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energising mobility

‘It’s Adaptive Control, but not as we know it’

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ImFlow is a policy-based distributed traffic signal control system. It uses state-of-the-art adaptive algorithms to optimise junction performance in real-time, alleviating congestion, reducing travel times and improving air quality.

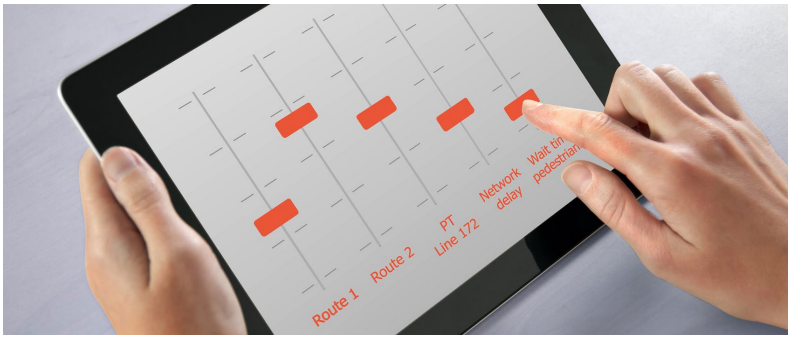
Optimal use of road capacity

Distributed and highly flexible

ImFlow is designed to run in the outstation using peer-to-peer communications with other outstations to deliver wide-area optimisation with no requirement for an instation. The optimisation algorithms are highly configurable and extremely flexible; the optimisation is re-evaluated every second with no constraints on how much it can vary other than those imposed by the user and the controller itself. The optional control centre application provides information about performance.

Policy-based traffic control

The philosophy behind ImFlow is to enable road authorities to control traffic based on their traffic policies. The policy objectives and parameters form the basis for control. Road authorities can configure requirements such as environmental targets, smooth



traffic flow on key routes, prioritisation of public transport, or maximising the flow of cyclists. These policy requirements are entered into the system and appear as sliders in the console. By removing the current need for detailed parameter knowledge, ImFlow is easy to use for both engineers and policymakers.

Control modes

The ImFlow platform has three primary control modes that can be configured to fit the traffic scenario. These modes provide the flexibility and manageability to address future changes in traffic scenarios and policy.

- Adaptive optimisation: This algorithm optimises junction capacity, based on real-time traffic intensity and predicts traffic situations in the immediate future. The queue algorithm provides ImFlow with real-time data on the road capacity. ImFlow calculates the actual saturation flow rather than using a fixed value ImFlow will instantly respond to incidents and changing weather conditions.
- Local optimisation: This algorithm optimises flow based on local traffic conditions. Green times are adjusted in line with real-time traffic volume to provide dynamic local control.
- Green wave optimisation: This algorithm optimises traffic across a series of intersections to create a green wave for traffic along one or more routes. The algorithm selects the right plan to optimise the green wave based on real-time traffic flow or a time schedule.

Make full use of new and existing detection

ImFlow can fully utilise existing loops and above-ground detection, including existing SCOOT and MOVA detectors, with no reconfiguration. It can also make use of more advanced detection such as video, ANPR and C-ITS, which generate richer data. This is possible because ImFlow uses classified traffic counts as its input.

Multi-modal optimisation

ImFlow supports optimisation across multiple modes of transport. Using advanced detection ImFlow can differentiate between different types of road user (e.g. cars, trucks, cyclists, pedestrians). ImFlow can also utilise data from connected road users (for example vehicles equipped with ITS-G5 or people using a supported app), providing further scope for optimisation. Information can also be shared with connected road users, such as predicted Time to Green and Time to Red. This allows road users to adapt their behaviour, with less harsh acceleration and braking, which bring benefits in safety, emissions, fuel economy and noise. Policies depend on the priorities of the Road Authority but could include;

- Emergency vehicles receive absolute priority
- Public transport vehicles and trucks receive conditional priority
- Pedestrians and groups of cyclists receive timely and, if needed, extended green lights

- ImFlow strongly contributes to traffic safety and optimises flow for all road users.

Cooperative Intelligent Transport Systems (C-ITS)

ImFlow has open and published interfaces to connected and cooperative applications and vehicles making it an advanced platform that is adaptable to future requirements. Dynniq supplies mobile applications providing speed advice and accepting priority requests and other information from all classes of road user (pedestrians, cyclists, cars, trucks, public transport, and emergency vehicles).

References

ImFlow is already in use successfully in multiple locations within Europe including; Helmond, Tilburg, Tampere (see further detail below), Amsterdam Airport Schiphol and Copenhagen.

Technical details

The ImFlow control application is supplied on the Application Control Unit (ACU), Dynniq's hardware platform. The ImFlow application is linked to the traffic light controller using a TCP/IP interface. ImFlow provides several log files for technical and functional analysis. To transmit information in real-time, the ImFlow intersections must be linked over a stable broadband communication network. The communication link to the optional ImFlow control centre application is not time-critical and therefore has no specific network requirements. Users can access the ImFlow control centre via a web page.

Figure 1. Dynniq ACU

The City of Tampere in Finland is literally paving the way for the most innovative traffic solutions.

The City of Tampere is positioning itself as the smartest city in Finland and beyond. One example is its implementation of a full suite of Dynniq smart traffic solutions including **ImFlow**.

Innovative Tampere

Tampere was once the home of Nokia. After the demise of the Finnish connectivity giant, the City has focussed on attracting technology companies and facilitating start-ups. Building on a tech-savvy local workforce, it is seeing success in positioning itself as a smart city. Smart traffic solutions are a logical next step. That's where

Dynniq comes in. Dynniq is providing Tampere with a full suite of smart mobility solutions: UTMS services, RMS, **ImFlow**, ImCity, real-time data gathering, journey time monitoring, GLOSA (Green Light Optimal Speed Advice), and more.

Headed to the future

Tampere's main goal is to utilize the most innovative operational mobility services improving traffic flow and prioritization at intersections, reducing emissions and improving quality of life. For example With GLOSA for example drivers can optimise their speed based on making the next green light.

Dynniq is proud to be a partner of the City of Tampere, and is working in close collaboration to optimize the cutting edge systems to meet the expectations of an ambitious client. Concrete results have been realised just a few years since the start of the collaboration. Reduced congestion, improved traffic flow and safety can be demonstrated by verifiable statistics. Tampere is a highly visible demonstration of the power of the Dynniq suite of smart traffic solutions.

The video that will form a part of the JCT presentation can be found here;
https://www.youtube.com/watch?v=BVUK3ArlodQ

Dynniq designs, develops and maintains innovative solutions that enhance everyday life for people all over the world. We aim to be a reliable partner who listens and engages proactively. If you would like to find out more, we would be happy to assist you.