

AMAA (Advanced Microsystems for Automotive Applications) March 2002 Conference Review

In recent years, microsystems applications (MST) in automobiles have become commonplace: they enabled the introduction of a series of new functions and at the same time the replacement of existing technologies with MST-based devices that offered improved performance and better value for money. In spite of the enormous progress made to date, the results achieved reveal only the beginning of a revolution in the vehicle sector, which implies a complete transition from the mechanically driven automobile system to a mechanically based but ICT-driven system as part of a likewise complex environment. Microsystems are indispensable for fulfilling these ambitions. Following NEXUS, it is suggested that the market for automotive sensors using microsystems technologies will reach \$3.5 bn by 2005 and growth rates in excess of 20% per year. At present, utmost importance is attributed to microsystems applications in safety, followed by engine and power train applications and on-board vehicle diagnostics. At the annual meeting of the MST automotive community, the AMAA conference, an interesting set of suggested applications and advanced solutions were introduced.

Need for Collaborative Work

Increasing expectations from customers and public bodies lead to an ever-higher demand for advanced technical solutions. Suggested applications build upon long-term research on generic technologies and on equipment, instrumentation and production technologies. The given tasks include high risks, leading to consortiums of shared interests. At AMAA 2002, CLEPA and EUCAR introduced activities towards integrated projects in the field of the networked vehicle, fuel cell and the 5-day car. Mr. Reibe from the European Commission presented informations on the planned instruments of the EC 6th framework programme: integrated projects, networks of excellence and the Article 169. Mr. Reiniger (Representative of EUCAR, DaimlerChrysler) asked for collaborative activities by all contributing parties, thereby stating that only the combined forces of OEMs, suppliers, SMEs and research institutions would solve the named challenges. Mr. Gloersson, speaking on behalf of NEXUS, suggested a forum (MST User-Supplier Club for Automotive) for developing technology roadmaps, the discussion of shared activities and closed discussions with the European Commission.

Technology meets Realisation

Since 1995, the AMAA has been offering innovators the opportunity to meet with system suppliers and car manufacturers. AMAA is a marketplace for competing technologies. At the present time, 23 solutions for increasing reliability, pressure sensing, power train and for obstacle detection were presented. **Obstacle detection**, being the basis for functions like driver warnings, advanced cruise control, automatic stop and go and precrash detection, was introduced by 7 presentations and 3 concept cars. Mr. Goernig (Conti Temic) discussed several technologies for reaching true 360° sensing. Among them, the PMD solution (Photonic Mixing Device), introduced at AMAA 2000 as a technology, could already be shown as an integrated passenger Out of Position detection system. PMD, delivering two-dimensional picture and distance information to each pixel within one device, is a promising solution towards affordable sensors. Other interesting contributions included the introduction of the EC CARSENSE project (dealing with a set of sensors), an electronic scanning antenna (BAE), an uncooled infrared system (Raytheon), a laser scanner (IBEO) and

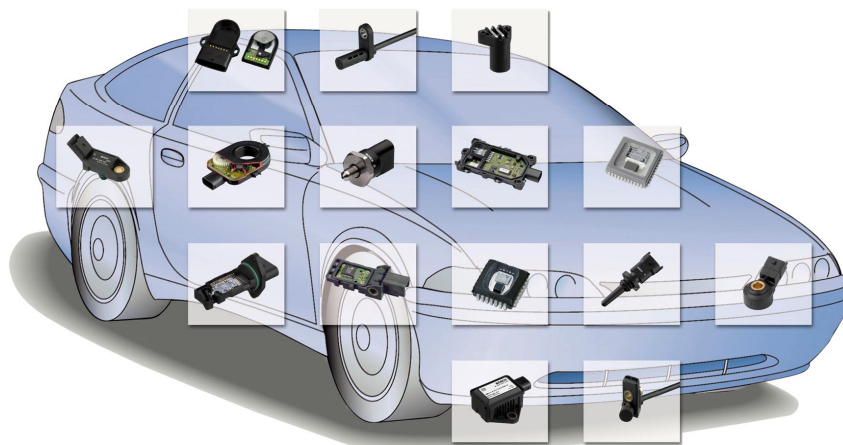
MOEMS (Micro-Opto-Electro-Mechanical Systems, FhG IZM) having the potential for scanning the near field.

A major concern is **reliability**. Sensors working for safety features and leading to functions controlling at least parts of the driving, need highest quality. On the other hand, reliability in the automotive environment with temperatures up to 125°C and aggressive media is an important cost issue. Mr. Lugert (Siemens VDO) said it was becoming more and more important to exactly know what level of reliability was wished and paid and to have models for delivering this demand. Packaging solutions (Eurasem, Emerson and Cumming) and contactless sensors (Siemens VDO) can help to reach the targets.

For **pressure sensing**, different principles compete over solutions like e.g. X-by-Wire applications, brake control, engine management and tire monitoring. Even for the measurement of the actuation force of the brake pedal pressure sensors are suggested (Mr Dullinger, BMW).

For **powertrain** applications closed loop control systems are mandatory. Systems introduced at AMAA 2002 include an active camshaft sensor (Infineon), hot film anemometer (EADS), a piezoelectric microinjector (DaimlerChrysler) and, last but not least, a contactless solution for torque sensing (ABB). Challenging goals are increased temperature range, more precise control of the combustion components and the monitoring of the material and media involved.

Once more, AMAA served as a platform for lively discussions and interesting insights into promising activities. Special thanks go to our sponsors, the Berlin Senate, the European Commission, the Ministry of Economics, Brandenburg, and A.D.C., Deutsche Bank, First Sensor Technologies, IBB, Raytheon and Conti Temic.



Microsystems are widely used in modern cars (Source Bosch).

Acknowledgements

The author wishes to thank Mr. Florian Solzbacher (First Sensor Technologies) for the inspiring conversations we had and especially for his commitment in organising the technology section (part 2) of the AMAA Yearbook 2002.

Next AMAA: April 10-11 2003
Year book: Springer, EUR 98
ISBN 3-540-43232-9

Contact

Sven Krueger

E-mail: krueger@vdivde-it.de

www.amaa.de