Low Floor Light Rail Vehicle Procurement

Stephen Lam, P.Eng.  
Superintendent  
Streetcar Engineering  

Jim Lee  
Chief  
Project Procurement
Streetcar Facts – Current System

Annual Streetcar Passenger-trips ~ 80 million

Vehicles:
- 196 CLRVs (Car 1 – 1977)
- 52 ALRVs (Car 1 – 1987)

Tracks:
- 85 double track km
- 89 special track work

Service Routes:
- 11 Routes total
- 3 Semi-Right-of-Way
Low Floor Light Rail Vehicle

Streetcar - LRV Fleet Plan

- CLRV (30 years for 196 cars)
- CLRV Overhaul (132 Cars)
- ALRV (30 years for 52 cars)
- Procure: Ph.1 = 204 LFLRVs (replace C & A LRVs), Ph. 2 = TC&RGS cars
- Enter Service - New Cars

Base 204 LF LRVs will:

- Replace aging fleet, relieve congestion & accommodate natural ridership growth
- Provide accessible, safe and customer-friendly vehicles; attract ridership
- Improve fleet reliability, availability & maintainability
- Form base design for adaptation for Transit City LRVs for improved reliability, maintenance efficiency and reduced spare parts ratio
MOVE ONTARIO 2020

- 120 double-track km / 7 lines
- approx 480 new LF LRVs
- 175 million new riders p.a.
- Commissioning starts 2012
Unique Technical Challenges in Toronto

1. Track Switch  
   (Single vs. Double-Point)

2. Tight Loop and Curve Radius  
   (11m vs. 25m)

3. Grade Requirements (8% vs. 5%)

4. Ground-borne Vibration

5. Overhead Wire Capacity

6. Buff Load (Collision Strength)

7. Fare Collection
2. Tight Curve Radius & 3. Steep Gradient

- Gunn’s Loop - 13.7 m (45’)
- St. Clair W. Stn. - 12.8 m (42’), 7% grade
- Dundas West St. - 12.2 m (40’)
- Roncesvalles Carhouse - 11.3 m (37’)
- McCaul Loop – 13.7 m (45’)
- Union Stn. – 14.5 m (47.5’), 7% grade
- Woodbine Loop – 11.2 m (36.6’)
- Neville Park Loop – 13.7 m (45’)
- Bathurst St. – 8% grade
- Bathurst Stn. – 12.8 m (42’)
- Bingham Loop – 11.9 m (39’)
- Russell Carhouse – 11.3 m (37’)
- Union Stn. – 14.5 m (47.5’), 7% grade
- Woodbine Loop – 11.2 m (36.6’)

TTC STREETCAR NETWORK

SAMPLE OF TIGHT RADIUS CURVES
AND STEEP GRADES

- Curve or Loop under 12.2 m (40’) radius
- Curve or Loop between 12.2 and 14.6 m (40’1” and 48’)
- Grade steeper than 7%
Low Floor Light Rail Vehicle

Queen at Mutual, December 1933
Low Floor Light Rail Vehicle

Derailment Video – Prague, the Czech Republic
LF LRV Main Features (1)

- 27m – 30m long (CLRV = 15.4m; ALRV = 23.2m)
- Single ended, 4 doors, air-conditioned
- ~ 260 passenger crush load (CLRV = 132; ALRV = 205)
- Customer input driven design
- Accessible – 2 wheelchair positions, bike rack, audio/visual stop announcement
- Secure – cameras, advance warning to motorists about impending stops, anti-microbial coating on stanchions
- Safe – performance, crash energy management, outward visibility, meet SSP
LF LRV Main Features (2)

- Environmental impact mitigation:
  - Regenerative braking
  - Equipment right-sizing
  - L.E.D. exterior lighting and intelligent auxiliary power control
  - Energy efficient glazing and insulation
  - Non-ozone depleting air conditioning freon
  - Aggressive weight and end-of-life recyclable material management programs

- Enclosed cab - ticket vending & validation machines

- Go anywhere – steep grades, tight curves, extended tunnel operation

- High reliability and maintainability

- Easy adaptation for Transit City vehicles
Low Floor Light Rail Vehicle

Possible Worldwide Solutions
Low Floor Light Rail Vehicle

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LF LRV Procurement Schedule

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<th>Year</th>
<th>2006</th>
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<td>Issue Request For Interest (RFI)</td>
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<td>Issue Request For Proposal (RFP)</td>
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<td>Review Submissions &amp; Award Contract</td>
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<td>Review Design, Cab &amp; Car Mock-up</td>
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Procurement Process to Meet Challenges

1. Analyze technical risks & Identify Best Practices
2. Advertise & Issue Request for Interest (RFI) to known carbuilders – 7 responded
3. Public consultation
4. Canadian Content
5. Meet with internal stakeholders
6. a) 3-D track geometry mapping to ensure compatibility of LRV with TTC infrastructure
   b) Simulate LFLRV behaviour – ground-borne vibration, overhead catenary capacity
7. In-depth technical discussions with 4 carbuilders
   a) Safety Against Derailment - single point track switch & tight radius curves
   b) Gradeability – all trucks powered, 100% vs. partial low floor
   c) Ground borne vibration
8. Release draft specification for industrial comments
9. Issue Request for Proposal (RFP)
RFP Submission Evaluation Process (1)

- Two Envelope process
- Pass/Fail technical requirements
- Qualitative technical evaluation
- Pricing (including relevant life cycle costing)
- Canadian Content requirement
- Negotiate with recommended qualified proponent
• Complete evaluation process identified in RFP
• Qualitative technical evaluation (includes specific scoring for various technical elements)
• MUST reach a minimum of 85% to be considered qualified
Canadian Content

- RFP will include Canadian content requirement
- Booz Allen developed target
- Designed to provide competitive bids
- Contract will include audit provisions to validate Canadian content
- Holdbacks will be in place to protect the Commission
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Thank you