HIGH TECH CAMPUS

EINDHOVEN



A DEEP DIVE INTO INTEGRATED PHOTONICS AT HTCE

In recent years, High Tech Campus Eindhoven has grown into a leading hub for integrated photonics. With a high concentration of companies launching, expanding, or relocating here, some even call it Europe's photonics hotspot. This document offers an insight into this dynamic ecosystem at the smartest square kilometer in Europe.

Discover 30 key players driving innovation in integrated photonics at High Tech Campus Eindhoven and beyond.

www.hightechcampus.com

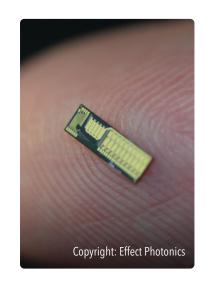
Updated April 2025



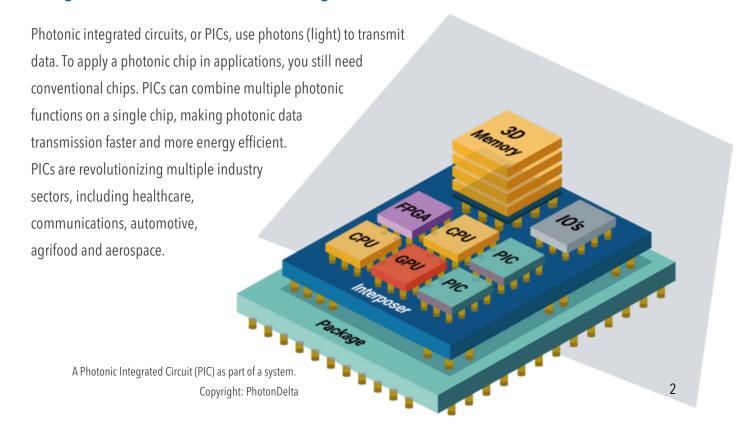
INTEGRATED PHOTONICS LANDSCAPE AT CAMPUS

For 25 years, High Tech Campus Eindhoven has been a center of technical innovation. In the past few years, it has also become an integrated photonics hub. Some in the industry go so far as to say HTCE is a European "hotspot" for integrated photonics, with its density of organizations starting, expanding or relocating here.

As a hub, HTCE hosts not just the startups and scale-ups in the increasingly crucial integrated photonics sector but also a cross-border ecosystem of photonic chip technology organizations: You could call <u>PhotonDelta</u> an "ecosystem orchestrator" for integrated photonics in the Netherlands. It's a non-profit organization supporting an end-to-end value chain for photonic chips. Founded in 2014, PhotonDelta landed 1.1 billion euros in public and private investment capital to transform Europe into the leader of next-generation semiconductors. PhotonDelta's headquarters is located at building HTC 31.



Integrated Photonics revolutionizing sectors



To ensure Europe and the Netherlands strengthens its position as a global innovator, PhotonDelta facilitates the growth of startups, the creation of new photonic chip applications, as well as the development of infrastructure and talent. Leveraging funding from the Dutch National Growth Fund, alongside strategic investments, they catalyse the acceleration of the photonic chip industry by stimulating industrialisation of PIC technology, and PIC-based application building, and forging connections with viable markets and stakeholders.

The Photonics ecosystem at High Tech Campus Eindhoven

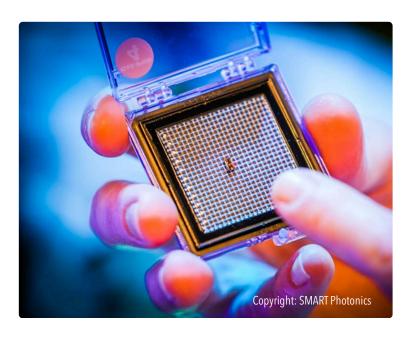
In 2022, <u>PhotonDelta</u> announced it had been awarded 1.1 billion euros to fund 200 startups on the same day <u>HighTechXL</u> announced its partnership with PhotonDelta. As the Netherland's only deep-tech venture builder, it made sense for HTXL to collaborate with PhotonDelta to get startups to market. If high tech is hard, deep tech is harder. Yet HighTechXL has churned out five ventures using integrated photonics sensors in five distinct industries, and PhotonDelta has provided early-stage funding for three of them.

Multiple PIC startups are forming or growing exponentially, including the Netherlands' only Pure-play InP foundry, SMART Photonics. In 2023, EFFECT Photonics moved its operations to HTCE.

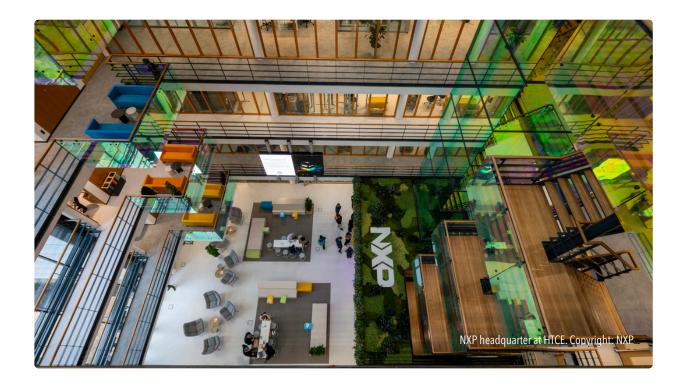
The two pioneering photonics companies are neighbors at building HTC 37.

SMART Photonics is a spin-off from Eindhoven University of Technology (TU/e) and Philips and was launched in 2012. It's been based at HTCE from the early days.

EFFECT Photonics is also a spin-off from TU/e. It was founded in 2014 and moved from its Strijp-S location in late 2023 to building HTC 37. EFFECT Photonics is headquartered here and has additional facilities in the UK, the U.S. and Taiwan.



Campus resident NXP (HTC 60 and HTC 91), one of the largest chip makers in Europe, is part of a syndicate that recently invested 100 million euros in SMART Photonics to expand its manufacturing capabilities and develop new PIC technology.



While the photonics revolution is well under way, there are still technical challenges to overcome. As of early 2025, there are multiple startups focused on, or using, integrated photonics, including creating chips that can transmit data at various light wavelengths simultaneously on the same chip. Toward that end, Holst Centre in building HTC 31 is creating labs for outside companies to use for photonics research.

Here we list all the major integrated photonics players at Campus (and nearby) by category so you can understand the dense web of a thriving ecosystem and how all the players are connected. And while most of these companies are either based at High Tech Campus or have locations here, we've also included companies and institutions we consider as essential to the integrated photonics ecosystem but that are located outside the epicenter of HTCE.

We call this #openinnovation.

INTEGRATED PHOTONICS ECOSYSTEM AT HIGH TECH CAMPUS EINDHOVEN



Applications









Sensing









Medical



Chip design & design software









Foundries

■ SMART PHOTONICS

XIVER

Packaging (enabeling

technologies)

© etteplan



Equipment

ASML PHILIPS Lab space & test facilities



PIT



Venture capital & building









Knowledge, education & talent











THE PHOTONICS COMPANIES IN DETAIL

Datacom/telecom applications

Aircision (HTC 12)

A HighTechXL deep-tech venture alumnus based in building HTC 12, uses proprietary laser-based free space optics to transmit data faster and over longer distances than conventional fiber. In March 2024, Aircision conducted the first terrestrial Optical Wireless Communications test bed, creating an optical wireless link connecting HTCE and TU/e five kilometers away.

Astrape Networks (HTC 27) Astrape Networks is creating optical switches for data centers, increasing data processing speed while cutting energy consumption. PhotonDelta was part of a syndicate that invested in Astrape. In February 2025, Astrape announced it was one of 71 companies to receive funding through the European Innovation Council (EIC) Accelerator grant.

EFFECT Photonics (HTC 37)

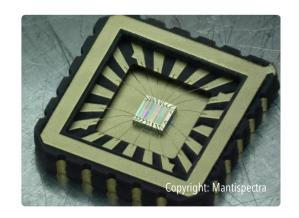
As a highly vertically integrated, independent photonic company, EFFECT Photonics uses proprietary digital signal processing and forward error correction technology, ultra-pure light sources and integrated optical system-on-chips for communication applications. EFFECT Photonics is a spin-off of TU/e.



Sensing applications

Mantispectra (HTC 9)

Mantispectra is developing the next generation of miniature photonic spectral sensors using near infrared



conveyor belts, along the full production chain and at the point-of-care for recycling. PhotonVentures invested in Mantispectra. In January 2025, Mantispectra <u>announced the launch of ChipSense</u>, the first wideband, 16-channel near-infrared spectral sensing IC.

spectroscopy for a number of applications: by farmers in the field, on the process line on

NXP (HTC 60 & 91)

NXP doesn't yet produce photonic chips, but it is funding advancements, including a major investment in SMART Photonics. NXP announced in January 2025 it had secured a €1 billion loan from the European Investment Bank. The funds will be used to advance the company's RDI investments across its broad portfolio of semiconductor solutions. NXP renovated its headquarters at HTC 60 over several months from 2024 to 2025. When the office reopened in March 2025, Maurice Geraets, Executive Director of NXP, announced it extended its commitment to HTCE until 2035.

Senergetics (HTC 27)

Senergetics uses optic fibers with sensors to monitor industrial processes in extreme conditions or dangerous environments where humans can't survive. Using data collection and AI modeling, Senergetics provides input for preventive maintenance and digital



twinning to avoid costly equipment failures, unexpected downtime, environmental pollution and accidents. Senergetics is a HighTechXL venture building program alumnus. PhotonVentures and DeepTechXL invested in Senergetics.

Spectrik (HTC 27)

A HighTechXL deep tech venture alumnus, is developing an integrated photonics gas sensor to measure real time ammonia emissions at livestock farms, including dairies and pork producers. Precisely measuring ammonia at the farm level to policymakers, officials and environmental services, Spectrik sensors could reduce the effect of agricultural emissions on biodiversity within one year. As of early 2025, Spectrik has a scalable and cost-effective ammonia sensor, and 50 will be deployed and operational by May 2025. Spectrik completed the testing phase at Dutch farms after receiving funding from PhotonDelta.

Medical applications

VitalWear (HTC 27)

Another HighTechXL alumnus, uses optical fiber sensing for non-invasive monitoring of medical conditions. Photonic measurement technology is integrated into textiles such as bed sheets, mattress covers or clothing, which enables continuous and autonomous monitoring of pressure ulcer patients with high patient comfort and low effort for care providers. VitalWear was recently awarded an EFRO OPZuid subsidy project to develop its minimum viable product and expects to launch its high-tech system to the market in 2027.

Chip design and design software

Ampicq (HTC 9)

Ampicq designs and develops Photonic Integrated Circuits (PICs) and photonic hardware products. These PICs are used in several application domains, including quantum communications, sensing, analog processors for AI/ML applications, quantum computing, neuromorphic/edge computing, PNT systems, telecommunications and data centers.

Bright Photonics (located at TU/e campus)

Bright Photonics is an independent design house for PICs in Silicon, III-V, SiN, Silica and Polymers. It supports PIC development from application idea to prototypes and design for volume production. While based at TU/e, Bright Photonics is an important player in the High Tech Campus integrated photonics ecosystem.

Synopsys (HTC 41)

Synopsys creates advanced technologies for chip design, verification, IP integration and software security and quality testing. Synopsys and PhotonDelta collaborate closely to accelerate the development and commercialization of integrated photonics. PhotonDelta provides the strategic framework and support for companies in the ecosystem, while Synopsys provides the knowledge, experience and solutions to design advanced

photonic integrated circuits and systems using integrated photonics.

Teledyne Dalsa (HTC 5 & 29)

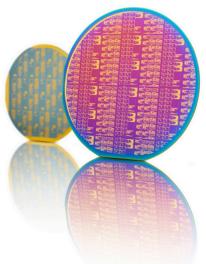
Teledyne Dalsa makes MEMS, microscopic devices incorporating both electronic and moving parts and semiconductor products at its own foundry.

Foundries

SMART Photonics (HTC 37)

In 2024, the Dutch foundry for photonic integrated circuits significantly scaled up its production of photonic chips by transferring its entire production capability at HTCE from 3-inch to 4-inch wafer substrates, one of the first PIC foundries to do so.

SMART Photonics announced it had raised €100 million in 2023, bringing total funding to €188 million. PhotonVentures, NXP and Innovation Industries all participated in the funding round.



Copyright: SMART Photonics

XIVER (HTC 4)

XIVER is the only independent MEMS foundry in Europe, offering seamless transitions from R&D to production with a customer-focused approach. The foundry is also involved in Silicon Nitride (SiN) photonics, a little known fact.

XIVER specializes in advanced MEMS manufacturing, serving diverse industries including MedTech, industrial, automotive and photonics. <u>XIVER was purchased from Philips</u> by a Dutch consortium in early 2025. <u>Read more about XIVER in this IO+ article</u>.



Lab space and test facilities

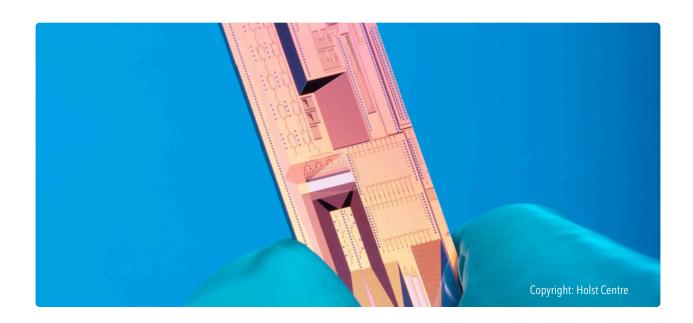
Holst Centre (HTC 29 & 31) Holst Centre partners with imec and TNO on R&D for health technologies and flexible and wireless electronics. In 2023, integrated photonics was named one of the new pillars in Holst Centre's strategy. Holst Centre builds a bridge between universities and industry, implementing the technology of integrated photonics into every-day applications. It offers all aspects needed in the development and production process, such as design, prototyping, testing and manufacturing.

Photonic Integration <u>Technology Center (PITC)</u> (HTC 31)

A joint initiative by TU/e, University of Twente, TNO and PhotonDelta, works with academic institutes and companies to find new, real-world applications for integrated photonics. PITC is located on the premises of TU/e and University of Twente in the Netherlands.

Center for Integrated Photonics Eindhoven (IPI) at TU/e (located at TU/e campus)

Eindhoven University of Technology (TU/e) is one of 14 engineering schools in the Netherlands and among the highest-rated in Europe. TU/e's Center for Integrated Photonics Eindhoven (IPI) carries out research in materials, devices, circuits and systems, enabling novel applications in computing, communications and sensing. IPI is part of the Eindhoven Hendrik Casimir Institute, which has a broader focus on information technology. The center regroups more than 100 researchers active in the field of photonics and has access to a large cleanroom (800 m²) optimized for photonics R&D.



Packaging (enabling technologies)

Etteplan (HTC 85)

Etteplan is a publicly traded company developing technology that accelerates the transition from electronic to PICs, a breakthrough in cost and cycle time of the manufacturing process.

Etteplan has developed a flexible assembly platform for integrated photonics. The Indigo can handle a wide range of actions commonly required in the final steps of integrated-photonics manufacturing, accelerating the prototyping of photonics products.

SCIL Nanoimprint Solutions (HTC 11)

SCIL Nanoimprint Solutions offers solutions for patterning nanostructures on large wafers with its unique and proprietary lithography technology. SCIL, or Substrate Conformal Imprint Lithography, enables the direct stamping of nano- and micrometer-scale structures such as slanted, holes, 3D structures, lines/spaces and pillars. SCIL provides high-quality prints with full wafer contact in areas up to 300 mm, making patterns with feature sizes below 10 nm and an overlap accuracy of less than 1um on two sides of the wafer.

Equipment

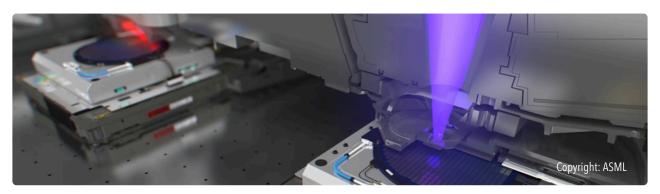
ASML

(HTC 25, 37, 43, 44 & 45)

ASML is the world's only maker of advanced UV photolithography systems for the semiconductor industry, manufacturing complex machines that are critical to the production of the next generation of integrated circuits or microchips. ASML also invested in the SMART Photonics €100M funding round.

<u>Philips Engineering</u><u>Solutions</u> (HTC 34)

Philips Engineering Solutions provides industrial supplies used in cleanrooms. It is still under the umbrella of Philips Innovation Services. PES also provides industrial supplies to others, including XIVER.



Venture capital & building

DeepTechXL (HTC 27)

DeepTechXL is a €110 million fund investing in deep tech, including integrated photonics startups. DeepTechXL has invested in two integrated photonics companies, including HTCE-based Senergetics and SuperLight Photonics, based in Enschede.

HighTechXL (HTC 27)

HighTechXL is the Netherlands' only deep tech venture builder. HighTechXL works closely with PhotonDelta to source integrated photonics technologies around which it builds teams and companies to take the tech to market and to PhotonVentures - located in Breukelen – for funding. Five ventures



using integrated photonics sensors in five distinct industries have completed the HTXL program, with PhotonDelta and PhotonVentures providing early-stage funding for three, including HTCE-based Astrape Networks, Senergetics and Spectrik.

Innovation Industries (HTC 41)

Innovation Industries is a venture capital firm investing in deep tech companies, including integrated photonics companies at HTCE. Innovation Industries announced it closed a €500 million fund in May 2024. The VC firm has invested in HTCE-based EFFECT Photonics and SMART Photonics as well as Phix, based in Enschede, and Morphotonics, based in Veldhoven. Harm de Vries, General Partner at Innovation Industries, participated in a panel discussion about the deep tech investment landscape at The Next Web (TNW) in June 2024. When asked which technologies were of interest to the VCs, all three panelists, including de Vries, answered "photonics."

PhotonVentures

PhotonVentures is an independent deep tech venture capital firm that has emerged from (located in Breukelen, NL) PhotonDelta. While PhotonVentures is not based at HTCE, it is an important investment avenue for integrated photonics companies and the ecosystem.

> <u>PhotonVentures raised €75 million</u> in its first financing round with PhotonDelta as the lead investor and plans to raise a total of €100M to €150M. The investment firm has invested in HTCE-based EFFECT Photonics, SMART Photonics and Mantispectra as well as nine other photonics companies.

Knowledge, education & talent

Holst Centre (HTC 29 & 31) Holst Centre is an independent R&D effort jointly operated by <u>imec</u> and TNO.

imec (HTC 11 & 31)

imec is the Interuniversity Microelectronics Centre, an international research and development organization focusing on nanoelectronics and digital technologies, including integrated photonics. imec combines the photonic microchip technology of imec in Belgium, the complementary photonic platforms and design expertise in the Netherlands and the optics and systems integration knowledge of TNO to help develop new sustainable solutions in various industries.

PhotonDelta (HTC 31)

PhotonDelta is an end-to-end value chain for photonic chips that designs, develops and manufactures innovative solutions that contribute to a better world.

TNO (HTC 21, 25, 29 & 31)

TNO is the independent but government funded R&D institution focusing on applied sciences. TNO's mission is to generate innovative solutions with demonstrable impact to achieve a safe, healthy, sustainable and digital society and boost the earning power of the Netherlands.

Eindhoven University of Technology (located at TU/e campus) TU/e has an intensive photonics program. The <u>Center for Integrated Photonics Eindhoven</u> (IPI) is a leading R&D center in the field of integrated photonics. Work ranges from fundamental scientific research in materials to the development of novel photonic devices, circuits and systems. This research directly addresses societal challenges such as the exponential growth and increasing energy footprint of the internet and the need for personalized medical care.



SERVICES AND ADVANCED FACILITIES FOR THE PHOTONICS & SEMICON INDUSTRY

High Tech Campus Eindhoven (HTCE), the smartest square km in Europe, is an ecosystem of more than 300 high tech companies. It is home to more than 12.500 innovators, researchers and engineers that create the technologies and businesses of tomorrow.

HTCE services semiconductor and photonics companies, facilitating their growth through state-of-the-art facilities, strategic support, and a vibrant community that fosters knowledge sharing and entrepreneurial spirit. From ISO-compliant, plug & play cleanrooms and rapid development and construction capabilities to tailored support in permits, HTCE's infrastructure is designed for growth and scalability.

Infrastructure strength and scalability

Rapid construction capabilities and ample buildable space (more than 100,000 m² available) provide an agile framework for companies looking to scale quickly. Specialized laboratories, including electrotechnical and chemical labs, offer dedicated spaces for R&D and small scale production.



YEAR

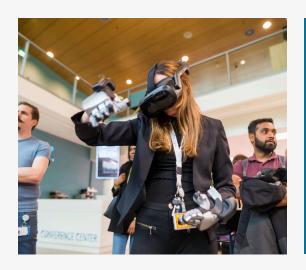
ISO-compliant plug & play cleanrooms

The campus is home to ISO-compliant, plug-and-play cleanrooms (ISO5, ISO6, and ISO7) that offer full utility integration. These facilities feature comprehensive support systems, from advanced air treatment and multi-level compressed air networks to specialized gases like nitrogen, argon, hydrogen, and demineralized water. Read more.

Support for permits, construction, and space planning

Whether navigating the complexities of permits, optimizing space planning, or coordinating rapid construction projects, the HTCE team is deeply integrated into the day-to-day realities of its tenant companies and provides provides tailored services.





Vibrant ecosystem

HTCE combines tech facilities with a dynamic, peoplecentered community. Tech talent from over 100 nationalities connects at events in the Conference Center, during a walk over the green campus or gathers at The Strip, featuring 11 restaurants, a fitness center, and shops. Innovation Hubs–like Al Innovation Center and 3EALITY– and HighTechXL bring together entrepreneurs and startups.

WANT TO JOIN THIS ECOSYSTEM?

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