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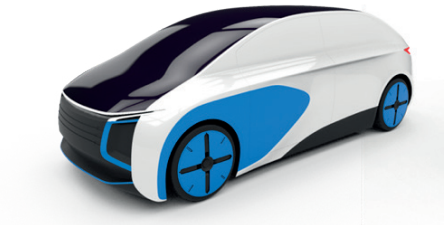
NGC Inter Urban Vehicle (IUV)

A vision for the long range

Brief description

The NGC Interurban Vehicle (IUV) offers a vision for comfortable and locally emission free driving on the long-range. With ranges up to 1000 km the Interurban Vehicle addresses the requirements of a family or business tourer for comfortable travel with automated driving modes and comfort-optimized interior and vehicle boarding concepts.



Aims

The objective of the NGC IUV project is to push the limits of locally emission free driving regarding range, weight, cost and packaging of a fuel-cell electric plug-in hybrid. The research focusses on development methods for holistic vehicle concepts and on various measures to reduce vehicle weight and to increase the energy efficiency of the vehicle.

Parties involved

DLR Institute of Vehicle Concepts, Composite Structures and Adaptive Systems, Structures and Design , Transportation Systems, Materials Research

Applications

- Overall vehicle concept development methods for locally-emission free long range individual transport
- Increase in efficiency and reduction of energy consumption by
  - Weight reduction while maintaining passive crash safety
  - Novel air-conditioning and energy management
  - Comfort and efficiency optimized cabin ventilation

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

Vehicle curb weight: 1600 kg
Fiber-composite intensive multi-material body-in-white: 250 kg

- Comfort-oriented long range vehicle with 4 + 1 Seats and SAE-Level 4
- Ranges up to 1000 km (in WLTP cycle), locally emission free
- Fuel cell plug-in hybrid electric vehicle (FC-PHEV)
- L = 5021 mm, W = 2000 mm, H = 1680 mm
- Hardware prototype of body-in-white realized

7 AFFORDABLE AND CLEAN ENERGY
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
11 SUSTAINABLE CITIES AND COMMUNITIES
13 CLIMATE ACTION

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As part of the NGC family, the Interurban Vehicle (IUV) is designed as a long range vehicle with improved comfort, safety and energy efficiency in order to overcome the current range limitations of locally zero emission motorized private transport between urban areas. As a plug-in hybrid, the IUV combines efficient battery technology for battery electric ranges of over 250 km with long-range driving distances of up to 1000 km with the fuel cell system in combination with the 700 bar hydrogen pressure tanks.

With automated driving functions up to SAE Level 4, the IUV offers a completely new kind of individual mobility. The ergonomic door concept together with a flexible and reconfigurable interior contributes to a comfortable traveling experience. The comfort-optimized cabin ventilation can adapt to the interior setting and provides both a pleasant and a highly energy-efficient air-conditioning.

An important factor in limiting energy consumption and thus extending the range of electric vehicles is the weight reduction of the vehicle structures. In order to achieve a vehicle curb weight of less than 1600 kg (including energy storage), the target of the body-in-white mass for the IUV is set at 250 kg, almost 25% reduction compared to the state of the art in this vehicle segment. For the IUV, a multi-material body structure with a high proportion of fiber-reinforced plastics (FRP) is being developed. Efficient materials with high weight-specific mechanical properties are used to increase the bending and torsional rigidity and to improve the safety of occupants and energy storage devices in crash scenarios.

In fiber-composite parts, numerous possibilities of integrating additional functions into load-bearing structural components are being investigated, whereby non-load-bearing masses can be shifted towards load-bearing masses and secondary lightweight potentials can be utilized. One example is the integration of electrical functions in the body structure. In this case, the metallic conductor tracks can contribute to the load transfer in the vehicle structure and at the same time provide contacting of electrical loads. Integration of additional functions (sensory, thermal, mechanical) results in intelligent structural modules that can become functional at an early stage of assembly.

Deutsches Zentrum für Luft- und Raumfahrt (DLR)
(German Aerospace Center, DLR)
Dr. Gerhard Kopp · E-Mail: Gerhard.kopp@dlr.de · DLR.de/en
Gundolf Kopp · E-Mail: Gundolf.kopp@dlr.de · DLR.de/en