# *Central Texas Regional Mobility Authority V2X Tolling Pilot*

## Austin, Texas (USA)

Kapsch TrafficCom and Ford Motor Company collaborated in partnership with the Central Texas Regional Mobility Authority (CTRMA) to test a next generation of connected vehicles that provide real-time toll services at the 2020 International Bridge, Tunnel and Turnpike Association (IBTTA) Annual Meeting.

**Our mobility solutions enable users to arrive at their destination comfortably, on time, safely and efficiently.**

Vehicle-to-everything (V2X) tolling solution leverages short range communications and payment management services to create a single, convenient toll payment transaction for individual consumers and the tolling authorities.

V2X Tolling, in vehicle, is defined as toll charging or electronic fee collection (EFC) supported by electronic equipment onboard a vehicle and utilizing V2X communications. The goal is to establish a uniform experience for individual consumers and tolling agencies, leveraging V2X technology to create a fast and efficient way to collect tolls in a secured manner, reducing fixed costs and increasing traffic throughput.

## Project Scope:

The scope of this Ford-Kapsch partnership was to demonstrate CV2X-PC5 technical feasibility between the RSU and Vehicle (OBU) through the exchange of TAM, TUM, TUM-Ack air interface messages and also the localization and charge data sent in TUM from the Vehicle (OBU).

The demonstration examined the reliability and accuracy of GPS-based tolling system using Kapsch connected vehicle (CV) roadside units (RSUs), MEC with Cellular-U Connectivity and vehicles equipped with connected vehicle Onboard Units (OBUs). In-vehicle messaging capabilities were also demonstrated.

The two locations in the Austin (Texas) region operated by CTRMA were identified based on existing tolling technology (fixed or dynamic priced tolling) and proximity to Austin for the demonstration:

- 45SW – A 3.6-mile fixed toll roadway connecting Loop 1 (MoPac) and FM 1626. It includes two tolled lanes in each direction.

- MoPac Express Lane – An 11-mile variably-priced tolled express lane along MoPac between Cesar Chavez Street and Parmer Lane.

The current tolling gantry infrastructure at the locations included gantries, an enforcement system (VES) cameras, an audit system, vehicle readers and sensors.

## Our Solution:

- Kapsch installed its dual-mode / dual-active RIS-9260 roadside unit (RSU) at toll gantries on the MoPac Express Lane and on the 45SW Toll Road. The RSUs communicated with Ford test vehicles using "Cellular Vehicle to Everything" (C-V2X) connected vehicle technology. Test drivers in Ford vehicles received visual and verbal messages as they approached and passed through tolling points.

- On the MoPac Express Lane, which has variable pricing that changes based on traffic volumes, drivers were notified about the toll rate prior to choosing whether to use the lane. On the 45SW Toll Road drivers were notified about the toll rate before passing through the tolling location. On both roadways, as drivers pass through the tolling location, the vehicle confirmed that the toll was paid. Drivers had the option to access their toll user account for a receipt and perform other account functions.

- In addition to tolling, the Ford connected vehicles will be able to receive and inform drivers with notifications about speed limits, roadside signs, and traffic conditions. The pilot project will test the ability of the Kapsch roadside units to accurately and effectively exchange this type of information with the Ford test vehicles.



## The Added Value

- Based on the results of the pilot, lane level accuracy at the gantry may be achieved utilizing C-V2X technology. The pilot provided evidence of the feasibility of gantry-less tolling which in the long run can result in significant reduction in infrastructure complexity, infrastructure investment and costly enforcement overhead services.

- The C-V2X tolling solution promotes significant potential value for toll roadway operators and customers including national interoperability (SAE standard messaging), reduced toll transaction revenue leakage and overhead charges, flexible and dynamic pricing, and consolidating collection and enforcement. The concept furthers the convergence of tolling and ITS services through total corridor management. In parallel with tolling services, ITS safety and mobility use cases enable critical information dissemination for weather, accidents, travel advisory, roadblocks, and emergency and first responder vehicle alerts.