

3. Four fully instrumented rail test cars have been acquired and a 21-mile section of mainline track has been upgraded and instrumented to provide a unique test facility for acquiring comprehensive data on the effects of high speed rail operations. In this operation, all parameters of track geometry and vehicle motion are recorded simultaneously, permitting direct analysis of the many interactions which govern the performance of rail vehicles, tracks, and power collection systems.

4. Research and development in unconventional systems has provided the basic understanding necessary for evaluating the potential of ground operations at speeds about 250 miles per hour.

5. Laboratory testing has shown the potential of radically improved tunneling techniques in reducing the cost of underground tube systems to a level competitive with surface systems.

6. Knowledge transferrable from aircraft and space technology has been substantially enhanced by pioneering research in the aerodynamics of tube and tracked air cushion vehicles.

7. New systems of ground transportation have been developed to the point where large scale testing is now feasible.

8. A linear electric motor has been designed and is under construction. This motor will provide the first test in a vehicle of a completely new electric propulsion system.

Demonstration achievements

1. Planning and engineering have been completed for high speed rail demonstrations between Washington and Boston. Service will begin when testing of the equipment is finished.

2. Track upgrading has been completed on the Penn Central and is continuing on the New Haven.

3. Station improvements have included construction of raised platforms to expedite the loading and unloading of passengers, some major refurbishing, and an experimental baggage-handling system; two suburban stations are under construction.

4. An on-train public telephone system which will connect Penn Central demonstration train riders with the worldwide telecommunications network has been designed and installed at no cost to the Government.

5. A new food handling system has been put into use by the Penn Central Railroad.

6. Data collection and processing procedures have been refined for gathering, analyzing and disseminating information on passenger response to changes and improvements in rail service. Data is now available on all rail passenger movements between major points in the Northeast Corridor, and also on the characteristics of rail passengers.

PROGRAM STATUS-RESEARCH AND DEVELOPMENT

The High Speed Ground Transportation Act authorized the Secretary of Transportation to "... undertake research and development in high speed ground transportation." In carrying out this responsibility, three major objectives of the program have been established:

1. To advance the technology of ground transportation, including railroads as well as more advanced systems.

2. To conduct research and development to make possible the design and demonstration of advanced ground transportation equipment, systems, and services.

3. To develop cost and performance data on existing potential systems for the Northeast Corridor.

The magnitude of this research and development activity has made it essential that it be done within a strong analytical framework that will highlight research opportunities and assure sound allocation of resources. Hence, a large proportion of the research and development effort is going into systems engineering/cost analysis. The other major areas into which the research and development activities fall are High Speed Railroad R&D, Unconventional Transportation Systems R&D, and Advanced Technology R&D.

In the following sections, each of these major activities is highlighted in terms of why research and development should be undertaken, what has been accomplished so far, and what else must be done in the near future. The timing of the work is discussed at the conclusion of this section.