We were at the right time at the right place, …

…and we, as engineers, developed products for engineers,” explained Martin Litschel, one of the three founders, the success of Vector. He believes that a company not located close to Daimler and Bosch would not have been able to have the same success. “It was a home game,” added Eberhard Hinderer, also a founder of the company. But the success has many fathers: “The CiA membership gave us the chance to present our first CANalyzer tool already in 1992 at the Interkama exhibition for chicken feed,” said Dr. Helmut Schelling, the third founder, remembering the early days of the CAN business. CAN network analyzing tools were also offered in those days by i+ME and Softing. “But, we discussed with our customers from engineer to engineer”, explained Litschel. “We were driven by our education background.” The result was a graphical user interface, easy to understand by engineers. “I had been involved in programming until 1998,” added Schelling, explaining the commitment and responsibility of the management in developing tools for engineers. No doubt, today Vector is the market-leading manufacturer of CAN network analyzer tools. In total, the company has sold far more than 200,000 of their CANAnalyzers. They are used in development, production, and maintenance departments all over the world.

From a 3- to an 1100-employees company

Vector, established April 1st, 1988, celebrates this year its 25th anniversary. Originally founded as an engineering office, the company is now a heavyweight in the CAN tool business and supplies also embedded software for the automotive industry. Nowadays, the company has subsidiaries in USA, Japan, France, Sweden, Korea, Great Britain, India, and China.

In the very early days, the owners did not want to take the responsibility to hire staff. But a couple of weeks later, they did it. “We have never planned the growth or the next steps,” said Schelling. “However, whenever there was need, we took the necessary decisions.” In 1994, the 25th employee joined the Swedish company. In 1999, 100 employees were already working in the Vector Group increasing to more than 500 in the year of 2005. Six years later, the number of employees exceeded the mark of 1000. Today the company employs some 1100 persons. The company has been awarded as an excellent employer. The European "Great Place to Work" initiative, together with the Handelsblatt (German) newspaper as sponsor awarded a quality seal for workplace culture to the 100 best employers in Germany. In 2011, Vector attained the 10th place in the category of companies with 501 to 2000 employees. The next award is in the pipeline: In 2013, Vector has been awarded the 2nd best employer in the IT industry in that category. The company also expects a good industry independent positioning.

While many rising stars in the young IT industry carried their gains to the stock markets, the Vector management invested in bricks, as Martin Litschel expressed it. The first company-owned building was finished in 2001, followed by a second in 2004. But this is not the end. “We are already planning the next construction stage with four additional buildings,” explained Hinderer, responsible for the project.

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Company milestones

1988: Foundation of Vector Software GmbH on April 1st by Eberhard Hinderer, Martin Litschel, and Dr. Helmut Schelling
1992: Renaming to Vector Informatik GmbH and delivery of the first CANalyzer license
1996: Delivery of the first licenses for CANoe and CANape
1997: Foundation of Vector CANtech (USA)
1998: Foundation of Vector Informatik GmbH
2001: Dr. Thomas Beck joined the company.Vector as shareholder and 4th managing director tement
2001: Foundation of Vector Consulting GmbH
2006: Vector acquired 4m Software Division of Micron Electronic Devices AG
2007: Foundation of Vector Japan
2009: Foundation of Vector Great Britain, Vector India, and Vector China
2010: Aquinto became part of the Vector Group
2011: The ownership of the Vector Group was transferred to the non-profit Vector Stiftung and the Vector Familienstiftung
2012: Thomas Rieggraf joined the company management

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Links

www.vector.com/25
www.vector.com
www.vector-cantech.com
www.vector-france.com
www.vector-gb.co.uk
www.vector-japan.co.jp
www.vector-scandinavia.com

Figure 1: Vector has invested in bricks; the next buildings are already planned

"We were at the right time at the right place, ..."
Not just a “toolmaker”

By the way, the company’s name derived from the first business: Programming NC machines using vector graphics. Starting with the making of bus analyzing tools in 1992, the company changed the name from the Vector Software origin to Vector Informatik. Nowadays, the company still makes half of the turnover with testing and tools. Of course, this includes the CANalyzer for testing ECUs (electronic control units) and the other well-known tools such as the CANoe for testing and simulation. The company supports all network technologies used in the automotive industry. However, the main business is still related to the CAN technology. So it is not a surprise that Vector is an early bird in the CAN FD development. The company already adapted the improved CAN protocol in analyzing tools, which were demonstrated several times on CAN FD events organized by Bosch and CiA. “CAN FD is the logical consequence, when you need more bandwidth,” said Martin Litschel, one of the “inventors” of the CAN protocol. To the question, if the improved CAN data link layer is a competitor of FlexRay, he answered: “CAN FD is a competitor of FlexRay, only in those applications, in which time-triggered communication systems have no business.”

The other half of Vector’s business is coming from embedded software including operating systems as well as ECU calibration and application software development. Beginning of this year, the Microsar Safecontext operating system (OS) has been certified to ASIL-D in compliance with the ISO 26262 standard. The software certified by TÜV Nord (Germany) runs on the TMS570 processor by Texas Instruments. The concept is currently being extended to other processors. Mixed ASIL systems require safe partitioning of software modules (“Freedom from Interference”). The certified OS supports this by protecting against overwriting of memory areas and by safe switching of contexts. The needed switching of the memory protection unit (MPU) and the switching of task and interrupt contexts was developed according to ASIL-D.

In order to cover also the hardware-near software development, Vector cooperates with iSystem (Germany) since this year. The companies have integrated their tools. The AMD and XCP options extend the CANoe development environment by adding the ability to access internal ECU values and to execute test and analysis tasks. In contrast to mere black box testing that only stimulates and measures external ECU signals, the ASAM standardized XCP protocol also facilitates the modification and analysis of internal ECU values. The main advantage is the monitoring of internal ECU parameters that cannot be measured over conventional bus communication. By modifying these parameters, it is moreover possible to introduce intentional fault conditions and directly test the resulting behavior of an ECU.

So far, memory access has been realized over CAN interfaces or ad-

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**Figure 2:** The first CANalyzer introduced in 1992

**Figure 3:** The current CANalyzer optionally supports different standardized higher-layer protocols including CANopen and J1939-based profiles
With their joint development, both companies have extended the Vector's tools with the access technology of the iSystems's debuggers. This integration is especially helpful in the development phase, in which the debug interfaces can still be accessed externally.

For the time being, the debuggers support more than 3000 different microcontrollers that can be connected directly under CANoe.AMD, CANoe.XCP or CANape. This access path to the ECU does not require any additional software or XCP drivers. No additional resources are used, and the real-time behavior is not affected.

**Succession arranged**

We all become older, and some day we will retire. In order to avoid that financial sharks take over the company, the four shareholders of Vector decided to transfer ownership to two foundations. In August 2011, the regional administrative authority of Stuttgart (Germany) admitted the two foundations. The non-profit foundation, known as the 'Vector Stiftung', was endowed by the company founders Eberhard Hinderer, Martin Litschel and Dr. Helmut Schelling. It will receive 60 % of the company's shares. The family foundation (Vector Familienstiftung), which was endowed by Dr. Thomas Beck as well, retains the remaining 40 %, but consolidates 94 % of voting rights.

"Taking this step ensures a solid, long lasting basis upon which Vector can continue to develop and grow. This guarantees long-term continuity to our employees, as well as our customers and partners," said Dr. Thomas Beck. "Along with continuity, the foundation concept also guarantees that company profits will be reinvested in a meaningful and socially balanced way," adds Dr. Helmut Schelling. The goals of the non-profit foundation are to support research for environmental-friendly mobility concepts, promote the development of young academics and support social institutions.

Eberhard Hinderer, Martin Litschel, and Dr. Helmut Schelling, already...
close to the age of 60 years, plan to reduce gradually responsibility in the next years. “We don’t plan to retire now,” stated all three. In order to hand-over the company management as smooth as possible, mid of last year, Thomas Rieggraf has joined the corporate management. Already in 2001, Dr. Thomas Beck joined the management. Rieggraf has been working for Vector for 23 years. He was involved in the development of the CANoe and CANalyzer tools. “I look forward to assuming my new role and responsibilities at Vector. I will dedicate myself to these tasks with full commitment to advance Vector’s development in relation to our customers and employees,” said Thomas Rieggraf.

Beginning of this year, Vector has reorganized its business with standardized higher-layer protocols. The department dealing with CANopen, Devicenet, J1939, Isobus and all the other standardized CAN solutions are integrated in the existing departments such as tools and testing, embedded software, and calibration. The protocol stack development has moved to the tool department. The avionics business unit is remaining as a strategic department, which is also responsible for the CAN-based avionics solutions (Arinc 825/6). “You should not misinterpret this reorganization,” said Dr. Beck. “We are strongly committed to standardization.” The company is present in many standardization committees and member of all relevant associations including CiA. “We even want to extend our business in the direction of commercial vehicles and other industries,” stated Thomas Rieggraf. “But we don’t want to invest heavily in businesses, in which the prices do not match our company’s goals,” added Martin Litschel.