1993
1992
1991
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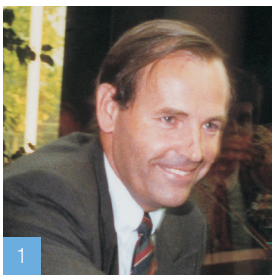
1989

Chapter 3 1989 | 1993

1989 | 1993 Board of Management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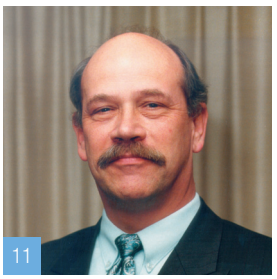
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1989

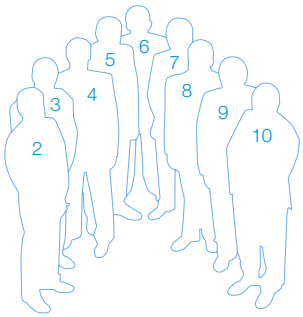
10. Willem Troost Managing Director
2. Richard Aurelio Sr VP Commercial Operations
3. Joop van Kessel Director Manufacturing
4. Gerard Verdonschot Director Finance / Administration and Chief Financial Officer
5. Evert Polak Director Research & Development
6. Anders Jacobsen Director Corporate Logistics
7. Nico Hermans Director Human Resources & Organization
8. Doug Marsh VP of Worldwide Sales
9. Dr. Steef Wittekoek Chief Executive Scientist

1990

Willem Troost Managing Director (until 1-Jun-90)
1. Willem Maris Managing Director (from 1-Jun-90)
Richard Aurelio Sr VP Commercial Operations
Gerard Verdonschot Director Finance / Administration and Chief Financial Officer
Doug Marsh VP of Worldwide Sales
Nico Hermans Director Human Resources & Organization
Evert Polak Director Research & Development
Anders Jacobsen Director Corporate Logistics (until 1-Jun-90)
Joop van Kessel Director Manufacturing
Dr. Steef Wittekoek Chief Executive Scientist

1991

Willem Maris Managing Director
Gerard Verdonschot Director Finance /



Administration and Chief Financial Officer
Doug Marsh VP of Worldwide Sales
Nico Hermans Director Human Resources & Organization
Evert Polak Director Research & Development
11. Ton Willekens Director Corporate Logistics
12. Arie Ouwerkerk Director Manufacturing
Joop van Kessel Director Worldwide Service & Quality
Dr. Steef Wittekoek Chief Executive Scientist

1992

Willem Maris Managing Director
Gerard Verdonschot Director Finance / Administration and Chief Financial Officer
Doug Marsh Worldwide Sales
Nico Hermans Customer Support
Evert Polak Research & Development
Ton Willekens Corporate Logistics
Arie Ouwerkerk Manufacturing
Joop van Kessel Worldwide Service & Quality
Dr. Steef Wittekoek Chief Executive Scientist

1993

Willem Maris Managing Director
Gerard Verdonschot Director Finance / Administration and Chief Financial Officer
Doug Marsh Worldwide Sales
Nico Hermans Research & Development
Evert Polak Marketing
Ton Willekens Corporate Logistics
Arie Ouwerkerk Manufacturing
Joop van Kessel Service & Quality
Dr. Steef Wittekoek Chief Executive Scientist

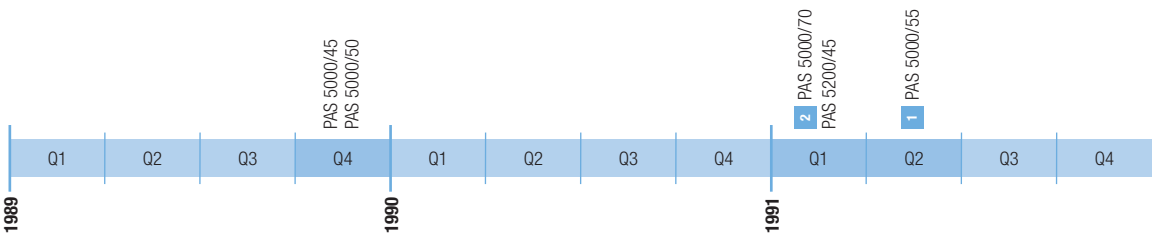
Product **Portfolio**

1

PAS 5000/50™ i-Line Stepper

In 1989, the PAS 5000/50 was the first mass-produced member of the PAS 5000 family, and was the result of a thorough modernization of the PAS 2500, including many performance improvements.

This enabled the PAS 5000 to be a leading-edge imaging solution at the 0.50-micron node when it was introduced. Since then, the system established itself as a high value alternative for non-critical lithography applications. Most of the 77



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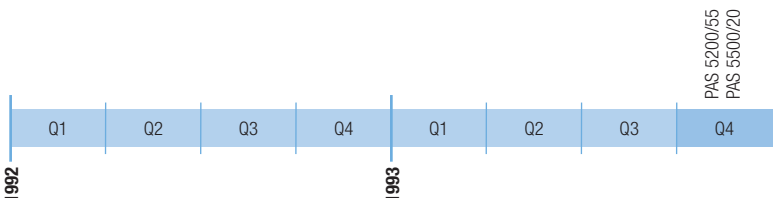
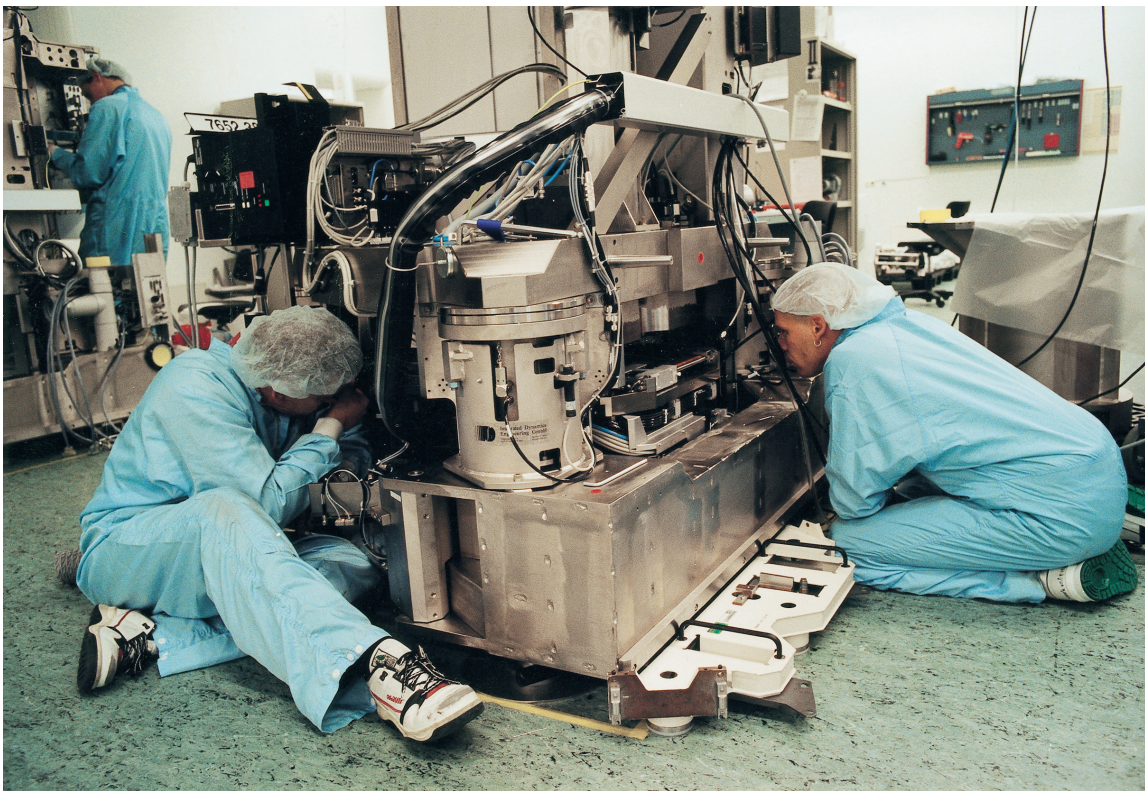
PAS 5000/50 systems built in its short one-year lifetime are still in active production with ASML customers worldwide.



From lamps
to lasers



Thanks to the PAS 2500 series, ASML quickly became seen as a serious, if small, player in the market. But in the business of lithography, there is no time to rest. Having produced a competitive g-line stepper, we now needed to improve the working resolutions of our machines, and the most promising option appeared to be reducing the wavelength of light we were using.

Reducing wavelength

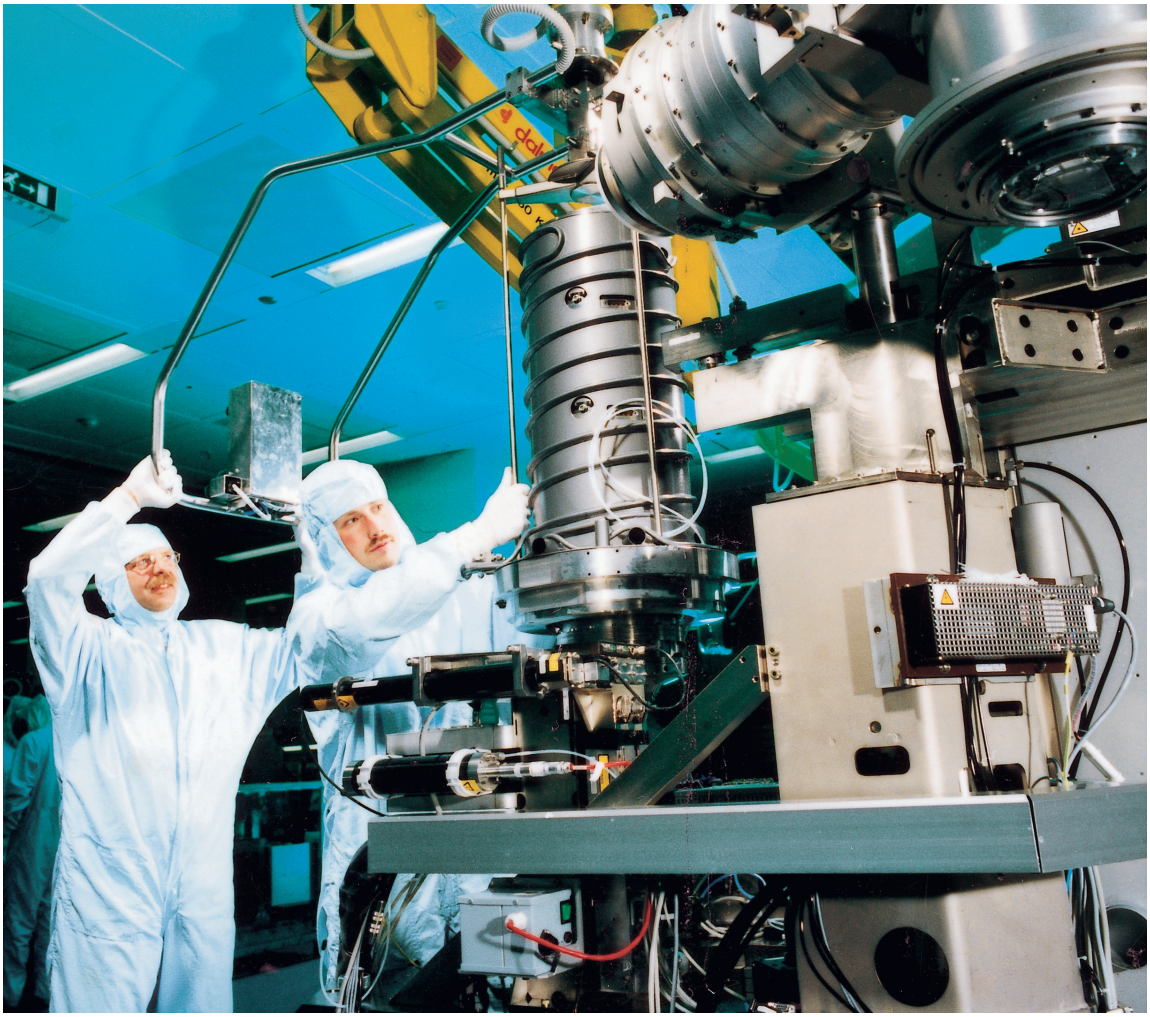
But reducing light wavelength sounds easier than it actually is. The crucial factor is the photoresist: not every photoresist responds equally well to exposure to light of all wavelengths. As a result, we can only use wavelengths for which a suitable photoresist already exists or can be developed. But problems are created to be overcome, and our first great advance in reducing the wavelength of the light used in our machines came in 1989, when we introduced i-line light. Still produced by a pressurized mercury lamp, this type of light has a shorter wavelength than g-line light (365 nm, as opposed to 436 nm), and incorporated into the PAS 5000 series, it enabled us to become the first company in the world to offer an i-line stepper with a working resolution of only 0.5 microns.

A new era?

But we had only just started. Around the same time, we were seriously exploring the use of light of an even shorter wavelength — deep ultraviolet light (DUV), which has a wavelength of between 100 nm and 300 nm. It can be produced by excimer lasers, which make use of various noble and halogen gases to produce DUV light of different wavelengths. We first used Krypton Fluoride (KrF) excimer lasers, which produce light with a wavelength of 248 nm. Later we introduced Argon Fluoride (ArF) lasers, which take the wavelength down still further to 193 nm. Our first DUV steppers — the PAS 5000/70 and the PAS 5500/90 — were rolled out in 1990. The improvement was significant and dramatic: we could now achieve working resolutions as small as 0.45 and 0.35 microns. The advent of DUV would herald in an entirely new phase of miniaturization.

Numerical aperture

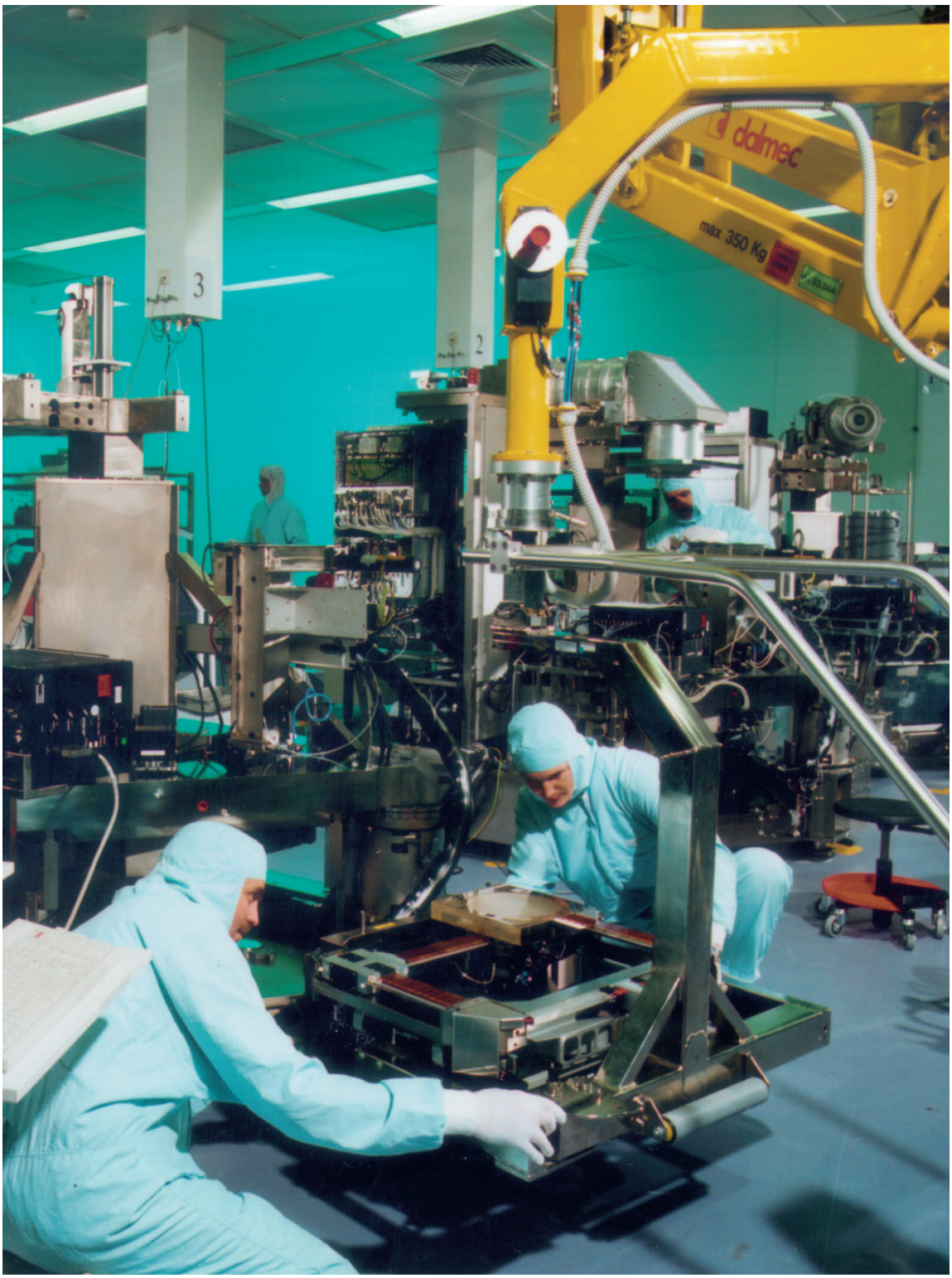
DUV was not, however, the complete solution for every situation. i-Line steppers were still more efficient and less costly than DUV steppers, and not all of our customers were ready to make the transition.



We therefore continued to work hard to find new ways to improve the resolution of our i-line machines. One way was to increase the numerical aperture (NA) of the lens. A high numerical aperture allows the lens to gather more diffraction orders of light, which in turn yields a higher resolution image. In this way, in 1993, we succeeded in producing an i-line stepper with a working resolution comparable to that achieved by a DUV machine — 0.35 microns (PAS 5500/100).

In the space of less than ten years, we had managed to more than halve both the working resolution (cutting it from 0.9 microns to 0.35 microns), and the wavelength of the light used (from 436 nm down to 193 nm).

Almost thirty years after Moore had made his prediction, Moore's Law was still holding. Surely this rate of progress could not go on indefinitely... Or could it?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2

ASML
around the world

Building 2 in Veldhoven

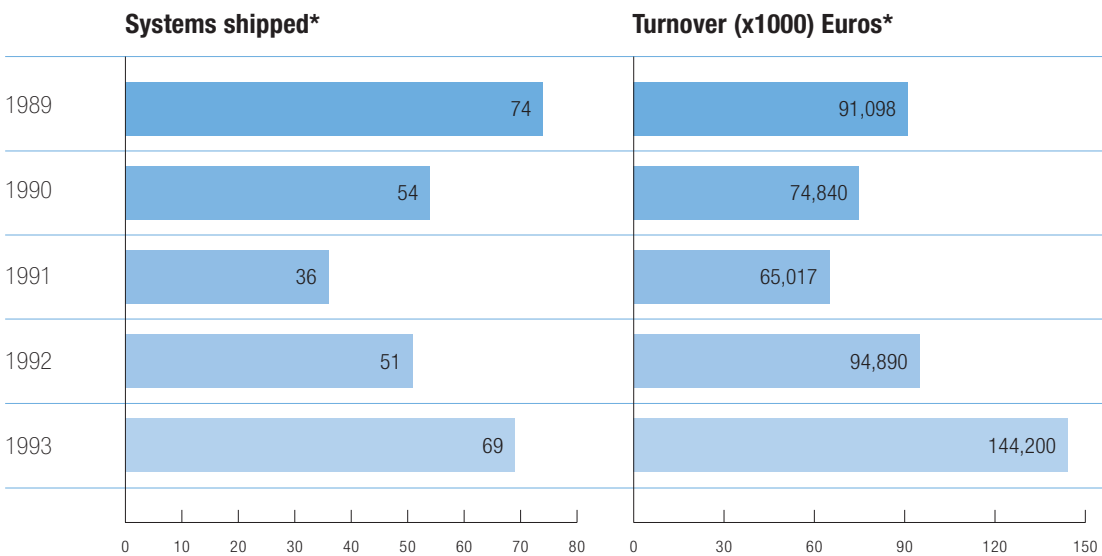
Between 1989 and 1993, ASML introduced itself to the Asia market. In 1989, ASML started working with agent Hermes Epitek (later called Hermes Systems), the largest semiconductor equipment agent in Taiwan.

ASML also worked with an agent in Korea. Our first agent was Intraco Korea. In 1993, ASML replaced Intraco Korea with Hantech, who became our exclusive representative in Korea. Hantech was ASML's sales and service representative, and ASML supported the customers with Korean engineers.

Around the world at the end of the 80s, ASML made plans for new office buildings. As the production capacity of the company grew to around 200 steppers (5500 equivalent), the company needed to expand its facilities. In the U.S., the employees in Colorado Springs, Colorado; Boise, Idaho; and Austin, Texas moved to new locations. In Veldhoven, new facilities were built, including a new office building, which was started in 1990 and completed in April 1991.

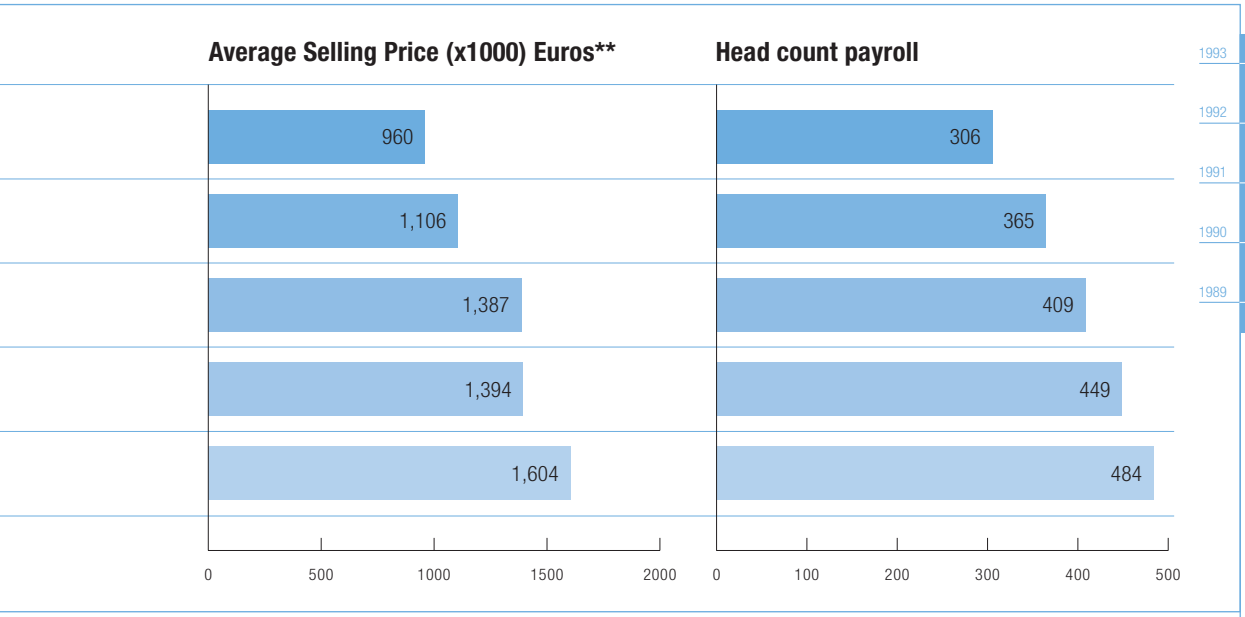
U.S. office in Boise, Idaho

1989 | 1993 Statistics



* Source: systems shipped + turnover: ASML Finance annual report/management report

** ASP: Average Selling Price



The company enjoyed greater success at the beginning of the new decade. Development of the PAS 5500 was well underway, and IBM was the first to purchase it in 1991. Still, another severe semiconductor industry downturn occurred in 1992, and ASML was close to shutting down. Henk Bodt, then on Philips Management Board, persuaded Philips to keep ASML going. A true believer, Henk Bodt later became chairman of ASML's Supervisory Board.

Social events


1


2

Veldhoven

1 • **December 1989:** "Sinterklaas" gathering, where the children received presents

2 • **December 1990:** Trendsteppers Christmas Dinner, attended by more than 100 employees

3 • **December 1992:** "Sinterklaas" gathering with 120 children

• **December 1992:** Trendsteppers Christmas Dinner with a Chinese/Indonesian buffet

Tempe

• **December 1990:** Dancing party with prizes

• **May 1991:** Western barbecue picnic at Canyon Lake with boating, swimming and games

• **April 1992:** Pot-luck barbecue in the Desert Breeze Park with fishing, swimming and volleyball

• **December 1992:** Christmas Party in Western style at the Radisson Tempe Mission Palms Hotel

• **October 1993:** Halloween party, with prizes for the best costumes

4 • **December 1993:** Christmas party, Hawaiian style

Boise

• **1990:** The "Safe & Sane"' picnic and the "Camp out for Rowdies"

• **1991:** Picnic in one of Boise's recreational areas

• **December 1991 + 1992:** Christmas party at the Lock, Stock & Barrel restaurant


3


4

San Jose

- **December 1990:** Dinner at the restaurant at the top of the Baron Hotel
- **December 1991:** Christmas dinner at the Nijo Castle restaurant
- **1993:** Beach party "Life is such a beach in San Jose…"

Fishkill

- **1991:** Several cook-outs and a poker night at the Residence Inn
- **December 1992:** Christmas party at the Copperfields restaurant, all east-coast employees and their families were invited, and the special guest was Santa Claus

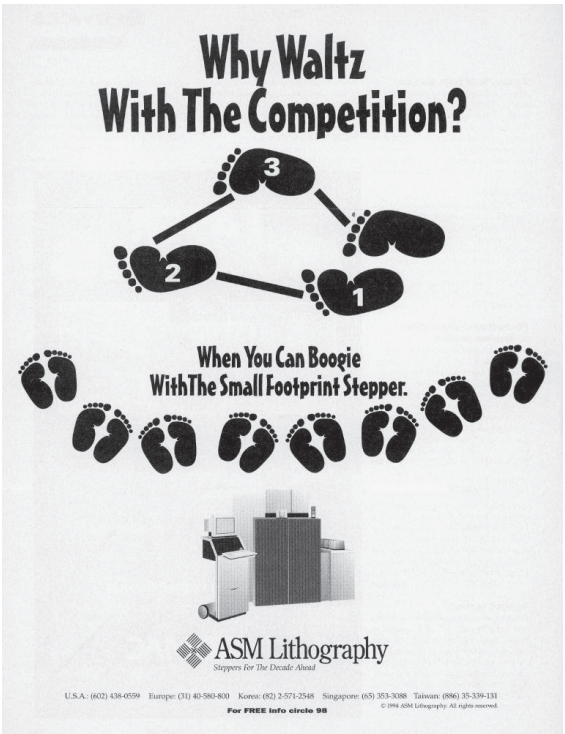
Colorado Springs

- **1991:** Christmas dinner at Chicago Joe's

Austin

- **July 1991:** A very late Christmas party at the McCluskey's
- **December 1992:** Christmas party at Carmello's restaurant

1989 | 1993 **Advertising**



Buy an ASML stepper and get a Nikon® free.

Here's your chance to get the Nikon you've always wanted.

We're giving this Nikon camera away with every ASM Lithography stepper you install.

It's our way of reminding you about the 20 percent greater throughput you'll get from our steppers. That it takes just four ASML steppers to do the job of five of theirs.*

So it's like getting one free. But that's not all you get:

Your throughput will improve even more on critical layers.

Our patented, process-insensitive alignment achieves overlay accuracy of 0.125μm – even through your toughest grainy aluminum.

With the new PAS 5000/50, you'll get full-production resolution down to 0.5μm with fifth-generation ASML/Zeiss i-line optics. And 20 percent more depth of focus than any g-line lens. So you can make devices never before possible.

With all this and absolutely no need for expensive, space-consuming environmental chambers, you'll also get lower costs per die. We guarantee it.

Then we'll support you with all the process expertise you will need to get up and running fast.

Zoom in on all the details. Just call or write the ASML office nearest you.

ASM Lithography

In U.S.A.: 2315 W. Fairmont Drive, Tempe, AZ 85282 Phone: (602) 438-0559; FAX (602) 438-0793.
In Europe: Meerenweg 15, 5503 HN VELDHOVEN, The Netherlands. Phone: (31) 40-380800.
In Taiwan: 3F-1, 376 Jen Ai Rd., Sec. 4, Taipei, Taiwan, ROC. Phone: (886) 2-709-7606.
In Korea: 903 Kwang Sung Building, 831-47, Yuk Sam Dong, Kangnam Ku, Seoul, Korea. Phone: (82) 2-562-8381.

*Nikon is a federally registered trademark used by Nikon, Inc. for its cameras.
*Nikon wafer steppers are manufactured by Nikon Corporation.

Supplier partnerships

ASML produces its systems with the assistance of an extensive network of suppliers, co-makers and co-developers. These range from producers of simple standard components to very specialist suppliers, and from small design and engineering firms to large R&D labs.

As much as 90% of our total manufacturing costs go toward materials and contractors. In the early days, we had to go on the road to find suppliers. No one knew ASML, and we had to explain who we were and what we wanted.

As ASML's reputation grew, all the top suppliers added ASML to their references. Later on, suppliers even stood in line to work for ASML. ASML worked under tremendously tight deadlines then, as we do now. Everything had to be delivered yesterday. It was very difficult to find the right suppliers who could meet our technical needs and who could keep up with us. If one could deliver in time, and meet our needs, we were quick to reward them.

Interview **Fried Verspaget**

Fried Verspaget recalls the rapid development of Customer Support in the late 1980s and early 1990s

Support on the go

As ASML grew, Customer Support had to become much more professional, and my role as Customer Support Manager was extremely varied. I had been asked to join ASML to set up a service department, which included Factory Support (now Service Engineering), the field organization and Publications and Training. The various “step-offs,” when customers tested our equipment against the competition, were supported by Factory Support. The set up of the Training department to provide technical training for staff and customers led to a modular training system that we developed in a matter of months and, from a customer perspective, gave us a valuable competitive edge. During this time, Customer Support basically adopted its current structure, with three lines of support and an Applications Support department. Highlights included the establishment of the first European operating office outside the Netherlands, in Grenoble, France, and the first PAS 5500 shipment. We accompanied the equipment on its journey to IBM in the U.S. Upon disembarking at John F. Kennedy Airport, we were shocked to see forklift trucks stacking the plane’s other cargo — enormous pallets of roses — by speeding and then braking hard to slide the pallets off. Luckily, this first PAS 5500 equipment didn’t receive the same treatment! For the next year, a team worked non-stop under the inspiring leadership of Martin van den Brink to adapt the system to IBM’s requirements, ultimately getting the mean time to failure up from 8 minutes to 1,795 hours.
Back then, ASML moved fast. The formal and informal networks were one and the same; you could be discussing an idea over a drink one night, and by the next morning it had been implemented…

Interview **Henk Bodt**

Henk Bodt, the Philips' board member who was responsible for ASML in the early 1990s, remembers his role in ASML's spectacular recovery in 1993.

Nine months and thirty-six million made all the difference

In 1990, ASM International had already stepped out of the ASML venture, and Philips was having a hard time with this rather "wild" group of pioneers. As a Philips Board member, I was made responsible for ASML, probably because none of the others wanted to do it.

In the early 90s, ASML's biggest problem was that the machines it produced wouldn't work properly. Philips had enough troubles of its own at that time, so they were understandably reluctant to invest in a company that was struggling to get the basics right. On my advice, ASML stopped most new developments and ensured that their existing machines started working properly.

However, the financial problems were getting worse. It turned out that no external financing was possible. The financial situation was once again getting critical; unless money could be raised, ASML would have to cease operations and file for bankruptcy. Philips itself was also facing hard times, with money not being available even for good investments. In July 1992, I finally asked Verdonschot and Maris to tell me exactly how much they needed, and for how long. The answer was 36 million guilders and nine months. I convinced my colleagues at Philips to give them one last chance. I will never forget that day in April 1993, exactly nine months later, when the two gentlemen entered my office with a check for 36 million. They put it on my desk with a huge grin on their faces. It was a glorious, breakthrough moment for all three of us!

ASML went public in 1995. As ASML was then no longer a full Philips subsidiary, my role also changed. I became Chairman of ASML's Supervisory Board, so I've remained closely involved with the company. I've witnessed how the company has prospered and developed into a major change factor in the industrial and scientific fabric of the area around Eindhoven.

"As a Philips Board member, I was made responsible for ASML, probably because none of the others wanted to do it"

Interview **Ton Willekens**

When Ton Willekens joined ASML in 1991 as Vice President of Corporate Logistics, he faced a chaotic system that needed substantial reform.

Efficient logistics

When I arrived at ASML, the business faced a financial crisis, and the lack of an efficient logistics system wasn't helping! My qualification as a Certified Public Accountant helped me identify where and how to optimize processes, improve throughput and cut costs. I quickly formed a dedicated Logistics team. Our first task was to merge the two conflicting material requirement planning systems in Development and Operations, which were eating up time and money, blurring priorities and making it impossible to control the supply chain. Later, we introduced Systems Logistics and General Logistics Planning.

Our suppliers needed to be aligned with our logistics, so we concentrated on improving supplier relationships both formally and informally. Transparency was vital; we asked all key suppliers to disclose their costing so that we could identify areas for improvement together. By creating a partnership of equals and communicating openly, we were actually able to influence Zeiss' production methods to our mutual advantage.
By '92, we'd achieved a lot, including improving the rolling plan procedure, cutting the number of "own use" systems (systems that were used by ASML development), improving logistics communications and implementing the production control module in assembly.
It was hard work — I remember having to climb over the fence to get home one night, as security had locked us in! But it was tremendously fulfilling, and I always looked forward to Fridays, when the people from Logistics and Finance exchanged views and ideas over a friendly drink in the local pub…

Interview **Paul van Attekum**

In 1991, while ASML was busy rolling out the brand-new PAS 5500, Paul van Attekum was given the job of product line manager for the PAS 2500 and PAS 5000. He recalls how he and his team worked hard on keeping existing customers happy.

Keeping customers happy

When I became a product line manager in 1991, I was basically appointed to discontinue the PAS 2500 and 5000! However, I soon discovered that there was still good money to be made out of them. Rather than trying to sell entire new systems, we started developing improvement packages for the installed base. These packages enabled existing customers to increase productivity or improve imaging performance, for instance. We talked to customers to find out what they needed, thought of options that would help them, developed these options and then sold them as a package. And it worked! In fact, the old machines were not discontinued until a few years ago, and we're still refurbishing used machines and delivering option packages for them today.

Even back then, while everyone else was getting excited about the PAS 5500 and new technologies, my team was very much aware that listening carefully to our customers was actually going to be key to the company's survival. In our industry, you rely on a relatively small group of customers, so each one is critical.

We tackled our task with enormous enthusiasm and optimism, even though the times were very much against us. Working at ASML meant "getting things done." I clearly remember the time we almost lost a customer to a competitor. We simply turned around and defined an entirely new system especially for them in just three weeks — something that would normally take months.
We kept the customer!

Interview **Willem Maris**

Willem Maris, CEO throughout the 1990s, remembers his first few years in office and the importance of a clear roadmap.

Consistency, focus and reliability

When I took over from Willem Troost as CEO in 1990, Philips' increasing concern about ASML's future meant that we received a lot of well-intentioned but often unsolicited advice and pressure from many departments, including Finance and Audit. This sometimes threatened to jeopardize our progress, and my first two years in office were largely spent negotiating a careful balance between keeping Philips at arm's length and making full use of the company's extensive technical and organizational expertise and resources. Not an easy task!

Of course, we did have much to thank Philips for. The Nat Lab, where our Executive Scientist Steef Wittekoek had worked on the development of an early stepper, continued to lend us support, and several groups helped us to set up essential systems and processes, as in HR, for instance. As a former Philips employee, I was also able to make good use of my wide-ranging network there.

Financially, these were tough years. While we were convinced that the PAS 5500 was better than our competitors' products, others weren't, including Philips. If we were going to fulfill the technology's commercial promise, we needed to focus. In 1990, therefore, the Board of Management clearly defined our mission, vision and strategic intent. Over the next decade, I started every presentation by reiterating these. This constant, consistent repetition meant that everyone understood where we were headed, and so was empowered to take independent decisions to help us get there. That was vital — there was no time to micro-manage people. If anyone was unsure what to do, there was only one rule: to do what was best for the customer.

We set ourselves goals that were ambitious but realistic and meaningful to us: not to be no. 1 in the market, for example, but to gain 30% of the market share in order to be able to cover our costs. Once they were set, these goals were left unchanged for years, so we could pursue them single-mindedly. Years later, I was enormously gratified when two students interviewing me for a case

study on ASML commented that they'd heard the same story from every ASML employee they'd interviewed!
The Board of Management was an extremely tight-knit group. Skills-wise, we were pretty diverse, and the cultural mix was interesting too — five Dutchmen and a single American, Doug Marsh. There was a lot of dynamic and productive tension, which I had to manage as Chairman, but no real conflict. We all were determined to make ASML a success, but I don't think any of us could have imagined then that it would one day be a billion euro business!

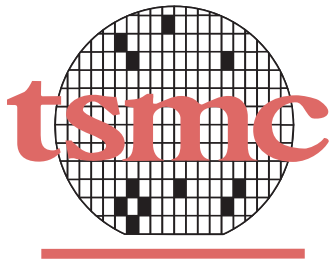
"As a former Philips employee, I was also able to make good use of my wide-ranging network there."

Micron Technology was founded in 1979 in Boise, Idaho, and shipped its first DRAM in 1981. Those were the heydeys for DRAMS. Micron purchased their first tools from ASML in 1987 — they were 2500/40 systems. Mike Mulholland (currently VP U.S. Sales) was the account manager for Micron at that time and did the deal to get this first order. Micron went on to purchase every single model type in i-line, DUV and ArF that ASML has introduced.

Micron currently has ASML litho tools installed worldwide in four fabs and one R&D center. The Boise fabs have remained relatively compact, with Micron pulling tools out every year to make room for ASML's newest models. They have become a good source of resale equipment for ASML. Used Micron tools can be found all over the world. They command a high price because all Micron's tools have been under 100% full service contracts since their install date.

Micron remains one of ASML's most loyal and important customers. Many of the young engineers who started at Micron still work with ASML, such as JJ Johnson, Bill Rericha and John Aiton. Micron continues to be an important source for beta tests and data gathering, and also is a key customer that drives our roadmaps in NA and overlay. With Micron's help, ASML has become the leader in lithography technology.

Customers | **TSMC**



TSMC (Taiwan Semiconductor Manufacturing Company) is one of the largest and oldest customers of ASML. They also have the largest installed base of ASML equipment in numbers and machine types, from the 2500/10 in 1988 up to the leading edge XT:1250i immersion machine, which will be delivered in 2004.

TSMC headquarters is located in the Hsin-Chu Science-Based Industrial Park in what is referred to as Taiwan's "Silicon Valley." The company is listed on the Taiwan Stock Exchange (TSE) and on the New York Stock Exchange (NYSE) and is the world's largest and most successful dedicated independent semiconductor foundry. TSMC was founded in 1987 as a joint venture between Philips Electronics and the Taiwanese government.

The evolution of advanced IC technology over the past decade has been so rapid that it has changed the way that all companies do business. Demands for faster design cycles and faster time-to-market have increased. Demands for higher speeds and product quality have increased as well. These are some of the many reasons companies turn to TSMC as their manufacturing partner, and why TSMC turns to ASML as a supplier.

As a foundry that manufactures wafers, TSMC must do everything possible to bring down the cost per die. Because they fully focus on manufacturing, TSMC has become an expert in this field. As of today, they serve as a productivity benchmark for a lot of other semiconductor manufacturers. ASML's own commitment to high productivity systems makes ASML a good partner for TSMC.

1989 | 1993 **Facts**

1989

- Debuted the PAS 5000 family. ASML had the world's first 0.5 micron stepper, the PAS 5000. This machine enabled us to realize 0.5 micron line definitions in i-line and 0.35 in DUV
- Achieved successful performance of the i-line technology (PAS 2500/40)
- Accelerated development of the PAS 5500 by increased financial support from Esprit and the Government
- Began strategic co-development program with Zeiss
- Increased service contracts and option sales (accessories) by 380%
- Climbed to 10% world market share in this 5 year period
- Saw the beginning of a market recession at the end of 1989
- Installed excimer lasers for the fist time

1990

- Faced a decrease in sales of approximately 17% and saw profits drop from 15 million guilders to 2 million guilders
- Climbed to the third position in the world market
- Invested heavily in the PAS 5500 project
- Built new test hall and extended the storage area
- Prepared for further expansion
- Increased production capacity to approximately 200 steppers (5500 equivalent) per year
- Began construction on building 2 in Veldhoven; integrated departments

1991

- Introduced the PAS 5500 product line into the market
- Created volume purchase agreements of the PAS 5500 with some major customers
- Began volume series production of the PAS 5500
- Began Total Quality Management implementation

- Saw sales decrease by 17% compared to 1990, which resulted in a loss of 9.7 million guilders
- Recognized by customers, as well as the leading industry periodical “Semiconductor International” as having the most advanced stepper in 1991 (the PAS 5500)
- Organized first Suppliers Day

1992

- Substantially grew sales revenue, despite a lower market for wafer steppers
- Improved reliability of the PAS 5500
- Increased sales in accessories, service and other revenues
- Extended the life cycle of our PAS 2500 and 5000 products. Options on the PAS 2500 and 5000 that are sold on machines that are already in the field are both a technical and a financial success
- Improved cycle time in manufacturing
- Decreased cost of major parts and components
- Increased performance in customer support
- Cut costs and decreased number of employees to deal with the market downturn
- Saw improvements in markets in the U.S. and Taiwan (where 80% of sales were made)
- Completed the 5500 family

1993

- Reduced cycle time in production and installation
- Reduced use of capital
- Increased worldwide market share
- Enjoyed 50% growth in turnover
- Saw maturation of the PAS 5500. Now seen by customers as a system with which you could make money
- Began considering the Step & Scan project