

Systems engineering

Systems engineering should be done because:

The rapid advance of technology in recent years provides a base from which to develop transportation systems which would be faster, more efficient, and more comfortable than present ones. The systems engineering undertaken by the Office of High Speed Ground Transportation will provide information essential to determining what systems and what combinations of systems could serve to meet future transportation needs in urbanized regions of the United States.

The systems engineering work was begun in fiscal year 1967 and is continuing in accordance with procedures initially recommended by the Massachusetts Institute of Technology. A major part of the work has been contracted to TRW Systems, Inc. The primary tasks in systems engineering are to analyze key technical features of alternative transportation systems, to prepare performance and cost estimates, and to evaluate subsystem alternatives.

Accomplishments in systems engineering

1. Studied potential improvement in ride quality at high speed to be gained by varying track structure stiffness.
2. Investigated design requirements in detail of tracked air cushion vehicle system for operation at speeds up to 300 mph.
3. Reduced candidate technological configurations of HSGT systems to meaningful number of alternatives.
4. Developed specification and technology base so that detailed descriptions of physical, performance, and cost characteristics of unit elements for each significant HSGT alternative could be examined.
5. Developed methodologies for comparative system evaluation and for making rapid cost estimates.
6. Determined system requirements for fleet and vehicle control, including vehicle allocation, fixed fleet scheduling, detection of vehicles and foreign objects, hardware systems for fixed and mobile installation, and system evaluation of advanced concept alternatives.
7. Evaluated requirements for electromagnetic suspension and developed a system-oriented research and development program.
8. Determine human factor requirements to insure passenger comfort.
9. Determined aerodynamic characteristics of tube vehicles.
10. Progressed in evaluating critical problem areas in evacuated tube systems.
11. Developed techniques for sizing terminals according to passenger flow rates and system schedules.
12. Collected cost data and developed cost estimating relationships.
13. Completed research for preliminary design study of tracked air cushion vehicle.

Work to be done in systems engineering

1. Perform Northeast Corridor Transportation project simulation of baseline High Speed Ground Transportation system definitions to be completed in FY 69.
2. Analyze inter-modal transfer of passengers and goods with a view toward improving overall system performance.
3. Assemble cost estimating relationships into total system cost model.
4. Analyze and evaluate ways to improve the transfer of passengers and goods between and within transportation modes.
5. Develop a model to select right-of-way routes which will minimize impact of noise on the adjacent community.
6. Analyze the feasibility of electromagnetic suspension systems.

High-speed railroad R. & D.

High speed railroad research and development should be done because:

High speed railroad research and development has been undertaken in order that the potential of wheel-supported concepts may be explored fully before major decisions are made on radically new systems. Rail passenger service will benefit from these efforts as will the future development of rail freight transportation, whether or not totally new systems are ever built. The Office of High Speed Ground Transportation, in order to evaluate and advance wheel-rail technology within the broad framework of long-range needs, is probing the underlying phenomena of rolling support and guidance, the theory of track structure behavior, and the application to this area of modern technology from other fields. Very little fundamental data exist on the physical phenomena involved in rolling support and wheel-rail interfaces, especially at high speeds. Such knowledge is