LURCHING TOWARD EPCOT

Monorail glides past "Spaceship Earth," Epcot Center, Disney World, Orlando, Florida.

Alan M. Field

TECHNOLOGY CHOICES FOR METRO'S SYSTEM CONNECTOR

In January 1988, voters elected in a referendum to allow the Metropolitan Transit Authority to spend $1.04 billion dollars developing a new "system connector" for Houston – a 20-mile-long mass transit system that would link various activity centers and bus-line terminals and that would influence the shape of the city well into the next century.

Now, more than a year later, it is apparent that many critical aspects of Metro's plan have yet to be determined: What kind of technology will the connector utilize – light rail, monorail, or some other system? What role will private entrepreneurs play in the design and construction of the system connector? Where will the tracks go?

Metro's hesitation in resolving these issues reflects to some extent the inherent complexity of such an undertaking, compounded by garden-variety political considerations. It appears now that definitive choices among the key variables will probably not be made until sometime this spring or later and that, in the absence of any compelling analytical basis, they will be made largely on subjective criteria.

Many Houstonians may still believe that last year's referendum specified a light-rail system – much like that utilized in Portland, Oregon, and favored by the Urban Mass Transit Administration of the U.S. Department of Transportation, a key source of construction funding. After all, Metro lacks the funds and public support to build anything like the $2.125 billion, 18.5-mile initial phase of the heavy-rail system rejected by voters in June 1983. Metro therefore intends to finance the new system connector from its own budget and available federal assistance – that is, without the bonding authority it sought in 1983. Moreover, Metro's own planners had recommended light rail to the nine-member Metro board as the best system available at the present budget.

But when the board finally got around to a detailed consideration of alternative technologies in January of this year, at a two-day conference held at Metro's downtown headquarters, little support materialized for a purely light-rail system. Instead a heated battle raged between proponents of a hybrid system called advanced rail and those who favored monorail, a technology more frequently associated with world's fairs (Seattle, Vancouver) or amusement parks (Epcot). Despite the emphatic counsel of Metro's own consultants, Lea + Elliott of Chantilly, Virginia, the monorail alternative seemed more seductive than was previously supposed.

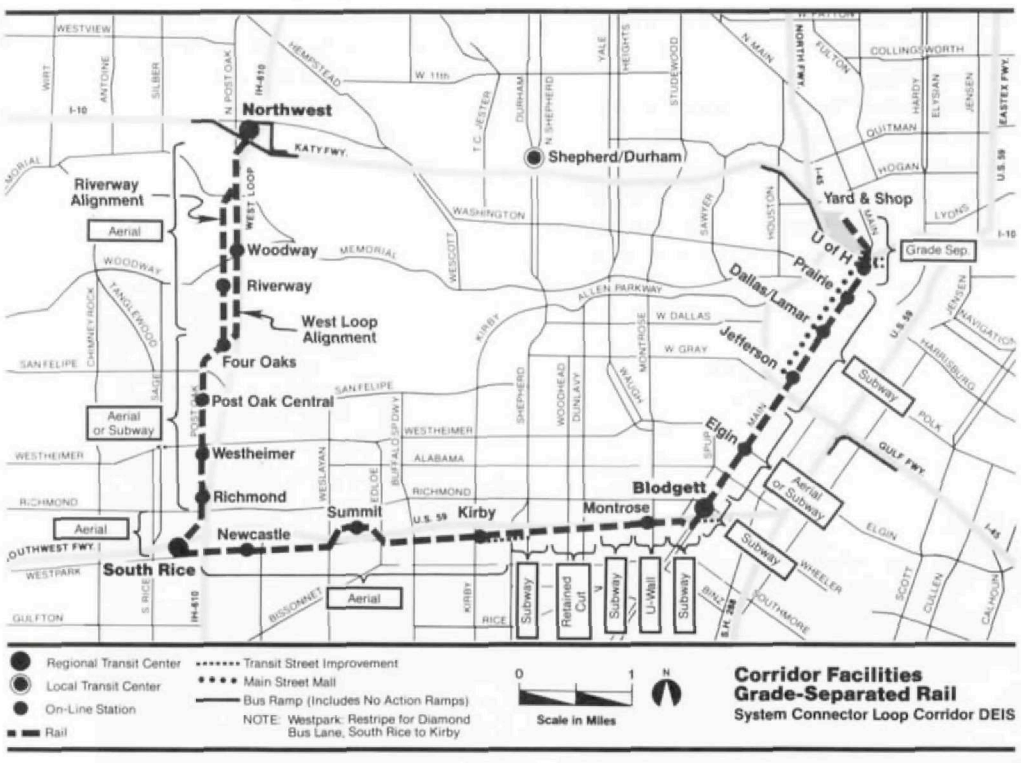
Lea + Elliott favors instead a "customized" combination of technologies it chose to call advanced rail: that is, automated rail (grade-separated with third-rail electric power) within the U-shaped trunk of the system connector (see map) and light rail (not grade-separated, power derived from an overhead catenary) for the feeder lines to the trunk. Among the reasons cited: this hybrid would use off-the-shelf technology that requires no further development; it would cost only $1.392 billion to construct, substantially more than the $1.04 billion voters approved last year, but far less than any other alternative under consideration (monorail would cost $1.8 billion); components and spare parts could be purchased and upgraded from a variety of suppliers, so Metro would never become dependent on a sole-source, proprietary manufacturer.

Overall, monorail ranked last among major technologies as evaluated by Lea + Elliott. Monorail, the report indicated, was too costly to build, too costly to operate, too clumsy in its switching, too potentially dangerous in its lack of emergency walkways. Perhaps worst of all, monorail is supplied only by proprietary manufacturers, who – since they provide everything that goes into a system – could command extraordinary prices for replacement parts and extensions. Such a sole-source supplier, of monorail or another proprietary technology, could even choose to get out of the business, leaving Metro with nowhere to turn. As Robert M. Eury, president of Central Houston, Inc., a downtown development organization, argued, "If you go with a single proprietary technology, no one else can bid, and once you build part of your system, it's very hard to use another type of technology in another part."

Those arguments hardly deterred monorail's supporters. Tom Stone (whose firm, TGI of Orlando, Florida, built the Disney World monorail and is a subsidiary of Bombardier, a Canadian firm that manufactures both monorail and light-rail systems), argued that virtually all the data presented by Lea + Elliott, not to mention its recommendations, were erroneous. According to TGI, monorail would cost Houston only about $1 billion. Switching, described by Lea + Elliott as slow and painful, was said to present no specific difficulty; maintenance would be cheaper and simpler. Safety concerns could be addressed by building emergency walkways. As for the risk of being locked into a proprietary technology, Stone promised great flexibility in making a deal with Houston: "You can negotiate a fixed price [allowing for inflation] for spare parts. . . . We will make the design available for bidding for others to build them. . . . We can probably extend parts at the same initial price."

In the selection of a technology it is not enough simply to compare such easily quantifiable factors as maintenance costs, average speed, and passenger capacity. Long-term economic values and aesthetics also count. Supporters of monorail consider aesthetics the key factor behind their advocacy. In contrast, Chuck Elms, senior principal at Lea + Elliott, ascribes no more weight to aesthetic considerations than to any other factor. He argued publicly that there was no industry consensus on which factors should be given greatest weight. (Elms's report did, however, give monorail the highest mark for aesthetics.)

Monorail's supporters believe that ultimately the public's aesthetic perception makes a greater difference than any other factor and that market appeal will be of paramount importance



North increment, grade-separated rail alignment proposed for Houston system connector. Compatible with monorail, magnetic levitation, and automated guideway technologies.

ACCORDING TO METRO CHAIRMAN ROBERT C. LANIER, "MONORAIL HAS A MYSTIQUE. I DON'T KNOW WHY–THE IMAGE. IT WOULD ATTRACT RIDERS, BECAUSE IT'S MONORAIL."

Texas Parade, December 1956, Houston Metropolitan Research Center, Houston Public Library

Houston's Trailblazer monorail, reinstalled in State Fair Park, Dallas, October 1956.

in counteracting Houston's decades-old infatuation with the automobile. They believe more commuters are likely to switch to mass transit *simply because* monorail is more visually alluring. Central Houston's Bob Eury may be right when he points out that "monorail is not a very new technology, it dates back to the 1950s," but for monorail supporters, that technology's long clean line – in particular its protruding nose – seems to spell The Future.

Many people don't care that, for example, the magnetic levitation ("MagLev") technology offered by Magnetic Transit of America (another proprietary technology dismissed by Lea + Elliott) is actually far more advanced than TGI's version of monorail. MagLev trains are square-sided, old-fashioned-looking boxes that remind people of subway cars. Says Allan Romano, a systems engineer and transportation consultant: "Monorail's mystique is its nose. It looks as if it's moving when it's standing still." Metro chairman Robert C. Lanier, former chairman of the Texas Highway Commission, apparently agrees. According to Lanier, "Monorail has a mystique, I don't know why – the image. It would attract riders, because it's monorail." Perhaps impressed when Tom Stone described the monorail TGI built for Disney World as "the single most memorable event there next to Mickey Mouse," Lanier imagined in almost poetic terms a ride northward from the Galleria on an elevated monorail, the downtown skyline visible to the east, the starkly modern architecture of Post Oak below. "It could be a tourist attraction," he concluded.

Is it irrational to choose a system because of its aesthetic superiority (assuming we agree it is superior)? Not if the other objections of safety, reasonable cost, switching ease, and so on can really be countered. Not if its futuristic mystique really will mean higher ridership on the system connector. Not if it somehow reinforces the image of Houston as Space City and helps encourage tourism and investment. If monorail spells more riders – both tourists and locals – it could be the most "rational" and cost-effective alternative.

On that score, the data are hardly convincing. John Carrara of the Goodman Corporation, transportation consultants, says that his surveys of Houston commuters indicate that "maybe one percent of people would be sold on mass transit as a result of this flashy technology." The vast majority, he adds, will decide to ride or not ride primarily on the basis of convenience and speed, not style.

Moreover, the Uptown Houston Association, which represents business and development interests in the Post Oak/Galleria area, is opposed to *any* elevated rail system along Post Oak, monorail or otherwise. To be sure, monorail can be constructed underground (or partially underground), but such a system would probably be less "futuristic" than its warmest supporters envisage – and less likely to attract riders.

A further problem is that Lea + Elliott apparently has not considered all the technological options available. Consultant Allan Romano faults Lea + Elliott for never taking a look at an advanced form of monorail built for the Sydney, Australia, harbor area last year by the Swiss firm Von Roll Habegger. This new technology, which Romano considers more suitable to Houston, runs on supporting columns along the curb instead of down the center of the street, allowing stations to be easily integrated into buildings and blocking less sunlight.

It's ironic, Romano argues, that the Lea + Elliott report failed to consider some new technologies on the grounds that they would require substantial development costs. Romano claims the hybrid "advanced rail" solution recommended by Lea + Elliott depends on a "bimodal" vehicle (light rail outdoors, automated rail indoors) that would require considerable additional development. "They recommended a vehicle that doesn't exist now," Romano says. "You'd need to develop something to pull the pantagraph [the electric pickup on top of the train] down as it enters the tunnel [when power begins to come from the third rail]."

Furthermore, the Lea + Elliott report appears to avoid a critical political consideration that might make TGI's monorail more appealing to Houston: this city's potential leverage for negotiating a good deal with TGI. Consider the situation: cities like Honolulu and Tampa, with similarly "futurist" transit boards, are waiting in the wings to make their mass transit decisions. TGI knows Houston's decision would have a substantial impact on the way these other cities go. It would be the first monorail to serve as the backbone of a major urban transit system. "A twenty-mile monorail system in the fourth-largest city in the U.S. would be a showcase for TGI," says Romano. "If they get Houston, Honolulu would be a sitting duck." That's good reason to suppose Houston would get favorable terms on a deal with TGI.

The question of the private sector's role in the process – the "privatization" issue – has provoked considerable controversy among Metro decision makers. Once the Metro board decides on a technology, should Metro then draw up detailed engineering designs of the connector and accept bids from private contractors? That is the usual procedure, but this method almost invariably results in cost overruns and long construction delays. Or should the private sector play a greater role in actually designing the new system? A lot of people think the private sector can work faster and do the job cheaper if it gets involved in the design process and assumes the financial risks; that is, if it goes far beyond merely executing a public agency's design. The thought is appealing in a city still economically depressed.

One extreme example of this approach surfaced last July when a group of developers known as Dacoma Transit Associates, led by Linbeck Construction, proposed to develop the system connector. For less than $900 million, Dacoma claimed, it could design and construct a "turnkey" project. After considering the Dacoma proposal, and the larger issue of how the private sector can participate in the development of the system connector, the Metro board adopted a resolution ruling out turnkey operations.

The Dacoma proposal failed in part because it was sketchily prepared. There were no guarantees that an adequate project could be achieved as cheaply as Dacoma proposed. Says John Thompson, a Metro consultant managing joint public-private development, "Dacoma didn't have a design, only a vague plan that changed alignments twice in six weeks." This vagueness suggested to the Metro board that the Dacoma people really did not know enough to steer their way through the rocky shoals of federal bureaucracy. That would be a major handicap, given the fact that the system connector will depend on funding from the Urban Mass Transit Administration of between $500 and $700 million before the year 2000. "To put together a one-billion-dollar system is fairly complex," Thompson argues. "There's a maze of government regulations and requirements to gain access to federal funds. Dacoma skirted that issue and left it to Metro to get the money."

Nevertheless, the Dacoma proposal seems to have sparked greater interest in the notion of privatization, given the financial constraints affecting Metro. But how much privatization? Explains Paul Bay, assistant general manager of Metro, "The definition of the system is the responsibility of Metro, but as we implement, we will use private firms to a maximum extent."

How will Metro's system connector affect the long-term evolution of Houston as a place to live and make money? It is widely recognized that, whatever the technology, under the right conditions rail transit systems can do far more than simply carry people from one place to another. They can also encourage pockets of economic activity by providing ready-made markets of commuters in and around rail stations. But given Houston's low population densities, its economic decentralization, and the loving dependence of its citizens on the automobile, probably no more than a small percentage of commuters will even ride the system connector to work. And since most rail stations will be in already active commercial areas, it will perhaps do little to stop the move outward or increase inner-city densities. As John Carrara observes, "The major stops are already at major points of development anyway."

But others expect that, whatever the technology or the role of private enterprise in its construction, the system connector will inevitably initiate a new age in the history of Houston: a slow compacting of the city around denser focal points within walking distance of the new stations. Metro consultant John Thompson argues that, even if most Houstonians remain fixed in their automobiles, "rail will tend to accentuate development along and near the [rail] stations. . . . Rail will foster development and density." Thompson points to the experience of Toronto, where the laying of rail tracks in recent decades has led to an "outcropping of development every ten blocks along the new line." Thompson believes that the impact of the system connector will be felt most dramatically downtown, particularly along decaying Main Street. How attached to their cars Houstonians will actually remain, though, will depend in large measure not only on the convenience but on the attractiveness of the system. And as Metro's Bob Lanier points out, "Without ridership, everything else falls off the table." ■

Monomania

Like 3-D movies and Tucker automobiles, monorails are among the quainter innovations of the recent future. Several years before Houston's singular contribution to the advancement of 20th-century urbanism, the Astrodome, came to South Main Street, two short "demonstration" monorail lines attempted to stake out the adjacent prairie.

The first began its brief transit in February 1956 on a 970-foot-long track erected in Arrowhead Park, near South Main and Old Spanish Trail. It was moved the following fall to Dallas, where more than 100,000 visitors to the State Fair paid a quarter each that season for a three-minute ride along its track, expanded to 1,600 feet. The monorail remained at the fair until 1964, long enough for a second monorail to begin runs back in Houston on a 1,250-foot-long track at South Main and Fondren in 1958. This second track was soon abandoned and came down in 1961.

The Arrowhead Park model, designated the "Trailblazer" and inaugurated with the help of Roy Rogers and children from a local orphanage, was conceived by a Houston engineer, Murel Goodell (in partnership with Francis Niven and Weldon Appelt). It was essentially an updated version of an eight-mile-long system erected in Wuppertal, Germany, in 1903, that was suspended from a train-track-like apparatus. Goodell's version was hung from a 30-inch pipe, which he promoted as offering "additional revenue possibilities such as carrying oil or public utility lines." The cargo mix may have suggested still other prospects for revenue enhancement to Goodell's backers, most of whom were local insurance men.

Except for Dallasites, whose credulity is sometimes the subject of unflattering speculation, Goodell's monorail found no other takers. He eventually relocated to Utah, where faith in novelty has never been in short supply. Meanwhile, more extensive and advanced monorail systems came into being independently at Disneyland (1959) and the World's Fair in Seattle (1960). With the completion of new lines at Disney World in Orlando (1971, 1982), Mickey Mouse became the technology's first repeat customer.

Drexel Turner