Solar-powered data gathering system enables more accurate traffic planning

It is a common problem in traffic planning: models are often not well suited to assist in planning new road construction or adding/changing capacity of the existing road network. This is not because the models are not good, but because their input data is inaccurate or is purely based on assumptions. This is not a good starting point when deciding where to invest limited funds. But there is help at hand…

The BS2-TS solar-powered station manufactured by ADEC

Need to know

An easy to install, wireless traffic data gathering system

- The BS2-TS uses up to three passive infrared (PIR) sensors
- It weighs just 3.5kg and can monitor up to three lanes of traffic
- Just one hour of sunlight per day is enough to power the system
- Data is transmitted via the cellular network

Above: **The BS2-TS is an easy to install solar-powered traffic data collection unit**
Left: **The web-based interface gives detailed data breakdown**

Technologies retrieves traffic data from up to three passive infrared (PIR) traffic detectors and sends it to a secure server. Historic and up-to-the-minute traffic data can be viewed and downloaded via any internet browser. The PIRs are directly connected to and powered from the BS2-TS; no other power source is required.

The BS2-TS, including solar panel and battery, is small and lightweight (265 x 220 x 90mm, 3.5kg). This permits the mounting of the BS2 on lampposts in urban areas or overpasses on highways. Two to three lanes can be monitored per BS2-TS. While the system is suitable for temporary traffic counts thanks to its straightforward installation, permanent solutions can be quickly realized as well.

Charging ahead

A BS2-TS with two detectors trickle charges the battery even on cloudy days. One full charge could power the system, including two PIRs, for about five days in complete darkness. With an hour of sun per day on average, the system can power three TDC1 detectors.

The BS2-TS transmits the data to a secure server. The front end of the system is the web browser. Thanks to the web interfaces on the server, the traffic data is accessible to any third-party software with internet access (and proper credentials) via secure https.

The BS2-TS uses the cellular network to transmit the data. Depending on the specific application, the BS2-TS can transmit single vehicle records or averaged data. Transmitting single vehicle records leads to greater data usage. As a rule of thumb, when transmitting each vehicle's properties (speed, length, gap), 15,000 vehicles per day consume about 2.2MB (this data volume does not linearly increase or decrease with the number of vehicles; half as many vehicles require somewhat more than half of that). Depending on the data plan on the uplink, it may not be optimal to transmit the traffic data of each vehicle, so the BS2-TS can be configured to average the data on an interval basis of 2, 5 or 10 minutes, and to only transmit the aggregated values, substantially reducing the data usage.

Larger customers (based on their buying power) typically use their own data plans. But for

those who do not have such an option, ADEC Technologies provides SIM cards in the BS2 that cost as little as US$0.08 (€0.075) per MB, plus an additional US$3.33 (€3.00) per month in Western Europe.

Easy installation

On the server, the stations are installed in so-called portals. Each customer account can set up a number of portals; each portal is a collection of one or more BS2-TS station, preferably within geographic proximity to be able to take advantage of the map feature in the browser.

All aspects of an installation are done through the web-browser. The account credentials are shared among the individuals within the organization who need access. Next, a portal is installed to group the BS2 stations to be commissioned. The station and the detectors are added to the portal using their respective IDs. This can be done on-site or later on in the office. The system is operational and traffic data is retrieved, transmitted and stored from the moment the station is added to the portal.

The BS2-TS with up to three TDC1-PIR traffic detectors is the smallest station for monitoring up to three traffic lanes available on the market today. Combined with its universal, secure and user-friendly browser access, the solution is a perfect tool for traffic data acquisition for any individual, community or authority wanting to get a clear understanding of what really happens on roads.

by **J J Eden**

New, integrated tolling technology is now being demanded by customers – the industry must respond

It wasn't too long ago that collecting tolls didn't involve making complex decisions about financial business rules, post-paid revenue, interstate enforcement and private sector integration into revenue collection.

'Back in the day' we had a uniform, well-accepted cash payment system. Around 1978 (yes, that was almost 40 years ago!) traffic and right-of-way restrictions combined to jeopardize our ability to effectively serve our customers. As agencies, we reacted by finding RFID technology developed by the military that we thought would solve the growing toll plaza congestion; thus electronic toll collection (ETC) was born. We sought the public's interest in ETC but received little encouragement. Facing growing complaints about toll plaza congestion, the industry pushed ahead and soon realized that this technology, which promised to improve our lane operations, was impacting every department in our authorities. With the first implementations came accusations of privacy violations. After a year, success came as more and more customers saw the benefits of ETC.

AET (All Electronic Toll Collection) was the industry's next advancement. If ETC proved to be disruptive, then AET changed everything. Not only did it change the business model of toll collection once again, but it opened the floodgates to new players and services because it was a mobile payment system. The services ranged from managed lanes and their DOT or private operators, to private sector companies buying into an agency's fleet account process in order to gain access to an entire region's multimillion customers with proprietary technology.

These changes were more customer-driven, but our customers have changed. Their habits and demands for up-to-the-minute technological conveniences will disrupt our industry once again. Unlike our customers in 1978, who saw technology and payment systems as intrusive, today's customers use payment systems to pay for pretty much everything. Younger customers are driving less partly due to ride-sharing services, they value time over money, and they don't want to stop to pay a toll. However, if they have a problem with a toll system, they demand a high level of customer service. More importantly they want combined billing systems so that all of their mobile payments can be made on one device. Sure you can utilize the same payment card on your Apple Pay, Google Pay, EZPass, Sunpass and SpeedPass, but you would need multiple devices to achieve it, and if there was a problem it would result in multiple phone calls.

> Younger customers value time over money; they don't want to stop to pay a toll

In 1978 the toll industry was far too small for banks and large companies to take an interest in. Today, the in-car mobile payment market estimates exceed US$50bn per year so we are seeing a push into the tolling/mobile payment market. This influx of interest from big financial and tech giants, coupled with customers willing to embrace the idea of getting the government out of the tolling business will result in yet another new business model that could topple our existing structure.

It is high time for us to lead these changes, not obstruct them!

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