

Unfors RaySafe: 'Like a canary in a coal mine'

With a mission to help people avoid unnecessary radiation, and the continuing launch of related products, the Swedish company points out that it is now the world's only provider of comprehensive solutions to measure, monitor and manage X-ray radiation dose

Report: Brenda Marsh

Founded 1994 by Tomas Unfors in Billdal, Sweden, Unfors Instruments began produced measurement equipment for quality assurance of X-ray machines. However, although still a leader in that market, in March 2012, the firm was renamed Unfors RaySafe. 'We made this change because our new brand will better represent our

company moving forward,' explained its CEO Magnus Kristoferson.

In just under two decades of its existence, the Unfors RaySafe now has 150 employees. 'To enable a rapid international expansion and better serve our market, we are represented by subsidiaries in seven countries, including United States, United Kingdom, Germany, Singapore, India, Japan and China. In addition we are present in 60 further countries represented by local distributors,' the firm's CEO adds. 'Among the customers are major X-ray manufacturers as well as some of the

most well-known university hospitals worldwide.' Revenues of around €20 million were reported in the fiscal year 2011/2012.

'Like the canary in the coal mine helped miners avoid dangerous gases,' Magnus Kristoferson points out, 'the RaySafe solutions, now and in the future, will enable users to help themselves and others avoid unnecessary radiation. Our philosophy of combining the simple and intuitive with the most advanced and innovative technology has made us a world-leading supplier of radiation measurement solutions in the medical field. Radiation, however, is not confined to the professional sphere. For the past 20 years, the average person's exposure has increased dramatically - a trend that is likely to continue. Therefore, we are constantly exploring new ideas and expanding our portfolio of products and services to help those we serve avoid unnecessary radiation.'

What's new from the firm, now with a symbolic canary in its logo? 'Early this year we introduced a new segment to our portfolio, personal dosimetry,' Magnus Kristoferson said. 'With the real-time solution medical staff is able to see, control and influence the amount of dose they are exposed to during intervention-

al procedures. And now, during the RSNA in Chicago, we have launched a software solution to better manage patient dose, improve process quality before, during and after X-ray procedures and to reduce a number of unnecessary exams. The key words here are justification, optimisation and control. With this introduction we can now provide a comprehensive solution to improve safety in the X-ray room - from quality assurance of X-ray equipment, to real-time dose monitoring for medical staff and dose management for the patient.'

The firm launched its real-time dose monitoring system RaySafe i2 at ECR 2012. The basic package has one real-time display and four dosimeters (additions are available). During imaging, the staff receives instant information on their current X-ray exposure giving them prerequisites to adjust their behaviour to minimise unnecessary exposure.

Studies presented at ECR and RSNA indicate a dose reduction among personnel up to 40% when using Unfors RaySafe's real-time dosimetry technology. Workplace efficiency and safety can be improved, and work processes streamlined, by facilitating the time-stamped, dose data collected by RaySafe i2.

'RaySafe i2 is proven to reduce staff dose, and makes it easy to work correctly and achieve a well-functioning radiation safety culture in hospitals,' Magnus Kristoferson concludes.

The new cloud-based software RaySafe S1 is prepared for integration in a multi-modality environment within diagnostic radiology, with equipment from different X-ray manufacturers that support the DICOM standard.

Whilst it enables medical staff to manage and lower patient dose it still



Magnus Kristoferson studied business administration at Umeå University, and successfully led several companies before becoming CEO of Unfors RaySafe in 2011.

retains image quality, thus reducing unnecessary examinations.

Additional assets: The software supplies justification support with evidence-based referral guidelines; optimises features that help find the right balance between image quality and dose - as well as minimise often hidden retakes and rejections; helps retain workflow control; provides online with notifications, alerts, checklists and protocol guides, and on demand can supply relevant statistics and key performance indicators.

Radiology data is also collected and shared with others in the diagnostic process - referring physicians, radiologists, operators, medical physicists, Radiation Safety Officers (RSO) and medical engineers. Additionally, the system can provide managers with insight into the radiology department's usage, to support efforts to increase productivity.



X-ray and ultrasound combo on a mammo platform

A first in medical imaging is still unknown for Kit Vaughan, who is ready to simultaneously scan with X-rays and ultrasound for breast screening. Stay tuned for the results at RSNA 2013, says EH Correspondent John Brosky.

It all works fine on paper - and the first clinical trial shows half the system, the X-ray mammography unit, is performing perfectly well. Now, over the next six months, CapeRay of Cape Town, South Africa, will try for the first time to layer an ultrasound scan on top of a simultaneous X-ray acquisition of compressed breasts. The goal is to generate a tightly registered fusion image for the early detection of breast cancer.

The PantoScanner X-ray mammography platform incorporates automated breast ultrasound, which the company believes will greatly improve both sensitivity and specificity for screening of women with dense breast tissue, where 50 percent of cancers are routinely missed.

Breast ultrasound (left) and X-ray image of the breast (right)

The radiographic component, the PantoScanner Soteria, is a slot scanner where the X-ray tube remains stationary as it emits a fan beam, the collimator, a narrow band detector.

According to CapeRay CEO Christopher 'Kit' Vaughan, the PantoScanner platform requires a more powerful X-ray tube, '... but a woman is exposed to much less radiation using slot scanning and we get a higher quality image due

to a higher signal to noise ratio that cuts down on the scatter, potentially by 50 percent.' Just how good the image quality is was not known until October 2012, when CapeRay was authorised to conduct its first clinical trial on 30 women.

A radiology board is currently assessing those images against a predicate device manufactured by GE Healthcare (Waukesha, Wisconsin).

Now comes the simultaneous ultrasound acquisition, the unknown factor. Bound to the detector moving on the PantoScanner, the ultrasound transducer that was added to create the PantoScanner Aceso model must move at 50 millimetres per second, which should be sufficient to acquire the signal.

'We have the prototype, but we have not yet acquired images,' Kit Vaughan explained. 'The effect of the scanning speed on image quality remains unknown, though we have an innovative way to solve the coupling and matching problem.'

On paper, he added, the radiation should not have a detrimental effect on either the ultrasound transducer or image quality. The PantoScanner Aceso model is an automated breast ultrasound (ABUS) in the same family as the FDA-approved U-Systems Sono V that was acquired in November 2012 by GE Healthcare.

What distinguishes the CapeRay ABUS method, said the CEO, is that



CapeRay CEO Kit Vaughan

where the Sono V requires a woman to lie down for a horizontal image acquisition, Panto uses the traditional standing position with compressed breasts. 'The issue is co-registration of the X-ray and ultrasound images,' he pointed out. 'When a radiologist needs to align two different images in his head, one vertical and compressed with one lying flat, it becomes difficult. Theoretically,' he added, 'our system acquires the breast images in the same orientation with the same degree of compression.'

With a goal of launching the combination PantoScanner Aceso model at RSNA 2013, Kit Vaughan says the CapeRay development team is 'scrambling to get the system ready'.

A clinical trial at the University of Cape Town, already funded by the South Africa Cancer Society, is planned for July 2013.

'We hope to make a meaningful difference for women in discovering cancers earlier,' Kit Vaughan explained, 'and for radiologists to make the job so they get the right diagnosis early enough.'

