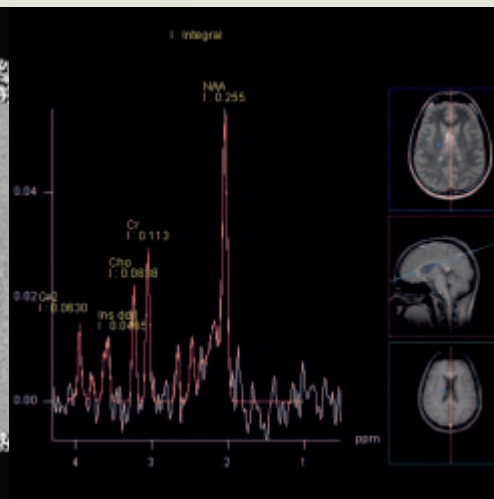
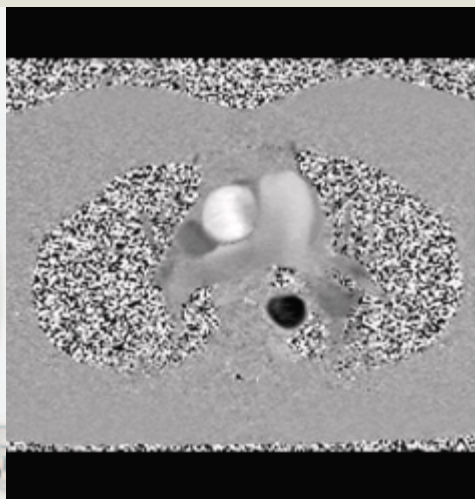
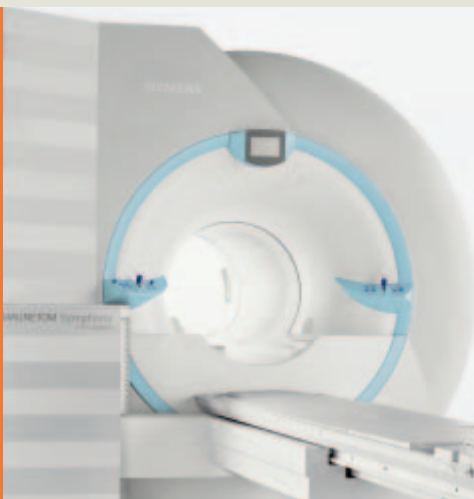


Data



MAGNETOM Symphony, A Tim System Application Packages



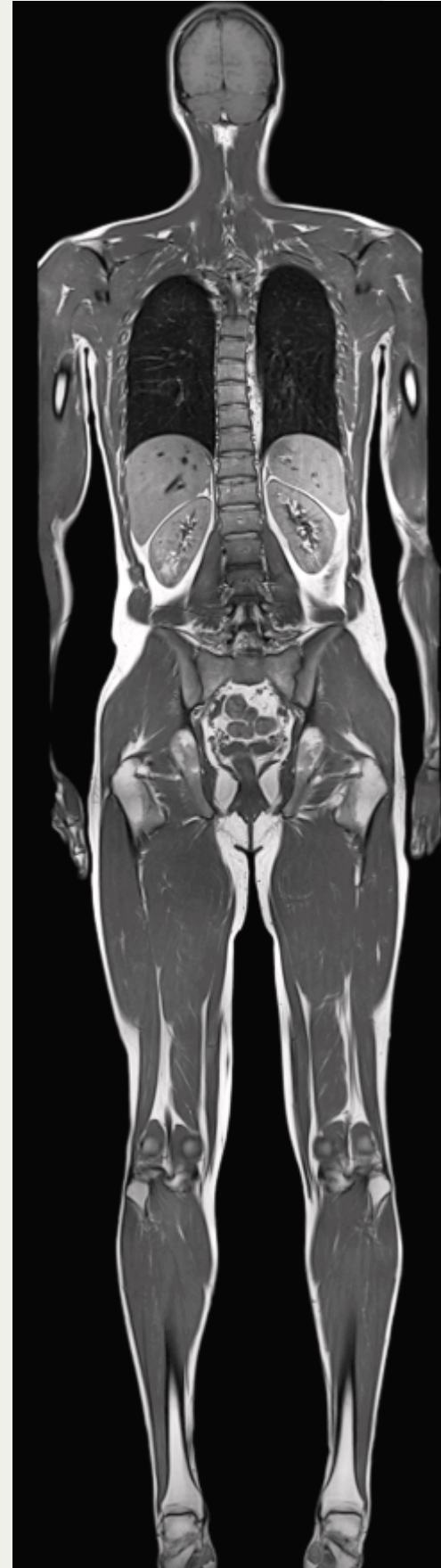
■ Tim Whole Body Suite

MAGNETOM Symphony, A Tim System features a unique telescopic patient table which enables a full Field-of-View of up to 200 cm, without increasing total system length. No additional table extension is required.

The table top has standard length. For Whole-Body exams the table simply travels further out at the rear side of the magnet. Table movement to its full extent can be controlled from the operator console.

The large FoV helps in imaging metastases with sequences such as TIRM (Turbo Inversion Recovery). Whole-Body MR Angiography is possible on the entire volume with iPAT.

- Max. scan range of 200 cm
- Protocols and programs for Whole-Body MR Angiography and metastases detection

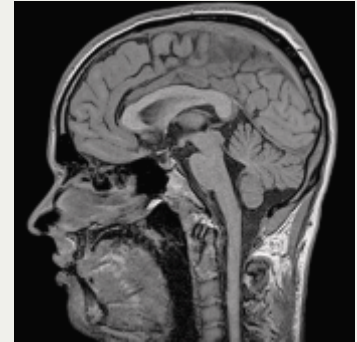
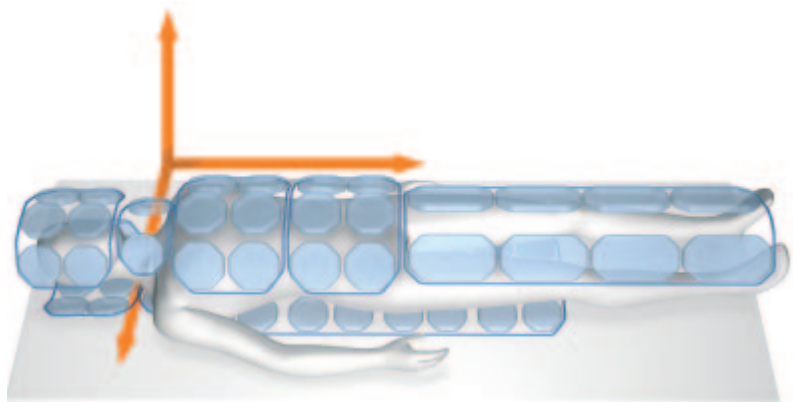


■ iPAT Extensions (Integrated Parallel Acquisition Techniques)

iPAT² allows iPAT in 2 directions simultaneously (phase-encoding direction and 3D direction for 3D sequences)

By applying PAT in 2 directions simultaneously, the effective PAT factor can be maximized, and PAT applications are extended.

Typical clinical applications are MR Angiography or ultrafast isotropic T1-weighted 3D imaging of the head.



■ CISS & DESS

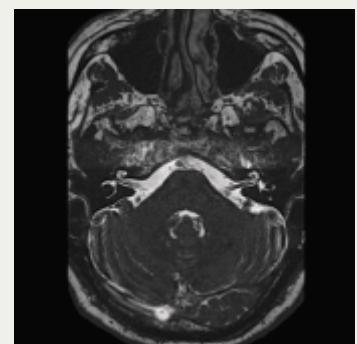
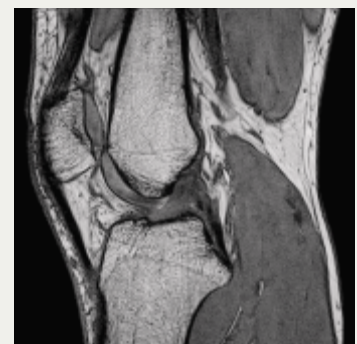
Unique Siemens sequences and protocols

3D DESS
(Double Echo Steady State):

- T2/T1-weighted
- Excellent fluid-cartilage differentiation in orthopedic imaging

3D CISS
(Constructive Interference in Steady State):

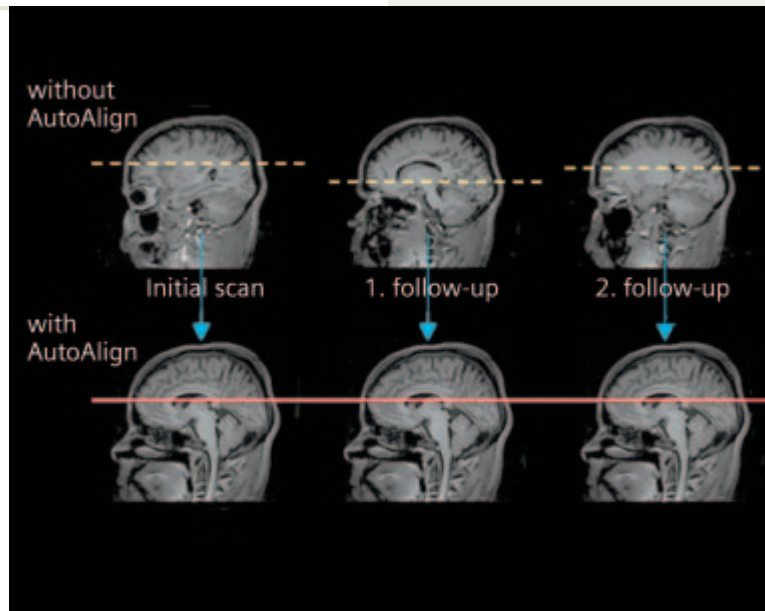
- Excellent visualization of fine structures such as cranial nerves
- High resolution imaging of inner ear and spine



■ AutoAlign

Automated alignment of slice positioning for head examinations. This option enables easy and accurate patient follow-up. AutoAlign references the 3D MR brain atlas and automatically aligns the slice positions in a standard reproducible way.

- Automatic slice planning: no manual adjustments of slice positioning necessary
- Reproducibility: reviews all head images in the same position and orientation
- Follow-up: reapplies exactly the same image position as in previous examinations (supported by the Phoenix technique)



■ syngo Security

Security package for general regulatory security rules

The option supports customers to achieve compliance with HIPAA (Health Insurance and Accountability Act).

- User authentication
- Restricts access to functions and data through privileges and permissions
- Logs relevant data security information in audit trail

■ MPPS

DICOM Modality Performed Procedure Steps (MPPS) allows communication of information about the examinations from the MR system to an information system (such as RIS systems). MPPS enables provision of data for billing, documentation and planning purposes to an information system.

■ Advanced Cardiac

Special sequences and scan protocols for MR studies of the heart

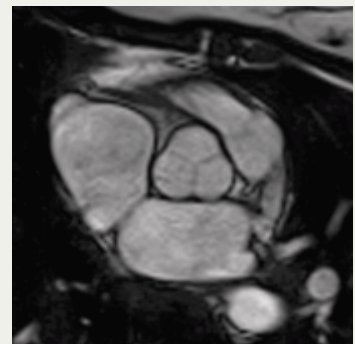
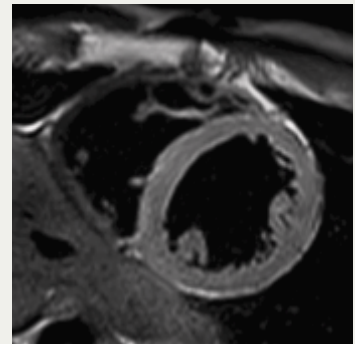
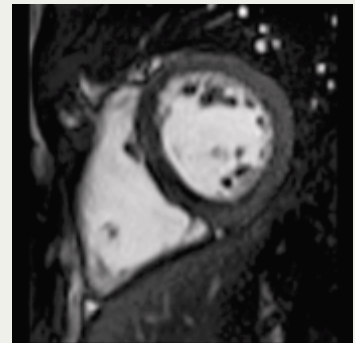
Morphology – Heart and Vessel Structure and Valve Function

- Dark-blood sequences using breath-hold technique
- Ventricular Function and Wall Motion
- Dynamic CINE TrueFISP imaging of cardiac function with prospective and retrospective ECG triggering, with or without breath-hold technique
- Cine imaging with echo sharing for high temporal resolution
- Triggered retrograded cine imaging with arrhythmia rejection for automatic adjustment of the number of phases to the heart rate
- Real-time cine TrueFISP imaging without need for ECG triggering or breath-hold commands
- Real-time radial imaging for high speed and high resolution cine studies
- Visualization of myocardial contractility using various tagging techniques
- Tissue characterization (differentiation of tissues with different T1 values)
- Ultrafast, high SNR sequences for first pass imaging using TrueFISP iPAT and Half Fourier techniques. These protocols provide multi-slice information for the assessment of coronary heart disease (TrueFISP)
- Robust and reproducible contrast between infarct and normal myocardium with phase-sensitive Inversion recovery. Adjustment of TI is no longer necessary with this technique
- Protocols for pediatrics, plaque imaging and stress imaging

Coronary Imaging

- Dedicated sequences for coronary imaging and angiography providing free breathing navigator (1D PACE) and breath-hold techniques (2D and 3D FLASH and TrueFISP)

Requires PMU Wireless Physio Control option



■ Flow Quantification

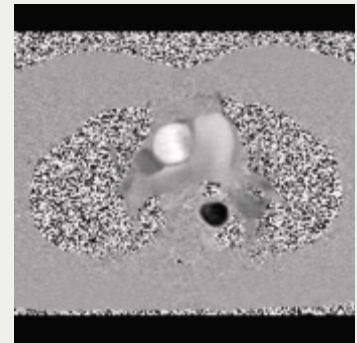
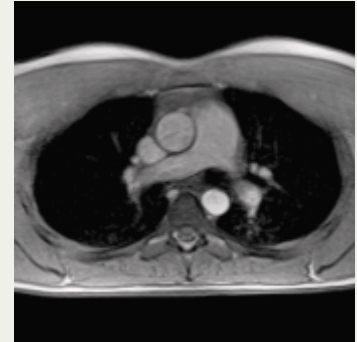
Special sequences for quantitative flow determination studies

Measuring blood/CSF flow non-invasively

Requires Physiological Measurement Unit (PMU) option

RetroGated Flow

- Dynamic representation of temporally changing flow



■ Interactive Realtime

Sequences and hardware for interactive real-time scanning.

Uses ultrafast TrueFISP and other Gradient Echo sequences for high image contrast

Real-time reconstruction of the acquired data

The user can navigate in all planes on-the-fly during data acquisition

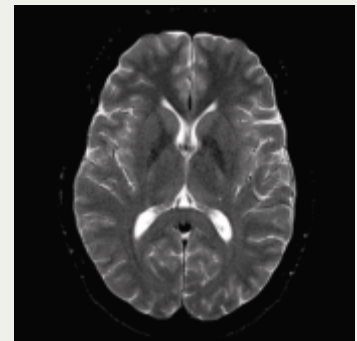
- Real-time cardiac examinations
- Real-time interactive slice positioning and slice angulation
- 3D Magellan SpaceMouse included

■ TGSE (Turbo Gradient Spin Echo)

Ultrafast sequence providing high resolution imaging or extremely short acquisition times

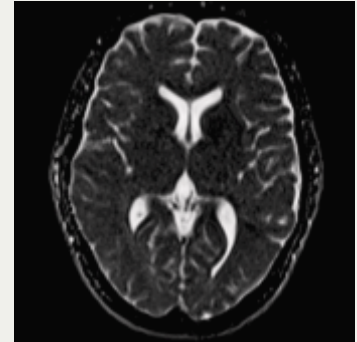
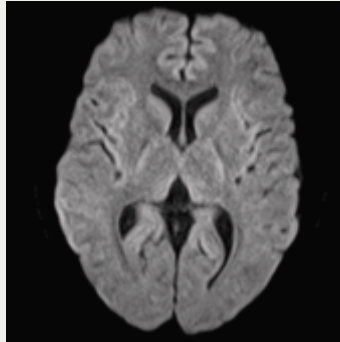
Hybrid Turbo Spin Echo/ Gradient Echo used primarily for T2-weighted imaging

- Shorter measurement time
- Decreased RF power deposition
- Improved visualization of hemorrhage, due to magnetic susceptibility differences
- High resolution imaging of brain and spine

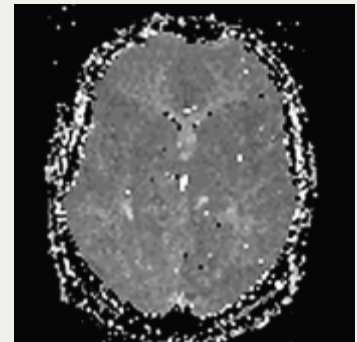
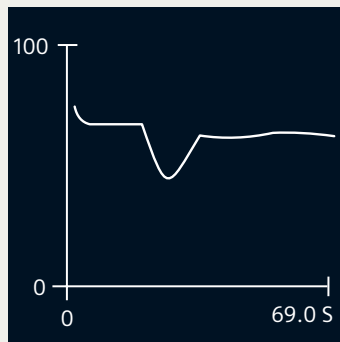


■ Inline Diffusion

Automatic real-time calculation of trace-weighted images and ADC maps with Inline Technology. Compatible with single-shot diffusion weighted EPI

**■ Inline Perfusion**

Automatic real-time calculation of Global Bolus Plot (GBP), Percentage of Baseline at Peak map (PBP) and Time-to-Peak map (TTP) with Inline technology

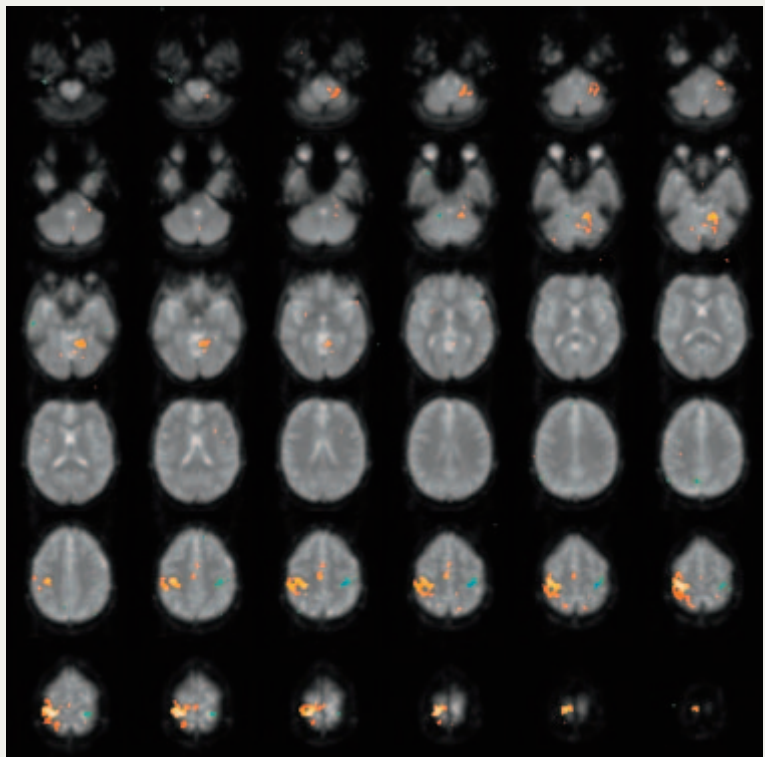
**■ Inline BOLD Imaging**

(Blood Oxygen Level Dependent)

Examination of intrinsic susceptibility changes in different areas of the brain, induced by external stimulation (e.g. motor or visual)

Automatic real-time calculation of z-score (t-test) maps with Inline technology, for variable paradigms

- Compatible with single-shot EPI with high susceptibility contrast for fast multi-slice imaging
- ART (Advanced Retrospective Technique) for fully automatic 3D retrospective motion correction, for 6 degrees of freedom (3 translations and 3 rotations)
- Mosaic images for efficient storage and transfer of large data sets
- 3D spatial filtering
- Overlay of Inline calculated t-test results on the EPI images



■ Advanced Functional Neuro

3D PACE (Prospective Acquisition CorrEction)

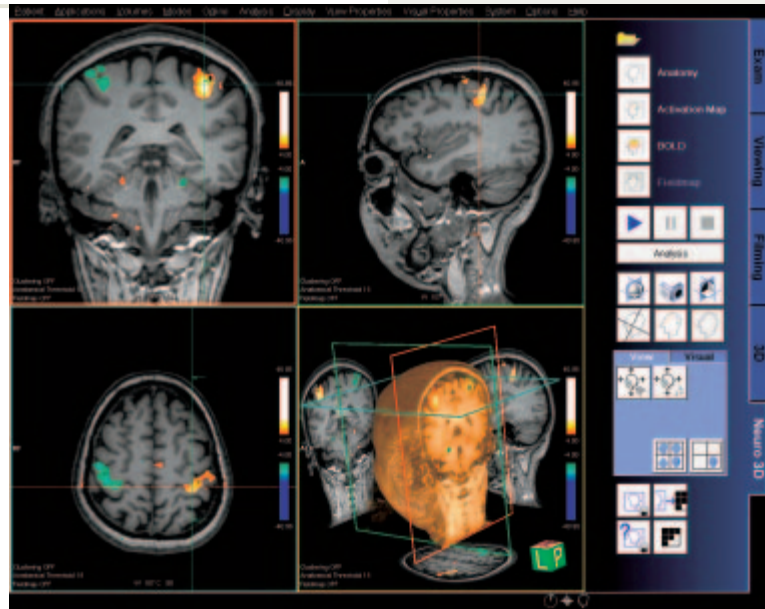
Prospective motion detection and correction in the volume to eliminate motion artifacts during BOLD measurements

- Fully automatic 3D prospective motion correction during data acquisition, for 6 degrees of freedom (3 translations and 3 rotations)
- Motion correction covering the complete 3D volume
- Provides high accuracy
- Substantially reduced motion-related artifacts in t-test calculations
- Significantly increased signal changes in the activated neuronal volume
- Increased functional MRI (fMRI) sensitivity and specificity

3D Inline fMRI

This specialized task card employs volume rendering and cut plane techniques to visualize results of BOLD imaging examinations overlaid on anatomical 3D data sets. Volumes of interest can be interactively specified to plot their signal time course over the underlying BOLD scans. Results can be stored and filmed. During ongoing scans results are displayed in realtime.

This 3D display of the results of functional brain mapping examinations gives a better understanding of the location of functional activation with regard to cortical landmarks or brain lesions (e.g. tumors)



Multi-Directional Diffusion Weighted Imaging (DWI)

- Measurements of multiple diffusion directions and b -values
- Suitable for investigation of anisotropic diffusion in tissue such as calculation of diffusion tensors

Single Voxel Spectroscopy

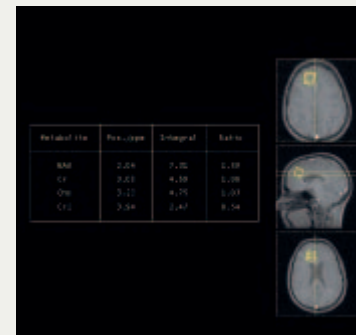
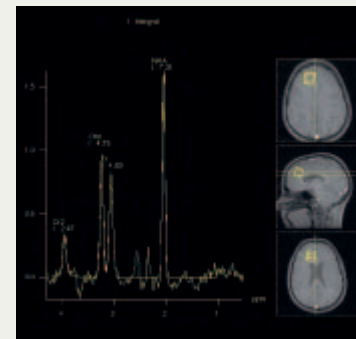
Integrated software package with sequences and protocols for proton spectroscopy

Streamlined for easy push-button operation

Matrix Spectroscopy – phase-coherent signal combination for maximum SNR

SVS techniques SE and STEAM

- Short TEs available
- Fully automated adjustments including localized shimming and adjustment of water suppression pulses
- Also available: Interactive adjustments and control of adjustments
- Optimized protocols for brain applications





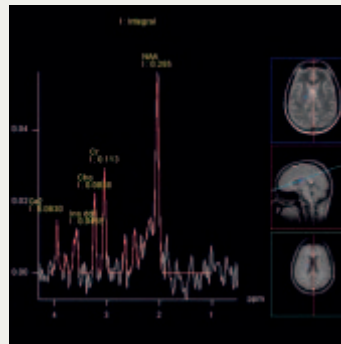
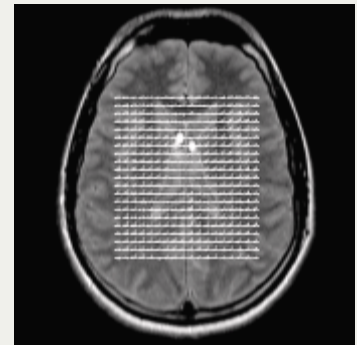
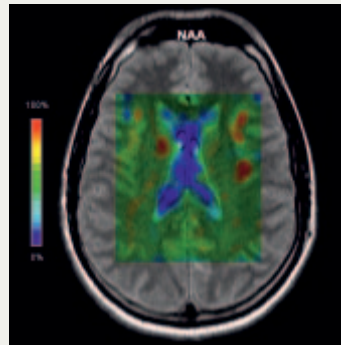
■ Chemical Shift Imaging

Integrated software package with sequences and protocols for chemical shift imaging (CSI)

Extension of the SVS package, offering the same level of user-friendliness and automation

- Matrix Spectroscopy – phase-coherent signal combination for maximum SNR with configurable prescan-based normalization for optimal homogeneity
- 2D and 3D Chemical Shift Imaging
- Hybrid CSI with combined Volume selection and Field of View (FoV) encoding
- Short TEs available (30 ms for SE, 20 ms for STEAM)
- Automated shimming of the higher order shimming channels for optimal homogeneity of the larger CSI volumes
- Weighted acquisition, leading to a reduced examination time compared to full k-space coverage while keeping SNR and spatial resolution
- Outer Volume Suppression
- Spectral Suppression
- Protocols for prostate spectroscopy

Advanced High Order Shim Option required.



■ Breast Biopsy Software

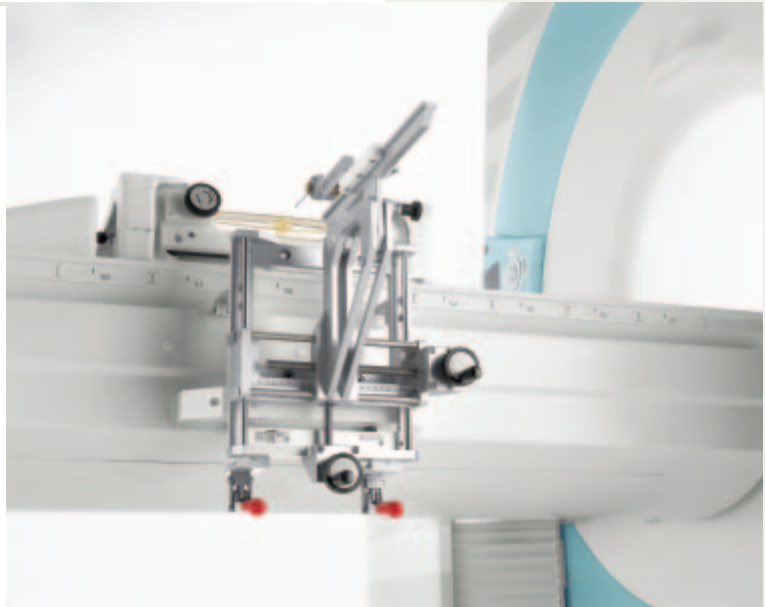
Easy to use *syngo*-based post-processing software helps finding the coordinates for needle insertion for biopsy or localization of breast lesions

Allows calculation of the coordinates after clicking the center of the lesion and the 0 marker of the breast biopsy device

- Printout of working sheet
- Multi-lesion calculation

Prerequisites:

- Breast Biopsy Device
- Loop Flex coil, large



■ IDEA Integrated Development Environment for Applications

Extensive programming environment used to create and modify pulse sequences, offering a maximum of flexibility

Based on C++ for Windows XP

Sequences and RF pulses are displayed in a visual interface

- Allows direct access to the Image Calculation Environment (ICE), and to all protocols
- Testing the generated code is extensively supported by the debugger and the simulation program
- IDEA is also usable on any standard PC with operating system Windows XP making developments independent of the MR system

Processing Plug-ins

For development or modification of user-defined image processing steps which may be integrated into the measurement protocols

- Individual processing is secured by a number of functions (e.g. TTP and MTT), useful for neuro or perfusion imaging

Prerequisite:

IDEA training course

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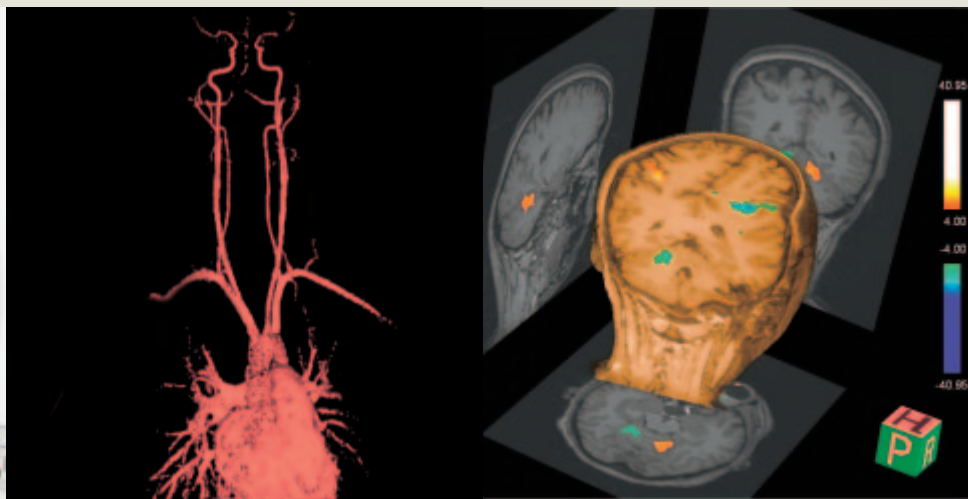
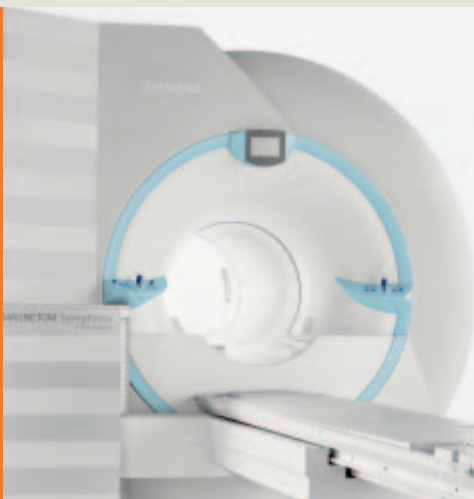
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Siemens **Medical**
Solutions that help

Data



MAGNETOM Symphony, A Tim System Post-processing Packages

All post-processing packages are separately available for the MR Main Console (MRC) or MR Satellite Console (MRSC)

Image Filter

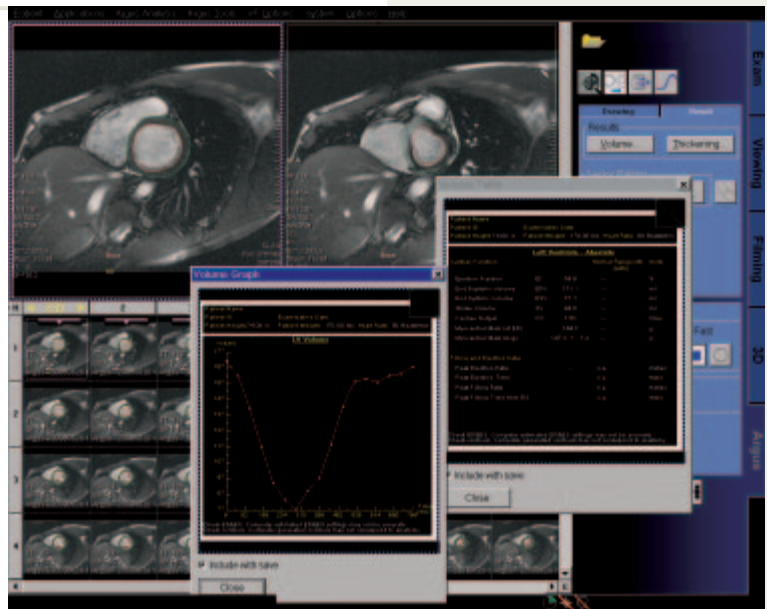
For noise reduction in the MR images and better edge definition

- Uses high-pass and low-pass filtering
- Automatically adjusts to the local image content (adaptive filtering)

Argus Function

Automated tool for cardiac function evaluation

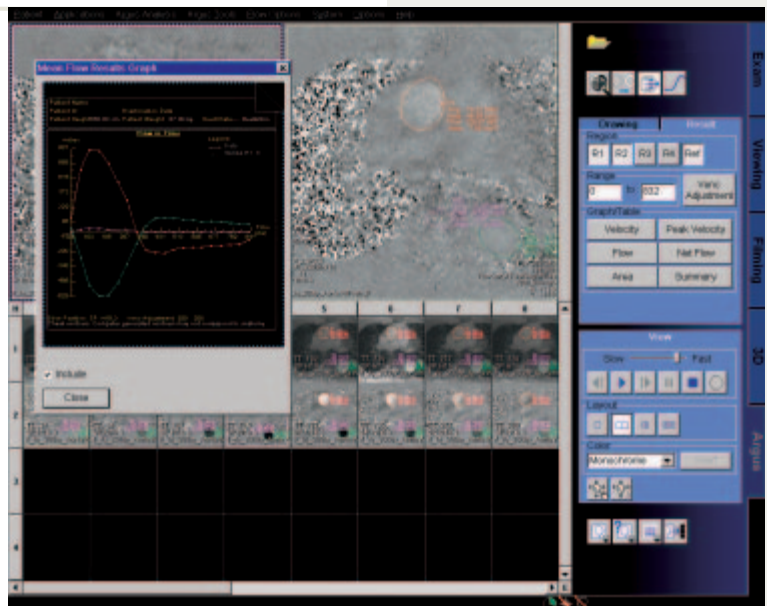
- Fully automatic image segmentation
- Easy user guidance with graphical selection of ED, ES, basal and apical slices
- Global function and regional wall motion analysis with color results



Argus Flow

Automated tool for analysis of blood and CSF flow

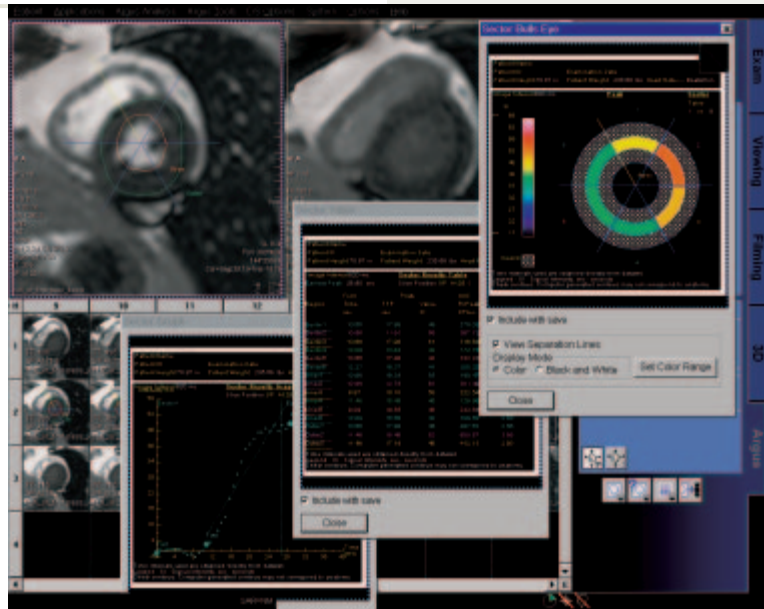
- Semi-automatic detection of regions of interest over time
- Color-coded display of velocity values
- Calculation of flow and velocity parameters with color results



Argus Dynamic Signal

Automated tool for dynamic data analysis

- Manual or automatic segmentation
- Automatic compensation of contours in regard to translation or deformation of organs over time
- Sector-based or ROI-based evaluation
- Evaluation of Time-to-Peak, Peak Value, Uptake Slope, Area under the Curve
- Graphical display of results in parameterized bull's eye plots



Vessel View

Interactive analysis of vessel disease using MR or CT angiography data

Viewing with VRT, MPR or MIP mode

- Automatic or semi-automatic detection of vessel segments
- Quantification of changes in vessel size
- Protocol-based software for workflow support



3D VRT Volume Rendering Technique

3D visualization for clearer depiction of complex anatomy and relationship of anatomy in 3D for contrast MR Angiography and VIBE imaging

More productive surgical planning and discussion with referring physicians

- Integrated with other 3D functionality
- Color image creation
- Color gallery of icon presets
- Additional threshold-based segmentation of 3D objects
- Volume measurements

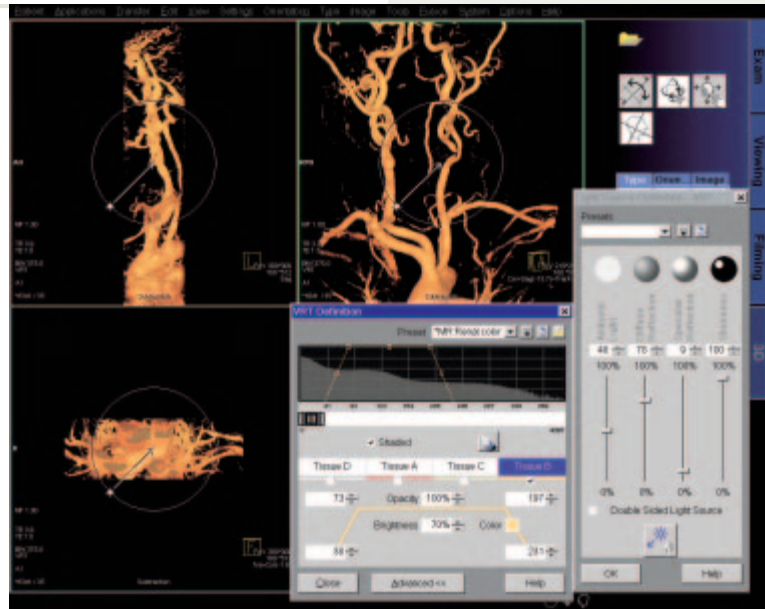
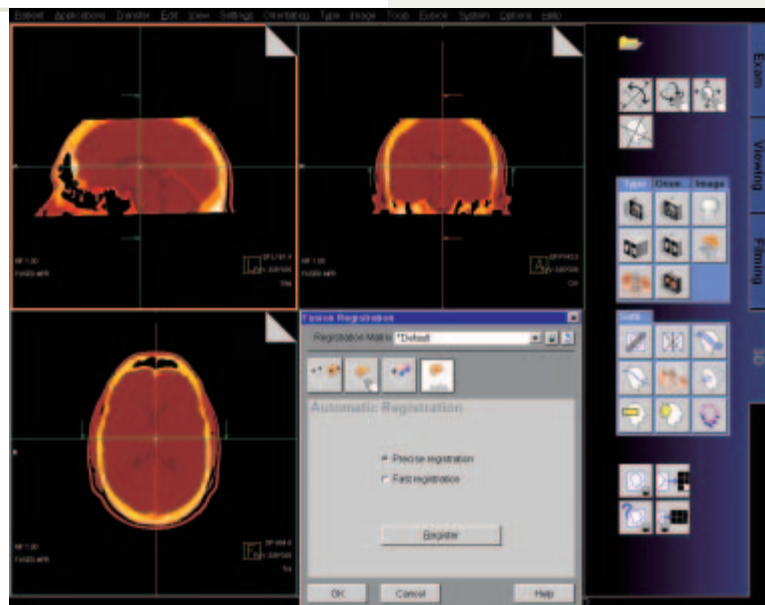


Image Fusion

Image fusion of multiple 3D data sets with alpha blending, i.e. overlay of two images with manual setting of the opacity

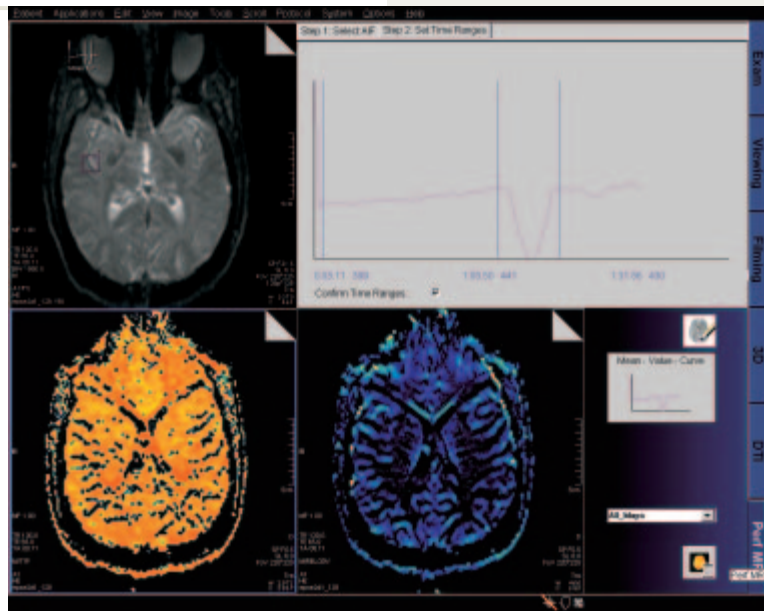
- Multiple 3D data sets from different modalities (MR, CT, Nuclear Medicine, PET)
- Visual alignment, automatic registration, or landmark based registration



Neuro Perfusion Evaluation

Dedicated task card for quantitative processing of neuro perfusion data

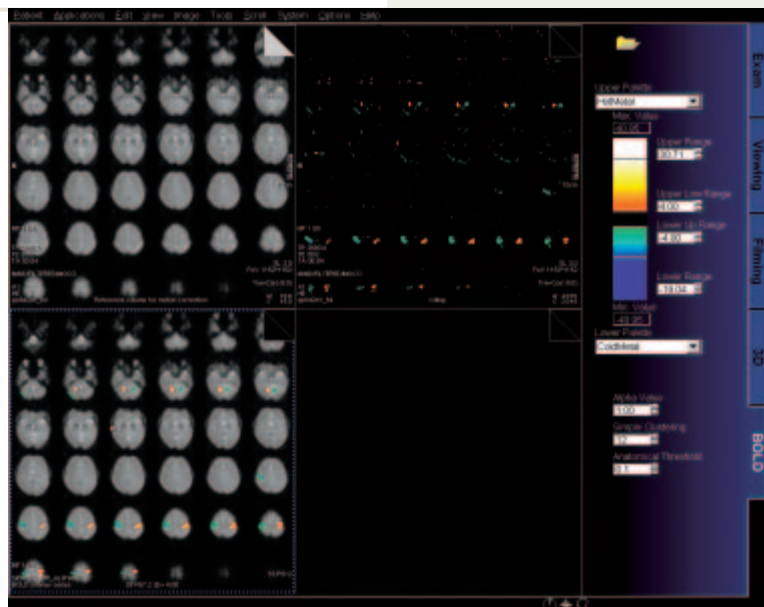
- Color display of relative Mean Transit Time (relMTT), relative Cerebral Blood Volume (relCBV), and relative Cerebral Blood Flow (relCBF)
- Flexible selection of Arterial Input Function (AIF) for reliable analysis. This function takes into account the dynamics over time of the contrast agent enhancement.



BOLD Evaluation (Blood Oxygen Level Dependent)

Dedicated task card for advanced post-processing of BOLD data sets

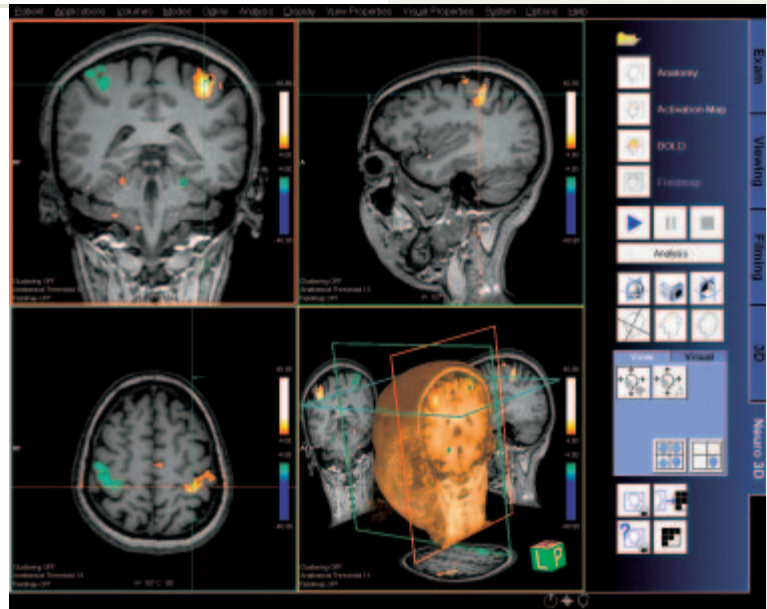
- Offline calculation of t-test maps from original fMRI data, e.g. with different filter settings as in the Inline calculation
- Colored overlay of functional and anatomic data



■ 3D Offline fMRI (only for MRSC)

This dedicated task card employs volume rendering and cut plane techniques to visualize results of BOLD imaging examinations overlayed on anatomical 3D data sets. Volumes of interest can be interactively specified to plot their signal time course over the underlying BOLD scans. Results can be stored and filmed

The 3D display of the results of functional brain mapping examinations gives a better understanding of the location of functional activation with regard to cortical landmarks or brain lesions (e.g. tumors)



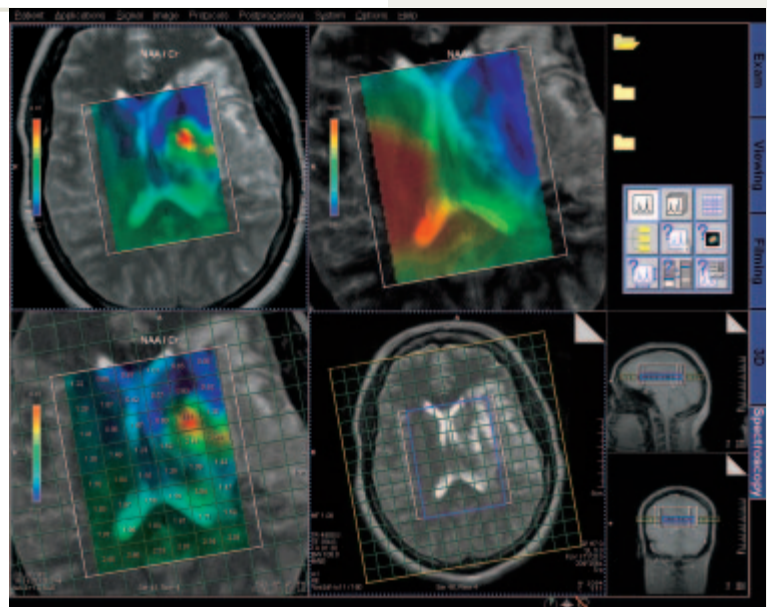
■ Spectroscopy Evaluation

Integrated software package with extensive graphical display functionality

Comprehensive and user-friendly evaluation of spectroscopy data

Display of CSI data as colored metabolite images or spectral overview maps, overlayed on anatomical images

- Export of spectroscopy data to a user-accessible file format
- Relative quantification of spectra, compilation of the data to result table



■ Spine Composing

Composing of images for spine examinations

- Automatic and manual composing of "Whole Spine" images
- Measurement on composed images (angle, distance)



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