Characteristics and Graphical User Interface to New Dose Calibrator

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Nuclear medicine consists of the use of radionuclides in medicine for diagnosis, staging of disease, therapy and also for monitoring the response during a disease process. Before treatment, the activity to be administered to the patient must be checked. This measurement is performed using popular instruments for performing assays of radioactivity in nuclear medicine, such as the commercially available reentrant ionization chamber, or dose calibrator [1].

The dose calibrator is intended to measure the activity of a radioactive source of a known isotope. This new instrument is capable of measuring a current of less than one picoampere. In the picoampere world, there are three common enemies: current leakages, noise sources, and stray capacitance. A good lowcurrent design must minimize the effects of these common enemies and strike a balance between optimal performance and product manufacturability. The amplifier's inverting input node and its feedback elements are critical nodes. The current leakage in this node determines the ultimate accuracy of the device.

The graphical user interface developed to be used with the new dose calibrator uses the human centered design approach, under guidance from the LABUCH (Laboratório de Usabilidade e Confiabilidade Humana) at IEN. The human centered design emphasizes the use of ergonomic methods to collect human performance data, so that the allocation of the user's needs can be guaranteed in all phases of the equipment design [2]. Figure 1 shows the main screen of the dose calibrator.

The unit chosen for control functions and display measurements was an Ipad tablet. A tablet computer is a wireless, mobile computer, with a touchscreen display, circuitry and battery in a single device. The iPad runs on the iOS operational system.



Figure 1. Main screen of the dose calibrator display unit.

Easy to read and intuitive to use, the touch screen display prompts users to advance effortlessly and logically through the dose calibrator. In the main screen, the system operates as a dose calibrator. The real time activity is measured in the detector for the isotope selected.

As an extra option, the same screen could run on a microcomputer with touch screen. In addition to counting isotopes, the dose calibrator screen allows the user to Zero Background, Select isotope, perform Dose Calculation, or print labels for the current activity in the detector. The user can also select wireless printers to print the results.

The new equipment simplifies the productions and modernizes the user interface using a tablet device as a control and display unit. New functions can be easily programmed and aggregated to the equipment using these devices.

References

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