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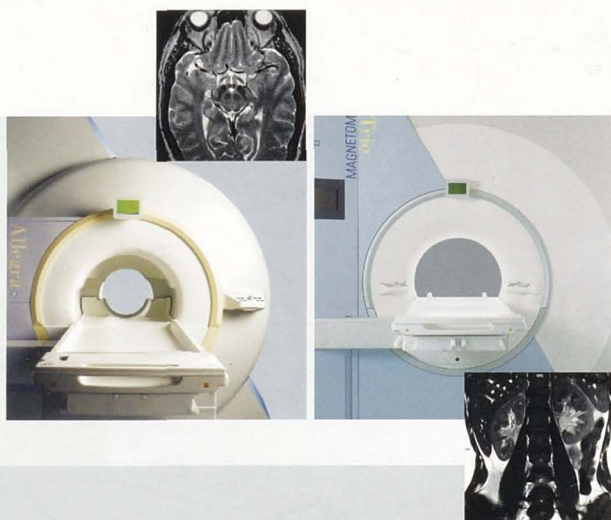
No.1 · 2002

MAGNETOM

An Applications Reference for Siemens MAGNETOM Users

Flash

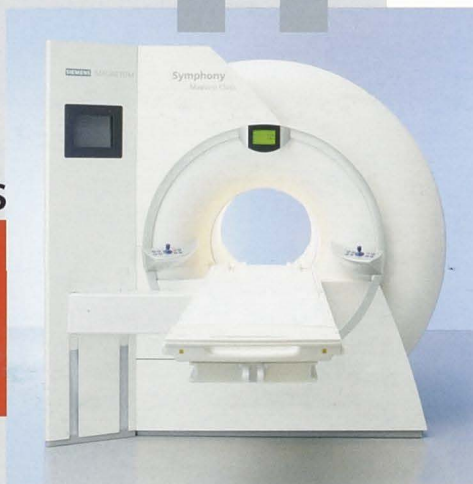
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Questions & Answers

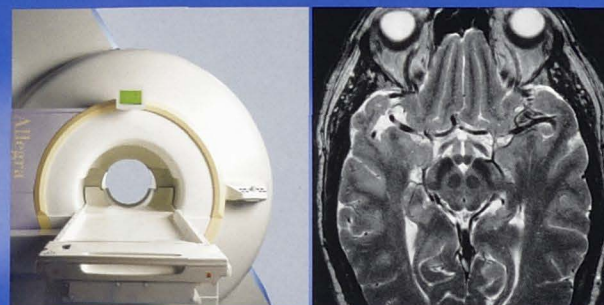
Maestro Class

is in



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Siemens Ultra High-Field Program

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The Siemens commitment to 3 Tesla can easily be seen in our leading product line in the Ultra High-Field segment. MAGNETOM® Allegra – See the Mind. Dedicated to brain imaging, this most compact 3T scanner is equipped with the strongest gradients in the market. MAGNETOM Trio – See the Body. The Trio is your system for whole body applications in the 3T Ultra High-Field sector. It offers a full 40 cm Field of View and is the shortest 3T scanner allowing clinical whole-body imaging at 3 Tesla.

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From the Editor – Old and new faces at MAGNETOM Flash:

For more than 6 years I've been contributing ideas and content to the MAGNETOM Flash. For the past 3 years I have been editor, author, manager and creative director of this newsletter, which is a lot of fun.

However, the increased interest in our newsletter and the increased number of installed systems require some changes. Beginning with this issue you will notice some of these changes.

First, we introduce a new column called "Questions & Answers". Here we ask questions regarding sequences and applications and provide answers.

Second, we will publish articles that are also available on the MAGNETOM World web site.

And, last but not least, we will change from a single person Editorial to an Editorial Board. I will step back a little and will be a member of the editorial board, which gives me a more relaxed schedule to contribute content.

This MAGNETOM Flash Editorial Board has 110 years experience in MR. It is a group of health care professionals with international experience. They are clinical and technical experts, and marketing, product, application as well as business managers.

The Editor in Chief

will be **Nejat Bengi**, M.D., a radiologist with 9 years of clinical, technical, business and consulting experience.

The Editorial Board:

Dagmar Thomsik-Schroepfer, PhD, a biologist with focus on medical writing, product and application marketing. I contribute another 10 years of experience to the editorial board. Occasionally I will provide information about our MAGNETOM products as well as contribute Q&As.

Another medical professional with 8 years in application support, product and application development and training is **Milind Dhamankar**, M.D..

Laurie Fisher, BSRT, R, MR – is currently the MR Installed Base and e-Health Manager for the US. She brings 12 years of clinical, technical and management experience.

Hands-on clinical and technical expertise comes from **Marion Hellinger**, application specialist, radiographer and Coordinator of our Application Training, with 11 years of expertise.

Peter Kreisler, PhD, a physicist, brings 17 years of expertise in product and application development, marketing and consulting.

Business and product aspects are also added to the team by **Charles Collins**, BSRT, with 14 years of clinical and application expertise, business consulting and product management.

Tony Enright, PhD, has been Collaborations Manager for the Asia-Pacific region for the past 2 years and adds another 4 years of medical research experience.

Michael Wendt, PhD, currently the Manager of MR R&D and collaborations in the USA, with 8 years of experience in MR. Before joining Siemens Medical Solutions USA, Inc., Michael was an Assistant Professor of Biomedical Engineering at Case Western Reserve University in Cleveland.

Daniel Grosu, M.D., recently joined the US MR Division as Manager of Research Collaborations. He brings 3 years of experience in medical practice and research, and in business development.

It is terrific to have **Helmuth Schultze-Haakh**, PhD, again as technical editor in the newsletter. He is MR Research and Development Collaborations Manager USA for the Pacific Region with 12 years experience.

Finally we have **Raya Dubner** and **Antje Hellwich** as creative directors.

Some of these names will sound familiar to you. That is because they are contributing authors to several medical journals.

The team approach will serve your wish to see the MAGNETOM Flash on a more regular basis – you ask, we listen!

We hope you will enjoy this issue. Please send your comments to us!

Dagmar Thomsik-Schroepfer, PhD

MAGNETOM Flash – Reader Service

Letters to the Editor – We welcome your comments about the content of MAGNETOM Flash. Please send comments to the Editor. Include your name, address, and phone number or e-mail.

World Wide Web – Visit us at www.siemensmedical.com. This site provides information about all Siemens medical products.

Publish articles? – You are invited to publish articles in the newsletter to share your experience with MAGNETOM MR users all over the world. To submit an article please contact the Editor.

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Abdominal MRI – Case Studies from Shanghai Changhai Hospital:

Dr. Jianping LU, Department of Radiology, Shanghai,
Peoples Republic of China



The Shanghai Changhai Hospital is a university teaching hospital, which is located in the northeast of Shanghai and has 1600 beds. It provides medical cares for local patients and the whole of China. The Department of Radiology performs more than 240000 exams annually. In 1994 and 2000, 1.0T MAGNETOM Impact and 1.5T Symphony were installed. At present, they examine about 80 patients every day. Abdominal MRI and contrast-enhanced angiography with fast and ultrafast sequences were routinely performed and accounted for 40 percent of all patients.

Case Studies

1. Duodenal Cancer

Patients History

A 38 year old women had occult upper abdominal pain with anorexia for half an year. All lab findings were normal. Gastroscopy examination showed normal esophagus and stomach, but missed duodenum. CT examination in local hospital showed the enlargement of pancreatic head and suspected cancer of pancreatic head. 10 days later, the patient arrived in our department of general surgery because of ascites.



Fig. A

The coronal FLASH 2d fs shows dark ascites around the liver and slight enlargement of whole pancreas with normal signal intensity. The duodenum becomes burlier and solid, which margin is unclear.

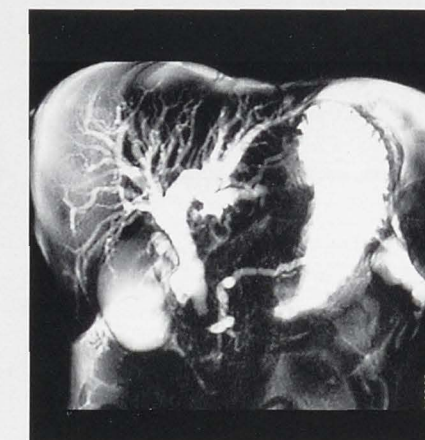


Fig. B

The thick slice of HASTE MRCP shows mild dilatation of both bile ducts and main pancreatic duct. The point of obstruction is located in ampulla of Vater without obvious mass.



Fig. C

The coronal TrueFISP also shows the enlargement of pancreatic head and mild dilatation of both bile ducts and main pancreatic duct, one cannot differentiate pancreatic head from duodenum.



Fig. D

The arterial phase image of 3D flash (VIBE) shows normal homogenous enhancement after administration of 20ml Gd-DTPA. The solid duodenum has moderate enhancement.



Fig. E

The image of portal vein phase shows unclear duodenum and infiltration toward contiguous organ.



Fig. F

The dorsal slice shows biliary obstruction at duodenal papilla.

The information presented in these case studies is for illustration only and is not intended to be relied upon by the reader for instruction as to the practice of medicine. Any health care practitioner reading this information is reminded that they must use their own learning, training and expertise in dealing with their individual patients. This material does not substitute for that duty and is not intended by Siemens Medical Solutions to be used for any purpose in that regard.

2. Annular Pancreas and Pancreatitis

Patients History

A 36 year old man had a history of acute pancreatitis three years ago. Recently, he felt mild pain in upper abdomen. Blood amylase increased by 261U (Somogyi). Clinically, he was suspected to have acute episode of chronic pancreatitis. However, CT examination in local hospital revealed a mass of pancreatic head and could not exclude the neoplasm.

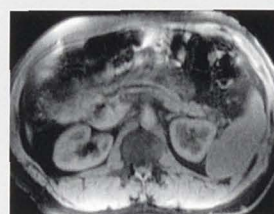


Fig. A

The axial FLASH 2d fs shows enlargement of pancreatic head and relative atrophy of body and tail. There is the low signal area within enlarging head.

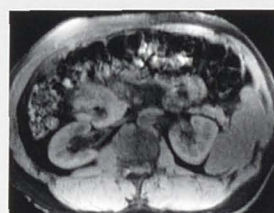


Fig. B

The caudal slice of image A shows focal low signal area besieged by the enlarging pancreatic uncinata process of normal signal.



Fig. C

The same slice of image B with TSE T2-weighted sequence shows the enlarging pancreatic uncinata process whose signal is similar to body and tail.

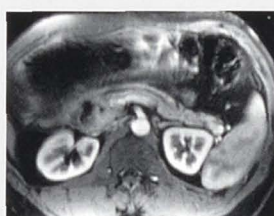


Fig. D

The image of FLASH 2D at arterial phase shows homogeneous enhancement of whole pancreas except the central area of pancreatic head and mild enlargement of main pancreatic duct.

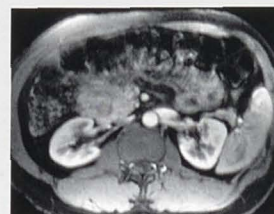


Fig. E

The margin of enlarging pancreatic uncinata process is unclear, but basically normal on caudal slice of image D.

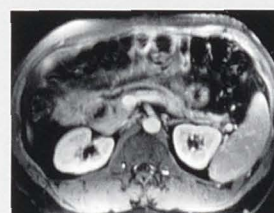


Fig. F

The image of FLASH 2D at phase of portal vein is same slice as image E.

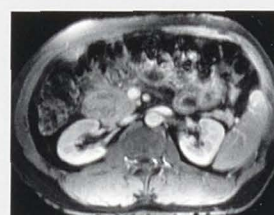


Fig. G

The image of FLASH 2D at phase of portal vein is same slice as image E.



Fig. H

The thick slice of HASTE MRCP clearly shows mild enlargement of main pancreatic duct, abnormal confluence between the common bile duct and main pancreatic duct, and some branches encircling the duodenum.

3. Cancer of Pancreatic Uncinate Process

Patients History

A 49 year old man demanded imaging examination because of only occult upper abdominal pain for a few days. All lab findings were negative.



Fig. A

The axial image of FLASH 2D without FS shows the enlargement and deforming of pancreatic uncinata process.



Fig. B

The signal of enlarging and deforming pancreatic uncinata process is lower than the other parts of pancreas on FS-fl2d image.



Fig. C

The thick slice of HASTE MRCP shows interruption of mildly dilated main pancreatic duct at uncinata process, but normal common bile duct.



Fig. D

The Sub-MIP image of thin slice of MRCP shows abruptly interruption of main pancreatic duct in detail.



Fig. E

The small mass within the uncinata process has decreasing enhancement on 3D VIBE image at arterial phase.

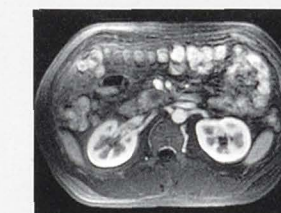


Fig. F

The caudal slice of image E shows the relationship between the mass and mesenteric vessels.

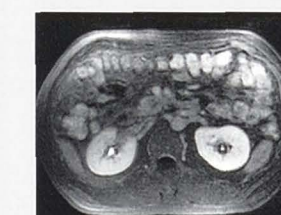


Fig. G

The enhancement of small mass within the uncinata process is still weaker than surrounding normal pancreatic tissues.

Results and Discussion

We presented three cases with disease of pancreatic head and duodenum. These case reports indicate that the combination of various MR sequences, including breath hold FLASH 2D T1 weighted imaging with or without fat suppression, Turbo Spin Echo T2 weighted imaging, thick and thin slice of MRCP, 2D FLASH and 3D FLASH dynamic scanning, can characterize the lesions in the regions of pancreatic head and duodenum. The combination can effectively evaluate the mass, mesenteric vessels, biliary system and pancreatic duct. It has potential advantages over CT and helps us to overcome difficulties in differential diagnosis. The MR examination always takes about 20 minutes.

Questions & Answers:

Dagmar Thomsik-Schröpfer, PhD Market Segment Manager High Field, Siemens Medical Solutions

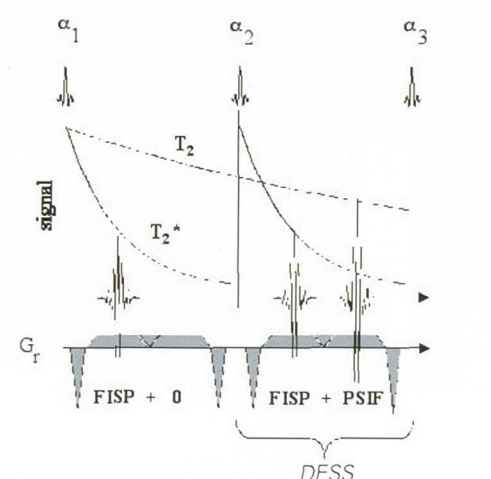
What is a DESS sequence?

A 3D steady state gradient echo sequence. DESS stands for Dual Echo Steady State and is denoted by a *de3d* in the sequence file name. This sequence acquires two signals, the FISP and PSIF gradient echo within the same repetition time. Both signals generate MR images of different contrast. The PSIF image is more T2 weighted. During image reconstruction, the strong T2 weighted PSIF images are added to the FISP images which are more T1/T2 weighted in comparison.

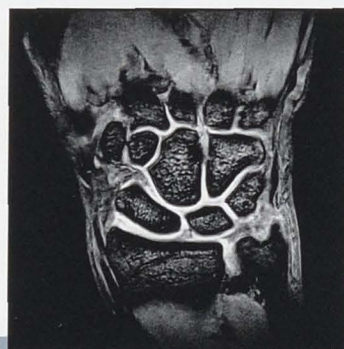
Advantages:

- Improved SNR due to the acquisition of two raw data matrices
- Strong T2 contrast with T1/T2 weighting, this helps Fluid-cartilage differentiation

MPR is used for post-processing. The DESS sequence is especially suitable for orthopedic series requiring good differentiation between synovial fluid and cartilaginous structures.



Double Echo Steady State : DESS sequence
Separate acquisition and calculation of both SSFP signals. Addition of FISP and PSIF results in an enhanced T2 contrast due to the strong contribution of the T2 weighted PSIF signal



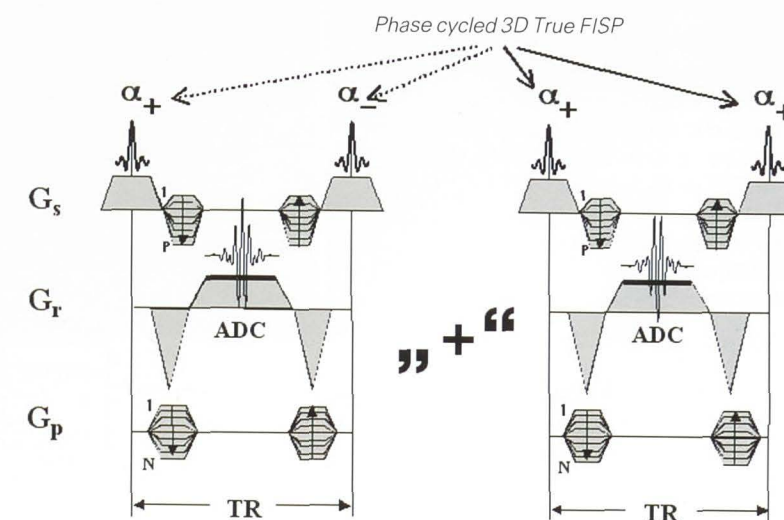
What is a CISS sequence?

A 3D steady state gradient echo sequence. CISS stands for Constructive Interference in the Steady State and is denoted by a *ci3d* in the sequence file name. This sequence offers rapid, high resolution T1/T2 weighted imaging. The sequence scheme is based on True-FISP. Each image is generated by the combination of two separately acquired TrueFISP images that differ only in THEIR RF pulse scheme. This helps to avoid interference streaks.

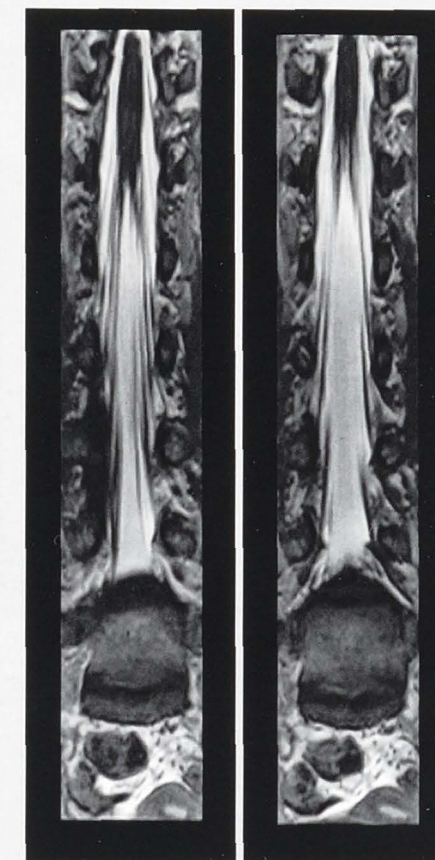
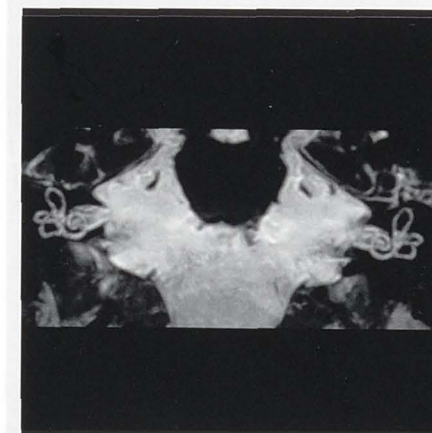
Advantages:

- Very high SNR of fluid and sub-millimeter resolution
- Strong T1/T2 contrast
- Robust

The 3D implementation of CISS provides T2 weighted sub-millimeter resolution imaging. Typical applications are the inner ear (cochlea, labyrinth), cranial nerve imaging, imaging of the cerebello-pontile angle, and the cerebellum. MPR or MIP is used for post-processing.



Constructive Interference Steady State: CISS 3D Sequence Diagram



What is a HASTE sequence?

HASTE is a Half Fourier single shot Turbo Spin Echo technique. HASTE stands for Half Acquisition Single shot Turbo Spin Echo and is denoted by the nomenclature *haste* in the sequence file name. HASTE is used for sequential acquisition of high resolution T2 weighted images. The sequence utilizes the longitudinal magnetization of the fully relaxed spin system.

This sequence utilizes a single 90° excitation pulse followed by an echo train of up to 512 RF refocused echoes. Only 53% of the total number of requested phase encoding lines are acquired with a k-space reordering technique. This allows the placement of a moderately T2 weighted TE at the effective echo time. All data for a single slice are acquired in a single shot before moving on to the next slice. The data are then reconstructed with a Half Fourier algorithm to achieve the final resolution.

This sequence is useful in the entire body for fast T2 weighted imaging.

Advantages:

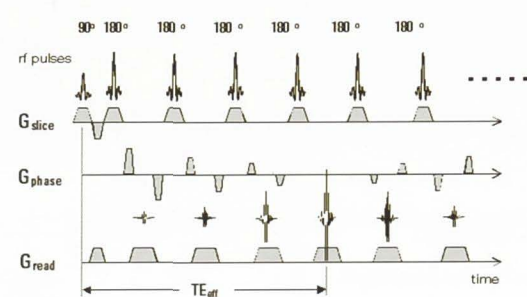
- Reduces TE_{eff} to less than 100 ms
- Even tissue with a short T2 can be displayed
- Robust single-shot technique not sensitive to motion artifacts

Because of the short acquisition time per image, the HASTE sequence is not sensitive to patient movement or respiratory artifacts. Thus, HASTE is suitable for use not only in abdominal imaging, but also for examinations of uncooperative or pediatric patients.

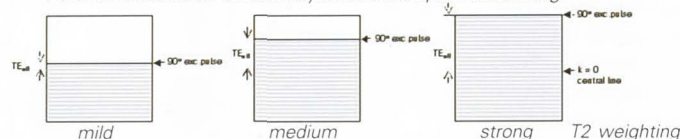
Changing the echo time

If you change the echo time TE, the number of lines measured before the central echo will also be changed. Thus, the actual Phase Partial Fourier factor is set with the parameter TE. At minimum TE, a Half Fourier measurement is performed; at maximum TE, a single-shot TSE measurement is performed, measuring the entire raw data space. The latter is used, for example, in cholangiography.

HASTE Sequence Diagram

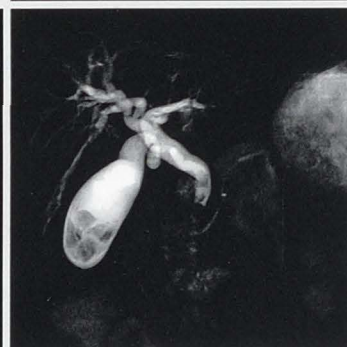
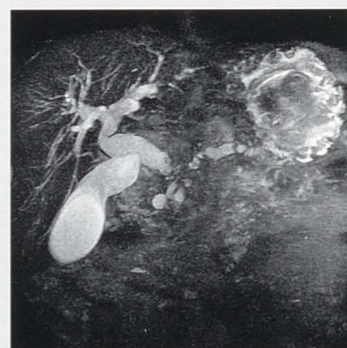


HASTE T2 contrast variation by different k-space data filling



Half Fourier
Single Shot Turbo Spin
Echo:
HASTE Sequence Diagram

Single shot multi echo
sequence
with half Fourier
reconstruction:
 $TA_{HASTE} \sim TA_{RARE} / 2$



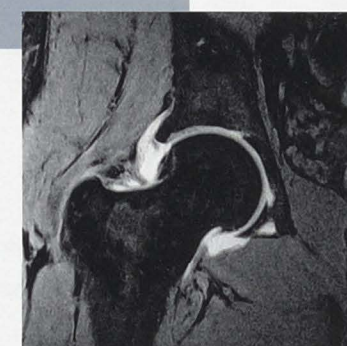
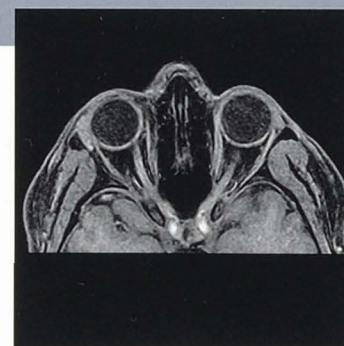
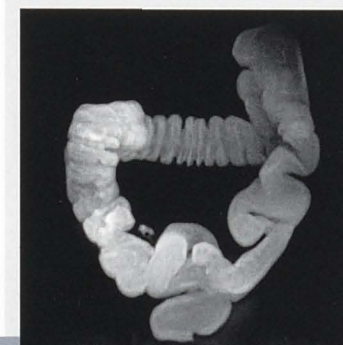
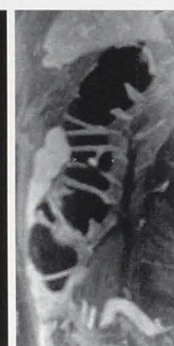
What is a VIBE sequence?

A T1 weighted 3D FLASH breath-hold technique. This sequence utilizes isotropic resolution, a frequency selected fat saturation pulse prior to each partition loop, thinner slices than a f12d sequence, and extended FoV coverage. VIBE stands for Volumetric Interpolated Breath-hold Examination and is denoted by the nomenclature *f13dv* or *d1* in the sequence file name. In addition FS is selected.

Advantages:

- 3D dynamic imaging of the abdomen with isotropic voxels
- High spatial resolution
- MIP to obtain vessel information without additional exam

Applications for this sequence besides dynamic liver and pancreas imaging are also the orbits, chest and pelvis. Post processing the same data set can also be used to provide high quality vascular information and you can separate the arterial, portal-venous and equilibrium phases. It can also be used for MR colonoscopy providing high resolution images showing presence of polyps and tumors, non-invasively.



What is a MEDIC sequence?

The MEDIC (Multi Echo Data Image Combination) sequence is a multi-echo gradient echo sequence with flow compensation with each echo. It is denoted with *me* in the sequence file name. MEDIC sequence combines multiple images with different T2 weighting.

T2*-weighted imaging with good signal-to-noise ratio for spine (especially transverse cervical and thoracic spine) and joint (knee and shoulder) imaging.

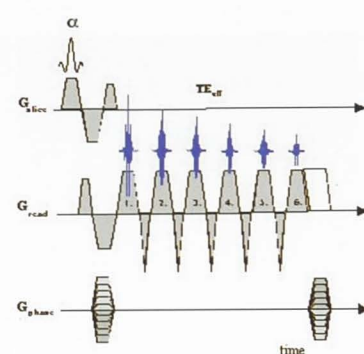
T2*-weighted 3D imaging of the cervical spine with small flip angle and adjusted TR.

When Combined Echoes = 1, this sequence behaves like a FLASH sequence with flow compensation.

Advantages:

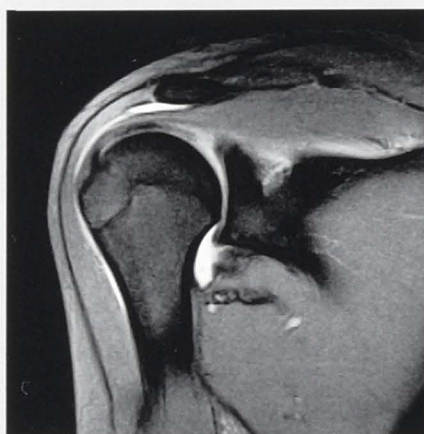
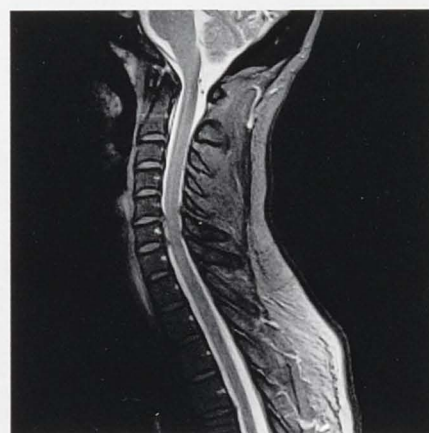
- Minimize chemical shift artefacts
- Minimal flow artefacts
- T2* contrast
- Better resolution compared to a single echo low band width sequence

Applications for this sequences are C-Spine and orthopedic imaging.



MEDIC: Multi Echo Data Image Combination

Unipolar "high bandwidth" multi gradient echo sequence with GMR. Features: reduced chemical shift-, susceptibility-, flow- artifacts. Data postprocessing possible.



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is in



intelligence
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PRODUCT NEWS

MAGNETOM Harmony, Symphony, Sonata Maestro Class — A New Degree of Perfection:

Dagmar Thomsik-Schröpfer, PhD, Siemens Medical Solution, Market Segment Manager High Field



At the RSNA 2001 Siemens Medical Solutions introduced the next step in development for their main product line MAGNETOM Harmony, Symphony and Sonata: the Maestro Class. New systems are delivered with Maestro Class already. And it is available for the already existing systems as an upgrade. The obvious change are new covers.

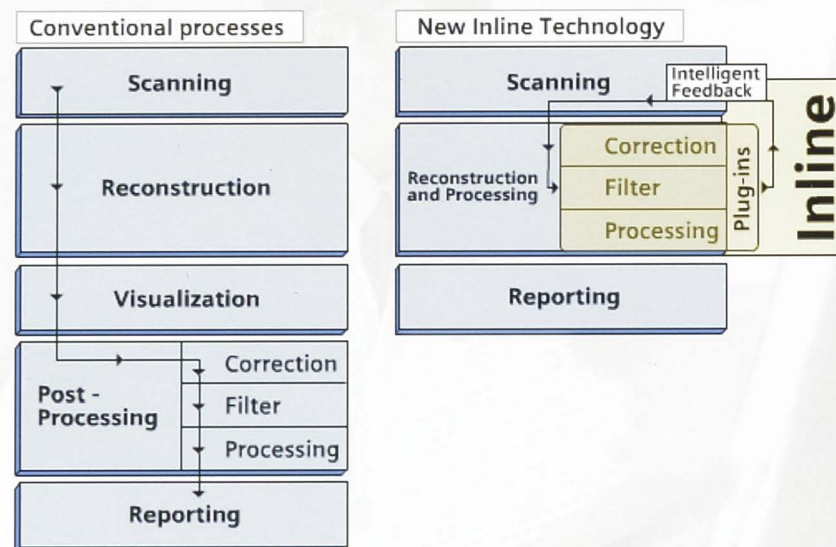
Within the soul of Maestro Class you find intelligence, speed and innovative applications.

Maestro Class
is in telligence —
to make MR easier!

We use technology in an intelligent way to make MR even easier to use. Many routine processes are automated, making them faster and simpler.

Inline Technology — Processing instead of Post-processing

The complete exam is finished as soon as image acquisition is finished. Inline technology uses an intelligent on-the-fly feedback loop to control scanning, reconstruction and processing. Thus motion is detected and corrected on the acquired image and unwanted

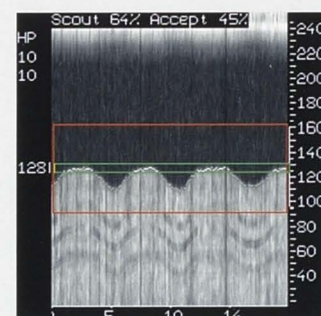
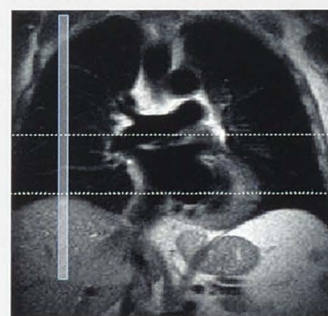


information is no longer filling up your harddisk.

PACE Prospective Acquisition and CorREction — Motion under control!

1D PACE allows exams with free breathing and is the perfect alternative

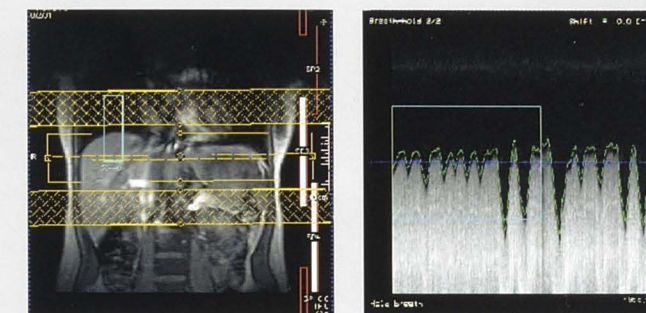
to breath hold scanning. The user defines the expiration phase in which data are accepted. The Inline display shows the diaphragm position. Thus respiratory motion is detected. For imaging only the selected phases are taken resulting in high image quality in free breathing.



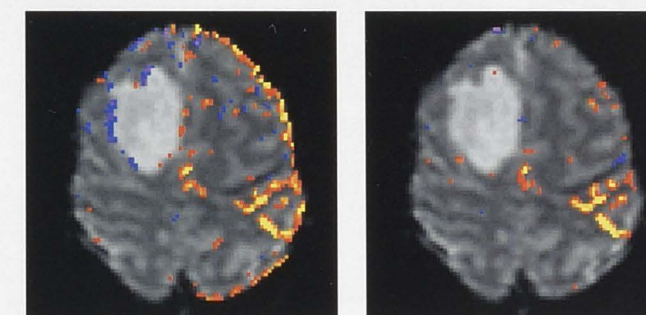
Inline display of diaphragm position
Define expiration phase to accept data

2D PACE improves selectivity and precision in abdominal MRI. It is a robust technique that automatically aligns each multi breath hold. 2D PACE compensates unwanted patient movement.

3D PACE* virtually freezes patient motion. It improves selectivity and increases selectivity. This is beneficial e.g. in functional MRI for precise neurosurgical planning.



Multi breath holding with
2D PACE control



None

3D PACE

*Processing Plug-ins —
provide unmatched flexibility*

Simplify routine procedures by selecting various checkboxes on the according syngo task cards (e.g. Subtraction, MIP, SuperMIP, t-test) or by creating own macros.

Maestro UI — Your cockpit for dynamic MRI

This ergonomic and easy-to-use interface supports the clinical workflow. A quick overview is provided by Image Stamps.

The Phoenix* feature is a drag and drop function. An existing image is selected via the Browser and simply placed into the measurement queue. All image parameters are extracted and placed into the exam task card.

syngo scan assistant

Changing one MR parameter inevitably means adjusting other parameters. The syngo Scan Assistant makes the effect visible and suggests further parameters in case of conflict.

Inline Movie for cine studies



Maestro user Interface

Maestro Class

is in creased speed
to make MR faster!

**The Solution to speed up
acquisition times is iPAT –
Integrated Parallel Acquisition
Techniques.**

- Integrated feature
- Integrated into the MAGNETOM IPA coil concept, use up to 8 independent channels
- Integrated Auto-calibration
- Combines the convenience of IPA and iPAT for many applications

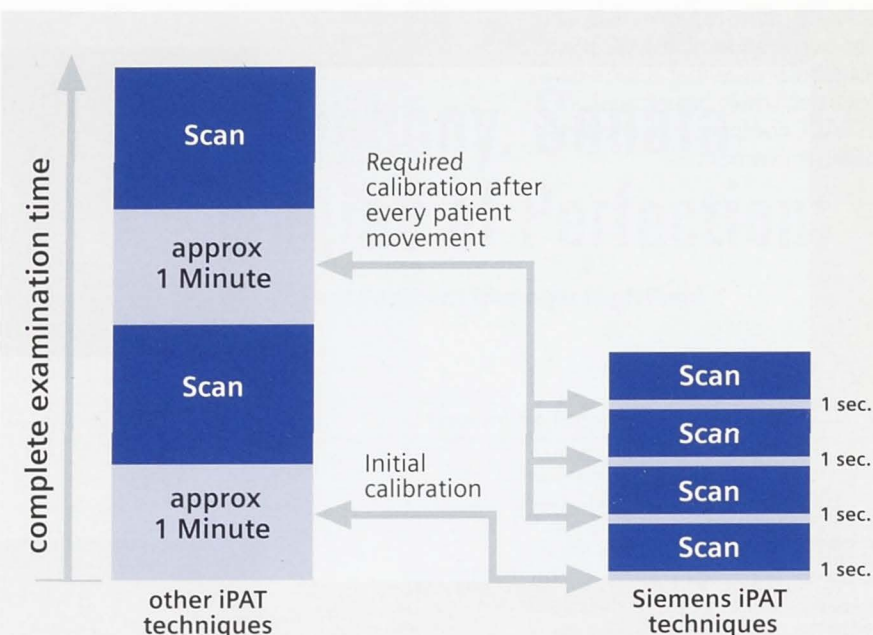
PAT factor 2 is Standard!

Maestro Class for MAGNETOM Harmony, Symphony and Sonata features iPAT with a speed factor of 2 as standard and is IPA compatible. The benefits are:

- Higher patient comfort – Shorter breath holds in abdominal imaging increase patient comfort; due to the short acquisition times
- Higher temporal resolution – in abdominal and cardiac MRI, e.g. dynamic 3D VIBE liver imaging, cine cardiac imaging
- Less blurring artifacts through the whole body due to shorter measurement times
- Improved diagnostic confidence in stroke imaging – shorter measurement times possible, higher resolution, FEWER distortion artifacts in single-shot EPI

PAT Plus – iPAT factor 4*

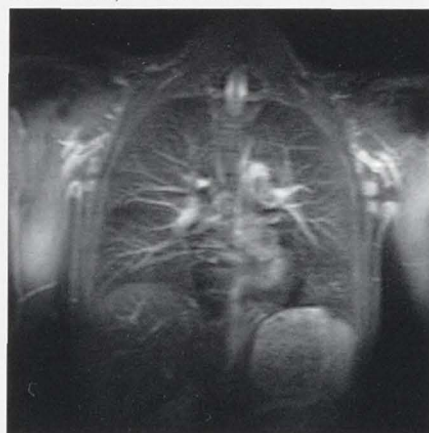
iPAT-Plus with speed factor 4 combines high speed imaging with the 8 channel neuro array coil and the 6 channel body array coil to push demanding applications, e.g. stroke imaging, even further.



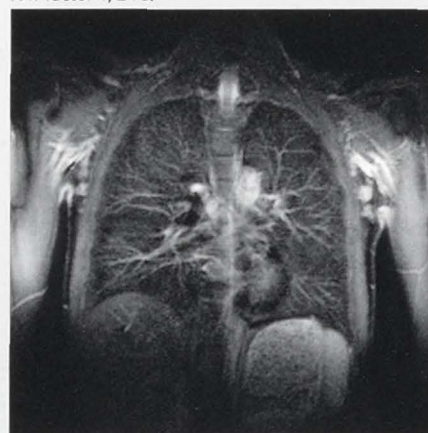
without iPAT, TA 1:24 min.



PAT factor 4, 24 s.



without iPAT, 20 s.



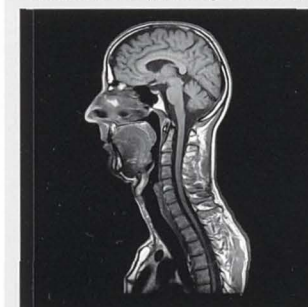
PAT factor 3, 16 s.

Maestro Class

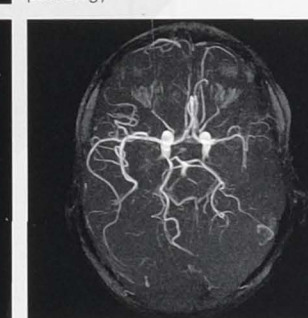
is in novative applications
Expand MR and open new application areas

Neuro MRI – One-stop stroke examination in less than 5 minutes

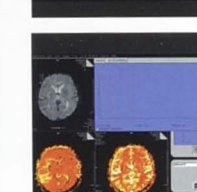
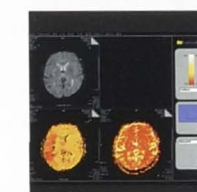
High resolution imaging with various contrast provides: perfect anatomical images, visualization of pathological tissue.



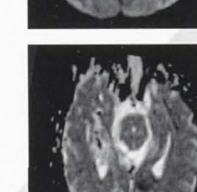
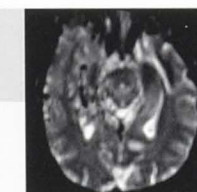
MR Angiography is an easy add-on to show details in vessels according to tissue/pathology



Easy patient set-up with high comfort for the patient



Parameter map calculations*, such as time to peak as well as relative MTT*, relative CBF*, relative CBV* are done automatically using Inline Technology.



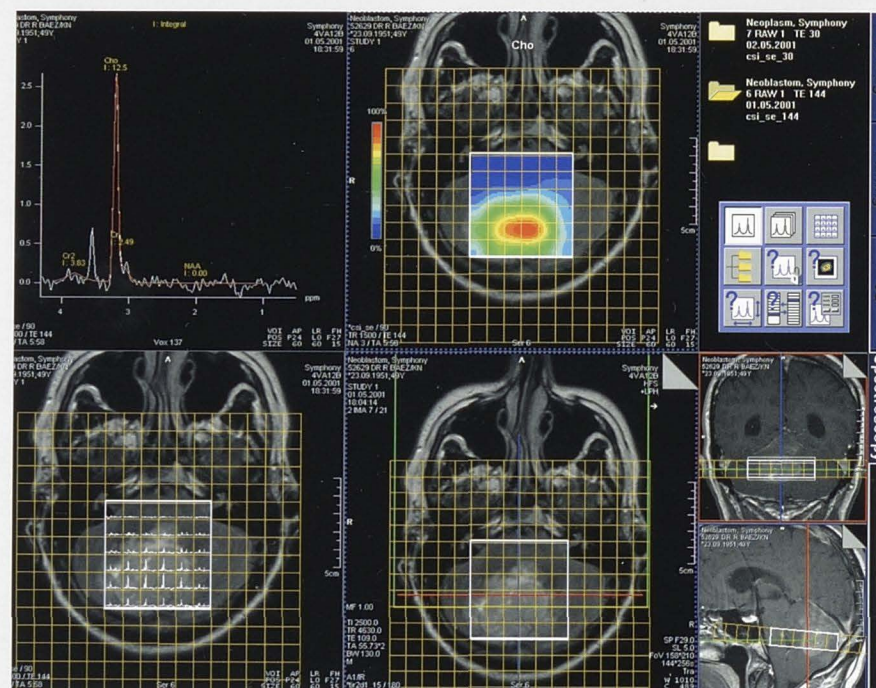
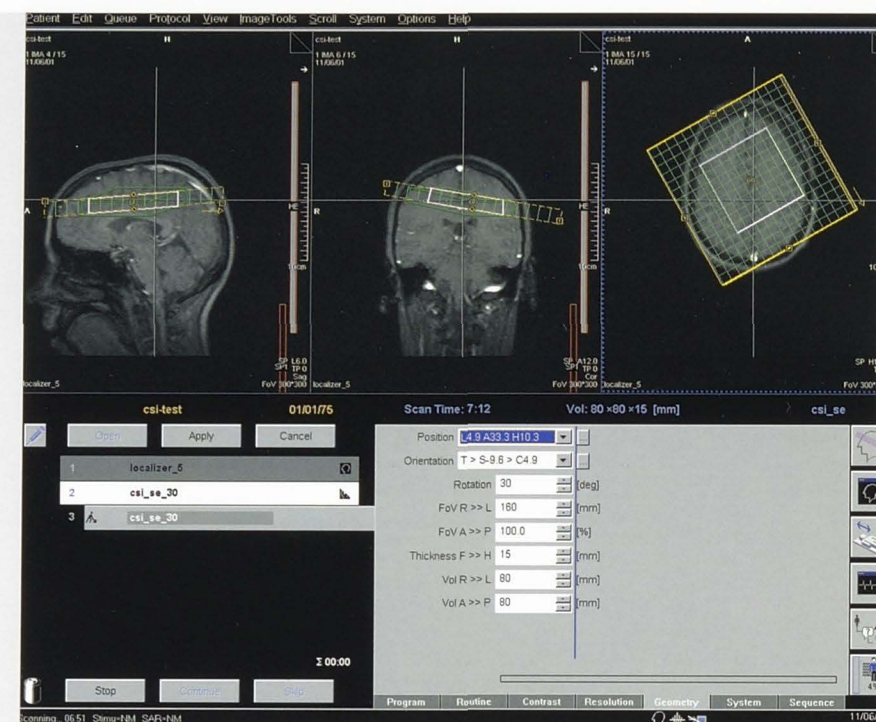
Diffusion-weighted MRI (DWI) in combination with Perfusion-weighted MRI is highly sensitive to early cerebral ischemia (within the first 30 minutes to 6 hours). It may predict the severity of the stroke and the outcome of the recovery.

The **ADC** (Apparent Diffusion Coefficient) map helps to estimate the age of stroke lesions. Calculate ADC maps automatically with Inline Technology at the end of the scan.

Trace-weighted images help to differentiate infarcted regions compared to normal tissue. They can be acquired directly in a single-shot exam or by combining individual diffusion-weighted images.

MR Spectroscopy is getting easier keeping the high flexibility for research

- **Easy and efficient** "single-button" Spectroscopy, with spectra annotation and quantification at a mouse-click.
- **Free slice positioning** – tailor slice position and orientation to your patient!
- **High research flexibility** – allows to interact with the whole procedure for the research approach
- **3D CSI** for complete anatomical coverage. For faster 3D CSI weighted encoding can be chosen
- Fully automated post-processing of data with instant display, e.g.
 - Spectral maps displaying spectra in the selected voxels
 - Metabolite images* are showing the voxel dependent peak intensities or peak ratios as grayscale or color overlay onto a reference image
 - Table of metabolites for simple reporting
- **31P and multi nuclear*** spectroscopy do benefit from the post processing functionality in the same extent



Metabolite	Position/ppm	Integral	Ratio
NAA	2.03	9.83	2.71
Cr	3.06	7.43	1.00
Cho	3.23	1.20	0.16
Ino d1	3.57	1.40	0.19
Ino d2	3.65	4.28	1.15
22	3.94	7.11	0.95

MR Angiography – Easy and completely automated – High resolution peripheral MRA from diaphragmatic level to distal vessels

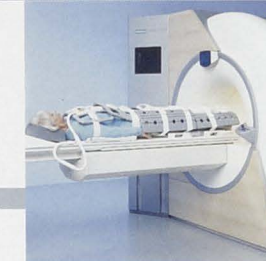
Use Body and CP Head Array Coil or a set up of multiple CP array coils with automated table movement using Integrated Panoramic Array (IPA) and Integrated Panoramic Positioning (IPP).

Optimized workflow is only a mouse click away!

Combination of Body Coil and CP Head Array Coil allows to get a vessel overview and can be used for post operative exams

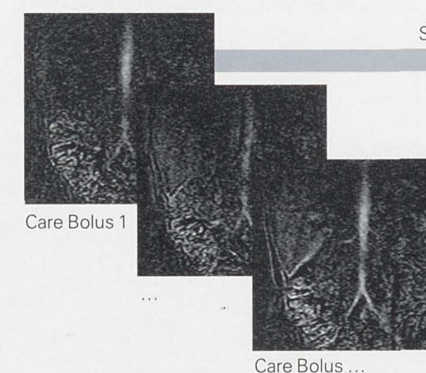
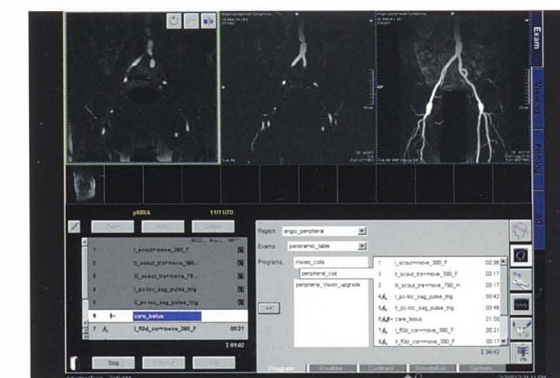


or

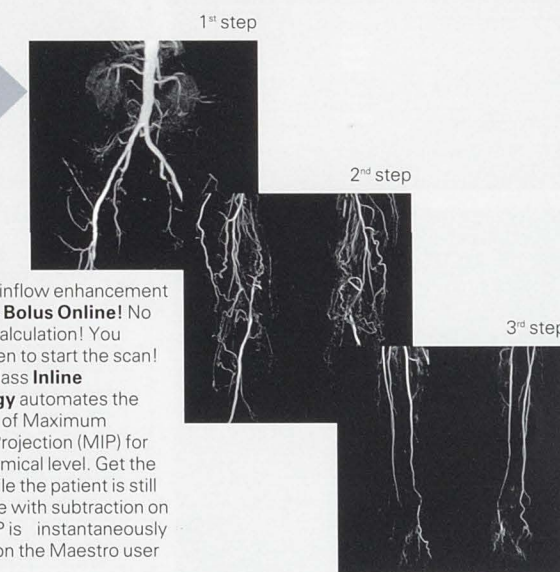


Get a **maximum coverage of 1.5 m** (5 feet) in 4 steps by combining our Peripheral CP Angio Array Coil, the CP Body Array Flex Coil and the Large Field of View Adapter. Used e.g. for pre-operative planning

The scan program for the whole examination is already programmed using the **Maestro User Interface** with its multi level scouts, automatic table travel and pre and post contrast scanning. Each measurement (no. of slices, matrix) can be individually adjusted to the patient anatomy



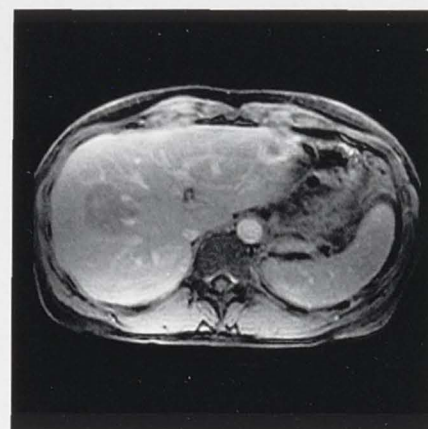
Switch to 3D



Watch the inflow enhancement using **Care Bolus Online!** No guess, no calculation! You decide when to start the scan! **Maestro Class Inline Technology** automates the calculation of Maximum Intensity Projection (MIP) for each anatomical level. Get the results while the patient is still on the table with subtraction on the fly. MIP is instantaneously displayed on the Maestro user interface.

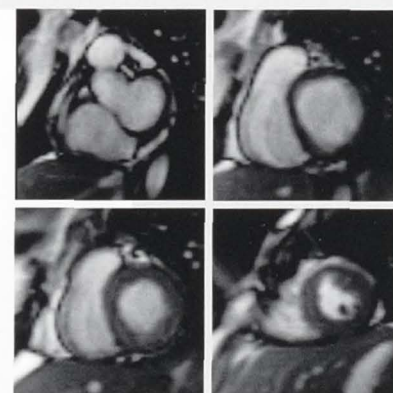
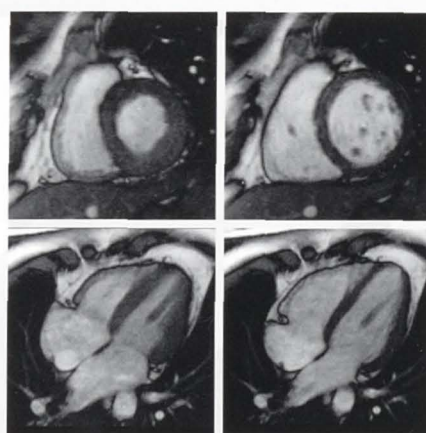
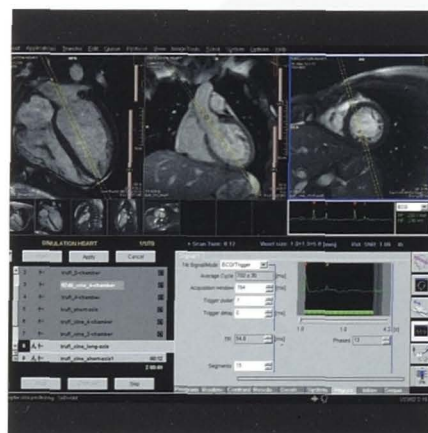
Body MRI – VIBE and iPAT – Expand your diagnosis

Combine VIBE and iPAT to speed up your body exams by a factor of 2 standard. This ultra fast imaging technique allows to visualize even earlier arterial phase in liver imaging which may open the way to new diagnoses.



Hepato cellular carcinoma
Courtesy of University Erlangen

Cardiac MRI – One-stop shop cardiac examination in just 16 Minutes



Function

Real time TrueFISP allows rapid assessment of ventricular function

Morphology

- Display your results automatically with the Auto Movie function
- Image stamps can be loaded into the movie function, the post processing card or into the measurement queue

* Information about features with syngo MR 2002B is being provided for planning purposes. The product requires 510(k) review and is not commercially available in the U.S.

The Siemens Ultra High-Field Program MAGNETOM Allegra and Trio 3T MR The Next Dimension in Clinical and Research MR Systems:

Cécile Mohr, PhD, Market Segment Manager Ultra High-Field, Siemens Medical Solutions

3T Magnetic Resonance for the future

Over the past 20 years, MR has made its way into the clinical world. This was achieved by first developing technical aspects of MR scanners and then by improving patient comfort and user friendliness. 1.5T is now the standard clinical field strength of today's MR. This is reflected in the success of the MAGNETOM Symphony and Sonata 1.5T platforms.

But good is not good enough! Higher field strengths offer more SNR, more BOLD effect and greater chemical shift. This benefits especially functional MR, MR spectroscopy examinations, and more generally whole-body techniques that require greater spatial resolution or speed.

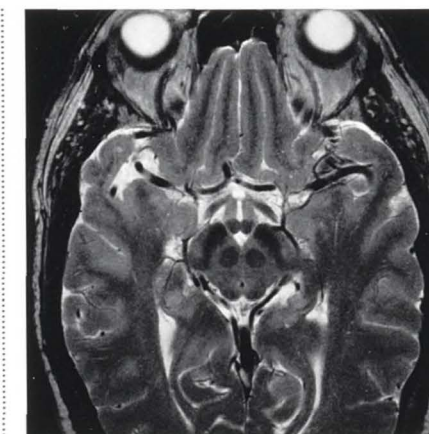


Fig. 1.:
High-resolution T2-weighted brain image
(MAGNETOM Allegra)
(courtesy of Dr. K. Wicklow, Washington
University, Saint Louis, USA)

"Making Research Clinical"

Siemens is the only manufacturer to offer two 3T products, both FDA-cleared, the MAGNETOM Allegra and MAGNETOM Trio. The MAGNETOM Ultra High-Field systems have been developed to take advantage of the increased SNR, BOLD effect and increased chemical shift available at 3 Tesla.

In 2000, Siemens launched the most compact 3 Tesla MR scanner, the MAGNETOM Allegra. With a 1.25 m long magnet, the Allegra has revolutionized the Ultra High-Field MR Market by providing the first patient-friendly Ultra High-Field MR. Dedicated to neuroimaging, the gradient power unleashed allows the fastest 3T image acquisition. There are now 15 Allegras installed in the USA but also in Turkey, Sweden, Japan to name just a few.

Based on this success, in 2001, the MAGNETOM Trio extended this revolution to whole-body imaging. The MAGNETOM Trio is a 3T MR-scanner offering a full 40 cm FoV. It opens new doors to clinical research in applications such as cardiac, spine, orthopedic MR and many more MR applications. The first Trio was installed in Boston, at the Massachusetts General Hospital (MGH) NMR center in the USA in November 2001 and was completed in only 6 days. The next installations were carried out at the University of Tübingen in Germany (December 2001) and at FC Donders, Nijmegen in the Netherlands (January 2002). The pace of installations is now increasing and the Trio installed base should reach 15 units by the end of the year.

Continuing its tradition of innovation, Siemens is proud to offer these 2 unique 3T MR systems to its customers.

MAGNETOM Allegra

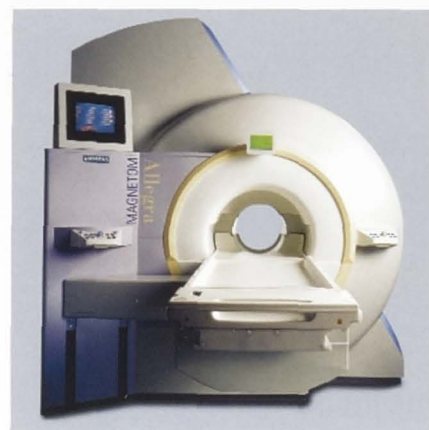
System Description

The MAGNETOM Allegra is the ultimate brain machine. This 3T MR scanner has been optimized for best image quality and fastest imaging of the brain, all in a highly compact design. These features provide best imaging to the physician for the diagnosis of stroke, epilepsy, tumor and multiple sclerosis. In addition, MAGNETOM Allegra provides the ultimate performance for neuro cognitive functional MRI research.

Leading gradient power

Leader in the design of gradient coils and amplifiers, Siemens is the first to offer the performance of the Allegra gradients. Just imagine 40 mT/m and a slew rate of 400 mT/m/ms! This allows performing EPI with echo-spacing down to 360 MICRO.

Easy siting in a 1.5T suit!



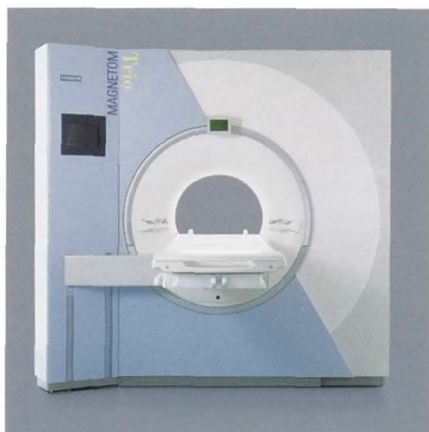
MAGNETOM Trio

System Description

The MAGNETOM Trio consists of a 3 Tesla superconductive Actively Shielded (AS) magnet equipped with the EIS system. With only 2 m length, homogeneity guaranteed for full 40 cm FoV and a full 60 cm patient opening, the MAGNETOM Trio is the shortest MR scanner allowing true clinical whole-body imaging at 3 Tesla.

Easy siting

The stray field (5 Gauss line) of the Trio extends to only 3.4 m in the x and y direction and 5.9 m in the z direction. In addition, electrical and cooling requirements are similar to those of the 1.5T MAGNETOM Sonata. These make the 3T Trio very easy to site.



SEMINAR

Siemens CT, MR and NM TECHNOLOGIST SEMINAR:

Hyatt Regency, On the River Walk, San Antonio, TX, May 2-4, 2002

We at Siemens Medical Solutions USA Inc., would like to invite all of our CT, MR and NM users to participate in our 2002 Multi-Modality Technologist Seminar in San Antonio, Texas.

We are excited to present our first multi-modality seminar with topics encompassing the most cutting edge technology to satisfy all of your educational needs. As CT, MR and NM Technologists, you will increase your knowledge in our general technologist session with topics such as the Correlation of CT, MR, NM and PET in Oncological Diseases and modality specific topics including Applications in Cardiac Imaging. In addition, you will learn to evaluate and identify anatomy and pathology.

Please come and join us! Our goal is to provide the opportunity for our colleagues and Siemens personnel to share experiences in CT, MR and NM imaging.

General Information

Registration

Registration will be held on Wednesday evening, May 1st from 7:00 PM - 9:00 PM at a designated registration desk at the Hyatt. Registration will also be held on Thursday, May 2nd from 7:00 AM - 8:00 AM prior to the start of the program.

Registration Fee: \$ 450.00

Early Registration Fee: \$ 400.00
(paid no later than April 1, 2002)

All cancellations must be submitted in writing to Traveltrust. An administrative fee of \$ 25.00 is retained on all refunds. Foreign payments must be made in U.S. currency.

Siemens reserves the right to cancel at any time. If this should occur, all registration fees will be refunded.

Information

For further information please contact the Applications Group at
1-732-321-32 70

Area Attractions and Hotel Accommodations

The Hyatt Regency is a 12 - mile taxi ride from the San Antonio International Airport and is located on the renowned San Antonio River Walk. Hotel facilities include heated outdoor swimming and whirlpool and a new complimentary health club. Golf and tennis accommodations are located nearby.

Area points of interest include the Alamo, the San Antonio Riverwalk, Six Flags, Sea World and the San Antonio Zoo.

Please call the Conference Reservation Center if you have any questions at:

1-800-792-46 62 (Nationwide)

1-760-635-17 00 (Canada)

or

E-mail - sms@traveltrust.com

Please do not call the hotel directly.

Meals

Siemens will host a Cocktail Reception on Thursday, May 2nd at 7:00 PM. A continental breakfast will be provided each morning of the seminar along with midmorning and afternoon coffee breaks.

MAGNETOM
Flash

AIRLINES

San Antonio International Airport is a 15 - minute cab ride from the Hyatt Regency.

A special discount on airfare is offered by calling our Conference Reservations Center. Our Reservations Center will save you money on your travel expenses.

Ground Transportation

Taxis to and from the airport cost approximately \$ 12 one-way.

Rental Cars

A special discount has been arranged for participants of this meeting. Please contact our Conference Reservations Center for this discount.

Credit

Evidence of continuing education, ECE points, have been applied for with the A.S.R.T. Check with the Siemens Applications group to verify credit on the state level.

Siemens CT, MR and NM Technologist Seminar, May 2-4, 2002**Meeting Registration Form**

Please complete and mail or FAX directly to:

Siemens Medical Systems, Inc.
c/o Traveltrust
374 North Coast Highway 101, Suite F
Encinitas, CA 92024
FAX **1-760-635-33 43**

Registration Fee: \$ 450.00
Early Reg. Fee: \$ 400.00

Make check payable to Traveltrust.
(Visa, MasterCard & American Express accepted for \$ 11.00 surcharge)

Note: Sign up for the breakout sessions will occur at the meeting.

Or Register online at:

www.traveltrust.com
Login: **Siemens**
Password: **Siemens**

Please Check Modality CT ☐ MR ☐ NM ☐

First Name Middle Initial Last Name

Site Name (must be filled in)

Address

City State Zip Code

Social Security Number Telephone Number

Email Address

Hotel Registration Form

Please complete and mail or FAX directly to:

Siemens Medical Systems, Inc.
c/o Traveltrust
374 North Coast Highway 101, Suite F
Encinitas, CA 92024
FAX **1-760-635-3343**

Reservations must be received no later than 15 days prior to the conference. Deposits will be refunded if cancellations are received prior to 7 days in advance of the conference.

☐ Hotel reservation guaranteed by enclosed check

☐ Hotel reservation guaranteed by credit card:

Please circle:
☐ AMEX ☐ MasterCard ☐ VISA

Card Number Expiration Date

Signature

Or make Reservations online at:

www.traveltrust.com
Login: **Siemens**
Password: **Siemens**

Arrival Date: _____ Departure Date: _____

☐ Single ☐ Double \$ 109 per night-does not include (16.75% occ. Tax)

*This group rate is offered from Wed May 1st - Sunday May 5th.

First Name Middle Initial Last Name

Site Name (must be filled in)

Address

City State Zip Code

Roommate's Name

General Session CT/MR/NM 8:00 – 12:15**Thursday May 2, 2002**

7:00 – 8:00	REGISTRATION
8:00 - 8:30	Welcome & Introduction Doug LaVigne
8:30 - 9:00	Applications – From Training to Education Mollie Beaver R.T. (R) (CT)
9:00 - 10:00	Are You Safe? Is Your Patient Safe? David T. Nixon MS, R.T.(R) (CT)
10:00 - 10:15	BREAK
10:15- 11:15	Are You Safe? Is Your Patient Safe? (Con't) David T. Nixon MS, R.T. (R) (CT)
11:15 - 12:15	Correlation MR/CT/NM and PET in Oncological Diseases Joseph Busch M.D.
12:15 – 1:30 PM	LUNCH sponsored by Mallinckrodt

CT AGENDA**Thursday May 2, 2002**

1:30 -2:30	Dose and the Pediatric Patient David Bradley BS,R.T. (R) (CT)
2:30-3:30	CT Fluoro – Appendicitis in CT Joseph Busch M.D.
3:30 – 3:45	BREAK
3:45 – 4:45	Post Processing / 3 D Sean Mahan M.D.
7:00 – 9:00 PM	WELCOME DINNER

Friday, May 3, 2002

8:00 – 9:00	Cardiac CT Imaging: An Overview Chad DeGraaf R.T. (R) (CT)
9:00 – 10:00	Cardiac CT Imaging: Part I Loke-Gie Haw
10:00 - 10:15	BREAK
10:15- 11:15	Cardiac CT Imaging: Part II Christoph Becker M.D.
11:15 - 12:15	Basics of Multislice William Davros Ph.D
12:15 – 1:30 PM	LUNCH on your own
1:30 -2:30	Coronary CT Angiography: Imaging Strategy & Postprocessing Loke-Gie Haw
2:30-3:30	Perfusion Alexander G. Khandji M.D.
3:30 – 3:45	BREAK
3:45 – 4:45	Artifacts Claudia Lindner

Saturday May 4, 2002

8:00 - 9:00	Neuro Angiography Alexander G. Khandji M.D.
9:00 - 10:00	Trauma CT Michael Lundgren R.T. (R) (CT)
10:00 - 10:15	BREAK
10:15 - 11:15	Sex, Embryos, and Stem Cells: Medical Ethics William B. Bondeson Ph.D.
11:15 - 12:15	The Future of CT Bappa Choudury

MR AGENDA

Thursday May 2, 2001

1:30 - 2:30	CE MRA Techniques David J. Fisher M.D., Ph.D.
2:30 - 3:30	Tech Tips and Hints Margaret King R.T. (R) (MR)
3:30 - 3:45	BREAK
3:45 - 4:45	Image Artifacts John Kirsch Ph.D.
7:00 - 9:00 PM	WELCOME DINNER

Friday, May 3, 2002

8:00 - 9:00	Advanced Abdominal and Pelvic MRI Glenn Coates M.D.
9:00 - 10:00	Advanced Neuro MRI Techniques Leo Czervionke M.D.
10:00 - 10:15	BREAK
10:15 - 11:15	Dynamic 3D MR of the Breast: Current Status and Technological Advances Bruce Porter M.D.
11:15 - 12:15	Real World Cardiac MRI Cases Glenn Coates M.D.
12:15 - 1:30 PM	LUNCH on your own

BREAKOUT SESSIONS

1:30 - 3:30	Advanced Protocol Programming Abraham Padua R.T. (R) (MR)
3:30 - 3:45	BREAK
3:45 - 4:45	Making Cardiac Imaging Fun! Stuart Schmeets/Brian DeSouza
3:45 - 4:45	Low Field Techniques Stephen Rigsby/ Thomas Minahan/Jeff Zimmers

Saturday May 4, 2002

8:00 - 9:00	MR Staging of Advanced Lymphatic Spread of Breast Cancer: Current Status and Technological Advances Bruce Porter M.D.
9:00 - 10:00	Basic Cardiac Hints John Anastos D.O.
10:00 - 10:15	BREAK
10:15 - 11:15	MR Contrast Agents Val M. Runge M.D.
11:15 - 12:15	The Future of Siemens MR Nancy Gillen

NM AGENDA

Thursday May 2, 2002

1:30 - 2:30	ESOF: Where are we at? Where are we going? Brad Pratt and David Hashimoto
2:30 - 3:30	Coincidence and High Energy Imaging with the DUET James O'Donnell M.D.
3:30 - 3:45	BREAK
3:45 - 4:45	New Technologies in PET Sylke Grootoonk Ph.D.
7:00 - 9:00 PM	WELCOME DINNER

Friday, May 3, 2002

8:00 - 9:00	PET: Protocols and Daily Operations Steven Wozniak B.S., CNMT, RT(N)
9:00 - 10:00	Clinical PET Paul Shreve M.D.
10:00 - 10:15	BREAK
10:15 - 11:15	3D Fusion Vilim Simcic Ph.D.
11:15 - 12:15	Gated Bloodpool SPECT Imaging Serge Van Krieking M.S.
12:15 - 1:30 PM	LUNCH on your own
1:30 - 2:30	Cardiac Quantification: 4DMSPECT James Kritzman B.S.
2:30 - 3:30	Cardiac Quantification: QGS & QPS Serge Van Krieking M.S.
3:30 - 3:45	BREAK
3:45 - 4:45	Profile Attenuation Correction James Kritzman B.S.

Saturday May 4, 2002

8:00 - 9:00	The Easy Way to ROI's and Curves Kevin Romine B.S., CNMT, RT(N)
9:00 - 10:00	PET Physics: Radiation Safety, QA John Gochoco M.S., DABR
10:00 - 10:15	BREAK
10:15 - 11:15	Reconstruction Capabilities with ESOF Jane Popov-Dadiani CNMT, RT(N)
11:15 - 12:15	The Future of NM Kerry Mowry

NUCLEAR MEDICINE BREAK

OUT SESSIONS:

The following interactive, hands on breakout sessions are designed to increase

competency and strengthen skills on the functionality of ESOF:

- Workflow Organization
- Organ Specific Processing
- Cardiac Processing
- Flexible Display Building

Attendees will sign up for break out sessions at registration.

Faculty

John Anastos D.O.

Parkside Magnetic Resonance Center

Mollie Beaver R.T. (R) (CT)

Siemens Applications Education Specialist

Christoph Becker M.D.

Grosshadern University Hospital

William B. Bondeson Ph.D.

University of Missouri

David Bradley B.S. R.T. (R), (CT)

Siemens Advanced Applications Specialist

Joseph Busch M.D.

Director of Radiology - Hutcheson Medical Center

Bappa Choudury

Siemens Division Vice President CT

G. Glenn Coates M.S., M.D.

Director Raleigh MRI Center

Leo Czervionke M.D.

Mayo Clinic Jacksonville, Florida

William Davros Ph.D.

Cleveland Clinic Foundation

Chad DeGraaff R.T. (R) (CT)

Siemens CT Applications Specialist

Brian DeSouza

Siemens MR Applications Specialist

David J. Fisher M.D., Ph.D.

Skagit Valley Hospital

Nancy Gillen

Siemens Division Vice President, MR

John Gochoco M.S., DABR

Saint Barnabas Medical Center

Sylke Grootoonk Ph.D.

Siemens Medical Solutions, Inc.

David Hashimoto

Siemens Product Manager, NM

Loke-Gie Haw

Siemens - Forchheim Germany

Alexander G. Khandji M.D.

Columbia University

Margaret King R.T. (R) (MR)

Manager Raleigh MRI Center

John Kirsch Ph. D.

Siemens MR R&D Collaborations Manager

Serge Van Krieking M.S.

Cedars-Sinai Medical Center

James Kritzman B.S.

University of Michigan Health Systems

J. Douglas LaVigne

Siemens Vice President of Logistics

Claudia Lindner

Siemens - Forchheim, Germany

Michael Lundgren R.T. (R) (CT)

Siemens CT Applications Specialist

Sean Mahan M.D.

Chesapeake General Hospital

Thomas Minahan R.T. (R) (MR)

Siemens MR Applications Specialist

Kerry Mowry

Siemens Division Manager, NM

David T. Nixon MS, R.T. (R) (CT)

Mercy Hospital

James K. O'Donnell M.D.

University Hospitals of Cleveland

Abraham Padua R.T. (R) (MR)

Siemens Advanced Applications Specialist

Jane Popov-Dadiani, CNMT, R.T. (N)

Siemens NM Applications Specialist

Bruce A. Porter MD, FACR

Medical Director - First Hill Diagnostic Imaging

Brad Pratt

Siemens Product Manager, NM

Kevin Romine B.S., CNMT, R.T. (N)

Siemens NM Applications Specialist

Val M. Runge M.D.

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Siemens MR Applications Specialist

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Siemens MR Applications Specialist

Special thanks to Mallinckrodt Inc.

MEETING

Siemens User Meeting:

at the Hilton Hawaiian Village, Monday, May 20, 2002, 7:00 pm

Monday, May 20, 2002, 7:00 pm

at the Hilton Hawaiian Village

2005 Kalia Road
Honolulu, Hawaii
USA

Phone: 1-808-949-43 21

Fax: 1-808-947-78 98

Room: Cocktail Hour
on the Lagoon Green
Dinner in the Tapa I & II

Experience the MAGNETOM World

Cocktail Reception

7:00 - 8:00 pm

Welcome and Introduction

8:00 - 9:00 pm

Dinner and Networking

9:30 - 11:00 pm

Please respond before May 3, 2002
by sending an e-mail to
raya.dubner@sms.siemens.com



Siemens User Meeting, Hilton Hawaiian Village, Monday, May 20, 2002

Meeting Registration Form

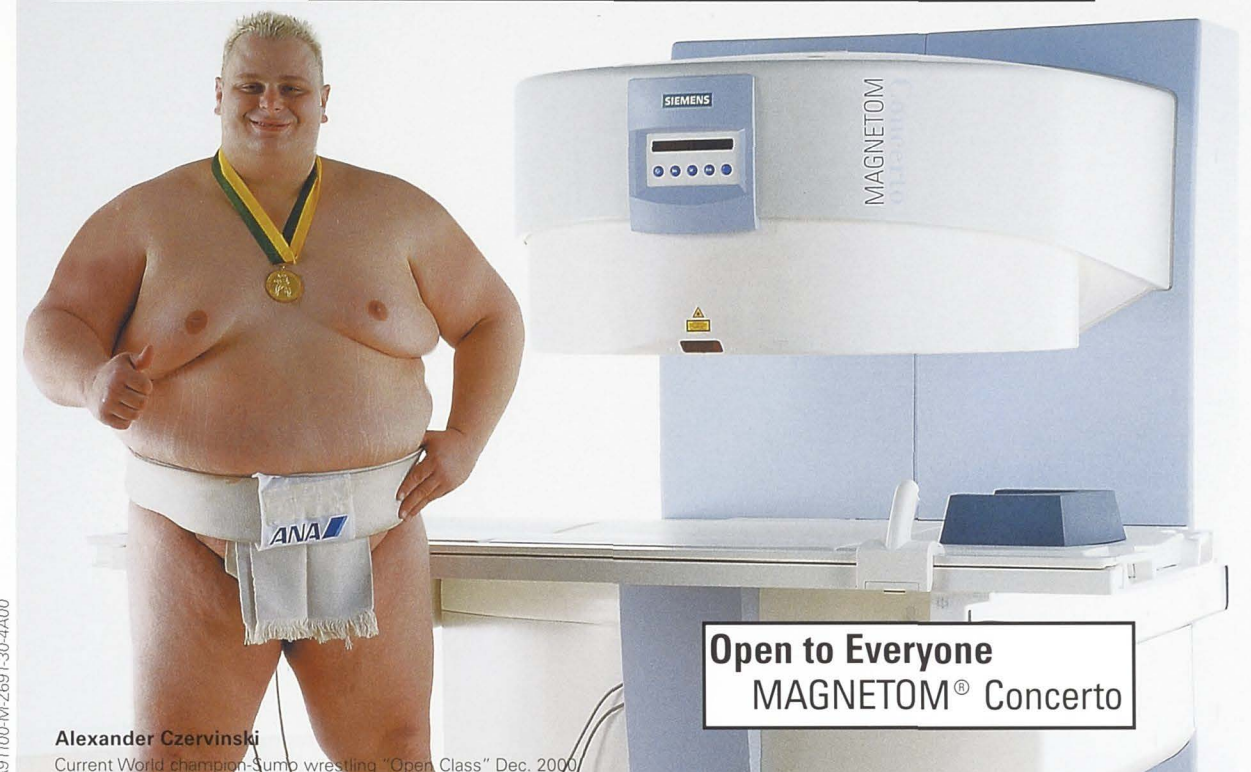
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First Name	Middle Initial	Last Name
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SIEMENS

MAGNETOM Concerto We've brought power to low field MRI



Alexander Czervinski
Current World champion-Sumo wrestling "Open Class" Dec. 2000

It delivers competitive applications

MAGNETOM Concerto goes beyond typical low-field applications and runs, for example, contrast-enhanced MRA in surprisingly short acquisition times.

It enjoys highest patient comfort

The open C-shaped design allows horizontal patient loading and maximum visual contact ensuring greatest acceptance by claustrophobic patients.

It fits your space

These days space is at a premium and every inch matters. MAGNETOM Concerto nestles into only 30 m² (325 square feet).

It promotes cost effectiveness

The new permanent magnet saves substantial running costs. With the EVOLVE program Siemens will replace the host computer and image reconstruction system every thirty-six months.*

It embodies ease of use

SYngo the common system platform sets new standards for simple and intuitive operations.

* a continuous Performance TOP service agreement must be maintained.

syngo
speaking

Please contact
Siemens Medical Systems, Inc.
186 Wood Avenue South
Iselin, NJ 08830-2770
Phone (732) 321-45 00

For further informations:

Internet:
SiemensMedical.com/MR

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