By adopting digital ASIC (application specific integrated circuit) technology ALV has improved the speed, size and power consumption performance of its digital correlator system used in photon correlation spectroscopy applications, whilst reducing the manufacturing costs significantly. The product improvement will enable the company to increase its market share, and to double its sales turnover.

ALV-Laser Vertriebsgesellschaft mbH designs, develops, produces and sells equipment for photon correlation spectroscopy, especially laser light scattering instruments, for use in university, pharamecutical, bio-technology, chemical and environmental research scientific applications.

### SIGNIFICANT ECONOMIC BENEFITS

Without product improvements ALV projected that it would have lost both sales and market share. The introduction of digital ASIC technology has allowed product cost reductions and feature improvements to be achieved allowing the company not only defend its market position successfully, but also to achieve additional sales from the development of new market areas, including hand-held applications. The prototype development costs were 135 K€. The increased sales profits will enable the company to recover this investment within 4 years. The return on investment will exceed 150% over 5 years. Additional costs of 75 K€ were required to industrialise the product.

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<tr>
<th>ALV-LASER VERTRIEBSGESELLSCHAFT MBH</th>
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<td>Technical expertise before the project</td>
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### PRODUCT IMPROVEMENTS

The company’s existing digital correlator used discrete device and FPGA technology which limited its sampling speed to 80 MHz. The introduction of digital ASIC technology has allowed the sampling speed to be increased to 200 MHz, whilst delivering the following benefits:

- A reduction in size, including a 90% reduction in the number of components automatically leading to increased product reliability.
- A reduction in power consumption from 10 Watts to 2 Watts.
- The ability to apply the correlator in hand-held applications and multi-channel correlation units.
- A 20% reduction in the manufacturing costs of the digital correlator.
CHOOSING THE RIGHT TECHNOLOGY

ALV used a standard cell digital ASIC device to implement the improved photon correlator product because it offered the following benefits:
• The high level of integration allowed the product’s size to be reduced to the required level.
• The availability of a cost effective MPW (multiple project wafer) prototyping facility and the ASIC library elements provided an acceptable technology implementation risk.
• The lowest cost / performance / volume trade off available.
• The potential to apply both the technology and the design methodology in future product developments.

A PARTNERSHIP FOR SUCCESS

ALV conducted the project as a FUSE application experiment. The company's staff participated in all of the project tasks in collaboration with selected subcontractors. The subcontractors provided support in:
• Training in ASIC technology and ASIC technical management.
• Specification of technologies, ASIC device libraries and device interfaces.
• Design of the digital ASIC device.
• ASIC test strategy development.
The main project tasks, effort and costs are listed in the adjacent table.

YOU CAN ALSO BENEFIT FROM MICROELECTRONICS

Digital ASIC technology provided ALV with the means of improving its photon correlation products and enhancing its market position. You can also achieve significant benefits by acquiring the right microelectronics technology and utilising it in your product or manufacturing process. You can get help from FUSE to realise this.

FUSE is a technology transfer programme, funded by the European Commission to stimulate the wider use of microelectronics technologies by European enterprises to increase their competitiveness and enhance their economic growth. The demonstrator described here is one of many examples in the public FUSE portfolio covering the whole spectrum of microelectronics technologies and spanning a wide range of applications and industry sectors.

FUSE provides you with:
• Best practice in acquiring specific microelectronics technologies and conducting full development projects through the FUSE portfolio of real life demonstrator documents.
• Local training and expert support to plan your innovation realistically and help you conduct your project successfully.

Further information and support relating to this and other demonstrators can be obtained from the addresses below.

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The Company
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