Metro Line LRT Status Update

Presentation Overview

1. Communications
2. Construction Deficiencies
3. Signals Deficiencies
4. Project Timeline and Update
5. Lessons Learned
6. Next Steps

Public Communications

- Regular memos to Council
- Email bulletin/project newsletter (400 subscribers)
- Key stakeholder meetings an updates
- Proactive/Reactive media relations
- Regular updates to dedicated web page
- Social media engagement (23,000 followers)
- LRT Project Information Centre for public inquiries

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Construction Deficiencies

- Quality Control & Quality Assurance Processes
  - Process for identifying & resolving
  - Major vs. Minor deficiencies

- Significance for escalation
  - Cost – Schedule – Scope – Risk

No significant outstanding issues

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Signals System Deficiency

- Thales Signals Contract: CBTC on Full Metro Line
- Significant Delays – Opening to service is 16 months behind schedule
- Mitigation Plan: staged implementation of CBTC
- Owner's Engineer (HMM) does not endorse acceptance of Thales' Safety Certificate

Project Timeline and Update

2008	Concept Plan Approved by City Council
2009	Train frequency & embedded track decision
2010	CBTC and contract delivery model decisions
2011	Two contracts awarded (Civil & Signaling)
2012	Tunnel Construction Opening Media Event
2014	Construction - substantial completion
2015	Safety Case hand-over March 23, 2015
2015 (June)	Testing reveals issues with CBTC

Lessons Learned

Design-Build Model	Appropriate where City maintains significant commercial leverage
Project Management Structure	Needs to be aligned with choice of contract model and to assure clear escalation path
New Reporting Process	Initiated regular reporting to City Council ✓ capital construction projects ✓ identification of significant deficiencies: Schedule – Cost - Scope - Risk

Contract and Project Management

Contract type & Project Management process:

- ✓ Need to be considered in tandem
- ✓ Power of commercial leverage

P3 Valley Line:

- ✓ all sub-contracts under one prime
- ✓ maximum commercial leverage & project management structures combine
- ✓ ensure mutual contractor performance

Next Steps Forward

1. HMM identified gaps in testing documentation (Thales Safety Certificate)
2. Intense investigation period - HMM attends Thales Toronto to review materials
3. Non-resolution of outstanding gaps
4. HMM recommends Independent Safety Audit
5. City retains Rail Safety Consulting (RSC)

Consultant Reports

- HMM Findings & Recommendations
- RSC Work Plan and Schedule
- Operating Plan for September 6 opening

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Hatch Mott MacDonald

Edmonton North LRT

August 17, 2015

Session with Edmonton City Council

HMM Role

- HMM engaged as Owner's Engineer by the City, to monitor and report on Thales' progress, and support the City in taking delivery of a system that meet all the requirements of the CBTC technical specifications.

Key Timelines

- Jan 2011 – CBTC RFP released, 5 bids received
- May 2011 – NLRT Civil Works award made, projected completion Sept 2013
- June 2011 – NTP to Thales for CBTC, projected completion Dec 2013
- Jan 2013 – CBTC staged implementation concept introduced to mitigate known Thales delays, to be operational by Dec 2013
- March 2014 – CBTC staged implementation Safety Case handed over by Thales, deemed incomplete

Status of Safety Case

- As the CBTC Design/Builder, contractual responsibility for the safety of the CBTC system is the sole responsibility of Thales
- Based on available information from Thales and extensive site monitoring, the City Team, including HMM, has reservations about the robustness of Thales' Safety Case
- Upon HMM's review of the Thales Safety Case submitted in March 2015, a number of safety documentation gaps were identified precluding HMM's ability to endorse the Thales Safety Case
- Ongoing information requests, made to Thales to close these gaps, remained unanswered
- To proactively resolve the impasse, HMM presented five key issues for Thales to respond to and demonstrate good industry processes had been followed in development of its Safety Case

Five Key Issues

- The five Key Issues for Thales to demonstrate that they had followed good industry process are :
  1. Regression Testing
  2. Testing and Commissioning Plan
  3. Consistency in the execution of testing
  4. Submission of System Verification & Validation Report
  5. Lack of support information cited in Safety Case

Response & HMM Review Process

- Thales closed out Key Issue #4 (the V&V item) and invited HMM to physically inspect their records on the remaining four
- This review took place the week of July 20, 2015
- The outcome of the review is that HMM remains precluded from validating the Safety Case

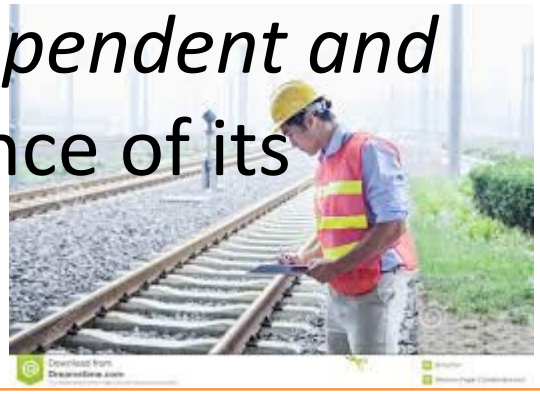
Rail Safety Consulting

Overview of Edmonton CBTC Safety Assessment

Sergio Mammoliti

About Rail Safety Consulting (a division of TUV Rheinland)

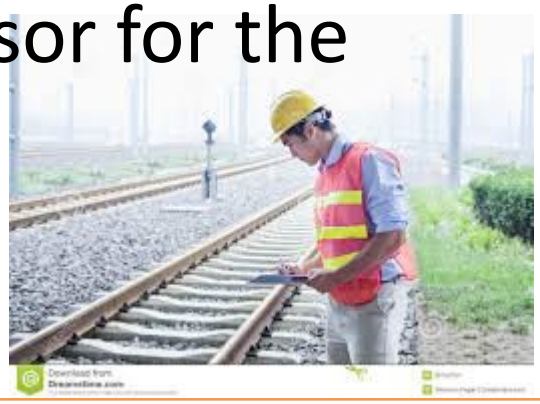
- RSC is the *leader* in independent safety assessments of freight rail and transit train control systems including CBTC.
- RSC is the *technical expert* in all types of processor-based fail-safe control systems.
- RSC is dedicated to a *totally independent and impartial* approach to performance of its assigned tasks.



The RSC Team has been providing safety and RAM consulting since 1993

About Rail Safety Consulting
(a division of TUV Rheinland)

- RSC has been the Independent Safety Assessor for NYCT's and PATH's CBTC programs as well as managing the Safety Certification programs for most Freight and Commuter Rail Positive Train Control (PTC) projects.
- RSC selected as the Safety Assessor for the Kitchener-Waterloo LRT System.



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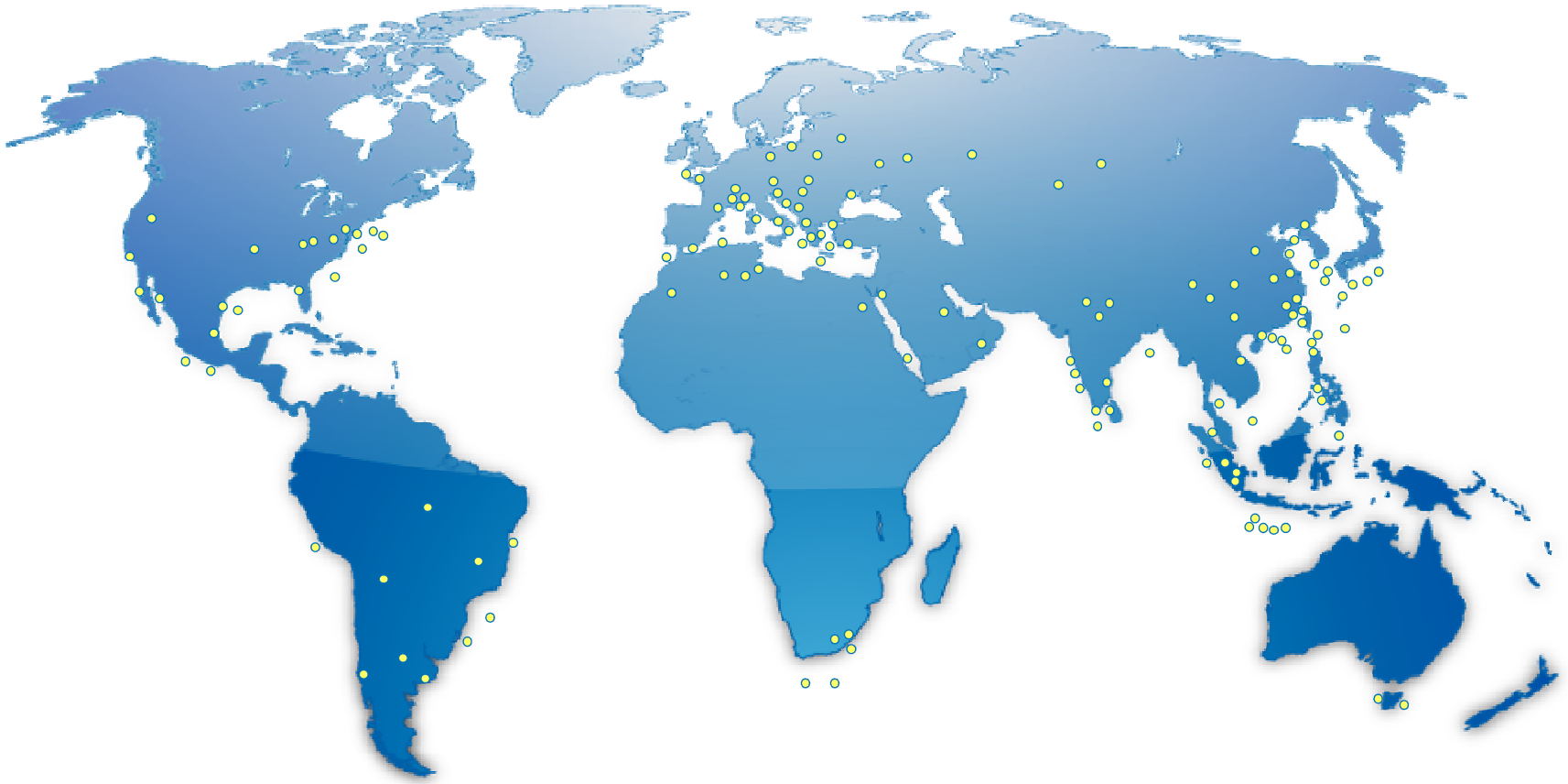
As Part of the TUV Family RSC has Global Experience

490 locations in 61 countries around the world.



RSC is headquartered in Rochester, NY with offices in Toronto, Atlanta and Charlottesville

Edmonton Strategy

- RSC understands that there is concern with the rigor of the Thales Safety and Configuration Control Processes associated with the deployment of SelTrac®.
- RSC strategy is to provide an independent assessment of the deployed system to identify any gaps and work with Thales to develop a mitigation strategy.
- RSC has CBTC Safety experts in Toronto who can interface with Thales on a daily basis.
- RSC will work with the City and Thales to implement the mitigations and bring the system into full revenue service.

Assessment Approach

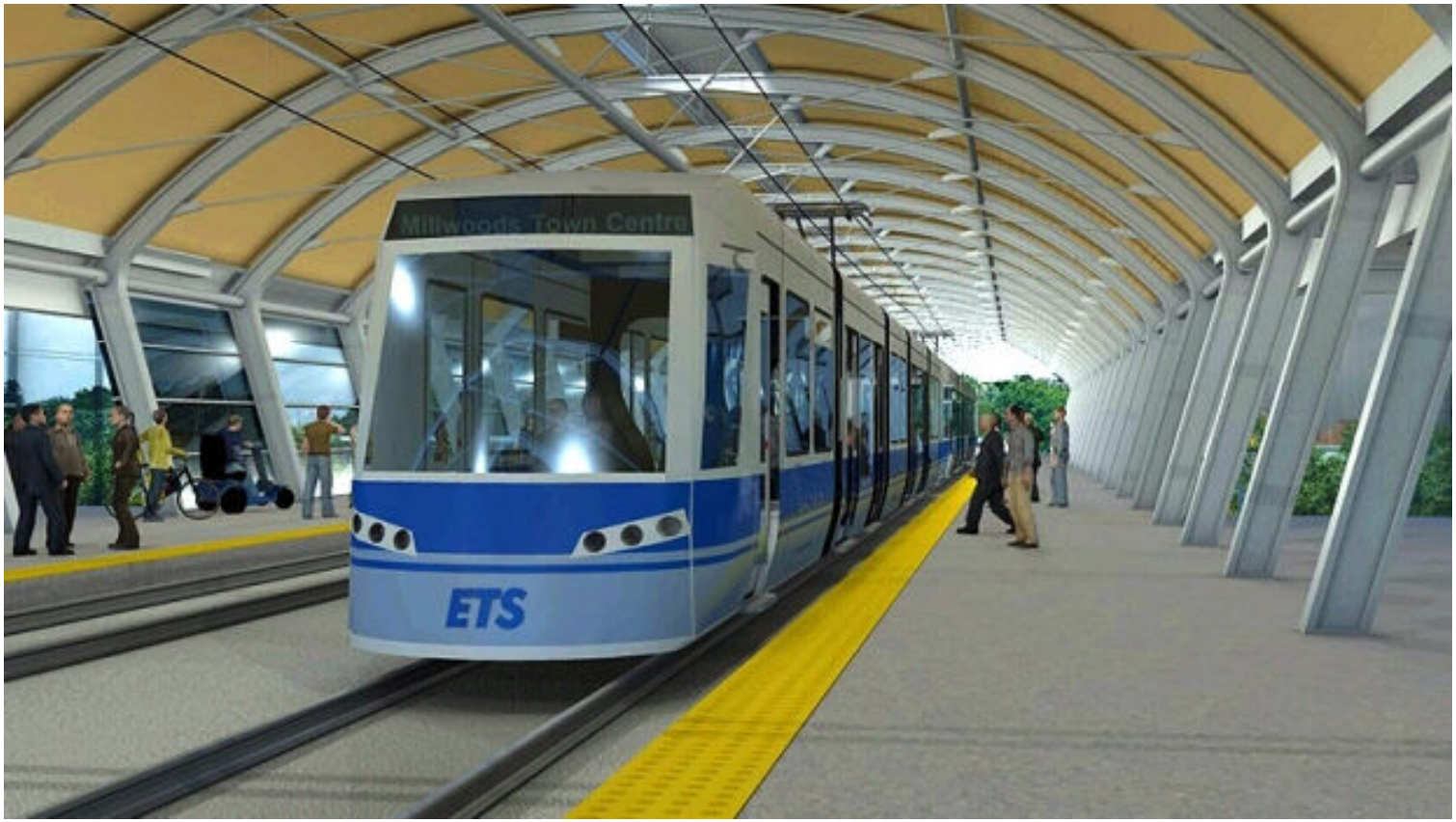
- Assessment will follow CENELEC 50129 standard and focus on 3 primary areas:

1. Adequacy of the Safety and Quality Processes used by Thales.
2. Completeness of the Safety Analyses performed by Thales.
3. Thoroughness of the Thales Test and Commissioning Program.

Assessment Approach

- 6 weeks for initial assessment
- 5 - 6 month timeframe to mitigate gaps.
  - Bi-weekly updates on results will be generated and interim versions of the Assessment Report will be provided.

Thank You



Pathways to Contracted Service

Objective 1	RSC identifies/closes gaps Staged implementation - (CBTC)
Objective 2	Modified service using Restricted speed line of sight operation

LRT and Bus Service

- Trains will arrive every 15 minutes
- Initial trip duration - NAIT to Churchill: 14 minutes
- Express bus in comparison takes 16 minutes
- In addition to LRT, bus service also enhanced.

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Metro Line Update

Thank you and

Questions

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