



5th ANNUAL CONFERENCE ON ELECTRIC ROADS & VEHICLES

The Path to Standards and Interoperability for In-Motion-Charging

- Learning from the standardization of stationary WPT charging systems -
 - Example: coil interoperability criteria and assessment -

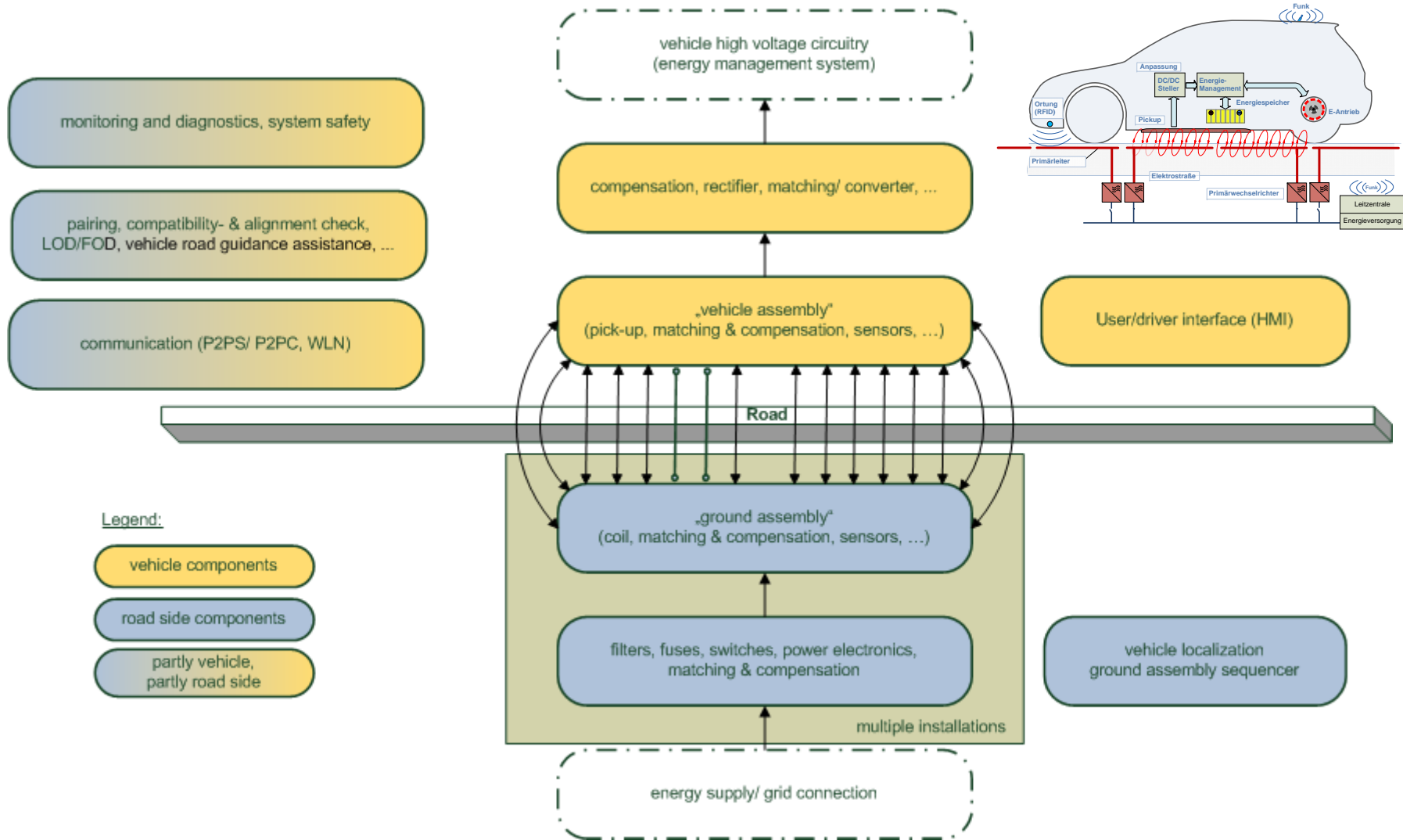
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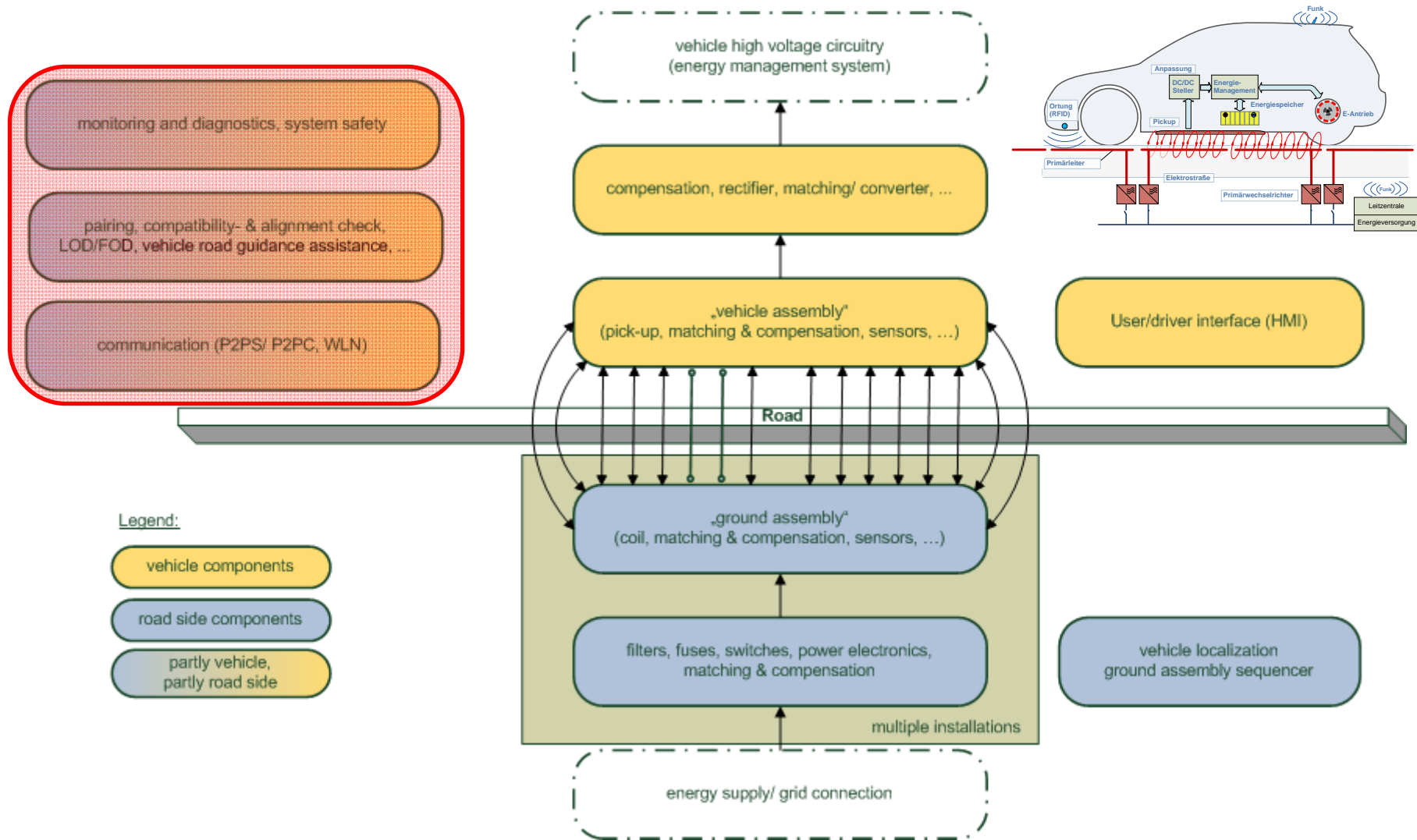
FEBRUARY 26–27, 2018
PARK CITY, UTAH, USA



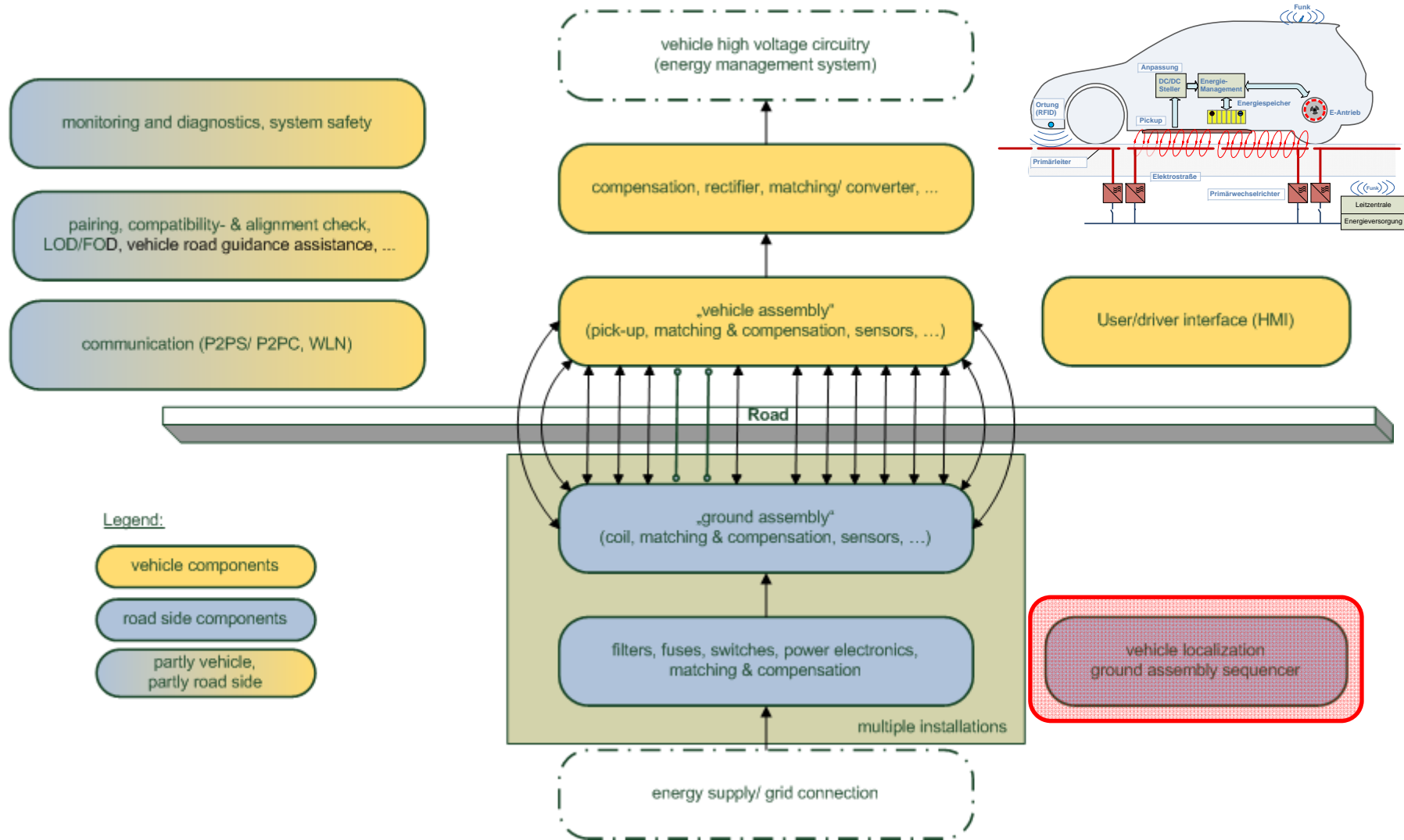
DWPT System overview



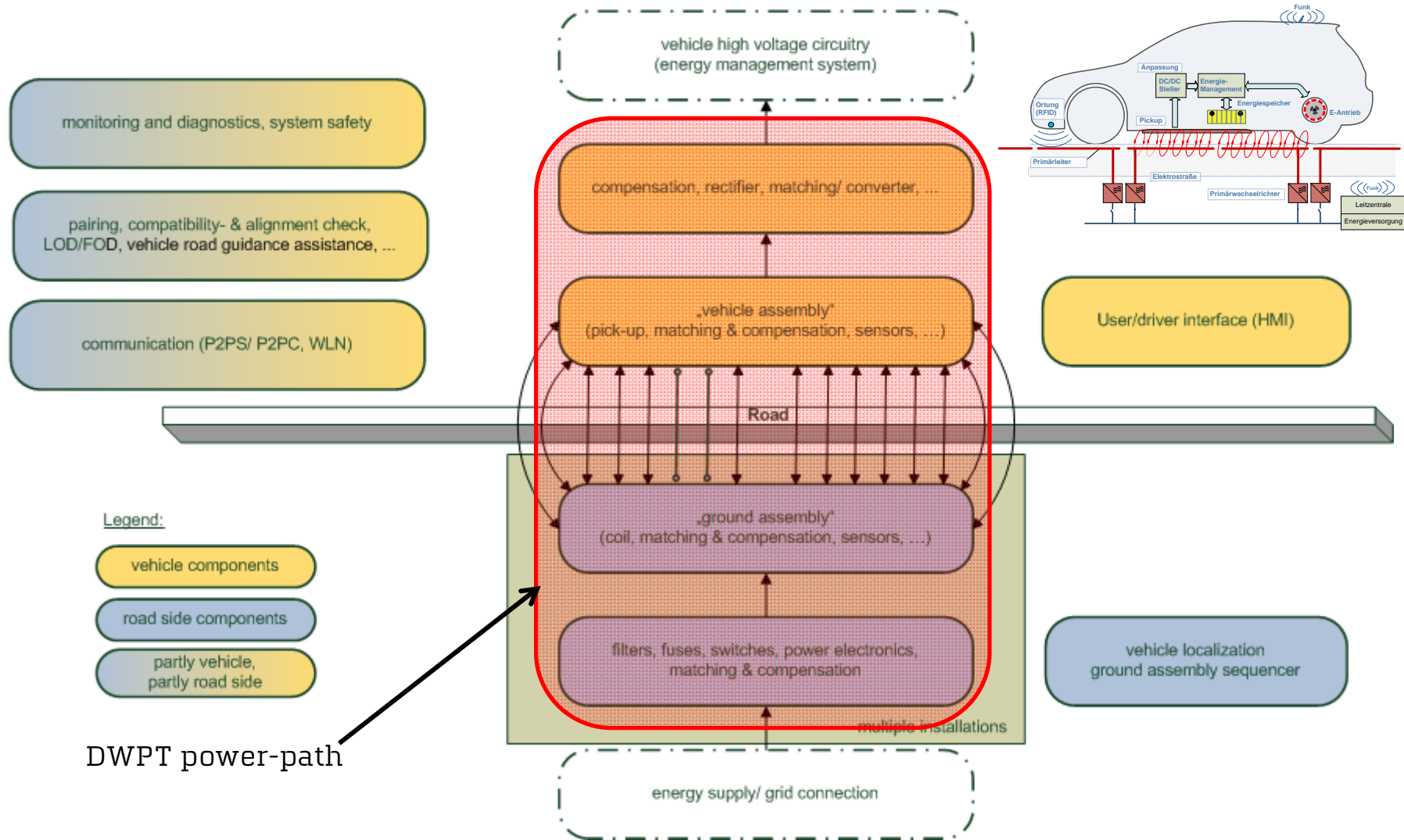
DWPT sub-systems requiring standardization



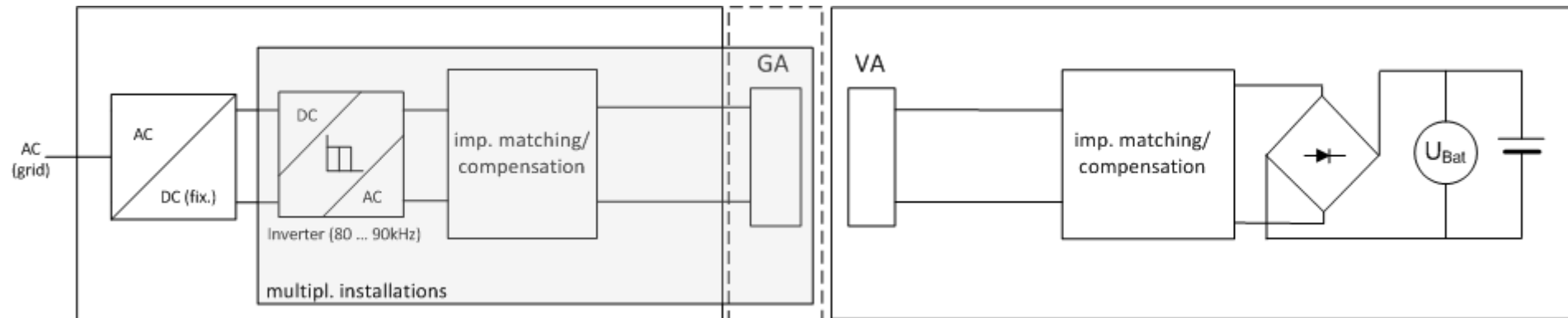
DWPT sub-systems requiring standardization



DWPT sub-systems requiring standardization



DWPT power-path (example, simplified):



Some topics, addressed/ investigated during SWPT standardization:

To which extent do the components of the DWPT power-path have to be standardized?

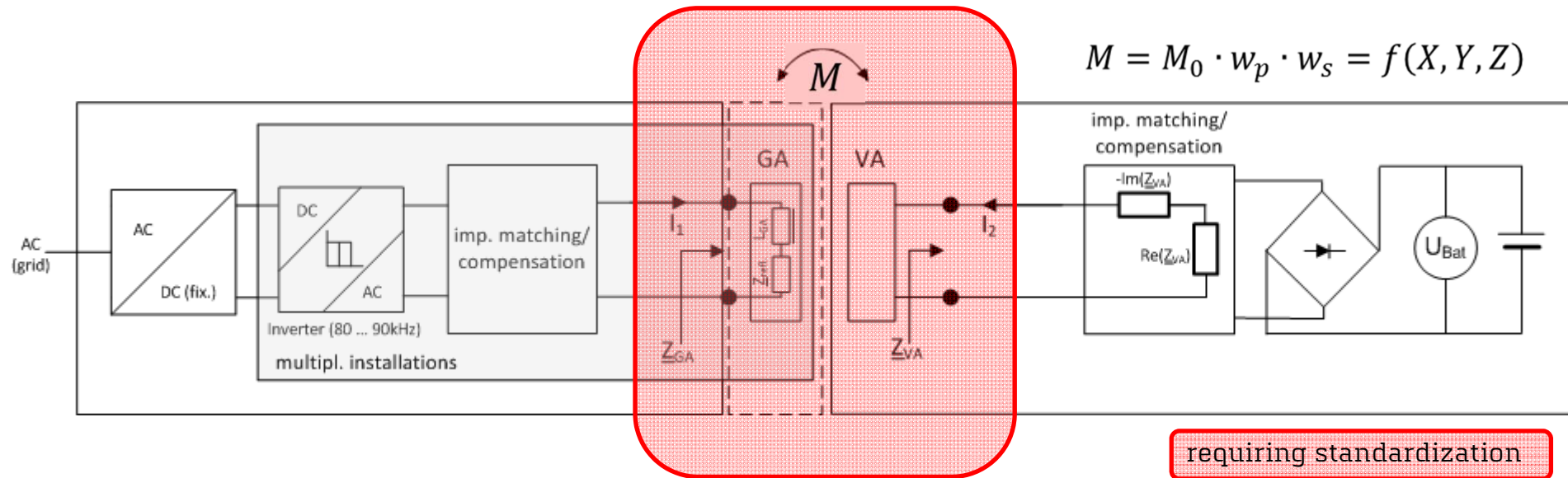
Which transformer coil parameters are relevant? Are parameters/ their ranges - like coil inductances or the transformer coupling factor - to be specified/ fixed?

Are requirements concerning the topology of networks (e.g. compensation & impedance matching) to be formulated/ fixed?

Can the Transformer be handled separately and if yes, how must the primary and the secondary transformer coil interface description look like?

...a lot can be learnt from the SWPT standardization process

e.g. that many matters related to the power-path-components do not have to be standardized!

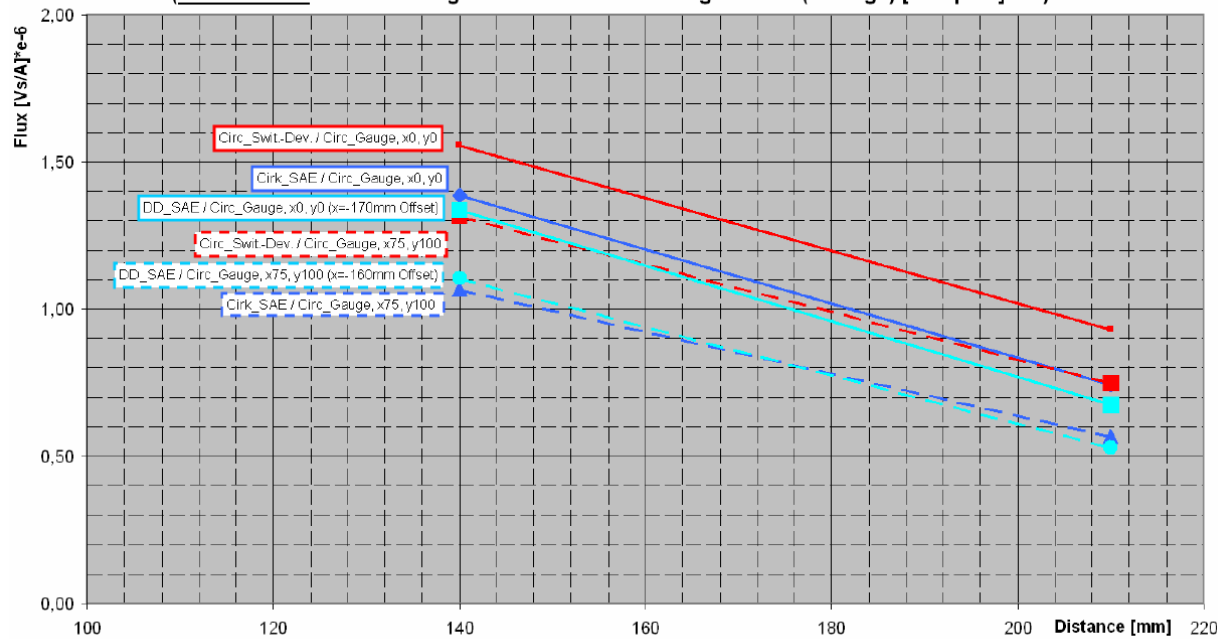


... when the following two-step-approach for transformer coil interoperability conformance verification is implemented

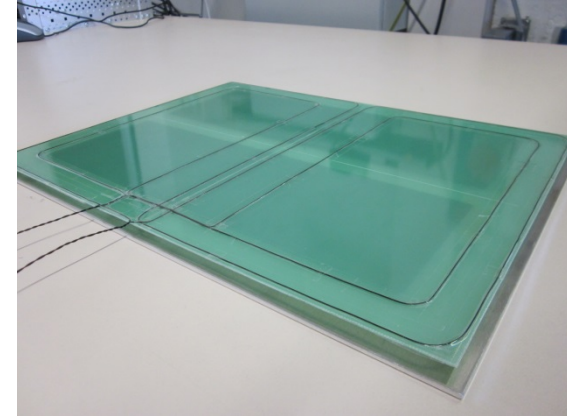
The two-step-approach for the verification of the transformer's coil interoperability

Step I: magnetic interoperability using test devices:

5.2 Messungen Intis: Sec. Gauge Device versus Primary SAE, Switchable-Device, Interop Circ-DD 30.3.2017
Sec. Circ.-Intis-Gauge vers. Prim. DD-SAE, DD-Swit.-Dev, Zirk-SAE
(Normalized measured Magnetic Flux sec. Side Gauge-Device (Average) [Vs/Aprim]*e-6)



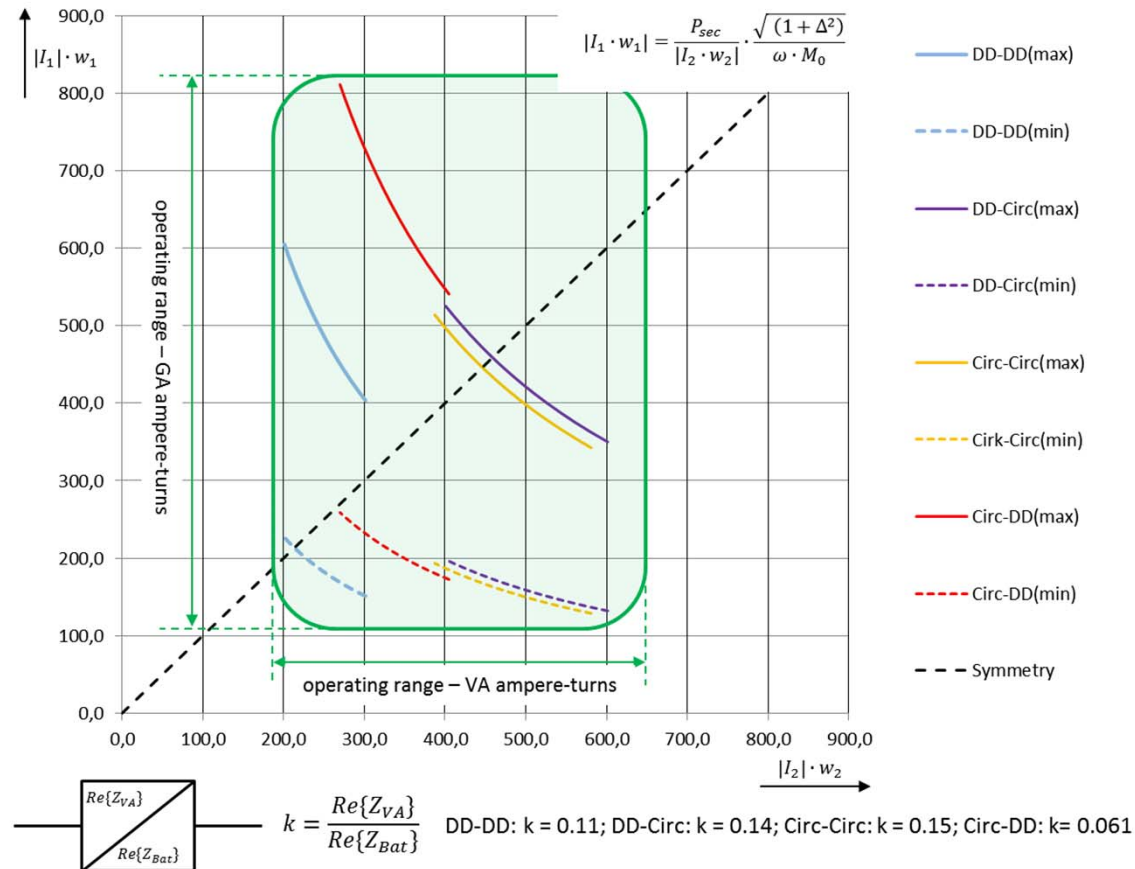
test device measurement results (example WPT2/Z2, INTIS)



transversal test device (example WPT2/Z2, INTIS)

The two-step-approach for the verification of the transformer's coil interoperability

Step II: electrical interoperability based on impedance assessments (example)



shown here: “non-optimized” conditions; optimization can be done/ is proposed by e.g. secondary side adaptive impedance matching or prim./ sec. side compensation network detuning

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