

ACDSS

Adaptive Control
Decision Support System

Intelligent Control for Smarter Signals

The integration of KLD's Adaptive Control Decision Support System™ (ACDSS) into TransCore's state-of-the-art TransSuite® traffic management software provides an adaptive control strategy that can be used as part of a larger, area-wide traffic signal control system. Traffic engineers can now conduct real-time analysis and change signal patterns at the touch of a button, helping to alleviate congestion before it worsens.

NTCIP Compatible

Designed to work with NTCIP-compatible controllers and detection equipment placed at strategic locations, ACDSS reduces investment needed for additional infrastructure, training and maintenance. ACDSS features real-time optimization technology for both over- and under-saturated traffic, just-in-time (JIT) microscopic traffic simulation, operator-in-the-loop, and autonomous signal operations.

Optimization Repository

ACDSS features a signal optimization repository, enabling several algorithms, from delay minimization and diamond interchange control to queue management, to be incorporated as switchable plug-ins. This concept enables regional multi-objective, multi-regime adaptive control not available from others. ACDSS also provides the flexibility to incorporate any state-of-the-art algorithm developed from existing and future ITS technologies as, needed.

Web Service-Based Communication Channels

Integral to the ACDSS development is the simple object access protocol (SOAP) web service-based



communication channels for retrieving traffic data, transmitting optimized signal plans in real time, and interfacing with the control infrastructure.

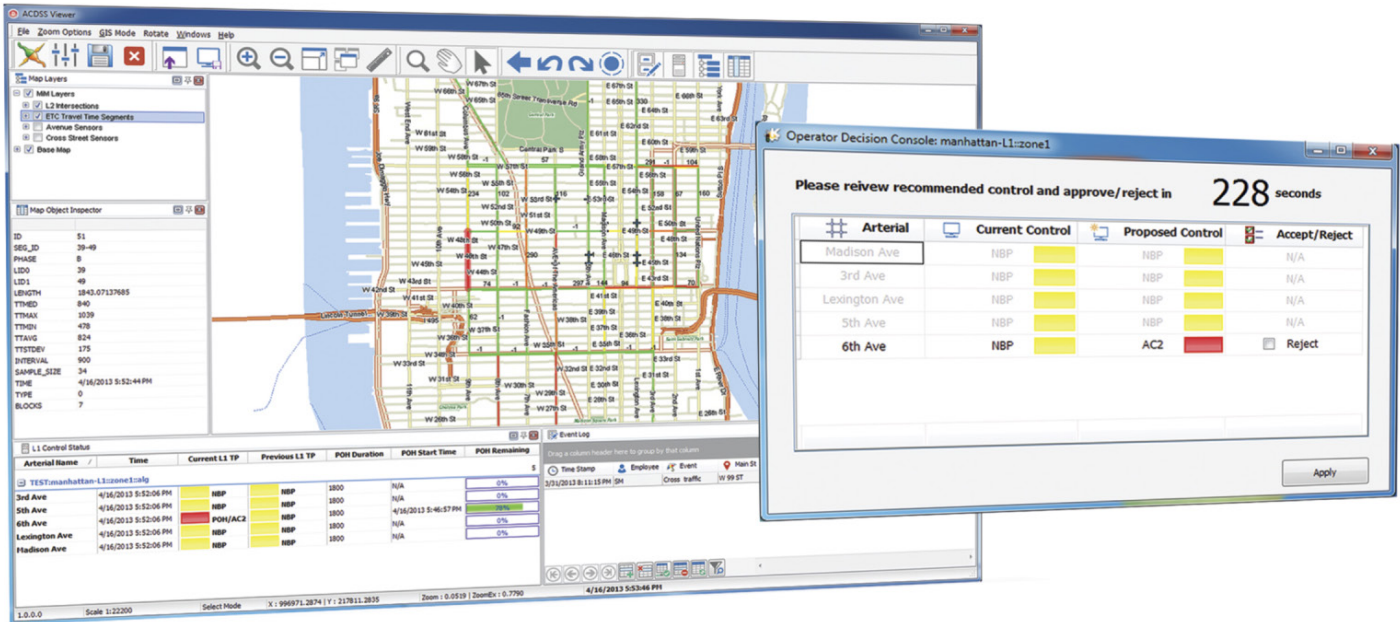
Database and Reporting

ACDSS features a hybrid database management structure. Short-term data is cached in memory for computational efficiency and all data is permanently archived, including detector data, controller status and operational logs. This provides the capability to use archived data for online data fusion in the case of sparse detectorization, as well as offline analysis and reporting.

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ACDSS Operator-in-Loop Graphic Interface

Arterial Applications

ACDSS optimizes arterial signals by adjusting cycle, offsets and splits asynchronously. The system assesses traffic conditions as frequently as multiple times within a cycle to decide the best signal timing parameters at the next local zeros. This enables a faster-than-a-cycle responsiveness without the need of extensive second-by-second data and control. If a change of offsets or cycle length is found beneficial, the new parameters are sent to controllers and implemented at the next cycle. This is followed by a pattern-hold period, where only the splits are continuously adjusted.

Urban Adaptive Control & Congestion Management

To preserve capacity and improve mobility in congested urban networks, ACDSS combines real-time demand regulating signal plans with dynamic

queue management at critical intersections. Signal timing plans are selected in real time according to the prevalent congestion levels to better utilize storage space and redistribute traffic. This works in concert with balancing queue storage ratios at critical intersections to symmetrically alleviate urban congestion.

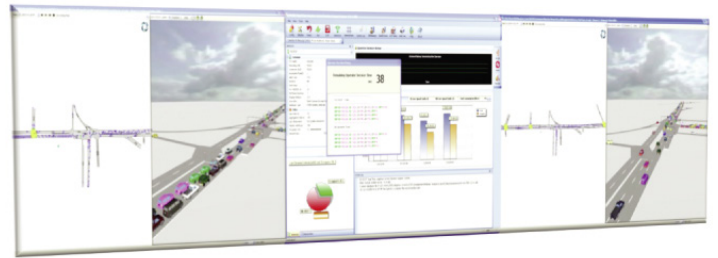
Operation

Designed as a centralized software paradigm, ACDSS supports both autonomous operation without operator interactions and operator-in-the-loop validation. When it comes to tactical control decisions such as shifting strategies from achieving smooth flow to congestion management, the operator can approve or reject system-recommended plans or strategies. The operator-in-the-loop helps achieve robust and reliable signal operations for eventful situations, training and confidence building.

Just-In-Time Simulation

ACDSS supports integrated real-time simulation for online performance evaluation. It provides flexible interfaces to existing commercial traffic simulators such as Aimsun or VISSIM. With JIT simulation, an operator can launch multiple instances of traffic simulation “just in time” to compare scenarios and choose the best available signal timing alternatives. These alternatives include:

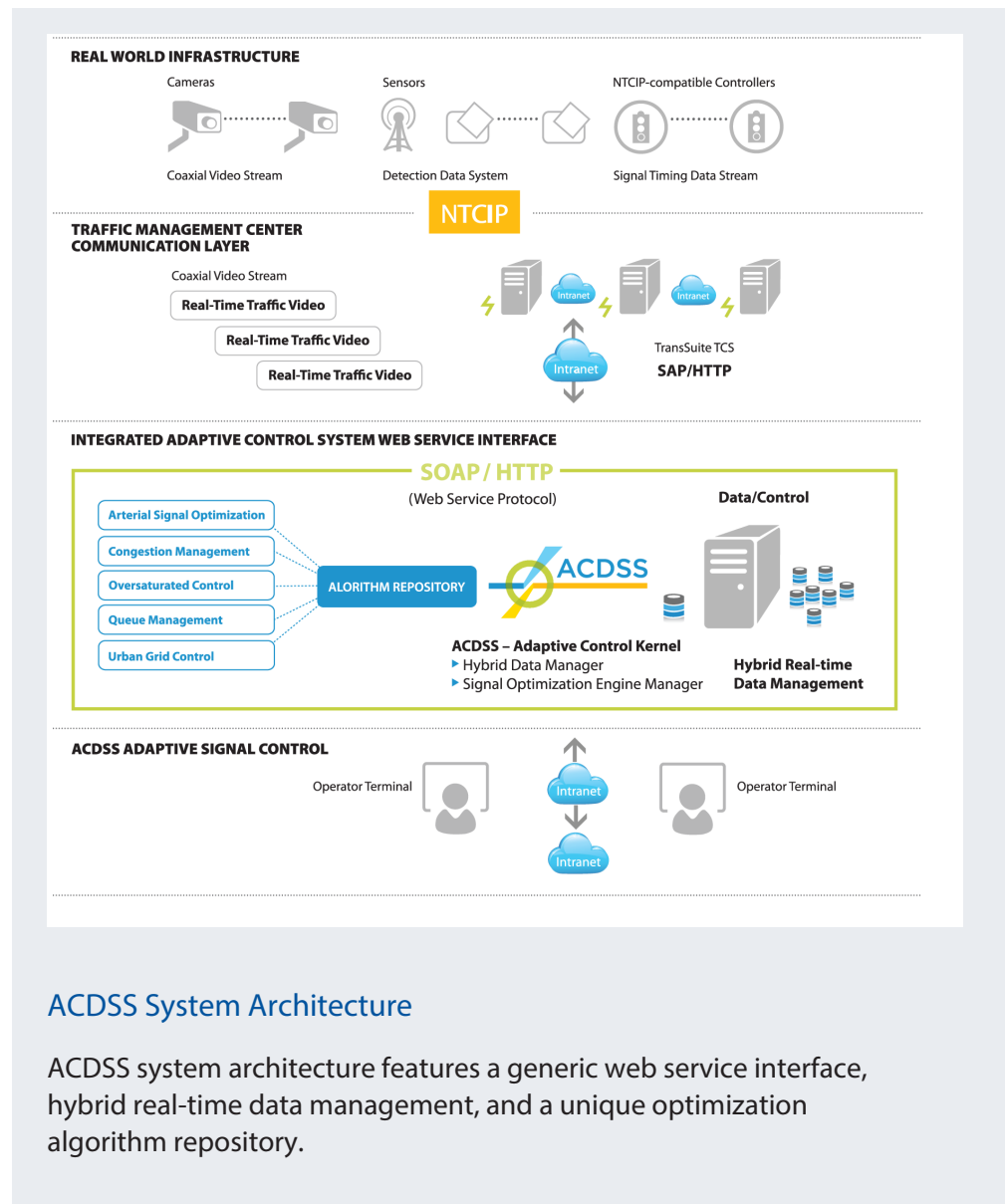
1) signal timing plan with optimized cycles, offsets and splits; 2) signal timing plan with unchanged cycle but optimized offset and split, and 3) signal timing plan with optimized splits only. The operator decides on the best alternative (operator-in-the-loop mode) based on the real-time simulations, or the system automatically selects one based on its internal rules (self-running mode).



Just-in-time simulation compares alternatives in real-time.

The TransSuite Family

TransSuite is a family of transportation management software products. TransSuite’s user interface is consistent and intuitive across the entire product family. The Windows-based interface will be familiar to novice users because the interface employs Windows® standards for drag and drop, ToolTip information, and context-sensitive device menus. Each workstation can access all system functions with customized security levels for each user. The TransSuite family includes modules for event management, ramp metering, dynamic message sign control, traveler information, transit priority, and RWIS data collection.



ACDSS System Architecture

ACDSS system architecture features a generic web service interface, hybrid real-time data management, and a unique optimization algorithm repository.




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