

# RAIL TRANSIT SERVICES

*Planning*

*Engineering*

*Procurement*

*Maintenance*

*Overhaul Programs*

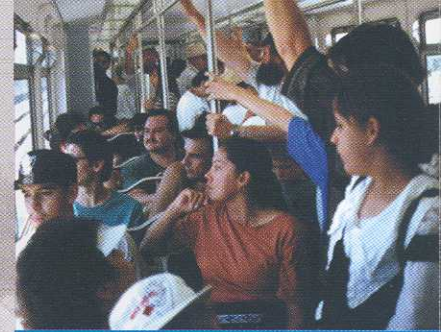
*Application of New Technology*

*Project Management Oversight*

*Operational Analysis*

Lea  Elliott





*These are exciting and challenging times for rail transit. Ridership is up, as is public interest and support. At the same time, there is stiff competition for available funds. To compete successfully, transit authorities and agencies must make the best use of new and existing resources. Systems must operate at a maximum level of efficiency, benefiting both customers and the bottom line. And that requires making the right choices—in planning, procurement and maintenance.*

**How** do you know whether to upgrade existing equipment or move on to the next generation? How can you assure the success of your turnkey projects? How can you streamline your inventory so that parts are available when you need them without collecting dust on the shelves? How do you know what data should be programmed into your maintenance management information system?



*Photo by G. Pancavage  
with permission of Amtrak*

**With** an experienced engineering consulting firm who knows the extent as well as limitations of the technologies on the market, has proven expertise in today's complex project delivery systems, understands management systems and software and how best to make them work for you—and who is committed to partnering with you, for the long term.

Lea+Elliott is this kind of consulting firm. Specializing in planning, procurement, project delivery, and maintenance for rail transit systems, Lea+Elliott helps clients throughout North America make smart decisions—regarding such issues as vehicle engineering, power distribution, signals and train control, fare collection, communications, track work, operational analysis and simulation, and maintenance facilities and equipment—that ensure measurable results for their rail transit systems.

Committed to our clients' success, Lea+Elliott assigns to each project senior staff who have the experience and skills to do the job right. And we stay with each project until it is completed—to the client's satisfaction. All of which has earned us a reputation as an imaginative, innovative and responsive firm, and has positioned us as a leader in the rail transit industry.

## COMPREHENSIVE SERVICES

Lea+Elliott provides a broad spectrum of services to help rail transit authorities cost-effectively and efficiently meet the needs of their clients—the riding public.

### Planning

Lea+Elliott's multimodal transportation planning services, for both public and private clients, include feasibility studies, corridor alternatives analyses, demand forecasts, train performance simulation, capital and operating cost analyses, and operational strategy. For planning new-start systems and extensions, from high speed rail to downtown people movers, Lea+Elliott has a long history of success. This includes a new-start rail system at the Grand Canyon National Park, for which Lea+Elliott has been leading the system planning and engineering activities for vehicle and system components.

### Engineering

**Technical studies.** Technically sound and well-structured studies of rail transit technologies and equipment help our clients select effective and efficient systems. Lea+Elliott's studies evaluate performance characteristics and operational data, cost and maintenance considerations, life cycle costs, suppliers' capabilities, equipment suitability, and industry standards and regulations.

**Design verification.** To build the confidence of both the client and the supplier, and ensure that vehicles or systems meet contract requirements, Lea+Elliott develops and implements design verification processes that typically include design reviews, qualification testing, FAI's, acceptance activities, and performance demonstration.

**Value engineering.** Our multidisciplinary value engineering teams regularly participate in evaluating new-system designs in the areas of vehicle, train control and signaling, power distribution, central control, fare collection, maintenance facility functionality, station platform design and passenger flow.

**Independent safety oversight and system safety certification.** System safety is the starting point for all transit systems, and Lea+Elliott has earned high marks from domestic and international clients in this area. For example, to ensure the highest level of system safety for San Francisco MUNI's communications-based train control system, we evaluated train control designs at the system and subsystem levels, and implemented a safety program for the entire signal overlay project.

### Procurement

Lea+Elliott pioneered the use of turnkey and design-build-operate-maintain (DBOM) procurements in the transit industry over 20 years ago with our work on the Miami Metromover, and we continue to refine this procurement approach. For DBOM, design-build and traditional procurements, we develop procurement strategy, write performance-based technical specifications and contract documents, evaluate supplier proposals, recommend contract award recipients, and monitor contract activities through project implementation.

### Maintenance

Lea+Elliott focuses on reliability-based maintenance. Our rail transit professionals have managed maintenance facilities and activities at some of the largest public transit authorities in the United States. Their expertise can bring a fresh perspective to the daunting task of keeping a fleet operating at a high level of availability and reliability at the lowest cost.

### Overhaul Programs

Lea+Elliott professionals have developed and managed the refurbishment of many rail fleets, from large fleets of rapid transit and commuter rail cars to smaller fleets of high speed trainsets, locomotives, light rail vehicles and PCC cars. Our technical specifications, procurement, design reviews, project management, and equipment commissioning services provide clients with cost-effective technical support.

### Application of New Technology

New technology, when applied wisely, can save transit agencies capital, operating and maintenance dollars. Our engineers can assist in identifying new vehicle technology and subsystem alternatives and quantifying their advantages, disadvantages and risks. We have successfully commissioned several first-time deployments of new technology and understand the balance that must be maintained between cost, risk, project schedule and off-site testing.

### Project Oversight

Our long history of hands-on experience in system implementation gives us the expertise to provide effective project management oversight, which is essential in avoiding cost overruns and schedule delays. Both the Federal Transit Administration (FTA) and Amtrak are long-term repeat clients.



## Operational Analysis: A Vital Tool

LEGENDS<sup>©</sup>, the sophisticated, proprietary family of computer models developed by Lea+Elliott, is recognized throughout the industry as a leading-edge analytic tool. Using the detailed data generated by LEGENDS<sup>©</sup>, Lea+Elliott professionals can assess critical components of a rail transit system, pinpoint possible trouble spots, analyze costs and make recommendations for improvements.

Simulating train performance, network operations and line capacities, LEGENDS<sup>©</sup> determines travel times, delay times and locations, optimal fleet size, system capacity, travel schedules, energy consumption, facility requirements and capital and operating costs.

For example, in the early planning stages of the Grand Canyon new-start rail system, alignment and vehicle performance data were used to determine trip times and system capacity with varying vehicle speeds, consist sizes and station dwell times. These outputs were in turn used to calculate fleet size for capital and operating and maintenance cost estimates. LEGENDS<sup>©</sup> has also been useful in comparing the performance of diesel multiple units with electric light rail.

The use of LEGENDS<sup>©</sup> has been enhanced by new software that provides an excellent visual presentation of the data generated by the simulation. This output can be displayed in the form of dynamic graphics, summary tables or graphs and is ideal for presentation to groups of any size.

## OFFICE LOCATIONS

With regional offices in Virginia, Florida, Texas and California and satellite offices throughout the United States, Lea+Elliott is positioned to provide a broad range of engineering and consultation services to public transit authorities and private sector clients.

### Washington, D.C.

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**Lea  Elliott**  
*an equal opportunity employer*



## The Lea+Elliott Team: Hands-On Professionals

The Lea+Elliott team includes planning, engineering and management experts who have worked for both suppliers and operators of rail transit equipment. Our first-hand knowledge of the ins and outs of transit operations and maintenance, as well as equipment manufacturing and overhaul—experience that is applicable to both intercity and urban rail systems—gives us a unique perspective that is an important added value for our clients. We know what it takes to do the job.

Lea+Elliott professionals deliver what's promised in terms of people, schedules, costs, and results. Working quickly and efficiently in streamlined, flexible teams, we listen, know how to ask the right questions, and work with clients to create custom-tailored solutions that are creative, on target and cost effective.

## Experience

We have worked on rail transit and intercity projects in the United States, Canada and overseas. Our clients have included:

Amtrak	Minnesota DOT
BC Transit (Vancouver, BC)	NJ Transit
California DOT (Caltrans)	National Park Service/Grand Canyon National Park
Chicago DOT	New Jersey DOT
Chicago Transit Authority	New York Metropolitan Transportation Authority
City and County of Honolulu	New York State DOT
City of Chicago	Orange County Transportation Authority (California)
City of Dallas DOT	Port Authority of Allegheny County (Pittsburgh)
Dallas Area Rapid Transit	Port Authority of NY and NJ
EGO General Directorate (Ankara, Turkey)	Port Authority Trans-Hudson Corporation (PATH)
Federal Railroad Administration	Regional Public Transportation Authority (Phoenix)
Federal Transit Administration	Regional Transportation District (Denver)
Florida DOT	San Francisco Bay Area Rapid Transit District (BART)
Greater Cleveland Regional Transit Authority	San Francisco Municipal Railway (MUNI)
King County Department of Transportation/Metro Transit (Seattle)	Taipei Municipal Government
Las Vegas Regional Transportation Commission	Toronto Transit Commission
London Regional Transport	Utah DOT
Los Angeles County Metropolitan Transportation Authority	VIA Metropolitan Transit (San Antonio)
MTA Long Island Rail Road	Washington Metropolitan Area Transit Authority
MTA Metro-North Railroad	
Metropolitan Transit Authority of Harris County (Houston)	
Miami-Dade Transit Agency	