

Monorail vs. Light Rail

<http://bicycleaustin.info/rail/monorail.html>

Some people are saying that monorail (elevated trains) would be better for Austin than light rail (street-level trains). This issue was debated extensively on the austin-bikes email list in 9-01 and 5-02, and the highlights of that dialogue are below. To save you the trouble of wading through it, our conclusions are below.

	Light Rail	Monorail
Convenience	██████████	██████████
Proven Technology	██████████	██████████
More stops	██████████	██████████
New stops can be added easily after construction	██████████	██████████
Safety	██████████	██████████
Minimal disruption during construction	██████████	██████████
Takes minimal amount of roadspace	██████████	██████████
Can operate without a driver	██████████	██████████
Voter Appeal (presumed)	██████████	██████████
Construction Cost	\$	\$
Operating Cost	\$	\$
Speed	██████████	██████████
Aesthetics (subjective)	██████████	██████████

Ways Light Rail is Better

CONVENIENCE. Light rail wins here because trains on the street are easy to get on and off. Monorail stations are elevated, and require passengers to go up and down to and from the stations.

PROVEN TECHNOLOGY. There are numerous successful light rail systems around the world and it has an excellent track record. But there are only a handful of monorail systems, outside of amusement parks. Voters and governments might be leery of spending money on monorail since they might view it as more of a gamble.

MORE STOPS. Stops for the proposed monorail system are about a mile apart, while stops for the proposed light rail system are more frequent, at about 0.8 miles apart.

NEW STOPS CAN BE ADDED EASILY AFTER CONSTRUCTION. Since light rail runs on the street, new stops can go just about anywhere along the street. But adding a monorail stop requires constructing an elevated platform with stairs and elevators.

Ways LRT & Monorail are Tied

CONSTRUCTION COST. Both LRT & monorail proponents argue that their kind of train system is cheaper. The arguments are lengthy and complex and there's no clear winner, so we'll call it a tie. The best we can figure, the cost of monorail or light rail are roughly comparable at around \$50

Ways Monorail is Better

SAFETY. Since monorail runs on its own dedicated tracks, there's nothing for it to run into. But light rail trains, operating on the street, can have spectacular collisions with cars, bicycles, and pedestrians.

MINIMAL DISRUPTION DURING CONSTRUCTION. Light Rail requires tearing up the whole road, but monorail requires only installing pre-fab columns every 100 feet on top of the road. The columns and beams can be prefabricated offsite and trucked in at night. Businesses will especially appreciate the quick construction time.

TAKES MINIMAL AMOUNT OF ROADSPACE. Monorail columns look to be only about half as wide as light rail tracks, and the columns are spaced 100 feet or so from each other (unlike rail tracks, which occupy every inch of their lane).

CAN OPERATE WITHOUT A DRIVER. Since monorail runs on its own guideway and it's impossible for the train to run into cars, the monorail operation can be automated. This COULD save money, and if so, this means that it would be possible for the system to run 24/7. Light rail, on the other hand, requires drivers. The operational cost of drivers is why the buses don't run 24/7, and why we can't expect light rail to run 24/7 either.

VOTER APPEAL. Light rail usually loses when it's placed on the ballot in some community. But there's reason to believe that voters might be more likely to approve monorail than light rail, since monorail seems fun and exciting. (Most people's experience with monorail is at Disneyland or Las Vegas.) If offering a system that's attractive to voters is what it takes for us to get a train system installed, then this might be reason ALONE to support monorail. Even if light rail were better, it does us no good if the voters won't approve it.

Survey Results

Here are the results of our survey conducted of our readers between May-Sept

million/mile. But monorail can be cheaper in places where right-of-way (land) is very expensive and density is very high. Thus, monorail makes sense for the Las Vegas Strip while light rail could be a better choice for a sprawling metropolis like Dallas.

OPERATING COST. Operating costs seem roughly comparable. Monorail probably doesn't save overall by not needing an operator, since monorail stations need additional security and other personnel.

SPEED. Monorail is faster than light rail, because it's grade-separated (i.e., doesn't mix with cars), but the advantage may be slight. LRT doesn't lose time at red lights because rail systems trigger the lights when approaching, so the train doesn't have to stop. And any advantage that monorail has in extra speed is probably negated by the fact that it has fewer stops, so many riders will have to spend more time walking to get to and from the station. Finally, it takes more time to go up and down to and from an elevated monorail station rather than simply stepping onto an LRT train from the street.

AESTHETICS. Some people think that elevated monorail beams obstruct the skyline and are ugly. Then again, while light rail isn't elevated, it does have overhead power lines. Monorail need not be ugly, check out this [large photo \(400k\) of a monorail system in Malaysia](#). We'll call this one a tie.

2002:

- 48% Monorail
- 36% Light Rail
- 12% Neither
- 4% Undecided

The survey was extremely unscientific, with only 102 people voting. I didn't bother to check to make sure people didn't vote twice, since the turnout was so low that the whole survey is of little use anyway.

Summarized Positions

FOR Monorail: "The costs of building monorail and light rail are about the same. But with monorail, you get a grade-separated, traffic-

independent, fast, public rail transportation system which can be built at a rate of 5 miles per year and can be fully automated, whereas with light rail, you get something which can get stuck in traffic, has catastrophically spectacular collisions with motor vehicles, is stupendously slow in congested areas, is going to keep Lamar Blvd. torn up and unusable for years, after which it will be almost twice as wide as before (with no clear plan of where to locate stations), but which probably won't get a chance to do that since even borderline road warriors (and anyone who ever drives on Lamar) is going to vote against it." -- *Patrick Goetz, Austin Monorail Project*

AGAINST Monorail: Monorail is much more expensive than light rail to build. The fact that no typical North American city has

built one for public transit underscores that nobody thinks it's a good idea. Monorail is inconvenient, since you have to take stairs or an elevator to a station to board instead of just walking onto a light rail car from the street. Monorails are elevated and are an ugly visual obstruction. -- [Light Rail Now](#)

CON by [Light Rail Now, 2000](#)

MYTH: Exotic, more modern transit modes, like monorail lines, are a better idea than light rail.

FACT: Monorail is far from an effective transit alternative to light rail. It's a heavy-investment mode, requiring strictly separated rights-of-way, and mostly elevated construction. Elevated passenger stations get you into bigtime construction costs, including elevators. In contrast, light rail is predominantly a surface mode, running on railroad rights-of-way, in grassy medians, even in streets. Light rail stations can be as simple as a bus stop.

Monorails are cumbersome. Vehicles and hardware are custom-designed and fabricated, not available off-the-shelf, like light rail equipment. To switch a monorail train to a different guideway, several tons of concrete support beam must be moved by powerful hydraulic machinery. In contrast, light rail uses standard, well-proven railway hardware (steel rails, crossties, etc.). Switching trains to a different track is easy - a simple lever moves 2 rails just a few inches.

Think about it: If monorails are such a great idea, then why, over the many decades that monorail technology has been available, have only places like amusement parks and zoos found any use for them? The number of cities in the world where monorails actually perform a general, practical urban transit function can probably be counted on the fingers of one hand -- and even there, it's usually a single-purpose, point-to-point operation, like the monorail from Seattle's downtown to the Space Needle. For its regional urban transit system, Seattle's going with light rail.

There's no need to "reinvent the wheel". Modern light rail is a highly developed, readily available, tried-and-true transit mode that can be implemented relatively quickly and at reasonable cost and it's proven that people want to ride it!

PRO by [Patrick Goetz, 9-16-01](#)

Below are some comments I forwarded to groupsolutionsrjw and Capital Metro regarding rail transit in Austin. As someone has mentioned already, rail will make another ballot appearance in November of 2002. Has anything changed to invalidate the criticisms directed at the previous rail proposal on the ballot last year? I don't think so. The idea, then, is to come up with a better proposal, one which addresses most of the problems identified by rail opponents the last time around; one which can actually achieve majority support on next year's referendum. One prominent light rail advocate recently mentioned that he's been advocating light rail in Austin for 26 years. That's 26 years of no rail on the ground and a lot of blab. It's time to actually get some tracks laid out in concrete and steel rather than glossy "wouldn't it be great?" brochures, and that's going to require a plan which works for Austin - not Dallas, or LA, or Baltimore, or Denver, but Austin.

To get some indication of what would probably happen next year if the same sad rail plan is put forth to be voted on again, look no further than Kansas City: in a previous rail referendum, rail barely lost; in the one they had last year, rail lost by a landslide. People already see this plan as a losing horse and will gleefully stomp it into oblivion in 2002 if they see it again. Time for a proposal which not only works, but can actually win public approval. My 1.5 cents, of course.

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As someone who has lived in cities with a comprehensive rail transit system and as someone who has enjoyed the benefits of being able to use rail transit for over 90% of my transportation needs, I've long been a strong supporter of rail transit in Austin. During the last rail referendum, I put a considerable amount of time and effort towards promoting Capital Metro's light rail plan despite my own growing concerns about the efficacy of the system being proposed. As a member of Austin's Urban Transportation Commission, I repeatedly asked Capital Metro to provide us with some information as to why alternative routes/systems were not being considered or had been rejected, and never received any kind of response other than something along the lines of "huh? Oh, yeah" when I suggested what I considered to be common sense route and system alternatives that should have been given at least some consideration.

Consequently, in addition to feeling a great sense of loss and disappointment when the rail referendum failed by the slimmest of margins last year, I couldn't help but also think that this was actually the best of all possible worlds: not only did Austin voters show strong support for rail transit, but now we were being afforded the opportunity to rethink the entire proposed system and perhaps come up with something much better. I fired up my computer, got on the Internet, and over the course of several months, put some effort towards trying to figure out what kind of a rapid transit system would work best for Austin (in my admittedly and decidedly amateur opinion).

In what follows, I will first describe the system and route which I consider to be the best choice for a first rail system for Austin, Texas. I will then list the 7 most critical reasons why the previous rail initiative failed and how my proposal addresses these points.

In a nutshell, what Austin needs first and foremost is a rapid transit backbone to activate our existing network of buses. This backbone should follow one or two major transportation corridors as closely as possible, both in order to maximize the direct utility of the system and to control and direct the changes in urban land use which will accompany the introduction of a high capacity rail transit system.

Rapid means fast. IT SHOULD BE AN AXIOM OF TRANSIT PLANNING IN AUSTIN THAT A MAJORITY OF PEOPLE WILL NEITHER SUPPORT NOR USE A (relatively expensive) RAIL TRANSIT SYSTEM WHICH DOESN'T GET THEM AROUND FASTER THAN THEY CAN SITTING IN TRAFFIC IN THEIR CARS. Rapid means minimizing inter modal conflict, and the only way to guarantee little or no inter modal conflict is grade separation. Grade separation means either subway or elevated, and it is relatively clear that we don't have the population density at this time to support the expense of a subway system. This leaves us with elevated, and my research indicates that monorail is the most cost effective elevated rail transit system. Consequently, the first rail system we implement in Austin should be a high speed monorail backbone which serves as a collector for most if not all bus routes.

Route: One of the benefits of monorail is that it allows us to run the rail line along existing transportation corridors without requiring too much (if any) additional right of way. A monorail line could be installed along Lamar and/or Congress with support columns that fit entirely into the existing center turn lane. This fact makes the route selection both natural and obvious.

For our backbone system, I propose that the rail line start at a large Park&Ride facility at Howard and I-35, proceed down Lamar to Guadalupe, and then down Guadalupe to Palmer Auditorium/Riverside. From there, the line would bifurcate, with one branch proceeding down Riverside and ending at the Austin-Bergstrom Airport, and the other line going south on Congress and ending at either Ben White or Wm. Cannon. One would expect that another Park&Ride structured parking facility would be built at the southern terminus of the system.

The choices of Lamar and Congress precisely fit the previously mentioned criteria; i.e. they're major transportation corridors surrounded by largely commercial and large institutional properties, and are good candidates for the additional developmental densities the introduction of a rail system will stimulate. Further, by proceeding down Guadalupe en route to the downtown area, the system can have stops directly at the locations of Austin's two largest employers, namely UT and

the state government complex.

Let's briefly consider some of the benefits of having the rail line run directly along the Lamar corridor:

- land is available for a large Park & Ride at I-35 and Howard
- the northern end is dominated by large apartment complexes, relatively high density population centers that would benefit from rail transit
- Lamar and Rundberg is a major commercial center
- Lamar and 183 has a major Capital Metro transit center
- land is available for an additional Park & Ride facility

at Lamar and Koenig Lane

- the system could include stops at the DPS facility, the School for the Blind, and the state Health and Human Services Complex
- the system could include a stop at the as-yet-to-be-developed but very high density Triangle complex at Guadalupe and Lamar

Similar arguments can be made for the Congress corridor (The School for the Deaf, St. Edwards University, etc.)

Now, on to the bullet items:

THE SEVEN REASONS WHY RAIL FAILED IN THE LAST ELECTION (in increasing order of importance) AND HOW MONORAIL ADDRESSES THESE ISSUES

1. Disruption of Neighborhoods

By proposing to use existing rail lines passing through neighborhoods such as Crestwood, Capital Metro turned what should have been inner city rail supporters into staunch rail opponents. Had the people in these north central Austin neighborhoods voted for rather than against rail, this alone could have provided the margin of victory in the last referendum for/against rail.

Not only that, but it simply doesn't make sense to run a transportation rail system through extremely low density SF-3 zoned neighborhoods. The cost savings of using existing rail simply doesn't make up for the poor route choice this results in, especially when one considers a long term view. The rail line should go where the people are and where the people want to go, and that means major transportation arterials with current or the capacity for high density commercial and residential land use applications. As already outlined, the proposed monorail system runs right down Lamar, minimizing the disruption of area neighborhoods and maximizing the utility of the system.

2. Inter modal Conflict

Has anyone from Capital Metro other than a few long suffering #1 bus drivers ever bothered to take a look at North Lamar Blvd. at 5 pm on an average weekday? The traffic is horrendous. Many, many people drive on Lamar every day, and when those people start to try and visualize how many cars will be displaced by a surface rail system, their hands will immediately start reaching for the "just say NO" lever.

For the vast majority of people in Austin, rail is as yet an untested transportation option. Who knows if it will work? Meanwhile, we better not screw up what we already have, namely our existing arterials designed for motor vehicle traffic. I don't think that this is a terribly unreasonable perspective, particularly for someone who's never experienced the benefits a rail system can provide.

The previously proposed surface rail system would have taken up vast stretches of real estate on Lamar between Airport and Guadalupe. For a large number of Austinites, this presents an unacceptable disruption of the motor vehicle-based transportation system they are already familiar and comfortable with.

As previously outlined, a monorail system would minimize the impact on existing traffic on Lamar and Congress. Of course a subway would take up no space at all on the roadway, but I don't believe we're anywhere close to the population densities or size needed to make subway a cost-effective solution.

3. Frequency of Service

A public transportation system which only runs some of the time is limited in its potential to get people out of their cars because of the fear of getting stranded some place when the train is no longer running. Once built, the single biggest expense of a rail system is labor; with our existing bus system, for example, the biggest expense in adding or extending the service hours is the bus driver, and this must always be taken into consideration when route determinations are made.

A surface rail system will always require drivers due to inter modal conflict. A monorail system, on the other hand, can be fully automated, allowing one to run trains without incurring the expense of a driver. A single set of operators can manage an entire network of trains from a central location, helping to reduce labor costs and removing this as a factor in determining what frequency of service and what service hours can be afforded the customers. Consequently, we can have extended service hours and frequency of service before a strong demand for these services exists, allowing the existence of the service to stimulate the demand. One possible consequence? Fewer drunk drivers endangering themselves and others on our roadways from 2-4 am.

4. Utility

That is, does the system go to the destinations that people want to go to? Again, since monorail can and should be deployed along existing major arterial roadways, one is assured that the rail service will go to the destinations that people want to go to, since these destinations are almost always located along major arterials for convenience of access by motor vehicle traffic. If the train goes the same places the cars are going, the path will probably be one of greatest utility. Maximizing utility will negate the "Does too Little" part of "Costs too Much, Does too Little".

5. Deployment

By all rights, the merchants along Congress Ave. should have been fanatically in favor of a transportation rail transit system along Congress Ave.. Instead, they were dead set against it. They even hired a lobbyist, former council member Max Nofziger, to speak out against the deployment of rail. Why? Fear of the disruption of access to their businesses construction of the rail line would cause. Installing a surface rail system would tear up the entire roadway for months, if not years, not to mention the large amounts of additional right of way which would need to be appropriated from property owners to accommodate the rail system.

One of the benefits of monorail is that the actual rails can be pre-manufactured off site and simply placed on the support pillars. The only track construction which takes place on site is the installation of the support pillars, and these need only be placed every 100-200 feet. Consequently, the disruption of traffic and access to businesses along the route is minimized. For any particular part of the street, there are problems while the support pillar(s) are being installed, but after a few days the construction crew moves on, leaving a fully functional street (and fully accessible businesses) behind.

The light rail system proposed in the previous referendum had a build-out time of 20 years. 20 years!!! Who wants to wait 20 years to enjoy the benefits of rail? To hell with that, give me another lane for my car, let me keep a big chunk of my billion dollars and I'll make do somehow; according to this plan I would have to anyway - there is no other choice.

According to one communication I had with an engineering firm, a single crew can deploy 5 miles of monorail track in a single year. By this reckoning, with 4 crew working simultaneously, we could have our entire monorail system in less than 3 years! 3 years is a time frame I (and most other people) can live with. 20 years is an outrageous and unacceptable amount of time to wait.

6. Speed

This point can't be stressed enough. People will simply not use a system which is slower than sitting in traffic in their own car. They might if parking were severely limited, but this is not the case in Austin; on the contrary, the downtown area is infested with an ever growing number of parking garages. Why on earth would anyone choose to sit in traffic in a bus or in a surface rail car when they can just as well sit in traffic in the air conditioned, radio and CD player equipped comfort of their own car? The average speed of the previously proposed surface rail system was 11 miles per hour. At this speed, I would never use the train because I can get to any destination in Austin faster on my bicycle!

According to my calculations, a monorail system with stations placed at intervals of 1 mile can easily achieve a cruising speed of 70 mph between stops, allowing for an average speed of about 28 mph (with stopping time included). Since the system enjoys grade separation, there is never any need to slow down at intersections or stop because, for example, another vehicle is stalled or stopped on the track due to traffic jams. This is a much higher average speed than one can get traveling downtown by automobile, particularly during rush hour. Combined with convenient frequency and hours of service, this is all that it takes to get commuters out of their cars and onto the train. Once they do it, they'll never look back, and a rail-friendly environment will have been established, allowing for additional rail routes (including, perhaps, surface rail on existing rail right of way and a downtown trolley system as part of the transportation mix).

Light synchronization DOES NOT solve the inter-modal conflict problems surface rail suffers from. The driver must still slow down and make sure some errant motorist isn't absentmindedly running the red light. And in the case of severe traffic jams and gridlock, surface rail vehicles are stuck in traffic just like everyone else. Consequently, what's the point? Why spend hundreds of millions of dollars on a system which will not only displace cars and vastly widen the roadway, but in the final analysis, doesn't improve quality of service? The only way to guarantee a fixed service time regardless of traffic conditions is grade separation. For Austin, grade separation means monorail - there is no other practical choice.

In short, LET'S KEEP THE RAPID IN RAPID TRANSIT.

7. Cost

One argument made against monorail is that it is considerably more expensive than a surface rail system. The argument made (successfully, I might add) against surface rail is that it "Costs too Much, Does too Little". Monorail solves the "Does too Little" part of this sound bite by providing fast, guaranteed service along existing major arterials to the destinations people want to go to. What about cost? My research indicates that - done right - monorail is no more expensive than surface rail. In the previous rail referendum, the cost of surface rail was estimated at 30 million dollars per mile. In an e-mail sent to me, David Owen of the Owen Transit Group, Inc. (<http://www.OTG-Inc.com>) cites costs for a monorail line which are considerably lower. Here is an excerpt from Mr. Owen's comments:

Our HighRoad numbers, however, are accurate. So much so that we'd be willing to contract to it. (Our web site states the complete cost of a typical 20-mile system in the Atlanta area would be \$22.5m/mile... Austin costs would be similar.) In general, the major cost items have been project priced from vendors... this includes the guideway manufacturer, vehicle manufacturer, controls vendor, etc.. We are an engineering firm. This is what we do. Others in the aircraft industry have given us extensive "peer reviews" and concluded our costs to be accurate and reasonable.

We cost analyzed conservatively, that is, in areas requiring parametric costing, we chose to set cost estimates too high rather than too low. Further, our manufacturing and costing standards are based on aerospace industry tolerances rather than the lower bus/transit standards. We desire to shake the industry with a quality product at a price point well below others in the same capacity range (such as heavy rail). Light rail, btw, falls far short of our capacity.

The cost of light rail being asserted at \$25m/mile is unique! A more typical industry history has shown the minimum cost to be \$42m/mile.

As previously mentioned, one of the benefits of monorail is that the actual rails can be pre-manufactured off site and simply placed on the support pillars. One way of cutting costs would be to have the actual rails manufactured locally, perhaps even by Capital Metro! In any case, it should be clear that the price of a monorail system can be competitive with the cost of deploying surface rail, and perhaps even cheaper.

A valid point is that monorail stations will be more expensive to build because they are elevated. On the other hand, they can be built over the roadway, reducing the amount of right of way which will need to be acquired along Lamar and Congress. One way of mitigating these costs is by including rental space for fast food and commercial vendors in the station design. In the final analysis, the expense of elevating the station should not be prohibitive, particularly in light of the reduced cost of land acquisition.

By every measure, monorail is the only rational solution for Austin.

PRO

by Tom Hopkins, 9-18-01

Here are two more big points in favor of monorail:

#1. People vote for monorails, they often don't vote for light rail. "Monorail" may be the most powerful brand in the world. Several polls have shown that the high-speed monorail proposed for Colorado enjoys positives of over 80% and negatives of only 15%. This is at the outset before the well-financed highway lobby begins their attack so we expect this to drop, but it shows the starting point. Not even "Coca Cola", often described as the world's strongest brand, enjoys such high positives and low negatives.

If you propose a monorail, you had better present something that looks like the Disney monorails because this is what people think of when they attribute wonderful vibes to "monorail". Disney has the most successful transportation systems in the history of world - over two billion passengers, not a single death, and very high levels of satisfaction. In every single ballot in which a monorail was compared with other transit systems, the monorail has won hands down. The public loves 'em.

#2 People will ride monorails, few will ride light rail. In corridors with light rail beside the highway, light rail does not attract even 5% of the travelers.

Light rail makes virtually no difference to the congestion on the highway, and if you want to win the election, you have to win the votes of all the drivers who want all those other people off the highway so they get a clear shot. I think the reason that the vast majority of people don't ride light rail is because it is too slow - averaging a lousy 11 to 14 MPH. Like Patrick says, he can beat it on his bike.

On the other hand, we have every reason to believe that lots of people will ride the high-speed monorail. CDOT did a massive survey in which they interviewed 1,400 people who had just driven I-70. An extraordinary 63% said they would consider riding the monorail instead of driving (by comparison, only 11% said they would consider a bus or van). In CDOT's combined summer & winter surveys where over 4,100 people were interviewed, very high numbers of each market segment said they "definitely would" or "probably would" ride the monorail.

The above surveys were done on an intercity system with some metro components - stations 10 to 15 miles apart and lots of express monorails. However, the high-speed monorail proposed for Colorado would be very fast in a metro application with stations just three miles apart. I said it would average over 50 MPH in a previous post, was challenged for claiming such a high speed, but was able to demonstrate with simulations that we could actually average over 70 MPH (if power usage was not an issue) while keeping acceleration rates low enough to allow people to walk about the cabin.

If you'd like a whole lot more information and arguments, please go to <http://highspeedmonorail.com>.

I wish to respond, at least in an initial, brief way, to Patrick Goetz's posting of 16 September, in which he tells us "By every measure, monorail is the only rational solution for Austin."

First of all, I believe the notion that there is one and only one mode of public transit which is the "only rational solution" for anywhere is a simplistic and unproductive approach to the problem of improving mobility. I urge all those on this list in the Austin area who seek a better transit system to participate in Capital Metro's Rapid Transit Area Teams process in a manner which recognizes that it's a complex problem requiring careful scrutiny of all the issues involved, and particularly that there's no single "mode du jour" which offers a magic-bullet, miracle solution.

In a sense, Patrick is turning the clock back about 25 years or so, when a monorail was first evaluated as a possible solution in the Austin Transportation Study process, in which I was involved from about 1975. Monorail, along with a number of other alternatives (such as subway/elevated rail and PRT), was eliminated at that time as a preferred mode for areawide implementation because of an array of weaknesses in comparison with the other modes which were carried forward (light rail transit and busways). At the time, light rail transit (LRT) was not in high favor. The nation had only 15 or 20 years before finished removing the last vestiges of surface electric rail transit systems in most of its cities, and monorails, PRT, and other "reinventions of the wheel" were very much in vogue ~ reflected in the installation of monorails in central Seattle and a number of recreational settings, and in large dollops of cash bestowed by the federal government (Urban Mass Transportation Administration, or UMTA, precursor to the FTA) for a variety of experimental new "guideway" projects.

So why did LRT emerge as a more promising rail candidate from this process? Mainly because, deployed in hundreds of countries worldwide, LRT has a very extensive, and positive, "track record". There are many dozens of competitive suppliers. It is extremely flexible, able to operate from tracks in streets with mixed traffic to median segregations to totally grade-separated elevated or subway alignments. LRT has proven that it can attract substantial numbers of travellers out of automobiles. And, despite the hype and claims of promoters of monorails, PRT, and other supposedly "low-cost" alternatives, LRT has been demonstrated to represent the lowest-cost rail construction and operation in most real-world deployments.

Monorail, in contrast, has been installed in a relative handful of cities worldwide ~ mainly in Japan, where high densities, government policies, and financial peculiarities are among the factors favoring their deployment in a few situations ~ mainly shuttle-type services in very compacted, congested urban corridors. (And keep in mind that in Japan conventional 2-rail transit is seeing many times the level of development of monorails.)

Monorail systems present planners and designers with many problems the more closely they are evaluated. The main problem is the lack of flexibility ~ the need for total grade separation, typically on an elevated beam (guideway). Thus monorails are, in effect, a form of "heavy rail" rapid transit. But a more workable alternative is usually a conventional 2-rail system, primarily because of the greater flexibility and availability of the hardware ~ standardized rails, power and control systems, switches, vehicle designs, etc. In contrast, there are a number of monorail systems, but they're mostly proprietary ~ leaving planners with the problem of whether they'll be able to get replacement parts, replacement vehicles, etc. down the line without having to contract for expensive, custom-made products.

Another major problem is the storage and maintenance facilities, all requiring thousands of feet, possibly miles, of monorail beams for vehicle storage. Such facilities also typically need lots of switches ~ a logistical nightmare, given the relative cumbersome, complex characteristics of monorail switches. This may be okay for a small-scale system ~ a point-to-point shuttle or a Disney World system ~ but it can balloon into a big headache for a city thinking of a network of multiple lines and hundreds of vehicles serving and expanding with a growing area.

Then there's cost. Monorail proponents often lowball the costs of their proposed alternatives ~ Patrick cites costs claimed by a vendor, clearly anxious to land an initial contract. These "theoretical" costs ~ usually encompassing simple construction, sometimes with or without stations, maintenance facilities, etc. ~ are invariably counterposed to the real-world costs cited for LRT, which take into account the array of actual costs encountered in any real transit project ~ engineering and project administration, real estate acquisition, mobilization, contingencies, and more. This "apples-oranges" comparison often deceives a gullible public.

Basically, there is little cost differential between heavy-duty, high-capacity elevated rail systems ~ monorail, RRT, or LRT. The structure still has to be strong enough to stand the static and dynamic stresses of heavily loaded, fast-moving trains. Elevated stations must be safely constructed and ADA-compliant, requiring stairs, elevators, and usually escalators. A similarly grade-separated, elevated LRT system would offer the advantage of lower-cost surface construction where traffic problems are less of an issue. But the bottom line is: Elevated construction is considerably more costly than surface. You can build far more system on the surface, implementing much more "spread", and serving much more of any given metro area, than you ever will with an elevated system.

A far more valid comparison of monorail costs with those of LRT would use a real-world project for a revenue-service system in a major urban deployment. The opportunity for such a comparison is offered by the monorail project in Las Vegas, currently under way. This is a privately funded project ~ basically, a consortium of casinos decided they wanted a "space-age" monorail to serve the Strip (another "point-to-point" shuttle-type monorail deployment). Thus it has not had to pass the rigorous planning benchmarks and regulations required for Federal Transit Administration (FTA) funding, as the Austin LRT project has done. Installation of the 3.8-mile monorail line is being financed through \$650 million in state-issued bonds ~ a cost of \$171 million/mile. That's about 8 times the per-mile cost claimed by Patrick's vendor and cited by Patrick as proof that monorail costs "are considerably lower". Furthermore, the projected fare per ride is \$2.50, a level which has aroused skepticism about the consortium's ridership projections.

One can draw a lesson here. The cost of this or that "mode du jour" can be theoretically "calculated" to be ever so low by proprietary vendors and zealous proponents. Experience has repeatedly shown that, when planners and engineers get down to the detailed tasks of actually trying to fit these systems, with their real-world requirements, into the hard realities of a developed central-city area, the actual challenges and costs quickly become apparent.

Another consideration is reliability and availability of the technology. LRT is extremely well-proven, with over a century of development, widespread deployment, and excellent off-the-shelf availability. Where is Patrick's recommended "HighRoad" system operating? What's its record in revenue passenger service? Has any locality implemented it even in a simple, short experimental scenario?

Patrick goes on at great length about the absolute and utterly unavoidable need for total grade separation, and I intend to respond to this at greater length in a subsequent posting (this is also the argument for other alternatives such as subways and PRT). At this point, let me just point out that surface LRT has been operating in this country and Canada since the 1970s, and has been far from the disaster Patrick suggests. On the contrary, from San Diego to Portland to Dallas to Baltimore, these systems have demonstrated not only that they can work well, but also that they have had considerable success in boosting ridership, attracting passengers from automobiles, and in most cases stimulating an expansion of the overall predominately bus-based transit system. In Dallas, LRT trains routinely cross streets with heavy cross-traffic in both North Dallas and Oak Cliff without catastrophic delays; likewise in St. Louis, Salt Lake City, Sacramento, San Jose, Los Angeles, and other cities with LRT. Patrick's dark vision of trains having to "slow down or stop because ... another vehicle is stalled or stopped on the track due [to] traffic jams" is certainly not typical of the operating reality of the new LRT systems which have been installed in North America.

Patrick also argues that monorails can be totally automated, and total automation will inherently reduce operating costs. This is also a claim on behalf of PRT, and I intend to address it at greater length in a subsequent posting. **For now I will just point out that a number of studies tend to disprove this claim, noting**

that the absence of a train operator is more than compensated for in the need for additional maintenance, security, and other personnel. A 1988 study published by the Transportation Research Board, for example (Special Report 221), actually presented data that showed LRT to have LOWER operating costs than automated systems. I will note that the projected fare of \$2.50 to ride Las Vegas's monorail also raises skepticism about the claim of much lower operating cost due to automated operation.

In his zeal to promote a monorail alternative, Patrick unfortunately stretches facts substantially. **For example, Patrick exaggerates the time to implement an LRT system:** "The light rail system proposed in the previous referendum had a build-out time of 20 years." Patrick denounces this with outrage, and claims 5 miles of monorail could be built in a year. In reality, the initial 12.5-mile LRT line was proposed for operation within 8 years of voter approval ~ and the implementation time included the time for design, real estate acquisition, mobilization, and other crucial preconstruction tasks, to which Patrick contrasts simply the time of monorail guideway construction. The 20-year estimate for total buildout applied to the entire 43-mile LRT system, and was constrained not simply by the array of necessary and required tasks in any major rail project installation but also by the availability of funding. All of this would, of course, apply equally to monorail development.

Patrick also claims that the LRT system proposed for Austin would have an average speed of 11 mph. Similar claims were made by ROAD and many of its supporters during last year's campaign. It has no factual basis. According to data provided by Capital Metro's consulting team, the entire north-south route, from Howard Lane to Ben White, would have an average speed, with stops (and allowance for occasional delays at intersections) of 21 mph. The average speed from Howard Lane to downtown (8th St.) would be even faster ~ 23 mph.

By comparison, average urban local bus speed is about 12 mph. Average all-day urban automobile speed is about 25 mph, but slower during peak hours. LRT would be particularly competitive with automobiles during peak times (the average speed would be consistent during all hours).

Patrick envisions a monorail line with a maximum speed of 70 mph, and claims an average speed of 28 mph. However, to accomplish that, he stipulates average station spacing of 1.0 mile -- which is wider than the 0.8-mile spacing assumed for LRT for the CBD-Howard (north/south) line. This additional 0.2 mile translates into a 4-minute additional walking access time. Together with the additional access needed to negotiate stairs, escalators, or elevators to reach the elevated platforms, this adds about as much access time as the running time saved by the higher speed. Incidentally, the south LRT segment to Ben White would have a spacing of about 0.5 mile.

Lengthening the stop spacing does make a higher maximum speed feasible, but it also lengthens the time and difficulty of passenger access to stations, especially in the central-city portions of the route. Furthermore, access to elevated stations imposes yet additional difficulty and time penalties. To ridership forecasters, all these additional access time penalties are translated into "disutilities" or "impedances" in the ridership modelling process. Since these are weighted more heavily than running time, the effect of more widely spaced elevated stations may be to negatively impact ridership, despite a faster maximum speed.

I must also point out that, in envisioning a 70-mph system, Patrick is effectively counterproposing a BART-type, heavy rail rapid transit (RRT) system more suitable for highspeed regional commuter trips over longer distances (e.g., widely dispersed suburbs, as in the Bay Area). LRT is envisioned as a cross between commuter and limited-stop services, and is designed to serve and enable easier access to inner-city origins and destinations. Thus once more, apples are being compared to oranges.

Austin might be able to afford to construct a monorail system ~ all 5 miles or so of an initial line, and 12 miles or so of a built-out system ~ but what kind of access and ridership would this provide? How expandable would such a system be? Where has it demonstrated success in a similar setting? What are the implications for vehicle storage, maintenance, and future procurements? These are issues which the Rapid Transit Area Teams process is intended to address. I urge participants in that process to keep a keen eye out for hard facts, and to be wary of glib claims for supposedly miracle panaceas.

PRO by Patrick Goetz, 9-20-01

I extensively argue that what Austin is most in need of is a high speed backbone system to activate the existing bus network. I didn't see anything in LH's response which addresses this point one way or the other. Since optimizing the public transportation system should be the most important consideration (if not the ONLY consideration) in implementing any new transportation options, and since LH's response doesn't even address this point, one begins to suspect that light rail advocates are motivated more by some kind of romantic infatuation with surface rail or trolley systems than they are by having the most effective public transportation system money can buy. This, in a nutshell, is why a very large percentage of Austinites are extremely suspicious of rail and explains the unreasonable efficacy of a single 6 word phrase (costs too much, does too little).

In particular, in my original post I explicitly say that traditional surface rail utilizing existing rail right of way and perhaps a downtown trolley circulator might very well be excellent additions to the public transportation mix AFTER a high speed backbone has been implemented. There are very specific reasons why surface rail which is a good solution in Dallas is not a good solution for Austin. For one thing, Dallas has lots of freeways for it to run along, Austin doesn't. Freeways settle the inter modal conflict argument in a simple fashion: there is no intermodal conflict, the freeway is king. And when 2 of these behemoths cross paths, they're grade separated in order to avoid 10,000 or more traffic fatalities per hour. Hmmm, grade separation: what a concept!

A few quick additional comments:

1. The idea that the issue of monorail was settled in 1975 is laughable, to say the least. Imagine someone telling you "we considered implementing PCs in place of typewriters in 1975, and decided it was a bad idea so there's no reason to revisit this issue now." We're better off pretending this statement was never made. If ROAD finds out about it, the rail referendum will already be over - no need to spend any more time and energy on a lost cause.

2. The idea that surface rail without the benefit of grade separation traveling on Lamar and Guadalupe will be able to average 21 mph is absurd. I have no idea what Capital Metro claimed they could do, but I'd like to see an example of an actual urban trolley system that achieves anywhere near these numbers.

3. LH wisely chose not to comment on the enormous amount of right of way (non-existent, for example, on Guadalupe) which will need to be acquired in order to implement surface rail. There are reasons why monorail is a superior solution; this is one of the big ones.

4. The Las Vegas monorail system has become the rallying cry of light rail romanticists all over the country. 171 million dollars per mile! "That's how much monorail costs" they trumpet gleefully (while losing rail referendum elections time and time again; but hey, they enjoy being the underdogs). Give me a break. Has anyone ever been to Las Vegas? This is the city where they build artificial volcanoes with actual eruptions, miniaturized replications of Paris, and gigantic water parks in the middle of the desert. The electricity bill for flashing light bulbs for one week in Vegas would pay for an entire monorail system for Austin. Obviously it's POSSIBLE to spend an almost infinite amount of money on anything. It's much more challenging (and requires a little more thought, planning, and creativity) to get the best value for your money. I've briefly touched upon things that could be done to make monorail an extremely cost effective solution (in-house local rail fabrication, for example), options which are simply not available for surface rail, since all the construction must be done in situ (it's a big word, Fred, look it up).

5. Having stations 1 mile apart (outside of the immediate downtown area) is EXACTLY what one wants for a high speed backbone system. If we're

talking about implementing a rail system which more or less duplicates what the #1 bus does (i.e. travel on the road and stop frequently) but on a steel rail rather than on rubber, then what's the point? Why spend a billion dollars to get bus on a rail?

6. The issue of storing monorail trains is almost certainly a red herring, but admittedly an issue that I hadn't thought about. Of course one must store light rail vehicles, too, and the surface area required to store larger light rail vehicles is probably greater (which is why this is probably a red herring).

7. Once again, the issue of popular support is treated as completely unimportant. Need I remind everyone YET AGAIN that rail must pass by public referendum before it can be implemented? Surveys indicate time and time again that monorail enjoys tremendous popular support. As Tom Hopkins pointed out, 80% pro in conservative Colorado (with similar results available in, for example, Los Angeles - see www.monorails.org for more information).

8. In the process of typing this brief response, I just learned that LH's comments make perfect sense to Fred Meredith. No point in wasting more electrons on a detailed response, since this more or less makes my point for me, generally speaking.

CON by NAWDRY@aol, 9-21-01

Patrick's post makes a number of points which merit some response.

1. The idea that the issue of monorail was settled in 1975 is laughable, to say the least. Imagine someone telling you "we considered implementing PC's in place of typewriters in 1975, and decided it was a bad idea so there's no reason to revisit this issue now." We're better off pretending this statement was never made. If ROAD finds out about it, the rail referendum will already be over - no need to spend any more time and energy on a lost cause.

Monorail was first evaluated and rejected in the 1970s in the course of the Alternative Futures project of the Austin Transportation Study, which recommended that more detailed evaluation proceed focused on light rail transit (LRT) and a busway system. Monorail systems have been repeatedly reviewed since then, but there has been no major new development in the technology which has persuaded Capital Metro's planners, engineers, and decisionmakers to depart from their original assessment. However, a monorail system is being given careful review once again in the current Rapid Transit study process.

2. The idea that surface rail without the benefit of grade separation traveling on Lamar and Guadalupe will be able to average 21 mph is absurd. I have no idea what Capital Metro claimed they could do, but I'd like to see an example of an actual urban trolley system that achieves anywhere near these numbers.

I don't have handy a breakdown of LRT average speeds in similar street alignments. The average projected for LRT in the Lamar-Guadalupe corridor and into downtown (8th St.) was about 18 mph. This assumed maximum speeds of 25 to 35 mph, average station dwells of 20-25 sec, and an average 32 seconds of total delay from cross-street traffic (probably mostly from hitting red traffic signals out of the prioritization envelope).

3. LH wisely chose not to comment on the enormous amount of right of way (non-existent, for example, on Guadalupe) which will need to be acquired in order to implement surface rail. There are reasons why monorail is a superior solution; this is one of the big ones.

Some right-of-way (ROW) would need to be acquired for widening Lamar and Guadalupe, both for LRT and for sidewalks. The result would be a more pedestrian-friendly and bicycle-friendly thoroughfare. There is an emerging philosophy that inner cities should no longer be sliced by motor vehicle corridors simply designed to facilitate the fastest movement of vehicles; LRT would therefore have somewhat of a "traffic calming" effect which would also facilitate the safe movement of pedestrians and cyclists.

A design goal for the corridor however has been to maintain the existing lane capacity as well as to install LRT. Some of the additional ROW would come from the current median turning lane and from one or both sides of the street.

A monorail or other elevated line would pose its own ROW needs ~ mainly space for support pillars down the center of the thoroughfare and additional space for station supports and access facilities (elevators, escalators, stairways) on both sides of Lamar and Guadalupe. Except for station locations, ROW requirements of an elevated alignment would probably be somewhat less than those for surface LRT.

4. The Las Vegas monorail system has become the rallying cry of light rail romanticists all over the country. 171 million dollars per mile! "That's how much monorail costs" they trumpet gleefully (while losing rail referendum elections time and time again; but hey, they enjoy being the underdogs). Give me a break. Has anyone ever been to Las Vegas? This is the city where they build artificial volcanoes with actual eruptions, miniaturized replications of Paris, and gigantic water parks in the middle of the desert. The electricity bill for flashing light bulbs for one week in Vegas would pay for an entire monorail system for Austin.

Las Vegas provides the first opportunity to obtain actual, real-world costs for a high-capacity, public transit monorail line in an inner-city urban setting. The private consortium funding the project hopes to make a profit, intending to charge a \$2.50 fare, so it's unlikely they're wasting money, paying for unnecessary extravagances, and neglecting their bottom line. This line is being built on a straight, flat alignment in the heart of downtown Las Vegas. Currently, its costs represent the best actual costs available to date to compare to those of LRT projects.

5. Having stations 1 mile apart (outside of the immediate downtown area) is EXACTLY what one wants for a high speed backbone system. If we're talking about implementing a rail system which more or less duplicates what the #1 bus does (i.e. travel on the road and stop frequently) but on a steel rail rather than on rubber, then what's the point? Why spend a billion dollars to get bus on a rail?

Now Patrick is talking about having 1-mile station spacing only "outside of the immediate downtown area". Reducing the station spacing for Austin's Core Area (UT-CBD) would reduce the operating speed for the monorail operation Patrick proposes.

If we consider LRT only "outside of the immediate downtown area" ~ Howard to 24th St. ~ the average speed becomes 25 mph and average station spacing is 1.0 mile. Thus, with comparable station spacing, Patrick's assumed higher speed (70 mph) with full grade separation yields a 3 mph average speed advantage.

6. The issue of storing monorail trains is almost certainly a red herring, but admittedly an issue that I hadn't thought about. Of course one must store light rail vehicles, too, and the surface area required to store larger light rail vehicles is probably greater (which is why this is probably a red herring).

Widths of light rail cars and monorail vehicles are about the same ~ about 8.5 ft. Providing storage and service tracks for LRT is considerably easier and less costly than providing comparable monorail beams. Access by personnel is easier for LRT, since they can simply walk across the tracks; in contrast, monorail beams would either have to be elevated to permit access beneath or other means of access would have to be provided. In addition, as mentioned in another posting, numerous switches are needed in such facilities; these are far less cumbersome and costly for LRT.

7. Once again, the issue of popular support is treated as completely unimportant. Need I remind everyone YET AGAIN that rail must pass by public referendum before it can be implemented? Surveys indicate time and time again that monorail enjoys tremendous popular support.

Whether Austin voters would be willing to pay for about 1/5 as much transit system for the money, possibly getting less ridership and less contribution to total travel, is a political issue which I will leave to others to debate.

Patrick also argues that the Dallas LRT system is a success because it's routed along freeways:

- There are very specific reasons why surface rail which is a good solution in Dallas is not a good solution for Austin. For one thing, Dallas has lots of

freeways for it to run along, Austin doesn't. Freeways settle the inter modal conflict argument in a simple fashion: there is no intermodal conflict, the freeway is king. And when 2 of these behemoths cross paths, they're grade separated in order to avoid 10,000 or more traffic fatalities per hour. Hmmm, grade separation: what a concept!

DART's LRT follows the North Central freeway for only part of its total route and, except for the tunnel from the edge of downtown to Mockingbird, is grade-separated only in certain portions. Much of it is routed in a surface railway corridor which has numerous grade crossings protected by crossing gates. I want to emphasize that, as we evaluate LRT, monorail, PRT, BRT, and other alternatives, it's critical that we be sure we're dealing with hard, reliable, factual information as much as possible. Informed decisions are made with sound facts, not unfounded or questionable claims and emotional exaggerations.

CON by Mike Dahmus, 9-20-01

It is very easy to realize that there is absolutely nothing we can learn from Disney World or Las Vegas which can be put into practice for daily mass transit, given the following:

1. People are willing to spend \$5, \$10, or even more for a trip while on vacation, while spending even \$5 every day to get to and from work is out of the question. Therefore, the claims that Las Vegas can build a monorail which is financially self-supporting, EVEN IF TRUE, are completely irrelevant. I can easily see spending ten or even twenty bucks to go on a ride from one casino to another; I sure as hell can't see doing it to get to work.

2. People are willing to wait in line for quite a while and take a nice ride while on vacation, even if slow, while doing it every day to get to work is out of the question. I can see waiting for 20 minutes for the monorail ride (and in fact have done it at Disney World), but those headways are unacceptable when going to work.

3. People are willing to use a monorail system which has stops exactly where they are staying and exactly where they are going. This is very easy to do in Las Vegas and at Disney World. It is very hard to do in the real world.

4. People are 100% willing to use a monorail when there are no alternatives. This makes Disney's monorail look great; GOLLY GEE **EVERYBODY** USES IT! We'll see how well Las Vegas does, however, applicability of that example will be likewise limited since driving your car from hotel to casino in Las Vegas is doubtlessly much more difficult than most peoples' Austin work commutes.

As for speed, light rail isn't exactly pokey. Take San Jose's rail system (please!) - here's a [map which indicates speeds on various parts of the line](#) Notice the configuration is very similar to the system proposed for Austin, as well as the systems on the ground in Portland and Dallas: in the downtown area, a set of 1-way tracks; a long stretch on more suburban-type streets where the rail runs where the median would be; and then a grade-separated portion in the true suburban areas. There's actually no difference between running in a freeway median and running in a grade-separated facility like the one which goes up to Leander, after all, except that the stations will be easier to build and get to for people in the surrounding neighborhoods. Note the parallels: speeds up to 55mph in the outlying areas where stations are pretty far between and ROW is totally separated (Cap Metro had this in their plan); speeds around 15-25mph on the urban but not high-density stretches (on-street on 1st St. mostly in San Jose; a good analogue to Lamar and Guadalupe here); very slow in the urban core where it splits into two tracks on the one-way street grid (just like us in the downtown area).

CON by NAWDRY@aol, 9-20-01

Additional commentary on several more assertions made by Patrick Goetz in his promotion of a monorail system for Austin.

1. "One prominent light rail advocate recently mentioned that he's been advocating light rail in Austin for 26 years. That's 26 years of no rail on the ground and a lot of blab."

The "blab" has mainly come from politicians and community leaders in past years who continually referred to "future light rail" without ever taking steps to actually do anything. It's furthermore come from a wide variety of community leaders, activists, etc. who have argued and argued over what should be done, often suddenly presenting their own alternative proposals without ever having any involvement in the planning process and familiarity with the real issues involved. It's also come from plenty of people afraid of any change whatsoever and therefore opposed to anything which might impact anything, especially near them, in any way. The net result has been decisionmaking gridlock. Some of us have witnessed this over more than two and a half decades.

2. "As previously mentioned, one of the benefits of monorail is that the actual rails can be pre-manufactured off site and simply placed on the support pillars. One way of cutting costs would be to have the actual rails manufactured locally, perhaps even by Capital Metro! In any case, it should be clear that the price of a monorail system can be competitive with the cost of deploying surface rail, and perhaps even cheaper."

Monorail systems do not have some kind of monopoly of prefabricated construction. Standard steel, 2-rail technology also extensively uses prefab techniques. The ribbon rail is prefab, as are the concrete crossties (sleepers), as well as the beams, slabs, bents, etc. on which these would rest on an elevated structure. The rails are quickly fastened to the crossties with highly automated machines. Anyone can see this in process by visiting Dallas and examining the construction of DART's new LRT branches to Plano and Garland.

There would be no need for Capital Metro to get into rail manufacture ~ there are plenty of suppliers who provide steel rails and other standard hardware items efficiently and at extremely competitive costs.

3. "A valid point is that monorail stations will be more expensive to build because they are elevated. On the other hand, they can be built over the roadway, reducing the amount of right of way which will need to be acquired along Lamar and Congress. One way of mitigating these costs is by including rental space for fast food and commercial vendors in the station design. In the final analysis, the expense of elevating the station should not be prohibitive, particular in light of the reduced cost of land acquisition."

Including rental space for commercial use rentals is not a bad idea, but it increases spatial and structural requirements and thus

construction cost. Elevated construction might save a bit in land acquisition, but there are still substantial ROW costs, especially for stations and access facilities from the street margins as well as for roadway expansion to accommodate placement of support pillars. (This usually requires substantial utility relocations and substrata stabilization as well.) Increased construction costs typically are far in excess over the ROW acquisition savings

PRO by Patrick Goetz, 9-20-01

D'Amico wrote:

- > systems. I'm not trying to be an ass, but it seems
- > like you spent some time browsing monorail website and
- > now you're a devotee without ever experiencing the
- > real questions involved (mainly cost).

Well, I haven't actually built my own monorail system, but I have had some discussions with engineers who work on transportation systems. The Disney system, for example, includes 2 miles or so of track, 2 elevated stations, and 2 trains and cost about 20 million to build (and has successfully transported over 2 billion passengers). Given the economies of scale, it would certainly seem like one should be able to match these numbers with a little prudence. It is very, very hard to pin down costs on these systems. This has been a active topic of discussion on the monorail list many, many times, and I've seen several cost analyses produced by transportation engineers trying mightily to put together a pick and choose spreadsheet allowing one to estimate total cost.

The point that monorail systems are largely proprietary is another red herring. Recently Disney went to replace their trains and had no problem finding vendors who made trains that worked on their existing tracks.

The fact that this is a point of contention even amongst experts should be some indication that there is no clear answer to this question. If you don't have to buy right of way and/or displace traffic, then surface rail is probably cheaper. Trying to install a surface rail line down 5th Ave in Manhattan, however, would cost about 2 billion dollars per mile (at least). Austin falls somewhere in the middle. Which system really costs more on a given route in Austin? I don't really know and doubt anyone else does at this moment, either.

Is this really the main issue, though? So what if we spend an extra 10 million clams per mile. Just the city of Austin's budget this year is almost 2 billion dollars. For a 20 mile system, this only represents 10% of 1 year's budget, and over the course of 10 or 20 years this is an insignificant pittance. The important thing is to get a good system that people will want to use and a proposal that people will vote for in the first place.

The property tax revenues from the increased density along the rail route will more than make up for a million here or a million there. Just one of the proposed stations in Dallas has already generated a billion dollars worth of speculative real estate development around the station - a station which hasn't even been built yet! But again, this is yet another reason to put the rail line along an existing commercial corridor such as Lamar. Try to run it through Crestview again, and watch those people scream bloody murder yet again. Why watch reruns of really bad movies?

- > But one question I have that's more list
- > relevant...and I also don't have a clue about...What
- > is monorail's track record regarding bikes? Are they
- > allowed on any of the systems that are public?

Everyone I've asked has said not a problem. If the system gets really popular, we will have problems during rush hour, of course, but that would be a rather pleasant complication to have to find a solution to.

- > Finally, I have to get in a dig, since you did on big
- > bad Fred. I notice you like to repeat the ROAD mantra
- > quite often. You been hanging out with Skaggs in his
- > Navigator or something?

Why on earth let those guys win another election without even lifting a finger? I want to make sure that "costs too much, does too little" is in NO WAY a factor next November. The last rail referendum was characterized by a bunch of light rail fan club members patting each other on the back and having little parties to tell each other how great light rail is. I know, I was there. Meanwhile the ROAD guys were taking it to the street. End result? A system which is already funded, in the most traffic congested mid-sized city in the country got voted down. Mayor Watson shaking Gerald Daugherty's hand like he's some kind of prince who saved the city from certain doom.

I don't mean to be an ass, but do you enjoy getting your ass kicked in elections? I don't, and don't intend to see it happen again next November. When I listen to those light rail guys speaking at the Rapid Transit Area team meetings, they sound whipped already. Like, they know this isn't going to pass, but it's their responsibility to do the right thing anyway. Everyone is out to get them. *sigh* Life sucks and then you die. *sigh* Oh well, better get up and talk the talk again. *sigh*

Fuck that, I want to see a better public transportation with higher density land use along the rapid transit lines and the whole banana, and not diddled out over 20 years. That means pushing the envelope a little, not pushing the same old tired ideas which have been considered and rejected for over 25 years now.

Sorry if my interest in seeing something actually happen is offending some people's tender sensibilities.

CON by Loren, 9-20-01

Not to undermine the seriousness of the discussion, ya'll want my gut instinct O-pinyon? A monorail would be keen cool neat-0! But speaking as a normal voter named Joe (or Jill, depending on the moon phase), I think Austin is a little too backwards in too many areas to spend 40 bajillion of my property tax on a novelty act.

Defeats of past plans say I ain't alone. I can see Dallas, or Vegas or Seattle dolling up with some hi-teckidness mass-tran, but I'm still stuck on that huge architects' drawing of the new convention center on Barton Springs and 1st depicting a beautiful airbrushed complex when it's obviously an already constructed plain old prehistoric concrete parking garage. (An example of how they shove a fancy picture down our throat while the wallet is being lifted.) Now I am being presented with shiny hi-speed Japanese style Disneylandesque Monorail, when reality will be smoking diesel, runaway mine trains, flattened dogs, rumbling smoke stained apartment complexes and debt for the homeowners all the way back to 2045.

Neutral by Roger Baker, 9-21-01

I tried to find good links comparing monorail with light rail, but didn't come up with much. The monorail sites tend to seem pretty biased in favor of monorail, but not very scholarly in their comparison. Sydney Australia has both, by the way.

It seems that you can get higher capacity with light rail. In congested areas you get higher speeds and less capacity with monorail, which tends to be favored when you have right-of-way constraints at the ground level. It appears that the cost may be roughly comparable.

CON by NAWDRY@aol, 9-24-01

There would definitely be objections from the public at large in regard to any elevated system -- monorail, PRT, LRT, or any other mode -- especially in regard to elevated structures through the central area, past UT, past the Capitol, through downtown, etc. The point is that all of these alignment choices (surface, elevated, subway, etc.) have pros and cons. So far, a totally grade-separated system has been presented by its promoters as a kind of panacea, but I believe it's important to recognize that there are serious disadvantages as well.

What I want to address in this commentary is the issue of routing light rail transit (LRT) ~ or any higher-capacity, higher-quality transit ~ in surface streets or thoroughfares. What has emerged over the past few months is a sort of coalition of opposition to this concept, some of it of course coming from staunch rail opponents (mainly the ROAD zealots) but also proponents of a subway, monorail, or PRT alternative. These disparate factions seem united on the notion that streets are for motor vehicles, and you don't want to inconvenience motorists or reduce traffic capacity or speed, no matter what. This notion is repeatedly expressed, for example, on the monorails.org website, leading one to wonder what these proponents think of reserved bus lanes.

Basically, I see a number of reasons for leaving open ~ and vigorously supporting ~ the option of using appropriate surface thoroughfares for LRT (or other transit, for that matter).

(1) Streets follow established traffic patterns and can provide relatively lower-cost, available rights-of-way.

(2) Surface-level LRT routes tend to be more "user-friendly" and accessible (passengers don't have to climb to a different level ~ and think of having to constantly climb or ride up and down carrying a bike). Also, they can be more closely spaced, thus reducing access time compared with grade-separated alternatives.

(3) Stations can be constructed far less expensively, and thus more can be provided on the route within an available budget.

(4) The visual obtrusion of an elevated structure is eliminated ~ the thoroughfare has much of its previous "streetscape" appearance, albeit typically "improved" with landscaping, better pedestrian facilities, etc., and with of course the obtrusion of an overhead contact system (OCS ~ simple trolley wire or more elaborate catenary).

(5) LRT surface riders get to see the street they're travelling on, storefronts, etc. On an elevated system they see the tops of buildings; in a subway, they see nothing.

(6) LRT in a thoroughfare typically has an important "traffic-calming" effect, helping to turn the thoroughfare away from simply a fast corridor for motor vehicles slicing through the city, and more into a neighborhood-friendly, pedestrian-friendly, bike-friendly mobility corridor.

Those are some major advantages of routing surface LRT in available thoroughfares. Obviously, there are disadvantages, and obviously, too, subway and elevated systems have their own advantages. But this aspect of LRT has been ignored in the ongoing discussion, and I think it's important to emphasize it.

I am particularly concerned that there is such vehement objection to routing LRT in thoroughfares, especially from some individuals ~ like Patrick Goetz ~ who are strong supporters of mass transit, pedestrian mobility, alternative transportation, better urban design, and other good things. I believe this position is ultimately untenable, and at odds with the thrust of modern mobility planning, which now places far more emphasis on the PERSON-moving capability of a street or road corridor rather than its VEHICLE-moving capability. Do this, and it makes more and more sense to find ways to fit high-quality (e.g., faster), higher-

capacity transit systems into the street right-of-way (ROW). Whatever Patrick may gain to make his case for monorail now, he is damaging the effort to introduce this important concept and these essential improvements to urban mobility and livability.

Surface LRT, much of it routed in public thoroughfares, is widespread elsewhere in the world, especially in Europe and Japan. While American cities were ripping out their surface electric trolley lines ~ both urban streetcars and fast interurban systems ~ countries like Germany, especially after World War 2, expanded and modernized these systems tremendously, to a point that they are now highly integral and critical components of an enviable mobility system. Surface LRT trains blithely coast by cars in city after city of Europe, then they glide through downtown streets, past pedestrians on wide sidewalks, past patrons in outdoor restaurants and cafes, sitting just a few meters away from the tracks.

LRT is favored in part because it enables PENETRATION of many more urban precincts ~ residential neighborhoods, commercial areas, etc. ~ with higher-quality transit, thus expanding system spread. Certainly, some of the largest cities, like Berlin, Hamburg, Munich, Stockholm, Paris, London ~ have subway and/or elevated systems. But many more cities have LRT, and it is being vigorously expanded ~ even in most of the cities with "heavy", grade-separated rapid transit. In fact, Stockholm, Paris, and London, despite their famous subway systems, have each begun introducing surface street-routed LRT back into their urban mobility cityscapes. That should tell you something about the real value of LRT.

As I've noted in previous posts to this list, LRT routed (in part) in street ROW is working extremely successfully in a wide variety of North American cities ~ those that immediately come to mind include San Diego, San Jose, San Francisco, Sacramento, Portland, Salt Lake City, Denver, Dallas, Cleveland, Philadelphia, Boston, Buffalo, Baltimore, Toronto, and Calgary. Houston, of course, is currently constructing its first LRT line smack down the middle of Main St., for 7.5 miles ~ a project it seems unlikely they would have undertaken to implement if street-routed LRT were truly the disastrous idea portrayed by opponents.

What I think is emerging is a richer multi-modal concept of mass transit: local buses on most major streets; streetcars (as in Portland) and limited-stop buses on some major streets; LRT (a modern variant of the interurban railway) on exclusive ROW and some major streets; express buses and/or regional passenger rail ("commuter rail") for regional connection to city centers. Especially within this context, I think it's a serious mistake to muster opposition to reserving ROW in public thoroughfares for higher-quality transit, be it streetcars/LRT, or some level of bus service.

Obviously, it's not easy to "sell" the concept of reserving street ROW for transit to a public so overwhelmingly dependent on going everywhere in automobiles. Pro-automobile zealots favoring more roadways and more privileges for motor vehicles have a distinct advantage, and have clearly mounted a campaign to foster opposition to the diversion of any street space to public transit. However, well-meaning transit supporters, endeavoring to promote their particular variants of grade-separated alternatives by playing to such attitudes, are not, in my opinion, doing a service to mass transit in the longer term.

As all those cities with successful LRT demonstrate, street-routed LRT can indeed work extremely well. Modern, efficient traffic-management techniques can come close to totally eliminating conflicts with motor vehicle traffic while expediting transit movement. It can even provide average speeds reasonably competitive with grade-separated alternatives and with automobile travel. These facts, and the arguments for this basic concept, must be brought to the Austin public if this option for rapid transit is going to be fairly evaluated.