United States General Accounting Office

GAO

Testimony

Before the Committee on Appropriations
Subcommittee on Transportation
United States Senate

For Release on Delivery Expected at 10:00 a.m. EST Thursday, March 4, 1993

HIGH SPEED GROUND TRANSPORTATION

Financing Issues

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GAO/T-RCED-93-14

Mr. Chairman and Members of the Subcommittee:

We appreciate the opportunity to testify on the issues surrounding the introduction of high-speed ground transportation (HSGT) in the United States. Our work to date on HSGT is based on meetings and discussions with members of the financial community with experience in financing these types of projects, Amtrak and other railroad officials, HSGT project planners, and other transportation analysts. We have analyzed the available data on the progress of HSGT both in the United States and abroad, and to gain some first-hand experience, we have ridden on several of the new systems, including the Swedish X2000 train. Our work is being done in response to interests expressed by both the Senate and House Appropriations Committees and the House Committee on Energy and Commerce.

By high speed we refer to systems capable of sustained speeds of at least 125 mph.[1] Advanced high-speed rail systems, such as the French TGV and the Japanese Shinkansen, have carried millions of passengers over the years at speeds between 130 and 185 mph, and magnetic levitation (maglev) technology is being developed in Germany and Japan that could carry passengers safely and efficiently at speeds over 250 miles per hour. Progress toward increased speeds in the United States has been limited to incremental improvements to existing Amtrak routes, especially in the Northeast Corridor, where Amtrak's Metroliner trains achieve 125 mph speeds over some stretches between Washington and New York. (See fig.1).

Policy choices with significant financial impacts will have to be made before HSGT is developed in the United States. High speed systems, like those of Europe and Japan, will be very expensive to build and no organization, thus far, has been willing to bear the risk of investing in HSGT in America.

Our basic points are as follows:

-- The United States could pursue several levels of technological improvements to make HSGT a reality here. Each higher level of improvement would result in greater speed, but only at a greater cost. Generally, incremental approaches that build on the existing rail infrastructure would allow increased speeds of up to 150 mph and would incur the lowest capital cost. This has been Amtrak's strategy in the Northeast Corridor. More advanced approaches, such as the French TGV or maglev, are much more costly and are perceived as being more risky by potential investors. Because these systems are untried in the U.S. environment, there is uncertainty about whether they

[1]In the United States, most Amtrak trains travel at speeds below 79 mph, and often average only 50 to 60 mph.

could generate revenues sufficient to cover operating costs, repay lenders, and produce an acceptable return on investment.

-- In addition to Amtrak's efforts, more than a dozen HSGT projects have been proposed around the nation, but none has obtained private funds to begin construction and federal support has been minimal. These proposals have tried, unsuccessfully, to rely largely on private capital to fund system construction, but our review shows that it is unlikely that any major HSGT projects will be built if developers must rely primarily on private capital. Until HSGT systems are proven to be successful in the United States or until the public sector decides that there are sufficient public benefits to justify underwriting some of the risk, private financing sufficient to launch a major HSGT project will not be forthcoming.

-- If HSGT systems are to be built in the United States, increased federal leadership and financial commitment will be necessary. To date, federal involvement has concentrated on underwriting Amtrak's program to bring about incremental improvements in the Northeast Corridor and to authorize funds for further research on HSGT. The financial community believes that federal commitment, especially through substantial financial assistance for the initial HSGT systems, is necessary to leverage significant amounts of capital from the private sector and to help establish public-private partnerships to develop additional HSGT systems.

-- Both private and public investors require realistic forecasts of potential ridership. Private investors need the data to project expected returns on investment. The public sector requires better data to judge the appropriate commitment of public resources. The federal commitment to HSGT must be proportional to the expected net social benefits, such as congestion relief and reduced pollution, that could result from investment in HSGT. Accurate estimates of the size of these benefits also depends on reliable forecasts of ridership. However, some data, especially for auto travel, are lacking and without these data accurate estimation of system use and social benefits is problematic. In addition, many social benefits are not easy to monetarize making it difficult to compare benefits with costs. While the data can never be perfect, there is room for considerable improvement. Given the size of the investments at stake, the data bases and benefit estimates should be improved.

I would like to turn to a more detailed discussion of these points.

QUESTIONS TO BE ADDRESSED BEFORE INCREASED COMMITMENT TO HSGT

Federal participation in developing HSGT in the United States depends on the answers to some basic questions: who? what? where? and why? Who will elect to ride such systems (and how much will they pay)? What kind of system should we build--rail or maglev? Where should such systems be built--in densely traveled corridors or between airports? Why should the federal government be involved--what are the social benefits from such systems? These questions are not easy to answer, and they are interrelated. Where we choose to build a system will help determine what type of system we should build. Who chooses to ride the system can help answer what public benefits might accrue. There is one other question, however, for which we do have at least a qualitative answer, and that is how much will it cost to bring HSGT to America? Quite a bit; the exact amounts depend on which technologies are chosen.

PERFORMANCE AND COSTS VARY FOR DIFFERENT HSGT TECHNOLOGIES

Each of the technology options performs differently and carries a different price tag. Not surprisingly, the cost of these options increases as the design speed increases. According to a recent estimate, the capital costs of achieving high speed operations for a hypothetical 200-mile-long system ranges from $500 million for incremental improvements to existing tracks that could bring speeds up to 110 mph to more than $12 billion for a maglev system that might allow speeds of more than 200 mph. (See fig. 2.)

The lower cost option would achieve higher speeds by improving the existing track, roadbed, and signal systems, and eliminating grade crossings. According to the National Research Council, the cost to upgrade an existing rail line to allow speeds of about 110 mph would be about $2.7 million per mile.[2] For most Amtrak routes outside the Northeast Corridor, this would represent a significant improvement over current conditions. Speeds on most Amtrak routes are restricted to below 79 mph, and on some sections of track, considerably below 79 mph. To achieve speeds of up to 150 mph while continuing to use existing rail infrastructure would require electrification of the rights-of-way and construction of additional track to permit high-speed passenger trains to pass slower freight and commuter trains. The capital cost to achieve speeds approaching 150 mph could range up to $10 million per mile.

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[2]Transportation Research Board, Special Report 233: In Pursuit of Speed-New Options for Intercity Passenger Transport (Washington: National Research Council, 1991).

Progress So Far Limited to Incremental Improvements in Northeast Corridor

To date, most of the improvements in rail operating speeds have been in the Northeast Corridor. Metroliner trains travel over electrified rights-of-way between Washington and New York at speeds up to 125 mph. North of New Haven, Amtrak must use diesel locomotives and speeds are further reduced due to the numerous curves between New Haven and Boston. Amtrak is currently experimenting with the Swedish X2000 tilt train. Tilt trains can traverse curves at higher speeds and, if adopted, can help shorten trip times significantly between New York and Boston after Amtrak completes its electrification of that part of the corridor. The X2000 is a part of an "incremental" approach to attaining higher speeds, and it is such incremental improvements that Amtrak plans for other corridors around the nation. By using technologies like the X2000 and continuing to eliminate grade crossings, improve signalling, and make other improvements Amtrak hopes to be able to offer 150 mph service in the Northeast Corridor by the end of the century.

The only major segment of the U.S. rail network owned by Amtrak is the Northeast Corridor. Outside of the Corridor, the railroad network is owned by freight railroad companies. Amtrak recently reached an agreement with the nation's freight railroads over the issue of liability for accidents on freight railroad-owned tracks where high-speed trains would share the track with freight trains. The agreement recognized the need to protect freight railroads from the consequences of accidents involving high-speed passenger trains, but does not remove the numerous logistical obstacles to operating freight and high-speed trains on the same track. Assuming that high-speed passenger service would be relatively frequent, there would be serious interruptions to freight operations. In the Northeast Corridor, some freight traffic is limited to night operations to accommodate passenger trains that operate over the same track during the day. Other costs, such as those for maintaining rights-of-way, will be higher if heavier freight trains share the track with high-speed passenger trains. Regardless of who bears the added costs from joint operation, the nation's privately owned freight railroads will, understandably, examine the impact on their operations before acquiescing to high-speed passenger trains over their tracks.

High-Speed Systems Beyond Incremental Improvements Will Be Expensive to Build

Proposals to go beyond incremental improvements have been advanced by groups other than Amtrak. While Amtrak is often viewed as a potential operator of these systems once built, it has been independent state and regional interests that have advanced HSGT thus far. For HSGT service over 150 mph, new track, new rights-of-way, or entirely new guideways will be required. The French TGV, for example, operates mostly over a dedicated right-of-way and achieves speeds above 180 mph. These types of systems reduce rail travel times so much that they might be competitive with air travel for many trips shorter than 400 miles. Both the French and the Japanese recorded substantial traffic shifts from air to rail following the introduction of high-speed rail systems[3]. The National Research Council estimated that capital costs for a TGV-type system could exceed $3.5 billion for a 200-mile system, or more than $17 million per mile. Alternatively, lanes could be added to expand capacity of interstate highways. Additional lanes would serve multiple users not just intercity travelers--although not at such high speeds. However, there are problems with widening highway rights-of-way that could frustrate such efforts to expand capacity. In some places where congestion is greatest, the highway is already bounded by development making expansion impossible without acquiring more land--often an expensive proposition.

A maglev system could allow even faster speeds, but also would require an entirely new guideway infrastructure, making maglev more costly than all high-speed rail alternatives. Although successfully tested at 320 mph in Japan and 270 mph in Germany, no high-speed maglev system has ever been placed in revenue service. In fact, the Germans have not chosen to introduce maglev on major routes, but have proceeded, instead, to introduce a new high-speed train that uses conventional railway track--the Intercity Express or ICE trains. A maglev system could cost between $20 million and $60 million per mile. The National Research Council estimated a cost of $6.4 billion for a 200-mile maglev system, or about $32 million per mile. Some advocates of maglev believe that it is the coming technology and that only maglev can offer Americans such a dramatic improvement in speed and service that they will switch to HSGT in large numbers. Other supporters believe that if the United States chose to develop its own version of maglev, the investment could generate new jobs and develop a new high-tech industry. Still, the cost of building a 200-mile system to serve one route could be twice as high as the $3.1 billion it cost to build the new Denver Airport, and while the maglev route serves only one corridor, the new Denver Airport connects Denver directly to hundreds of cities around the nation and the world. Like highways, however, airports face serious restrictions on new construction and expansion.

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[3]European nations and Japan have historically followed policies that favor rail over air and auto travel for intra-national trips. Air fares are much higher and investment in the highway systems came later than in the United States, and so rail has preserved a higher market share than in the United States even in markets not served by high-speed trains. Nevertheless, the rail share increased significantly in French and Japanese markets after high-speed service was introduced.

Any HSGT systems that operate at speeds over 150 mph require dedicated rights-of-way except in urban areas, where new rights-of-way are difficult to obtain. Therefore, a major part of the cost of such a system will be right-of-way acquisition. As reported last year in our study of HSGT right-of-way issues, both high-speed rail and maglev systems will require new, relatively straight, and level rights-of-way compared with existing rail rights-of-way to eliminate safety and passenger discomfort problems.[4]

Operating and maintenance (O&M) costs of HSGT systems are also likely to be high, relative to those for conventional rail for several reasons. Track and guideways must be maintained to very high standards, and safe operation of HSGT requires expensive signal and control systems. One analysis reported that track maintenance costs are 5 times higher for 125 mph trains than for trains traveling 60 mph. The O&M cost per train mile for a maglev system has been estimated to be about 20 percent higher than that for a high-speed rail system. However, as there is no U.S. experience with operating HSGT systems, O&M costs in the U.S. operating environment can only be roughly estimated until a system is actually put in operation.

PRIVATE FINANCIAL COMMUNITY VIEWS HSGT AS A RISKY INVESTMENT

A general unwillingness to commit private and public financial resources to American HSGT projects is the principal reason why no such projects have progressed beyond the planning stage. On the basis of the projects and analyses that we reviewed and on discussions with members of the financial community who have experience with major infrastructure investment projects, we believe that unless the federal government underwrites a large part of the risk and assumes a larger role in HSGT financing, these projects are unlikely to be built. HSGT development will require a long-term commitment of capital and resources. Because there is little assurance that these systems can earn a positive return on invested capital, they are considered to be very risky investments by private investors.

Private investors will review HSGT projects to determine if the potential returns on investment are commensurate with the level of risk. Equity investors want a correspondingly high rate of return, as high as 30 percent according to some analysts, for investing in a high-risk venture. Providers of debt-capital also want to be certain that the system will generate revenues to pay the interest and repay principal. Moreover, while the discussion below focuses on the risks to private investors, there are also

[4]High-Speed Ground Transport: Acquiring Rights-of-way for Maglev Systems Requires a Flexible Approach (GAO/RCED-92-82, Feb. 10, 1992).

risks associated with public investments. Ridership and revenues may be less than projected leading to larger operating subsidies and to fewer social benefits. Public funds that could have gone for other projects or to deficit reduction would be lost.

According to members of the financial community to whom we spoke, there are several sources of risks for these projects that explain why private investors are unwilling to go it alone.

First, because of the lack of experience in the United States with HSGT, ridership and revenue forecasts may be exaggerated. The financial community typically discounts demand forecasts for demand-sensitive start-up projects, like toll roads and, presumably, HSGT projects. Furthermore, projects are usually expected to generate revenues sufficient to more than cover their debt service needs. For some projects, these "coverage factors" can be as high as 150 percent of actual debt service needs or greater. These relatively high levels of coverage are desirable because they can offset various uncontrollable events that could affect demand and revenues. Unless the financial community believes that HSGT projects can generate enough revenues to both cover debt service and provide a return on investment commensurate with the risks, it is unlikely that private capital will be forthcoming.

Financial analysts with whom we spoke agree that in the near term most HSGT projects will not generate enough revenues from their operations to pay off their capital debt, making such projects unattractive to debt investors. Moreover, new technologies on the horizon, such as tiltrotor and teleconferencing, may compete favorably with all forms of transportation including HSGT.

Second, the large scale of proposed HSGT projects adds to the risk. The larger the project, especially when new technologies are being introduced, the greater the likelihood that delays and cost overruns will undermine the financial feasibility of the project. Generally, projects that issue debt to raise capital will need to begin repaying the debt by a specific date. A concern of potential lenders is that unless adequate revenues or other cash are available on that date, the project could go into default. Furthermore, system start-up delays cause interest to accrue on outstanding debt.

Third, large-scale projects like HSGT systems face a number of political risks, in part, because many jurisdictions at different levels of government will be involved in issuing the permits and other clearances needed to build and operate the system. In our review of the problems associated with acquiring rights-of-way for HSGT projects, we uncovered numerous constraints. For example, the proposed maglev route between Anaheim and Las Vegas would face scrutiny by the Bureau of Land Management because of possible disruption of the habitat of several endangered species. These are not the only risks associated with investing in a HSGT project, but they are representative of the concerns of the financial community.

Obtaining either equity or debt financing from private investors may prove problematic for developers of HSGT projects. Investments of equity in a project are often needed before commercial lines of credit can be obtained or investment-grade debt can be issued. However, equity investors often demand high rates of return and a relatively quick payback. Because HSGT projects will have lengthy development and construction periods, it will be difficult to provide the timely payback that equity investors want. Therefore, HSGT developers may find it difficult to obtain private equity for capital purposes. By contrast, bond buyers are generally interested in a secure investment with a guaranteed return over time. Debt instruments are typically rated on the probability that they can be paid off by the project. Equity in the project can bolster confidence in the project's chance of success and thus enhance the ability to raise capital through debt instruments.

FEDERAL COMMITMENT TO HSGT NEEDED TO ENCOURAGE PRIVATE INVESTMENT

Members of the financial community familiar with large-scale projects told us that in order for major HSGT systems to be built, the federal government must make a greater commitment. They stated that until the federal government assumes a major role in HSGT development, thereby reducing the perceived investment risks, private capital generally will not be available. Government involvement in financing could take a number of forms such as providing financial and administrative assistance and equity capital at an early stage, providing loan guarantees, exempting interest income from taxation, establishing revolving loan funds, and participating in value capture strategies. However, any federal financial involvement would need to be evaluated to determine its budget and deficit impacts. If the federal government concludes that a greater commitment to HSGT is warranted, it could help lower the risk to private investors in several ways.

SEVERAL STRATEGIES COULD BE PURSUED BY THE FEDERAL GOVERNMENT TO REDUCE THE RISKINESS OF INVESTMENTS IN HSGT

The federal government could provide financial and administrative assistance during the initial development and construction phase of HSGT projects. This stage is typically a high-risk period for new infrastructure projects because many time-consuming regulatory and financial obstacles must be overcome. Further, several analysts suggested that the federal government is the entity best suited to be the principal provider of equity capital during the early phase of a HSGT project. The early phase-

-between designing the system and commencing construction--is often the most risky period. Private financial markets want the project to have equity in it before lines of credit or other private assistance will be extended. The federal government could also provide financial assistance through loan guarantees and tax exemptions.

Provide Loan Guarantees. The federal government could become a guarantor for different components of a project. Under the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), a loan guarantee program for HSGT was authorized as an amendment to the Railroad Revitalization and Regulatory Reform Act of 1976, although no appropriations for new commitments have been made under this program. According to HSGT proponents, contingent loan guarantees such as these could induce private debt and equity investments in HSGT. Similarly, the federal government could become a guarantor of revenues for HSGT projects. Such guarantees could be particularly helpful during the first few years of operations, giving the system time to build up ridership and revenues. Again, with such guarantees behind the project, a HSGT developer's ability to secure private financing would likely be enhanced.

Extend Tax-Exempt Status. The Congress could extend tax exempt status to debt issued to build HSGT systems. HSGT proponents believe that tax-exempt status is critical if these systems are to be built. Tax-exempt bonds are an attractive mechanism for raising capital because bond issuers pay a lower interest rate than on taxable debt, thereby lowering the cost of capital. While the current tax code does not restrict the amount of private activity, tax-exempt bonds issued for airports and waterways, it restricts tax-exempt bond issues for high-speed rail. The limitation on these bonds was imposed in 1986 in response to a proliferation of such bonds for private, profit-oriented projects, and the resultant loss of revenue to the federal government. However, some financial community representatives believe that HSGT, even if developed and operated as a private venture, would clearly serve a public purpose. The Congress last year considered but did not enact legislation to remove this restriction for HSGT. The Congress has again taken up removing the restriction on using tax-exempt bonds to finance HSGT development. However, the benefits to HSGT will need to be weighed against the potential impact on the federal deficit as well as against other initiatives that may also seek to receive favorable tax treatment.

Create a Revolving Loan Program. Direct loans, through a revolving loan program, is another option for a federal role in HSGT development. Some members of the financial community, as well as the Infrastructure Investment Commission, have suggested that the federal government should establish its own revolving loan fund for infrastructure development or help fund state-level funds for the same purpose. To capitalize such a fund would require a large initial appropriation or several smaller appropriations over the span of several years. HSGT projects, however, are likely to be so large that only a portion of their financing needs could come from such a fund, particularly since HSGT will have to compete with other infrastructure projects. However, loans from such a fund would presumably carry below-market interest rates. Thus, they could help lower the cost of capital for HSGT and enhance their financial feasibility.

Use Value-Capture to Fund Parts of Projects. Finally, value capture is a way for other government entities to assist the development of HSGT. Under a typical value capture strategy, a local or state government would provide funding for components of a HSGT system, such as a station, in anticipation that property values would increase in the vicinity of the HSGT property after the system is in place. Rising property values could generate increased tax receipts or other assessments which could offset the state's initial expenditure. In this sense, the HSGT system "captures" the benefits of higher future property values, and uses them as a source of funds. In the past, value-capture strategies have been used successfully to provide revenues for several urban transit systems. An innovative value-capture-type financing strategy was used in California, where a new publicly administered but mostly privately financed toll road has imposed fees on new construction in the areas that will presumably benefit from the toll road. These fees will be used to help leverage private capital investments to build the road.

For HSGT, however, value capture could be used to finance specific components of a system, but could not be the major funding source. The plan to build the Tampa-Orlando-Miami HSGT system initially relied on a strategy similar to value capture as the major source of finance, but found that it would not generate sufficient funds and has since revised its financial strategy. Furthermore, it may take several years to generate any revenue from value-capture strategies, since land value increases and development around a HSGT system might not occur until the system's construction or operation is well underway.

Nevertheless, there are a number of options for increased government involvement at all levels in financing HSGT projects. Furthermore, it seems likely that some combination of these options would be necessary to bring a HSGT project from concept to reality. Different financing methods could be used at different "risk points" during a project's development period. For example, the Texas HSR Corporation plans to use different financing techniques in various phases of its plan to bring TGV-style service to the "Texas Triangle" cities of Dallas, Houston and San Antonio. The plan includes using initial equity contributions, tax-exempt debt backed by long-term letters of credit, and after operations and revenues become steady, a public stock offering.[5] Such a combination of approaches spreads, and therefore minimizes, risk over time and across investors and creditors, thereby making investment in such a project more plausible.

Regardless of how creative high-speed rail developers are with their financing plans, it seems apparent that the private sector alone will not assume all, or even a substantial share of, the risks associated with HSGT development financing. Many states and localities are experiencing financial difficulties, with little, if any, funding resources available for financing high-risk, large-scale infrastructure projects. While the federal government is also faced with making difficult spending choices, it is the only entity capable of underwriting the sizeable risks associated with HSGT projects. Therefore, the federal government would need to assume a major role in financing HSGT if such projects were to be built in this country.

FEDERAL INVOLVEMENT TO DATE

The federal government has provided assistance to Amtrak to improve speeds on the Northeast Corridor. Amtrak has spent about $2 billion to date and expects to spend an additional $1.5 billion to complete improvements which it expects will allow 150 mph speeds by the turn of the century.

The federal government has also sponsored the National Maglev Initiative (NMI), which is a 3-year effort to assess the potential role of maglev in the United States. Funding for the NMI, has totaled $36 million, according to figures provided by the Federal Railroad Administration (FRA). The report is due in the Spring of this year.

In 1991, as part of the ISTEA, the Congress authorized $725 million for a National Maglev Prototype Development Program. The Congress has not appropriated any funds for this program for fiscal year 1993.

In fiscal years 1991 and 1992, the Congress appropriated $3 million for HSGT studies in specific corridors, contingent on matching funds. Additionally, FRA has used some of its R&D funds to develop safety regulations for HSGT systems.

President Clinton often offered HSGT as an example of the kind of infrastructure spending that the nation should be making. The new administration has now proposed to spend $646 million between 1994 and 1997 above and beyond what is already been appropriated

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[5]The system was originally scheduled to begin service in 1998. Obstacles, including financial ones have seen the schedule slip and the start up date is now uncertain.

for HSGT. Whether this increased spending will signal a change of commitment to the investment community remains to be seen.

FEDERAL GOVERNMENT NEEDS TO WEIGH CAREFULLY THE BENEFITS AND COSTS OF HSGT BEFORE MAKING MAJOR RESOURCE COMMITMENT

Federal resources are scarce and becoming increasingly so. At a time of national belt-tightening, all new projects must be given careful scrutiny to ensure that they are cost-effective. If the federal government decides to invest in HSGT, it will need to be certain that such investments are cost-effective over the long term--that is, that investing in HSGT is an efficient way to capture desirable social benefits.

In order to determine the amount of federal resources that might be committed to developing HSGT in the United States, the Congress and the Clinton administration need good data to determine what social benefits might result from such systems. But, the data often do not exist or can not help determine whether HSGT is the best way to achieve these benefits. HSGT must be evaluated in comparison to alternative approaches. Airport congestion could be relieved by building HSGT or it could be relieved by adding another runway. Air pollution emissions could be reduced by diverting auto traffic from congested highways onto HSGT or stricter emissions standards could be adopted.

In order to determine the relative cost-effectiveness of HSGT, better estimates of potential demand are needed, but there are gaps in the necessary data. The data are either too aggregated or do not exist at all. For example, diverting auto traffic can be an important source of public benefits, but there are virtually no data on intercity auto travel that could be useful for forecasting demand for HSGT. In addition, there are problems with translating social benefits into comparable monetary terms. For example, how much is it worth to remove a ton of automobile-generated air pollution? How does the fact that the reductions occur over a widespread, often non-urbanized area affect the estimates of the benefit? How reliable are the estimates of the relationships between emissions and health costs? How much, if anything, beyond the current market price of energy is reduced reliance on foreign petroleum worth?

While there are many problems with calculating the potential social benefits from investing in HSGT systems, the federal government could consider investing in developing better data on which to base demand forecasts for HSGT. Although data collection can be costly, the cost will be relatively insignificant compared with the size of the investment at stake. Gaining improved prior information on the likely success of an investment in HSGT seems to be the prudent course of action.

CONCLUSION

The decision to increase spending for HSGT is an important one that must be made at a time when efforts to pare down the size of the federal deficit are making discretionary dollars increasingly scarce. Yet, without an increased federal commitment, HSGT will not advance in the United States.

If the Congress decides to increase the federal role in developing HSGT, the Congress will need to balance the resources it provides between continued support for incremental improvements by Amtrak and underwriting the risks of more ambitious projects through forging public-private partnerships. The Congress will also need to decide where to target the resources it makes available for specific HSGT projects. This will require a fuller understanding of the benefits and costs of individual HSGT projects, and gaining that understanding requires, in turn, reasonably reliable data. Better information will help the Congress as it sets priorities for the future of HSGT in America.

Mr. Chairman, that concludes our testimony. We would be happy to respond to any questions you might have.

Figure 1: Relative Top Speeds of High Speed Ground Transportation Systems

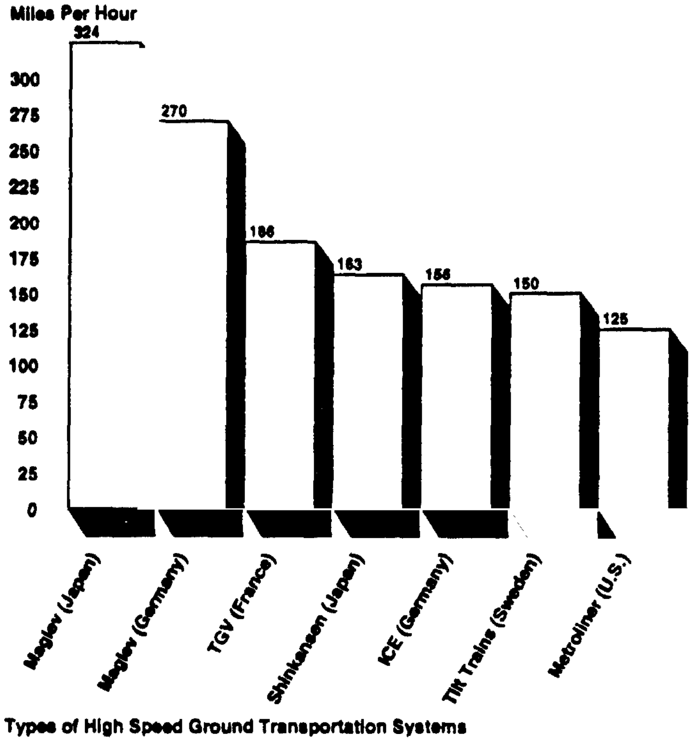
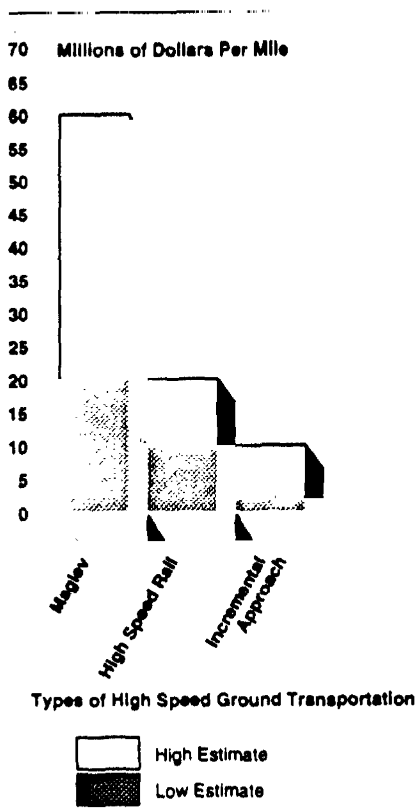


Figure 2: Relative Costs of High Speed Ground Transportation



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