



GETTING ALIGNED

HIGH PERFORMANCE AT HIGH SPEED



Authors:

Wouter Spoorendonk

R&D project manager
at IMS



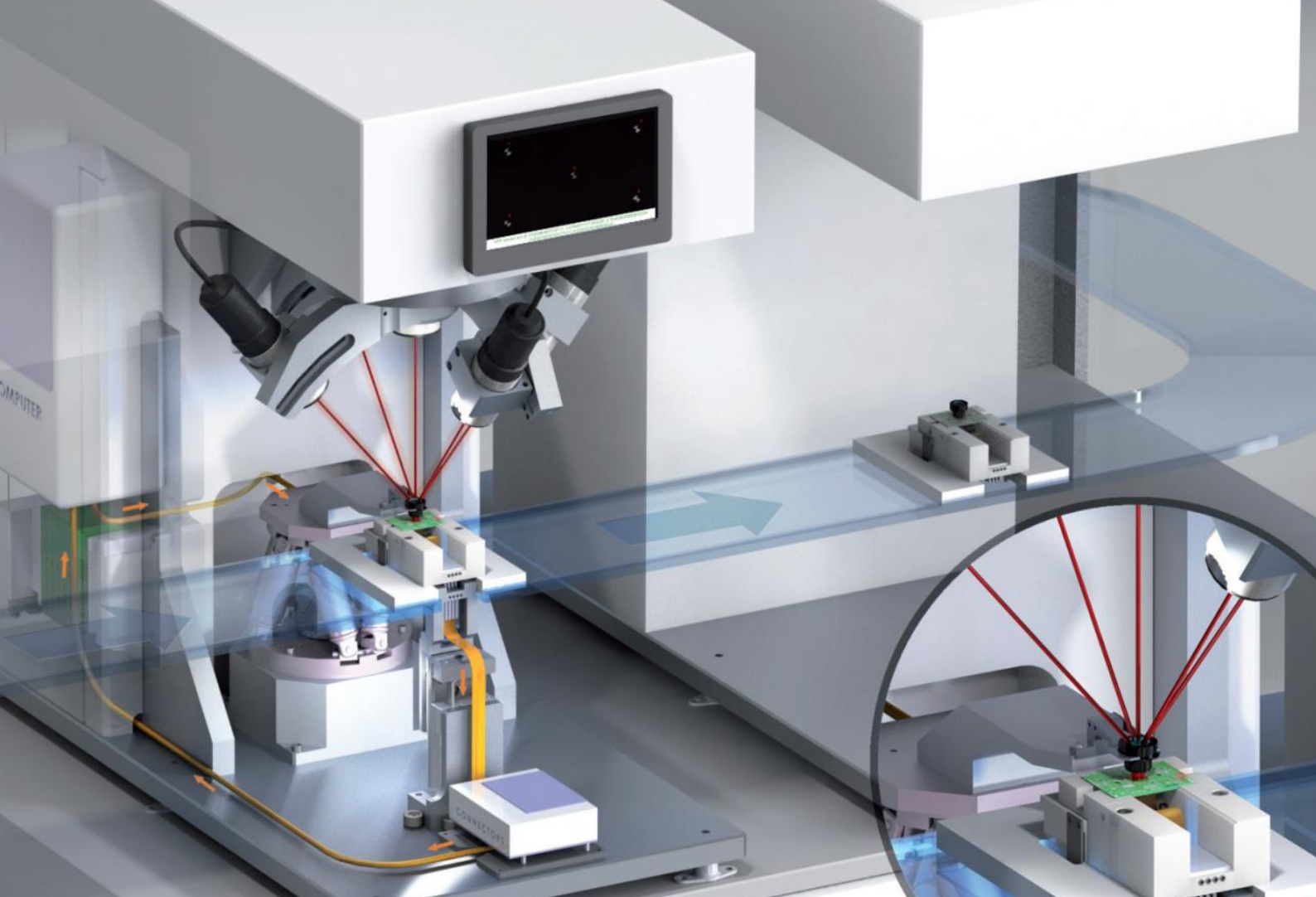
Marc Beusenbergh

R&D director
at IMS

In the world of micro-optics and micro-structure assembly and testing, alignment is critical to achieve the desired performance. For more than 20 years, Integrated Mechanization Solutions in Almelo, more commonly known as IMS, has gained an expert position and a considerable track record in this field. IMS develops, builds, supplies, and supports high precision production systems 'from lab to fab'. Over 120 professionals work with high precision to create test systems, operator workstations, stand-alone assembly systems, and fully automated production lines for customers worldwide.

High Precision

High precision assembly at IMS means small and complex products that need to be assembled with precision levels of a few-hundreds of millimeters down to one-tenth of a micron or even less. Examples of products that require such accuracy are automotive lighting systems and sensors, medical implants and surgery equipment, security systems and drone cameras, and many components in mobile phones and other smart devices.



▲ *Consumers, and therefore industries, are asking for higher performance, more complex, and smaller devices and sensors, which in turn increases the demand for high quality imaging. This drives up the accuracy of manufacturing optical systems. As complexity and accuracy increase, so do manufacturing challenges. Many optical system production systems can no longer rely on only mechanical alignment of components but need active alignment.*

Assembly of Optics

A very specific class of products for which IMS builds production systems are micro-optics and camera modules. Keeping cost down while still achieving high performance requires more than just considering size and shape when we deal with optics. Here, we need to look at actual optical performance while putting components together – also known as active alignment. Whether lens-to-lens, lens-to-camera sensor, laser-to-lens, lens-to-LED, and many more, these subassemblies require measuring optical performance using an image or projection while putting components together. Quite often this means that components need to be manipulated in 6 degrees of freedom while continuously measuring optical performance until an optimum configuration is reached.

Scalable Solutions

A major consideration in developing production systems at IMS is offering solutions that 'grow' with the customer's challenge – both in volume as well as in product design. Especially in early stages of product development, design changes need to be handled. Also, very often a family of products need to be produced using the same or similar equipment. Furthermore, production volumes are expected to increase as the customer's product becomes more successful, requiring a higher level of automation. IMS builds modular production systems to handle these challenges.

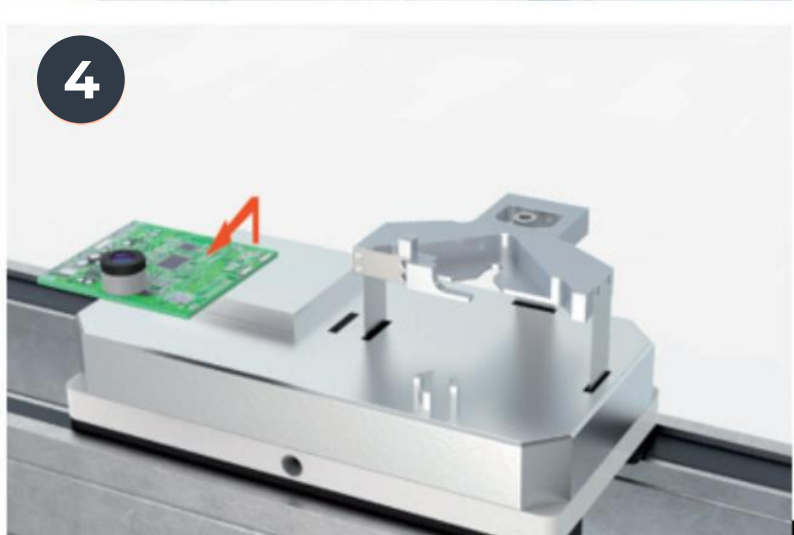
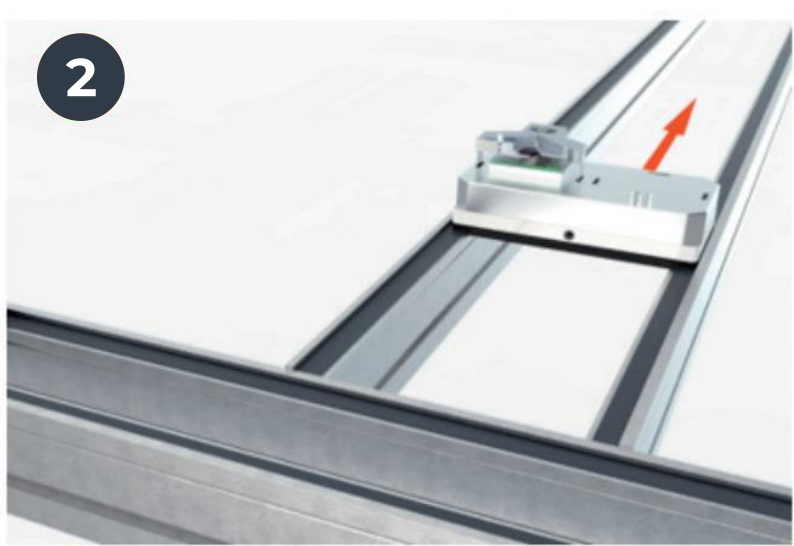
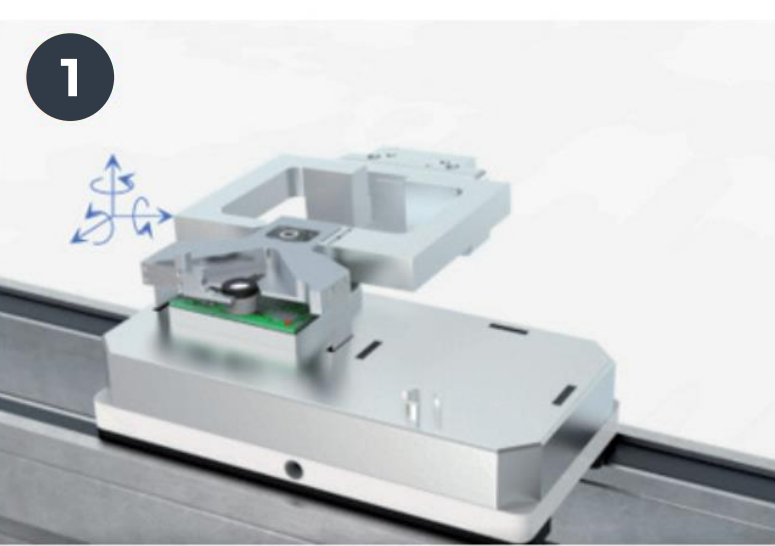


▲ *Our production lines are scalable in capacity, capable of a high-mix and flexible in layout. When developing a production line, we're making use of our standard automation platforms, which form a reliable and robust basis to integrate the needed manufacturing and assembly processes on.*

Active Alignment System with Unique Features

Recently, IMS released a highly modular and scalable production system for optics assembly: the A-Lign5. The A-lign5 is a camera module assembly workstation fit to be used alike in R&D environments, small to medium volume production systems, and in highly automated production lines. Lens systems can be actively aligned to a camera sensor using the A-lign5 with an accuracy of only 1 micron – a high accuracy that is needed to obtain the best camera module performance. Fast algorithms and controls provide quick feedback and short cycle times, which is needed for scaling up production volume. With only a limited number of modifications, the system can handle different types of optical systems, e.g. lidars.

The A-lign5 can be equipped with different types of cleaning, dispense and curing systems in accordance with customer demands. Furthermore, and unique to the world of active alignment production systems, is a feature to freeze the alignment without fixating the components. This feature is called the Position Freezing Carrier: it holds the aligned optics and allows it to be fixated in a parallel step, next to the alignment station. This eliminates the need for pre-curing glues and reduces cycle time – hence saves costs. Additionally, it allows product developers to reconsider the fixation of components altogether, thus provides high design freedom.



▲ *The main steps of the Position Freezing Carrier (patent pending).*

Scaling Up and Down

Active alignment is applied in many applications. Automotive head lights using more advanced (accurate) LED, laser, and lidar systems, require economic, scalable, and accurate active alignment solutions. Quality and performance of components are going up, enabling the automotive industry to meet increasing sustainability and safety demands and get ready for autonomous driving.

Another field of application of active alignment that is rapidly increasing is integrated photonics. Photonic integrated circuits (PICs or photonic chips) are now finding their ways into telecom, medical, computing, and many more applications rapidly. Allowing these PICs to communicate to other PICs or the 'outside world' using glass fibers or fiber arrays, rely on active alignment to guarantee the best coupling and minimal signal loss. Here IMS is working on production systems that make this possible – in other words: IMS is aligning for high performance at high speed.

Main steps of the Position Freezing Carrier (patent pending):

- 1 After actively aligning the optics in six degrees of freedom, the 'intermediate body' that holds the optics is 'frozen', i.e. clamps are closed.
- 2 It can now be moved into a parallel process, e.g. glue curing, while the AA-workstation can continue with the next product.
- 3 Once the bonding is completed, the parts return to the main production track.
- 4 When the assembly is completed, parts are removed from the production line and the intermediate body is in its rest position.



We are IMS, will you join us?

Do you want to contribute to tomorrow's world with high-tech production solutions?

Join the club! We are looking for new high-tech colleagues. With more than 120 colleagues we develop and build advanced assembly lines for small composite products. You can think of automotive lighting systems, pressure sensors or many components in mobile phones and other smart devices. In the coming years, we will need new colleagues to optimally serve the growing number of customers.

Involved from A to Z

Working at IMS means working on innovative projects in a flat organization with multidisciplinary teams. During a project you are involved from A-Z and you are in direct contact with our customers. The passion for technology and commitment to the customer and your colleagues, makes that we continuously challenge ourselves to achieve the best results.

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