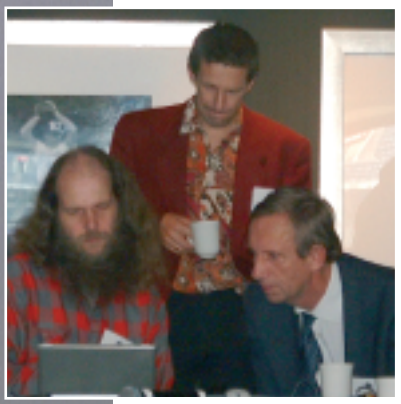
WAVELENGTH

News and advances in precision radiation treatments and neurosurgery | www.elekta.com | Vol. 9 No. 1. | March 2005

Elekta re-energizes radiation therapy in Southwestern India

Conferences confirm Elekta's continuing dominance in 4D Adaptive™ IGRT



By working together we can fight serious disease and enhance quality of life

ELEKTA

SOLUTION CLASSIFICATIONS

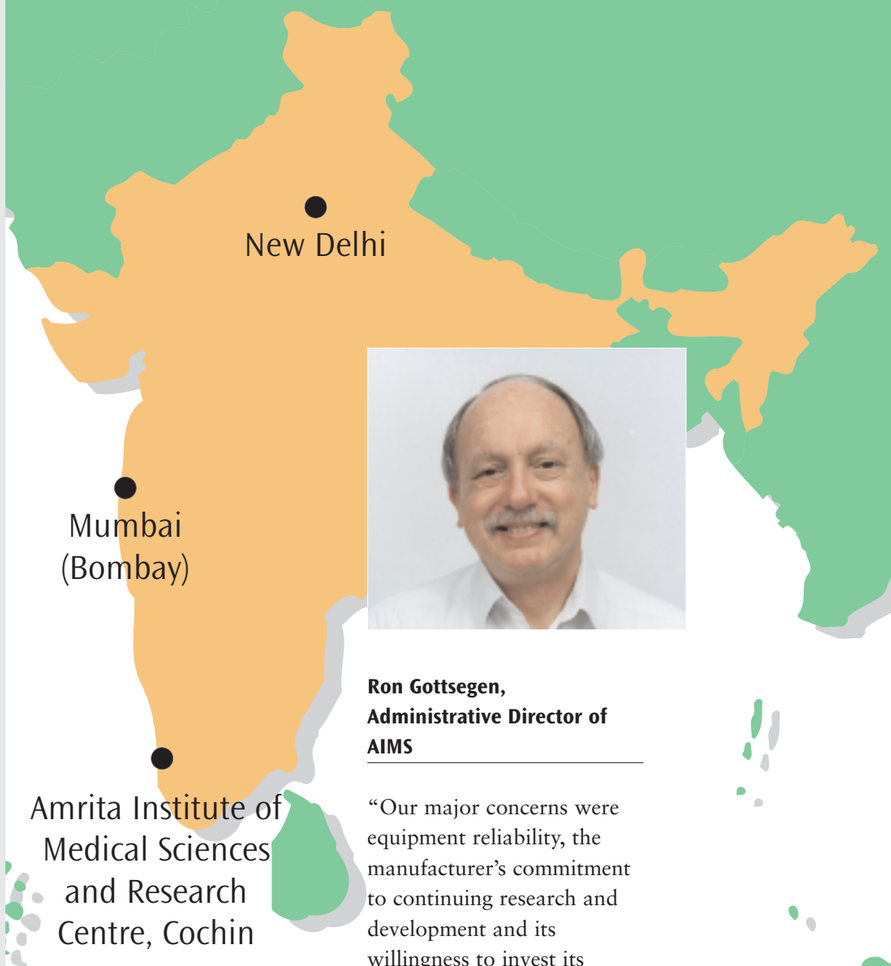
- Precision Radiation Therapy
- Image Guided Radiation Therapy
- Stereotactic Radiation Therapy
- Gamma Knife® surgery
- Stereotactic Neurosurgery
- Functional Mapping

IN THIS ISSUE

COMPANY INFORMATION

Elekta Synergy® S and Beam Modulator™ are work-in-progress and not currently available in all markets. Please contact your local representative or authorized distributor for availability.

Elekta re-energizes rad iation therapy in Southwestern India



To meet the radiation therapy requirements of India's population of 1.1 billion, the World Health Organization has recommended a ratio of one linear accelerator (linac) for every one million people. While there has been a large increase in the number of new linac orders in India in 2004, there are only 85 linacs (installed/ordered) in the country. The state of Kerala on the southwest coast is home to nearly 32 million people, the most of any Indian state. To better serve the healthcare needs of this region, the Amrita Institute of Medical Sciences and Research Centre (AIMS) was established in 1997 in Kerala's coastal city of Cochin.

Ron Gottsegen, Administrative Director of AIMS

"Our major concerns were equipment reliability, the manufacturer's commitment to continuing research and development and its willingness to invest its personal efforts and resources into our center to make us successful and keep us at the technical edge where we wanted to be as a teaching institute."

Although AIMS is presently a world-class medical center with superspecialties in all major departments, it opened with no radiation therapy equipment at all. However, under the spiritual leadership of India's Mata Amritanandamayi ('Amma,' see page 6), AIMS and Elekta collaborated to make radiation therapy services a reality. AIMS began radiation treatments of cancer patients in February 2004.

Until the inception of radiation oncology services at AIMS in 2004, pain palliation was typically the most that thousands of cancer patients in Kerala could hope for. "Nearby hospitals use cobalt units almost exclusively, so often the intent was palliative even for potentially curable diseases, due to the absence of adequate treatment modalities," says AIMS Medical Director, Prem Nair, M.D. "Today, with two Precise Treatment Systems™ and a wealth of auxiliary equipment, Kerala has a center that aggressively pursues cure as a philosophy. Following AIMS's lead, three additional centers in Kerala and several in the rest of India have placed orders for linacs in 2004, a number of them choosing Elekta."

AIMS started out small in 1998 with just 200 beds, but since then has grown dramatically, adding 800 beds and a medical complex consisting of a medical school, school of nursing, school of pharmacy, school of dentistry and several specialty institutes under the auspices of AIMS. Amrita Medical School has super-specialties in the departments of cardiology, nephrology and gastroenterology, with supporting services in radiology and pathology. A cancer center was in embryonic stages in 1998, as were plans to integrate a department of radiation oncology within the center. Final pre-construction planning for the radiation oncology department began in 2000 and culminated in equipment selection in 2002.

Elekta presents key advantages during evaluation

Two of the main principals in AIMS's equipment evaluation committee, Dr. Bhaskaran K. Pillai, Ph.D., Chief Physicist and Ron Gottsegen, Administrative Director of AIMS (pictured left), had virtually no experience with Elekta equipment in 2000 when evaluations began. In fact Dr. Pillai had worked in the USA with the treatment machines of a major Elekta competitor for 33 years and went into the evaluation with a strong preference for this vendor. In addition, another Elekta competitor's diagnostic imaging equipment was already in place at AIMS. The odds weren't great for a newcomer, but AIMS brought in Elekta to ensure due diligence. During the evaluation process, Elekta advantages began to mount, according to Dr. Pillai.

"Initially, I didn't have a specification for three photon

Pictured right:
Meeting at the Elekta exhibit at ASTRO 2004 are (left to right); Percy Schroff, Managing Director, Elekta India; Brendan Vahey, Director, Sales & Marketing, Asia Pacific; Bhaskaran Pillai, Ph.D., AIMS Chief Medical Physicist; Volker Stieber, President & CEO, Elekta, UK and Somnath Ray, National Manager, Product Division, Elekta India.

energies, as I was used to just two." he says. "But when I learned that Elekta offered three photon energies, and appreciated that southern India has a high incidence of head-and-neck cancers, I felt that 4MV would be a very appropriate third beam for AIMS to have. Plus, 4MV would provide a very good picture for Elekta's iViewGT™ portal imager."

iViewGT™ itself was unique among the other vendors' portal imaging devices, Dr. Pillai adds. "Portal imaging and particularly portal imaging with amorphous silicon detection technology was still in its infancy in 2000. Although iViewGT™ was new to clinical use, the images I believed it could provide us would be extremely useful."

Beyond technical considerations, the most important factor favoring Elekta was the level of commitment Elekta showed during the process. Elekta wanted a new clinical partner in India and clearly demonstrated this desire.

"Elekta invited us to its facility in Crawley, UK, and showed us how intently they wanted to help us develop our site," he says. "Elekta struck us as a progressive company that is committed to creating a long-term partnership and devoted to the customer's preferences and satisfaction. We had to go through the other vendors' corporate layers, so in the end it was as much a gut feeling for Elekta as it was appreciation of the technology."

"Our major concerns were equipment reliability, the manufacturer's commitment to continuing research and development and its willingness to invest their personal efforts and resources into our center to make us successful and keep us at the technical edge where we wanted to be as a teaching institute," says Ron Gottsegen. "Elekta scored very high in all these areas. We were impressed by the company's growth, its technical innovation and capacity to move products to market, and reports of equipment reliability. Elekta's commitment was evident up and down the line, from the corporate office to the Elekta people in India. Elekta has done everything, and continues to do everything, necessary to make us as successful as we are."

In May 2002, AIMS placed orders for two Precise Treatment Systems™. The first system was installed in the newly completed AIMS Radiation Oncology Department and accepted in November 2003. Patient treatments began on February 16, 2004. The second Precise Treatment System™ was delivered in April 2004, installed and accepted in June 2004 and started treating patients on September 20, 2004. The CMS XiO system is used for planning.

Volume builds quickly

By the end of its first week of operation, Amrita's first Precise Treatment System™ was treating 20 patients per day, increasing to 50 patients by the end of May 2004. Demand for radiation therapy services created a backlog of about 30 patients, despite initial clinic hours of 7 a.m. to 9 p.m. The average time slot was 12 minutes, enabling clinicians to treat about five patients per hour. Two to three hours each day are reserved for new patient starts, which average 45 minutes per slot. By October 2004, with both Precise Treatment Systems™ operational, the combined patient volume had climbed to nearly 80 patients per day. At press time, daily volume is expected to be at maximum for both systems for a combined daily total of about 100 treatments.

"With the high dose rate (up to 600 MU/minute) of Precise Treatment Systems™ we have had no problems treating our large daily volumes," Dr. Pillai says. "In addition, field sequencing enables us to very efficiently deliver beams once we have communicated the patient plan to Desktop. And, with the built-in record-and-verify system – which is standard with Elekta – we have not had any machine set-up errors in treatments."

70% of AIMS's treatments are 3D conformal and employ wedge and electron fields for approximately 30% of all patients. The case load comprises 36% head-and-neck cases, 20% breast cancer and the remainder a variety of other disease sites.

Maintaining this brisk department workflow wasn't simply a matter of acquiring advanced linacs, Dr. Pillai notes. Many technologists in the area were accustomed to outdated equipment and needed intense training and retraining, which Elekta helped provide. "The Elekta applications group did a wonderful job of training technologists, many of whom were not only novices, but those who had mostly used cobalt machines and therefore had to un-learn some of the techniques," he says. "The benefit of this training was that we were able to get a few trained technologists to serve as anchors on both the machines."

Further supporting AIMS's mission, Elekta offered to keep two service engineers on-site to perform all the first-line maintenance and trouble-shooting. "The down-time is virtually always scheduled down-time and it is working extremely well," Dr. Pillai says.

"We haven't yet had a full day of down-time on these systems," adds Dr. T.K. Padmanabhan, M.D., Head of the Department of Radiation Oncology, who joined AIMS in January 2004 after working as a senior consultant in Apollo Hospital, Chennai for 11 years with two non-Elekta linacs. "Our up-time has been 98%, so I'm extremely happy with the equipment."

The new Elekta radiation treatment systems at AIMS have begun to relieve much of the pressing load of cancer cases in the over-burdened state of Kerala, initiating a new era of treatment availability among the

"We were impressed by the company's growth, its technical innovation and capacity to move products to market, and reports of equipment reliability. Elekta's commitment was evident up and down the line."

> "Our up-time has been 98%, so I'm extremely happy with the equipment."

state's 32 million inhabitants, Dr. Padmanabhan adds.

"The only other cancer center true to this designation is the regional government-funded cancer center in Trivandrum, where most patients receive free treatment and which has an extremely heavy workload," he says. "Amrita Institute is a huge leap forward in terms of technology – not only in the state of Kerala, but also in the entire country, so this institution's Precise Treatment System™ really improves the treatment outlook for millions of people. Apart from the Regional Cancer Centre in Trivandrum, AIMS hospital will have a major role in the management of cancer patients in Kerala."

"Elekta established a regional office in Cochin before the equipment installation and has a team of engineers throughout the country," says Percy Shroff, Managing Director of Elekta India. "Our mission is to have the most competent service organization in India to provide excellent after-sales support to our customers in the country and the region."

Amma, the 'Hugging Saint of India,' drives development of AIMS through message of love

Mata Amritanandamayi, or 'Amma,' as she is widely known in India and worldwide, was the driving force in AIMS's establishment. During the last 30 years, the 51-year-old spiritual leader has dedicated her life to uplifting humanity through the simplest of gestures – the embrace. In this way, Amma has blessed and consoled more than 21 million people around the world. She has initiated and inspired a vast network of charitable activities, harnessing her ability to transform her compassionate vision into practical reality. AIMS is the physical manifestation of Amma's vision to create a hospital in Kerala where the poor could receive the very best medical care possible from highly skilled physicians and nurses in a compassionate, caring atmosphere.

"Amma's message is one of love and compassion," says Prem Nair, M.D., AIMS Medical Director. "There is a strong bond that develops between her and the people who meet her. It's the personal transformation that occurs which allows people to work selflessly toward a higher cause."

According to AIMS Chief Medical Physicist, Dr. Bhaskaran Pillai, AIMS fulfills Amma's creed of service to fellow man in the area of medicine. "This is a unique institution that is one-of-a-kind in India and possibly the whole world. AIMS's first thrust is to provide an opportunity for service to humanity," he says. "Secondly, its goal is to provide these healthcare services to the needy and provide them at state-of-the-art level. A third of our patients are treated for free, another third is charged at concessional rates and the last third of patients is charged well below the prevailing rates of other corporate hospitals. Accordingly, after AIMS was established many of the area hospitals were compelled to reduce their charges to the ultimate benefit of all patients."

The funds collected to create AIMS and to finance countless other charitable projects of Amma were non-solicited donations and not acquired through any fundraising at all on Amma's part, which testifies to the spiritual leader's ability to awaken the spirit of giving among all whom she encounters, Dr. Pillai adds. "Private donations come not just from a few individuals, but millions – and yet not a single dollar is solicited. In fact, Amma has instructed us to never request funds. It's her inspiration that enables people to give selflessly."

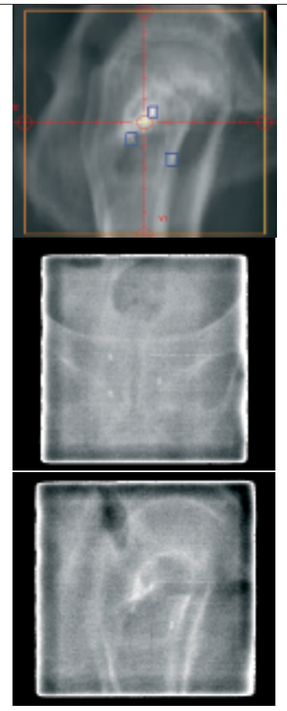
In relief of the victims of the December 26, 2004 tsunami, Amma has pledged a donation of Rs. 100 crores (US $22 million) and has provided medical aid from AIMS as well as aid in rebuilding homes for the poor.

Redding Cancer Treatment Center builds disease-fighting capabilities while retaining non-clinical ambience

In the early 1990s, radiation oncologist Vidya Bobba's vision was to create a cancer treatment center that was as unlike the standard example as possible – at least from appearances. Dr. Bobba's own ideas, and those obtained through patient questionnaires, resulted in a free-standing outpatient treatment center that looks like a home from the outside with a warm, inviting and decidedly non-clinical feel inside. However, the technological capabilities at Redding Cancer Treatment Center (RCTC), Redding, California, USA are anything but quaint. Through the years, Dr. Bobba has been quietly building an arsenal of advanced cancer-fighting technology. Redding's most recent acquisition includes a Precise Treatment System™ with iViewGT™ and PreciseBEAM™ IMRT, which executes IMRT plans developed on the NOMOS CORVUS planning system.

Vidya Bobba, M.D., Radiation Oncologist and founder of RCTC, didn't want to evoke 'hospital' among patients visiting his site. While hospitals are places where sick people go for treatment, patients and visitors often perceive the architecture, ambience, décor and even sterile smells as negatives.

"The goal was to make the center as unlike a hospital as possible," Dr. Bobba recalls. "I've worked and trained in several hospitals and their drabness can be very discouraging for patients. So, I had the center built to look like a house. On the inside we chose colors, pictures and furnishings that would put patients and family members at ease. Interestingly, we did not put in things such as an aquarium or provide jigsaw puzzles to help



Images of gold seed markers, front and lateral views from iViewGT™, both simulation (top) and portal images

patients pass time, because we wanted them in and out quickly for their convenience."

Since its opening in 1994, RCTC has been very popular with patients, he says. "They really love it, and remark on how nice it looks and how pleased and comfortable they feel in this place."

Practice grows steadily

Starting with an Elekta SL18 treatment system (upgraded to an SL19) and SLS9 simulator, and himself as the sole radiation oncologist, Dr. Bobba began treating patients from Redding's population of 85,000. Most patients still come from Redding today, but within a 15-mile radius are approximately 150,000 residents, increasing to 350,000 inhabitants in the greater region. "That doesn't sound like a lot, but there are a lot of retired folks that tilt the population for our specialty quite a bit," he says.

RCTC's principal indications have always been lung and breast cancer, but prostate cancer patients began flooding in over the last three years when Dr. Bobba and his associate Wayne Koll, M.D., who joined the practice in 1999, began conducting real-time ultrasound-guided brachytherapy implantations. "We're the only center that does this in co-operation with the urologists in the community," he says. "So, now we see nearly 100% of the prostate patients in Redding."

Today, half of RCTC's prostate patients receive real-time brachytherapy, while the other half is treated exclusively with external beam radiation therapy. Approximately one third of the seed implantations also receive a five-week course of external beam radiation therapy to treat the prostate, seminal vesicles and adjacent lymph nodes. At any one time, eight prostate cancer patients are on the treatment schedule. For all indications, RCTC treats approximately 40 patients a day.

Soon after the inception of the brachytherapy program, the treatment center continued to improve its cancer treatment services for prostate and head-and-neck cancers with the 2001 acquisition of the NOMOS Peacock MIMiC (highly conformal MLC) system with NOMOS Corvus IMRT software. RCTC also acquired the NOMOS BAT ultrasound system for localization of the prostate.

Precise Treatment System™ is newest technology centerpiece in Redding

Although RCTC inaugurated its treatment services with Elekta treatment and simulation equipment, acquiring additional radiation therapy equipment to meet Redding's burgeoning demand wouldn't be driven by sentimentality for its first system.

"In 2002, we re-did the whole process of evaluation, and invited both Varian and Elekta to make sales presentations," Dr. Bobba says.

In the end, several key advantages convinced Dr. Bobba, Dr. Koll, Chief Radiation Oncology Physicist, Steven Wallace, Ph.D (hired in 2002), the dosimetrist and radiation therapists that Precise Treatment System™ would be the right choice.

"The therapists and the dosimetrist really liked the operator-friendliness of the existing Elekta system," he says. "Actually, when I evaluated that system in 1993, I interviewed

Vidya Bobba, (fourth from left, back row),
M.D., Radiation Oncologist and founder of RCTC

"The goal was to make the center as unlike a hospital as possible," Dr. Bobba recalls. "I've worked and trained in several hospitals and their drabness can be very discouraging for patients. So, I had the center built to look like a house."

many therapists in various Elekta centers and they unanimously expressed their enthusiasm for the user interface. We researched portal imaging and realized after evaluating several EPIDs that iViewGT™ was the best on the market, and indeed, the only amorphous silicon detector. The image quality is excellent."

"I was very impressed with iViewGT™ and continue to be," Dr. Wallace observes. "The EPID's superb image quality is the reason we were able to start using gold markers for daily prostate localization. The iViewGT™ software makes it extraordinarily easy to calculate the shifts patients need to make in order to correct set-up errors. The therapists can implement the shifts very quickly and that was a big plus for us."

Perhaps the most important deal-maker was Elekta's promise to assign a senior service engineer to RCTC if they purchased Precise Treatment System™. "Before we installed our second Elekta system, Tom Belcham became our service engineer," he says. "We really liked him and told Elekta we would purchase Precise Treatment System™ if the company could convince him to move to Northern California from Los Angeles. Since then, he has done a wonderful job."

In May 2003, RCTC completed acceptance testing on Precise Treatment System™, equipped with MLCi, iViewGT™ and PreciseBEAM® IMRT. In July 2003, commissioning was completed and the system began treating patients. Concurrent with the Precise Treatment System™ purchase, RCTC also acquired a GE CT-simulator.

RCTC is first to use NOMOS Corvus IMRT software with MLC-equipped Elekta system

In the summer of 2003, Redding continued its technology acquisitions with the purchase of the NOMOS Corvus IMRT package for Precise Treatment System™. Integration of Corvus with Precise Treatment System™ would mark the very first MLCi-equipped Elekta treatment system to have this IMRT software. This wasn't just by chance; RCTC's Physicist, Dr. Wallace, worked for a year at NOMOS focusing on IMRT commissioning and QA on a number of vendors' MLC modules, including Elekta's.

"In 2002, I began working at RCTC, which less than a year later would have Precise Treatment System™ with MLC, just as NOMOS was releasing the new Corvus version, so the cards just fell into place," Dr. Wallace recalls.

Around the time clinicians began using Precise Treatment System™ to treat patients in July 2003, Dr. Wallace began the commissioning process for Corvus. "We did a fairly substantial QA procedure," he says. "For our first 10 patients, I did film dosimetry in axial, sagittal and coronal planes – which is far above requirements, but since this was the first one we really wanted to make sure the QA was comprehensive. We then did a very thorough individual patient QA, delivering each plan four times, one to an ion chamber and then to three orthogonal films, before we put the patient on the couch."

In October 2003, RCTC began

its prostate IMRT program on Precise Treatment System™. The typical case specifies a 5-field, 75-segment treatment in a 15-minute time slot.

"Precise Treatment System™ delivers 600MUs per minute, which is a very fast dose rate, but since we're using a step-and-shoot technique I was concerned about our dose accuracy and flatness and symmetry for small MU segments," Dr. Wallace says. "I tested it with the Profiler™ and the ion chamber measurements all the way down to 1MU and it was very acceptable, with dose accuracy within 1% and flatness and symmetry within 2%. And this was for just a 1 or 2MU beam. I was astonished with that."

In addition to prostate IMRT, RCTC also conducts IMRT for head-and-neck cancer, and upper abdominal and pelvic malignancies.

Upgrades, acquisitions continue to better serve community

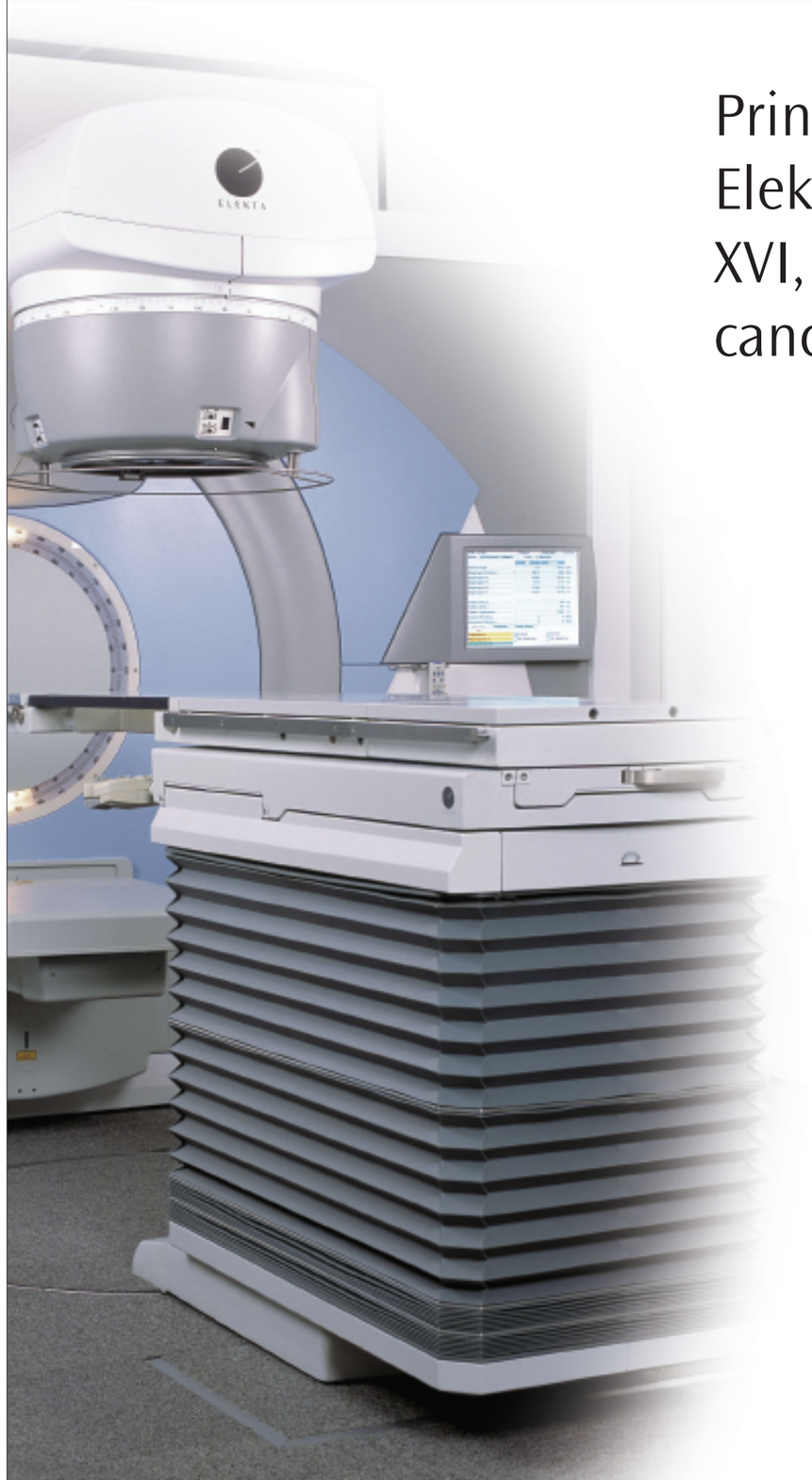
In November 2004, RCTC received the new Desktop Pro™ control system for Precise Treatment System™, which Dr. Wallace predicts will shave five minutes from IMRT delivery times. "Beam loading will then be virtually instantaneous, so we will gain almost a minute per field," he says.

In addition, at press time, the treatment center was upgrading the SL18's control system to Desktop, Dr. Bobba says.

"Presently, we're also just about ready to start HDR brachytherapy with the Gamma-Med Plus, and we're going to start doing MammoSite breast implants," he adds. "Our hope is that – just like with prostate – technology will attract and benefit many breast cancer patients."

Since its founding in 1994, RCTC's staff has grown dramatically as well. Mahesh Pant, M.D., joined the center in August 2004 and now the staff includes three physicians, two physicists, a dosimetrist, five therapists, an administrator, a medical assistant and two administrative assistants.

"The whole story of Redding Cancer Treatment Center is one of growth," Dr. Bobba continues. "The community is growing, the population that will need our services is also growing fast. So, we'll continue to acquire the latest technology to meet the needs of the residents of Redding and this region."



Princess Margaret Hospital uses Elekta Synergy® Platform with XVI, in first 'solo' case of prostate cancer patient

On September 29, 2004, Princess Margaret Hospital (PMH), Toronto, Ontario, Canada became the second of four Elekta Synergy® Platform with XVI, clinical installations to use 4D Adaptive™ IGRT VolumeView™.

The volumetric (cone beam) scanning capability was used to localize patient anatomy, with the patient in the treatment position just before treatment. The prostate case occurred several months after PMH researchers initiated an investigation comparing Elekta Synergy® Platform XVI soft tissue matching with PMH's benchmark seed matching program for prostate cancer.

PMH will conduct similar XVI treatments in additional patients who are contraindicated for fiducial marker implantation, and intends to expand clinical applications as work progresses.

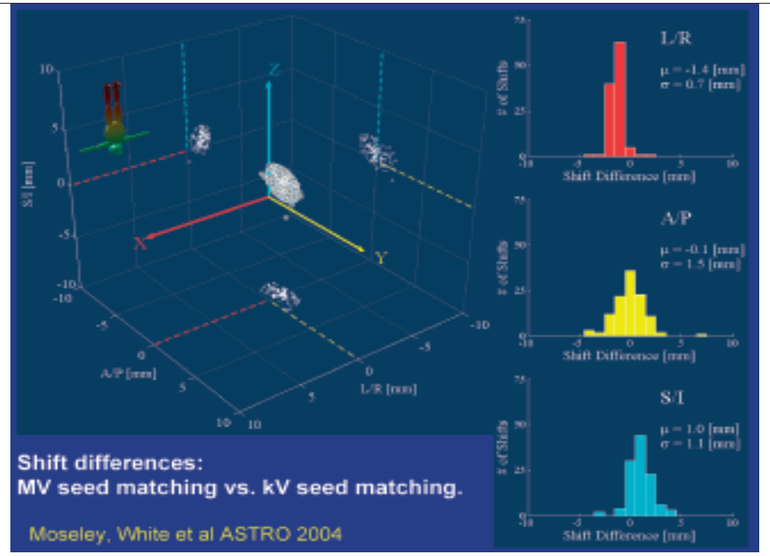
Charles Catton, M.D., Radiation Oncologist, Princess Margaret Hospital, a member of the Elekta Synergy® Research Group

Since 1997, PMH clinicians have refined a strategy to address prostate motion in an effort to improve the radiation therapy accuracy. PMH's benchmark technique uses fiducial markers implanted in the prostate for target localization and to serve as reference points to improve the accuracy of MR image fusion.

"The use of implanted gold markers is a robust method that enables daily on-line imaging of the target, but it does have disadvantages," according to Charles Catton, M.D., Radiation Oncologist at PMH. "It is invasive, adds time to the planning process and requires an expert inverventionalist to implant the seeds. The markers can also degrade planning CT images and this method can only be used on-line with an amorphous-silicon imager."

An ongoing study that began in February 2004 comparing PMH's seed matching technique and soft tissue matching using Elekta Synergy Platform® XVI demonstrated that the two image matching techniques yield comparable accuracy. Accordingly, on September 29, 2004, PMH conducted its first Elekta Synergy® Platform treatment unaided by portal imaging in a patient for which seed implantation was contraindicated.

"We're flying solo with this gentleman," Dr. Catton says. "In other words, we're using Elekta Synergy® Platform's XVI volumetric kV imaging capability (VolumeView™) as the sole technique for image matching. He's halfway through his 42 fractions and it's going great."



Shift differences:
MV seed matching vs. kV seed matching.

Moseley, White et al ASTRO 2004

Study demonstrates excellent image quality with XVI

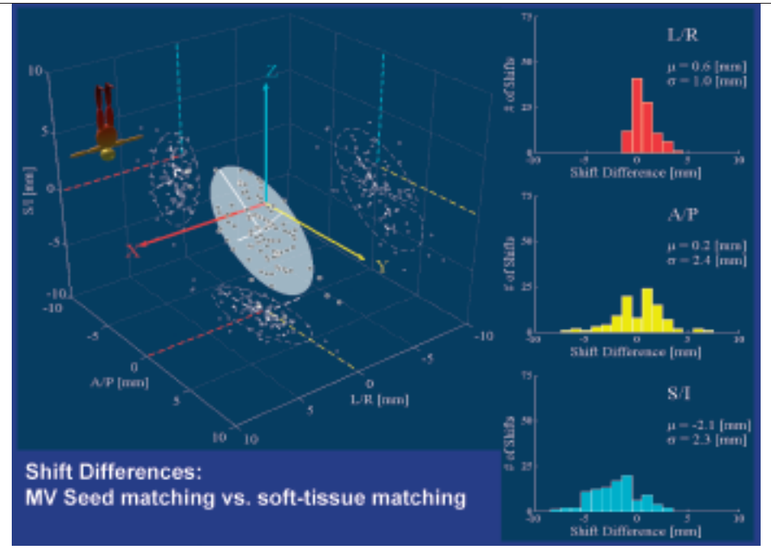
Because PMH's study population was comprised entirely of patients with previously implanted fiducial markers, investigators had to first address issues of image degradation and observer bias, Dr. Catton says.

"The gold seeds right in the middle of the prostate were interfering with the kV image quality and also causing observers to inadvertently focus on the seeds rather than on the soft tissue," he observes. "To deal with these issues for the purposes of our study, our physicist devised a program to electronically delete the seeds from the images."

Over the next few months, clinicians acquired – and stored for future analysis – a volumetric data set of each patient before proceeding with the customary seed matching protocol using Elekta iViewGT™ electronic portal imager. Any necessary adjustments were made to the patient's set-up before treatment. Later in the evening, the therapist would pull up the VolumeView™ images and perform two retrospective matches.

"They matched MV seed matching versus kV seed matching, then erased the seeds and compared MV seed matching to soft tissue matching," Dr. Catton explains. "This latter match was done by moving the cone beam image to match the target as closely as possible to determine the degree of agreement with seed matching."

At press time, of the 600 VolumeView™ images acquired, PMH researchers had analyzed 100. The results showed that, in general, both XVI and seed matching techniques achieved similar accuracy, with MV seed matching and kV seed matching being virtually equivalent.



Shift Differences:
MV Seed matching vs. soft-tissue matching

"Using the cone beam to match seeds versus the portal imager to match seeds, there is very little difference," he reports. "From left to right (L/R), there's a 0.7mm spread, from front to back (A/P), a 1.5mm spread and from top to bottom (S/I), a 1.1mm spread."

There was a slightly larger divergence when comparing MV seed matching with soft-tissue matching. In this case the results were: L/R, A/P, S/I = 1.0mm, 2.5mm and 2.3mm, respectively.

A statistical comparison (R-coefficient) yielded good to excellent agreement between the two techniques. MV and kV seed matching showed high correlations (R2 = 0.98, 0.95, 0.89 [L/R, S/I, A/P]). There were lower, but still good, correlations for shifts based on soft tissue targeting (R2 = 0.97, 0.73, 0.71 [L/R, S/I, A/P]).

Interobserver variability tested real-world conditions, in which different individuals would be evaluating images (see below).

Interobserver variability: MV seed matching vs. soft-tissue matching (contoured CTV)

(mm)	*L/R*	*A/P*	*S/I*
MV Seeds	*0.3*	*0.9*	*0.5*
Soft tissue	*1.1*	*2.8*	*3.0*

Average SD for 5 observers over 5 patients

"In MV versus kV seed matching, different observers agreed virtually all the time, to within a millimeter," Dr. Catton notes. "With soft tissue, it's not quite as good, but still pretty acceptable. The top/bottom plane seems to be the most difficult to deal with."

Although at press time, PMH had analyzed only a portion of the acquired VolumeView™ images, Dr. Catton expects no surprises.

"The XVI images we acquired were excellent and were all perfectly useable for the purposes of the study," he says. "The two matching techniques are not identical, but they are comparable. One possible reason that seed and soft tissue matching on reconstructions in the coronal and sagittal planes are not identical is because of the learning curve to address. We have analyzed only 100 images so far, and it likely took the therapists about 30 images to become accustomed to the soft tissue matching process. Secondly, the image quality isn't identical in all three planes – it's best in the axial plane, and you can't see the edge of the prostate quite as well in the coronal and sagittal planes."

Next steps

The next logical evolution of PMH's new soft tissue matching technique is to implement the technique in real-time.

"Once we limit the therapist to 20 minutes to do the match, their challenge will be to acquire the images, do the match and treat the patient while still maintaining the same level of accuracy that they achieved when working quietly in the evening, and I think we are very likely to achieve that with this system," he says.

Swedish Medical Center to acquire Elekta Synergy® and Elekta Synergy® S systems

The first of three Elekta Synergy® systems will arrive at the Swedish Cancer Institute (part of the Swedish Medical Center, Seattle, Washington, USA) in early 2005. Two additional Elekta Synergy® systems and an Elekta Synergy® S will be installed in the third and fourth quarters of next year. The Elekta acquisitions represent Swedish Medical Center officials' realization that Elekta is capable – today – of supplying the image-guided radiation therapy (IGRT) equipment the center would need to enter a new phase of advanced radiation therapy.

"We conducted an exhaustive search of linear accelerator vendors specifically looking for IGRT capability, and based on that search criterion we chose Elekta," says Todd Barnett, M.D., Radiation Oncologist and Medical Director at the Swedish Cancer Institute, the largest cancer treatment provider in the Northwest USA. "In the end we really sensed that Elekta is ahead of the curve technologically and that Elekta Synergy® is actually treating patients clinically. Additionally, we very much wanted a strong partner to team up with us on research, and we believed Elekta also strongly valued such a relationship."

Another key differentiator, Dr. Barnett points out, is that all Elekta products, including Elekta Synergy®, are networkable with the treatment planning and record-and-verify products of multiple vendors. "Swedish Medical Center is a large complex network that has invested significantly in many vendors' products," he says. "Going with our current vendor for IGRT would have compelled us to use most of its ancillary products as well, which would have been a lengthy, complex and expensive project."

Lung cancer program to benefit with Elekta Synergy®

Elekta Synergy® system's ability to image patients at the point of treatment will profit the Swedish Medical Center's lung cancer program, Dr. Barnett observes.

"We don't know what's happening in these lung cancer patients, in terms of both inter- and intrafraction target motion," he says. "Consequently, we're reluctant to make our margins much tighter due to this uncertainty. Elekta will be working with us to develop a protocol and image registration tools for Elekta Synergy® that should improve these treatments and give us greater clinical confidence."

Elekta Synergy® S will complete stereotactic center of excellence

With the later addition of Elekta Synergy® S, Swedish Medical Center will have the tools necessary to become a stereotactic center of excellence – Elekta Synergy® S for extracranial radiosurgery and Leksell Gamma Knife® for intracranial radio-surgery.

"Our medical oncologists and surgeons want better treatment options for patients with liver metastases, paraspinal metastases and even pancreatic primary tumors – targets where surrounding structures are very sensitive, and where we could perform some highly focused treatments."

Elekta and Royal Preston Hospital

team up to fine tune the physics and clinical aspects of the Beam Modulator™

Medical equipment manufacturers always get the most useful assessments of a new product when the device has spent time operating in the real-world laboratory of the clinic or hospital. These assessments are even more valuable when obtained before the product is commercially introduced. In 2003, Elekta had the opportunity to test the pre-market version of Beam Modulator™ (Elekta's fine resolution beam-shaping system) at the Royal Preston Hospital (RPH), Rosemere Cancer Centre, Preston, Northern England, in collaboration with an Elekta team. The project resulted in many improvements that are now integrated in the commercial Beam Modulator™, a key component of Elekta Synergy® S, Elekta's platform for advanced stereotactic radiation therapy.

In the spring of 2003, RPH was in negotations for a sixth linear accelerator, one equipped with a fine-leaf MLC capable of stereotactic treatments. Elekta was among the finalists in the evaluation, although Elekta's Beam Modulator™ – the beam-shaping component of Elekta Synergy® S – was still in pre-verification development.

"We wanted an integrated MLC, not an add-on device," says Dr. Michael Kirby, Consultant Physicist, Deputy Head of Radiotherapy Physics at RPH. "Plus, we have a long history with Elekta. All our linacs and simulators are from Elekta and it was desirable to maintain our good working relationship. Although we didn't know then that we would be the Beam Modulator™ test site, there still was the attraction of being among the first centers globally to have this new technology. Royal Preston has always prided itself on using novel technology to its fullest and on being at the forefront of routine use of, state-of-the-art radiation therapy delivery for as many patients as possible. Selecting Beam Modulator™ was a way of being at the forefront with a new product and evaluating it in a clinical environment."

Royal Preston Hospital agrees to testing partnership

What would change the complexion of this Beam Moduator™ acquisition, ironically, was a resource issue, Dr. Kirby says. "Royal Preston didn't have enough radiographers to operate its complement of linacs, thus leaving one treatment machine underutilized." At Elekta, meanwhile, Beam Modulator™ was undergoing extensive engineering. In April 2003, Elekta took a prototype Beam Modulator™ to Brighton and Sussex University Hospitals to re-evaluate the penumbra following leaf tip modifications using the center's non-commissioned linac. Because further testing was desirable on a clinical machine, Elekta issued a field request to locate a clinical site capable of conducting these tests. In May 2003, Paddy Greally, the Elekta representative for RPH, notified headquarters that the Elekta SL15 at RPH could be modified to incorporate Beam Modulator™ for testing.

"Paddy told us we would have a shelter available from June until at least September," says Beam Modulator™ Project Manager, Mark Knowles. "It was like gold – we jumped at the chance. We know from vast experience that when we go to a hospital, especially with a new MLC during pre-verification – when the door is open to accept design changes and improvements – we can improve the product."

On June 17, 2003, a meeting

between Elekta and RPH representatives generated a proposal for a 'testing in partnership' venture. The agreement covered installation of the pilot Beam Modulator™ hardware and software, upgrade to Desktop Pro™, set-to-work and calibration. Additionally, the project specified a comprehensive range of tests, including physics data collection, safety and performance, clinical workflows from planning to treatment delivery, and verification test case dry runs.

"It was truly a collaborative venture. The project involved engineering, clinical and physics staff from both Elekta and the Royal Preston," Dr. Kirby notes. "Elekta staff installed the Desktop Pro™ upgrade and did data collection, set up the connection between Precise-PLAN® and Beam Modulator™ and tested the optics. Concurrently, Preston staff evaluated the technical ability of Beam Modulator™, examining leakage characteristics, leaf position accuracy and reproducibility, stability of Beam Modulator™ optical assembly and MLC camera image, leaf penumbra, connectivity to a commercial TPS, improvements in isodose shaping and distributions and analyzed its ability to deliver IMRT. Ultimately, a joint team of Elekta and Preston clinical staff, led by Superintendent Radiographer Helen Clements, evaluated actual clinical delivery and workflow aspects by running through a number of test cases."

The Beam Modulator™ and Desktop Pro™ upgrades to RPH's SL linear accelerator, and calibration and set-to-work activities occurred in August and September 2003, followed by the start of the main test period in September.

Testing reveals sophistication of Beam Modulator™

The RPH-Elekta team discovered some key areas in which Beam Modulator™ could be improved, and was pleased with the integrity of the device.

"Our overall impression was that technically everything looked very good," Dr. Kirby recalls. "We were perfectly happy with beam outputs, wedge factors, leaf positioning reproducibility and stability and how Beam Modulator™ was set up. We were even able to deliver an IMRT plan (on a phantom) in the first week."

On December 2, 2003, the RPH team presented its Beam Modulator™ test results to all Elekta users in Northwestern England. With their Elekta colleagues present, RPH representatives discussed engineering, radiation therapy physics, clinical workflow and IMRT verification aspects, and gave Elekta clinical users a hands-on tour of the testing configuration.

"We wanted other customers to witness the benefits of Beam Modulator™ in a clinical setting and hear about them from clinical professionals," Dr. Kirby says. Numerous other presentations by RPH staff followed including;

- February 2004, internal seminars at Elekta, Crawley, UK
- June 2004, presentation as part of Elekta's 'A clinical and product review for UK Elekta customers,' Crawley, UK
- September 2004, presentation at the IPEM ASM, University of York, York, UK
- October 2004, poster presentation at ESTRO, Amsterdam, the Netherlands.

As a result of RPH's successful verification testing of Beam Modulator™, Elekta asked the hospital to help conduct formal validation of the technology beginning in March 2004. RPH also performed IEC 60976 testing from July to September 2004. This improved version of Beam Modulator™ was installed on one of RPH's newest Elekta linacs in December 2004.

"Validation went exactly according to schedule, because we had ironed out virtually all technical issues," Knowles adds.

Testing in partnership benefits all parties

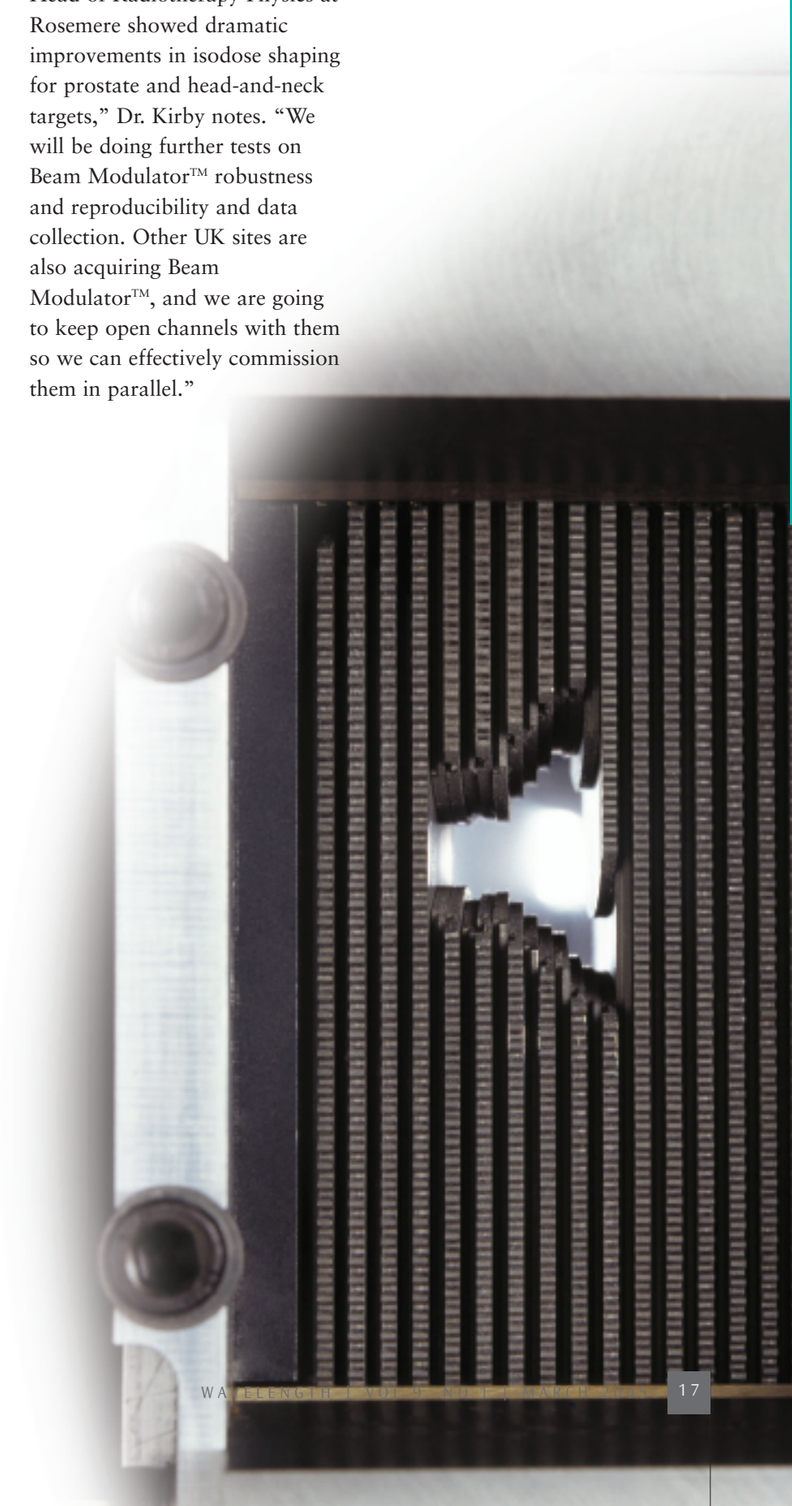
RPH professionals take great pride not only in using advanced technology, but also in learning enough about it to provide development input. Accordingly, testing Beam Modulator™ was a very appealing prospect.

"We were deeply interested in knowing exactly what Beam Modulator™ could do and also to be involved at a stage where we could possibly influence its development. To see that feedback reflected in the final clinical product is immensely satisfying," Dr. Kirby says.

"The testing in partnership venture with the Royal Preston made Beam Modulator™ what it is today – a reliable, clinically useable, installable safe component, a component that will enable Elekta Synergy® S to satisfy the customer's advanced stereotactic needs," Knowles adds. "Plain and simple, if we hadn't gone to the Royal Preston last autumn, Beam Modulator™ would not be as good as it is today."

In December 2004, RPH began commissioning a production Beam Modulator™ on its Elekta Synergy® Platform. The system will be used to evaluate the field shaping capabilities of Beam Modulator™.

"We will begin using Beam Modulator™ at the end of March 2005, focusing on prostate cases, and in time, head-and-neck cases. We believe we will obtain extremely good field shaping for prostate fields due to the finer resolution. The planning studies we did, led by Glyn Shentall, Head of Radiotherapy Physics at Rosemere showed dramatic improvements in isodose shaping for prostate and head-and-neck targets," Dr. Kirby notes. "We will be doing further tests on Beam Modulator™ robustness and reproducibility and data collection. Other UK sites are also acquiring Beam Modulator™, and we are going to keep open channels with them so we can effectively commission them in parallel."



Conferences confirm Elekta's continuin g dominance in 4D Adaptive™ IGRT

With the 46th annual meeting of the American Society of Therapeutic Radiology and Oncology (ASTRO, October, Atlanta, Georgia, USA) as the backdrop, Elekta continued to assert itself as the undisputed leader in image-guided radiation therapy (IGRT) with two major IGRT meetings: the first meeting of the Elekta Synergy® Research Group and an IGRT educational symposium, each of which drew hundreds of attendees.

"These conferences staked out Elekta's clear leadership position in 4D Adaptive™ IGRT offered by Elekta Synergy®, an image guided robotic linear accelerator," says Rajinder Singh Dhada, Director, Global Marketing at Elekta. "These meetings emphasized the important role of IGRT in providing the most effective radiation therapy treatments and that Elekta is at the forefront in this field with a 4D Adaptive™ IGRT solution in clinics treating patients today."

The Elekta Synergy® Research Group (the first global users meeting of Elekta Synergy® customers) was held October 2, 2004 at Atlanta's Fox Theatre. More than 100 customers, who have purchased Elekta Synergy®, Elekta Synergy® Platform and Elekta Synergy® S, attended the event, along with Elekta officials and key members of the Elekta Synergy® Research Group.

The Elekta educational symposium on 4D Adaptive™ IGRT in the clinic convened on October 2, 2004 at the 755 Club at Turner Field, Home of the Atlanta Braves. This meeting attracted over 450 radiation oncologists, physicists, therapists, dosimetrists and administrators.

Elekta Synergy® Research Group emphasizes clinical breakout of world's first IGRT system

To highlight the first global users meeting of Elekta Synergy® customers, talks were given by representatives of the Elekta Synergy® Research Group, the founding members of which are: William Beaumont Hospital (WBH), Royal Oak, Michigan, USA, the Netherlands Cancer Institute (NKI/AvL), Amsterdam, the Netherlands, Christie Hospital (Christie), Manchester, UK and Princess Margaret Hospital (PMH), Toronto, Ontario, Canada).

After confirming Elekta Synergy® system's ability to acquire single volumetric images with VolumeView™ – to verify treatment delivery in a wide variety of disease sites – Christie began acquiring multiple serial images, according to Christie's Ann Henry, M.D.

"We acquired VolumeView™ images of patients with bladder cancer for the first five treatment days, and then once weekly during treatment," she said. "The coronal images were very good for verification in 3D treatment delivery to the CTV. In 93% of the images, the CTV was within the PTV and the GTV was always within the PTV."

Christie clinicians also obtained promising results in Elekta Synergy® lung tumor studies

"For several patients, we're acquiring AP and lateral Planar-View™ kV static and Motion-View™ fluoroscopic qulaity images over two to three breathing cycles and evaluating systematic and random set-up errors and lung tumor motion," she said. "The PlanarView™ kV static images give us much better bony anatomy definition and soft tissue resolution than electronic portal imaging."

Christie's prostate studies entail daily tracking of prostate motion. Elekta Synergy® is used for off-line analysis of CTV coverage to correct for systematic errors (translations). Investigators are also conducting on-board planning studies that employ Elekta Synergy® VolumeView™ volumetric imaging to assess the impact of deformation.

Di Yan, Ph.D., WBH, discussed ongoing projects in Adaptive Radiation Therapy (ART) utilizing Elekta Synergy®. These include hypofractionation of prostate cancer, accelerated radiation therapy for lung cancer and partial breast treatment. "These treatment processes all use Elekta Synergy® for either on-line navigation to correct for patient position and/or as an off-line tool for adaptive planning modification to account for the patient's temporal changes during the treatment course," Dr. Yan said.

WBH's applications afford the opportunity to evaluate Elekta Synergy® system's various imaging modes. For example, Motion-View™ is used to monitor breathing motion in lung treatments. "We can generate a digitally reconstructed image from 4D adaptive planning that is used to compare with portal MotionView™ before treatment to verify how the breathing pattern affects tumor motion and make treatment corrections accordingly," he says.

The concept is similar for partial breast treatments, except that implanted markers are tracked. "There's a surgical marker around the tumor bed," Dr. Yan says. "When we treat the patient, we use VolumeView™ and MotionView™ to monitor marker position, and determine what kind of modification is needed."

Additional Elekta Synergy® updates were given by Harry Bartelink, M.D. (NKI/AvL) and David Jaffray, Ph.D. (PMH). Elekta Strategic Program Manager, Elekta, Robert Pitt, provided an update on Elekta's stereotactic body radiation therapy IGRT program featuring Elekta Synergy® S.

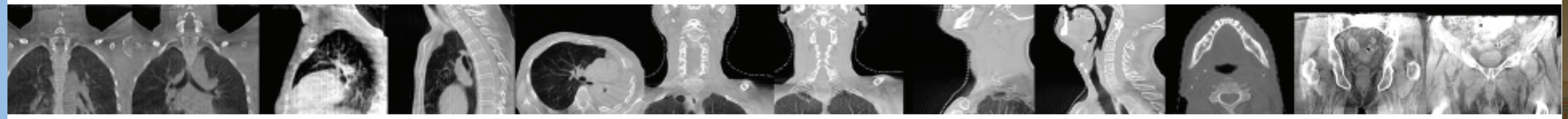
Elekta Research Director, Kevin Brown, shared his view that the technical development phase of Elekta Synergy® is officially over. "We are at the end of a period of significant product engineering and moving into an era of very broad clinical deployment and development."

He observed that the Elekta Synergy® Research Consortium will enable Elekta Synergy® users to share best practices and will serve as a clearing house for the collection of clinical data that will sustain funding and reimbursement for 4D Adaptive™ IGRT.

Jill Stief, Product Manager, Imaging and Positioning, Elekta, provided product update information on Elekta Synergy® and imaging software tools, which detailed a number of new software options and packages. Most significant are software options for three imaging modes: MotionView™, PlanarView™ and VolumeView™.

Symposium demonstrates Elekta's leadership position in IGRT

Clinicians at the four Elekta Synergy® Research Group institutions provided compelling testimony on the practical imple-



mentation of Elekta Synergy® today, at the Elekta Educational Symposium on 4D Adaptive™ IGRT in the Clinic.

Christie's Jonathan Sykes discussed two possible future applications of Elekta Synergy®, Intensity Modulated Arc Therapy (IMAT) and kV fluoroscopy. "In IMAT, Elekta Synergy® could be employed in an off-line adaptive protocol for auditing patient position during treatment," he said. "Performing the gantry rotations for both imaging and treatment simultaneously would save time, but we would have to determine how much MV scatter is encountered at the kV panel."

Utilizing a Farmer chamber, Sykes measured MV scatter to be 0.14Gy/min. or less than 0.2% of the dose at dmax. "MV scatter deteriorates image quality in terms of contrast-to-noise, but it may be possible to improve image quality by using scatter reduction techniques," he observed. "The reconstruction image quality is sufficient for automated 3D registration of high-contrast anatomical interfaces, such as bone-tissue and tissue-air interfaces."

Sykes also discussed the potential of Elekta Synergy® using either or both kV and MV imaging systems for real-time tracking of tumor motion in the upper abdomen and lung. "It may be possible in some cases to track the movement of features in the image and use these to infer tumor motion," he said. "An alternative is to track the motion of radiographic markers implanted in the tumor. Both strategies focus on finding a way to gate treatment based on tumor position."

"The PlanarView™ kV static images give us much better bony anatomy definition and soft tissue resolution than electronic portal imaging."

"Challenges arise in real-time measurement since both MV and kV beams are needed; the tumor may fall outside dose tolerance, necessitating turning off the MV beam and losing a key measurement dimension," he said. "Similarly, if the MV beam were an IMRT prescription, the MLC would inevitably obscure the marker of the feature being tracked. Therefore, the future of real-time measurement using Elekta Synergy® would be for validating indirect methods of monitoring tumor motion, such as tracking the surface of the lung or validating using Active Breathing Coordinator™."

To test the effects of MV scatter on contrast detail, Sykes imaged a contrast detail test object and gold seeds sandwiched between two slabs of solid water, with and without the MV scatter. "MV scatter reduces the visibility of all sizes of contrast detail, which will make automatic detection of small objects, such as radiographic markers, more difficult," he explained. "Solutions include either increasing the exposure or increasing marker size. A promising alternative could be using synchronous interlacing of MV and kV exposures."

Larry Kestin, MD (WBH), discussed the difficulties in free-breathing slice-based CT of lung tumors and how Elekta Synergy® was used to address these challenges.

"Unlike conventional CT, respiratory-correlated cone beam CT doesn't require an external signal – you can just use the diaphragm from the images," he said. "As long as we know in which breathing cycle phase each projection was obtained, we can reconstruct these images in a CT data set in that position of the breathing cycle. In the (Elekta Synergy®) respiratory-correlated scan, we have fairly good visualization of the tumor throughout the breathing cycle. A respiratory curve can be used to create a probability density function for tumor motion, to determine the mean position of the tumor based on the breathing cycle position."

WBH's 4D union technique (GTV = union of all GTVs acquired during 4D image scans), incorporates respiratory motion, enabling accurate definition of tumor position over time, Dr. Kestin notes. "Their 4D adaptive technique builds on this concept, incorporating further information, including the probability density function of tumor location, to reduce the margin while still assuring accurate coverage of the tumor in all phases of the breathing cycle."

Laura Dawson, M.D. (PMH), discussed the use of image guidance in a stereotactic hypo-fractionated radiation treatment protocol for primary and metastatic liver cancer. "When feasible, patients are treated with their liver immobilized using Active Breathing Coordinator™. Using daily orthogonal MV portal imaging, PMH therapists reposition the patient for any offset in diaphragm position of 3mm or more."

"This has enabled us to improve the accuracy of set-up, but MV orthogonal imaging has limits," Dr. Dawson observed. "The image quality for bone is not as good as that of kV, and the process is based on 2D alignment of vertebral bodies and the diaphragm, which is a surrogate for the liver."

"In the (Elekta Synergy®) respiratory-correlated scan, we have fairly good visualization of the tumor throughout the breathing cycle."

Using Elekta Synergy® Platform with XVI, PMH acquired 53 orthogonal sequence mode (MotionView™) sessions and 53 cone beam images in 15 patients with liver cancer. "kV imaging of fluoroscopic quality allows confirmation of the liver position and range of liver motion due to breathing immediately before each radiation fraction," she said. "We recently used Elekta Synergy® with XVI to obtain volumetric imaging of the liver, immobilized using Active Breathing Coordinator™. This 3D verification imaging is providing us with far more information than we had with megavoltage imaging and we are looking forward to using Elekta Synergy® Platform with XVI for image guidance of future liver cancer patients."

Additional presentations on early experience with IGRT in the clinic were given by Alvaro Martinez, M.D. (WBH), Charles Catton, M.D. (PMH, see article page 11) and Marcel van Herk, Ph.D. (NKI/AvL).

Top Kevin Brown, Elekta Research Director, and David Jaffray, PhD., PMH, at the seminal meeting of the Elekta Synergy® Research Group, October 2nd, 2004
Bottom Marcel van Herk and Harry Bartelink, M.D., NKI/AvL, presenting at the Elekta Educational Symposium on 4D Adaptive™ IGRT, October 2nd, 2004

Backed by:

- Scientific papers
- The Elekta Synergy® consortium
- The Elekta IGRT educational symposium
- A visitor-packed Elekta IGRT demonstrations and
- Ample evidence of Elekta 4D Adaptive™ IGRT in clinical practice today

Elekta made a powerful statement at ASTRO 2004 that it leads the world in IGRT

Elekta's IGRT leadership on display at ASTRO 2004

An estimated 10,000 radiation oncology professionals attended the 46th ASTRO in Atlanta, Georgia, USA, October 3-7, 2004 at the Georgia World Congress Center.

Elekta Synergy®, Elekta Synergy® S and 4D Adaptive™ IGRT formed the centerpiece of Elekta's offering. Around this unequaled IGRT portfolio, Elekta also built a forceful case for its continuing pre-eminence in neurosurgery and radiation oncology solutions with its broad arsenal of disease-fighting weapons, including Precise Treatment System™, Leksell Gamma Knife® 4C, Precise-PLAN®, PreciseBEAM® IMRT, Stereotactic Body Frame®, and Active Breathing Coordinator™.

At ASTRO 2004, Elekta presented IGRT, neurosurgery and radiation oncology, under the theme of "Disease-focused Solutions," clinical solutions that physicians can harness to treat breast, lung, prostate and metastatic disease. Elekta's sophisticated stereotactic tools and accurate disease targeting technology become potent weapons in the hands of clinicians, giving them the power to fight cancer more aggressively than ever before without endangering healthy tissue.

"Only Elekta gives clinicians the power to treat their patients with unmatched accuracy using IGRT or disease-focused solutions," says Anthony De Carolis, President and CEO of Elekta North America, Inc.

"Elekta remains at the forefront of technology, business solutions and treatment solutions. Our commitment to research and development, and to expanding our solutions will continue to fuel Elekta's growth, as well as the growth of centers using our technologies."

Elekta Synergy® still drawing thousands

The ASTRO 2004 Elekta Synergy® exhibit continued to attract intense curiosity and attention, even a full year since Elekta Synergy®, the world's first IGRT system, was launched at ASTRO 2003. Continuous Elekta Synergy® demonstrations were given at the Elekta exhibit during the five-day meeting, attracting large audiences. Attendees learned that Elekta Synergy® systems in clinical sites worldwide have acquired nearly 2,000 images among 200 patients and across a broad spectrum of clinical indications.

This year's conference highlighted new software options; single image mode (PlanarView™), sequence image mode (MotionView™) and volume mode (VolumeView™), part of Elekta Synergy® X-ray volume imaging technology. Also at ASTRO 2004, a total of 15 presentations and 16 posters featured Elekta 4D Adaptive™ IGRT, adding to an Elekta IGRT bibliography that currently lists 127 presentations and papers in 2004 alone.

Elekta Synergy® has made such tremendous progress in the last year that Elekta had the critical mass of interest in the radiation oncology community and wealth of clinical experience within the Elekta Synergy® Research Group to host two IGRT meetings at ASTRO 2004: the very first meeting of the Elekta Synergy® Consortium and an IGRT educational symposium, each of which drew hundreds of attendees.

"In the arena of IGRT, ASTRO 2004 was a stunning success for Elekta," says Rajinder Singh Dhada, Director, Global Marketing at Elekta. "Elekta clearly demonstrated its committment and the leadership position with clinically working 4D Adaptive™ IGRT solutions that we can offer doctors today. This was reflected in the attention Elekta Synergy® received at the exhibit, the number of papers and posters on Elekta 4D Adaptive™ IGRT and the incredible attendance at our IGRT events."

A weapon for all common clinical challenges

At the four corners of Elekta's ASTRO 2004 exhibit were disease-based clinical solutions, featuring sophisticated Elekta stereotactic tools and disease-targeting technologies.

- In the breast cancer area, demonstrators showed how Active Breathing Coordinator™ can help shield the heart from radiation, while OmniWedge™ software creates virtual wedges in any direction, that help obtain greater dose conformality to the treatment area.
- The lung cancer area featured Stereotactic Body Frame®, a tool for enabling increased dose delivery to the target in a reduced number of fractions – one clinic is ensuring high conformality for lung tumors using real-time MotionView™ during patient set-up on Elekta Synergy®
- Elekta Synergy® VolumeView™ dramatically increases targeting accuracy by enabling the visualization of soft tissue shape and position, according to one clinic's experience, as highlighted in the prostate cancer area. Another clinic uses VolumeView™ in an off-line adaptive manner to measure systematic errors, enabling PTV reductions.
- Lastly, the metastatic disease area highlighted the use of Leksell Gamma Knife® 4C to treat multiple brain metastases on an out-patient basis. In addition, one clinic is considering the use of Elekta Synergy® to rapidly image, verify and palliatively treat a patient suffering pain from a spinal metastasis.

COMPANY INFORMATION

Fighting serious disease

www.elekta.com

Stereotactic Neurosurgery • Gamma Knife® surgery • Functional Mapping • Precision Radiation Therapy • Image Guided Radiation Therapy • Stereotactic Radiation Therapy

Corporate Head Office
Stockholm, Sweden
Tel +46 8 587 254 00
Fax +46 8 587 255 00
info@elekta.com

Worldwide Product Support Center
Tel +44 1293 654068
Fax +44 1293 654655
info.europe@elekta.com

North America
Atlanta, USA
Tel +1 770 300 9725
Fax +1 770 448 6338
info.america@elekta.com

Europe, South America, Africa & Middle East
Tel +44 1293 654068
Fax +44 1293 654655
info.europe@elekta.com

Japan
Kobe, Japan
Tel +81 78 241 7100
Fax +81 78 271 7823
info.japan@elekta.com

Asia Pacific
Hong Kong, China
Tel +852 2891 2208
Fax +852 2575 7133
info.asia@elekta.com