In today’s clinical environment, quality is expected, with no time for delay. More medical physicists are selecting ArcCHECK® and 3D SCANNER™ to save time and improve quality.

DISCOVER THE DIFFERENCE

ArcCHECK®
Over 500 installations since October, 2009

3D SCANNER™
Over 100 installations since March, 2011

Your Most Valuable QA & Dosimetry Tools
www.sunuclear.com
Dear Colleagues,

Since 2010, radiation oncology has come under the spotlight of both media and government, and much remains to be seen in terms of how the important issues of patient safety and fee schedules will evolve. What we do know is how far radiation oncology has positively progressed from only ten years ago and how much more opportunity we have ahead of us.

One sign of a rapidly evolving and innovating marketplace is a proliferation of choices. This is certainly true in radiation oncology for both patients and practitioners. At Sun Nuclear we are committed to working with practitioners to simplify their QA choices, and improve the implementation of their selected delivery technologies to give our mutual and ultimate customer, the patient, the best possible outcome.

For patient specific QA, Sun Nuclear offers the widest array of options designed to simply your workflow and improve the effectiveness and value of your QA efforts.

Meet Sun Nuclear’s Support Operations Team!

At Sun Nuclear we know the value of good support, and are committed to providing customers with the best possible support experience. As always, customers receive complimentary standard technical support. If you have a question, give us a call or submit a support request (www.sunnuclear.com/support) and we will answer your questions.

Sun Nuclear’s Support Operations team is the best in the radiation oncology QA and dosimetry industry. Amongst our 21 professional team members you will find:

- 4 physicists, including medical physicists
- Professional backgrounds in engineering, radiation oncology, teaching, customer support, and hospital operations
- Prior experience at radiation oncology TPS and Linear Accelerator manufacturers and service providers
- Coverage in South America, Europe, Asia, and North America
- Multi-lingual specialists in Chinese, Russian, Spanish, German, Turkish

Sun Nuclear’s Support Operations group offers more than technical support.

Professional installation and training services are available for all products to get you up, running, and productive in less time. We offer on-site and web based training – the choice is yours. Contact your regional account manager or insidesales@sunnuclear.com to learn more.

We are adding common machine QA tests into our SNC Patient QA software, as described in this newsletter, as a way to help you do more with less time. Also in this newsletter you will find an article on a promising new research project sponsored by Sun Nuclear that quantifies the interplay of motion and dose modulation, as a way to allow clinicians to improve the effectiveness of the technology they are investing in. Finally, we recognize the value of your time and the importance of receiving help when you need it, which is why we have increased the size of our customer support team by over 50% since the beginning of this year to a total of 21 dedicated team members (see below).

As always, Sun Nuclear is honored to contribute to the advance of radiation oncology and the high promise it holds for many cancer patients. We look forward to the positive improvements that lie ahead of us and in partnering with you to make it happen.

Sincerely,
Jeff Simon
Chief Executive Officer
Sun Nuclear Corporation

Our online support site is a free and powerful tool that provides you with 24/7 access to all of your product information, software access, license key access and generation, and account maintenance. Visit www.sunnuclear.com/support to learn more.

There is a choice when it comes to quality service and support. Our promise to you – should you need it, we will provide a support experience that is positive, productive, and efficient.

Left to Right: Johnnie Nowells, Corey Jaenicke, Andrew Flinn, Jim Sellers, Sandra D’Cruz, Brian Moravecky, Amy M. Smith, Fernando Otero, David Rayburn, Sam Newstadt, Jason Sun.

Not Pictured: Paul Jason, Jeff Dinan, Daniel Vergara, Salih Arican, Mustafa Gurbuz, Jesus Fernandez, Oksana Skripka, Andrew Dike, Max Tang, Darron Burow.
WHAT’S NEW

3DVH® 2.2 Now Released
- Integrated 4D Workspace tab
- Dose plane export
- Shift calculation tool

SNC Patient™ 6.2 Now Released
- New Machine QA module – included with SNC Patient 6.2 for ArcCHECK and MapCHECK™ 2 (see below)
- ArcCHECK Merge – merge two ArcCHECK measurements to create double detector density – ideal for SRS/SBRT

ArcCHECK® PMMA MultiPlug™
- Accepts ion chambers, diodes, film
- Position single detectors in any of 25 unique locations
- Accepts heterogeneity plugs

PDI Extender
- Extended power/data cable to 50 meters

3D SCANNER™ System
- Setup and verification functionality from pendant
- SNC Dosimetry™ 1.6
- New 3D MiniLift™
- Detector setup caps

DoseLab™ 6.4
- New Tolerances – design tolerance sets for different machines, image settings, and more
- 3D Winston-Lutz – automatically calculates 3D offsets with as few as two images
- FractionCHECK™ for Elekta – only software available for Elekta treatment log file analysis
- PDF Reports – save your PDF Reports to the built-in DoseLab database

ATLAS™ QA 1.4
- New Test Builder feature enabling ultimate flexibility in test design and customization
- Standard test libraries for daily, monthly and annual tests (e.g. TG-142 & TG-51)
- Machine maintenance and downtime tracking/reporting

MACHINE QA MODULE

Standard with SNC Patient 6.2

ArcCHECK® MapCHECK® 2

With the release of SNC Patient 6.2, a standard suite of tests for Machine QA is now available for ArcCHECK and MapCHECK 2. Tests include:

- **Gantry angle:** independently verify Linac gantry angle without inclinometers or additional cables (ArcCHECK)
- **Gantry rotation:** perform a gantry star shot and a gantry isocentricity test for static and arc delivery (ArcCHECK)
- **Gantry speed:** perform a gantry speed test for an arc delivery (ArcCHECK)
- **MLC/collimator:** perform a MLC/collimator QA test (ArcCHECK)
- **Beam profile flatness & symmetry:** perform a profile flatness & symmetry test (ArcCHECK)
- **Beam delivery system reproducibility:** test short and long term reproducibility of a beam delivery system (ArcCHECK and MapCHECK 2)
- **Collimator rotation QA:** perform a collimator star shot and collimator isocentricity test (MapCHECK 2)
- **Couch rotation QA:** perform a couch star shot and couch isocentricity test (MapCHECK 2)

WHAT USERS ARE SAYING

In selecting a new dosimetry scanning system, our key decision criteria were positional accuracy, reproducibility, stability and a quick and easy set up procedure. We chose Sun Nuclear’s 3D SCANNER, which satisfies all 4 aspects and astoundingly has an Auto-Setup capability which allows the tank to level itself (Z) and detect the beam center and adjust its position (X/Y) to within +/- 0.1mm, all automatically. We have found these features to be very beneficial to our dosimetry scanning results.

Homeira Mosalaei, M.Sc.
QA Coordinator
London Regional Cancer Program
Ontario, Canada
Quality in Motion
The Interplay of Dynamic Dose and Targets-in-Motion

When a moving target is irradiated by dynamic dose delivery, there is an interplay effect that influences patient dose and DVH. This is not well accounted for in routine QA but is very important in our quest to improve patient safety and outcomes. This article describes recent research that allows a clinic to quantify the impact of the interplay effect and estimate accurate dose to moving targets before treatment.

Background: The Interplay Effect
Modern radiation therapy delivery is dynamic in nature, even more so with VMAT where the MLC leaves and the gantry are in constant motion. Anytime there is dose that is highly-modulated vs. time, the interplay effect is a critical consideration. Interplay is the term used to describe the complication of estimating target/anatomy cumulative dose when the dose pattern itself is moving, i.e. dynamic, such as with IMRT, VMAT, TomoTherapy, etc.

Interplay complicates the ICRU concept of the internal target volume (ITV) because the moving target can no longer be assumed to be contained in temporally invariant beam doses as was the case with simple 3D plans. Interplay acts, in general, to degrade (i.e. lower) target dose coverage while increasing dose to adjacent organs-at-risk (OAR). The interplay effect becomes even more pronounced the fewer the treatment fractions (hypofractionation, SRS, SBRT), as it becomes less likely that interplay effects per-fraction can “cancel each other out” over N fractions.

4D Measurement Guided Dose Reconstruction and 4D Voxel Tracking
Sun Nuclear’s 3DVH® uses measurement-guided dose reconstruction (MGDR) to estimate delivered patient dose. Like a TPS, these dose estimates are based on a rigid body, virtual patient model. However, by virtue of the “4D” nature of MGDR with ArcCHECK dose movie measurements, one can generate high density, high resolution time-resolved dose grids, i.e. 4D dose grids. These dose grids enable simulation of moving target scenarios to quantify the effects of interplay between moving targets and dynamic dose delivery. Figures 1, 2, and 3 illustrate the basic concepts of what we can call a “virtual motion simulator”.

To prove the feasibility of pre-treatment moving-target/dynamic-dose estimation, the methods must be proven accurate. Moffitt Cancer Center, led by Dr. Vladimir Feygelman, is conducting studies to independently prove the accuracy of a virtual motion simulator with a research version of 3DVH. Dr. Feygelman’s validation strategies include exotic permutations of dynamic dose delivery combined with physical moving targets embedded in measurable patients (various phantom shapes and sizes) atop a 2D motion platform. The first phase of validation compares virtual motion simulation absolute dose estimates to time-resolved ion chamber measurements and cumulative film dose. The results are very encouraging and have been accepted as an oral presentation at the upcoming International 3D Dosimetry Conference in Sydney, Australia, and will be submitted for peer-reviewed publication soon.

Summary
A virtual motion simulator is one more way Sun Nuclear is researching ways to expand your toolset for pre-treatment dose QA, enabling you to improve patient safety and quality in radiation oncology.
Weekly Webinars

Sun Nuclear hosts free weekly QA & Dosimetry webinars every Thursday at 12:00pm EST. Webinars last approximately 30 minutes and are delivered by clinical users. Register now at www.sunnuclear.com/webinars.

QA & Dosimetry Symposium

The 6th annual QA & Dosimetry Symposium will be held April 5-6, 2013, at the Hilton / Waldorf Astoria in Orlando Florida, and offers approximately 13 CAMPEP credits.

The Symposium is the only annual event focused on issues related to QA & Dosimetry in radiation oncology. The goal of the symposium is to expose attendees to clinical talks from industry experts on new and relevant products, processes, and techniques in today’s evolving radiation oncology Medical Physics and Patient Safety environment. The clinical talk schedule is supplemented by opportunities to interact with leading industry vendors and colleagues on both professional and social levels. Register now at www.qasympostium.com

Register Now!
April 5-6, 2013

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Orlando, Florida
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QA & DOSIMETRY NEWS

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QUALITY IN MOTION
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