



Software Engineering Issues from Automotive SPIN Italia

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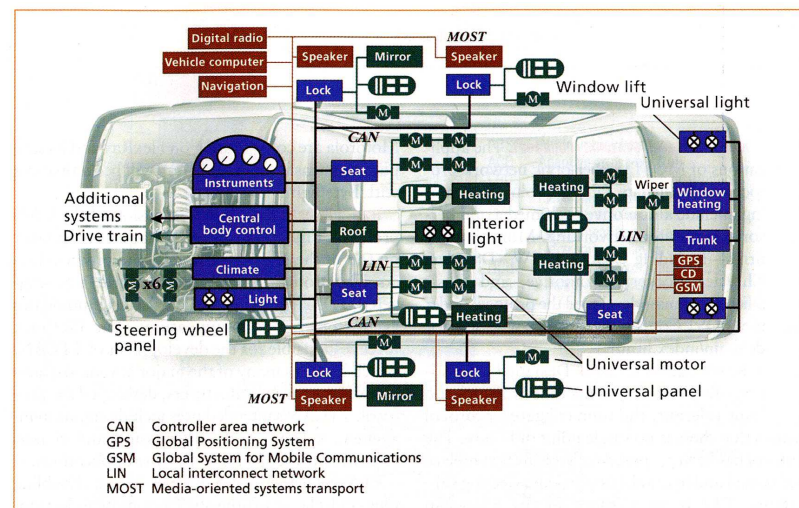
Paolo Panaroni (Intecs)

Talk outline

- Software in Automotive
 - An overview on the state-of-the-art
- Automotive SPIN Italia
 - Mission, Objectives, Organisation, Strategy
 - History
- Software Engineering Open Issues in Automotive
- Conclusions

Automotive Software: an Overview

- Automobiles are today “computers on wheels”
- Software plays a key role: 80% of the whole project is for electronics
- Software-intensive car components more and more complex
- High complexity of ECU interactions: problems in terms of integration



Automotive Software: Problems & Causes

■ Problems

- ❑ High complexity of ECU interactions: problems in terms of integration
- ❑ Customer-supplier relationships (Requirements Specification and Project Monitoring)

■ Main Causes

- ❑ Lack of standard approaches and platforms
- ❑ Cultural transition

Automotive Software: Countermeasures

- Product-based countermeasures
 - AUTOSAR
 - MISRA
 - OSEK
 - Product Lines

- Process-based countermeasures
 - Automotive SPICE
 - Customer-derived Qualifying Capability Profiles

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Automotive SPIN (Software Process Improvement Network) Italia

Automotive SPIN Italia: Members

- Car Manufacturers
- Software-Intensive Systems Suppliers
- Academia and Research Institutions
- Certification Bodies
- Consulting Companies

Automotive SPIN Italia: Mission

- To be a forum for free and open exchange of experiences in the SPI in automotive
- To be a source of information and knowledge for its members and the community in general
- To let the software industry know-how and automotive needs meet together
- To support its members for
 - Achieving higher levels of process maturity
 - Technology transfer
 - Enforce the competitivenessby networking and organizing events.

Automotive SPIN Italia: Objectives

- Sharing knowledge, lessons-learned and innovation among members
- Promoting co-operation between industry, academia, and certification bodies for SPI in automotive
- Promoting and put in evidence opportunities for SPI

Automotive SPIN Italia: organisation and strategy

- Lean organisation (President and Management Board) - Free membership
- One web site (www.automotive-spin.it)
- Workshops (2-3 per year)
- International partnerships (SEI, SPIN Munchen)
- Collect recommendation from members to the standardisation bodies
- Identify research areas



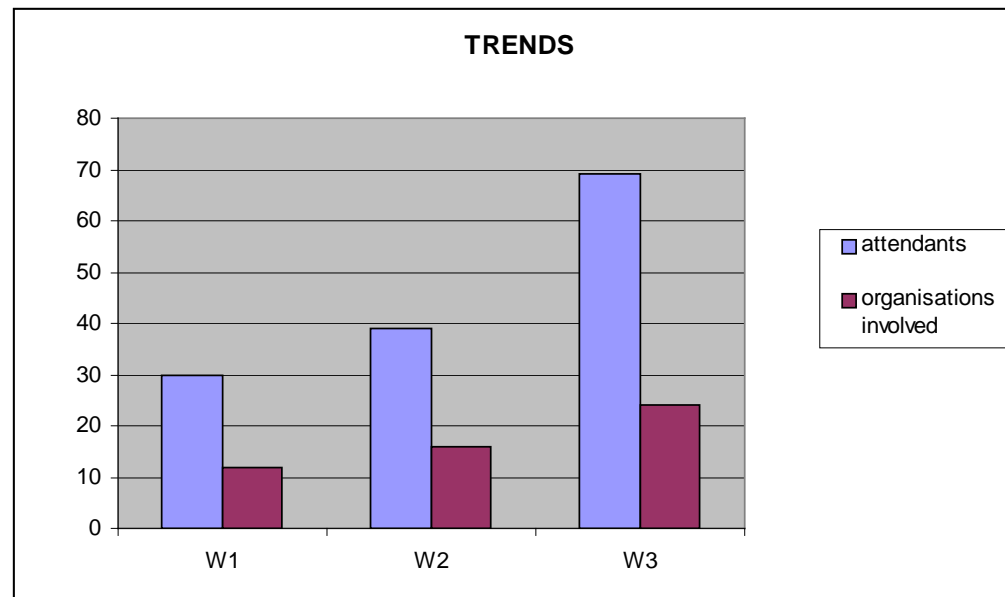
Automotive SPIN Italia

Management Board Composition

- Daniele Di Ciccio (Cobra)
- Pascal Jansen (DNV)
- Giuseppe Lami (ISTI – CNR)
- Paolo Panaroni (Intecs)
- Edoardo Sivera (Fiat Group Automobile)
- Ugo Schiara (Bitron)

Automotive SPIN Italia: history

- Born in March 2007 with the kick-off meeting held in Milan
- 3 Workshops made



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Software Engineering Open Issues in Automotive

- System vs. Software
 - High volatility of requirements
 - Requirements produced, analysed and also agreed with the customer
 - Requirements often delivered to software developers still as *system* requirements
 - Required closer relationship between system and software engineers

Software Engineering Open Issues in Automotive

(cont.d)

- Customer / Supplier relationships
 - Acquisition as a key process
 - Requirements understanding and continuous communication between customer and supplier
 - Customer: improving supplier's project monitoring
 - Supplier: more open to customer involvement and requirements volatility seen as a challenge

Software Engineering Open Issues in Automotive

(cont.d)

■ Safety

- Achievement of an adequate system safety level vs. standard compliance
- ISO26262 still under development – great expectations and some concerns:
 - Mainly phased-development view and SW engineering practices-based (instead of process view – only supporting processes)
 - Little integration between system and sw engineering
 - Responsibility for safety left to the validity of the standard and to the process of the adoption of the standard

Software Engineering Open Issues in Automotive

(cont.d)

- Automotive SPICE Assessments and Assessor Qualification Schemes
 - Mutual recognition of qualification profiles among different car manufacturers
 - One unified, transparent, general, third party and rigorous assessors' qualification mechanism. For achieving uniform confidence and validity of assessment results

Software Engineering Open Issues in Automotive

(cont.d)

- Standard harmonization
 - Different reference standards for suppliers' qualification (AutomotiveSPICE, CMMI)
 - New standards are coming (e.g. safety related standards as ISO26262 and IEC 61508).
Need of harmonization and cross-mapping

Software Engineering Open Issues in Automotive

(cont.d)

- Model-based Software Development vs. Automotive SPICE/CMMI
 - Model-based development approach widely used in the automotive software (advantages in terms of automatic code generation, verification of the dynamic behaviour before coding, ...)
 - Automotive SPICE and CMMI don't match perfectly such an approach. Mapping up to the assessors

Software Engineering Open Issues in Automotive

(cont.d)

- Tool integration
 - Sophistication of product, standards and regulations, design procedures make the sw development more and more complex.
 - Need of integrating development activities and the related technologies and artifacts

Summary

- Automotive SPIN Italia as a mean to discuss and collect open issues and problem froms the industry
- Sources of research questions, input for standardisation WGs and improvement initiatives

Thank you.

Questions?

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