Example CV Pilot Deployment Concepts:

Greypool County

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Greypool County Operations

Greypool County DOT:
- Rural county in Southwest U.S.
- Summers focused on enhancing road weather safety. The county experiences extreme heat, severe lightning storms, and dust storms
- Incident response often requires response vehicles (e.g., ambulance, fire, and police) to travel long distances

Limited road weather information collected by TMCs and disseminated to drivers

Severe incidents at rural intersections

**Limited transit options into Greypool;
Long wait times for fixed transit**

Stakeholders Convene and Identify Key Transportation Challenges

- **Safety at Rural Intersections**
  - Poor line of sight at intersections and high speeds on the mainline often result is drivers misjudging gaps when departing from stop signs
  - Red light running violations are prevalent at signalized intersections
  - Collision at intersections when a vehicle is turning left result in the most severe crashes – often resulting in injuries and fatalities

- **Accessibility in Greypool County**
  - Existing fixed route transit options do not serve the majority of the destinations in the county
  - Transit stops are not always accessible to travelers and travelers often experience long wait times at transit stops

- **Road Weather Information Dissemination**
  - Unpredictable weather (e.g., lightning storms, dust storms) during summer months often cause delays and impact safety
  - Limited deployed devices in the field to collect road weather information
  - Limited mechanisms to disseminated proactive road weather information to drivers

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Stakeholder Set Three Key Improvement Targets

Goal	Performance Measure	Performance Target
Reduces crashes, injuries, and fatalities	Number of crashes, Injuries and fatalities	Reduce crashes by 10%; injuries by 20%; and fatalities by 30%
Improve accessibility	Transit wait times	Provide transit options to areas not being served by fixed transit in Greypool County Reduce wait times for transit riders by 20%
Improve collection and dissemination of road weather information	Number of weather-related traveler information	Increase availability of weather-related traveler information

Applications Considered for Improving Safety

V2I Safety

Red Light Violation Warning
Curve Speed Warning
Stop Sign Gap Assist
Spot Weather Impact Warning
Reduced Speed/Work Zone Warning
Pedestrian in Signalized Crosswalk
Warning (Transit)

V2V Safety

Emergency Electronic Brake Lights (EEBL)
Forward Collision Warning (FCW)
Intersection Movement Assist (IMA)
Left Turn Assist (LTA)
Blind Spot/Lane Change Warning (BSW/LCW)
Do Not Pass Warning (DNPW)
Vehicle Turning Right in Front of Bus Warning (Transit)

Road Weather

Motorist Advisories and Warnings (MAW)
Enhanced MDSS
Vehicle Data Translator (VDT)
Weather Response Traffic Information (WxTINFO)

Environment

Eco-Approach and Departure at Signalized Intersections
Eco-Traffic Signal Timing
Eco-Traffic Signal Priority
Connected Eco-Driving
Wireless Inductive/Resonance Charging
Eco-Lanes Management
Eco-
Eco-Cooperative Adaptive Cruise Control
Eco-Traveler Information
Eco-Ramp Metering
Low Emissions Zone Management
AFV Charging / Fueling Information
Eco-Smart Parking
Dynamic Eco-Routing (light vehicle, transit, freight)
Eco-ICM Decision Support System

Improve Safety

Agency Data

Probe-based Pavement Maintenance
Probe-enabled Traffic Monitoring
Vehicle Classification-based Traffic Studies
CV-enabled Turning Movement & Intersection Analysis
CV-enabled Origin-Destination Studies
Work Zone Traveler Information

Mobility

Advanced Traveler Information System
Intelligent Traffic Signal System (I-SIG)
Signal Priority (transit, freight)
Mobile Accessible Pedestrian Signal System (PED-SIG)
Emergency Vehicle Preemption (PREEMPT)
Dynamic Speed Harmonization (SPD-HARM)
Queue Warning (Q-WARN)
Cooperative Adaptive Cruise Control (CACC)
Incident Scene Pre-Arrival Staging Guidance for Emergency Responders (RESP-STG)
Incident Scene Work Zone Alerts for Drivers and Workers (INC-ZONE)
Emergency Communications and Evacuation (EVAC)
Connection Protection (T-CONNECT)
Dynamic Transit Operations (T-DISP)
Dynamic Ridesharing (D-RIDE)
Freight-Specific Dynamic Travel Planning and Performance
Drayage Optimization

Smart Roadside

Wireless Inspection
Smart Truck Parking

Applications Considered for Increasing Accessibility

V2I Safety

Red Light Violation Warning
Curve Speed Warning
Stop Sign Gap Assist
Spot Weather Impact Warning
Reduced Speed/Work Zone Warning
Pedestrian in Signalized Crosswalk
Warning (Transit)

V2V Safety

Emergency Electronic Brake Lights (EEBL)
Forward Collision Warning (FCW)
Intersection Movement Assist (IMA)
Left Turn Assist (LTA)
Blind Spot/Lane Change Warning
(BSW/LCW)
Do Not Pass Warning (DNPW)
Vehicle Turning Right in Front of Bus
Warning (Transit)

Road Weather

Motorist Advisories and Warnings (MAW)
Enhanced MDSS
Vehicle Data Translator (VDT)
Weather Response Traffic Information
(WxTINFO)

Environment

Eco-Approach and Departure at
Signalized Intersections
Eco-Traffic Signal Timing
Eco-Traffic Signal Priority
Connected Eco-Driving
Wireless Inductive/Resonance Charging
Eco-Lanes Management
Eco-Speed Harmonization
Eco-   ntrol
Eco-Traveler Information
Eco-   Ramp Metering
Low Emissions Zone Management
AFV Charging / Fueling Information
Eco-Smart Parking
Dynamic Eco-Routing (light vehicle,
transit, freight)
Eco-ICM Decision Support System

> **Increase Accessibility**

Agency Data

Probe-based Pavement Maintenance
Probe-enabled Traffic Monitoring
Vehicle Classification-based Traffic
Studies
CV-enabled Turning Movement &
Intersection Analysis
CV-enabled Origin-Destination Studies
Work Zone Traveler Information

Mobility

 Advanced Traveler Information System
Intelligent Traffic Signal System
(I-SIG)
Signal Priority (transit, freight)
Mobile Accessible Pedestrian Signal System
(PED-SIG)
Emergency Vehicle Preemption (PREEMPT)
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Incident Scene Work Zone Alerts for Drivers
and Workers (INC-ZONE)
Emergency Communications and Evacuation
(EVAC)
Connection Protection (T-CONNECT)
Dynamic Transit Operations (T-DISP)
Dynamic Ridesharing (D-RIDE)
Freight-Specific Dynamic Travel Planning and
Performance
Drayage Optimization

Smart Roadside

Wireless Inspection
Smart Truck Parking

Applications Considered for Informing Drivers During Bad Weather

V2I Safety

Red Light Violation Warning
Curve Speed Warning
Stop Sign Gap Assist
Spot Weather Impact Warning
Reduced Speed/Work Zone Warning
Pedestrian in Signalized Crosswalk
Warning (Transit)

V2V Safety

Emergency Electronic Brake Lights (EEBL)
Forward Collision Warning (FCW)
Intersection Movement Assist (IMA)
Left Turn Assist (LTA)
Blind Spot/Lane Change Warning
(BSW/LCW)
Do Not Pass Warning (DNPW)
Vehicle Turning Right in Front of Bus
Warning (Transit)

Road Weather

Motorist Advisories and Warnings (MAW)
Enhanced MDSS
Vehicle Data Translator (VDT)
Weather Response Traffic Information (WxTINFO)

Environment

Eco-Approach and Departure at
Signalized Intersections
Eco-Traffic Signal Timing
Eco-Traffic Signal Priority
Connected Eco-Driving
Wireless Inductive/Resonance Charging
Eco-Lanes Management
Eco-Speed Harmonization
Eco-Cooperative Adaptive Cruise Control
Eco-Traveler Information
Eco-Ramp Metering
Low ~~Emissions Zone Management~~
AFV ~~Charging / Fueling Information~~
Eco-~~Smart Parking~~
Dynamic Eco-Routing (light vehicle,
transit, freight)
Eco-ICM Decision Support System

Manage Weather Events

Agency Data

Probe-based Pavement Maintenance
Probe-enabled Traffic Monitoring
Vehicle Classification-based Traffic
Studies
CV-enabled Turning Movement &
Intersection Analysis
CV-enabled Origin-Destination Studies
Work Zone Traveler Information

Mobility

Advanced Traveler Information System
Intelligent Traffic Signal System
(I-SIG)
Signal Priority (transit, freight)
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Dynamic Transit Operations (T-DISP)
Dynamic Ridesharing (D-RIDE)
Freight-Specific Dynamic Travel Planning and
Performance
Drayage Optimization

Smart Roadside

Wireless Inspection
Smart Truck Parking

Connected Vehicle Applications Selected in Performance-Driven Approach

Improve Safety

- Red Light Violation Warning
- Stop Sign Gap Assist
- Left Turn Assist

Increase Accessibility

- Dynamic Transit Operations (T-DISP)

Informing Drivers During Bad Weather

- Weather Response Traffic Information (WxTINFO)

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Projected Synergies and Impacts from Safety Applications in the Deployment Concept
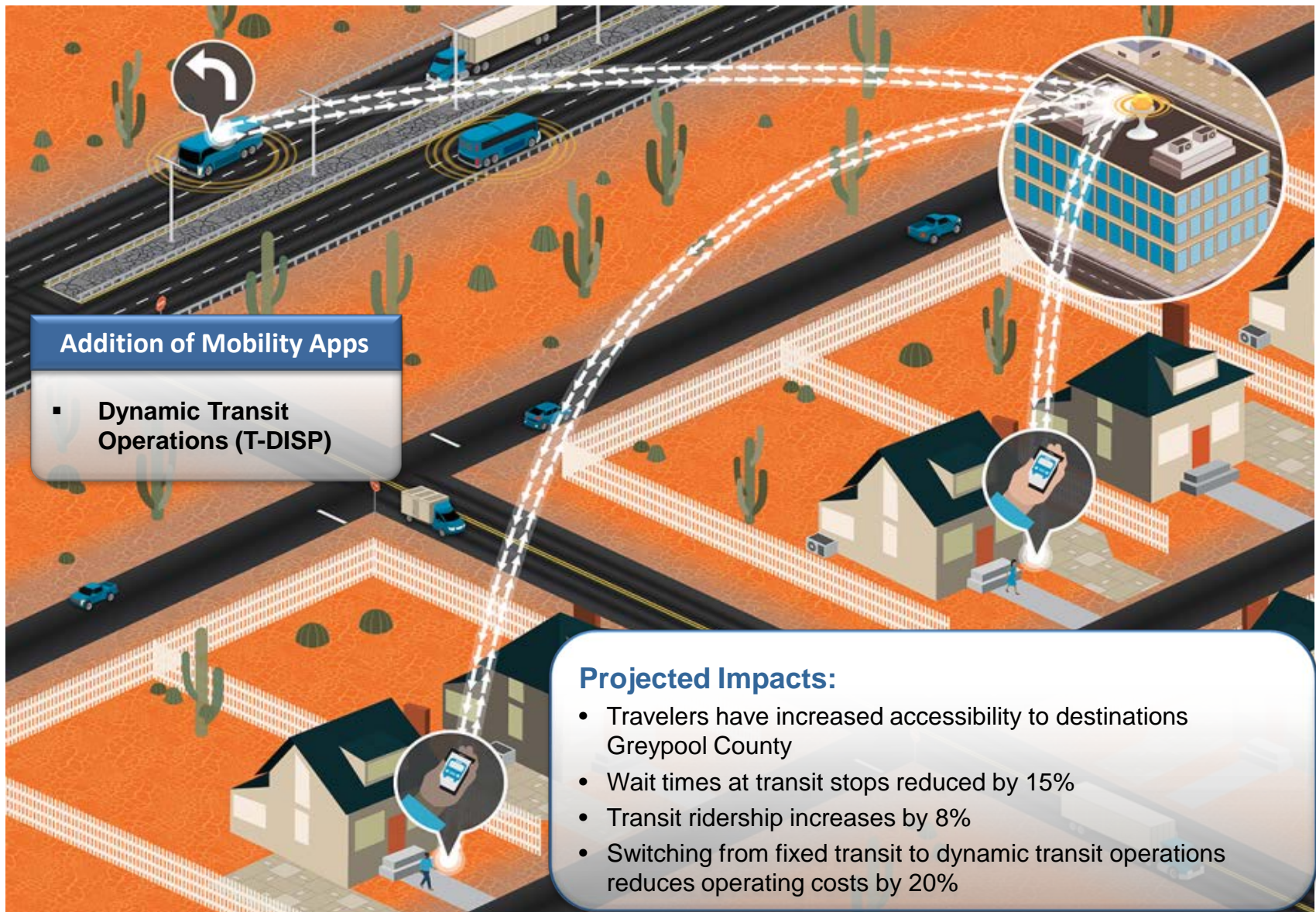

Addition of Safety Apps

- Red Light Violation Warning
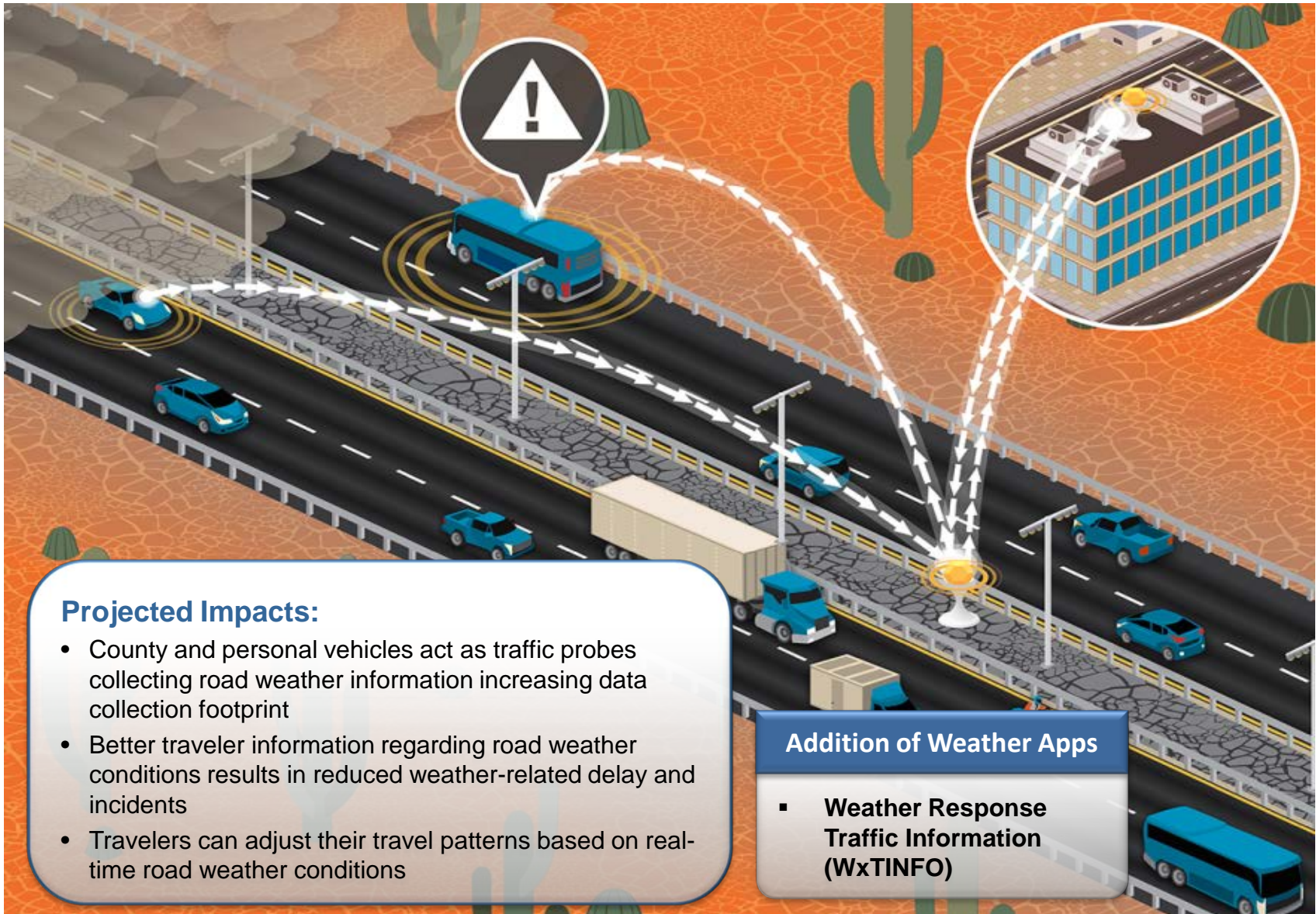- **Stop Sign Gap Assist**
- Left Turn Assist

Projected Impacts:

- Significant reduction in collisions, injuries, and fatalities at intersections.
- Non-recurring congestion resulting from incidents is reduced by 30%

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Projected Synergies and Impacts from Mobility Applications in the Deployment Concept

Addition of Mobility Apps

- **Dynamic Transit Operations (T-DISP)**

Projected Impacts:

- Travelers have increased accessibility to destinations Greypool County
- Wait times at transit stops reduced by 15%
- Transit ridership increases by 8%
- Switching from fixed transit to dynamic transit operations reduces operating costs by 20%

Projected Synergies and Impacts from Road Weather Applications in the Deployment Concept

Projected Impacts:

- County and personal vehicles act as traffic probes collecting road weather information increasing data collection footprint
- Better traveler information regarding road weather conditions results in reduced weather-related delay and incidents
- Travelers can adjust their travel patterns based on real-time road weather conditions

Addition of Weather Apps

- **Weather Response Traffic Information (WxTINFO)**

Integrated Concept for Greypool Operations