TRAINFO

Improving Road Safety and Public Health with Real-Time and Predictive Train Crossing Information

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TRAINFO Corp.

We believe in a world with

seamless mobility

and

no railway crossing fatalities

“Why can’t anyone tell me when a railway crossing is blocked?”

TRB
TRANSPORTATION RESEARCH BOARD
OF THE NATIONAL ACADEMIES

Best Application of a New Data Source

"Recognized as providing an
innovative, practical, broadly applicable solution
that addresses a critical data gap"

Presentation Content

- How TRAINFO works
- Road Safety Research
  - Vehicle-to-Level Crossing (V2LX) – National Research Council
  - Emergency Response – Natural Science & Engineering Research Council
  - Hybrid Safety Warning Systems (HSWS) – Transport Canada
- Conclusion

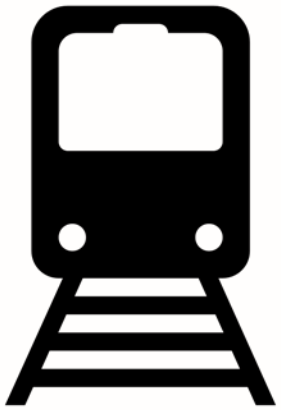
How TRAINFO works

Detect, analyze, share

Analyze

Patented, machine learning algorithms

Detect



Proprietary trackside sensors

<2 seconds

Share

Smartphone, web map, database, TMC

Road Safety Research

V2LX | Emergency Response | Hybrid Safety Warning Systems

Vehicle-to-Level Crossing (V2LX)

Research with National Research Council of Canada (NRC)

Purpose

- Communicate between level crossing and vehicles

Objectives

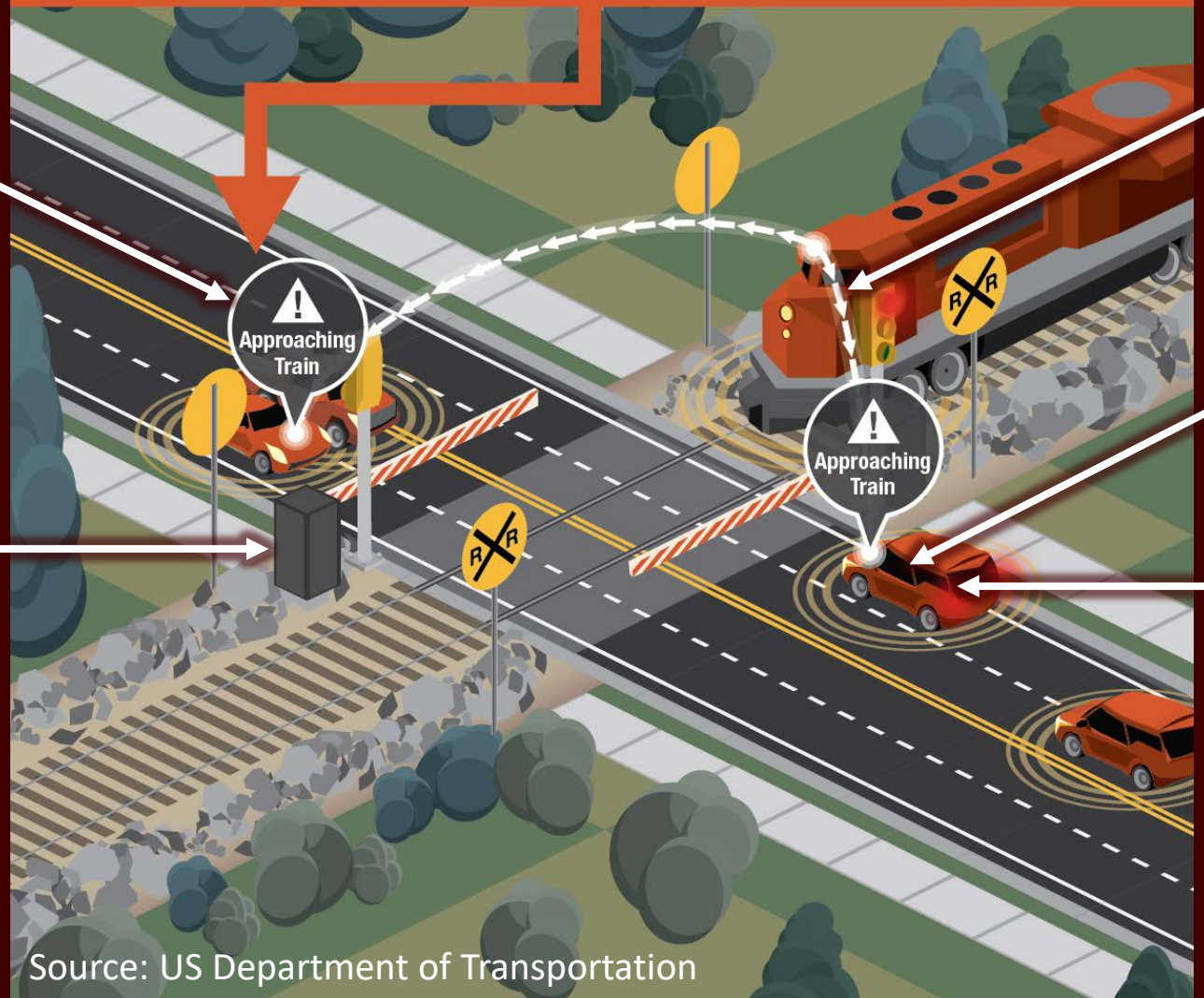
- Design & develop on-board unit (OBU) and roadside unit (RSU) prototype
- Demonstrate vehicle-to-infrastructure (RSU-to-OBU) communication (DSRC)
- Ensure interoperability with vehicle CAN Bus
- Develop Basic Safety Message (BSM)
- Conduct lab and field tests, participate in Plugfest

Status

- Prototype complete, basic lab and field tests conducted
- Planning stage for BSM development and Plugfest participation

Connected Vehicle Safety for Rail

Warns drivers if there is a train approaching and if there is a potential risk of collision, as well as provides drivers with information on the estimated amount of time until the train clears the intersection



Source: US Department of Transportation

BSM

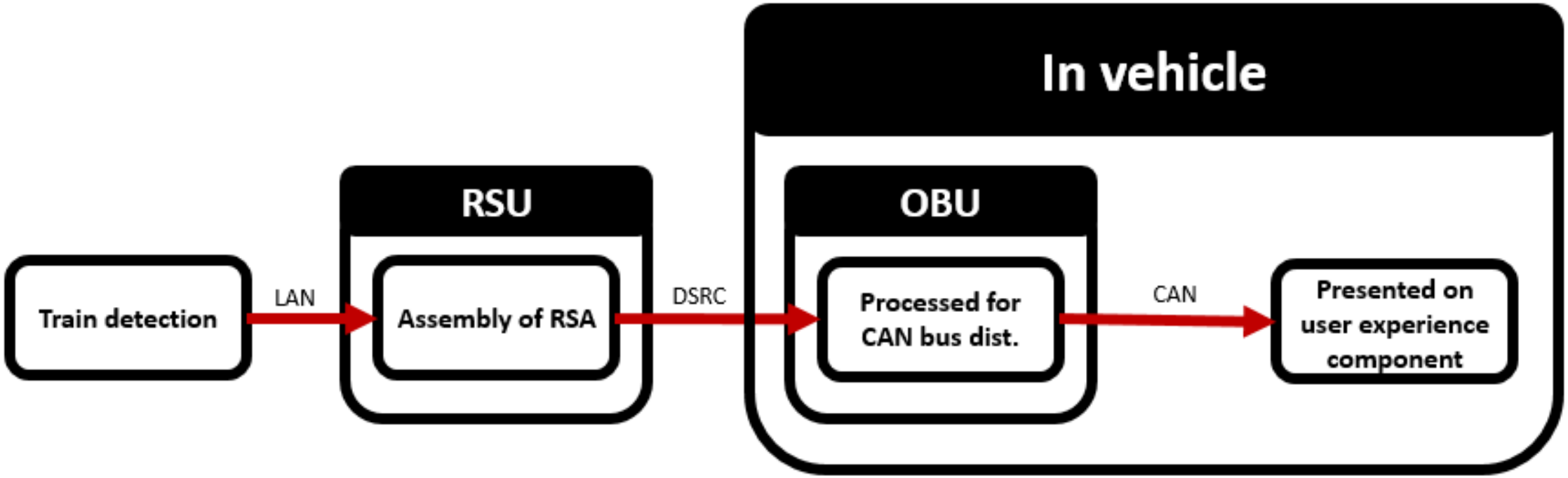
RSU

DSRC

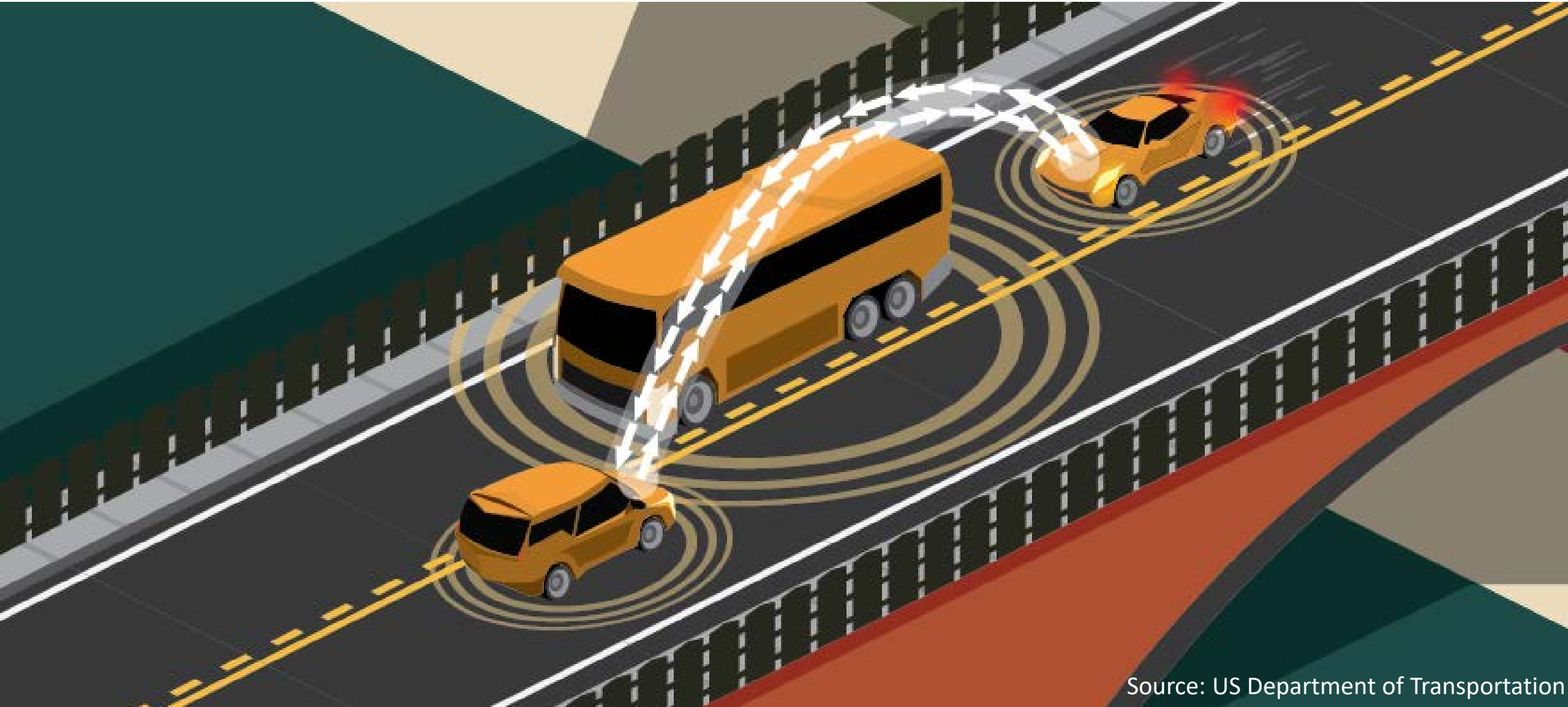
OBU

CAN Bus

On-board unit (OBU) and roadside unit (RSU)



Dedicated short-range communication (DSRC)



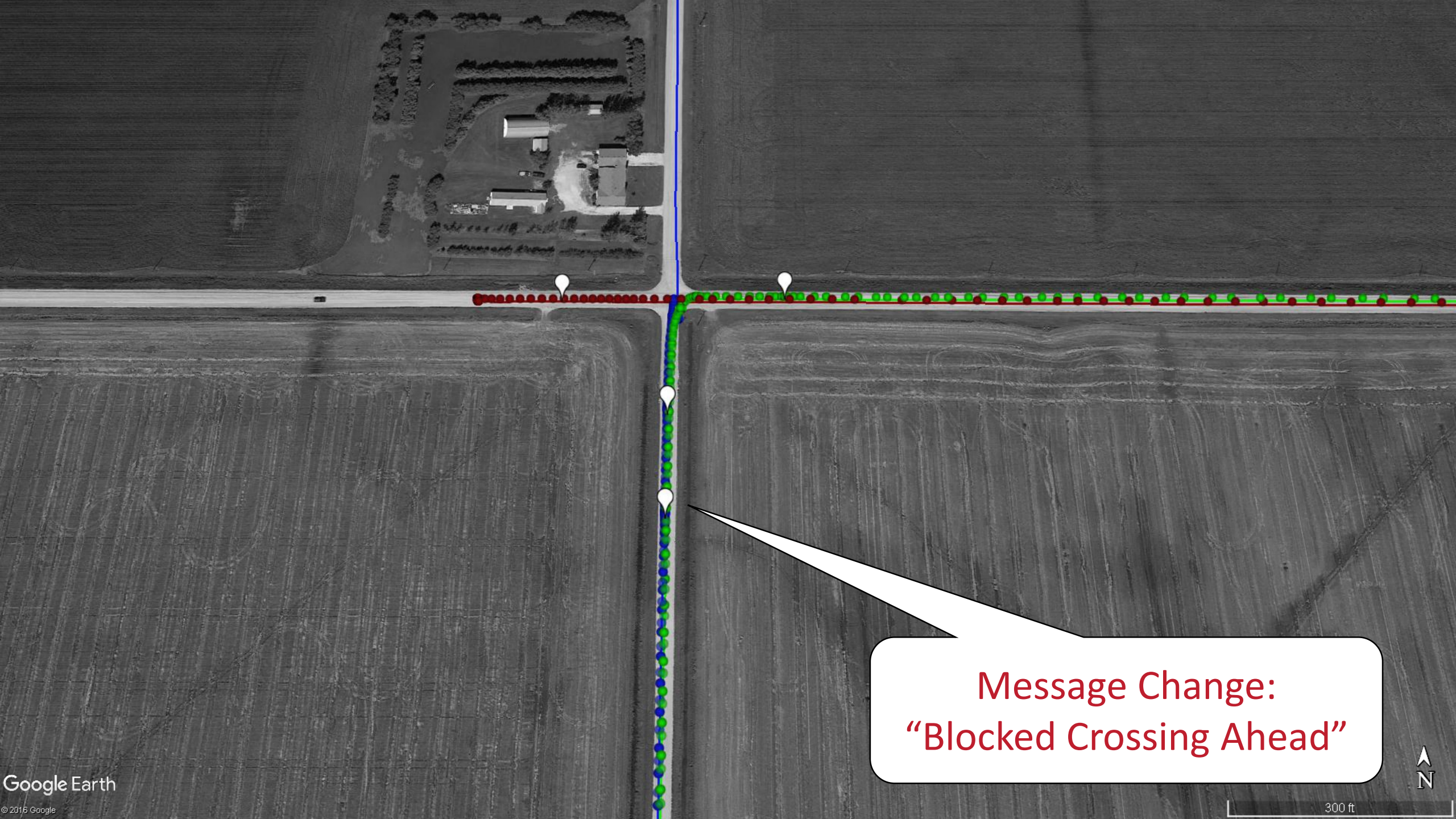
Source: US Department of Transportation

Basic safety message (BSM)

- Critical communication between vehicles and surroundings
- 10 communications per second
- Ensures vehicles don’t hit things
- V2V – location, heading, velocity, acceleration
- SAE J2945/1 standard
- Every OEM uses these standards

Rural field testing


1400 m
1400 m
Message:
“Railway Crossing Ahead”
Google Earth
© 2016 Google
3000 ft
N


Message Change:
“Blocked Crossing Ahead”
Google Earth
© 2016 Google
N
300 ft

Urban field testing


150 m
400 m
250 m
Google Earth
© 2016 Google
N
300 ft

Outcome and next steps

- Successful prototype development
- Research & development of BSM
- Plugfest participation
- Include railway crossings as a standard BSM in SAE J2945/1
- Determine implications of DSRC in urban and rural environment
- Test technology at a Plugfest
- Obtain security credentials
- Testing in a connected vehicle test bed

Emergency Response

Research for Natural Sciences & Engineering Research Council (NSERC)

Purpose

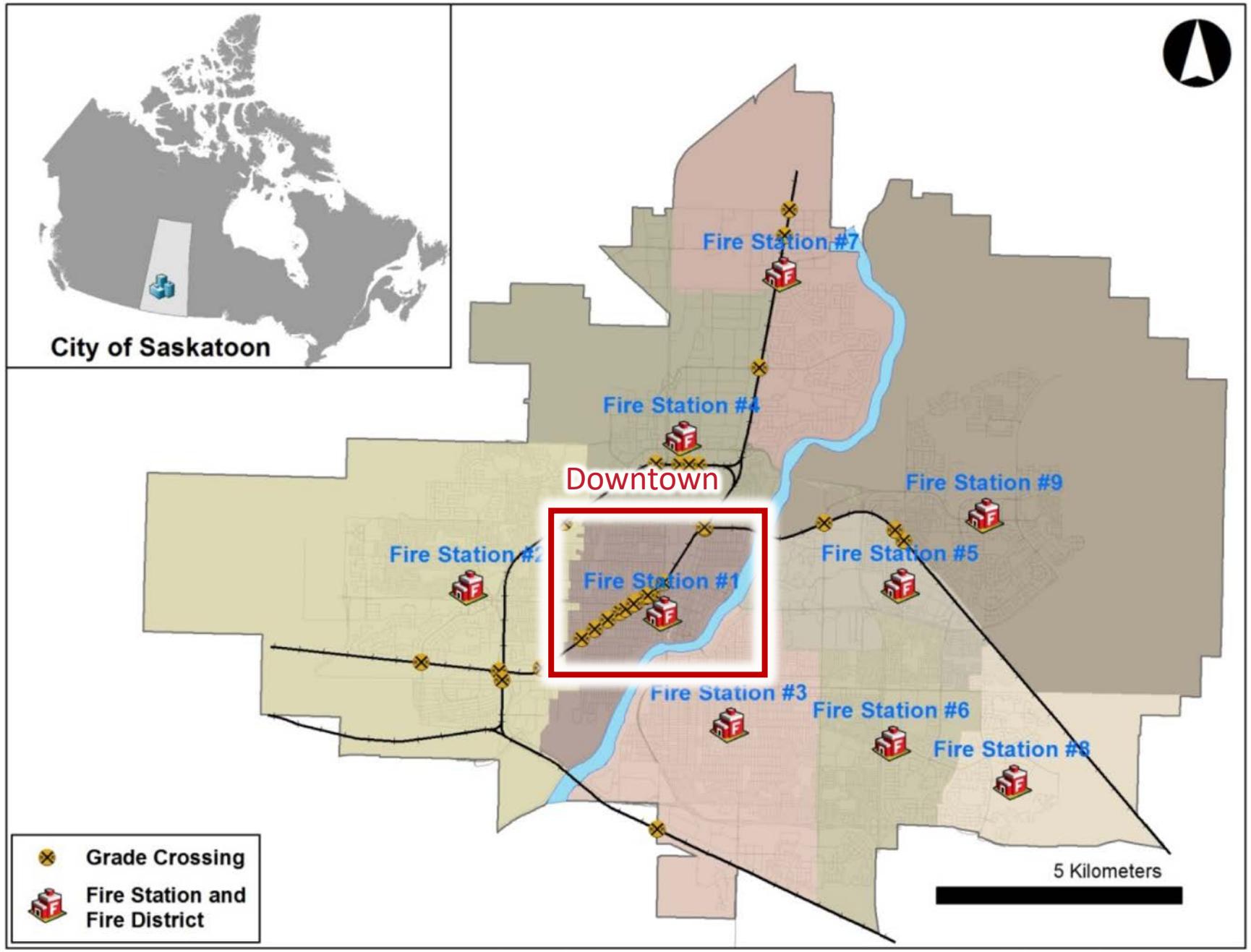
- Demonstrate the benefits of train crossing information for EMS

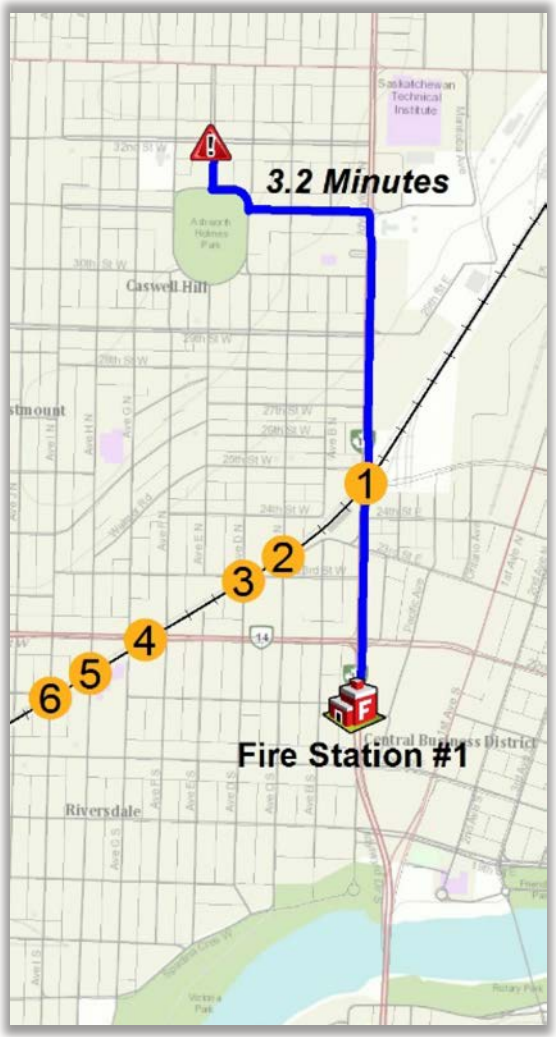
Objectives

- Develop model that compares response time with and without trains

Status

- Complete


City of Saskatoon
Fire Station #7
Fire Station #4
Downtown
Fire Station #9
Fire Station #2
Fire Station #1
Fire Station #5
Fire Station #3
Fire Station #6
Fire Station #8
Grade Crossing
Fire Station and Fire District
5 Kilometers



Blue Path

No train

3.2 minute response time

Red Path

Train blockage

No blockage information

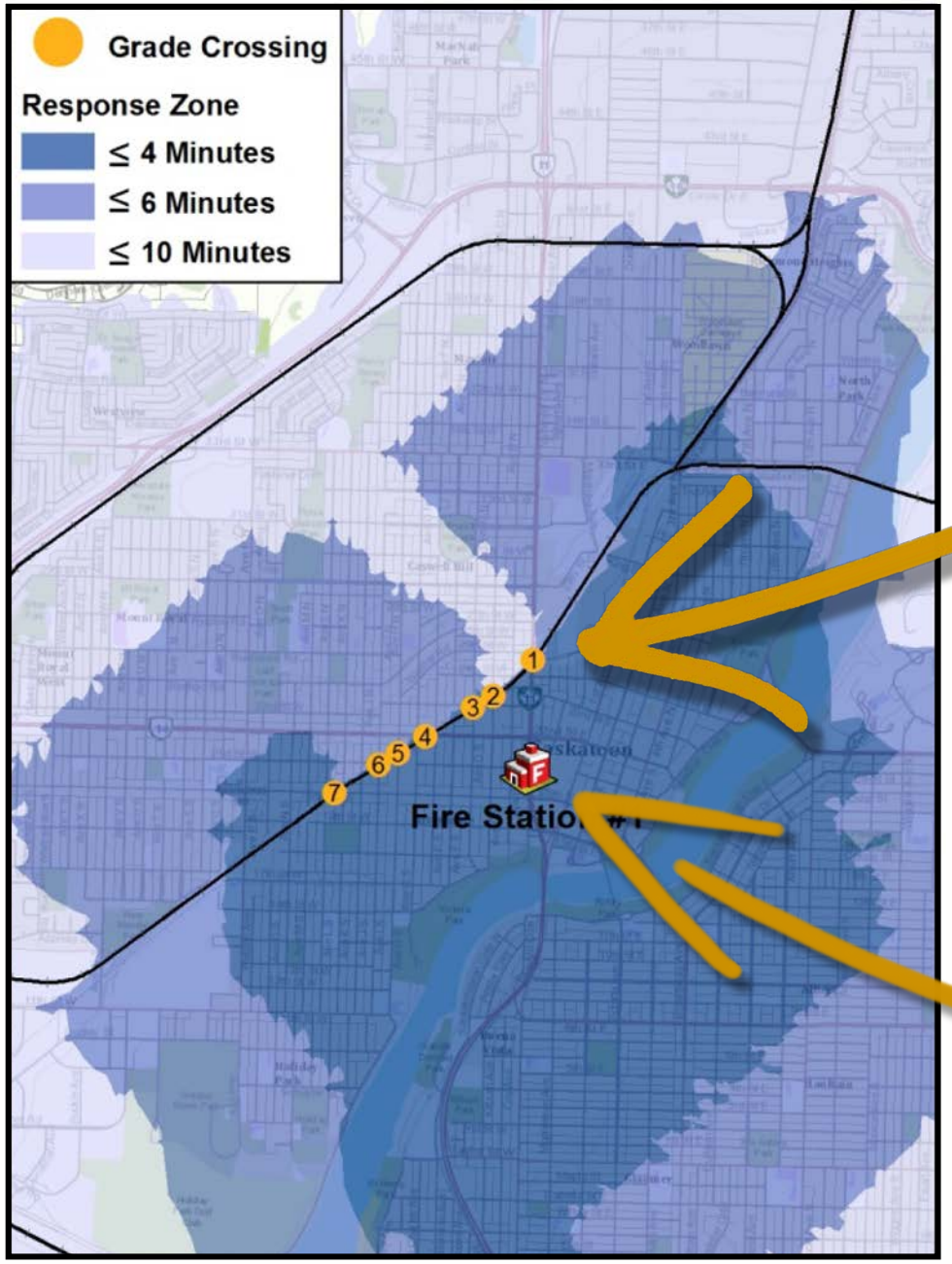
6.0 minute response time

Green Path

Train blockage

Blockage information

4.2 minute response time

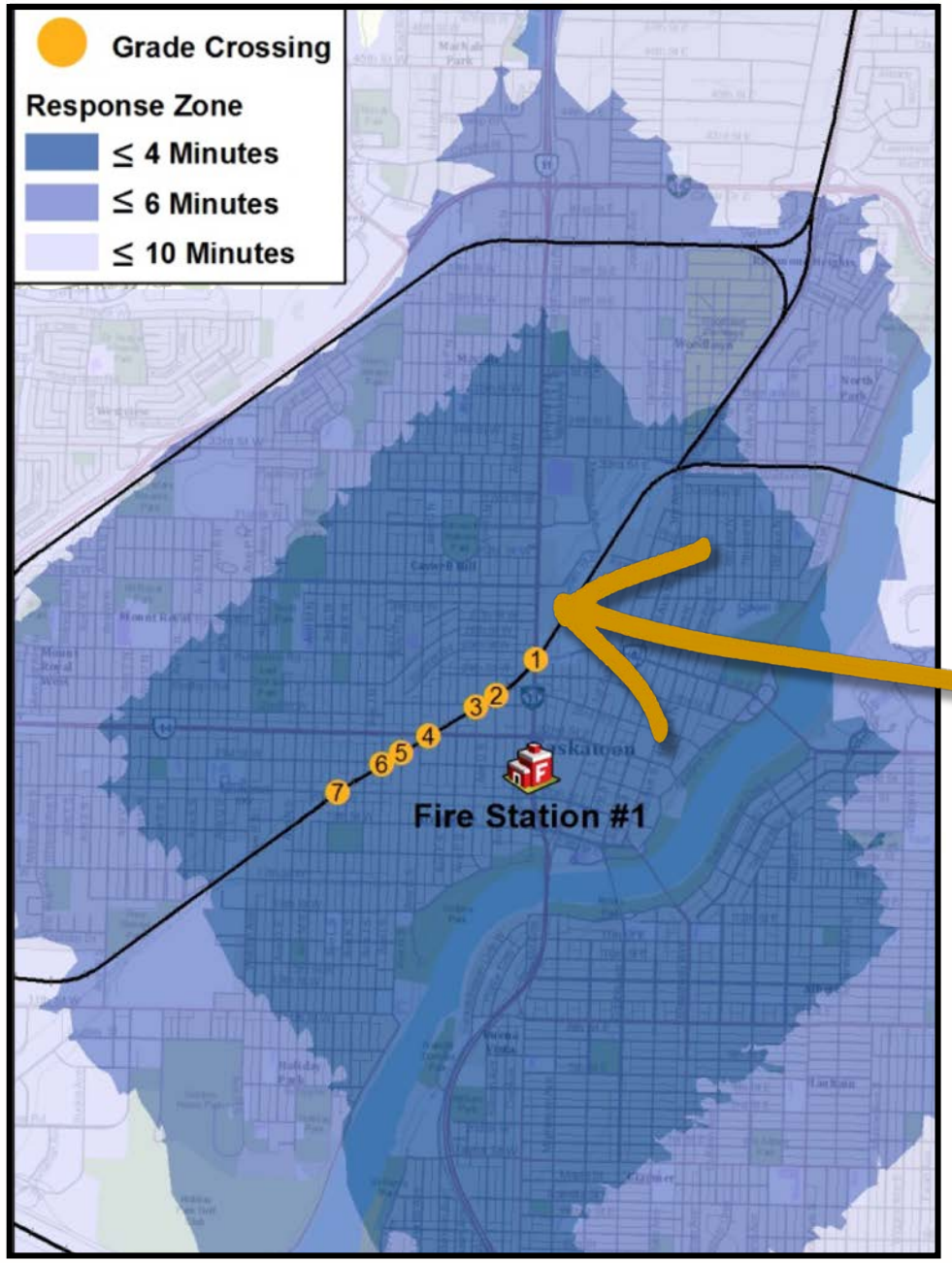


City of Saskatoon

Without train information

7 grade crossings

Fire Station #1



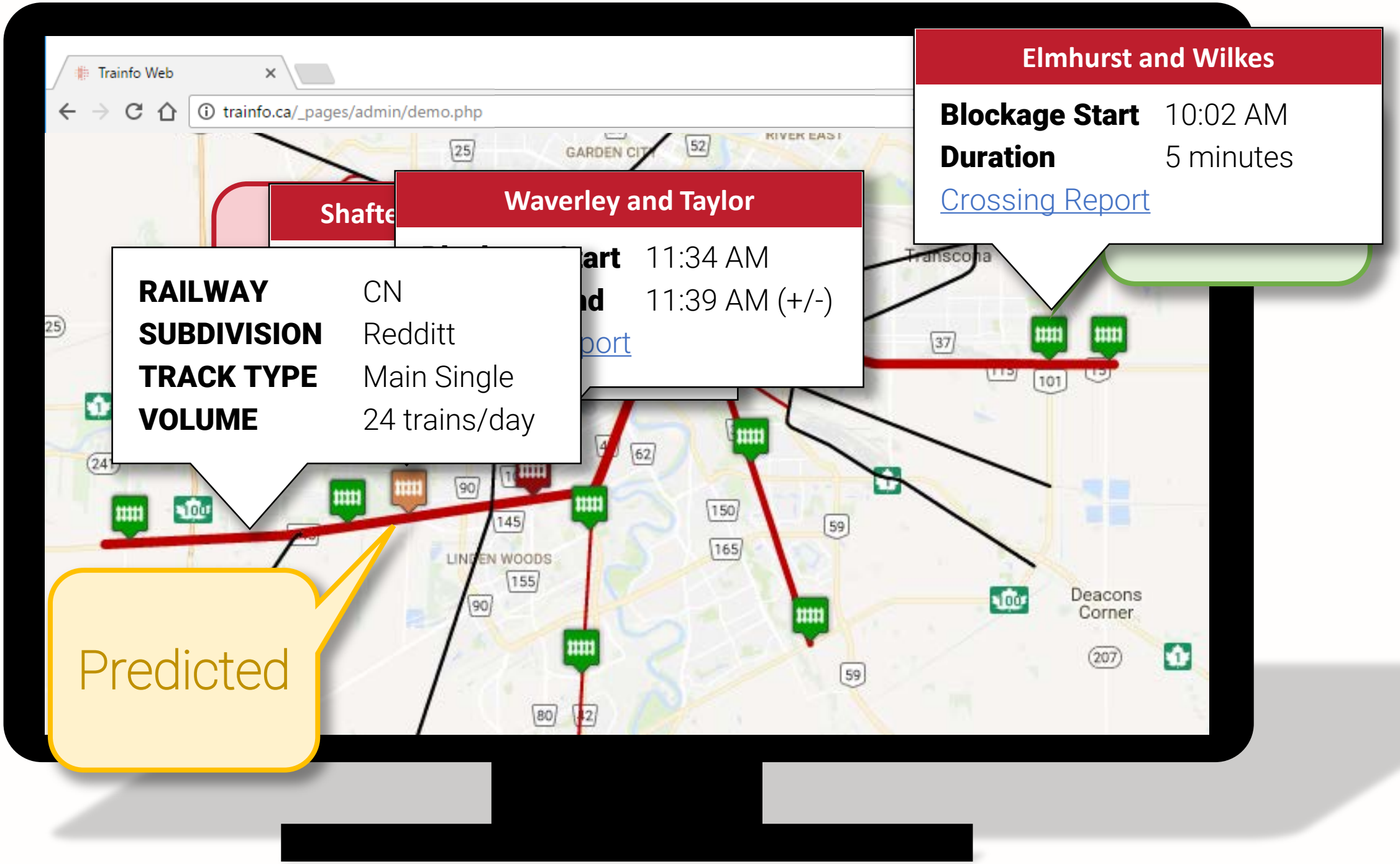
City of Saskatoon

Without train information

Cardiac arrest survival rate decreases 10% per minute*

90% chance of survival

*Source: American Heart & Stroke Association


Trainfo Web
trainfo.ca/_pages/admin/demo.php
Elmhurst and Wilkes
Blockage Start 10:02 AM
Duration 5 minutes
Crossing Report
Waverley and Taylor
art 11:34 AM
d 11:39 AM (+/-)
port
RAILWAY CN
SUBDIVISION Redditt
TRACK TYPE Main Single
VOLUME 24 trains/day
Predicted
GARDEN CITY
RIVER EAST
Transcona
LINDEN WOODS
Deacons Corner

See this map live

Visit www.TRAINFO.ca and click on “Demo”

Waverley St

TRAIN AHEAD

Hybrid Safety Warning System (HSWS)

Research for Transport Canada (Rail Safety Improvement Program)

Purpose

- Develop a lower cost, off rail property warning system prototype for railway crossings

Objectives

- Assess the performance of HSWS
- Identify potential applications for HSWS

Status

- Literature review complete


STOP

Issues to consider

- Physical crossing characteristics
  - Number of tracks
  - Obstructions
  - Rail type
- Operational railway characteristics
  - Train speed
  - Rail vehicles
  - Switching
- Environmental characteristics
  - Temperature
  - Sun exposure
  - Inclement weather

Conclusion

- Railway crossing blockages can result in serious injuries and fatalities
- Until now, there have been no sources of real-time railway crossing blockage information
- This information can improve road safety and save lives by:
  - Integrating with vehicle-to-level crossing (V2LX) systems
  - Helping emergency responders avoid blocked crossings
  - Supporting low-cost railway warning systems
- We are conducting various research projects and seeking partners for pilot tests

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and

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