V2X

P3Mobility Use Case Stakeholder Interviews

March 2024

PURPOSE OF STUDY

Enable a more comprehensive understanding of the details required by OEMs and fleets in the development, deployment and adoption of C-V2X technologies by utilizing expert stakeholder voices. By identifying key questions and insights through expert input, P3Mobility can make more informed decisions and develop strategies to maximize the potential benefits of V2X technologies while addressing relevant challenges.

BACKGROUND

The Road Commission for Oakland County was awarded one of 50 USDOT SMART Planning Grants in 2023. P3Mobility was chosen as the lead to create a blueprint for building V2X (vehicle-to-everything) infrastructure that supports private investment. The project pilot includes ten fleet vehicles and five Oakland County intersections that have been selected to improve safety, mobility, and equity for vehicles and vulnerable road users.

In addition to the pilot, the project will plan for a county-wide deployment of V2X infrastructure. The final deliverables for the full project include:

- A business & financial plan
- Recommended roads to deliver safety, mobility and equity improvements
- A community engagement plan
- A workforce development plan

The final deliverables for this phase of the project include:

- Key expert insights on use cases
- Potential barriers
- Additional opportunities
- A community engagement outline

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PROCESS

PHASE 1

- Develop discussion guide and images for review during one-on-one expert interviews.
- Recruit appropriate stakeholders to interview in the OEM and Fleet Management space.

PHASE 2

- Conduct one-hour online interviews reviewing P3Mobility use cases for stakeholder feedback.

PHASE 3

- Backend analysis of stakeholder interviews and reporting.

STAKEHOLDERS

Product Management, Stellantis

Government Affairs, Audi

The Shyft Group

Product Planning & Strategy, ZF

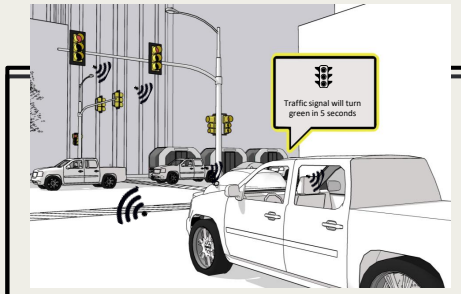
Urban Freight Labs

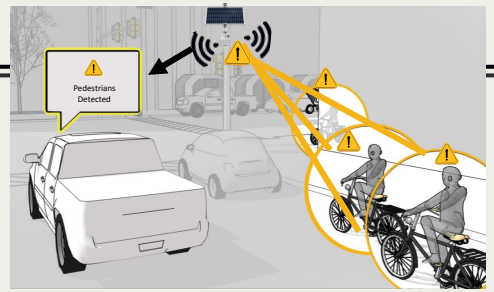
Engineering, General Motors

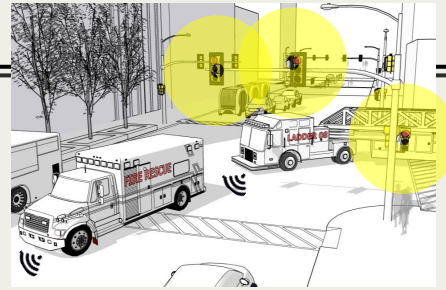
Technology & Strategy, Magna

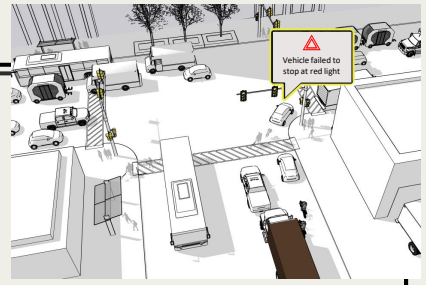
Research & Innovation, Magna

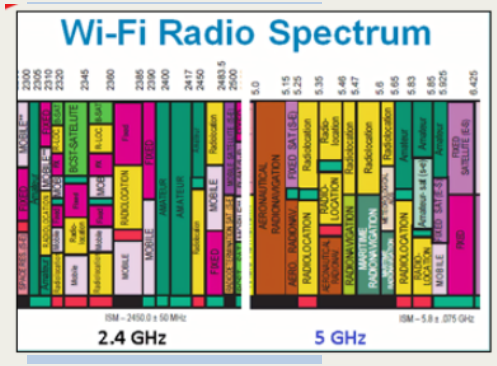
USE CASES REVIEWED











Basic Level of Safety

Allows vehicles to communicate with each other, with infrastructure, and even with pedestrians, using high-speed communication.

Vulnerable Road Users Alert

Leverage infrastructure-based sensors (e.g., camera, radar, lidar) to detect VRUs and alert vehicles of potential collisions.

Signal Priority / Pre-Emption

Signal Pre-Emption and Signal Priority are designed to enhance traffic flow and improve safety on our roads.

Fleet Intelligence

C-V2X Fleet Intelligence is designed to capture enhanced data related to a driving situation.

Extended Transportation Spectrum

Leverages the unlicensed Wi-Fi spectrum to ensure safety-critical use cases that require low-latency are not compromised.

CENTRAL QUESTIONS AND KEY INSIGHTS

What is necessary to assist with adoption of V2X within OEMs and fleets?

OEMs and fleets look to the **federal government** for regulations to help guide them on when their vehicles need to be equipped with V2X technology.

How do OEMs expect consumers to acquire V2X capabilities?

While V2X is ramping up it is expected that in vehicle capabilities would be **subscription** based unless there is a change in policy.

What use cases resonate the most?

It is believed consumers will be more likely to pay for additional **convenience features** (e.g., signal priority/pre-emption), as opposed to more safety features to start.

For fleets, the **VRU Alerts** use case was the highest valued V2X opportunity.

THE BENEFITS OF C-V2X

SAFETY

V2X is perceived in the industry as something consumers might not be willing to pay for, mainly because consumers don’t currently understand what the use cases and associated value propositions could be. In that regard, **consumer education will be key to a V2X deployment and consumer adoption strategy.**

Identifying new use cases and educational assets for both safety informational and safety critical could be a key in adoption for all V2X ecosystem stakeholders.

THE BENEFITS OF C-V2X

EFFICIENCY

Efficiency is a key consideration for fleets and every second counts for them. Features such as **signal priority** might boost efficiency enough for fleets to consider piloting this type of technology. Having a connected vehicle fleet is already viewed as a competitive advantage, with additional enhancements such as V2X, it might give one company a larger competitive edge over another.

Efficiency could also be relevant to consumers for commutes, longer road trips and in speed critical zones (construction, school, etc.). **Enabling a more efficient journey** could allow consumers to reach their destination faster.

THE BENEFITS OF C-V2X

COMFORT & CONVENIENCE

Providing what is described in this deck as a ‘basic level of safety’ to **enhance daily commutes of everyday people** could give any OEMs a competitive advantage. This could be through shortening a consumers drive to work or while running errands by informing them about light timing, congestion, etc. **Convenience features** are believed to more appealing and could be more widely adopted and paid for by consumers than safety features.

THE BARRIERS TO C-V2X

INFRASTRUCTURE

Although some new vehicles come equipped with V2X features now, there is currently not enough supporting infrastructure to incentivize additional OEMs/Tier 1s to equip their vehicles with V2X technology.

REGULATIONS

Due to the complete absence of policy/ regulations in the United States currently, numerous companies are not rushing their compliance with V2X, unlike Europe. Another concern is maintaining funding for future infrastructure maintenance.

INTEROPERABILITY STANDARDS

Standardization will ensure seamless usage between different manufacturers, regions, etc. Standards will enable V2X to scale and provide critical mass for proliferation.

CONSUMER AWARENESS

Consumers currently lack an understanding of the advantages offered by V2X technology and require education through compelling use cases. Finding an everyday value proposition could be more effective for consumer adoption than less often used safety use case.

ADDITIONAL OPPORTUNITIES OF C-V2X

LUXURY & EARLY TECH ADOPTERS

Consumers looking to have the most technologically advanced vehicles will likely want to include V2X options when it's made widely available. V2X would open a new level of opportunity to make the customers journey smoother and more efficient.

Typically, new vehicle tech enters the market at a luxury price point and moves down market into entry level vehicles over time. Safety, however, is viewed as an equity issue and could impact policy and V2X deployments.

EDUCATION & REGULATIONS

Commercial and consumer education is necessary to move this technology forward. The V2X ecosystem is so promising that both the consumer and commercial segments need to be better educated on the opportunities associated with it. This presents itself as a chance to manage the narrative around V2X opportunities and help prioritize the most prominent use cases.

Governments are looking to co-create. V2X has to be a partnership between local and state infrastructure owners and operators. - **Brad Stertz**

SUBSCRIPTION UPTAKE

V2X will most likely be rolled out in phases until it becomes widespread. Reaching scale is critical to incentivizing OEMs and fleets to enable their vehicles. National companies such as Amazon, FedEx, UPS, etc. need a national footprint of enablement to justify the potential additional hardware expense.

HISTORICAL DATA

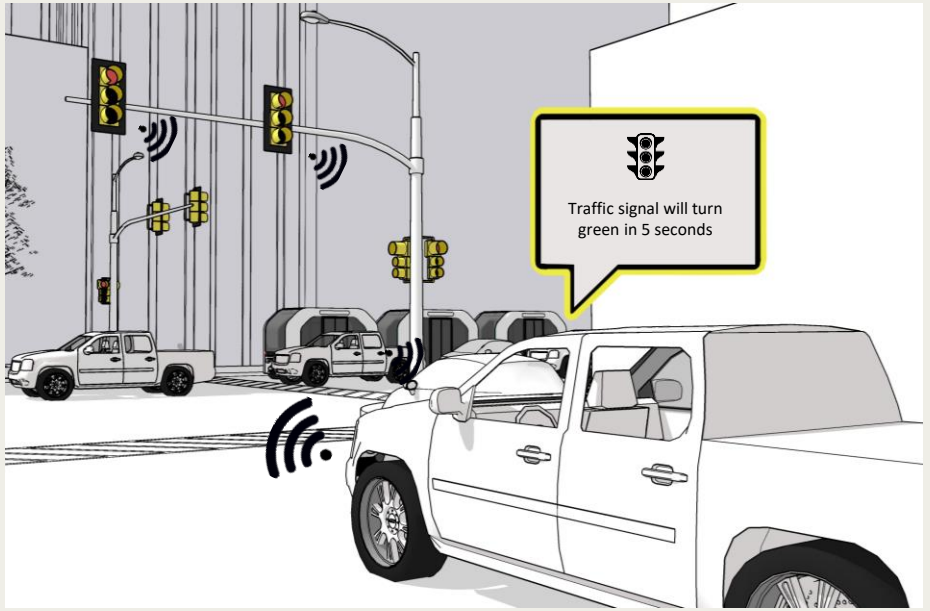
While real time data is useful for safety critical messaging, providing historical data can also be just as helpful for safety informational messaging as real time. e.g., notification of a pedestrian dense intersection, average length of red light, or specific traffic rules for a particular intersection, etc.

USE CASE PERSPECTIVES FROM INDUSTRY EXPERTS

BASIC LEVEL OF SAFETY

Safety is a principal consideration in the transportation industry, particularly among long haul freight companies like UPS, FedEx and Amazon. Safety is a significant concern due to the associated liability and the high cost of insurance. However, this use case was viewed more as a ‘comfort’ or potential ‘luxury’ feature, as opposed to a safety feature.

An opportunity may exist to tie this use case more directly to efficiency, which has a more tangible value proposition to the commercial market e.g., green light optimal speed advisory.

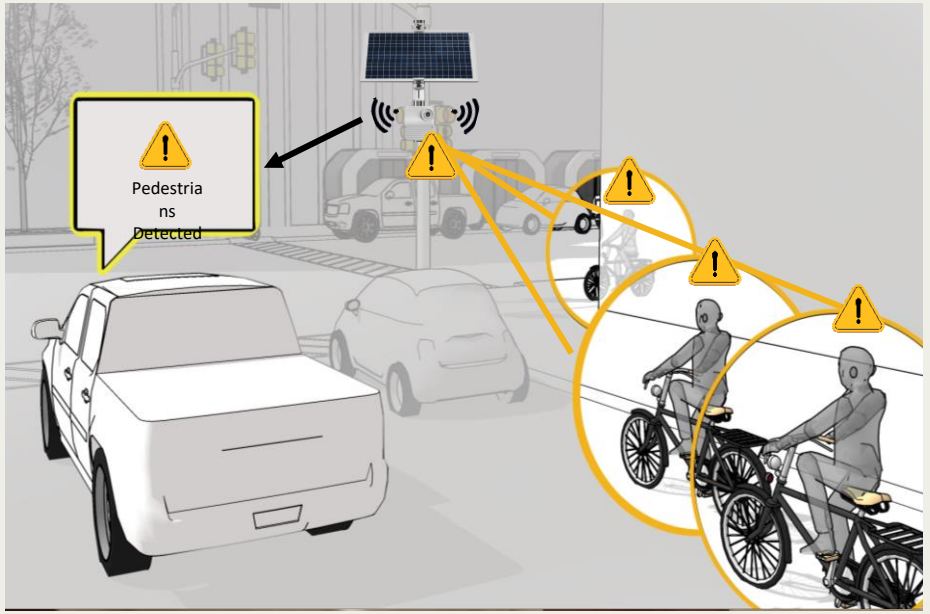


“V2X is a real tangible safety benefit that can be shown from day 1 and has more society value that automated driving does in its early phases.” – Audi

VULNERABLE ROAD USER ALERTS

The application of V2X in this use case was seen as extremely beneficial and was the highest valued. However, concerns were discussed regarding the challenges associated with predicting and relying on the behavior of pedestrians and cyclists.

Interview discussions highlighted limitations, especially in situations where pedestrians or cyclists deviate from established norms, making their detection more challenging (such as crossing between cars or moving in the wrong direction). While V2X is becoming more widely deployed, infrastructure priority should be given to intersections with the highest incident/accident rates.

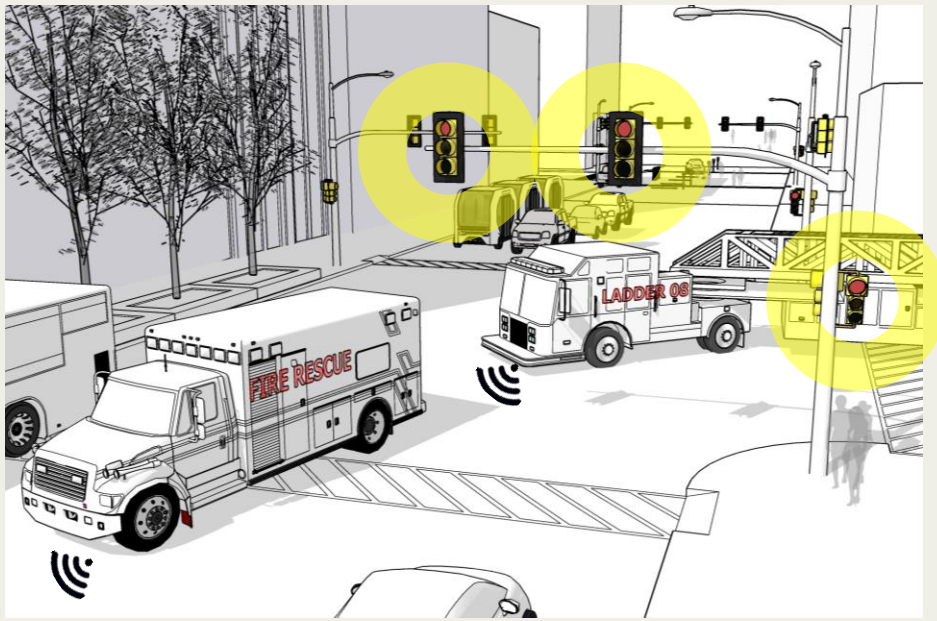


"Hitting other vehicles is a problem, hitting a person is a much bigger problem." – Shyft

SIGNAL PRIORTY/ PRE-EMPTIONS

This use case has the potential to be beneficial for fleet vehicles, especially within the realm of fleet logistics and possibly also within the luxury vehicle sector. In the context of commercial fleets, there was assumed interest in exploring the potential effects of influencing traffic signals that could enhance efficiency (less time spent at lights) and reduce vehicle maintenance costs (less braking and idling).

In the luxury vehicle market, where a strong emphasis is placed on tech and personalized features, this could represent an option that provides a sense of exclusivity to customers (e.g., extended green lights exclusively for a specific brand of vehicle). Equity among road users may influence how and if luxury vehicles would get priority.

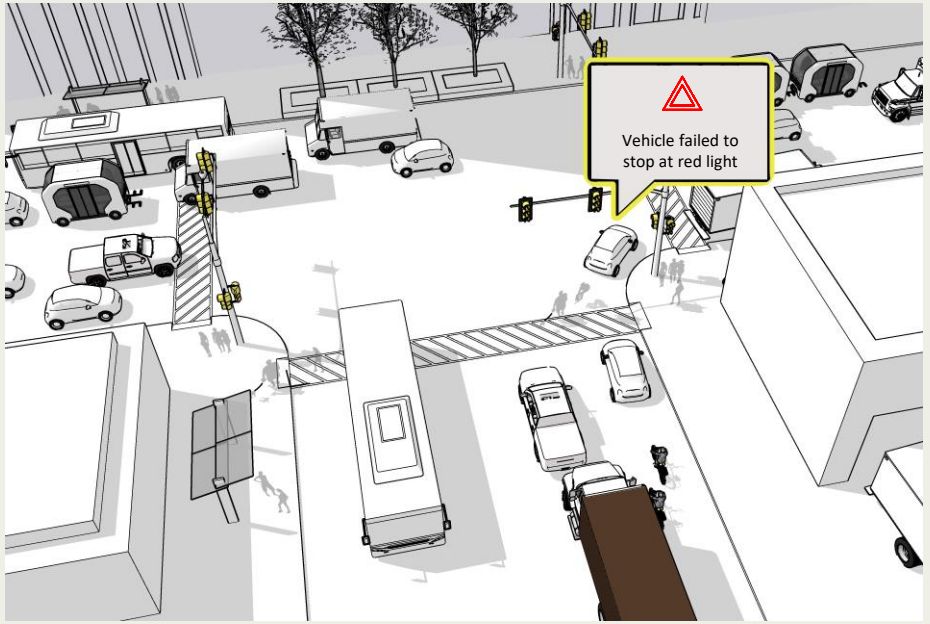


"Everyone likes to feel special…extending a green light has strong appeal." – ZF

FLEET INTELLIGENCE

The potential to enhance safety and efficiency in fleet vehicle operations was of high importance. However, concerns were raised regarding data ownership. Leveraging this data to gain insights that could contribute to establishing new rules and regulations for a fleet company on a broader scale was viewed particularly beneficial e.g., no left turns due to high likelihood of accidents based on historical data.

Additionally, this data could prove instrumental in assisting fleet companies in managing liability and insurance costs, currently near-miss accident data is hard to acquire. It's also worth noting that perspectives within the fleet industry may differ based on specific companies; for example, UPS independently operates and manages its fleet, while Amazon uses 3rd party companies.

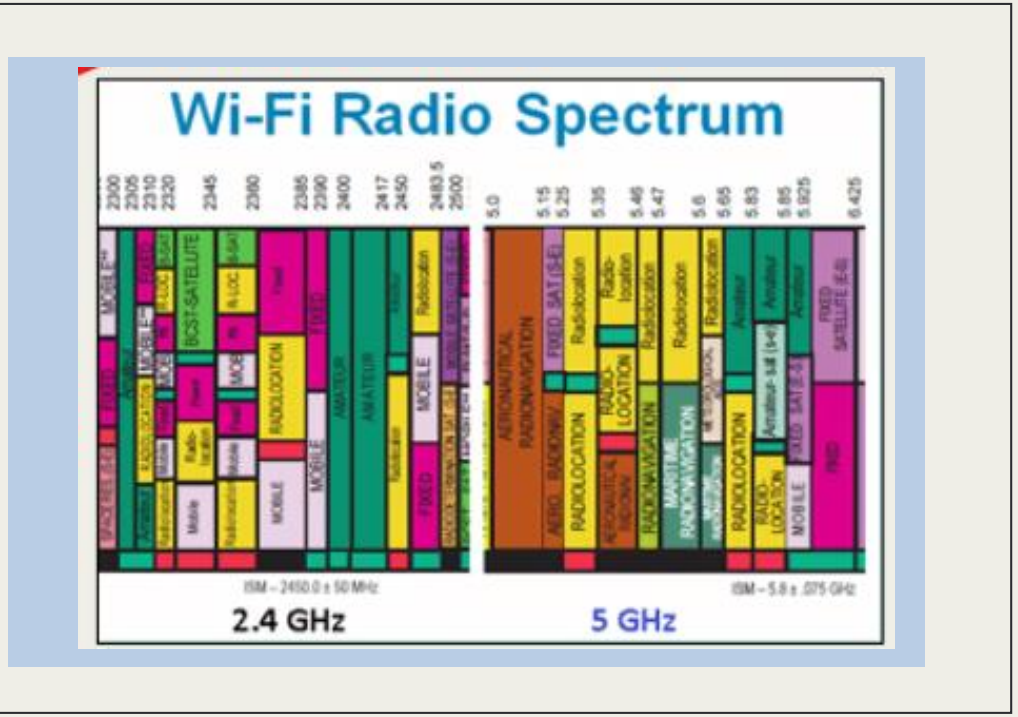


"Every second counts…they're always looking to be more efficient." – Shyft

EXTENDED TRANSPORTATON SPECTRUM

There are some concerns surrounding "urban canyons" within cities where signal loss can occur and cause a disturbance to V2X communication. To ensure V2X effectiveness and adoption, there is a requirement for high fidelity, low latency, and interference-free connectivity such as utilizing this extended transportation spectrum. However, there are concerns with the use of unlicensed Wi-Fi not being able to be utilized worldwide.

Overall, accurate maps are crucial for assisting vehicles, particularly autonomous vehicles, navigate through intersections safely. There is a debate between the need for historical and/or real-time data, as it is believed there needs to be a balance in providing general information to drivers while defining the potential benefits of real-time data granularity. Additionally, data privacy concerns may impact policy and standards concerning V2X deployments.



“It’s more practical to use something that already exists. Vehicles must perform in a known way around the world.”– Magna

INDUSTRY STAKEHOLDER ENGAGEMENT EXERCISE

INDUSTRY STAKEHOLDER ENGAGEMENT PLAN

Mission (DRAFT, to be defined)

Demonstrate viability and benefits of P3Mobility's unique C-V2X capability.

Generate Enthusiasm for & Trust in P3M Technologies

Monitor Public Perception of Emerging Pilots

Understand Changes in Public Perception, Identify Key Value Propositions

Development Activities

RCOC PILOT

TECHNOLOGY READINESS (PILOT FINDINGS) WHITE PAPER

ECOSYSTEM READINESS WHITE PAPER

Engagement Tools

End User Survey

End User Interviews

Touch & Feel Events

Media (CES events, Automotive News, etc.)

AUDIENCE

REGULATORY (government)	FCC, USDOT
INFRASTRUCTURE (technology partners)	Siemens, Cisco
INTEROPERABILITY (OEMs and gov)	Local and State Governments, GM, Stellantis, Audi, etc.
CONSUMERS	Luxury and Early Tech Adopters, VRUs, etc.

PATH TO INTEGRATION

Collaborate

With Industry Partners

Elicit collaboration between P3M, automotive manufacturers and infrastructure operators to ensure interoperability and a cohesive V2X ecosystem.

Educate

Create Public Awareness

Educate the audience regarding the benefits of V2X technology and relevant use cases, addressing concerns related to privacy and security.

Influence

Regulatory Framework

Establish desired V2X regulations and policy revisions necessary with other stakeholders and garner government support through associated organizations.

Monitor

Evaluate Performance

Continue to monitor and evaluate the performance of V2X systems to identify areas for improvement.

Enhance

Continue Advancements

Continue research and development to enhance V2X capabilities, addressing any new technologies and evolving needs.

Thank you