SAGE SYSTEM

I. SUOP(Sage Unified Operational Program)

This is a program system that controls the complex decision making process involved in the conduct of air defense. It is used by subordinate units in executing the commands emanating from those decisions. It is composed of a group (35) of functional programs which operate sequentially under the control of an executive program.

A. SUOP Master Tape

The SUOP master contains all of the programs and initial system data necessary for processing input and output data during the conduct of air defense, program system tests or training exercises.

*see APPENDIX 1 for tape format

B. FAST(Facility/Startover/Tape Load Complex)

The FAST Complex performs all Startover, Facility and Tape load functions of SUOP. It performs all non-real time functions of the Q-7 SAGE operational program system, plus certain real time functions which are related to program testing. The complex consists of those programs which read in the SUOP tape, modify the system content for test purposes, set up test control information, and initiate the system cycle(or restart the cycle following machine malfunction or swithover). In addition in contains programs which can be operated during the cycle under special test conditions. The complex also includes those programs which are concerned with the maintenance of the SUOP tapes.

1. Classes of FAST
   a. Startover/Switchover/Automatic Recovery functions.
   b. System Modification functions.
   c. Test Tool functions.
   d. Precycle Control functions.
   e. Tape Maintenance functions.

   * for definitions of these functions see Fast Complex Users Manual, Chap. 1.

II. Subordinate Units

A. RUN(Reduction Unlimited)

RUN is a Sage data reduction system whose purpose is to tabulate info in a form that facilitates evaluation by data analysis. For example, flight characteristics of tracks are presented to the operator in a printout or on a display console(what you see on the scope concerning tracks, history and their characteristics).

1. Data Input

   The usual data-input to RUN is the Master Operational Recording Tape(MORT) which is explained later.

2. Output

   RUN processors[1], ~~except the Display Processor,~~ can be presented on wither the direct line printer, a delayed output tape, or the card punch. ~~The Display Processor can display outputs on any standby situation display scope.~~

[1]Processor: a program for reducing data to obtain a particular output format. Each processor may consist of several processing routines(sub-routine).

B. Record Systems

1. MORT(Master Operational Recording Tape System)

This system records values of core memory at regular intervals during air defense activity. Its capabilities are more limited than ATRS in order to privent excessive frame time.. The data it records is used by RUN, SPARS(Site production and reduction system) and NORM(Normative Operatives Recording Method) for dat input. The MORT system sits-up a MOR0 table to list all of recordings needed by other systems. A Standard MOR0 talbe lists general requirements for all regions, specified and released by 26SPA. Any unique regional requirements (permanent or temporary) are listed in a non-standard MOR0 table.

2. ATRS(Assembly Test Recording System)

The second record system records values of core memory primarily during testing activities and allows reoording of any information at any time.

3. Conversion System

Since these systems only transfer binary information from core memory onto a recording tape, it is necessary to have another system to translate the binary data from the recording tape in English language and non-binary(octal and decimal) digits. One such reduction system is known as the GIANT parocessor. The GIANT(General Item and Talbe Processor System) system prints the information in a readable format and adds identifying information. It consists of a number of processors, each designed for a specific function, operated by, ;and added to the system with a minimum of difficulty and the only limit to the number of processing routines that can exist is the storage space of the computer.

The GIANT output differs from the air-situation oriented data reduction tools(RUN, SPARS, etc,.) in that machine core is reproduced as it existed at the time of recording, "item by item," and/or"address by address." For example RUN, one may have an output of number of tracks with different identities that have existed in the system, or a list of all SRN"s that have corelated with a given TRN, GIANT on the other hand, gives output which reflects the contents of an area of machine core at a given time. (in other words a dump)

III. Simulation Facility

The Sage System must have the capability to be tested unnder simulated war time conditions so responsible personel are assured that the system will function properly if and when a war does occur. This capability lies in the Simulation Facility. This facility contains three packages to carry out its testing responsibilities.

A. UNISIM(Universal Simulater)

This system is a collection of routines for the Q7 which can generate nearly all the types of input data normally received by a RCC. Its output is a binary magnetic tape containing the input information for SAGE in time sequence. (Only used by the 26th Region)

B. SPARS(Site Production and Reduction System)

This system operates on the Q7, preparing inputs in non-real time for training the operators of SAGE. It is a group of computer programs and procedures designed to make simulated radar imputs for the SAGE System Training Missions(SSTMS) and reduce the data obtained during a SSTM. These simulated radar imputs are put on stored on Problem Input Tapes(PI tapes) to be used during a simulated exercise. PI, tapes are time oriented, on the basis of seconds, rather than frames.

C. A real-time simudation system permanently embedded within the SAGE system. This system satisfies the two needs of the users; testing and training. As part of the process of satisfying the training needs, this simulation subsystem also provides the capability for generation the so-called independent air picture in response to manual insertions, so that it is possible to run on-the-job training(OJT) exercise in a completely self-contained manner. (This system is considered part of SUOP, full-filling SUOP's testing capibility)

*for further reference seeThe Sage System: An Introduction to Air Defense for Sage Programmers, page 2-47.

APPENDIX 1

SUOP TAPE FORMAT

ucture

The SUOP Tape is a multi-file tape. The files are organizes so that they may be read in as entities and/or loaded as entities. This is necessary so that the content of the tape may be easily reordered for optimum tape access time, and so that portions of the SUOP tape may be updated while other, umchanged portions are duplicated tape-to-tape.

SUOP Tape types

1. Maintenance Tape(system maintenance)
2. Operational Tape(performing startovers and supporting active air defense)

File Types

There are two types of binary files on the SUOP Tape, plus an optional symbolic file type.

1. Image-types files are composed either of Drum Data records, containing the images of entire drumfields; Core Data records, containing the images of blocks of core; or Initial Conditions records, containing specific items of data with the control information needed for their distrubution.
   Files of this type include:
   Primary Permanent Core File
   Auxiliary Permanent Core File
   Program Drum File
   Initial Conditions File

2. Program-type files are composed of program records in the format that is output from COSEAL Translator.
   Files of this type include:
   FAST Unloader File
   Facility/Tape Load Control File
   Facility/Tape Load Function File
   Startover File
   Co-Located Program File
   Geography
   Compool Files(Master Compool, Auxiliary Compool)
   Test Tool File
3. Inventory Files (optional) are composed of symbolic inventory records showing what program mods, Symbolic Correctors, octal corrections, and Initial Data have been loaded on the master tape.

*for descriptions of files see Fast Complex Users Manual, page 1-4, para 2.2.