

WIRELESS SYSTEMS IN AUTOMOTIVE R&D

COST WIPE 2015 WG4 Keynote

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Public



1. Company Introduction
2. Why Wireless?
3. Challenges
4. Some Research Activities
5. Shopping List

DEVELOPMENT, SIMULATION AND TESTING



Passenger Cars



2-Wheelers



Racing



Construction



Agriculture



Commercial Vehicle



Locomotive



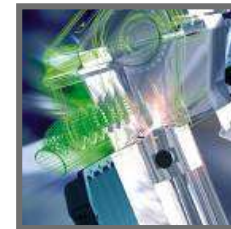
Marine



Power Plants



Powertrain Engineering



Simulation



Measuring & Testing

Development Platform



AVL AT A GLANCE

INNOVATION

1,500 patents granted

RESEARCH

10% of turnover in-house R&D

STAFF

6,700 employees

65% engineers & scientists



EXPERIENCE

65 years

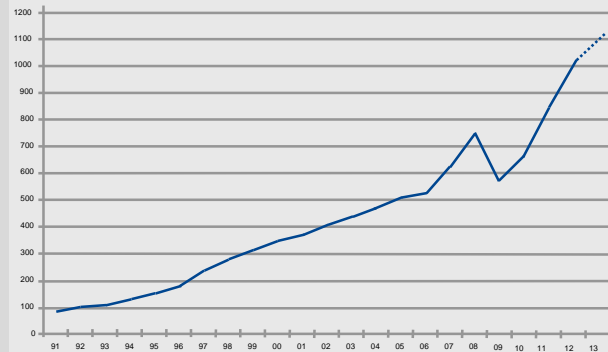
GLOBAL PRESENCE

30 engineering locations
49 affiliates

MARKET LEADER

> 4,000 automotive R&D test beds
> 15,000 R&D measurement instruments

GROWTH



>€1bn
turnover
2013

ONE PARTNER

MAJOR CHALLENGES IN AUTOMOTIVE INDUSTRY

Energy & Environmental Efficiency



Integrated Safety



Communication Everywhere



INSTRUMENTATION AND TEST SYSTEMS



- Testing (V&V) in automotive R&D
- Test beds
operate and observe systems
- Instrumenting a unit under test (UUT)
→ sensor wires, connectors, measurement modules, bus wires, power supply,...
- **Wireless instrumentation** allows to
 - Simplify → reduce time and costs
 - Reduce error rate
- Scenarios
 - Stationary (Test bed)
 - Mobile (Test vehicle)



HARSH AND DEMANDING ENVIRONMENT

- reflections and absorption
- multipath conditions
- non-line of sight scenarios
- Interference with other RF systems
- Co-existence of multiple systems (test field)
- Data consistency requirement
- Safety and security
- Mechanical vibrations
- automotive temperature range $-40^{\circ} \dots + 105^{\circ} \text{C}$

COOPERATIVE RESEARCH PROJECTS

Some related research projects
(in alphabetical order)

- ARROWHEAD
collaborative automation
<http://www.arrowhead.eu/>



- DEWI
Dependable Embedded Wireless Infrastructure
<http://www.dewi-project.eu/>



- SeCOS
Smart RFID-Technologies for a Connected World
<http://comet-secos.at/>



ARROWHEAD AHEAD OF THE FUTURE



- Vision: Enable **collaborative automation** by networked embedded devices
- SOA shall enable automation in an open-network environment
- AVL use case: **Smart Services** in engine development and production
- 78 Partners, 68 Mio €



Luleå tekniska
universitet
3E N. V.
Aalborg Universitet
Aktiebolaget Elektronik-
Konstruktion
Innovation (Abelko)
ACCIONA
Infraestructuras S.A.
Airbus Operations SAS
Akhela sri
Artelys
AIT Austrian Institute of
Technology GmbH
AVL List GmbH
BITRON SPA
BNearIT AB
Boliden Mineral AB
C2 SmartLight OY
CAMPUS 02 University
of Applied Science Graz

...





dewi

dependable embedded wireless infrastructure



This project is co-funded by the
ARTEMIS Joint Undertaking

www.dewi-project.eu



DEWI	Dependable Embedded Wireless Infrastructure
FP7 Call	ARTEMIS 2013
Project coordinator	Werner Rom (ViF)
Email	dewi@v2c2.at
Web	www.dewi-project.eu
Start	March 1 st , 2014
Duration	36 Months
Partners	~ 60
Total Budget	~ 40 M€

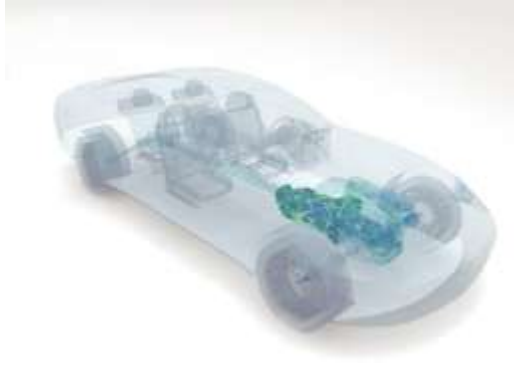
INDUSTRIAL USE-CASE: REAL-TIME ASSET TRACKING



- Task
 - **locate** devices in a test field
- Challenges
 - Real-time locating and tracking
 - use standard (passive) **RFID** tags
 - resolve **ambiguity** in side by side situations
 - Lots of metal ...



"SHOPPING LIST"



LOOKING FOR...

- **remote power supply** of sensor (and actuator) nodes
 - in-room
 - in-vehicle
 - dynamic scenarios
- **Energy management** in WSN
- **Identifying, Configure, Join** WSN: protocols, middleware, **security** concepts
- WSN for extreme environments - **UWB** approaches
- Solutions for **in-vehicular** applications (robustness, sustainable energy supply)
- Sensor **localization**



THANK YOU



www.avl.com

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