TRANSPORTATION

Late to the station

Despite new Clinton initiatives, the United States is moving too slowly on high-speed rail.

By David Moberg

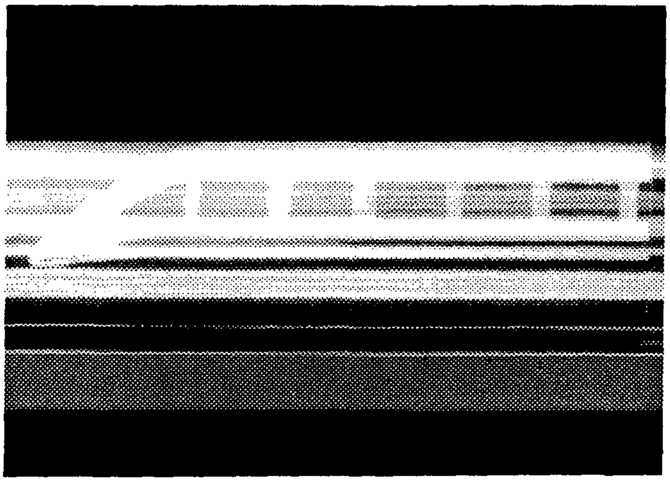
By the turn of the millennium, Japan expects to begin construction on a second-generation high-speed train system. Depending on the results of tests now underway, the Japanese government will choose one of two technological options. It may decide to upgrade the steel-wheel-on-steel-rail technology used in Japan's nearly 30-year-old 130 mile-per-hour bullet train. Or it may opt for a new "maglev" technology—a concept that eliminates old-fashioned wheels and track in favor of powerful superconducting magnets that suspend the train above a guideway and propel it at 300 miles per hour.

Also around the year 2000, the major cities of Europe will be increasingly linked by 200 mile-per-hour steel-wheel trains of principally French and German manufacture. Other important routes will be improved to accommodate trains at 125 miles per hour or more. If the German government gives its approval later this year, construction may also start in 1994 on a $5 billion maglev line that would link Hamburg and Berlin using Germany's well-tested Transrapid technology. A trip that now takes three hours by modern train would zip by in only 55 minutes on the Transrapid.

By contrast, in the United States there may be a few corridors in densely populated regions that have been improved enough to run European-designed trains at 125 miles per hour by the year 2000. If all goes well, there will also be a U.S. maglev prototype ready to begin testing. In the unlikely event that any high-speed steel-wheel trains are deployed by then, the technology will almost certainly be European or, at best, the product of a joint venture with U.S. companies.

Yet even this anemic U.S. performance will be possible only because the Clinton administration is seeking a hefty increase in high-speed train funding. The administration proposes spending $1.3 billion over five years on high-speed trains, including $300 million on technology development. That includes $228 million over five years for maglev research. The administration also plans to continue separate funding of improvements on the Amtrak line from Boston to Washington that will permit running higher speed trains. In addition, President Clinton is seeking a change in tax law to enable states to issue tax-free revenue bonds to finance rail projects.

George Bush had proposed no funds for any passenger trains—including Amtrak—and froze even some of the more modest high-speed rail spending approved by Congress in 1991. Clinton's high-speed train proposal reflects the best of his campaign promises—economic stimulus through public investment that will strengthen the economy for the long run. Yet even Clinton's projected spending will leave the United States lagging far behind other industrial



Argonne National Laboratory Photo

countries. Meanwhile, America's rail gap will continue to hurt the country on many fronts—jobs, trade, economic efficiency, public convenience, safety, energy efficiency, the environment and even foreign policy.

Trains have been a missing link in the transportation infrastructure of the United States, the victim of private mismanagement and unsupportive, even hostile, public policy. Even so, rail freight has made a small comeback, especially with "piggyback" trains hauling truck trailers. Amtrak has also made vast improvements, though it still isn't a match for even the most backwater European trains. Because we've slipped so far, however, there is far less of a built-in constituency for trains—except for a dwindling club of train buffs—than there is for cars, trucks and planes. Yet even in such auto shrines as Southern California, modestly modernized rail has proven popular.

Contemporary high-speed trains make sense. They can carry travelers over distances of several hundred miles as quickly as planes, based on overall travel time, thus offering an alternative to gridlocked highways and airports. They require roughly one-third the energy per passenger mile of autos and about one-fourth to one-sixth the fuel of airplanes.

Japan's and Europe's more efficient transportation systems help these U.S. economic rivals produce goods with about half of the energy that this country does, giving their businesses a competitive edge. Electrified trains do not rely on oil and could free the United States from its dangerous and costly reliance on the Mideast, which skews U.S. foreign and military policy. The energy advantage of trains yields an environmental reward, despite the pollution and radiation waste disposal problems of power plants for electrified trains. And if photovoltaics and wind generators were used, trains might prove an environmental bonanza.

Trains use far less space than highways or even airports and operate more quietly than airplanes (although they still pose noise problems at high speeds). They are the safest form of transportation: after billions of passenger miles on high-speed trains in France and Japan, there have been only two fatalities—and those occurred when the French TGV (*train a grande vitesse*) was nearing a station at a low speed. Trains also encourage denser urban settlement, which is more efficient and less environmentally destructive than auto-induced sprawl.

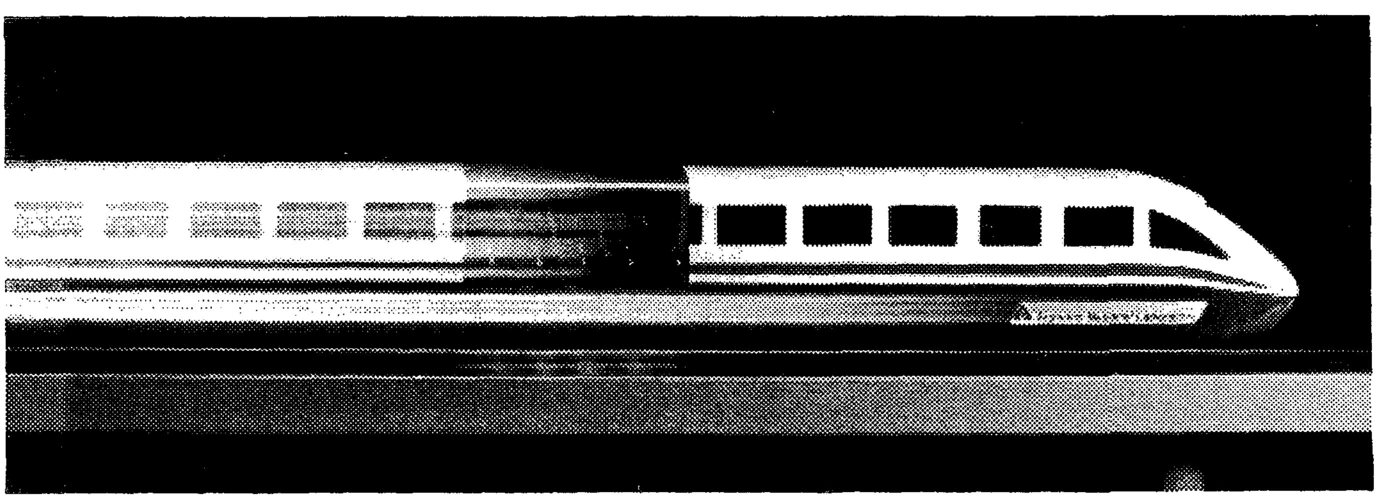
The existing U.S. transportation system is less and less effective even at moving people at reasonable speeds. Highway gridlock wastes more than 3 billion hours each year for commuters, truck drivers and travelers. By 2005, we'll be wasting 12 billion hours. Figuring that a person's time is worth, say, $10 an hour, the cost is staggering.

Delays at airports are also costly. Larry Johnson, director of the Center for Transportation Research at Argonne National Laboratory near Chicago, calculates that passengers lose more than 12 million hours each year in delays at O'Hare airport alone. In 1986, according to the Federal Aviation Administration (FAA), airline delays cost $5 billion, including $2 billion in extra fuel and labor costs for the ailing airline industry.

Building new highways and airports is often unpopular, and such construction creates as many new problems as it solves by contributing to urban sprawl and further lengthening commuting time. It's also costly. Relieving airport congestion will cost $117 billion over the next decade, according to the FAA. Maintaining the interstate highway system could run $3 trillion over the next several decades.

High-speed railroads could relieve many of these problems, but the biggest obstacle is financing. Building a new rail system requires a long-term strategic outlook that government must provide—either as a major investor and guarantor or as the outright owner and operator.

At first glance constructing a new train system seems very expensive. Yet comparison of the costs of different transportation modes is complicated. Although railroads were heavily subsidized in the 19th century, government policies have favored highways and airports at the expense of rail for more than 50 years. Highway and airport trust funds receive fuel and airport taxes, but for many years railroad taxes went not for rail improvements but for general federal programs. There are also direct subsidies to highways (about 40 percent of total costs) and air travel (more than



half the cost of the FAA). Defense spending subsidizes pilot training and aircraft development.

Environmental, safety and other costs of trucks, cars and airplanes are also not adequately accounted for in the prices people pay for tickets, fuel or cars. For example, Worldwatch Institute, an environmental research group, calculated that every auto receives a subsidy of about $2,400 a year. Thus car and air travel seem cheaper than they would be with a full accounting of costs.

It's clear that money must be spent on transportation simply to accommodate growing demand, not to mention the need for cheaper, faster, safer or more environmentally sensitive forms of travel.

So how should it be spent? Argonne's Larry Johnson argues that maglev, for example, could compete in cost and time with most flights of up to 600 miles. That represents more than 40 percent of the flights at an airport like O'Hare. Maglev could save $1.5 billion a year by relieving just one-third of airport congestion, Johnson estimates. If it were possible to capture that savings to finance maglev, the country could build 2,000 miles of maglev over 20 years. If savings in energy and health care (from eliminating higher safety and environmental illness costs of current transportation) were calculated, the new system would more than pay for itself. Also, building high-speed rail lines, which require far less maintenance than highways, would reduce expenditures that would otherwise have to be made for highways and airports.

Unfortunately, the world of finance doesn't operate on the basis of a social rationality that comes from looking at the big picture. That's especially true since federal policy—even under Clinton's proposals—insists that new high-speed rail must be primarily privately financed, even though other transportation infrastructure has been mainly funded through taxes. European and Japanese high-speed trains have been quite profitable and employ some private financing. Nonetheless, public authorities play a lead role as financier, guarantor and planner.

What would a modern U.S. rail system look like? Roughly four-fifths of the cost of any system is the infrastructure—land for right-of-ways and construction of the rails or guideways. Much of the federal rail money spent over the next five years will upgrade six or more corridors (including a California system and a Chicago-centered Midwest network). The goal is to accommodate slightly higher speed trains by eliminating dangerous highway crossings and improving track and control systems.

At present, there is growing enthusiasm among policymakers for the X2000 train built by the Swedish-Swiss firm Asea Brown Boveri, which has a factory in New York. It is designed to maximize speed for existing track layouts by handling turns better than trains currently in use. Its top speed is 130 to 150 miles per hour.

But existing track will not work for steel-wheel trains that travel at very high speeds. The new European and Japanese steel-wheel trains—expected to travel around 200 miles per hour—require completely new, very straight, segregated, electrified rail lines, thus raising the cost significantly. Several states—including Texas, California, Florida and Ohio—have seriously considered launching their own high-speed rail systems but have tripped up over financing questions, airline opposition or regional obstacles.

Any new system will have to provide links to city centers as well as major airports. To best maximize revenue, a high-speed system might not only offer passenger service, but also carry valuable freight—such as overnight express packages—or even passengers' cars.

Building a new rail system requires a long-term strategic outlook that only government can provide.

Some transportation experts believe the real future of high-speed rail is not with steel-wheel technology but with maglev. Maglev is a controversial alternative not yet in commercial operation anywhere in the world. An idea of American inventors—first from rocket pioneer Robert Goddard in 1909, then from Brookhaven National Laboratory scientists in the '60s—maglev research was funded by the federal government until 1975. Germany and Japan have since invested about $1 billion each in developing their maglev prototypes.

Maglev relies on powerful magnets. Using the force of magnetic repulsion or attraction (depending on the system), a maglev train "floats" a few centimeters to a few inches above its guideway, thus eliminating all friction except air drag. The suspension magnets can be embedded in the floor of the guideway or, as maglev research increasingly favors, in the sides of the guideways. The train and guideway also constitute a giant stretched-out electric motor that moves the train forward rather than turning a motor shaft around rapidly.

The German Transrapid uses huge conventional electromagnets to lift trains through the force of attraction. The Japanese—who have developed both a high-speed maglev based on repulsion and a commuter-speed model based on magnetic attraction—use superconducting magnets that must be cooled by liquid helium and nitrogen. Although they are lighter in weight and stronger than conventional magnets, there are problems with greater electromagnetic radiation and reliability of the magnets. The German train has a much smaller gap between the train and guideway, raising questions about construction tolerances required and maintenance. At this point, the Germans claim to be five to ten years ahead of the Japanese in development of a commercially viable maglev.

Since 1990, four consortia of corporations and universities have been developing different U.S. models of maglev under the National Maglev Initiative, which will soon issue its final report recommending that the United States go ahead with further development and narrowing of options. All of the U.S. maglev concepts employ superconducting magnets; three of the four use electromagnetic repulsion. At a recent international maglev conference at Argonne, U.S. Army researcher James Lever argued that the four U.S. proposals promised higher performance than the Transrapid or the French TGV at comparable cost.

There are still technical issues to be resolved, especially with the new U.S. concepts. No prototypes have been built or tested yet. But the issue of cost still emerges immediately in most discussions.

At this point maglev seems likely to be more expensive than high-speed steel-wheel rail. Typical ballpark figures suggest an average of $10 million to $15 million a mile for high-speed trains, $20 million to $30 million a mile for maglev. Maglev proponents claim they could build a system for under $20 million a mile. Costs could be reduced dramatically if maglev could use interstate highway right-of-ways. Most maglev designs assume that tracks would be elevated, but money could be saved if the guideways could operate at ground level for long stretches in rural areas. Most urban expressways cost in this same $20 million to $30 million range (or even more), but average overall highway costs are lower.

John Harding, research director for the Federal Railway Administration, says that at these prices maglev could pay its full operating and construction costs in the San Diego-Los Angeles-San Francisco corridor and in the Northeast, from Washington to Boston. In several other densely populated areas, maglev could pay full operating costs out of fares but probably not all construction costs, Harding says.

Steel-wheel advocates argue their technology is now ready to go and has proven that it can reach speeds on test runs of over 300 miles per hour. Maglev advocates argue that their systems start at 300 miles per hour and represent the inevitable triumph of electronic over mechanical systems. They doubt steel-wheel technology is viable at the highest experimental test speeds. Yet maglev's higher speeds may offer only insignificant time savings for short- and medium-range travelers. For example, on a 50-mile trip, improving speeds from 50 miles per hour to 150 miles per hour cuts a one hour ride to 20 minutes. But jumping from 150 miles per hour to 300 miles per hour only reduces that already short 20-minute trip to 10 minutes.

Although maglev has often been presented as more energy efficient than rail, research presented at the Argonne conference suggested maglev may be more energy intensive—but not enough to make a big difference at current energy prices. Both are far more efficient than planes, but steel-wheel technology may run into problems of maintenance and reliability at the upper range of its speed.

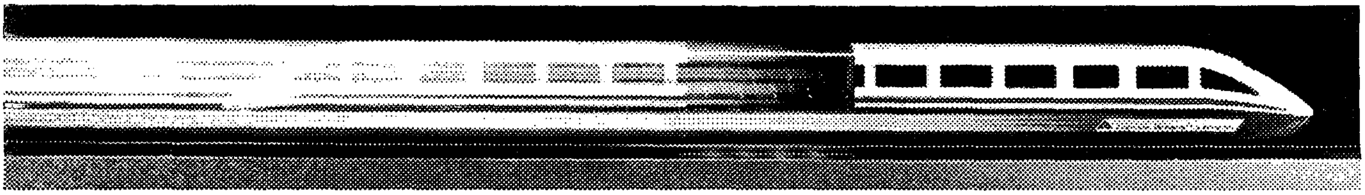
Maglev appeals to strategists who see it as an opportunity for U.S. corporations—possibly including converted defense suppliers—to leapfrog to a new generation of transportation technology and overcome the nation's neglect of rail over the past 50 years. There is only one U.S.-owned company with a limited capacity now to make passenger locomotives (Morrison Knudsen) and two weakened freight locomotive manufacturers (General Electric and General Motors). Two foreign-owned firms have locomotive factories in the U.S.

With steel-wheel technology, American producers may be locked into an inferior position, relying on technological leadership from overseas. Hard bargaining could move some production jobs here or encourage joint ventures, however. Clinton's program provides some help for non-electric high-speed locomotive development as well as maglev in the hope that U.S. firms can carve out a new niche. It will be a tricky balancing act for government to mesh industrial strategy and transportation objectives without letting either policy distort the other.

Much of the rail infrastructure work is now being left to private investors, who are notoriously skittish about such long-range commitments. Consequently, many rail advocates think the federal government should assume primary responsibility for the track infrastructure. This would be accomplished not through tax revenue, but by issuing bonds to raise private funds. There could be competition for operation of the trains, with Amtrak as one likely contender. But the same competitive model that governs airlines or trucking firms is likely to work even less well on railroads. That's especially true for maglev, since the choice of a guideway design will essentially determine the train design as well.

The national transportation strategy must balance immediate incremental improvements in conventional rail with efforts to develop new technology, both steel wheel and maglev. The nation can't wait for maglev breakthroughs, for example, nor can it rely solely on gradual modernization.

Some skeptics doubt whether government has the will or ability to pull off such a massive mission—comparable to the interstate highway program started under Eisenhower or the space program under Kennedy. A new high-speed ground transportation system will be costly. Yet there are less obvious costs of delay—inefficiency and damage to human health and the environment. Without strong government leadership, the nation will pay a hidden price it can't afford. ◀



TRANSPORTATION

Flying through turbulence

What should the Clinton administration do to help the troubled airline industry? Not much.

By Kevin Kelly
CHICAGO

Over the last three years the nation's airline industry has resembled a demolition derby. Suicidal fare wars sparked by desperate carriers trying to coax recession-weary travelers back onto planes bashed profits. Sky-rocketing costs, including high wages paid to pilots, and overambitious growth plans drove losses up further.

All told, the industry has lost $10 billion since 1989. The destruction wreaked by such steep losses is everywhere evident. Three of the nation's 12 largest carriers have gone out of business. Three others spent most of the last 48 months grounded in the bankruptcy courts. And the madness continues: during the first quarter of 1993 the nation's airlines lost another $1 billion.

So it's no wonder that the Clinton administration formed a commission to figure out whether the federal government can help the industry. With unemployment proving an especially stubborn problem, the White House worries that a continued bloodletting in the airline industry will only further swell the jobless ranks. The industry has already shed 100,000 jobs, including employees laid off by aircraft manufacturers like Boeing Corp., as the nation's carriers cancel multibillion-dollar plane orders. Moreover, the federal government fears U.S. carriers may soon be too weak to fend off strong foreign competitors unless the industry's financial losses end soon.

What's the government to do? Well, very little, actually. Most of the industry's wounds are self-inflicted, and federal government action can do almost nothing but exacerbate the bleeding. If the Clinton administration takes action before the industry moves to heal itself, it will only preserve a money-losing structure that consumers will end up paying for through higher fares. In the worst of all worlds, taxpayers would end up footing the bill through a direct subsidy to the airlines, just as they do in Europe and the Far East.

But the administration's newly formed Commission to Ensure a Strong Competitive Airline Industry is likely to hear lots of contradictory opinions. Already dozens of politicians and the industry's leading labor unions, including the Air Line Pilots Association and the International Association of Machinists (IAM), have demanded reregulation. This coalition believes insane pricing has sabotaged profits. So they want the commission to reinvent something akin to the Civil Aviation Board, the agency that regulated fares before deregulation took hold in 1978.

The airlines have other ideas. The industry's Big Three—United, Delta and American—want the 10 percent federal ticket tax rolled back, arguing that it dissuades travel. They also want limits placed on how long a carrier can remain in bankruptcy, since they believe it is the bankrupt airlines that are responsible for most fare wars. Since there's no evidence to support that, the insolvent carriers oppose any revision of the bankruptcy code. Instead, they want the government to turn the ticket tax over to the airlines as a de facto subsidy. And American Airlines chief executive Robert Crandall thinks the federal government should provide loan guarantees for new aircraft purchases, making taxpayers pick up the tab if a carrier defaults.

What's wrong with these options? Reregulation would be a hopeless task. Regulation was relatively easy when carriers simply shuttled passengers from point A to point B, say Cleveland to St. Louis. But these days, with airlines ferrying passengers through highly complex "hub and spoke" systems that funnel the St. Louis-bound traveler through a hub in Chicago first, it's impossible to tally the exact cost of each leg of a flight. Worst yet, the task of calculating fares for thousands of daily departures would require personnel and