

NASA TECH BRIEF

Lyndon B. Johnson Space Center



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Computer Program for Analysis of Vectorcardiograms (VECTAN II)

The problem:

In flight medical experiments, Project Skylab required the analysis of vectorcardiographic (VCG) data from normal individuals during rest and controlled-orthostatic stress procedures.

The solution:

The VECTAN II computer program was developed to accept as input digitized three-lead Frank VCG data sampled at 320 samples/second/lead, analyzing one VCG complex in each 5-second interval for experiments of up to 25 minutes' duration. The program calibrates these data, locates the three major waveforms (P-wave, QRS complex, and T-wave), performs waveform analyses, and produces a statistical summary of the analyzed data.

How it's done:

In the waveform recognition technique employed to find the beginning and end points of the three basic waveforms, the VCG spatial vector length rather than its derivative is used to reduce the effects of high-frequency noise and to eliminate sensitivity to differences in waveform location among the three leads. The waveform analysis is designed to give the minimum number of parameters that fully characterize an individual's response to a stress protocol. These analyses utilize the eigenloop concept to characterize the three-dimensional vector loops of the QRS and T waves, with the results including the eigenloop area,

circumference, depth, and orientation angles, as well as fractional circumference vector parameters characteristic of the eigenloop shape. Conventional parameters such as ventricular gradient, J-junction offset, ST segment slope, and waveform temporal measurements are also produced. Because VECTAN II is designed to measure VCG variations in normal subjects, no diagnostic options are included.

Notes:

1. This program was written in FORTRAN V for the Univac 1108 computer operating under the EXEC II Monitor and utilizes the NASA Integrated Graphics System (IGS) to produce microfilm plotter output using an SC-4060 recorder.
2. Inquiries concerning this program should be directed to:

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