Agenda

- Interoperability
- Technology
- Operationalizing
CONNECTED VEHICLE ENABLES TOMORROW’S TRANSPORTATION EVOLUTION
Standards and national certification bodies are meant to help:

- USDOT RSU 4.1 Specification
- Omni Air
- SAE/IEEE/ISO/3GPP

SCMS introduces another layer of complexity.
**Interoperability – It’s not all it’s made up to be!**

- What’s gone wrong
  - Data set interpretation
  - Interfaces implemented differently

- What’s gone right
  - Florida DOT D5 SR-434/PedSAFE/I-75 FRAME
    - Standardized testing approach
    - Product qualification
  - Smart Columbus
  - Marysville, OH
DEDICATED SHORT-RANGE COMMUNICATION (DSRC)

Secure, fast messaging on the FCC-approved 75 MHz band of the 5.9 GHz spectrum

RIS-9160 ROADSIDE UNIT

FLEXIBLE MOUNTING OPTIONS
MEETS OR EXCEEDS ENVIRONMENTAL REQUIREMENTS
HSM FOR SECURE CERTIFICATE STORAGE
CELLULAR V2X (C-V2X)

C-V2X is a new technology that allows direct safety communication independent of cellular network. It features enhanced range and reliability for direct communication without network assistance.
What does an agency do with the data?

Product Vision

Corridor Management Platform

A transportation data aggregation, warehousing, and processing platform that enables data sharing, advanced analytics, and application development in support of the connected mobility ecosystem.
Corridor Management – Managing Roadside Units and Outgoing Roadside Messages

- Locations identify intersections or road segments where multiple devices may reside (RSUs, Traffic Controllers, etc.)
- MAP and TIM/RSM messages and message scheduling are associated with locations and will be transmitted via any/all RSUs associated with that location.
- MAP and TIM/RSM message payloads can be generated via the MAP/TIM/RSM creation tools.
- Messages can be scheduled for transmission via multiple RSUs over multiple locations.
CMM – Managing Incoming Messages – Live Data

View BSMs, PSMs, MAP, TIM, SPaT, and Ped Light data Live

➢ Visualize data generated from the corridor

➢ Make available for existing and future systems

➢ Envision predictive and proactive use cases

➢ Leverage data across entire transportation ecosystem
Closing

➢ Don’t underestimate the interoperability challenge

➢ Watch the technology market closely

➢ Consider operational benefits and challenges
Thank you.

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Services and Products
V2X Software

**V2V**
- Collision avoidance
- Emergency electronic brake light
- Emergency vehicle approaching
- Video exchange

**V2I**
- Intersection Warning
- Warnings: Speed, Construction Zone and School Zone
- Emergency communications
- Transit priority
- Emergency vehicle preemption

**V2P**
- Pedestrian warning
- Pedestrian in intersection
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RIS-9160 ROADSIDE UNIT

FLEXIBLE MOUNTING OPTIONS

MEETS OR EXCEEDS ENVIRONMENTAL REQUIREMENTS

HSM FOR SECURE CERTIFICATE STORAGE
CELLULAR V2X (C-V2X)

C-V2X is a new technology that allows direct safety communication independent of cellular network. It features enhanced range and reliability for direct communication without network assistance.
RIS-9260 C-V2X RSU

- Same physical characteristics as the 9160
- C-V2X and DSRC supported
- Multi-mode operation available soon
- QC 9150 chipset
- Delivered 125 units to Colorado for deployment on the I-70 Mountain Corridor west of Denver
CAV Services Strategic Focus

- Provide high margin data-centric operational services at scale
  - V2X in a Box (V2XaaS)
  - Safety and mobility focused services (V2I, V2N, V2P)
  - Data analytics

- Assuming Component Sales or Distributorship will continue but not the primary focus of this plan
UNITED STATES CONNECTED VEHICLE PROJECTS

- Port of Hood River 5.9 ETC (Oregon)
- Connected Traveler & Safe Trip 21 (San Francisco – Bay Area)
- I-70 Mountain Corridor (Colorado)
- C-470 Express Upgrade (Denver)
- Port of Hood River 5.9 ETC (Oregon)
- Ann Arbor V2X Pilot
- McComb County Transit Bus Priority
- Smart Columbus RSU SI, SMC 33 RSU SI
- ITS World Congress Schodack E-Screening (New York City)
- VDOT eWalk Pilot
- Cary CV Corridor (North Carolina)
- ITS World Congress, SR-434 PedSAFE (Orlando)
- Pinellas Cty SPaT (Tampa)
- Lee County Bridge ETC (Tampa)
- HELP Inc SPC Weigh Station Bypass (IN, IL, OH)
- USDOT DTE, Telegraph Rd Safety Pilot, I-94 Truck Parking
- Ann Arbor V2X Pilot
- McComb County Transit Bus Priority
- Smart Columbus RSU SI, SMC 33 RSU SI
- ITS World Congress Schodack E-Screening (New York City)
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- HELP Inc SPC Weigh Station Bypass (IN, IL, OH)
- USDOT DTE, Telegraph Rd Safety Pilot, I-94 Truck Parking
CANADA CONNECTED VEHICLE PROJECTS

Montreal Pilot

407 Pilot

Calgary SPaT

Montreal Pilot
## 2019 Active Pursuits

<table>
<thead>
<tr>
<th>Location</th>
<th>Project Description</th>
<th>Value</th>
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<tbody>
<tr>
<td>Dallas</td>
<td>CV Ecosystem</td>
<td>$10,500,000.00</td>
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<tr>
<td>Cintra</td>
<td>Potential for CV as sub to INDRA</td>
<td>$1,500,000.00</td>
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<tr>
<td>I-66 CV</td>
<td>Congestion Pricing RFP – CV only portion of solution</td>
<td>$400,000.00</td>
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<td>NY City</td>
<td>DSRC RSU, Installation services</td>
<td>$265,000.00</td>
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<tr>
<td>Kentucky CV Corridor</td>
<td>Intersection and Ped safety and mobility</td>
<td>$-</td>
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<tr>
<td>LA Metro Pilot</td>
<td>Ped safety</td>
<td>$46,000.00</td>
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<tr>
<td>LACDPW eWalk</td>
<td>SC3, SCMS and Support for Cary</td>
<td>$225,011.00</td>
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<tr>
<td>H407</td>
<td>SC3 and SCMS</td>
<td>$117,926.00</td>
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<td>Sumitomo Equipment Sales</td>
<td>Internal Demo System</td>
<td>$28,527.00</td>
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<tr>
<td>Econolite</td>
<td>CVV, RSU OBU</td>
<td>$57,739.00</td>
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<td>Georgia</td>
<td>RSUs</td>
<td>$500,000.00</td>
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<td>Utah</td>
<td>C-V2X RSU – 150</td>
<td>$540,000.00</td>
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<tr>
<td>WSP</td>
<td>MNDOT Snowplow Signal Priority</td>
<td>$46,453.00</td>
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## Recent Awards

<table>
<thead>
<tr>
<th>Location</th>
<th>Project Description</th>
<th>Value</th>
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<tbody>
<tr>
<td>Pinellas County Florida</td>
<td>CV Corridor</td>
<td>$267,045</td>
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<tr>
<td>Equipment Sales Econolite / Ohio TRC Pinball – Custom Light Control plus OBUs &amp; RSUs</td>
<td>$121,000</td>
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<td>Columbus RSU</td>
<td>RSU Corridor in Ohio</td>
<td>$950,000</td>
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<td>Calgary</td>
<td>CV Corridor with Emergency Preemption (PoC Pilot)</td>
<td>$198,634</td>
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<tr>
<td>Ohio DOT Smart Corridor 33</td>
<td>R33 (Submitted as Sub)</td>
<td>$500,000.00</td>
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</tbody>
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Total $2,079,415
Key Initiatives

- Strategic
  - V2XaaS
  - Trusted Partner / Distributorship
  - OEMs
  - MNOs
  - Data service providers
  - Strategic account regional projects

- Corridor level services
  - Fusion of legacy and connected data driven use cases
  - “Aftermarket” OBUs
    - DSRC and C-V2X platforms
  - RSU
    - Omni-Air certification in September
    - C-V2X only variant