



### MULTILANE FREE FLOW

High capacity and performance is needed to register and detect vehicles regardless of speed, weather and environmental conditions. Q-Free's MLFF system is built around a Multilane Controller, controlling in real-time all peripheral sensors of the roadside infrastructure. The Q-Free MLFF system uses either conventional rigs of DSRC tag and beacon systems in combination with ANPR cameras, or the solution can also be made solely using ANPR cameras. Advanced vehicle detectors performs detection and classification of each vehicle. MLFF solutions with DSRC beacon and ANPR

cameras are operational in Australia, Portugal, Norway and Sweden, whilst an MLFF system solely using the ANPR cameras for identification and enforcement is used in the Stockholm Congestion Tax System in Sweden.

First showing a successful demonstration of DSRC MLFF in 1996, Q-Free still is the world leader with respect to development of MLFF solutions. Q-Free's MLFF technology can be implemented in any ITS scheme requiring high performance and availability.



### ROAD USER CHARGING

Since 1986, Q-Free has been delivering innovative and profitable Road User Charging solutions to customers world-wide. Be it Electronic Toll Collection, mixed operations ETC and manual toll collection, Multilane Free Flow or conventional plaza arrangements, Q-Free has a solution for all.

### TRAFFIC SURVEILLANCE

Q-Free delivers an interesting range of solutions well suited for traffic surveillance. If you are looking for an affordable solution to precisely monitor the flow of traffic, Q-Free's ANPR-solutions are excellent for this purpose. If you want to implement systems for section based speed control, again our camera based ANPR solutions are the best solution for this. Q-Free offers an extensive suite of camera based solutions, offering ANPR, photo fingerprint and image analysis.

### TRUCK TOLLING

Truck Tolling is in reality a variety of a Road User Charging scheme. Some properties however make Truck Tolling differ from conventional Road User Charging. The percentage of traffic encompassed by the scheme is typically low and the number of control points is typically high. This means that a Truck Tolling scheme aims to reduce the investment related to road infrastructure and that this can be done by allowing a somewhat

higher cost per vehicle unit. This leads to the choice of GNSS for the purpose of determining tax liability for each vehicle. Q-Free's solutions utilizes GNSS-OBUs with the capacity of DSRC communications for easy control. The enforcement equipment, in fixed control posts or mobile enforcement vehicles, is equipped with ANPR cameras for the purpose of identifying violators and providing legal evidence for the violation.

### BACK OFFICE

A Back Office implementation is a system deployed to execute the business rules of each system in question. Thus, every Back Office solution from Q-Free is implemented to allow for customer specific business rules and routines.

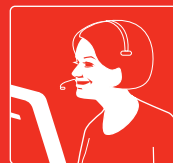
At the very core of the Back Office is the Operational Back Office, the heart of the system, that collects all events from the infrastructure, processes this according to rules and charges the customer accounts affected accordingly. The OBO also

generate supporting statistics, provides system surveillance and dispatches information to all system parts connected.

The OBO provides interfaces to the Commercial Back Office, CBO, allowing the CBO to exchange information between the OBO and service providers. The option of offering the CBO interface, means that Q-Free rapidly can deploy a Back Office solution into virtually any business environment. A CBO is typically delivered through local allies with Q-Free.

Q-Free's Back Office solutions offer all known varieties of subscriptions (prepaid, postpaid, credit card payments, bank account clearing), a wide range of discount schemes, charge to account or period based subscription, multiple vehicles to one account type services and so on.

All Q-Free Back Office solution naturally offer full audit trails and integration with all major ERP systems.



### CONGESTION CHARGING

Whilst Road User Charging primarily focuses on maximising the return on investment, Congestion Charging solutions aim to distribute and reduce the traffic in such a manner that the traffic becomes less congested, travel time improved and the environmental impact from transportation reduced. Q-Free's solutions for Congestion Charging are made to fit into a city environment, offering fair and reliable services

with high degree of availability. As for the Road User Charging solutions, we utilise all parts of our toolbox to make a solution perfectly fitting to each case. Choose from Multilane Free Flow solutions entirely relying on ANPR-cameras to conventional tag and beacon based solutions. Select from a variety of control station topologies, from conventional MLFF stations to single-pole implementations.

### GNSS

GNSS, Global Navigation Satellite Systems, technology is offered to be used in solutions where complex Road User Charging schemes are to be applied. Q-Free's GNSS technology is the perfect choice when large geographical areas shall be covered and a future change of the tariffs can be expected. Offering efficient enforcement solutions and high performing infrastructure with low initial investment, this is the perfect choice for Truck Tolling or heavy goods vehicles' taxation.

### VIDEO TOLLING

In some markets, the use of only video cameras to identify the vehicles might be an interesting option rather than deploying a tag and beacon based solution. In particular, if the traffic affected by the system to a large extent is local traffic and the access to vehicle registers is good, Video Tolling can be a very interesting solution. Video Tolling is also an option to consider in case a number of motorists requests interoperable services. Rather than exchanging OBU identities, the operators can exchange video fingerprints, thereby securing mutual identification of the vehicle. Video Tolling offers high performance solutions with very low initial investment and offers an excellent path to interoperability in case operators with noncompatible technical solutions seek for interoperability.

