Level 6 GCOS Multi-Dimensional Tasking (MDT), Release 100, is a disk/diskette-based operating system with executive, file management and communications facilities that support multitasking real-time or data communications applications in one or more online streams. In addition, program development or other batch type applications can be performed concurrently in a single batch stream.

The GCOS 6/MDT Executive supports the execution of user application tasks and provides a set of system services that enable users to control the execution of individual tasks and to synchronize multiple tasks with one another and with time-related events. The Executive controls the loading of user programs and manages requests for available memory. It provides standard system trap handling routines for responding to exception conditions and also allows users to provide their own trap handling routines for user-caused trap conditions.

GCOS 6/MDT file management offers an extensive set of logical I/O access methods. It provides device-independent access to any device for sequential files, and direct and indexed access to direct access mass storage files. In addition, the File Manager automatically manages the space utilization of mounted mass storage volumes thus allowing users to create and expand mass storage files as online applications need them.

The GCOS 6/MDT operating system offers two levels of communications interface. Remote/local terminals may be accessed through the sequential file interface of file management or, for more direct control of the communications environment, by using the system's physical I/O interface.

EXECUTIVE ENVIRONMENT

The GCOS 6/Multi-Dimensional Tasking (MDT), Release 100, operating system concurrently executes one batch stream (program development or other batch-oriented user application) and a number of online user application streams. The batch application's memory can be rolled out to a mass storage device to obtain additional memory for online applications.

User-written online applications may be loaded and started any time after system initialization. The number of applications in operation is limited only by the amount of available memory. When one application is deleted or terminates, another may use the released memory without reinitialization.

The Operator's Interface exercises control over the system through the Operator Control Language commands. Online applications may be directed by Operator Control Language or by the Execution Control Language commands that functionally overlap Operator Control Language but are submitted from a different source, such as a disk file or a remote terminal.

The GCOS 6/MDT monitor allocates memory dynamically from pools and can relocate programs at load time. Once an application is loaded into memory, it is dispatched according to its assigned priority level. When multiple tasks share a priority level they are serviced in a round robin fashion.

PROGRAM DEVELOPMENT

The GCOS 6/MDT operating system gives users a powerful and comprehensive set of program development components, utilities and debugging aids for applications development, all running under control of the Executive. GCOS 6/MDT facilities accommodate applications developed under the Basic Executive Systems (BES). These facilities include utilities to move source and object program files between the two operating systems, and support of BES system service calls via a special interface package. Files created under the BES File Manager are supported directly by GCOS 6/MDT; programs created under BES must be relinked.

TEXT EDITOR

A powerful Text Editor for program preparation, updating and correction is part of GCOS 6/MDT. This editor allows unlimited forward and backward scanning of files and allows files to be created and portions moved via auxiliary buffers. Programs can be prepared and compiled concurrently by running the Text Editor as an online task and scheduling its output for later compilation in the batch stream.

FORTRAN COMPILER

A powerful FORTRAN Compiler is based on the proposed 1976 standard developed by the American National Standards Institute. Extensions to the FORTRAN Compiler for GCOS 6/MDT provide for double-precision data type, extended I/O edit capabilities, and the alternate RETURN statement. Programs generated by the compiler may be used with the Scientific Instruction Processor (optional on model 6/40).

COBOL COMPILER

The previously announced COBOL Compiler, which is based on the 1974 standard developed by the American National Standards Institute and Series 60 standards, has been significantly extended in its support of indexed files (ISAM), signed 16-bit binary data (Comp-1), variable length records and magnetic tapes.

RPG COMPILER

The GCOS 6/MDT operating system includes a Report Program Generator (RPG) that is an efficient, commercially oriented, problem solving high level language. The Level 6 RPG Compiler is a compatible language subset of other Series 60 (Level 62 and 64) compilers, as well as System/3 and System/32.

LINKER

The linker that processes the object text output of the language processors producing load modules is enhanced to facilitate rapid program loading and relocatable code capability.

ASSEMBLER

A powerful Assembly Language for program development is supported by the GCOS 6/MDT operating system.

UTILITIES

GCOS 6/MDT offers a wide range of utilities, which run under its control to support mass storage, magnetic tape, and card and print devices. Some of these utilities include debugging aids, program patch, copy/compare, print, dump/edit, file dump, data transcription and file formatting.

SORT

The GCOS 6/MDT disk sort runs as a utility. Salient features of the Sort are:
- Up to eight Sort keys consisting of character strings.
- Output sequence can be based upon ascending/ descending ranking by key.
- Collating sequence is ASCII.
- Input file is any file which can be read sequentially.
- Output file is a sequential file on disk or diskette.
- Sort work file is on disk or diskette.

FILE MANAGEMENT

The GCOS 6/MDT File Management System supports three access methods to different media This includes sequential access to all devices (mass storage, printer, magnetic tape, communications, card reader, console CRT and KSR), and direct and indexed access to mass storage devices.

All devices in the system are either in the online pool or the batch (program development) pool. A file on a device cannot be referenced from the other pool unless it has been declared to be sharable. In addition, users can specify the level of access to a file on a mass storage device in five levels by tasks that are sharing a file within an application: read only, read/write, exclusive write, exclusive read/ write and read/no write.

The File Management System supports the following file types:
- Sequential on all media
- Relative on mass storage (BES-compatible)
- Relative with deletable records on mass storage (BES-compatible)
- Variable sequential on magnetic tape and mass storage
- Indexed files on mass storage in both fixed and variable length

SYSTEM CONTROL

ECL Processor

The Execution Control Language processor enables users to define and control application tasks. It reads commands from a sequential input file, which

may be an interactive terminal or a prestored command file, and causes each requested function to be executed serially.

The batch application stream is always controlled by the Execution Control Language processor; concurrent online applications can also use the processor optionally.

A wide variety of Execution Control Language commands provide file maintenance and other utility functions, inter- and intrajob control, file assignment, asynchronous task operation and communication with the system operator.

Operator Control Language Processor

The Operator Control Language processor allows the system operator to dynamically configure, load and monitor application processes. Most Execution Control Language functions are also available within the Operator Control Language, using identical commands and syntax.

COMMUNICATIONS SUPPORT

An extensive set of communications facilities is accessible by user applications through the File Management System or directly through the physical I/O interface. When operating at the file system level, communications end points (terminals) appear to users as sequential files. In this context, applications written in higher level languages (COBOL, FORTRAN) and the operating system itself have access to communications end points.

Communications protocols support the following terminals in asynchronous nonpolled environment:
- ASR 33/35 Keyboard Printer
- KSR 33
- VIP 7100

Synchronous protocol support is provided for the VIP 7700/7760 terminals and a subset of the IBM 2780 BSC. The VIP 7700/7760 terminals are supported in both polled and nonpolled modes at speeds up to 4800 baud. Support covers the keyboard, screen, and optional hardcopy device.

The BSC 2780 protocol supports communications between two Series 60 Level 6 systems or from Series 60 Level 6 to Series 60 Level 66 at speeds up to 9600 baud. The interface to the Level 66 system is through the remote batch dimension.

FILE TRANSMISSION

Any Level 6 file on mass storage that can be accessed sequentially can be transmitted to a Level 66 host computer and vice-versa. When operating this facility the Level 6 system appears to the Level 66 as a nonpolled VIP 7700.

The program operating in the Level 66 uses the direct access mode facilities provided by GCOS and operates on standard GCOS files.

MINIMUM HARDWARE FOR PROGRAM DEVELOPMENT
- Level 6 Models 6/34, 6/36, or 6/43 central processor with 32K words of main memory
- One Cartridge Disk Unit or four diskettes
- One console (KSR teleprinter or equivalent)

Specifications may change as design improvements are introduced.

Honeywell