NXT GEN hightech

MicroAlign

Semicon 09:

Production Equipment for High-Volume PIC Manufacturing

In Semicon09, efforts are focused on developing production equipment for integrated photonics to enable the mass production of these components and devices. The project aims to standardise both front-end and back-end manufacturing processes for producing wafers with Photonic Integrated Circuits. The objective is to develop machines suitable for various product families, utilising standard substrates such as SiN and InP. These developments are essential for the assembly of components, integrating different coupling methods, such as vertical and horizontal. Additionally, the project seeks to advance new process developments in the front-end, targeting properties like PZT and CVD.

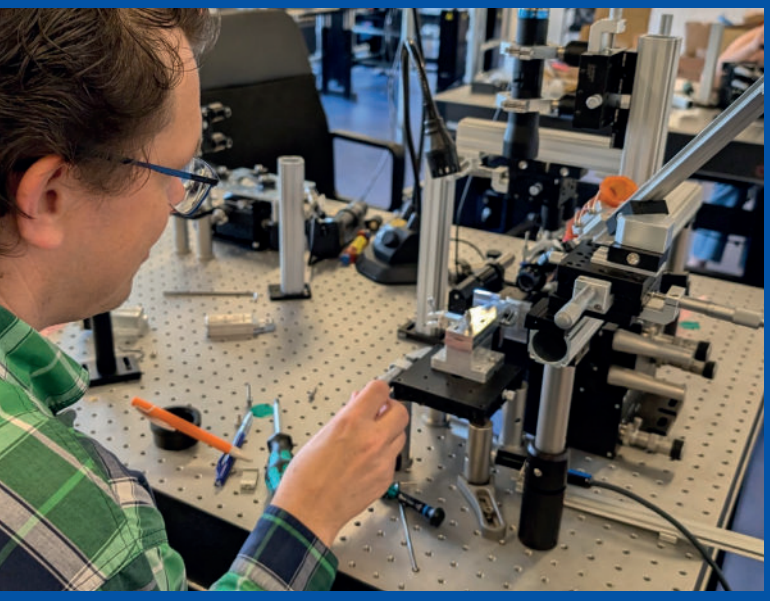
MicroAlign: Pioneering Fiber Alignment Solutions in Semicon 09

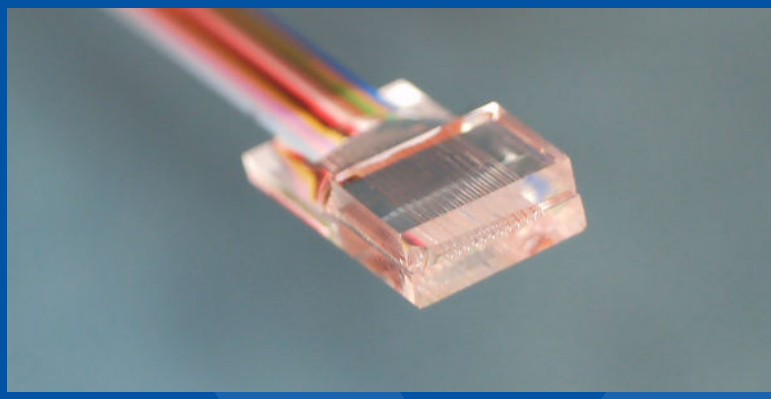
MicroAlign, a deep-tech startup and spin-off of the Eindhoven University of Technology, is revolutionizing fiber alignment through its groundbreaking technology. Co-founded by Simone Cardarelli, MicroAlign's innovative approach enables sub-micrometer accuracy in the connection of multiple fibers to multiport optical components. The company's core technology focuses on developing next-generation high-accuracy fiber arrays with pitch accuracies of less than ±0.05 µm. As a partner in the NXTGEN High Tech program and the Semicon 09 project, MicroAlign is driving advancements in integrated photonics and high-precision fiber alignment.

Role in Semicon 09
MicroAlign plays a crucial role in the Semicon 09 project by contributing its unique technology for ultra-high-accuracy fiber alignment. The company's focus within the project is on optimizing the alignment of optical fibers in fiber arrays, ensuring sub-micron precision through a novel micro-electromechanical system (MEMS). This system allows for the simultaneous core-based alignment of each optical fiber in a fiber array, making MicroAlign the only company worldwide capable of achieving such accuracy. The company's involvement in Semicon 09 includes improvements on its actuator technology and supporting key applications with its precision fiber arrays.

Completed Activities
MicroAlign has already made significant progress in advancing its technology and positioning itself as a key player in the Semicon 09 project. The company has completed the following activities:

- Developed and operationalized the 250 µm pitch alignment tool
- Produced the first lab versions of fiber arrays with 12 channels
- Optimized actuator technology for improved alignment precision
- Established a strong foundation for supporting photonic and quantum computing applications





Planned Activities
Looking toward the future, MicroAlign has an ambitious roadmap to further enhance its technology and expand its production capabilities. The company's planned activities include:

- Introducing 127 µm pitch fiber arrays with additional channels for any wavelength
- Setting up a fully automated volume production process and manufacturing facility in the Netherlands
- Expanding applications in high-end metrology, spectroscopy, sensing, and quantum computing

MicroAlign Expertise
MicroAlign's expertise lies in its ability to manipulate and align multiple closely placed fibers with nanometer accuracy, a capability that far exceeds current industry standards. While state-of-the-art technology typically achieves fiber alignment accuracies of 500 nm, MicroAlign's precision tools can reach an accuracy of 100 nm. This makes the company's fiber arrays a critical enabling component in applications where every photon counts, such as in photonic quantum computers, high-end metrology, and advanced spectroscopy.

What sets MicroAlign apart is its seamless integration capabilities. The company's fiber arrays have similar dimensions and handling requirements to standard V-Groove arrays, making them easy to test and integrate into existing production lines. This flexibility, combined with MicroAlign's pioneering accuracy, positions the company as a key player in the high-tech ecosystem, enabling the development of next-generation technologies.

Conclusion
MicroAlign's role in Semicon 09 and its involvement in the NXTGEN High Tech program highlight the company's leadership in ultra-high-accuracy fiber alignment solutions. Through its completed activities and planned advancements, MicroAlign is poised to make significant contributions to the future of integrated photonics, quantum computing, and other high-tech fields. As the only company capable of achieving nanometer-level fiber alignment, MicroAlign stands out as an ideal partner in projects that require precision, innovation, and scalable solutions.

About **NXTGEN Hightech**

The NXTGEN Hightech program has been awarded a grant from the Dutch National Growth Fund to stimulate structural and sustainable economic growth in the Netherlands. Learn more:

www.nxtgenhightech.nl

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