

Presenting a test centre for electric vehicle inductive energy transfer systems

INTIS (www.intis.de) provides specialist engineering service for the electric vehicle (EV) industry. To allow field testing and verification of inductive energy transfer systems, INTIS operates its own test centre in Lathen, the Emsland.

The facility has been constructed according to modular principles and enables the examination of both road side and vehicle side components. The centre can be used to test the full range of inductive energy transfer elements from the component level right up to complete energy transfer systems.

INTIS is a specialist in the development of innovative solutions for private and industrial applications and its test centre is available to INTIS' customers to examine their components and systems as well as technologies specially developed by INTIS as a development partner.



Figure 1 - Dynamic charging on the move

The test centre

One of the features of the test centre is its modular construction. The heart of the centre is a (currently) 25m long test track which can be outfitted with inductive coil sections. These coil sections can have any number of different characteristics and lengths. In the centre of the road is a 1.2m wide trench in which the particular coil topology to be tested is installed. A cable canal parallel to the road contains the energy supply cabling as well as communication and positioning technology for the primary side of the inductive system. The energy supply to the inductive coils is handled by a number of power electronics boxes alongside the road. Positioning systems allow the road side coil sections to be activated according to positioning and timing data from the vehicle.

The main road side components for inductive energy transfer systems for stationary or on-the-move applications are all available and can be used for tests up to a transferred power of 200 kW at frequencies up to 35 kHz.

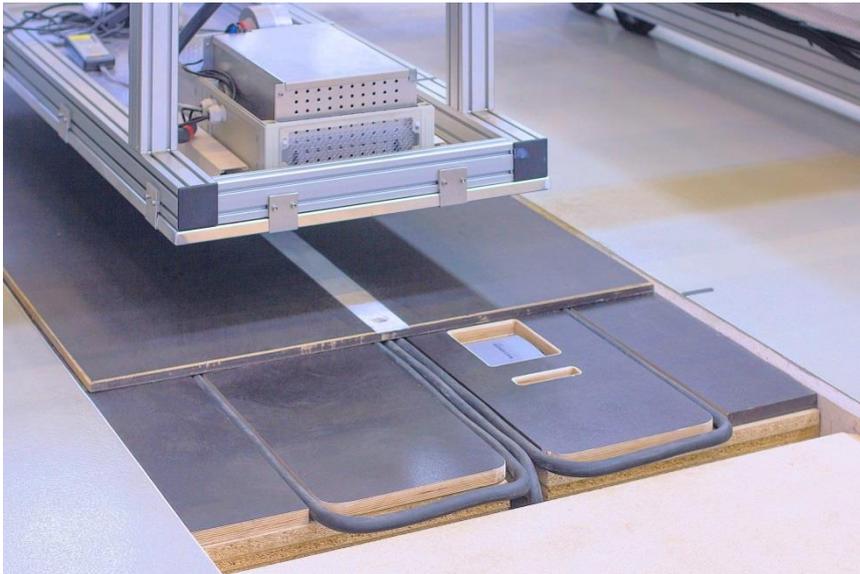


Figure 2 - Road-side inductive coils

A specially designed test frame is available for examining the vehicle side of the system. Vehicle side inductive coils (pick-ups), downstream power electronics, positioning and communications technology can all be installed on the test frame. A testing vehicle is also available for verification of systems in a real-world on-vehicle environment.



Figure 3 - Test frame for inductive components

All components of inductive energy transfer systems can be flexibly integrated and tested individually or as part of a complete system, according to customer requirements. The test frame optimally allows INTIS or customer vehicle side coil systems to be examined for power transferred, lateral tolerance, transfer efficiency and EM field spread. The test frame itself can be precisely adjusted to requirements. This allows the impact of parameter or geometry variations to be determined and reproduced.

Energy supply, simulation tools and laboratory equipment

Vehicles that INTIS' customers require examining, from cars to busses and Lorries, can be specially outfitted to be supplied with inductively transferred energy on the test track. This, in combination with

INTIS' own or customer provided positioning and communications systems, allows complete inductive transfer systems to be tested in realistic, on-vehicle conditions.

This approach allows INTIS to rapidly feedback results from experimental testing of prototype components into a comparison with results from cutting edge simulation and modelling tools. At the end of this iterative process, which uses numerical, simulation and laboratory analysis, the outcome is used to create solutions for application and vehicle optimised inductive energy transfer systems for both stationary and dynamic scenarios. The product of this painstaking process is then handed over to the customer.

Comprehensive testing and development services

INTIS is a specialist in the field of development, experimental verification and optimisation of inductive energy transfer systems.

The requirements for an inductive energy transfer system, such as power transfer, air gap, dimensions, environment and operations, vary greatly from application to application. To be able to satisfy these requirements, no matter what the application, unique systems design and development services are required. Services for our customers focus on the development, optimisation and testing of inductive energy transfer systems, including all components as shown in figure 4:

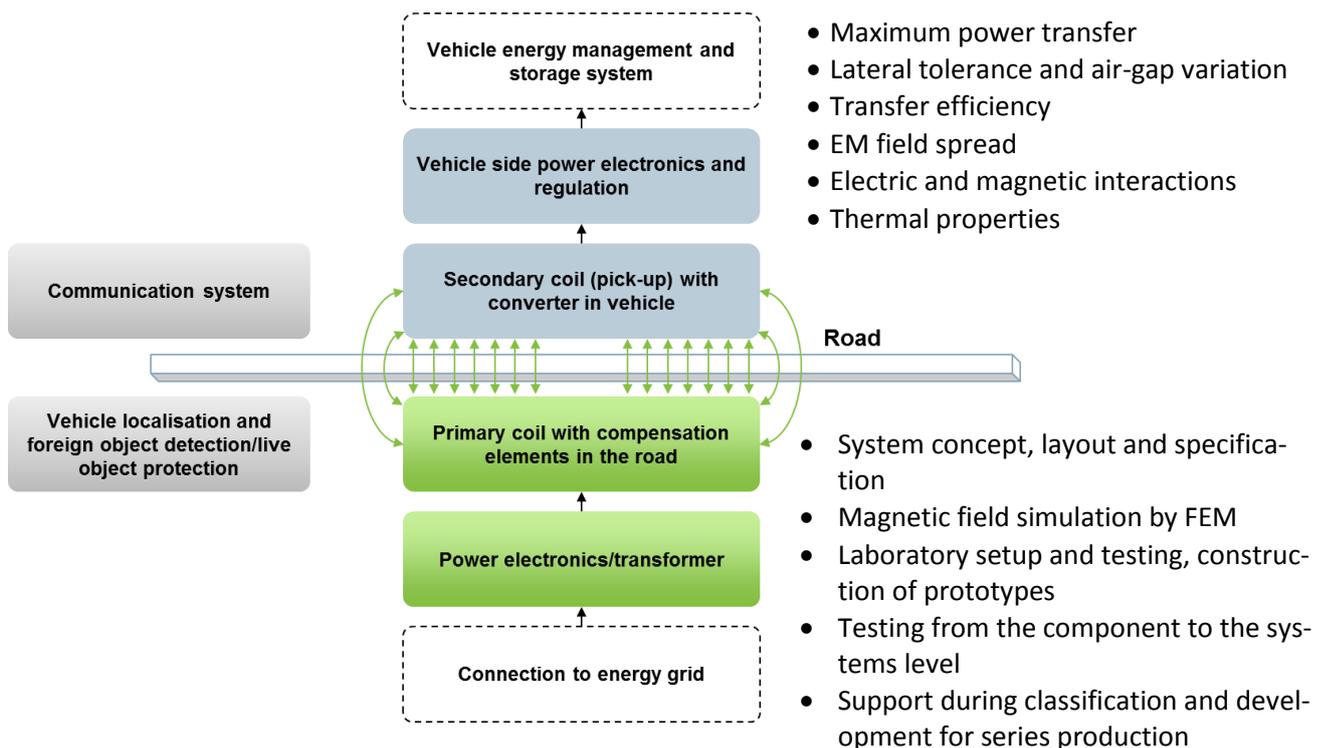


Figure 4 - Inductive energy transfer system components

All analysis is supported by our highly capable mathematical and simulation suites.

The inductive charging project

INTIS recently successfully tested an inductive energy transfer system it has developed for cars and busses with a transfer power of 30 and 60 kW. Tests were carried out at INTIS' own test centre. INTIS worked together with the IABG, some institutes of Fraunhofer and a number of other companies and associated partners in the completion of the project.

The project was subsidised by the German Federal Ministry of Transport and Digital Infrastructure (BMVI) as part of the project “Modellregionen Elektromobilität Bremen-Oldenburg” and was coordinated by the National Organisation of Hydrogen and Fuel Cell Technology (“Nationale Organisation Wasserstoff- und Brennstoffzellentechnologie” - NOW GmbH).

About INTIS

INTIS was founded by its parent company the IABG mbH in 2011 and is headquartered in Hamburg, Germany.

INTIS has an office and test facilities in Lathen, Emsland, from which it provides engineering services to growing markets in the areas mobility, energy and environment. A particular focus is on integrated infrastructure solutions for future-proof transport systems and sustainable provision of energy.