Who is Delcan?

Founded in 1953, Delcan is a 750 person multidisciplinary engineering, management and technology consulting firm focused on transportation.

Integrated Systems and Infrastructure Solutions

Moving Technology to the Future for over 50 years - Worldwide
“If man had been meant to fly, god would have given him wings”

- Milton Wright, 1870
“Heavier than air flying machines are impossible”

- Lord Kelvin, 1895
“Everything that needs to be invented has been invented”

- Charles Duell, Head of US Patent Office, 1899
“If man can fly to the moon, why can’t we get to work on time”

- Joe Lam, 1989
Looking into the Future

- Technology
- Needs
- Desires
Needs

• Population growth causing acute congestion -- much more capacity required
• Insatiable needs for mobility
• Competition among major urban centers (50 mega-cities by 2025) requires increased efficiency in all aspects of transportation
• Economic sustainability and internet shopping require different perspectives on trucks
• Much more adaptive and integrated approach required for transportation systems with a multi-modal approach.
• Data explosion leads to data management needs
• Reliance on ITS inevitable
Technology

- Wireless technology continues to develop unabated
- Multi-purpose smart mobile devices provide one-gadget operation
- Significant proportion of vehicles are connected
- Easy transition between personal and in-vehicle devices
- Abundance of data sharing, fusion, management and warehousing technologies

*91% of Americans owns a cell phone with 56% owning smartphones*
Desires (Will)

• Uncompromised desires for sustainability and quality of life
• Economic sustainability will be the key
• Political environment more conducive to creative solutions
• Numerous legislations adopted in favor of public transit, other high occupancy vehicles and non-motorized transportations
• The public accepts a high degree of monitoring and surveillance
• Employers encouraged/legislated to provide incentives for non-SOV travel.
Data Explosion

• Array of on-street and off street sensor technologies
• In-vehicle technologies
• Region-wide detection system using cell and/or GPS probes
• Wireless technologies abundant
• Data fusion, filtering and interpretation methodologies still uneven
• And don’t forget the social media
Data Management Issues

The explosion of data requires additional management but will enhance transportation management through data sharing.

But do we share data, information or intelligence?
Data-Related Issues

- Accuracy and availability
- Functional differences
- Standards
- Privacy or perception of it
- Business intelligence
- Policy (open?)
- Ownership
- Willingness to share
- Data sharing partnership
- Capital and maintenance funding
- Regulatory framework
• Resource effective
• Flexible over time
• Sustainable and international
• Suitable for change management
National Data Warehouse in NL

- Enhance traffic management requires detailed and dynamic traffic data on national level.
- National road operators have agreed to cooperate on the collection and distribution of high quality traffic data:
  - Highways 3300 km
  - Provincial roads 2600 km
  - Urban roads 700 km
Main ideas of NDW:
- There are more traffic data available than used
- Bring all traffic data together in one national database
- Make all data available for all data providers, traffic information service providers and researchers with less than 2 minutes delay
- Install detectors where the coverage is poor

17 participating authorities
- National Road Authority (Rijkswaterstaat – RWS)
- 5 provinces
- 4 large municipalities and 7 metropolitan areas

2 private partners (after European tender)
Currently about 5000 km covered, this year +1000 km
About 30,000 detection points in use
VMS’s show speed and traffic jams; if necessary also alternative routes.
Traffic management Technologies 2025++

- Wide adoption of ITS standards
- Abundance of data sharing, fusion, management and warehousing technologies
- Regional TMC integrated across jurisdictions
- Active traffic management getting even more active
- Rule-based traffic response and management plans
- Intelligent corridor management (ICM)
Traffic management Technologies

2025++

- Proliferation of traffic management analytics and control algorithms
- Adaptive signal control – multi-criteria control
- Commercial vehicles – logistics, automated enforcement and smart corridors
- Traveler information systems – modal, integrated, real-time and interactive
- Towards a smart city concept
ICMS --San Diego I-15 Corridor

- 21 mile corridor
- Manages Lanes for 16 miles
- Encompasses three cities: Escondido, Poway, and San Diego
- Interregional goods movement corridor
- 3 segments: South, Mid, North
Rancho Bernardo Transit Center

- Main Lanes
- Managed Lanes
- Park-and-Ride
- Direct Access Road to Arterial
- BRT Station
- Drop Ramps
ICMS Inputs and Outputs
What will ICMS do?

Implements Active Traffic Management (ATM) strategies to pro-actively manage multiple modes through and along the corridor.

- En-route and pre-trip traveler information
- Dynamic Rerouting
- Freeway coordinated adaptive ramp metering
- Signal coordination on arterials with freeway ramp metering
- Regional arterial management
- Real-time multimodal decision support
- Network traffic prediction
- On-line micro simulation analysis
- Real-time response strategy assessment
Multi-Criteria Adaptive Control

Design Timings for Different Traffic Conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Degree of Saturation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gridlocked</td>
<td>1.0++</td>
</tr>
<tr>
<td>Oversaturated</td>
<td>0.90 - 1.0+</td>
</tr>
<tr>
<td>Heavy Demand</td>
<td>0.75 – 0.90</td>
</tr>
<tr>
<td>Medium Demand</td>
<td>0.50 – 0.75</td>
</tr>
<tr>
<td>Light Demand</td>
<td>0 – 0.75</td>
</tr>
</tbody>
</table>
Total Volumes vs. Cycle Length at 72 Ave. & 122 St. in Surrey BC, on August 2, 2012

- Cycle Length [seconds]
- Total Volume

- Number of Vehicles (veh / cycle)
- Timing Plan Cycle Length
- Total Volume

3:00PM - 3:50PM - 4:40PM - 5:30PM - 6:20PM - 7:10PM - 8:00PM

Time [minutes]
Greater Vancouver Smart Corridors
Network Topology
Greater Vancouver Smart Corridor Concept for Commercial Vehicles

- Truck border processing information - delays, queues
- Real-time traffic conditions on roads, bridges, and tunnels - speeds, queues
- Construction work sites affecting traffic - partial/full closures, speed reductions
- Real-time information on incidents affecting traffic - congestion, delays
- Truck and cargo information and locations - dangerous goods movement
- Truck locations in relation to terminal reservations
- Terminal operation status - open/close, capacity
- Ferry schedule - delays, cancellations
- Traffic signals operations
- Truck and/or driver conditions
• Data connectivity (V2V and V2I) providing massive navigation data will spark unlimited applications
• Telematics-enabled customer relationship management (e.g. Toyota Friend)
• Fleet management subscriptions growing from 13.3M in 2012 to 30.4M in 2016 globally
• Multi-modal routing (BMW Vienna World Congress)
• Car sharing (5M participants in Europe by 2016) – Households without cars grew from 39% to 42% between 1997 and 2008
• Heavy goods movement – road trains (10B invested in self-driving in 2011 alone)
What can we expect in 2045?

- Full-functioned regional TMC’s connected to local traffic control, utility, logistics and emergency centers, and mobile units, forming a smart city conglomerate.
- Data is shared readily across systems and jurisdictions.

- SOV discouraged from travel on freeways and other thoroughfares.
- Urban networks populated with HOV and HOT lanes.
- Widespread use of personal transport systems (bicycles, segways, etc.).
- Interactive ATIS for individual modes.
- All traffic signals are adaptive.
The Daily Commuting in 2045

- Plan your day’s itinerary with your smartphone
- Pay for your trips using the integrated fare app
- Travel to your local hub by car or bicycle (or segway?)

- Take an express bus which joins a fleet on the highway and speeds to downtown on the HOEV lane, next to a TOL and HOV lane. SOV’s are not encouraged.
- In the multi-modal hub downtown, your company shuttle is waiting to take you to work
- After work, go shopping on a segway
- Return the segway at the hub and go home on an express bus
2025++ Scenario – An Utopia?

Will it happen?

• Yes, all the technologies are available
• The needs are inescapable
• The speed of implementation with the required funding will depend on social support and political leadership
• Of course, we need ITS with Triple I rating – Inter-operable and Integrated with Inter-agency cooperation
Questions and Answers

For further information, please contact: Joseph Lam (j.lam@delcan.com)
THANK YOU

Visit our website! .delcan.com