

Memorandum

To: Mark Ardis, Rose Hulman
From: Gary Adler, Chief, Medical Physics, Hux Cancer Ctr
Date: December 12, 2002
Subject: Lotus 123 Monitor Unit (MU) Calculation Program Issues

Description: Monitor Unit Calculation Program

A program designed to calculate the amount of time a linear accelerator must be turned on (Mu = monitor units) to deliver the dose of radiation to the intended target based on a series of machine parameters to be used, the quantity of radiation to be delivered, and some information about the patient (depth inside the patient). It consists of an introductory spreadsheet (mucalc_f.wk4) which gives basic directions and information about current changes to the program as well as providing the locked control of flow of the calculations to follow. It also provides the user interface for selection of the 3 types of calculations and a data integrity check controlled by special spreadsheets with automatic macros (via 1 of 4 custom smarticons). Once one of these smarticons are clicked, another spreadsheet opens and an automatic macro is begun which controls the input through custom dialog boxes with preset default values that can be altered by the user, and the resulting calculation of the monitor units. At the end it was designed to offer an opportunity to either print the preselected section of the spreadsheet, preview it, or cancel the print. In all cases it would then close the calculation spreadsheet and return to the introduction spreadsheet, awaiting either the closing of the program or selection of another icon.

The worksheets, icons and macros were designed to operate in Release 5 of Lotus 123. However using Windows 2000 operating systems, release 5 hangs up, necessitating that we try and use a new version of 123, specifically Release 9. After Release 5, Lotus moved to Lotus Script and many of the originally supported macro commands no longer work. Other subtle changes also exist which prevent our program from running flawlessly.

There are some issues which make it impractical to use by a non-technical individual (as opposed to a computer literate individual). There have always been some issues that made the program less than efficient. I need to find ways around the first issue and would like to find ways around the 2nd issue.

I will try and explain the issues below:

1: Issues which need to be addressed so that we can use the program

A. The data integrity check macro worksheet apparently cannot find the data/data spreadsheet files to identify if the data is unchanged. This appears to be a change in the way newer versions of 123 expect the path to be written.

B. The electron macro has list in the input dialog boxes from which the user is suppose to pick the appropriate choice by highlighting them. However in the new version of lotus, when you complete selections in the dialog box and click OK, you get a warning that you have not selected anything in those particular list fields. This of course is essential to continue on.

C. When you complete any of the macro calculations and get to the print screen, if you choose print it prints, but when control is returned to the introductory spreadsheet, the smarticons bar with the smart icons for selecting a type of calculation is not active and cannot be utilized. However, if you select Cancel, the SmartIcon bar is active and further selection can be made.

D. Originally the screen was setup to display only Printer Selection on the Menu Bar and only the calculation and integrity check smarticons and an Exit Smarticon. However, I cannot figure a slick way to have the intro spreadsheet run a macro initially to set up only those icons - an extra bit of safety, but perhaps overkill. Part of the problem is with non computer literate individuals, I don't want them to have to figure out how to get icons up to choose from, nor do I want them to be able to get out of controlled execution of the calculation macros.

E. There is an extension of the calculation needed to improve the results in a couple of the spreadsheets. One selection is for a wedge factor currently taken from a two dimensional table (wedge angle vs Beam Energy. New data we have shows that there should be another parameter included to better refine the value: for each energy: data as a function of wedge angle AND Beam Size (which is currently a calculated value in the spreadsheet but currently not used to pick this wedge factor. So we would like to reconfigure this data and the dialog box action to find the appropriate value when a wedge is used. If this new data table is created and used, then it will require the data integrity check macro to be updated with a data value for comparison to the data value of the new table spreadsheet.

Issues that would be nice to address:

A. The possibility during execution of a calculation macro to calculate one mu set, view it before going on to an extra calc on same spreadsheet, and if it looks not appropriate, to select redo, and go back over the calc, using the current values as defaults in the dialog boxes, allowing user to only change what needs to be different. Also allow this type of repeat of any of the 4 possible mu calculations that can be put on one sheet during execution.

B. To eliminate print preview, and configure displays such that the entire printable area is viewable on the screen (this would be associated with the usefulness of A above. Part of the problem now is a Calculation Macro button that sits right in the center of the display area, preventing viewing the data underneath it.

C. The possibility to save these spreadsheets in a directory and to call them

back at a later time, modifying the input and recalculating. Sometimes as treatment goes on, one or two parameters, might change necessitating a recalculation. Each time requires re inputting all the data to redo the calc. This is a nicety, but not important if it would take too much time to figure out how to do it and implement it in a secure method. Infor protected from change except thru recalc and when resaved, saved with a different name, but for same individual.

There are a lot more improvement that could be made to make the program (or the concept) useful for years to come. But would entail significant research into methods currently being used to do special calculations and modeling - something that I am not up on at present as we do not have equipment, needing those types of calculations.

Gary Adler