

## USING CHAINS AND GROUPS TO MAKE GPSS MORE EFFICIENT

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### 1. INTRODUCTION

GPSS has always been looked upon as a process-oriented language for simulating discrete events. The approach to implementing a model developed in GPSS is to move transactions through the various block types that constitute the block diagram defining the system under investigation. The transactions are the active elements and the block types the passive elements of the simulation. The traditional view of model-building in GPSS holds that the transactions represent physical entities that depend on the nature of the system. The traditionalists say that GPSS is suitable for queuing problems, job shop problems, and other problems that fit the organization of GPSS. They also say that GPSS is less flexible than the statement-oriented simulation languages such as GASP and SIMSCRIPT.

This presentation will attempt to show that with a little thought, and perhaps some unorthodox use of the various GPSS entity types, it is possible to represent any discrete system in GPSS, to achieve results in weeks rather than months, and to develop efficient models in the process.

### 2. FEATURES OF THE PRESENTATION

Several examples will be used to illustrate the use of unorthodox thinking and user chains in the development of GPSS models. The first concerns the application of user chains in developing an air traffic control simulation model (1). User chains and the group entity type will then be applied in the implementation of a simulation model developed to evaluate a data base management system (2). The next example will illustrate the use of user chains and groups to implement a program for computing minimum-cost multidrop networks (3). Finally, the capability of the user chain in the modeling of a hypothetical health-type environment will be demonstrated.

These examples will show the capability and versatility of the GPSS block types and entity types. Essentially, I am advocating the use of these

block types and entity types in accordance with what they can do rather than what they were designed to do.

### 3. SUMMARY

This presentation will attempt to demonstrate the capability inherent in GPSS beyond the original intent of the language developers. For the efficient use of GPSS it is necessary to determine what you want to do and then determine how best to represent it. It is often necessary to change the perspective of the problem -- e.g., model the buffer management problem rather than the data-base management problem -- to effect a simple and efficient solution. The effective application of user chains in all their different aspects can appreciably reduce the analyst's efforts and at the same time increase the efficiency of the simulation. This position was demonstrated in a head-to-head competition with SIMULA and a GPSS/360 equivalent (4). It required eight times longer to complete the task using a traditional implementation in GPSS 1100.

### REFERENCES

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- (4) Ingerman, Donald, "Modeling in GPSS," Minutes of USE Conference (Montreal, Quebec, Canada, 1971).