

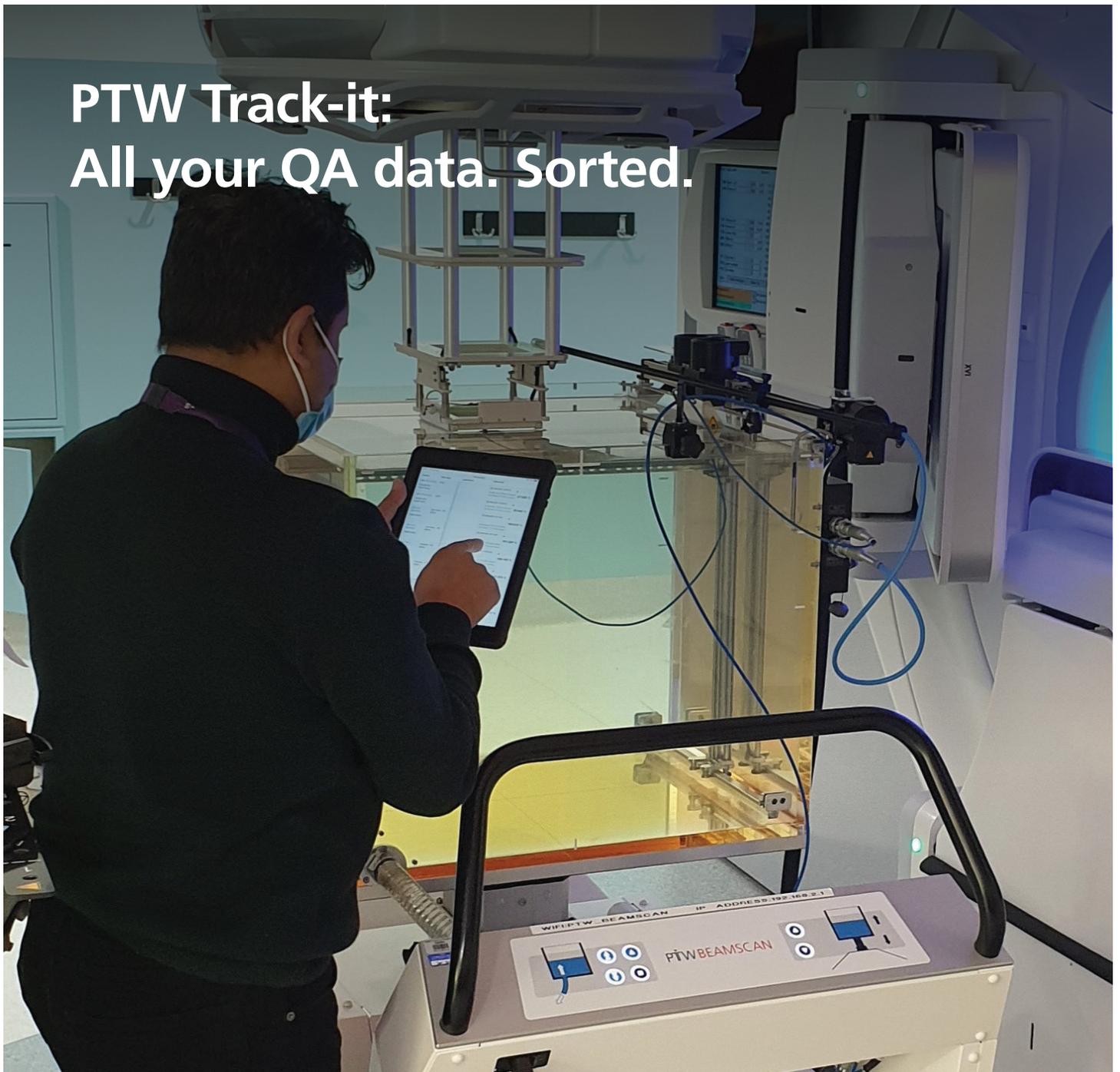
A User's View

October 2021

Implementation and use of Track-it data management software for quality assurance in radiation therapy: A user experience

By Steve Weston and Ashraf Esmail,
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Hospitals (Leeds Cancer Centre), UK

**PTW Track-it:
All your QA data. Sorted.**



Streamlining QA data management in radiotherapy

Any medical physicist who has prepared the annual audit of a linear accelerator knows the time and effort involved in this process: The QA reports of hundreds or even thousands of measurement tasks must not only be documented in a reproducible manner, but also be complete and easy to find regardless of whether they are available digitally or in paper form. The acquisition and compilation of annual tasks is not the only challenge however—monthly, weekly and daily quality assurance (QA) tasks also demand a great deal of time and effort.

Many data are still partly handwritten, available only in hard copy form and distributed at different locations as well as stored in different forms and on different media. In many cases, handwritten entries cannot always be deciphered easily. It is also very time-intensive to change test procedures, because changes must be made in all existing protocol templates. If an error message occurs on a linear accelerator, the question of whether this error has already occurred before can usually only be answered after careful scrutiny of the linear accelerator's paper logbook. For the same reason, subtle but important changes in tolerances and deviations from expected values can easily go undetected.

To address these challenges, PTW has developed the browser-based Track-it data management platform, which is accessed through the local area network of the hospital or doctor's office. All QA data from different sources can be documented, monitored and accessed at any time using any WiFi-enabled device. Measurement data from different devices can be imported directly into Track-it or via an open XML interface, and historic data can also be added.

A practical tool for the annual audit —but also for daily clinical routine

In Track-it, QA data is provided in a structured, readable format, visible and accessible at all times. This not only considerably reduces the time required for the annual audit, but the data management platform also helps to streamline the daily workflow. Individual measurement results as well as entire measurement series can be retrieved quickly and easily by convenient search functions or by setting filters, for example, by date, keyword or specific parameters. The selection of templates saves time and greatly improves the daily QA workflow.

Deviations can be easily identified by the trend function

The trend function in Track-it can be used to track and monitor machine-specific parameters at a glance. This makes it possible to quickly determine whether the values remain constant over time. If deviations from expected values exist (over weeks or months, for instance), these can be visualized and quantified. Measurement results of multiple devices can be displayed in one single plot, so deviations between different and/or several radiation devices can also be identified more easily. If deviations are detected in good time, appropriate interventions can occur before critical values are reached.

Track-it Fact Sheet

- ▶ **All QA data in a central platform, accessible at any time via PC, tablet, etc.**
- ▶ **Flexible, open structure—easy to adapt to individual needs**
- ▶ **Quick access to information on different radiation devices**
- ▶ **Trend function for constancy checks: identify deviations before they become a problem**
- ▶ **Easy to update in case of changes in test procedures**

Case Study at The Leeds Teaching Hospitals (Leeds Cancer Centre), UK

The QA team of the Medical Physics Department supported the development of Track-it from the very beginning.

A case study by medical physicists Steve Weston and Ashraf Esmail.

Why we chose Track-it

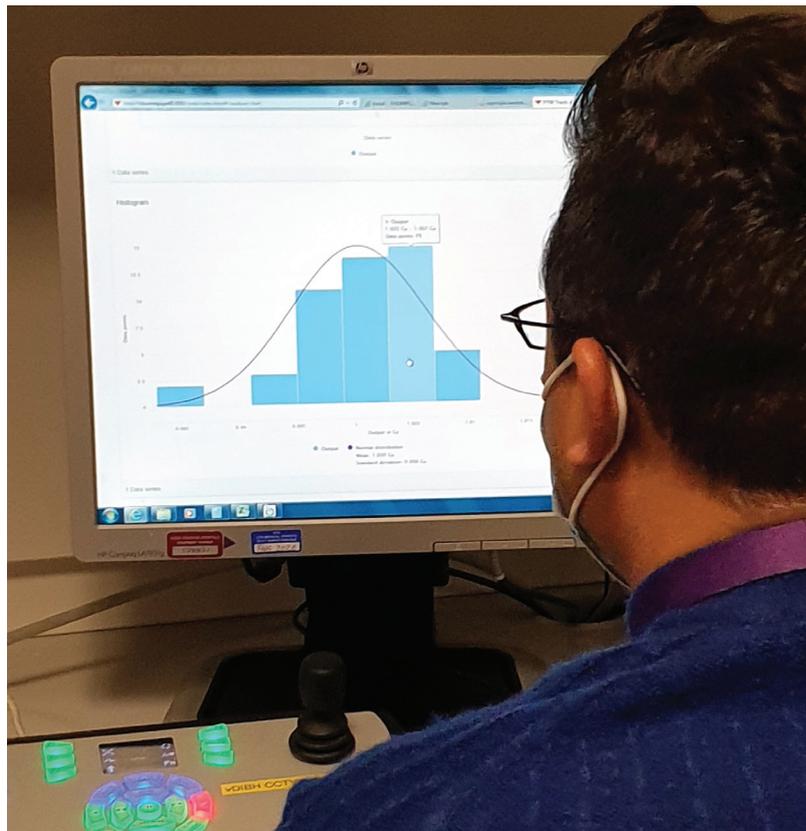
It was a long-term goal of ours to develop an electronic database for all our QA data. Back when we started looking for a solution, there were no suitable products on the market, and we did not have the resources available to develop our own system. Around 2012 and 2013, the first products started to appear on the market and we evaluated these carefully. When we finally decided to use Track-it, it was clear that we were amongst the first users and there was little practical experience with this software in the field.

We regarded the fact that we were starting with Version 1.0 of the software as a big advantage for us. It was a conscious choice of ours to help develop the software, to test it in our clinical environment, and to assist in improving the system. The fact that we have been, and still are, involved in its development has not only been advantageous for us, but also for PTW.

The development team at PTW is small, which meant we had close and direct contact with them, and all our comments and feedback were being passed on, unfiltered, to those developing the software. As a result of this close collaboration, we benefit from using a system that comes closer and closer to being absolutely ideal for our requirements.

“It was a conscious choice of ours to help develop Track-it. As a result, we benefit from using a system that comes closer and closer to being absolutely ideal for our requirements.”

—Steve Weston



How we implemented Track-it

Initially, we had just one person working with Track-it. We set the software up, tested it and gradually began configuring the data management system to suit our requirements. The paper forms and Excel spreadsheets, which had previously been the basis for our linear accelerator (LINAC) QA, were converted into Track-it protocols. In order to test the protocols, we integrated one of our LINACs into the

Track-it workflow, initially performing lots of simple tests involving no electronic data transfer or associated equipment—PTW or otherwise. Since Track-it is very flexible, you can collect data on any QA parameter. The protocols, which we have developed over time, are now very extensive. They include hundreds of tests, and we now process and manage all of our QA procedures with Track-it.



Why Track-it is at the heart of day-to-day activities

Track-it is one of the most important systems that we have in radiotherapy, and its use extends across the whole of the service. It has become such an essential part of our equipment and data management system, that before the system is taken offline to allow updates to the software, we ensure there are no major upcoming QA tasks which need to be carried out during this time. This is because we record all outputs, document the monthly LINAC QA, and even have the CT simulators represented in the Track-it software.

When the department saw the potential of the Track-it data management system, and how flexible it is, they all became very interested. That is why Track-it is now used to support QA of the Gamma Knife and brachytherapy treatment systems—for which we do not actually use any PTW dosimetry hardware. We really appreciate how mobile we can be with Track-it; there is department-wide WiFi and we can use iPads to record the data directly whilst working at the LINAC. You can use the iPad to record data and upload it later if there are issues with the WiFi. An additional bonus is it is very easy to take a photo with an iPad and attach it to the QA record if necessary.

Hospital Profile

The Leeds Teaching Hospitals 
NHS Trust

The Leeds Teaching Hospitals
Leeds Cancer Centre
Medical Physics Department



▶ Radiation Equipment and Devices:

- 12 LINACs
- 3 CT simulators
- 1 brachytherapy unit
- 1 Gamma Knife

▶ Measuring Devices:

- About 70% PTW equipment
- BEAMSCAN water phantoms
- UNIDOS electrometers
- STARCHECK array
- Various detectors
- About 30% other brands

▶ Radiotherapy Physics Department:

- About 105 employees
- 36 medical physicists
- 43 consultant oncologists
- Dosimetrists
- Assistant technicians
- Key radiographers

▶ Use of Track-it:

- Since 2016
- 40 active users

▶ Number of Track-it Licenses:

- 9

▶ Number of Patients:

- 7,000 per annum

Track-it features that we find especially helpful

The **simplicity and user-friendliness** of Track-it were amongst the main criteria which convinced us to implement this software. It incorporates a traffic light system that indicates if there are any discrepancies or if any action is required to be taken.

The **scalability and the adaptability** of Track-it has proved very useful. We are a large centre, and many systems often struggle to cope with the demands that we have. Adding other modalities to Track-it has been very straightforward.

The **trend function** is one of the features that we use most frequently. It allows an overview of a machine's performance over a period of time to be evaluated, or even provides a direct comparison of the performance of different machines across the fleet. When we suspect that there could be a problem, we can analyze the relevant data very quickly using Track-it, and thus establish if remedial action is required. One of the system's greatest strengths

is that it is so unbelievably easy to compare data. The relevant data is selected—we have been using Track-it since 2016, so we already have a large amount of data—and within a few minutes we can assess how our equipment is performing.

The **homepage** offers a very useful overview; it allows us to see immediately which tests need to be carried out, and the results from the tests that have already been conducted can be viewed with just a mouse click. With Track-it fully deployed, the QA workflow is very straightforward.

The system allows the **attachment of PDF documents**, so we no longer need extensive instruction booklets. If someone requires further information or a reminder of the details of a particular test, they can now easily access PDF versions of the procedures at any time. Because all the data in Track-it is always available, there is no need for us to generate regular reports.

Therefore, we only produce PDF reports for specific purposes, such as audits.

A massive improvement for us was the development of **protocol templates**. This allowed us to apply a particular protocol to any number of LINACs—which was especially useful for us at such a large hospital. We can now manage the machine fleet more easily by assigning a specific test protocol to a particular group of accelerators. When changes need to be made, all that needs to be done is to adapt the protocol template accordingly—and that's it!

A further advantage is that the **system is web-based** and thus accessible from anywhere with a user-specific login. This means the data can be retrieved from within the treatment rooms, where the test equipment is located, or from anywhere else, which has been particularly useful during the SARS-CoV-2 pandemic, as the data can be accessed from home using Citrix.

Personal



▶ **Steve Weston, The Leeds Teaching Hospitals (Leeds Cancer Centre)**

1991 – 1996: PhD (Physics) at the University of Hull
1996 – 2002: Trainee Physicist at Leeds Cancer Centre
2002: MPE Radiotherapy Physics
2005: Head of Radiotherapy Technology Physics at Leeds Cancer Centre



▶ **Ashraf Esmail, The Leeds Teaching Hospitals (Leeds Cancer Centre)**

2002: PhD (Physics) at the South Bank University London
2002: MRI Physicist at the Royal Naval Hospital Haslar in Gosport, Hampshire
2016: Radiotherapy Clinical Scientist at Leeds Cancer Centre

Tips & Tricks

When making a decision about which software solution you should use for QA, it is not only the acquisition costs that need to be taken into account, it is also a question of the level of manpower required for the implementation and development of the system.

Therefore, it is important not to underestimate the amount of work required when setting up, configuring and

modifying a data management system. With a software solution such as this, which is intended to significantly improve the daily workload, a certain level of input and effort is required at the beginning, and this needs to be planned for. Once the software is installed and set up, time should be scheduled for managing updates and regularly maintaining the protocols.

“It is less of a tip, but more of a recommendation: Use Track-it to map the entire QA. The software is so incredibly flexible that practically anything can be integrated, not just PTW measuring devices.”

—Ashraf Esmail

Brief and to the point

“We have incorporated practically all QA data in Track-it. The fact that 100 percent of QA tasks are recorded using Track-it speaks for itself.”

—Steve Weston

The main advantage for us with Track-it is that it can always provide us with a complete overview of our QA data. This is particularly significant for us due to the size of our radiotherapy department, with its extensive, multifaceted infrastructure, including

12 LINACs, a brachytherapy unit, 3 CT simulators, a Gamma Knife and in the future also an MR simulator. We have incorporated practically all QA data in Track-it. The fact that 100% of our QA tasks are recorded using Track-it speaks for itself.

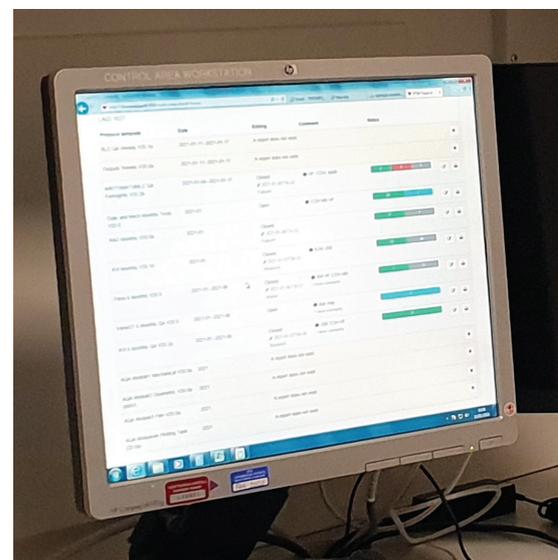
Outlook for the future

The next big step for us will be importing data from our Excel spreadsheets into Track-it. We are currently working alongside PTW to develop a tool that can be used to import this data directly into Track-it.

There is only limited space left in our department, but in 2021, we will take

possession of an MR simulator, and the QA data from this machine will also be recorded in Track-it.

Thanks to Track-it, we completely eliminated the dependence on paper records and are working in an entirely paperless environment.



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Publisher

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Lörracher Strasse 7
79115 Freiburg

Editor

PR hoch drei GmbH
www.pr-hoch-drei.de

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Design and Layout

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