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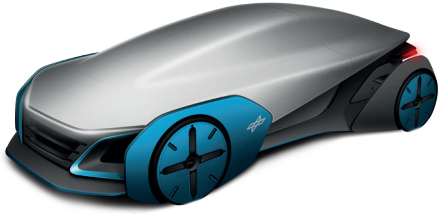
NGC Safe Light Regional Vehicle (SLRV)

Cost-effective, very light and safe vehicle

Brief description

The Safe Light Regional Vehicle (SLRV) is the smallest vehicle in the NGC family of new road vehicle concepts. It addresses the light electric vehicle segment and is powered by a fuel-cell-hybrid drive train. An important innovation of this vehicle concept is the car body, designed as a sandwich construction, in order to achieve a combination of low weight, good crash performance and acceptable cost.



Aims

One important goal of the NGC SLRV concept is to offer solutions to some of the main challenges of electric vehicles: To provide an adequate range and at the same time, a reasonable price of the vehicle. In order to address these challenges a major goal of the concept is to minimize the driving resistance of the vehicle.

Parties involved

DLR Institute of Vehicle Concepts, Transportation Systems, System Dynamics and Control Structures and Design, Materials Research

Applications

- Vehicle concept
- vehicle structure
- vehicle safety
- fuel cell powertrain
- lightweight sandwich structures
- innovative vehicle body
- crash performance of sandwich structures

Outlook

At DLR, the Next Generation Car (NGC) project is aimed at developing various vehicles that incorporate the trends, technologies and development methods of future vehicles. The main goals are: protecting climate, ensuring mobility, improving safety for all road users, managing transformation of the transport system.

Facts and figures

Light, safe L7E class vehicle
Kerb weight: max. 400 kg
Range: 400 km
Calculated SLRV fuel consumption: 0.34 kg H2/100 km (only half of a conventional vehicle concept)

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In the NGC-family of new road vehicle concepts, the SLRV – the "safe light regional vehicle"- is the smallest vehicle of the family addressing the micro electric vehicle segment in the L7e category. Apart from public transport, small electric vehicles are beneficial compared to conventional ICE vehicles in terms of social, economic and environmental benefits. NGC-SLRV addresses the safety concern of typical L7e vehicles. The SLRV is therefore specifically designed to provide a level of passive safety that is comparable to current full size vehicles. One important goal of the NGC SLRV concept is to offer solutions to some of the main challenges of electric vehicles: To provide an adequate range and at the same time, a reasonable price of the vehicle. In order to address these challenges a major goal of the concept is to minimize the driving resistance of the vehicle.

Concept of the car body

The SLRV is a 2- seater with a low, elongated body, to provide minimal aerodynamic drag. An innovative metal sandwich structure is developed to achieve a very low weight of the body-in-white of only 90 kg, and at the same time optimize crash characteristics to protect the occupants. The use of a metal-sandwich structure limits the material and manufacturing cost and also helps to reduce the number of individual parts necessary for the assembly of the car body.

Drivetrain of the SLRV

NGC-SLRV is designed for an electric drivetrain, powered by a hydrogen fuel cell system. For the targeted range of 400 km, a fuel cell system can achieve a much lower weight than an equivalent battery system. Due to the low driving resistance of the vehicle, the fuel cell system can be designed with a low power output, which limits the cost of the system, as well as the consumption of hydrogen. The challenges are to balance good driveability with the overall weight.

Chassis concept

The chassis of the SLRV uses a double-wishbone suspension for the front wheels. An innovative crash mechanism has been developed for this suspension, which is designed to avoid an impact of the wheel to the cabin, in case of a frontal crash. This will allow the design of a lightweight cabin and will improve the safety of the vehicle. The use of a drive-by-wire system will make mechanical steering devices and their associated support structures unnecessary, and will also enable an easy integration of various automated driving functions.

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