Transportation systems have not traditionally utilized computer-managed systems. That has changed in the past 10 years through “Intelligent Transportation Systems” or ITS. ITS is the application of modern computer technology to manage congestion by improving transportation, signal and other traffic systems, including goods movement for the Gateway Cities subregion. ITS improves traffic flow, air quality as well as safety.

An integrated ITS plan for the Gateway Cities area will increase mobility and safety allowing freight to complete end-to-end trips as efficiently as possible using technology. This technology will improve connectivity among different transportation modes, eliminate bottlenecks and unnecessary delays, improve travel time, and expand the options available for interregional and intra-regional travel.

The Gateway Cities Strategic Transportation Plan (STP) will bring several transportation and planning studies, projects, and other issues in the Gateway Cities area into one analysis. The purpose of the STP is to develop a unified, subregional multimodal transportation improvement strategy. The Plan will foster regional coordination and collaboration among stakeholders, leading to reduced roadway congestion, improved air quality, a stronger economy and a better, healthier quality of life within.

The STP includes a task to prepare a Technology Implementation and Analysis, and builds upon the recently completed Gateway Cities Technology Plan for Goods Movement study, detailing how technology can be leveraged to improve the efficiency of goods movement in the Gateway Cities and the larger Southern California region. This task includes the following elements:

2. Develop system requirements and architecture for a freight-focused traveler information system.
3. Inventory, analyze, and prioritize conceptual design concepts for arterial smart corridors; and develop conceptual design concepts for freeway gaps.
4. Develop I-710 connected/platooned truck technology conceptual design and infrastructure requirements.
5. Design a connected test corridor.
6. Design a concept of operations for the I710 freight corridor.
Conduct research on zero emissions freight technology.

Investigate Truck Enforcement Network Sites (TENS) on I-405 and I-710.

Coordinate with Regional Developments in Container Goods Movement Efficiencies.

Several Task Reports are now available for review. Links to these documents can be found on Page 12 of the Gateway Cities ITS News.

Truck-only lanes on the I-710 Freight Corridor feature technology to enable zero emissions operations, autonomous truck conveyance control, electronic tolling, and enhanced freight traveler information.

The Concept of Operations for the Zero Emissions Freight Corridor Intelligent Transportation Systems (ITS) Project will be released in early September. The Concept includes the development and phased implementation of assisted and autonomous truck control that uses emerging commercial vehicle technologies to decrease headway between trucks. Safety is enhanced resulting in increased throughput and reliability for trucks in the Corridor. A description of the proposed system can be found in Chapter 5 of the ConOps document.

Nokia, Acyclica Bluetooth Sensors, and TomTom Navigation among Technologies Deployed at FRATIS Demonstration Sites

The Freight Advanced Traveler Information System (FRATIS) Plan for the Los Angeles area was recently approved by the US Department of Transportation. This Small-Scale Prototype Demonstration Project Plan was prepared to provide guidance … to all parties of the testing program that will be conducted for the LA-Gateway FRATIS Demonstration Project. The Project is currently in the baseline data collection phase, with six months of operational testing scheduled to begin on October 2013.
Building Southern California’s Goods Movement System for the Next Century

Twenty-five years from now, the goods movement system in Southern California is envisioned to include bold new capacity enhancements. The Los Angeles Metropolitan Transportation Authority (Metro) and Gateway Cities Council of Governments (GCCOG) are working together to plan an ambitious expansion of the I-710 freeway, which stretches from the San Pedro Ports to SR-60 freeway. Planned for this Corridor is a 4-lane Zero-Emission Freight Corridor (ZEFC) designed to carry zero-emission trucks. The ZEFC, currently estimated to open in 2025, will greatly reduce the impact of harmful diesel emissions on I-710 corridor communities.

As part of the planning process, Metro and Gateway Cities have prepared The Concept of Operations (ConOps) for the Zero Emissions Freight Corridor Intelligent Transportation Systems (ZEFC-ITS) Project to be released in early September.

The purpose of this ConOps is to provide technical, operational, and conceptual guidance on the following objectives for the Zero Emissions Freight Corridor ITS:

- Helping to ensure truck access to the Ports via the new I-710 dedicated truck lanes;

- Defining an effective conveyance of trucks on the I-710 freight corridor that will safely maximize the through-put of trucks operating with zero emissions in the freight corridor;

- Helping Southern California establish a leadership position in Connected Vehicle technologies industry that will enhance the local economy; and

- Establishing an ongoing partnership and environment that attracts additional funding opportunities.
The I-710 ZEFC-ITS Project is envisioned as a truck-only limited access facility that is currently planned to run in parallel with the general-purpose lanes of the I-710 freeway between Ocean Boulevard in Long Beach and SR-60 in East Los Angeles – for a total distance of 18-miles.

Finally, in an effort to increase capacity, reliability, and safety, the I-710 freight corridor will be designed as an autonomous truck corridor. This means that the trucks themselves are under autonomous control – without driver intervention – with vehicle-to-vehicle as well as vehicle-to-infrastructure communications.

More information on the approach for autonomous vehicles is presented in the next article, “Why Commercial Connected Vehicles.” The ConOps document defines the high-level architecture, information flows, and major technical functions that will be required to begin designing the ZEFC-ITS system.

This high-level architecture illustration highlights the major elements, functions, and information flows of the I-710 Zero Emissions Freight Corridor ITS.
Why Commercial Connected Vehicles?

The ultimate goal of implementing commercial connected vehicles on the I-710 Corridor is to make the corridor ultra-safe and hyper-reliable for the trucking industry.

Today, cargo moves into and from the two ports by either rail or trucks.

The Concept of Operations for the Zero Emissions Freight Corridor Intelligent Transportation Systems (ITS) Project that will be released in early September is based on some level of assisted or autonomous driving in truck lanes in 2025. The goals are to increase safety and overall throughput of truck traffic. Commercial connected vehicles will maximize the system and provide operational efficiencies to the San Pedro Bay Ports and its associated industries.

Autonomous driving will be enabled by two major components: Connected Vehicles (CV) technologies and Advanced Driver Assist Systems.

- CV technologies enable vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communications in real-time (the current standard is Dedicated Short Range Communications (DSRC)).

- Advanced Driver Assist Systems include in-vehicle systems, such as adaptive cruise control, automated braking, automated steering, lane keeping and warning, and advanced 360 degree object sensors.
Overview of How Partially Autonomous Truck Conveyance Would Work

These Connected Vehicle phases with their technology and infrastructure requirements are described in more detail in Section 5.8 of the Concept of Operations document.

This figure describes the I-710 application that is being termed, “Partially Autonomous Truck Conveyance.”

Only trucks operating in zero emissions mode would be allowed on the I-710 Freight Corridor. This Concept assumes that trucking companies and truck owner/operators would register their vehicles and obtain certification that each vehicle using the truck lanes is a zero emissions vehicle. The zero emissions certification and operability will be checked electronically for each vehicle entering the truck lanes. It is also assumed that the zero emissions technology will be in the vehicle propulsion system, no roadway or roadside equipment (i.e., catenary wires) will be provided to power the vehicle.
Truck Technology Progression

This Figure illustrates the truck technology progression and summarizes some of the key I-710 operational characteristics discussed in the Concept of Operations.
ITS Infrastructure Impacts

The purpose of the ITS Infrastructure Impacts Report is to present proposed technological equipment, their functional specifications and their impact on Intelligent Transportation Systems (ITS) infrastructure when applied to the Gateway Cities highways project on route I-710 in Los Angeles County. The goal of the I-710 Zero Emissions Freight Corridor system is to operate all trucks in the corridor under coordinated operations, resulting in shortened headways between vehicles, increased reliability, and improved safety. The system will be a combination of vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) connectivity through the application of advanced wireless technologies. Currently, this type of technology is being considered in a significant research effort headed by the U.S. Department of Transportation (US DOT) known as the Connected-Vehicle program.

In Phase I of the Gateway Cities Council of Governments Strategic Transportation Plan, a concept of operations and preliminary assessment of the anticipated technologies to be utilized on the corridor was outlined. Under this Phase II of work, more in-depth impacts to the infrastructure are evaluated. In particular, this study focuses on system requirements and the resultant impacts on the roadway, right-of-way, easements, operations and maintenance areas, and other items that would need to be taken into consideration in the development of final design level documents.

Field device systems considered include Connected Vehicle, Automated Tolling (independent of Connected Vehicle deployment), and Closed Circuit Television (CCTV). The infrastructure requirements for the Connected Vehicle system were developed with input from the USDOT’s Safety Pilot Model Deployment project which is occurring in Ann Arbor, Michigan (http://www.its.dot.gov/safety_pilot/). Automated Tolling is in accordance with LA Metro’s ExpressLanes (FasTrak) project. CCTV systems presented in this report are in accordance with Caltrans standards and specifications. The result of this review is to ascertain the impact of these technological installations on the transportation infrastructure. The report and appendices are available at this link.

Codha Wireless Unit
Source: Paul Gray, Cohda Wireless
FRATIS Demonstration Advances to Operational Testing

Project Update

The Freight Advanced Traveler Information System (FRATIS) Plan for the Los Angeles - Gateway Cities region has moved past the planning stage, and it now being deployed. A formal “Demonstration Plan” was approved by USDOT in July 2013. Based on the achievement of this milestone, Agile Software Development and Baseline Data Collection are currently underway, and will take three months to complete. Additionally, 50 TomTom fleet tracking and information-exchange devices were recently installed on each truck of the Port Logistics Group drayage fleet; and a comprehensive queue measurement system was recently deploy at eight key locations at Yusen Terminals.

Operational Testing will begin in mid-November, and is expected to last six months. A special “Virtual Ribbon Cutting” event/demonstration is anticipated to occur in conjunction with the Gateway Cities ITS Working Group Meeting on November 13th.

Please contact Mark Jensen (mjensen@camsys.com) for further information.
Project Background

The FRATIS Los Angeles (LA) demonstration project is focused on:

1. improving communications and sharing intermodal logistics information between the truck drayage industry and port terminals such that terminals are less congested during peak hours; and

2. improving traveler information available to intermodal truck drayage fleets so that they can more effectively plan around traffic and port congestion.

Together, these two areas of focus can result in significant improvements in intermodal efficiency, including reductions in truck trips, reductions in travel times, and improved terminal gate and processing efficiency – these benefits, in turn, will directly result in the public sector benefits of improved air quality, reduced traffic congestion, and increased fuel savings.

The two primary private sector participants in the FRATIS LA demonstration project are Port Logistics Group (regional drayage fleet with 50 trucks) and Yusen Terminals, Inc. (Port of LA Terminal). The primary regional public sector agencies that are supporting the test are LA Metro and the Gateway Cities Council of Governments; with additional stakeholder interaction with the ports of Los Angeles and Long Beach, and the Southern California Association of Governments.

Technologies that will be utilized during the demonstration test include: advanced traveler information, port terminal truck queue time measurement, automated ETA messaging to the terminals 1-day in advance of truck arrivals, direct messaging of trucks by terminals, and employment of an algorithm which will optimize the PLG truck deliveries and movements based on several key constraints (e.g. time of day, PIERPASS restrictions, terminal queue status, etc.). The primary user interfaces for these technologies will be a web application for drayage truck dispatchers, a mobile application for drayage truck drivers, and messaging/alerts functionality for terminal operators.

This project is being sponsored and funded by the USDOT, under the Connected Vehicle Program. The USDOT Point-of-Contact is Randy Butler (Randy.Butler@dot.gov).

The sharing of information through the use of technology will be the most significant development in port drayage in 20 years.
UPCOMING EVENTS

ITS Working Group Meeting
September 18, 2013

METRANS International Urban Freight Conference
October 8 – 10, 2013

Connected Vehicle Charrette
November 4 and 5, 2013

ITS Working Group Meeting
November 13, 2013

REFERENCE LINKS

TECHNOLOGY PLAN REPORT Links
• Concept of Operations for the Zero Emissions Freight Corridor Intelligent Transportation Systems (ITS) Project
• I-710 ITS Infrastructure Impact Study
• Freight Advanced Traveler Information System (FRATIS) Small-Scale Demonstration Project Plan for Los Angeles

VIDEO Links
Connected Vehicle Demonstration Projects
• Volvo Collision Mitigation with Emergency Braking (Production)
• SATRE Truck and Car Platooning Approach (Research)
• JARI Truck Platoon (C-ACC) Project (Research)
• Volvo Traffic Jam Assist (Research)

Building Southern California’s Goods Movement System for the Next Century