Ontario

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and

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Intelligent Transportation Systems
Ministry of Transportation Ontario

Context of Change

Vision Zero

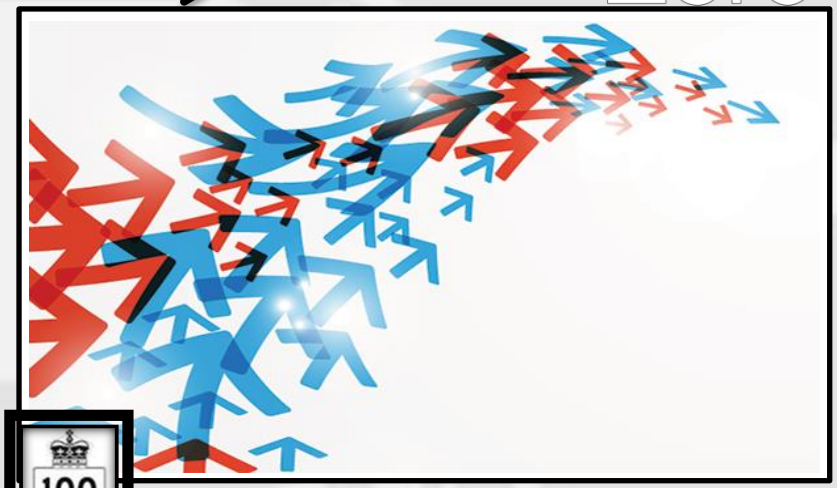
Automated Vehicles

Monitoring by sensors
Control by algorithms
Navigation by maps

Connected Vehicles

Connectivity to improve:

safety, mobility and the environment



Today

Smart Cities

Data Connectivity

Disruption

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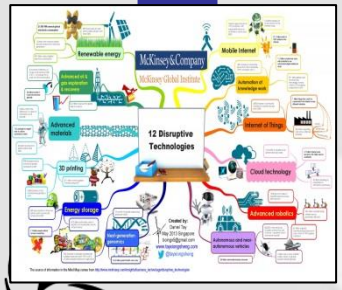

ITS in the Context of Change

Vision Zero

Automated Vehicles

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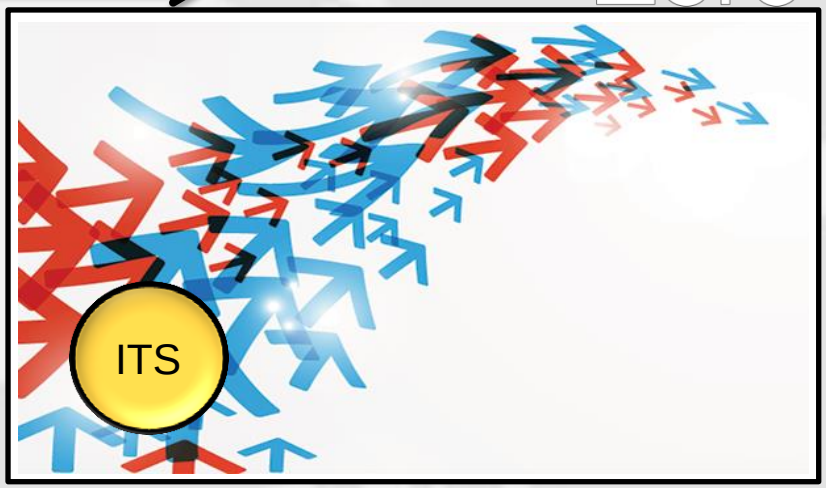

Today

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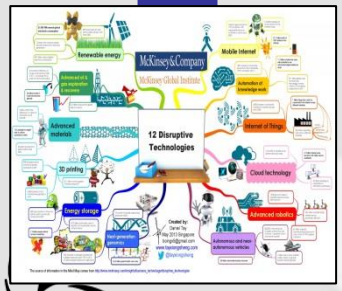

INTELLIGENT TRANSPORTATION SYSTEMS

ITS Service Bundles

ITS Service Bundles		
	1	Travel Times
	2	Digital Traffic Metering
	3	Advanced Traveller Information
	4	Lane Closure Management
	5	Traffic Signal Control
	6	Dynamic Lane Management
	7	Queue Warning
	8	Operating System
	9	Interagency Traffic Management Coordination
	10	Traffic Incident Management
	11	Emissions Monitoring and Management
	12	Emergency Management Coordination
	13	Roadwork Monitoring
	14	Multi-Modal Coordination
	15	Performance Metrics Data Mart

Sensing Tools											Messaging Tools					Control Tools		
CCTV Cameras	UAV Cameras	Detection Cameras	Radar Sensors	Bluetooth Sensors	Probe Vehicle Data	Road Weather Sensors	Emissions Radar Sensors	Transit Data	Emergency Services Data	3rd Party Data	Variable Messaging	Website	MTO Open Data	Phone - 511	Traveller Apps	Automated Swing Gates	Timing Modifications Arterial Signal	Lane Control Signal
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Systems																
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Travel Time System	Queue Warning System	Adaptive Ramp Metering System	Smart Phone App Interface	Advanced Traveller Information System	Active Traffic Management System	Signal Modification	Dynamic Messaging System	Video Management System	Centre-to-Centre Integration	Decision Support Tool	Predictive Analysis	Incident Management System	CAD Interface	Roadwork Monitoring System	Data Integration	
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ITS Service Bundles - Examples

1. Travel Times

- Travel times (or delays) utilize travel time data collection to estimate the time it takes for vehicles to travel between points of interest, and then displays that travel time information to travelers.

2. Electronic Road Metering

- Electronic Road Metering applies transportation demand management principles by communicating information and incentives to road users (through an app), moderating or redirecting their flow onto the road network.

3. Advanced Traveler Info

- provides tailored information in response to a traveler's specific context. This can take the shape of either real-time interactive request/responses or publishing of tailored streams of information to travelers based on submitted profiles. Travelers can obtain current information regarding traffic conditions, roadway maintenance and construction, transit services, ride share/ride match, parking management, detours and pricing information.

11. Emissions Monitoring and Management

- Emissions Monitoring and Management monitors either area wide air quality or point emissions. Summary emissions information or warnings can be displayed to motorists, and the gathered information can be used to implement environmental programs, policies, and regulations.

13. Roadwork Monitoring

- Roadwork Monitoring facilitates knowledge of current and planned roadwork to enable oversight of road work activities. The service enhances agencies' transportation management capabilities in and around work zones by monitoring construction zone ITS technologies and enabling work zone management strategies.

ITS Customer Driven Projects

1. Queue end warning
2. Median mounted sign (TC 64)
3. Temporary construction zone ITS smart zone (camera, travel times, etc.)
4. Google Glass applications (safety study, asset management)
5. HOT Lanes
6. LTE communications, devices, system, predictive algorithms
7. Non intrusive sensors for pavement detection
8. Video analytics – incident detection
9. Commercial Vehicle Eco Drive – Ottawa & Transport Canada
10. Weather advisory system – 401 Northumberland
11. Environmental Office – Hwy 26 (deer, turtles, etc.)
12. University research projects (York, Guelph, Western, Waterloo)
13. Ontario Centers of Excellence – Connected Vehicle
14. Multi Ministry Connected Vehicle Working Group
15. Partnerships development - municipal, New York, Michigan, MoH, etc.
16. Transport Canada Smart Corridors

Ontario Centres of Excellence - Research Fund

- Ontario Centres of Excellence Connected/Automated Vehicle Program (To-Date Total $2.95M)
  - To advance and commercialize Ontario technologies in the CVAV space
  - Encourages businesses to collaborate with each other and academic institutions to develop and commercialize innovations in connected and autonomous vehicle technologies.
- Phase 1 ($0.95M funded by MTO) launched in early 2014
  - Leveraged $2.9M in investment and funded 15 projects in areas such as 3D camera sensors, fleet sharing software solution, adaptive cruise control, audio alerts, V2V communications and context aware traveler information.
- Phase 2 ($2.00M funded 50/50 by MTO and MEDG) launched in 2015
  - Has generated 16 proposals seeking contributions up to $50k and 14 submissions seeking contributions up to $250k
  - Nearly a 3:1 in matching funds and in-kind contributions from applicants

News Release

Automated Vehicles Coming to Ontario Roads

University of Waterloo, Erwin Hymer Group, BlackBerry QNX First to Test New Technology

November 28, 2016 9:30 A.M. | Ministry of Transportation

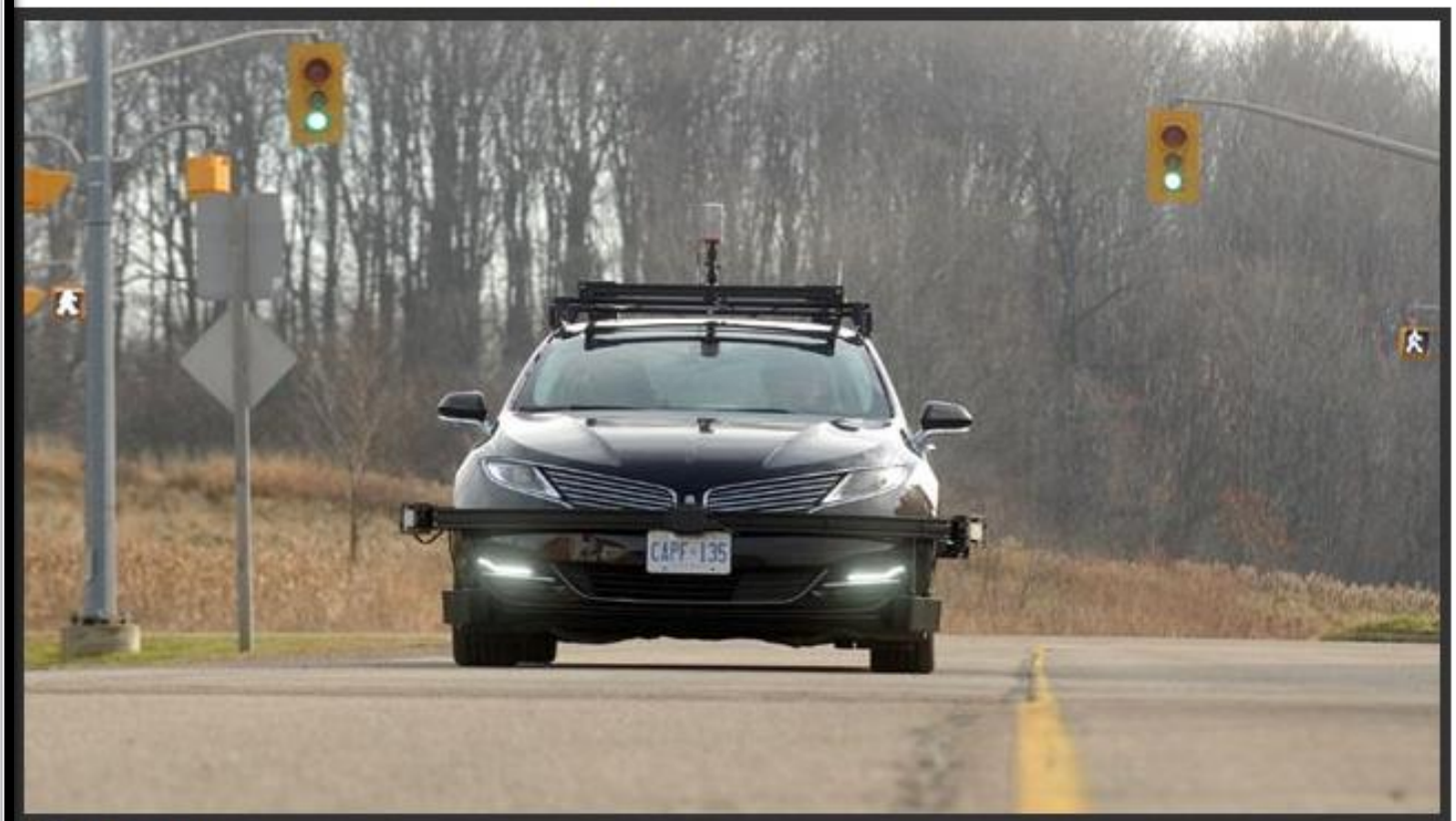
Ontario is supporting innovation in the transportation sector by launching the first automated vehicle (AV) pilot program in Canada, led by The University of Waterloo, the Erwin Hymer Group and BlackBerry QNX.

Automated vehicles are driverless or self-driving vehicles capable of detecting and navigating the surrounding environment, and have the potential to help improve road safety and fuel efficiency, as well as reduce traffic congestion and greenhouse gas emissions. The pilot brings together a range of expertise from the research, manufacturing and technology sectors to advance innovation and capability in Ontario's AV sector. The participants include:

- **The WATCar Project at the University of Waterloo's Centre for Automotive Research**, which will monitor a Lincoln MKZ for performance and test it on-road at different levels of automation
- **The Erwin Hymer Group**, an international auto manufacturer active in the Kitchener-Waterloo tech and innovation corridor, which will test and monitor a Mercedes-Benz Sprinter Van at different levels of automation
- **BlackBerry QNX**, a Canadian global software development leader, which will test a 2017 Lincoln with automated features.

Nov 28, 2016 | Vote 0 20

UW's Autonomoose hits the road — no hands on wheel, no foot on the gas



Autonomoose

David Bebee,Record Staff

Ontario Transportation Minister Steven Del Duca takes a test drive in the Autonomoose, a self-driving vehicle outfitted with autonomous technology developed by the University of Waterloo.

1/2

Waterloo Region Record

By Terry Pender

Highway 26: MTO ITS Pilot to Production Project

Overview of Highway 26 Project

Ontario

Mitigation Measures: Exit Ramps

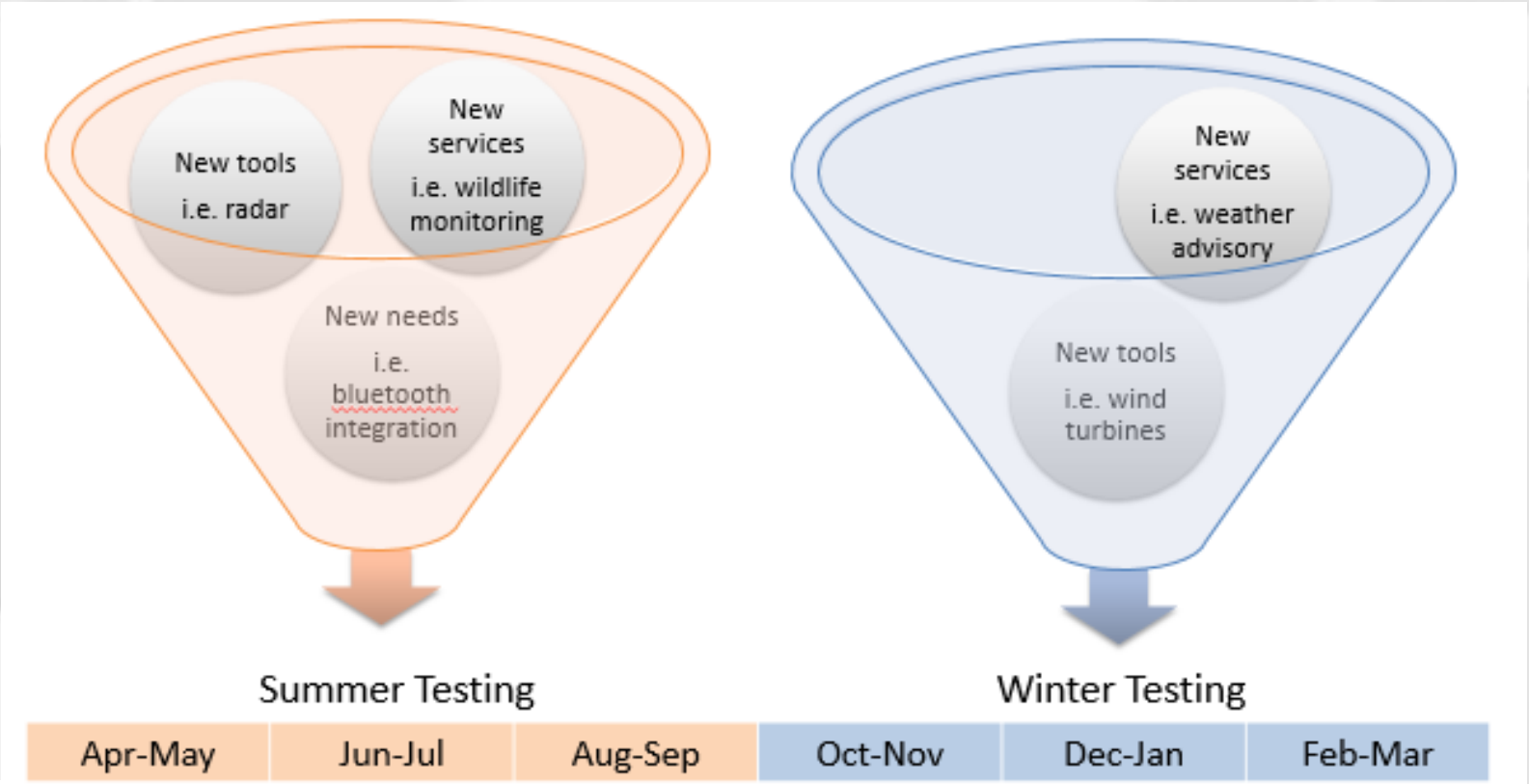
Ontario

Mitigation Measures: Deer Fence

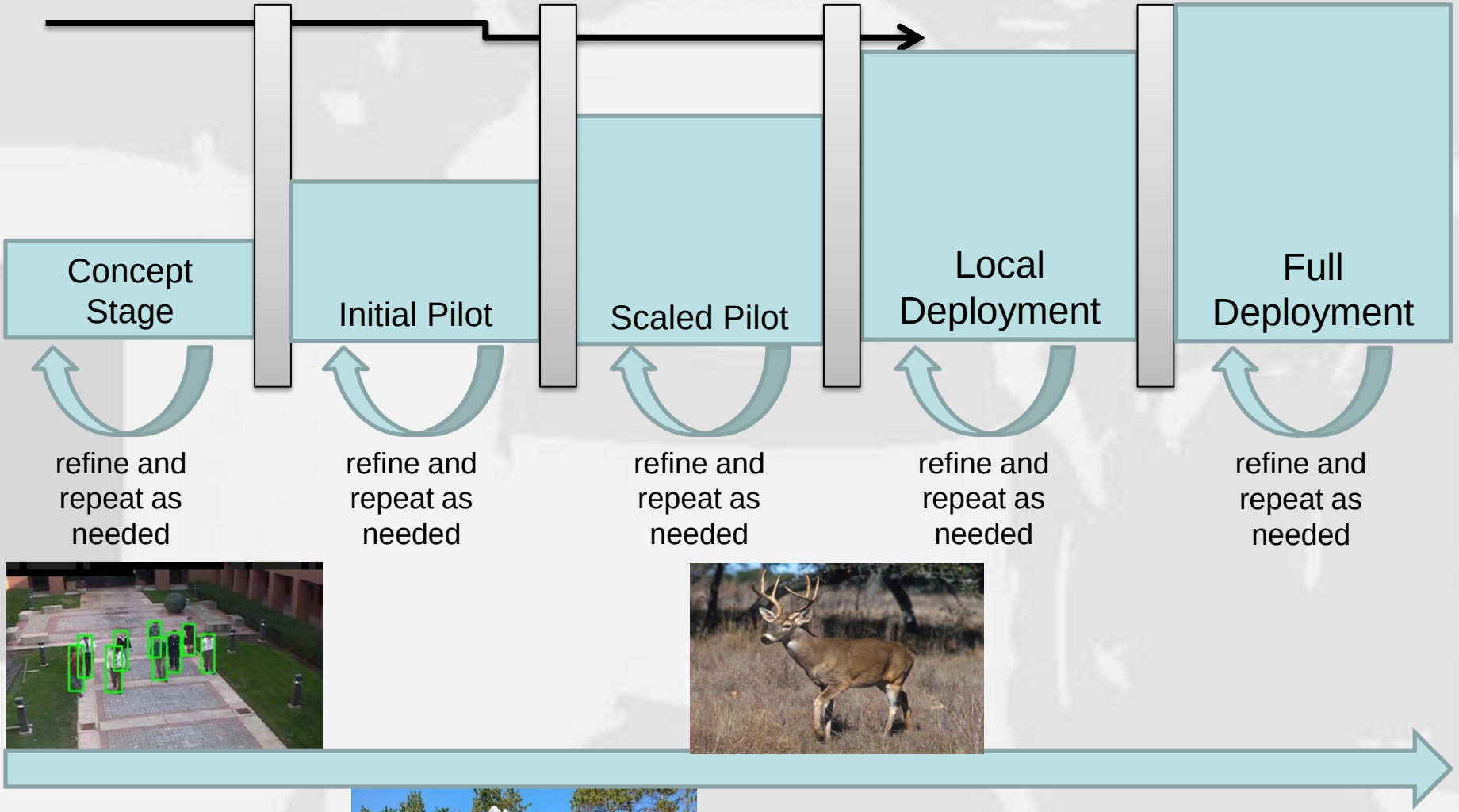
Methodical Approach

Pilot to Production Approaches

Methodical Approach



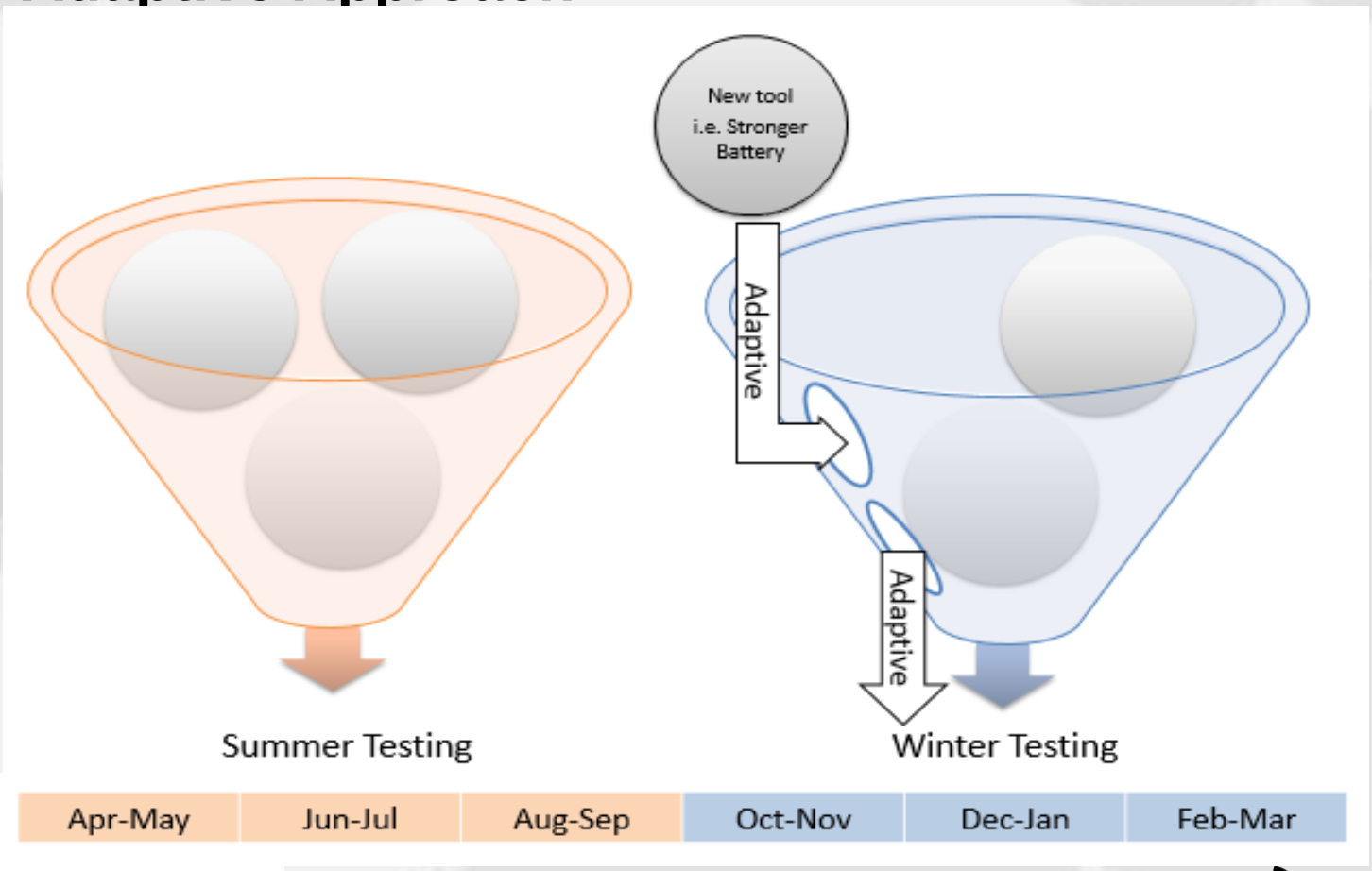
Steps to Full Implementation



Adaptive Approach

Pilot to Production Approaches

Adaptive Approach



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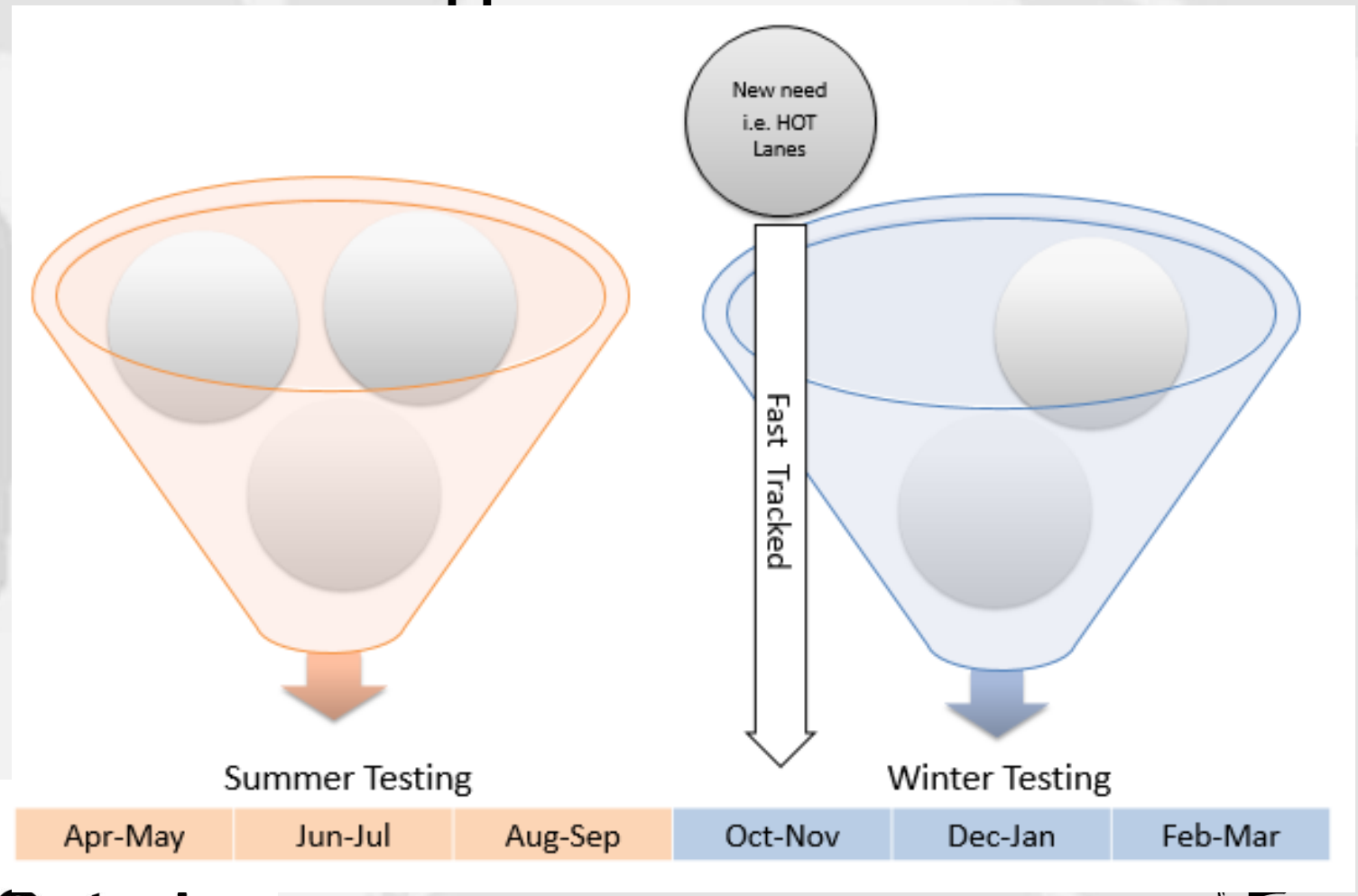
Fast-Tracked Approach

Pilot to Production Approaches

Fast Tracked Approach



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Example - New * Median Mounted VMS

Initial Research phase

Concept Stage

Review

Initial Pilot

Review

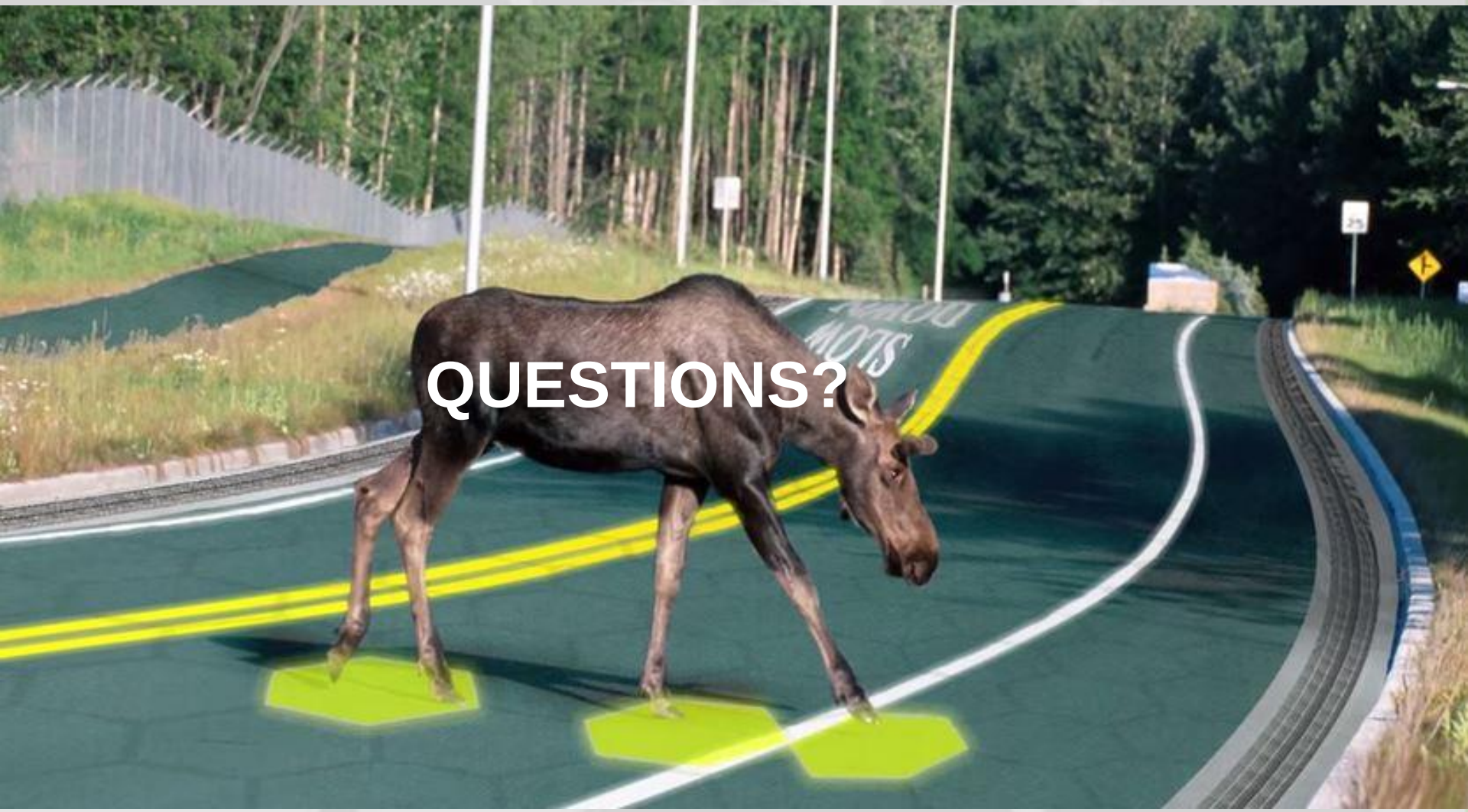
Scaled Pilot

Review

Local Deployment

Review

Full Deployment


QUESTIONS?