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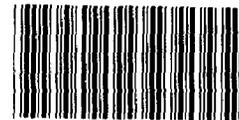
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HIGH SPEED GROUND
TRANSPORTATION

Strategic Approach Needed
for Introduction of HSGT

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Mr. Chairman and Members of the Subcommittee:

We appreciate the opportunity to testify on the issues surrounding the development of high-speed ground transportation (HSGT) in the United States. 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 HSGT systems, including the X2000 tilt train. We have also met with Amtrak management, other railroad officials, HSGT project planners, transportation analysts, and members of the financial community. Last month we testified before the Subcommittees on Transportation of the House and Senate Committees on Appropriations. In those testimonies we focused on HSGT financing issues. Our testimony today reviews the alternative HSGT technologies and focuses on infrastructure improvements needed to bring HSGT to the United States on existing railroad rights-of-way. We will also discuss the social benefits that might accrue from introducing HSGT and the problem of accurately assessing these benefits.

By high speed we refer to systems capable of sustained speeds of at least 125 mph.¹ Amtrak's Metroliner trains travel at 125 mph along some stretches of track between Washington, DC and New York City. 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 150 and 185 mph, and magnetic levitation (maglev) technology is being developed in Germany and Japan that could carry passengers at speeds over 250 miles per hour.

Our basic points are as follows:

- The United States could pursue several levels of technology options to make HSGT a reality here. The incremental approach involves building upon the existing rail infrastructure, which could increase speeds to 150 mph, and would incur the lowest capital cost. Incremental improvements would include electrifying rights-of-way, eliminating grade crossings, and making a number of other track and signaling improvements. Since freight railroads own most track in the United States, their cooperation would be essential to the success of an incremental improvement project. The United States could also pursue higher-speed approaches such as building a TGV-type system, which could permit speeds near 200 mph, or maglev, which has potential for speeds over 250 mph. These systems are more costly than the incremental approach because they require completely new tracks, rights-of-way, and in the case of maglev, specialized guideways.

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

- More than a dozen HSGT projects have been proposed around the nation, but only in Amtrak's Northeast Corridor have plans moved to implementation. Nearly 20 years of federally funded incremental improvements have increased speeds on the Northeast Corridor. Amtrak plans to make further improvements to permit speeds of 150 mph between New York City and Boston by the turn of the century.
- Plans to build TGV-type and maglev systems in other locations have been advanced by groups other than Amtrak who have attempted to secure private-sector financing for their proposals. However, these plans have stalled due to a lack of interest on the part of private investors. Investment bankers experienced in financing transportation projects told us that investors have shown little interest in HSGT projects because of uncertain rates of return. Private investment bankers told us they believe that without a substantial federal investment that reduces the perceived risks, few private dollars will flow towards any HSGT systems.
- Federal investment in HSGT projects should be predicated on the projects' predicted net social benefits, such as reduced airport and highway congestion, reduced energy consumption, or increased economic activity. However, serious gaps in transportation databases make it difficult to predict these benefits, especially the benefits from reduced airport and highway congestion, which, in turn, depend on significant diversions of current airplane and automobile users. In addition, some effects, such as the benefits of reduced air emissions, are hard to translate into dollar terms. While the data can never be perfect, there is room for considerable improvement. Given the size of the investments at stake, the databases and estimates of benefits should be improved.
- Policy choices with significant financial impacts will have to be made before HSGT is developed in the United States. HSGT systems in any form are very costly. Developing HSGT in a single 200-mile corridor could cost between \$2 billion and \$12 billion, depending on whether incremental, TGV-type, or maglev technologies are pursued. Because federal funds are limited, a strategic approach is needed to focus federal funds, rather than spreading federal resources across a large number of projects nationwide.

Now we would like to discuss these points in more detail.

PERFORMANCE AND COSTS VARY FOR DIFFERENT HSGT APPROACHES

The various approaches to HSGT have different performance characteristics and, not surprisingly, the systems that offer the highest speeds cost the most. The incremental approach--improving existing railroad rights-of-way--can permit speeds of up to 150 mph without significant purchases of new rights-of-way, which holds costs down. Systems like the French TGV can achieve speeds near 200 mph, but because they require very straight track dedicated to passenger operations, they require new, dedicated rights of way which adds to their costs. Maglev, which could achieve speeds of well over 250 mph, requires specialized guideways which further adds to the cost of these systems. (See figures 1 and 2.)

INCREMENTAL APPROACH BUILDS ON EXISTING INFRASTRUCTURE

Because the incremental approach requires little or no acquisition of new rights-of-way, it costs the least. According to the National Research Council (NRC), the cost to upgrade an existing rail line to allow speeds of about 110 mph would be about \$2.7 million per mile. The NRC estimates that to achieve speeds of 125 mph would cost \$10 million per mile, while speeds of 150 mph would cost \$13 million per mile.² These expenditures result from the need to electrify the rights-of-way, eliminating grade crossings, and otherwise upgrading the railroad infrastructure. In addition, high-speed operations under this approach would require the cooperation of the freight railroads that own most of the nation's track, other than the Northeast Corridor, which Amtrak owns. Amtrak is upgrading the Northeast Corridor where 125 mph speeds are already achieved in some segments and 150 mph speeds are planned by the turn of the century. Amtrak is also pursuing development of a non-electric locomotive capable of at least 125 mph speeds that could provide high speed service without the cost of electrifying routes outside the Northeast Corridor.

Electrifying Track and Eliminating Grade Crossings Are Costly

Electrifying rights-of-way and eliminating grade crossings are among the most expensive investments that must be made to upgrade existing rail services to high-speed levels. Electric locomotives are currently the only locomotives capable of traveling 125 mph or more. In Europe and Japan, electric locomotives are standard in high-speed passenger operations. Amtrak plans to electrify the Northeast Corridor north of New Haven at a cost of about \$2 million

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

per mile. Outside the Northeast Corridor, where most rights-of-way are not electrified, rail services are provided by diesel locomotives.

Because safety concerns limit train speeds through grade crossings, eliminating as many grade crossings as possible will be critical for HSGT. However, eliminating grade crossings by either raising or lowering the road is costly, ranging between \$5 million and \$20 million for each grade crossing project. Because grade crossings average about 1 per mile on routes where incremental improvements are planned, the total cost to eliminate all grade crossings would be prohibitive. A less expensive option is to close crossings, (i.e. create dead end roads), but the resulting disruption to local traffic limits the applicability of this approach. Enhancing grade crossings with protective devices is another option, but passenger trains would still have to slow down at each remaining grade crossing. A combination of grade crossing treatments will likely be needed, depending on a project's budget.

Numerous Other Improvements Are Required to Upgrade Existing Rights-of-Way to Accommodate HSGT

Continuous-welded rail and concrete ties are required to help maintain the precise track alignment necessary for high-speed operations. High-speed switches are also needed. High-speed operations require cab signaling, that is, train control signals are displayed in the locomotive cab. Furthermore, a system is needed that automatically slows or stops the train if the operator fails to respond properly to a signal.

Additional improvements may be needed, depending on the condition of existing rights-of-way. On routes with substantial freight traffic or conventional passenger service, additional track may be needed to allow high-speed passenger trains to pass the slower trains. Some bridges may need to be widened or require structural reinforcement to handle trains traveling 125 mph. Rights-of-way may need to be fenced to protect pedestrians and prevent vandalism.

While specific conditions vary on individual routes throughout the country, deficiencies of these types have combined to restrict passenger train speeds. On most Amtrak routes, cruising speeds are restricted to only 55 mph.

Freight Railroad Cooperation Is Needed to Operate Trains Over Shared Rights-of-Way

Operating 125-mph passenger trains on the track currently used by slower-moving freight trains, conventional intercity passenger trains, and commuter trains raises logistics and safety issues. The Association of American Railroads (AAR), which represents the

railroad industry, recently issued a policy statement stipulating that if high-speed passenger trains operate over freight-railroad owned rights-of-way, the passenger service should bear any capital or maintenance costs required by high-speed passenger operations. According to AAR and freight railroad officials, improvements to allow higher speeds are of little benefit to freight traffic and the nation's freight railroads should therefore not be expected to share the costs. The freight railroads want immunity from potentially catastrophic, uninsurable liability from accidents in these rights-of-way. The 1987 collision between a Conrail freight train and an Amtrak passenger train in Chase, Maryland, heightened railroad industry concerns over liability for punitive damages. In the Chase accident, the Amtrak engineer and 15 passengers died and 174 passengers were injured; Conrail paid about \$130 million in out-of-court settlements. Because Amtrak cannot afford to indemnify freight railroads from punitive damages, it has requested the Congress and the administration to examine how best to approach the liability indemnification issue.

Amtrak Continues to Improve High-Speed Service in the Northeast Corridor

Amtrak's Northeast Corridor Improvement Program is an example of the incremental approach to high-speed transportation. As a result of about \$2 billion in improvements since 1976, electrically powered Metroliner trains travel between Washington and New York City at speeds up to 125 mph. Because the track north of New Haven is not electrified, trains traveling north must switch there to diesel locomotives which are slower than electric locomotives. Travel between New Haven and Boston is further slowed by numerous curves along the route.

Amtrak plans to electrify the route between New Haven and Boston and is experimenting with new trains that can traverse curves at higher speeds than conventional equipment. For example, Amtrak is currently experimenting with the Swedish X2000 tilt train, which tilts into curves to provide passenger comfort while maintaining higher speeds. By using such modern train technologies, electrifying the route, continuing to eliminate grade crossings, improving signaling, and making other improvements, Amtrak hopes to offer 150-mph service in the Northeast Corridor by the end of the century. However, to achieve this goal, Amtrak claims it will need about \$1.35 billion in federal funds. Of this amount, about \$900 million would be used for infrastructure upgrades and \$450 million would be used for the purchase of 26 new trainsets (locomotive and passenger cars). The new trainsets will utilize European technology but will be built in the United States. The total cost for Northeast Corridor improvements will be about \$3.5 billion. Excluding the \$450 million for new trainsets, the total cost of Northeast Corridor Improvements would be about \$7

million per mile.³ Amtrak intends its Northeast Corridor improvements to serve as a model for incremental improvements elsewhere in the country.

Amtrak Is Examining Alternatives to Electrification

While only electric locomotives are currently capable of achieving 125-mph or higher speeds, Amtrak is pursuing development of a non-electric locomotive that can achieve speeds of 125 mph. Outside the Northeast Corridor, most railroad rights-of-way are not electrified, precluding use of the faster electric locomotives. A non-electric locomotive capable of speeds of 125 mph or more could permit high speeds without the expense of electrifying the rights-of-way. Amtrak has been reviewing design proposals for such a locomotive, but thus far, has found all proposed locomotives to be too slow, too heavy, and/or too expensive.

Amtrak now plans to undertake an experiment that involves placing a new generation turbine engine in an existing Amtrak turbine train in cooperation with the New York Department of Transportation. However, turbine trains have a history of high maintenance costs. Amtrak plans to place the experimental train in operation on the New York-Buffalo route to test performance and gather data on operating and maintenance costs.

Turbine trains would have to be adapted to enter New York City. Because rail access to New York City is via tunnels, where internal combustion locomotives cannot operate, only electric powered locomotives can be used. To avoid a time consuming switch of locomotives, Amtrak hopes to equip the high-speed non-electric locomotive with the capability of using electric power to move through the tunnels, but at slower speeds.

TGV-TYPE AND MAGLEV SYSTEMS REQUIRE NEW RIGHTS-OF-WAY

For trains that operate over 150 mph, new track, new rights-of-way, or entirely new guideways will be required, adding considerably to costs. High-speed rail systems, such as the French TGV and the Japanese Shinkansen generally operate on a dedicated right-of-way. Maglev systems require new rights-of-way and specialized guideways.

³The \$2 billion already spent on Northeast Corridor Improvements did not include trainset costs, according to Amtrak officials.

High-Speed Rail Systems Require Dedicated Rights-of-Way

The higher speeds of TGV-type high speed rail systems require relatively straight and level rights-of-way that are free from grade crossings and slower freight or conventional passenger rail traffic. As a result, a completely new right-of-way must usually be built. In central city areas, where acquiring new rights-of-way might be impractical, these systems could use existing rights-of-way, at lower speeds.

Significantly lower rail travel times can make rail travel competitive with air travel for many trips of less 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.⁴ The NRC 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.

Maglev Requires Specialized Guideways

A maglev system could allow even faster speeds, but it requires special, expensive guideways. 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 chosen not to build maglev systems on major routes. Instead, they have introduced a new high-speed train that uses conventional railway track--the Intercity Express or ICE train. Cost estimates to build a maglev system run between \$20 million and \$60 million per mile. The NRC estimated that a 200-mile maglev system would cost \$6.4 billion, or about \$32 million per mile, which is about in the mid-range of maglev system cost estimates. Some proponents of maglev believe that it is the technology of the future and that only maglev can offer Americans a dramatic enough improvement in speed and service to convince travelers to switch to HSGT in large numbers. Other supporters believe that if the United States chose to develop its own version of maglev, new jobs could be generated and a new high-tech industry developed.

⁴European nations and Japan have historically followed policies that favor rail over air and auto travel for intra-national trips. Air fares are much higher in these countries, and investment in the highway systems came later than in the United States. Rail has therefore preserved a higher market share than it has in the United States even in markets not served by high-speed trains. Nevertheless, the rail's market share increased significantly in French and Japanese markets after high-speed service was introduced.

In the United States, preliminary maglev plans, as outlined in the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), envision building maglev systems along interstate highway rights-of-way. However, as we reported last year, interstate highway designs might not be compatible with maglev systems.⁵ Maglev systems built alongside interstate highways or in the median strips must contend with numerous obstacles, including bridges, overpasses, and interchanges. Traversing hill crests and valleys could interfere with passenger comfort at high speeds. Finally, concerns have been raised over the "startle effect" on automobile drivers that could occur when a 250-300 mph maglev suddenly appears, but supporting data are scarce.

SLOW PROGRESS IN HSGT DEVELOPMENT

Compared with Europe and Japan, progress in developing HSGT in the United States has been slow. Amtrak's program in the Northeast Corridor is part of a continuing, federally funded program that began nearly 20 years ago. Some federal funds have recently been made available to state departments of transportation for eliminating grade-crossing hazards on five potential high-speed routes, but initiatives to build higher-speed TGV-type or maglev systems have been advanced by groups other than Amtrak who hope to secure private funding for the proposed systems. However, private investors seek a positive return on invested capital, and the consensus of the financial community is that these projects are simply too risky to interest private investors. Therefore, private capital has not been forthcoming, and none of these projects has advanced beyond the planning stage.

Funding Provided for Incremental Improvements Outside the Northeast Corridor

In the fall of 1992, the Federal Railroad Administration (FRA) designated five intercity travel corridors as eligible for federal funding for elimination of grade-crossing hazards--a critical step in establishing HSGT. The five corridors are Washington-Charlotte, Detroit-Chicago-Milwaukee-St. Louis, Tampa-Orlando-Miami, Vancouver-Eugene, and Sacramento-San Francisco-San Diego. FRA selected these corridors under the provisions of ISTEA, which authorized \$30 million over 6 years for up to five corridors where trains currently achieve speeds of 90 mph or could be expected to achieve this speed. Although 90 mph is slower than what is usually considered HSGT, the states involved have submitted plans for future improvements to achieve higher speeds in these corridors. In October 1992, FRA allocated the first \$5 million among the corridors.

⁵High-Speed Ground Transport: Acquiring Rights-of-Way for Maglev Systems Requires a Flexible Approach (GAO/RCED-92-82, Feb. 10, 1992).

HSGT Faces Financial Barriers

Plans to introduce high-speed rail systems have been proposed in more than a dozen locations around the nation. HSGT planners in Texas want to link the cities of Houston, Dallas, and San Antonio using TGV technology. Maglev proponents hoped to build a system connecting Anaheim, California with Las Vegas, Nevada. In Florida, HSGT planners want to construct a 13.5 mile maglev system connecting the Orlando International Airport with International Drive, the location of numerous hotels serving the area's tourist attractions. However, these and similar projects have not attracted sufficient investment to move beyond the planning stages.

Members of the financial community told us that the private sector has been unwilling to commit financial resources to HSGT because of a number of perceived risks. Because of the lack of experience with HSGT in the United States, investors believe that ridership and revenue forecasts may be exaggerated. The financial community typically discounts traffic forecasts for demand-sensitive start-up projects, like toll roads and, presumably, HSGT projects. Furthermore, investors require that projects generate sufficient revenues to cover their debt service needs, including a substantial cushion to cover contingencies. For some projects, this cushion could be as high as 150 percent of the actual debt service costs. 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. Given the perceived risks of HSGT, investment bankers with whom we spoke told us that without a considerable increase in federal commitment, major private-sector investment is unlikely.

HSGT SOCIAL BENEFITS AND COSTS SHOULD BE CAREFULLY EVALUATED

Private investors make their decisions based on the expected private rates of return. But projects could generate benefits above and beyond those that accrue to private investors. In these cases, it is in society's interest for the government to invest in or to subsidize the activity to ensure that sufficient amounts of the good or service are produced so that the social benefits are realized. Thus, public investment decisions should be based on expected social benefits. In the case of HSGT, social benefits include relief from airport and highway congestion, energy conservation, and abatement of air and noise pollution. The quantity of social benefits that a proposed HSGT system can be expected to provide could serve as a key factor in deciding where to invest federal funds. Because federal resources are scarce and HSGT systems are very costly, the Congress and the administration will want to channel federal funds toward the most cost-effective

projects. However, current data and measurement techniques need improvement before social benefits can be accurately predicted.

Social Benefits From HSGT
Are Difficult to Measure

The amount of social benefits that a HSGT project can generate depends on the amount of traffic diverted from less environmentally benign or less energy-efficient transportation modes. Unfortunately, reliable data on some of the modes are lacking, making it difficult to forecast the potential for traffic diversion and thus, the potential social benefits. Even if traffic diversion could be accurately forecast, expressing some social benefits in dollar amounts to compare with HSGT construction costs may be problematic. Finally, because HSGT systems can create some social costs such as increased noise, it is the net social benefits that should form the basis for a public investment decision.

Existing data are insufficient to permit reliable forecasts of the level of social benefits that a proposed HSGT system might generate. Substantial traffic diversion from air and automobile travel is critical in achieving what is perhaps HSGT's most significant social benefit--reduced air and highway congestion. Demand forecasters attempt to estimate the numbers of travelers that may switch from airplanes and automobiles, but to do so they need data on current travel behavior. Some data, especially for automobile travel, are lacking and, as a result, the forecasts are less reliable.

HSGT demand forecasts also contain a number of assumptions which must be assessed for reasonableness and their potential impact on predictions of ridership, revenues, and public benefits. For example, demand forecasts typically assume that the fare on an HSGT system will be less than the competing airline fare. However, airlines would likely cut their fares if HSGT offered a serious challenge to their traffic bases. HSGT demand forecasts also typically assume that a certain percentage of ridership will occur that would not have occurred in the absence of HSGT. Estimates of this ridership, called "induced demand," have ranged from 10 up to 40 percent of total ridership in demand forecasts. Some analysts believe that any assumption of induced demand assumption over 10 percent of total demand may be too high.

Economic development is also cited as a social benefit of HSGT. HSGT systems create jobs in construction and in system operation. HSGT systems may also stimulate economic activity in the vicinity of stations. However, the NRC points out that predictions of economic development often do not take into account the opportunity cost of building a HSGT system instead of building

airport or highway improvements.⁶ Construction jobs could be created by widening interstate highways. Building new or expanded airports may provide a more flexible and lower-cost option. For example, the \$3.1 billion cost of the recently constructed New Denver Airport, which provides access to hundreds of cities around the nation and the world, was about half the estimated cost for a 200-mile maglev, which would serve only one route. Both highways and airports, however, face serious restrictions on new construction and expansion.

Comparing HSGT's potentially positive net public benefits with the construction and operating costs or the costs of alternative transportation projects is complicated because many of the social benefits of HSGT, such as reduced air pollution, are not readily translated into dollar amounts. In addition, there are social costs associated with HSGT. For example, while air traffic diversion could reduce airport noise, the HSGT system could produce a social cost by generating noise along the entire right-of-way.

Federal Spending on HSGT Systems Should be Focused

Regardless of the approach, developing HSGT is expensive. Making incremental improvements to achieve 125 mph speeds could cost \$2 billion for a 200-mile corridor. Building a TGV-type high-speed rail system to achieve speeds near 200 mph could cost \$3.5 billion for a corridor of the same length. Finally, building a maglev system to achieve 250 mph speeds could cost \$12 billion for a 200-mile corridor.

Federal funds authorized to date are only a fraction of what would be needed to fund all the HSGT projects that have been proposed, and the funds actually appropriated are even fewer. At the same time, federal dollars are becoming increasingly scarce. If the Congress chooses to increase the federal involvement in HSGT, it might wish to consider strategically targeting the resources to improve the likelihood that some projects are built. Spreading federal dollars over many projects may not provide the critical mass necessary to get any projects up and running.

PAST FUNDING HAS FOCUSED ON THE NORTHEAST CORRIDOR, BUT INCREASES ARE PLANNED

As mentioned earlier, the federal government has provided over \$2 billion to improve speeds in the Northeast Corridor. Other federal assistance efforts include funding to study specific HSGT corridors and to develop HSGT safety regulations. In fiscal years

⁶Transportation Research Board, Special Report 233: In Pursuit of Speed-New Options for Intercity Passenger Transport.

1991 and 1992, the Congress appropriated \$3 million for studies of specific HSGT corridors, contingent on matching funds being provided. The FRA also has used some of its research and development funds to draft safety regulations for HSGT systems. Recently, FRA allocated \$5 million out of a total of \$30 million authorized in ISTEA for eliminating grade-crossing hazards in 5 potential high-speed corridors.

For maglev, the federal government has sponsored the National Maglev Initiative (NMI), a 3-year study to assess the potential role of maglev in the United States. According to FRA officials, funding for NMI has totaled \$32 million.⁷ The NMI report is due this spring. As a part of ISTEA, the Congress authorized \$725 million for a National Maglev Prototype Development Program, but no funds were appropriated in fiscal years 1992 and 1993. The Bush administration decided to allow the NMI to complete its work and issue its report before requesting these funds. ISTEA authorized up to \$1 billion in loan guarantees for HSGT projects, but there is no budget authority for this program.

During his campaign, President Clinton often offered HSGT as an example of the kind of infrastructure expenditure that the nation should be making. The new administration has now proposed \$140 million for fiscal year 1994 and a total of \$1.3 billion during fiscal years 1994-98 to be invested in HSGT technology and in incremental improvements for selected corridors. Although these funds will be used for HSGT programs authorized in ISTEA, no decisions have been made on how the funds will be divided between rail and maglev technologies. Whether the increase in funding will be sufficient to encourage private investment is uncertain, given the high cost of these projects.

INCREASED FEDERAL PARTICIPATION COULD TAKE MANY FORMS

The federal government, through appropriations to Amtrak, will probably continue to be the primary funding source for future incremental improvements. The more costly, higher-speed TGV-type and maglev systems have tried to rely on private-sector financing. However, in the view of members of the investment banking community, significant federal participation, which would reduce the perceived investment risk, will be essential before substantial private investment flows toward the higher-speed systems. Assuming the federal government decides that a HSGT project's potential public benefits are worth a federal investment, the federal government has a number of options to assist in financing. Given the large scale of these projects, it seems likely that some

⁷In previous testimonies we stated that the NMI funding totaled \$36 million according to figures provided by FRA officials. FRA has since revised the figure to \$32 million.

combination of these options would be necessary to bring a HSGT project from concept to reality.

- Appropriations. The federal government has financed the Northeast Corridor improvements through appropriations. ISTEA provided a limited amount of direct federal support for eliminating grade-crossing hazards. Increasing appropriations, perhaps in conjunction with state matching funds, is one alternative.
- Financial and administrative assistance during the initial development and construction phase of HSGT projects. The early stages of a project are typically a high-risk period for new infrastructure projects because many time-consuming regulatory and financial obstacles must be overcome. Federal funding for the early development and construction phases could reduce perceived risks and attract additional private financing.
- ISTEA's loan guarantee provisions. ISTEA made HSGT eligible for \$1 billion in loan guarantees authorized by the Railroad Revitalization and Regulatory Reform Act of 1976. Loan guarantees would also reduce the perceived risk for private investors.
- Direct loans through a revolving loan program. Some members of the financial community, as well as the Infrastructure Investment Commission, have suggested that the federal government establish its own revolving loan fund for infrastructure development or help fund state-level revolving loan funds for the same purpose.
- Tax-exempt debt for HSGT systems. HSGT proponents believe that removing the requirement to subject 25 percent of the value of HSGT development bonds to state volume-caps is critical to HSGT system development. Tax-exempt bonds are an attractive mechanism for raising capital because bond issuers pay a lower interest rate than they would on taxable debt. Legislation has been introduced to remove the restriction on using tax-exempt bonds to finance HSGT development.

CONCLUSIONS

The important decision on the level of funding for HSGT must be made at a time when efforts to pare down the size of the federal deficit are making discretionary dollars increasingly scarce. While TGV-type and maglev systems offer greater speed, they are more costly than the incremental approach. The incremental approach could permit speeds up to 150 mph--a substantial

improvement over the average 55-mph speeds of passenger trains outside the Northeast Corridor.

HSGT systems are expensive in any form, requiring a strategic selection of the most beneficial projects. Any sum of federal funding will likely be extremely low compared with the total combined cost of all currently proposed systems. If federal funding is spread over many projects, none of them may have sufficient funds to reach implementation. Therefore, we believe that if Congress chooses to increase federal funding for HSGT, it might wish to consider targeting funds to ensure that projects reach completion. Deciding where these funds can best be delivered to provide maximum social benefits will require a fuller understanding of the benefits and costs of individual HSGT projects. This understanding, in turn, requires more complete data than now exists. Given the billions of dollars potentially at stake, we believe a federal effort to develop more complete data would be prudent.

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

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

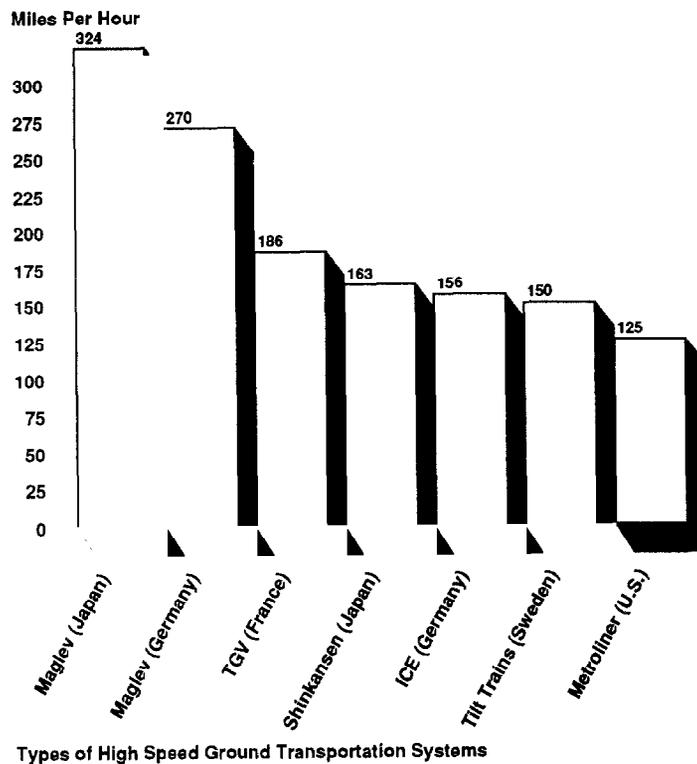
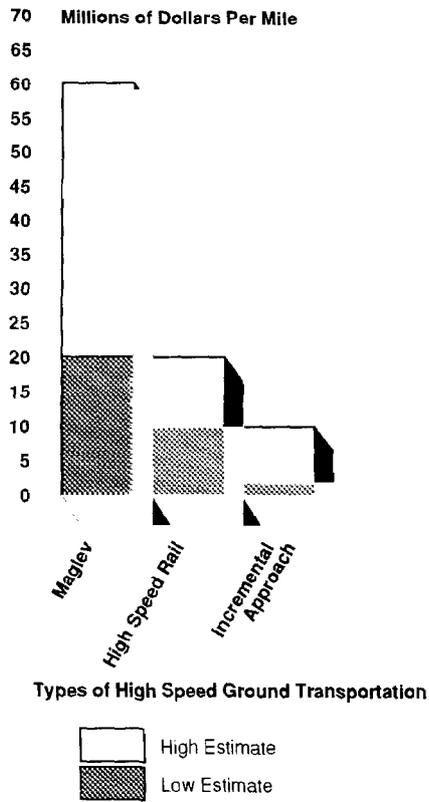


Figure 2: Relative Costs of High Speed Ground Transportation



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