

Operations

Sivers Semiconductors enables a more connected and safer world by delivering market-leading solutions for sensors, and data and telecom networks. The products satisfy demand for upgrading new infrastructure driven by the explosive increase in data traffic.



Well equipped for the ongoing technology shift

Sivers Semiconductors is an international supplier of advanced 5G systems for data- and telecommunications networks and optical products to optical fiber networks, sensors and optical wireless communication (Li-Fi). Millimeter wave technology and optical semiconductors are central to high-speed networks. The Wireless business area is fully focused on 5G, while the Photonic Business focuses on Passive Optical Networks, data centre interconnect, and sensing applications for emerging applications in mobile devices, autonomous vehicles, medical sensors and industrial.

Increased volumes and new applications

Both business areas are therefore well equipped for the technological shift that is taking place with solutions for both wireless networks and fiber networks. The market for data centers as well as wireless and fixed broadband and sensors is growing rapidly, and the chips and components offered by the Group meet demand in all these areas.

Wireless and Photonics are facing a shift, as our customers' customers are starting to demand increased volumes and new applications are continuously emerging. The two business areas share the ability to adapt products to specific customer needs, while the focus is on infrastructure applications.





Wireless

Millimeter wave is a key technology in 5G networks and the core of the wireless solutions Siverts Semiconductors offers. A big advantage of millimeter wave is that it enables higher data transfer rates, which enables significantly cheaper data transfer per megabyte compared to alternative technologies.

Wireless

The reason why millimeter wave enables higher data transfer rates is that the higher frequencies offer a more accessible spectrum than is available for today's technology.

In addition, Siverts Semiconductor's chip has a number of leading features:

- We are the only manufacturer that has commercially proven that a single chip can support the full 14 GHz of frequency band now available for unlicensed 5G (57-71 GHz).
- The industry's lowest phase noise for an unlicensed 5G chip, which provides increased data transfer speed.
- Highest commercially proven power output, providing longer coverage.

Wireless development in 2020

In 2020, Wireless signed a development and delivery agreement with an estimated future value of SEK 480 M, an important milestone for the Company. The Group's 5GmmWave technology will be included in a CPE product (Customer Premises Equipment) launched by a global semiconductor company, and will be available in large volumes from 2023 onwards. The agreement indicates the potential for substantial volumes, and confirms that the Group's 5GmmWave technology is world-leading.

Siverts Wireless had signed another long-term supply contract for the new 2D RF module with 8 devices, a Lithuanian company that offers products for wireless broadband access globally. The value of the supply contract is by the customer estimated at SEK 70–100 M for the period 2021–2024.

Examples of new applications includes the order received from Siemens Healthineers for evaluation packages and radio modules for use in medical applications requiring high data speeds. The order relates to the Chinese market and is a first

step in Siemens Healthineers' ambition to utilize unlicensed 5G technology more extensively.

Wireless in 2021

At year end 2020, the business area had 21 design wins, which means that 21 customers/partners had chosen to build their upcoming products on Siverts Semiconductors' integrated 5G circuits. These design wins are divided into four different areas: data/telecom, medical technology, defense and rail (track-to-train). In 2020 some 150 evaluation packages were also sold to customers or educational institutions that want to study our products and technology more closely.

Product development is a highly prioritized area. Of a total of 31 employees in the business area, 16 work with development. The focus of the work is based on our extensive experience in the industry, and our responsiveness to our customer's needs and requirements. Feedback from our network of partners is of considerable importance in this context. In some development projects, specific customers are involved throughout the entire journey. Development includes both chip and

modules/antennas where a chip is included. Normally, 2–3 chip projects are ongoing and up to 10 module projects run in parallel.

The Wireless business area has no in-house production and uses external partners for all production. This allows for rapid growth without necessitating major investments. At chip level, the infrastructure is in place for very large volumes without requiring investments in proprietary production, which creates the right conditions for managing expected substantial sales growth.

Deliveries are made directly to system manufacturers and other product companies, and through a strong global network of partners. In the latter case, the Group's products are included in subsystems and solutions that are developed in collaboration with partners. In addition, partners provide valuable input to the Group's product development. The network is also critical to the Group's opportunities for global marketing and reach. Important partners include world-leading manufacturers such as Ampleon, IDT, Fujikura and NXP.



Photonics



The Photonics business area develops, manufactures and sells semiconductor-based products for optical networking, optical sensors and optical wireless communication (Li-Fi).

Photonics

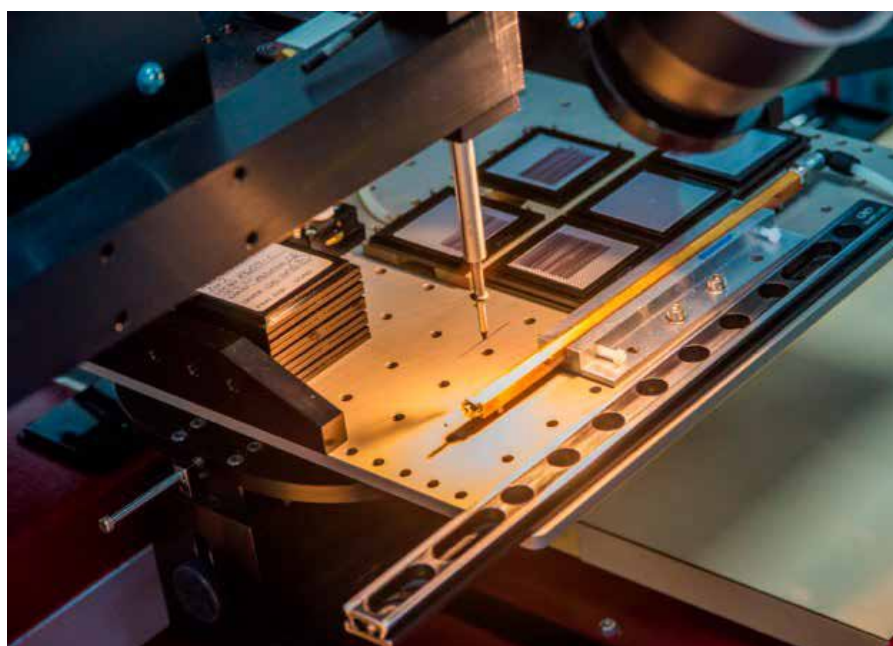
The optical communications devices are a key component of cloud storage and cloud communications; passive optical networks (PON), including fiber-to-the-home; 5G fronthaul; and Quantum technologies. The optical sensing devices enable autonomous and assisted driving vehicles; consumer biometrics; hazard and metrology; security; and augmented and merged reality applications. The optical wireless devices are critical for Li-Fi.

Silicon photonics is a rapidly growing technology where small silicon optical chips replace copper waveguide connections for light transmission. The light source is a laser chip, made from Indium Phosphide, integrated into the silicon waveguide. Photonics is a leading supplier of these indium phosphide lasers. In addition to traditional data applications, Photonics has technical knowledge and the ability to customize solutions in the field of lasers for optical sensors in a variety of applications.

Photonics development in 2020

Photonics continued to develop its relationship with its first Fortune 100 customer during the year, and signed several new orders with this customer with a total value of some SEK 25 M. In total, this Fortune 100 customer had placed orders worth SEK 74 M at year end. Another order for approximately SEK 11 M was added in January 2021.

During the year, Photonics secured another development order from a new Fortune 100 customer. The order totaled SEK 7.5 M, and related to optical semiconductor lasers for use in sensors. The fact that two of the world's largest tech companies are included amongst Photonics' customers demonstrates the innovative and market-leading nature of the products.



Alongside a group of sector-leading operators, Photonics signed an agreement relating to the standardization of integrated photonics solutions in 2020. The agreement involves a new sector standard for continuous wave laser sources that reduces the need for complex adaptations, which makes the technology more attractive for use in cost-sensitive applications. The group include industry leaders such as Arista, Ayar Labs, imec, Intel, Lumentum, Luminous Computing, Quintessent, Sumitomo Electric, II-VI and MACOM.

Photonics in 2021

The Photonics business area in Glasgow, Scotland, is one of few independent factories in the world that develops and manufactures custom lasers, and semiconductor optical amplifiers in chip and wafer forms. Photonics currently has expertise in

many material combinations and manufacturing processes used in the commercial manufacture of semiconductor chips for optoelectronic purposes. The factory in Glasgow is being extended, which will imply a significant increase in delivery capacity.

For a more detailed description of the technology and products, see

www.sivers-semiconductors.com