



Transportation Systems

Applying a Systems Thinking Approach

We are all affected by the transportation system and all interested in it working well. Whether the mode of travel is road, rail, air, or water-based, whether it is on, below, or above ground, we are affected both as direct users of transportation and as consumers of the goods that transportation moves.

Since the transportation “system” is really a myriad of systems, Noblis takes a systems thinking approach in helping our clients solve complex transportation problems. By taking this holistic approach of examining linkages among the many elements of the entire system and assessing how that system interacts with its environment, we are able to not only offer creative and practical solutions but ensure that they do not have unintended consequences on other components of the system.

Over the past two decades, we have been working with government and industry stakeholders on a broad range of activities to improve our transportation system. We are

- pioneering new technologies to protect travelers from bad weather and road hazards
- data mining vast amounts of system usage data for major cities in order to understand traffic trends and support informed strategic decisions
- partnering with government agencies and auto makers to develop an integrated telecommunications infrastructure that will connect vehicles and the transportation infrastructure like never before
- designing more efficient mass transit systems to ease congestion
- analyzing the lessons learned, costs, and benefits across a wide variety of Intelligent Transportation System applications, enabling us to not only provide actionable solutions for our clients, but to advise on outcomes to avoid

The work requires us to take on trusted-partnership roles in policy analysis, all elements of systems analysis and engineering, simulation and modeling, economic and financial analysis, and program and acquisition management. Across the board, our systems thinking approach has been essential in achieving sound and implementable solutions.

Selected Achievements in Transportation

Deployed Capabilities

511 Traveler Information. We conducted required research and drafted the Federal Communications Commission petition and implementation guide for 511. There are currently forty 511 systems in operation, serving nearly half of the entire U.S. population.

DSL Technology for Arterial Management. We conducted research and field tests on the use of DSL modems and existing twisted pair infrastructure for arterial video surveillance. Tests were successful and multiple communities have since deployed this solution.

Next-Gen Traffic Simulation (NGSIM). We recommended a shift in the federal role in the development of traffic simulation tools, from a competitive role to a collaborative one. Today, we are building upon our work to advise The Federal Highway Administration on moving NGSIM assets to an open source community environment.

Analytics

Urban Congestion Reporting (UCR). We developed and implemented the UCR concept to improve real-time management of the transportation infrastructure. UCR combines self-adaptive web-mining techniques with human-in-the-loop data quality monitoring procedures to transform roadway travel times into monthly nationwide congestion reports produced with a dramatically reduced turnaround time. The reports are part of the monthly dashboard reports provided to Department of Transportation executives.

Heuristic On-line Web-Linked Arrival Time Estimator (HOWLATE). Our research determined that traveler information services provide benefits through improved time management. The results have led the traffic community to an increased focus on travel time reliability as a key performance metric.

Crash Avoidance Analysis. The major auto manufacturers incorporated our rear-end collision warning algorithm into their pilot test of rear-end warning systems.

VII Communications. We reviewed the VII communications cost study and assisted in the correction of many technical and architectural errors and improving estimates for system infrastructure costs.

ITS Benefits, Costs, and Lessons Learned Knowledge Resources. Noblis provides the content to this resource, which is made available to all Intelligent Transportation System stakeholders via the USDOT website. The website receives over 180,000 sessions annually. Public sector agencies, such as San Francisco Bay Area's Metropolitan Transportation Commission, Florida DOT, Michigan DOT, and North Carolina DOT, are using the ITS Costs Database as a basis for estimating their ITS costs.

On-Going Acquisitions

NG9-1-1. NG9-1-1 is our nation's next generation 9-1-1 emergency services system. Our experts played a major role in drafting the program concept and strategy, conducted requirements analysis, drafted the RFP for the design/demo project, and provide quality control review on the deliverables.

ITS Standards. Our systems engineering methodology for assessing Intelligent Transportation System standards has ensured a high degree of completeness and correctness, improved alignment with agency operational needs, and facilitated deployment.

ITS Software Acquisition Guidance. We developed the widely praised Road to Successful ITS Software Acquisition and accompanying courses. Several state DOT's have successfully used these materials.