

## OSCAR - Open Source CAR Powerful and Efficient City Car

### - Concept

The goal is to demonstrate a vehicle, which combines true practical usefulness with minimum energy consumption. The current project is the development of a state of the art propulsion system, including batteries with high performance thermal management, electric traction system using lightweight high speed AC induction motor (exceeding 25,000 rpm) with high power density and fully integrated power electronics.



OSCAR prototype

### - High Efficient Electric Drive System

#### \_ Aims

- Developing and evaluating a complete, highly efficient drive unit for light weight ZEVs (zero emission vehicle).
- Comparison and energetic evaluation of the drive-concept with conventional combustion engines and fuel-cell systems within regenerative scenarios.
- Integrating the drive into a lightweight vehicle.
- Training engineers and scientists in alternative vehicle drives (sustainable proliferation of results).
- Conveying knowledge and optimizing results by an early involvement of contractors in the design process.

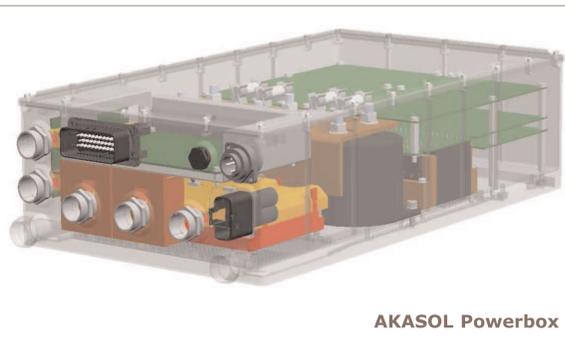
#### \_ Power Electronics

##### Progress by Functional Integration:

Charger, drive (frequency) converter, 12 V converter as well as central parts of the driver information system and battery management are integrated into a single chassis.

##### Technical specifications:

- 50V to 400V DC; 280A DC
- 100 kVA max
- Volume < 7,4 l
- weight < 12 kg
- IP 66, all plugable
- foil capacitors
- 500 A IGBTs



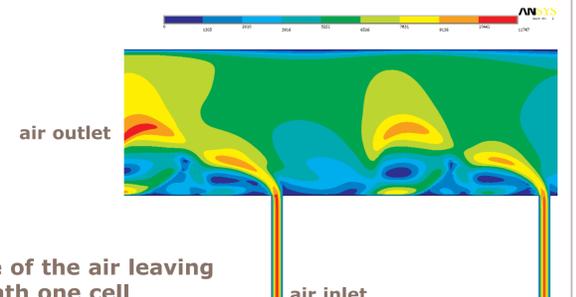
AKASOL Powerbox

### \_ Battery System Design

- technology-independent management system
- entire pack at an even and moderate temperature (thermal management)
- isolation monitoring
- protection from overheating and short-circuit



#### Air-cooled Battery System



Velocity profile of the air leaving the gaps beneath one cell

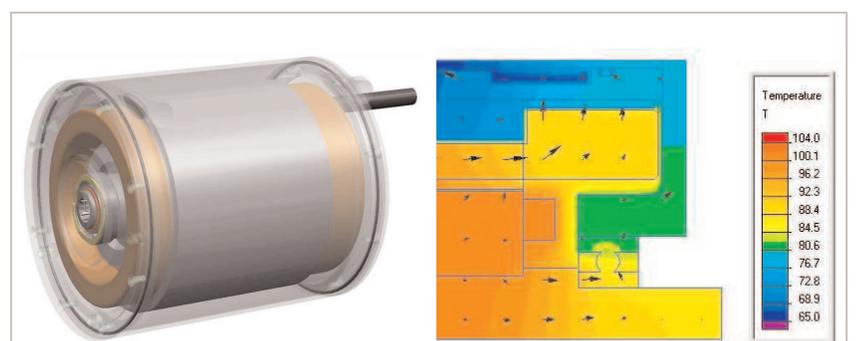
### - Conclusions

- The successful development of a high efficient drive system and a save, compact lightweight and very powerful car has been completed.
- There is a worldwide need for cars like OSCAR to avoid local emission in dense urban areas, to improve life quality with less noise and pedestrian impact friendly cars.

### Technical Data

- 1 liter per 100 km consumption equivalent 6 kWh/ 100 km off the grid
- 100 to 200 km radius without recharging enough for everyday use
- Seats for tall adults - space miracle for 2 basketball players or one player plus 2 kids
- 130 km/h maximum speed
- 2.50 m long - crosswise parking permitted a built in parking space!
- 1.55 m high - traffic under control
- 1.20 m wide - slim and easily steered

### \_ High Performance Electric Drive



AC induction motor with high power density and Thermal simulation

#### Technical Specification (high speed version)

- Weight 21 kg
- Up to 25,000 rpm
- Up to 20 kW continuous power, > 40.5 kW max
- Up to 25 Nm nominal torque, > 49.5 Nm max
- Efficiency up to 94.9 % (sinus)



Motor and 2-speed automatically shifting high speed gearbox

- International actions for alternative energy and propulsion systems, will find out soon, that a lightweight battery electric vehicle is the most energy efficient form to provide a save and cost effective solution for individual mobility powered by renewable primary energy.
- We are inviting potential partners to build a demonstration fleet of 1000 OSCARs with us.