Ingenia 1.5T helps advance MRA at Utrecht, is a neuro “workhorse” at OHSU

Ingenia 3.0T excels in cardiac MR at SLEH, in high detail MSK at PAMF, in fast high quality DWIBS at Tokai

Impressive workflow benefits and quality imaging with Ingenia 1.5T at Nemoscan and Ingenia 3.0T in Trier
Dear Friends,

Initial user reports about Ingenia are in, and they are overwhelmingly positive! Our customers are raving about the lightweight, easy-to-use coils and simple patient set up, as well as the remarkable image quality, higher throughput and robustness of the system.

Be sure to read about the success of Ingenia 3.0T in cardiac imaging at St. Luke’s Episcopal Hospital, and its superb spine imaging at Trier, Germany. Also in this issue, users are reporting Ingenia is a great system for routine neuro work, and excels in whole body and MSK imaging as well.

We are continuing to collaborate with our customers in events such as The First Ingenia User Event, which took place in Germany in October, as well as The Global Pediatric Network Meeting, which drew more than 500 participants to China in September, and the U.S. Champions in Radiology Meeting.

At RSNA, Philips presented “proof positive” on Ingenia. We predicted that Ingenia would be a game-changer, and we proved it, with impressive user experiences and exceptional clinical images.

With Ingenia, Philips has once again placed itself as a market leader. Look for continued success in 2012!

Tracy W. Byers

Vice President and General Manager Magnetic Resonance Imaging,
Global Sales and Service, North America
Users on Ingenia
Ingenia users share their experiences and findings.

User experiences

6 Routine neuro scans benefit from Ingenia’s large bore and superb image quality
Dr. Pollock, OHSU, uses Ingenia 1.5T as a “workhorse” for routine neuro.

10 Ingenia 3.0T provides high SNR, exceptional homogeneity for MSK scans
Dr. Goumas, Palo Alto Medical Foundation, sees dramatic improvements in MSK, breast and spine exams using Ingenia 3.0T.

15 Ingenia 3.0T combines high quality imaging with productivity
Prof. Busch, Trier, sees increased efficiency and excellent spine and MRA exams with Ingenia.

22 Ingenia 1.5T helps to advance MR angiography at Utrecht
dStream digital architecture and large FOV simplify and accelerate MRA procedures while achieving excellent image quality.

26 Ingenia 3.0T excels in cardiac imaging at SLEH
St. Luke’s Episcopal Hospital sees huge advantages in image quality, workflow.

30 Ingenia 1.5T provides impressive workflow benefits at Nemoscan
High-speed, superb quality MRI and Intellispace Portal dramatically accelerate workflow.

38 Global Pediatric Network Meeting held in Beijing
Cross-modality pediatric healthcare symposium draws more than 500 international participants.

39 Users share convincing results at First Ingenia User Event
Ingenia users shared how the dStream digital architecture has expanded clinical MR capabilities and throughput.

40 20,000 registrations on NetForum
View most popular MR content on NetForum.

MR News

4 RSNA 2011 – Philips MRI going strong
Philips booth shows the latest on Ingenia, Intellispace Portal, Panorama HFO and more.

Application tips

34 Spine imaging of challenging patients using Ingenia

Calendars

42 Education calendar 2012
43 Events calendar 2012

41 Receive FieldStrength by e-mail
Visit NetForum
Colophon
RSNA 2011 – Philips MRI going strong

The Philips MR portfolio features innovative solutions to elevate clinical performance, to accelerate patient management and to improve economic value. These solutions and the latest additions were shown at RSNA.

Ingenia proves a huge success

In July Philips started commercial shipment of Ingenia, the first-ever digital broadband MR solution. During the RSNA 2011 meeting, Philips was able to announce that it already shipped over 100 systems.

In all clinical areas, the Philips booth at RSNA 2011 displayed impressive results reported by Ingenia 1.5T and 3.0T customers from all around the globe. Philips’ innovative dStream architecture provides up to 40% increase in SNR. Xtend imaging space provides the largest homogenous field of view in a wide 70 cm bore for superb image homogeneity and fat suppression, as well as faster total spine and whole body scans because fewer stations are needed. MultiTransmit 4D brings a next level in patient-adaptive 3.0T as it also provides superb uniformity, contrast and consistency to real-time applications such as cardiac. Ingenia uses a channel-independent architecture for future expansion of clinical capabilities and low upgrade costs, making it an excellent economic value.

In addition, Ingenia accelerates patient management to deliver up to 30% increase in throughput. This is realized by faster patient setup and scan planning, as well as faster scanning. New coils introduced at RSNA include dS Endo coil, dS Pediatric HeadSpine and dS Pediatric TorsoCardiac coils, and the 32-channel dS Head coil.
**Imaging 2.0**
Philips understands the needs of your patients, as well as the challenges you face every day. We draw on this knowledge to develop more intuitive, more affordable, and more advanced imaging solutions to help you deliver best healthcare possible. That is the mission of Imaging 2.0.

**New coils and methods on Panorama HFO**
Panorama HFO provides excellent clinical versatility from MSK to cardiac, and is preferred by patients because of its wide open bore. At RSNA, Philips introduced a new STSENSE NV 8 coil for neurovascular applications, that can also be set up for superb foot/ankle scanning. Also new on Panorama HFO are spectroscopy and mDIXON. Panorama excels in MR-guided minimally invasive procedures like biopsy, brachytherapy and others. Its Oncology Configuration provides MR soft-tissue imaging for radiation therapy planning.

**Image viewing and processing made easier with IntelliSpace Portal**
Philips IntelliSpace Portal is a thin client applications server solution that provides convenient multi-modality image review, as well as powerful applications like Cartilage Assessment and Tumor Tracking. The task-guided setup and many automated steps allow fast and easy viewing and processing. With access from any location, IntelliSpace Portal enables efficient collaboration, virtually anywhere and anytime.

Top : 0.6mm³ isotropic T2W TSE of IAC, Ingenia 1.5T.
Left: 2-station total spine, Ingenia 3.0T.
Right: Whole body DWIBS, Ingenia 3.0T.

*FieldStrength 5*
Routine neuro scans benefit from Ingenia’s large bore and superb image quality

OHSU uses Ingenia 1.5T as a “workhorse” for routine neuro

Oregon Health and Science University (OHSU, Portland, Oregon, USA) is an academic hospital that gathers referrals from all around the Pacific Northwest region. OHSU installed Ingenia 1.5T in April 2011 and is currently scanning approximately 100 patients a week, about 70% of whom are neuro patients. Ingenia provides up to 40% more SNR than other systems, making it an excellent option for neuro imaging.

“Users experiences

Jeffrey M. Pollock, MD, is Assistant Professor of Neuroradiology and Director of MRI and Functional MRI at OHSU

Jeffrey M. Pollock, MD, is Assistant Professor of Neuroradiology and Director of MRI and Functional MRI at OHSU. “For spine imaging, especially, Ingenia is very fast, saving time on both workflow and scan times,” says Dr. Pollock.

“It has better SNR than our other 1.5T scanners, and particularly our Ingenia spine imaging is outstanding. It is a very good spine imaging platform. There are several sequences we routinely perform in the brain where I have examples showing that Ingenia 1.5T images are superb. Ingenia is definitely a good workhorse system for neuro imaging.”

“We optimize for image quality, but regardless of that, our scan time has still improved.”
Patient comfort and digitized coils add to ease of use

“We now have the potential to scan many more patients.”

“The patient comfort level is really high, as well,” says Dr. Pollock. “With Ingenia we now scan a lot of larger patients, as well as claustrophobic patients; for both groups, the 70 cm bore is very helpful. Ingenia has allowed us to scan patients we otherwise couldn’t have scanned. I’ve actually been in the magnet myself and it was very spacious and comfortable. A comfortable patient helps make exams faster and easier.”

“With the tiltable dS HeadSpine coil, Ingenia can accommodate patients who may not be able to lie flat, or are uncomfortable in certain scanning positions. The head coil is also much less bulky, much more open around the face and more streamlined than other head coils I used,” says Dr. Pollock.

In addition, OHSU makes good use of the FlexCoverage coils. “We use the integrated Posterior coil for just about everything. You don’t even notice it; it’s just a part of the table.”

“Our techs say that all the coils are great to use. Signal is digitized at the patient, and fiber-optics are used instead of heavy cables. Therefore the coils are lighter and easier to work with than previous coils. It’s faster to change the coils and makes the workflow more efficient in terms of room turnover.”

Speed, image quality positively impact neuro scans

When optimizing scans, Dr. Pollock primarily focuses on image quality. “We optimize for image quality, but regardless of that, our time has still improved. We can do a complete, high quality brain exam in about 20 minutes, where it used to take about 35 minutes. And a total spine – cervical, thoracic and lumbar – takes about 25% less time than it could take on other platforms.”
“Ingenia is definitely a good workhorse system for neuro imaging.”

**Rhabdomyosarcoma**

2-year-old child with several month history of nasal stuffiness. A large pedunculated nasal cavity mass is seen that partially enhances. There is bilateral adenopathy in the jugulodigastric and retropharyngeal nodes seen on the axial image. Biopsy showed rhabdomyosarcoma with local metastasis.

**Multiple sclerosis**

An Ingenia 1.5T BrainView FLAIR is reformatted in the sagittal plane. The MS lesions are well seen with good contrast between the lesions and normal white matter.

Dr. Pollock and his team carefully optimized the Ingenia protocols according to their needs. In spine exams, for instance, they modified some of their axial T2 sequences. “I told the techs to scan a volunteer patient in 6 or 10 different ways and then not tell me what they did, but show me the images side by side. Judging by image quality, we’d pick the best one, and then see what time savings it had or didn’t have. After a few iterations of repeating the same sequence a couple different ways, we arrived at what we all liked and that became the new protocol.”

**More patients, better images, faster exams**

On the whole, the higher SNR and faster workflow make Ingenia the neuro workhorse that it is, but Dr. Pollock also emphasizes the advantage of a large bore in routine neuro imaging. “Ingenia has opened the door for patients who we never thought would be able to get in a scanner, because of claustrophobia or because of their size. Many patients who might have had to use the open scanner can get into Ingenia and it works really well. So we now have the potential to scan many more patients on a better quality magnet.”
Ingenia 3.0T provides high SNR, excellent homogeneity for MSK scans

Using its new Ingenia MR system, Palo Alto Medical Foundation sees dramatic improvements in MSK, breast and spine exams

Ingenia 3.0T with MultiTransmit 4D provides image contrast and consistency, very high resolution, and excellent homogeneity. The latter is particularly important for anatomy that is off-center or subject to dielectric shading. This makes Ingenia 3.0T a great choice for MSK, as well as most other types of scans.

The Palo Alto Medical Clinic/Palo Alto Medical Foundation (PAMF, Palo Alto, California, USA) is a multi-specialty clinic of approximately 1,000 physicians over northern California. The clinic is well established in the community and well known in the region, drawing patients from California and surrounding states. PAMF installed Ingenia 3.0T at its Women’s Health Center in July 2011, and it’s already reaping the benefits in high quality MR exams.
“Ingenia has everything we need: the homogeneity, the wide bore, the high SNR and it’s 3.0T.”

Tibial plateau fracture
A 57-year-old female fell on both knees while gardening. She presented with trauma and pain of the left knee. MRI reveals an occult fracture in the knee. Ingenia 3.0T with the dS Knee 8ch coil was used to produce optimal SNR for the highest resolution possible. Features that advanced these protocols included phase oversampling or REST slabs to minimize scan times allowing more time to sample signal. SENSE was used judiciously to help keep scan times of within about five minutes. The patient was positioned feet first, supine, with feet and calves supported in cushions.
“The homogeneity is outstanding, and the fat saturation is very robust.”

Chris G. Goumas, MD, says, “About 30 to 40% of Ingenia scans are MSK and sports medicine, and it performs beautifully. It’s also perfect for breast imaging, because there are no banding issues, where you get the band of standing waves that go across the patient with signal loss. The magnet is awesome. It has everything we need: the homogeneity, the wide bore, the high SNR and it’s 3.0T.”

Outstanding clinical performance
Dr. Goumas says his initial experiences with Ingenia have been very positive. “We have an Achieva 3.0T, which is already a pretty awesome scanner. But now with dStream, in the same scan time, we’re able to get a 20% reduction in slice width. We were at the very edge of SNR on the old scanner, and now we’re cutting another 20% off. In our spine imaging, slices used to be 3.5 or 4 mm thick – and they’re now 2.5 mm thick. That’s a huge reduction in slice width. Plus, we’re still doing the scan in the same time – about 5 minutes. So we’re actually using the Ingenia in two ways: for resolution improvement and for speeding up our scans.”

Robust homogeneity and good fat saturation can be a challenge in a wide bore system, but Dr. Goumas says Ingenia has both in abundance. “The homogeneity is outstanding, and the fat saturation is very robust. When we’re doing a wrist, we always do it at the patient’s side, with perfect fat saturation. Same for shoulders: perfect fat saturation. This is very good for MSK work because so much of the anatomy like elbow, shoulder and wrist is off-axis.”
To be able to obtain this kind of homogeneity in a wide bore system is remarkable, he says. “A lot of our competitors aren’t up to that task. We can do even larger athletes now with the 70 cm bore, and we still have better exams because of the speed and the homogeneity off isocenter.”

**Coils for all applications**

Dr. Goumas says the clinic uses all available coils, and all are top-notch performers. “With digitization at the coil and a shorter cable length, we have far less signal loss, and the coils are very lightweight. Our technologists are finding it much easier to handle them, especially our smaller techs. They say the cable management overall is much better.”

The integrated Posterior coil is a significant advantage in Dr. Goumas’ spine work. “The patient positioning is so much easier,” he says. “The patient just lies on the table, and we don’t need to move a big coil on and off.”

The clinic’s spine work has improved dramatically, he adds. “We haven’t had a problem with the banding artifact across the conus that you get in the LS spine. That black band of signal loss has disappeared on Ingenia because of MultiTransmit 4D – the parallel RF transmission – and the integrated Posterior coil.”

**“We’re actually using the Ingenia in two ways: for resolution improvement and for speeding up our scans.”**

---

**Rotator cuff tear**

A 25-year-old male presenting with increasing shoulder pain for six months. MR images demonstrate a labral tear. Patient was positioned head first, supine, with the shoulder supported by anterior elements of the shoulder coil. Ingenia 3.0T and the dS Shoulder 8ch coil were used to produce optimal SNR for the highest resolution possible. Phase oversampling or REST slabs and SENSE were used.

---

<table>
<thead>
<tr>
<th>Cor PD FS</th>
<th>Cor T2</th>
<th>Cor T1</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.22x0.39x2.25 mm.</td>
<td>0.22x0.39x2.25 mm.</td>
<td>0.22x0.39x2.25 mm.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sag PD FS</th>
<th>Sag T2</th>
<th>Ax PD FS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.22x0.39x2.25 mm.</td>
<td>0.22x0.39x2.25 mm.</td>
<td>0.22x0.39x2.25 mm.</td>
</tr>
</tbody>
</table>
When compared to previous protocols across all MSK sequences, Dr. Goumas says, “In our experience so far, we’re seeing up to about 20% improvement in resolution, and another 10-15% improvement in performance, in terms of slices acquired per unit of scan time, so a 30% improvement, based on those two parameters.”

“It’s impressive to see the capabilities of Ingenia 3.0T – a fresh, brand-new product, that’s been introduced with such a huge step up in capabilities. We used to fight for 5% and 10% improvement, and now we’re looking at 30%. And that’s fresh out of the box.”

---

**Calcified ligament**

A 43-year-old female presented with left shoulder pain after falling with outstretched arms to catch herself. MR images show an incidental finding of calcified supraspinatus ligament. Ingenia 3.0T and the dS Shoulder 8ch coil were used to produce optimal SNR for the highest resolution possible. Phase oversampling or REST slabs and SENSE were used.
**Ingenia 3.0T combines high quality imaging with productivity**

German site sees increased efficiency and excellent spine and MRA exams with Ingenia

Krankenhaus der Barmherzigen Brüder (Trier, Germany) installed its Ingenia 3.0T system in February 2011. The clinic’s MR group focuses mainly on neuro, MRA and whole body imaging. Daily monitoring of the scanner’s utilization helps the department run smoothly and boosts patient throughput.

**Image quality improves with dStream**

Prof. Hans-Peter Busch, MD, radiologist and physicist, is Director of the Department of Radiology, Neuroradiology, Ultrasound and Nuclear Medicine. The department houses two Philips 1.5T MR scanners and Ingenia 3.0T. “Right from the beginning, Ingenia has impressed us with its excellent image quality, high resolution and efficient workflow. We are very enthusiastic, and very satisfied with it.”

“Ingenia’s high SNR is an important advantage,” Prof. Busch explains. “With Ingenia, I can not only measure the higher SNR, I can really see it in the images. In our optimization strategies, we primarily invest the high SNR in image quality to obtain higher spatial resolution and enhanced contrast. However, for restless patients, it’s more useful to invest in making the exam quicker to help reduce motion artifacts.”

**High quality spine imaging with improved workflow**

“Our 3.0T spine imaging is excellent,” says Prof. Busch. “We can see very small lesions such as in encephalomyelitis disseminate. Our typical resolutions are below 1 mm. For instance, we have an impressive 3D FLAIR sequence with 1.04 x 1.04 x 0.56 mm voxels (reconstructed) for the brain and cervical spine. And we are very satisfied with the quality of the diffusion images.”
“Right from the beginning, Ingenia has impressed us with its excellent image quality, high resolution and efficient workflow.”

Ingenia provides the largest homogenous FOV for a 70 cm system. “With the large FOV we can do total spine imaging in two stations, but we only use this for restless patients. For routine exams we use three stations and a longer scan time for exceptional image quality,” explains Prof. Busch.

The large bore of 70 cm allows patients to be comfortable, even if they can’t lie flat or are very large. “One of my larger spine patients could never be scanned in a bore less than 70 cm and the CT exam was not diagnostic,” remembers Prof. Busch. “On Ingenia, he totally filled the gantry, but we scanned this person with excellent image quality.”

“For spine imaging, we use the integrated Posterior coil alone. It works well and is comfortable for the patient. Ingenia’s workflow is fast and easy. We compared time for patient positioning in head/total spine exams. On Ingenia it only took 1 minute, but 6 minutes were needed on our older system, because the patient must stand up again and again to change the coil. This is an example of how Ingenia significantly decreases examination time and increases throughput.”

**MRA very efficient with Ingenia 3.0T**

“With Ingenia 3.0T we can do high quality MR angiography, for both peripheral MRA and MRA in the head,” says Prof. Busch. “All our neurosurgeons now use the MRA exam to plan their interventions, without need for an additional invasive DSA, apart from a very rare exception.”

**Total spine imaging demonstrates vertebral fracture**

70-year-old female with lower back pain was examined on Ingenia 3.0T with the integrated Posterior coil. A high-resolution 3-station exam was done within 18 minutes. Voxel size was 0.8 x 1.2 x 4.0 mm for T2-weighted and 0.8 x 1.0 x 4.0 mm for T1-weighted scan. A vertebral fracture is seen in L2.
Prof. Busch combines the integrated Posterior coil with the tiltable dS HeadSpine coil for MRA of the carotids and intracerebral vessels. “We like this coil very much. For patients with kyphosis or who otherwise don’t have a flat spine it’s very comfortable to be examined in this position.”

**Overall productivity is up – for all**

Prof. Busch has a clear focus on continuous improvement of productivity. Monitoring his systems’ utilization dashboard on NetForum is part of his daily routine. “If you want to improve something, you must first measure it. The utilization dashboard clearly shows where the opportunities are,” he expounds.

“With Ingenia, I can not only measure the higher SNR, I can really see it in the images.”
Peripheral arterial occlusive disease

Patient history
69-year-old male smoker with intermittent left calf claudication, pain-free walking distance is limited to 100 meters. Ultrasound indicated an occlusion of the left superficial femoral artery (SFA) and a high-grade stenosis of the right SFA. MRA was requested to help in treatment planning.

MR examination
Ingenia 3.0T with Posterior and Anterior coils, MobiFlex protocol, breath hold in the pelvis. Pelvis: scan time 15.1 sec., recon voxel size 0.77 x 0.77 x 1.70 mm. Upper leg: scan time 16.2 sec., recon voxel size 0.81 x 0.81 x 1.50 mm. Lower leg: scan time 45.3 sec., recon voxel size 0.64 x 0.64 x 0.90 mm.

MR results
MRA shows a 145 mm long occlusion of the mid portion of the left SFA, collaterals from the deep femoral artery indicating the occlusion to be older. A short high-grade stenosis is seen in the mid portion of the right SFA. Posterior tibial arteries are partially occluded on both calves. Source images in the pelvis region show irregular atherosclerotic plaque material covering the posterior wall of the distal aorta, possible origin of peripheral embolism.

Diagnosis
Peripheral arterial occlusive disease stage Fontaine IIb on the left and IIa on the right. The patient got a femoro-popliteal bypass operation of the left thigh. Later the right SFA stenosis was treated with PTA.
“The bottom line is that Ingenia makes MRI exams easier and shortens exam times. That is an advantage for economy, for the patient, for all.”

“Management of the patient outside the scanner has the most impact on increasing throughput. The second factor is coil handling, and third is reducing scan time of individual sequences.”

“Ingenia has helped us to realize time savings with its easy-to-use coils, enhanced planning workflow and shorter exam times. The hospital also uses ambient lighting and designer aromas to help patients relax and move less to make the exam easier and faster,” Prof. Busch reports. The hospital’s technologists like to work with Ingenia, for its superb ease of use and efficient workflow.

The hospital recently held its “Turbo Day” to find out the maximum patient throughput it could obtain on Ingenia. “We constructed an ideal day by scheduling patients that needed relatively easy exams, and were very cooperative. We had a maximum throughput of 29 patients in 8 hours! On a normal day, of course, we also have intensive care patients in beds, patients needing anesthesia, or trauma patients and it comes down to about 15 patients in 8 hours as there are lots of variables.”

“The bottom line is that Ingenia makes MRI exams easier and shortens exam times. That is an advantage for economy, for the patient, for all,” he says.

Visit the online Philips NetForum community - ExamCards from Prof. Busch will soon be available.
Whole body DWI with high quality and high speed realized with Ingenia

With Ingenia, whole body diffusion weighted imaging is becoming fast enough for normal clinical routine

Ingenia allows some important advances in whole body imaging: the dStream platform, high SNR, dS-SENSE, wide bore, large FOV and huge scanning range help to reduce imaging time, particularly in whole body diffusion weighted imaging (DWIBS). In addition, workflow improvements reduce the setup time. And the image quality also benefits from the high SNR and the excellent homogeneity in the wide bore.

“We don’t have to worry about the precise location of the coil anymore. SmartSelect will select the coil elements matching the FOV.”

Taro Takahara, MD, PhD, is using Ingenia 3.0T at Tokai University, Tokyo, Japan. He pioneered DWIBS (diffusion weighted whole body imaging with background body signal suppression) a few years ago, and now uses this free breathing method on Ingenia for imaging, staging and monitoring in oncology patients without contrast agent and without ionizing radiation.

Image quality is amazing
“Ingenia 3.0T offers very high homogeneity, even with the 70 cm wide bore. This is really important for DWI,” Dr. Takahara says. “Until now, 3.0T DWI was sensitive to image distortion, but with the Ingenia 3.0T we can obtain beautifully homogeneous DWIBS. In addition, Ingenia’s dStream platform increases SNR, because the signal is immediately digitized in the coil at the patient and transported via fiber optics. This significant increase in SNR also progresses DWIBS. The image quality is amazing.”

“There’s more that makes Ingenia a real whole-body scanner,” he continues. “It allows a scanning range of up to 200 cm (over 6.5 ft). And the wide-bore gantry of 70 cm means we can now accept larger patients.”

Exam time reduced by faster scanning and workflow
“Faster scans are important in DWIBS, which used to be a 4-station scan taking up to 30 minutes, and covering about 120 cm. Now, with Ingenia’s increased SNR, the same scan can be done in about 15 minutes,” says Dr. Takahara.
“In a recent study, we measured distortion and g-factor. Ingenia showed significantly less distortion and better g-factor than Achieva 3.0T, particularly at a high dS SENSE factor of 5. Thanks to this advantage, we finally succeeded in doing fast, direct coronal DWIBS instead of axial. Since the number of slices can be reduced in the coronal scan, as the imaging volume is smaller in AP direction, it takes only 2:15 minutes for one station with 30 cm coverage. In this way, we can now do DWIBS in about 9 minutes for 4 stations.”

“Apart from faster scanning, Ingenia helps reduce exam time by its workflow enhancements for whole body imaging,” says Dr. Takahara. “The Posterior coil integrated in the table and the lightweight Anterior coils reduce patient setup time. The SmartSelect feature reduces planning time by automatic selection of coil elements to use for the chosen FOV,” he explains. “By the way, this is not only advantageous for whole body imaging, but also for regional scanning, because we don’t have to worry about the precise location of the coil anymore. The scanner will select the coil elements matching the FOV.”

“I believe Ingenia 3.0T is really ready for whole body scanning. It is the first practical whole body DWI scanner. The fast, high quality DWIBS obtainable with Ingenia 3.0T can fit in routine clinical practice.”

Dr. Takahara concludes.

“DWIBS used to be a 4-station scan in 30 minutes. With Ingenia the same can be done in about 15 minutes.”

References
H Takano, T Horie, I Muro, N Kajihara, Y Imai, M Obara, T Ogino, A Suwa, M Van Cauteren, G Herigault, T Kwee, T Takahara
Whole-body DWI: reduction of scan time using direct coronal acquisition
ISMRM 2012
Ingenia 1.5T helps to advance MR angiography at Utrecht

dStream digital architecture and large FOV simplify and accelerate MRA procedures while achieving excellent image quality
University Medical Center (UMC) Utrecht was the first in the world to install a Philips Ingenia 1.5T scanner. Now, one year on, the radiology department has built up considerable expertise in working with the system. According to Tim Leiner, MD, PhD, cardiovascular radiologist and Associate Professor of Radiology at UMC, Ingenia provides high SNR and a large, homogenous field of view which benefit quality and speed of MRA exams.

“Some key features of Ingenia really benefit MRA,” says Dr. Leiner. “The high SNR provided by dStream, the large coverage, and the high SENSE factors can be used to improve spatial resolution and speed up scanning. In addition, patient positioning is really easy with the integrated Posterior coil combined with, for instance, the lightweight Anterior coils for peripheral MRA or with the dS HeadSpine coil for carotid MRA with coverage including the aortic arch and isotropic resolution of 1.0 x 1.0 x 1.0 mm³. MRA of the upper extremities can be challenging, but Ingenia 1.5T offers gorgeous image quality without signal drop-off at the edge of the FOV.”

Easier patient positioning and scan planning

“Ingenia 1.5T has allowed us to greatly increase the coverage in peripheral MRA exams,” he says. “For instance, we often had to scan the peripheral arteries with rather limited anteroposterior coverage, which made it somewhat difficult to include all the relevant anatomy. Now with Ingenia, it’s possible to scan thick volumes in every station with a wide coverage in both anterior-posterior and the left-to-right direction, including all the relevant anatomy. This makes it much easier for the technologist to position the scanning volumes, which means both patient setup and planning can now be done really quickly.”

The department’s acquisition protocol for peripheral MRA with the Ingenia 1.5T shows substantial increases in coverage of about 35% in the aortoiliac station, 70% in the upper legs and more than 40% in the lower legs. Still, scan time is kept short with SENSE factors of 4 to 5 in every station which, according to Dr. Leiner, is a great advance on what was available previously.

**Ingenia 1.5T peripheral MRA at UMC – typical parameters**

<table>
<thead>
<tr>
<th>Station</th>
<th>Voxel size [mm]</th>
<th>AP coverage [mm]</th>
<th>SENSE factor</th>
<th>Scan time [sec]</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB</td>
<td>1.1 x 1.2 x 2.8</td>
<td>150 (was 112)</td>
<td>4</td>
<td>16.9</td>
</tr>
<tr>
<td>UL</td>
<td>1.1 x 1.3 x 2.4</td>
<td>150 (was 90)</td>
<td>4</td>
<td>18.1</td>
</tr>
<tr>
<td>LL</td>
<td>0.9 x 0.9 x 0.9</td>
<td>150 (was 105)</td>
<td>4.5</td>
<td>58.6</td>
</tr>
</tbody>
</table>

“Our peripheral MRA shows substantial increases in coverage in all stations. Still, scan time is kept short with SENSE factors of 4 to 5 in every station.”
According to Dr. Leiner, another important development that has a tremendous impact on peripheral MRA is the Philips multipoint Dixon method.

In a normal contrast-enhanced MRA procedure, a non-contrast-mask scan is initially acquired, then the contrast is administered and exactly the same scan with contrast is acquired. Image subtraction will then eliminate the signal of non-arterial tissues such as muscle and subcutaneous fat. But this comes at the price of increased scan time and reduced SNR.

With mDIXON however, it is possible to obtain water-selective images. “With Ingenia 1.5T we can immediately administer contrast and perform fast mDIXON imaging to obtain a water-selective image which has intrinsic background suppression, eliminating the need for subtraction,” Dr. Leiner explains. “So using mDIXON helps to reduce scan time by about 50%. In addition, it eliminates disadvantages of having to perform a subtraction such as motion artifacts and SNR loss.”

*mDIXON for vascular imaging is not yet commercially available

“Users experiences

“The trade-off between spatial and temporal resolution is significantly less stringent with the technology advances that the Ingenia offers.”

Arteriovenous malformation in shoulder

17-year old male with pulsating mass on right shoulder. The coronal source image shows the central thoracic vessels as well as the arteriovenous malformation in the right shoulder. The high spatial resolution allows differentiation of arteries and veins with high confidence. Note the exquisite delineation of anatomy despite imaging at the edge of the field-of-view. The color volume rendering better depicts the spatial relation between the arteriovenous malformation and the feeding arteries as well the draining veins. Ingenia 1.5T was used with the Anterior and integrated Posterior coils. The actual spatial resolution was 1.0 x 1.0 x 1.5 mm³. dS SENSE parallel imaging was used to achieve 5 fold-acceleration, leading to scan times of 20 sec.
Easier trade-off and reduced contrast dose

“Contrast-enhanced peripheral MRA requires a trade-off between the high spatial resolution needed for visualizing small stenoses, and the scan time,” says Dr. Leiner. “Longer imaging provides higher resolution but more of the contrast bolus will have reached the venous system, which may lead to sub-optimal images. However, this trade-off between best possible spatial resolution and short imaging times is much less stringent with the technology advances that Ingenia offers.”

With its digital architecture, Ingenia 1.5T provides larger coverage and up to 40% increase in SNR. “We are performing tests to see if the increased SNR can be used to reduce contrast dose without compromising image quality. This will not only benefit the patient but also save on costs,” he explains. “In our initial results we see beautiful enhancement throughout the full coverage.”

According to Dr. Leiner, the Ingenia 1.5T system has lived up to expectations in all areas, especially in one of his own areas of interest — peripheral MRA. “Large coverage and high SNR provided by the Ingenia assure high image quality with minimal trade-off between resolution and speed.”

Peripheral MRA using subtractionless mDIXON

65-year old male with bilateral intermittent claudication. Left image shows MIP of non-subtracted first pass MRA. Center image shows the improvements after subtracting the pre-contrast mask scans from the contrast-enhanced data. The relatively poor vessel-to-background contrast below the knee is due to the low contrast dose. The mDIXON image, obtained without subtraction, shows excellent background suppression and allows accurate assessment of aortoiliac stenoses on the right, as well as bilateral upper leg occlusions and small collaterals. Also note the superior depiction of lower leg arteries with mDIXON.

Ingenia 1.5T is used with the Anterior and the integrated Posterior coils (28 elements in each station). The actual spatial resolution ranges from 1.3 x 1.3 x 2.8 mm³ in the aortoiac station to 1.0 x 1.0 x 1.5 mm³ in the lower leg station. dSSENSE parallel imaging was used to achieve an 8- to 10-fold acceleration, leading to scan times between 16 sec. for the first station and 25 sec. for the third station.
Benjamin Y. Cheong, MD
Director of Clinical CVMRI at SLEH

Claudio Arena
MR technologist

Raja Muthupillai, PhD
Director of Imaging Research in the SLEH Department of Diagnostic Radiology

Ingenia 3.0T excels in cardiac imaging

St. Luke’s Episcopal Hospital sees huge advantages in image quality, workflow

“With Ingenia, we just lay the patient down, put the Anterior coil on, plug it into the table, and go.”

“We perform a broad range of CMR examinations at St. Luke’s, including evaluation of adult congenital heart disease, evaluation of ischemic cardiomyopathy, and a wide array of tissue characterization experiments,” says Raja Muthupillai, PhD, Director of Imaging Research in the SLEH Department of Diagnostic Radiology.

SLEH has been one of the first Ingenia 3.0T users in the USA. Since cardiac patients are often larger, Dr. Muthupillai appreciates Ingenia’s wide, 70 cm bore. “We have scanned patients with a BMI greater than 50, who were difficult to image in a smaller bore.”

MultiTransmit provides a more homogeneous B1 field

“Ingenia’s MultiTransmit 4D is essential for body and cardiac applications at 3.0T,” says Dr. Muthupillai. “Studies have shown that, with a patient in the bore, the transmit B1 field can be very inhomogeneous, even across a small region such as the heart. In our experience, the MultiTransmit capability with independent control of the RF amplitude and phase can minimize the RF inhomogeneity across the heart by as much as 40%, which helps image interpretation tremendously. This high image uniformity is also critical for any attempt at quantitative imaging at 3.0T.”

Thanks to Ingenia, cardiac MRI has become more robust and more efficient at St. Luke’s Episcopal Hospital (SLEH, Houston, Texas, USA). Ingenia 3.0T with MultiTransmit 4D provides excellent cardiac image quality and shortens total examination time in 3.0T cardiac MR.
"With MultiTransmit technology, we can now achieve optimal imaging in real time of the beating heart."

Distal septum thinning
A 48-year-old with diabetes and documented left descending artery disease was imaged on Ingenia 3.0T with dS Torso coil solution. The phase sensitive inversion recovery image in the 4-chamber orientation demonstrates thinning of the distal septum.

Benjamin Y. Cheong, MD, Director of Clinical CVMRI at SLEH, reports, “With MultiTransmit 4D technology, we can now achieve excellent imaging in real time of the beating heart, without the dielectric shading that conventional 3.0T systems suffer from. MultiTransmit particularly improves Balanced FFE (steady state free precession) imaging, which is the workhorse of cine imaging. With Ingenia 3.0T we can now achieve high quality cine cardiac MR.”

dStream provides higher SNR and fast patient preparation
Ingenia uses Philips’ revolutionary dStream technology to digitize the signal directly at the patient. “Because of this immediate digitization in the coil and further signal transmission through fiber optics, much less noise is added. The SNR increases and we get improved image quality,” explains Dr. Cheong.

“dStream coils clearly reduce patient preparation time, as the Posterior coil is integrated in the MR tabletop and the system automatically selects the coil elements that provide highest SNR. In addition, the FlexCoverage Anterior coil is very flexible and lightweight,” reports Dr. Cheong. “The traditional cardiac coil was less comfortable for patients, especially those who have had surgery. Now, we just lay the patient down, put the Anterior coil on, plug it into the table, and go.”

Myocardial tagging
Myocardial tagging in the short-axis orientation during mid-systole, performed using the Ingenia 3.0T with dS Torso coil solution. Note the persistence of tag contrast throughout the cardiac cycle due to prolongation of T1 at 3.0T.
A previously well, 48-year-old female with palpitation presents for an MR exam as surface echocardiography demonstrated a left atrial mass. Using Ingenia 3.0T with dS Torso coil solution, a well circumscribed 1.3 cm mass is seen in the posterior aspect of the left atrium (left), in close proximity to the right lower lobe pulmonary vein. No obvious stalk is seen. It has high signal intensity in T2-weighted spin echo images (right). The provisional image diagnosis of either an atypical left atrial myxoma or a left atrial hemangioma was suggested. The patient underwent surgical excision 1 week later and the pathology confirmed the diagnosis of left atrial myxoma.

**Left atrial myxoma**

[dStream technology also provides the ability to automatically select only those elements that contribute to signal from the anatomy of interest. This relieves the operator from having to decide what coil elements to select to achieve the optimal SNR.](#)

“The advances in coil handling have significantly reduced the room preparation time between patients, and have streamlined the workflow,” says MR technologist, Claudio Arena.

**Protocols optimized for Cardiac MRI**

Dr. Cheong explains how Ingenia’s high SNR improves specific cardiac exams. “We can tailor our scan sequences to either make the exam quicker or make the spatial resolution better. When a physician needs to see how much damage exists in the heart, we can improve our spatial resolution. However, in cine images where we look at heart function, we don’t have to crank up the resolution any more, so we can invest the SNR to decrease the imaging time, and reduce the number of breath-holds a patient has to perform in a single imaging session”.

“Ingenia delivers ease of use for the technologist, better images for the doctors and comfort for the patient,” Dr. Cheong says. “Its high image quality has improved our confidence and this can translate into providing more useful information to our referring physicians, so ultimately this also helps patients.”

“Ingenia delivers ease of use for the technologist, better images for the doctors and comfort for the patient.”

---

“...”

---

---
74-channel coil designed for imaging large areas with high coil density

St. Luke’s is using a research coil with 74 independent coil elements on its Ingenia 3.0T system. This 74-element coil is designed to cover the entire anatomy, from the heart all the way through the head with sufficient coil element density. This coil is being researched for imaging both a large area as well as a specific region within the field of view at very high spatial resolution. In conventional MRI two different coils would be needed for this, often requiring repositioning of the patient.

Dr. Muthupillai explains, “We could connect this 74-channel coil on Ingenia without modifying the RF platform. Our preliminary tests with this coil showed that it can cover a large FOV as well as zoom in and image a small area with very high resolution.”

Dr. Amol Pednekar, a Philips clinical scientist working with the St. Luke’s team, presented the results from this preliminary experience at the ISMRM 2011.

“High image quality, as provided by Ingenia 3.0T, improves our confidence and this can translate into providing more useful information to our referring physicians, so ultimately this also helps patients.”

References

C. Possanzini, P. van Liere, H. Roeven, J. den Boef, C. Saylor, J. van Eggermond, P. Harvey, E. Moore
Scalability and Channel Indepedency of the Digital Broadband dStream Architecture
Proc. ISMRM 19 (2011) 1863

A. Pednekar, C. Arena, G. Wilson, C. Possanzini, C. Saylor, R. Muthupillai
Comprehensive Neurovascular Evaluation Using an Automatic Optimal SNR-based Channel Combination from a 62 Element Coil Array at 3T
Proc. ISMRM 19 (2011) 1888

R. Krishnamurthy, A. Pednekar, M. Kouwenhoven, P. Harvey, C. Arena, B. Cheong, M. Kouwenhoven, R. Muthupillai
Quantitative Evaluation of Regional RF shimming on a Wide Aperture Dual-Channel Multi-Transmit 3.0T: Implications
Proc. ISMRM 19 (2011) 3353
Ingenia 1.5T provides impressive workflow benefits at Nemoscan

High-speed, superb-quality diagnostic MR imaging and easy patient handling combined with the IntelliSpace Portal dramatically accelerate workflow

Nemoscan is an association of radiologists in Nimes, France, that has set up diagnostic imaging centers in three of the city’s healthcare institutions. In the largest of these institutions, the Franciscaines Private Hospital, which focuses on cardiothoracic, neuro and orthopedic surgery, Nemoscan recently installed an Ingenia 1.5T MR scanner and the IntelliSpace Portal.

Ingenia combines high speed with superb diagnostic image quality

According to radiologist and Nemoscan managing director Jean-Marc Teissier, MD, PhD, the fully digital Ingenia 1.5T is demonstrating its qualities every day. “Nemoscan is currently facing a major challenge in the area of MRI as surgeons are becoming more and more demanding in the speed of receiving MRI exam results, especially in emergency and semi-emergency cases,” explains Dr. Teissier. “Now thanks to the excellent performance of the Ingenia 1.5T, for the first time we have access to truly high-speed MR exams with excellent quality. In the past, using analog systems it was impossible to believe we would achieve such rapid acquisition times with this level of quality.”

“I believe Ingenia 1.5T with dStream has an impressive SNR level. The high SNR allows us to make most scanning faster, from joints to the skull to the abdomen. For example, for the lumbar spine, T1 sagittal, T2 sagittal, and T2 axial in three minutes with largely satisfactory image quality is now routinely demonstrated with rapid and robust acquisitions.”

“Clearly, taking a little longer, Ingenia’s high SNR can also be used to enhance image quality, spatial resolution, and contrast resolution. Ingenia also provides a large FOV and superb image homogeneity, so that all...
“The Ingenia has become a firm favorite with everyone involved with it – our radiologists, technologists and patients.”

stations in whole body imaging are of high quality, including areas where images merge and on the edges. This type of imaging is acquired in about 15 minutes, and with an exceptional quality. In my opinion, whole body imaging has benefited enormously from the new coil system.”

“Abdominal imaging and pelvic imaging have also progressed tremendously with Ingenia, thanks to the large FOV and high homogeneity,” marks Dr. Teissier. “Additionally, where we’ve previously experienced many cases where total hip replacements had a major impact on MR image quality, our Ingenia hips exams are now capable of supporting diagnoses, even in areas close to the prosthesis.”

Streamlined patient setup provides speed and flexibility

“Ingenuity is fitted with a coil system that is both simple and powerful,” he says. “The multi-element Posterior coil is integrated into the table, which works very efficiently. The two Anterior coils are lightweight, comfortable to position, well tolerated by patients and allow imaging of the whole body. Smaller dedicated coils only need to be added for specific cases such as bone joints.”

“We have patient setup is easy and fast. Then, in about 80% of our exams, SmartExam helps technologists achieve fast and reproducible planning. The technologist just needs to take the relevant ExamCard and start the procedure. The exam will be performed automatically with SmartSelect automatically selecting the coil elements. Ingenia has eliminated many redundant clicks and actions by providing these tools.”

“Thanks to the system’s easy coil handling and wide bore, we can easily pass from an exam of, say, the lumbar spine to an exam of knee, skull or abdomen,” says Dr. Teissier. “That’s an enormous advantage, as we no longer have to organize logical sequences of exams. What’s more, emergency cases can be handled during the normal workflow and don’t need to be scheduled beforehand or delayed due to incompatibility with the schedule.”

“We’ve only been working with the system for a few months but I can tell you now, Ingenia has become a firm favorite with everyone involved with it – our radiologists, technologists and patients.”

According to Dr. Teissier, the benefits offered by the Ingenia 1.5T mean they can handle more patients per day and they can examine more challenging patients.

“Ingenia 1.5T allows MRI to be used, for example, on hyperalgesic patients, where their increased sensitivity to pain means they can’t remain in a supine position for very long, as well as for brain assessments of patients who’ve just undergone surgery to check post-operative status, and patients who are being ventilated or intubated who require constant monitoring during the examination.”

“For these challenging patients we use Ingenia’s FlexTrak dockable patient transport system so that we can take our time to position and prepare the patient outside the examination room. When ready, the FlexTrak with the patient is rolled to the Ingenia and the patient enters the magnet on the FlexTrak tabletop. Two or three minutes after start of the acquisition, we often find that the patient has fallen asleep. This provides simplified patient preparation, as well as easy exam set up,” he says.

The 10 min. lumbar spine exam consists of sag T2W TSE, T1W TSE, T2W IR, axial T2W TSE and myelography. When needed, scan time for only sagittal T1W and T2W, and axial can be brought down to 3 min. only.
Users experiences

"With Ingenia 1.5T we can handle more patients per day and we can examine more challenging patients."

**Ingenia 1.5T realizes higher patient throughput**

“The center started using the Ingenia 1.5T in May 2011, and after around 10 days, it was working at a rate of three patients per hour, with sufficient capacity in reserve for any emergency patients requested by surgeons at the hospital,” according to Dr. Teissier.

“Previously, our daily workload consisted of 30 planned and up to 6 emergency patients per day. Ingenia now allows us to increase the number of exams over the course of a day. In the same time, we now plan 36 patients and can still add up to 6 emergency patients per day. That represents a throughput increase of 15-20%. So, this obviously provides financial benefits.”

“Its rapid acquisition method, quick access to the interior of a comfortable wide bore, and its lightweight, easy to install coils make Ingenia easy to use, and therefore fast and comfortable for patients, technologists and radiologists,” Dr. Teissier concludes.

**IntelliSpace Portal connects and supports**

The center also takes advantage of Philips’ IntelliSpace Portal, a multimodality server embodying advanced viewing and processing capabilities. “The multimodality character is essential, as it is unimaginable today to make a diagnosis with MRI or CT without looking at and reworking images produced earlier or with complementary methods. IntelliSpace Portal allows us to use CT and MRI images, easily and fast.”

“At present IntelliSpace Portal is used for simple viewer functions, fusing images, and re-reading images. In whole body imaging, for example, the information supplied by diffusion can be re-transcribed in the form of color images that are applied to anatomic imaging (type T1 or T2) or simply to the survey. The Portal can routinely produce and fuse these images quickly, which helps us to simply interpret pathological regions.”

At Nemoscan, IntelliSpace is used remotely by radiologists and other physicians at the different locations. In some cases, a specialized radiologist may be far from the facility where the acquisition took place. In other cases, surgeons and cardiologists use the Portal to rework the images to recalculate vascular stenoses, for example, or reread the dynamic imaging of a heart, either in their offices or in the operating room.

Very fast brain exam in 2:28 minutes.
“IntelliSpace Portal is an intuitive and user-friendly tool that can be simultaneously accessed by many colleagues and users, and its applications are solidly constructed and stable.”

Body imaging benefits not only from the high SNR but also from the wide bore and large FOV of 55 cm combined with excellent homogeneity and very good fat suppression.

Excellent homogeneity is demonstrated in the pelvis.
Spine imaging of challenging patients using Ingenia

Ingenia is designed for simplified, fast workflow. Ingenia makes it easy to scan challenging patients, especially in the clinical area of the spine. Not everyone is able to lie completely flat in the MR for a study. For patients with kyphosis or those who have difficulty swallowing or breathing when lying flat, it can be very challenging to lie still for the time it takes to achieve a high quality exam. That’s why we need a solution to image these patients without a significant trade-off in resolution and/or scan time.

**TIP 1**

Spine imaging with tilted dS HeadNeckSpine coil solution

The FlexTilt coil tilting device is designed for patients who do not like to be closed in, such as patients suffering from claustrophobia, and for patients who just can’t lie flat. FlexTilt provides an alternative way to image these challenging patients with easy, fast positioning and scanning. The tilting device works with either the dS HeadSpine or dS HeadNeckSpine coil solutions. It allows tilting the dS HeadNeckSpine coil in increments from 0-20 degrees. FlexTilt is designed to accommodate claustrophobic patients and patients with kyphotic spines, for instance, who could not comfortably tolerate imaging previously.
Use SmartExam with tilted dS HeadNeckSpine solution

It is possible to use SmartExam with the tilted dS HeadNeckSpine solution to obtain excellent automatic planning and automatic numbering of vertebrae.

Example of the correct Smart Planning with tilted dS HeadNeckSpine coil solution.

SmartExam study with sagittal T2 (left) and T1 (right) with large FH coverage of 380 mm.

Setup with the top of the dS HeadNeckSpine coil solution added.

With tilted coil the patient can look out of the tunnel without obstruction when the head is at isocenter.
TIP 3

Fast Cervical Spine imaging in 8 minutes

dStream digitizes the signal directly in the coil at the patient, which provides higher SNR and signal fidelity than a (partly) analog pathway. This increase in SNR can be used for faster scanning, while still maintaining superb resolution. A full, high-resolution cervical spine study can be completed within 8 minutes. A transverse cervical spine (C2-T1) is included in this protocol. The fast cervical spine ExamCards are available in the scanner database for Ingenia 1.5T and 3.0T.

Parameters of fast cervical spine sequences for Ingenia 1.5T

<table>
<thead>
<tr>
<th>Ingenia 1.5T</th>
<th>T2 sag</th>
<th>T1 sag</th>
<th>T2 3D ax</th>
<th>B_FFE ax</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scan time</td>
<td>1:45 min.</td>
<td>1:51 min.</td>
<td>2:08 min.</td>
<td>1:05 min.</td>
</tr>
<tr>
<td>Pixels [mm]</td>
<td>0.9 x 1.0</td>
<td>0.95 x 1.2</td>
<td>0.5 x 0.7</td>
<td>0.75 x 0.9</td>
</tr>
<tr>
<td>Slice thickness [mm]</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>1.5</td>
</tr>
<tr>
<td>FOV AP, FH, RL [mm]</td>
<td>160, 220, 43</td>
<td>160, 220, 43</td>
<td>180, 100, 180</td>
<td>120, 100, 120</td>
</tr>
<tr>
<td>SENSE factor</td>
<td>1.3</td>
<td>1.3</td>
<td>2</td>
<td>1.5 x 1.5</td>
</tr>
</tbody>
</table>

Parameters of fast cervical spine sequences for Ingenia 3.0T

<table>
<thead>
<tr>
<th>Ingenia 3.0T</th>
<th>T2 sag</th>
<th>T1 sag</th>
<th>T2 3D ax</th>
<th>B_FFE ax</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scan time</td>
<td>1:15 min.</td>
<td>2:20 min.</td>
<td>2:20 min.</td>
<td>1:32 min.</td>
</tr>
<tr>
<td>Pixels [mm]</td>
<td>0.9 x 1.1</td>
<td>0.9 x 1.1</td>
<td>0.5 x 0.7</td>
<td>0.75 x 0.75</td>
</tr>
<tr>
<td>Slice thickness [mm]</td>
<td>3</td>
<td>3</td>
<td>2.5</td>
<td>1.5</td>
</tr>
<tr>
<td>FOV AP, FH, RL [mm]</td>
<td>160, 220, 43</td>
<td>160, 220, 43</td>
<td>180, 80, 180</td>
<td>120, 80, 120</td>
</tr>
<tr>
<td>SENSE factor</td>
<td>1.2</td>
<td>1.5</td>
<td>1.3 x 1.3</td>
<td>1.3 x 1.3</td>
</tr>
</tbody>
</table>
Fast imaging of the complete spine in two stations

Because of the Xtend imaging space there is outstanding magnet homogeneity delivering a homogenous field of view up to 55 x 55 x 50 cm, making it possible to perform 2-station total spine exams instead of 3-station total spine exams, both on 1.5T and 3.0T. On Ingenia, this procedure does not require any coil or cable handling; the patient simply needs to lie down on the table and positioning is done, fast and easy.

In addition, with SmartSelect the technologist no longer needs to select coil elements; it is done automatically. SmartSelect picks the most optimal channels needed to provide the best SNR in the chosen FOV of the exam, to help get a first-time-right exam and may reduce re-scans. The 2-station total spine ExamCards are available in the scanner database for Ingenia 1.5T and 3.0T.

Parameters of 2-station spine for 1.5T

<table>
<thead>
<tr>
<th>Parameters</th>
<th>T2 sagittal</th>
<th>T1 sagittal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scan time</td>
<td>2:34 min. per station</td>
<td>2:38 min. per station</td>
</tr>
<tr>
<td>Pixels</td>
<td>0.96 x 1.2 mm</td>
<td>0.96 x 1.2 mm</td>
</tr>
<tr>
<td>Slice thickness</td>
<td>4 mm</td>
<td>4 mm</td>
</tr>
<tr>
<td>FOV</td>
<td>370 mm per station</td>
<td>370 mm per station</td>
</tr>
</tbody>
</table>

Parameters of 2-station spine for 3.0T

<table>
<thead>
<tr>
<th>Parameters</th>
<th>T2 sagittal</th>
<th>T1 sagittal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scan time</td>
<td>2:50 min. per station</td>
<td>3:01 min. per station</td>
</tr>
<tr>
<td>Pixels</td>
<td>0.95 x 1.15 mm</td>
<td>0.95 x 1.15 mm</td>
</tr>
<tr>
<td>Slice thickness</td>
<td>4 mm</td>
<td>4 mm</td>
</tr>
<tr>
<td>FOV</td>
<td>360 mm per station</td>
<td>360 mm per station</td>
</tr>
</tbody>
</table>

T1 and T2 sagittal in 2 stations.
Global Pediatric Network Meeting held in Beijing

Cross-modality pediatric healthcare symposium draws more than 500 international participants

With 33 speakers from China and around the world, the Global Pediatric Network Meeting in Beijing, China on September 16-18 was an opportunity to learn, as well as share experiences and forge networks with other Philips pediatric customers.

Radiologists, cardiologists and interventionalists took part in Read-with-the-Expert sessions, hands-on exercises and case readings, and CME certificates were distributed in both English and Chinese. The Philips Experience Plaza offered displays, expert presentations and hands-on educational sessions of all modalities in the Philips Healthcare portfolio, tailored to the needs of pediatric clinicians.

A great deal of positive feedback came from participants in this exciting event. The event was covered extensively in Chinese media, further strengthening Philips’ role as a leader in pediatric imaging.

“This meeting serves as a model for future events. This is exactly what the WFPI aims to do - increase the dialogue between pediatric imagers around the world. This meeting has achieved its goals!”

Prof. Ines Boechat, Past President of the Society of Pediatric Radiology, USA, and Founding President of the World Federation of Pediatric Imaging (WFPI)
Users share convincing results at First Ingenia User Event

Philips organized the first Ingenia User Event on October 13, 2011, in Bad Neuenahr, Germany, gathering 145 participants from around Europe and Asia Pacific, three months after the start of commercial deliveries.

Ingenia users met their peers and discussed experiences on how the dStream digital architecture has expanded clinical MR capabilities. Outstanding presentations by Ingenia users covered a broad spectrum of clinical experiences with Ingenia 1.5T and 3.0T, showing cutting-edge imaging, challenging cases and high throughput.

Presenters said they have been extremely impressed with the image quality that the Ingenia provided in all major applications right from the very start. MultiTransmit 4D is seen as the major leap in cardiac imaging at 3.0T, providing outstanding image quality. Presenters were delighted with the new coil design, advancements in SmartAssist and fast protocol possibilities, enabling significant improvement in workflow. Higher throughput of patients was experienced by many of them. The excellent patient acceptance of the Ingenia with its wide bore and high patient comfort also contributes to that.

Attendees also had the opportunity to learn more on benefits of the Ingenia with hands-on sessions at the full size model and workspot demonstrations by Philips application specialists, both of which were highly appreciated.

The atmosphere was great and the event received very positive feedback. Philips is already making plans for a second Ingenia User Event in 2012.
Philips NetForum recently welcomed its 20,000th registered member to the community. This milestone marks NetForum’s continued growth over the past seven years. NetForum content helps Philips MRI, CT and NM users learn from their peers.

Registered members enjoy privileged access to ExamCard downloads, online training and other content. In addition, registered users can opt in to receive email updates when new content of their personal interest is published. Registered members can share their own insights by uploading content to NetForum and thus help fellow users to optimize their own Philips system use.

Finally, registered NetForum users can gain access to business tools such as the Upgrade Advisor and Utilization Services*.

* Access to Utilization Services requires further registration / permission processes to access.

Ingenia content on NetForum

Philips Ingenia with dStream – content overview
Ingenia 3.0T and 1.5T are based on revolutionary dStream architecture, which captures the MR signal at the patient. Combined with increased SNR, Ingenia provides ease of use and enhanced workflow.

Get there via: Explore > Clinical News > MRI

Ingenia ExamCards
Some first Ingenia ExamCards can be downloaded from NetForum and many more are in preparation. Do not miss them, keep checking NetForum or sign up for email updates.

Get there via: Operate > ExamCards > Ingenia 3.0T, Ingenia 1.5T

Most popular MRI NetForum contributions in fourth quarter of 2011

1. ExamCard 1.5T hip with prosthesis using MARS protocol
2. Application Tip Tips for body diffusion weighted imaging (DWI)
3. Application Tip Metal artifact reduction for MRI of metal prostheses and implants
4. ExamCard 1.5T right knee with 16-channel SENSE Knee coil - Radiology Center Speyer
5. Application Tip Tips for cardiac triggering in MRI
Receive
FieldStrength by e-mail
Visit www.philips.com/fieldstrength to manage your subscription or to preview FieldStrength online.

FieldStrength offers electronic-only subscriptions in an effort to be more environmentally friendly. When a new FieldStrength issue is available, subscribers receive an email with an overview of the issue’s contents and links to the articles online. We encourage existing readers to switch to an email subscription, and new readers to register for an email subscription.

NetForum
www.philips.com/netforum
Visit the NetForum User Community for downloading ExamCards and viewing application tips, clinical cases, extended versions of FieldStrength articles and more.

Visit
NetForum
Breast MR

European Workshop on MRI-guided vacuum Breast biopsies
Bruges, Belgium
Dates: April 12-13; October 25-26
European Workshop for radiologists with experience in breast imaging. Organized by Dr. Casselman, AZ St. Jan.
Info: jbenecke@mammotome.com
Phone: +49 40 593559116

Advanced Breast MRI Workshop
Cleveland, OH, USA
Dates: t.b.a.
2.5-day course for radiologists and technologists with basic understanding of breast imaging. Course includes didactic, hands-on and clinical reviews. Breast biopsy and post processing packages will also be covered.
Info: kara.grey@philips.com

Erasmus course: Breast and female imaging
Zagreb, HR
Date: 31 May - 3 June
This four-day program provides different workshops and lectures on breast & female imaging. Organized by Dr. B. Brkljacic
Info: www.emricourse.org/breast_2012

Breast MR with guided biopsy
Reston, VA, USA
Dates: February 7-8; May 21-22, June 26-27
This 100-case course is designed to provide practicing radiologists with an intensive, hands-on experience in reading breast MRI. Participants will develop their interpretive skills through extensive case reviews at individual work stations.
Info: www.acr.org
Email: EDCTR-WebReg@acr-arrs.org
Phone: +1 800-373-2204

The Breast Course 2012
Lisbon, Portugal
Date: April 15-18
Info: www.thebreastpractices.com

Musculoskeletal MR

Erasmus course on MRI: Musculoskeletal II
Valencia, ES
Date: September 24-28
Info: www.adtei.uv.es/emrivalencia2012/
Email: maria.jose.garcia@adtei.uv.es

Current issues of MRI in orthopaedics and sports medicine
San Francisco, CA, USA
Date: August 26-29
Info: www.stollerscourse.com

Cardiac MR

Cardiac MR courses at CMR Academy
German Heart Institute, Berlin
All courses are for cardiologists and radiologists. Some parts will be offered in separate groups.
Info: www.cmr-academy.com
Email: info@cmr-academy.com
Phone: +49-30-4502 6280

Complete course
Dates: Part 1: Feb. 27 - Apr. 5; Oct. 22 - Nov. 30
Part 2 - home study:
Apr. 6 - May 20; Dec. 1 - Jan. 13, 2013
Intensive course including hands-on training at the German Heart Institute, and reading and partially quantifying over 250 cases.

Compact course
Dates: Feb. 27 - Mar. 2; Aug. 27-31; Oct. 22-27
CMR diagnostics in theory and practice, including performing examinations and case interpretation.

CVMRI Practicum: New Techniques and Better Outcomes
St. Luke’s Episcopal Hospital, Houston, TX, USA
Date: February 18-21; October 20-23
On principles and practical applications of Cardiac MRI.
Info: ddees@leh.com and hillareal@leh.com

Clinical Workshop on Cardiac MR stress imaging
London, United Kingdom
Date: March 21-23
Dedicated, intense, individualized and hands-on CMR stress imaging training to a small number of participants (max 10). Aimed at cardiologists and radiologists. Theoretical and practical aspects will be addressed.
Info: www.cvti.org.uk
Email: admin@cvti.org.uk and enquiries@cvti.org.uk
Phone: +44 20 8983 2216

Hands-on technologist CMR training
St. Louis, MO, USA
Date: Offered monthly, by appointment
Two-day course is designed for technologists, nurses and sonographers interested in cardiac MRI. Maximum of 3 participants per class.
Info: ctrain.wustl.edu/ClinicalResearch/TechnTraining2.aspx
Phone: +1-314-454-7459
Fax: +1-314-454-7490

MR Spectroscopy

MR Spectroscopy course
Zurich, Switzerland
Date: summer 2012
Theory sessions and daily practical scanning and post-processing sessions in small groups.
Info: www.biomed.ee.ethz.ch/education/education-centre/spectroscopy-course;
Email: dmieier@ethz.ch

Register on NetForum to have free access to online training modules on use of Philips MR scanners and packages, use of coils, use of EWS, MR safety.
### Advanced MR Spectroscopy
**Cleveland, OH, USA**

**Dates:** t.b.a.

MR engineers, research technologists, physicians, and physicists of Philips MR sites, interested in MR spectroscopy. Participants require basic MR scanning experience. Note that class size for this course is limited.

**Info:** vicki.milligan@philips.com

---

### General MR

### Essential Guide to Philips in MRI
**Cheltenham, UK**

**Dates:** May 14-17, November 5-8

Designed for Philips users. Includes 2 days on basics of MR physics and 2 days on advanced concepts. The course can be attended for 2-4 days.

**Info:** education@cobalthealth.co.uk

---

### Philips North America off-site training courses

#### Dates: upon request

**Info:** kara.grey@philips.com

**Phone:** +1-440-483-5355

**Fax:** +1-440-483-7946

**Advanced MRI for Philips users**

**Cleveland, OH, USA**

Didactic and hands-on course covering advanced applications including advanced scan parameters, pulse sequences, advanced neuro, ortho, body and breast imaging techniques.

**Cardiac imaging for Philips users**

**Cleveland, OH, USA**

Didactic and hand-on course covering all cardiac views, heart valves, Q-flow, coronary arteries and the postprocessing packages on the EWS.

**1H Basic spectroscopy imaging**

**Cleveland, OH, USA**

Didactic and hand-on course covering Basic 1H Spectroscopy for the brain, prostate, and breast. This course also covers postprocessing packages on the system.

---

### Events calendar 2012

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Location</th>
<th>More information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 26-29</td>
<td>American Society Neuroimaging - ASN</td>
<td>Miami, FL, USA</td>
<td><a href="http://www.asnweb.org">www.asnweb.org</a></td>
</tr>
<tr>
<td>Feb 2-5</td>
<td>Society for Cardiovascular Magnetic Resonance - SCMR</td>
<td>Orlando, FL, USA</td>
<td><a href="http://www.scmr.org">www.scmr.org</a></td>
</tr>
<tr>
<td>Feb 7-11</td>
<td>American Academy of Orthopedic Surgeon - AAOS</td>
<td>San Francisco, CA, USA</td>
<td><a href="http://www.aaos.org">www.aaos.org</a></td>
</tr>
<tr>
<td>Feb 9-11</td>
<td>Joint Interventional Meeting - JIM</td>
<td>Rome, Italy</td>
<td><a href="http://www.jim-vascular.com">www.jim-vascular.com</a></td>
</tr>
<tr>
<td>Mar 1-5</td>
<td>European Congress of Radiology - ECR</td>
<td>Vienna, Austria</td>
<td><a href="http://www.myesr.org">www.myesr.org</a></td>
</tr>
<tr>
<td>Mar 7-9</td>
<td>American Society of Functional Neuroradiology - ASFNR</td>
<td>Orlando, FL, USA</td>
<td><a href="http://www.asfnr.org">www.asfnr.org</a></td>
</tr>
<tr>
<td>Mar 18-21</td>
<td>Society of Skeletal Radiology - SSR</td>
<td>Miami Beach, FL, USA</td>
<td><a href="http://www.skeletalrad.org">www.skeletalrad.org</a></td>
</tr>
<tr>
<td>Mar 24-27</td>
<td>American College of Cardiology - ACC</td>
<td>Chicago, IL, USA</td>
<td><a href="http://www.accscientificsession.org">www.accscientificsession.org</a> <a href="http://www.accscientificsession.org/ACC12.aspx">ACC12.aspx</a></td>
</tr>
<tr>
<td>Mar 24-29</td>
<td>Society for Interventional Radiology - SIR</td>
<td>San Francisco, CA, USA</td>
<td><a href="http://www.sirmeeting.org">www.sirmeeting.org</a></td>
</tr>
<tr>
<td>Apr 14-18</td>
<td>American Association of Neurological Surgeons - AANS</td>
<td>Miami, FL, USA</td>
<td><a href="http://www.aans.org">www.aans.org</a></td>
</tr>
<tr>
<td>Apr 21-26</td>
<td>American Society of Neuoradiology - ASN</td>
<td>New York, NY, USA</td>
<td><a href="http://www.asnr.org">www.asnr.org</a></td>
</tr>
<tr>
<td>May 3-6</td>
<td>Jornadas Paulistas de Radiologia</td>
<td>Sao Paulo, Brazil</td>
<td><a href="http://www.spr.org.br/jpr2012">www.spr.org.br/jpr2012</a></td>
</tr>
<tr>
<td>May 4-6</td>
<td>State of the Art Techniques - SAT</td>
<td>Las Vegas, NE, USA</td>
<td><a href="http://www.astro.org">www.astro.org</a></td>
</tr>
<tr>
<td>May 5-11</td>
<td>ISMRM</td>
<td>Melbourne, Australia</td>
<td><a href="http://www.ismrm.org">www.ismrm.org</a></td>
</tr>
</tbody>
</table>

---

**FieldStrength** 43
The first-ever digital broadband MR is changing expectations, and lives. That’s the power of Philips Imaging 2.0.

Thanks to Philips Imaging 2.0, a revolutionary imaging approach, the Philips Ingenia 1.5T and 3.0T MR systems set a new standard in clarity, speed and expandability. Ingenia captures and digitizes the signal closest to the patient to improve SNR by up to 40%. Easier coil handling and improved patient comfort help increase productivity by up to 30%. And, Ingenia is designed to meet the growing needs in oncology imaging. Discover the revolution in MR technology at www.philips.com/Ingenia30T.