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# EXTENSION OF HIGH-SPEED GROUND TRANSPORTATION ACT

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## HEARINGS BEFORE THE SUBCOMMITTEE ON SURFACE TRANSPORTATION OF THE COMMITTEE ON COMMERCE UNITED STATES SENATE

NINETIETH CONGRESS

SECOND SESSION

ON

**S. 3237 and H.R. 16024**

TO EXTEND FOR TWO YEARS THE ACT OF SEPTEMBER 30,  
1965, RELATING TO HIGH-SPEED GROUND TRANSPORTA-  
TION, AND FOR OTHER PURPOSES

JULY 16 AND 17, 1968

Serial No. 90-80

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## EXTENSION OF HIGH-SPEED GROUND TRANSPORTATION ACT

TUESDAY, JULY 16, 1968

U.S. SENATE,  
COMMITTEE ON COMMERCE,  
SURFACE TRANSPORTATION SUBCOMMITTEE,  
*Washington, D.C.*

The subcommittee met at 9:10 a.m., in room 5110, New Senate Office Building, the Honorable Frank J. Lausche, chairman of the subcommittee, presiding.

Present: Senators Lausche, Cannon, Moss, Pearson, and Pastore.

### OPENING STATEMENT BY THE CHAIRMAN

Senator LAUSCHE. The meeting will come to order.

The hearing this morning was originally scheduled to hear S. 3237, a bill proposed by the Secretary of Transportation to extend for 2 years the program of research and development undertaken by the Secretary of Transportation in high-speed ground transportation. On July 12, the House passed a companion bill, H.R. 16024, and today's hearing will be for the purpose of receiving testimony on both the House and the Senate bills.

The two bills materially differ in only two respects. Both bills in the first and second subsections propose technical changes in the High-Speed Ground Transportation Act of 1965 to reflect the establishment of the Department of Transportation and the transfer to it of this program from the Department of Commerce.

Both bills in the third subsection propose to grant the Secretary of Transportation the authority to acquire by purchase, lease, or grant necessary sites and to acquire, construct, or furnish necessary support facilities, for research and development and demonstration programs under the act. In addition, the House bill authorizes the Secretary of Transportation, in furtherance of a demonstration program, to contract for the construction of two suburban rail stations, one at Lanham, Md., and one at Woodbridge, N.J., without acquiring any property interest therein.

Both bills in the fourth subsection propose a technical change to reflect the transfer of functions from the Administrator of the Housing and Home Finance Agency to the Secretary of Housing and Urban Development.

In the fifth subsection of S. 3237, appropriation limitations for prior years are proposed to be deleted. No appropriation limitations are proposed for future years. In the sixth subsection of S. 3237, the act is extended for 2 years by striking out the words "June 30, 1969," and inserting in lieu thereof the words "June 30, 1971."

Staff member assigned to this hearing: Stanton P. Sender.

The House bill also authorizes an extension of the act for an additional 2 years and places an appropriation limitation of \$16,200,000 for the fiscal year ending June 30, 1969; and \$21,200,000 for the fiscal year ending June 30, 1970.

There will be inserted in the record at this point a copy of S. 3237 and H.R. 16024; the comments on S. 3237 received from the Comptroller General, the Department of Transportation, Department of Commerce, the Department of Justice, the Postmaster General, the Department of the Army, the General Services Administration, the Interstate Commerce Commission, the Department of Agriculture; and a resolution of the Council of State Governments.

Senator Magnuson advised me that he would be unable to attend today's meeting and at his request his statement will be inserted in the record.

(The documents referred to above follow:)

[S. 3237, 90th Cong., second sess.]

A BILL To extend for two years the program of research and development undertaken by the Secretary of Transportation in high-speed ground transportation, and for other purposes

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That the Act of September 30, 1965 (79 Stat. 893; 49 U.S.C. 1631), is hereby amended as follows:

- (1) in section 1, by striking out the words "Secretary of Commerce" and inserting in place thereof the words "Secretary of Transportation";
- (2) in section 5, by striking out the words "Department of Commerce" and inserting in place thereof the words "Department of Transportation";
- (3) in section 7, by adding the following: "In furtherance of these activities, the Secretary may acquire necessary sites by purchase, lease, or grant and may acquire, construct, repair, or furnish necessary support facilities.";
- (4) in section 9, by striking out the words "Administrator of the Housing and Home Finance Agency" and inserting in place thereof the words "Secretary of Housing and Urban Development";
- (5) in the first sentence of section 11, by striking out all that follows the word "Act" and inserting in place thereof a period; and
- (6) in section 12, by striking out the words "June 30, 1969" and inserting in place thereof the words "June 30, 1971".

[H.R. 16024, 90th Cong., second sess.]

AN ACT To extend for two years the Act of September 30, 1965, relating to high-speed ground transportation, and for other purposes

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That (a) the first section of the Act entitled "An Act to authorize the Secretary of Commerce to undertake research and development in high-speed ground transportation, and for other purposes", approved September 30, 1965 (79 Stat. 893; Public Law 89-220; 49 U.S.C. 1631), is amended by striking out "Secretary of Commerce" and inserting in lieu thereof "the Secretary of Transportation".

(b) Section 5 of such Act of September 30, 1965, is amended by striking out "Department of Commerce" and inserting in lieu thereof "Department of Transportation".

(c) Section 7 of such Act of September 30, 1965, is amended by adding at the end thereof the following: "In furtherance of these activities, the Secretary may acquire necessary sites by purchase, lease, or grant and may acquire, construct, repair, or furnish necessary support facilities. In furtherance of a demonstration program, the Secretary may contract for the construction of two suburban rail stations, one at Lanham, Maryland, and one at Woodbridge, New Jersey, without acquiring any property interest therein."

(d) Section 9 of such Act of September 30, 1965, is amended by striking out "Administrator of the Housing and Home Finance Agency" and inserting in lieu thereof "Secretary of Housing and Urban Development."

(e) The first sentence of section 11 of such Act of September 30, 1965, is amended by striking out "and" and by striking out the period at the end thereof and inserting in lieu thereof a semicolon and the following: "\$16,200,000 for the fiscal year ending June 30, 1969; and \$21,200,000 for the fiscal year ending June 30, 1970."

(f) The first sentence of section 12 of such Act of September 30, 1965, is amended by striking out "1969" and inserting in lieu thereof "1971".

Passed the House of Representatives July 12, 1968.

Attest:

W. PAT JENNINGS,  
*Clerk.*

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COMPTROLLER GENERAL OF THE UNITED STATES,  
*Washington, D.C., April 11, 1968.*

XXXXXXXX

HON. WARREN G. MAGNUSON,  
*Chairman, Committee on Commerce,*  
*U.S. Senate.*

DEAR MR. CHAIRMAN: We refer to your letter of March 28, 1968, asking for our comments on S. 3237.

The bill would extend for two years the program of research and development in high-speed ground transportation undertaken by the Secretary of Transportation pursuant to authority granted in the Act of September 30, 1965, 79 Stat. 893, 49 U.S.C. 1631 *et seq.* The bill contains several technical amendments required to reconcile the language of the 1965 Act with later reorganizational changes in the executive departments. Apart from the two-year extension of the program, probably the most important change to be effected by the bill is the removal of limitations on appropriations for the program which were contained in Section 11 of the 1965 Act, 49 U.S.C. 1641.

While we have a statutory duty to audit expenditures made under the program, we do not have any responsibility for the implementation and administration of this research and development program. Consequently, we do not offer any recommendation on the merits of the bill.

Sincerely yours,

FRANK H. WEITZEL,  
*Assistant Comptroller General of the United States.*

---

OFFICE OF THE SECRETARY OF TRANSPORTATION,  
*Washington, D.C., April 15, 1968.*

HON. WARREN G. MAGNUSON,  
*Chairman, Committee on Commerce,*  
*U.S. Senate, Washington, D.C.*

DEAR MR. MAGNUSON: You requested the views of the Department of Transportation on S. 3237, a bill "To extend for two years the program of research and development undertaken by the Secretary of Transportation in high-speed ground transportation, and for other purposes."

This bill is legislation which was drafted by the Department and transmitted to Vice President Humphrey by Secretary Boyd on March 9, 1968. It has a high priority in the Department's legislative program and we support the bill.

We stand ready to testify on the bill and to provide the Committee and its staff with answers to any questions you might have.

Sincerely yours,

JOHN L. SWEENEY,  
*Assistant Secretary for Public Affairs.*

---

GENERAL COUNSEL OF THE DEPARTMENT OF COMMERCE,  
*Washington, D.C., May 6, 1968.*

HON. WARREN G. MAGNUSON,  
*Chairman, Committee on Commerce, U.S. Senate,*  
*Washington, D.C.*

DEAR MR. CHAIRMAN: This is in further reply to your request for the views of this Department concerning S. 3237, a bill "To extend for two years the program

of research and development undertaken by the Secretary of Transportation in high-speed ground transportation, and for other purposes."

The Act of September 30, 1965 (Public Law 89-220; 49 USC 1631) authorized the Secretary of Commerce to undertake research and development in high-speed ground transportation.

S. 3237 would amend the Act to reflect the transfer of responsibility for programs under the Act from the Secretary of Commerce to the Secretary of Transportation pursuant to Public Law 89-670, the "Department of Transportation Act." These amendments are desirable and we recommend their enactment.

S. 3237 also amends the Act in a number of other respects, including an extension of the termination date of the Act for two years, from June 30, 1969 to June 30, 1971. We would defer to the views of the Department of Transportation concerning such other amendments.

We have been advised by the Bureau of the Budget that there would be no objection to the submission of our report to the Congress from the standpoint of the Administration's program.

Sincerely,

PEDRO R. VAZQUEZ,  
(For General Counsel).

OFFICE OF THE DEPUTY ATTORNEY GENERAL,  
Washington, D.C., May 23, 1968.

HON. WARREN G. MAGNUSON,  
Chairman, Committee on Commerce, U.S. Senate,  
Washington, D.C.

DEAR SENATOR: This is in response to your request for the views of the Department of Justice on S. 3237, a bill "To extend for two years the program of research and development undertaken by the Secretary of Transportation in high-speed ground transportation, and for other purposes."

The bill, introduced at the request of the Secretary of Transportation, would extend the termination date of the High-Speed Ground Transportation Act, Public Law 89-220 for two years from June 30, 1969, to June 30, 1971.

Subsections 1, 2 and 4 are technical amendments to the Act reflecting the transfer of responsibilities to the Secretary of Transportation in accord with the provisions of the Department of Transportation Act, Public Law 89-670. Subsection 3 would authorize the Secretary to acquire sites and support facilities necessary to extend the Secretary's present authority under Section 7 of the Act to "lease, purchase, develop, test, and evaluate new facilities, equipment, techniques and methods, and conduct such other activities as may be necessary."

The Department of Justice, which favored enactment of the High-Speed Ground Transportation Act, recommends enactment of S. 3237 because of the continuing need to carry on fundamental research and development in ground transportation in order to improve the Nation's transportation system.

The Bureau of the Budget has advised that enactment of this legislation would be consistent with the Administration's objectives.

Sincerely,

WARREN CHRISTOPHER,  
Deputy Attorney General.

THE POSTMASTER GENERAL,  
Washington, D.C., June 7, 1968.

HON. WARREN G. MAGNUSON,  
Chairman, Committee on Commerce,  
U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: This is in reply to your request for comments from this Department concerning S. 3237, a bill to extend the High-Speed Ground Transportation Act for an additional two years from June 30, 1969, to June 30, 1971.

The bill also proposes several technical amendments to the present law (49 USC 1631-1642) to reflect the transfer of functions resulting from the establishment of the Department of Transportation under Public Law 89-670 and the Department of Housing and Urban Development under Public Law 89-174.

In addition, the bill would authorize appropriations to be made for fiscal years subsequent to June 30, 1968; clarify and extend the Secretary's authority (49 USC 1637) to acquire sites and provide support facilities necessary for accomplishing the activities authorized by the Act.

We have no objection to the enactment of S. 3237. In our view, the programs authorized by the High-Speed Ground Transportation Act are as necessary today as they were when the law was enacted.

The Bureau of the Budget has advised that there is no objection to the submission of this report to the Committee from the standpoint of the Administration's program.

Sincerely yours,

W. MARVIN WATSON,  
*Postmaster General.*

DEPARTMENT OF THE ARMY,  
*Washington, D.C., June 27, 1968.*

HON. WARREN G. MAGNUSON,  
*Chairman, Committee on Commerce,  
U.S. Senate, Washington, D.C.*

DEAR MR. CHAIRMAN: Reference is made to your request to the Secretary of Defense for the views of the Department of Defense with respect to S. 3237, 90th Congress, a bill "To extend for two years the program of research and development undertaken by the Secretary of Transportation in high-speed ground transportation, and for other purposes". The Secretary of Defense has assigned to the Department of the Army the responsibility for expressing the views of the Department of Defense thereon.

The main purpose of S. 3237 is to extend the High-Speed Ground Transportation Act (Act of September 30, 1965; 49 U.S.C. 1631) for an additional period of 2 years from June 30, 1969 to June 30, 1971. In addition, the bill would clarify and extend the authority of the Department of Transportation to acquire sites and provide support facilities necessary for carrying out the activities authorized under the Act. Finally, the bill would make several technical amendments to reflect the transfer of responsibilities for programs under the Act from the Secretary of Commerce and the Administrator of the Housing and Home Finance Agency to the Secretary of Transportation and the Department of Housing and Urban Development, respectively.

The High-Speed Ground Transportation Act which is due to expire on 30 June 1969 authorizes the Secretary of Transportation to undertake research and development and to contract for demonstrations in intercity high-speed ground transportation. This Department supported enactment of that legislation. Since enactment, substantial progress has been made in the development of new ground transportation facilities, equipment and techniques. Extension of the Act would permit this significant and promising research and development to be carried forward without a break in the momentum which has already been achieved.

The Department of Defense is vitally interested in a strong, reliable national transportation system and consequently favors broad development programs designed to improve passenger service and modernization of facilities. Accordingly, the Department of the Army on behalf of the Department of Defense supports enactment of S. 3237.

The fiscal effects of S. 3237 cannot be estimated.

This report has been coordinated within the Department of Defense in accordance with procedures prescribed by the Secretary of Defense.

The Bureau of the Budget advises that there is no objection to the presentation of this report for the consideration of the Committee and that enactment of S. 3237 would be consistent with the administration's objectives.

Sincerely,

STANLEY R. RESOR,  
*Secretary of the Army.*

GENERAL SERVICES ADMINISTRATION,  
*Washington, D.C., April 25, 1968.*

HON. WARREN G. MAGNUSON,  
*Chairman, Committee on Commerce,  
U.S. Senate, Washington, D.C.*

DEAR MR. CHAIRMAN: Your letter of March 28, 1968, requested any comments the General Services Administration may care to offer on S. 3237, 90th Congress, a bill "To extend for two years the program of research and development undertaken by the Secretary of Transportation in high-speed ground transportation, and for other purposes."

In addition to extending the High-Speed Ground Transportation Act, Public Law 89-220, for two years from June 30, 1969, to June 30, 1971, the bill would provide the Secretary of Transportation authority to acquire sites and provide support facilities in carrying out the purposes of the Act. The acquisition of sites and construction of facilities for the purposes of research and development of high-speed ground transportation and demonstrations of new transportation equipment are not within the purview of the Public Buildings Act of 1959, 73 Stat. 479, as amended (40 U.S.C. 601-615).

In view of the above, the proposed bill does not affect the functions and responsibilities of GSA, and accordingly we do not have sufficient basis to comment on its merits.

The Bureau of the Budget has advised that from the standpoint of the Administration's program, there is no objection to the submission of this report to your Committee.

Sincerely yours,

LAWSON B. KNOTT, Jr., *Administrator.*

---

INTERSTATE COMMERCE COMMISSION,  
*Washington, D.C., June 24, 1968.*

HON. WARREN G. MAGNUSON,  
*Chairman, Committee on Commerce,  
U.S. Senate, Washington, D.C.*

DEAR CHAIRMAN MAGNUSON: This is in response to your request for our views and comments on S. 3237, a bill, "To extend for two years the program of research and development undertaken by the Secretary of Transportation in high-speed ground transportation, and for other purposes". On behalf of the Committee on Legislation, I am authorized to submit the following comments.

S. 3237 would (1) extend the expiration date of Public Law 89-220 until June 30, 1971, (2) take account of the establishment of the Department of Transportation and the transfer to it of certain elements previously in the Department of Commerce, and (3) clarify the authority of the Department of Transportation to acquire necessary real property for test site purposes.

The Commission supported the High-Speed Ground Transportation Act at the time of its initial enactment in 1965, and it continues to do so.

As you and other members of the Committee are aware, the Commission is concerned over acceleration in the decline in railroad passenger service since we believe that the preservation and improvement of essential passenger operations are a necessary part of a soundly balanced transportation system. We also recognize that, in the long run, simply preserving the status quo will not provide the solution to this problem. Rather, it will take extensive economic and technological research and development into new types of railroad passenger service to bring about the required improvements in equipment and service that is responsive to the public needs.

The two high-speed projects now under way in the Northeast Corridor are directed to this end and indicate the promise of revitalizing essential rail passenger service through a coordinated program of public and private action. Since this legislation does not confine the Department to either the Northeast Corridor or railroad passenger service, we would hope that, following the successful completion of two projects now under way, this program could be expanded to other modes and other parts of the country where corridor-type service may be feasible.

Sincerely yours,

PAUL J. TIERNEY,  
*Chairman, Committee on Legislation.*  
VIRGINIA MAE BROWN.  
LAURENCE K. WALRATH.

---

THE SECRETARY OF HOUSING AND URBAN DEVELOPMENT,  
*Washington, D.C., May 24, 1968.*

HON. WARREN G. MAGNUSON,  
*Chairman, Committee on Commerce,  
U.S. Senate, Washington, D.C.*

DEAR MR. CHAIRMAN: This is in further reply to your request for the views of this Department on S. 3237, a bill "To extend for two years the program of

research and development undertaken by the Secretary of Transportation in high-speed ground transportation, and for other purposes."

This bill would extend the High-Speed Ground Transportation Act for two years from June 30, 1969, to June 30, 1971. It would also amend that Act to (1) authorize appropriations for fiscal years subsequent to June 30, 1968, (2) clarify the Secretary of Transportation's authority to acquire sites and provide support facilities under the Act, and (3) make several technical amendments to reflect the transfer of functions required by the establishment of the Department of Transportation and the Department of Housing and Urban Development.

This Department is in full accord with the purposes of this Act and has no objection to its enactment.

The Bureau of the Budget has advised that there is no objection to the submission of this report and that enactment of S. 3237 would be consistent with the Administration's objectives.

Sincerely yours,

ROBERT C. WEAVER.

DEPARTMENT OF AGRICULTURE,  
Washington, D.C., July 17, 1968.

HON. WARREN G. MAGNUSON,  
Chairman, Committee on Commerce,  
U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: It is my understanding that the Subcommittee on Surface Transportation is now giving consideration to S. 3237, a bill to extend for 2 years the program of research and development undertaken by the Secretary of Transportation in high-speed ground transportation, and for other purposes.

This Department recommends enactment of this bill.

S. 3237 would provide for a continuation of the programs of research, development, and demonstrations conducted by the Office of High Speed Ground Transportation, U.S. Department of Transportation. Although much of the attention has been directed heretofore at problems of transportation which have developed in or are projected for areas of the highest population density, the results of the research, development, and demonstration work carried on can often be applied also to the transportation problems of the less densely settled areas.

There is need to facilitate access and to provide better commuting systems between town and country, between rural and suburban areas, and even between cities. Improved transportation facilities are needed to stimulate economic development and to make the movement of people and goods easier among towns and small cities. Three out of 10 rural residents cannot now conveniently commute to a city of 25,000 population. Regular efficient public transportation is needed to provide easy access to education, training, and jobs.

The Bureau of the Budget advises that the enactment of this proposed legislation would be in accord with the President's program.

Sincerely,

ALFRED L. EDWARDS,  
Acting Assistant Secretary.

THE COUNCIL OF STATE GOVERNMENTS,  
Washington, D.C., June 13, 1968.

HON. WARREN G. MAGNUSON,  
Chairman, Committee on Commerce,  
U.S. Senate, Washington, D.C.

DEAR SENATOR MAGNUSON: The National Legislative Highway Committee has asked that we forward a Resolution concerning S. 3237 on High Speed Ground Transportation.

The Committee, composed of key state legislators concerned with transportation matters, has asked that this short statement be made a part of the Hearing record on this legislation.

Thank you.

Sincerely,

JAMES A. R. JOHNSON,  
Legislative Assistant.

## NATIONAL LEGISLATIVE HIGHWAY COMMITTEE

## RESOLUTION

Whereas, We live in a time when it is increasingly easier, safer, and faster to fly between cities, or drive from one state to another, than it is to drive from our suburban homes to the office downtown, and,

Whereas, The challenge of mass transportation in the Nation's growing metropolitan areas is one of the most serious problems facing the states today, and,

Whereas, Population, motor vehicle registration, and miles traveled by all vehicles in urban areas will almost double in a decade, and,

Whereas, problems of traffic congestion, lack of parking facilities, decline in patronage of public transit systems, and lack of adequate integration of different modes of transportation add up to a chaotic urban transportation situation: Now, therefore, be it

*Resolved*, That the National Legislative Highway Committee express its support for federal grant programs enabling statewide and regional transportation planning and coordination of all transportation modes with other aspects of urban development. The Committee maintains that the most logical point for such coordination is at the State Government level; and be it further

*Resolved*, That the Committee support United States Senate Bill 3237, and similar legislation in the House of Representatives, to extend for two years the program of research and development undertaken by the Secretary of Transportation in high-speed ground transportation systems, and be it further

*Resolved*, That the Committee express its support for further study of alternative means of financing the development of public transit systems, by both United States Congressmen, and State Legislators.

APRIL 16, 1968.

*Washington, D.C.*

STATEMENT OF HON. WARREN G. MAGNUSON, U.S. SENATOR FROM THE STATE OF WASHINGTON

Mr. Chairman, I am submitting this statement in support of S. 3237, which I introduced at the request of the Secretary of Transportation, to extend for an additional two years the program of research and development, and demonstration, in high-speed ground transportation.

Three years ago, I introduced at the request of the administration the legislative proposal which began the high-speed ground transportation program. It seemed to me that the testimony at the 1965 Surface Transportation Subcommittee hearings amply demonstrated the need and interest for this program to provide the Nation with better and faster intercity passenger service, not only in the northeastern corridor, but also, between the major population centers throughout the United States.

At the time President Johnson signed the High-Speed Ground Transportation Act on September 30, 1965, he said:

"In recent decades, we have achieved, technological miracles in our transportation. But there is one great exception.

"We have airplanes which fly three times faster than sound. We have television cameras that are orbiting Mars. But we have the same tired and inadequate mass transportation between our towns and cities that we had 30 years ago."

I believe that the extension of the high-speed ground transportation Act for an additional two years is essential if we are to have a system of advanced ground transportation linking our cities. At the end of the two year period, it is anticipated that results of the present research and development program in the northeastern corridor will be available. The lessons of this eastern demonstration project will aid other national corridors in developing their own high-speed intercity ground transportation programs. But these other areas will not be able to fully benefit from these lessons unless they are in a position to start planning now.

The National Legislative Highway Committee of the Council of State Governments in its April 16, 1968 resolution supporting S. 3237 has called attention to need for federal grant programs enabling statewide and regional transportation planning and coordination of all transportation modes with other aspects of urban development.

Professor Jarold A. Kieffer, Chairman, Public Affairs and Administration Program, University of Oregon, has suggested that S. 3237 be amended in a number of respects, including the adoption by Congress of a program of financing

regional intercity transportation planning grants, and eventually federal financing of the projects themselves.

Professor Kieffer suggests that the Washington-Oregon area would be a suitable location for a "Northwest Express" extending from the California border through the Puget Sound area—perhaps even to the Canadian border. Other Senators have no doubt received letters from interested citizens in their regions proposing intercity transportation corridor express service.

In my opinion, the planning for such corridors should be fostered at the local level, but the federal government, I believe, should provide the funds for such planning studies.

The planning for intercity express ground transportation service will not be an easy task. It is said that in the Northeastern Corridor there are between 100 and 120 political jurisdictions involved. If the Northwest Express is to become a reality, the planning will involve the States as well as many cities, counties, and other political jurisdictions. Such intercity express planning must not only be coordinated with the intercity air and highway programs of the Department of Transportation, but also with the intracity highway and urban mass transportation planning of that Department and the Department of Housing and Urban Development.

There is appended to my statement a proposed amendment to S. 3237, to enable the Secretary of Transportation to enter into contracts or other agreements to carry out planning for interurban transportation and to the extent necessary for urban transportation. In view of the brief time that appears to be remaining in this session of Congress, I do not intend to pursue the amendment at this time. I have written to the Secretaries of Transportation and Housing and Urban Development to obtain their views on the best means of providing coordinated federal planning funds for such studies. Early in the next Congress, I intend to offer legislation to insure that intercommunity transportation planning will move forward.

#### APPENDIX—AMENDMENT TO S. 3237

S. 3237, to extend for two years the program of research and development undertaken by the Secretary of Transportation in high-speed ground transportation, and for other purposes, viz: At the end of the bill insert a new section as follows:

SEC. 2. Such Act of September 30, 1965, is further amended—

(1) in section 8(a) (2), by inserting "for planning or" after "contracts"; and

(2) by inserting at the end thereof a new section as follows:

"SEC. 13. For the purpose of promoting necessary and proper planning in gaining the objective stated in the first section of this Act, the Secretary is authorized to enter into contracts or other agreements to carry out planning for interurban transportation and to the extent necessary for urban transportation."

Senator LAUSCHE. The first witness today will be Mr. A. Scheffer Lang, Administrator of the Federal Railroad Administration, Department of Transportation; accompanied by Robert A. Nelson, Director of the Office of High-Speed Ground Transportation of the Department of Transportation.

We will be glad to hear your testimony, Mr. Lang.

#### STATEMENT OF A. SCHEFFER LANG, ADMINISTRATOR, FEDERAL RAILROAD ADMINISTRATION, DEPARTMENT OF TRANSPORTATION; ACCOMPANIED BY ROBERT A. NELSON, DIRECTOR, OFFICE OF HIGH-SPEED GROUND TRANSPORTATION, DEPARTMENT OF TRANSPORTATION

Mr. LANG. Thank you very much. I appreciate the opportunity to appear before you on the extension of the High-Speed Ground Transportation Act, Public Law 89-220, proposed by S. 3237.

The bill would extend the act for 2 years and establish June 30, 1971, as the expiration date of the act. Other procedural amendments would take account of the establishment of the Department of Transporta-

tion and the transfer to it of elements previously in the Department of Commerce.

A more substantive change is the amendment to section 7 which would clarify the authority to acquire necessary real property by purchase, lease, or grant; and to construct, make repairs, or furnish necessary support facilities. This clarification is necessary then in order for the Department to acquire a test site for the development of advanced ground transportation systems. The amendment would not change in any way the prohibition now in the act against the Secretary's acquisition of any interest in any line of railroad.

The House Interstate and Foreign Commerce Committee in reporting favorably on H.R. 16024, the bill introduced in the House, concurs in this substantive change and the various technical changes and goes further to authorize the Secretary of Transportation to " \* \* \* contract for the construction of two suburban rail stations, one at Lanham, Md., and one at Woodbridge, N.J., without acquiring any property interest therein \* \* \*" as " \* \* \* furtherance of a demonstration program \* \* \*"

Senator LAUSCHE. May we pause at this point?

How would the Department of Transportation acquire two sites or contract for the construction of two suburban rail stations without acquiring any property interest therein?

Mr. LANG. Our plans, Mr. Chairman, are merely to construct the passenger shelter and platforms at these two stations. The land will be furnished by the States of New Jersey and Maryland and by the railroad—I stand corrected. And the preparation of the parking lots at these sites will be handled by Prince Georges County in the case of the one at Lanham and by the State of New Jersey in the case of the one at Woodbridge, N.J. So we would be constructing only the platforms and the passenger shelters on land that was owned by others.

Senator LAUSCHE. Under necessary rights acquired from the railroad, without this Government backing of the owner and the operator?

Mr. LANG. That is correct.

One of the important advantages to this arrangement, from the standpoint of the Government, is that, by providing these facilities for the use of the railroad, they will assume full liability for their operation and maintenance.

Senator LAUSCHE. All right. Proceed.

Mr. LANG. The House bill also concurs in the 1971 expiration date and provides appropriation authorization of " \* \* \* \$16,200,000 for the fiscal year ending June 30, 1969; and \$21,200,000 for the fiscal year ending June 30, 1970."

The 1968 authorization is equal to our pending appropriation request for the next fiscal year and both Senate and House Appropriation Committees are awaiting enactment of the authorization before acting on the request.

Senator LAUSCHE. How long has this act been in effect?

Mr. LANG. Since June 30, 1965.

Senator LAUSCHE. And how much has it—

Mr. LANG. Excuse me. September 30, 1965.

Senator LAUSCHE. How much has been appropriated under it and expended?

Mr. LANG. Fifty-two million dollars of the ninety million dollars originally authorized has been appropriated. And the expenditures

are now in the range of—Mr. Nelson advises me that the full expenditures are less than half, although our commitments run very close to the full \$52 million at this point.

Senator LAUSCHE. How much was appropriated?

Mr. LANG. Fifty-two million in 3 years.

Senator LAUSCHE. How much was authorized for the 3 years?

Mr. LANG. Ninety million dollars.

Senator LAUSCHE. Was it anticipated that the \$90 million would do the job when the act was first passed?

Mr. LANG. Given the original purposes, it was felt that \$90 million, as I understand it, would do the first part of the job that was identified at the time of the passage of the legislation in 1965.

It was clear from legislative history that there was at that time an expectation that the program would be continued beyond the 3 years, though there was no discussion of the funding that might accompany such a continuation of the program.

Senator LAUSCHE. Well, the \$90 million was to, in effect, make possible an experiment about the success of high-speed train services. Isn't that correct?

Mr. LANG. Well, that was the purposes of the original act and the money which was authorized to be spent under that act. But, in addition, the act very importantly was intended to initiate a research and development program which it was expected would probably continue beyond the 3 years. In addition, the act also authorized the initiation of a national transportation statistics program. That particular part of the program authorized by the 1965 act did not have at the time any expiration date on it and remains in effect.

Senator LAUSCHE. How far into the stage of experiment have you gotten?

Mr. LANG. Well, I am going to speak to that a little bit later in my remarks.

Senator LAUSCHE. All right. Proceed.

Mr. LANG. The fiscal year 1970 authorization is substantially below the amount of \$36.5 million we consider necessary for fiscal year 1970 to carry out planned research and development in advanced systems and technology. Nevertheless, in the interest of expediting the business of the legislative session, we would concur in the reduced amount at this time. We would, therefore, be agreeable to Senate substitution of the House bill for S. 3237.

Senator LAUSCHE. What is the difference between the Senate version and the House version?

Mr. LANG. The Senate version does not include this specific authorization for the second year. But that is the only difference at this point.

Senator LAUSCHE. Well, you recommend the acceptance of the House version; is that correct?

Mr. LANG. That is correct, Mr. Chairman.

Senator LAUSCHE. Well, does the House bill have no limitation by way of authorization?

Mr. LANG. Yes, sir; it does.

Senator LAUSCHE. It is an open end?

Mr. LANG. No, sir; it has a specific limitation.

Senator LAUSCHE. Of 2 years?

Mr. LANG. Of 2 years of time and a specific limitation of \$16,200,000 in authorizing for 1969.

Senator LAUSCHE. Then it is not an open end. It is a 2-year limitation, \$16,200,000 for the first year.

Mr. LANG. Yes.

Senator LAUSCHE. And how much for the second?

Mr. LANG. \$21,200,000 for the second year.

Senator LAUSCHE. Proceed.

Mr. LANG. The proposed test facility is needed to carry research and development on new systems, such as the tracked air-cushion vehicle and the linear electric motor, to a testing stage. For test operations at speeds on the order of 300 miles per hour, we need a great deal of land and relative isolation to assure noninterference. We are seeking about 30,000 acres of land that is relatively flat and free of obstructions. We hope that it will be Government-owned property or property that can be made available to us at little or no cost.

The suburban stations are considered an integral part of the planned demonstrations to test public response to improvements in service and equipment. They are being located at junctions with major limited-access highways, with ample parking provided to determine whether the urban, suburban, and rural populations in the communities having access to those highways will use the rail service for intermediate-distance travel.

The High-Speed Ground Transportation Act was passed in 1965 with a sense of urgency that the demand for transportation in the urbanized intercity corridors which have grown up about the Nation will far exceed our present capability to handle it. The purpose of the act was to try, through research, development, and demonstration, to stimulate alternative modes of transportation which could better handle high volumes of movement in densely populated regions.

Today there is an even greater sense of urgency. Travel volumes have increased at a greater rate than predicted and the period of time before we will completely run out of transportation capacity in the northeast corridor is being drastically shortened. The growth in air transportation has been particularly dramatic. Between 1962 and 1966, intercity air passenger miles in the United States nearly doubled, while intercity passenger miles by all modes increased by more than 17 percent.

In the northeast corridor the problem of congestion is extremely critical at several major airports. According to Federal Aviation Administration estimates, delay time at J. F. Kennedy, Newark, La Guardia, Washington National, Boston, and Philadelphia airports in 1965 amounted to 49,000 hours. Estimates indicate that at three airports alone—Kennedy, La Guardia, and Newark—there will be an increase in delay time from 33,000 hours annually in 1966 to 133,000 hours in 1970, and the delays will become very much larger by 1975, if nothing is done to expand capacity.

Estimates by the Bureau of Public Roads indicate that highway travel on intercity routes in the northeast corridor will almost double between 1965 and 1985. Approximately \$2½ billion will be needed just on the intercity portion of the corridor highway system. The total cost to Federal, State, and local authorities of all street and highway construction in the northeast corridor for the same 20-year period is estimated at more than \$33 billion. These new facilities will have to be accommodated into what is already the most heavily developed region in the country. Fourteen percent of the Nation's total road mileage is concentrated on less than 2 percent of the land area.

As income levels go up, we anticipate that transportation demand will continue to expand at a very rapid rate. No doubt most of the cost of meeting this demand can be, and should be, imposed on the users of these services. In today's economically and technologically complex world, however, the direction which the development of new systems and the improvement of the old should take is not clear. Research and development, testing and demonstrations should be carried on in several directions until we begin to see clearly the most useful and productive path.

It is unrealistic to expect completely private sponsorship during this experimentation phase. The costs are too high and the risks are too great. Government must provide the seedbed and must stimulate and encourage involvement by private firms. This is essentially what this program has tried to do and, I believe, has done with a high degree of success. We estimate that, over the 3-year period, Federal appropriations of \$52 million have been met by \$75 to \$100 million of expenditures and commitments by private firms.

Senator LAUSCHE. May we pause at this point? Will you identify the private industry which is involved in helping finance it?

Mr. LANG. If I may allow Mr. Nelson to refer you to the charts that we have over here, Mr. Chairman?

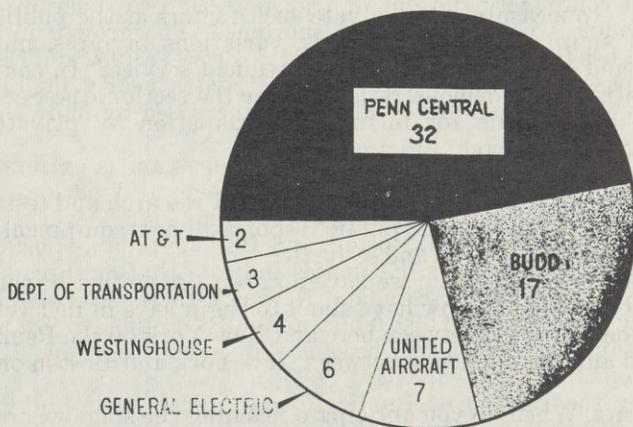
Senator LAUSCHE. Mr. Nelson, if you will proceed?

Mr. NELSON. Most of it, sir, is shown on this chart on your right.

## DEMONSTRATIONS... BOSTON-N.Y.- WASH.

EXPENDITURES THRU 4/1/68

\$71 MILLION



The General Electric Corp., Westinghouse Corp., American Telephone & Telegraph Co., the Budd Co., and the Penn Central Railroad are responsible for the bulk of the figures to which Mr. Lang referred.

However, there are other firms which also contributed—which have made commitments of their own in research and development expenditures—but the bulk of it is there.

Senator LAUSCHE. Proceed.

Mr. LANG. The Office of High-Speed Ground Transportation has direct responsibility for the Northeast Corridor Transportation project, under the Secretary's general authority, to carry out research and development in intercity transportation, and has responsibility for the research and development and demonstrations in high-speed ground transportation under the act of 1965. In carrying out its responsibilities, the Office of High-Speed Ground Transportation has retained essentially a task force orientation to the problems of transportation in urbanized regions. Close integration and coordination has, therefore, been maintained between the Northeast Corridor Transportation project and the research and development and demonstration activities pertaining to high-speed ground transportation systems.

The High-Speed Ground Transportation Act of 1965 authorized appropriations of \$20 million for fiscal year 1966, \$35 million for fiscal year 1967, and \$35 million for fiscal year 1968, for research, development, and demonstrations in high-speed ground transportation and for the national transportation statistics program. Of the authorized \$90 million, \$52 million have been appropriated.

I should like to describe briefly what we have accomplished since the High-Speed Ground Transportation Act was passed. The major categories of activity have been research and development and demonstrations.

Section 2 of the High-Speed Ground Transportation Act authorizes the Secretary of Transportation, “\* \* \* to contract for demonstrations to determine the contributions that high-speed ground transportation could make to more efficient and economical intercity transportation systems.” The purpose of demonstrations, carried out under the act, is “\* \* \* to measure and evaluate such factors as the public response to new equipment, higher speeds, variations in fares, improved comfort and convenience, and more frequent service.” In connection with contracts for demonstrations under the section, the Secretary shall, “\* \* \* provide for financial participation by private industry to the maximum extent practicable.”

Senator LAUSCHE. Let us pause.

Up to this time have you reached in your stage of research and tests a point where you have learned the public response to new equipment, higher speeds, variations in fares, and so forth?

Mr. LANG. Well, Mr. Chairman, we have not, because neither of the two demonstrations which we now have about to begin have in fact yet begun. That is, the operation between here and New York on the Penn Central Railroad and the operation between New York and Boston on the New Haven.

Senator LAUSCHE. When do you anticipate reaching the stage where you will actually observe the public response to a new type of high-speed service?

Mr. LANG. If I may, Mr. Chairman, let me ask Mr. Nelson to answer that for you.

Mr. NELSON. That is a question that I cannot, I must admit, answer with any great degree of confidence, reflecting the changes in the scheduled starting times that have occurred in the last year.

But I think we could say that we believe that both the United Aircraft Corp., which has responsibility for building and getting into service the TurboTrains, and the Budd Co., which has responsibility for building and turning over to the Penn Central Railroad the Metroliners, are working out the technical difficulties which have harassed them now for some 6 months, and that it is not going to be very long before service is actually operating between Washington and New York and between New York and Boston.

I think the prospects are that service would probably start north of New York before it starts south of New York. But this is the way we see the prospects at the moment. The cause of the later-than-we-had-hoped-for start in the demonstrations has been entirely technical.

I should point out that we have for the last 2 years been collecting data about passengers riding or using rail passenger service between Washington and Boston on the two railroads. This data has been very important to us and has told us a good deal about the kind of people who ride the railroads, where they start from and what they want in the way of transportation. So we have a very solid base now upon which to put the new service into operation and then see what changes come about.

Senator LAUSCHE. Based on what has been done, is your anticipation of success greater now than it was when you started?

Mr. NELSON. Yes, sir; very much greater. The reason for that is because of the tremendous increase in volumes of traffic which are presently being handled by the airlines in the Northeast Corridor.

Senator LAUSCHE. Proceed.

Mr. LANG. Within this pattern of objectives, two rail passenger service demonstrations were set up for the Northeast Corridor. One was to operate between New York and Washington and the other between New York and Boston. A third demonstration of auto-on-train service between Washington, D.C., and Jacksonville, Fla., was planned and partly funded. The three demonstrations would help to determine the role that rail passenger service, based on generally contemporary technology, can play in future transportation. In both the New York-Washington and New York-Boston demonstrations substantial improvements in rail passenger service are to be made. Terminal-to-terminal times are to be reduced, new equipment is to be acquired, and roadbeds and stations are to be upgraded.

In carrying out the Washington-New York demonstration, the Department entered into a contract with the Pennsylvania Railroad—now Penn Central. Under the contract the railroad was to acquire a fleet of not less than 28 and not more than 50 new MU cars capable of sustained speeds of up to 150 miles per hour. The railroad was to upgrade its roadbed to very high standards specifically set out in the contract; to build high-level platforms at Wilmington, Baltimore, and Washington, D.C.; to retrain personnel to be utilized in the new service and to operate the new trains on schedules of not more than 3 hours between Washington and New York.

The consideration to be paid to the Penn Central Railroad for the performance of the contract was \$9.6 million. The railroad was to bear all costs which, excluding the Government's contribution, were estimated at the time of the signing of the contract to be between \$20 and \$25 million. The contract also provided that the Department of Transportation would be able to collect data on passenger movement on board trains between New York and Washington prior to and during the demonstration.

The conduct of the demonstration between New York and Boston posed a different situation. There the New Haven Railroad has been in bankruptcy for 7 years. The Department of Transportation had to take full responsibility for the conduct of that demonstration. Early in 1966 the Department contracted with the United Aircraft Corp. for the lease of two three-car turbine-powered trainsets for a 2-year period at a cost of \$1.7 million. The Department agreed to pay maintenance costs for the 2 years which would amount to \$2.8 million. We estimate that operating and other costs will be \$4 million. The total cost of the New York-Boston demonstration would be about \$9.5 million, some of which may be returned through revenue-sharing arrangements with the New Haven Railroad.

From the New York-Boston demonstration we expect to determine the prospective usefulness of equipment which can operate at a substantially higher speed than conventional equipment over curved roadbed. If the equipment is successful and attractive to the public, it may be an answer to short and intermediate rail passenger hauls in many areas of the country. It offers the prospect of substantially upgraded service at minimum cost.

Both the Washington-New York and New York-Boston demonstrations have been delayed beyond the starting times we originally hoped for. Very clearly we were unduly optimistic about the time that would be required for the design, building, and testing of new equipment. In both cases the equipment is a substantial advance in the state of the art. United Aircraft TurboTrains are relying on turbine power for propulsion and have adopted an advanced suspension system.

The cars for the Washington-New York demonstration, built by the Budd Co., are electronically the most complicated ever built. They will have a sustained speed capability of 150 miles per hour and will have automatic controls of speed, braking, and wheel slide. If the speed requirement of 150 had not been imposed, it is probable that the cars could have been built much more quickly. Without this capability, however, we would have precluded the possibility in the future of improved performance with a better roadbed.

Target dates for the start of the demonstration were set to convey the sense of urgency in the program. When it was apparent that the project would not meet them, Secretary Boyd called a meeting of the major industry participants in the program. He suggested that all the parties form a task force to identify and establish the priority of the unresolved technical problems. Where is priority of problems established? The task force identified these problems as follows:

1. Electronic maintainability;
2. Wheel thermal stress under specified deceleration when using airbrakes alone;

3. Pantograph-catenary current collection stability at high speed during winter months, particularly under the remaining light wire; and

4. Acceptability of ride quality.

The task force found that many of the individual problems which delayed the demonstration had been identified by the contractors and that substantial resources were now being devoted to their resolution. The task force also found that, given the magnitude and complexity of the project, all concerned with it—Government, railroad, car builder, and equipment supplier—were overly optimistic with respect to the planning and scheduling. The task force concluded that a reliable demonstration could be initiated within 7 months, given prompt action in the major problem areas.

The implementation of the task force report is now being expedited by a steering committee that the Secretary has appointed for the purpose.

It should be perfectly clearly understood that the holdup in the delivery of equipment for these demonstrations has been completely without funding costs to the Government.

In completing this discussion of the demonstrations, I should like to commend the Penn Central Railroad and the rail supply firms involved in the construction of equipment for the demonstrations. The rail industry and the rail equipment industry have clearly not enjoyed financial prosperity since the end of World War II. Yet the firms involved here have been willing to commit sizable resources to research and development, and to the improvement of their engineering and production capability. This has been done, moreover, with the prospect of only a relatively small Federal financial participation.

The research and development in high-speed ground transportation has also proceeded more slowly than anticipated. Almost all of the reduction in appropriations has been taken by this activity. Nevertheless, in addition to specific advances in technology in several areas, the program has marked out the general directions for research and development in high-speed ground transportation for the future. Work has been done in systems engineering and in high-speed rail operation, new high-speed ground systems, tunneling, power pickup and guideway surveillance.

Among the accomplishments of the program are the construction of four rail-research cars which have been operated under test conditions at speeds of 150 miles per hour on upgraded roadbed; the design and current construction of a 2,500-horsepower linear electric motor; the development of designs for tracked air-cushion vehicles; and breakthroughs in tunneling technology. These accomplishments will lead to the building of test vehicles, guideways and propulsion systems, and, ultimately, to commercial demonstrations.

The work in the high-speed ground transportation program has been done with a total authorized staff for the first 2 years of 27. This was increased for fiscal year 1968 to 34.

I should like to request that a detailed "Statement in Explanation of Request for High-Speed Ground Transportation Legislative Extension" prepared by the Office of High-Speed Ground Transportation be entered into the record. This statement is intended to provide detailed information in review of the program and in explanation of work which remains to be done. It outlines the major areas in which the new authorizations which we have requested will be obligated.

I strongly urge upon this committee the passage of S. 3237 with the amendments proposed.

Senator LAUSCHE. The statement in explanation of the request of the high-speed ground transportation legislative extension will be printed in the record as you request it.

Mr. LANG. Thank you, Mr. Chairman.

(The statement follows:)

STATEMENT IN EXPLANATION OF REQUEST FOR  
HIGH SPEED GROUND TRANSPORTATION LEGISLATIVE EXTENSION

S. 3237  
H.R. 16024

Department of Transportation

Office of High Speed Ground Transportation

May 28, 1968

(19)

INTRODUCTION

The High Speed Ground Transportation Act of 1965 authorized research, development, and demonstrations in high speed ground transportation and authorized appropriations for these purposes for the fiscal years 1966, 1967 and 1968. Although, at the time the Act was being considered, the House Committee on Interstate and Foreign Commerce and the Senate Commerce Committee recognized the desirability of a continuing program, they recommended that it be reviewed in three years.

If the high speed ground transportation program is to be continued and funded with 1969 appropriations, the High Speed Ground Transportation Act of 1965 must be extended, and authorization for appropriations must be granted for fiscal year 1969 and such succeeding years as the Congress deems appropriate. The Secretary of Transportation has requested that Congress extend the expiration date of the Act (PL 89-220) to June 30, 1971, and authorized appropriations for fiscal years 1969 and 1970. The only significant change in the proposed legislation from the existing Act is in clarification of the authority for site acquisition for development-testing of proposed new high speed ground transportation systems and components.

The national transportation information program provided for in Section 4 of PL 89-220 will not terminate on June 30, 1969, along with the rest of the Act. The intent of the 1965 legislation was to consolidate the existing powers of the Secretary of Commerce

to collect data for transportation planning, but not in any way to limit his existing authority. The Secretary of Transportation has separated administratively the transportation information and high speed ground transportation programs and has included appropriations requests for the information program with those of his office. This request for extension, therefore, is concerned only with the provisions of the High Speed Ground Transportation Act referring to research and development, and demonstrations.

This statement will:

1. Discuss the need for continued focus on the intercity transportation problems of urbanized regions;
2. Review the background and administration of the high speed ground transportation program and summarize its major accomplishments;
3. Discuss the status of the program; and
4. Outline the proposed continuing program activity.

THE TRANSPORTATION CRISIS IN URBANIZED REGIONS

The work of the Office of High Speed Ground Transportation is being carried on with a sense of urgency which arises from the realization that the demand for transportation in urbanized regions of the United States will more than double in the next twenty years. The economic cost of adding to existing capacity to meet these increased demands will be great; however, the economic and social costs of failing to meet them would be greater still.

Transportation is a moving force in a technologically oriented society. It enhances personal mobility, brings people closer to work and recreation, and provides business and industry with broader markets, fostering specialization of effort, decreasing average cost, and other economies of scale.

If the nation's transportation system is to continue to benefit society, it must grow to handle the flood of people and products which will need to be served over the next 20 to 30 years. Over this period of time, the population of the United States will increase by an estimated 50 to 75 per cent and the production of goods and services will expand even faster. The demand for transportation will increase most rapidly of all in response to rising incomes and greater use of transportation in the productive and distributive processes.

Much of this anticipated growth will take place in our cities and metropolitan areas. Currently about two-thirds of the population reside in urban places. By 1985, this proportion will rise to 80

per cent; with much of this increase being concentrated in a few regions. Transportation growth will be greatest within the metropolitan areas themselves and in the urbanized corridor regions between cities.

The extent to which intercity passenger travel on each mode has changed since 1950 is shown in the following table.

INTERCITY PASSENGER TRAVEL IN THE U.S.

(In Billions of Passenger-Miles)

<u>Year</u>	<u>Airline</u>	<u>Rail</u>	<u>Bus</u>	<u>Auto</u>	<u>Total</u>
1950	8.0	26.8	22.3	402.8	458.8
1951	10.5	29.7	22.3	457.8	502.3
1961	31.1	16.2	19.7	714.0	780.9
1962	33.6	15.9	21.3	736.0	806.8
1963	38.5	14.4	21.9	766.0	840.8
1964	44.1	14.0	22.7	802.0	882.9
1965	51.9	13.3	23.3	838.0	926.4
1966	60.6	12.9	24.8	880.0	978.3

Over the fifteen year period covered by these data, total intercity travel more than doubled. Air travel increased eightfold, or at a rate approximately four times that of the average for all modes combined.

These airline passenger data also show generally increasing growth rate changes for the years since 1961. For example, the percentage increase in air travel between 1961 and 1962 was 8 percent, for 1962 through 1964 it was 15 percent annually, and 17 percent for each year between 1964 through 1966.

On the basis of these trends, it is evident that intercity travel will again more than double over the next twenty years and that air travel will increase more rapidly still. This growth, were it to be distributed uniformly over the nation, would pose a serious challenge to government and the transportation industry; focused, as it will be, on a relatively few urban complexes, this projected demand assumes crisis proportions.

Taking each of the modes separately and projecting the requirements using the Northeast Corridor as a base, the following statements indicate the magnitude of the problems which will have to be faced over the next 20 to 30 years.

A fourfold projected increase in air traffic will be superimposed on the air space which is already virtually saturated. In 1965, for example, delay times using the operators' own measures for 23 large United States hub air terminals totalled 115,000 hours. This figure represents 34.2 per cent of total delays for the 292 airports in the United States receiving scheduled flights. Total air carrier delay costs for these same 23 airports due to extra crew and fuel requirements amounted to \$31.7 million, or 68.4 percent of the total operator delay costs for the same 292 airports. The situation is even more critical in the six major Northeast Corridor airports: J. F. Kennedy, Newark, La Guardia, Washington National, Boston and Philadelphia. According to Federal Aviation Administration estimates, delay time and increased costs for air carriers in 1965 for those six airports were 49,000 hours and \$13.1 million. The estimates indicate that three airports, Kennedy, La Guardia and Newark, will have a rise in delay

times from 33,000 hours annually in 1966 to 133,333 hours in 1970 and the delays will become very much larger by 1975, if nothing is done to increase capacity. These cost and time figures do not, of course, take into account the personal losses in inconvenience and delay to millions of air passengers on taxiways waiting for runway clearance or circling airports awaiting landing instructions.

Solutions which have been proposed include the construction of larger jet aircraft and the separation of common carrier airports from general aviation airports. Both of these solutions will create severe problems of land use in heavily populated areas, noise pollution, air pollution, and access to and from new airports. The current minimum standards for an average jet port require 10,000 acres of land which must often be taken from other productive uses. In addition, airport construction is a relatively expensive activity. For example, estimates of federal and local expenditure for 1967 amounted to \$515 million on new airport facilities, with an additional \$120 million dollars being provided from airline funds for improving existing facilities.

From the table above it can be seen that in spite of the exploding rates of growth from 1950 to 1966, air transportation comprised only 6 per cent of the intercity passenger travel in the United States during 1966. Forecasts of the requirements to 1975 indicate a need to double airport facilities, involving a planned expenditure of \$6 billion for airports in the next 8 years. Of these planned expenditures at least one half of the funds will have to be found before 1970. If the 1975 demand for air support facilities is to be satisfied, the Air Transport Association estimates that the airlines will have to invest an additional \$18 billion for ground and flight equipment.

Estimates by the Bureau of Public Roads indicate that highway travel on intercity routes in the Northeast Corridor will almost double between 1965 and 1985 and that approximately \$2.5 billion will be needed just on the intercity portion of the corridor highway system. The total cost to Federal, State, and local authorities of all street and highway construction in the Northeast Corridor for the same 20-year period is estimated at more than \$33 billion.

These new facilities will have to be accommodated into what is already the most heavily developed region in the country--fourteen percent of the Nation's total road mileage is concentrated on less than 2 percent of the land area. The freeway network alone in the Corridor now occupies an area equivalent to one-quarter of the State of Rhode Island; the entire road and street network covers an area equal to all of Connecticut, Rhode Island, and the District of Columbia.

The significance of such demands for space should be considered within the context of land values in the Northeast Corridor, which have a mid-range of approximately \$4000 per acre in rural areas of one person per acre to \$1/2 million for urban land at a density of 100 persons per acre.

More efficient use of the highway system would result from greater use of bus transportation as a substitute for travel by private auto. However, there is little evidence in the figures presented above that such a shift is likely. Intercity passenger-miles by bus have risen only slightly over the past 25 years. Although increases in population improved vehicles, and further development of limited access highways will probably

result in a continued growth in bus volumes, the degree of relief to highway congestion which this would represent would be slight.

The one existing intercity transportation mode with excess passenger capacity and which is relatively economical in its land use is the railroad. Passengers can be transported at significantly higher rates than at present, with considerable expansion of capability possible at an investment cost which is relatively minor compared with the other transportation modes discussed above. Railroads have a huge sunk cost in the Northeast Corridor; there are 25,100 miles of track or 12 percent of the national total in the States encompassed by the Corridor. Recent estimates indicate that a \$500 million improvement could greatly improve comfort and time on the 229 mile right-of-way between New York and Washington to permit 2-hour schedules on trains. Even less, possibly half this amount, need be spent if the schedule requirement is raised to 2-1/2 hours. Such improvements would permit at a maximum a tripling of passengers serviced over the number of passengers who used this transportation mode in 1963.

Given the continuing concentration of population and economic activity in and around urban areas, it is evident that the capacity of transportation networks in the Northeast Corridor and in similar corridors in other parts of the Nation will have to be substantially expanded over the next ten to twenty years. Many of our present problems of congestion, inefficiency, and deteriorating service arise out of the mis-match between a massive and relatively fixed system of facilities and a rapidly growing demand for a wide variety of transportation services. Without concerted action to redress this imbalance, there is a danger that congestion and

delay will increase in many areas while excess capacity will continue to exist elsewhere.

More efficient use will have to be made of existing facilities; and new systems, less demanding of space than those presently in use, will have to be introduced to accommodate dense corridor flows. High speed ground transportation, which in the near term can take advantage of the availability of existing track and right-of-way, offers the prospect of efficiently transporting large volumes of people at high speeds in safety and comfort. The potential of this technology is, as yet, relatively untapped; the pay-off from a vigorous program of research, development, and demonstrations could, therefore, be correspondingly great.

The reports of the Office of High Speed Ground Transportation, which will be based on systematic research, will focus on the most effective and efficient use of resources to maintain mobility in the Northeast and in other densely populated regions of the United States.

BACKGROUND, ADMINISTRATION, AND SUMMARY OF ACCOMPLISHMENTS  
OF THE  
HIGH SPEED GROUND TRANSPORTATION ACT OF 1965

Background

In June 1962, Senator Claiborne Pell of Rhode Island introduced into the Congress a resolution (S.J. Res. 194, 87th Congress, 2nd Session) which would have authorized the District of Columbia and eight Northeastern States to "...enter into a compact to establish a multi-state authority to construct and operate a rail passenger transportation system within the area..." In the following October, Senator Pell requested that the Administration provide assistance in analyzing the transportation problem which had prompted his resolution. The President responded by directing that an interagency task force be assembled "...to survey available information, to identify issues and to estimate the time, expense and staff required to prepare such proposals as may be appropriate." The interagency task force reported to the President on December 10, 1962, recommending that a "...comprehensive analysis of transportation problems in the Northeastern Megalopolis..." be carried on by the U. S. Department of Commerce.

Work began on the Washington-Boston study in June 1963 with funds which had been previously appropriated by Congress for transportation research in the Commerce Department. In September 1964 the study was given formal project status as the Northeast Corridor Transportation Project, first, in the Office of the

Secretary of Commerce and, in April 1965, in the Office of the Under Secretary of Commerce for Transportation.

It soon became apparent that, in order to evaluate adequately alternative ways in which the transportation needs of the Northeast Corridor could be met, much more and better information was needed, including technological and cost data for both current high speed ground systems and possible new systems. The President, therefore, asked the 89th Congress for legislation which resulted in the High Speed Ground Transportation Act of 1965. This Act authorized the Secretary of Commerce to undertake research and development in high speed ground transportation, to contract for demonstrations in high speed ground transportation and to collect and collate transportation data, statistics, and other information.

Although the demonstration projects described in the legislative background were to be in the Northeast Corridor, the single area of greatest regional population density and transportation congestion, the High Speed Ground Transportation program was to be national in scope. The information gained in the Corridor would have general application in other highly urbanized regions. Planners, builders and operators of urban and interurban transportation systems throughout the United States would have available to them the new technology coming out of high speed ground transportation research and development, as well as the data obtained in testing public acceptance of improved rail service. The systems engineering,

costing, and system simulation and evaluation techniques to be developed for analyzing alternative transportation systems for the Northeast Corridor would also be available for application in other regions of the nation.

#### Administration

The Office of High Speed Ground Transportation was established in October 1965 in the Department of Commerce to administer the High Speed Ground Transportation Act. The Northeast Corridor Transportation Project, a task force organization formerly in the Office of the Under Secretary of Commerce for Transportation, was made an element of the Office of High Speed Ground Transportation along with research and development and demonstrations. On April 1, 1967, the office became a component of the Federal Railroad Administration in the new Department of Transportation. It has responsibility for the Northeast Corridor Transportation Project under the general authority of the Secretary of Transportation to carry out research and planning in intercity transportation, and has responsibility for the research, development, and demonstrations in high speed ground transportation under the Act of 1965. In carrying out its responsibilities, the Office of High Speed Ground Transportation has retained essentially a task-force orientation to the problems of transportation in urbanized regions. Close integration and coordination has, therefore, been maintained between the Northeast Corridor Transportation Project and the

research, development, and demonstration activities pertaining to high speed ground transportation systems.

The activities of the office are carried out through three divisions: Transport Systems Planning, which conducts the Northeast Corridor Transportation project; Engineering Research and Development, which is responsible for the engineering work of the office and for research and development under the Act; and Demonstrations, which administers the demonstrations. All three divisions report to the Director of the Office of High Speed Ground Transportation, whose own staff includes administrative and clerical personnel, as well as an intergovernmental relations unit to handle liaison and specialized research projects associated with the Northeast Corridor project.

The 30-man professional staff of the Office, which includes engineers, economists, operations research specialists, data specialists, planners, political scientists, and a lawyer, is exceptionally well trained in many academic disciplines relating to transportation. Six hold doctorates and fourteen more hold master's degrees. (See Appendix A.)

#### Funding

The High Speed Ground Transportation Act of 1965 authorized appropriations of \$20,000,000 for FY 66, \$35,000,000 for FY 67, and \$35,000,000 for FY 68 for research, development, and demonstrations in high speed ground transportation, and for the national transportation statistics program. Of the authorized

\$90,000,000, \$52,000,000 has been appropriated, of which \$2,028,000 was allocated to the statistics program in the Office of the Secretary.

The amounts appropriated have been expended or allocated as follows:

Systems engineering	\$ 6,200,000
High speed railroad R&D	6,755,000
Unconventional systems R&D	3,075,000
Advanced technology and test facility	6,745,000
Washington-New York demonstration	11,749,000
Boston-New York demonstration	8,426,000
Auto-train demonstration	3,887,000
Data collection	1,521,000
Administration	<u>1,614,000</u>
Total:	\$49,972,000
Data Program:	<u>2,028,000</u>
Total Appropriations:	\$52,000,000

The Office has obligated or committed most of these funds. The chart of program activity in Appendix B provides a detailed accounting for funds appropriated.

#### Compliance with Statutory Requirements

The record of committee hearings in 1965 made it clear that the Congress did not intend the High Speed Ground Transportation Act to provide for continued support for rail passenger service, and that maximum private participation should be obtained. The following chart breaks out estimated total private and public funding.

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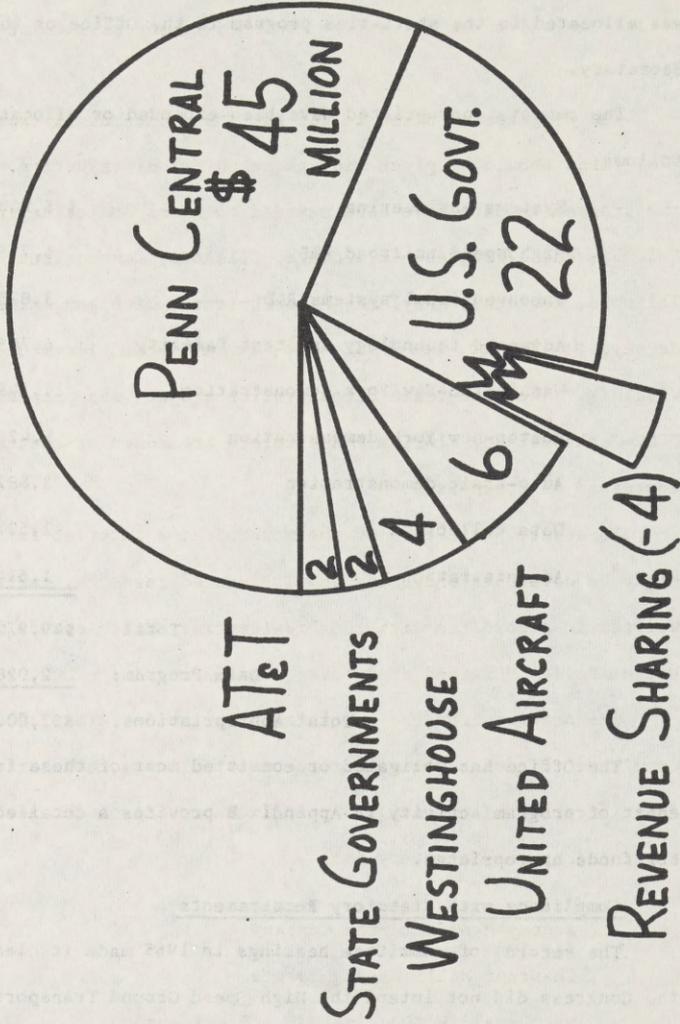
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**DEMONSTRATIONS**  
**FINAL EXPENDITURES**  
 \$ 81 MILLION  
 BOSTON - N.Y. - WASH.



The High Speed Ground Transportation legislation specified that activities under the Act not be confined to any particular mode of transportation.

The Congress required in the Act that contractual expenditures of HSGT funds should be given wide geographical distribution. Contracts under the program to date have been awarded to firms domiciled in the District of Columbia and 17 States--California, Colorado, Connecticut, Florida, Illinois, Kentucky, Maryland, Massachusetts, Michigan, Missouri, New Jersey, New Mexico, New York, Ohio, Pennsylvania, Rhode Island, and Virginia. The auto-train demonstration project was proposed for Washington, D.C.--Jacksonville, Florida. A complete breakdown of contract information is contained in Appendix B.

To assure protection of the Government's interest in any patents that might be developed under any OHSOT financed research, contracts are written in accordance with the Presidential "Statement of Government Patent Policy," issued on October 10, 1963.

The Act required the appointment by the Secretary of an advisory committee to advise him with respect to policy matters arising in the administration of the Act. The full membership of the Advisory Committee appointed by the Secretary is:

Mr. Robert M. Jenney, President  
Jenney Manufacturing Company  
Box 100  
Chestnut Hill, Massachusetts

Mr. Donald W. Douglas, Jr., President  
Douglas Aircraft Company, Inc.  
Long Beach, California

Mr. William B. Johnson, President  
Illinois Central Industries  
135 East Eleventh Place  
Chicago, Illinois

Professor Raymond R. Tucker  
Washington University  
St. Louis, Missouri

Mr. George E. Leighty, Chairman  
Railway Labor Executives Association  
400 - 1st Street, N. W.  
Washington, D. C.

Mr. Charles A. Webb, President  
National Association of Motor Bus Operators  
839 - 17th Street, N. W.  
Washington, D. C.

Mr. Milton A. Gilbert  
Chairman of the Board  
Gilbert Systems, Inc.  
441 Ninth Avenue  
New York, New York

The Advisory Committee first met in formal session on June 21, 1966, and has met on six subsequent occasions with the Secretary (or his designate) and the Director and functional staff of the Office of High Speed Ground Transportation. The Committee has been organized and has functioned in accordance with Executive Order 11007 of February 26, 1962, and supplementing orders of the Department of Transportation. In addition to formal meetings, the Committee has also contributed advice on the program through exchanges of correspondence between the Director and the members. Professor Tucker was designated Committee Chairman.

In its demonstration contracts, OHSGT has been careful to comply with the employee protective arrangements in Section 6a of the HSGT Act. The Secretary of Transportation has appointed the President of the Railway Labor Executives Association as a member of the Advisory Committee required by the Act, in order to assure a continuing and open relationship with the railroad employee organizations that may be most directly concerned with changes in service that affect numbers of positions or conditions of employment. Contracts with consultants and research and development firms are also written to assure compliance with all Federal labor standards as required by Section 6b of the Act.

Reports on HSGT activities were submitted to the Congress by the Secretary of Transportation at the end of fiscal years 1966 and 1967 in keeping with the requirements of the Act. (A report reviewing and evaluating existing and proposed programs and projects was also submitted in February 1968 at its request to the Subcommittee on Transportation of the House Appropriations Committee.)

#### Significant Achievements

In authorizing the original \$90 million for the HSGT program, the Congress recognized the need for public investment in seeking solutions to the problems of ground transportation and encouraging future private transportation investment. Spending at the rate of approximately \$35 million per year for research, development, and demonstrations was determined to be needed for the conduct of the program and to insure the continuing interest and participation of the transportation industry and its equipment suppliers.

The Office of High Speed Ground Transportation has not yet reached all of its three-year objectives. Appropriations for the program have been substantially less than the amounts requested; recruiting of qualified technical personnel has been difficult; hardware projects have been slowed by shortages; and time has been needed for careful design of the program. Nevertheless, significant progress has been made as shown in the following:

Achievements in Research and Development

1. The most promising areas for high speed ground transportation research and development have been identified and a comprehensive research and development program has been laid out to exploit the full potential in each area.
2. Pertinent engineering efforts in other public and private technical sectors have been investigated for application to transportation. Technical information has been exchanged with foreign governments and firms.
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 above 250 miles per hour.
5. Laboratory testing has shown the potential of radically improved tunnelling 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.

Consultant and staff reports are listed in Appendix C on this work and are available through the Clearinghouse for Federal Scientific and Technical Information.

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 and 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.

### 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 specifications and technology base so that detailed descriptions of physical, performance, and

cost characteristics of unit elements for each significant HSCT alternative could be examined.

5. Developed methodologies for comparative systems evaluation and for making rapid cost estimates.
6. Determined systems 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 systems evaluation of advanced concept alternatives.
7. Evaluated requirements for electromagnetic suspension and developed a system-oriented research and development program.
8. Determined 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 FY69.
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 necessary for analysis of current test results and for simulation of future operations.

Active vehicle suspension systems would offer a means of enabling rail cars to negotiate curves at significantly higher speeds than are presently practical. Schedules are seriously restricted by the need to

slow down for existing curves. Elimination of curves in existing rights-of-way requires costly land acquisition and relocation. A successful "active" banking system would enable the vehicle body to lean into the curve at high speed. This concept would be useful for new systems as well as for rail.

Research results to date indicate that track structures must be improved for safe, comfortable, high speed rail passenger service. Theoretical studies and operations of the research cars thus far indicate that track structures maintained according to current railroad standards will not provide acceptable rides at very high speeds. There is also an indication, however, that conventional track installed to high standards may deteriorate less rapidly than widely supposed by the rail industry. An improved balance between installation cost and maintenance cost may therefore be found to exist. If more stable structural designs can successfully be developed, maintenance cost would be lowered, possibly resulting in a basic reduction in rail service cost. The fruits of these efforts will also be applicable to future HSGT facilities.

Drive system investigations fall in two areas: power collection and on-board power conditioning and control. Intermediate speed systems for rail are included here; radical departures for very high speed work are being investigated in Advanced Technology.

#### Accomplishments In High Speed Railroad R&D

1. Acquired four 150 mph rail research cars and established

a specially upgraded and instrumented 21-mile high speed test track.

2. Developed instrumentation for four research cars, test track, and overhead catenary and initiated a comprehensive test program.
3. Evaluated track upgrading on Penn Central demonstration project.
4. Programmed track upgrading on New Haven Railroad demonstration project.
5. Supported testing of telephone service between New York and Washington for demonstration project.
6. Established feasibility of auto-train service and determined ride quality through actual test of automobiles in railcar.
7. Developed auto-train concept and supervised detail design.
8. Collaborated in developing pantograph modifications for Metroliner trains.
9. Developed computer simulations of railroad car, roadbed, and overhead catenary.
10. Initiated study to determine requirements of laboratory equipment for study of interaction and upper speed limits of steel-wheeled vehicles on steel rails.
11. Evaluated alternative means of noncontacting electric energy transfer.
12. Initiated design of servo-pantograph for high speed trains.
13. Determined aerodynamics of large freight cars and studied improvements thereto.
14. Initiated industry-Government study of automatic freight car couplers, trainlined control systems, and their resulting operational economics and flexibilities.
15. Designed surveillance equipment for high-speed rail vehicles.
16. Analyzed and developed new track structure designs.

17. Analyzed active suspensions and made initial design of prototype for rail applications.
18. Initiated study of adhesion improvement through rail cleaning by plasma torch.
19. Supervised technical progress of Metroliner and TurboTrain development programs.
20. Made initial design of 250 mph truck for the linear electric motor project.
21. Derived extension of theory of rolling contact.
22. Evaluated turbine drive concepts.

Work To Be Done in High Speed Railroad R&D

1. Utilize Office of High Speed Ground Transportation rail research vehicles and previously developed computer simulation to study phenomena of:  
(a) truck stability and adhesion, (b) ride quality as a function of speed and guideway quality, and  
(c) pantograph-catenary interaction.
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, increase safety, reduce use of surface right-of-way, and accelerate faster.

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

Accomplishments In Unconventional Transportation Systems R&DTracked 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 tracked air cushion configuration wind tunnel tests.
4. Acquired French "Aerotrain" TAC 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 TAC 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.

14. Investigated radiative power transfer to tube vehicles on theoretical and subscale basis.
15. Studied feasibility of vehicle in evacuated tube system.
16. Developed system engineering and cost tools for future evaluation of alternate tube vehicle systems.

#### Work To Be Done In Unconventional Transportation Systems R&D

1. Design, fabricate, and test a TAC research vehicles and guideway.
2. Conduct scale model tests of tube vehicles to gain further knowledge of system dynamics and of scaling effects prior to initiation of full-scale tests.

#### Advanced Technology R&D

Advanced technology research and development is being done because:

High speed ground transportation systems can be no better than the subsystems of which they are composed, the construction methods by which they are built, or the materials of which they are made.

This R&D is being carried out in the following major areas: guideways, communications and control, power collection, obstacle detection, linear electric motors, and magnetic suspension, and planning for a high speed ground transportation test facility.

Significant advantages are to be gained by the use of subsurface routes for HSGT systems. Unfortunately, present costs for tunnel construction tend to make tunnels less attractive economically

than surface routes. Wholly insufficient efforts have been devoted in the past, either by Government or by industry, to advancing scientific and engineering knowledge of tunneling. Advancements in tunneling technology create many possibilities for the future development of economically feasible subsurface systems.

High speed ground transportation will require improved communications to maintain safe and efficient operations. Unfortunately, there are an insufficient number of radio frequencies available to provide the necessary level of communications capacity. Research is therefore being carried out in nonradiating communications to determine their feasibility for HSGT systems.

For speeds above 200 mph, it is apparent that a stiff contact-rail approach or a noncontact technique for electric traction power pick-up is necessary. Studies have been performed on noncontact electric energy transfer. This work evaluates possible techniques for transferring large amounts of electrical energy without physical contact, such as through induction or arc plasma transfer. Results so far are not encouraging for the early use of noncontact methods.

Safety is one of the most vital aspects of a HSGT system, since the consequences of accident are more serious at higher speeds. HSGT systems must, therefore, employ a separate guideway having no crossings at grade. It may be necessary to have an obstacle detection system protecting against possible collision with foreign objects on the

guideway to guarantee the safety required by the speeds envisioned for HSGT. Obstacle detection systems may have application to conventional railroads as well.

Propulsion of ground transportation vehicles is typically accomplished by transmitting power through axles and wheels to a roadway or rails. This method requires adhesion for the vehicle to accelerate or decelerate. To eliminate the need for adhesion for wheeled vehicles, or to propel an air cushion vehicle, research has centered on linear electric motors. Propeller driven and turbo-jet engines also eliminate the requirement for adhesion; however, they are less desirable because they are noisier, less safe, and create more air pollution.

Magnetic suspension is being evaluated for use in those applications where neither wheels nor air cushions are feasible. A high speed vehicle operating in an evacuated tube may be one case where a magnetic suspension system is required.

The final step in the evaluation of new ground vehicles and components must be full scale testing. Experimental vehicles, when tested at high speed, cannot be operated in close proximity to commercial traffic. A test facility is therefore needed where test and evaluation can proceed unhindered and without endangering public transportation.

Initial tests of the linear electric motor would require a track several miles long. Tests at 300 mph would necessitate a track from

Work To Be Done In Advanced Technology

1. Investigate various communication and control techniques including surface wave transmission lines, W-type continuous access communications waveguides, leaky waveguides, and millimeter waves in special waveguides.
2. Conduct studies to determine best configurations, voltage levels and supply point spacing for a stiff contact-rail system for power collection.
3. Continue to study noncontact techniques for power collection.
4. Test optical laser device for detecting obstacles on guideways.
5. Test prototype linear induction motor on wheeled research vehicle as preparation for installation of later model on TAC research vehicle.
6. Investigate feasibility of electromagnetic suspension, examining possible configurations, transient magnetic field effects, and cryogenic insulation strengths.
7. Continue rock fracture research using high power lasers.
8. Research the phenomena of rock weakening by chemical agents.
9. Conduct studies as to feasibility of using lasers and chemical weakening agents in combination with hard rock tunneling machines (moles).
10. Conduct system development and field testing of flame jet tunnelers.
11. Develop tunnel excavation systems using high velocity fluid jets.
12. Develop design for a high velocity water jet nozzle using multiple low-speed orifices.
13. Continue light gas gun fracture research by field experiments.
14. Continue analysis of requirements and costs for tunnels in the Northeast Corridor.

10 to 20 miles in length. The TAC research vehicle would require tracks of the same length but of entirely different cross section. This facility may ultimately serve as the testing site for early tube vehicles.

#### Accomplishments In Advanced Technology

1. Started on construction of full-scale 2500 HP linear induction motor and test vehicle.
2. Undertook approaches to communications and control without use of radio frequency spectra.
3. Established feasibility of surface conduction line for communications and control.
4. Undertook design of optical laser system for obstacle detection.
5. Established feasibility of flame-jet tunneling system.
6. Established practicability of using lasers for fracturing rock.
7. Improved on technique of using chemical surfactants to weaken rock.
8. Pioneered use of high velocity fluid jets for fracturing rock.
9. Advanced the technique of using light gas gun for firing high velocity projectiles for fracturing rock.
10. Initiated study to improve materials and techniques for lining tunnels.
11. Examined use of cavitation for eroding rock.
12. Developed new methods of predicting nature of and magnitude of rock slippage.
13. Developed mathematical models to predict settlement of fills and heave of excavations.

15. Fabricate scale models of advanced-technique tunneling systems.
16. Conduct field experiments and demonstrations of new techniques on actual tunnel construction projects in Chicago, New York, and other locations.

#### Timing

The fulfillment of the growing transportation requirement places an increasing demand on the best possible use of technology. Continuing research and development is required to improve steadily the performance potential of HSGT subsystems. High priority is now being given to alternative systems selection so that efforts can be focused on the more promising concepts. It is estimated that HSGT classes such as auto-train, high speed rail, and multi-modal systems could be operational in the early 1970's, tracked air cushion vehicle systems in the mid-1970's, and tube vehicle systems in the later 1970's. Research and development on advanced systems is now underway and includes analytical studies and small-scale laboratory experiments. This should progress to larger-scale experiments, prototype hardware and passenger demonstrations. Full-scale field experiments are already underway with the high speed rail research vehicles and track structures; and large-scale laboratory rail-vehicle dynamics experiments are planned to commence in FY71. Full-scale field experiments of a tracked air cushion vehicle are planned to commence in FY71 and of a tube vehicle in FY74. The present laboratory phase of the Advanced Technology research will likewise require larger-scale field experiments in the next few years.

PROGRAM STATUS--DEMONSTRATIONS

Section 2 of the High Speed Ground Transportation Act authorizes the Secretary of Commerce (now Transportation) "to contract for demonstrations, to determine the contributions that high-speed ground transportation could make to more efficient and economical intercity transportation systems."

The purpose of demonstrations, carried out under the Act, is "to measure and evaluate, such factors as the public response to new equipment, higher speeds, variations in fares, improved comfort and convenience, and more frequent service." In connection with contracts for demonstrations under the section, the Secretary shall "provide for financial participation by private industry to the maximum extent practicable."

Purpose of the Demonstration Project

President Johnson emphasized the need for demonstrations in his letter of March 4, 1965, which proposed the High Speed Ground Transportation Act to the Congress--namely, that "...we must learn about travel needs and preferences, in part through the use of large-scale demonstration projects."

Congress authorized the demonstrations on the finding that there is insufficient information about traveler needs and desires, particularly in intercity movements, to provide a sound basis for public and private investment policies. Within this broad context there may be cited two specific and immediate end uses for the data generated by the demonstrations.

One is input for the Northeast Corridor Transportation Project. The information on public response to improvements in railroad intercity passenger service will shed light on the contribution that rail transportation can make toward meeting the need for additional transportation facilities in densely populated urbanized corridor-type areas around the country. In addition, by providing detailed analysis of public preference, shown by actual use and by payment for varying combinations of service, the demonstrations will indicate the relative weight of individual service components in attracting public patronage.

The demonstrations will evaluate the influence of speed, schedule frequency, terminal convenience, comfort levels, and fare structure and will identify the relative impact of each on public acceptance. Since these basic elements of service are common to all modes of passenger transportation, the results of the Corridor rail passenger demonstrations will be important in determining passenger preferences for all modes.

The second immediate application of information produced by the demonstrations is to indicate the limits of economic viability and customer acceptance of improved railroad passenger service over the country as a whole. The findings would provide a more up-to-date and realistic determination of the capacity of the present railroad network to meet new needs by testing, under revenue service conditions, the reliability of and traveler reaction to equipment improved to the limit of existing railroad technology.

The demonstrations now planned will produce information about public response to improvements in the quality and range of railroad

service which can be obtained with relatively modest expenditures and without significant developmental lead time. The demonstration between Washington and New York, for example, costing the Government about \$12 million, will help decide whether investments ranging from one-quarter to five billion dollars in new rail facilities between these points would be worthwhile.

A by-product of the demonstrations is the physical improvement of the railroad properties selected for the experiments. Although these improvements are related directly to requirements for data-gathering and evaluation, they will produce measurable long-term benefits for passengers using other trains on the demonstration routes, including commuters, and shippers and receivers of railroad freight. In the Washington-New York demonstration project, the contribution by the Federal Government of \$12 million has encouraged the railroad to invest more than \$45 million in upgraded facilities and in new equipment

The two demonstration projects in the Northeast Corridor at the time of completion will have cost the Government approximately \$21.4 million. In addition to information for decision-making by both the railroad industry and Government, the demonstrations will provide seed money for immediate improvements in railroad passenger equipment, track and station facilities. The railroads and equipment manufacturers involved have greatly exceeded the Government's contribution to the demonstration cost.

Criteria for selection of demonstration projects have included the following:

1. Minimum duplication in the factors to be tested in each project, including natural limitations such as terrain and route location.
2. Use of limited available resources to provide improvements which will provide most efficiently and promptly the positive service improvements and innovations needed for a valid test of public reaction.
3. Train speeds measurably faster than, and standards of riding comfort substantially superior to, those now attained, as a basis for an adequate test of the market.

The timing of both the Washington-New York and the New York-Boston demonstrations of rail passenger service deserve an explanation.

Undoubtedly in the winter and early spring of 1966 when the demonstrations were being set up, an optimistic view prevailed as to the time that would be required for the engineering, the building and the testing of new equipment. Considering that none of the equipment suppliers had built equipment of this kind before, delivery commitments could not be based on prior experience. Nevertheless, the car builders for both demonstrations accepted in their contracts penalty provisions for late delivery. Based on the estimates of time of delivery for equipment, starting dates were set for the demonstrations. In the case of the demonstration between Washington and New York, the time required for up-grading of the roadbed was thought to be the critical element and it governed the starting date. In April 1966, before the contract for the building of the Washington-New York demonstration cars was awarded, the Department of Commerce and the Pennsylvania Railroad agreed that "...the demonstration was expected to start in October 1967."

About 8 months after the award of contracts for construction of the equipment it became apparent that the Budd Co. would have difficulty

in delivering equipment on time for the Pennsylvania Railroad to start the demonstration on October 29. A decision had to be made by the Railroad and the Government as to whether to hold to the original starting date. The Government took the view that an extra effort should be made by the Budd Co. to get equipment built as soon as possible. On this basis the Government agreed to pay for overtime and extra costs incurred by Budd up to a total of \$220,000. Also, the Government insisted that October 29 be retained as a target for starting the demonstration and public statements were made to that effect by the director of the Office of High Speed Ground Transportation.

Very clearly at this time the Pennsylvania Rail Road, the Budd Co. and the electrical suppliers had very serious doubts that enough equipment could be ready for service by October 29. The office of High Speed Ground Transportation is responsible for holding to the original starting date.

The Government believed that there was an urgency (and there still is) to get the information which would be provided by the Washington-New York demonstration and in light of this urgency that it was desirable to set an early date for the start.

The measure of success or failure, however, in getting equipment designed, built, tested and into operating condition expeditiously should probably rest more on a comparison with the time required to carry out other similar projects than on whether or not an early estimate of time of delivery was met.

In making this determination it should be understood first that there is not an easy basis of comparison between this equipment and other rail passenger equipment which has been built in recent years.

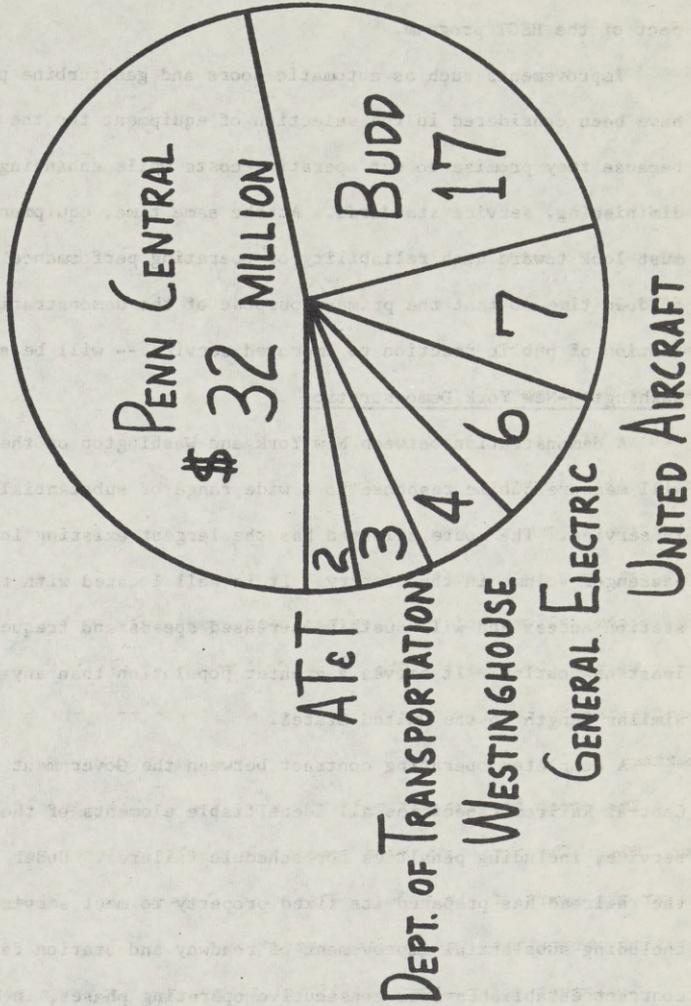
The electrically propelled cars which are to operate between Washington and New York are the most technologically advanced ever built. The complexities in the control system have required much more testing than was anticipated.

It may be noted that the Japanese National Railroad cars, the only ones comparable to the Metro-liners, were engineered, built, tested and put into service over a three year period. The delivery time for transit cars, without major design improvements, averages 14 months. Also it may be pointed out that a study of 12 U.S. Air Force weapon system development programs has revealed that, on the average, the time required for these programs has been 36% longer than estimated. Looked at in this light and considering the amounts of their own money committed over the contract price, the record of the equipment suppliers in this project does not seem to deserve much censure. In any case the hold-up in the delivery of the cars has been completely without funding cost to the government. The chart following shows the present expenditures by the government and estimated expenditures by the private parties.

The order for the metro-liners was given to the Budd Co. in late May 1966. The cars have been completely built in less than 24 months after the award of the order. They must, however, go through further testing before they can go into operation.

Equipment and roadway facilities to provide improved performance are attainable under present technology, but do not now exist in this country. Hence, an important consequence of the demonstration will be the testing in actual revenue service, under severe operating conditions, of advanced designs and components of railroad equipment.

**DEMONSTRATIONS**      **BOSTON - N.Y. - WASH.**  
**EXPENDITURES THRU**    **4-1-68**      **\$71 MILLION**



This will contribute significantly to the research and development aspect of the HSGT program.

Improvements such as automatic doors and gas turbine propulsion have been considered in the selection of equipment for the demonstration because they promise to cut operating costs while enhancing, rather than diminishing, service standards. At the same time, equipment specifications must look toward high reliability of operating performance and minimum of down time so that the primary purpose of the demonstrations -- determination of public reaction to improved service -- will be satisfied.

#### Washington-New York Demonstration

A demonstration between New York and Washington on the Penn Central will measure public response to a wide range of substantial improvements in service. The route selected has the largest existing intercity rail passenger volume in the country. It is well located with regard to station access and will sustain increased speeds and frequency with the least new outlay. It serves a greater population than any rail route of similar length in the United States.

A completed operating contract between the Government and the Penn Central Railroad specifies all identifiable elements of the demonstration service, including penalties for schedule failures. Under its provisions the railroad has prepared its fixed property to meet service standards, including substantial improvement of roadway and station facilities. The contract establishes four consecutive operating phases, in each of which the mix of variable service elements -- such as food service, seating arrangements and crew complements, fares, frequencies, etc. -- can be modified.

Among the special contractual obligations the railroad is required to meet throughout the two-year demonstration are:

1. An advertising and promotion campaign designed to inform the traveling public fully of significant service features both before they are introduced and during their availability;
2. A comprehensive training program for public-contact railroad employees.

Nearing completion are negotiations with the State of New Jersey, Prince George's County, Maryland, and the Maryland State Roads Commission to build two suburban rail stations. Each would be near a major highway net. The stations will permit a test of the attractiveness of ample, inexpensive parking in connection with intercity transportation service.

Additional experiments sponsored or encouraged by the Office of High Speed Ground Transportation include a new type of baggage handling facility at the Baltimore station and the installation of newly-designed on-train telephone service over which passengers can receive as well as initiate calls on the standard commercial telephone network. The American Telephone and Telegraph Company has paid the entire cost of developing and installing the mobile telephone system.

Public service operation of the Washington-New York project for a period of two years will start as soon as the Penn Central has accepted 28 of its total order for 50 new high-speed electric cars to provide a partial demonstration service.

Developmental testing and modification required to meet the high standards established for the equipment -- including a speed capability of 160 mph, rapid conversion to commercial power frequencies, and compatibility between equipment produced by individual builders -- have delayed the start of operations.

### Boston-New York Demonstration

A demonstration between Boston and New York on the New Haven Railroad will test public response to a light-weight, turbine-powered train of advanced design. The Government entered into a two-year lease with the United Aircraft Corporation in fiscal year 1966 for two 3-car TurboTrains. Demonstration service will be in addition to regular schedules on the route and will be designated in public timetables as experimental.

The trains are designed to accomplish several important objectives:

1. The use of gas-turbine engines is expected to cut operating, repair and fuel costs as well as to provide faster acceleration.
2. Use of a suspension system which has a novel self-banking mechanism which should permit the trains to take curves at speeds at least 30% higher than can be achieved with conventional equipment.
3. A three-hour and fifteen-minute schedule between Boston and New York, with four intermediate stops. More stops will be made if they can be accommodated in the three-hour and fifteen-minute schedule.

The TurboTrain is well suited for fast rail shuttle service for distances of 200 to 300 miles. If the equipment meets expectations, its use could lead to improvements without electrification in passenger service in many parts of the country. It could provide an economic intercity train service faster and more comfortable than can be produced presently.

The present status of the Boston-New York project is as follows:

Under a contract with the Government for maintenance and servicing of the two TurboTrains, the builder and lessor, United Aircraft Corporation, has completed a shop facility in Providence, Rhode Island,

designed specifically to support new methods of preventive maintenance, including rapid change-out of components. The builder has established procedures for detailed statistics of maintenance and operating costs which the Government will evaluate and distribute to the railroads and others who are interested.

The Government and the New Haven Railroad have reached tentative agreement on schedules, meal service, fares, public information and reservations systems. Although the demonstration is planned primarily as a test of equipment, the Department will utilize it also as an opportunity to test the effect on passenger demand of experimental fares, control of passenger seating, modern quick-preparation food service and ticketing.

Since the railroad is in bankruptcy and has agreed to operate the demonstration only if no loss is suffered from it, the Government has agreed to pay up to \$1.7 million for upgrading roadway maintenance levels required directly to prepare the property for higher speeds and increased passenger comfort. To date a total of \$1.4 million has been authorized on work orders approved by the Office of High Speed Ground Transportation for additional maintenance expenditures. The Department expects to draw upon the amount of \$500,000 authorized by the State of Connecticut for work performed within the State.

The two trainsets to be operated in the demonstration are currently undergoing modification following extensive development testing and will be made available to the railroad for scheduled-service testing

and employee training as soon as the equipment meets the Government's performance specifications.

#### Auto-Train Marketing and Feasibility Studies

Prior to the decision by Congress not to provide additional funds for an Auto-Train demonstration for fiscal year 1968, the Office of High Speed Ground Transportation had planned the purchase of locomotives and cars and an operating demonstration of an auto-train, a new rail service for motorists. This was to test the usefulness of an automobile-carrying rail service in which passengers could keep their automobiles with them and use them for seating en route. It was based on the recognition that long-haul rail passenger service is no longer competitive with air and highway, and that this service might provide a means for the railroads to obtain greater utilization of their plants. The risks involved in experimenting with the service seemed to be greater than the railroads would accept in their present condition of a capital shortage. Also, only the Government had the means to carry out the necessary research for the service.

At the time when Congress indicated it favored greater private capital for the auto-train equipment and operation and refused further appropriations, the Department had completed studies and tests which gave clear indication that, at equipment standards and costs then contemplated, a profitable service could be operated on a proposed 750-mile route between Washington, D.C., and Jacksonville, Florida. Initial economic and public acceptance studies of all experiments to date, world-wide, of the movement of private motor vehicles by rail had led to the conclusion that service

of a wholly new kind was required to produce speed, cost and convenience competitive with driving over modern American highways. The emphasis, it was clear, would have to be on rapid terminal handling, non-stop operation between facilities strategically located with respect to the highway network, and use of the autos themselves as the main occupancy unit during the rail journey, supported by quick-service utility amenities designed for volume use.

Extensive marketing studies showed a potential patronage of more than 500,000 automobiles yearly, far more than the capacity of the 15-car bi-level train for which conceptual designs had been completed. OHSGT explored alternative operating and maintenance arrangements and reached tentative agreement with the Seaboard Coast Line Railroad. It completed designs for fast loading terminals. Investment and operating costs and probable load factors had been refined to the point where a viable fare structure could be established.

In the last 9 months the Office of High Speed Ground Transportation has been exploring with sources of private investment capital the operation of auto-train as a business undertaking. Available for interested parties are the studies described above; ride quality studies, both simulated and from actual prototype operation; completed conceptual drawings and description of railcar equipment tested for auto loading, unloading and safe carriage en route in full-size mock-up experiments; and partially completed engineering production drawings. Both the Ford Motor Company and a financial group in New York City have extensively investigated the auto-train and are considering it as a business venture.

Airport Ground Access

Ground access to commercial airports in large metropolitan airports which often is both congested and expensive, is presently a major deterrent to more effective use of air transportation. These impedances are likely to increase when ultra-high-capacity jet aircraft, including SST's, are introduced. The problem is also likely to become more acute because land use patterns and social pressures against noise and space allocation in residential areas may force new airport construction to areas 50 to 100 or more miles distant from metropolitan centers.

The Office of High Speed Ground Transportation has completed a survey of the uses of National, Friendship and Dulles Airports in the Washington, D.C., area. In addition to air travel information, it provides up-to-now unavailable data on local origins and destinations, and mode and time patterns of ground access transportation. Included are the demographic characteristics of airport travelers, traveler-connected visitors and employees.

If funds and program authorization are granted, the Department will take the next step--namely, an estimate of future traffic patterns and levels. This information will be obtained in coordination with other agencies involved in airport access in the Baltimore-Washington area. If the surveys show market viability, the Department would initiate preliminary engineering feasibility analyses of a high-speed ground access system. Particular attention will be given to the possibility of a rail shuttle service between Washington, and the Capitol Beltway station, Friendship Airport, and Baltimore.

### Data Collection

Since the collection and evaluation of information on traveler response is the prime purpose of the demonstration projects, the Office of High Speed Ground Transportation has well in advance of the start of the demonstrations given priority to the formulation and implementation of statistical systems.

Three principal means of obtaining information have been in operation and will be expanded and amended as the demonstrations move through successive phases:

1. **Datacheck Passenger Count:** The Department devised, and has had in effect since 1966, a new means of obtaining prompt counts of passenger travel, identified by stations of origin and destination and individual train, by means of a machine-readable, hand-punched seat check. This technique meets the need for a "cash register" measurement of public reaction and, also important, a firm basis for identifying the changes in patronage which determine the sharing of expenses and revenues in the Penn-Central and New Haven service contracts.

A computer linked with a tag reader has been installed in the OHSGT and provides details of travel on all through trains on demonstration routes of both railroads within a few days after its performance. Data of this quality had been unobtainable prior to installation of the system.

2. **On-Train Survey:** - To obtain more comprehensive information about travelers' behavior and needs, the Office of High Speed Ground Transportation inaugurated in November 1966 a continuing questionnaire survey of a sample of rail passengers presently on the demonstration routes. Continuing controls will maintain sampling reliability. Questionnaires will be modified periodically to get a wide range of information as the demonstration develops, specifically as to reasons for choice of mode and reactions to various changes.

3. Total Population Survey: Changing travel habits of the total population in the Northeast Corridor are to be measured prior to and during the demonstration periods. In March 1966 arrangements were made with the U. S. Bureau of the Census to increase the coverage in the Northeast Corridor region of the Bureau's 1967 National Travel Survey. The survey has been in operation this past year and should be continued in the Northeast Corridor for the Office of High Speed Ground Transportation during calendar years 1969 and 1970.

#### Grade Crossing Safety Action

The Office of High Speed Ground Transportation is actively involved in a national program for elimination of, or improved safety features for, railroad-highway crossings at grade. This participation is related directly to the prospect of more frequent and somewhat faster service on the Washington-New York and Boston-New York demonstration routes.

By direction of the Secretary, the Department of Transportation formed a joint Federal Railroad and Federal Highway Administration Action Committee to launch a program to upgrade protection measures. Special emphasis is to be placed on the heavily-traveled Northeast Corridor. An OHSGT representative participated in a safety inventory of each public crossing on the Penn Central between Washington and New York and will shortly participate in a similar inventory on the New Haven Railroad between New York and Boston. It is expected that these inventories will produce recommendations for better grade crossing protection across the Nation.

In addition, OHSGT is participating financially in a joint program for immediate crossing protection improvements on the Penn Central. This effort involves the Federal Government, the State of Maryland and,

thus far, its constituent counties of Prince George's and Baltimore. A similar program is being negotiated with the State of Delaware. The OHSGT will provide partial funding to implement such recommendations for crossing improvements on the New Haven route as may be advanced by an inventory team.

#### What Remains to Be Accomplished

##### Washington-New York Demonstration

A date for the start of revenue demonstration service on the Washington-New York route is tied directly and solely to completion of developmental testing, modification--principally of electrical components--and final acceptance by Penn Central of new self-propelled electric cars designed for the operation. It is anticipated that the railroad may be able to provide initially nonrevenue and excursion runs, using the first cars accepted. The full demonstration service cannot start until 28 cars meet acceptance tests.

All of the other elements of improvements for which the Penn Central is responsible, and which are required to support the experimental design of the demonstration experiment, have been completed. These include roadway improvements, station modernization, and changes in overhead catenary for electric power distribution. Schedules, fare structures, food service, employee training, advertising and public information and all other administrative elements of the demonstration service are ready for immediate implementation.

Construction of suburban automobile-parking station facilities in New Jersey and Maryland, which are a shared responsibility of the

railroad, the Federal Government and local authorities (as noted), is proceeding. Start of the work has been delayed by the need to scale down standards set forth in original plans for the stations. Excessive costs not foreseen in the planning stage, which relate chiefly to modifications in railroad plant to meet operating problems have forced these changes.

Penn Central will operate the new demonstration trains as an integral part of its New York-Washington service. The Government and the railroad have agreed, however, on detailed conditions of the service to be provided. These are precisely set forth in a 60-page operating contract providing four separate service phases over a two-year test period of revenue operation. Each phase will effect a new combination of service elements.

The operating contract calls for experiments in varying types of meal service, luggage handling aboard cars, use of coach attendants, fixed or reversible seating and deletion or addition of intermediate station stops, among others. Food service in the new Metro Club (parlor) cars, for example, will be varied in price from phase to phase, and in one period will be included in the ticket price.

The parties may agree upon experiments in fare levels beyond those already planned. These may include, for instance, premium charges for nonstop service, fees for coach seat reservations, bargain rates for

off-peak hours, or special inducements for non-commuter patrons to increase the frequency of their travel on the route.

Variation of a number of service elements simultaneously is required because the two-year limitation on the period of the demonstration will not permit isolated exposure to the test of public acceptance of individual changes.

The task of testing the maximum possible number of service elements in a relatively short time span requires that the Office of High Speed Ground Transportation exercise continuous, detailed surveillance over the demonstration service and, in coordination with the operating railroad management, plan for prompt corrections and changes as necessary to carry out the overall design of the experiment. The contracting parties must inform the public fully and rapidly of forthcoming changes. The Government staff must modify its continuing data collection and evaluation procedures accordingly. The contents of on-train survey questionnaires, for example, must be reviewed constantly so that they will reflect service modifications and identify, so far as is possible by statistical techniques, public acceptance of the individual elements of successive service combinations.

Boston-New York Demonstration

As is true of the demonstration to be conducted on the Penn Central, the most critical step to be accomplished before operation of the Boston-New York demonstration can start is acceptance by the Department of Transportation, as lessee, of the two trainsets which will perform the service. It has been necessary for the builder to carry out important modifications, after development testing showed original noise levels, ride quality, braking rates and reliability of power and gearing to be unsatisfactory. As revised, the equipment must again be subjected to road testing. If the two trainsets meet the Department's specifications, they must undergo next a period of scheduled-service testing by the New Haven Railroad lasting approximately six weeks, during which training of employees will be carried on simultaneously. These tests may turn up the need for additional modifications.

Unlike the Penn Central operation, however, there are also other tasks to be accomplished before any level whatever of a demonstration service on the New Haven Railroad can start. These include completion of roadway upgrading, curve adjustment at a critical point on the route and provisions for electrical operation within New York City. At this writing, it appears probable that these improvements can be completed in short order.

Planning and preparation of all administrative elements of the service--such as schedules, fares, ticketing, reservation system and meal service--are in general completed. Since the TurboTrains have not been subjected to intensive daily scheduled use under actual service conditions,

and no spare, or relief, equipment will be available in substitution, OHSGT plans to start the demonstration at a reduced level of service for an initial period until reliability and speed of repairs have been proven-- perhaps two to three months. The demonstration on the New Haven is not designed to coordinate with or serve in substitution for the existing service on the route; it will be superimposed on a reduced level of conventional train service. The public, therefore, will not be inconvenienced by postponement of full level of service (equivalent of four round trips between Boston and New York daily).

In contrast to the Washington-New York demonstration, where the Penn Central is responsible for carrying out all of the requirements of the experimental design imposed by the Department of Transportation, the demonstration on the New Haven Railroad is entirely a Government responsibility. The railroad will perform transportation and traffic functions only, under direction of the Office of High Speed Ground Transportation. The two TurboTrains, as noted earlier, will be leased by the Government from United Aircraft and furnished to the railroad for operation. In view of their advanced and novel design and propulsion, the trainsets will be maintained and serviced by United at its own shop in Providence. The railroad will turn over the equipment to United Aircraft each night.

The OHSGT must, therefore, coordinate the responsibilities of the New Haven Railroad and United Aircraft, respectively, which are covered under separate contracts, but require joint action at numerous points. This task requires that the Government's staff give continuous, detailed

surveillance and evaluation to activities of both contracting parties throughout the period of the demonstration.

Complete estimates of operating costs will not be available until the railroad has had experience with the equipment. Hence, the net cost to the Government will not be known until it can be determined to what extent the demonstration trains will attract new revenues which would offset the Government's burden.

#### Data Collection

Collection and evaluation of the data on public reaction to service elements and changes will be a continuous responsibility of the Office of High Speed Ground Transportation throughout the two-year span of the two railroad passenger service demonstrations in the Northeast Corridor. Government staff will revise information sources to correspond with service changes. It will also make modifications in both source and handling which appraisal of the data received indicates is necessary to meet the objectives of the Projects. It is likely that successive changes will be necessary also to satisfy the requirements of the Northeast Corridor Transportation Project, as experiments and testing of transportation demand models dictate.

Continuous coordination of demonstrations data handling with the evolving Corridor analysis will be required particularly because the usefulness of statistics of public response to actual rail demonstration service is not confined to determining the role of that mode in meeting future needs. Demonstrations-produced data will also be used as a

control in testing the validity of mathematical models of future demands based on socio-economic factors and price-time-convenience characteristics of all modes of transport. Finally, since the basic individual service elements--such as speed, frequency, fare, etc.--are common to all modes, determination of their relative weight in public acceptance of the demonstration service will assist the Corridor Project staff in evaluating the influence of these factors on the effectiveness of any other mode. In addition to the traveler-reaction data obtained from the three sources described in an earlier section of this report, the demonstrations staff will be responsible for collecting, evaluating and summarizing operating and equipment maintenance cost data covering the two rail demonstrations.

An important objective of the demonstrations is to determine whether new equipment and advanced preventive maintenance techniques will reduce operating costs substantially. Added to increased revenues these savings may move certain essential intercity rail services out of the direct-cost deficit status, in which many now fall, to a more economic basis.

To make a valid determination, the Office of High Speed Ground Transportation must administer a continuous and sophisticated cost study of the major expense elements of the demonstrations obtained from the railroads and, in the Boston-New York operation, from United Aircraft.

At the conclusion of the demonstrations, the Governemnt's staff must undertake a task without which the demonstrations project would be essentially fruitless. This is the evaluation of the large amounts of

demand and cost data collected. There also will be a complete review of the effectiveness of equipment performance, operating methods, pricing, and other elements of the merchandising process utilized in the tests. The final report on the demonstrations project should furnish the Government and the public, including carriers, the suppliers of transportation equipment and local authorities, the detailed information they require for future planning.

#### Airport Ground Access Demonstration

On the basis of present demand data relating to the Baltimore-Washington area airports now in hand, an estimate of future traffic patterns and demand levels should be compiled to determine the range of ground transportation loads and schedule patterns required to meet these demands. If these studies show that sufficient potential demand exists, market studies, including service and price characteristics of alternative means of transport, will be conducted, followed by engineering feasibility studies of a high-speed service between the city centers of Baltimore and Washington and Friendship Airport. This project would utilize existing transport technology and the present main line of the Penn Central Railroad and would require the construction of only a new short loop rail line to the airport terminal.

The Office of High Speed Ground Transportation will also give attention on a broader basis, and with a view to more advanced technology, to airport access problems of application generally to other areas of the country. There is a need for analysis of patterns and volumes of ground travel to and from those airports where it appears high-speed ground

transportation could be used. These findings would be used to determine at what points it would be profitable to make more detailed engineering studies of alternative systems of high-speed, exclusive-route ground transport systems. The purpose of these investigations would be to determine the best approach to a solution at each of the selected airports. The feasibility studies would draw upon the technical information on potential forms of high-speed ground transport compiled under the research and development program.

If one or more new systems show promise of successful application in the solution of a local problem, the Office would then seek to undertake an actual demonstration, including the construction of fixed facilities and procurement of the equipment required.

CONTINUING PROGRAM ACTIVITIES

The program of the Office of High Speed Ground Transportation for the next three years will emphasize development of components of transportation systems which research has proven feasible for the improvement of transportation in densely populated areas.

If projects now underway are continued, it is possible that the United States in the next decade could have operational tracked air cushion vehicle and tube vehicle transportation systems.

The experiments which have already been planned for such systems will result in the development of prototype hardware and, eventually, in the conduct of demonstration projects.

The Office of High Speed Ground Transportation will continue to coordinate with the research and development programs of other Federal agencies, foreign governments, and private corporations to assure immediate application of technological innovations from these sources to the work of the Department to increase the speed, efficiency and economy of our intercity transportation systems.

The work of the Office of High Speed Ground Transportation has already had and will continue to have the effect of encouraging private industry to increase its attention to research and development related to intercity transportation. This cooperative Government-industry undertaking will, if continued, provide many benefits to the American public.

Another obvious but indirect benefit of a continued Federal effort to improve ground transportation will be the development of new academic programs in this field and the renewal of concern within universities in this significant area of research.

The transfer of certain urban mass transportation programs from the Department of Housing and Urban Development to the Department of Transportation will provide new opportunities to relate intercity and intracity research, development, and demonstrations.

Finally, the Northeast Corridor Transportation Project's investment planning analysis can adequately evaluate alternative systems only if current and accurate data are available on the cost and performance characteristics of both conventional and advanced systems as well as on passenger acceptance of the equipment and services to be tested by the Office of High Speed Ground Transportation demonstration projects.

Not only is each of the three activities of the Office of High Speed Ground Transportation important in its own right, therefore, but also each is dependent on results from the others for success.

The first section of the report deals with the general situation of the country and the progress of the work done during the year. It is followed by a detailed account of the work done in each of the various departments, and a summary of the results obtained. The report concludes with a statement of the work planned for the next year.

The second section of the report deals with the work done in the various departments. It is divided into several parts, each dealing with a different department. The first part deals with the work done in the office, the second with the work done in the laboratory, and the third with the work done in the field. Each part contains a detailed account of the work done, and a summary of the results obtained.

The third section of the report deals with the results obtained during the year. It is divided into several parts, each dealing with a different department. The first part deals with the results obtained in the office, the second with the results obtained in the laboratory, and the third with the results obtained in the field. Each part contains a detailed account of the results obtained, and a summary of the work done.

The fourth section of the report deals with the work planned for the next year. It is divided into several parts, each dealing with a different department. The first part deals with the work planned for the office, the second with the work planned for the laboratory, and the third with the work planned for the field. Each part contains a detailed account of the work planned, and a summary of the results obtained.

APPENDIX (A)

STAFFING

## OFFICE OF HIGH SPEED GROUND TRANSPORTATION

## Organization and Permanent Employees

Professional Fields	Authorized Total	Filled 5-1-68	Office of Director	Divisions		
				R&D	Demonstration	Trans. Systems Planning
Engineering	12	9	1	9	-	2
Economics	5	5	1	1	-	3
Operations Rsh.	4	3	-	1	-	3
Transportation	4	4	-	-	3	1
Intergovernmental	3	2	2	-	1	-
Statistics	2	1	-	-	2	-
Data Systems	4	3	-	-	1	3
Legal	1	1	1	-	-	-
Admin. and Clerical	<u>21</u>	<u>20</u>	<u>6</u>	<u>4</u>	<u>7</u>	<u>4</u>
Totals	56	48	11	15	14	16
FY 69 Requests	+5			+5		

## Education

Master's Degrees 14  
 Doctorates 5  
 Law 1

APPENDIX (B)

PROGRAM ACTIVITY - FINANCIAL

OFFICE OF HIGH SPEED GROUND TRANSPORTATION  
PROGRAM ACTIVITY

MAY 1968

(In thousands of dollars)  
ENGINEERING RESEARCH AND DEVELOPMENT

Scope of Work	Contracts Obligated Fiscal Year		Planned Use FY68 Availability (5 Year)	Future Funding Requirements	Contractors & Location	Estimated Completion Mo/Yr.
	66	67				
<b>SYSTEMS ENGINEERING</b>						
Systems Engineering Procedures	130	53	-	-	Massachusetts Institute of Technology Cambridge, Mass.	completed
Tech. Evaluation of Systems Engineering Proposals	-	7	-	-	Mitre Corporation Bedford, Mass.	"
Specialized Engineering Support	-	5	-	-	National Bureau of Standards Washington, D. C.	"
Effect of Capacity on Operating Cost	-	33	-	-	Planning Research Corp. Los Angeles, Calif.	"
Cost Study Definition	-	39	-	-	Resource Mgt. Consultants, Inc. - Bethesda, Md.	"
Parametric Cost Model Theory	-	2	-	-	Richard Soberman Toronto, Canada	"
Systems Cost Relationships	-	-	199	223	Resource Mgt. Consultants, Inc. - Bethesda, Md.	5/69
Tech. Support of Major Research Programs	-	170	621	-	Mitre Corporation Bedford, Mass.	12/69
Systems Analysis	-	2,884	1,747	9	TW Systems Redondo Beach, Calif.	5/69
Scheduling Techniques	-	-	-	78	MIT, Cambridge, Mass.	12/68
Systems Engineering	-	-	-	5,000	Contractors to be Selected	
TOTAL	130	3,193	2,567	310		5,000

Scope of Work	Contracts Obligated		Planned Use FY68 Availability	Future Funding Requirements (5 Year)	Contractors & Location	Estimated Completion Mo/Yr.
	Fiscal Year 66	Fiscal Year 67				
<u>HIGH SPEED RAILROAD R&amp;D</u>						
<u>Research Car Field Testing Program</u>						
Purchase of Four Test Cars	1,015	19	-	-	Budd Company Philadelphia, Pa.	completed
Improvement and Maintenance of Test Track	1,555	-	30	300	Penn: Central Railroad Philadelphia, Pa.	continuing
Simulation of Test Track Operations	-	35	-	-	University of California Los Angeles, Calif.	completed
Modification of Test Car Circuitry	-	-	2	-	General Electric Co. Erie, Pa.	completed
Design and Operation of Test Car Instrumentation	200	608	390	-	Melpar, Incorporated Falls Church, Va.	continuing
Operation and Maintenance of Test Cars	-	250	150	1,250	Penn: Central Railroad Philadelphia, Pa.	continuing
<b>TOTAL</b>	<b>2,770</b>	<b>912</b>	<b>572</b>	<b>1,250</b>		

Scope of Work	Contracts Obligated Fiscal Year		Planned Use FY68 Availability	Future Funding Requirements (5 Year)	Contractors & Location	Estimated Completion Mo/Yr
	66	67				
<u>HIGH SPEED RAILROAD R&amp;D (Cont.)</u>						
<u>Rail Vehicle Dynamics</u>						
Use of Plasma Torch To Increase Adhesion	-	-	36	-	British Railways Research Dept.-Derby, England	6/69
Laboratory Facility Design	-	-	54	-	Gen. Amer. Trans. Corp., Rsh Div.-Niles, Illinois	7/68
Wheel Rail Dynamics	-	-	-	6,710	Contractors to be selected	
<b>TOTAL</b>			36	6,710		
<u>Vehicle Suspension &amp; Guidance</u>						
Active Suspension Feasibility	40	63	38	-	MIT Cambridge, Mass.	9/68
Dynamic Simulation of Suspension Systems	100	200	-	-	Melpar, Incorporated Falls Church, Va.	6/68
Dynamic Simulation of Auto Train Suspension	-	31	-	-	Illinois Inst. of Tech. Research Inst., Chicago, Ill	completed
Active Suspension Prototype Design	-	-	52	-	Westinghouse Electric Corp. Pittsburgh, Pa.	10/68
Development of Prototype	-	-	130	4,700	Contractors to be selected	
<b>TOTAL</b>	140	294	38	182		44700

Scope of Work	Contracts Obligated Fiscal Year		Planned Use FY68 Availability	Future Funding Requirements (5 Year)	Contractors & Location	Estimated Completion Mo/Yr.
	66	67				
<u>HIGH SPEED RAILROAD R&amp;D (Cont.)</u>						
<u>Experimental Track Structures</u>						
Computer Simulation of Track Structure	-	40	19	-	Battelle Memorial Institute Columbus, Ohio	completed
Design of More Stable Track Structure	-	15	-	-	Carnegie Mellon University Pittsburg, Pa.	"
Research on Use of Polymers for Stabilizing RR Ballast	-	50	19	-	Materials R&D, Inc. Oakland, Calif.	7/68
Test of Track Structures	-	-	-	1,110	Contractors to be selected	
TOTAL		105	38	870		1,110
<u>Vehicle Drive Systems</u>						
Gas Turbine Electric Propulsion System	-	-	59	-	United Aircraft Corporate Systems Center Farmington, Conn.	11/68
Servo-Operated Pantograph	-	-	147	-	UACSC-Farmington, Conn.	12/68
Survey of European Electrification Technology	-	-	5	-	Transport International California-Carmel, Calif.	completed
New Drive Systems	-	-	-	9,300	Contractors to be selected	
TOTAL			211	-		9,300

Scope of Work	Contracts Obligated Fiscal Year		Planned Use FY68 Availability	Future Funding Requirements (5 Year)	Contractors & Location	Estimated Completion Mo./Yr.
	66	67				
<u>HIGH SPEED RAILROAD R&amp;D (Cont.)</u>						
<u>Other Rail Related R&amp;D</u>						
Feasibility of Auto Train Equipment	-	165	-	-	L. T. Klauder & Associates Philadelphia, Pa.	completed
Ride Test for Auto Train	-	2	-	-	Atlantic Coastline Railroad Jacksonville, Florida	"
Wind Tunnel Testing of Freight Car Aerodynamics	-	-	14	-	Naval Ship R&D Center Washington, D. C.	"
Develop Specifications for and Inspect New Equipment	-	112	116	30	L. T. Klauder & Associates Philadelphia, Pa.	6/68
Develop Surveillance Equip- ment for Rail Cars	-	14	31	-	American Machine & Foundry Alexandria, Va.	9/68
Track, Wheel, Axle & Wheel Profile Engineering	-	-	4	26	Association of American Railroads-Chicago, Ill.	5/69
Potential Use of Linear Electric Motor as Booster For Locomotives	-	-	-	7	AiResearch Corporation Torrance, California	9/68
TOTAL	293	165	63	-		

Scope of Work	Contracts Obligated Fiscal Year		Planned Use FY68 Availability	Future Funding Requirements (5 Year)	Contractors & Location	Estimated Completion Mo./Yr.
	66	67				
<u>UNCONVENTIONAL SYSTEMS R&amp;D</u>						
<u>Tracked Air Cushion Vehicle</u>						
Aerotrains Test Data	-	25	92	-	Aeroglide, Inc. New York, N. Y.	8/68
Self-stabilized Air Cushion Vehicle	-	8	-	-	University of Kentucky Lexington, Kentucky	completed
Air Cushions	45	40	71	-	MIT Cambridge, Mass.	9/68
Potential of Flexible Diaphragm Air Cushion	-	72	-	-	General Motors Research Labs Santa Barbara, California	completed
Investigation of Air Cushion Seal Materials	-	-	10	11	Johns-Manville Manville, New Jersey	12/68
Designs and Tests	4	-	-	1,434	Contractors to be selected	
TOTAL	45	145	173	1,445	24,778	24,778

Scope of Work	Contracts Obligated Fiscal Year		Planned Use FY68 Availability	Future Funding Requirements (5 Year)	Contractors & Location	Estimated Completion Mo./Yr.
	66	67				
<u>UNCONVENTIONAL SYSTEMS R&amp;D (continued)</u>						
<u>Tube Vehicle Systems</u>						
Feasibility of Cryopumping	26	-	-	-	Celestial Research Corp. South Pasadena, Calif.	completed
Technical Background Data On Gravity Vacuum Tube System	-	3	-	-	Tube Transit, Inc. Palo Alto, California	completed
Feasibility of Air-Supported Vehicles in a Non-Evacuated Tube & Micro Wave Transmission	225	323	60	118	Rensselaer Polytechnic Institute Troy, New York	2/69
Aerodynamics of Tube Vehicle Stability	29	85	-	-	Oceanics, Inc. Plainview, New York	6/68
Application of Coanda Effect to TACV's and Tube Systems	-	-	62	-	Illinois Institute of Technology, Research Institute Chicago, Ill.	7/68
Drag of Vehicles in Tubes	75	58	44	-	MIT Cambridge, Mass.	9/68
Research in Aerodynamic Drag	-	-	37	-	Carnegie-Mellon University Pittsburgh, Pa.	12/68
Long Tube Resistance To High Speed Vehicles	-	-	-	10	Ohio State University Columbus, Ohio	12/68
Designs and Tests	-	-	-	112	Contractors to be selected	
TOTAL	355	496	203	240		
				18,605		
				18,605		

Scope of Work	Contracts Obligated Fiscal Year		Planned Use FY68 Availability	Future Funding Requirements (5 Year)	Contractors & Location	Estimated Completion Mo./Yr.
	66	67				
<u>ADVANCED TECHNOLOGY R&amp;D</u>						
<u>Communication and Control</u>						
Literature Survey on Com. & Control of HSGT	2	-	-	-	Hughes Aircraft Corp. Fullerton, Calif	completed
Feasibility of Surface Wave Guide Transmission Line	-	295	-	-	Environmental Sci. Services Administration-Boulder, Colo.	6/69
System Control Requirements	50	27	19	-	MIT-Cambridge, Mass.	9/68
Coupled Waveguide Systems	-	-	-	-	Sumitomo Elect.-Osaka, Japan	12/68
New Communications Devices	-	-	13	11,240	Contractors to be selected	
<b>TOTAL</b>	<b>52</b>	<b>322</b>	<b>19</b>	<b>11,240</b>		
<u>Power Collection</u>						
Simulation	-	52	48	-	General Electric Schenectady, N. Y.	10/68
Non Contact Method	-	-	19	-	General Electric Schenectady, N. Y.	completed
Design & Test New Methods	-	-	-	8,460	Contractors to be selected	
<b>TOTAL</b>	<b>52</b>	<b>67</b>	<b>67</b>	<b>8,460</b>		
<u>Obstacle Surveillance</u>						
Laser Beams	-	-	100	259	Radio Corp. of America Princeton, N. J.	11/68
New Detection Methods	-	-	-	2,300		
<b>TOTAL</b>	<b>-</b>	<b>-</b>	<b>100</b>	<b>2,549</b>		

Scope of Work	Contracts Obligated Fiscal Year		Planned Use FY68 Availability	Future Funding Requirements (5 Year)	Contractors & Location	Estimated Completion Mo/Yr
	66	67				
<u>ADVANCED TECHNOLOGY R&amp;D (Cont.)</u>						
<u>Linear Induction Motor</u>						
Feasibility of Linear Induction Motors in HSGT	30	41	-	-	AiResearch Corporation Torrance, Calif.	completed
Feasibility of Advanced Electric Systems	90	50	-	-	MIT Cambridge, Mass.	9/68
Design and Fabricate Test LIM Propulsion System	-	-	1,200	531	AiResearch Corporation Torrance, Calif.	7/69
Lateral Stability of Test Vehicle	-	-	-	35	British Railways Research Dept. - Derby, England	2/69
Test LIM Propulsion System	-	-	-	2,030	Contractors to be selected	
<b>TOTAL</b>	120	91	1,200	2,596		
<u>Magnetic Suspension</u>						
Preliminary Research	-	-	-	4,950	Contractors to be selected	

Scope of Work	Contracts Obligated		Planned Use FY68 Availability	Future Funding Requirements (5 Year)	Contractors & Location	Estimated Completion Mo/Yr
	Fiscal Year 66	Fiscal Year 67				
<u>ADVANCED TECHNOLOGY R&amp;D (Cont.)</u>						
<u>Tunneling</u>						
Feasibility of Tunneling by Flame Jet	-	75	94	-	United Aircraft Corporation completed Research Lab. East Hartford, Conn.	completed
External Augmentation of Velocity of Fluid Jets for Tunneling	-	12	18	-	Bowles Engineering Silver Spring, Maryland	completed
Research in High Pressure Water Jet Delivery Optimization for Tunneling	-	21	32	-	Bowles Engineering Silver Spring, Maryland	6/68
State-of-the Art, Hypervelocity Water Jets	-	11	14	-	University of Missouri Rolla, Missouri	completed
Soil Mechanics and Chemical, Thermal and Laser Techniques for Rock Fracture	90	287	78	-	MIT Cambridge, Mass.	9/68
Rock Tunneling by Water Jets Using Cavititation Principle	-	37	21	-	Hydronautics, Inc. Laurel, Md.	5/68
National Academy of Science, Tunneling Research Requirements	-	9	-	-	U.S. Bureau of Mines Washington, D. C.	completed
Geological Mapping of Northeast Corridor	-	103	-	-	U.S. Geological Survey Dept. of Interior Washington, D. C.	completed

Scope of Work	Contracts Obligated Fiscal Year		Planned Use FY68 Availability	Future Funding Requirements (5 Year)	Contractors & Location	Estimated Completion Mo/Yr
	66	67				
<u>ADVANCED TECHNOLOGY R&amp;D (Cont.)</u>						
<u>Tunneling (Cont.)</u>						
Reference and Bibliography Service	-	-	2	-	Library of Congress Washington, D.C.	completed
Hypervelocity Fluid Jet Driver-System	-	-	25	-	Bowles Engineering Silver Spring, Maryland	6/68
Design of Tunnel Liners	-	-	60	-	University of Illinois Champaign, Ill	2/69
Correlation of Rock Properties to Fracturability	-	-	29	-	University of Missouri Rolla, Missouri	12/68
Rock Breakage by Light-Gas Guns Firing Liquid Pellets	-	-	40	10	Illinois Institute of Technology Research Inst.	12/68
Design & Test	-	-	-	161	Contractors to be selected	
	90	555	413	171		
				5,750		
				5,750		
<u>HSGT TEST FACILITY</u>						
Construction, Maintenance & Operation	-	-	-	284	Contractors to be selected	
Analysis of Prospective Facility Sites	-	-	17	14	Limbaugh Engineering Albuquerque, New Mexico	6/68
			17	298		
				11,268		
				11,268		

OFFICE OF HIGH SPEED GROUND TRANSPORTATION  
PROGRAM ACTIVITY  
MAY 1968  
(In thousands of dollars)  
DEMONSTRATIONS

Scope of Work	Contracts Obligated		68	Planned Use FY68 Availability	Future Funding Requirements (2 Year)	Contractors & Location	Estimated Completion Mo/Yr
	Fiscal Year 67	Fiscal Year 68					
<u>WASHINGTON-NEW YORK DEMONSTRATION</u>							
Operation of Demonstration Service	5,400	4,200	532	15	400	Penn Central Railroad Philadelphia, Pa	1970
Preliminary Car Engineering Design	100	-	-	-	-	L.T. Klauder & Assoc. Philadelphia, Pa.	completed
Railroad Baggage Handling Systems	31	-	-	-	-	Drake, Sheehan, Sweeney & Hupp-New York, N.Y.	completed
Preparation of Auditing Procedures Program	2	-	-	-	-	Peat, Marwick & Mitchell New York, N.Y.	completed
Survey of Cost and Revenue Data	-	37	-	-	30	Price, Waterhouse Philadelphia, Pa.	12/69
Plans for Improvement of Washington, D.C. Union Station	-	2	.8	-	-	Cuccio & Chioda Design Assoc.-Westport, Conn.	completed
Computer Simulation of PC RR Train Operations	-	-	72	-	-	University of California Los Angeles, Cal.	8/68
Suburban Stations	-	-	-	1,300	600	Penn Central Railroad	1968
Grade Crossing Safety	-	-	40	10	-	Maryland State Roads Com. Delaware State Roads Com.	1968
	5,533	4,239	652	1,325	1,030		

Scope of Work	Contracts Obligated Fiscal Year		Planned Use FY68 Availability	Future Funding Requirements (3 Year)	Contractors & Location	Estimated Completion Mo/Yr
	66	67				
<u>BOSTON-NEW YORK DEMONSTRATION</u>						
Lease of 2 TurboTrains	1,220	274	1,135	50	-	United Aircraft Corporate Systems Center Farmington, Conn.
Maintenance and Servicing of Trains	940	100	1,266	-	500	United Aircraft Systems Corporation Providence, R. I.
Survey of Cost and Revenue Data	-	1	-	15	60	Not yet determined
Survey of Track Conditions	-	3	2	-	-	New Haven Railroad completed
Training Railroad Personnel	-	2	-	-	-	New Haven Railroad completed
Installation of Transformer at Grand Central Station	-	-	-	46	-	Penn Central Railroad Philadelphia, Pa.
Track Upgrading and Operation of Demonstration	-	-	1,379	2,953	500	New Haven Railroad New Haven, Conn.
TOTAL	2,160	380	2,822	3,064	1,060	

Scope of Work	Contracts Obligated		Planned Use FY68 Availability	Future Funding Requirements (3 Year)	Contractors & Location	Estimated Completion Mo/Yr	
	Fiscal y-						
	66	67					
<b>DATA COLLECTION ACTIVITIES</b>							
Data-Tag Supplies and Lease of EDP Equipment	-	158	169	157	700	Kimball Systems, Inc. Washington, D. C.	continuing
Procedures for and Analysis of Airport Passenger Data	-	101	44	-	-	Abt Associates Cambridge, Mass.	5/68
Passenger Survey for Wash.-New York Project	-	104	48	45	750	Opinion Research Corp. Princeton, N. J.	continuing
Develop, Tabulate & Analyze Travel Data in NEC	-	85	285	-	960	U.S. Bureau of Census Washington, D. C.	continuing
Computer Programming	-	2	-	4	10	Smithsonian Institution Washington, D. C.	6/68
Rental of ADP Machines	-	-	54	33	200	IBM Corporation Washington, D. C.	continuing
Rental of Tick-O-Meters	-	6	2	-	5	Pitney-Bowes, Inc. Washington, D. C.	continuing
Passenger Survey of Dulles- National-Friendship	-	145	13	-	-	Human Sciences Research McLean, Va.	completed
Experimental Design For Demonstration	-	-	50	-	-	Mathematica, Inc. Princeton, N. J.	8/68
Data Utility	-	-	35	-	-	Economic Sciences Corp.	12/68
Market Analyses	-	-	-	7	575	Not yet determined	
<b>TOTAL</b>	<b>601</b>	<b>681</b>	<b>239</b>	<b>239</b>	<b>3,200</b>		

Scope of Work	Contracts Obligated Fiscal Year		Planned Use FY68 Availability	Future Funding Requirements	Contractors & Location	Estimated Completion Mo/Yr
	66	67				
<u>AUTO-TRAIN DEMONSTRATION</u>						
Determination of Feasibility	4	24	-	-	H. O. Whitten & Assoc. Washington, D. C.	completed
Research & Testing of Autos on Railroad Cars	8	-	-	-	Association of American Railroads Chicago, Illinois	completed
Equipment & Facilities for Ride Test	3	-	-	-	Baltimore & Ohio Railroad Baltimore, Maryland	completed
Develop Scale Model	-	2	-	-	Sundberg Ferar Detroit, Michigan	completed
Determine Market Potential for Auto-Train Service	-	40	12	-	Ctr. for Advanced Admin. Research-Boca Raton, Fla.	completed
Detail Design & Engineering of Equipment	-	1,700	1,043	-	United Aircraft Corp. Systems Center Farmington, Connecticut	completed
Storage of Materials	-	-	10	11	Budd Company Philadelphia, Pa.	1968
Terminals	-	-	-	1,030	Not yet determined	
	15	1,766	1,065	1,041		

PUBLISHED RESEARCH REPORTS

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APPENDIX (C)

THE NATIONAL BUREAU OF STANDARDS-TECHNOLOGICAL CENTER

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1963

1. DEMAND FOR INTERCITY PASSENGER TRAVEL IN THE WASHINGTON-BOSTON CORRIDOR (288 Pages)

Systems Analysis & Research Corp.      PB166884      1963

2. THE NORTHEAST CORRIDOR REGION: MAIN LINE PASSENGER SERVICE IN THE SOUTHERN SECTION - 1947-1963 (125 Pages)

Maryland University, College Park, Maryland (George Smerk)

PB168214      1963

3. FEASIBILITY AND COST OF EXPANDED INTERCITY AIR SERVICE IN THE WASHINGTON-BOSTON CORRIDOR (199 Pages)

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National Academy of Science - National Research Council

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5. HIGHWAY TRAVEL IN WASHINGTON, NEW YORK, BOSTON MEGALOPOLIS (176 Pages)

Wilbur Smith & Associates      PB166881      Nov.      1963

6. INTERCITY FREIGHT TRANSPORTATION REQUIREMENTS OF THE WASHINGTON-BOSTON CORRIDOR in 1980 (243 Pages)

United Research Corporation PB166885 Nov. 1963

7. WASHINGTON-BOSTON TRANSPORTATION STUDY - PART B-FEASIBILITY AND COST OF IMPROVED RAILROAD SERVICE- FINAL REPORT (228 Pages)

MRD Div., General American Transportation Corp.

PB166886 Nov. 1963

8. REPORT ON RESEARCH PROJECT ON HIGH-SPEED RAILROAD OPERATIONS WITHIN THE NEW YORK METROPOLITAN AREA IN CONNECTION WITH HIGH-SPEED SERVICE BETWEEN WASHINGTON, D.C. AND BOSTON, MASSACHUSETTS (156 Pages)

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1964

9. PRELIMINARY ENGINEERING REPORT ON POSSIBLE IMPROVEMENTS TO RAILROAD PASSENGER SERVICE BETWEEN NEW YORK AND WASHINGTON (135 Pages)

Louis T. Klauder & Associates

PB166879 June 1964

10. SUPPLEMENTAL REPORT ON IMPROVEMENTS TO RAILROAD PASSENGER SERVICE BETWEEN NEW YORK AND WASHINGTON (123 Pages)

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PB166880 June 1964

11. A PROJECTION OF TECHNOLOGY APPLICABLE TO THE FUTURE HIGHWAY SYSTEM OF THE BOSTON-WASHINGTON CORRIDOR (400 Pages)

Cornell Aeronautical Laboratory

PB166878 Oct. 1964

12. STUDIES ON THE ECONOMIC IMPACT OF RAILWAY ABANDONMENT AND SERVICE DISCONTINUANCE (216 Pages)

W.B. Saunders & Company - "Implications of Railway Abandonments"  
(A General Survey)

Boston University - Bureau of Business Research - "The Economic Impact  
of the Discontinuance of the Rutland Railway" (A condensed Version)

PB167640 June 1965

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13. BUFFETING TESTS ON THE HUDSON TUBE (23 Pages)  
Stanford Research Institute                      PB168647                      June                      1965
14. SURVEY OF TECHNOLOGY FOR HIGH SPEED GROUND TRANSPORT  
 Part I, IA, & II. (481 Pages)  
Massachusetts Institute of Technology PB168648                      June                      1965
15. HIGH SPEED GROUND TRANSPORTATION RESEARCH AND DEVELOPMENT: A  
 PRELIMINARY APPRAISAL (68 Pages)  
Office of the Under Secretary for Transportation (Commerce)  
Transportation Research Staff                      PB168782                      1965
16. HIGH PRIORITY RESEARCH TASKS FOR HIGH SPEED GROUND TRANSPORT  
Massachusetts Institute of Technology PB169121                      June                      1965
17. LITERATURE SURVEY OF PASSENGER COMFORT LIMITATIONS OF HIGH SPEED  
 GROUND TRANSPORT (57 Pages)  
United Aircraft Corporation                      PB168171                      July                      1965
18. A SYSTEM ANALYSIS OF SHORT HAUL AIR TRANSPORTATION (494 Pages)  
Massachusetts Institute of Technology PB169521                      Aug                      1965
19. DESIGN FOR IMPACT STUDIES (NORTHEAST CORRIDOR TRANSPORTATION PROJECT)  
Consad Research Corporation                      PB173484                      Aug.                      1965
20. STUDIES IN TRAVEL DEMAND - VOLUME I  
Mathematica                      PB173499                      Sept.                      1965
21. BIBLIOGRAPHY OF HIGH SPEED GROUND TRANSPORT - Part IA (82 Pages)  
Massachusetts Institute of Technology PB170581                      Oct.                      1965

22. SELECTED COMMODITY UNIT COSTS FOR OCEANBORNE SHIPMENTS VIA COMMON CARRIERS (BERTH LINER)

Ernst & Ernst PB174274 Oct. 1965

23. PRELIMINARY ENGINEERING REPORT ON POSSIBLE IMPROVEMENTS TO RAILROAD PASSENGER SERVICE BETWEEN NEW YORK AND BOSTON (166 Pages)

Louis T. Klauder & Associates PB169907 Nov. 1965

24. ECONOMIC ANALYSIS OF ST. LAWRENCE SEAWAY CARGO MOVEMENTS AND FORECASTS OF FUTURE CARGO TONNAGE (184 Pages)

Stanford Research Institute PB169965 Nov. 1965

25. TRAIN-AUTO FERRY OPERATIONS (132 Pages)

Herbert O. Whitten & Associates PB170798 Nov. 1965

1966

26. APPENDIX TO REPORT ON SELECTED COMMODITY UNIT COSTS FOR OCEANBORNE SHIPMENTS VIA COMMON CARRIERS (BERTH LINER)

Ernst & Ernst PB174275 1966

27. FREIGHT PROBLEMS OF NEW ENGLAND RAILROADS (196 Pages)

A.D. Little, Inc., Cambridge, Mass (Edited by E.S. Prentice)

PB169387 Feb. 1966

28. OPERATING COST ESTIMATES FOR LONG-HAUL SUB-SONIC JET AIRCRAFT (32 Pages)

Planning Research Corporation PB170691 Feb. 1966

29. LITERATURE SURVEY ON THE COMMAND CONTROL OF HIGH-SPEED GROUND ORIENTED TRANSPORTATION SYSTEM (53 Pages)

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59. A CALCULATION OF THE LATERAL HUNTING MOTION OF A TRACKED VEHICLE  
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Massachusetts Institute of Technology PB176136 Sept 1967

## 86. UNSTEADY FLOW IN TUNNELS, BY F.T. BROWN, R.P. SHAH

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Massachusetts Institute of Technology PB173635 November 1966

Senator LAUSCHE. Senator Pearson?

Senator PEARSON. What is your estimate on times and costs? You were optimistic once. I served on the Armed Services Committee too, and I know in getting into all of these—whether it be weapons systems or new scientific efforts such as this—that you just can't very well predict what you are going to do, either on time or costs. But you must have some estimate, whether it be optimistic or pessimistic. Can you give us the benefit of that now?

Mr. LANG. Which specific work do you have in mind in connection with this question, Senator—the demonstrations or some of the research and development work?

Senator PEARSON. I really had in mind the demonstrations leading up to the actual operations of these high-speed trains over routes you mentioned.

Mr. LANG. Well—

Senator PEARSON. What I really had in mind is that today everyone is looking forward to the time when we really have these trains in operation, particularly in the northeast corridor.

Mr. LANG. Well, Senator, I'm not trying to be evasive. As was suggested by Mr. Nelson's answer of a moment ago, we clearly were over-optimistic—and "we" means everybody involved in the program—on when this equipment could be ready for regular reliable operation. And, frankly, we have been burned so many times on making predictions of specific dates that none of us is willing to give a specific date any more. However, it is quite clear from the work that is now being done by the suppliers, from their recognition of what their specific remaining technical problems are, and from the steps that they have taken to acquire, when they did not already have, adequate technical assistance to solve these problems, that both the TurboTrain, which would operate between New York and Boston, and the Metroliners between New York and Washington, would be ready within the next few months.

But just what date they are going to go into revenue service is something at this point I cannot say. But it is a matter of months, and not of years. And we have gone far enough down this road now so that we know what our problems are, and we know that none of them is in any important respect insoluble. It's just a matter of working out these bugs.

Senator PEARSON. It's not my intention to put you on the spot. If a Senator should ask Senator Lausche that on the floor when this comes up, I think he would have to have an answer too. And I suppose we would just give them the one you gave us here.

I have no further questions.

Senator LAUSCHE. Senator Cannon?

Senator CANNON. Thank you, Mr. Chairman. You asked in your statement for a change in amendment to section 7 to acquire necessary real property by purchase, lease, or grant, to construct a support facility. Where do you have in mind doing this?

Mr. LANG. Senator Cannon, we have reviewed a very large number of potential sites for the test facility which we have in mind. At the current time we have narrowed the number of sites which are now known to us, and I insert that parenthetical qualification because our experience over the last year, in looking for an acceptable site, has

been one of new sites being suggested to us almost every week and there is no guarantee that some additional ones won't come in even at this late stage of the game which warrant consideration.

In any case, we now have narrowed that down to, I believe, five sites, which are under intensive investigation. One of the important things that we have to determine about each of these sites is the amount of earthwork which would be required to give us the kind of extremely high-speed roadbed for our test vehicles which we need.

Senator CANNON. What is the size of the site that you are talking about?

Mr. LANG. Well, the test track that we have based our site research on would require an area of approximately 30,000 acres. Now, I should qualify that by pointing out that we would actually use only a small share of that land. The test track would be built in the shape of a very large oval, and we would have no use, no need for the land in the interior of that oval. However, it is absolutely critical that this test facility—the roadbed—not be crossed by any facility at highways or roads and that it also be isolated some little distance from any other activities, because of the very high speeds that we will be operating to test these at. We can't take a change, of course, of having one of them fly off the roadbed and plow into adjoining activities.

So we do need a relatively vacant area in order to build this test track.

Senator CANNON. That sort of limits your possibilities of test track in the Eastern area, doesn't it?

Mr. LANG. Most of the sites that have been suggested to us, and all of these that we now have under intensive investigation, are west of the Mississippi.

Senator CANNON. Do any of those five sites involve the acquisition of private lands? Or do they involve the use of Government land?

Mr. LANG. They involve basically the use of Government land. I don't remember just exactly which ones. Some of them would involve acquiring some private land. However, the sites that are currently the front runners, so to speak, offer the possibility of our being able to exchange nearby Government land that would be required to fill out the site.

Senator CANNON. So that you wouldn't envision that you would select a site where you would have to go out and purchase private land for the acquisition of the areas to complete this project?

Mr. LANG. That's correct, Senator. And our request to the Appropriations Committee for authority to proceed on this particular project has contemplated no expenditure for land. Our money, as we have presently programed it, would be spent only for the support facilities and the construction of the guideway itself and the test vehicles.

Senator CANNON. I don't want to appear parochial about this, but, for example, in my own State of Nevada, 87 percent of the land of my State is owned by the Federal Government. And I think it would be very ill advised for you to come along with a project and say you are going to go out and try to buy lands to accomplish this project, because we are not completely unused. While we are one of the highest, there are many other States that have large areas of public land that is really not useful for any purpose found so far.

And I certainly would be opposed to this, if you contemplated going out and purchasing any private lands of any sort for this kind of a project, where it simply is a demonstration or a research and development type project.

Mr. LANG. No, our experience to date—and, as I say, we have considered a very large number of potential sites—indicates that we should be able to find one that is acceptable in all ways, and does not require us to purchase any land.

Senator CANNON. In your statement, you tell about some of the progress that is being made, and that you're making a great deal of progress in tunneling activities, for example. What type of things are you doing in this area?

Mr. LANG. Well, we have initiated what might best be determined an exploratory research program in tunneling technology into a number of different ways of speeding up the tunneling process and thus reducing its cost.

Probably the most interesting of these various ways in which we have approached this problem so far is the work that we are doing on the use of an unfocused laser to break down rock structures and make them more susceptible to mechanical digging machines and thereby obviate the need for blasting.

We are, however, investigating, through research contracts, the use of very high pressure water jets, a type of technique which the Russians have done a great deal of work on in connection with tunneling, and with flame jet methods of breaking down rock.

Senator CANNON. It would be your intention to use the very latest in research and development in trying to make some improvements in the methods that are being used over those used at present?

Mr. LANG. That is correct, Senator. We found when we got into this research and development area that, somewhat to our surprise, the amount of research and development which had been done on tunneling technology up to the time that we began our program was in fact very, very small, considering the really enormous amount of tunneling that we do in this country for one reason or another.

But our preliminary studies show that with land costs increasing at the rate that they are, and the demand for transportation facilities increasing at the rate that they are, that we were clearly going to be forced to go underground with more and more of our transportation facilities, not merely high-speed ground systems but highway systems as well, and that therefore these modest sums of money that we are now spending on research and development and technology would be justified many times over if we were in fact able to advance the state of the art significantly—which we now think we should be able to in time.

Senator CANNON. The distinguished Senator from Rhode Island on my left here, his committee has done and is doing a tremendous amount of research and development work in the peaceful uses of atomic energy, and the use of atomic energy for grading and with the possibility of building open canals. I don't know but what there might be some area here that might be useful even in tunneling where you don't actually break open the surface. I would certainly hope that you would explore every possible avenue and not get fixed in one direction and say, "This is the way we used to make tunnels and let's just see if we can upgrade that a little bit."

Mr. LANG. Yes, Senator. We have been in contact with the AEC on this possible approach to the problem. And it was our conclusion that their research program was more than adequate in this area. There was nothing that we could add that AEC really couldn't do better than we. So this is the one approach to the problem that we have left to others at this juncture.

I should add, however, that we are part of an interagency tunneling research committee which is coordinating the research in this area between our department, the Department of Housing and Urban Development, which has interests somewhat similar to our own, and the Department of the Interior which, of course, is interested because of its impact on mining economics.

And we have done now a coordinated Government-wide program in tunneling research and development.

Senator CANNON. I was rather interested in your statement on page 3, when you talk about the problem of congestion in the northeast corridor and you pointed out:

The delay time at J. F. Kennedy, Newark, La Guardia, Washington National, Boston, and Philadelphia airports in 1965 amounted to 49,000 hours.

I think that that is probably an understatement, and it's going to continue to get worse. I happened to be in New York last Friday and rushed madly out to the airport to catch the 11 o'clock shuttle. I barely made it before the door closed, got on and went out and sat at the end of the runway for 50 minutes. We were number 16 in line to take off from La Guardia.

So we are meeting a problem there that is going to get worse and stack on top of the problems. And certainly if you can do what we think you can do here, and do it at a reasonably early date and make some significant progress within a reasonable cost area, I think you're going to be making some tremendous strides for us. That's all I have, Mr. Chairman.

Senator LAUSCHE. Senator Pastore?

Senator PASTORE. Yes. Just a few questions. We had a markup of the appropriations bill on this high-speed transportation this morning. I happened to attend that meeting and I want to get down there. Has the House passed your authorization?

Mr. LANG. Yes.

Senator PASTORE. How much did they allow you?

Mr. LANG. \$16,200,000 in fiscal year 1969, which is the amount of our request.

Senator PASTORE. In this authorization you're asking for 1970 as well?

Mr. LANG. Yes. Also in 1970. Their bill authorized \$21,200,000 for this program in fiscal year 1970.

Senator PASTORE. In other words, they allowed you what you asked for?

Mr. LANG. Well, that's not exactly correct. We testified before the House committee that we felt the 1970 program should amount to approximately \$36.5 million. But they decided to set the authorization for fiscal year 1970 at \$21.2.

Senator PASTORE. You're taking the figure allowed by the House in 1970 fiscal?

Mr. LANG. Yes, sir.

Senator PASTORE. Now, this \$16.2 million, would you break it down for me? I do want to get down there and, even though the authorization hasn't been passed, I want to urge it, subject to the authorization. Otherwise, I'm afraid you are going to lose the vote on this.

Mr. LANG. I think Mr. Nelson has that breakdown for us.

Senator PASTORE. Let me ask you this question. Have you made this presentation before the Subcommittee of Appropriations in the Senate?

Mr. LANG. Yes, we have.

Senator PASTORE. Have you broken down the figure?

Mr. LANG. Yes, sir.

Senator PASTORE. And the figure adds up to \$16.2?

Mr. LANG. That's correct, sir.

Mr. NELSON. It's also filed in the House report, sir.

Senator PASTORE. That's all I wanted to know. Thank you very much. Thank you, Mr. Chairman.

Senator LAUSCHE. Thanks, Senator Pastore.

I would like to ask a few questions. There will be new Senators considering this bill, perhaps. The original objective of the experiment was to find ways and means of inducing travelers to use rail transportation and thus relieve the highways of the heavy traffic that they have got to bear, and otherwise facilitate the movement of people as they go from one place to another. Is that correct?

Mr. LANG. That is correct, Mr. Chairman.

Senator LAUSCHE. The New Haven Railroad was mentioned. Is that the correct name of it?

Mr. LANG. The New York-New Haven & Hartford.

Senator LAUSCHE. New York, New Haven. How much money has the Federal Government put into the lifelines of that company in order to help it out of its fiscal distress? Are you able to tell, approximately?

Mr. LANG. I cannot recall all of the figures here, Mr. Chairman. There has been a long and somewhat checkered history of Federal financial involvement with that carrier, starting with the so-called flood loans under the Reconstruction Act back in the 1950's, going on to the so-called part V loans under part V of the Interstate Commerce Act as enacted in 1958.

Then, in addition, there was some money, some Federal funds, provided in connection with the Department of Housing and Urban Development mass transit demonstration program under the 1964 Mass Transportation Act. And now, of course, we are involved within this New York-Boston high-speed train demonstration and have provided, together with the State of Connecticut, some funds already for purposes of assisting them in upgrading the roadbed to bring it up to the standards necessary for the operation of this train.

Senator LAUSCHE. Well, I'm now reading from hearings before the Committee on Commerce of the 89th Congress, first session, the report submitted under the title "The Crisis in Passenger Train Services." On page 43 of that report, this statement appears:

Under the Transportation Act of 1958, the Interstate Commerce Commission during 1959 through 1961 guaranteed \$23.1 million in special loans to the New Haven. After the railroad entered receivership in 1961, it defaulted on payment of

the \$14 million balance of the flood loans and on an additional \$3 million on the special loans. The U.S. Treasury then paid the railroad creditors \$28.3 million.

Now, I understand there is a representative of the Interstate Commerce Commission here who will be able to give the figures on what financial help we have given to this company. Am I correct in that understanding?

Mr. LANG. Yes, sir.

Senator LAUSCHE. Well, I will ask that the figures be provided.

(The information requested follows:)

INFORMATION SUPPLIED BY THE INTERSTATE COMMERCE COMMISSION ON THE PART V  
LOANS TO THE NEW HAVEN RAILROAD

The following loans to the New Haven Railroad and to the New Haven Trustees were guaranteed 100 percent as to principal and interest by the United States under Part V of the Interstate Commerce Act:

Finance docket No.	Date approved	Amount approved	Repayments	Unpaid balance, June 30, 1968
<b>New Haven RR.:</b>				
20372.....	Aug. 5, 1960	\$8, 159, 400	\$4, 351, 680	\$3, 807, 720
20397.....	Jan. 8, 1960	500, 000	500, 000	-----
20398.....	Oct. 28, 1959	1, 500, 000	864, 456	635, 544
21299.....	Oct. 31, 1960	4, 500, 000	627, 900	3, 872, 100
21299.....	Dec. 29, 1960	3, 500, 000	-----	3, 500, 000
21299.....	Feb. 14, 1961	3, 500, 000	-----	3, 500, 000
21299.....	May 12, 1961	1, 500, 000	-----	1, 500, 000
Total, finance docket No. 21299.....		13, 000, 000	627, 900	12, 372, 100
Total loans to New Haven.....		23, 159, 400	6, 344, 036	16, 815, 364
<b>New Haven trustees:</b>				
21685.....	Aug. 2, 1961	5, 000, 000	-----	5, 000, 000
21808.....	Dec. 7, 1961	7, 500, 000	-----	7, 500, 000
Total loans to the trustees.....		12, 500, 000	-----	12, 500, 000

Loans to the Trustees are secured by Trustees Certificates which have the highest priority for payment.

The New Haven defaulted on its loans in Finance Docket Nos. 20398 and 21299 in July 1961, with unpaid principal balances of \$1,375,000 and \$13,000,000, respectively, and on October 2, 1961, the United States paid the unpaid principal balance on these loans, plus interest of \$300,740, with funds provided in Supplemental Appropriations Bill 1962 (H.R. 9169).

The unpaid balance of the loans in Finance Docket Nos. 20372 and 20397 were assumed by the Trustees appointed by the Court in the reorganization proceedings. The loan in F.D. No. 20397 was paid in full in January 1965.

Under Part V of the Act, in the event of a default on any guaranteed loan and payment thereof by the United States, the Attorney General has the responsibility for such actions as may be appropriate to recover the amount of such payments. Under agreement between the Department of Justice and the New Haven Trustees, approved by the Court in December 1965, accrued interest on the loan in Finance Docket No. 20398 was waived and the principal was to be paid in installments during 1966 and 1967. As of June 30, 1968, \$739,456 has been received and applied in reduction of the principal balance. Under said agreement the unpaid balance after December 31, 1967 became an administration claim (priority for payment on a par with Trustees' Certificates) with an interest rate of 4½ percent. Under a subsequent agreement in December 1967, the Department of Justice waived interest payments for the 6 months ended June 30, 1968.

The loan in Finance Docket No. 20372 is fully secured by locomotives valued at \$5.1 million as of June 30, 1968.

No securities or other property were pledged as collateral security for the loan in Finance Docket No. 21299. However, New Haven covenanted that if it should

receive any income from certain claims then in litigation and certain other sources, such income would be applied in reduction of this loan. As of June 30, 1968, \$627,900 had been applied against the principal of F.D. No. 21299 as a result of the settlement of certain of said claims.

Senator LAUSCHE. Why has the railroad had such difficulty in keeping aboveboard financially?

Mr. LANG. I'm not sure, Mr. Chairman, that I can answer that question as well as perhaps Chairman Tierney can when he takes the witness stand. I can offer only some ideas by way of explanation. New Haven has had a very long and somewhat checkered financial career that actually dates back to about 1912. In recent years, it has been particularly hard hit by the construction of high-type highway facilities alongside of its roadway, which resulted in a substantial diversion of freight traffic.

They were further hit very hard by the hurricanes in the 1950's, and experienced very large reconstruction costs.

And, of course, the passenger traffic, which accounts for a very large share of their revenue, has apparently never been a going financial proposition. So, as their freight traffic dropped off, their ability to finance whatever deficits they might have had in passenger operations disappeared, the whole railroad went down into the red and has been unable to get back out of it for the last 10 years.

Senator LAUSCHE. You mention that, as their freight traffic was reduced, hindering them in making up the deficits in their passenger services, their financial plight became worse.

Mr. LANG. Yes.

Senator LAUSCHE. Do you accept it as axiomatic, on the basis of the present type of services that railroads are able to offer to passengers, that there normally is a deficit in the operation of the passenger services?

Mr. LANG. All of the failures which we had been able to get hold of suggest that in almost every case the situation is that the passenger operations are running at some kind of a deficit. Of course, precisely how large that deficit is depends upon what kind of accounting system you want to adopt for purposes of determining the deficit. They have therefore been required to subsidize this deficit operation through their freight operation.

Senator LAUSCHE. Under the present type of equipment available for the transportation of passengers, is it a fact that the less the freight service and the greater the passenger service, the less the ability of the railroad to survive financially?

Mr. LANG. This has been the typical picture in the industry throughout the country. The railroads which have a high proportion of passenger service have fared much worse financially than those with a higher proportion of freight service.

Senator LAUSCHE. Which railroad in the country do you understand has had the worst proportion of freight service compared to passenger service?

Mr. LANG. That has always been the Long Island Railroad, followed by the New Haven.

Senator LAUSCHE. I see. Now, what about the Pennsylvania's passenger service for commuters and so forth?

Mr. LANG. Well, the Pennsylvania—

Senator LAUSCHE. Which would be the second one in that category, if you can answer?

Mr. LANG. Well, I think the ranking—if that is the right way to put it—has, as I said, always been the Long Island first, the New Haven second, the Pennsylvania third, and the New York Central fourth, in that order, as a share of passenger service, as a share of the total revenue.

Senator LAUSCHE. The merger of the Pennsylvania and the New York Central has brought together the Pennsylvania which was third, and the New York Central which was fourth in the badness of the proportion of passenger service to freight service. Is that correct?

Mr. LANG. Yes, sir.

Senator LAUSCHE. That would help the Pennsylvania, if it were alone, and would hurt the New York Central. But I suppose the net result is tit for tat.

Mr. LANG. Well, of course, both of these railroads—particularly the New York Central—have in recent years cut back rather drastically on their long-haul passenger service. They have both, however, kept their commuter services in the New York area, in case of both railroads, and in the Philadelphia area, in the case of the Pennsylvania, at prior levels. But the commuter service operation has really come to be viewed in a different category from the intercity transportation, which, of course, is the object of the studies and research of this legislation that we have before us.

Senator LAUSCHE. I think you testified before this committee about a year ago, or 18 months ago, and my recollection is that you said that there was an improvement in the fiscal position of the railroads. Are you able to tell me at this time what that situation is? Has the curve been upward, showing improvement? Or was there an improvement for a period and it has now taken a movement downward?

Mr. LANG. I did appear before this subcommittee last year, Mr. Chairman, but I believe that I said at that time that there was not an improvement but rather a deterioration in the financial position of the industry as a whole. They did enjoy relative—and it is only relative—prosperity in 1966.

However, business began to take a significant downturn for them in 1967. And in 1968, while it looks as though it will be a little bit better revenue year than 1967, it does not promise to be significantly better, if better at all, from the standpoint of net earnings.

Senator LAUSCHE. What is the percentage of net earnings, on the average, of the railroad industry?

Mr. LANG. Well, they have varied rather widely over the last few years. In 1967 they earned, if I recall correctly, \$555 million. That is the class 1, so-called class 1.

Senator LAUSCHE. Let's confine it to that.

Mr. LANG. Yes.

Senator LAUSCHE. What would that be translated into percentage?

Mr. LANG. That is roughly 5 percent of their gross revenues.

Senator LAUSCHE. That is 5 percent of their gross revenues, but what is it on the basis of return to stockholders?

Mr. LANG. It's a little over 2.5 percent, calculated return on net investment.

Senator LAUSCHE. All right. We have here the Yearbook of Railroad Facts, 1968 edition, issued by the Association of American Rail-

roads. Whether that is prejudiced or not, I'm not prepared to say, but it shows, for 1958, 2.76; 1959, 2.72; 1960, 2.13; 1961, 1.97; and now I'll jump to 1967: estimated 2.45. Is it your opinion that this research work and these tests, if they prove successful, that it will not only stabilize the general transportation service of the country, but will also inure tremendous benefits to the traveling public?

Mr. LANG. Well, that's very clearly our objective. But I might go on to point out—and that is by way of amplification of the answer to an earlier question—that our intention here is not simply to put passenger services, intercity passenger business, back on the railroads, but rather to identify much more clearly than we have been able to in the past, precisely what kind of passenger service and in what kinds of markets the railroads can play an effective role in the future.

We have felt very strongly, since the outset of this program, and nothing that we have learned during the last 3 years has significantly altered this opinion, that the intercity railroad passenger services that we have known in the past, the relatively ubiquitous intercity passenger service that served all of the urban centers in our country, is probably no longer a viable proposition, given modern highway transportation and modern air transportation such as we now know it.

However, it is becoming clear with the increasing congestion that we are experiencing, particularly in the more developed sections of the country, that highway transportation and air transportation will begin in certain areas to choke on themselves, so to speak.

And here we have to find alternatives, and clearly one of the important ones is a revitalization of rail passenger service in a new form. And this is precisely one of the major objectives of this program.

Senator LAUSCHE. Well, the fact is that it is your major objective to develop improved service so as to command a favorable response from the traveling public. Isn't that it?

Mr. LANG. If the public doesn't want to use it, then we have to figure out a different way to provide transportation for them.

Senator LAUSCHE. May I ask Mr. Lang—it doesn't pertain to this matter, but did you testify with respect to this new permissive legislation for the use of enlarged sized trucks and weights on the Interstate System?

Mr. LANG. No, Mr. Chairman.

Senator LAUSCHE. I have no further questions. Mr. Nelson, is there anything you desire to say?

Mr. NELSON. No, sir. Nothing further.

Senator LAUSCHE. Senator Moss?

Senator MOSS. No.

Senator LAUSCHE. Senator Cannon?

Senator CANNON. I have nothing further, Mr. Chairman.

Senator LAUSCHE. Thanks very much.

Mr. LANG. Thank you, Mr. Chairman.

Senator LAUSCHE. Mr. Paul J. Tierney, Chairman of the Interstate Commerce Commission. Mr. Tierney, while your statement is quite brief, you might as well read it.

STATEMENT OF PAUL J. TIERNEY, CHAIRMAN, INTERSTATE COMMERCE COMMISSION; ACCOMPANIED BY THADDEUS W. FORBES, DEPUTY DIRECTOR, OFFICE OF PROCEEDINGS, INTERSTATE COMMERCE COMMISSION; AND RICHARD BRIGGS, SPECIAL ASSISTANT TO THE CHAIRMAN, INTERSTATE COMMERCE COMMISSION

Mr. TIERNEY. Thank you, Mr. Chairman. On behalf of the Commission I wish to thank you for the opportunity to express our views on S. 3237, a bill to extend for 2 years the program of research and development undertaken by the Secretary of Transportation on high-speed ground transportation, and for other purposes.

Before I continue, Mr. Chairman, I would like to introduce the gentlemen here at the table with me. On my right is Mr. Richard Briggs, the special assistant in my office, and on my left is Deputy Director Thaddeus Forbes of the Office of Proceedings.

S. 3237 would (1) extend the expiration date of Public Law 89-220 until June 30, 1971, (2) take account of the establishment of the Department of Transportation and the transfer to it of certain elements previously in the Department of Commerce, and (3) clarify the authority of the Department of Transportation to acquire real property for test-site purposes.

The Commission strongly endorsed the High-Speed Ground Transportation Act at the time of its initial enactment in 1965. We support the continuation of this program since we believe that modern high-speed rail service in densely populated corridors has the greatest potential of any type of noncommuter rail service.

The Commission is deeply concerned over acceleration in the decline of intercity railroad passenger service during the past year. The preservation and improvement of essential intercity passenger operations are necessary, if the Nation is to maintain a soundly balanced transportation system. Preserving the status quo will not provide a solution to this problem. Extensive economic and technological research and development into new types of railroad passenger service are necessary to bring about the required improvements in equipment and service which are responsive to the public needs.

The two high-speed projects now underway in the Northeast Corridor are directed to this end and indicate the promise of revitalizing essential rail passenger service through a coordinated program of public and private action. Since the legislation does not restrict the Department of Transportation to either the Northeast Corridor or railroad passenger service, we also hope that successful completion of the present project will lead to expansion of this program to other modes and to other parts of the country where corridor-type service may be feasible.

In its recent report to the Congress on "Intercity Rail Passenger Service in 1968," the Commission emphasized that prompt action was imperative if significant segments of noncorridor intercity rail service were to be preserved. Changes in Federal policy are urgently needed, and a comprehensive governmental review of the present and future need for intercity rail service should be undertaken at once. The Northeast Corridor project involves only a limited part of the problem. Beyond that, the existing governmental environment does little more than weakly support that level of service which the railroads them-

selves can afford. The quality and quantity of that service are deteriorating. The forces underlying this trend grow stronger. Present programs—public and private—cannot reverse this decline. And we do not believe that any significant action will be taken until a consensus is developed on whether a national intercity rail system is needed. The national ambivalence toward the problem not only fosters inaction and inconsistency in governmental policy, it encourages railroads to continue the present trends.

We therefore, have recommended—

(1) that a Federal study of the need and means for preserving a national rail passenger system be initiated as soon as possible;

(2) that section 13a be amended to provide more effective and efficient regulation geared to present conditions, including a provision to preserve a minimum level of service while the study is in progress; and

(3) that the Post Office Department consider temporarily re-directing its policies on mail contracts to support the present level of passenger train service during this study.

I again wish to thank you for this opportunity to appear before the subcommittee. Mr. Chairman, this concludes my prepared statement.

Senator LAUSCHE. Senator Cannon.

Senator CANNON. Mr. Chairman, I have no questions of Mr. Tierney. I note that he restates the recommendations that a number of us have been supporting here to try to strengthen the rail system. And so far we have not had too much success.

Thank you, Mr. Chairman.

Senator LAUSCHE. Senator Moss.

Senator MOSS. I would reiterate much of what Senator Cannon said. We have pending here in the committee at least two bills calling for the kind of overall study that you recommend. I had one that I introduced calling for a 1 year's moratorium on all discontinuances while we made a study of the need for an overall integrated transportation system in determining what our needs are.

I am glad to have you make these recommendations again, because I agree that there is very little public interest in it. It is just apathy, it seems to me, on the part of people that allow these rails to continue to take off passenger trains. Passenger transportation is deteriorating and almost disappearing now in sections.

Mr. TIERNEY. Thank you, sir.

Senator LAUSCHE. You have made the statement :

The Commission is deeply concerned over acceleration in the decline of intercity railroad passenger service during the past year.

Will you detail that, please, that statement ?

Mr. TIERNEY. Yes, sir. I am not sure I can give the correct statistics. I have them here. We have experienced generally a great increase in the number of applications for discontinuances during the past fiscal year. Much of it has been attributable, we have found, to a new system of mail distribution adopted by the Post Office Department and by rail transportation of mail by freight trains. Much of the revenues of these passenger trains was earned from transporting mail, Mr. Chairman. In many of those instances, of course, the result was that where a service

was on the borderline from a financial standpoint, it then became a loser.

Senator LAUSCHE. Do your records show whether there has been a diminution of the number of people using the railroads? Or is your statement confined to a reduction of income because of the mail service?

Mr. TIERNEY. No; it is a combination of both. The mail service changes began within the last year and a half, and this accelerated the decline.

But over the years there had been a decline in the use of passenger trains by the public. They have gone to other modes. There is no doubt about that. Last year this downward trend accelerated.

Senator LAUSCHE. Has your office calculated what the loss will be for the year because of the discontinuance of the use of railroads to carry mail?

Mr. TIERNEY. I am not sure. Mr. Briggs, do we have a figure on that?

Mr. BRIGGS. In 1967, the total mail revenues received by passenger trains dropped approximately 20 percent. That reflects two factors: (1) the absolute loss of mail contracts by the railroads and (2) the transfer of mail from passenger to freight trains.

We are unable to calculate for the present year what the total loss would be, although it is estimated that perhaps as much as one-half of the mail formerly carried in passenger trains at the beginning of 1967 now moves in freight trains. The transferred business involves primarily bulk mail. The absolute loss of mail involves mostly rail post office cars, the majority of which have now been eliminated.

Senator LAUSCHE. You have stated there has been a revenue loss of 20 percent from those trains providing service for mail and passengers; is that right?

Mr. BRIGGS. There has been a decline of 20 percent in the mail revenues received by the railroads for passenger operations.

Senator LAUSCHE. What does that 20 percent mean in dollars?

Mr. BRIGGS. It means approximately \$64 million; \$23 million of that \$64 million loss was the result of the switch from a passenger train to a freight train.

So the absolute loss in revenues to the railroads would be less than \$41 million.

Senator LAUSCHE. Now, you recommend three things:

That a Federal study of the need and means for preserving a national rail passenger system be initiated as soon as possible.

There was a study in 1958. Do you believe that that study, the recommendations of that study are now obsolete and a new look has to be taken at it?

Mr. TIERNEY. That is correct, sir.

Senator LAUSCHE. You support this bill that is before us; that is correct, isn't it?

Mr. TIERNEY. Yes, sir. We do.

Senator LAUSCHE. Thanks very much. Any further questions?

Senator MOSS. No.

Mr. TIERNEY. Thank you, Mr. Chairman.

Senator LAUSCHE. Paul H. Reistrup, vice president of the passenger services, testifying on behalf of Mr. William Johnson, president of the Illinois Central Railroad and a member of the High-Speed Ground Transportation Advisory Committee.

Is he present?

Mr. REISTRUP. Yes, sir; I am here.

Senator LAUSCHE. Mr. Reistrup, your statement will be fully printed in the record. You may proceed by reading it or if you want to, express your views directly and give us the highlights. We will accept either way.

Mr. REISTRUP. I will proceed, Mr. Chairman.

**STATEMENT OF PAUL H. REISTRUP, VICE PRESIDENT, PASSENGER SERVICES, TESTIFYING ON BEHALF OF WILLIAM JOHNSON, PRESIDENT, ILLINOIS CENTRAL RAILROAD AND A MEMBER OF THE HIGH-SPEED GROUND TRANSPORTATION ADVISORY COMMITTEE**

Mr. REISTRUP. I am Paul H. Reistrup, vice president, passenger services, Illinois Central Railroad, 135 East 11th Place, Chicago, Ill.

I am responsible for the passenger operations of the Illinois Central Railroad, both commuter and intercity service. The suburban commuter service is electrified and extends some 29 miles south of Chicago with two 4-mile branch lines, handling approximately 78,000 riders per workday. The intercity service extends from Chicago to New Orleans and through Birmingham to Florida, in conjunction with two other carriers. We handled some 3,600,000 intercity passengers in 1967.

I have been with the Illinois Central since July of 1967 and previously was with the Chesapeake & Ohio-Baltimore & Ohio system in various positions in the operating department, head of the passenger department, and was in the executive department when I joined Illinois Central.

The president of Illinois Central, Mr. William B. Johnson, had hoped to be here in person, but conflicting engagements have prevented his doing so. He is a member of the High-Speed Ground Transportation Advisory Committee.

If permissible, I would like to read Mr. Johnson's statement into the record.

Senator LAUSCHE. If you will omit reading the first and second paragraphs, in which he relates his position, and proceed directly to the third paragraph, getting to the substance of his testimony.

Mr. REISTRUP. Yes, sir.

The principal demonstrations, on the Penn Central between Washington and New York, and on the New Haven between New York and Boston, have not progressed as anticipated because of various technical difficulties.

Senator LAUSCHE. Mr. Reistrup, Senator Pell is here and, since you are just starting the main part of your presentation, I will ask Senator Pell: Are you prepared to testify?

Senator PELL. I am, sir.

Senator LAUSCHE. If you will step forward.

**STATEMENT OF HON. CLAIBORNE PELL, A U.S. SENATOR FROM THE STATE OF RHODE ISLAND**

Senator PELL. I thank you, Mr. Chairman, very, very much indeed for letting me come in this way. As with you, we all have different

committees meeting at the same time and you are particularly nice to let me come forward.

Mr. Chairman, I appreciate tremendously this opportunity to appear before you. I have taken a very active role in everything to do with the High Speed Ground Transportation Act and ground transportation. The interest of this committee in this program always has been most beneficial, and I look forward again to the committee's constructive contributions.

I know I need not dwell upon my own strong interests in this legislation as a Senator from an urban State in the densely populated Northeast, a State that shares the chronic transportation problems of that region. And I am very proud to recall that a proposal I made 6 years ago to improve rail passenger service in the northeast corridor led eventually to establishment of the high speed ground transportation program. Indeed, I claim a fatherly or, at least, a grandfatherly relationship to the current program.

Mr. Chairman, when this program was being considered 3 years ago, the committee and the Congress were given abundant evidence of an impending crisis in passenger transportation, particularly in our congested and growing urban areas. The only real change in the situation since that time is that the crisis is closer at hand, and the indications of its rapid approach are more readily evident.

Despite the admirable efforts of the airlines to expand services and facilities, our airways and airports have become increasingly congested. Passenger delays are a distressingly common occurrence.

On the ground, our magnificent Interstate Highway System is nearing completion, but few contend that it can handle efficiently the traffic volumes projected for the future. Already some sections are congested. And there is a growing public resistance to devoting more of the precious acreage in our urban areas to the construction of still more sprawling expressways.

There undoubtedly will be further expansion of the needed facilities for both air and highway travel, but it will be enormously expensive. And, I believe, such an expansion alone will fall short of meeting the intercity transportation needs in our growing urban areas.

Meanwhile, a third and potentially far more efficient mode of transportation, the railroads, are vastly underutilized. Only last month the Interstate Commerce Commission, after reviewing trends in rail passenger service, expressed doubts that any significant segments of long- and medium-distance rail passenger service will survive the next few years without a major change in Federal and carrier policies.

Mr. Chairman, it is my conviction that the passenger transportation needs of the near future cannot be met without a balanced program, making the fullest and most efficient use of all transportation modes—air, highway, and high-speed ground transportation.

But to reverse the trend in rail passenger service, and to make high-speed ground transportation an effective element in the solution of the transportation crisis requires research and development, and demonstrations to test the feasibility of new equipment.

This was the goal of the Congress when it adopted the High Speed Ground Transportation Act. The reasons for its original enactment argue even more persuasively now for its extension.

I recognize problems have delayed the progress of this program during the first 3 years, but I believe nobody could have done a better

job than its able director, Dr. Robert Nelson, whose work I believe should be much commended.

There have been disappointments, specifically in the nature of delays in the planned high-speed rail passenger demonstrations between Washington, New York, and Boston. These delays have been as frustrating, I know, to the Office of High Speed Ground Transportation as they have been to me personally.

I would hope that the current technical difficulties that are causing these delays in the demonstration projects will be solved as rapidly as possible.

All of us, I know, would like to see these new demonstration trains in actual revenue service at the earliest possible moment. But we must realize that the goal of the program is a radical advance in design and engineering, and in such radical advances there are bound to be unforeseen technical problems.

Even with the technical difficulties, I am proud to say there have been encouraging developments. I have had the satisfaction of riding the United Aircraft turbotrains designed and built for service in New England at a record speed of more than 170 miles per hour. And I must report to my colleagues that even with my poor eyesight, riding at that speed I was able to read the fine print in the Congressional Record. I tried it as an experiment, and one could actually read it without the train shaking your hands. You could not do this in the regular Pennsylvania or New Haven train at its normal 50 miles an hour.

One of the greatest accomplishments of the program has been in enlisting the participation and support of private enterprise. In this regard, the demonstration program of the Office of High Speed Ground Transportation must rank among the most successful programs the Federal Government has ever undertaken in stimulating private industry investment.

At last report, the total private investment in the northeast corridor demonstration projects stood at about \$81 million, while the total Federal Government expenditures were only slightly more than \$3 million. I can think of no other program in which seed money from the Federal Government has brought forth matching funds from the private sector on a ratio of more than 25 to 1. It is a most convincing demonstration that the private sector has confidence in the future of high-speed transportation.

At least I trust and hope they do.

While these demonstration projects have caught the public's imagination and attention because of their glamour and immediacy, I think it is well to remember that research being conducted on other modes of high-speed ground transportation may well prove more significant in the long term.

The research phase of the high-speed ground transportation program is a vital one. It is in this phase that the feasibility of more advanced systems of propulsion, guidance, suspension, and tunneling are explored. It is this phase of the program that can produce the blueprints for the high-speed ground transportation of the coming decades.

Parenthetically, in this connection, I was in France a week or so ago and talked to the people in charge of the high-speed ground trans-

portation program in that country and they are actually going ahead and building a train that will reach Orleans—which is a city some 80 miles away from Paris—within 20 minutes commutation distance from Paris. These will be the so-called air cushion trains on a guided runway with either a jet or linear induction engine which will by 1973 be bringing people 80 miles in 20 minutes at an average speed of 240 miles an hour.

And this project is actually going ahead. This is the kind of thinking, and informed thinking, that I think we should have the courage to face up to ourselves in this program.

Dr. Nelson has that courage. The people in his office have that courage. Secretary Boyd has that courage. But they do need a little seed money and a little help, and a little encouragement to move ahead.

In the gloom of the current state of rail passenger service, it may be difficult to envision advanced high-speed ground systems carrying passengers speedily, conveniently, and safely between the core cities of our megalopolitan areas. To my mind, this is not a fanciful dream, but a necessity of the future.

My own concept is that in the whole of megalopolis, trains eventually will be running back and forth unscheduled at 10-minute intervals and on very much the same principle that you have mass transit within a city. I like to think of megalopolis, the area between Boston and Washington, as one big congested city at the moment, and it needs subway service between the individual component parts, just as in a major city today you have subways running between various stops within it. This is the dream and the vision that I would like to see carried through by this committee.

The legislation before this committee would authorize a modest Federal Government investment to meet a critical problem. I respectfully urge the committee to recommend approval of the bill.

Senator CANNON. Thank you, Senator Pell, for your very fine statement. You certainly have been the leader in the field for this mass transportation, rapid transportation problem over the years.

I think you also have given the future an advertising slogan here this morning if you permitted them to advertise now, "Ride the high-speed trains and read the Congressional Record." So that is something that may be an added inducement to some.

Senator PELL. It may increase the circulation.

Senator CANNON. It may at that.

(Discussion off the record.)

Senator PELL. There is one further thought. I would like to compliment Mr. Stuart T. Saunders of the Penn-Central because of all the railroading executives I know, he is the only one I have seen who has given encouragement to this idea of speeding up passenger transportation. Most of the other railroad executives really, I think, wish I would drop dead and this idea would drop dead and they could get out of passenger transportation.

I think if this committee and the Congress can show them that they can make money and haul passengers productively, they will change their mind and follow the lead of Mr. Saunders.

Senator CANNON. I recall discussing with the witness several years ago the fact that I rode some of the high-speed trains in Japan long before World War II and their speeds and their efficient transportation

were much higher at that time than ours are today, our intercity transportation.

Senator LAUSCHE. Senator Moss?

Senator MOSS. I congratulate the Senator for his continuing efforts in this field. I am sure that it takes quite a push from you and others in the Government who are interested in this, because it does seem to me that the trend in railroading now is to drop those passenger trains and get out of the passenger business and run railroads for freight only. This is sort of swimming against the tide, to be experimenting in trying to build more efficient passenger transportation.

Is it your opinion that research, if we get the breakthrough on the research, that there will then come about a resurgence of passenger service on trains not only in megalopolis but elsewhere in the country?

Senator PELL. I think there are two stages—first, the steel wheels on the steel rails, where the Japanese and Europeans are well ahead of us. This is a stage in which we should at least achieve parity with them particularly in megalopolis and the urban area.

Then in the next stage are the new systems of the future, whether they are tunnels or guided air troughs or aerotrains, or be they what they may. These systems could bring towns and cities, within a distance of 300 or 400 miles within reasonable traveling time of each other.

Personally, I think the 2,000-mile or even the 1,000-mile, intercity passenger service is probably not for ground transportation. I think air probably has the edge at that distance. But for shorter distances than that, I think that these new systems in the future could meet the needs.

Senator MOSS. Do you think that they could be made competitive in time with air because of the difficulties of takeoff and landing of airplanes?

Senator PELL. Right. For instance, I cited the example of traveling from Orleans to Paris at 240 miles an hour. Going a little bit further, traveling between cities 400 miles apart, at the same rate of speed would take about an hour and a half. Taking the same trip by airplane, by the time you got out to the airport, got into the plane, took off and landed, it would probably be an hour and a half, no matter how supersonic the airplane was that you took. I think with distances much over that you will find that these fast airplanes would have the advantage. But within this limit, I think fast trains would.

There is another thought here too. What the Japanese have done is to use their high-speed trains to haul express freight at night. At night these same fast trains, or the tracks, the engine and the equipment are used to haul express freight.

Senator MOSS. Thank you.

Thank you, Mr. Chairman.

Senator LAUSCHE. Anything further?

Senator CANNON. No.

Senator LAUSCHE. Thanks very much, Senator Pell.

Senator PELL. Thank you so much for your kindness in letting me come on at this point.

Senator LAUSCHE. Now, Mr. Reistrup, will you again take the stand?

Mr. REISTRUP. I will continue where I was.

There is not sufficient time to gather information and get meaningful results before the expiration of existing legislation, which would be in June of 1969. Hopefully, however, the demonstrations will be in operation soon and the operational results would begin to become available for evaluation. It would be wasteful of the effort, time, and money spent so far if this project were not followed through with a thorough analysis of these demonstrations, while they are in operation.

The research and development funding under the high-speed ground transportation legislation has been cut back and, therefore, has not been emphasized to the extent contemplated under the original legislation. Extension of the project, if funded as set forth, would allow for catching up on the research and development, which is really the most significant part of the entire high-speed ground transportation project.

Although originally contemplated, the project was to consist of demonstrations within the Northeast Corridor, it was recognized that such demonstrations would have application elsewhere in the country. Unless the legislation is extended as set forth in the bill which I have mentioned, there will be no possibility for extending the demonstrations or even passing on the information gained to other parts of the country.

It is my understanding that you have been fully apprised of the technical difficulties with the demonstrations both between Washington and New York, and between New York and Boston, which have delayed the actual operation of new railroad equipment between those points. We, on Illinois Central, had similar setbacks when installing on our commuter operation what was then the first fully operational automatic revenue collection system (ARCS).

The booklet attached entitled "Private Breakthrough for a Public Cause," details rather candidly the history of the ARCS system, with its setbacks and pitfalls, as well as its accomplishments. In early 1967 the system was functioning so badly, with thousands of ticket failures each day, that the Illinois Central was at a point of making a decision on whether to rip out the entire installation.

At the 11th hour, a new read-write mechanism was developed by the manufacturer, solving the ticket rejection problem, and the automatic revenue collection system has now been extended to practically the entire 49 stations of the commuter operation and is doing a superior job. We have had days with as few as three ticket failures out of 100,000, which is much lower than might be expected.

Senator LAUSCHE. What do you define a ticket failure to be?

Mr. REISTRUP. A ticket failure would be—Mr. Chairman, this ticket is a piece of computer tape, actually, that is inserted into an automatic gate. And the ticket failure would be a rejection of this ticket by the gate for any reason—damage by the passenger, not magnetized properly, et cetera.

Senator LAUSCHE. So that finally you reach the stage of efficiency where you had three ticket failures out of 100,000 operations.

Mr. REISTRUP. That is the low so far. The normal is about 30 a day.

Senator LAUSCHE. All right. Proceed.

Mr. REISTRUP. My point is that there is a parallel here between the high-speed ground railroad demonstration and the ARCS pioneering. As a private enterprise, it would probably have been easier for us to reach a decision to rip out the equipment and write it off as a failure,

but we stuck with the project and really gained because of our fortitude. It is my sincere recommendation that similarly the time for the high-speed ground tests be extended so that the demonstrations can be carried out as planned.

With the accelerating disappearance of long-distance intercity passenger trains in this country, there may be a tendency on the part of some interested parties to involve the high-speed ground transportation legislation with the passenger train issue. I emphatically urge that the Congress not be so tempted and rather continue the development of high-speed ground transportation systems on its present legislative base. The question of whether or not to provide passenger train service to some particular town in one of our States, has not any relationship to the high-speed demonstration. To attempt to weave such an issue into the high-speed project would only result in dilution of effort and, in my opinion, absolutely nothing would be accomplished from what otherwise appears to be a rather promising project.

Our committee has given some consideration to the recently implemented transfer of the Urban Transportation Administration from the Department of Housing and Urban Development to the Department of Transportation. We felt that some of the research that was being carried out in the urban transportation areas, particularly having to do with access to airports, might also be applicable in the intercity ground transportation arena and vice versa.

I suggest that no definite steps be taken at this time to merge the research and development efforts in the two areas of urban transportation and high-speed ground transportation.

Senator LAUSCHE. Just one moment.

What does the bill provide as it is now before us? Are the operations of the Urban Mass Transportation Agency being transferred to the Department of Transportation?

Mr. REISTRUP. No, sir; that transfer has already taken place, on July 1. Urban Transportation is now under the Department of Transportation.

Senator LAUSCHE. Is there anything in the bill before us that you feel should be eliminated with respect to the operations of the Department of Housing and Urban Development?

Mr. REISTRUP. No. As it is written, we support the legislation; yes, sir.

Senator LAUSCHE. All right. Go ahead.

Mr. REISTRUP. There should first be an assimilation of the Urban Transportation Administration into its new Department. Administratively, coordination has been effected and will continue with both of these administrations now being in one department. At the end of the recommended extension of the high-speed ground transportation legislation, the two important areas of urban transportation and intercity ground transportation can perhaps then be folded together, based on the working knowledge that will be gained.

Finally, I wish to comment on the decision which will be facing Congress on this legislation. If the high-speed ground transportation legislation is not extended, the Congress would in effect be prejudging the merits of this type of transportation, without giving it the benefit of a full investigation through the demonstration program which, considering all factors, has been proceeding quite well. It is easy to set

target dates that are too ambitious and perhaps prove to be a little unrealistic. This is a trait common to development of new systems which frequently turn out to be more complicated technologically than considered at the outset.

I have every confidence that the technical difficulties will be overcome as a result of the demonstration trains, and that the operation of these trains in public service will tell us whether improved rail passenger systems can play a significant future role in the intermediate distance travel market and heavily populated sectors of the country.

In conclusion, I urge that the legislation be extended.

Senator LAUSCHE. Thanks very much.

Senator Cannon?

Senator CANNON. I have no questions, Mr. Chairman. I have been reading the enclosure along with this. It is quite an interesting experiment. I have never seen it in operation, but is this turning out financially to be an acceptable program?

Mr. REISTRUP. Yes; it is, Senator Cannon. The return is not really what we had originally expected, but it is operating satisfactorily and it is a good investment.

There were labor savings involved which enabled us to hold the commuter fare structure down. Our fares are the only ones in the Chicago area that have not been raised in the last 5 or 6 years.

Senator CANNON. Does a person buy a ticket that is used once only and it is deposited in the gate? Or is it simply inserted and used again for a period of time?

Mr. REISTRUP. If it is a one-ride ticket, after the first ride the gate keeps it. If it is a round trip, he can use it one more time. We go as high as a 50-ride monthly ticket, and each time it is used the gate erases one ride magnetically.

Senator CANNON. I see. And can the user buy that through a vending machine?

Mr. REISTRUP. Not at the present time, but it is contemplated.

Senator LAUSCHE. Senator Moss?

Senator MOSS. I take it that the plea of Mr. Johnson is that his present program be extended, because he feels that it hasn't yet achieved its goal but it is on its way; is that right?

Mr. REISTRUP. That is correct.

Senator MOSS. And you think that with additional time and additional funds it will ultimately be able to find the answer on this high-speed turbine transportation?

Mr. REISTRUP. Yes. Mr. Johnson feels this way and I concur also.

Senator MOSS. Thank you.

Senator LAUSCHE. I observed from your statement that your service is electrified and extends some 29 miles south of Chicago, two 4-mile branch lines, handling approximately 78,000 riders per day?

Mr. REISTRUP. Yes, sir.

Senator LAUSCHE. You also have intercity service for passengers extending from Chicago to New Orleans and through Birmingham to Florida in conjunction with two other carriers. You handled some 3,600,000 intercity passengers in 1967?

Mr. REISTRUP. Yes, sir.

Senator LAUSCHE. What proportion of your income is derived from freight and what proportion from passenger service?

Mr. REISTRUP. The total passenger related services—this would be the commuter, the passenger revenue, what mail is left on passenger trains, what express is left on passenger trains, dining services—is just about 10 percent of the gross of Illinois Central.

Senator LAUSCHE. Ten percent from passenger and 90 percent from freight?

Mr. REISTRUP. Yes, sir.

Senator LAUSCHE. Do you know how that compares with the New Haven?

Mr. REISTRUP. There would really be no comparison. As I recall, the New Haven is 50 percent or more, or thereabouts, passenger. But our railroad is relatively high.

Senator LAUSCHE. I see.

Mr. REISTRUP. I would say the normal now is about 3½ or 4 percent. The 10 percent is high.

Senator LAUSCHE. You think the New Haven is about 50 percent from passenger and 50 percent from freight?

Mr. REISTRUP. Yes, sir.

Senator LAUSCHE. What about the Long Island?

Mr. REISTRUP. That is more than 90-percent passenger; I believe about 95 percent or something like that.

Senator LAUSCHE. Did you induce any innovations other than mechanical receipt of the ticket?

Mr. REISTRUP. In the commuter service; no. This is the only recent innovation. Of course, 42 years ago when the system was electrified, it really was done so in an ultimate manner. It was done very well. We are in the process now of trying to reequip that commuter operation.

In the intercity service, the significant innovation is the type of pattern service between Chicago and Carbondale, Ill., 306 miles to the south, which we feel might—well, we call it Mini Corridor; but there is no comparison there with the populations that you have in the East. We have several universities along the line with very heavy passenger usage of the operation, and we have tried to improve it, speed the trains up. But it is not really a significant change just a rescheduling here.

Senator LAUSCHE. Is Mr. Johnson of the opinion that through this experiment or research work other devices may be discovered which will improve the fiscal position of the railroads and their ability to render passenger service?

Mr. REISTRUP. Yes; depending, of course, on the markets for this service. Our feeling is that these efforts should be directed in the megalopolis sections of our country where there is a real market. You have to have enough population to support a multiple train schedule over intermediate distances.

Senator LAUSCHE. Are you familiar with the situation at the Chicago & Northwestern?

Mr. REISTRUP. Yes; I am, sir.

Senator LAUSCHE. It is continuing its passenger service, is it?

Mr. REISTRUP. It is continuing its commuter passenger service, sir. There is not much of the intercity service remaining on Chicago and Northwestern.

Senator LAUSCHE. Yes. Has its results, from the standpoint of revenues and of expenses, improved in the last 10 years?

Mr. REISTRUP. It has, overall, yes, sir; basically because of the improvement in the commuter operation and elimination of each of the intercity services.

Senator LAUSCHE. It has, I think, had pretty outstanding success in improving its service and improving its fiscal position.

Mr. REISTRUP. Yes, sir, I believe the profit is over \$2 million a year now on the commuter operation.

Senator LAUSCHE. They are having a profit?

Mr. REISTRUP. In commuter, yes.

Senator LAUSCHE. With the proper distribution of operating expense?

Mr. REISTRUP. I am not an accountant.

Senator LAUSCHE. Well, all right. I think that is all. Thanks very much.

Mr. REISTRUP. Thank you.

#### STATEMENT OF WILLIAM B. JOHNSON

My name is William B. Johnson and I am president of the Illinois Central Railroad Company. My office is at 135 East Eleventh Place, Chicago, Illinois. The Illinois Central Railroad has one of the larger commuter operations in this country, and operates several intermediate and long-distance intercity passenger trains including the Panama Limited-Magnolia Star, the City of New Orleans, and the City of Miami.

I am a member of the High Speed Ground Transportation Advisory Committee whose Chairman is Professor Raymond R. Tucker of St. Louis, Missouri. Other members include Mr. Robert M. Jenney, President, Jenney Manufacturing Company; Mr. Donald W. Douglas, Jr., President, Douglas Aircraft Company, Inc.; Mr. George E. Leighty, Chairman, Railway Labor Executives Association; Mr. Charles A. Webb, President, National Association of Motor Bus Operators; and Mr. Milton A. Gilbert, Chairman of the Board, Gilbert Systems, Inc. In addition to functioning as required by Executive Order, the Committee has carried on correspondence and participated in field trips.

The principal demonstrations, on the Penn Central between Washington and New York, and on the New Haven between New York and Boston, have not progressed as anticipated because of various technical difficulties. As a result there is not sufficient time to gather information and get meaningful results before the expiration of existing legislation, which would be in June of 1969. Hopefully, however, the demonstrations will be in operation soon and the operational results would begin to become available for evaluation. It would be wasteful of the effort, time and money spent so far if this project were not followed through with a thorough analysis of these demonstrations, while they are in operation.

The research and development funding under the High Speed Ground Transportation Legislation has been cut back and, therefore, has not been emphasized to the extent contemplated under the original legislation. Extension of the project, if funded as set forth, would allow for catching up on the research and development, which is really the most significant part of the entire High Speed Ground Transportation project.

Although originally contemplated, the project was to consist of demonstrations within the Northeast Corridor, it was recognized that such demonstrations would have application elsewhere in the country. Unless the legislation is extended as set forth in the bill which I have mentioned, there will be no possibility for extending the demonstrations or even passing on the information gained to other parts of the country.

It is my understanding that you have been fully apprised of the technical difficulties with the demonstrations both between Washington and New York, and between New York and Boston, which have delayed the actual operation of new railroad equipment between those points. We, on Illinois Central, had similar setbacks when installing on our commuter operation what was then the first fully operational automatic revenue collection system (ARCS).

The booklet attached entitled "Private Breakthrough for a Public Cause" details rather candidly the history of the ARCS system, with its setbacks and pitfalls, as well as its accomplishments. In early 1967 the system was functioning

so badly, with thousands of ticket failures each day, that the Illinois Central was at a point of making a decision on whether to rip out the entire installation.

At the eleventh hour, a new read-write mechanism was developed by the manufacturer, solving the ticket rejection problem, and the automatic revenue collection system has now been extended to practically the entire 49 stations of the commuter operation and is doing a superior job. We have had days with as few as three ticket failures out of 100,000, which is much lower than might be expected.

My point is that there is a parallel here between the High Speed Ground railroad demonstrations and the ARCS pioneering. As a private enterprise, it would probably have been easier for us to reach a decision to rip out the equipment and write it off as a failure, but we stuck with the project and really gained because of our fortitude. It is my sincere recommendation that similarly the time for the High Speed Ground tests be extended so that the demonstrations can be carried out as planned.

With the accelerating disappearance of long-distance intercity passenger trains in this country, there may be a tendency on the part of some interested parties to involve the High Speed Ground Transportation Legislation with the passenger train issue. I emphatically urge that the Congress not be so tempted and rather continue the development of high speed ground transportation systems on its present legislative base. The question of whether or not to provide passenger train service to some particular town in one of our States, has not any relationship to the High Speed Demonstration. To attempt to weave such an issue into the High Speed Project would only result in dilution of effort and, in my opinion, absolutely nothing would be accomplished from what otherwise appears to be a rather promising project.

Our Committee has given some consideration to the recently implemented transfer of Urban Transportation Administration from the Department of Housing and Urban Development to the Department of Transportation. We felt that some of the research that was being carried out in the urban transportation areas, particularly having to do with access to airports, might also be applicable in the intercity ground transportation arena and vice versa. I suggest that no definite steps be taken at this time to merge the research and development efforts in the two areas of Urban Transportation and High Speed Ground Transportation. There should first be an assimilation of the Urban Transportation Administration in its new department. Administratively, coordination has been effected and will continue with both of these administrations now being in one department. At the end of the recommended extension of the High Speed Ground Transportation Legislation, the two important areas of urban transportation and intercity ground transportation can perhaps then be folded together based on the working knowledge that will be gained.

Finally, I wish to comment on the decision which will be facing Congress on this legislation. If the High Speed Ground Transportation Legislation is not extended, the Congress would in effect be pre-judging the merits of this type of transportation, without giving it the benefit of a full investigation through the demonstration program which, considering all factors, has been proceeding quite well. It is easy to set target dates that are too ambitious and perhaps prove to be a little unrealistic. This is a trait common to development of new systems which frequently turn out to be more complicated technologically than considered at the outset. I have every confidence that the technical difficulties will be overcome as a result of the demonstration trains, and that the operation of these trains in public service will tell us whether improved rail passenger systems can play a significant future role in the intermediate distance travel market and heavily populated sectors of the country.

In conclusion, I urge that the legislation be extended.

Senator LAUSCHE. Mr. David Early, Washington coordinator, State of Florida Development Commission. Mr. Early, if you will proceed.

**STATEMENT OF DAVID EARLY, WASHINGTON COORDINATOR,  
STATE OF FLORIDA DEVELOPMENT COMMISSION**

Mr. EARLY. Thank you, Mr. Chairman, members of the subcommittee. My name is David Early, Washington liaison officer of the State of Florida.

I am the manager of the Florida Development Commission staff in Washington. I report directly to the Florida Development Commission and Governor Kirk, as well as to the department heads and cabinet officials in the State itself.

Today I am representing both the Governor and our new Department of Transportation. It's a privilege to appear before your committee so we in Florida could express our views on the transportation crisis affecting our State.

We have carefully reviewed the statements of the Department of Transportation, Office of High Speed Transportation, dated May 28, 1968. We feel, if anything, they have made a conservative case for the necessity of increased appropriations for the immediate future.

In the case of Florida, we face unique pressures which highlight, we feel, in turn the Nation's problems.

Mr. Chairman, I am sure you and your committee are well aware of the tremendous growth in Florida during 17 years. The Bureau of Census reports that for 1950 to 1960, Florida's growth rate was 78.7 percent, whereas the U.S. growth was 18.5 percent.

Thus, our population grew four times as fast as the national average. In the period of 1960 to 1967, our growth rate was 21 percent, whereas the national resident population was 10 percent.

Thus, Florida is now the 8th largest State in the Nation with a permanent population. We have now over 6 million people residing permanently in Florida.

During the season—

Senator LAUSCHE. How many?

Mr. EARLY. Over 6 million, sir.

Senator LAUSCHE. The population of Florida is 6 million now?

Mr. EARLY. Yes, permanent residents. That is as of last year. It is probably closer to six and a half now.

During the season, we have a unique problem because of a tremendous influx of tourists and tourism. So, during a 4-month period, we experience a terrific pressure on our entire transportation system, with over double our normal population.

It is noted on page 3 of the Department of Transportation Office of High Speed Ground Transportation report, May 28, "intercity travel will gain more than double over the next 20 years, and air travel will increase more rapidly still." I might add here that, based on an estimated 500 million travelers nationally per year circulating in the United States, our tourism figures alone show that we have over two and a half times as many people circulating in our State as that of the national average.

Geographically, as you gentlemen know, Florida is some 450 miles long and, up to the present, the most frequently visited portion is the southeast gold coast, which takes us some 300 to 350 miles south of Jacksonville, our most northern major city.

To further point out our transportation crisis, we are experiencing an almost unbelievable boom in central Florida. The commuting between Orlando and Cape Kennedy presents us in the State with a crisis that we are trying to alleviate with our own resources immediately.

In addition to the world's largest tourist attraction, in the form of Disney World on 43,000 acres, being completed at an estimated

cost in somewhere of the neighborhood of \$500 million by 1971, this is expected to completely change our travel pattern within Florida.

Disney World alone is expected to attract in the neighborhood of 25 million visitors a year.

Scheduled for completion in 1971 is the International Trade and Cultural Center, popularly known as Interama, located on Biscayne Bay, Miami.

Research studies show that between 15 and 30 million visitors a year are expected at this permanent exhibit.

The recent cuts in the Interstate Highway System, postponing its eventual completion to about 1975, also points out the necessity for our dependence upon other than pure highway transportation.

You might say, Mr. Chairman, we have a continuous rush hour during the 4 months of the winter season in Florida. This, of course, is alleviating and creating other problems. We are experiencing a great pressure for increasing highway safety programs as the population is being forced more and more onto the crowded highways in Florida.

On May 1, 1968, Governor Kirk advised Secretary Boyd that Florida would welcome projects in advanced transportation techniques. To this end we are actively soliciting location of the first high-speed ground transportation testing center in Homestead, Fla. As of last week, we advised the Department of Transportation that not only do we desire to place the 170-mile-an-hour high-speed train in operation in Florida, but we will, as a State, actively back private enterprise, building immediately, the first railroad train to carry automobiles.

Senator LAUSCHE. Just a minute. Proceed.

Mr. EARLY. Yes, sir. In connection with the automobile train-carrying project, we have contacted State officials of Illinois and hope to interest them in a similar venture between Chicago and Florida.

We are using private funds, Mr. Chairman, to build a major new airport west of Miami to accommodate the new Boeing 747 air bus and the supersonic transport.

To further point out our awareness and concern with the transportation crisis, which parallels our population explosion, we have recently created a department of transportation within the State. The creation of this department and the State funding of it followed the first Governors' conference on transportation which took place May 21, 1968, at Winter Park.

At the conference the Governor proposed as one of his five points the creation by the State legislature next year of an environmental transportation laboratory. The Governor said, and I quote:

The Environmental Transportation Laboratory would be highly advanced and sophisticated systems center for research and development work on our present and future transportation needs.

The ETL will concern itself with compiling, through the use of computers and other techniques, the data projections in all aspects of transportation.

Governor Kirk went on to say:

The ETL will provide us with data about our regional transportation needs, specifically to the tristate area of Florida, Alabama, and Georgia.

I would interject here that we feel that transportation is now definitely a regional matter, and I am sure your committee has recognized this.

The legislation does not note the problems in the northeast corridor. This ETL would make available projections on a potential, and assumed to be, 700 million in Latin America which are going to also require increased transportation techniques.

Mr. Chairman, I would like to conclude by pointing out that we in Florida feel that the Federal effort is most vital, that the funding which is needed is indeed modest on a national scale, yet it is vital for what assistance can be given to our efforts in our State.

I would also point out that we are not facing the problem with complacency in seeking Federal moneys to assure our State's well-being. We urge, therefore, that significant work done by the Office of High-Speed Ground Transportation be recognized and tangibly further encouraged by your subcommittee in their report.

Senator LAUSCHE. Thanks very much for your testimony.

Mr. EARLY. Thank you, Mr. Chairman.

Senator LAUSCHE. The next witness is Robert W. Minor, senior vice president, Penn Central Railroad.

Mr. Minor, your paper will be fully transcribed into the record, and I would suggest that you just present extemporaneously the highlights of what you feel are the merits or demerits of the bill before us.

**STATEMENT OF ROBERT W. MINOR, SENIOR VICE PRESIDENT,  
PENN CENTRAL RAILROAD**

Mr. MINOR. Very well, Mr. Chairman.

I am glad to have the opportunity to appear in support of the 2-year extension of the High-Speed Ground Transportation Act. We believe at Penn Central there is a significant market in the medium-range passenger haul for high-speed transportation. We believe that the air and highway congestion has reached the point where, as someone put it, the cloverleaf is becoming our national flower.

We think we have just about reached the end of the line as far as airport congestion is concerned. We think that the time to move is now, and we think that this act provides a vehicle whereby the Government and private enterprise, working in partnership, can develop a viable program which will demonstrate, beyond any reasonable doubt, that there is a substantial market for the short- to medium-range intercity move by rail.

My statement details, which I shall not do, the efforts that Penn Central has made. I would simply state that we have already spent almost \$32 million of our own money in this program. We anticipate spending something like \$17 million more. We are disappointed that the program has been met with certain frustrating delays. We are ready to run the cars as soon as the cars are delivered to us. We have upgraded our catenary system. We have upgraded our roadbeds. We have constructed new high-level platforms at the various stations, and we are ready to go.

We are not dismayed, however, by the delays which have been occasioned in the delivery of the cars.

I would point out to the subcommittee reference has been made to the Japanese trains, that the new cars which will be delivered, what we call the metroliners, by the Budd Co., are by far the most sophisticated passenger equipment in the world. The Japanese line doesn't begin to compare.

On page 4 of my statement, I have certain statistics which I would like to read, Mr. Chairman.

The metroliners will have an accelerating rate of 1 mile an hour per second from 0 to 100 miles per hour compared with 0.68 mile per hour per second for the Japanese trains. Motors produce a maximum of 2,560 horsepower per car versus 1,120 per car on the Japanese line.

The Japanese built an entirely new railroad, Mr. Chairman, which meant that they could eliminate all grade crossings and minimize any curves. We are putting equipment on existing rights-of-way with its present defects. By that I am talking about curvatures, grade crossings, and that sort of thing. Consequently, it was necessary for us, in specifying this equipment, to obtain the maximum rate of acceleration and deceleration in order to maintain the high-speed schedules.

We have an extremely complicated control system. We have three independent sets of brakes. We have a new type hook coupler that is unknown, that no other passenger railroad in this country has. There are 102 electricity circuits which are automatically made through this coupler.

But, as I said earlier, we are not dismayed because of this high degree of sophistication with the delays we have encountered. After all, the Japanese took 5 years to build their first car, and then experimented with it for 2 years before they went into revenue service. We expect to beat that by several years.

In urging the Congress and this subcommittee to favorably consider the legislation now before you, I must point out to you that our motives are not altruistic. We have \$32 million invested in this program already, and we are anxious to get the cars and revenue service so we can begin seeing some return on that investment.

Again, we appreciate the opportunity to appear here today, and we urge your favorable consideration of S. 3237.

Thank you, sir.

Senator LAUSCHE. You state you have spent \$32 million already?

Mr. MINOR. Yes, sir.

Senator LAUSCHE. When did your initial expenditures begin?

Mr. MINOR. I believe in 1965.

Senator LAUSCHE. At the time the program was adopted and the work started?

Mr. MINOR. As soon as we entered in the agreement with the Department of Transportation, yes, sir. We began upgrading our roadbed and improving our catenary system.

Senator LAUSCHE. Are you familiar with what the fiscal situation is in this Japanese high-speed railroad?

Mr. MINOR. No, sir. I do not know.

Senator LAUSCHE. You can't tell whether it is operating on a self-sustaining basis there?

Mr. MINOR. The reports from Japan are that it is. There are some who doubt it. You see, the Japanese have an entirely different situation than the American railroads.

When Senator Pell was talking about using the high-speed tracks and equipment at night for the movement of freight, the Japanese have a very minimal movement of freight by rail compared to the American railroads—the reason being that their major cities are reached by water. All of them are reached by water, and movement of

heavy bulk commodities takes place by both. So they don't need the railroad freight systems that we have in this country and that we, of course, need. Consequently, they can devote more of their efforts toward passenger service.

Further, the distances in Japan are not so great as to provide a clearly defined advantage for the airplane over the rail haul. While motor cars are becoming more frequent, roadbeds, I understand, are not adequate for high-speed motor services between major cities.

Senator LAUSCHE. I rode that train in Japan, I think in 1964, and it was a highly pleasing ride. At that time they were not operating on a self-sustaining basis, but they hoped that they would be. Your understanding now is that the income is adequate to bear the expenses?

Mr. MINOR. Those are reports I have seen put out by JNR, Japanese National Railroads.

Senator LAUSCHE. Thanks very much. Is there anything further?

Mr. MINOR. No, sir. I understand the statement will be printed in its entirety?

Senator LAUSCHE. Yes, sir. Thanks very much.

(The statement follows:)

STATEMENT OF MR. ROBERT W. MINOR, SENIOR VICE PRESIDENT, PENN CENTRAL

Mr. Chairman and members of the subcommittee, I am pleased to have this opportunity to affirm Penn Central's support for a two-year extension of the High Speed Ground Transportation Act.

We at Penn Central are optimistic over the prospects for success of this marketing demonstration. The so-called "Northeast Corridor" between Washington and Boston—with its burgeoning population, high concentration of industry and ever-increasing urbanization—offers a timely and promising opportunity to test the market demand for modern, high speed rail passenger service.

We are convinced that high speed rail transportation offers the best solution to the transportation problems in our multiplying urban corridors. It is clearly the most economic means of moving large numbers of people through crowded metropolitan areas.

The unacceptable alternative is a steady worsening in the ability of our highways and airways to handle peak loads. The resulting congestion threatens health and safety and represents a growing economic loss in wasted man hours. We cannot continue to strangle our cities and stifle our economy for want of solutions that are obtainable today through technological innovation, creative marketing and ambitious promotion.

The time to unplug our arteries of commerce is now—before the spiraling rise in intercity passenger traffic overwhelms us. The High Speed Ground Transportation Act is the vehicle by which we may determine the sure course to our objective—the maintenance of the high degree of personal mobility that is essential to a dynamic society.

Under the leadership of Transportation Secretary Alan S. Boyd, Federal Railroad Administrator A. Sheffer Lang, and Dr. Robert A. Nelson, Director of the Office of High Speed Ground Transportation, we have made significant progress in developing the potential for high speed rail passenger service in the Northeast Corridor.

Penn Central's participation in the development of high speed passenger service between Washington and New York has been right on schedule. We have dedicated our best efforts, assigned top engineers and technicians and have spent substantial amounts of money to help assure the success of this program.

Once the decision was made to participate in this program with the Department of Transportation and various railway suppliers, Penn Central embarked on an extensive 2-year program to upgrade its roadway and related facilities between New York and Washington.

The track upgrading program alone included the following requirements:

New welded rail.....	298 miles.
Rail surface grinding.....	302 miles.
Track raising and tie renewals.....	352 miles.
Ties renewed.....	338,000.
Switch timbers installed.....	160,000 lineal feet.
Joint welding and reformed splices.....	67 miles.

In addition, we constructed new high-level train platforms at Wilmington, Baltimore and Washington. We completely rebuilt Penn Central station in New York and extensively modernized Union Station in Washington. Other improvements included upgrading our electrical system, installing the most modern signaling devices and replacing the standard-weight overhead power wire with heavy-weight wire.

By October 1967 all necessary plant improvements were completed and Penn Central was ready for operation of Metroliner service.

We have already spent \$31,740,000 of our own funds on plant improvement to prepare for high-speed service. We have an additional \$17 million scheduled for investment in the project. The Penn Central roadbed between New York and Washington now is the finest in the Nation.

In addition we are investing approximately a million dollars in a training program for some 2,600 employees in all categories of service. This is in cooperation with the Departments of Labor and Health, Education, and Welfare which are supplying an additional half-million dollars to assist in the training of employees for the Metroliner service.

We are experimenting now with a new dining service on our regular trains in which parlor car passengers are served meals in their seats. This "airline style" food service will be a feature of the Metroliner service and has been extremely well received by our customers.

The new Metroliner cars will be the finest passenger cars in the world for this type of service. We are employing the best of the tried and proven components combined with the latest developments in all fields of technology.

The performance characteristics of the new Metroliners far exceed those of the cars on Japan's new Tokaido line, the world's only true high speed service in daily operation. The Metroliners have an accelerating rate of 1.0 miles per hour per second from 0 to 100 miles per hour compared with 0.68 miles per hour per second for the Japanese trains. Motors produced a maximum of 2,560 horsepower per car versus only 1,120 per car on the Tokaido line.

The Japanese trains have reached 159 miles per hour in testing, but in production operate at speeds up to 130 miles per hour. Our specifications call for a maximum speed of 160 miles per hour with a six-car train, and we have already exceeded that figure and reached a speed of 164 miles per hour with two cars.

Because of our high strength and higher performance requirements and our different electrical supply system, the Metroliners are somewhat heavier than the Tokaido cars. To complement such safety features as the strongest car body, sturdy cast steel trucks, the largest passenger car axles, and the absence of any flammable fuels aboard the train, we have also insisted upon a superior braking system. In fact, there are three braking systems: dynamic (electric braking), electro-pneumatic and pneumatic. We specified these systems, not only to make these high speed cars safe, but to provide the high rate of deceleration essential to our reliably meeting the proposed operating schedule.

Another development is the new hook-type coupler, designed especially for this service. It represents a complete departure from anything ever before used in long-distance intercity railroad operations. We were able to specify such a coupler because the equipment is not being interchanged with other railroads. The new design gives us a strong, tight, self-locking coupling between cars. Instantaneously, it makes or breaks the mechanical, electrical and pneumatic connections. There are 102 contacts in the couplers which provide passage for the various electrical circuits between the cars.

One propulsion system employs a silicon controlled rectifier system using thyristors for phase-shift voltage control. This is the first time that such solid state devices have been employed on railway passenger cars in the United States or on any railroad propulsion equipment having such high horsepower.

We have in these cars a high degree of sophistication unmatched anywhere in the world. When the Metroliners are operated as an eight-car train (with a

seating capacity of 472 passengers), they in effect are equivalent to a train of eight locomotives. They will contain more than 70 miles of wire and some 25,000 electronic components.

Obviously, we were disappointed when the cars were not ready at the same time our plant improvements were completed. However, many of the individual problems delaying our acceptance of the cars and, ultimately, the demonstration, have already been identified by the various builders and equipment suppliers. Substantial resources have been and are being dedicated to the prompt resolution of the remaining problems—and we are confident they will be overcome soon.

When the Metroliner service is ready to begin, we will employ every practical modern marketing technique to “merchandise” the new concept. The public will be advised, informed and enticed through an extensive multi-media advertising campaign.

Now our motives are not purely altruistic. Penn Central has invested \$32 million in the Metroliner project already. By the time the demonstration begins we will have some \$50 million of our own money at stake. We are confident—and will make every effort to insure—that our investment will produce a reasonable return.

Moreover, in terms of long range public benefit, the return will more than justify the relatively modest federal investment in this program. We strongly urge that the High Speed Ground Transportation Act be extended for an additional two years.

Senator LAUSCHE. Is there any other witness who desires to testify? If not, this meeting will be adjourned until 10 a.m. tomorrow morning.

(Whereupon the meeting was adjourned at 11:15 a.m., to reconvene at 10 a.m., Wednesday, July 17, 1968.)

## EXTENSION OF HIGH-SPEED GROUND TRANSPORTATION ACT

WEDNESDAY, JULY 17, 1968

U.S. SENATE,  
COMMITTEE ON COMMERCE,  
SURFACE TRANSPORTATION SUBCOMMITTEE,  
*Washington, D.C.*

The subcommittee reconvened at 10 a.m., in room 5110, New Senate Office Building, Hon. James B. Pearson presiding.

Present: Senator Pearson.

Senator PEARSON. This is a continued hearing on S. 3237 and H.R. 16024, bills proposed by the Secretary of Transportation to extend for 2 years a program of research and development undertaken in high-speed ground transportation.

Senator Lausche, chairman of this subcommittee, as so often is the case, has dual responsibilities this morning with several committees and in his absence I will chair these hearings today.

First witness is Mr. Anthony Haswell. Is Mr. Haswell here? Would you come up please, sir?

Mr. Haswell, have a seat please, sir. Mr. Haswell is executive director of the National Association of Railroad Passengers with offices in Chicago, Ill., and we are pleased to have you, sir. You have your statement. You proceed as you desire.

### **STATEMENT OF ANTHONY HASWELL, EXECUTIVE DIRECTOR, NATIONAL ASSOCIATION OF RAILROAD PASSENGERS, CHICAGO, ILL.**

Mr. HASWELL. Thank you very much, Senator Pearson. My name is Anthony Haswell. I am executive director of the National Association of Railroad Passengers, with offices at 333 North Michigan Avenue, Chicago, Ill.

I would like to make it clear right off we are strongly in support of these bills and an extension of the program. It goes without saying that our association is in favor of more high-speed train service between our major population centers. We believe that the Northeast Corridor program looking toward that end between Boston, New York, and Washington, is well conceived for that particular area. While we regret that technical difficulties have delayed the commencement of the service, we hope that these problems will not deter the Congress from extending the program. Nevertheless, we have a couple of specific comments and criticisms which we would like to bring to your attention at this time.

The Department of Transportation has repeatedly asserted that the high-speed service, once inaugurated, will provide a "market" test of public acceptance of improved passenger service. As I understand it, this means that unless the public by its patronage contributes sufficient revenues to cover the cost of operation, the Department will conclude that there is no "market" and hence the experiment is a failure.

In our view, this "market" theory is valid only if the product under evaluation—rail service—is being operated at maximum inherent efficiency, and the competitive products—air and highway services—enjoy no special advantages. In our opinion, neither of these conditions will be fulfilled in the Northeast Corridor program.

On the one hand, present railroad labor work rules, which artificially increase operating costs both through excess personnel requirements and through unreasonably short working days, will remain in effect. As a consequence, the railroad will have to charge a higher fare than if it were able to operate at maximum efficiency. On the other hand, air and bus operators will remain the beneficiaries of large amounts of government expenditures for airports, airway control systems, and highways. User charges imposed upon these carriers fall far short of reimbursing the Government for the cost of the facilities it provides. Furthermore, none of these properties are on local tax rolls. Hence the competition can charge a lower fare than if it were obliged to cover the full costs of the service.

In short, "market" appears a very inadequate basis upon which to evaluate a competitive program wherein one of the competitors—here, the railroad—must start at a point well behind the others and in addition carry extra weight on its back.

Senator PEARSON. Let me stop you there. Is it your understanding that the Department of Transportation indicated that market acceptance was going to be the sole measurement as to whether or not this has been a good transportation development?

Mr. HASWELL. I have just been told by Dr. Nelson that the Department does not believe that this will be the sole test. However, the Secretary of Transportation, the Federal Railroad Administration, and particularly, I might say, personnel connected with the Penn Central Railroad, have repeatedly asserted in public statements that this is a test to see whether the public will accept it, whether it will carry its costs, and the statement has been made both by implication and explicitly, that unless, after a period of time, there is sufficient business to make it economically viable or worthwhile, it will be considered a failure.

This is my—I believe this thinking permeates the railroad and certainly is held by some personnel in the Department of Transportation. This is what I'm calling attention to here.

Senator PEARSON. Do you know whether or not they have any time frame in which they are going to run these tests? Acceptance tests?

Mr. HASWELL. I believe I heard a period of 2 years.

Senator PEARSON. You are concerned because of the differences in fare, perhaps, and otherwise, that we aren't going to be able to have that acceptance?

Mr. HASWELL. Yes. I am simply concerned about the test or people arguing that it should be written off as a failure because it was unable

to attract a paying business on what I believe are distorted competitive ground rules that will be in effect, and that when this is evaluated by both the Congress and the Department of Transportation, that these distortions should be kept in mind. That is really what I'm saying.

Senator PEARSON. Very well. Thank you. You go ahead with your statement.

Mr. HASWELL. A principal objective of the Northeast Corridor program is to provide data and experience for use in improving rail service in many other parts of the country. But there are increasing indications that the present program may not be of great value in this respect. In summarizing the recent hearings of the Senate Subcommittee on Transportation Appropriations, Senator Allott commented as follows:

Because of the sophistication of the metroliner equipment, maintenance of the cars, once they are in service, is a matter of great concern to all parties involved. While there appears to be a general awareness of the complexity of the maintenance problem on the part of the railroad, builder and suppliers, there were no hard and fast statements given that adequate maintenance facilities would be ready by the time the cars begin regular service. In the words of Dr. Nelson, "I am not guaranteeing any results, but we are going to make every effort possible."

As I said earlier, I'm not entering any opinion here today on any of the technical problems or difficulties which have beset the metroliner program. All we can say is that they were very unfortunate and we certainly hope that all parties are successful in ironing them out.

The point, however, that I want to make at this point, is that the conclusion seems unavoidable that the maintenance expense of the metroliners, after the bugs are eliminated, once they go into service, will be substantially in excess of conventional equipment. Such sophisticated equipment may well be needed for service at speeds of up to 160 miles an hour. However, it is fairly clear that entirely apart from rolling stock, an important engineering and technological threshold of high-speed rail operations is between 100 and 110 miles an hour. Above this level, grade crossings must be eliminated, track structure elaborately refined, and signaling made increasingly complex. So it seems to us that for many parts of the country, 160-mile-per-hour service would be economically unfeasible and, hence, the metroliner technology would have a rather limited application.

On the other hand, a more modest increase in present speeds using relatively conventional equipment is easily attainable. Trains have been operated in regular service at over 100 miles an hour from time to time on different runs in our country for the last 35 years. Top speeds in this range would permit start-to-stop averages of between 60 and 85 miles an hour, depending upon curves, grades, speed restrictions through towns, et cetera. This would be a big improvement over many present schedules. Our main lines could be upgraded for these speeds at a small fraction of the cost necessary to attain speeds of 150 miles per hour or more, which is what the present DOT program is geared for.

We believe that the utility and marketability of rail passenger service is not necessarily dependent upon a drastic speedup in schedules. Trains have sufficient advantages in various respects over other modes that, were they made to be smooth, clean, comfortable, and dependable, many people will ride them who are not doing so today. The Canadian

National has experienced dramatic results by upgrading conventional passenger train service. Between Montreal and Toronto service was speeded up to 5 hours for the 335-mile run, a start-to-stop average of close to 70 miles per hour. The equipment was refurbished, an electronic reservation system installed, and a hard-hitting marketing and promotional campaign undertaken. Results of this "Rapido" service have been spectacular. The Montreal-Toronto run has been primarily responsible for an increase of 26 percent in passenger revenues, 1967 over 1966, and a 67-percent increase in passenger revenues, 1967 over 1961. So a moderate increase in speed plus good service can attract travelers. However, we must not overlook operating costs.

An important share of present passenger operating cost is accounted for by maintenance of equipment expense. These costs must be reduced in order for rail service to be economically viable. Since the metroliner cars will be more expensive to maintain than conventional equipment, they will not be of much help in improving passenger service in areas where ultrafast service is not justified. What is needed, then, is a passenger car which will provide a high standard of service at moderately higher speeds than at present and, at the same time, be economical to produce and operate. Once again, Canada appears to be leading the way.

The Canadian National has now initiated a new type of medium distance intercity service which it calls "Tempo." Operating between Windsor, Ontario, and Toronto, the objective is high-quality service at the lowest possible operating cost. The lightweight cars are designed to ride comfortably at speeds of 80 or more while, at the same time, being very economical to maintain and service.

For the benefit of the committee I have a number of brochures which describe in detail this new service on the Canadian National which I would be glad to give the committee.

Senator PEARSON. We would be very pleased to receive them. We will just make them a part of the file.

Mr. HASWELL. All right; fine. Thank you.

A similar approach by the Department of Transportation is badly needed. For instance, we wonder what the results would be on the New York-Washington run if, as a first step, instead of attempting to design the ill-starred metroliners for 160-mile-an-hour service, the planners had simply taken the operationally proved, low-cost Budd Silverliner self-propelled electric car and adapted it for intercity service at speeds of up to 110 miles per hour. Recent studies show that this equipment operates in the Philadelphia suburban area at even lower cost than buses. Its adaptability for intercity service has been shown in regular service between Philadelphia and New York and Philadelphia and Harrisburg.

It may be that the United Aircraft TurboTrain, soon to go into high-speed service between New York and Boston, will fill the technological gap which I have been discussing. Available information indicates that, unlike the metroliners, these trains will be suitable for operation over many of our present main lines on an economical maintenance basis, entirely aside from their high-speed capabilities. But it may take some time yet before the turbotrains are operationally proven, and more time before they can be mass produced. Furthermore, they have the disadvantage of not being compatible with con-

ventional equipment, and of being somewhat inflexible with regard to adding and subtracting cars. Since a very important reason for keeping and improving rail passenger service is provision of dependable, and attractive transportation for peak period travel, the need remains for a comfortable, economical passenger coach for service at speeds up to 110 miles an hour.

We emphasize that we are not opposed to the high-speed service concept as such. The faster the schedule, the more attractive the trains will be in comparison to other modes. But since high-speed operation can become a reality only in a few areas, we believe that the Department of Transportation has an obligation to help preserve and improve service for the rest of us.

I thank you for the opportunity to appear before you today.

Senator PEARSON. Thank you very much, Mr. Haswell. We appreciate your statement and contribution that you made here this morning. I have no further questions. Does counsel have any?

Mr. SENDER. No questions.

Senator PEARSON. Thank you very much.

Our next witness this morning is Prof. C. L. Miller. Professor Miller, won't you come up, sir?

Professor Miller is the head of the Department of Civil Engineering and Director of the Urban Systems Laboratory, Massachusetts Institute of Technology. Very pleased to have you here sir. We have your statement. You might proceed in any manner you desire.

**STATEMENT OF PROF. C. L. MILLER, HEAD, DEPARTMENT OF CIVIL ENGINEERING, AND DIRECTOR, URBAN SYSTEMS LABORATORY, MASSACHUSETTS INSTITUTE OF TECHNOLOGY, CAMBRIDGE, MASS.**

Mr. MILLER. Thank you. My name is C. L. Miller, head of the Department of Civil Engineering, and Director of the Urban Systems Laboratory.

I sincerely appreciate the opportunity to comment on the important matter of extending the high-speed transportation program of the Federal Government. While I am interested in the overall program, I will restrict my remarks to the research and development component for two reasons: (1) The R. & D. component shows the most promise for significant contributions to progress in the transportation system of the Nation, and (2) the R. & D. component is in most critical need of careful attention, understanding, extension and expansion.

It was my privilege to have participated in a small way in the early efforts which led to the High Speed Transportation Act of 1965. Accordingly, I know something of the early hopes and dreams for a wholly new dimension in transportation initiated by the act. While I have not been directly involved in the program for the last 3 years, I have followed it closely, observing and evaluating its progress, problems and successes.

Those of us who have cared deeply about the success of the program over the past 3 years have been concerned but not disappointed. We have been concerned over the enormous pressures the program has been under to match escalating expectations with inadequate resources and very limited leadtime.

What has been expected of this program would be unthinkable for a defense program. Despite the near impossible odds, the R. & D. effort has made surprisingly good progress.

No other R. & D. program in the country of comparable funding has attracted the scope and magnitude of attention from the public and the professional community. The attention has been far out of proportion to the size of the program. My explanation of this phenomenon is as follows:

The public interest is attributed to a deep concern for technological progress of direct benefit to people, large numbers of people. There is a growing public disenchantment with research which does not rather directly contribute to the solution of pressing social and economic problems of our Nation, of which transportation is high on the public's priority list. People do not oppose other kinds of research, but they are becoming increasingly concerned over the gross imbalances which exist. The high-speed ground transport R. & D. effort is highly responsive to these public concerns and interests, and the program attracted corresponding attention.

We were overwhelmed to have representatives speak to lay groups at times. Newspaper coverage of this has been spectacular, far out of proportion to the size of the program.

Senator PEARSON. I think the public is quite aware of the transportation problems. Whoever drives to work in the morning and tries to get from this place to that place—

Mr. MILLER. This we saw as an R. & D. effort that was trying to be responsive to the things they lived with. We wanted to hear more about it. In a quite similar way the professional community is highly motivated to work on civilian and pressing social problems. The feelings are serious and they run deep. High-speed ground transport is not only a very challenging problem area, but one which has tremendous appeal to the sense of social responsibility. Few Federal R. & D. programs offer these characteristics, and the professional community has been eager to participate.

I watched with considerable interest the response of industry, of the universities, of R. & D. type organizations. It is literally beating down the door to try to get in and participate in this program.

Again, I say this is attributed to the sense of wanting to participate in R. & D. activities that are responsive to problems we see all around us.

Now, this enormous attention which the R. & D. program has attracted is rewarding, but it is also dangerous. It can lead to disappointment and frustration if resources available are not adequate to insure continuous progress and implemented results.

I only wish that more participants from the communities and the resources committed—a larger scale effort in the professional community. When the effort started, I had one strong conviction—that conventional technology, no matter how advanced, would not be adequate to make any real progress in high-speed ground transport. The experience of the last 3 years has reinforced this conviction. Even the demonstration component has run into problems with conventional technology. The R. & D. component has, not surprisingly, exposed and defined significant areas requiring new knowledge and new opportunities for progress. The case for new technology has been rapidly built.

The R. & D. component is important to the solution of specific problems, be they general systems problems or detailed component problems. And there are many still ahead, many known and some not suspected yet. However, there is another very important product of the R. & D. component. It is the source of innovation, new ideas, new concepts, and new approaches. More than anything else, we need bold and imaginative innovation in transportation in this country, indeed in the world. Innovation will not be forthcoming if we do not have a strong R. & D. effort which has mobilized the best minds we have.

We have to get good people working on this problem and the ideas and solutions will be forthcoming.

Senator PEARSON. That was a question I was going to ask you. You say our technology is lacking. Do we have the scientific and professional personnel that is needed today to go forward with this program? Has a lack of that been one of the reasons some of us have been disappointed in the progress made to date?

Mr. MILLER. In the long range we are—even in the short range we are very, very short on specialists working directly in the transportation field and knowing the transportation field. We are in the process—this kind of effort has been one—it is a conversion program of a kind.

It has been a matter of taking specialists who were good in disciplines, good in skills, but working in another problem area, and bringing them to bear on the transportation problems.

It takes a little while for them to get fully abreast of the dimensions of the problem. The transferability is there. The country has the brainpower that can be mobilized and brought to bear on this problem. We need to give them time because they are changing fields, if you will, in many instances.

But due to this motivation I referred to previously, good people, good engineers, good scientists, given a choice between working on this kind of problem or some other one, will operate in this one. That is what the program has going for it, this interest.

Now, the R. & D. program progress of the Office of High Speed Ground Transportation over the past 3 years has laid an excellent foundation to build upon. Considering the limited resources and time, the progress has been quite good, phenomenal, considering the pressures and what little there was to work with in so little time.

Much of the research progress is now ready for prototype development, design, and testing. This is an expensive phase, but an essential phase, if one really means business and expects operational implementation; continuity is extremely important at this point. I urge you to give the effort your full support.

My only reservations about the R. & D. proposals for the next few years, as I understand them, are twofold:

A much larger and bolder program is warranted. I feel the Department of Transportation is being much too modest in its requests to the Congress. There is a danger in being below critical size in such important and complex efforts.

I am concerned that the program should be larger and bolder rather than what is being proposed. The second reservation is a mild professional concern for the prospect that this enormous pressure for field results may be placing undue emphasis on prototype development and a premature curtailment of research. Prototype development and test-

ing is quite timely, but not to the exclusion of parallel research of a practical but innovative nature.

I might add that I have no specific evidence that this is going to happen, that this curtailment is going to happen.

I would merely mention it as a concern that I would urge the Department to pay attention to and be careful about because this prototype work, testing work, is going to be large scale, difficult, tough. It will be absorbing a tremendous amount of management supervisory time.

High-speed ground transport is an area in which the Federal Government is showing creative leadership, the leadership for this whole program and effort, the idea of a new dimension in transportation. That leadership has been coming from the Federal Government. The potential public benefits are much too great to merely maintain this position. It should be expanded and carried to a decisive conclusion.

Thank you.

Senator PEARSON. Thank you very much, Professor Miller. I am pleased to have your professional opinion that the progress has been quite good. This is a very helpful statement.

I have no further questions. We are grateful for your appearing here today.

Senator PEARSON. Congressman Irwin from Connecticut, we are pleased to have you here today. I know you have a great interest in this subject.

#### STATEMENT OF HON. DONALD J. IRWIN, A U.S. REPRESENTATIVE FROM THE STATE OF CONNECTICUT

Mr. IRWIN. Thank you.

I don't have a prepared statement.

Like the rest of us, I have a district where the problems of high-speed ground transportation are becoming more and more dramatic every day. I live in a suburban district to New York City, in effect.

I drive in to the airport at La Guardia myself every Monday morning, and when I think of the fact that people drive into New York City every day by the hundreds and thousands and look at the expense that is involved in that form of transportation, the expense in a financial sense, in a human sense, the energy and wear and tear on people's physiques, frankly I wonder how long they can keep it up.

It seems to me there is no way to put a price tag on that expense, but it seems to me it represents a tremendous waste of manpower and of time and that the Government essentially has an absolutely prime responsibility to give leadership in this area. If they do, private enterprise will be encouraged to get into this themselves. We see evidences of it already.

For example, the railroad station in Greenwich, Conn. today is going up, a new, good building, because there is confidence the Federal Government will encourage ground transportation.

Senator PEARSON. Congressman, the other day I saw a statement that estimated the cost of handling one more automobile in the city of New York, to be about \$20,000.

For someone from out in Kansas, that is a shock.

Mr. IRWIN. It reached a dramatic point. You look at it and—you see, in fact that people aren't making rational decisions. People are

going to New York City with an automobile when everything would argue against it.

The Government has a responsibility to give them sensible alternatives. You make a transcontinental flight from LA, or San Francisco to New York City, and it won't be long before it will take you as long to get from Kennedy into New York City, as it takes you to fly across the country.

Senator PEARSON. It won't be long before it takes that long to get off the ground at some of these airports, too.

Mr. IRWIN. Right. The last few weeks it has been so.

So I know that the committee is well disposed toward this legislation and has given good leadership. I merely am here to encourage you to continue on this path. I think we are making some real headway.

I recently had an opportunity to ride on the United Aircraft Turbo-Train here in Washington. It was here for a test. It does represent a technological breakthrough on the rail transportation. It is a very promising piece of equipment.

I think we can acknowledge that something has been done there, and we need to keep on moving.

Senator PEARSON. Thank you very much.

I know of your great interest and your leadership in this particular field.

We appreciate very much that you came over today to help us on this.

Thank you very much.

Next is Mr. Donald S. Beattie. Is he here? Fine. Mr. Beattie is executive secretary of the Railway Labor Executives' Association with offices here in Washington, D.C.

#### **STATEMENT OF DONALD S. BEATTIE, EXECUTIVE SECRETARY OF THE RAILWAY LABOR EXECUTIVES' ASSOCIATION**

Mr. BEATTIE. Mr. Chairman, I appreciate the opportunity to come before your committee this morning.

On behalf of the Railway Labor Executives' Association, a voluntary association of the chief executive officers of 23 standard national and international railway labor organizations, I would urge your favorable consideration of S. 3237. It is our conviction that the High Speed Ground Transportation Act must be extended and broadened if this Nation is to effect a rational and integrated passenger system.

That we do not presently have such a system is altogether too apparent. Air transportation, only a decade ago thought to be the wave of the future, has reached a saturation point at many city airports. A Time magazine article of June 14, 1968 cites Los Angeles Airport, designed to handle 15 million passengers a year with its seven highly automated "satellite terminals," as already obsolete. The article also reports that O'Hare Airport of Chicago has almost reached the saturation point. In short, as put by New York Port Authority Aviation Director John R. Wiley: "What we have is an air transportation crisis."

Auto transportation, too, has reached a saturation point in terms of expense, in terms of death and destruction. Last year 55,000 persons were killed in auto accidents and another 4 million were injured. The

property damage resulting from automobile accidents was approximately \$12 billion. The pollution which hovers over every metropolitan area owes much of its existence to the internal combustion engine. As a Nation, we have spent in excess of \$100 billion for highway construction, thinking that it could fulfill our needs. Now, even before completion of the interstate highway program, it is obvious that no highway system alone can handle the growing passenger transportation needs between our great metropolises.

Estimates by the Bureau of Public Roads indicate that highway travel on intercity routes in the Northeast Corridor will almost double between 1965 and 1985 and that approximately \$2,500 million will be needed just on the intercity portion of the northeast corridor highway system. The total cost to Federal, State, and local authorities of all street and highway construction in the northeast corridor for the same 20-year period is estimated at more than \$33 billion. These new facilities will have to be accommodated into what is already the most heavily developed region in the country; 14 percent of the Nation's total road mileage is concentrated on less than 2 percent of the land area.

Side by side with this saturation of highways and airports, we are witnessing the dismantling of our railroad passenger system, which could, with proper planning, technology, and financing, provide a comfortable and efficient alternative. The high-speed ground transportation program is the only existing program that is trying to develop such an alternative. Railroad management generally has shown no desire to develop the kind of railroad passenger service which could meet today's needs with their own money or their own planning. Penn Central's commitment of funds and organization under the high-speed program is the exception, not the rule.

Much of today's lopsided and inefficient transportation system is a consequence of railroad management's failure to meet the challenge of modernizing its segment of the passenger transportation industry. Their steadfast refusal to uphold their portion of the transportation sector has placed the initiative for doing so at the doors of Congress.

If the rate of growth in travel continues as estimated, much of the capacity of the transportation system must be doubled by 1975. If these needs are not met, congestion and adverse economic impact will be the inevitable result. Traditional solutions are not enough to meet the transportation problems of the populated areas.

The promise of the High-Speed Ground Transportation Act is not only that it can help relieve the congestion in the Northeast Corridor, but that its success can persuade the Nation's railroads to accept their responsibility for intercity transportation by showing them its profitability. We have never accepted the proposition that rail passenger service must be limited to those areas where, due to congestion in air transportation, the train is the fastest transportation available. Comfortable, efficient ground transportation when available is always in demand. Certainly, the present carnage on our highways suggests a need that could be translated into sales and profit for efficient rail service.

Consequently, it is our hope that your subcommittee will continue to impress upon the industry the need for service which the present demonstration projects promise.

Senator PEARSON. Thank you, Mr. Beattie. The point you make is a vital one. Someone indicated that our population in this country might double by the end of this century; 75 to 80 percent of those people live in three great metropolitan strips: Los Angeles-San Diego, Milwaukee-Cleveland, Boston-Richmond, Va., actually.

This is an aside and a personal observation, but I was up in Boston in February of this year. I made a speech and went out to the airport to take a plane after dark on a night of unbelievable visibility. We took off from Boston and flew down the coast, and for the first time I began to understand: The lights from Boston all the way down to Washington, D.C., constituted a solid mass of development. It is one of the most graphic and dramatic ways to really see what the development has been in this northeast corridor.

Our transportation systems are reaching the point of saturation. I received a letter from Mr. Stuart Tipton yesterday talking about the great delays at airports that we have. We have a bill here trying to do something about that.

It is helpful to bring this forth. I do not have any questions. Thank you very much.

Mr. BEATTIE. Thank you, Mr. Chairman.

Senator PEARSON. Next witness is Mr. Rudy Beeder. Mr. R. H. Beeder is the chief engineer of the Atchison, Topeka & Santa Fe Railroad, with offices in Chicago. We are very pleased to have you here today, sir. Please proceed.

**STATEMENT OF RUDY H. BEEDER, CHIEF ENGINEER SYSTEM,  
ATCHISON, TOPEKA & SANTA FE RAILWAY CO.**

Mr. BEEDER. Thank you, Mr. Chairman, for permitting me to appear before you.

My name is R. H. Beeder. I am chief engineer system of the Atchison, Topeka & Santa Fe Railway Co., with headquarters in Chicago. I have been working for the Santa Fe since 1920 and continuously in the engineering department since 1925. My engineering department experience is location, construction, and maintenance. In 1943, I was made a division engineer, and since that time have served as district engineer and assistant chief engineer system, until appointed chief engineer system on December 1, 1958.

Senator PEARSON. You have been working for the Santa Fe for 48 years?

Mr. BEEDER. Yes, sir. Summer vacations and going on continuously in 1925.

Senator PEARSON. You have been working for them longer than I have been around here. [Laughter.]

Mr. BEEDER. Thank you. Presently, I am also a member of the Research Consulting Committee of the Association of American Railroads and, additionally, am chairman of the Research Committee of the Engineering Division of the Association of American Railroads.

I am familiar with the proposed legislation of S. 3237 to extend for 2 years the program of research and development undertaken by the Secretary of Transportation in high-speed ground transportation and my comments are in favor of that legislation from a railroad viewpoint.

In my opinion, industrial research is the primary method by which industry grows and increases its efficiency in this day of rapid economic and technological change. Certainly the railroads are no exception to this and the need for research and development, particularly in railway track construction, is greater today than ever before. I believe this to be true because the type of track construction in general use in railways today was evolved early in their history. The quality and strength of materials have been greatly improved but the basic components of ballast, ties, rail, and fastenings have been continued without significant changes.

Within certain levels of expense, experience has shown that the present conventional track structure can be built and maintained to standards which provide excellent riding qualities. However, under today's railway operating conditions with high speeds and heavily loaded cars, the need for a more stable and permanent type of track structure is evident in order to promote overall track maintenance economies. This is evident because today's trains tend to produce greater stresses which subject the track structure to forces of a magnitude that sometimes result in track alinement shifts, track settlement, and accelerated wear and damage to the component parts of the track structure.

In such a situation, the most promising approach to the solution to today's and tomorrow's railway tracks structure problems would be to establish selected tests of track construction innovations in a proposed test track that would be subjected to actual operating conditions so that we can attain our objectives of overall track maintenance economies. The construction of such a test track could utilize many different types of new techniques to develop a more stable and permanent form of track structure; but, to suggest one approach, the usual ballast section in track construction might be stabilized significantly by pumping an emulsion into the ballast to the extent that full penetration of the voids would result. A number of materials to fill the ballast voids might be suggested, but it would appear that one of the elastic polymers would offer the best opportunity for success. It would also appear that optimum results might be obtained when the material used in filling the voids in the ballast retained sufficient strength for stabilization, but would still have enough workability for the operation of production-type ballast tamping equipment.

With these thoughts in mind, the Santa Fe Railroad Co., has submitted an unsolicited proposal for a "Proposed Track for Service Tests of Experimental Track Structures" to the Office of High-Speed Ground Transportation of the Department of Transportation. In our view of recent trends in all aspects of railway operation and maintenance, we feel that modifications and improvements in the design of railway track structures can be made to meet the challenges of faster trains and heavier locomotives and rolling stock. The extension of the program of research and development by the Secretary of Transportation in high-speed ground transportation would be of great significance in this important undertaking.

Thank you, Senator Pearson.

Senator PEARSON. Thank you, Mr. Beeder. This is very helpful. The railroads have played a very significant role in this development and I think your company's attitude in presenting this proposal is going to help a great deal.

This track structure: Is that really one of the great unsolved problems so far?

Mr. BEEDER. It is insofar as maintenance expenses are concerned, which is, of course, a big drain on the railroad revenues and the ability to construct track of a more stable and permanent nature would be of great assistance.

Senator PEARSON. This has been very helpful. Thank you very much.

Is Mr. Reinhold here yet? I know he was coming down. Yes; he is. Fine. Come right up. I understand that you have Mr. Samuel Kanell with you.

Mr. REINHOLD. Right. We are both here.

Senator PEARSON. Come right up. We are pleased to have you with us today. We understand you were coming down to be with us this morning.

Mr. Reinhold is the chairman of the Connecticut Transportation Authority. Mr. Kanell is the executive director of that authority and we are pleased to have you. Please proceed in any manner you wish.

**STATEMENT OF FRANK M. REINHOLD, CHAIRMAN, CONNECTICUT TRANSPORTATION AUTHORITY; ACCOMPANIED BY SAMUEL KANELL, EXECUTIVE DIRECTOR, CONNECTICUT TRANSPORTATION AUTHORITY**

Mr. REINHOLD. May I proceed?

Senator PEARSON. Yes; of course.

Mr. REINHOLD. Mr. Chairman, members of the committee, I am Frank M. Reinhold, chairman of the Connecticut Transportation Authority. This agency was established by the Connecticut General Assembly in 1963 for the purpose of preserving and improving essential rail transportation service and other forms of mass transportation within the State of Connecticut.

I am appearing at this hearing on behalf of Governor John Dempsey, of the State of Connecticut, to support the bill calling for extension of the High-Speed Ground Transportation Act. Governor Dempsey has asked me to outline to your committee the steps Connecticut is taking to preserve and improve our transportation system.

Connecticut and our neighboring States have the difficult task of coping with the problems posed by the bankrupt New Haven Railroad. This railroad is the only major railroad linking every major city in Connecticut with our neighboring States. It is the only major passenger carrier in the country that carries up to 25 million passengers per year and has sought to discontinue all passenger service. Over 2 years ago, the Interstate Commerce Commission denied the request of the trustees of this bankrupt railroad to discontinue all passenger service, predicated upon the financial support furnished by the States of Connecticut, Massachusetts, New York, and Rhode Island.

At the same time, the Commission approved consummation of the merger of the Pennsylvania and New York Central Railroads, predicated upon the requirement that the merged company include all New Haven operations.

Following lengthy litigation, the Penn-Central merger was consummated on February 1 of this year. However, the inclusion of the New Haven has been delayed because of court appeals by the creditors of the New Haven, who claim that the price Penn-Central would pay for New Haven properties is too low.

Therefore, Connecticut, along with our neighboring States, has been compelled to continue financial support for the New Haven Railroad during this interim period.

We are now providing the New Haven Railroad complete tax relief, which I estimate to have a value of \$7 million per year. We are also providing cash financial assistance at the rate of \$3,200,000 per year.

The extraordinary efforts we are making to preserve rail service within our State demonstrates our commitment to maintain railroad service as the vital basis of our transportation system.

We are all aware of the increasing congestion on our highways and at our airports. We are also aware that building new highways and bigger airports to accommodate bigger airplanes is not the answer to our transportation problems.

We have not yet developed a transportation system that can carry people more conveniently, comfortably, efficiently, dependably and speedily in local intercity travel, than our railroad system.

I would estimate that we would need 20 lanes of superhighways to transport the number of people that can be carried by a single line of railroad track.

It is for this reason that Connecticut is committed to cooperate with the Department of Transportation by providing \$500,000 in financial support to demonstrate the feasibility of high-speed train service between Connecticut and our neighboring States. To my knowledge, we are the only State that is cosponsoring this high-speed demonstration by assuming a substantial portion of the financial burden required to conduct this service. The \$500,000 we are expending to support this demonstration is in addition to the \$3,200,000 I referred to that we are providing in direct support for current New Haven Railroad services.

Of course, our commitment will have no practical value unless you approve extension of the High Speed Act, and I am here to support this bill.

Mr. Kanell, director of the Connecticut Transportation Authority, will explain to the committee the background and nature of our commitment to the Department of Transportation.

I will be pleased to answer any questions you may have.

Thank you.

Senator PEARSON. Thank you, sir. Indeed, Connecticut, if you count the loss of tax revenue, has about a \$10 million contribution plus your considerable help to the Department of Transportation.

The point that comes to mind, of course, is your commuter problem. Is this high-speed transportation going to alleviate any of that? Certainly, the stops are so frequent up and down from Connecticut into New York. What is the relationship between the commuter problem and the high-speed rail transportation?

Mr. REINHOLD. Well, something which I hadn't been able to touch upon in this brief testimony I presented, is the fact that we are also embarking upon a program with the State of New York for the mod-

ernization of the so-called west end. This is from New Haven into Grand Central Station; the area in which the greatest amount of commuter traffic takes place, probably 80 percent of the riding on the New Haven. This is a program which is moving rapidly.

The two States together with Federal aid through the former HUD arrangement will spend upward of \$55 or \$60 million on this phase alone. But to come back to your question, the high-speed trains which we expect will be operating very shortly between New York and Boston, the so-called aircraft trains, will give us the answer, we believe, to high-speed commuter transportation if they perform as we all expect they are going to.

These two particular trains, they won't be a great deal of help, let's face it, but our group already has tentative commitments with United Aircraft Corp. whereby if these trains perform well, the State of Connecticut by itself will purchase equipment to operate between Hartford and New York, New Haven and New York and elsewhere serving Connecticut.

Most of all we must have the results of this special service before we can proceed.

Senator PEARSON. It is those intangible, unknown spinoffs, perhaps, that may come out of this.

Mr. REINHOLD. That is true.

Senator PEARSON. Mr. Kanell, we will hear from you, now.

#### STATEMENT OF SAMUEL KANELL, EXECUTIVE DIRECTOR, CONNECTICUT TRANSPORTATION AUTHORITY

Mr. KANELL. Thank you. Governor John Dempsey of Connecticut requested Chairman Reinhold and me to represent him before this committee in order to outline our commitment to the high-speed ground transportation demonstration that will serve Connecticut before the end of this year.

Early in 1966, the Office of High Speed Ground Transportation announced a proposed high-speed ground transportation demonstration to be operated between Boston and Providence, as part of the northeast corridor program. This demonstration was of special interest to Connecticut because it was to be operated with turbine-powered trains, developed and built by a Connecticut company, the United Aircraft Corp. Since it was planned to run another type of high-speed demonstration between Boston and Washington, it appeared that every State in the northeast would be served by this program, except Connecticut. We were left out.

Following several meetings, with the then Under Secretary of Commerce for Transportation Alan Boyd and with Dr. Robert Nelson of the high-speed program, the CTA concluded that the most effective means of assuring Connecticut's participation in the program would be our willingness to provide financial support.

I might tell you that when the legislature set us up, it gave us some latitude with respect to our financing. It allocated one-fifth of the taxes we assess on the public utility companies, water companies, gas companies, telephone companies, to finance our program.

Therefore, we were in a position to make offers of this sort, and we made an offer of \$500,000 in cash financial support upon condition

that the Boston-Providence demonstration be extended to include operations through Connecticut. This offer was accepted, and I believe that it is a source of satisfaction to both the Department of Transportation and the State of Connecticut that we will have high-speed train service operating along the Connecticut shoreline route of the New Haven Railroad before the end of this year.

Chairman Reinhold and I have had the unique experience of riding the United Aircraft trains, and I want to tell the members of this committee that it is a satisfying experience to ride comfortably on rails at speeds in excess of 125 miles per hour.

Engineering studies made by the Department of Commerce concluded that it would cost \$700 million to upgrade the New Haven Railroad roadbed system in order to operate high-speed train service by use of conventional equipment. As members of this committee undoubtedly know, over \$30 million was spent to upgrade the Penn-Central mainline between Washington and New York in order to operate the forthcoming high-speed demonstration along that route.

While those trains will be electric-powered trains, they are basically conventional type trains but with faster type motors. In some areas there are the complexities of controls, but basically they are faster trains with faster motors and will run by use of the existing overhead electrical system. In contrast, only nominal amounts of scarcely over a million dollars will be spent to upgrade the New Haven system. This is because the unique nature of the construction of the turbine powered United Aircraft Corp. trains, make it possible for these trains to operate at speeds of up to 140 miles per hour over conventional roadbeds. In fact, a train hit 170 miles an hour on the test track of the Penn Central system.

Such speeds have already been achieved on the New Haven Railroad system without extensive rehabilitation.

Senator PEARSON. On existing roadbeds?

Mr. KANELL. Yes. In laymen's language, I look at the turbine powered train as an airplane fuselage on wheels. As a result of their unique A-frame suspension system, the undercarriage absorbs any irregularities of the roadbed, while the passenger rides in comfort.

I work for the State, not the United Aircraft Corp. We are thrilled that they could develop these trains and I want to see them in regular operation. We have talked to the corporation and have a commitment from them to work out an arrangement to buy the trains if they are successful. We will not exercise any options before the trains run in regular service. We want to see them running regular service before we make final commitment. It's an exciting prospect.

As you may know, Connecticut has been in the forefront of completing our Interstate Highway System. We have excellent highway links between our State Capital in Hartford and New York City. A Hartford businessman can drive this 110-mile distance at normal highway speeds in about 2½ hours—but will he have a place to park in New York City? The high-speed train will be able to operate between Hartford and New York City in 100 minutes and the car will stay in Hartford. Our businessman can read, write, or sleep—rather than fight traffic. I think that if the State of Connecticut buys trains of this nature to be placed into Connecticut-New York service, we will relieve highway and traffic congestion, and we will provide a practical answer to our transportation problems.

We are now negotiating with the United Aircraft Corp. for an option to acquire these trains following their successful operation in the forthcoming demonstration.

Under our understanding with the Department of Transportation, the funds we will make available will be used to reimburse the Department for its obligations to the United Aircraft Corp., or to the New Haven Railroad for improvement of the roadbed within Connecticut.

We also anticipate that, to the extent funds will be available, we will upgrade this demonstration to three five-car trains, since the two trains that have been built have a capacity of only 150 passengers each. They were built originally for local commuter service. This is why they are so small. This is too limited a capacity to accommodate more than a fraction of people who require this service.

We ask your favorable action on the bill to extend the High Speed Ground Transportation Act in order to permit the continued cooperation between Connecticut and the Department of Transportation to obtain the benefits of this high-speed transportation demonstration. Use of this new service may disclose a solution for our national transportation problems, which will be far more practical and economical than building more highways or further congesting our airways and airport terminals.

I will be happy to answer any questions that you may have.

Senator PEARSON. Well, we appreciate this statement. You sure have the problem up there and are doing something about it.

Mr. KANELL. Thank you.

Senator PEARSON. We are pleased to be in partnership with you in this regard. You had some good illustrations and examples of the federal system working. I don't have any further questions.

Senator PEARSON. The next witness is Mr. Edward Heffernan, representing the State of Illinois, Department of Business and Economic Development.

If you would like to make your statement at this time, go ahead. We are happy to have you here.

**STATEMENT OF EDWARD D. HEFFERNAN, REPRESENTING THE  
STATE OF ILLINOIS DEPARTMENT OF BUSINESS AND ECONOMIC  
DEVELOPMENT**

Mr. HEFFERNAN. Thank you. My name is Edward Heffernan of the Illinois Department of Business and Economic Development. It is a distinct pleasure to have the opportunity of appearing before your subcommittee today to speak on behalf of the extension of the High Speed Ground Transportation Act and authorization of funds for fiscal years 1969 and 1970.

Mr. Chairman, much is heard these days of the so-called urban crisis. We, in Illinois, are aware that this embraces within it a transportation crisis of major proportions. Our growing population, our burgeoning economy, and the rapidly increasing mobility of our people, make it imperative that our ground transportation facilities be expanded and improved to keep abreast of our needs. Given an anticipated growth in U.S. population of 50-75 percent over the next quarter century, we can expect at least a commensurate increase in the movement of people and goods. Since two-thirds of our population now

reside in urban areas, we can expect much of this anticipated growth to occur in, around, and between our major cities. We know that between 1950 and 1966, total intercity travel alone more than doubled.

Long called the crossroads of the continent, Illinois has always considered itself, and the city of Chicago in particular, to be the major transportation hub in the Nation. Transportation is one of Illinois' most important industries and only Texas surpasses Illinois in total railroad mileage. In railroad employment alone, Illinois is first, with 69,880 employed in 1966 and a payroll of over \$500 million. Hundreds of thousands of our people are employed in other forms of transportation, Mr. Chairman, we believe that the various forms of transportation are interdependent and that solutions to the problems of transportation are interrelated.

We strongly support the work being carried on by the Office of High Speed Ground Transportation in research, development, and demonstration projects, leading to the solution of these complex problems. We have followed with interest and enthusiasm the work being conducted by this Office, in the fields of high-speed rail transportation and unconventional transportation systems, including studies of aerodynamics, vehicle propulsion, vehicle control, and communications and guideways.

The results of the Northeast Corridor project, if successful, give rise to the hope that a Midwest corridor project might be feasible.

Additionally, we have a keen interest in plans for airport ground access demonstration projects. We well appreciate the interdependence of air and ground travel. O'Hare International Airport, located many miles from the center of our largest city, is the world's busiest commercial air terminal.

We are encouraged by the plans to test a tracked air cushion vehicle, linear electric motor, and a tubular vehicle, for they well might prove to be feasible for high-speed airport access. We are now examining the practicality of State involvement in encouraging the private development of an auto train which was first designed by the Office of High Speed Ground Transportation.

I might add that the city of Chicago presently is considering plans for a third major airport in the Chicago area, conceivably located either in the lake or far to the south of the city.

Senator PEARSON. I talked to your Mr. Downes about that.

Mr. HEFFERNAN. He is very enthusiastic about the lake site. Obviously, if we go 3 to 5 miles out into the lake, work in the track vehicle phase—

Senator PEARSON. If you can get people out and back.

Somebody mentioned, I think, in the testimony here this morning that the Los Angeles International Airport handled 15 million passengers per year.

Francis Fox, who is the manager, indicates that Los Angeles International could probably handle 30 million a year, but could only get half of them in town. That is what the problem is.

Mr. HEFFERNAN. This is why we are hopeful that some of this work, particularly in the track vehicle subway type of transportation, may prove to be the answer to the ground transportation problems related to such a lake site.

Finally, we believe the requested authorization of \$16,200,000 for fiscal 1969 is a modest investment in seeking solutions to the ever-increasing transportation crisis.

Thank you Mr. Chairman and members of the committee. I do thank you for allowing me the opportunity to testify.

Senator PEARSON. Thank you.

I always thought of this in terms of passenger traffic. I suppose some day high-speed rail transportation might be an answer to some of our other traffic.

Do you have a boxcar shortage situation in Illinois?

Mr. HEFFERNAN. I understand there is a shortage, but I am not really knowledgeable about the details of the problem.

Senator PEARSON. I can guarantee you, you do. [Laughter.]

We are very pleased that you came today.

Mr. HEFFERNAN. Thank you.

Senator PEARSON. Now, is there anyone else here today that would like to be heard?

If not, I am going to close these hearings, and I don't believe I will keep the record open, with the shortness of time we think we have left in the 90th Congress.

So, if there are any other statements to be made by any interested party, I hope they would submit them at this time. Otherwise, I will adjourn these hearings.

(Whereupon at 11:20 a.m., the subcommittee was adjourned.)

STATEMENT OF ROBERT M. COULTAS, CHAIRMAN, COMMITTEE ON PASSENGER TRAFFIC, RAILWAY PROGRESS INSTITUTE

My name is Robert M. Coultas, Manager of Transportation Systems Business Development of the General Electric Company. I have been associated with the railroad and urban transportation business of General Electric for 22 years.

I would like to file this statement in support of S. 3237 on behalf of the Committee on Passenger Traffic of the Railway Progress Institute. I am Chairman of that Committee. The institute is the national trade association of the railway supply industry comprising 190 corporate members. The Committee on Passenger Traffic consists of representatives of 30 companies which supply equipment and services for intercity and urban transportation.

We believe that the research, development and demonstration projects being undertaken by the Office of High Speed Ground Transportation can lead the way not only in the Northeast Corridor, but in other developing population corridors of the nation. In the Northeast Corridor we are presently experiencing congestion in transportation that promises to become worse.

The projects underway in the Office of High Speed Ground Transportation hold great promise of bringing about a much more balanced system of transportation, not only in the Northeast Corridor, but in other developing population corridors throughout the nation. The projects have brought about commitments of resources by private industry far in excess of the appropriations made by the Congress in support of the High Speed Ground Transportation Act of 1965.

On June 12, 1968, Secretary Boyd, in testimony before the House Subcommittee on Transportation and Aeronautics, declared: "In completing this discussion of the demonstrations, I should like to commend the Penn Central Railroad and the rail supply firms involved in the construction of equipment for the demonstrations. The rail industry and the rail equipment industry have clearly not enjoyed financial prosperity since the end of World War II. Yet the firms involved here have been willing to commit sizable resources to research and development and to the improvement of their engineering and production capability. This has been done, moreover, with the prospect of only a relatively small Federal financial participation."

We appreciate that expression of confidence in our industry. We believe that it typifies the spirit which prevails in this entire High Speed Ground Transportation program, of which the Northeast Corridor project is only one part.

We have been impressed with the ability of the people directly responsible for administration of the program, Federal Railroad Administrator A. Scheffer Lang, Dr. Robert A. Nelson, Director of the Office of High Speed Ground Transportation, his associates, and all the top level representatives of contractor firms.

This genuine partnership of government and industry holds promise of great benefit ultimately to millions of Americans by finding solutions to intercity transportation problems, not only in the Northeast Corridor, but in other heavily populated sections of our nation, as they develop.

For that reason, we sincerely hope the Congress will extend the High Speed Ground Transportation Act for two years, and fund it at the levels provided in H.R. 16024, at least.

**ROBERT M. COULTAS,**  
*Chairman, Committee on Passenger Traffic,  
Railway Progress Institute.*



*[The following text is extremely faint and largely illegible, appearing to be a continuation of the letter or a separate document. It contains several paragraphs of text, some of which are partially legible, such as 'The program is...', 'The program is...', and 'The program is...'. It also includes a signature block at the bottom: 'ROBERT M. COULTAS, Chairman, Committee on Passenger Traffic, Railway Progress Institute.']*

