

July 18, 2012



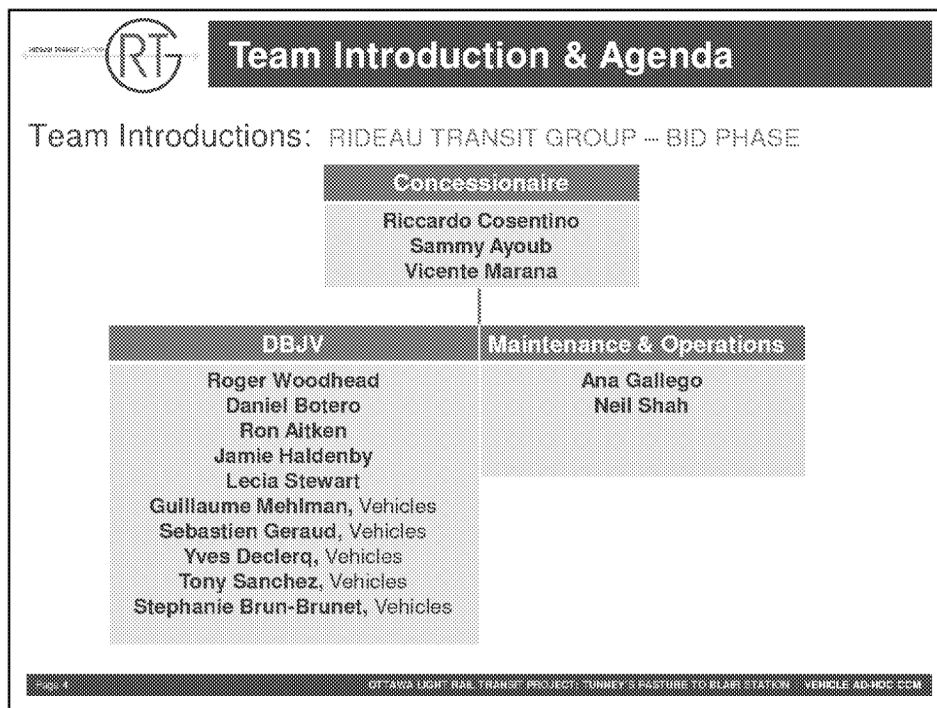
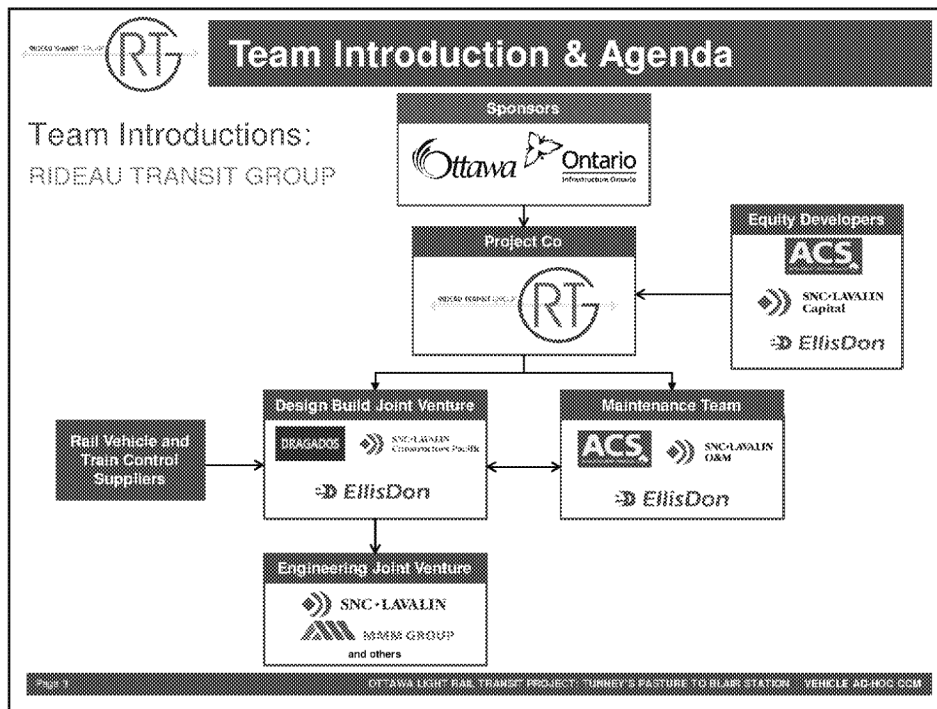
**OTTAWA LIGHT RAIL TRANSIT
PROJECT:
TUNNEY'S PASTURE TO BLAIR STATION**

VEHICLE AD-HOC CCM



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**TEAM MEMBER
INTRODUCTIONS &
AGENDA**







Team Introduction & Agenda

Guillaume Mehlman, PhD
 President – Alstom Transportation North America

- 25 years of experience in Rail Transportation and Energy
- PhD from the Ecole Polytechnique in France
- 10 years of experience in Rail Transportation
- Former Managing Director of Le Creusot site, ALSTOM's global Excellence Center for rolling gear and trucks
- Management responsibility for development, industrialization, and production of trucks for all rolling stock product lines including Light Rail Vehicles
- Project Management experience in nuclear energy (several >1 b USD turnkey facilities)




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Team Introduction & Agenda

Sébastien Géraud
 Technical Bid Manager – Alstom Transport SA

- Over 10 years of experience in Rolling Stock Design & Manufacturing
- M.S. from Georgia Institute of Technology
- Project engineering manager on two passenger projects
 - Acela high speed train
 - KZ4AT passenger locomotive
- In charge of Engineering of North American LRV
- Wide experience in all types of Rolling stock from VHST to LRV




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Team Introduction & Agenda

Stephanie Brun-Brunet
 Vice President Turnkey, Infrastructure and P3 projects
 Alstom Transportation North America

- 17 years of experience in Rail Transportation
- Engineering degrees (INPG, France)
- Masters in product development & industrialization (ESCG, France)
- Various management responsibilities held in several continents including product development for propulsion systems, technology transfers, business development, mergers & acquisitions, sales, and general management.
- Project experience (relevant for ORLT project):
 - LRV : Dublin, Rotterdam, Shanghai, Buenos Aires,
 - Metros and Commuters: Santiago, Sao Paulo, Metrovias
 - Several >1 bUSD turnkey rail systems: Caracas, Merval, Nottingham




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Team Introduction & Agenda

Yves Declercq
 LRV Product Director – Alstom Transport SA

- Over 20 years experience in rail transportation
- Engineering degree: Ecole Centrale de Paris 1986
- Project Manager of France's largest LRV and Metro Project in the past 10 years
 - SNCF Tram-train TTNG Project (800 M€)
 - RATP Metro MP05 Project (500 M€)
 - RATP Metro MF2000 Project (700 M€)
- Wide experience in all type of Rolling Stock from VHST to LRV



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Team Introduction & Agenda

Tony Sanchez
Engineering Manager - Alstom Transportation North America

- Engineering Manager - Alstom Transportation North America
- Over 18 years of experience in Rolling Stock design and manufacturing
- MSc electrical engineering, MBA business management
- Project engineering manager of three North American LRV projects:
 - Houston S70
 - San Diego S70
 - Charlotte S70
- Head of Alstom engineering for North America
- Experience in LRVs, Metros and EMUS



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Team Introduction & Agenda

Agenda


1. Introduction
2. Alstom Capabilities
3. Service Proven Vehicle
4. Preliminary Design
5. Canadian Content
6. AODA/ADA
7. Integration with CBTC
8. Discussion
9. Closing

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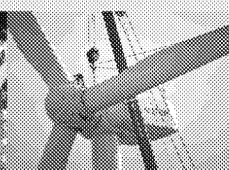
ALSTOM CAPABILITIES



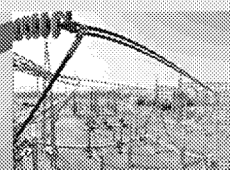
Alstom's Four Main Businesses




Thermal Power plant
Equipment & services for
power generation



Renewable Power plant
Equipment & services for
power generation



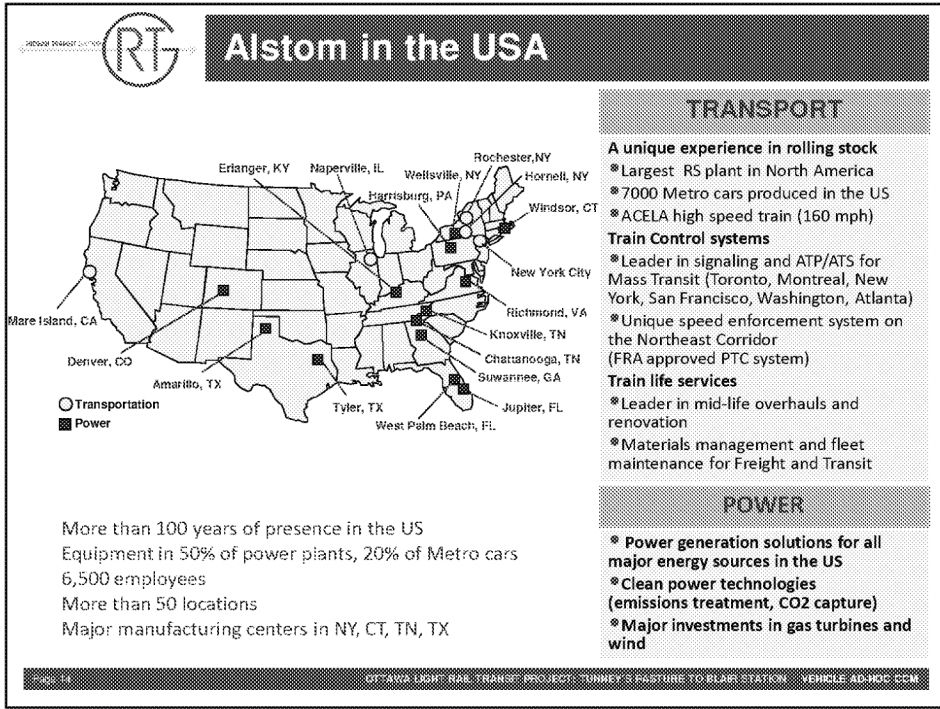
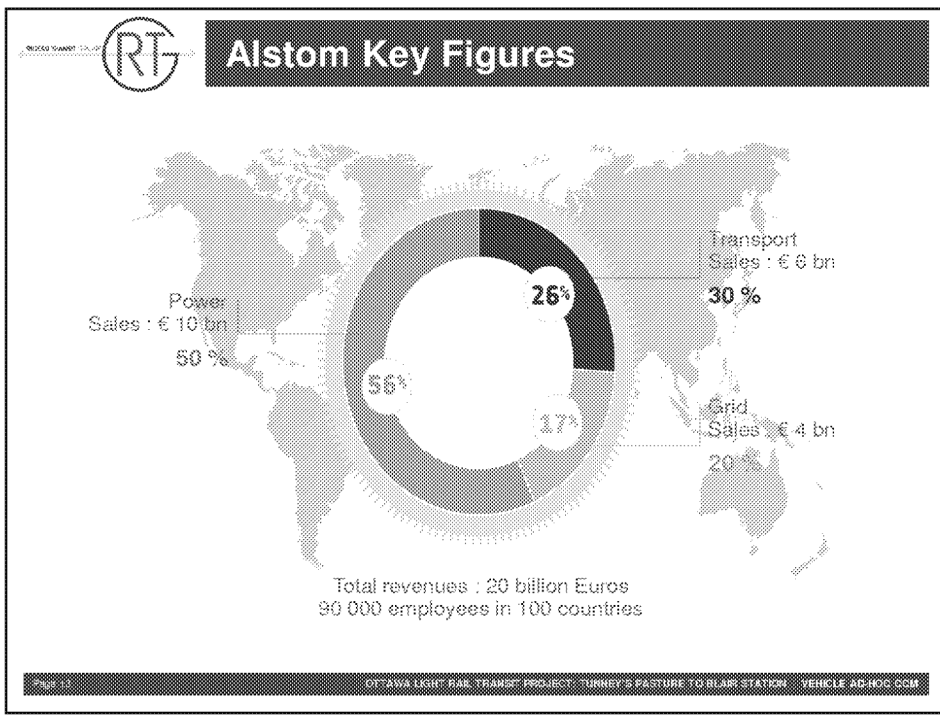
Grid system
Equipment & services for
power transmission




Transport sector
Equipment & services
for rail transportation

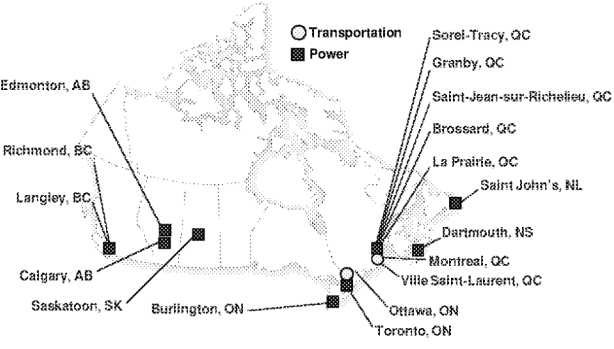
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Alstom in Canada



More than 70 years of presence in Canada
 More than 2000 employees
 More than 25% of total power generation installed base
 Major manufacturing centers in QC, AB, BC

TRANSPORT


Passenger Information, Safety, and Communications Systems
 * Global centre of excellence for advanced passenger information, safety, communication and entertainment systems (carborne and wayside)
 * 90% export to major transit agencies worldwide
 * Delivery of the most advanced integrated train control center in the world to STM in Montreal

Electrification
 * Traction Power Supply R&D Center opened in Toronto in 2012
 * High efficiency reversible substations for the North American market

POWER

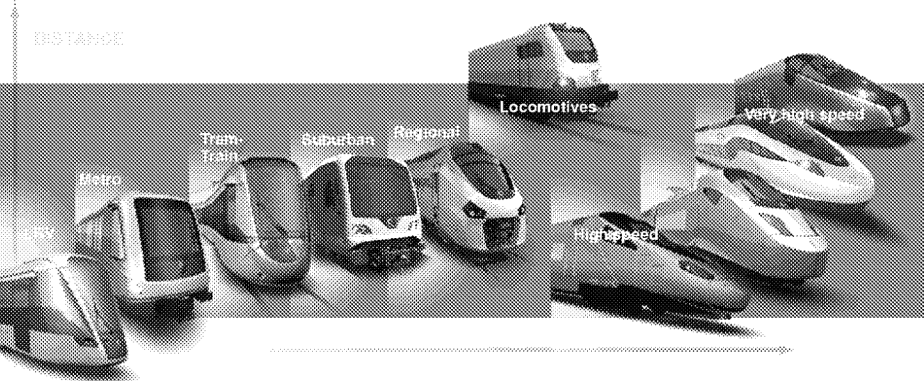
* Hydro power : 28% of installed base
 * Grid technologies

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OTTAWA LIGHT RAIL TRANSIT PROJECT; TURNER'S PASTURE TO BLAIR STATION; VEHICLE AD-HOC CCM




Alstom Transport


A wide range of products and services for more than 100 years



- N°1 in high and very high speed
- N°2 in urban transport (LRVs, Metros)

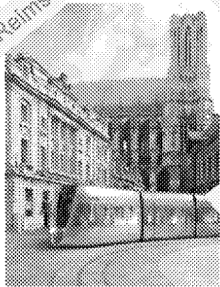


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PPP's: ALSTOM References

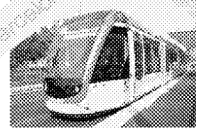
- **Manchester Metro Line 1** - UK 1990
UK's first light rail BOT; 26 km/26 vehicles
- **Rouen Metrobus Line 1** - France 1991
30-year concession; 11 km/28 vehicles
- **Arlanda Airport Link** - Sweden 1994
45-year concession; 40 km line/7 EMU trains
- **Barcelona LRT Ph 1** - Spain 2000
28-year concession; 16km/19 Citadis LRV's
- **Barcelona LRT Ph 2** - Spain 2003
25-year concession; 14km/18 Citadis LRV's
- **Jerusalem LRT Line 1** - Israel 2004
30-year concession; 14km/46 Citadis LRV's
- **Florence LRT Lines 2&3** - Italy 2005
25-year concession; infrastructure
- **Milan metro Line 5** - Italy 2006
32-year concession; infrastructure
- **Milan metro Line 5** - Italy 2010
Extension of L5; infrastructure
- **Reims LRT Line 1** - France 2006
30-year concession; 11km/18 Citadis LRV's
- **Reims LRT Line 1** - France 2006
30-year concession; 11km/18 Citadis LRV's
- **Nottingham Phase 2** - UK 2011
23-year concession; 10+8km/22 Citadis LRV's
- **Albacete-Alicante HSL Infra** - Spain 2011
22-year concession; 165km line ERTMS2 signaling
- **Nimes Montpellier High Speed line** - France
25-year PPP, 80 km line, infrastructure



Reims






Barcelona



Milano

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OTTAWA LIGHT RAIL TRANSIT PROJECT: TURNEY'S PASTURE TO BLAIR STATION VEHICLE AC-HOG.COM



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SERVICE PROVEN
VEHICLE

RT **Alstom CITADIS**

CITADIS, a success story started in 1997

42 Billion Passengers
40 cities
245 Million km
 More than **1500** LRV


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RT **Alstom CITADIS**


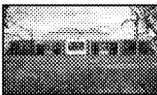
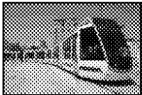
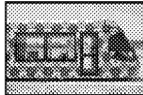


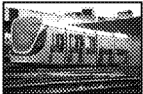
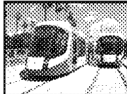








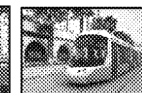
CITADIS, a success story started in 1997

Montpellier, France 30 Citadis	Orléans, France 22 Citadis	Dublin, Ireland 40 Citadis	Lyons, France 73 Citadis	La Rochelle, France 1 Citadis	Valenciennes, France 30 Citadis
Barcelona, Spain 41 Citadis	Bordeaux, France 88 Citadis	Bordeaux, France 12 Citadis	Lyons, France 10 Citadis	Melbourne, Australia 36 Citadis	Strasbourg, France 41 Citadis
Rotterdam, NL 113 Citadis	Paris, France 79 Citadis	Paris, France 46 Citadis	Grenoble, France 50 Citadis	Mulhouse, France 27 Citadis	Orléans, France 21 Citadis


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 **Alstom CITADIS**


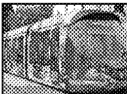

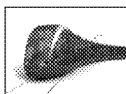
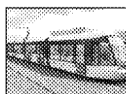
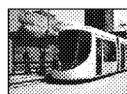

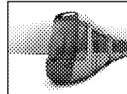

CITADIS, a success story started in 1997

					
Nice, France 29 Citadis	Tenerife, Spain 26 Citadis	Tunis, Tunisia 55 Citadis	Montpellier, France 27 Citadis	Madrid, Spain 70 Citadis	Le Mans, France 25 Citadis
					
Jerusalem, Israel 46 Citadis	Algiers, Algeria 41 Citadis	Casablanca, Morocco 74 Citadis	Toulouse, France 24 Citadis	Reims, France 18 Citadis	Angers, France 17 Citadis
					
SNCF, France 200 Citadis (Frame - 45 firm order)	Istanbul, Turkey 37 Citadis	Oran, Algeria 30 Citadis	Constantine, Algeria 27 Citadis	Dubai, UAE 11 Citadis	


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 **Alstom CITADIS**

CITADIS, a success story started in 1997

					
Rabat, Morocco 44 Citadis	Montpellier, France 24 Citadis	Brest, France 21 Citadis	Dijon, France 32 Citadis	Rouen, France 27 Citadis	Le Havre, France 22 Citadis
					
Tours, France 21 Citadis	Aubagne, France 8 Citadis	Nottingham, UK 22 Citadis			

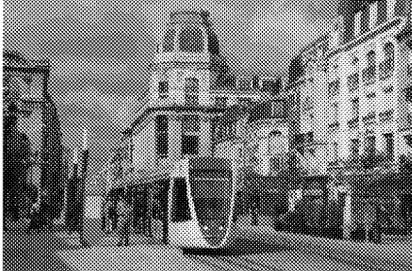

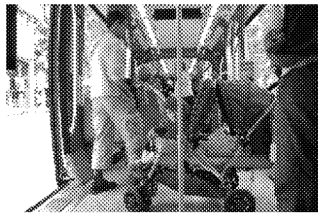
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Alstom CITADIS

The CITADIS Advantage

- Passenger focused design
- Accessibility and access is optimized
- Safety is enhanced
- Gentle footprint on the environment
- Superior Urban Integration
- Operational benefits


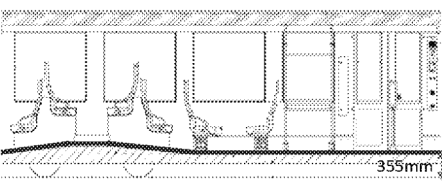
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Alstom CITADIS

CITADIS: 100% Low Floor

- No steps means: safer, quicker and smoother passenger flows inside the vehicle to reduce dwell time
- Increase the effective standing capacity
- Accessibility to restricted mobility passenger
- More flexible train layout
- Easier and more economical truck maintenance
- Flat and smooth under frame, less exposure to snow ingress

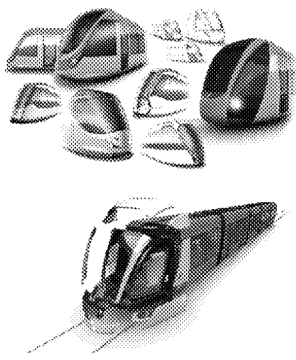
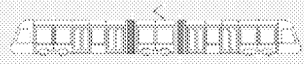



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Alstom CITADIS

CITADIS: 100% Modularity

- Customized to city needs
- Proven sub-system modular design

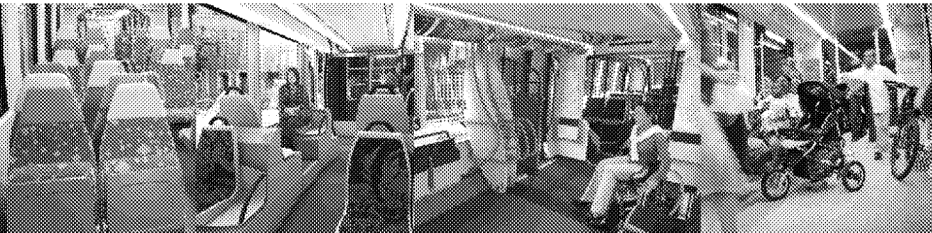
Design Modularity	Capacity Modularity
	 <div style="text-align: right; font-size: small; margin-top: 5px;">28 to 30 meters 180 to 190 pass.</div>
	 <div style="text-align: right; font-size: small; margin-top: 5px;">32 to 37 meters 230 to 265 pass.</div>
	<div style="text-align: center; margin-bottom: 5px;">+</div>  <div style="text-align: right; font-size: small; margin-top: 5px;">42 to 48 meters 280 to 320 pass.</div>
	<div style="text-align: center; margin-bottom: 5px;">+</div>  <div style="text-align: right; font-size: small; margin-top: 5px;">51 to 58 meters 360 to 425 pass.</div>

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Alstom CITADIS

CITADIS: 100% Comfort




- The passenger is our guest
- Modular design allows multipurpose areas
- Maximum visibility provides pleasant ride
- Ultra-smooth running trip: high comfort level

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Alstom CITADIS

CITADIS: 100% Accessibility



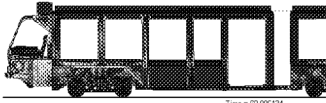
- Ease of use for all passengers
- Perfect alignment between platform and the LRV
- Large corridor and gangway
- 100% low-floor (no step) going through the vehicle

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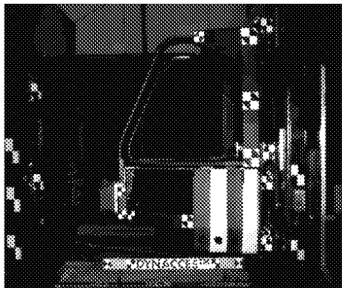


Alstom CITADIS

CITADIS: 100% Safety




Title = 0100134



Title = 0100134


- Safety based on EN 50126 and MIL-STD-882 throughout the entire life cycle of the vehicle, from conception to vehicle operation and maintenance
- Vehicle is designed to the latest fire safety standards and is compliant with NFPA 130 and 49 CFR part 238
- The driver's cab and driver are protected by crash absorption system compliant to the ASME RT-1

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Alstom CITADIS

CITADIS: 100% Designed for availability



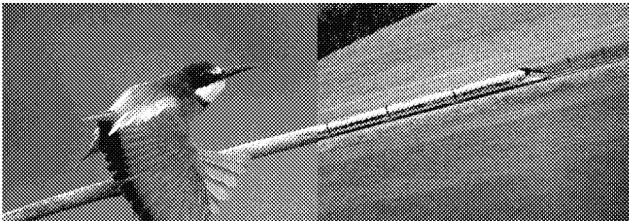
- CITADIS benefits from the Alstom experience as train designer and train maintainer
- State of art on-board monitoring system for remote diagnosis and troubleshooting with TrainTracer™
- Braking equipment, gear-box, traction motor and wheels are directly accessible for inspection and replacement from the side of the train without truck removal
- Side windows are quickly replaced (30 minutes) thanks to our exclusive rapid mounting system

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Alstom CITADIS

CITADIS: 100% Environmentally Friendly



- Vehicle is recyclable at 95%
- Reduced energy consumption:
 - Regenerative braking
 - Single stage gearbox for better efficiency
 - Interior low consumption LED lighting
- Improved urban integration:
 - Aesthetic design enhancing urban landscape
 - Designed to reduce noise level

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OTTAWA LIGHT RAIL TRANSIT PROJECT: TURNEY'S PASTURE TO BLAIR STATION - VEHICLE AD-HOC CCM


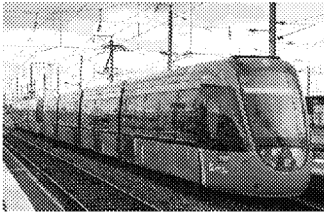


Service Proven Vehicle


a) The proposed OLRT vehicle is the evolution of CITADIS based on:

- Istanbul CITADIS
 - Total order: 37 vehicles
 - 3 sections vehicle
 - Service started in December 2010
 - Total 2 000 000 km

- SNCF Nantes CITADIS
 - Total order: 200 vehicles (frame contract) including 24 trains for Nantes
 - 4 sections vehicle
 - Service started in June 2011
 - Total 200 000 km

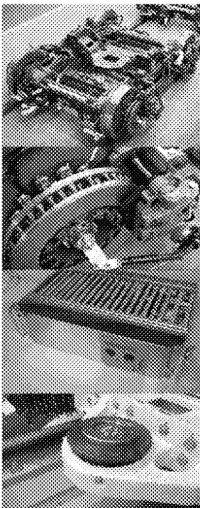
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Service Proven Vehicle

a) All subsystems are service proven on both Istanbul and SNCF CITADIS

- IXEGE Truck
 - Last Citadis truck generation specially designed for high comfort, 100% low floor and 100 kph operation
- Hydraulic braking system
 - Alstom has developed two alternative and interchangeable solutions for the CITADIS family
 - Faiveley system is mounted on Istanbul
 - Knorr system is mounted on SNCF
- ONIX Propulsion system
 - Alstom ONIX IGTB technology + Alstom AGATE control unit is the standard Alstom traction system
 - Equip all CITADIS LRV
- Articulation joint
 - Standard and proven design CITADIS solution is installed on both Istanbul and SNCF CITADIS



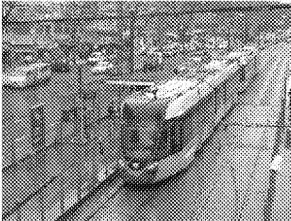

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Service Proven Vehicle

c) With similar revenue service experience

- Istanbul
 - 37 vehicles in service
 - System opened December 2010
 - Operating Speed: 70 km/h
 - Operation in multiple unit of two vehicles
 - 120s minimum headway
 - 19.5 km line
 - 14,000 PPHPD at peak hour
- SNCF Nantes
 - 7 vehicles with 12 months of service
 - Operating Speed: 100 km/h
 - Operation in single and multiple unit
 - Operated as a suburban train
 - 26.5 km line
 - Only Full low floor LRT running at 100km/h

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Service Proven Vehicle

c) With similar revenue service climatic conditions

- Our current LRV solution are proven design to operate in temperate climate down to -25°C
- Use of service proven solutions taken from Alstom experience, expertise (Sweden EMUs, Finland/Russia HST, etc.) and European standard PrEN16251 to design LRT for severe winter conditions → Moscow LRT

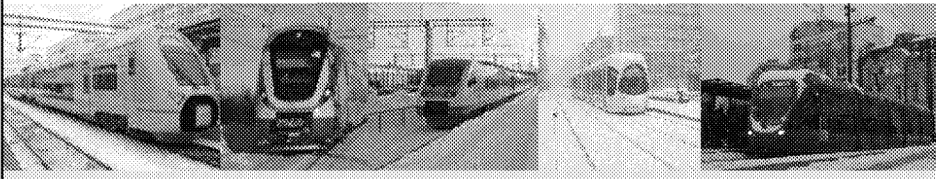



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Service Proven Vehicle

Cold Climate Operations



- Application of service proven solutions for extreme cold weather focused around:
 - Passenger safety and comfort
 - Operational performances
- Solutions are based on:
 - ALSTOM experience on product adaptation for heavy snow and extreme cold conditions (-40°C): X40 train for Sweden, Helsinki-Saint Petersburg HST, Russian Locomotives, Moscow tramway, etc.
 - The future European Norm PrEN16251 - Railway Application – Environmental conditions - design and test of rolling stock under severe conditions

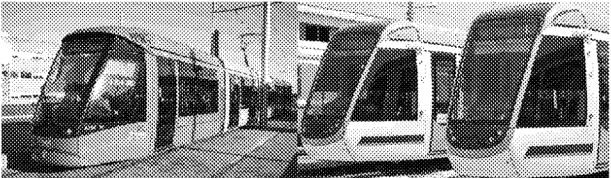

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Service Proven Vehicle

Revenue service in hot climatic conditions

- Alstom has many experience of LRV operation in extreme environmental condition:
 - Tenerife
 - Algiers
 - Tunis
 - Istanbul
 - Jerusalem
 - Dubai

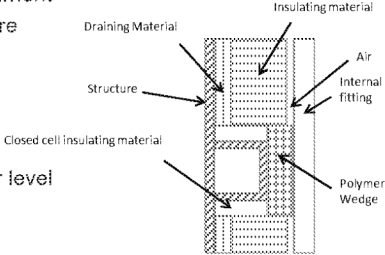
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Service Proven Vehicle

Cold Climate Operations: Passenger safety and comfort

- Provide passenger with a comfortable environment
 - Comfortable and homogeneous temperature
 - No wet or cold surface in train
 - Reduce heating/cooling energy
- Heating the passenger compartment:
 - HVAC unit on each car
 - Conditioned air distributed at roof and floor level
 - Local heated floor and/or heaters
- Prevention of trip hazard:
 - Use of a full-low floor architecture
 - Heating of door thresholds to prevent ice and snow
- Ensure good visibility:
 - Strip heated front window
- Ensure braking performances in slippery conditions
 - Wheel slide protection system
 - Heated sanders and sand-boxes to prevent ice clogging



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OTTAWA LIGHT RAIL TRANSIT PROJECT: TURNER'S PASTURE TO BLAIR STATION VEHICLE AD-HOC CCM




Service Proven Vehicle

Cold Climate Operations: Ensure Vehicle Performance

- Material selection: Materials (oil, grease, rubbers, plastics, etc.) selected to ensure:
 - Performance over time
 - Mechanical and chemical resistance to de-icing agent (glycol, steam, etc.)
 - Resistance against salt used on regular roadways
- Prevent snow accumulation:
 - Use of external panels on roof
 - Air inlets positioned and sized to avoid obstruction by snow
- Protect underframe equipment from snow and ice:
 - Underframe equipment protected by screens, covers and protective coating
 - Snow plough mounted under the cabin

Page 8
OTTAWA LIGHT RAIL TRANSIT PROJECT: TURNER'S PASTURE TO BLAIR STATION VEHICLE AD-HOC CCM




Service Proven Vehicle

Cold Climate Operations: Ensure Vehicle Performance

- Door adapted to Ottawa environment:
 - Door actuator power reinforced to break ice layer forming on doors during freezing rain
 - Use of polymeric gasket
- Ensure good electrical contact:
 - Electrical heated pantograph with ice scrapper
- Ensure proper coupler operation:
 - Coupler head will be heated
 - When stowed, coupler will be protected by a cover
 - Fewer couplers thanks to long train architecture
- Train storage:
 - Train can be stored outside under catenary power. Park heating will maintain acceptable temperature in passenger compartment.

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OTTAWA LIGHT RAIL TRANSIT PROJECT: TURNER'S PASTURE TO BLAIR STATION VEHICLE AD-HOC CCM



Service Proven Vehicle

d) Istanbul CITADIS in service MDBTD performances

- Failures are defined as malfunctions causing Revenue Service delays of 4 minutes or more
- TARGET MDBTD on Ottawa LRT = 50,000 km
- TARGET MDBTD on Istanbul = 130,000 km
- ACHIEVED MDBTD after 14 month = 575,000 km

Month	Ind. AB : I kinf mensuel	Ind. AB : I kinf 3 sliding month	Ind AB : Monthly Target	Expon. (Ind AB : Monthly Target)
M1	0.08	0.05	0.38	0.35
M2	0.05	0.03	0.38	0.35
M3	0.02	0.01	0.38	0.35
M4	0.01	0.00	0.38	0.35
M5	0.05	0.02	0.38	0.35
M6	0.01	0.00	0.38	0.35
M7	0.15	0.08	0.38	0.35
M8	0.02	0.01	0.38	0.35
M9	0.01	0.00	0.38	0.35
M10	0.01	0.00	0.38	0.35
M11	0.01	0.00	0.38	0.35
M12	0.01	0.00	0.38	0.35
M13	0.01	0.00	0.38	0.35
M14	0.01	0.00	0.38	0.35

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OTTAWA LIGHT RAIL TRANSIT PROJECT: TURNER'S PASTURE TO BLAIR STATION VEHICLE AD-HOC CCM

RT Service Proven Vehicle

Customer Satisfaction

PRAYS DE LA LOIRE

ALSTOM

23000 Deschamps
Boulevard
Tours - France
37000 Tours
02 47 88 12 00

Mr. Jean-Louis
Maire de Blazay

During the development phase of this Tram-train « CITADIS DUALIS », ALSTOM Transport has been a serious and solid partner in integrating this new rolling-stock in its environment and in putting in evidence the communication between the Region and its citizens. I wanted through this letter to thank ALSTOM in the name of the Pays de Loire Region.

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RT Service Proven Vehicle

Customer Satisfaction

ALSTOM


ALSTOM

23000 Deschamps
Boulevard
Tours - France
37000 Tours
02 47 88 12 00

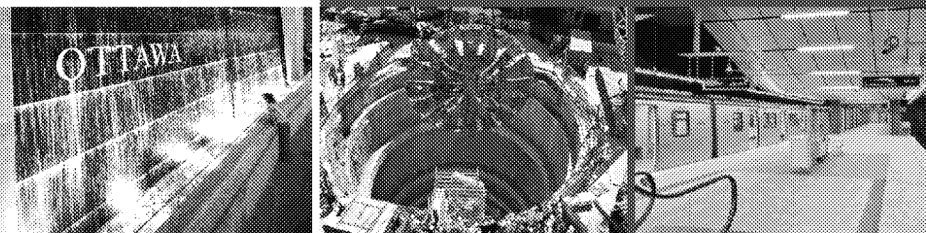
Mr. Jean-Louis
Maire de Blazay

We hereby would like to express our satisfaction with the operation performance and availability of the tram cars as well as our appreciation for the modularity offered by the Citadis range combining tradition and modernity through customized design in line with the image of our city.

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OTTAWA



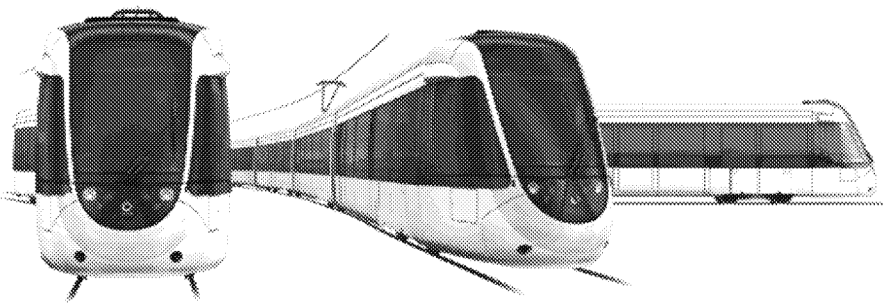
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VEHICLE DESIGN




Vehicle Design

CITADIS for the City of Ottawa: Best in Class



100% low floor – 100 km/h

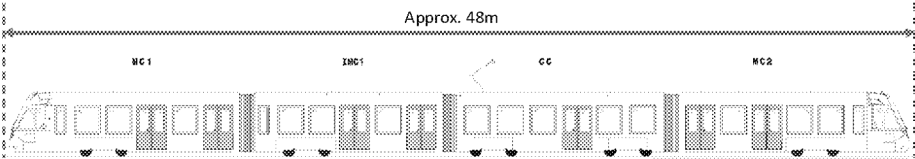
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Vehicle Design

CITADIS for the City of Ottawa: Operating Scenarios

Approx. 48m




- Motorized axle
- Un-motorized axle

Capacity:
 Seats : 122
 Capacity @ 3.33 pass/m²: 290

Operating Scenario	Capacity (pphpd)	Headway (s) ¹	Train Quantity	Vehicle Quantity ²
Opening Year	10,700	195	15	30
Scenario 1	11,360	184	16	32
Scenario 2	18,040	115	25	50
Scenario 3	24,000	97	30	60

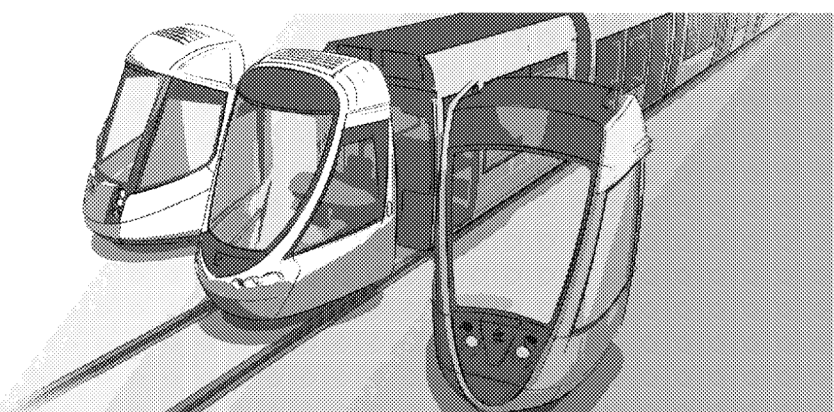
¹ Based on two vehicle consist
² Does not take into account spare vehicles for maintenance

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OTTAWA LIGHT RAIL TRANSIT PROJECT: TURNER'S PASTURE TO BLAIR STATION
VEHICLE AD-HOC CCM




Vehicle Design

CITADIS for the City of Ottawa: Design & Styling



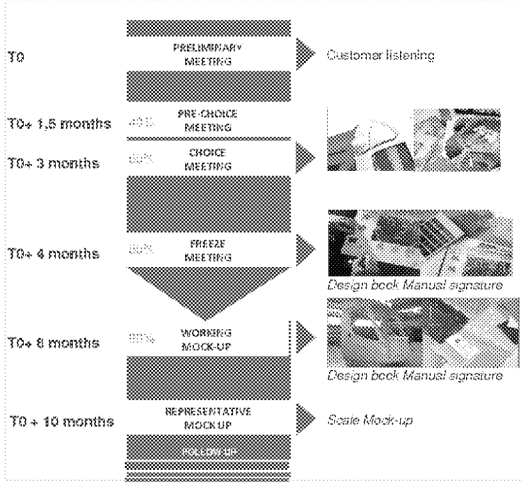
Front end is the City's identity

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OTTAWA LIGHT RAIL TRANSIT PROJECT: TURNER'S PASTURE TO BLAIR STATION
VEHICLE AD-HOC CCM





Vehicle Design


CITADIS for the City of Ottawa: Design & Styling

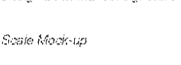



TO PRELIMINARY MEETING → Customer listening

TO+ 1,5 months PRE-CHOICE MEETING → 

TO+ 3 months CHOICE MEETING → 

TO+ 4 months FREEZE MEETING → 
Design book Manual signature


TO+ 8 months WORKING MOCK-UP → 
Design book Manual signature

TO+ 10 months REPRESENTATIVE MOCK-UP → 
Scale Mock-up

Collaborative Design process

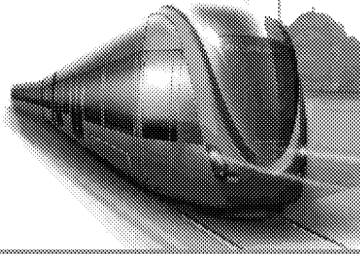
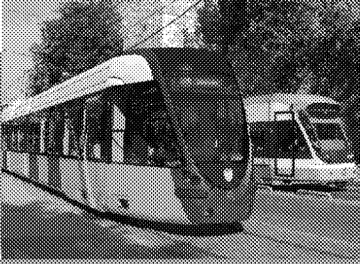
1. Design, step-by-step
2. Round-the-clock dialogue
3. A committed team
4. A proven methodology
5. Feasibility
6. Design Manual

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OTTAWA LIGHT RAIL TRANSIT PROJECT: TURNER'S PASTURE TO BLAIR STATION - VEHICLE AD-HOC CCM



Vehicle Design

CITADIS for the City of Ottawa: Design & Styling example: Istanbul

- Theme: Tulip
- Alstom in-house design
- Customer corporate identity for rolling stock



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OTTAWA LIGHT RAIL TRANSIT PROJECT: TURNER'S PASTURE TO BLAIR STATION - VEHICLE AD-HOC CCM

 **Vehicle Design**

CITADIS for the City of Ottawa: Design & Styling example: Dubai



- Theme: Diamond
- Alstom in-house design



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 **Vehicle Design**

CITADIS for the City of Ottawa: Design & Styling example: Reims



- Theme: champagne glass
- Customer Art direction: Ruedi Baur
- In collaboration civil work architects



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Vehicle Design

CITADIS for the City of Ottawa: Design & Styling real size mock-up







- Accurate model of the future vehicle : front-end cab design - colors and trimmings inside
- Mock-up can be done for a single element, such as the seats
- Essential tool for communicating the project to a host community

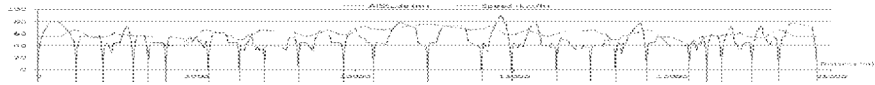


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OTTAWA LIGHT RAIL TRANSIT PROJECT: TURNEY'S PASTURE TO BLAIR STATION - VEHICLE AD-HOC CCM



Preliminary Design Drawings

CITADIS for the City of Ottawa: Performances




	Total Trip Time* <small>Turney's pasture - Blair</small>	Total Trip Time* <small>Blair - Turney's pasture</small>	Traction Energy consumption
All-Out	21 min 05 sec	20 min 51 sec	101kWh
5% Coasting	22 min 05 sec	21 min 44 sec	84kWh

*: including dwell time

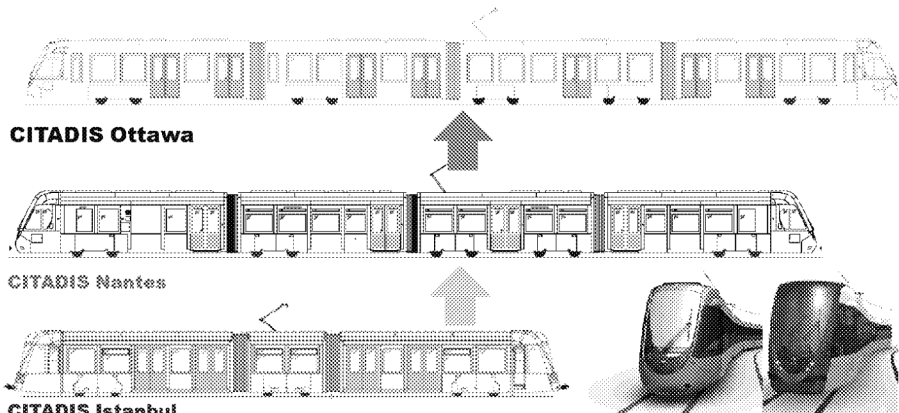
NOTE: Proposed vehicle achieves total trip time requirement with a maximum service acceleration of 1,19m/s² and service braking of 1,18m/s² in AW2.

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OTTAWA LIGHT RAIL TRANSIT PROJECT: TURNEY'S PASTURE TO BLAIR STATION - VEHICLE AD-HOC CCM

 **Preliminary Design Drawings**

The proposed OLRT vehicle

- The City of Ottawa LRT will be a evolution of SNCF Nantes Citadis to fulfil OLRT ridership expectation




CITADIS Ottawa

CITADIS Nantes

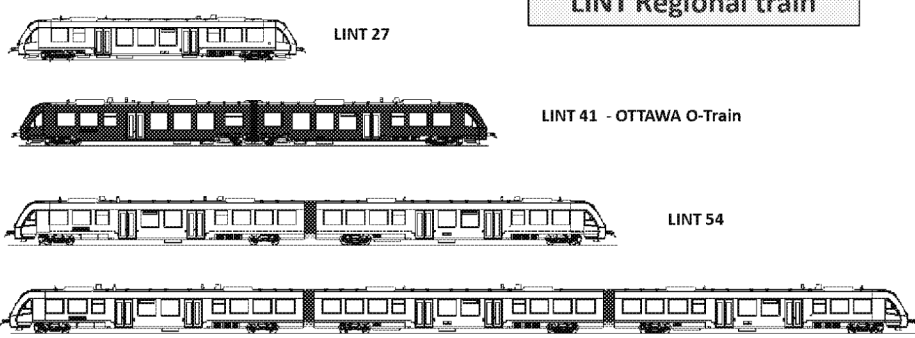
CITADIS Istanbul

Page 33 OTTAWA LIGHT RAIL TRANSIT PROJECT: TURNKEY'S PASTURE TO BLAIR STATION VEHICLE AD-HOC.COM

 **Preliminary Design Drawings**

The proposed OLRT vehicle:

- ALSTOM is experienced with modular product design including carshell adjustment:



LINT Regional train

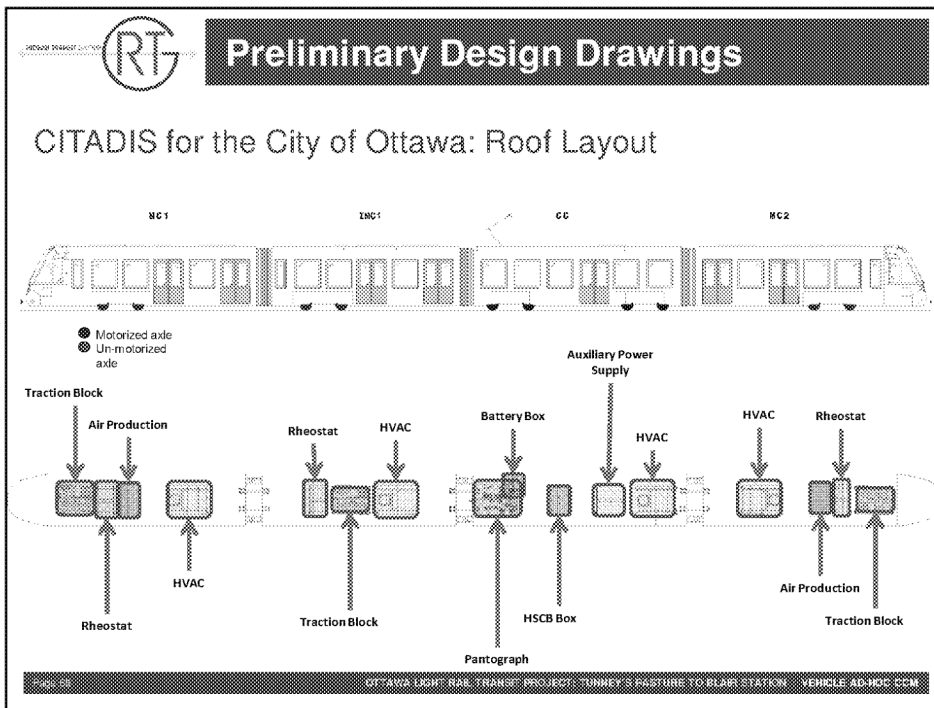
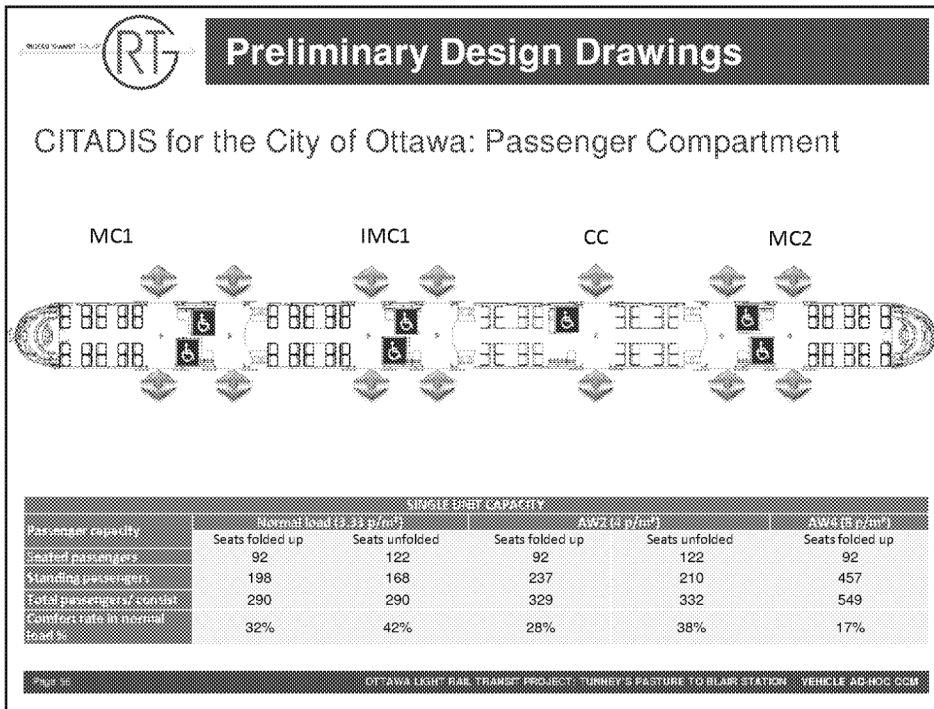
LINT 27

LINT 41 - OTTAWA O-Train

LINT 54

LINT 81

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RT **Canadian Content**

ALSTOM : 70 years presence and more than 2000 employees in Canada

ALSTOM Holding ALSTOM Power ALSTOM Grid ALSTOM Transport

ALBERTA
Edmonton
Electrical
Control
Telecommunications
Automation
Automation

BRITISH COLUMBIA
Vancouver
Victoria
Telecommunications
Automation


ONTARIO
Ottawa
Canadian Head Office
Engineering, Telecommunications
Automation
Production Services
Automation, S&M

QUEBEC
Montreal
Vancouver
Edmonton
Ottawa
Toronto
Winnipeg
Halifax
Charlottetown

EAST COAST
St. John's
Halifax
Charlottetown

Whitehorse Yellowknife Inuvik
Edmonton Regina Winnipeg
Ottawa Toronto Fredericton Halifax
Quebec St. John's Charlottetown

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Canadian Content

More than 25% local content

PROJECT SUB-DIVISION ITEMS	Items / Total proposal price (%)	Part localized in CAD (%)	Local Content (% proposal price)
Labour	8%	85%	6.8%
Sub-components and components	64%	20%	12.8%
Project management	6%	25%	1.5%
Engineering	14%	5%	0.7%
Manual	1%	0%	0.0%
Special tools	1%	0%	0.0%
Test equipment	2%	75%	1.5%
Freights	1%	100%	1.0%
Warranty	3%	100%	3.0%
TOTAL	100%		27.3%

- Project core team based in Ottawa
- Strong Canadian supply base
- Final assembly done in a Canadian facility in Ottawa's area
- Warranty and reliability growth phase ensured locally by Canadian engineers and workers

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OTTAWA LIGHT RAIL TRANSIT PROJECT: TURNER'S PASTURE TO BLAIR STATION VEHICLE AD-HOC CCM



Canadian Content

Sourcing: Most of Alstom's usual suppliers located in Canada













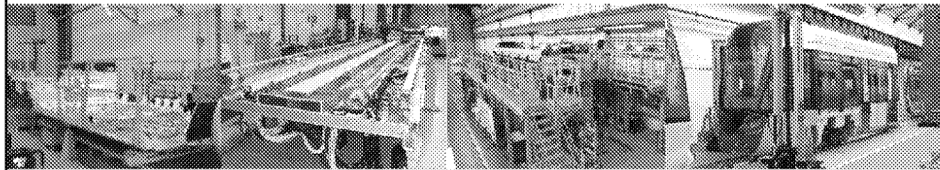




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OTTAWA LIGHT RAIL TRANSIT PROJECT: TURNER'S PASTURE TO BLAIR STATION VEHICLE AD-HOC CCM

RT Canadian Content

Manufacturing facility in Ontario: CITADIS modular product allows local assembly



Assembly of prefabricated modules

```

    graph LR
      ROOF --> A[Assembly, Fitting, Wire to Wire test]
      SIDES --> A
      CABIN --> A
      U_FRAME --> A
      A --> B[Coupling & Final fitting]
      B --> C[Water & Static Test]
      C --> D[Dynamic test Final Inspection]
  
```

No welding and no painting at final assembly site


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RT Canadian Content

Manufacturing facility in the Ottawa area

- Project core team based in Ottawa
- Main assembly:
 - Research in progress for 4,000 m² + additional area for warehouse
 - Focus on Ottawa or Ontario possibilities
 - Integrate optimized layout as per existing workshops
 - Adaptation to be made upon available premises
- Static Test:
 - Research in progress for a 2,500 m² facility to perform:
 - Watertightness tests
 - Functional Static test
- Dynamic tests:
 - We propose to use a 1,200 m section of the actual Ottawa track

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Canadian Content

Hiring plan and skills development

- To run the manufacturing premises, about **100 people** will be needed:
 - 80% workers
 - 20% management
- Most people will be hired from Ontario area and can be transferred to maintenance activity on conclusion of manufacturing activities
- In addition, hiring plan will consider other workforces:
 - Project management team
 - Local engineering team

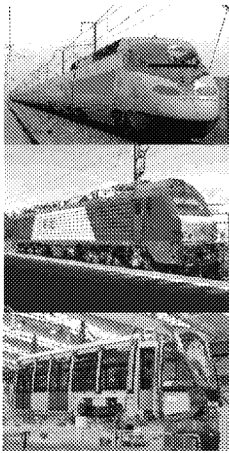
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OTTAWA LIGHT RAIL TRANSIT PROJECT: TURNER'S PASTURE TO BLAIR STATION
VEHICLE AD-HOC CCM



Canadian Content

More than 20 years of successful technology transfers

- 34 Korea - KTX (Korean High Speed Train)
 - Full transfer from France to Korean partners
- 500 China CoCo Electric locomotives
 - Full transfer from France to Chinese partners
- Montreal Metro (Bogies)
 - Transfer from Alstom Le Creusot to Alstom Sorel Tracy (Quebec)
- 70 Madrid LRV
 - Transfer from La Rochelle (France) to Barcelona(Spain)
- 37 Istanbul LRV
 - Transfer from Valenciennes (France) to Katowice (Poland)
- 20 Acela Express trains
 - Traction cubicle: Transfer from Tarbes (France) to Hornell (USA)
 - Trucks: Transfer from Le Creusot (France) to Bombardier (USA)





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VEHICLE AD-HOC CCM

RT **Canadian Content**

Technology Transfer Principles

1 Vehicle assembled in Valenciennes site (LRV centre of excellence) to


- Validate design and performance
- Validate industrial process and tools
- Prepare Documentation

↓

Transfer of Technology

- Preparation of Ontario plant
- Tools installation
- Training





Serial Vehicle assembled in Ontario

- Assistance on first serial vehicles


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RT

6

AODA/ADA



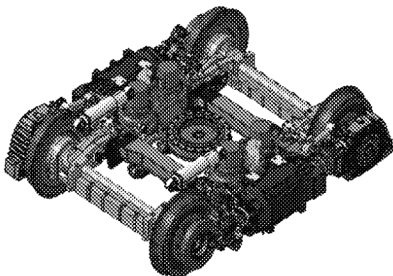
Design for AODA and ADA

Pneumatic suspension to ensure load levelling and comfort


- Leveling valve to ensure boarding level within 355mm +/- 16mm between AW0 and AW3 according to ADA / AODA
- Extensive experience on pneumatic load leveling on all type of Rolling Stocks (subway, suburban, regional, high-speed train, etc.)
- Service proven solutions and subsystems in very cold environment (X40, X60, Helsinki-St Petersburg high speed tilting train)

International passenger comfort standard compliance

- ISO 2631 associated with UIC 513: Measurements will be performed as per UIC 518
- ISO2631-1985: Evaluation of Reduced Comfort Boundary for urban application



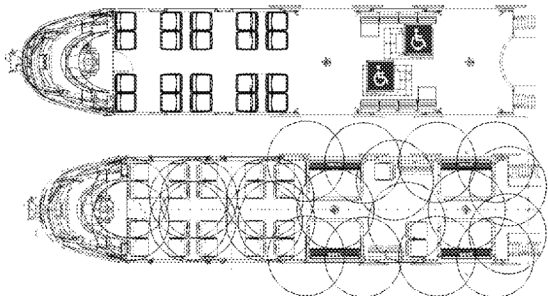
Page 27
OTTAWA LIGHT RAIL TRANSIT PROJECT: TURNEY'S PASTURE TO BLAIR STATION VEHICLE AD-HOC CCM

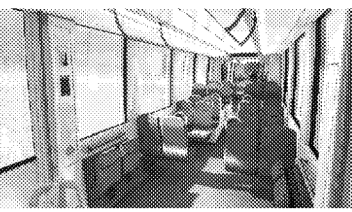
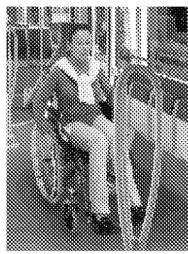


Design for AODA and ADA

Train Access and Interior Design

- Wheelchair area at each doorway according to ADA/AODA requirements
- Handrails for standing passengers according to ADA/AODA & TSI requirements



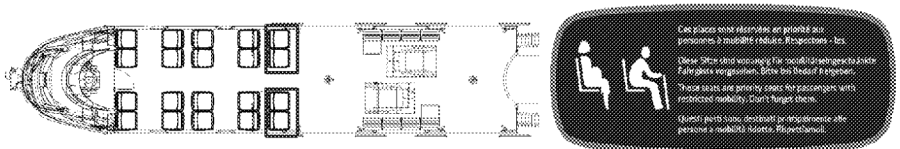



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OTTAWA LIGHT RAIL TRANSIT PROJECT: TURNEY'S PASTURE TO BLAIR STATION VEHICLE AD-HOC CCM

RT Design for AODA and ADA

Signage and Priority Seating

- Doors supplied with audio and visual warning signals in order to alert passengers when the doors are closing
- Each vehicle contains priority seats located close to access doors and identified by explicit signs





The diagram shows a side profile of a light rail vehicle with several doors marked. A callout box on the right contains the following text:


Die plaats voor de stoelen is gereserveerd voor personen met beperkte mobiliteit. Bijgevoegd - 103.
 Diese Sitze sind reserviert für behinderte Passagiere. Folgende vermerken. Bitte bei Bedarf 3 reservieren.
 These seats are priority seats for passengers with reduced mobility. Don't forget them.
 Questi posti sono riservati per persone a mobilità ridotta. Riservatissimi.

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RT


7 INTEGRATION WITH CBTC



 **Train Control Integration**

Train Control Equipment integration

- Alstom has extensive experience integrating train control systems from different suppliers to meet customer specific requirement
- Alstom has already installed Thales CBTC systems on many past contracts (LUL Jubilee line, Shanghai L6/L7, etc)
- Based on received information and our positive past experiences with Thales, we will be able to integrate the Thales CBTC system successfully on the Ottawa LRT

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8 **DISCUSSION**

 <p>OTTAWA</p>	
	
<p>9</p>	<p>CLOSING</p>

 <p>OTTAWA</p>	
	
<p>THANK YOU</p>	<p>THANK YOU</p>