White Paper #4 — Future of Tollling Series

Mobile – The Future of Tolling?

Compiled by: A-to-Be® | Mobility-Beyond

Executive Summary

Technology has been a disruptive agent in the transportation industry, and it's not slowing down. Look no further than what Uber has done to the taxicab market or what smartphones with mapping apps have done to traditional maps. However, **the transportation economy and specifically the tolling industry are still ripe for new technologies** to improve the user experience. According to Pew Research, 85 percent of Americans own a smartphone and, across the globe, over 6 billion people own a smartphone (Pew Research Center, 2021). **As smartphone ownership has increased, some tolling authorities are now exploring mobile tolling technology**.

> "Mobile tolling is prime to disrupt the ETC marketplace, and ultimately replace transponder-based systems."

All-electronic tolling (AET) is an increasingly popular option in the tolling industry. It has become the foundation of toll collection in the United States, **used at almost 60 percent of tolling facilities**. AET helps operators save money, reduce greenhouse gas emissions, improve traffic safety, and, perhaps most importantly to their customers, keep vehicle traffic flowing. **Mobile tolling can be considered a type of AET**, since there is no cash or card payment at the tolling point and ideally, no human review required. Thanks to the smartphone, mobile tolling is prime to disrupt the electronic toll collection (ETC) marketplace and ultimately replace transponder-based systems such as E-ZPass. Motorists today are accustomed to using a transponder to pay tolls but, by downloading and registering with a smartphone app, they can drive through an electronic tolling facility and pay their toll just like they would with a transponder. **However, today, mobile tolling apps only make up a small fraction of the tolling ecosystem**.

How Does Mobile Tolling Work?

Because more than half of U.S. facilities are cashless and operate without toll stations, anyone using them typically needs a transponder to pay. Without a transponder, the driver's toll is processed, often with an additional fee, relying on video and by using license plate recognition (ALPR) algorithms. Currently, **most mobile tolling options in the U.S. work with ALPR or "video tolling" systems**, occasionally supplemented by GPS. Mobile tolling ties the license plate to a user's account and payment method through the app, and then the car is charged through ALPR. The app primarily serves as account management. When the driver passes through a tolling point, they may be considered a violator or a Pay by Mail customer because they have no transponder, and the license plate are compared to the mobile app registered customer list. If there is a match, the driver is charged through the app's default payment method. **A driver's phone doesn't have to be in the car or awake for the app to work**; the toll will be charged automatically once a car is registered in the system and passes a tolling point. If the vehicle is not on the list of app users, they typically are looked up in nearby DMV databases and are billed by mail.

In some cases, when a vehicle crosses the toll area**, the app checks the vehicle's current position using GPS coordinates**. Then, the app sends the transaction information to the back-office system

used by the tolling agency. The back-office then stores the toll data and sends the transaction information to the mobile app, and the app settles with the tolling agency through the user's desired payment method.

Another mobile tolling option relies on Bluetooth technology. In contrast to the majority of tolling apps which rely on backoffice system (BOS) data and ALPR or costly human image review to identify a driver without a transponder, **Bluetooth beacons can be positioned at the toll site, constantly sending out signals**. As the driver approaches the toll gantry, the phone receives the beacon's signals, the signals are captured, and the app communicates with the backoffice system to register the passage. Today's Bluetooth technology is powerful enough to differentiate between the tolled road and nearby, separate roads.

A-to-Be is currently trialing this disruptive approach as a potential replacement for transponders or as complement for agencies to increase revenue assurance, in both open road tolling and channeled lanes.

Benefits of Mobile Tolling

> "Agencies that use new tolling technologies... can expect to experience increased revenue... and decreased leakage."

Agencies that use new tolling technologies, including mobile tolling, can expect to experience **increased revenue streams and reduced leakage**. Reducing leakage is crucial because, according to KPMG, tolling operators lose, on average, $8 million per year from inefficiencies and leakage (KPMG, 2019), (Scolforo, 2021) . By prompting occasional toll road users to create mobile accounts, road operators can **reduce revenue leakage** and **save money by reducing bills sent by mail**.

> "Mobile tolling can help improve interoperability."

The **lack of interoperability in tolling between different states leads to many problems**, namely leakage and a higher cost to collect tolls from users of non-interoperable toll roads. Mobile tolling can help improve interoperability. For example, **having one mobile tolling app used by most ETC systems could enable a driver to pay tolls virtually anywhere in the country** using the driver's one tolling account, without having to stop at a booth or deal with enforcement issues from different tolling agencies. Those agencies also **wouldn't need to establish interoperability protocols** with other ETC systems.

> "Another benefit of mobile tolling is convenience."

Another benefit of mobile tolling is the convenience of allowing vehicle owners to simply pay these bills through an individual's smartphone rather than ordering a transponder in the mail or picking it up in a store. Customers benefit from a **simple account management interface** on their smartphone, **multi-modal payment options, singular invoicing**, and **dedicated customer support**. Mobile tolling can also help reduce the transmission of viruses as the human contact between the driver and toll collector does not need to take place.

> "Mobile tolling would eliminate the need for toll booths and labor costs to staff them..."

Further, AET and, in this case, mobile tolling, **helps tolling agencies save on labor costs**, which, according to the KPMG study, **accounts for 55 percent of the total cost to collect a toll**. Industry averages show that the typical cost to collect a cash toll is about three times that of electronic collection options, at about 50 cents, and the cost to collect a toll by video is about 38 cents, versus a cost to collect as low as 18 cents for a transponder-based transaction (KPMG, 2019). Mobile tolling would eliminate the need for toll booths and the labor costs needed to staff them at all hours of the day and night and removes the cost of looking a license plate up in DMV databases and sending a paper bill**. By investing in mobile tolling, state governments can see significant savings** and reinvest those savings in aging infrastructure.

Concerns

> "...Mobile tolling app providers will need to work with video tolling subsystem to navigate edge cases."

In today's digital age, cybersecurity and data privacy are important concerns. These concerns can slow adoption of new technology. **Mobile tolling users must be willing to download the app onto their smartphone and input all the necessary data**. For various reasons, including privacy, some drivers may not be willing to do this. To ensure that data privacy is secure, mobile tolling providers **adhere to all industry standards and go one step further by encrypting all transactions**. At the same time, many other apps track users just as, or even more, closely than a mobile tolling app does.

Other concerns exist if the system relies solely on the mobile app. As an example, one practical concern for mobile tolling is **what happens if a driver's phone is dead when they pass through a toll?** Similar to current tolling systems, mobile tolling app providers will need to work with video tolling subsystem to navigate edge cases like these. Additionally, the relative immaturity of this technology, when compared to the current technology, may discourage its immediate adoption, but as with any new technology challenging an established one, **adoption is likely to accelerate over time as mobile tolling matures**.

Where is Mobile Tolling Taking Place?

Southern and Northern California, North Texas, Kansas, and many other regions and states are using mobile tolling and mobile apps today.

In Southern California, mobile tolling is available on the SR-133 Laguna Freeway, SR-241, SR-261, SR-73 in Los Angeles and Orange Counties, and the SR-125 South Bay Expressway in San Diego. In Northern California, users can use mobile tolling on the Antioch Bridge, Benicia Martinez Bridge, Carquinez Bridge, Dumbarton Bridge, Golden Gate Bridge, Richmond San Rafael Bridge, San Francisco Oakland Bay Bridge, and San Mateo Hayward Bridge.

Drivers in Virginia can use their smartphone to pay to drive on Virginia's toll roads even if drivers don't have an E-ZPass transponder. Mobile tolling could be very important as **25 percent of drivers in the Washington region don't have a transponder**. Virginia's mobile tolling app works on over a dozen roads, including the express lanes on Interstates 395, 95, 495, and 66, and on the Dulles Toll Road.

Further information from Virginia includes a report **stating 80 percent of drivers in the Washington D.C. area that were surveyed said they are interested in a mobile app to pay for tolls**, 60 percent want to see real-time toll price information, and 65 percent said they are likely to increase toll road use if they could pay using a mobile app (Lazo, 2020).

Mobile tolling also has a presence in Europe. For example, in Portugal, **Via Verde has been piloting mobile tolling since mid-2021**. Drivers using Via Verde in Portugal download an app, similar to the apps drivers would use in the United States and register their vehicle (since the current app is still a pilot, no payments are yet taking place). When the driver passes a tolling point, the app uses geofencing technology to register that the driver has passed that point. Then, the app sends the transaction data to app's backend system to generate the record of the passage. In future versions of the app, this passage record will be sent to the backoffice, which will store the toll data and settle with the tolling agency through the user's desired payment method. **Mobile tolling also takes place throughout Europe using ALPR and apps such as BroBizz, Blue Media, and Satelise** (Ptolemus Consulting Group, 2021).

Conclusion

Today, **there is an app for everything, and tolling is no different**. The early uses of mobile tolling in Europe and the United States offer compelling evidence that mobile tolling can be the future of ETC. **Mobile tolling helps tolling agencies capture potential leakage** and offers consumers the **added**

ease of using their smartphones to pay tolls and manage their accounts. Using near-universal technologies such as Bluetooth, smartphones have high potential to become an alternative to the costly infrastructure and a true replacement for a transponder. Just as technology has positively disrupted our everyday lives, mobile tolling and future technological developments will propel mobile tolling even further into the mainstream.

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