

FREE FLOW SYSTEMS: FULLFILING THE ELECTRONIC FEE COLLECTION SOLUTIONS PORTFOLIO

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ABSTRACT

Brisa Inovação e Tecnologia (BIT) is a business unit of Brisa Group, the main Portuguese highway operator, which is in charge of all the developments of technologic solutions related with toll charging and telematics.

The free flow systems, which allow the toll classification, collection and enforcement on highways, maintaining the normal circulation speed, are pointed out by many as the solution for the future, because it allows an effective and efficient toll collection, with low-cost implementation to the highway concession.

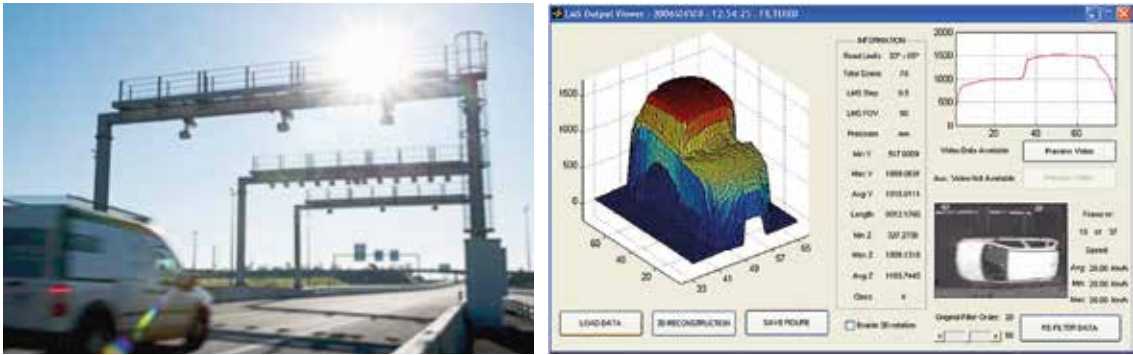
Over the years BIT has developed systems for toll collection on manual lanes (with or without toll booth operators), automatic channeled Electronic Fee Collection (ETC) lanes and now the free flow systems. With this recent development BIT offers in its portfolio of products and system, solutions applicable to all toll collection situations.

This article describes, through a case study, the development, production and installation works done by BIT, of a free flow solution at a Portuguese motorway concession. In this development process, BIT used its innovation network, engaging several partners, from the scientific, supplier and entrepreneurial domains, creating value for the company and the society.

INTRODUCTION

Either for helping to reduce traffic congestion generated at peak periods, reduce noise, air pollution and other environmental impacts or to improve business profits and sustainability, multilane free-flow systems (MLFF) or open road tolling (ORT) is positioned to support such requirements, combining the benefits of technologies applied to the transport domain.

MLFF system solution created by Brisa Innovation is based on the efficient combination of electronic toll collection (ETC) microwave technology, video-processing and dynamic vehicle classification technological services.



This solution has several benefits:

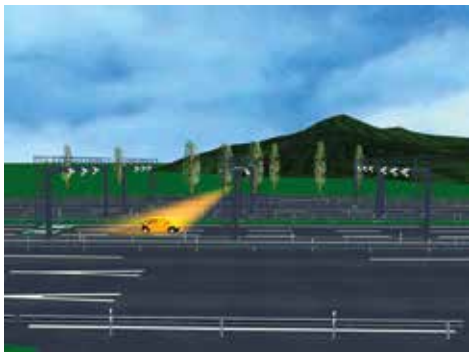
- ETC systems enable decreases down to 1/3 of the transaction cost, when compared to manual toll collection;
- Remotely auditable system;
- Lower operational cost requiring no human operators near the gantries;
- Safety increases without toll barriers, allowing the road user to maintain the same cruising speed;
- Allows road-user to minimise its green-house gas emissions;
- Full integration with 3rd party central systems and clearing houses.

The BIT MLFF system integrates both License plate and DSRC identification systems, allowing a fully auditable system with remote video streaming, using a front and rear (IR and Visible light) imagery for enforcement and toll recovery. The vehicle classification is fully adjustable according with national or international specifications, using a laser curtain with 500 readings per second for greater accuracy in evaluating fraud and vehicle class discrepancies. This system allows the integration of RFID sticker tags.

This system is composed of three successive gantries. The On-Board Unit (OBU) is read for vehicle identification, associating the timestamp, and then registering front and rear license plates, which are associated with visual footage of the transaction.

The 3 main sub-systems are:

- 1 · Toll collection system, including the roadside system to communicate, and perform correct transactions with all the equipped vehicles in the toll site.
- 2 · Vehicle detection and classification system, to handle vehicles passing through the toll area.
- 3 · Video-tolling system, to identify unequipped vehicles and record the identification for enforcement purposes or, when video-tolling is enabled, to carry on with the toll transaction.



Transactions are only fully qualified to be delivered to central systems result from combining these sub-systems' data.

IMPLEMENTATION CASE STUDY

At the beginning of 2008, Brisa Innovation was awarded a contract to supply a complete cashless solution to Northwest Parkway (NWP) in Denver, Colorado, USA.

This 13mi highway, operated by NWP, is now equipped with BIT solution, comprised of toll lane level equipment and a central system that was developed by Brisa Innovation and Via Verde Portugal.

Additionally, the company has also signed a ten year service agreement for both lane and central systems' levels.

CHALLENGE

The proposed main goal was "To setup, design, develop and deploy a fully Cashless Toll System to fit the NWP needs allowing to follow other local operators' strategy". From the operator's side, one of the main goals was to reduce operational costs. Also, as the adjacent highway E470 adopted a cashless system, NWP decided to follow this new operational strategy. Manual toll lanes were problematic, since they required intensive and frequent maintenance. The new solution, 100% ORT, should also apply to design and implement a new more cost effective maintenance model. The Client expectations for this project were that, through this new system, chances for success would be maximised, with the ability to grow and adapt more efficiently.

SOLUTION

When using Brisa Innovation solution, all road users, without exception, use the motorway without stopping. Also, for each transaction, the Road Operator does not require any manual intervention. By using the system and paying for the service provided,

the customer has several options:

- a) Installing an OBU (On-Board Unit): by associating it with a pre-paid account, every trip on the open road toll plaza is automatically charged. These OBUs are issued by E470, where all transactions are collected at the lane level and sent to E470 for reconciliation and payment.
- b) Optionally, the end user creates a GO-PASS online account with NWP. Each passage uses license plate recognition (ALPR) for vehicle's identification, which is then credited to the account.
- c) The last option was designed for those road users that do not need or want a pre-defined contract. Brisa Innovation's ALPR works to positively identify the vehicle, enabling that a bill is sent by post to the vehicle owner's registered address, with the least amount of manual intervention. Within normally 30 days, the payment can be reconciled, by accessing the GO-PASS online website and crediting a bank card, through a secured and certified data transmission. This option is more expensive for the road-user, due to administrative costs.

Brisa Innovation's provided a complete and integrated solution, covering several options for ensuring ease of payment, as well as secure and safe usage of tolling points. All these alternatives were meant to minimise the Road Operator transaction cost and simplify the road users' experience of the toll road.

A 35% reduction on O&M costs was achieved, thanks to a low-cost maintenance design and optimising human intervention throughout the entire toll collection process. With over 4M transactions a year, NWP benefits are:

- Seamless road network operations;
- Cost efficiencies, with a shift from fix to variable costs;
- Minimum investment option and system conversion;
- Higher convenience, without the need to carry cash;
- Environmental beneficial (GHG emissions reduction).





QUICK NOTES AND FACTS

Customer's name: Northwest Parkway LLC

Country: United States of America

Completion date: Since 2009

ROADSIDE SOLUTIONS INVOLVED

- MLFF (ORT) ETC Solution (2x3 lanes in Mainline);
- Single Lane ETC Solution (1 lane in Mainline, 4x1 lanes in Ramps);
- ALPR (Advanced License Plate Recognition);
- Video Enforcement System.

BACKOFFICE SOLUTIONS INVOLVED

- GO-PASS Website (www.go-pass.com);
- Esys (Photo Processing);
- BackOffice (Handling GO-PASS and Express Toll Accounts, System Reporting, Fees, Parameters, Alerts).

STRATEGY

Brisa North America aims to increase its market presence and capitalize its long expertise as an O&M operator by implementing O&M services as part of an integrated mobility concept strategy for an urban area or corridor.