Traffic Light Control Simulation for Various Simulation Environments

**Behnecke D**, **Fischer M**, **Farkas B**, **Assmann D**, **Berekovic M**, **Köster F**
1 German Aerospace Center (DLR), Institute of Transportation Systems, e-mail: danny.behnecke@dlr.de
2 Technische Universität Braunschweig, Abteilung technische Informatik, E.I.S

**Introduction**

The ongoing digitalization of life would not be imaginable without software. Every aspect is now or will soon be software supported or already controlled. But the more complex a piece of software becomes, or the more software is used, the greater the probability of clutter and bugs becomes. In this environment, clear, direct and unraveled software designs are highly relevant. This becomes even more important when operating in domains that harbor possible dangers like it is the case in traffic control. With intelligent infrastructure design arises the need for safe, secure and reliable software. Key components here are the traffic lights and their control.

**Design**

It is a mixture of the Observer and the Model-View-Controller Pattern. The arrows indicate both control and notify structures as well as membership of the different modules among each other. This design allows the user to simulate every control scheme, from normal fixed time controls to more complicated, adaptive ones. Also it could improve interoperability between simulation frameworks, as every framework has its strengths and weaknesses in the context of traffic simulation.

Furthermore it defines a structure that can be tested in a straightforward manner. When talking about distributed systems, testing and ensuring quality is a major task. This design presents a very modular structure and therefore a very cohesive architecture. Its modules are connected via narrow interfaces, partly given by the Observer pattern and partly domain specific. These interfaces reduce the test-cases to be tested and, again, unifies them. This would create transparency between traffic control simulation systems when it comes to traffic light controlling.