

ent is the application of organized technical direction to the program. This direction is designed to monitor and control the program on an adequate technical, financial and schedule basis, and to resolve the problems which inevitably develop.

The most important question related to the effective use of the capabilities of various laboratories is in insuring the proper attention to these three basis areas. Obviously, there is no single way to solve this problem. One extreme approach could be the close direct control from DOT which would generate various problems of staffing, communications, and motivation. At the other extreme would be an approach in which a transportation program would be initiated by the given laboratory under only the most general coordination with the Department of Transportation. Regardless of the manner and the degree of flexibility in the approaches, the three basic requirements itemized above must be satisfied—they are fundamental.

One of the first tasks of the Department of Transportation was to pull itself from the existing, but widely scattered, Federal agencies which were combined on its establishment on April 1, 1967. It is now one of the largest Federal agencies—about 95,000 persons—with an annual budget of more than \$6 billion.

The laboratory and the R&D direction capabilities of the Federal Aviation Administration, the Federal Railroad Administration, the Federal Highway Administration, and the U.S. Coast Guard differ widely. They must be enhanced and coordinated to serve as the focus for transportation research and development. In addition, the research laboratories of NASA and DOD, as well as other laboratories, are considered major resources for providing the necessary capability to support this new Department's requirements for advance technology and compliance testing associated with regulatory standards. Since each of these research centers conducts important projects as a means of fulfilling its own technical requirements, the additional requirements to assist DOT involves interagency coordination in handling DOT's research and development while simultaneously providing the opportunity for NASA and DOD laboratories to become more directly involved in practical transportation problems.

Among the transportation research and development activities that exist at the research centers of other agencies, for example, are the responsibility for developing the quiet aircraft engine at NASA Lewis Research Center; the wind tunnel projects aimed at determining the best aerodynamic design for high speed ground vehicles, at NASA Langley Research Center; and the earth tunneling project directed for us by the Bureau of Mines of the Department of Interior. These research and development requirements have been put into the workload schedules of existing Government laboratories. This, of course, is also providing a useful interchange for broadening the mission of specialized laboratories.

We are now in the process of formulating and planning for research and development relating to transportation, which includes a thorough analysis of the kinds of problems to be solved. The requirements that must be satisfied will be better identified and structured into the alternative solutions. From these various requirements will then emerge specific demands for R&D laboratory capabilities and support.

Recognizing the magnitude of our national investment in Federal laboratories, it seems to me, the next logical step should be to determine exactly what laboratory capability is available. The process to accomplish this task could be eased to a large degree if there were available a single source from which the capabilities of all Federally-owned laboratory facilities could be obtained.

Such a source must be able to provide the current and projected status of all laboratories, including programmed new facilities. It would allow each Government agency or organization to determine whether a laboratory exists with adequate capability to satisfy its particular requirements; or whether such a capability is programmed and would be available in the future; and assist in determining the necessity for establishing new laboratories or special test facilities.

In spite of the best planning and programming for laboratory support, there will be cases in which unexpected additional requirements may arise for which quick reaction from a laboratory would be desirable. For example, in transporting hazardous material, the problem of stress corrosion has recently been encountered in tank trucks due to anhydrous ammonia. The task of finding a laboratory that might be available to conduct a testing program related to this problem could be eased if an effective laboratory reference source were available. This is a subject which I think needs further study.