SAE INTERNATIONAL

PERSPECTIVES FROM VEHICLE OEMS

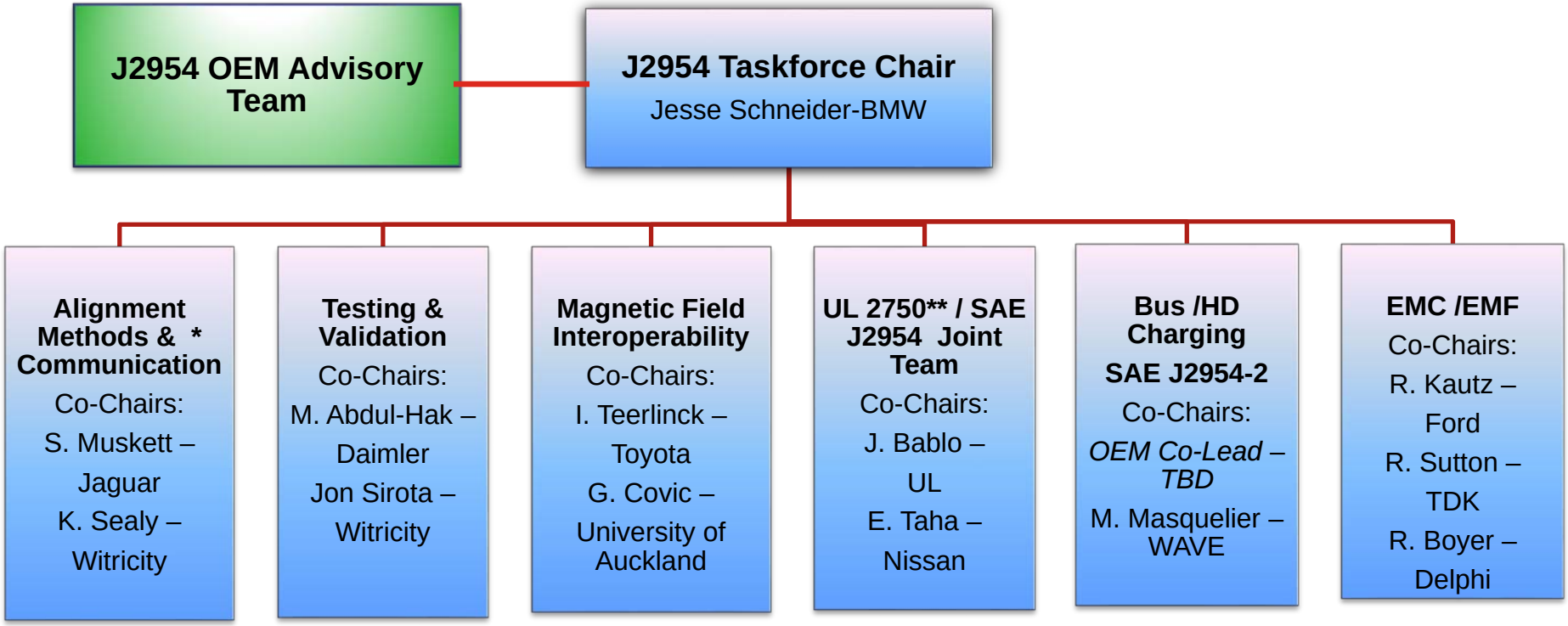
-SAE J2954-

JESSE SCHNEIDER (BMW)
SAE TASKFORCE CHAIR

WIRELESS POWER TRANSFER AND ALIGNMENT METHODOLOGY

SAE TIR J2954 document is the first of its kind document to specify Wireless Power Transfer for both vehicle and ground (infrastructure) assemblies and provide guidance for safety, interoperability, EMC/ EMF, alignment, coil specification as well as testing for Wireless Power Transfer for Plug-In Hybrid and Electric Vehicles.

SAE J2954 Taskforce Structure: OEM/ Supplier Co-Chairs



Liaisons:

ISO**/IEC : J. Sirota (Witricity)/ I. Teerlinck (Toyota)
SAE EMC Committee: R. Kautz (Ford) / R.Boyer (Delphi)
AAMI/ ANSI/CISPR: R. Boyer (Delphi) / Sutton (TDK RF)
FCC/FDA: Schneider / Kautz / Sutton / Boyer

*In Coordination with ISO & SAE Hybrid Communications & DSRC Committees
**SAE J2954 MOU with UL established. ISO MOU under discussion.

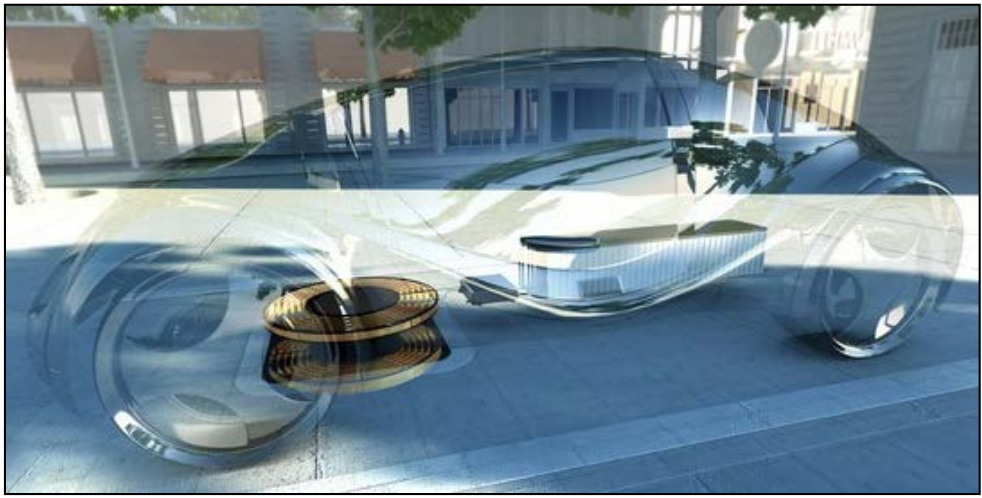
Automakers and Tier 1 supporting SAE J2954 WPT Standardization

Auto OEMs:

- BMW
- Daimler
- Fiat Chrysler
- Ford
- GM
- Honda
- Jaguar
- Karma
- Mitsubishi
- Nissan
- Toyota

Bus OEMs:

- BYD
- Gillig
- Proterra
- Volvo



OEM Tier 1 & Technology Suppliers

- Delphi
- Lear
- LG
- Magna
- Panasonic
- TDK
- Toshiba
- Conductix Wampfler
- Evatran
- Momentum Dynamics
- Qualcomm Halo
- SEW
- Wave
- WiTricity

Other Entities participating in SAE J2954 WPT Standardization

Government Groups

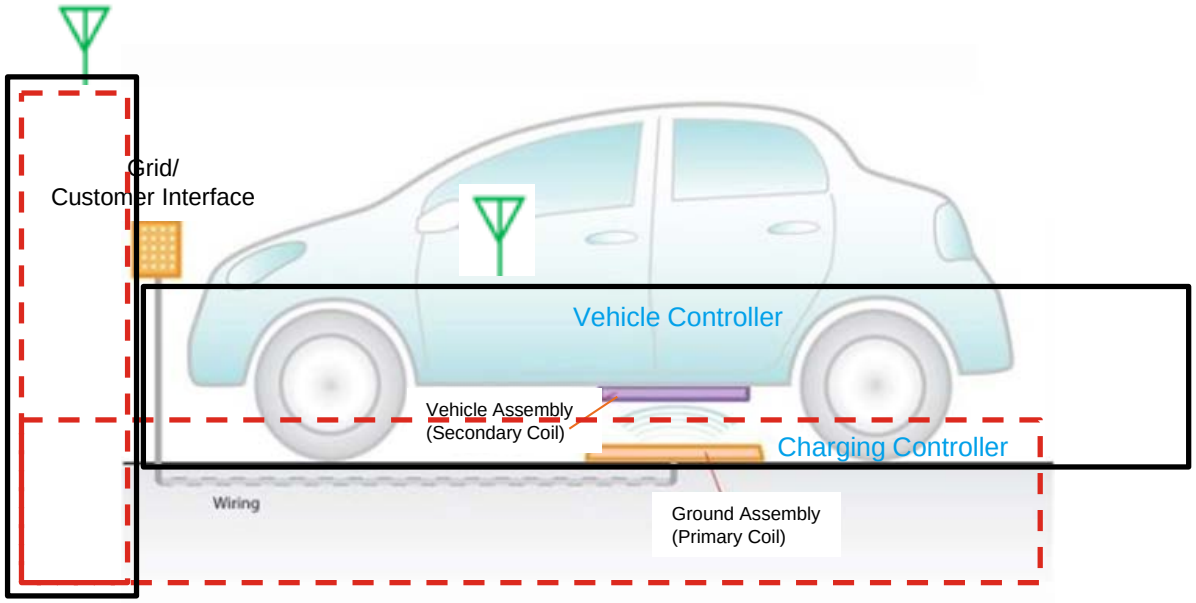
- US DOE
- US FCC
- US FDA
- US DOT (NHTSA)
- US National Laboratories: INL, ANL, ORNL, EDL
- JARI (Japan)
- Kaist (Korea)

Other Groups

- American Association of Medical Instrumentation (AAMI)
- EPRI
- ISO 19363 (MOU in Process)
- Universities (Aukland, Colorado, Michigan, Utah,etc.)
- UL (MOU Established)
- TÜV North America

Vehicle Wireless Charging Standards Overview Overlap SAE J2954, SAE J2836/6 UL 2750

SAE J2836/6: Use Cases and Communications
SAE J2847/6: WPT Communication PHEV and the Utility Grid
SAE J2931/6: Digital Communication for WPT for PHEV



UL 2750: Verification of Wireless Charging Base Safety (Draft)

<- MOU ->

SAE TIR J2954: Wireless Power Transfer and Alignment

Vehicle to Ground Assembly Alignment & Communications + Other Services

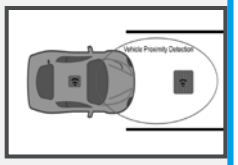
SERVICES GPS+ DSRC + SAE Standards

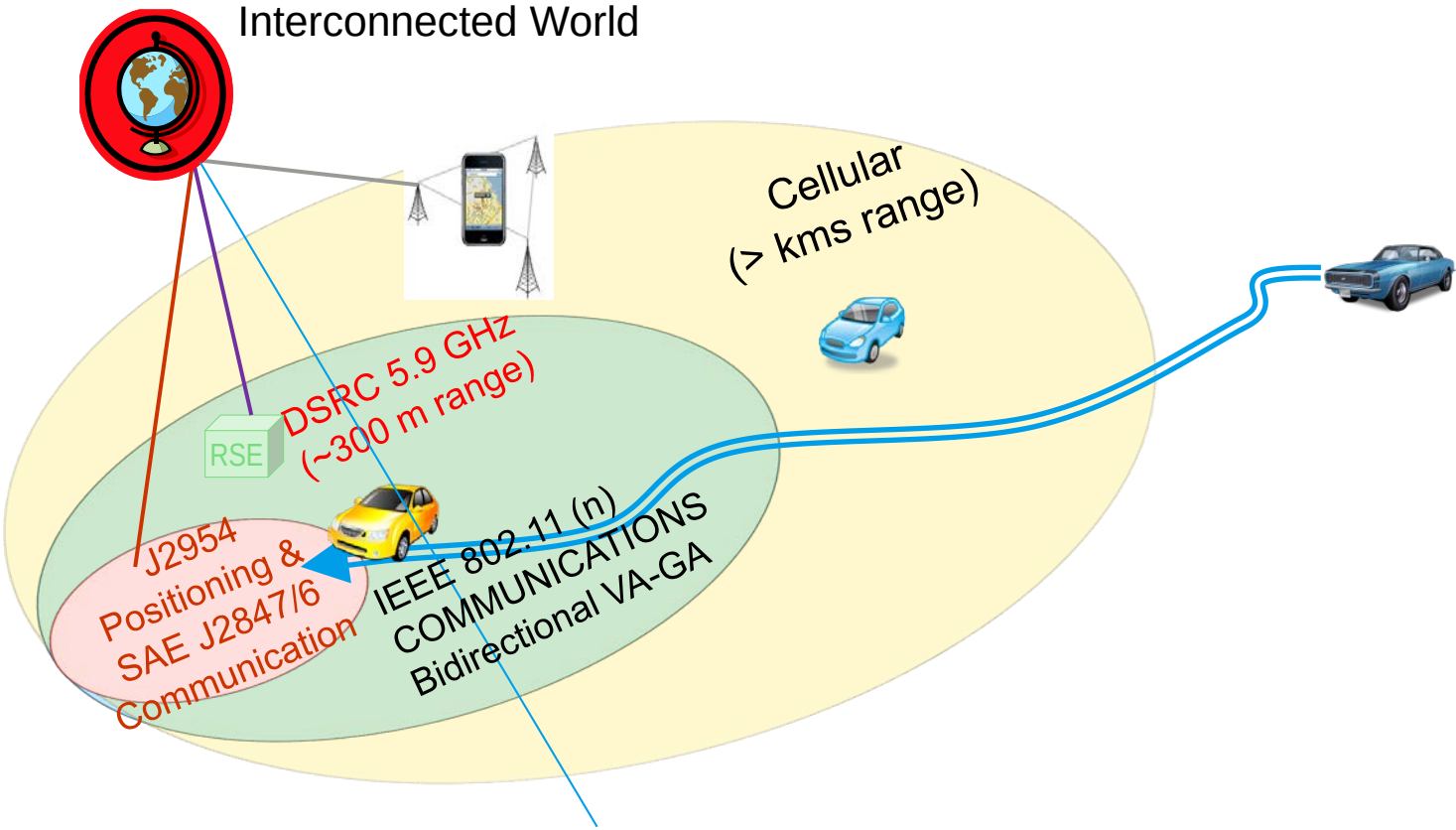
Integrated Vehicle Navigation

Locations of Electric Charging Stations

Charging & ePayment Solutions

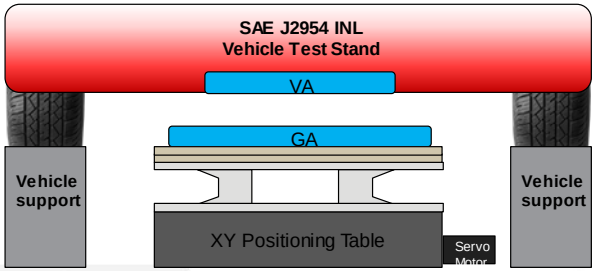
SAE J2954 Vehicle to Ground Assembly Alignment





SAE Interconnected communication layers will enable the private sector & public interests to co-exist

SAE J2954 Bench & Vehicle Testing Project Time Line With US DOE & National Labs (INL / ANL)



Verification Testing:

Activity

Month

2015 | 2016 | 2017

Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov

Establish Team and Plan
- Ph1 (Bench) Kick-Off
- MOU/ NDA Test Plan
- DOE AMR Review
- Ph2 (Vehicle) Kick-Off
- WPT1/2 Design Freeze
- Project Completion DOE Review

Test Setup Design & Build
- Bench Setup
- Vehicle Setup

Phase 1: Bench Test
- Ph1.a/b (Bench): • Matched • Interop.
- Optimize design
- Ph1.c/d (Bench): • Product • Auxiliary

Phase 2: Vehicle Test
- Ph2 (Vehicle): Operation, Interoperability, Performance and conformance
- Test Report

Test Plan and Report
- Test Plan Complete
- 8/8/16 Ph 1a Test Report
- 10/21/16 Ph 1b Test Report
- 5/21/17 Ph 1c/d Test Report
- Ph 2 Test Report 9/3/17

Feedback to SAEJ 2954

Feedback to SAEJ 2954

Current Participants: Toyota, Ford, Nissan, Daimler, Jaguar, Qualcomm and Witricity

THANK YOU

QUESTIONS?:

J2954 WIRELESS POWER TRANSFER

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