



Spanning the Bosphorous

REDFOX ID'S QUANTUM TECHNOLOGY REDUCES CONGESTION, HELPS WITH ENVIRONMENTAL IMPACT AND INCREASES TURNOVER FOR TURKEY'S HIGHWAYS DIRECTORATE

PROJECT: HGS - Hızlı Geçiş Sistemi
LOCATION: Istanbul, Turkey
CLIENT: Tetra HGS
APPLICATION: Single lane tolling upgrade to ORT
PRODUCT: Quantum TA

15 July Martyrs Bridge



The 15 July Martyrs Bridge or unofficially the Bosphorus Bridge, (also called the First Bridge), is one of three suspension bridges spanning the Bosphorus Strait in Istanbul, Turkey. There are 2 other bridges also connecting Europe and Asia, the Second Bridge, Fatih Sultan Mehmet Bridge (FSM) and the Third Bridge, Yavuz Sultan Selim Bridge. These bridges historically were single lane, tolling sites with manual toll gates and barriers. They were notorious bottlenecks at peak times of traffic, increasing journey times enormously, causing considerable congestion and having massive environmental impacts on local wildlife and the regional community at large.

The decision was made in 2011 by the General Directorate of Highways (KGM) to change these sites to multi-lane ORT (open road tolling) systems enabling barrier free transactions, with the integration of toll collection systems to replace card payment. With this decision came the need to find a free-flow tolling system that could address the challenges of one of the 21st century major pan-continental arterial routes. Emphasis was placed on solving issues such as: stop/start traffic, tailgating, straddling lanes and motorcycle lane traversing.

Red Fox ID Consultancy & System Design

During the development phase in 2015, Red Fox ID (Redfoxid) were approached to assist with a novel design for a 6 lane solution on the Fatih Sultan Mehmet (FSM) bridge using existing technologies. The team's advice was then sought to design a system for the first of type multi-lane site which dealt with the extreme challenges on Turkey's busiest bridge. With over 2 decades of experience, the system integrator, toll authorities and roadway operator looked to the Redfoxid team to deliver a solution that would provide the best possible results for vehicle detection and classification, maximum toll revenue production, with the minimal roadside infrastructure and implementation cost for future projects. Redfoxid's Quantum technology was the answer and had the ability to meet and exceed all the aspects demanded by the new projects. Quantum addressed the specific traffic challenges whilst achieving accuracy levels of 99.96% for vehicle detection and 99.9% for vehicle axle classification in all traffic conditions, ensuring increased toll collection revenue, leading to fewer errors resulting in increased customer satisfaction.

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Continuing the Partnership

Securing the contract for all the new ORT systems on the FSM Bridge, which had its official opening in October'17 and included Redfoxid's innovative Quantum detection array and automatic vehicle classification technology. Following on from this, the Quantum TA technology, became the AVC tolling solution of choice for all new ORT builds and the 3rd Bosphorus Bridge - Yavuz Sultan Selim Bridge. The Yavuz Sultan Selim Bridge is a significant capital infrastructure project of national importance, the last bridge across the Bosphorus was completed in 1988. This installation comprised of 15 multi-lane ORT sites and additional new inter-connector sites.



Yavuz Sultan Selim Bridge



Fatih Sultan Mehmet Bridge

As part of the ongoing project, along with the 3rd Bosphorus bridge, Quantum was also selected for the Mahmutbey toll plaza in Istanbul. This is one of the busiest toll plaza's in the entire network with 4 lanes plus a service lane in each direction, the Mahmutbey exit became fully operational in June'17 and the Mahmutbey entry completed in August'17. The vehicle mix comprised of cars, buses and trucks with Quantum detecting and classifying over 195,000 vehicles daily. Quantum TA has since been installed on further sites including the Camlica entry and exit, Etiler (merge lane on FSM bridge) and the 15 July Martyr Bridge, recording vehicle numbers of more than 500,000 per day across all sites. These newly completed toll roads and connected bridges have generated revenue incomes of 362.32 million Turkish liras (\$96.2 million) for the state Highways Directorate in 2017 alone. The official data confirms that over 458 million vehicles paid tolls to use the facilities in the same period.

***Table shows the traffic mix & number of Quantum detected & classified vehicles per site.**

Bridge/ site name	No. of lanes	Daily no. vehicles	Traffic mix	Traffic mix %
15 July Martyr Bridge	4+1 (service lane)	95,000	Cars & buses	93% cars, 7% buses
FSM North Bridge	4 lanes	110,000	Cars & buses	89% cars, 11% buses
Mahmutbey Exit	4+1 (service lane)	85,000	Cars, buses & trucks	80% cars, 20% buses & trucks
Mahmutbey Entry	4+1 (service lane)	100,000	Cars, buses & trucks	90% cars, 10% buses & trucks
Camlica Exit	4+1 (service lane)	90,000	Cars, buses & trucks	85% cars, 15% buses & trucks
Camlica Entry	4+1 (service lane)	93,000	Cars, buses & trucks	94% cars, 6% buses & trucks
Etiler	2+1 (service lane)	18,000	Cars & buses	93% cars, 7% buses

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