

obtain day-to-day computer support from a computer organization that has been established for the computation needs of a Center in general.

The most obvious example of the first method is the RTCC at Mission Control Center at MSC. In this instance, a need was established at the Gemini, Apollo, and Mission Operations Program Office level within MSF. Once the need was established, all levels through the NASA Administrator were in the chain of approval. After approval, operational responsibility was assigned through the chain of supervision to MSC, to a directorate, and thence to the Flight Support Division. In circumstances such as this, the responsibility is clearly established and applications are monitored by the organizational structure.

Not so obvious, but certainly as vital, are the hundreds of thousands of run requests, printouts, computations, and tabulations that are the day-to-day applications placed by the scientific, engineering, and management personnel of each Center. These responsibilities are not so clearly defined, and thus not so easily traced through a chain of supervision or to a clearly required function. The management techniques, such as the resource control systems, job order assignments, and budget allocation, are discussed in the "Management Techniques" section of this report. They supplement and make possible the application of responsibility for these many and varied applications. From a responsibility point of view, it was most important that each system be carefully designed to insure a firm chain of audit from the expenditure of any and all computation resources to a responsible individual in each and every case.

In addition to the two basic methods of obtaining computer support discussed above, there is a need to use a computer as a supplement to another piece or pieces of equipment. In those instances, the user organization deems it necessary to have computer equipment (special purpose) as an integral part of a mission-related system. The user must first obtain cognizant mission-authority approval. Then, as an example, the Computation Laboratory at MSFC enters the picture to determine which hardware and software best satisfy the user requirements, follows through with the user in the procurement process, and maintains computer-related responsibility throughout the installation and operational phases. This same pattern exists for the launch vehicle (MSFC cognizance) and spacecraft (MSC cognizance) checkout equipment located at KSC, even though the users perform actual operation of the equipment.

A very important responsibility at each of the Centers is the establishment of computational objectives as related to the scope of the computer operations. These objectives involve short- and long-range planning, organization, and staffing of all elements associated