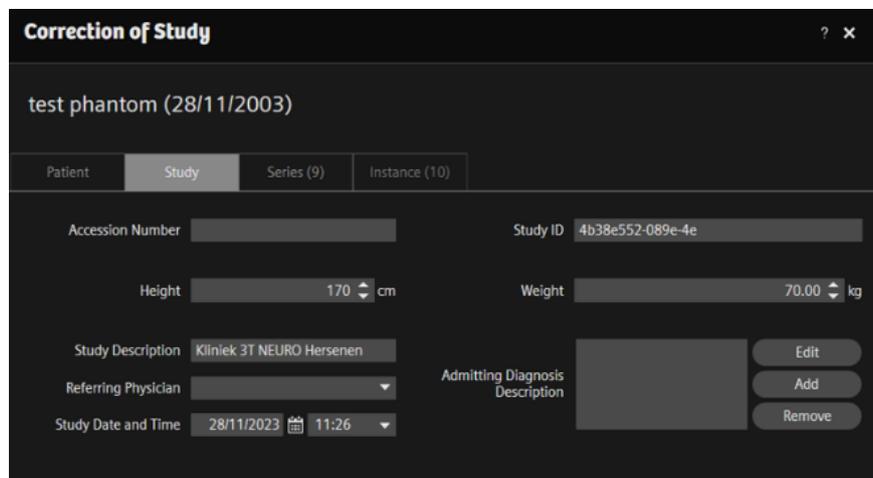
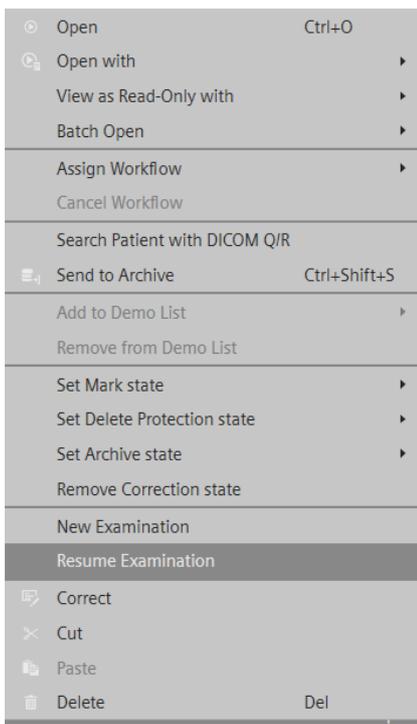
XII. DATA TRANSFER

To transfer your data to an external hard disk, work on the right screen.



Anonymizing data

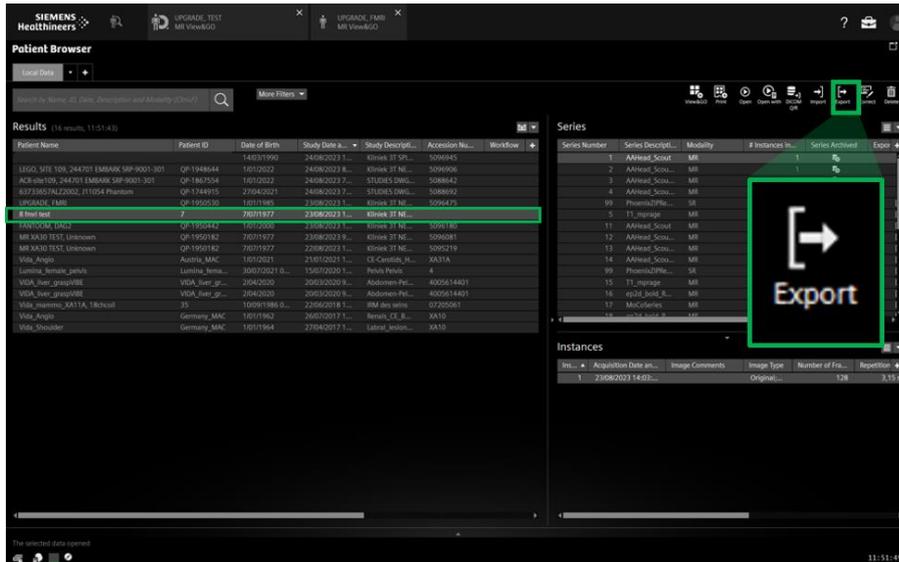
- Close the EXAM card (LEFT SCREEN) and VIEW&GO card (RIGHT SCREEN) of the participant.
- Browser - select the participant's file – right click -> Correct. Change any field.



Exporting data

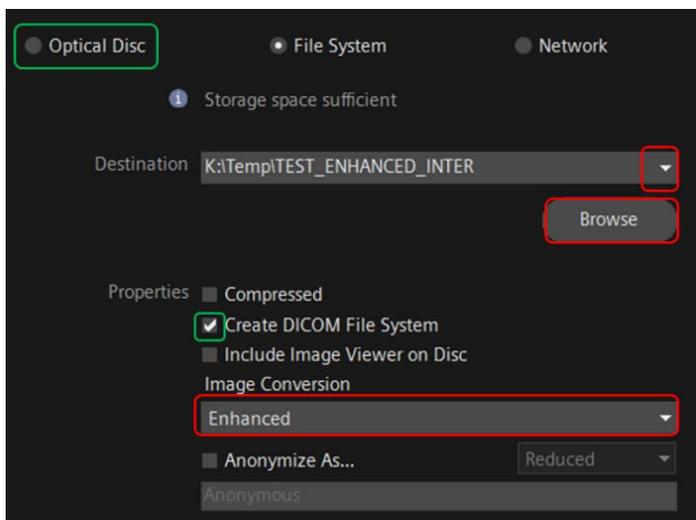
For your interest: The images you acquire will be sent to PACS in real time, but this would only serve as the ultimate back-up in dire need, but for research purposes it is mandatory to export your images to an external HDD. Best practice is to do this right away after the acquisition, but at last within ten days after scanning –data set is then erased from the database to ensure the availability of the hard disk of the scanner for storage.

Plug your external drive (HDD or 3.0 USB hard-drive recommended - 2.0 USB is very slow) in a USB port on the front panel of the console. If a drive is not recognized, try to use another one.



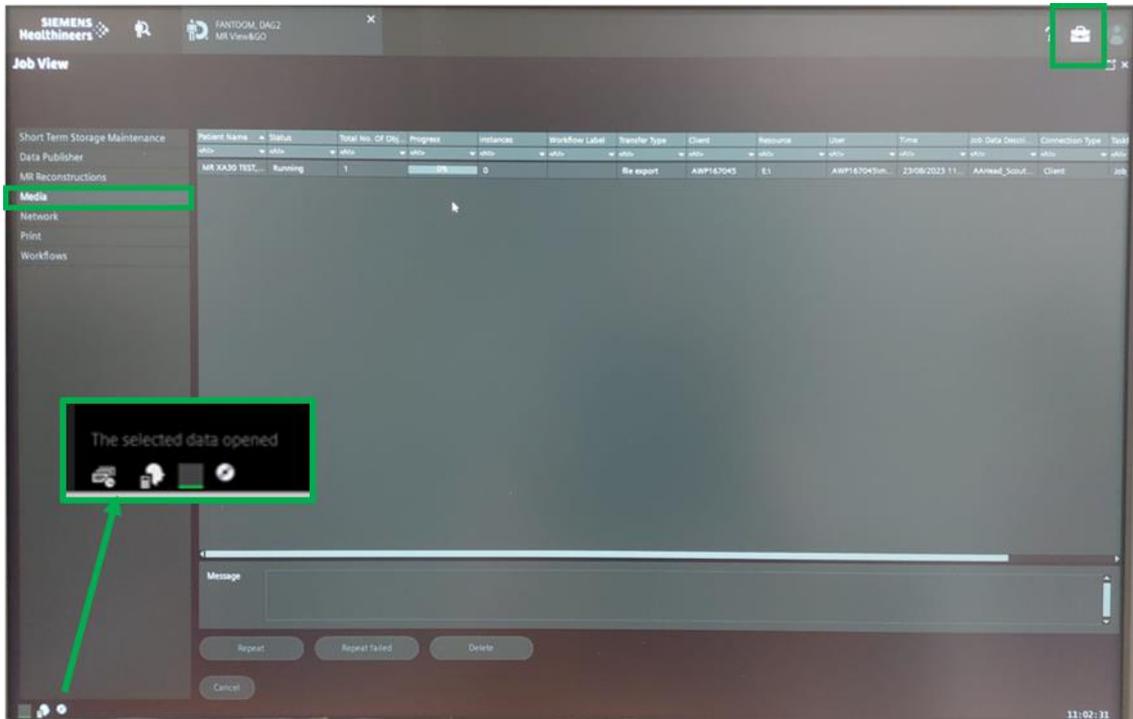
Export data pop up:

- Choose optical disc – browse!! – find your HDD
- Create dicom file system
 - Check if you want the output to be 2 files, named “DICOM” and DICOMDIR.
 - Don’t check if you want the output to be sequence named files.
- Image conversion: (*)
 - Enhanced: generally speaking necessary for fMRI
 - Interoperability: for structural imaging and when working with external partners



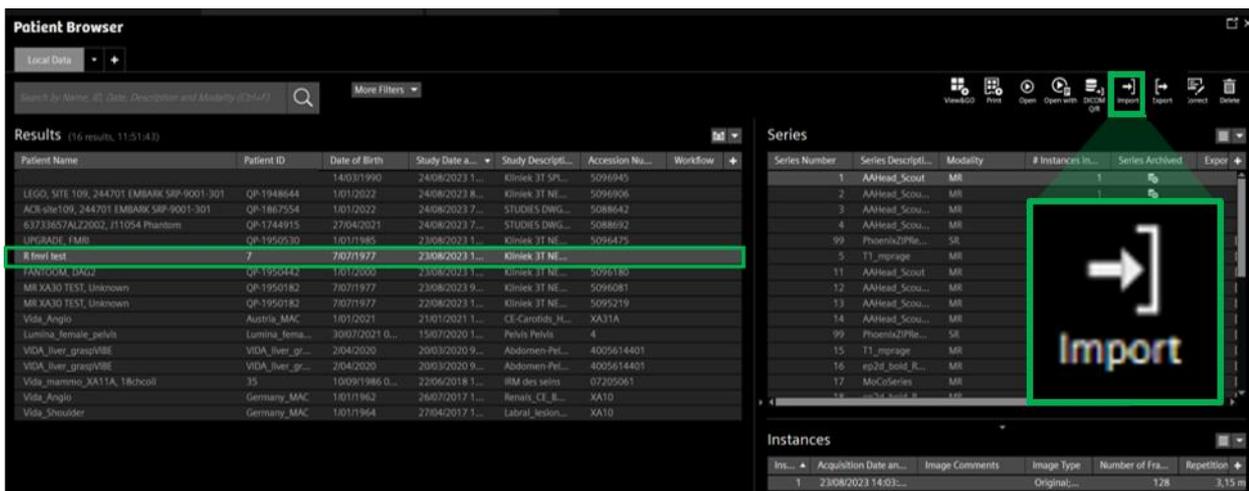
To check the status of the transfer:

- A disk appears in the lower left bottom while the transfer is active. Clicking on this will refer you to the Media file where you can check the status.
- If the disk already disappeared (because the transfer is finished) you should go by the bag icon – media.



Importing data

Plug your external drive (we highly recommend the use of an HDD or 3.0 USB hard-drive - 2.0 USB is very slow) in a USB port on the front panel of the console. If a drive is not recognized, try to use another one.



Choose the origin of your files and then click "OK".

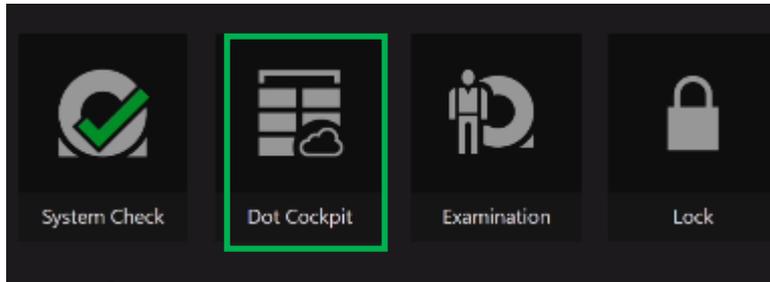
Tip: No blanks are allowed in the path – you will have to remove these beforehand.

XIII. Protocol transfer

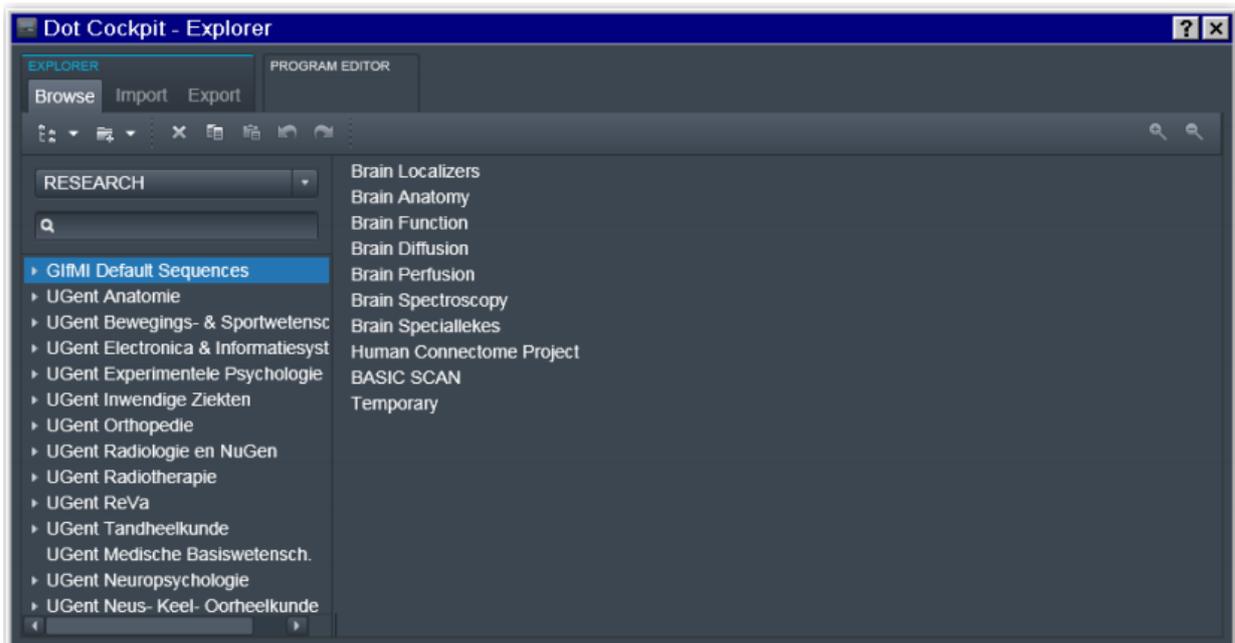
Exporting the parameter file of a protocol as a pdf

LEFT SCREEN - HOME PAGE - Dot Cockpit

- Click the Dot Cockpit icon to open Dot Cockpit.

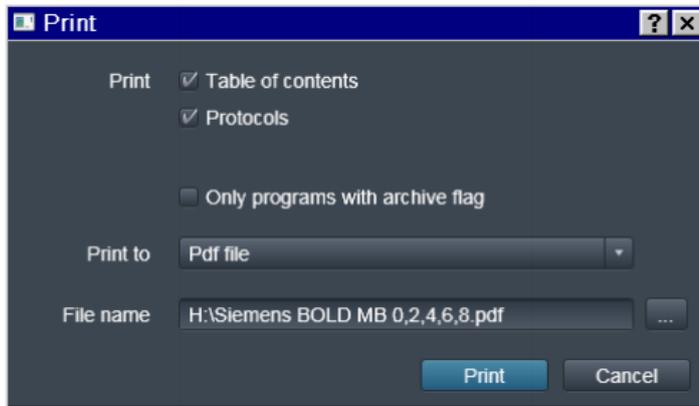


- Browse to your protocol from the dropdown menu: **FLEET_DWG_RESEARCH_do not delete**'.
- Right-click – 'Print' to open the Print dialog window. Opening the context-menu with a right-click can be done at any level of the protocol tree. Everything below the selected level will be printed.

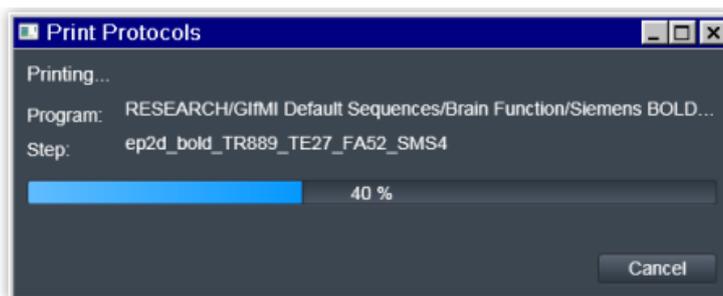


- **Print the selection**
 - Check
 - Table of contents - A list of contents is printed for the selected measurements programs, examinations or regions.
 - Protocols - An overview of the parameter settings is printed for all selected protocols. The settings are listed in the same way as on the parameter cards.
 - Don't check
 - Only programs with archive flags - Limits the print range. Only the protocols of modified measurement programs are printed.
 - Select the file format to print to (PDF or XML file). For human readable text choose PDF.

- Set a file name; Click the three dots to open a standard Windows file selection tool. Browse to the desired drive/location. Use the drive letter detected by the scanner console in paragraph 1 to save the file on the external drive.
- Click Print or Cancel to abort.



The Print Protocols dialog window pops up, a progress bar indicates the duration of the file generation. The higher up in the protocol tree, the more pages need to be generated, the longer it will take.



XIV. FAQ

Why is the head of the participant upside down?

In the registration form, instead of selecting 'Head first – supine' as the participant's position, you chose 'Feet First Supine'.

The image shows a patient registration form with several sections and callouts:

- 1**: Patient information fields (Last Name: UPGRADE, First Name: TEST, etc.)
- 2**: Institution dropdown menu (set to UZ Gent)
- 3**: Examination Information section (MR fantoom, Accession No: 5097216, etc.)
- 4**: Program Selection dropdown (set to ...NEURO » Hersenen » Hersenen zonder contrast)
- 5**: RF Transmit Mode dropdown (set to Any Polarization)
- 6**: Patient Orientation dropdown (set to T)

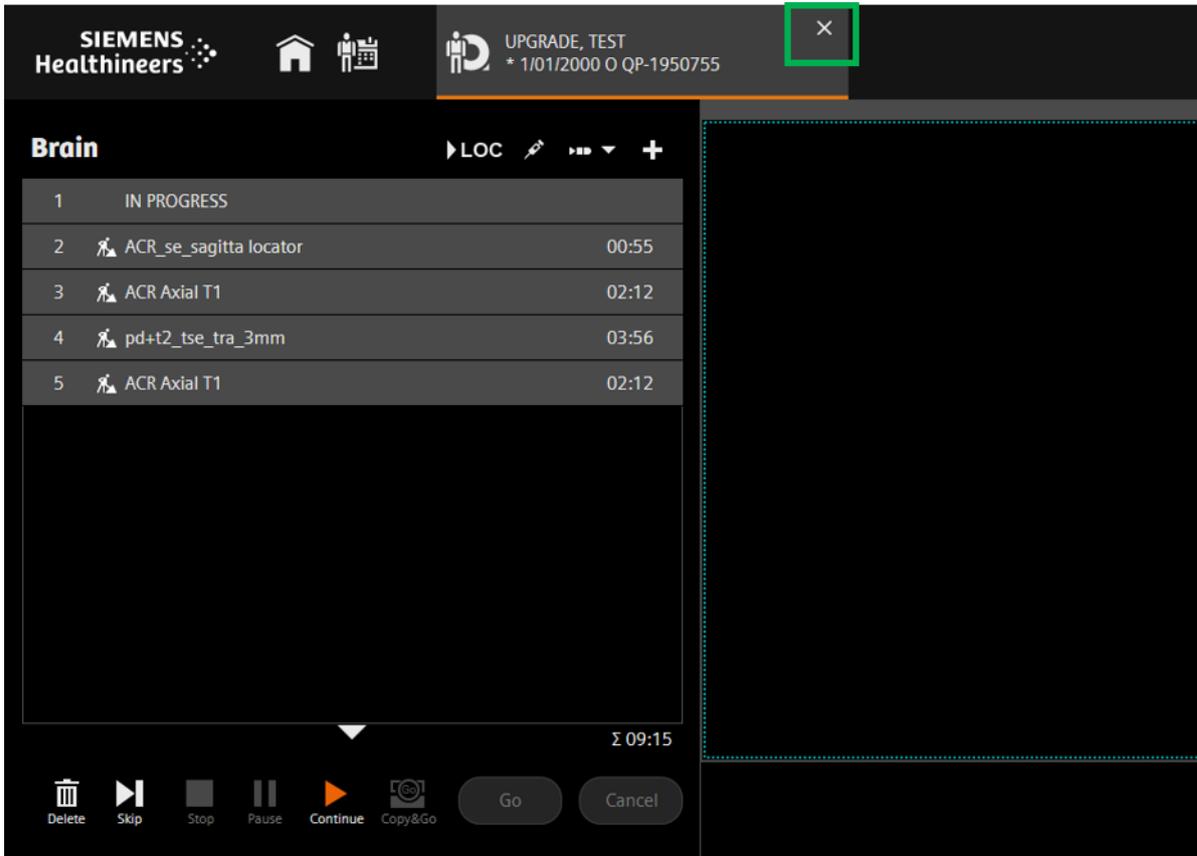
An inset window titled 'All Programs' shows a list of programs, with 'RESEARCH' selected. Another inset window shows a grid of patient orientations:

P	Head First Supine	Feet First Supine
*	Head First Prone	Feet First Prone
R	Head First Left Lateral	Feet First Right Lateral
B	Head First Right Lateral	Feet First Left Lateral
*	Special Orientations ...	Select

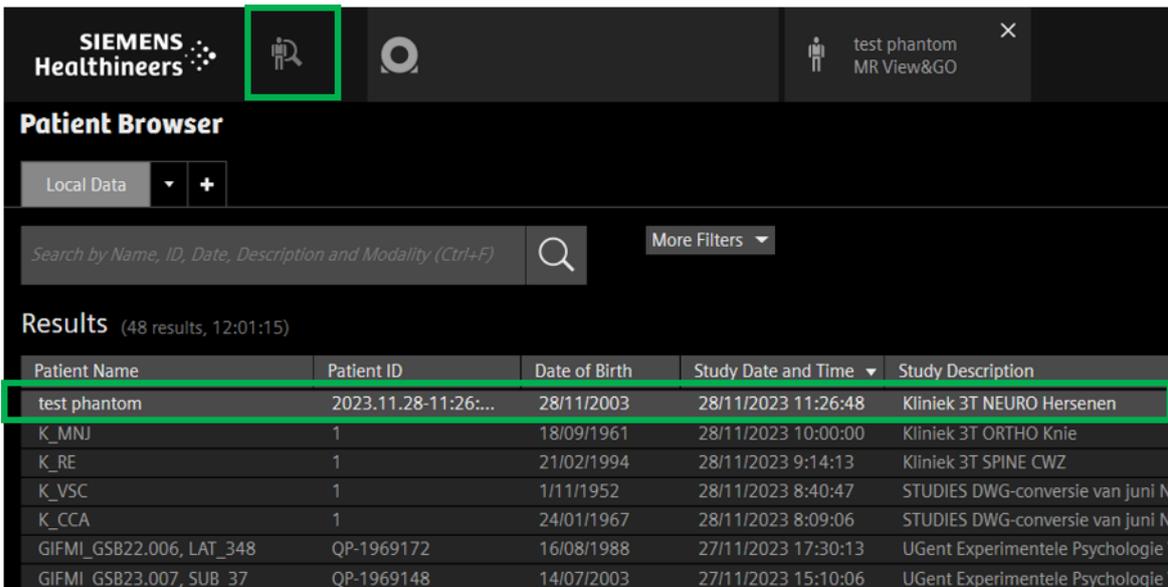
The 'Exam' button is visible at the bottom right of the orientation menu.

How to correct this:

- Close the EXAM card by clicking on the cross.

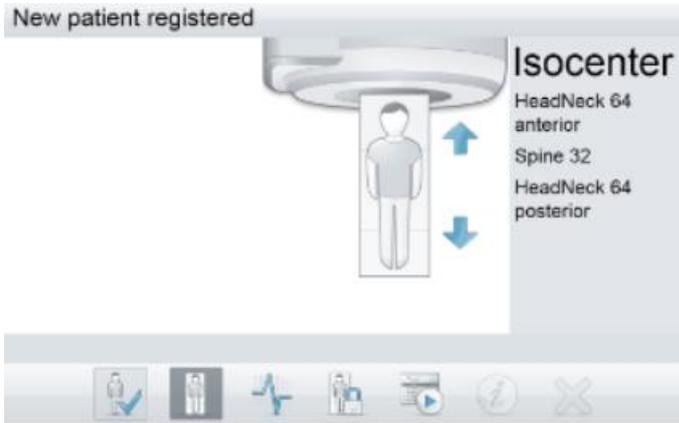


- Go to the DATABASE – RIGHT Click on the subject – select 'Resume' and correct.

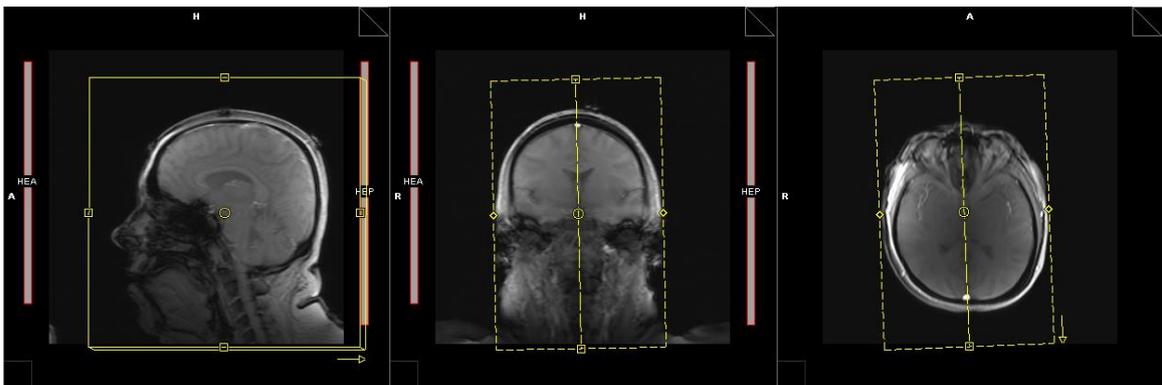


How can I check whether the head coil is recognized by the scanner?

- Check the display on the scanner.



- Visually - Check if the coil elements are active (red frames with white filling) on each side of the skull. If not, the coil is recognized but not active. Click on the frames to activate them. If there are no squares at all, the coil is not recognized. Check the coil plugs.

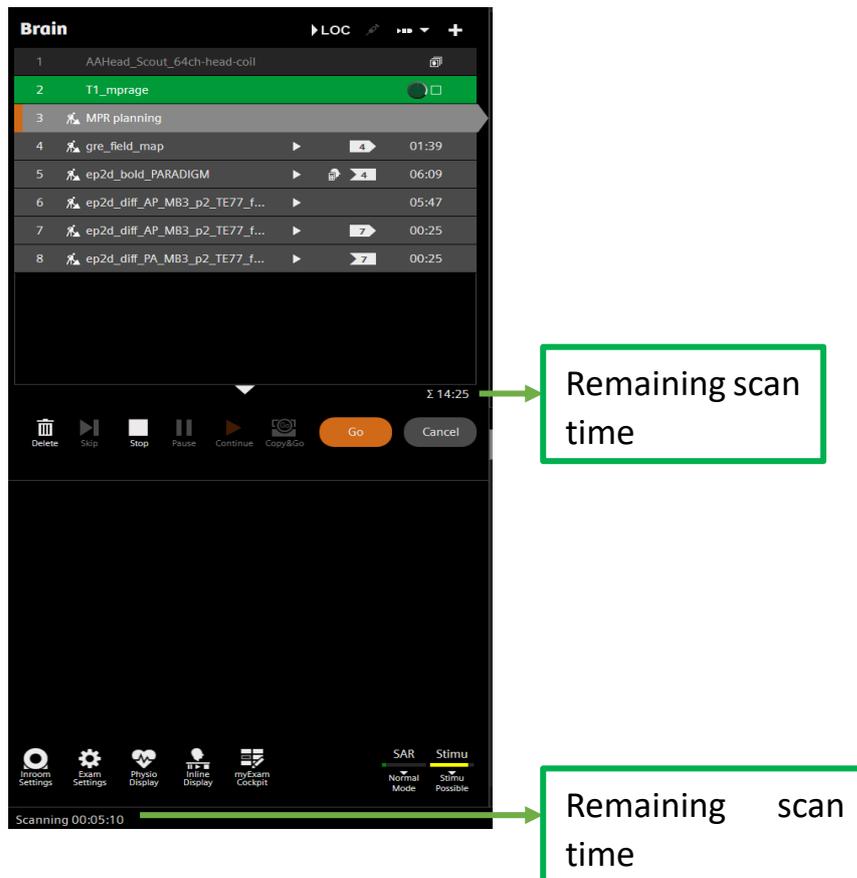


- Double click on the sequence to open the parameter window, move to 'SYSTEM – COILS'. If there are no symbols at all, the coil is not recognized. Check the connection of the coil plugs in the table sockets.



How long will the scan take (time of acquisition, TA)?

- In the parameter file while setting the parameters.



How do I multiply sequences?

- If you want more runs with the exact same parameters, there are two options:
 - Right click on the sequence you want to copy - select APPEND.
 - If you don't want to make any changes: right click on the copy and select 'Complete' –
 - If you want to make changes: double click to open, adapt, GO.
 - Drag the copied sequence upwards to start.

How do I check the positioning of the FOV when that sequence is already running or even ready.

- Select the sequence. Right Click > Append. The sequence will be copied and will be added last in row.
- Double click to open.
- Check the positioning of the FOV or the parameters.
- Cancel.
- Delete.

How do I check the parameters when a sequence is already running or even ready.

- Double click on the sequence.
- You will get a parameter window where you can check the parameters, but of course as the sequence is already running or finished, this is for viewing only.

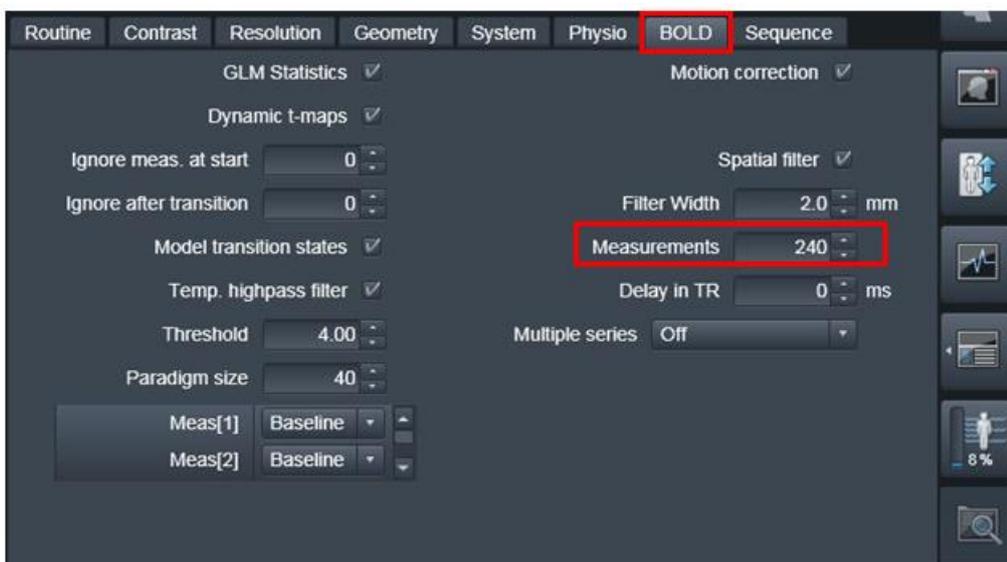
How do I change the parameters when the sequence is already running or even ready.

This is impossible. If you want to change parameters, you will have to

- Stop the currently running sequence.
- Multiply the sequence: right click > Append (it will be added last in row) > Double click to open
- Apply the necessary changes > Click Apply
- Move the sequence up in the row.

I want more volumes in my EPI time series. How do I do that?

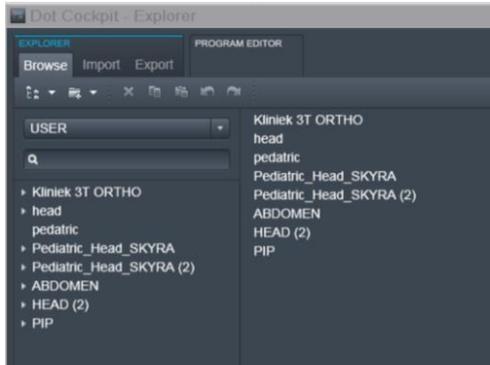
On the Exam tab, select the BOLD tab on the parameter window. The number of volumes is specified by the rather cryptic parameter called 'Measurements'. Just enter the number of volumes you want to scan and hit Enter. Check the effect on your time of acquisition (TA).



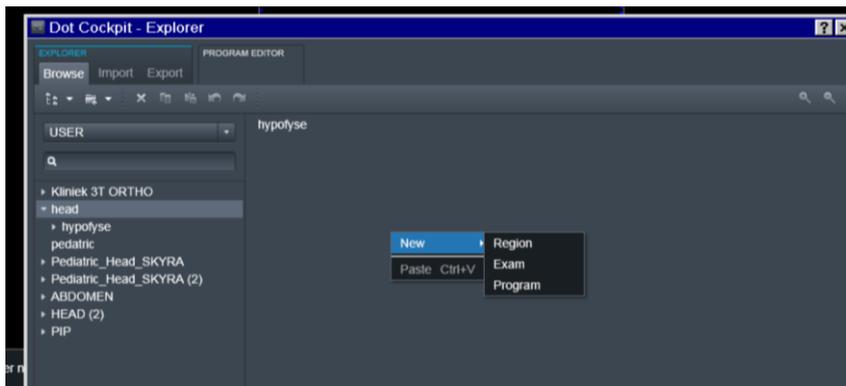
How do I build my own protocol?

Note: please note that assistance is available for this. Make an appointment with the GifMI Operational Team in time.

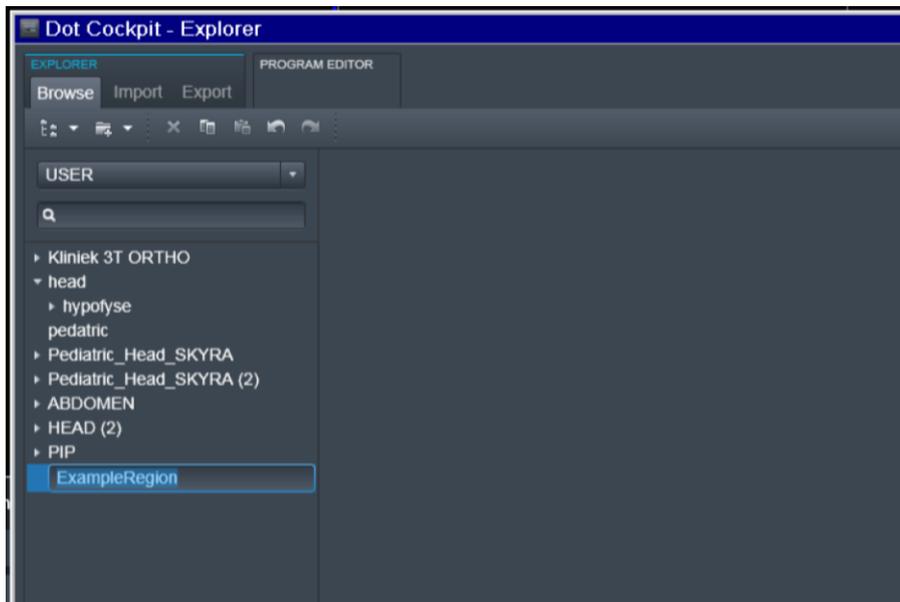
- Open the DOT Cockpit and select the tree you are normally using.
- For researchers, this is the RESEARCH_ do not delete tree, for clinical the KLINIEK or USER tree etcetera. You cannot edit the SIEMENS tree.



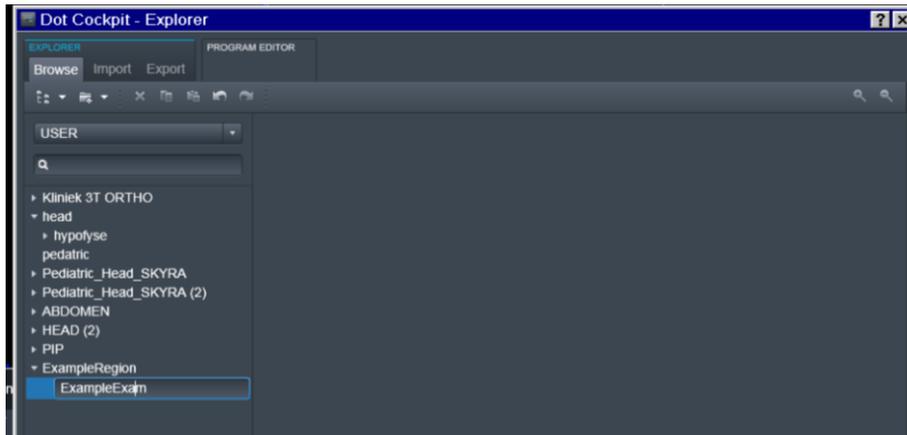
- There are three levels of the USER Tree: Region, Exam, and Program. This guide will start by creating a new Region but you can start from any level.
 - Right mouse click anywhere in the Dot Cockpit and select New > Region.



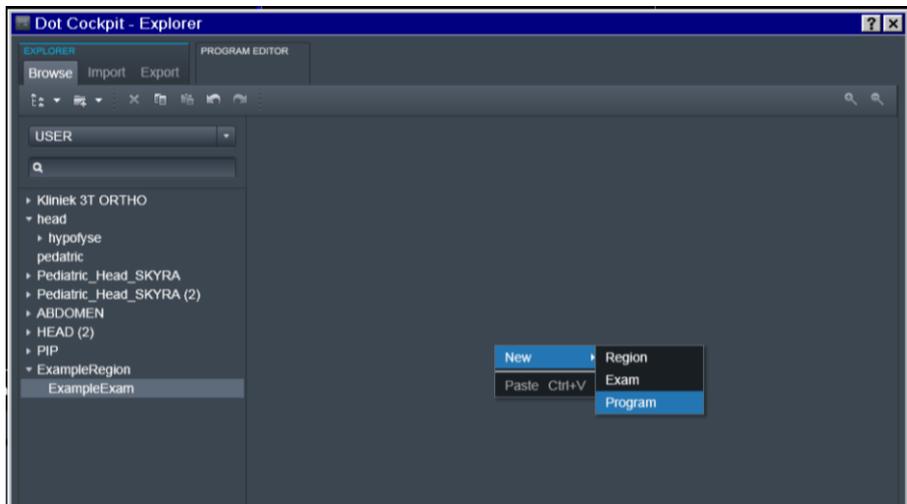
- Name your region and press Enter



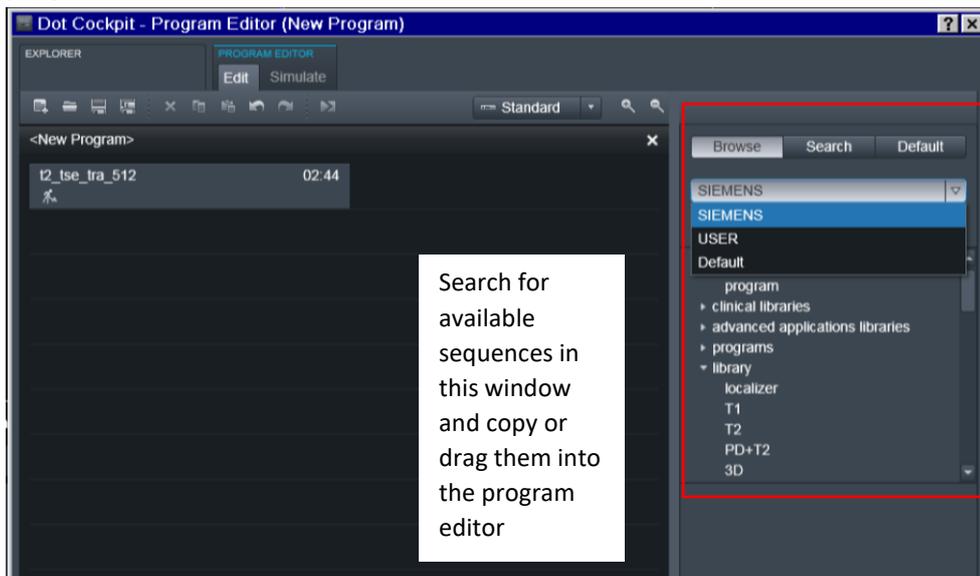
- Select the Region you just named, then right mouse click and select New Exam. Name your exam and press Enter.



- Select the Exam you just named, then right mouse click and select New Program. Name your program and select OK.



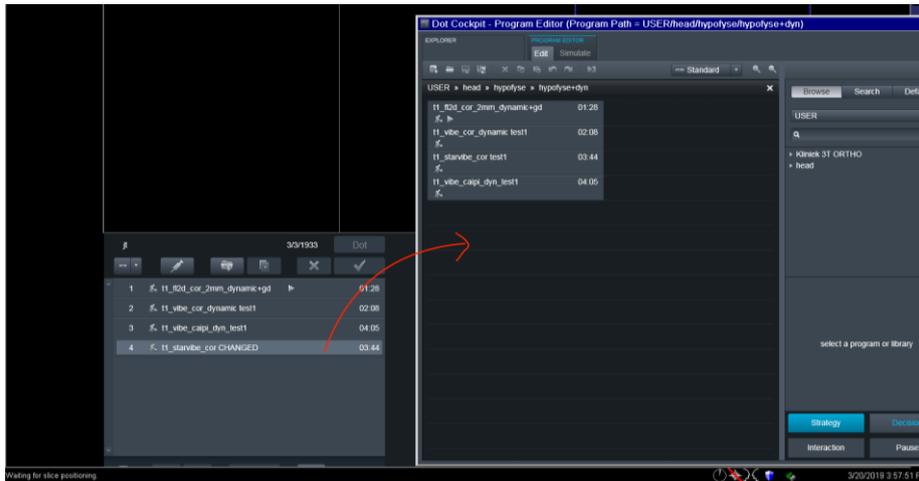
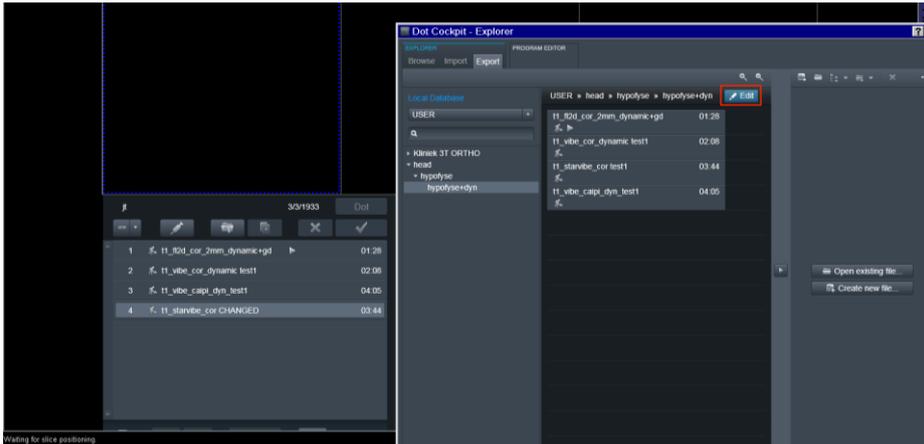
- The Program editor will open , you are now ready to copy and paste sequences into your new program (or drag them from the database or the scan queue). After you have your program complete with all the required sequences, select the Save icon to save this as a new RESEARCH program.



How do I apply changes to my protocol?

If you have made changes in your protocol during scanning (e.g. voxel size, TE/TR etc), and want to save this for future use.

- LEFT SCREEN – HOME – DOT COCKPIT
- Browse to your protocol.
- Click 'EDIT'.
- Drag the modified sequence / protocol from the EXAM card to the Dot Cockpit.
- SAVE.



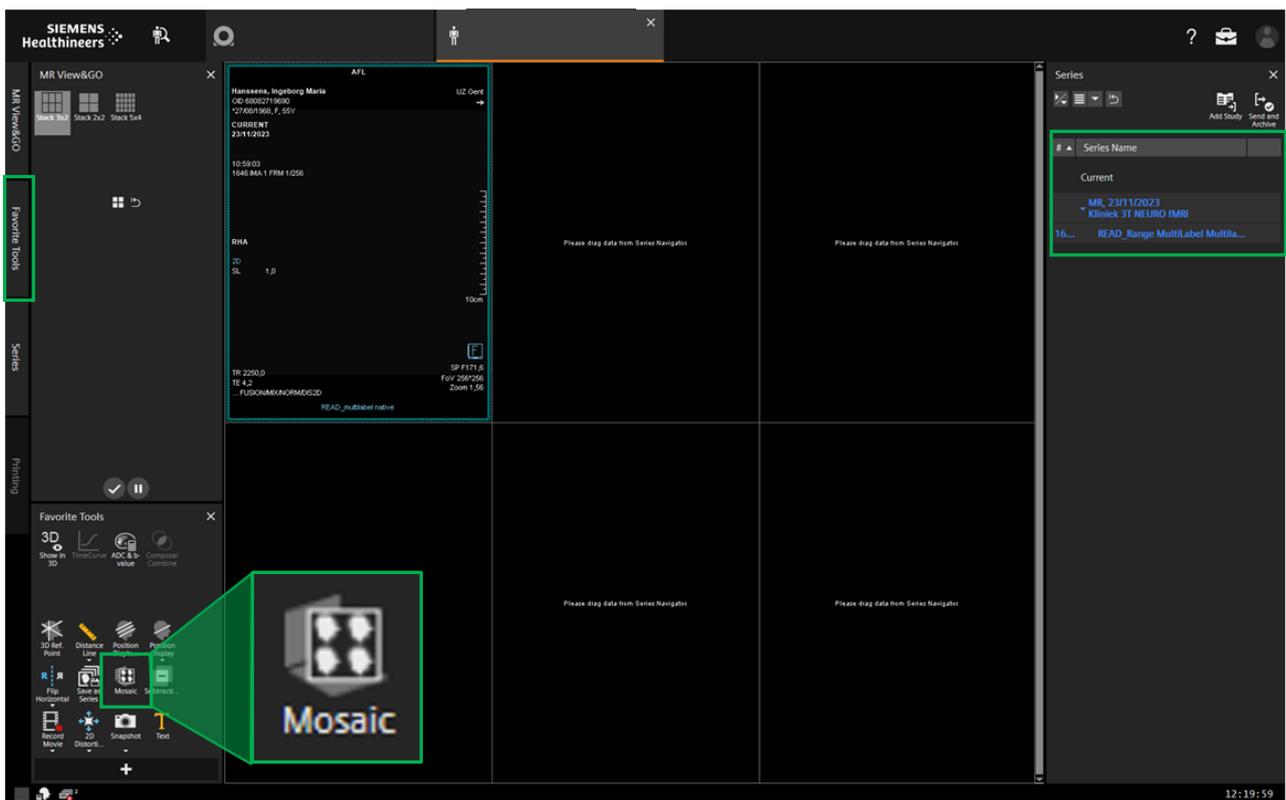
How much participant movement is too much for fMRI?

This is participant and research dependent!

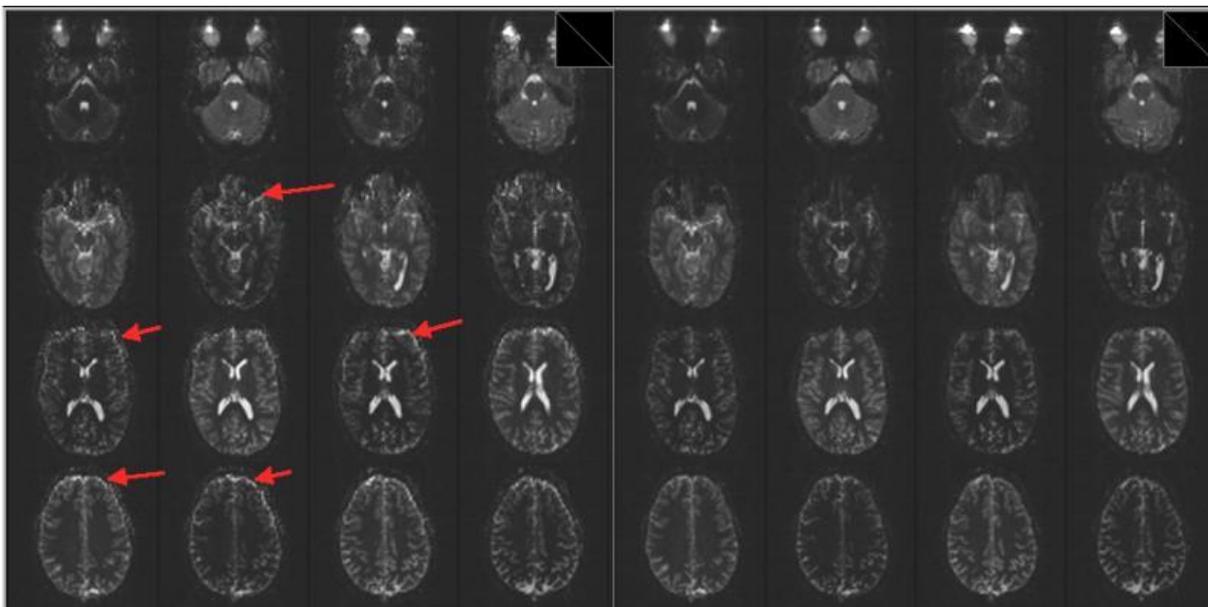
At the end of the day, only the results of a full analysis can determine whether your participant(s) moved too much. As a rough rule of thumb, though, users report that rigid body realignment numbers of less than **2 mm** of movement in any one axis over the duration of a time series is normally acceptable for getting activations that make sense, and without too many false positives. The more you scan and the more data you analyze, the more likely you are to be able to tighten this criterion and perhaps add your own empirical assessment that you can use during a scan session (where you have a chance to fix the problem).

Most often this means watching the Inline Display closely for glaring examples of participant motion (yawning, nose scratching, head movement coincident with respiration because you didn't pack the head very well, etc.)

- RIGHT SCREEN – database
- VIEW & GO
- SERIES NAME (On the right side): click on the bold series you want to evaluate.
- FAVORITE TOOLS – Mosaic

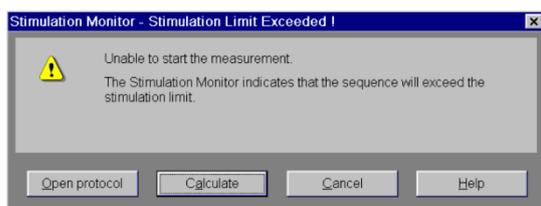


Now scroll through the images. This will give you a sense of how much movement occurred and over how many time points. Areas where signal intensity has changed a lot during the time-course appear bright, while other areas appear dark. The eyes are usually bright, however a bright ring around the head (red arrows on the left standard-deviation map) might indicate significant motion (right image shows a separate run with less motion). Ideally, this would be performed at the end of each run so that if there is a lot of movement you can give the participant feedback and/or you can re-collect that run of your experiment (if your experimental paradigm allows you to do this).



Why do I get a SAR warning?

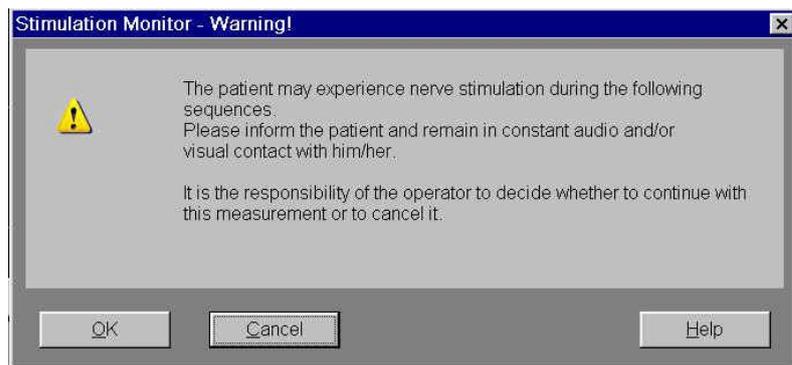
The scanner will refuse to acquire data when the SAR (Specific Absorption Ratio) limit is exceeded, this is to prevent the participant's body temperature to rise too much. It will require you to change parameters (TR, number of slices, flip angle, ...). Click Calculate and follow the instructions.



Can I add 5 kg to the participant's weight to overcome the scanner's SAR limit?

No you cannot. The SAR limit is a safety measure to prevent the participant's body temperature to rise too much, you should always answer truthfully.

Why does the scanner warn for nerve stimulation?



- Rapidly changing magnetic fields of gradient coils can induce electric fields in human tissue causing stimulation of peripheral nerves. This is a protective pop-up (when scanning EPI images).
- Inform the participant about possible twitching of muscles, before you proceed.

What to do with incidental findings?

Images are not systematically reviewed by a radiologist and the sequences used are not meant for clinical evaluation. On occasion, you may notice an odd finding yourself. In such a case, please contact the MRI Research Assistant with the registered QP-number. A radiologist will review the examination and will consult the GP or a specialized medical doctor if necessary. Please do not tell the volunteer about the finding until it has been reviewed by an expert, as you may cause undue alarm and anxiety.

XV. Technical Problem / Error solving

Upon arrival, there is an audible alarm coming from the alarm box

In case of an alarm, write down the notification, press the 'Audio Alarm OFF' button to silence the acoustic alarm and contact the MRI Site Manager or MRI Research Assistant during office hours. Notify Siemens Service if during the evening or weekends.



There is no chirping/heart beat from the cooling system when I enter the scanner room.

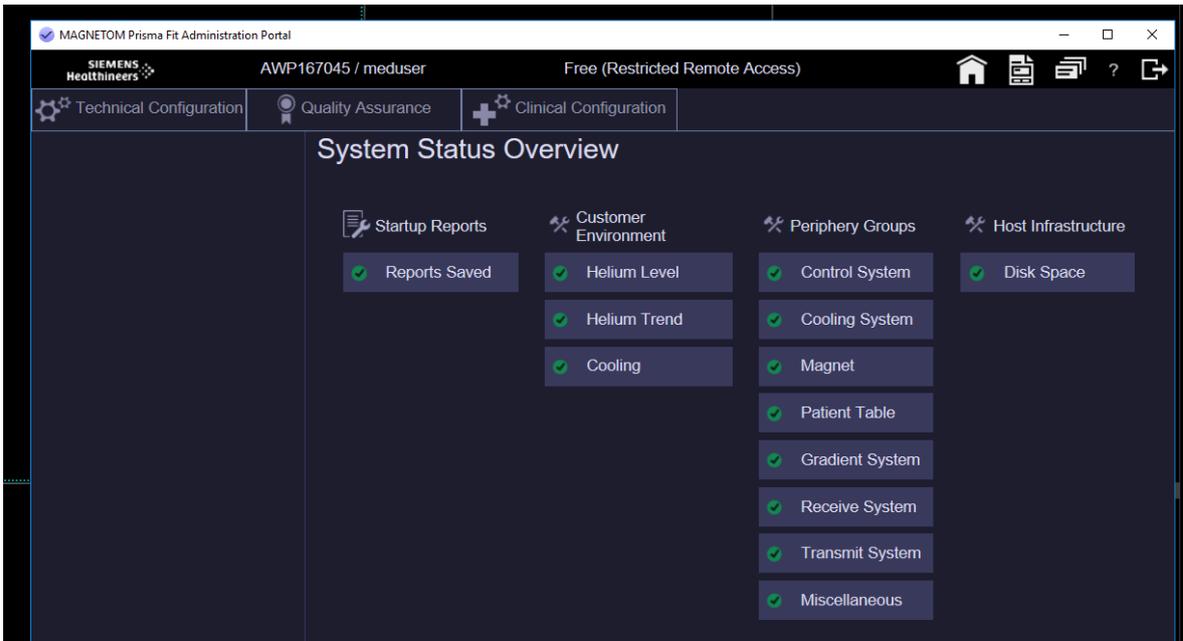
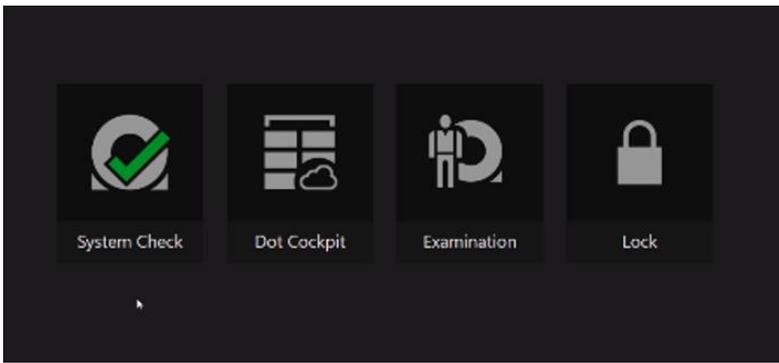
- The MRI cold head that recondenses helium gas back to liquid is down. Helium will start burning off, no longer keep the magnet at required temperature levels.
- Scanning is absolutely not allowed.
- Contact the Research Assistant, Site Manager or Siemens.

Problem: the wall lighting in the scanner room is off – what to do?

- Call the electrician (22552) to reset switch 61A (technical area – left electrical box).
- If after hours, call the electrician on duty: 26800 / 26801.

The scanner doesn't seem to be working properly. How can I tell what is wrong?

- LEFT SCREEN – HOME PAGE – SYSTEM CHECK
- A red cross means there is something wrong. Click it and check.



- During office hours, contact
 - the MR Research Assistant 09 332 50 62
 - the MR Site Manager 09 332 48 20
 - Siemens Service Center 02 536 46 00

- After hours or during the weekend, there is no support guaranteed; that is the risk that comes from scanning outside of business hours. Siemens support is also restricted to weekdays. It is always a good idea to take a picture of the message so that you can relay it to the Research Assistant and the Site Manager.

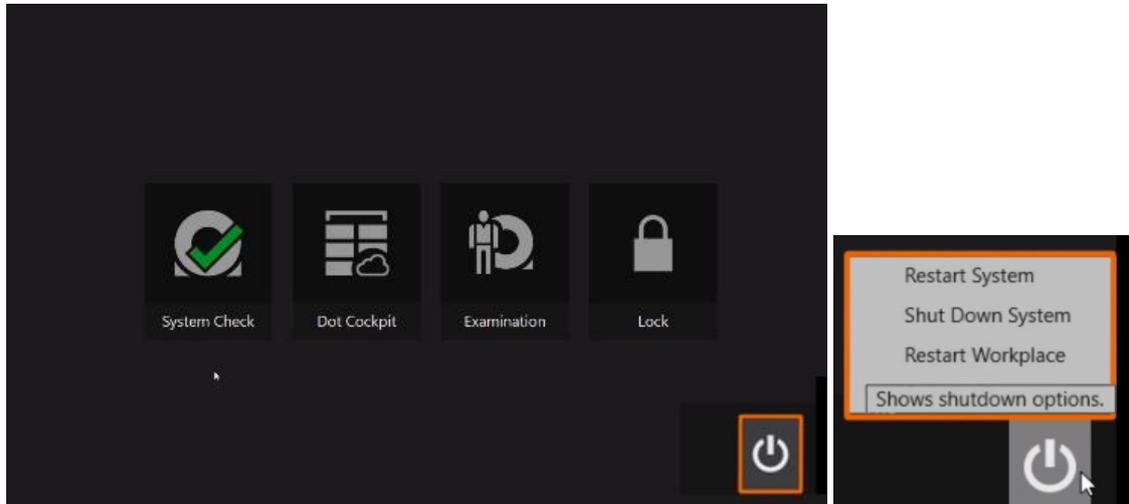
The scanner doesn't seem to be working properly. What can I do (in general)?

Set the scanner bed at the HOME position (all the way up and all the way out – to do this press the HOME button on the control panel); Plug out all elements of the receiver coil; Shut down the system completely (so don't select 'restart').

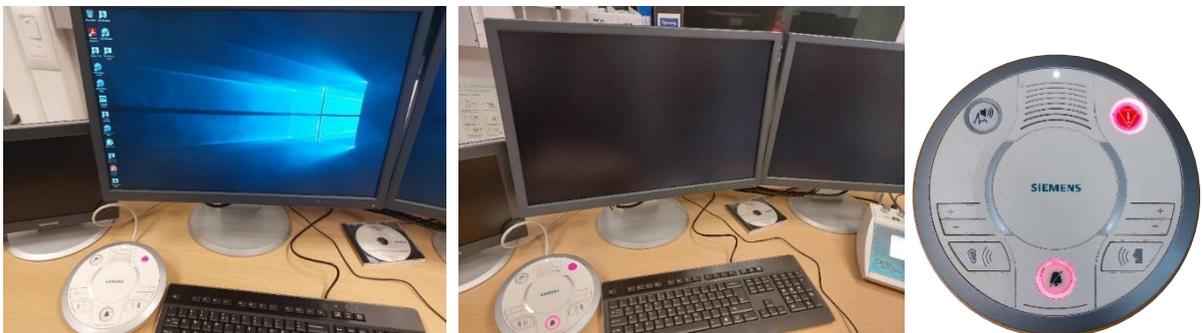
- LEFT SCREEN – HOME screen – 'Shut down system'

The scanner table freezes

- Hit the red 'stop' button on the side of the scanner and then hit the table in/out buttons back and forth until you hear a "click". Then press the table forward once and release. Watch for an arrow to appear at the head and feet of the icon on the display. The table is now reset.



- Wait for red lights flickering on the Siemens intercom unit AND a completely black screen.
- Estimated shutdown time: 7 minutes.

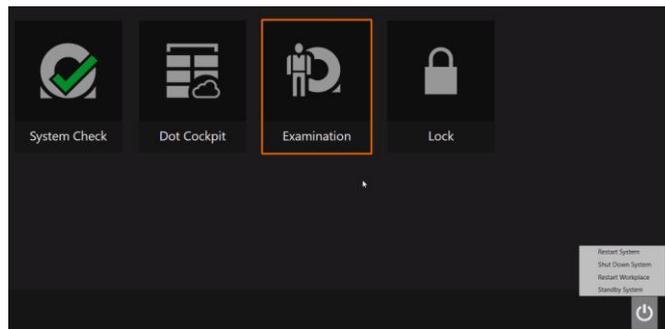


- Then press the blue button "SYSTEM OFF" on the Siemens Control Box. Wait 1 minute then start up the system by pressing SYSTEM ON on the Siemens Control Box. Wait for the Home page to appear.

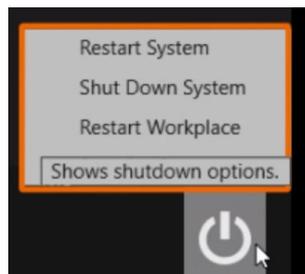


What to do when the User Interface is frozen?

Go to the HOME page.



Choose: **Restart Workplace (Reboot)**.
Restarts the workplace and the measurement and reconstruction system (MaRS) software.



Choose **Restart Workplace** (instead of the longer shutdown procedure) when

- The User Interface is frozen.
- Hardware errors occur.
- The scanner table is not responding to controls.
- An error message has occurred that requires the system to be rebooted.

.Helium is too low

The scanner can inform you that the helium level is too low (< 50%) in two ways:

- Either a message is displayed at the MR console informing you that the helium fill level is too low.
- Warning is lighted on the Siemens Box.

Press the 'Acknowledge' button at the Siemens Box to set off the audible alarm. The LED will continue to be lit. The helium supplier is automatically notified and will call the Site Manager to book an appointment to refill the system within the next week.

You may proceed to scan, it is safe, also during the weekend. Inform the Research Assistant and Site Manager so that they can check that the refilling of the system was indeed booked.

Pop-up messages

'License is about to expire'.

This means that the license for a certain sequence (not necessarily any of your sequences) is about to expire.

- It is safe to scan.
- Notify the Site Manager and Research Assistant so they can contact Siemens for renewal of the license.

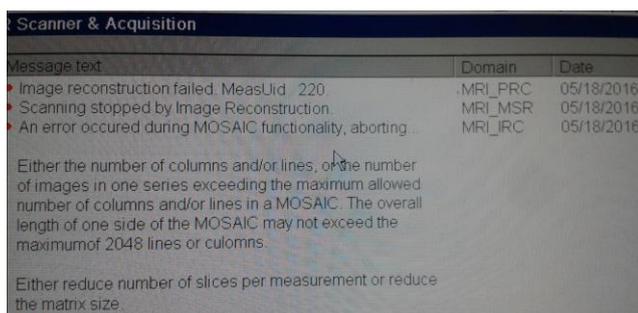
'Scanner hardware malfunction. Functional problem within automatic shutdown mechanism.'

Although the pop-up advises to 'Retry, reboot scanner, switch off/on the scanner', this problem should not prevent you from scanning.

- Click away the pop-up and start to scan.
- Inform the Research Assistant and Site Manager.

'Image reconstruction failed.'

This is often due to a sequence that is asking too much of the reconstruction system, therefore the scanner will refuse to acquire unless you apply the proposed changes, such as reducing the number of slices.



Remark on the table position

Very often the table is not perfectly in the home position.

- Put the table in the home position using the control panel on the scanner.
- Start to scan.

Temperature/pressure warnings: 'SEP temperature warning' - 'ACS warning: return pressure out of tolerance' 'Magnet Supervision Warning: compressor water error is detected'.

If the water pumping through the MRI system is not cool enough, the scanner will lock-up and disallow scanning until the temperature can be brought back down to specified levels. This is mostly due to a problem with a water pump or clogged water filters.

What to do?

- During the office hours
 - Don't waste time and call Veolia (24317) immediately.

- Mention 'a problem with the water temperature of the MRI scanner in MR-dwarsgebouw which is in need of urgent action'. Wait for Veolia to analyze and/or solve the problem.
- Inform the Site Manager and Research Assistant.
- After hours
 - Call 'stookcentrale' (22567) or 'stoker van wacht' (24950)
 - Mention 'a problem with the water temperature of the MRI scanner in MR-dwarsgebouw which is in need of urgent action'.
 - Inform the Site Manager and Research Assistant by e-mail.

If Veolia cannot solve the problem, they will refer to Siemens. Call Siemens.

Remark on the RF power Amplifier

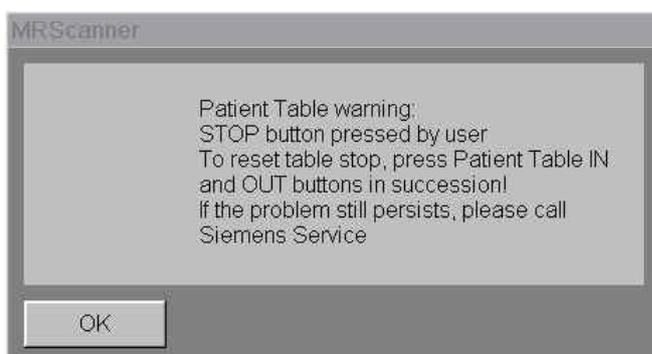
- What to do yourself:
 - Unplug all coils and put the table in the home position.
 - Try to reboot first: System > Control > tab MR scanner > Reboot. Most often this doesn't solve the problem, but as it only takes a couple of minutes, it is worth the try.
 - If the problem persists, a complete shut-down will be necessary (see above): System > End session > Shut down the system.
- Contact the Research Assistant and the Site Manager.
 - They will check the count -down of the RF amplifier in the technical room (only access with key).

Humidity alarm

- It is OK to start scanning.
- Inform the Research Assistant and Site Manager.

Patient Table warning: STOP button pressed by user

- You accidentally pressed the STOP button on the intercom.
- Go inside the scanner and on the control panel, press up/down/up (quickly). This will resolve the problem.

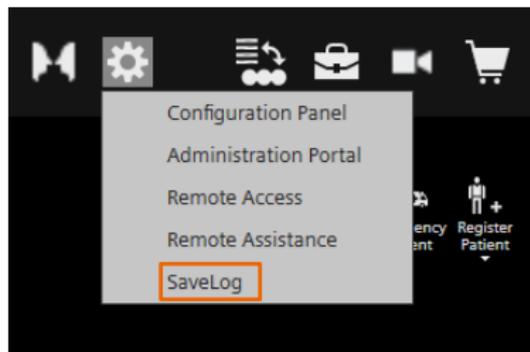


How to make a system log file after a serious error

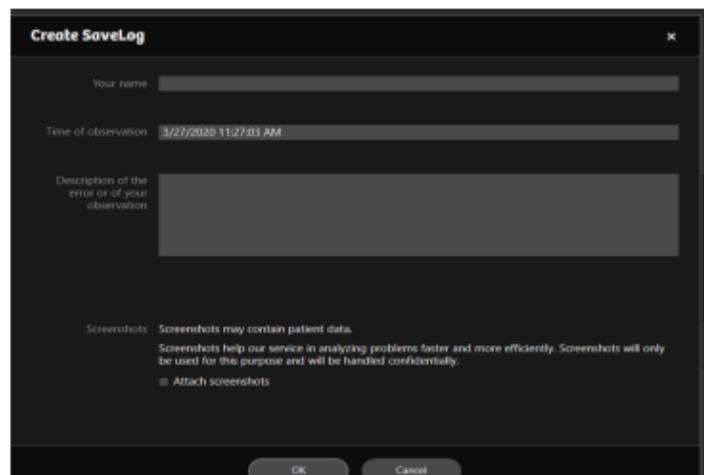
A memory system log file (Save Log) is a file containing all events in the system that makes it possible to reconstruct the error for the precise diagnosis in order to resolve them as effectively as possible and prevent their recurrence.

If possible do this **before you reboot the system** as it must be created within a time interval close to the appearance of the error, and before the system shuts down. The process can take up to 20 minutes, no actions are possible on the acquisition console when creating the SaveLog. If that is not possible in the interest of your scheduled scan time, please do make the log file after the reboot – there is still a chance that logging the system works.

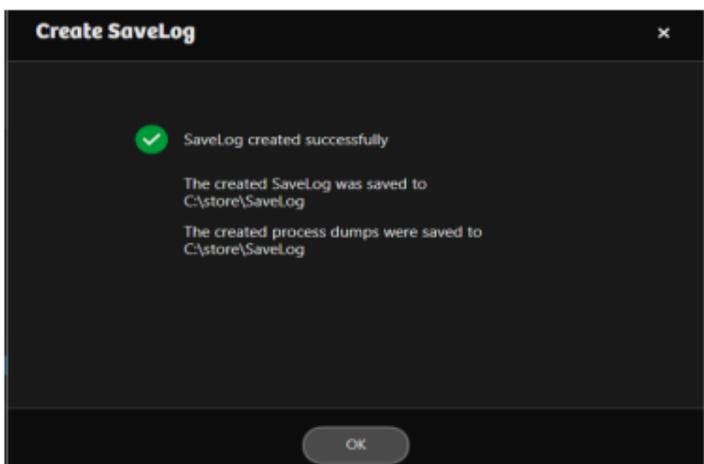
LEFT SCREEN - Move the mouse to the top right onto the cog wheel icon, choose SaveLog.



Enter your name: UZ GENT GIFMI
And a description of the problem, then click OK.



A message will notify you when the procedure is complete.



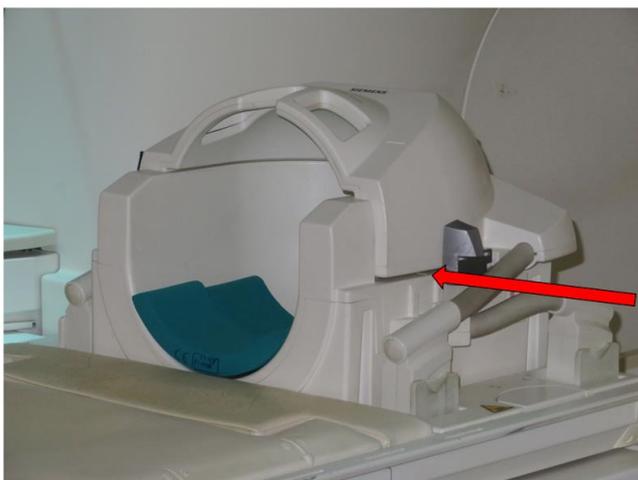
Inform the GIfMI Operational Team for support.

Image artifacts (spikes, lines, graininess, ...)

Image artifacts are most often caused by improper placement of the head coil, rather than by components of the MRI scanner itself.

Image artifacts are most often related to not properly connected coil plugs (or as in the photo, the head coil was not closed properly).

- Disconnect all the plugs (also the spine coil if this is in place).
- Open the head coil, take off the front panel.
- Put the front panel back in place, close properly.
- Reconnect all plugs.
- Center the laser light.



If the problem persists, restart the system (see above).

If the problem still persists, call the Site Manager. Damage to a coil plug or the scanner (loose part) could be the cause of the problem. This can only be solved by maintenance by the vendor. The scanner will be out of service for at least a couple of hours, maybe even a whole day depending on the cause.

XVI. Reporting incidents

All accidents and/or incidents (this also refers to near incidents) must be reported. An accident/incident report form is available from www.cabiatl.com, and this should be submitted to the Site Manager/Research Assistant within 24-hours of the event.