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Volume 1

Welcome to the Transportation Research Forum's 1998 Annual Meeting

These proceedings contain those papers presented at the 40th Annual Meeting of the Transportation Research Forum, held in Philadelphia from October 29-31, 1998, that were received by the deadline publishing date. All papers were reviewed by the Program Vice President to assess their suitability for inclusion in these volumes. Additional papers may be made available by some of the presenters at the time of the Conference.

The Transportation Research Forum (TRF) is an independent organization of transportation professionals providing pertinent and timely information to those who conduct research and those who use and benefit from research. It functions as an impartial meeting ground for carriers, shippers, government officials, consultants, university researchers, suppliers, and others seeking an exchange of information and ideas related to both passenger and freight transportation. The Transportation Research Forum started with a small group of transportation researchers in New York in 1958 and the first national meeting was held in St. Louis in 1960. National meetings have been held annually since 1960 at various cities throughout the U.S. and Canada.

Numerous TRF members and supporters aided in the development of this year's Forum, but it is authors of the papers, the organizers and contributors to the various panels, and the session chairs who make TRF annual meetings so worthwhile and enjoyable. The conference program simply reflects the interests, enthusiasm and commitment of those members of the transportation community. Special thanks go to Patrick and Judy Little who graciously agreed to assemble this year's proceedings for me. Without their help, the job of Program Chair would have been much more of a burden.

A number of other TRF members also assisted in the development of this meeting. Randy Resor and Jim Blaze were constant sources of ideas and encouragement. When help was asked for, they came through repeatedly. Other TRF members provided help with the program in their areas of interest. I want to thank Alan Bender, Michael Belzer, Ken Ericksen, Paul Gessner, Harold Kurzman, Scott Ornstein, Clint Oster, and Peter Smith for their help. Claire LaVaye at the University of Texas assisted with promoting the meeting on TRF's website. Finally, Rick Guggolz provided valuable assistance on the businees arrangements for the conference.

We are also grateful to those companies and organizations who have sponsored awards or made other contributions to the success of the Forum. These include: LTK Engineering, The Metropolitan Transit Association, and RailTex. Among our own members, we are especially indebted to the TRF Foundation, the Cost Analysis Chapter and the Aviation Chapter for their assistance and support.

These proceedings are prepared and distributed at the TRF Annual Forum as a means of disseminating information and stimulating an exchange of ideas during the meeting. Every effort has been made to reproduce these papers accurately. TRF, however, assumes no responsibility for the content of the papers contained in these volumes.

Richard Golaszewski
Program Vice President
October, 1998

AMTRAK, THE NATIONAL RAILROAD PASSENGER CORPORATION: CURRENT PERFORMANCE AND FUTURE PROSPECTS

By

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I. Introduction

Amtrak took over operation of long-distance rail passenger service in the United States on May 1, 1971. In the more than 27 years since Amtrak's creation, the debate over Amtrak has repeatedly revisited the same issues:

- Lack of a dedicated funding source
- Inadequate capital investment
- Failure to exploit many obvious markets for passenger service
- Unreliable trains and poor service quality
- High cost relative to the service levels provided

The debate over Amtrak has been one of the longest-running shows in Washington politics, and has proved seemingly incapable of resolution. Starting with Richard Nixon, every President has proposed to zero out Amtrak's operating subsidy; none has succeeded in doing so. A total of more than $21 billion has been authorized for Amtrak's operating and capital budgets over the past 27 years, yet Amtrak remains starved of capital investment and on the edge of bankruptcy.

There are indications that the political will (or lack of will) that has sustained Amtrak for more than two decades may be eroding. In 1995, under pressure from both the Congress and the President, Amtrak re-examined its route structure and made the first significant cuts in its operations since 1979. Following the recommendations of a consultant, the route structure and train frequencies were both realigned in an attempt to cut operating costs and increase equipment utilization without a significant loss of ridership. At the same time, Amtrak's president Tom Downs announced his commitment to balancing Amtrak's operating budget. In 1997, Congress made this an official goal, mandating a "glide path" to self-sufficiency by the start of fiscal 2002.

By 1997, however, it was apparent that revunue losses were larger, and savings smaller, than had been envisioned. Amtrak was off the glide path. So another round of service cuts was made, eliminating two Western routes altogether. At the same time, a substantial commitment to developing an "express" business was announced. Express (less than carload, high priority package freight) was to contribute a net $70 million to Amtrak's bottom line; several hundred express box cars and RoadRailers were ordered to carry this traffic. Amtrak also began to look for more income from real estate, and from the operation of commuter rail service under contract (Amtrak is forbidden by law to directly operate such service).

Unfortunately, in early 1998 Amtrak found itself once again in crisis despite Congressional passage of the Taxpayer Relief Act of 1997 . This act authorized a total of $2.1 billion in capital funds for Amtrak. This money, combined with the President's request for $621 million in discretionary capital funds for 1997 and only slightly less in the "outyears", totaled to "...more than has ever been invested [in Amtrak] over any five-year period in the past 18 years."[1] However, according to Amtrak's testimony, not only was this funding insufficient, but Amtrak asked for Congressional permission to use some of the $2.1 billion for routine maintenance, asserting that otherwise, the goal of a balanced operating budget could not be achieved.

Amtrak claims to need double the $2.2 billion in the Taxpayer Relief Act for capital improvements. Much of Amtrak's capital funding is being spent on high-speed trainsets and electrification along the Northeast Corridor between Boston and Washington. At the same time, annual reductions in Federal operating subsidies, along with a failure to realize budgeted economies and revenue increases, have resulted in steadily increasing negative cash flows, to the point that bankruptcy of the corporation is being seriously discussed[2]. The juxtaposition of near-bankruptcy with the start of new high speed service is incongruous, to say the least.

Revisions to Amtrak's September 1997 Strategic Plan were presented during the March 1998 budget hearings; among other things, the forecast contribution of the express business was projected to be, at most, $27 million annually rather than the $70 million previously forecast. Savings from route restructurings were smaller than projected, and various changes to labor protection payments and contracting-out were not expected to produce near-term savings. Losses were also projected to be larger than forecast in 1997.

At the same time, Western states have been funding purchase of Talgo tilt-trains and other new rolling stock. Other states are also increasing their funding. Amtrak's acting president George Warrington mentioned a $70 million increase in state contributions to Amtrak for new service. Patronage, at least in some areas, is increasing. So the question

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[1] Testimony by Federal Railroad Administrator Jolene Molitoris, Committee on Appropriations, House of Representatives, One Hundred Fifth Congress, Second Session (Washington: March 11, 1998)

[2] "Issues Associated With a Possible Liquidation of Amtrak", United States General Accounting Office, March 1998.

remains: what really is the present status of Amtrak, and what future does it have? This paper will attempt to develop an objective answer to that question.

II. Amtrak's Current Condition

A. Operating Results

In 1995, Amtrak reorganized into three Strategic Business Units (SBUs), to improve accountability and customer focus. These three SBUs (Northeast, Intercity, West) have, according to Amtrak, brought increased revenues and better customer service. However, a look at Amtrak's own figures tells a somewhat different story than Amtrak chooses to present[3]. What it shows is the following:

- Revenues from passenger train operations (tickets, food and beverages, 403b services) have decreased from 70% of total revenues in 1988 to 57% in 1997
- Passenger *miles* reached their lowest level in ten years in 1996, and are up only slightly for 1997
- Passenger revenue (in current dollars) has been essentially flat since 1990
- The load factor has declined steadily from 53% in 1988 to a low of 46% in 1996, improving slightly to 47% in 1997
- Amtrak's share of the air/rail market has declined from about 8% in 1988 to 5.5% in 1997.

Amtrak is also pleased to boast about the "glide path" to self-sufficiency. While it is true that Amtrak's operating subsidy was only $223 million in 1997, 42% of the 1988 level, this reduction was partially achieved by running an operating deficit. In 1988, with a $532 million operating subsidy, Amtrak ran a year-end *surplus* of $35 million. Thus, the net operating loss was only $497 million. In 1997, the year-end deficit was $70 million, and there was also a Federal contribution of $142 million for excess RRTA payments (this amount was included in the 1988 subsidy). Thus, in 1997 Amtrak actually received $444 million and ran a $70 million deficit beyond this, totaling to a net loss of $521 million. It is difficult to see this result as an improvement. Furthermore, Amtrak generated 9% fewer passenger-miles in 1997 than in 1988.

Figure 1 shows Amtrak's sources of revenue over the last ten years. Note that while total revenue has grown by 51% in current dollars, *passenger* revenue (income from carrying passengers on trains) has grown only 27% in the same period. Amtrak is in effect getting out of the passenger train business, generating increasing amounts of income from contract operation of commuter trains, from real estate, and (most recently) attempting to add express freight services to its trains.

[3] "FY 1999 Amtrak Legislative Report and Federal Grant Request", Amtrak, February 1998.

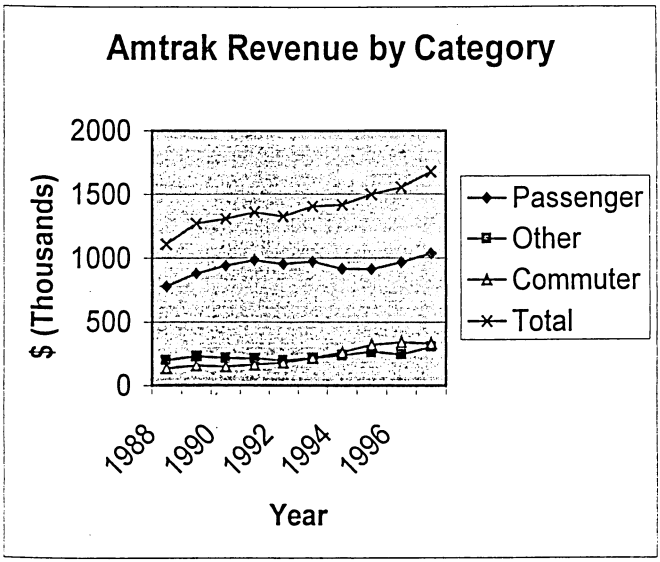

Figure 1: Amtrak Revenue Sources (Source: Amtrak)

In terms of total cash contribution, the commuter service operating contracts generated the largest part of this non-passenger revenue. Carriage of U.S. mail was a distant second. Despite substantial investments in equipment by Amtrak during 1997, the "express" business generated very little revenue, as Amtrak notes in its legislative report. It did, however, generate a great deal of controversy. Amtrak is currently embroiled in a proceeding before the Surface Transportation Board in which Union Pacific Railroad and Conrail are challenging the corporation's right to solicit express traffic on its passenger trains..

It also must be noted that, in constant (inflation-adjusted) dollars, passenger revenues have been stable since 1989. The selective increases in "yield" that Amtrak notes have simply kept pace with inflation. The improvement in subsidy per passenger over the same period appears to result mainly from an increase in the percentage of short-distance riders (at lower fares and therefore lower subsidy). This is unsurprising, since the majority of the service reductions since 1994 have affected long-distance trains.

B. Ridership Trends

Amtrak has trumpeted recent increases in West Coast Business Unit patronage. However, the WCBU is the smallest of Amtrak's three Strategic Business Units (SBUs), and only the increase in 1997 (10% over 1996) was large enough to interrupt a secular downtrend in annual passenger miles that had been continuous since 1991.

Passenger *miles* reached a high (for the Amtrak era) of 6.365 billion in calendar 1979 (the year of the Iranian revolution), and declined thereafter through the mid 1980s. Since then, there has been some growth. However, the most recent peak was in 1991, when Amtrak generated 6.2 billion passenger miles. This number equaled the passenger miles generated by the private railroads in 1970, the last full year of private operation of passenger trains. Passenger miles have declined continuously since (except for 1997).

The *number of passengers* carried by Amtrak also peaked in 1979 (the year of the Iranian revolution) at 21.5 million. This level of ridership was not reached again until 1988, and was exceeded only in 1990, 1991, and 1993. With the 1995 restructuring, the number of passengers returned to the levels of the late 1970s.[4]

The point of this discussion is that an examination of Amtrak ridership trends reveals no clear trend. Ridership has been stable, with minor increases and decreases, for nearly twenty years. Adjustments to the size of the network appear only to shift ridership from one area to another. Increases on one route or in one market appear to be balanced, in general, by decreases elsewhere. Figure 2 shows trends since 1970.

C. Restructuring and Revenue Initiatives

Amtrak's attempts at restructuring appear to have failed to achieve the economies claimed for them. Ridership has declined from its 1991 high, and revenues have only kept pace with inflation despite large increases in prices in some markets (as an example, a round-trip *Metroliner* coach ticket from Philadelphia to Washington cost $96 in 1993. The current price is $156). In fact, there is considerable anecdotal evidence that Amtrak may have exhausted opportunities to increase passenger fares. On the Northeast Corridor, *Metroliner* fares now equal or exceed prices charged by competing airlines. Elsewhere, the cost of air travel also restrains opportunities for increases. A round-trip from Philadelphia to Jacksonville, FL in an Amtrak sleeping car now exceeds the weekday, unrestricted air fare by about $200.

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[4] Statistics are from the *Yearbook of Railroad Facts, 1981 Edition* (Association of American Railroads), Amtrak's 1988 annual report, and Amtrak's *Legislative Report*, 1997.

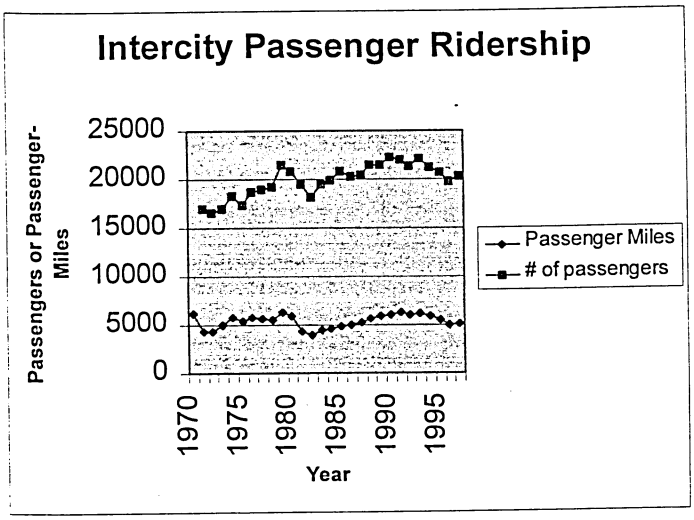

Figure 2: Intercity Passengers and Passenger Miles, 1971 - 1997
Source: AAR *Yearbook of Railroad Facts*, Amtrak annual report for 1988, Amtrak Legislative Report 1997.
NOTE: 1971 figure is for eight months of Amtrak operation

By its actions, Amtrak appears to have recognized the limited opportunities for increasing fare yield. Instead, the company has pursued real estate development, U.S. Mail contracts, and the movement of "express" traffic. As noted earlier, Amtrak in 1997 realized only 57% of its total revenue from passenger fares, as against 70% in 1998.

The difficulty with Amtrak's apparent strategy is that, to date, it seems to have borne no fruit. The expansion of express traffic, promised in Amtrak's September 1997 business plan to yield as much as $70 million in incremental annual revenue, is tied up in a Surface Transportation Board proceeding. There may be some additional opportunities in the management of commuter rail operations or in additional mail contracts. However, the volume of mail and express now being carried by Amtrak has already caused the corporation to lengthen train schedules (to allow for the extra switching needed, and to allow time for loading and unloading).

The bottom line is that the United States now has less passenger service than in 1988, for about the same subsidy.

III. Future Prospects

A. Real Estate and Express

Since 1988, when Washington Union Station was opened with great fanfare, Amtrak has attempted to exploit the commercial potential of real estate along the Northeast Corridor and elsewhere. However, real estate revenues have never exceeded $55 million annually, and show no clear growth trend over the last ten years. It appears unlikely that Amtrak will be able to meet its mandate of self-sufficiency through real estate development.

Mail, baggage, and express revenues have doubled, to $70 million annually, in ten years. However, the express business has been much slower to develop. In written testimony provided to the Transportation Subcommittee, George Warrington of Amtrak noted that net revenues from express traffic, forecast at $75 million to $76 million in the September 1997 Strategic Plan (on expected gross revenues of more than $400 million), have been reduced to a maximum of $27 million in 1999 and beyond. Even with a favorable STB decision, it appears doubtful that express revenues could close the revenue gap for Amtrak.

B. Payments to Freight Railroads

Amtrak is really two separate railroads. In the Northeastern U.S., the right-of-way is owned by Amtrak, which allows use of it (for a fee) by commuter and freight railroads. Their payments are used to defray part of the maintenance cost.

Elsewhere in the U.S., Amtrak is almost always a tenant on privately-owned freight railroads, who receive compensation for use of the track. By law, Amtrak pays only the "incremental" cost of this use (defined as the cost that would be avoided should Amtrak cease operating). This cost is very substantially less than what the private railroads typically pay each other for "trackage rights", and accounts for much of the controversy over Amtrak haulage of express traffic. Table 1 compares typical Amtrak payments with those paid by freight railroads to each other.

In December of 1995, Amtrak was dealt a setback that is mentioned directly nowhere in the GAO reports, the Amtrak Legislative Report, or in testimony. In that month, the Interstate Commerce Commission found for Conrail in a compensation case against Amtrak. Amtrak was directed to pay nearly $3 million per year for use of Conrail trackage. This decision set the pattern for renegotiation of contracts with all private railroads over which Amtrak operated. All contracts expired in 1996. Previously, Amtrak used a formula that reduced the incremental cost of passenger train operation as total railroad traffic volume increased, and this formula had produced costs as low as $0.70 per train mile on some railroads. Following the ICC decision, Amtrak's new contracts have been averaging about $1.00 per train mile for track usage, plus incentives for on-time performance.

Table 1: Payments for Trackage Rights

	Basis	Amount Per Car Mile
Freight railroad (typical)	Car mile	$0.20 to $0.30
UP/SP Merger trackage rights to BNSF	Ton mile	$0.18 (based on a rate per ton-mile)
Amtrak to freight railroads	Train mile	$0.07 to $0.20, depending on train length (based on a typical payment of $1.00 per train mile)
Freight railroads to Amtrak for NEC use	Car mile	$0.89
Commuter rail operators	Train mile	$1.00 to $2.00 (includes electric power cost, a share of dispatching and overhead)

The net cost of these new contracts to Amtrak may be as much as $100 million per year, but still does not give the freight railroads the level of payments they would receive from providing trackage rights to each other. As long as the operation of Amtrak trains produces substantially less revenue for the freight railroads than operation of freight trains, Amtrak can expect resistance to initiatives such as the planned move into the express business. Also, the Western railroads are seriously capacity-constrained, as the UP "service meltdown" has made clear. Additions to capacity can be expensive. If these investments must be made as a result of the presence of Amtrak trains, there may be an expectation that Amtrak will pay part, or all, of the cost.

By any objective measure, Amtrak enjoys access to the freight railroad network at "below market" rates. While this may continue, so will the resistance of the freight railroads to expansion of service. Potentially, this resistance could result in increased costs of access for Amtrak in the future, especially if substantial increases in passenger train traffic are proposed.

C. The Northeast Corridor

Ownership of the Northeast Corridor (the railroad from Boston to Washington, with branches from New Haven to Springfield, MA and from Philadelphia to Harrisburg, PA) was conveyed to Amtrak by Conrail in 1976 as part of the transfer of assets from the Penn Central estate and other railroads to Conrail, local governments, and commuter rail operators. In the subsequent 22 years, a total of about $2.5 billion has been spent on capital improvements of various kinds. Service on the "southend", from New York to Washington, is generally reliable and quick, with schedules of three and a half hours or less typical for most trains. The "northend" is still operated with diesel locomotives from New Haven to Boston, since the original funding of 1977 and later was insufficient to electrify the railroad. However, electrification is now finally underway, and Amtrak pins many of its hopes for the future on the increased patronage expected from the faster Boston-New York service that will result.

The NEC SBU already carries more than half of Amtrak's passengers. Completion of the northend improvements will only strengthen its position.

The Northeast Corridor (NEC) represents an unusual opportunity for Amtrak. First, it does have excess capacity (mostly at night) that might be sold to freight operators. Second, it serves the largest urban area and one of the largest ports in America (New York). Amtrak has been ambivalent about increased freight traffic on the NEC, however, despite the announced intention of Norfolk Southern (in its Conrail purchase filing) to greatly increase its freight operations in the corridor. In fact, there was until recently a marked lack of interest on Amtrak's part in even renegotiating the existing Conrail NEC access agreement.

There are opportunities for Amtrak in two areas. First, the NEC may be more effectively exploited freight operations, increasing Amtrak's revenue. At present, freight operations are minimal except between Perryville, MD and Baltimore, and total annual payments by freight railroads for NEC use are in the range of $15 million.

Another option might be the sale of the NEC (possibly to the states, to port authorities, or to an entity specifically created for the purpose), and its lease by Amtrak. This would make a large amount of badly needed capital available to Amtrak, in return for annual lease payments that could potentially be lower than current costs.

D. The "Glide Path"

Amtrak has recognized that certain elements of the September 1997 Strategic Business Plan, such as the projected revenue from express service, are no longer realistic. However, it appears that the "glide path" itself may no longer be a realistic expectation. Amtrak's request to divert part of the $2.1 billion in TRA funds to operating subsidy is a virtual admission that financial self-sufficiency, at present, appears out of reach. Certainly, nothing in the trends of the last 20 years suggests that Amtrak may expect major changes in patronage or revenues short of inventing some radical new way to conduct the business of passenger railroading.

It appears that Amtrak may be caught in a sort of circular argument. Without further capital investment, Amtrak will be unable to enter new markets and compete for new business. However, Amtrak has never had the capital to do this, and has never done it. Perhaps Amtrak's boldest venture was in taking over the "Auto Train" service in 1983. However, this service (which was operated for nearly a decade, at a profit, by Auto Train) is now one of the largest loss-makers among Amtrak trains[5]. Further, its loss per passenger has increased rapidly in recent years. Prospects for changing this trend do not appear bright.

The cumulative result of 26 years of investment in Amtrak has been, essentially, stability. Amtrak's market share has fallen, ridership is stable at a time when air travel

[5] The GAO report, *Financial Performance of Amtrak's Routes*, shows a calculated loss of $118 per passenger for the Auto Train, one of the highest among all routes.

and auto travel are both increasing much faster than population growth, and capital funding is insufficient even to keep pace with accumulated depreciation. A continuation of the current state of affairs would appear to guarantee eventual liquidation of Amtrak, not financial self-sufficiency.

IV. A Look at the Future

It is certainly possible that the future of Amtrak may end up looking a lot like its past. After all, the same policy debates have occurred over and over since 1971, and the result has been a deadlock. Amtrak muddles from crises to crises, and there have been no breakthroughs or even major changes. The number of passengers carried annually has been stuck in the range of 20 million for two decades, while auto and air travel have increased dramatically. Amtrak's total subsidy (operating plus capital) has been stuck in the $1 billion range for most of the same time period, absent specific expenditures for items such as the Northeast Corridor reconstruction in the late 1970s (which, interestingly, appears to have had at most a minor impact on total ridership). It does seem possible that Amtrak can simply carry on, capital-starved and operating a skeleton service in most of the United States, and costing about a billion taxpayer dollars per year.

Perhaps there is an opportunity here to "think outside the box", however. Ironically, Amtrak's own restructuring into SBUs makes it possible to imagine a passenger carrier that serves a very different set of markets from the Amtrak that has been argued over for nearly 30 years. Perhaps, with state and local funding, it might be possible to restructure Amtrak into a number of short-distance services serving specific markets (some states such as North Carolina are already doing this). One of Amtrak's major problems has always been its legal mandate to be a "national passenger network". The same act that authorized the $2.1 billion in capital funding last year also removed the requirement that Amtrak operate a "national network". Amtrak is now free to redeploy its assets as it sees fit.

Ridership numbers support such a strategy. A recent GAO letter to Frank Wolf, Chair of the Subcommittee on Transportation of the House Appropriations Committee, breaks down Amtrak ridership (boardings and alightings) by state[6]. Nearly half of Amtrak's passengers board or alight in one of the "Northeast Corridor" states (MA, RI, CT, NY, NJ, PA, DE, MD, DC, VA). Another 22% ride in California, Oregon, and Washington (half of them in California). The remaining 30% of Amtrak riders are spread out across the remaining states with Amtrak service. Amtrak could choose to concentrate on its East and West Coast corridors to the exclusion of this 30%, or it could encourage individual states to fund local service. North Carolina, served by only one daily Amtrak train with a destination in the state and four on their way to other points (mostly in the middle of the night) manages to account for more annual boardings and alightings (almost 472,000) than Ohio (184,000), a much larger state, or Rhode Island (363,000), which is on the Northeast Corridor. There may be considerable potential, especially in states like Ohio, for redeploying Amtrak resources to serve local markets.

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[6] Leter report B-280160 to the Honorable Frank Wolfe, Chairman, Subcommittee on Transportation and Related Agencies, Committee on Appropriations, House of Representatives (Washington: June 5, 1998)

Amtrak has pinned its hopes on express business (which appears doubtful), on operating economies (which have not been achieved), and on the introduction of the new high speed train sets on the NEC. Based on the experience of the 1970s, where $2.5 billion was spent rebuilding the right-of-way, Amtrak ordered nearly 500 "Amfleet" cars and new locomotives, and schedule timings were reduced by 30 minutes to one hour, Amtrak may be expecting far too much from the electrification of the north end of the NEC. After all, the work on the south end may have increased ridership, but apparently at the expense of ridership elsewhere, since total passenger miles peaked in 1979. Since about half of all Amtrak riders are on the Northeast Corridor and its extensions (to Springfield, Buffalo, and Harrisburg), one might have expected a somewhat greater impact.

If Amtrak cannot achieve the projected ridership increases, the result will be a continuing need for subsidies, and the nation will be back to Amtrak as usual. A continuation of business as usual will ensure continued stability for Amtrak, but at $21 billion over 27 years, stability has been very expensive. At a time when other modes of transportation are enjoying rapid growth, Amtrak cannot seem to increase its market penetration. It is time to re-think the way in which Amtrak's assets are used.