

January 5, 2001

**Central Area Loop Study
Measures of Performance**

The Sky Loop

Cost Factors

- **Operation and Maintenance:** The operation and maintenance cost of the system must be within a reasonable (fundable) budget. Operation and maintenance can be quantified in terms of dollars per year or total cost for the life of the system.
 - Unlike all other forms of public transit, the Sky Loop will make a profit. The Sky Loop Financial Plan shows an annual profit of \$8,107,476.00, and annual cash flow of \$12,782,772.00!
 - This profit assumes 50% Federal financing, 30% debt, 20% contribution of local public and private stakeholders.
 - The stakeholders' equity would be \$19,643,388, so their return on investment would be 41.3%, including depreciation, and 65.1%, with depreciation added back.
 - These funds, assuming a 501c3 operating company, could be used as equity for system expansion.
 - As the system grows larger, it becomes more useful to all, thereby increasing ridership. This would increase cash flow, providing further funds for expansion, etc.
- **Capital:** The capital cost of the system must be within a reasonable (fundable) budget. Capital costs can be measured in terms of total cost of the system in dollars or dollars per mile.
 - The latest cost estimates from Taxi 2000 for the proposed Sky Loop 12.84 mile system total \$70,080,898. This is \$5,458,014 per mile.
 - This includes SLC's allowance of \$500,000 per mile for relocation of overhead and underground utilities along the route, as well as the extra cost of going across the three bridges. (This figure is included not as a serious cost estimate, but just a reminder that such costs must be included, when known.)
 - By comparison, the I-71 Corridor light rail (LRT) cost estimate for the entire 43 miles is \$1,200,000,000, or \$27,906,977 per mile; and \$874,700,000 for the 19 mile Phase One (Minimum Operating Segment), or \$46,036,000 per mile. (Phase One includes \$45,000,000 for a new bridge next to Clay Wade Bailey, and \$100,000,000 for a tunnel up the hill to U.C.)

Safety Issues

- **ADA Compatibility.** Technologies must meet with ADA requirements.
 - The Sky Loop is ADA compatible.
- **Fire Life Safety.** Technologies must meet applicable fire codes and regulations.
 - The Sky Loop does not affect street level traffic, so there is no risk of collision with other vehicles or pedestrians. This is a safety problem with LRT or streetcars.
 - Because Taxi 2000 is a form of public transit that has been fully designed, but not yet built, and because Taxi 2000 and other PRT designs are totally different from other technologies, existing fire codes and regulations will have to be applied to the Sky Loop in a way that is reasonable.
 - There is currently under way creation of a new ASCE Standard for Automated People Movers, which will include standards for PRT. The CALSC's PRT consultant, Sam Lott, is on the committee writing this new standard, and Sam and Ed Anderson of Taxi 2000 are consulting on how Taxi 2000 solves all the various fire and safety issues. Hopefully this new ASCE standard will incorporate the Taxi 2000 solutions, so that we can refer to this new standard when dealing with local fire codes and regulations.
 - One of the issues concerns the need for a walkway for emergency egress in case of fire. Taxi 2000 maintains that this is not necessary because 1) 99.997% of the time an overheating vehicle can be routed or pushed to the nearest station before a fire would occur; 2) computer controls will identify an overheating condition long before a fire would occur; 3) the only source of fire within the vehicle would be in the chassis, which is isolated from the vehicle cabin by the guideway and fireproof floor of the cabin.
 - The Taxi 2000 design incorporates a hierarchy of fault-tolerant redundant control systems; redundant motors and brakes; a bi-stable fail-safe switch; real time speed control for all vehicles; automated emergency vehicle pushing; emergency passenger communications; and back-up power supplies.
 - Although there may well be other issues that arise, Taxi 2000 has spent years addressing all types of safety issues, so we believe all such issues will ultimately be resolved satisfactorily.
- **Building Code Issues.** Technologies must meet local building code requirements.
 - Sky Loop stations are designed to go inside buildings, or outside. Guideway may also be attached to buildings.
 - This unique technology will thus involve compliance with local building codes. Until presented to local authorities, we cannot know what they will require.

Environmental Considerations

- **Historic Structures and Districts.** The selected technology and alignment should either minimize or enhance effects to historic districts and structures. This criteria will be measured by the number of historic structures or districts affected.

- The suggested route of the Sky Loop was carefully designed to avoid Licking Riverside Historic District in Covington, except for the handful of buildings along 4th Street, and have no impacts on Newport's public housing on 5th Street, while still serving these areas well.
- Unlike LRT, AGT, or streetcars, the route is designed to go along 4th Street only, both directions, eliminating the need for a new bridge across the Licking. This would save the historic Hern House from demolition.
- In Newport, the route follows 5th Street to Saratoga, then turns north to 3rd Street, then east to Washington, then north to Cowens Drive, then east to the Bellevue line and back again along Cowens to cross the L & N Bridge. This route carefully avoids both the East Hill and Mansion Hill Historic Districts, yet serves them well, with access to the Sky Loop system.
- In Cincinnati, the route follows entirely commercial areas, except for portions of 4th Street that contain a few historic buildings on the west end.
- **Parklands:** The selected technology and alignment should either minimize or enhance effects to parklands and/or green space. This criterion will be measured by the acres of parkland or green space affected.
 - The Sky Loop has a 3' x 3' guideway and a 5'w x 5'h vehicle on top, and is elevated 16' above grade. It is designed to operate above sidewalks, or elsewhere in existing street right of way. Therefore, no parklands or green space will be used.
 - To the extent it makes parking lots and garages more efficient, it is possible parking lots and garages could be eliminated in certain areas along the route. If so, added parks could replace them.
- **Noise/Vibration:** The selected technology and alignment should not create an unacceptable noise or vibration in the project area. This is measured by decibels per unit distance for varying speeds.
 - The chassis for Taxi 2000 is completely contained within the covered guideway. The only moving parts are the rubber tires and the in vehicle switch. The motors are linear induction, which has no moving parts.
 - Because of this design, Taxi 2000 is almost noise free.
- **Visual Impacts:** The selected technology and alignment should minimize visual impacts to the project area.
 - The Sky Loop offers by far the smallest guideway and smallest vehicles of any of the technologies being considered.
 - The modern look of the guideway and vehicles will take some getting used to—but not nearly as much as it did for our interstate highways a generation ago. However, a color scheme for both guideway and vehicles can fit the taste of the community.
 - Consider this question: in Covington and Newport, would you rather look at the Sky Loop or overhead electric wires and poles? (The Sky Loop would require that they be placed under ground along the route.)

- Consider also this question: in Cincinnati, Covington or Newport, would you rather look at catenary, which is the spider web of overhead electric wires that power streetcars and light rail, or look at the Sky Loop?
- The Sky Loop would pass by second and third story windows of various buildings along the route. This would, of course, impact office workers and others at these levels along the route. This will take some getting used to. But how often do office workers look out their window? Will this make it more interesting to do so, or less? This is a very subjective area.
- **Displacements and relocations:** The technology or alignment should minimize displacements and/or relocations.
 - We are aware of no displacements or relocations that would be necessary to build the Sky Loop, except for utilities where either guideway or post foundations will be located.
- **Neighborhoods:** The technology or alignment should not cause impacts to disrupt a cohesive community/neighborhood.
 - This is usually associated with new expressways, that separate areas of a neighborhood or community. PRT does not do this.
- **Environmental Justice Issues:** The preferred alternative should to the greatest extent practicable and permitted by law, achieve environmental justice by identifying and addressing, as appropriate, disproportionately high and adverse human health and environmental effects on minority and low income populations.
 - The Sky Loop would, in fact, offer substantially increased mobility to handicapped, minority and low-income populations who work and live in the downtown areas.
 - Because the Sky Loop is an area network of loops, it will provide service to a much greater number of destinations and areas than the other technologies. It will provide the greatest opportunity for all income and minority groups, not just commuters or tourists, to and from home and work.
 - The SLC believes the Sky Loop system could be extended easily to the Over the Rhine area, for example, to serve both those who live there, those who work in the restaurants and entertainment venues in the area, and those who come to visit the entertainment district.
 - The Sky Loop would also offer significant “reverse commute” possibilities from the inner city neighborhoods to jobs in the area, without the need to rely on very slow bus routes.
 - If the Sky Loop were later extended to other neighborhoods and work centers, this advantage to the low income and handicapped would continue to grow.
- **Traffic Impacts:** The selected technology and alignment should maximize mitigation effects to traffic congestion.
 - Being elevated, the Sky Loop will not diminish the capacity of the existing road system in any way.

- In fact, the Sky Loop would likely offer substantial relief to traffic congestion, in two ways:
 - Busses now distributing people around the downtown area could stop doing this, and go directly to the intermodal center, where Sky Loop cars would take passengers directly to the station nearest their final destination. It would make the busses faster by eliminating lots of downtown stops, so, even with the transfer to the Sky Loop, people would likely arrive at their destination sooner. Further, busses would become less of a contributor to traffic congestion downtown.
 - Mode split studies of PRT done in other cities indicate that 25-30% of trips taken now by auto or by foot would be taken by PRT, given the level of service PRT provides. This means that 25-30% of autos now in traffic downtown could be eliminated. Similar studies of LRT and busses show 2%-5% of trips now taken by auto or foot use LRT or busses—a huge difference!

Travel Time and Ridership

- **Point to Point Travel Time:** The total travel time including: Time from origin to station, wait time at the station, travel time in the system, walk time to destination. Measured by total travel time in minutes.
 - From our simulator for the Sky Loop system, the total time should be 4 to 14 minutes, calculated as follows:
 - Time from origin to station: 1-3 minutes (0-2 block walk)
 - Wait time at the station: 0-3 minutes (usually a car is waiting for you; average wait time is <one minute)
 - Travel time in the system: 2-5 minutes (all trips bypass intermediate stations; average speed about 25 mph)
 - Walk time to destination: 1-3 minutes (0-2 block walk)
- **Wait Time:** The time a passenger waits at a station before a vehicle is available, measured in minutes.
 - 0-3 minutes, as noted above (average wait time is <one minute)
- **Station to Station (In-Vehicle) Time:** The travel time between stations, measured in minutes.
 - 2-5 minutes, as noted above.
- **Headways/Frequency of Service (Peak/Off Peak):** A measurement of the time between available vehicles at a station. The minimum headways depend on technology speed and control, as well as operating environment (exclusive of shared guideway).
 - The Sky Loop is designed for headways of one second or less, but the system proposed isn't likely to require headways below two seconds, on the main guideway.

- In stations, the time lapse between people entering a vehicle and leaving to enter the main guideway should average about 5-10 seconds, depending on age, agility, etc.
- There will be a short learning curve for passengers, just as there is for any new technology. The primary time lapse, in the beginning, will be people learning to use the automated ticketing machine, where they need to enter their Sky Loop Card, credit card, or cash, and then choose a destination. Route maps in the station, with station numbers, to be read before approaching the ATM, should minimize this learning curve. One reason the SLC proposes a monthly Sky Loop Card with unlimited use 24/7 is to cut down on the use of cash or credit cards, so the user need only insert his card and choose his destination.
- Other than these issues, of course, there should be no waiting beyond 3 minutes for a vehicle to arrive at the station (average wait time is <one minute)
- **Ability to Handle Surge Crowds:** Surge crowds will be defined as a percentage of persons attending a large event. The ability to handle surge crowds will be measured in passengers per hour.
 - The Sky Loop is designed to handle people from a large number of stations, who want to go to any one of a large number of other stations. To the extent a Reds or Bengals crowd wants to just go home, we think they will continue to go to their car and drive home, or continue to go to the bus area and take the bus to the nearest stop. If light rail were built, they would probably just walk to the intermodal center. However, in this case, some may take the Sky Loop to the intermodal center to save the walk, especially in inclement weather.
 - If the Sky Loop system were later expanded into the suburbs, then people could take it to and from a Reds or Bengals game, and numerous stations could be built around both stadiums to accommodate this.
 - Any single guideway, with one second headway, can handle up to 3,600 vehicles per hour, or 10,800 passengers per hour, fully loaded. As you add guideways to diverse destinations, with stations along the way, this capacity would increase exponentially.
 - Station capacity depends upon the number of berths, but a large 15 berth station can handle 1,500 vehicles, or up to 4,500 passengers, per hour. Thus, if you built, say, 10 stations at all the entrances to each stadium, you could deliver or take away up to 45,000 people per hour, as long as they were using five or more guideways to reach their final destinations.
 - This would not make sense, however, unless the Sky Loop system were to deliver people into the suburbs, where they live. This would come in a later phase.
 - In the meantime, people who wanted to go from a game to another station on the proposed circulator, could, of course, do so quickly, if stations were built around the stadiums.
- **Ridership:** Ridership is defined as the number of passengers that are likely to utilize the preferred technology and alignment, to be measured in passengers per hour.
 - Also called mode/split analysis in various studies, this is a major piece of information to obtain, probably through a separate study done by experts on PRT.

- Studies done in several U.S. and foreign cities on PRT indicate about 25-35% of trips taken in a downtown system would be on the PRT system (see attached). If this bears out for the Sky Loop, then a similar study for Indianapolis projecting 100,000 trips per day might be reasonable. (Our Financial Plan assumes the sale of 20,000 Sky Loop Cards, or 20% of the 100,000 downtown workers alone, so is more conservative.)
- This 25-35% mode split estimate for PRT compares with 2-3% for the other technologies being considered. Why the difference? The on-demand, non-stop service and much faster travel time of PRT simply attracts many more riders, according to these studies.
- **Capacity:** Capacity is defined in terms of passengers per hour.
 - As noted above, a single guideway, at one second headway, has a maximum capacity of 10,800 passengers per hour. The Sky Loop system proposed is, in fact, a series of loops, so the total capacity on the entire proposed system would be higher. This can be determined by the Taxi 2000 simulator for the Sky Loop.

Operational Characteristics

- **Fleet Size:** The number of vehicles needed to effectively serve the study area.
 - In the Sky Loop Financial Plan, we provided 706 vehicles, sufficient for 37,107 trips per day. The actual number employed will depend upon demand, but this should be about right for the 20,000 monthly Sky Loop Card holders. If not, more vehicles can be provided at very little incremental cost.
 - One of the major advantages of PRT is the ability to mass produce these small vehicles, and add them as demand warrants. The other technologies being studied use much larger vehicles, usually custom designed, often costing millions of dollars apiece, and seldom produced in quantity.
 - Another advantage of a large fleet of small vehicles is that a very small percentage can be continuously undergoing cleaning, maintenance, repair, or even replacement, with no impact on the overall system. This cannot be said for technologies with just a few very large, expensive vehicles in their fleet.
- **Vehicle Size and Passenger Capacity:** The number of passengers per vehicle.
 - Three (3) adults; two (2) adults and two (2) children; or one person in a wheelchair and one adult or child accompanying. 650 lbs total live weight; 1000 lbs total vehicle dead weight.
- **Station Size and Characteristics:** The design and physical size of the station for a particular technology.
 - Sky Loop stations will vary from about 3 to 15 berths, depending upon demand. Vehicles are 8.5' long, so at 9' spacing, the station could vary from 27' to 135' in length. A single off line guideway is recommended as the most cost efficient.
 - 16' width will provide for the elevator, stairs, ATM machine and room for waiting passengers.

- Because all stations are off line and passengers will seldom wait for vehicles, substantial room for wait lines should be unnecessary, except perhaps at stations subject to large surge demand.
- Stations may be outside buildings, with elevators, roofs and half walls, or inside buildings.
- **Flexibility of Alignment/Trackway:** The flexibility of the alignment to adapt to the geometric constraints of the setting.
 - The Sky Loop guideway is 3' x 3', set on top of posts typically 16' above grade. The height can be adjusted as needed for going over or under obstacles, including the Cincinnati Skywalk.
 - Posts are typically set at 60' intervals. This can be adjusted, if needed, to cross certain streets, etc.
 - Total height of guideway and vehicle will be 16' + 3' + 5' =24' from grade to top of vehicle.
 - Unlike the other technologies, the Sky Loop can be attached to all three of the existing bridges. The SLC Bridge Committee has drawn this conclusion after studying the structural and physical characteristics of each bridge. This will need to be reviewed and confirmed by bridge engineers with KYTC, but we feel it likely KYTC will come to the same conclusion.
- **Flexibility of Station Siting:** The ability to locate stations at numerous attractions in the CALS Area. This criterion can be measured by the number of reasonable stations located in the study area for each technology.
 - The Sky Loop system provides 30 stations, designed to cover most of the 115 locations the CALS desires to cover. For those few not covered within a two block walk, stations can be added as desired. Additional guideway loops can also be added, such as the Over the Rhine area, if demand warrants.
 - The beauty of PRT is that, because all stations are off line, you can add stations, even additional loops and stations, without slowing down travel. No other technology being studied offers this. Indeed, a major problem with all other forms of public transit is that adding stations, to serve more customers, slows down the ride for everyone. PRT eliminates this problem.
- **Station Costs:** The cost of a station, which includes the facilities, equipment, platform, and vertical circulation, computed in dollars per station.
 - Taxi 2000's latest estimate is \$234,467, for the prototype outdoor station, including elevator. Indoor stations could be more or less, depending upon specific design.
- **Opportunities for Station Integration with Development:** A rating of the opportunity for a particular technology and alignment to integrate with existing and future development.

- Real estate is always worth more if it has a superior location. The Sky Loop will make all buildings with a station in or near their building more accessible to the entire CALS Area, and thus enhance their location. Building owners and their tenants will benefit enormously from the Sky Loop, so SLC thinks they should pay for their own stations!
- All parking lots and garages in the CALS Area will be used more efficiently, and those now on the fringe of downtown, such as those on the riverfront on both sides of the river, will be in much greater demand if a Sky Loop station is in or near their lot or garage. It is estimated that the 7,800 spaces to be built between the stadiums will be used about 50% of the time without the Sky Loop. With the Sky Loop, and several stations in these garages, utilization would increase dramatically, providing up to \$2,000,000 per year added revenue to these garages alone (\$45/mo x 12 x 3,700 spaces).
- It will no longer be necessary to build large parking garages under new office, retail or hotel properties, to accommodate daily workers, customers or guests. For example, the \$50 million Cincinnati subsidy for Nordstrom's could have been reduced by up to \$20 million, by eliminating part or all of the adjoining parking garage.
- The effect on downtown retail resulting from making downtown more convenient for suburbanites to shop and enjoy the current and future downtown amenities is so important that we have written a separate paper on this subject.
- **Vehicle Storage and Maintenance Requirements:** The physical space and facilities needed to accommodate vehicle storage and maintenance, measured in square feet.
 - The cost for the central facility, which includes vehicle cleaning, maintenance, central system control, and administration, is estimated at \$470,329.
 - Taxi 2000 will provide an estimated size for this facility, based upon the size of the Sky Loop system.
 - Vehicles are in fact stored at each station and in circulation, waiting for a command to go to a particular station. They are also stored at Station 11 in Newport, and at Station 31, the Central Facility, which also includes cleaning, repairs, and other maintenance activities. The large stations around the stadiums also serve as storage facilities when no game is scheduled.
- **Geometric Requirements (Grade and Turning Radius):** The maximum grade and turning radius achievable by a particular technology. Both grade and turning radius will be limited by passenger comfort considerations.
 - The Sky Loop maximum grade is 10%, which is enough to negotiate any of our hills without the need for tunneling, and far greater than the 4% maximum grade of light rail.
 - The Sky Loop system allows a minimum 90' radius curve, banked at 12 degrees, running at 25 mph, providing a tight enough turn to negotiate most of our streets. At 20 mph, the curve radius could be 58', or even 36' at 16 mph.
 - All design parameters assume a maximum 0.25 g force, providing complete comfort for passengers, all of whom will be seated.

- **Speed/Acceleration/Deceleration:** The technology must be able to operate at a speed necessary to meet travel time requirements and energy efficiency. Acceleration and deceleration rates must permit attaining the cruise speed efficiently.
 - The proposed Sky Loop system will run at 20-40 mph cruising speed, depending upon where it is within the system. In the downtown area, when turning streets, 20 mph is provided. When going on long stretches between stations, such as across the river, 40 mph will be achieved.
 - Because all PRT trips are express, the average speed of PRT must be compared to the average speed of the other technologies, all of which must allow for time in stations.
 - Acceleration/deceleration is very smooth, due to the use of linear induction motors, which use no mechanical brakes, and comfort limited profiles in the control system. (A mechanical brake is included in each vehicle as a failsafe redundancy.)

Technology Factors

- **Enhancement of Street Life:** A rating which determines the likelihood that a particular technology would enhance street level activity.
 - This subject, normally associated with retail and tourist activity, is discussed in SLC's paper entitled "The Sky Loop: Effect on Downtown Retail," sent to you earlier.
 - The short answer is that the Sky Loop, due to the high mode split and induced ridership, would bring more people downtown, discharge them within two blocks of whatever activity they were seeking, and make it much easier to park. It would also remove a large amount of auto traffic from the CAL area. Although the system is elevated, these benefits would greatly enhance street level activity in this indirect way.
- **Integration with Urban Design:** A rating which determines how a particular technology will fit into the current and future design of the study area.
 - The Sky Loop will have a very modern, futuristic look. The color scheme of guideway and vehicles will determine whether it has a bold appearance, or one more designed to blend in with the surroundings. This is a matter of taste, style, and desired identity for the three cities.
 - The Sky Loop itself would become a major area tourist attraction, although an extremely useful and practical public transit system. We would likely be the first city in the world to build one, if the CALSC chooses the Sky Loop.
 - Cincinnati has a reputation of being very conservative, and the last to do something new. Do we want to be the first in the world to have an exciting, modern new public transit system, or do we want to rely upon the 19th century technology of streetcars and light rail?

- **Technology Maturity:** The technology has been developed to a state that it can be implemented with minimum technological risk and will meet the program schedule. Maturity can be measured by: 1) passenger service operation in a similar setting or configuration for a minimum number of years; 2) being proven on test track operations; and/or 3) an evolutionary development by an experienced supplier.
 - The Sky Loop Committee chose Taxi 2000 in September, 1998 as the most advanced design for PRT in the world. It has a long history of development, best described in the booklet entitled "Taxi 2000, The Urban Transit Solution."
 - Several other cities in the USA have concluded MIS and other studies that selected PRT as their Locally Preferred Alternative when Raytheon was in charge of Taxi 2000, including SeaTac, WA and Rosemont, IL, but the size and cost of the Raytheon version was too high. If Taxi 2000 meets its size and cost parameters, it is likely these cities will return as customers.
 - There are no Taxi 2000 systems yet built anywhere in the world. At this time, Taxi 2000 has completed an Investor Proposal/Business Plan that calls for \$25 million in capital for a three year development and marketing program. During this three years, a full scale prototype will be built in Minneapolis, complete with a 2,122 ' test track loop, three vehicles, a station, and control system. Testing would begin in the 19th month and be completed in the 36th month, designed to prove the entire system works as designed, and to reliability standards acceptable to all.
 - Sufficient capital is budgeted for a full compliment of top rated engineers to test the entire Taxi 2000 design, locate all initial suppliers and purchase all needed system components.
 - Capital is also budgeted for marketing expense, system support, substantial worldwide travel to meet with potential system customers in the U.S., Europe and Asia, and to work out design and safety standards and codes with public officials, engineering organizations, etc.
 - Upon completion of the full scale prototype, it is expected that a major corporation will partner with Taxi 2000 for construction and even operation of systems worldwide. The Lockheed Martin Corporation has indicated it wishes to be that partner, once the prototype is completed and tested. It is likely that Taxi 2000 will solicit proposals from several major corporations however, when the prototype is finished and tested.
 - Taxi 2000 accepts the fact that it will need such a major company, with deep pockets, to provide the capital and guarantee that systems built will work as intended. Lockheed Martin fully accepts this approach, and believes this would be its primary contribution to the partnership.
 - During the three year prototype development and testing phase, it is assumed the CALSC, if the Sky Loop were chosen as the Locally Preferred Alternative, would enter a second phase, and complete its preliminary engineering phase.
 - Thereafter, once funded and a contract with Taxi 2000 is signed, the Sky Loop could be built within two years or less, most of which would be for fabrication off site and construction of stations in buildings.

- Lockheed-Martin's vice president said about Taxi 2000: "This is not rocket science. All the components are proven. It is only the application of these components that is new."
- **Technology Stability:** The robustness of design and the future availability of suppliers and manufacturers for this technology.
 - Taxi 2000 would be the sole supplier of the design, and would lease the computer software for all system controls.
 - All physical components of the Sky Loop would be available from more than one supplier, although initially certain components would likely be bought from a single source, to achieve volume pricing. Such components are all commercially available today, and well proven.
- **Competition:** The number of responsive bidders (and suppliers) within a technology group. This is important for obtaining good capital, operating and maintenance costs.
 - There are other PRT systems out there, but none are nearly as far along in design as Taxi 2000. Thus, while we could submit the system for bid, it is extremely likely Taxi 2000 would win.
 - While competition is generally important, one must realize that the Sky Loop capital and operating costs, discussed above, are already a mere fraction of those of the other technologies being considered. More important than competition is the elegant design of Taxi 2000, the goal of which was always to keep costs below that of any other public transit system.
 - Competition for various components, among suppliers, will grow rapidly, as more miles of system are built worldwide. This will bring down costs much more dramatically than that of other technologies, due to economies of scale.
- **Perception of Personal Safety:** The perception by passengers of personal safety they feel when utilizing a particular technology.
 - The speed, jerk, and other forces of the Sky Loop will seem quite tame to riders. Being elevated 16' should not concern most folks with acrophobia. The biggest "thrill" will likely be the ride across the river, but most riders should like this.
 - Station design is open, well lighted, with no hidden corners, and security cameras tied into the central station. Because wait time is minimal, riders should not get nervous waiting for a vehicle, like they might with the other technologies.
 - There is no more possibility of riding with someone you don't like than there is with your car; you decide who will ride with you. In the unlikely event that a person will jump in your vehicle after you get in, it will be seen on the security monitor, and you would push a panic button, delivering you to the next station, or the central facility, where a policeman will be waiting. All perpetrators are likely to be caught, so this isn't likely to happen more than once.
 - Other safety issues are addressed elsewhere herein.

- **Convenience:** A measure to determine how passengers feel about the station location (ease of access) and frequency of service of a particular technology.
 - Elevators and stairs will be provided for outside stations. The 19' climb to the platform should not be a deterrant, given the other benefits of the Sky Loop.
 - For stations inside buildings, they will certainly be more convenient than other technologies for workers and visitors in those buildings.
 - If the Skywalk is retained, this would enhance access to Sky Loop stations at the same elevation, without going outside. The two should compliment each other.

- **Ease of Expansion:** The ability of the technology to accommodate increases in system capacity and system length and/or addition of new stations.
 - Because stations are off line, and more can be built without slowing down the system, they can be added at any time, where demand warrants.
 - Because having a Sky Loop station enhances property values, we believe private interests will want to build stations to their facilities, without use of public capital.
 - Adding guideway is easy, just a matter of adding loops to the system. All construction is modular, so on site construction is a matter of setting footers for posts, then erecting the guideway in 60' straight and curved sections on these posts.
 - As noted earlier, the larger the Sky Loop system becomes, the more useful it becomes to a wider and wider population, and thus more revenue the system will generate. Because it will be profitable, it would likely expand very rapidly, at no burden on the taxpayer.
 - If light rail is built, the Sky Loop will compliment it, by distributing riders to and from light rail stations. If light rail is not built, the Sky Loop could be expanded to take its place, and offer express service wherever built, at a fraction of the cost of light rail.

In summary, we believe the Sky Loop will meet all the measures of performance far better than any other technology.

The Sky Loop Committee
Chip Tappan, Chairman