Area Traffic Control System Implementation at Pune – Case Study

V. Muralidharan, Additional Director, C-DAC
P. Ravikumar, Deputy Director, CIG, C-DAC
Area Traffic Control System in India

- ATCS is a fairly new concept in India
- After Delhi, Pune is the second city in India to have an ATCS; and the first city to have an indigenous ATCS
  - 63 junctions in Delhi is under SCOOT (imported from UK) and 38 junctions in Pune is under CoSiCoSt (developed by C-DAC)
  - CoSiCoSt is being implemented in Jaipur on a pilot scale
What is ATCS?

- Area traffic control systems are traffic responsive systems that use data from vehicle detectors and optimize traffic signal settings to reduce vehicle delays and stops.
- The system operates in a closed loop, evaluating the real time demand and properly updating network signal timings.
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C-DAC ATCS Model

- Stop line / exit loop Detector
- Sensor utilization factor
- Traffic Signal Controller
- Feedback (Signal Timings executed against the prediction)
- Signal Timings (Prediction)
- Central Control Station (CCS)
- Signal Lights

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Major building blocks of ATCS

- Traffic Signal Controller
- Vehicle Detectors
- Communication Network
- Application Software
- Central Control Station
Traffic Signal Controller
Vehicle Detection

Stop line Loop for Straight going traffic

Exit Loop for Right turning traffic
Central Control Station (CCS)
Challenges in implementing ATCS on Indian roads

- Traffic is not lane following
- A vehicle entering the approach (upstream) on a particular lane need not maintain the same at the intersection
- Uncontrolled side roads and on-street parking
- High mix of traffic
- Obtaining a correct measure of traffic count is highly complex
- Data loss due to power failure
- Network failure
- Availability of funds
Homogeneous, lane following traffic

Typical flow on Indian Roads (A scene from Pune)
Typical Indian Road Condition
On-street Parking

A typical parking pattern seen on Laxmi Road
Typical Corridors
Addressing the Challenges

- C-DAC developed a Composite Signal Control Strategy (CoSiCoSt) for distributed network model that address all typical Indian road conditions.
- Strategies are built into the system to guard against network failure, power failure etc.
- Distributed control give high scalability. Phased implementation of the system is possible based on funds availability.
CoSiCoSt Network Model

- Detector
- Demand
- Split Optimizer
- Intersection Controller
- New Timings & Preferences
- Translation Plan
- Stage Timing, Stage Saturation, Speed info
- Performance Index / Offset
- Split time modifier
- Route Selection & Offset Optimizer
- Current Timings
- Area Optimizer
- Preferences & Observations
- Weights & Bias

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Project Area in Pune

38 Intersections
Photographs from Surveillance Camera
Alka Talkies Junction, Pune
Variable Message Sign
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Service Crew Monitoring System

[Image of a city map with a highlighted vehicle]
Controller supply and installation

- M/s Webel Mediatronics Ltd., Kolkata
  38 controllers and 136 vehicle sensor loops

Impact Analysis of ATCS in Pune

- M/s. Consulting Engineering Services (India) Pvt. Ltd., Mumbai
  Pre and Post implementation study
Measure of Effectives (MoEs) considered for evaluation of impact of ATCS

- Average Travel Speed
- Average Delay
- Average Saving in Fuel
- Average Saving in Time
Summary of these MoEs

- Average travel speed increase in the range of 2% to 12%
- Reduction in average delay in the range of 11% to 30%
- Estimated annual fuel savings in the year 2006 due to implementation of ATCS is about Rs. 4.77 Crores
- Estimated annual time saving benefits in the year 2006 due to implementation of ATCS is about Rs. 0.83 Crores
- Total annual saving in the year 2006 due to implementation of ATCS on the 6 project corridors is about Rs. 5.60 Crores

Over all Increase in the Traffic Volume is 9.06%
Funding and Duration

- Project Jointly funded by DIT and Pune Municipal Corporation
- Duration: 30 Months (January 2004 to June 2006)
- Project Cost: Rs.597.68L

Percentage Share

- DIT: 65%
- PMC: 35%
Agencies come forward for ATCS Technology

- M/s. Webel Mediatronics Ltd., Kolkata
- M/s. KELTRON, Thiruvananthapuram
- M/s. Bharat Electronics Ltd., Bangalore
Patents

- A method for synchronizing Heterogeneous Road Traffic and System thereof
  - #1087/CHE/2005 dated 08/08/05
- System and Method for Vehicle Identification
  - #1201/CHE/2005 dated 29/08/05
- Distributed Time Synchronization of Road Traffic Signal Controllers using GPS
  - IP 2069/AFS/pgv (K&S Partners ref.)
Paper Publishing

“A Composite Signal Control Strategy for Indian Roads”, Indian Highways, August 2006 issue of The Indian Roads Congress, New Delhi
Paper Presentation

“Real-time Adaptive Traffic Control Systems for Indian Cities – Challenges and Solutions”

Presented in
7th International Workshop on Transportation Planning & Implementation Methodologies for Developing Countries

at
Indian Institute of Technology Bombay

on
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Thank You