The development of a Virtual Reality Dosimetry Training Platform for Physics Training.

The Virtual Environment for Radiotherapy Training (VERT) provides a simulation environment to aid the training of radiation oncology professionals. It was initially developed to help address the issue of clinical resource shortages with regards training Therapists/Radiographers. A 3D model of a Linac is controlled using authentic hand pendants and behaves in a manner consistent with its real world counterpart; three major Linac vendors are represented. A patient representation, plan and associated dose are available via a DICOM interface, allowing treatment delivery to be simulated. One of the exciting uses of VERT, indeed one that the user base is particularly active in expanding, is the ability to explore administration errors and ‘treatment incidents’ in a safe environment. The images presented here are captured from the VERT software.

The scope of the VERT system has been expanded to include a newly developed range of Physics equipment, which allows the user to undertake realistic QC processes on the virtual Linacs. Five devices have been modelled: 1) scanning water phantom (Fig 1), 2) ‘solid water’ QC block/ion chamber, 3) light/ radiation field coincidence phantom, 4) laser alignment phantom and 5) water based calibration phantom with reference class and ‘departmental’ ion chamber. Mechanical and calibration errors can be simulated (Fig 2), including jaw calibration, laser alignment and isocentre integrity, in order to allow the trainee to explore fault conditions. The more complicated phantoms are articulated in the simulation, allowing the chambers to be placed at depths selectable by the user. The water tank can be misaligned and poor set up ‘measured’ by observation of the attached spirit levels. Simple beam models are embedded in order to enable the chambers to register realistic measurements. The calibration phantom workspace is shown in Fig 4. As with the VERT system, the intention is to provide a training environment that can prepare the trainee to use the real equipment so that maximum efficiency is gained when using the latter.

Furthermore, fault conditions (poor calibration) can be explored without any danger of leaving a real Linac in that state! The VERT system can be installed in a conventional seminar or teaching room. In summary, the Virtual Training environment is a safe way in which experience can be gained and the trainees understanding of processes can be enhanced in a ‘classroom’, with realistic simulations of actual equipment and protocols.