



CANCER RESEARCH AND TREATMENT CENTER  
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BIOMEDICAL PHYSICS DIVISION

July 30, 1980

TO: Distribution

FROM: H. Amols

SUBJECT: Dynamic Treatment Software Users Manual

STEP #1: Create a data file to be used by the dynamic treatment software. This data file contains information on the rangeshifter functions and the relative weighting factors used at each step of the treatment. These data are determined from the treatment planning programs developed by M. Collier and A. Smith.

These programs calculate, for each step of the treatment, two numbers, the normalized dose weight ( $W_i$ ) and the field factors ( $f_i$ ). From these numbers, calculate the following:

$$F_T = \sum_i \frac{W_i}{f_i}$$

$i$  = sum over all steps of the treatment

$$F_i = \frac{1000 \times W_i / f_i}{F_T}$$

be sure that there are no roundoff errors, so that  $\sum_i F_i = 1000$

$$FCTR = \frac{F_T}{10 \cdot DFANPLAN}$$

where DFANPLAN = The maximum dose value as calculated by the program FANPLAN (DFANPLAN  $\approx$  30-40, and FCTR  $\approx$  .001)

Once all of these numbers have been calculated, log onto the 11/70, under UIC = [30,6] (Password = RED) and run the program SIMAK2. This code will create a treatment table file on disk. Run the code as follows:

<u>Question</u>	<u>Answer</u>
Output file name	6 character name for treatment table
Tune #	as required
Port #	
Rads, FCTR	total dose in rads, FCTR as described above. Format is 2F12.6. Commas are OK.
NPTS	number of steps in treatment table. Format is I2.
x, y, $F_i$ for step $i^*$ (See note below)	x, y, position in mm, $F_i$ as described above. Input format is 3I4. Commas are OK. This question will be repeated NPTS times.

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RS function for step i

6 character name of rangeshifter file.  
This question will be repeated NPTS  
times.

STOP

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Your file now exists, at UIC = [30,6] with extension.TAB

\*Note: x and y are values of couch position, in channel coordinates. That is, if  $x_i > x_{i-1}$  then on step i of the treatment, the couch will move  $(x_i - x_{i-1})$  mm in the +x direction (i.e. towards the scanner, approximately SSE.). +y is approximately WSW.

When this file is completed, you are ready to do a treatment. \_\_\_\_\_

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CANCER RESEARCH AND TREATMENT CENTER  
Biomedical Physics Division

TO: Distribution

FROM: H. Amols

SUBJECT: Update on Dynamic Treatment Software

REPOSITORY LANL/ARC  
COLLECTION MP-DO  
BOX No. A-91-011  
FOLDER 85-10

In preparation for the coming pion cycle, the dynamic treatment software has been upgraded.

Creating data files for dynamic treatments is done as described in my memo of July 30, 1980 (copy attached), except for a change in program name from SIMAK2, to SIMAK3.

Execution of the program TRTCHK however has been substantially altered. Run TRTCHK, from UIC= [30,6] and answer the program prompts as follows:

<u>Question</u>	<u>Answer</u>
1) Name of treatment table - 6 characters, as required	
2) Couch 1 or 2?	- answer 1, or 2. The treatment couches are labeled - and are not identical!
3) Tune #	- as required
4) Port #	- as required
5) Total rads for complete treatment	- as required
6) % total treatment to deliver new	- usually, your answer will be 100, unless there has been a computer crash or hardware malfunction during treatment. In this case, answer the appropriate value (i.e., a number between 1-99)
7) Rad/mu for Tune 16B	- type in daily calibration factor
8) Set patient to (0,0), and hit CR	- align center of treatment volume on lasers (0,0), and hit CR.
9) Move couch +10 cm in +y direction, and hit CR	- this requires moving the couch in the +y direction in the channel coordinate system (west by southwest). It may require motion of both the x and y motors on the couch. A marker inscribed on either the bolus or the collimator should facilitate this move.

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- 10) Positioning error =  
is this O.K.? - the error printed out tells you how accurately you moved 10 cm. A 1% error for example = 1 mm. If you respond with a no, the program returns to step 8.
- 11)  $\text{COS}^2 + \text{SIN}^2$  - no response is required. However, if this value is significantly different from 1.000, patient alignment is not accurate
- 12)  $\mu =$  Please set dose integrator - set #1  $\mu$  as directed. Be sure you are in  $10^{-8}$  scale. Be sure #2  $\mu$ , and timer are at safe values.
- 13) Is RS in 1103 control? - set switch, and answer yes
- 14) Are dose integrators set? - answer yes when ready
- 15) Is couch ready? - set covers on the couch controller down, and be sure all interlocks are set

The terminal bell will ring, and a message: 'Ready for treatment, Insert target' will appear.

At this point, the computer should have positioned the couch to the first treatment position, and initiated the first RS function. Verify this fact, and sweep treatment room. Insert target.

Treatment will now proceed automatically. Messages will appear periodically advising you of status. If an error in either couch position, or RS function is detected, the following will occur:

- 1) The target will automatically be pulled
- 2) A message will be sent, informing you of error status
- 3) Channel operator will be asked 'Do you wish to continue treatment.' A yes response will reset the target interlock, allowing treatment to proceed. The causative error however will not be fixed by the computer. A no response will halt treatment, and queue out treatment log (at operators option).

If treatment is successfully completed, with no detected errors, the target will be pulled at completion of treatment, and a treatment log will be queued out (at operators option).

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