Advanced Transportation System and Coordination (ATSAC)

Summary

LADOT engineers developed the initial ATSAC system around the Coliseum to improve the efficiency of the city's road network during the 1984 Olympics. Continually expanded since, the current generation of signal synchronization technology includes over 4,900 signalized intersections that control over 7,500 miles of city streets. The system includes over 26,000 vehicle detectors and over 590 CCTV cameras.

▲ ATSAC Center

The main goals of the system are to:

- Safely manage the movement of different transportation modes (pedestrians, cyclists, transit buses, light rail and heavy rail trains, and other vehicles)
- Improve the efficiency of the traffic signal system by optimally allocating green time to different modes and in different directions
- Provide the capability to remotely monitor and adjust signal timing in real-time to respond to specific traffic conditions or occurrences
- Provide the ability to analyze traffic data
- Implement special traffic signal timing as required

Adaptive Signal Timing

The ATSAC system is adaptive, meaning that the system monitors traffic volumes in real time and changes the signal timing as traffic conditions change. For example, a network of signals with low traffic volume in the morning may have a short green signal, while later in the day as traffic volume increases, the amount of green time increases to move more traffic.

Light Rail Transit & Bus Rapid Transit

For light rail transit and bus rapid transit, ATSAC provides a window of green time that is matched to the train or bus schedule. If the train or bus is running behind schedule, the system changes the signal cycle, holding the train or bus signal green longer, generally for up to ten percent of the cycle, e.g. 12 seconds for a 120 second cycle.

Heavy Rail Crossings

ATSAC improves pedestrian and vehicle safety at heavy freight and passenger rail crossings with advance sensors clearing existing traffic from an intersection prior to the train's arrival.

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Reversible Lane Operation

ATSAC technology can automatically reverse the direction of travel during different times in the day on select corridors.

Special Events & Emergency Operations

LADOT programs the system with special signal timing for major special events at venues such as the Coliseum, Dodger Stadium, and Staples Center/LA Live. The signals are timed to accommodate very high traffic volumes (vehicle, transit, pedestrian, etc.) arriving and departing the venues, usually within a very short time window.

Benefits

Researchers at Texas A&M Transportation Institute (TTI) in 2013 concluded that corridors with signal synchronization would produce benefits in three areas:

- Travel speed (mph): +13% (increase)
- Travel time (delay): -32% to -43% (decrease)
- Emissions: -3% to -4% (decrease)

ATSAC 3.0 & The Future

Previous generations of ATSAC technology focused on optimizing signal timing and centrally controlling every signalized intersection in the city. Since the department achieved this objective, the future vision is focused on using and sharing data to improve performance and inform decision-making, supporting emerging technology such as connected and autonomous vehicles, and incorporating features which improve safety benefits for pedestrians and cyclists. The next generation of ATSAC technology will improve customer experience by:

- Supporting Connected and Autonomous Vehicles by deploying Dedicated Short Range Communications (DSRC), Cellular and other Wireless technologies
- Sharing relevant ATSAC sensor data with the public and third-parties
- Connecting traffic signal information with bus drivers
- As part of Vision Zero, identifying locations of safety risk and incorporating signal timing measures such as Leading Pedestrian Intervals (LPI) and Scramble Pedestrian Phases

Focus on infrastructure improvement such as:

- ATSAC Center expansion
- Upgraded high capacity fiber optic communications network
- All digital video surveillance system
- Traffic signal type ATC cabinets accommodating embedded guide light, pedestrian and bike safety, transit vehicle gate control, emergency vehicle preemption, and other expanded capabilities

You can learn more about ATSAC here:
https://ladot.lacity.gov/projects/transportation-technology/atsac