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## Chapter 13

# ICT infrastructure for automated driving

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### 13.1 Introduction

This chapter provides an overview of several favourable approaches and solutions for infrastructure support of automated vehicles. Two inherent generic goals for this are to increase traffic efficiency and to enhance traffic safety. For efficiency, there are several measures that can be taken with a traffic light controller. An already established service for cooperative vehicles is Green Light Optimal Speed Advice (GLOSA) [1]. This service gives a speed advice to approaching vehicles that prevents them from stopping at the intersection. With automated vehicles, the potential of this service can be further increased due to the higher precision with which instructions can be provided and executed. However, it is also widely known that dynamic behaviour of traffic light control algorithms can deteriorate the impact of the GLOSA service and in some cases even make the service harmful.

The combination with a green wave [2] and platoon shaping takes speed advice a step further. An important element here is lane advice, because with the formation of platoons far upstream, there is a risk that large platoons stay on one lane while not using the other lanes. This leads to increased green time requirements and therefore less traffic efficiency. Research on the separate elements is already abundant, but the novel integrated system presented in the section about the integrated green wave combines green wave, speed advice and lane advice in an efficient way that can eliminate stopping at intersections completely.

Information coming from vehicles is recognized to have a high potential for traffic efficiency improvement. Speed and position data are already commonly used [3], but specific data about intended-turn direction, desired speed and sensory information of surrounding vehicles can enhance the queue model data of traffic control algorithms more significantly, leading to better control performance. The possibilities and algorithms involved in this approach are described in the last section related to intersection control.

While all these principles mainly focus on traffic efficiency and only indirectly contribute to traffic safety by making traffic flow more smoothly and reducing

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