PHILIPS

Ingenia Ambition X

MR Systems

Excel in your daily MR services, **helium-free**

with BlueSeal magnet

The Philips MR portfolio connects data, technology and people – **seamlessly**

At Philips, we unlock the full potential of MR by seamlessly connecting data, technology and people. Our integrated MR solutions offer new levels of speed and productivity as they drive confident diagnoses and foster a brighter, more confident future for everyone.

As healthcare comes under pressure to drive better outcomes, radiology departments are specifically caught between ever-increasing imaging demands while also feeling tremendous pressure to engage more deeply with both referring physicians and patients. And often, these challenges must be met with the same, or even fewer resources.

For too long, the perception of MR has been that it's a time-consuming, anxiety-inducing experience only appropriate for a limited patient population. At Philips, we're committed to partnering with you to deliver a confident diagnosis the first time, while also helping to future-proof your radiology department. We do this by leveraging our deep insights into the people behind the image. This has culminated in our all new Ingenia integrated MR solutions, which break down diagnostic boundaries to empower a faster, smarter, and simpler path to confident diagnosis, elevating the patient experience and, above all, helping to improve patient care.

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PHILIPS
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BlueSeal

Ingenia Ambition X

Excel in your daily MR services, helium-free

Every day, healthcare moves forward with new clinical pathways, innovations and supporting technologies. In radiology, meeting the need for high productivity, an improved patient experience while ensuring excellence in imaging can be daunting. The perception is often that MR represents a trade-off between productivity and image quality. The new Philips Ingenia Ambition offers cutting-edge MR imaging techniques to help you excel clinically every day. Based on its new, revolutionary fully sealed BlueSeal magnet, the solution lets you experience more productive[1] helium-free MR operations.

The Ingenia Ambition delivers superb image quality even for challenging patients, and performs MRI exams up to 50% faster[2] with Compressed SENSE accelerations for all anatomies in both 2D- and 3D scanning. Fast overall exam-time is achieved by simplifying patient handling at the bore with the touchless guided patient setup. Furthermore, the Ingenia Ambition offers an immersive audio-visual experience to calm patients and guide them through MR exams. In a study conducted using our in-bore solution, Herlev Gentofte University Hospital in Denmark managed to reduce the number of rescans by up to 70%[3,4], allowing radiologists to review more patients per day.

1. Compared to the Ingenia 1.5T ZBO magnet.
2. Compared to Philips scans without Compressed SENSE.
3. Compared to the average of the other 5 Philips Ingenia MR scanners without Ambient Experience and In-Bore Connect.
4. Results from case studies are not predictive of results in other cases. Results in other cases may vary.

Transition your department towards m
helium-free MR operations[1]

Forget about helium
Micro-cooling technology. Fully sealed.

Designed to facilitate low siting and other construction costs
No vent-pipe. 900 kg lighter[1].

Toward uninterrupted MR operations
Adaptive intelligence. EasySwitch solution[2,3].

High-performance by design
55cm FOV. Hours of continuous scanning.

1. Compared to the Ingenia 1.5T ZBO magnet.
2. Requires remote connectivity.
3. Requires appropriate service contract.

more productive

BlueSeal **magnet system**

Built around the unique, fully sealed BlueSeal magnet, the Ingenia Ambition is designed to simplify your MR installation, reduce lengthy and costly disruptions in your MR services, and help your department transition to productive helium-free operations. Based on a decade of innovation, this revolutionary magnet operates with only seven liters of liquid helium and is fully sealed – freeing up your mind and operations from potential helium complications.

With BlueSeal magnet, Philips aims to help MR facilities overcome potential helium-related issues of classic magnet design and eliminate radiology department dependency on scarce helium supply. What's more, the system can achieve hours of continuous high-performance scanning and offers a leading field-of-view of 55 cm for a wide bore 1.5T system.

BlueSeal magnet design	
Fieldstrength	1.5T
Frequency	63.86 MHz
Magnet design	Ultra compact, lightweight and sealed
Magnet dimensions (LxWxH)	1.62 x 1.88 x 2.29 m (5 ft. 3 in. x 6 ft. 2 in. x 7 ft. 6 in.)
Magnet weight (with cryogen)	2,300 kg (5,071 lbs)
Open bore diameter (incl. shim, gradient & QBC)	70 cm
Maximum FOV	55 cm × 55 cm × 50 cm
Fringe field containment	
Fringe field 5G (radial x axial)	2.4 x 4.0 m (7 ft 10 in. x 13 ft 1 in.)
Fringe field 1G (radial x axial)	3.2 x 5.6 m (10ft 10 in. x 18 ft 4 in.)
Temporal stability	Guaranteed: <0.1 ppm/hr Typical: 0.001 ppm/hr

Homogeniety		
Field homogeniety	Typical (ppm, V-RMS)	Guaranteed (ppm, V-RMS)
55 x 55 x 50 cm ellipsoid	≤ 5	-
50 x 50 x 45 cm ellipsoid	≤ 1.8	≤ 2
45 cm DSV	≤ 1.1	≤ 1.2
40 cm DSV	≤ 0.5	≤ 0.55
30 cm DSV	≤ 0.15	≤ 0.17
20 cm DSV	≤ 0.06	≤ 0.07
10 cm DSV	≤ 0.015	≤ 0.017

Measurement performed in 24 planes/24 points per plane

Shimming	
Type of shimming	Passive + Active (Dynamic)
Number of shim positions for accurate magnet field shimming	1008
Patient specific shimming	3D Volume Shim
1st order shimming	3× linear
Total active shimming time	linear shims: <0.1 ms
Off center FOV shimming	± 27.5 cm

Shielding	
Magnet shielding	Actively self-shielding
External interference shielding	Yes

BlueSeal cooling system	
Type of cryogen	Liquid helium (~ 7 liters)
Micro-cooling technology	Yes
Cryogen boil-off rate	Not applicable, fully sealed
Cryogen refill interval	Not applicable, fully sealed
Vent-pipe requirements	Not applicable, fully sealed

BlueSeal adaptive-intelligence	
Type of magnet controller	Digital, adaptive-intelligent
Self ramp-up unit	Yes, digital
Self ramp-down unit	Yes, digital
BlueSeal EasySwitch	Yes, adaptive-intelligent
BlueSeal Protection solutions	Yes, magnet UPS, air-cooled compressor and e-Alert predictive functionalities

Ingenia Ambition X **gradient system**

Philips Omega HP gradient's high linearity enables availability of maximum gradient amplitude and slew rate over the entire 55 cm imaging field of view. It's superb linearity improves geometric and diffusion accuracy even at the edges of the field of view. Patient specific shimming is provided with the first and second order shim. The force-balanced dedicated coil design minimizes vibrations and acoustic noise, enhancing patient comfort.

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
Duty cycle	100%
Gradient linearity: at 20 cm DSV at 50 cm DSV	 0.4% 1.4%
Gradient coil design	Non-resonant

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

Resolution	
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 µm
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

Parameters			
Matrix	64	128	256
SE TR (ms)	8.7	8.7	8.7
SE TE (ms)	2.9	2.9	2.9
IR TR (ms)	21	21	22
IR TE (ms)	2.8	3.0	3.0
IR delay (ms)	12	12	12
2DFFE TR (ms)	0.80	0.80	1.0
2DFFE TE (ms)	0.22	0.27	0.37
3DFFE TR (ms)	0.80	0.80	0.95
3DFFE TE (ms)	0.18	0.23	0.32
TSE echo spacing (ms)	1.5	1.5	2.0
TSE TR (ms)	6.4	6.5	7.4
TSE TE (ms)	1.6	1.7	2.2
Max. TSE turbo factor	1024		
GRASE echo spacing (ms)	0.25	0.4	0.76
GRASE TR (ms)	12	14	19
GRASE TE (ms)	3.1	3.6	4.9
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	27
Max. EPI factor	255		
Max. b-value (s/mm^2)	25000	25000	25000
TE (SSh DWI, b=1000, SENSE factor 2)	42	44	57

Notes: The Ingenia Ambition X 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.

Ingenia Ambition X **RF system**

Philips unique digital broadband MR architecture, dStream samples the MR signal directly in the RF coil at 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. The 18 kW High-performance solid-state RF power amplifier affords the energy necessary to manage even very large patients. Both RF transmit and reception are synchronized by the dSync Digital network architecture, that brings fast loopback times and high resolution wave form shaping to facilitate the development of new MR methods and applications.

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.

Transmit	
RF Amplifier type	Solid state, microprocessor controlled
Output power	≥ 18 kW
Output frequency	63.86 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
RF Amplifier type	Solid state, microprocessor controlled
Sync accuracy	20 ps
Min. dwell duration	100 ns

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

Easy expandability

The number of channels is determined by the coil rather than limited by 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

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

Ingenia Ambition X **speed**

Thanks to innovative sensing technology and in-room guidance, Ingenia Ambition delivers new workflow capabilities to minimize interactions with the system, freeing you up to care for your patient and drives fast exams.

The system is designed to be less dependent on user expertise and can be handled by a single operator more efficiently[2], helping you address your staffing challenges. With Ingenia Ambition, we aim to help you scan more patients per hour.

VitalEye	
Frame rate	20 frames /s
Temporal resolution	50 ms
Infra red compatibility	Yes
Motion detection resolution	Sub-mm
Accessories needed for respiratory triggering	No
Calibration	Automatic

VitalScreen	
Display size	12 inch
Capacitive Multi-Touch	Yes
Supports medical gloves	Yes
Glass	Chemically hardened
CPU	Dual Core
Operating system	Windows 10
Height position	2 height positions (1300 and 1400 mm)
Number of displays	2 (left side and right side of the gantry)

VitalScreen main functions	
Patient infomation	Name, date of birth, gender, age, weight, patient ID number
Protocol infomation	Total exam time, number of scans, SAR, SED, breath holds, contrast media
Coil information	Recommended coil is listed Coil connection status is displayed
Patient position	Recommended patient position is displayed
Change patient position at gantry	Yes
Change patient weight at gantry	Yes
Patient privacy function	Yes (auto-hide patient details)
Display cleaning mode	Yes
Contrast administration	Contrast agent type and dose is displayed
VCG signal display	Signal available when VCG is applied
Respiratory signal display	Respiratory signal is displayed
Ventilation	Current level is displayed with possibility to adjust
Audio level	Current sound level is displayed with possibility to adjust
Light control	Current light mode is displayed with possibility to switch on/off
AutoStart	Start the exams upon closure of the examination room's door
Help	Help function can be accessed at the gantry

1. Based on in house testing, with brain, c-spine, l-spine, liver and knee exams, measuring exam times only.
2. Compared to the Ingenia 1.5T ZBO magnet.

ScanWise Implant main functionalities	
Max. spatial field gradient	Can be entered as specified by implant manufacturer in Gauss/cm or T/m
Graphical representation of restricted area in the gantry	Provided in all 3 orthogonal views (with possibility to print)
Max. RF energy	Can be entered as s specified by implant manufacturer for: • SAR (whole body coil) • SAR Head • B1+rms
Max. dB/dT	Can be entered as specified by the implant manufacturer.
Max. slew rate	Can be entered as specified by the implant manufacturer.

Designed for single-operator workflow, **with a smart touch**

The Ingenia Ambition is designed to make system operation by a single person more time efficient[1], reducing superfluous activities and allowing the operator to focus where it matters. From the moment your patient is set up through to the time the images are ready for reading, the Ingenia Ambition offers the opportunity to run your examinations in one smart touch. With the new VitalScreen, you can easily adjust your imaging strategies and start your exam from the patient side with a single touch. When you close the door of the exam room, Ingenia Ambition starts to scan instantaneously using SmartStart. From there, SmartExam[2] adaptive intelligence is planning and running the ExamCard protocol in the background. Finally, SmartLine automatically post-processes your images and transfers them to the PACS, ready-for-reading. This is how simple an exam can be on Ingenia Ambition.

Simplified exams with a SmartTouch

SmartSelect	Automatically determine which coils and elements should be activated to produce the highest SNR for the selected area.
SmartTouch	Easily adjust your imaging strategies and start your exam from the patient side with a single touch.
AutoStart	When you close the door of the exam room, Ingenia Ambition will start to scan instantaneously using AutoStart.
SmartExam[2] adaptive intelligence (optional)	SmartExam adaptive intelligence is planning and running the ExamCard protocol in the background. It is optionally available for brain, spine, shoulder, knee and breast imaging.
SmartLink	Simplifies the planning, viewing and processing of multi-sequence, multi-station exams, treating multistation exams as one volume.
SmartLine	Performs intelligent background processing (such as volume view, diffusion, perfusion etc.,) of multiple image datasets in parallel with image acquisition which saves time.

Does your technologist need support?

With Communication toolbox (optional), your techs will never be left alone. They can call, chat, screenshare or exchange files directly from the MRI console with the lead technologist or radiologist anywhere on the Hospital IT network.

1. Compared to the Ingenia 1.5T ZBO magnet.
2. SmartExam is not available to patients with MR Conditional Implants.

Ingenia Ambition X **coil solutions**

Ingenia Ambition X offers a wide range high channel count digital coil solutions. Dedicated coils are available for all anatomies.

dS coil solutions

	dS TotalSpine	dS HeadSpine*	dS HeadNeckSpine*
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)	20 (Head/Neck)
		51 (Total Neuro)	52 (Total Neuro)
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

dS coil solutions

	dS Torso	dS Whole Body*
Coil solution type	Integrated	Integrated
Coverage	60 cm	200 cm
Max. no. channels	32	108
Main applications	Chest, Pelvis, Heart,Peripheral-vascular	Whole Body, Chest, Pelvis, Heart, Peripheral-vascular
		

*WholeBody Specialist required.

FlexConnect coil connection
Single-handed coil connection for fast and easy plugging and unplugging of coils, and for auto-eject with FlexTrak undocking in emergency cases. The small FlexConnect connectors use advanced fiber-optic connections for carrying digital broadband MR signals. High reliability by eliminating delicate RF pin connections.

FlexTrak table top
Thin table top that maximizes bore space. Includes coil connections directly on the table top for fast and easy setup.

- Thin design facilitates minimal distance between patient and FlexCoverage Posterior coil for optimal SNR.
- Strong design supports patients up to 250 kg (550 lbs).
- Easily removed for patient transport using the optional FlexTrak patient transport system.

Flex Caddy coil cart (optional)

Ingenia Ambition X
patient experience

Your patients are at the heart of Ingenia Ambition – which includes an MR experience that enhances comfort and compliance. With up to 80% acoustic noise reduction, voice guidance, immersive in-bore visuals and a comfortable table, your patients are made to feel at ease, resulting in smooth, fast exams.

Patient comfort	
Patient aperture	70 cm
Flare at 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	On/Off
Fresh air supply	6 levels
Scan range	140 cm / 215 cm*
Horizontal travel	
Distance	275 cm
Accuracy	+/- 0.75 mm (0.03 inch)
Speed	Up to 325 mm/s
Max. weight capacity	250 kg (550 lbs)
Min. table height	59 cm
IV pole	Integrated

* WholeBody Specialist required.

Ambient Experience In-bore Connect (optional)	
Main applications	Head, spine, body
Comforts	Wide screen mirror and large 52 inch screen providing an immersive visual experience
Guidance	Progress visualization per scan and total exam, visualization of the remaining breath hold time

Acoustic noise reduction	
Gradient	Force-balanced technology gradient coil
Other hardware	Covers and sound reduction headset
Software	AutoSoftTone noise reduction: up to 30dB
	SoftTone to adjust the noise level individually on sequence level
	ComforTone (optional) up to 80% noise reduction applicable to high gradient gradient settings, while keeping similar scan times and image resolution. Easy to implement thanks to ready-to-use ExamCards

AutoVoice (optional)	
Main applications	All anatomies
Pre recorded languages	30 languages
Customization	Record new text and or new voice
Announcement	Scan duration, table movements
Breath hold guidance	Automated breath hold commands based on your preferred setting: - Pre-recorded breath hold instructions with timing synchronized to fit patient's respiratory cycle. - Pre-recorded breath hold instructions with manual timing. - Manual breath hold instructions with manual timing.


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Table ComfortPlus mattress

Ingenia Ambition X offers a table mattress set that brings patient comfort and compliance to the next level. The 60 mm thick viscoelastive foam makes the patient comfortably sink towards the posterior coil adapting to the shape of the body. The bielastic special knitwear offers an exceptional texture that is easy to clean, durable, and pleasant to the patient's skin. The head positioning support offers stability and comfort making it easy for the patient to lie still throughout the whole MR exam.

Patient positioning accessories
Comprehensive set of patient accessories:
• Comfort mattress set
• Head/leg support
• Knee support
• Positioning wedges
• Small foam wedges
• Set of sandbags
• Set of patient fixation straps

Patient communication

Communication system allows for two-way intercom communication with the patient and includes a nurse call button. Optional camera and monitor are available (up to 4 cameras can be connected).

Patient support

- Patient support enables a maximum weight capacity of 250 kg (550 lbs).
- Patient table height 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.
- Up to 215 cm* scan range.
- Horizontal travel of 275 cm (9 ft 1 in.) with +/- 0.75 mm (0.03 inch) accuracy.**
- 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 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 maneuver 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.

*WholeBody Specialist required.
**Magnet siting requirements needs to be confirmed to allow full usage of horizontal table movement.

Physiology synchronization	
Cardiac	Wireless VCG, wireless PPU
Respiratory	VitalEye sensing technology, wireless respiratory sensor
Display physiological signals	VitalScreen, operator's console monitor

Ingenia Ambition X **patient data protection**

Philips recognizes the importance of securing your medical devices and protecting your patient data. On Ingenia Ambition, Philips has applied the principle of the defense-in-depth strategy to its MR Release 5 systems, implementing a security strategy that comprises multiple layers: Firewall, operating system (OS) and application hardening, malware protection, authorization user management and authentication, audit logging and patient data encryption. To illustrate the security posture on the Philips Ingenia Ambition, it received an Authority to Operate (ATO) from the U.S. Defense Health Agency (DHA) based on the compliance requirements and risk assessments as required through the Risk Management Framework (RMF) process.

Addressing security in Philips Magnetic Resonance (MR) Release 5 imaging systems
Philips has applied the principle of the defense-in-depth strategy to its MR Release 5 systems, implementing a security strategy that comprises multiple layers:

- Firewall
- Operating System (OS) and Application Hardening
- Malware Protection
- Authorization, User Management and Authentication
- Audit Logging
- Patient data encryption

Firewall to protect from network attacks
Strict firewall policies that block all unnecessary ports help inhibit communication with unauthorized computers, limiting the attack profile that a malicious hacker may try to exploit.

Operating system hardening to limit the attack surface
Similar in principle to firewalls, operating system hardening involves identifying all unnecessary services and functions that are included within the operating system and disabling those not required by MR Release 5 systems. OS hardening reduces the attack surface by eliminating those services that may become vulnerable over time. Philips MR follows the guidance provided by the Center of Internet Security (CIS) as a baseline for the OS hardening.

Malware protection via whitelisting provides protection against unknown threats
To mitigate the risk of unknown threats, Philips has implemented policies which allow only trusted code to run on the system. This solution, known as whitelisting, helps protect MR systems from malware.

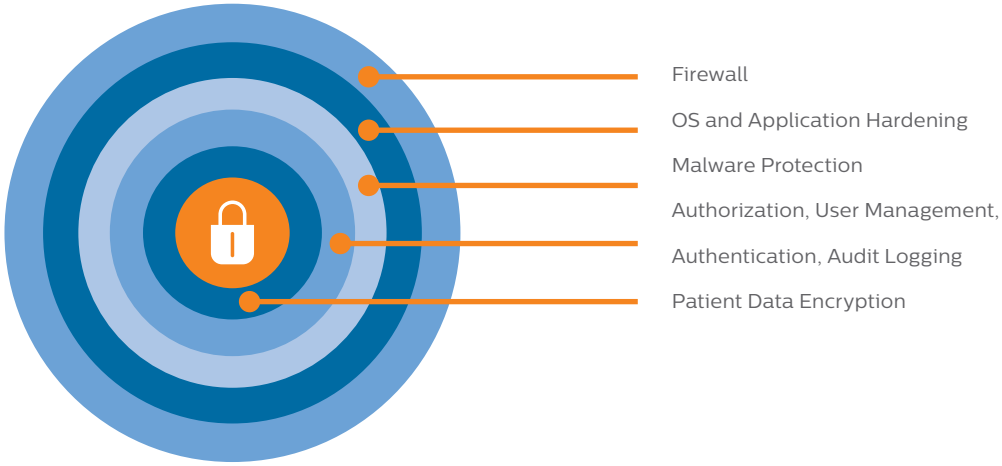
Malware protection via conventional anti-malware provides additional protection against known threats
To mitigate the risk of infections during service activities, Philips has additionally implemented conventional antimalware which protects your MR systems from malware during service activities. To keep the anti-malware up to date, Philips maintains the anti-malware signatures via an on-line service as part of a Philips MR service agreement.

Authorization to protect your assets
To help control access to data on your Philips MR Release 5 system, users have access restricted to need:

- A clinical user may perform exams and access any previously completed exams stored on the system. The system requires a login before the operator can access the data. When configured, clinical users can install released updates.
- Hospital Administration: can perform simple administration tasks, lock/unlock clinical accounts, and create new accounts for clinical users. Administrators can install released updates, but do not have access to patient data.
- Service Engineers: can perform system maintenance tasks, perform the initial installation and fault finding activities.

User management to improve access control and audit trail
With MR Release 5 you have the ability to create multiple clinical user accounts and multiple hospital administrator accounts. With both systems, hospital administrators have the option of specifying password policies in accordance with local information security requirements and policies.

MR Release 5 systems can interface with your LDAP environment to authenticate users and groups using your standard network accounts (i.e., Active Directory). Service Engineers can access the system using 2-factor authentication. Dongles can be activated and/or revoked by Philips.



Each of these defensive layers plays an important role in helping obstruct hackers, defend against malware, and prevent unauthorized access to imaging systems and devices.

Audit logging provides data for analysis

Philips has enhanced MR Release 5 systems' audit logging capabilities. Users can configure the system to send the logs to a local system log (syslog) server for retention, accessibility, and further analysis. To aid forensic analysis, users can ensure consistent time stamps by synchronizing the time on the MR systems with your network time server.

Patient data encryption at rest and in-transit to protect patient data

All patient data stored on Philips MR Release 5 system hard drives can be encrypted according to your institution's specific requirements. In addition, you can choose DICOM with TLS for node authentication without encryption, DICOM utilizing TLS encryption, or a combination of the two to encrypt patient data in-transit. (Note: This requires corresponding functionality on your PACS system.)

Philips MR Release 5 Features Summary

- Firewall policy blocks all unnecessary ports
- Microsoft Windows 10 OS hardening
  - OS settings utilizing the CIS benchmarks as baseline
  - Default having disabled unnecessary services
  - Disabled auto-run for removable media, and configurable access
- Media export security
  - Provides the ability to disable export of patient data to removable media (configurable)
  - Provides the ability to encrypt removable media
- Malware protection utilizing the McAfee Anti-Malware solution combined with whitelisting policies
- User management policy
  - User management using local accounts
  - Support for multiple unique user accounts
  - Support for multiple unique administrator accounts
  - User management LDAP
  - Supports Active Directory authentication utilizing LDAP (system will be joined to the domain)
  - Support for individual accounts or Active Directory groups for users and administrators
- Configurable password policies
  - Provides the ability to specify password policies for local accounts and LDAP
  - Password history (0-24)
  - Minimum password length (0-14)
  - Maximum password length (14 (local authentication), 63 (LDAP))
  - Minimum password age (0-998 days)
  - Maximum password age (1-999 days)
  - Complex password required (yes/no)
  - Account lockout policies
  - Lockout threshold (0- 999 attempts)
  - Lockout duration (1-99999 minutes)
  - Lockout counter reset (1-99999 minutes)
- Screensaver with password protection – locks the screen after the specified period of inactivity. Screensaver will not interfere during scan. (enabled/disabled, 1-999 minutes, password protected yes/no)
- Patient Data encryption
  - 128 bit AES Bitlocker(can be enabled during installation)
  - DICOM (Secure DICOM managed by certificates)
- Audit log export
  - Audit logs may be continuously exported utilizing syslog

Ingenia Ambition X **computer systems**

Ingenia Ambition X is delivered with state of the art computer system, delivering outstanding performance.

Host computer*	
Processor	≥ 3.4 GHz Eight Core Intel processors
Host memory	≥ 32 GByte
System disk	≥ 120 GByte SSD, Solid State Disk Technolology
Image database disk	≥ 512 GByte SSD, Solid State Disk Technology Approx. ≥ 600,000 images (256 x 256)
Image storage	External storage via USB port DICOM STD-CTMR and E-MR format
Parallel scanning and saving images	Yes

Reconstructor*	
Processor	≥ 3.4 GHz Eight Core Processor
Reconstructor memory (RAM)	≥ 96 GByte
Reconstruction speed 256 FFT, 100% FOV	Up to 113,000 recons/sec
Parallel scanning and reconstruction	Yes

Console	
Display size	≥ 23 inch LCD wide-screen
Resolution	1920 x 1200 pixels

Connectivity	
Protocol	Ethernet 1 Gb TCP/IP standards-based image transfer with DICOM 3.0
Network connection	RJ45 10/100/1000 Mbps

*These can be combined in one computer.

Connectivity/interoperability
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 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.

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 of Philips MR data, all the exported image types**
- **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.

Ingenia Ambition X **siting**

BlueSeal magnet is designed as a solution, which could dramatically reduce installation costs. On a classic magnet, long vent pipes must be installed to meet safety requirements and direct helium to an outside vent in case of a magnet quench. Because no helium can escape[1] due to the magnet being sealed, BlueSeal magnet does not need a vent pipe, significantly reducing construction costs. Philips BlueSeal magnet is also lightweight with a minimum siting limitation of 3,700 kg. This is around 900 kg lighter than its predecessor[2], a decrease in weight that can potentially facilitate easier siting, reduce floor adaptations and further lower construction costs.

Examination room	
Floor space (Recommended)	4.8 m × 7 m
Floor space (Minimum)	3.4 m × 5.3 m
Ceiling height (Recommended)	3.0 m
Ceiling height (Mimimum)	2.56 m
Temperature	18-22 °C
Humidity (Non-condensing)	40-70 %
Heat dissipation	2 kW

Control room	
Temperature	18-24 °C
Humidity (Non-condensing)	30-70 %
Heat dissipation	0.3 kW

Technical room	
Floor space (Recommended)	5.0 m × 2.0 m
Floor space (Minimum)	3.8 m × 1.8 m
Ceiling height (Recommended)	3.2 m
Ceiling height (Mimimum)	2.6 m
Temperature	15-24 °C
Humidity (Non-condensing)	30-70 %
Heat dissipation	
Standby	2 kW
Peak	6 kW

Power requirements	
Mains voltage	380V, 400 V or 480 V +/- 10 %
Surge protection	Complies with IEC 60601. A voltage stabilizer or power conditioner is not required if site meets the above mains requirements.
Mains frequency	50 or 60 Hz +/- 1 Hz

Typical power consumption (including magnet cryocooler)		
Mains frequency	50 Hz	60 Hz
Cryocooler only	4.1 kW	5.8 kW
Standby	5.5 kW	7.5 kW
Ready for measurement	9.0 kW	10.8 kW
Average*	20.4 kW	22.2 kW

*Average scanning power based on COCIR.

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.

1. Even in the rare case of the magnet becoming unsealed, the negligible amount of helium escaping would not materially affect the oxygen level within the room.
2. Ingenia Ambition is not yet CE marked, and not available for sale. Ingenia Ambition is 510(k) pending. Not available for sale in the USA.

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