

2. Continue monitoring alignment of track and quality of ride on Penn Central and New Haven demonstration projects.
3. Build, instrument, test, and analyze performance of short test sections of experimental track structures previously developed.
4. Determine deterioration of experimental track structures versus time with research cars.
5. Establish performance capabilities of industry-loaned evolutionary railroad equipment at higher speeds.
6. Design and construct research laboratory for simulating rolling dynamics at speeds up to 300 mph, with industry support, if possible.
7. Build and test prototype active suspension system.
8. Determine capabilities of developmental servo-pantograph at high speeds using rail research cars.
9. Study catenary structures to determine most cost-effective design for new electrifications.
10. Cooperate with industry in rail electrification feasibility studies and development of advanced drive systems.
11. Collaborate with industry on improved maintenance and inspection procedures, using demonstrations as case studies.

Unconventional transportation systems R. & D.

Unconventional transportation systems research and development is being done because:

A need exists to determine the relative advantages of improved existing systems and unconventional systems in meeting future transportation needs. Much of this work is therefore directed toward defining promising new transportation system alternatives.

The Office of High Speed Ground Transportation has concentrated research in unconventional systems during the past few years on high speed tracked (or guided) air cushion vehicle systems and tube (or enclosed guideway) vehicle systems. Both offer promise for operation well above 250 miles per hour. The tracked air cushion vehicle (TACV) systems can be brought into operation earlier. Initiation of research on other novel systems will depend on the results of the systems engineering studies.

A very major reason for research on tube vehicle systems is the possibility of attaining high speeds with relatively low power consumption. In addition, tubes can provide all-weather operation, increased safety, reduced use of surface right-of-way, and higher acceleration.

No base of experience exists for high speed vehicles operating in tubes. Thus, research and development is needed before the potential of the tube vehicle systems can be estimated.

Accomplishments in unconventional transportation systems R. & D.

Tracked air cushion vehicles

1. Completed trade-off analyses and developed alternate feasible configurations for operational TACV systems.
2. Identified critical aerodynamic problem areas for wind tunnel investigation.
3. Completed wind tunnel tests of TACV body configurations; partial completion of TACV cushion configuration wind tunnel tests.
4. Acquired French "Aerotrain" TACV research vehicle test data.
5. Continued analytical investigation and subscale experiments on air cushion dynamics. Investigations to date show a need for secondary suspensions.
6. Prepared and issued RFP for the Office of High Speed Ground Transportation TACV Research Vehicle Design Study. Proposals received and evaluated. Research objectives based on results of analytical studies and subscale testing results.
7. Acquired results to date of British TACV development program.
8. Developed basic cost data for TACV subsystems; e.g., guideway, vehicle, propulsion, suspension.
9. Evaluated the "Hovair" principle as applied to high speed TACV.
10. Investigated active controls for TACV suspension systems.

Tube vehicles

11. Developed theory for predicting stability of vehicles travelling in tubes.
12. Investigated drag of vehicles in tubes on subscale experimental basis.
13. Developed experimental facility for validating theory of internal propulsion of tube vehicles.