



# Changing Expectations

Philips Magnetic Resonance Ingenia 3.0T  
with Omega HP gradients

**PHILIPS**  
sense and simplicity

# Ingenia 3.0T: The first-ever digital

Ingenia with dStream architecture provides flexible and intelligent tools for faster exams and more consistent scanning, as well as excellent clinical performance for a variety of applications – all while increasing patient comfort. Designed for today and tomorrow, it is a safe investment that will serve your needs well into the future.

At the heart of the Ingenia is the new dStream architecture comprising:

- **DirectDigital RF receive technology**, which samples the MR signal directly in the RF coil at the patient.
- **FlexStream workflow**, which increases system versatility and throughput.
- **EasyExpand**, which enables plug and play expansion of clinical capabilities without major upgrades.

## Clarity, speed and expandability

Philips Ingenia significantly improves MR image clarity, speed and expandability.

### Clarity

By digitizing the signal directly in the RF coil at the patient, dStream captures a high purity MR signal.

### Speed

Patient and coil handling have never been easier: flexible exam setup to meet each patient's unique situation, simplified coil changeover and optimal quality for any exam.

### Expandability

The number of channels is determined by the coil, rather than limited by the system. This makes the MRI system forward-compatible to easily access emerging applications like body and cardiac and new enhancements for established applications like neuro and musculoskeletal imaging.

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broadband MR



# Clarity, speed and expandability

Philips Ingenia 3.0T delivers consistent image quality across all applications, clinical versatility to further expand into high growth opportunities such as body, cardiac, neuro and oncology imaging and productivity enhancements that increase throughput and patient comfort.

With a better patient experience, superior clinical capabilities and more efficient healthcare delivery – all for the life of the system – Ingenia 3.0T will cause you to rethink what MR is and should be.

## Xtend magnet

- Ultra-compact patient-friendly magnet design with a flared 70 cm bore.
- Best-in-class magnet homogeneity for high quality, off-center imaging.
- Xtend ultra-large, up to 55 cm field-of-view, supporting wide coverage and imaging of large patients.
- Lightweight design with small fringe field footprint for easy siting.

## FlexCoverage Posterior coil

Integrated under the tabletop, it provides neck-to-toe coverage without the need for handling or patient repositioning. It is always available when needed.



## Optical connectors

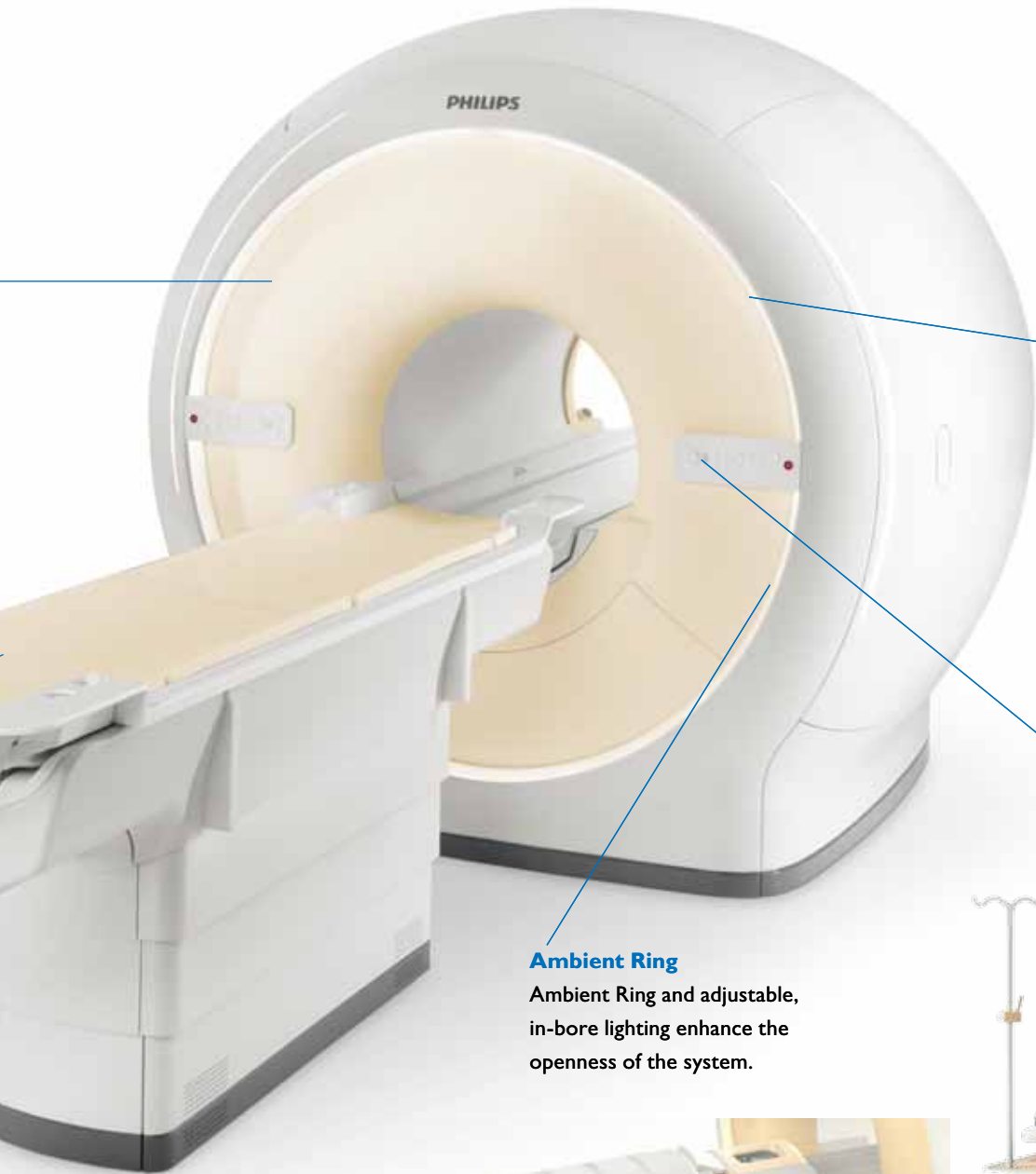
Optical connectors with flexible fiber-optic cables for enhanced quality and ease of use, extreme bandwidth and no electrical interference.



## dStream digital coil solutions

Providing a full range of clinical solutions with both integrated and dedicated coils, dS coil solutions have been designed for:

- Intrinsic signal-to-noise-ratio using DirectDigital sampling
- Imaging coverage
- Parallel imaging performance



**MultiTransmit 4D**

MultiTransmit 4D parallel RF transmission and reception (2 x 2) using two independent RF amplifiers and receivers enabling patient-adaptive RF shimming; MultiTransmit 4D can be applied to real-time (4D) cardiac\* applications.

\*available in the course of 2011

**SmartStart**

Single press of a button that automatically moves the table to the isocenter while the operator walks back to the console, thereby reducing the setup time.

**Ambient Ring**

Ambient Ring and adjustable, in-bore lighting enhance the openness of the system.



**FlexCaddy coil cart**

Storage cart for frequently used dStream coils and accessories to enhance workflow.



**FlexStream workflow**

A new concept in exam management designed to streamline workflow and reduce exam time, FlexStream enables imaging with fewer coils and reduces patient setup time.



# Xtend magnet system

Philips' Xtend system design is optimized to provide a 70 cm wide bore, combined with optimum quality and performance for imaging large patients. Industry-leading magnet, gradient and system body coil designs provide the largest field-of-view in a wide bore system. Xtend offers an exceptional combination of magnet homogeneity and gradient performance over a 55 cm FOV. The HeliumSave zero-boil-off technology ensures zero helium consumption and zero dynamic boil-off (0 l/hr boil-off rate) even under regular scanning.

- Image eyes-to-thighs in as few as two stations.
- Excellent large FOV and off-center imaging, ideal even for large patients.
- Increased image accuracy for large FOV and multi-station exams.

Magnet Parameters	
Field strength	3.0 T
Frequency	127.7 MHz
Magnet design	Ultra compact, lightweight
Magnet dimensions, (LxWxH)	1.62 x 1.88 x 2.29 m
Magnet weight (with cryogen)	4600 kg
Magnet length	1.62 m
Open bore diameter (incl shim, gradient & QBC)	70 cm
Maximum FOV	55 cm
Fringe field 5 G (axial x radial)	3.05 x 4.95 m
Fringe field 1 G (axial x radial)	4.20 x 7.25 m
Temporal stability	Guaranteed: < 0.1 ppm/hr Typical: 0.001 ppm/hr

Magnet Homogeneity		
Field homogeneity	Typical (ppm, V-RMS)	Guaranteed (ppm, V-RMS)
55 x 55 x 50 cm	≤ 5	
50 x 50 x 45 cm	≤ 1.8	≤ 2
45 cm DSV	≤ 1.1	≤ 1.2
40 cm DSV	≤ 0.4	≤ 0.45
30 cm DSV	≤ 0.07	≤ 0.08
20 cm DSV	≤ 0.02	≤ 0.022
10 cm DSV	≤ 0.002	≤ 0.0022

Measurement performed in 24 planes / 24 points per plane



<b>Shimming</b>	
Type of shimming	Passive + Active (Dynamic)
Number of shim positions for accurate magnet field shimming	1008
Patient specific shimming	3D Volume Shim
2nd order shimming	3x linear + 5x second order
Total active shimming time	Linear shims: <0.1 ms HO shims: 10 ms
Off center FOV shimming	± 27.5 cm

<b>Shielding</b>	
Magnet Shielding	Active self-shielding
External Interference Shielding	Yes

<b>Magnet cooling system or Cryogenics</b>	
Type of cryogen	Liquid He
HeliumSave technology	Yes (Zero boil-off)
Cryogen boil-off rate	0.0 l/hr*
Cryogen refill interval	Not applicable
Vessel capacity (liters)	1550

\*under regular scanning conditions

# Xtend gradient system: Omega

Omega HP gradient's high linearity enables availability of maximum gradient amplitude and slew rate over the entire imaging field of view.

- Superb linearity to improve geometric and diffusion accuracy, and to maximize resolution, even at the edges of the field-of-view.
- High order shimming capabilities: first (x, y, z) and second order ( $x^2$ - $y^2$ ,  $z^2$ , xy, xz, yz) for improved patient-specific shimming.
- State-of-the-art water-cooled gradient coil and solid-state amplifier for high fidelity and 100% duty cycle.
- Non-resonant gradient design allows flexible generation of any type of gradient waveform.
- The integrated force-balanced design of the gradient coil and magnet reduces vibrations and ensures acoustic noise is minimized.
- Extremely low eddy currents for short echo times
- AutoSofTone further reduces gradient acoustic noise by up to 30 dB (up to 86 % reduction in patient-perceived acoustic noise).





# HP gradients



Gradient performance	
Max. amplitude for each axis	45 mT/m
Vector amplitude for each axis	78 mT/m
Max. slew rate for each axis	200 T/m/s
Vector effective slew rate for each axis	346 T/m/s
Max. FOV with max. gradient amplitude	55 cm
Shortest TE (SSh DWI, b=1000, 128 matrix, SENSE factor 2)	43 ms
Duty cycle	100%
Linearity at 20 cm DSV	0.4%
Gradient linearity at 50 cm DSV	1.4%
Gradient coil design	Non-resonant

Gradient Amplifiers	
Type	Solid state
Cooling (Coil & Amplifier)	Direct liquid cooling
Force Compensation	Non-resonant

Resolution parameters	
Max. FOV	550 mm
Min. FOV	5 mm
Max. scan matrix	1024 (2048 optional)
Max. recon matrix	1024 (2048 optional)
Increment steps for matrix	steps of 16
Highest in-plane resolution	5 $\mu$ m
Max. number of slices	1024
Min. slice thickness (2D)	0.5 mm
Max. slice thickness (2D)	320 mm
Min. slice/partition thickness (3D)	0.05 mm
Max. slice/partition thickness (3D)	64 mm
Slab thickness 3D (Min)	5 mm
Slab thickness 3D (Max)	500 mm

Gradient timing parameters			
Matrix	64	128	256
SE TR (ms)	8.8	9.1	9.6
SE TE (ms)	2.9	3.1	3.3
IR TR (ms)	132	132	132
IR TE (ms)	3.3	3.4	3.5
IR delay (ms)	14	14	14
2DFFE TR (ms)	0.80	0.80	1.0
2DFFE TE (ms)	0.22	0.28	0.38
3DFFE TR (ms)	0.80	0.80	0.95
3DFFE TE (ms)	0.18	0.23	0.34
TSE echo spacing (ms)	1.8	1.9	2.1
TSE TR (ms)	17	17	17
TSE TE (ms)	1.8	1.9	2.1
Max. TSE turbo factor	1024		
GRASE echo spacing (ms)	0.29	0.4	0.66
GRASE TR (ms)	17	17	17
GRASE TE (ms)	4.3	4.6	4.8
GRASE max. turbo factor	170		
GRASE max. EPI factor	63		
EPI echo spacing (ms)	0.25	0.37	0.65
EPI TR (ms)	1.9	2.6	4.1
EPI TE (ms)	0.8	1.0	1.4
EPI min. measurement time (ms)	3.2	8.2	26.5
Max. EPI factor	255		
Max. b-value (s/mm <sup>2</sup> )	25000	25000	25000
TE (SSh DWI, b=1000, SENSE factor 2)	42	43	49

Notes: The Ingenia can perform all of the sequences mentioned above with matrix sizes from 64 to 1024 (2048 optional). This table is limited to commonly used matrices. A combination of the stated parameters is not always possible; some parameters may require optional packages. Scan parameters are compliant with I.E.C. S.A.R. regulations.

# RF system

## dStream architecture

Unique digital broadband MR architecture capturing a high purity MR signal, combined with enhanced workflow and ease of use to provide increased SNR and greater efficiency in your daily operations. In addition the number of channels is no longer determined by the MR system.

- Up to 40% greater signal-to-noise ratio (DirectDigital).
- As much as 30% improvement in throughput (FlexStream).
- Easy expandability of clinical capabilities without the need for major system upgrades (EasyExpand).

## MultiTransmit 4D RF transmit system

Unique RF transmit design using multiple RF sources. MultiTransmit parallel RF transmission enhances signal and image contrast uniformity, speed and consistency at 3.0T for all applications.

## Benefits:

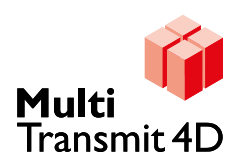
- Patient-adaptive RF matches the RF field to the anatomy of each and every patient.
- Up to 40% more speed compared to single transmit RF systems.
- New MultiTransmit 4D enables the RF field to be optimized even during real-time cardiac\* applications.

\*available in the course of 2011

## Features

- Parallel RF transmission and reception (2 x 2 channels) using two independent RF sources, amplifiers and receivers enabling patient-adaptive RF shimming: Adjustment of individual RF sources to provide uniform, consistent RF distribution and lower local RF deposition in each individual patient.
- The independent RF amplifiers feed into the individual ports of the MultiTransmit dS T/R System Body coil.
- Patient-adaptive RF shimming adapts the RF (power, amplitude, phase, waveform) to each patient and each anatomy to provide superb RF uniformity, contrast and consistency.
- 2 x 18 kW high-performance solid-state RF power amplifiers allow ultra-short and complex RF pulses, even on large patients.
- Digital control loops for each individual (TX) transmit channel digitize the transmit signals close to the System Body coil. These feedback loops support outstanding image quality by delivering optimal amplitude, phase and waveform of the RF pulses.
- RF-SMART technology enables SAR to be effectively managed through balanced system design, and maximizes scanner performance in combination with the application of Philips-unique imaging capabilities such as SENSE, SPAIR, Flip Angle Sweep and RF amplitude control.

MultiTransmit 4D RF transmit	
Parallel RF transmission	Yes
Number of fully independent RF amplifiers	2
Number of fully independent RF sources	2
RF Amplifier type	Solid state, microprocessor controlled
RF control (power, amplitude, phase, waveform)	Patient-adaptive. Fully flexible for each source, real time feedback loop
Output power	2 x 18 kW (distributed)
Output frequency	127.728 MHz
Bandwidth	720 kHz
Amplitude resolution	16 bits
Phase resolution	16 bits
Frequency resolution	0.07 Hz/bit
Frequency stability over a 10 minute period	< 10 ppb
Gain stability over any period of time > 100 microseconds	< 0.1 dB



Miniaturized analog-to-digital convertor (spectrometer) integrated in the RF coils captures the MR signal at its purest and transmits data through the fiber-optic chain.

### DirectDigital

Unique Philips technology that samples the MR signal directly in the RF coil on the patient. The fiber-optic transmission of digital broadband data from the coil to the image reconstructor removes potential noise influences typical with analog pathways.

- Pure MR signal with up to 40% greater signal-to-noise, enabling higher speed/resolution.
- Increased dynamic range (187 dB).

DirectDigital technology additionally includes:

- Sub-millisecond TRs and ultra-short TEs.
- Real-time imaging control for clinical motion correction:
  - Navigator-corrections required for free-breathing cardiac techniques.
  - High-resolution diffusion with profile updates within 1 ms (PhaseTrak).
  - Real-time control of RF transmission, gradient switching, data acquisition and triggering.

### EasyExpand

Inherent design of the dStream architecture, whereby channels are determined by the coils rather than the system. The MR system becomes channel independent, which means a removal of the number of channels as a system specification. This enables plug-and-play expansion of clinical capabilities. Expansion does not require major system upgrades, resulting in lower life cycle costs.

### dS-SENSE

Next generation parallel imaging for the dStream (dS) architecture, which simplifies and speeds up scan setup and enables higher parallel imaging factors for more speed or resolution. Includes quick, fully integrated reference scans which are planned automatically.

#### RF receive

Number of independent receive channels	Channel Independent
Location of analog-to-digital converter (ADC)	Inside the coil close to receive elements
Coil element to ADC distance	Approx. 1 cm
Signal chain from coil to reconstructor	Fully digital
Signal chain from coil electronics to connector	Digital
Signal chain from connector to magnet	Digital
Signal chain from magnet to reconstructor	Digital
Receiver signal resolution*	32 bits (4 bytes)
Analogue to digital converter (ADC) input bit depth	19 bits
Maximum dynamic range	187 dB
Pre-amplifier noise figure	< 0.5 dB

\* data storage and transfer

# RF coil solutions

## dS coil solutions

dS coil solutions provide a full range of clinical solutions with two types of coils:

- Integrated coils combine to provide solutions for multiple applications.
- Dedicated coils optimize imaging for a single application.

dS coil solutions have been optimized for 3 important characteristics:

- Intrinsic signal-to-noise (DirectDigital)
- Imaging coverage (FlexCoverage)
- Parallel imaging performance (dS-SENSE)

## dS T/R System Body coil

The integrated dS T/R System Body coil is a transmit/receive system coil which is typically used for RF excitation, but can also be used for imaging various (large) body parts.

- MultiTransmit solid-state phased-array Transmit/Receive system body coil for improved SAR control and a high signal-to-noise ratio
- DirectDigital sampling in the coil to capture a high purity MR signal.
- Channels: 2 x 2 (Transmit x Receive)
- Excellent homogeneity.
- 70 cm aperture.

## FlexCoverage Posterior coil

An integrated coil below the tabletop typically used in about 60% of routine applications. This coil does not need to be carried, positioned, connected or exchanged, thereby enhancing workflow. It is always there when you need it.

- Head-to-toe coverage up to 200 cm in combination with the base coil.



Spacious, 70 cm aperture enables imaging of large patients.



Integrated below the thin tabletop, the FlexCoverage Posterior coil provides neck-to-toe coverage without any coil handling.



### Standard coil solutions



	<b>dS TotalSpine</b>	<b>dS HeadSpine*</b>	<b>dS HeadNeckSpine*</b>
Coil solution type	Integrated	Integrated	Integrated
Coverage	90 cm	30 cm (Head) 90 cm (Total Neuro)	45 cm (Head/Neck) 90 cm (Total Neuro)
Max. no. channels	44	15 (Head) 51 (Total Neuro)	20 (Head/Neck) 52 (Total Neuro)
Weight	No coil handling	2.5 kg	3.4 kg
Main applications	Total spine, C-Spine, T-Spine, L-Spine	Head, Brain, Total neuro, Total spine (CTL)	Neuro-vascular, Head, Brain, Pediatric, Total neuro, Total spine (CTL)

\* at least one of these solutions must be chosen

# Patient environment

## Patient comfort

- 70 cm aperture for enhanced patient fit and comfort.
- Choice of feet-first or head-first imaging for most applications.
- FlexCoverage Posterior coil: never worry about the position of the patient with this coil. No cables, no connections. This invisible, patient-friendly coil is always there when you need it.
- Lightweight, conforming coils for enhanced patient comfort and operator handling.
- Ambient Ring circular light further enhances the visual openness of the system.
- Adjustable fresh air supply (6 levels).
- Adjustable in-bore lighting (3 levels).
- In-bore microphone and ceiling-mounted loudspeakers support two-way patient-operator communication and music.
- Hand-held technologist call button.
- Patient headset reduces acoustic noise by up to 25 dB.
- Look-out mirror with adjustable angulation.

## Patient handling (patient support)

- Patient support enables patients weighing up to 250 kg (550 lbs) to be comfortably positioned and lifted.
- Wide table top for improved patient comfort and accommodation of larger patients.
- Patient table can be quickly lowered, providing access for compromised or non-ambulatory patients.
- Detachable tabletop can be combined with one or more FlexTrak patient transport systems for efficient patient management and rapid egress. Supported by manual mode table release.
- 200 cm scan range.
- Horizontal table speeds of up to 325 mm/s to enable fast, easy patient positioning and rapid multi-station examinations.
- Ergonomically designed control units on both sides of the bore to increase operating flexibility.

Patient aperture	70 cm
Flare on both ends	Yes
Tunnel diameter at both ends	95 cm
Choice of head-first or feet-first patient entry for most applications	Yes
In-bore lighting	3 levels
Fresh air supply	6 levels

Scan range	140 / 200 <sup>1</sup> cm
Horizontal travel:	
Distance	275 cm
Accuracy	+/- 0.5 mm (0.02 inch)
Speed	up to 325 mm/s
Max. weight capacity <sup>2</sup>	250 kg (550 lbs)
Min. table height	59 cm
IV pole	Integrated

<sup>1</sup> optional

<sup>2</sup> for vertical and horizontal movement

**FlexTrak patient transport (Optional)**

- Dockable patient transport system for simplified patient preparation, handling and transportation from preparation room to the MR scanner, without repositioning the patient.
- Lightweight, easy to manoeuvre FlexTrak patient support system docks and undocks quickly and easily with patient support and tabletop.
- Patient and coils can be prepared outside the MR room. No need to remove coils to reposition patients.
- Integrated coil connections on the table and FlexConnect connectors for efficient patient management and rapid evacuation.
- Easy-to-use foot pedal, locks wheel direction during transport or brakes the FlexTrak while standing still.
- IV pole included.
- Optional second FlexTrak solution to allow enhanced throughput.
- 250 kg / 550 lbs capacity.



HA FlexTrak



FlexTrak Mammo

Patient transport system	FlexTrak FlexTrak Mammo
Height adjustable patient transport	HA FlexTrak HA FlexTrak Mammo
HA FlexTrak min. patient table height	49 cm
Max. weight capacity	250 kg (550 lbs)
Additional Posterior coil with second FlexTrak patient transport system	Not required



### Patient positioning accessories

Comprehensive set of patient accessories, including:

- Table mattress set
- Head/leg support
- Knee support
- Positioning wedges
- Small foam wedges
- Set of sandbags
- Set of patient fixation straps

### Patient communication

Two-way intercom communication with the patient. Nurse call button. Optional camera and monitor are available (up to 4 cameras can be connected).



### Physiology measurement and gating

Wireless physiological hardware to provide synchronization for sequence triggering and gating. Wireless physiological signals can be observed on the operator's console monitor or on the optional Physiology Display at the magnet.

- Wireless Physiology consisting of wireless Basic Triggering Unit and respiratory module hardware.
- Physiological synchronization for sequence triggering and gating through:
  - Wireless VCG
  - Wireless Respiratory
  - Wireless PPU (requires optional PPU Sensors)

Signal type (standard)	Vector ECG (VCG) and Respiratory
Signal type (optional)	Peripheral Pulse
Imaging Methods	Gating, Triggering
Waveform Display	On Operator's Console
Waveform Display (optional)	On Interventional Monitor mounted in exam room

### Acoustic noise reduction

Both hardware and software solutions are employed to provide a comfortable acoustic environment for the patient.

- Hardware acoustic noise reduction
  - Acoustic damping of covers
  - Epoxy encapsulated body coil
  - Force-balanced gradient coil with flexible mounting
  - Headset (up to 25 dB reduction)
  - Pediatric acoustic hood
  - Anti-vibration pads
- Software acoustic noise reduction
  - AutoSoftone noise reduction (up to 30 dB)
  - dS-SENSE





# Workflow and throughput



## FlexStream

FlexStream is hinged upon the unique FlexCoverage Posterior coil that provides neck-to-toe coverage without the need for any manual removal or repositioning. The FlexCoverage Posterior coil automatically combines with other dS coils to enable imaging with fewer coils and reduce concerns for coil positioning and patient setup.

The optional FlexTrak patient transport system enables easy patient preparation and more efficient use of the MR scanner. FlexTrak solutions can instantly convert your MR system from general purpose use to dedicated advanced clinical use, such as breast imaging, intervention or therapy applications, while supporting high throughput.

- As much as 30% improvement in throughput.
- Easy coil handling through lightweight patient conforming coil design.
- Large coverage coils for easier positioning.
- Flexible combinations of coils/elements.
- Efficient coil usage – more applications with fewer coils.
- Unique design allows up to 70% of routine applications without additional coil connections.
- FlexConnect easy to use, single-handed coil connections.

The combination of the integrated FlexCoverage Posterior coil and head base coil allows imaging of up to 70% of routine applications without additional coil connections.





#### **FlexConnect coil connection/connectors**

Single-handed coil connection for fast and easy connection and disconnection of coils; auto-eject with FlexTrak undocking in emergencies. The small FlexConnect connectors use advanced fiber-optic connections to transport digital broadband MR signals.

- Enhanced reliability by elimination of delicate RF pin connectors.

#### **FlexTrak tabletop**

Ultra-thin tabletop that maximizes bore space. Includes coil connections directly on the tabletop for fast and easy setup.

- Ultra-thin design ensures minimal distance between patient and FlexCoverage Posterior coil for optimal SNR.
- Robust design supports weights up to 250 kg (550 lbs).
- Wide table for enhanced patient space and comfort.
- Easily removable for patient transport using the optional FlexTrak patient transport system.

The optional lightweight FlexCoverage Anterior coils are quick and easy to position and conform to the patients shape without the need for fixation straps.



### SmartAssist

Next generation, easy-to-use SmartExam and ExamCards software that helps the user reduce the number of manual tasks.

- Simplifies workflow by making ExamCards more efficient.
- Significantly reduces repetitive tasks.
- Increases efficiency, reproducibility and consistency.



### ExamCards

A grouping of individual sequences and operations that define a clinical protocol. An ExamCard can include both the imaging sequences and any of the SmartAssist functionalities. ExamCards makes even the most complex exams simple. A set of Philips defined ExamCards is standard.

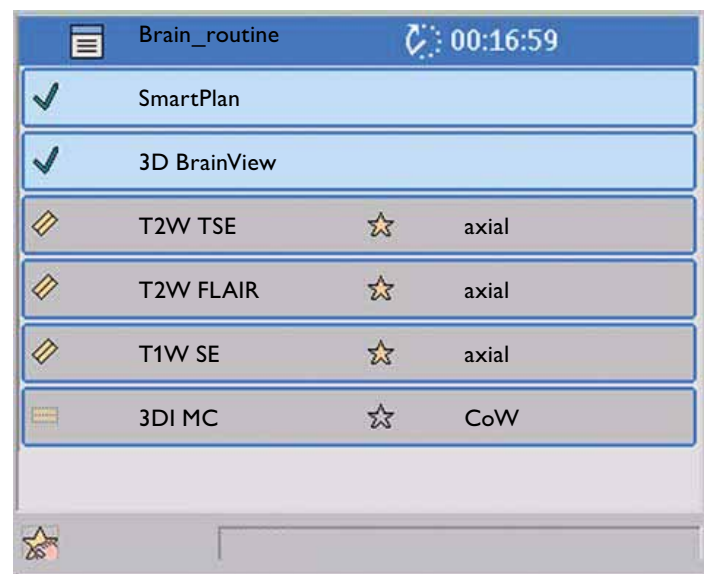
- User-defined ExamCards can be created and stored.
- Can be exported to memory stick or portable device.
- Can be locked with a password to prevent unintended changes.
- Can be shared among any of your scanners.
- Philips Netforum provides an online community that allows ExamCards to be shared and downloaded.
- Supports user-editable tips and processing/viewing/networking steps.
- Supports single mouse-click scanner operation.

### SmartStart

One button action that automatically moves the table to isocenter and starts the ExamCard while the operator walks back to the console reducing the setup time.

### SmartSelect coil and element selection

- Automatically detects and selects the right coil and coil elements to maximize the SNR matching the area to be scanned.
- Simplifies patient positioning and coil placement.
- No need for manual coil or element selection.
- Optimal SNR.
- Facilitates higher throughput.





#### **SmartExam planning (optional)**

Assists the operator in planning the MR exam. SmartExam uses sophisticated algorithms to recognize the anatomy. Then, using previously run exams as input, SmartExam automatically positions slices on the target anatomy, and uses ExamCards to conduct the study, reducing operator input to as little as a single mouse click and providing superb reproducibility and consistency.

#### **SmartExam optional packages include:**

- SmartExam Brain
- SmartExam Spine
- SmartExam Shoulder
- SmartExam Knee
- SmartExam Breast

#### **SmartLink geometry linking**

SmartLink (geolink) is a tool for simplifying the planning, viewing and processing of multi-sequence, multi-station exams, treating multi-station exams a single volume.

- Allows a single table sweep for multi-sequence (e.g. T1, T2, STIR) multi-station exams. All sequences are run at each station before the table is moved to the next station, thereby minimizing the number of table movements for increased patient comfort.
- Provides the flexibility to perform one sequence at all stations before starting the next sequence.
- Labels and sorts images regardless of the order in which they are acquired for subsequent viewing and processing as a single volume.

### SmartLine processing

Smart, automated and intelligent processing of image data. SmartLine processing steps can be run simultaneously and in parallel with image acquisition. Defined in the ExamCard, the same processing settings are used every time for consistent results.

- Clear display of progress of each processing step as well as overall progress.

The following packages are included:

- SmartLine VolumeView Real-time MIP, MPR and 3D surface rendering (standard or user defined volumes of interest enable elimination of unwanted signals regions).
- SmartLine ImageAlgebra (including addition, subtraction, relative subtraction, cumulation, ratios, MTC).
- SmartLine PicturePlus for user-defined image filtering (smoothing and/or edge enhancement).
- SmartLine T1/T2/Rho map calculation.
- SmartLine Delayed Reconstruction enables various retrospective image reconstructions from raw data (e.g. reconstruction of various flow directions from a 3D phase-contrast MRA dataset).

### ScanTools dependent options:

- SmartLine Diffusion registration
- SmartLine Diffusion (ADC, eADC, etc.)
- SmartLine IViewBold real-time fMRI analysis

### Viewing, filming and export

The MR viewing environment supports fast and flexible viewing, processing and film generation:

- Window width/level, zoom, pan, rotate and mirror.
- Image annotation (text, arrows and lines).
- Simultaneous visualization of up to four independent series for comparison.
- Cine movie display in various formats.
- Drag & drop functionality to enable the creation of films containing random image selections.
- Single mouse click film generation of image series using a range of predefined formats.
- Images and movies can be exported to Windows PC formats as visible on screen.

# Computer system

Host computer	
Processor Type	Intel Quad Core
Clock Rate	≥ 2.4 GHz
Operating system	Windows
Host memory	8 Gb
Data disk size	≥ 150 Gb
Image disk size	≥ 150 Gb
Approximate number of uncompressed 256 x 256 images that can be stored	250,000
Console display size	≥ 23 inch
Display resolution	1900 x 1200

## Image storage

- External storage via USB Port.
- DVD+RW 4.7 Gbyte. Approx. 40,000 uncompressed images (256 x 256) DICOM STD-CTMR format (optional).

## Connectivity and interoperability

The MR environment fits seamlessly into local network environments. Communication is performed via DICOM protocols. The system can be configured for safe storage of MR images and other patient data in departmental information systems and PACS. The MR workspace conforms to the new Enhanced (multi-frame) MR DICOM standard, which improves the performance of data transfer of large data sets and fully supports information associated with diffusion and spectroscopy.

Reconstructor	
Processor Type	Intel Quad Core
Clock Rate	≥ 2.4 GHz
Operating system	Windows 64 bit
Reconstructor memory	24 Gb
Reconstruction speed (256 x 256 matrix, 100% FOV)	Up to 12000 recons/s (256 FFT)

The system can be configured (per node) to support standard DICOM MR image transfer or DICOM Enhanced MR Image Transfer. If a receiving node does not support DICOM Enhanced MR, standard DICOM MR Images will be transferred.

## DICOM Workflow Management

- DICOM Modality Worklist
- DICOM Modality Performed Procedure Steps
- DICOM Storage Commitment

## DICOM Send/Receive

- DICOM Enhanced MR
  - Export / Import of DICOM Enhanced MR Images
  - Export / Import of DICOM MR Spectroscopy
  - Export / Import of DICOM Raw
- DICOM MR
  - Export / Import of DICOM MR Images
  - Export / Import of Philips Private MR Series Data
  - Export / Import of Philips Private MR Spectrum Data
  - Export / Import of Philips Private MR ExamCards Data
- DICOM SC
  - Export / Import of SC (color) Image Data
- DICOM Grayscale Softcopy Presentation State
  - Export / Import of Grayscale Softcopy Presentation State

## DICOM Query/Retrieve

- All the exported image types of Philips MR data

## DICOM Print

- Grayscale Softcopy Presentation State with preset window settings as on the console
- Basic Grayscale Print

## DICOM Media

- MR Studies on DVD (Read / Write)

## IHE Integration Profiles

- Scheduled Workflow
- Patient Information Reconciliation
- Consistent Presentation of Images
- Basic Security
- Consistent Time

Full information on compliance with DICOM standards and available functionality is contained in Philips' DICOM Conformance Statement.

# Siting information

## Installation

System designed for rapid installation times, compact siting footprint and low ceiling heights.

- Installation times as short as 7 days, based on prepared site conditions.
- Industry's lightest wide-bore magnet enables siting on upper floors.
- Siting (exam/technical/control room) as small as 30 m<sup>2</sup>.
- Low ceiling and transport height for easy installation and facility access.
- System/building vibration transfer is minimized by special vibration pads that require no facility adaptations.

## Site-planning

Philips site-planning specialists will assist in all aspects of site and installation planning. Detailed data concerning installation requirements is given in specific site planning documentation (Planning Reference Book). Please refer to the local Philips organization for detailed specifications for the installation.

Total Gantry installed weight (including gradient coil, electronics, and patient support)	≤ 5800 kg
Minimum siting requirement (Exam/Technical & Control room)	30 m <sup>2</sup>
Minimum ceiling height	2.50 m*
Minimum transport height	2.15 m
Recommended transport height	2.3 m

\* Min. ceiling height above the magnet for vent pipe and service access: 2.56 m.

\*\* Option

## PowerSave technology

Unique, efficient design combined with smart power management of the high power sub-systems (gradient amplifiers, RF amplifiers, etc.) enable reduction in power consumption by up to 50% without affecting overall performance.

Power requirements	
Mains voltage	400 or 480 V +/- 10 %, 3 phase, neutral & earth. Surge Protection: Complies to IEC 60601. A voltage stabilizer or power conditioner is not required if customer site meets the above mains requirements.
Mains frequency	50 or 60 Hz +/- 1%
Power consumption (including magnet cryocooler)	
Standby	9 kW
Ready for measurement	13 kW
Average*	19 kW
Peak	50 kW

\* Estimated power consumption during measurement.

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