Real Time Optimiser – the latest from the streets of London.

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Introduction
Siemens Mobility and Transport for London, in collaboration with the University of Southampton, are working to create the Real Time Optimiser (RTO) solution that will deliver a new era of traffic management and control.

A key deliverable of this project is a newly engineered Urban Traffic Control (UTC) system, which paves the way for the development of an entirely new adaptive algorithm that TfL will use to replace SCOOT, a solution that has been in place in the capital for three decades.

Scope of this year's JCT presentation
This JCT presentation will explain the challenges that cities like London are currently facing and are likely to face in the future, such as population growth, fast changing travel patterns, new modes of transport and evolving technology. TfL will discuss their vision for system evolution and the requirements for RTO and future adaptive control, and Siemens Mobility will provide an update as to the development status, approach, and expectations of the new adaptive control solution that forms a key deliverable of the RTO development.

RTO and a new adaptive control algorithm
TfL and Siemens Mobility view the ten-year RTO project as a long-term partnership that will allow London's road network management system to be upgraded and optimised to embrace the diverse challenges that the city's transport network faces over the next decades. But it will also provide a solution that will be of value to other cities around the world – cities of all sizes and complexities.

The current Mayor of London's Transport Strategy emphasises how important healthy streets, air quality and crucially a reliable and sustainable public transport system are for all of London. To meet these aims, a change in approach and departure from the existing adaption mechanism is necessary. As part of the RTO programme, a new adaptive algorithm is being developed, which enables all modes of transport to be modelled and optimised in a policy responsive manner. Rather than primarily focusing on vehicular traffic using traditional inductive loops, richer, multi modal data sources will be used to optimise the signalised junctions or pedestrian crossings, changing the underlying philosophy from SCOOT (of minimising vehicle delay and stops) to optimising junctions based on all road users' needs.

In general, the new adaptive control solution embraces the traditional approach, utilised in legacy systems such as SCOOT, to systematically optimise split, cycle and offset times. However, the underlying algorithms and interactions are quite different, with advanced mesoscopic simulations used to swiftly evaluate the effect of available adaption options. This increases the possibilities for effective signal time adjustments, since many more options can be evaluated with less rigid search approaches. The general strategy of the optimiser algorithms is that they evaluate changes to the input or default plan based on targeted changes based on policy and evaluation KPIs within given constraints, rather than focusing only on the degree of saturation of vehicles.

The Living Laboratory – on the Streets of London.
Whilst network simulations are useful, they do not reflect all the characteristics and dependencies of a real road network. For this reason, Siemens Mobility and TfL are deploying a "Living Laboratory" within the RTO development programme. A preliminary version of the RTO system will be deployed on TfL's network and will be used to manage traffic within a defined region in London. This real-world environment will also allow RTO and the new adaptive control features to be deployed and tested, performance improvements immediately verified and optimisation conducted if necessary.