2008/4th edition **No.23**

www.gehealthcare.com

ultrasound post

technical development and medical research – news and facts

C is for Patient Care and Diagnostic Consistency

Introducing the Entry-Level **LOGIQ C Series**

GE Healthcare is proud to present the new LOGIQ C Series, entry-level ultrasound diagnostic systems for radiology which reflect GE's thorough understanding of the needs of patients and healthcare providers.

What makes the LOGIQ C series so special – and makes us stand out clearly from the competition – is that each system in the series is based on GE's unique TruScan Architecture. First developed and introduced into GE's high-end ultrasound units, TruScan Architecture is now incorporated into each of these entry-level systems, providing every LOGIQ C series user with state-of-the-art technology. The TruScan Architecture in each model embodies a range of features:

SmartScan - for superior diagnostic consistency and improved image acquisition, reducing the time needed for examining each patient. **ComfortScan** - the ergonomic design of each model aids ease-of-use and operator comfort. **TruAccess technology** - incorporated into the LOGIQ C3 & C5, it enables live scanning techniques to be applied to stored image data – an exclusive GE raw data processing technology that enhances diagnostic capability.

The LOGIQ C series is a perfect example of GE's practice of technology migration, long preached by GE as a method of providing customers with a price/performance ance ratio in the industry that is second to none.

LOGIQ C2

LOGIQ C2 – Your logical first choice

The LOGIQ C2 is a black and white system designed as a stepping stone into the world of ultrasound for clinical practices. This entry-level system draws on GE's leading ultrasound technologies, enhancing quality of diagnosis but without over-stretching budgets.

Whilst light in weight, with a small footprint and easy to move, the LOGIQ C2 is truly big on features, including:

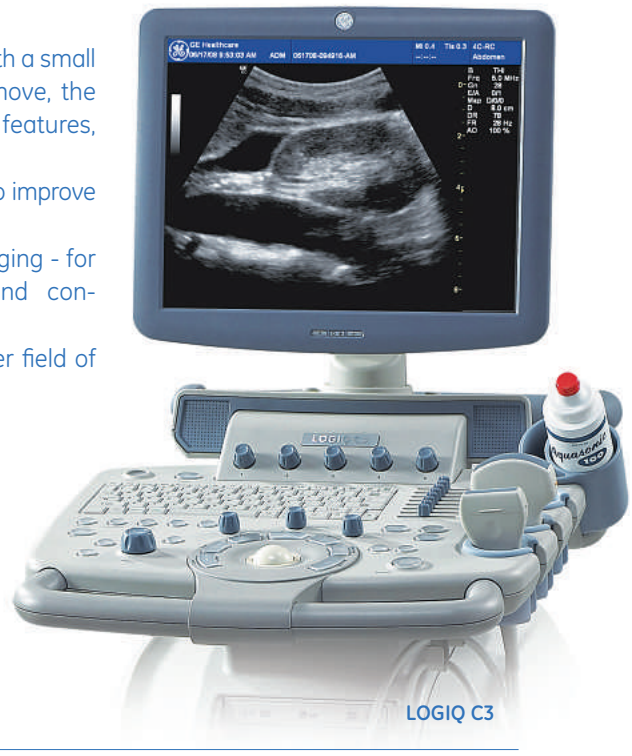
- Auto Optimization - to improve contrast resolution
- Tissue Harmonic Imaging - for increased spatial and contrast resolution
- Virtual Convex - wider field of view on linear probes
- Auto Depth
- Optional extras: LOGIQView, Easy3D and DICOM

LOGIQ C3 – Diagnosis with details

The black and white LOGIQ C3 is designed with an in-depth understanding of the needs of clinical practice, it features a higher level of image quality and is equipped with a host of features for optimized performance.

With the Auto Optimization, Tissue Harmonic Imaging, Virtual Convex and Auto Depth features of the C2 as standard, the LOGIQ C3's impressive performance is further enhanced with optional add-on features such as:

- LOGIQView - to provide an extend field of view
- Easy 3D – to see greater detail in anatomy positions
- Anatomical M-Mode – for angle adjustment on frozen and live images
- DICOM – for easy connectivity with workstations
- PWD – Pulse Wave Doppler



LOGIQ C3

EDITORIAL – Heinz GLOOR

Vice President / General Manager GE Healthcare Clinical Systems Ultrasound & PCD Europe, Middle East & Africa

Dear Readers,

We will be able to look back on 2008 as a significant year for GE Ultrasound, one in which we launched more new ultrasound products than ever before. This should be clearly understood as a reflection of GE's determination to stand alone in the market. It is also proof of our commitment to listen to the needs of healthcare practitioners in all fields of medicine, so that we can develop the technological solutions which will assist them most in everyday practice.

The impressive lineup of new GE ultrasound systems launched this year includes two flagship units, the Vivid E9, especially designed to offer 4D imaging in cardiac ultrasound , and the LOGIQ E9 which, for the first time, enables ultrasound to be completely integrated into the radiology diagnostic suite with imaging modalities such as CT or MR. Close on their heels comes the Vivid S5, launched this spring as a sibling to the signature class Vivid S6. These four models are joined by the portable Vivid q, the Vivid ICE and the entry-level LOGIQ C series – the C2, C3 and C5.

This range of new systems not only bears witness to our focus on continued research and development into ultrasound technologies but also to technology migration, a philosophy we have been preaching for years.

Remember the days when electric windows and air conditioning were only offered on luxury cars? Today you expect them to be included in standard models. Well, the same goes for GE's specialist, healthcare ultrasound technologies. Our unique TruScan Architecture, for example, first developed and introduced in our high-end units, is now incorporated into all the entry-level ultrasound systems in the new LOGIQ C series. The compact Vivid q, with integrated AFI and M4S Transducer - both migrated from the top-of-the-range Vivid 7 - is another example of this philosophy in practice.

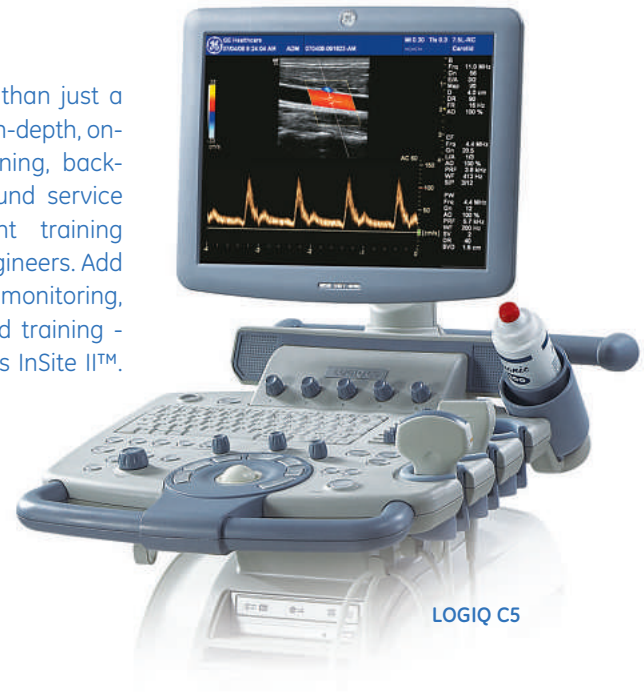
As a result, GE ultrasound users enjoy a price/performance ratio in the industry which is second to none, not to mention the confidence that comes from having state-of-the-art technologies at their fingertips and the support of our worldwide team of dedicated GE service engineers. So with this in mind, sit back and enjoy this issue of Ultrasound Post.

Yours,
Heinz Gloor

LOGIQ C5 –
Offering greater insight
The LOGIQ C5 offers all the features of the C3, plus advanced color Doppler to enable informed decision making. It is designed to support healthcare specialists in clinical practice with higher patient volumes and growing case complexity by bringing superior diagnostic capability to your fingertips. The LOGIQ C5 boosts productivity and performance. But without the need for large investments.

The LOGIQ C Series also supports a wide range of ergonomically designed convex, micro-convex, linear and phased-array sector probes.

The LOGIQ C product range is backed by GE's strong service support. Our dedicated teams of service engineers worldwide ensure that GE customers are purchasing much more than just a product. We provide in-depth, on-site applications training, back-up from our ultrasound service teams and frequent training programs for field engineers. Add to this pro-active monitoring, real-time support and training - all available from GE's InSite II™.


LOGIQ C5

Assessing the Scope of Prenatal Ultrasound

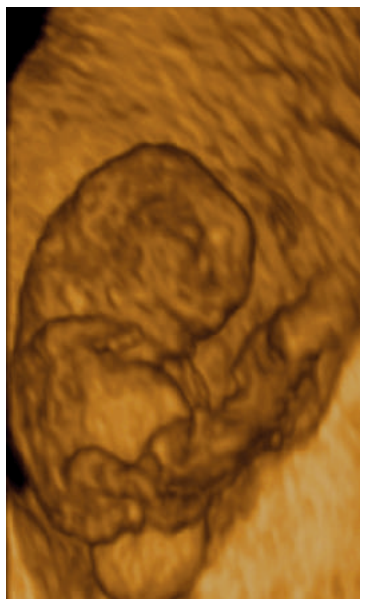
A Role for Ultrasound **Earlier in the First Trimester?**

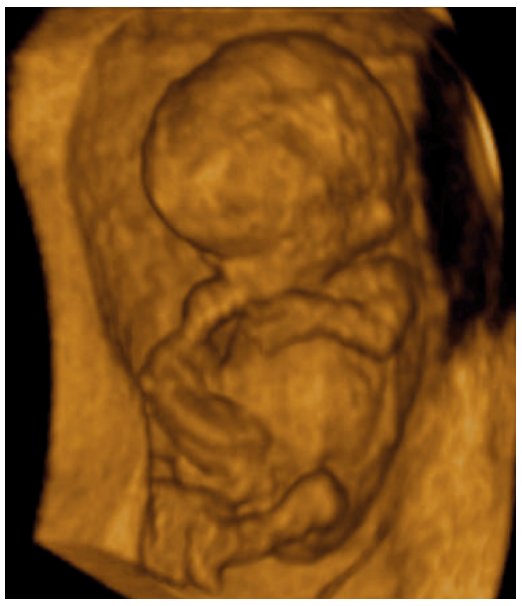
Patient demand usually follows hot on the heels of each technological advance, and prenatal diagnosis is no exception. The last decades have seen screening for chromosomal abnormalities brought forward, from around 16 weeks with the triple test to around 12 weeks with a combination of biochemical and ultrasound screening. Women certainly prefer earlier screening for Down syndrome. However, earlier screening will also detect more abnormalities in fetuses which are destined to abort.

Where ultrasound screening has been brought forward to the late first/early second trimester (11 – 14 weeks), detection rates for structural abnormalities fall to around half those of screening in the second trimester. Exceptions are detection rates for anencephaly, holoprosencephaly, encephalocele, omphalocele and gastroschisis, at over 75% at 11-14 weeks. When screening even earlier, in the late embryonic period (up to 10 weeks gestation), the a priori risk of abnormalities certainly increases - for example, neural tube defects occur in around 1% of spontaneous miscarriages, about 10 times the risk at term.

The smaller size of the conceptus during earlier first trimester screening, and its more limited movement compared to 11-14 week or 17-23 week old fetuses, means that only a single 3D volume sweep is required, thereby reducing the embryo's ultrasound exposure. However, in addition to intra-uterine lethality and the greater a priori chance of finding abnormalities, we also need to take into account the rapid changes in appearance of the developing structures.

The following is a brief review of the anatomical and ultrasound appearance of structures during the late first/early second trimester: *(Note: Although the literature on embryogenesis usually refers to postconceptional days, here postmenstrual days are used in order to correspond with the obstetrical literature.)*

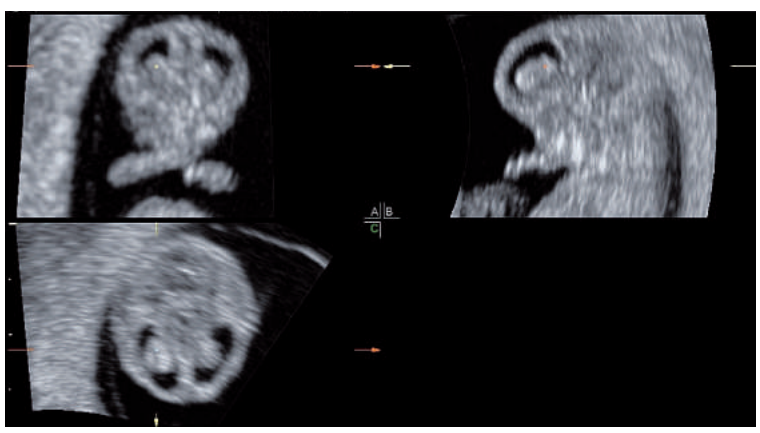

Fingers at 8w6d (CRL=22mm)


9w6d (CRL=30mm); Fingers fully formed; Note as yet nonrotated foot


10w1d (CRL=32mm); Note as yet nonrotated feet

Central Nervous System
By 6 weeks the neural tube has closed. By 7 weeks the telencephalon, with a central and two lateral portions (the future cerebral hemispheres), and the diencephalon, from which the optic vesicles develop, have formed. There is a narrow part between the mesencephalon (the future midbrain) and rhombencephalon, and the rhombencaphalon has also formed two parts: the metencephalon (the future pons and cerebellum) and the myelencephalon, separated by the pontine flexure. SonoAVC enables us to dramatically visualize the (relative) growth of the different vesicles and yields images previously unobtainable in a routine clinical setting. Although developed to calculate the volume of spheroid or ellipsoid follicles, the SonoAVC algorithm uses the number of colored voxels to calculate an estimated volume and should therefore be equally accurate when calculating the volume of smaller and irregularly shaped structures.

The choroid plexus is more apparent at 8 weeks and clearly visible at 9 weeks, although the cerebral ventricles still fill less than half of the cranium on the axial section. From 10 weeks it should be possible to visualize the cerebellum in around 80% of fetuses, and in all fetuses by 11 weeks.


CRL=28mm (9w4d) choroid plexus visible

Cardiovascular System
At 8 weeks the primitive atria and ventricles have formed, the primitive interventricular foramen is still patent. The atria are wider than the ventricles and a double aorta still remains.

Gastro-intestinal Tract
The physiological umbilical hernia is present from 7 to 11 weeks. At 8 weeks the stomach should be visible in 31% of fetuses, at 10 weeks in 76% and from 11 weeks in all fetuses.

Urorenal Tract
The permanent kidneys start forming at 7 weeks. From 11 weeks onwards it should be possible to see the kidneys and bladder in 80% or more of fetuses.

Limbs
The arm and leg buds start developing at 6 weeks. At 7 weeks paddle-like hand and foot plates are visible and at 8-9 weeks fingers and toes have developed. The lower limbs lag behind the upper limbs by a day or two. During the 9th week the upper limbs rotate laterally and the lower limbs medially.

Face
Between 6 and 10 weeks the face is formed from the prominences developing from the first branchial arch around the stomodeum.

Most studies investigating the age at which structures become visible are more than a decade old. As a result of the enhanced capabilities of the latest high resolution transducers, together with modern 3D and 4D software, these studies need to be carried out again, and may well result in some embryological data having to be rewritten. It is likely that today's ultrasound technologies are able to further reduce the current "no man's land" between pre-implantation and prenatal diagnosis.


Physiological Hernia (10w)

Dr. Lou PISTORIUS, Department of Obstetrics at the University Medical Centre Utrecht in the Netherlands.

Previewing the Next Revolution in Ultrasound Imaging

Agile Ultrasound on the LOGIQ E9

The diagnostic use of ultrasound has greatly expanded over the past couple of decades. As an imaging modality ultrasound offers many advantages – it is non-invasive, non-ionizing, real-time, portable, and low-cost.

However, although image quality and back-end post-processing capabilities have improved significantly, ultrasound image quality is more variable and depends both on the type of patient and expertise of the operator. GE's new Agile Acoustic Architecture is designed to reduce these dependencies and improve the acceptance of ultrasound. Image quality depends on the complex interaction of the human body with the ultrasound signal. Each human tissue type affects the ultrasound beam differently. As ultrasound passes through multiple body tissues, variations in the speed and attenuation along the ultrasound beam cause an aberration or depth-dependent distortion in the beam.

To counteract these effects, ultrasound systems must continuously adjust a multitude of internal system parameters in the beamformer, to optimize image quality for each point in the image (voxels). The more parameters that can be adjusted, the better the image quality - but also the computational complexity. Because ultrasound must provide real-time images, the time permitted for these computational corrections is short. As a result, conventional ultrasound systems limit computational complexity and make many simplifying assumptions about the body in order to achieve real-time imaging. This results in compromised image quality and requires the user to make many system adjustments to compensate.

Excellent image quality and uniformity are depicted in this high frequency image of superficial bowel.

GE's new Agile Acoustic Architecture is based on the concept of agility. It starts with the development of complex acoustic models based on clinical data which take into account more realistic and dynamic physics profiles for each tissue type. Unlike the presets used in conventional ultrasound which provide a starting point for the keyboard controls, with Agile Acoustic Architecture the user simply selects the appropriate clinical model for the anatomy being scanned and the agile model automatically adjusts the internal system parameters.

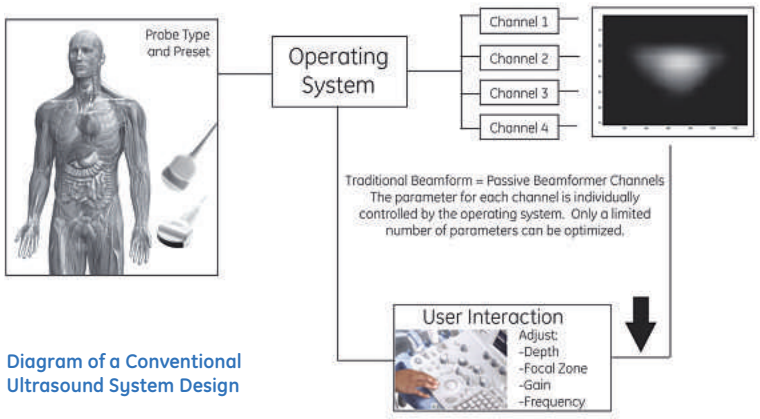


Diagram of a Conventional Ultrasound System Design

Add to this new flexible architecture a series of powerful distributed processors on each beamforming channel and you achieve the order of magnitude increase in processing power which is required by these acoustic models. The result is dramatically improved image quality, improved near-field and better uniformity with reduced need for user adjustments.

GE's significant investments in miniaturization have enabled us to put the processing power of high-end systems into hand-held packages. This expertise has also allowed us to pack an order of magnitude greater processing power into the space of a full sized ultrasound system, the LOQIQ E9. Ultra-high speed links transferring 3 GB of data per second – 30 x the rate of conventional ultrasound systems - have also been developed to effectively transmit the data and imaging parameters.

Despite these advances, however, Agile ultrasound is still in its infancy. The sophisticated sound/body models do not yet come close to reaching their potential. They open up a new branch of ultrasound science that will drive other innovations in the coming years and with the basic architecture in place, the opportunities to further refine sound-tissue models hold great promise.

A Milestone Year for Vivid Ultrasound

This was a record-breaking year both for GE ultrasound product launches and the Vivid range of cardiological ultrasound products. Our dedication to annual breakthroughs in ultrasound technology has boosted the line-up of Vivid leadership ultrasound products for echocardiology, each designed to advance the treatment of cardiovascular disease throughout the world. 2008 also saw milestone sales figures for the Vivid range with the sale of our 10,000th Vivid 7 system and 5,000th compact Vivid system.

This autumn marked the launch of our flagship Vivid E9, a system which demonstrates the future for ultrasound. The Vivid E9 is the first system built from scratch to incorporate our new 4D Accelerated Volume Architecture (AVA) which allows the entire heart to be captured in a single heart beat – ungated and unspliced. The Vivid E9 will revolutionize echocardiography by making 4D imaging easy enough to use every day, and ushers in a new category of GE ultrasound system – the Expert Series.

The Vivid E9 also offers new user tools such as Easy 4D and ScanAssist for 4D acquisitions, 4D quantification and 4D connectivity, all aimed at streamlining the 4D exam.

Our portable range of ultrasound systems starts with the compact Vivid i, our first system designed to take ultrasound out of the echo lab and to the point of care. The Vivid i was joined this year by our new leadership-level compact Vivid q, marking a new milestone in portable echocardiography. The Vivid q incorporates a whole host of quality enhancements such as AutoEF, a new automated ejection fraction measurement program, plus - another example of the GE philosophy of technology migration - the M4S Transducer and Automated Function Imaging (AFI) which are migrated from the Vivid 7. With its 14 probes and its compact size, the Vivid q lets users share exceptional ultrasound imaging wherever they are.

The functionality of the Vivid i and Vivid q systems is further enhanced by our new Intra-Cardiac echo (ICE) catheter technology for exceptional, real-time image guidance, and the visualization of anatomical structures to increase confidence when performing complex electrophysiology and interventional cardiological procedures. The ICE's proven catheter technology performance, supported by the ACUSON AcuNav™ 10F ultrasound catheter, enables cardiologists to visualize and identify anatomic structures during therapy, and demonstrate structural orientation during trans-septal puncture. Close on their heels comes the Vivid S5, launched this spring as a sibling to the signature class Vivid S6. Both models leverage on GE's miniaturization expertise which is gained from the Vivid i, the performance expertise of the console Vivid 7 and the proven utility and versatility of the Vivid 4. Their quantative tools come directly from the acclaimed Vivid 7, including TVI and TSI. Combined with stress echo and trans-esophageal echo capabilities, these new models expand the reach of patient examinations. With enhanced connectivity and productivity tools, the Vivid S6 and Vivid S5 are a great fit for routine cardiovascular and shared service ultrasound exams.

The Vivid range provides cardiologists with a complete range of ultrasound models, for individual practice through to the echo lab environment, for in the clinic or on the move. "The Vivid family of products doesn't sit still. We are already engineering the future of cardiovascular ultrasound for our healthcare industry to use for years to come", explains Anders Wold, general manager of GE's cardiovascular ultrasound business. The future looks bright for Vivid.

LOGIQClub Goes EMEA-Wide!

We are delighted to announce that, as of October 31, 2008, **LOGIQ**Club membership is now available to all LOGIQ ultrasound system users throughout Europe, Africa and the Middle East.

So if you are not yet a member, we invite you to sign up. You'll be joining a network of healthcare professionals dedicated to clinical excellence in ultrasound diagnostics for radiology.

Membership is free.

LOGIQClub provides its members with all the benefits that go with belonging to a community of shared interests.

You'll be given the opportunity to share ideas and practices with clinicians throughout the entire EMEA region to help you apply the full diagnostic potential of your LOGIQ system. We'll help you to stay at the forefront of advancements in medical and diagnostic developments in ultrasound, and inform you about cutting edge product and software update.

Members are also regularly informed about developments in

LOGIQ ultrasound technology and provided with special offers and opportunities announced on the club's own website: **www.logiqclub.net.**

So come and join the **LOGIQ**Club today, and stay at the forefront of your profession.

The benefits of membership:

- **Educational Offers**
  Learn how to get the most from your LOGIQ system from renowned experts, and stay up-to-date with the latest in ultrasound techiques.
- **LOGIQ**Club **User Days & VIP Lounges**
  Meet other LOGIQ system users and fellow club members in person at international congresses and special GE events held in your region.
- **LOGIQ**Club **Website - www.logiqclub.net**
  Get unlimited access to clinical news, courses, publications and clinical cases, Tips & Tricks ... and stay informed of developments by registering for our personalized newsletters.

To join the **LOGIQ**Club simply register online at **www.logiqclub.net.**
We'll send you your official **LOGIQ**Club membership card and you can start enjoying the benefits of membership immediately.

We look forward to welcoming you as a member!

Register now at: **www.logiqclub.net**

CONGRESSES 2008/2009

TOPIC	LOCATION	DATE
11th WORLD CONGRESS ON CONTROVERSIES IN OBSTETRICS, GYNECOLOGY AND INFERTILITY	Paris, FRANCE	27 -30 Nov.
ARAB HEALTH	Dubai, VAE	26 -29 Jan.
ECR	Viennna, AUSTRIA	6 - 9 March

GE Healthcare

Welcome to the Club.
VividClub.

A network for Vivid ultrasound users.

Be part of the Club.

Register now at:
www.vividechoclub.net

GE Healthcare

Welcome to the Club.
VolusonClub.

A global network for Voluson ultrasound users.

Be part of the Club.

Register now at:
www.volusonclub.net

GE ULTRASOUND OFFICE ADDRESSES:

AUSTRIA
General Electric Austria GmbH
Filiale GE Healthcare Technologies
EURO PLAZA, Gebäude E
Technologiestrasse 10
A-1120 Vienna
Phone: (+43) 1 97272 0
Fax: (+43) 1 97272 2222

BELGIUM
GE Medical Systems Ultrasound
Eagle Building,
Kouterveldstraat 20
1831 DIEGEM
Phone: (+32) 2 719 7204
Fax: (+32) 2 719 7205

CZECH REPUBLIC
GE Medical Systems Ultrasound
Vyskocilova 1422/1a
140 28 Praha

DENMARK
GE Medical Systems Ultrasound
Park Allé 295,
2605 Brondby
Phone: (+45) 43295 400
Fax: (+45) 43295 399

FINLAND & ESTONIA
GE Medical Systems
Kuortaneenkatu 2
000510 Helsinki
P.O.Box 330,
00031 GE Finland
Phone: (+358) 10 39 48 220
Fax: (+358) 10 39 48 221

FRANCE
GE Medical Systems Ultrasound and Primary Care Diagnostics
France, F-78457 Velizy
Fax: (+33) 13 44 95 202

- **General Imaging**
  Phone: (+33) 13 449 52 43
- **Cardiology**
  Phone: (+33) 13 449 52 31
- **Luna Densitometry**
  Phone: (+33) 13 449 53 65
- **Service:**
  8, Rue Paul Dautier
  F-78140 Velizy-Villacoublay
  Phone: (+33) 1 69 18 54 02
  Fax: (+33) 1 64 46 32 48

GERMANY
GE Medical Systems Ultrasound
Beethovenstr. 239
42655 Solingen
Phone: (+49) 212 28 02-0
Fax: (+49) 212 28 02-47

GREECE
GE Medical Systems Hellas
156 Kyprou Av.&
91 Konstantinoupoleos
Str. Argyroupolis, 164 51 Athens
Phone: (+30) 210 96 90 990
Fax: (+30) 210 96 25 931

HUNGARY
GE Hungary Zrt. Ultrasound Division, Akron u. 2.
Budaörs 2040 Hungary
Phone: +36 23 410 314
Fax: +36 23 410 390

ITALY
GE Medical Systems Italia spa
Via Galeno, 36, 20126 Milano
Phone: (+39) 02 2600 1111
Fax: (+39) 02 2600 1599

NETHERLANDS
De Wel 18 B,
3871 MV Hoevelaken
PO Box 22,
3870 CA Hoevelaken
Phone: (+31) 33 254 1290
Fax: (+31) 33 254 1292

NORTHERN IRELAND
G.E. Healthcare
Victoria Business Park,
9, Westbank Road,
Belfast BT3 9JL.
Phone: 028 90 22 99 00

NORWAY
GE Healthcare
Sandakerveien 100C
Postbox 4830, 0404 Oslo
Phone: +47 23 18 50 00

NORWAY
GE Vingmed Ultrasound
Strandpromenaden 45,
P.O. Box 141, 3191 Horten
Phone: (+47) 33 02 11 16

POLAND
GE Medical Systems Polska
Sp. z o.o., ul. Wołoska 9
02-583 Warszawa, Poland
Phone: +48 22 330 83 00
Fax: +48 22 330 83 83

PORTUGAL
General Electric Portuguesa, SA. Avenida do Forte, n° 4,
Fraccao F,
2795-502 Carnaxide,
Phone: (+351) 21 425 1309
Fax: (+351) 21 425 1343

REPUBLIC OF IRELAND
G.E. Healthcare
Unit F4, Centrepoint Business Park,
Oak Drive, Dublin 22
Phone: 01 4605500

RUSSIA
GE Healthcare
Krasnopresnenskaya nab., 18, bld A, 10th floor
123317 Moscow, Russia
Phone: +74 95 73 96 931
Fax: +70 95 73 96 932

SPAIN
GE Medical Systems España
Avda. Europa 22
(Parque Emp.La Moraleja)
28108 Alcobendas-Madrid
Phone: (+34) 91 663 2500
Fax: (+34) 91 663 2501

SWEDEN
GE Medical Systems Ultrasound
PO Box 314,
17175 Stockholm
Phone: (+46) 08 55 95 00 10

SWITZERLAND
GE Medical Systems Ab
Europastrasse 31,
8152 Glattbrugg
Phone: (+41) 1 809 92 92
Fax: (+41) 1 809 92 22

U.A.E
GE Healthcare
Building 18,
Dubai Internet City
P.O. Box 74594, Dubai
United Arab Emirates
Phone: +9714 429 6101
Fax: +9714 429 6201

UNITED KINGDOM
GE Medical Systems Ultrasound
2, Napier Road
Bedford MK41 0JW
Phone: (+44) 1234 340 881
Fax: (+44) 1234 266 261

IMPRINT:

Publishers:
GE Healthcare
Marketing Department Europe
Beethovenstraße 239
42655 Solingen

Editor–in-chief:
Pierre Radzikowski
usmarketing.europe@med.ge.com
Tel: +48 2275 14103

Concept and Production:
ICS Media GmbH
A-4860 Lenzing, Austria
office@ics-media.at

Printing:
Kroiss & Bichler GmbH & CoKG
Römerweg 1, A-4844 Regau
office@kb-offset.at

Printed in Austria - 300-08-U047E