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SUCCESS STORY

# Optimized traffic flow and reduced travel times

ESTABLISHING AN INTELLIGENT TRANSPORTATION SYSTEM IN TAICHUNG CITY

## PROJECT GOAL

Taichung City, located in central-western Taiwan, is suffering from congestion. City officials aimed to cut congestion and reduce travel time at the particularly problematic Daya interchange by predicting traffic conditions and offering real-time information to travelers.

## RESULTS

By implementing PTV Optima and PTV Balance, Taichung City established an Intelligent Transportation System (ITS). Traffic flow at the Daya intersection improved with a travel time reduction on the key routes by 10%.

Taichung City is growing rapidly. With currently around 2.8 million inhabitants, the city's main transport corridors are suffering from heavy congestion. Especially during the peak hours but also on holidays, the intersections in the suburban area of the Daya Region, close to the ramps of Freeway 1 and Expressway 74, are packed with traffic. The highway ramp metering system often leads to oversaturation and congestion, spilling back on to the associated urban roads and junctions thereby reducing overall network efficiency. On particularly busy days, motorists driving on Huanzhong Road from east to west, experience travel delays of up to 45 minutes. Cars travelling from south to north on the Zhongqing Road are also frequently affected by delays. In total, the area covers approximately 535 kilometers of roads with 61 signalized intersections.

## WIDENING THE ROADS IS ONLY THE FIRST STEP

To improve traffic flow, Taichung City already implemented different engineering actions: They added another lane for vehicles turning left at the junction of Huanzhong Road and Daya Interchange Contact Road. During peak hours and on holidays, the hard shoulder is also used as an additional lane to keep traffic moving. As a third intervention, Taichung City added one lane at the junction Huanzhong Road and Daya Interchange Contact Road for vehicles traveling southwards to further minimize the delays at the intersection.

## INTEGRATING AN INTELLIGENT TRANSPORTATION SYSTEM

But for Taichung City to make the best use of their existing infrastructure and further optimize traffic flow on a strategic level, in October 2017, they joined forces with Far EasTone Telecommunications (FET) and PTV Group.

## THE PROJECT IN FIGURES

The five-month project achieved significant improvements:

- Reduction of area-wide average travel time by 9.4%
- Improved average traffic speed by 8.4%
- Increased throughput rate by 7.6%
- The impact of traffic incidents can now be predicted up to 60 minutes into the future

Traffic Supervisor is PTV Optima's web-based graphical user interface.

"We are glad to work with PTV Group to implement a coordinated real-time regional traffic control system in phase 1 with PTV Optima and PTV Balance. With the real-time traffic prediction, adaptive traffic control, event management and alternative path guidance function, we can better manage congestion and respond to incidents faster", says Feng Hui-Sheng, Taichung Transportation Bureau Deputy Director-General. "The ongoing ITS system phase 2 will further expand to include more real-time data sources, such as mobile phone and GPS data. Thanks to the support of PTV Group, the motorcycle algorithms will also be implemented into the system to better localize to Taichung traffic conditions."

### REAL-TIME TRAFFIC MANAGEMENT WITH PTV OPTIMA

The real-time traffic management software, PTV Optima, combines real-time data with a model-based approach for a detailed analysis of the current traffic state and a comprehensive forecast for a period of up to an hour. The system detects incidents at an early stage and helps operators work out a response plan to reduce negative impacts on the traffic flow. Based on the analysis and prediction of PTV Optima, Taichung City can now provide motorists at the Daya interchange with alternative route guidance published on variable message signs. As the real-time traffic management software calculates the rerouting effects on the entire network area, drivers always receive reliable recommendations and know which alternative path they should take to access Freeway 1 and Expressway 74. "We are pleased to be the first system integration partner to introduce PTV Optima and PTV Balance in Asia. This is also the first project for our telecom operators to promote an ITS solution. We will expand the use of mobile big data as a new data source for intelligent transportation services in smart cities", says Kevin Yeh, Director at FET.

### ADAPTIVE SIGNAL CONTROL WITH PTV BALANCE

At six intersections in the Daya Region, the city installed the dynamic signal timing solution, PTV Balance, to optimize signal control. Based on the data input provided by the detectors placed along the road network, the software identifies any changes in the transport patterns and reacts to what is happening on the road. As a model-based control system, PTV Balance even goes one step further by automatically designing a range of signal control options and sending the optimized signal plans to the local controllers in a 5-minute interval. This way, Taichung City coordinates ramp metering in the Daya Region and reduces the overall travel delay for motorists.