

Personal Computer Based Teletherapy CT-RT Treatment Planning System (TSG-RADPLAN)

V. K. Sharma and S. L. Kapoor

A radiotherapy treatment planning system has been installed on a personal computer and was developed to meet the clinical demands and budgetary constraints of any radiotherapy department. The system consists of an IBM compatible PC-AT computer with a 16 bit microprocessor, 40 MB hard disk drive, and a 5-1/4" floppy disk drive. The computer is supplied with an analog to digital conversion card for communication with a back lit digitizer. The CT-Interface computer with 16 color extended graphics display unit allows for the transfer of data on contours of the patient body, tumor, critical normal structures, and a density matrix (Hounsfield numbers) from the CT-Images taken from a CT-Scanner. The system supports software for teletherapy, brachytherapy, combined therapy (tele + brachy) and cancer registry. MS-DOS Version 3.21 is used as the operating system. The programs are written in BASIC, C, and Assembly languages. The system has high performance with speed and accuracy during dose calculations. A dot-matrix printer/plotter is used to print the final dose distribution results in text or graphics for permanent records.

INTRODUCTION

Computers are believed to be helpful in achieving fast and accurate treatment planning results. These results lead to detailed dose distribution plans for patients undergoing radiotherapy treatment. Computerized treatment planning systems not only maximize the effectiveness of a medical physics staff through increased productivity, but also improve the quality of patient care through decreased error rates, ability to calculate more complex plans and more detailed calculations.

In the early sixties, digital computers were used to calculate the dose distribution. Today, with the rapid development in the field of microelectronics, it is possible to have a more powerful personal computer with adequate processing than a minicomputer of the last decade. The cost of the personal computer hardware is minimal which prompted us to use this equipment to develop a cost-effective radiotherapy treatment planning system.

Three-dimensional planning systems have also been developed by some companies and installed in a few institutions. Those systems are not feasible on a large scale due to