

October 5, 2017



V2X Deployment Program

CO/WY ITE and ITS Rocky Mountain Joint Meeting

Panasonic | V2X Deployment Program

V2X = Connected Vehicle Technology

V2V = Vehicle-to-Vehicle communication

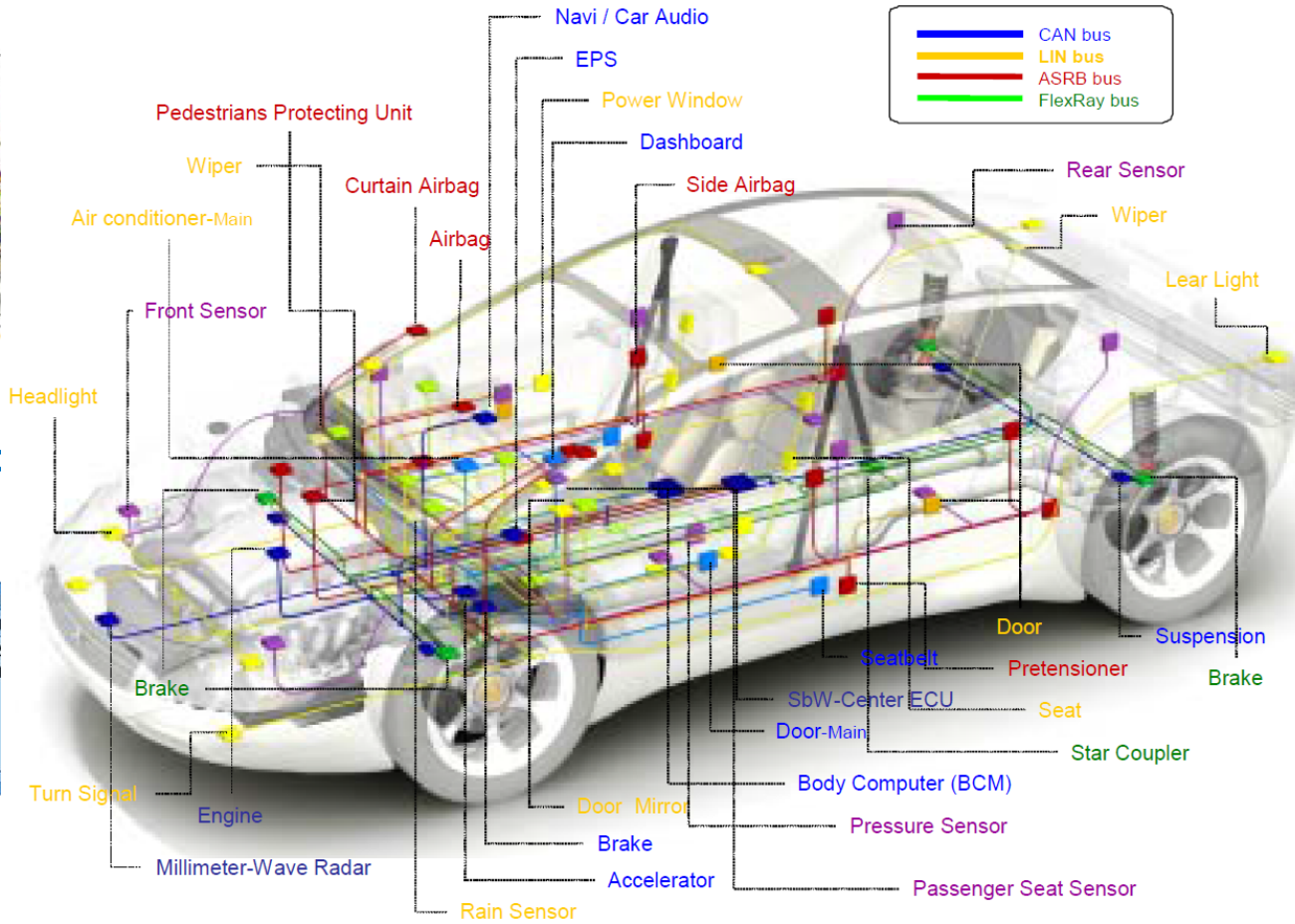
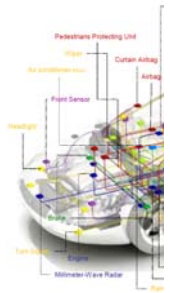
V2I = Vehicle-to-Infrastructure communication

I2V = Infrastructure-to-Vehicle communication

V2X = Vehicle-to-Everything communication

Vehicles have a lot to say...

Interpreted vehicle data enabled by V2X



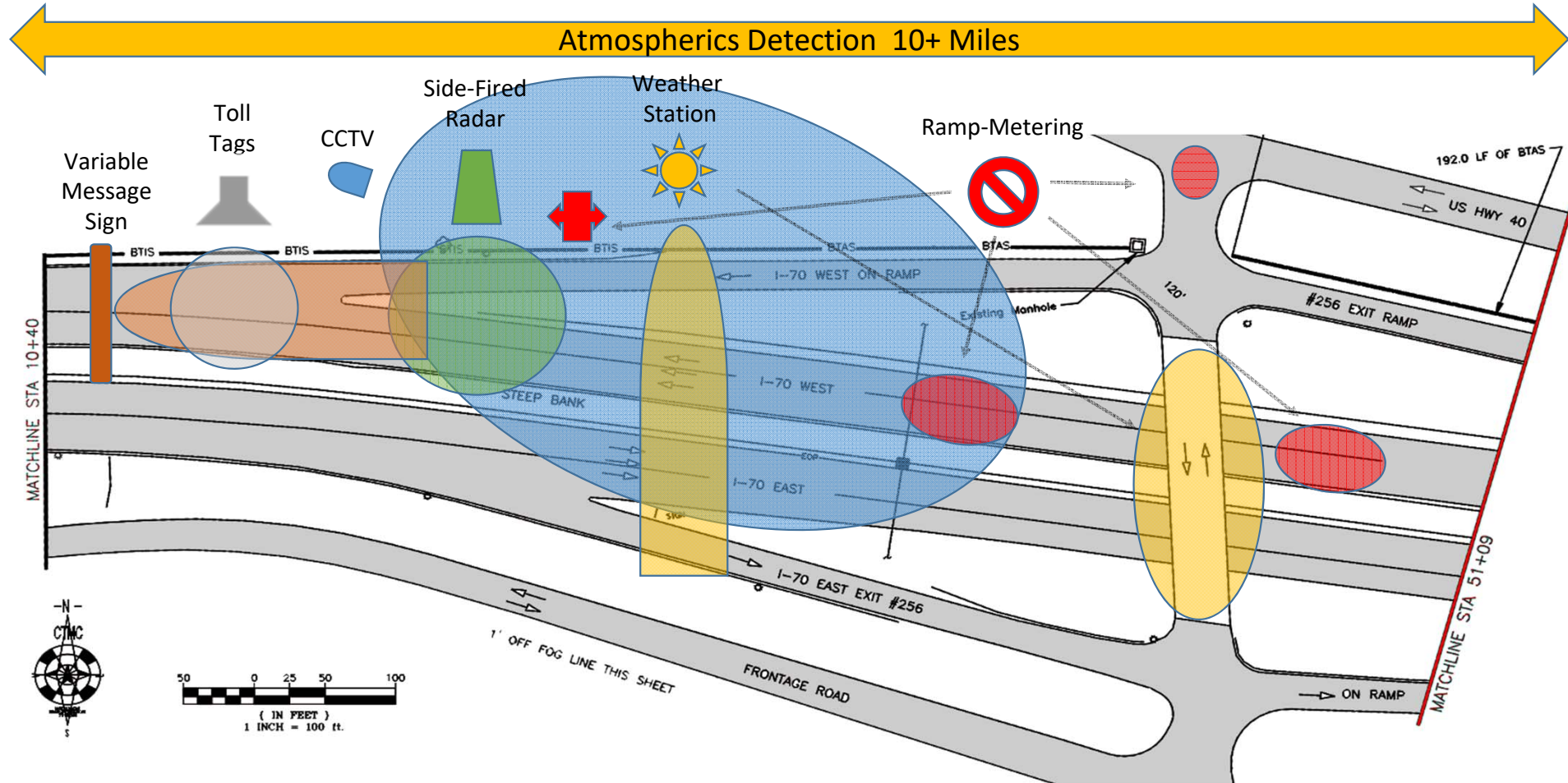
- WheelAngleRate
- Pressure
- Position
- Temperature
- Speed
- Steering
- Throttle
- Brake
- Light
- Alert

All built on native





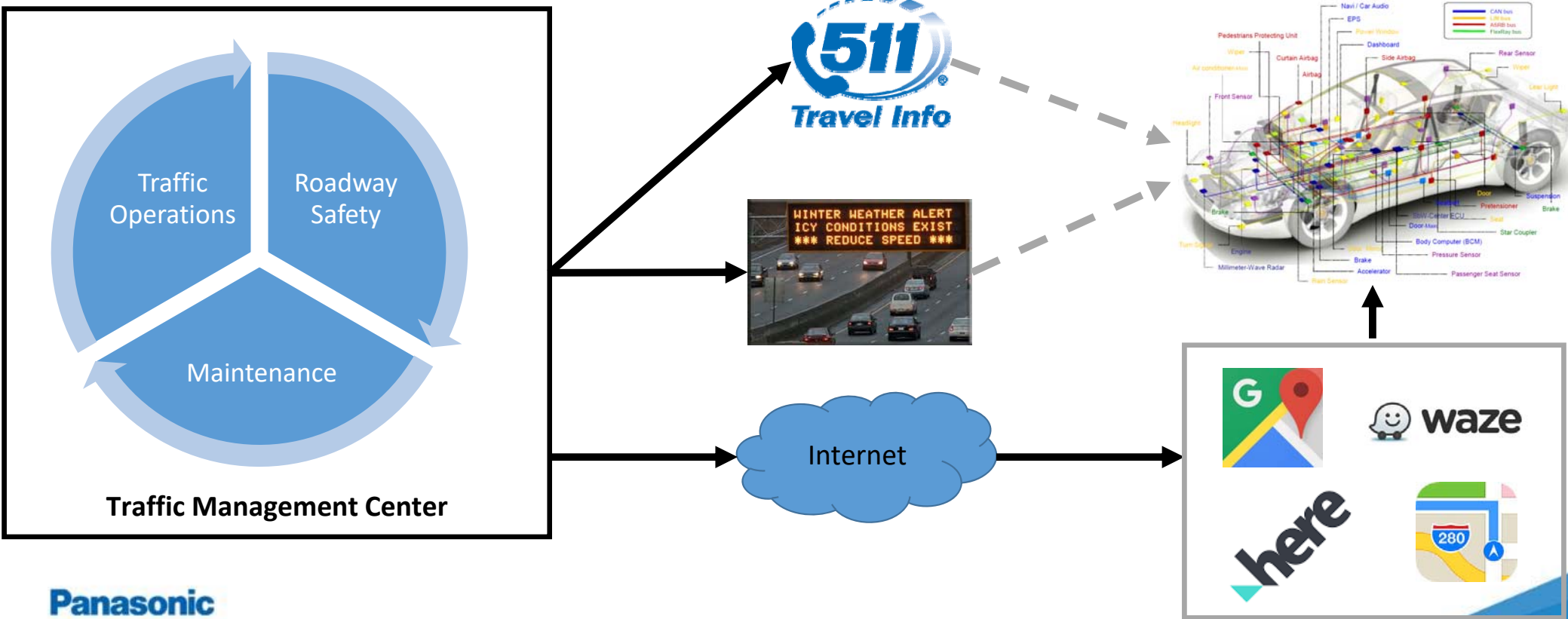
Intelligent Transportation Systems



ITS with C/V

Traffic Management Today

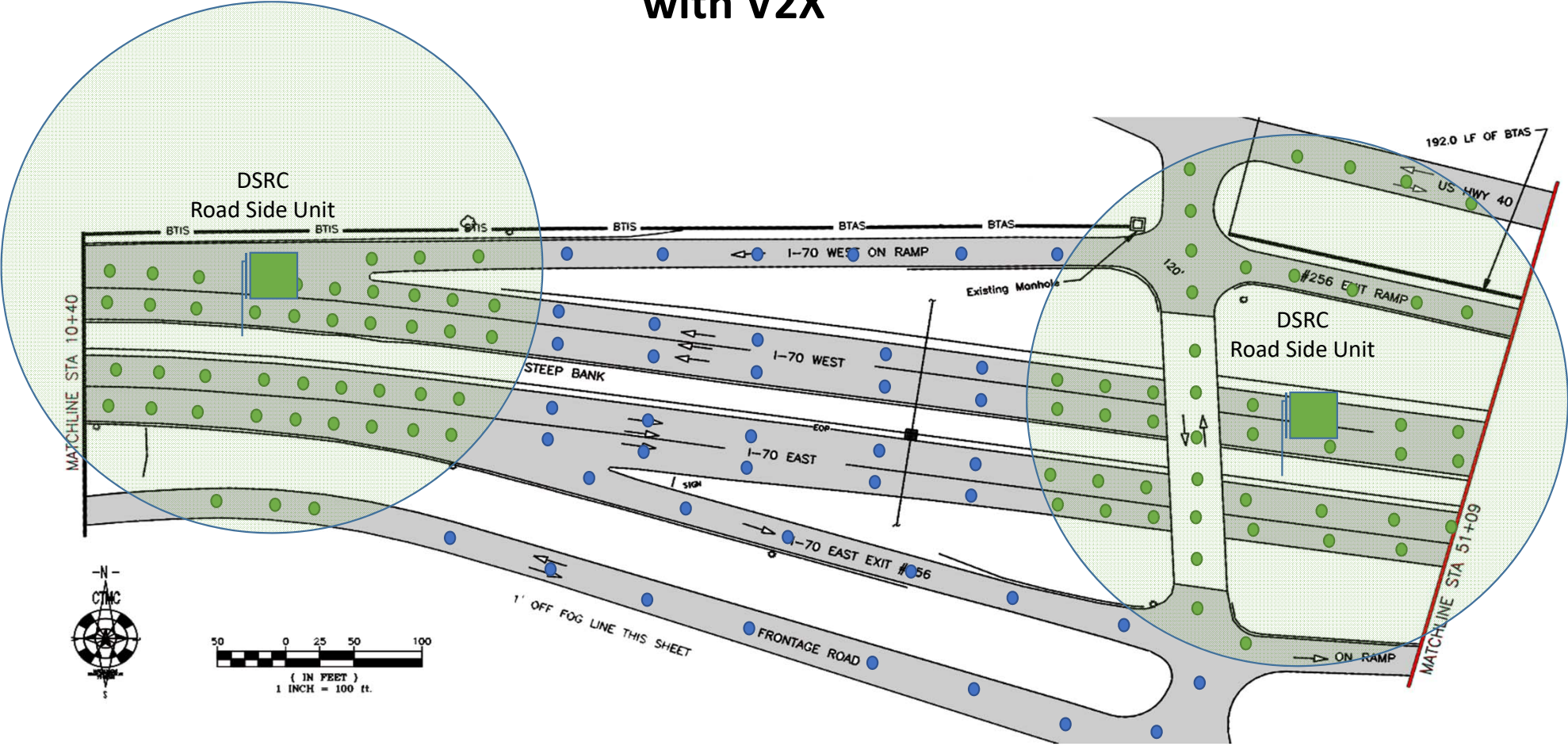
Cities have limited situational awareness and a one-way communication path to vehicles and often deal with the ramifications of non-roadway operators re-routing traffic.





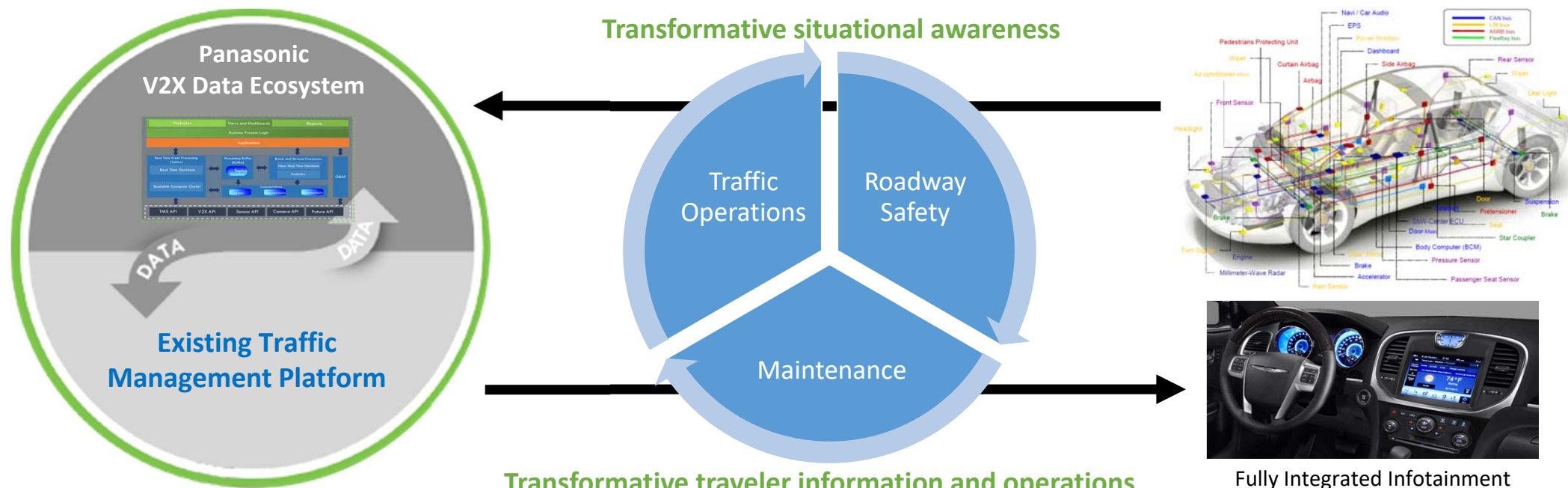
Intelligent Transportation Systems with V2X

ITS with V2X

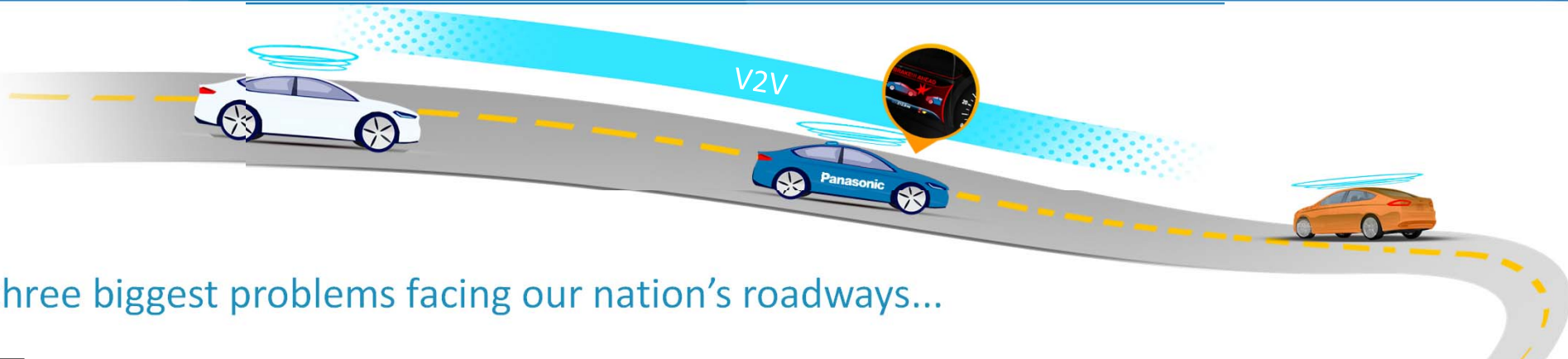


Traffic Management Tomorrow

Unlocking a Direct, Bi-Directional Path to the Vehicle for Holistic Situational Awareness and Traffic Operations; Putting Cities Back in the Driver Seat on Managing Roadways.



Why V2X Technology?



The three biggest problems facing our nation's roadways...



5.6 million crashes
32,719 deaths



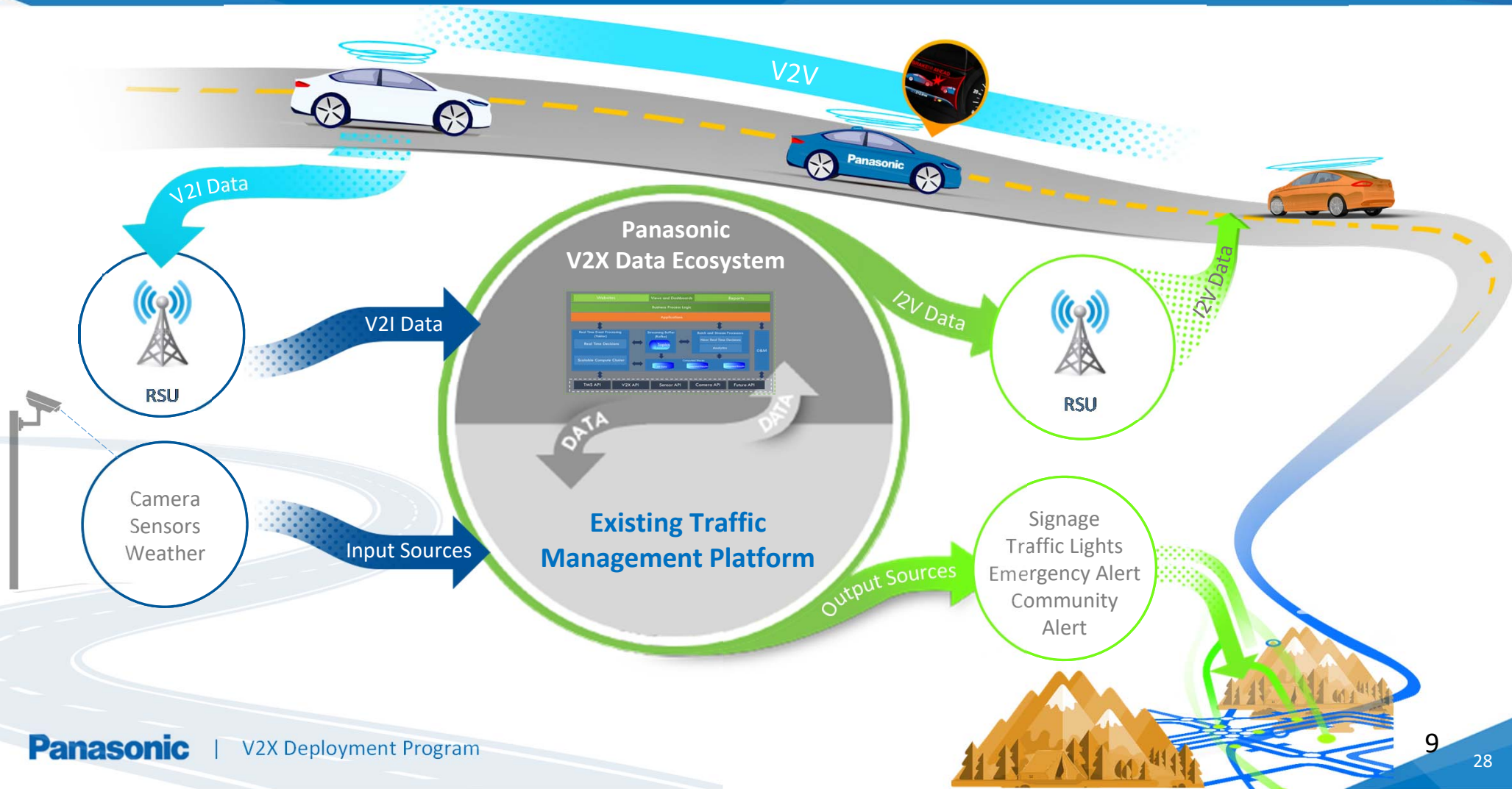
6.9 billion hours in traffic

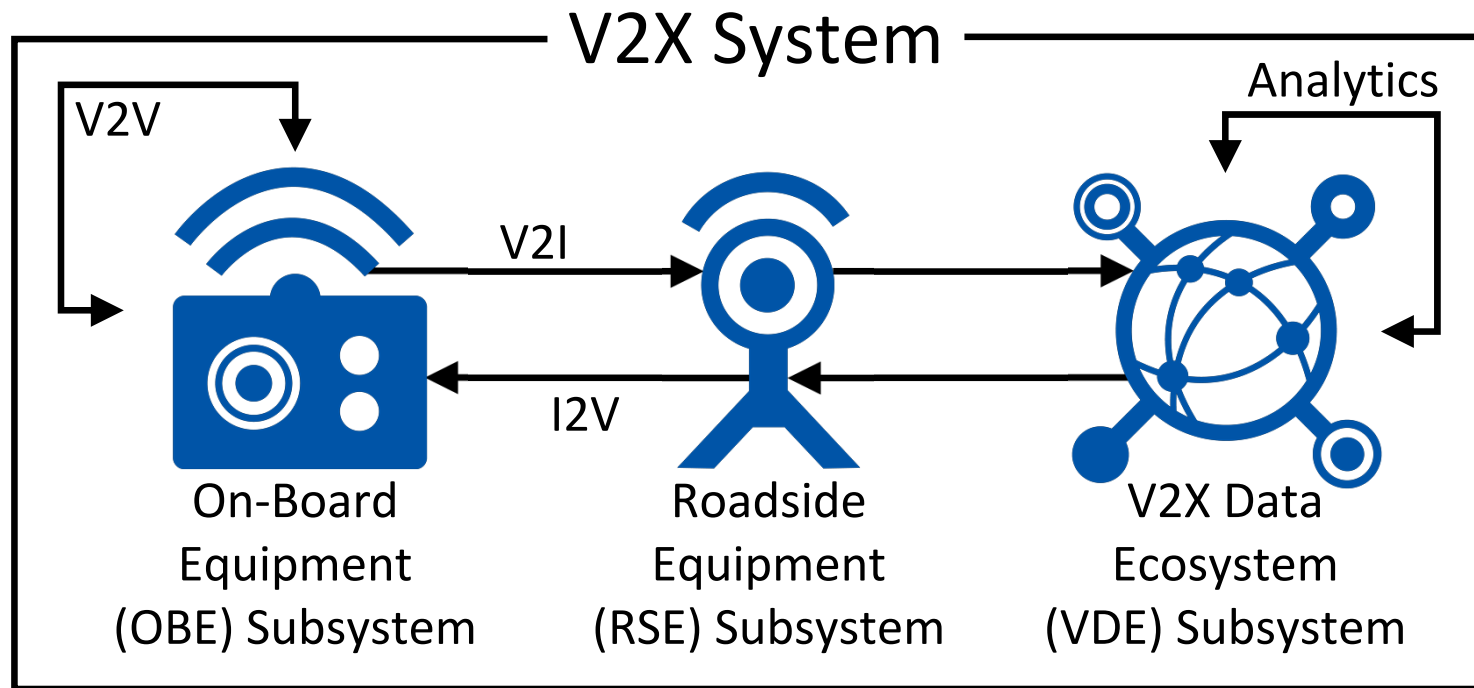


3.1 billion gallons wasted

“The safety benefit of V2V is undeniable. It will save lives, and everybody knows that. A delay in rolling out V2V will cost lives, and that’s a tragedy.”

- Harry Lightsey, General Motors





1. **On-Board Equipment (OBE)** – V2X equipment inside vehicles that transmits and receives data between vehicles and to the infrastructure.
2. **Roadside Equipment (RSE)** – V2X equipment installed on the infrastructure that transmits and receives data to and from vehicles.
3. **V2X Data Ecosystem (VDE)** – The “Brain”

The V2X Ecosystem Unlocks Even More

Imagine...



Prevent **419,000** additional crashes
Save **5,000** more lives
Avoid **5,000** more fatal crashes



Improve freeway travel times by **42** percent
Improve arterial travel times by **27** percent
Reduce poor weather incidents by **25** percent



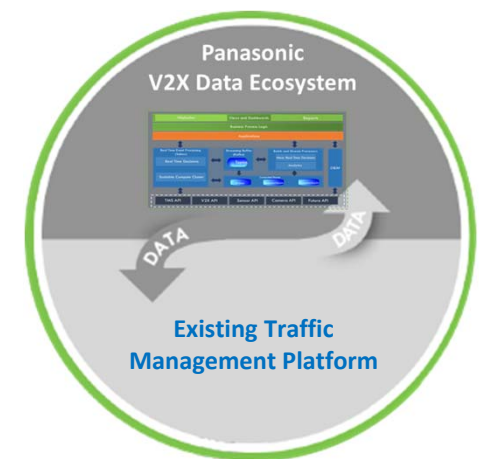
Improve fuel savings by **22** percent
Reduce VMT by **20** percent
Improve freeway travel times by **42** percent

V2X ecosystem gives roadway operators the ultimate situational awareness of all roadways providing:

- Highly accurate, geo-located traveler information
- Highly accurate, localized weather data
- Faster emergency response times
- Improved incident management
- More intelligent, coordinated traffic signal systems
- Improved truck parking information/availability
- Enhanced maintenance decision support systems (e.g., snow plow operations)
- Improved infrastructure diagnostics (e.g., pothole identification, roadway friction)

Benefit to Cities:

1. Empowers DOTs with data ownership and delivers open data for the world.
2. Prepares DOTs for autonomous vehicles





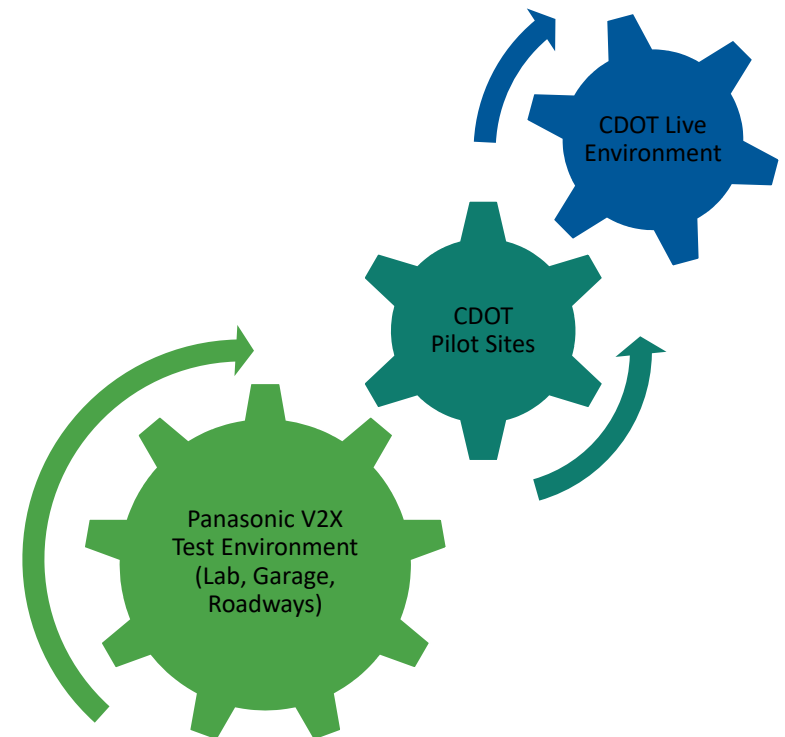
A Different Approach to V2X

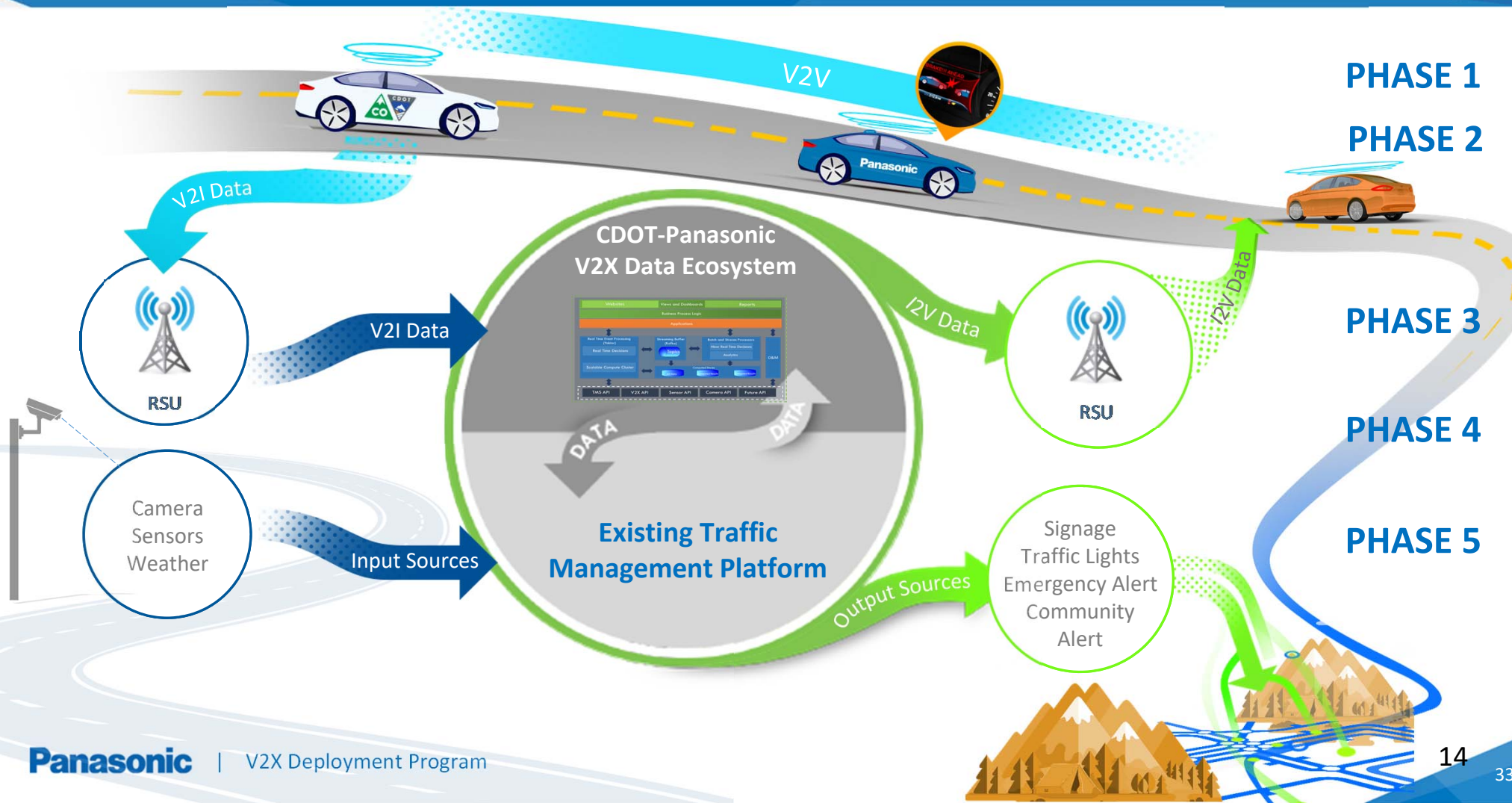
Panasonic | V2X Deployment Program

Phased Deployment Approach

Phase 0	<p>Project Plan & System Design</p> <ul style="list-style-type: none"> • Develop Phase 0 Baseline Schedule • Define & Initiate Program Management • Complete Systems Engineering Planning • Select Project Vendors & Partners • Build CDOT-Panasonic V2X Test Environment • Develop Phase 1-5 Preliminary Schedule • Develop Phase 0 Final Report defining Phases 1-5
Phase 1	Vehicle-to-Infrastructure (V2I) Communications – Collect Data
Phase 2	Infrastructure-to-Vehicle (I2V) Communications – Disseminate Data
Phase 3	Vehicle-to-Vehicle Communications (V2V)
Phase 4	Enhanced Data Analytics
Phase 5	End-to-End System Deployment on I-70

Agile, Iterative Delivery





Agile, Iterative Process for Technical Advancement

