VIGO PHOTONICS

FINANCIAL RESULTS FOR Q2 2023

September 20, 2023

VIGO IN A NUTSHELL

35 years of experience and operations

Headquarter in Poland
and branch office in USA

Over **200** highly qualified and experienced experts
(1 Professor, 14 PhDs and >60 engineers)

25 distributors in **18** countries supporting sales of solutions

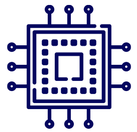
Listed on the WSE since **2014**

Approx. **PLN 400 million** capitalisation

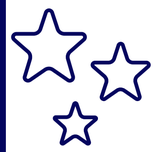
Support for stable long-term **shareholders**

VIGO IS A WORLD LEADER IN HIGH-TECH SOLUTIONS – THE MOST ADVANCED MID-INFRARED PHOTONIC DETECTORS, DETECTION MODULES AND SEMICONDUCTOR MATERIALS

Activity in the global infrared market: infrared sensors (12.3% CAGR 2020-30), semiconductor materials (17.2% CAGR 2020-27), photonic integrated circuits (20.4% CAGR 2021-30).

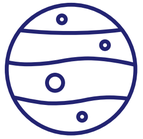


Numerous long-term technological megatrends, e.g. systems miniaturization, Internet of Things (IoT), wearables lab-on-chip, security and defense, development of the semiconductor industry in Europe.



Presence at the global forefront of industrial innovation - using a unique advantage throughout the entire VIGO photonic value chain.

An established market position reinforced by the world-class R&D department and expert technological knowledge of over 60- person team of engineers and scientists.



Addressing market needs thanks to a modern, scalable production facility, providing the most technically advanced solutions.

Implementation of an ambitious development strategy - moving VIGO to a higher utility curve in order to provide long-term value for all stakeholders.

AGENDA

1. EXECUTIVE SUMMARY
2. SUMMARY OF Q2 2023
3. FINANCIAL RESULTS FOR Q2 2023
4. PERSPECTIVES
5. SUMMARY

EXECUTIVE SUMMARY

Q2 2023 SUMMARY

Sales

- PLN 18.3 million of consolidated revenues (-4% y/y) - increases in industrial applications (+6% y/y) and science and medicine (+19% y/y); +20% y/y consolidated revenues in H1 2023
- Growing share of revenues in the USA (+83% y/y) and in Poland (+69% y/y)
- Implementation of price increases for customers for 2023 in the amount of 20-30% - successive implementation since the beginning of this year.
- Two new significant contracts for the supply of infrared detectors worth EUR 7.2 million, in the military segment, a new contract with PGZ and a letter of intent with PCO

Improving operational results

- Higher operating results y/y related to limited cost growth

Accelerating development activities

- Significant achievements in projects introducing a new family of crycooled detectors, as well as project related to military applications
- New funding in the amount of PLN 9.4 million for the implementation of a research and development project regarding a sensor for water quality testing
- EC approved the maximum amount of 102 m EUR of potential state aid for the HyperPIC project

Infrared detetctors

Infrared detection modules

Epiwafers

VIGO PHOTONICS

SUMMARY OF Q2 2023

SIGNIFICANT NEW CONTRACTS FOR THE SUPPLY OF INFRARED DETECTORS

AGREEMENT WITH A GERMAN CONTRACTOR FOR THE SUPPLY OF DETECTORS WORTH UP TO EUR 3.5 M

- Contractor: Customer from Germany
- Subject of the contract: delivery of detectors for precise and fast control of laser pulses (another VIGO contract with this contractor)
- Value of deliveries: EUR 2.9 to 3.5 million (PLN 13.3 -16.2 million)
- Delivery time: March 1 - December 31, 2023

The infrared detectors covered by the contract are used for precise and quick control and diagnostics of laser pulses produced by the contractor. They allow you to determine the shape, power and repetition rate of pulses in real time.

AGREEMENT WITH A COMPANY FROM THE CATERPILLAR CAPITAL GROUP FOR THE SUPPLY OF DETECTORS WORTH EUR 3.7 M

- Contractor: a company from the Caterpillar Company Inc.
- Subject of the contract: supply of detectors for railway transport safety control
- Value of supplies: EUR 3.6 million (PLN 16.3 million)
- Delivery time: until May 30, 2025

The infrared detectors covered by the contract are used to control the safety of rail transport. Sensors installed on the tracks allow for real-time monitoring of the temperature of bearings, brakes and wheels of a train moving at a speed of up to 300 km/h.

GROWING DEMAND FOR VIGO SOLUTIONS IN THE MILITARY SEGMENT – AGREEMENT WITH PGZ AND LETTER OF INTENT WITH PCO

AGREEMENT WITH AN ENTITY OF THE POLISH ARMS GROUP WORTH PLN 15.8 M

- Contractor: entity from the Polish Armaments Group (PGZ)
- Subject of the contract: delivery of detectors in quantities specified each time by the customer who declared the purchase of a volume of detectors
- Contract value: PLN 15.8 million (includes indexation clause)
- Delivery time: until December 31, 2035

The infrared detectors covered by the contract are used in automatic fire detection and extinguishing systems in armored vehicles.
VIGO detectors delivered to PGZ are one of the most important components of the explosion suppression and fire extinguishing system developed by Polish entities in tanks, combat vehicles and other vehicles for both military and civilian purposes.

LETTER OF INTENT WITH PCO FOR THE IMPLEMENTATION OF INFRARED MATTERS AND APPLICATIONS IN THE POLISH ARMY

- Parties of the letter of intent: PCO S.A. and VIGO Photonics S.A.
- Goal of cooperation: development of innovative solutions tailored to the needs of a modern battlefield, in particular infrared matrices based on T2SL supernet technology (Type II Superlattice)
- Scope of cooperation: securing the supply chain, solutions for detecting threats on the battlefield and preparing and implementing the technological strategy of both entities
- Assumed effects of cooperation: implementation of Polish matrix detectors developed by VIGO into production and introduction of them for sale, including distribution by PCO

PCO is a leading manufacturer of high-class optoelectronic equipment, developing competences in the field of new defense technologies, producing, among others: thermal imaging cameras for military applications.

SUPPORT FOR COMMERCIALIZATION OF SOLUTIONS THROUGH MARKETING ACTIVITIES IN Q2 2023 (1)

ACTIVITY AT INTERNATIONAL SCIENTIFIC CONFERENCES AND INDUSTRY FAIRS:

- SPIE Optics+Optoelectronics (Czech Republic) - lecture by a representative of VIGO Photonics and establishing cooperation with the Czech Photonics Cluster.
- OPIE (Japan) - participation of a VIGO representative and support of distributors operating on the Japanese market.
- Infrared Colloquium (Germany) – sponsorship and lecture at one of the most important infrared conferences.
- Laser World of Photonics (Germany) - presentation of VIGO's potential during the largest photonics industry fair in Europe.
- Korea – Poland Business Forum (Poland) – participation in a discussion panel and establishing relationships with representatives of Korean companies.
- SEMICON (Taiwan) - participation in the Polish economic mission and presentation of VIGO technology at the National Pavilion.

Focus on actively acquiring new orders from existing customers and gaining new sales opportunities.

SUPPORT FOR PRODUCT COMMERCIALIZATION:

- Premiere of a new product dedicated to the AMS module.
- A campaign promoting new products based on compounds from groups III-V.
- Conducting a webinar dedicated to superlattice InAs/InAsSb detectors.
- Promotion of epitaxial layers dedicated to QCL lasers as part of the Epitaxial initiative.
- Co-creation of the Microelectronics, Electronics and Photonics Cluster.
- Receiving the "Forbes Diamond" title.

Microelectronics, Electronics & Photonics Cluster

Check out:
QCLs epi-structure

Electrical adapter for the AMS detection module series

InAs/InAsSb Detectors or InAs/InAsSb T2SL

SUPPORT FOR COMMERCIALIZATION OF SOLUTIONS THROUGH MARKETING ACTIVITIES IN Q2 2023 (2)

INCREASED SALES ACTIVITY IN THE SECURITY AND DEFENSE INDUSTRY:

Participation in the International Defense Industry Exhibition - MSPO:

- signing an agreement with PCO S.A. regarding technological cooperation in the implementation of optoelectronic solutions for the Polish army.
- contacts with representatives of companies from Korea, consistent with the possibility of providing Polish technology for orders carried out by the Ministry of National Defense.
- developing relationships with defense industry companies that are part of the Polish Armaments Group (PGZ).
- presentation of VIGO products and production capabilities for the largest companies from the military sector (including Leonardo, MBDA, DIEHL Defense, Thales) as part of the "Photonics in Defense" event.

Sponsorship and participation in the Research and Applications of Photonics in Defense (RAPID) conference in the USA:

- establishing relationships with government representatives and US companies operating in the military sector.
- presentation of VIGO's technological capabilities and solutions applicable in security and defense applications.
- market research and verification of photonic technologies currently used in the US military industry.

MCT+ DETECTOR INITIATIVE

TECHNOLOGY DEVELOPMENT

Objective of the initiative

- Exploitation of the market in its gradual fading phase by improving the customisation process and exploring uncovered market niches.
- Stabilisation of multi-element detector technology, implementation of digital solutions, development of products for military and space applications.

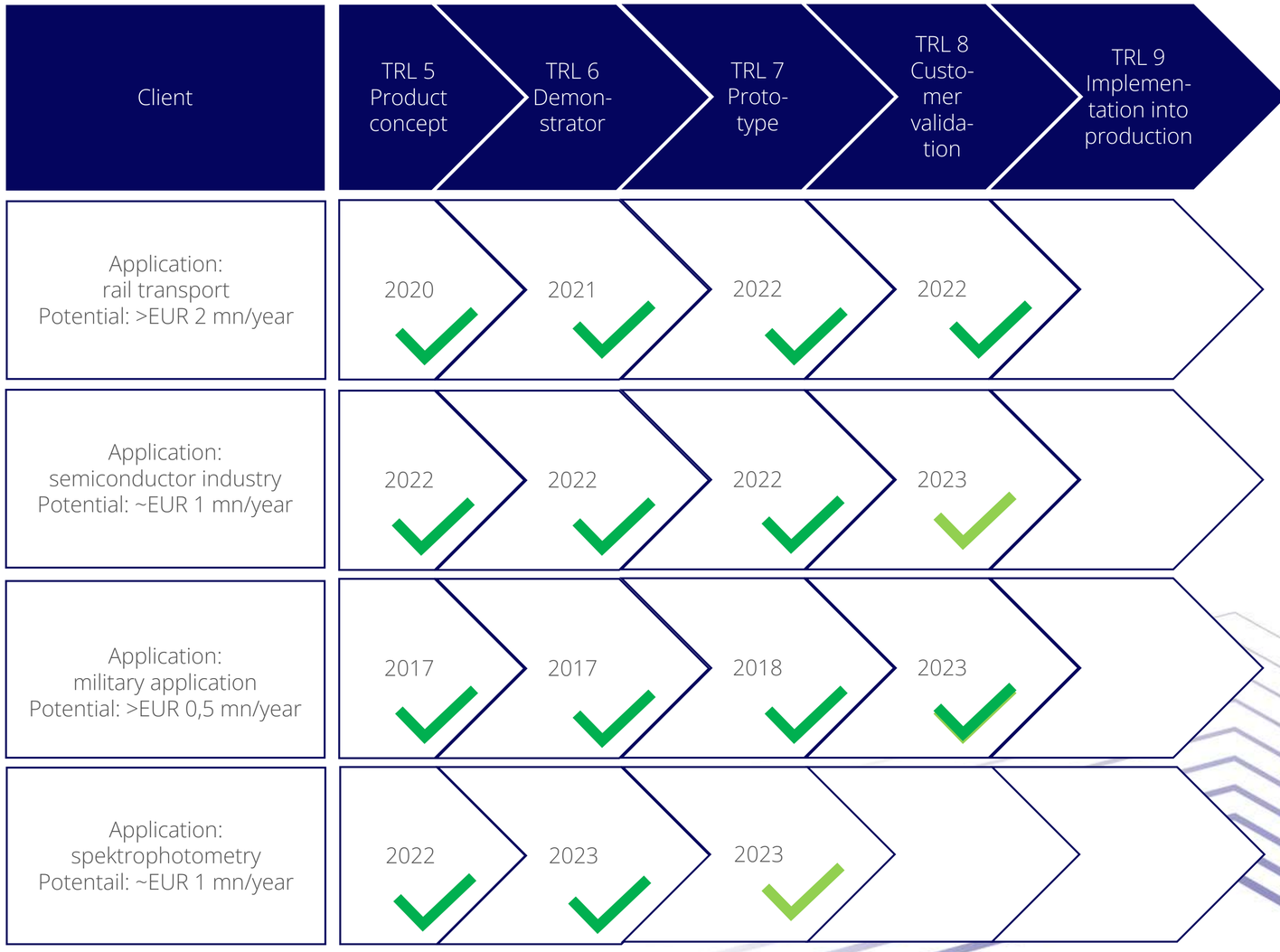
Achievements in Q2 2023

- Prototypes of LN2 detectors were delivered to the main client – one of the biggest manufacturer of spectrophotometers. Sales volume potential for >1000 detectors/year (>1 mn EUR).
- The first orders for a security system in military applications with VIGO detectors have been receved. Sales potential >2000 pcs/year.
- Confirmation of the effectiveness of the solution developed for the semiconductor industry. Potential > 0.5 million euros/year

Plans for 2023

- Increasing the diversification of suppliers of key components in the face of the changing geopolitical situation.
- Implementation of LN2 cooled detectors into production.

COMMERCIALISATION - SAMPLE PROJECTS



III-V InAsSb DETECTORS AND DETECTION MODULES INITIATIVE

TECHNOLOGY DEVELOPMENT

Objective of the initiative

- Gaining the No. 1 position in the market for manufacturers of III-V detectors in the MidIR range. Implement T2SL supergrid technology (matching MCT performance), achieving technical performance superior to competitors across the MidIR range.

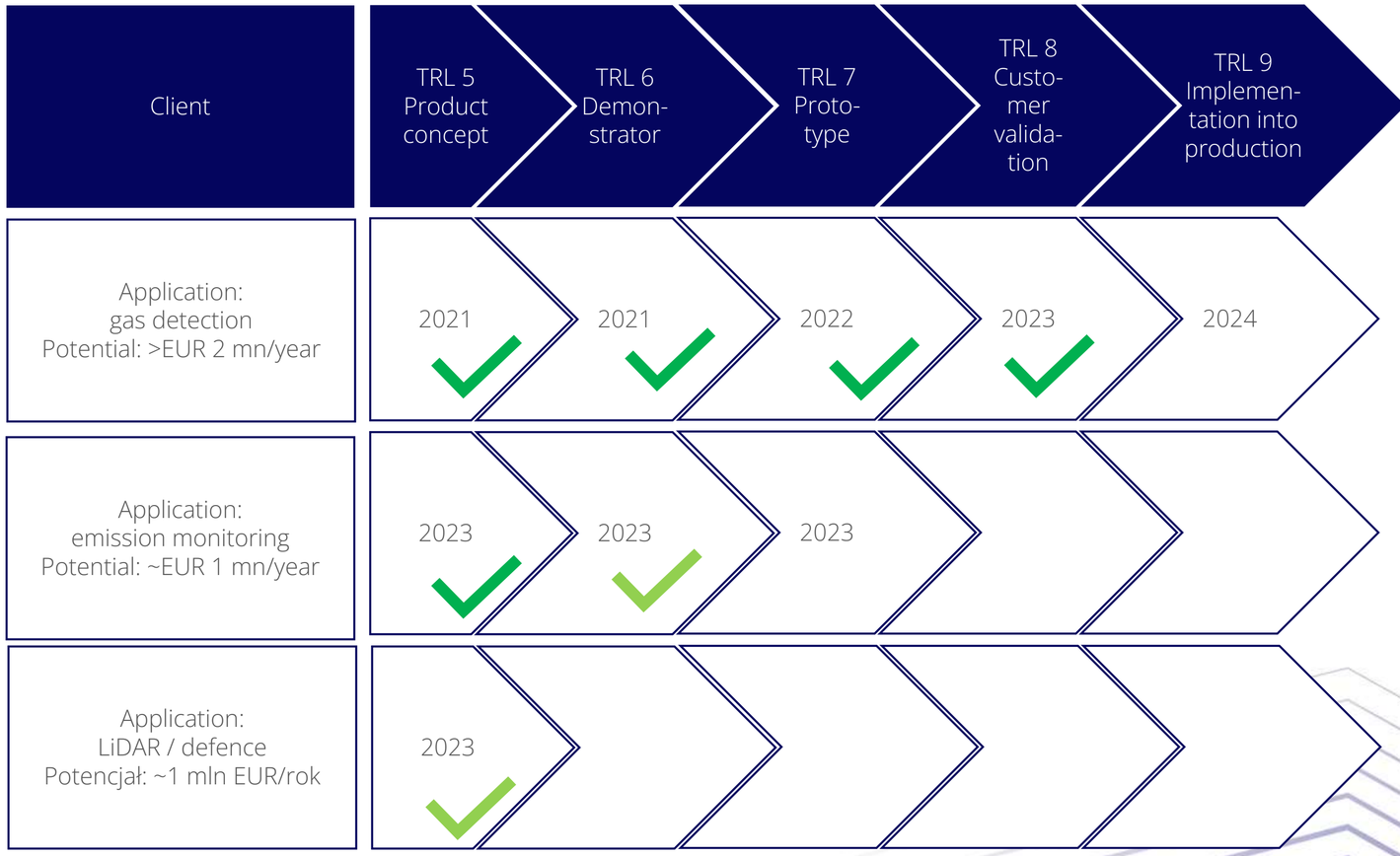
Achievements in Q2 2023

- New production processes necessary for the Affordable Detector and Affordable Detection Module implemented
- New order for AMS-based modules for methane detection
- Development of a photovoltaic superlattice detector optimal for LWIR spectroscopy
- Release of the detectors dedicated to the TDLAS method for mid-infrared

Plans for 2023

- Stabilization of the epitaxy and processing process of a new long-wavelength superlattice devices
- Development of passivation improving the stability of detectors at high temperatures.
- Reaching the level of MCT detectors in III-V detectors for the MWIR.

COMMERCIALISATION - SAMPLE PROJECTS



III-V InGaAs DETECTORS AND DETECTION MODULES INITIATIVE

TECHNOLOGY DEVELOPMENT

Objective of the initiative

- Entering the III-V InGaAs detectors' market.

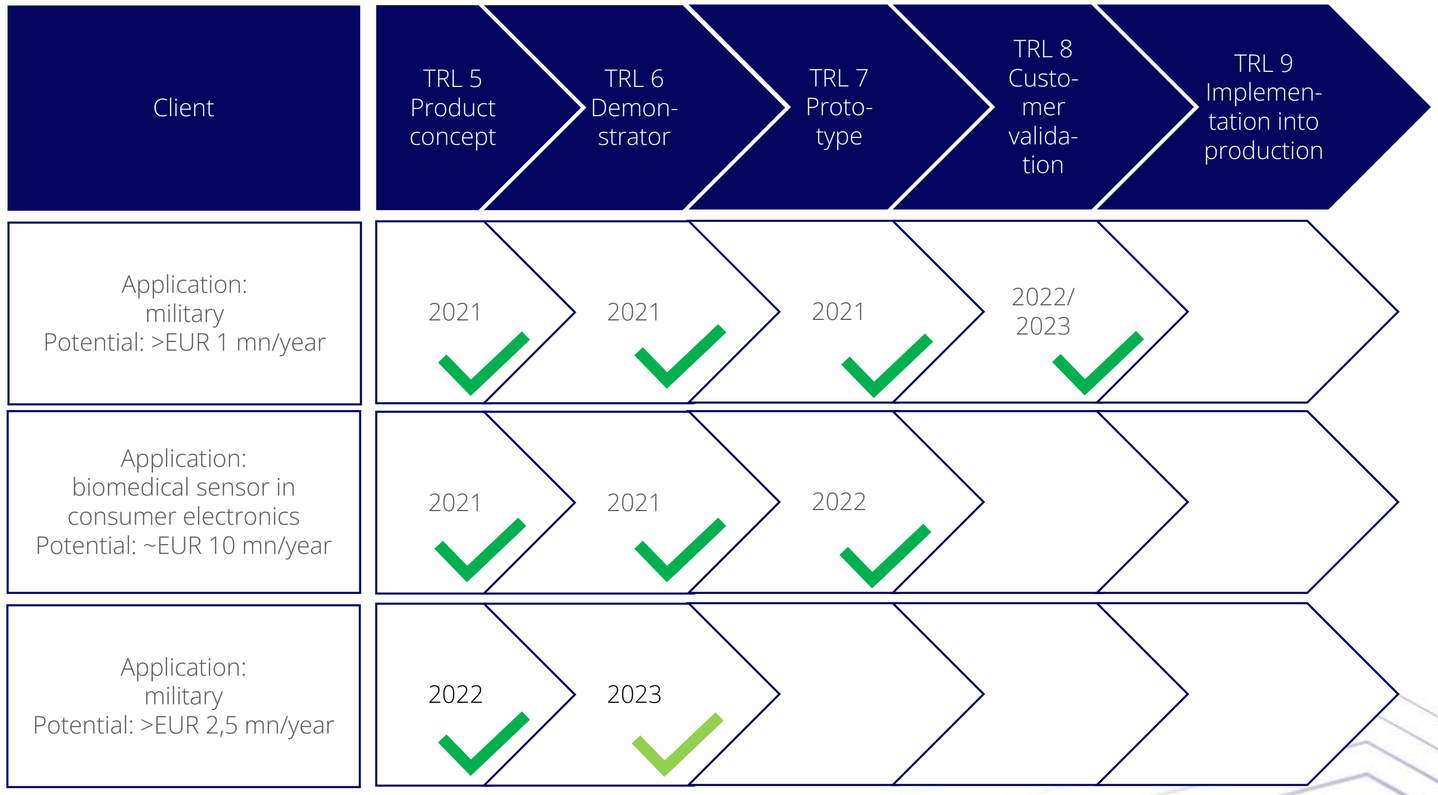
Achievements in Q2 2023

- High-speed detector demonstrator for a military customer shipped.
- Acquiring new customers interested in Extended InGaAs products. Potential for > 1 million euros/year

Plans for 2023 and 2024

- Extended InGaAs market entry in the "gas detection" area.
- Development of a multi-element detector for industrial applications.
- Collaboration with a large military contractor to develop a balanced Extended InGaAs module.
- Obtaining better parameters for a detector with an area larger than 0.5 mm2

COMMERCIALISATION - SAMPLE PROJECTS



III-V EPITAXY* INITIATIVE – SEMICONDUCTOR MATERIALS

TECHNOLOGY DEVELOPMENT

Objective of the initiative

- Gain visibility in the market for epitaxy services, exploring market niches for photonic instruments (new VCSELs, unusual solutions).
- Refining the technology for the production and characterisation of VCSELs.

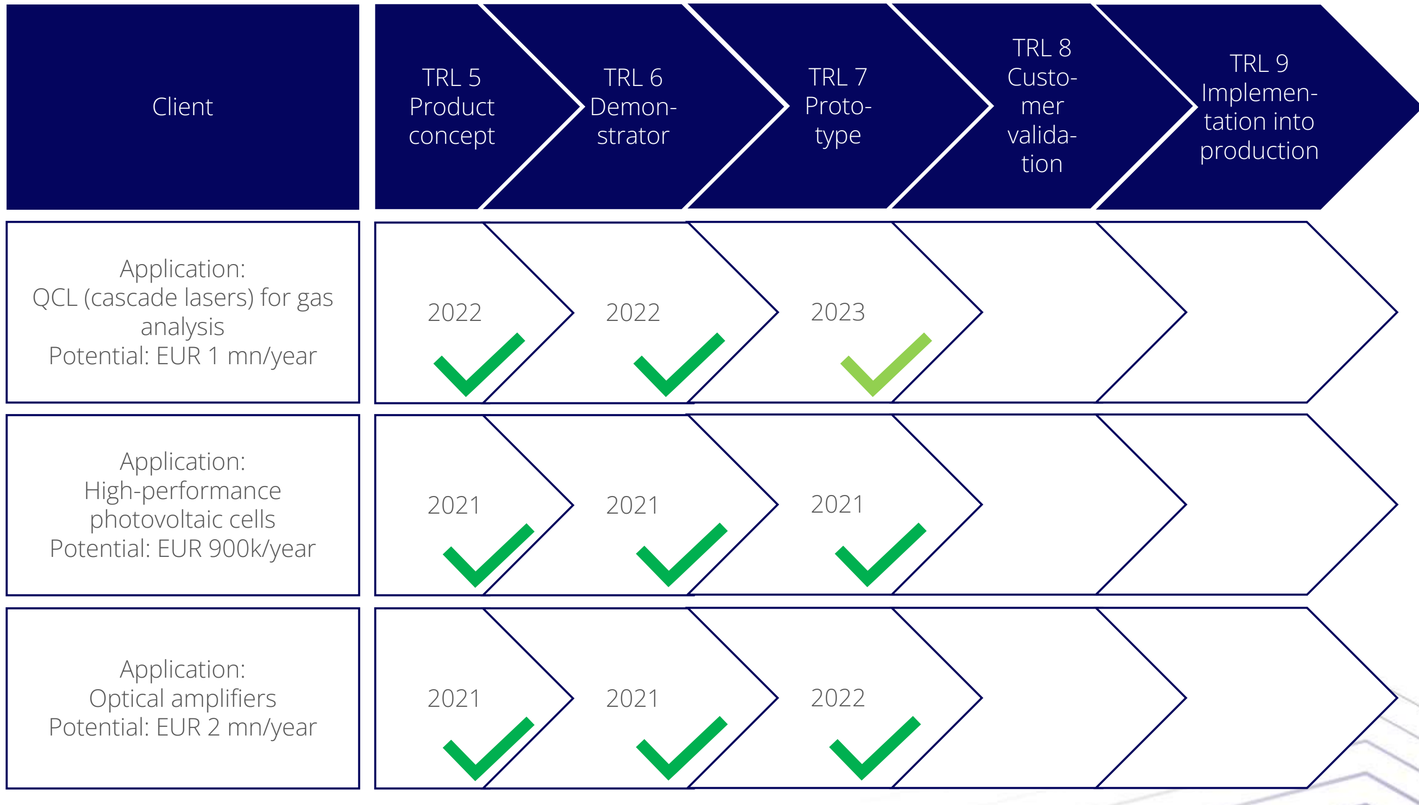
Achievements in Q2 2023

- Structures of Quantum Cascade Lasers (QCLs) - positive implementations at clients, strengthening the position of a manufacturer of high-quality laser structures.
- Photovoltaic Cell Structures - resumption and commencement of the second stage of implementation in the project of high-efficiency photovoltaic cells after restructuring on the client's side.
- Structures of Semiconductor Optical Amplifiers (SOA) - project maintenance, next development stage and preparation for implementation at the customer's site.

Plans for 2023

- Completion of implementation and preparation for serial production of QCL structures.
- Completion of implementation and preparation for serial production of photovoltaic cell structures.
- Completion of implementation and preparation for mass production of SOA structures.

COMMERCIALISATION - SAMPLE PROJECTS



*High-quality epitaxial structures of III-V semiconductor materials (InGaAs, InAsSb) offered directly to customers for in-house production of detectors/chips and VCSEL lasers, as well as production of SWIR (VCSEL) including VIGO VCSEL lasers.

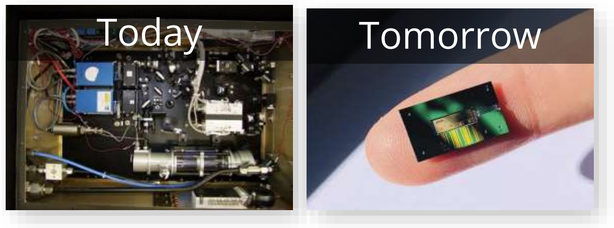
OPTOELECTRONIC SYSTEMS AND PHOTONIC INTEGRATED CIRCUITS (PIC) INITIATIVE

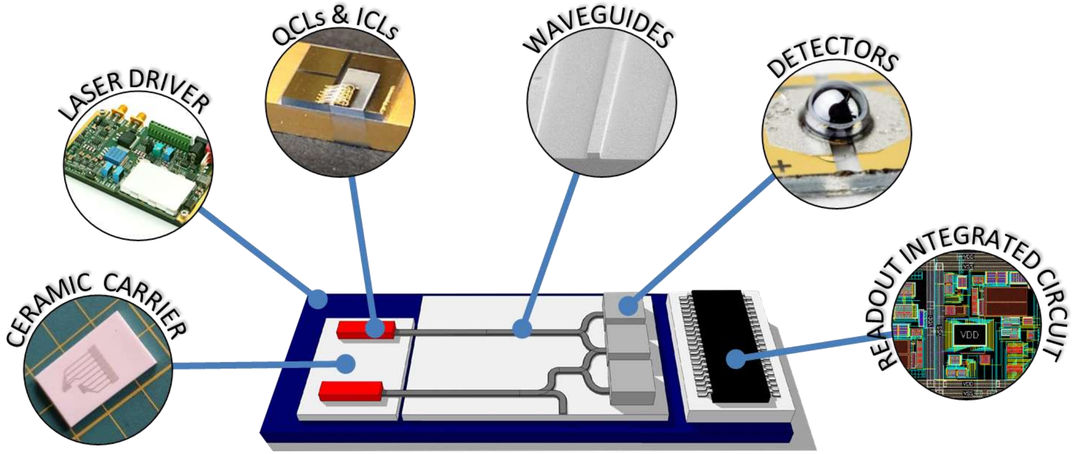
TECHNOLOGY DEVELOPMENT

Objective of the initiative

- Introduction, as the world's first manufacturer, of mid-infrared integrated circuits.
- Complete production line (world's first) for PICs in the MIR range (MIRPIC), complete supply chain for MIRPICs.

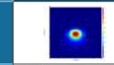
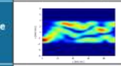
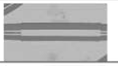
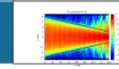
Gas detectors

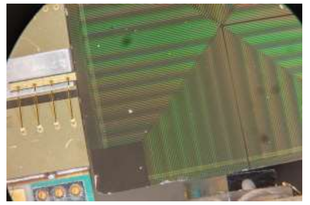


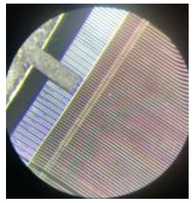


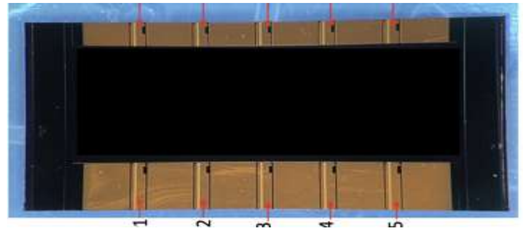
Achievements in Q2 2023

- Continuous development and optimization of the components library (PDK)
- Characterization of Ge-on-Si/2 µm structures (IMIF QCL + WUT waveguide + VIGO DET)
- Testing and development of heterogeneous integration („shelf" i „super-shelf" configurations)
- Optimization of etching of Ge and Si and post-processing processes.
- Investigation of IMIF QCLs with VIGO's drivers (confirmed operation up to 2 GHz).
- Preparation of detectors' integration tests
- EC approval for HyperPIC

Component	Design	Structure	Parameters
Waveguide WG			• attenuation 3 dB/cm • spectral range 3,0-5,5 µm • minimal bending radius 500 µm • minimal WG width 0,8 µm • Ge layer thickness: 1 µm, 2 µm
Multi-Mode Interference (MMI) coupler			• spectral range 3,0-5,5 µm • excess loss below 0,8 dB • configuration 1×2, 2×2 i 1×4 • asymmetric splitting ratio available
Spot-Size Converter SSC			• spectral range 3,0-5,5 µm • transmission ≥90% • lateral taper (w_{out} = 8 µm)







Plans for 2023

- Manufacturing of AWG multiplexers and DBR mirrors (confirmation of technological maturity).
- Test and optimization of integration techniques of passive circuits with active components.
- Packaging of a complete photonic integrated circuit with a miniaturized laser driver and ROIC.
- Tests of a scalable technology of the production of passive photonic circuits


European Commission | English | Search

Home > Press corner > Important Project of Common European Interest

Available languages: English

Press release | 8 June 2023 | Brussels

State aid: Commission approves up to €8.1 billion of public support by fourteen Member States for an Important Project of Common European Interest in microelectronics and communication technologies

The first workstream "Sense" will focus on **developing novel sensors** able to collect relevant analogue signals from our environment and translate them into digital data. Vigo, a Polish SME, will develop sensors in highly compact integrated circuits, replacing the current complex and large systems.

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innovation and the first industrial deployment of microelectronics and communication technologies across the value chain.

The project, called **"IPCEI ME/CT"**, was jointly prepared and notified by fourteen Member States: Austria, Czechia, Finland, France, Germany, Greece, Ireland, Italy, Malta, the Netherlands, Poland, Romania, Slovakia and Spain.

INFRARED ARRAY INITIATIVE

TECHNOLOGY DEVELOPMENT

Objective of the initiative

- Becoming a major supplier of detectors for the Polish army/armament industry, winning customers outside Poland (industry, space).
- Development of cooled array production technology.

Achievements in Q2 2023

- Starting conversations with PCO S. A. regarding the final product configuration.
- Successful processing attempts for target resolution

Plans for 2023

- Signing a letter of intent and then a contract for the supply of cooled FPAs with PCO S.A.

COMMERCIALISATION - SAMPLE PROJECTS

Client	TRL 5 Product concept	TRL 6 Demon-strator	TRL 7 Proto-type	TRL 8 Custo-mer valida-tion	TRL 9 Implemen-tation into production
Application: military technology Potential: > EUR 10 mn/year	2021 ✓	2022 ✓			
Application: aviation, space Potential: ~ EUR 1 mn/year	2021 ✓	2022 ✓	2022 ✓		

INVESTMENTS IN INNOVATIVE PROJECTS - VIGO VENTURES ASI FUND

VIGO PHOTONICS

VIGO VENTURES

VIGO VENTURES ASI 2023:

- Portfolio of 7 companies from 5 countries
- Over 130 employees in portfolio companies
- Over 20 cooperating organizations

MANAGEMENT BOARD

Wojciech Smoliński
Managing Partner, President of the Management Board

Marek Kotelnicki
Managing Partner, Member of the Management Board

SUPERVISORY BOARD

Paweł Maj, WEG Partner
Adam Piotrowski, President of VIGO Management Board
Łukasz Piekarski, Member of VIGO Management Board

KEY EVENTS IN 2023

- A new investment was made in a company from Germany, with a unique solution and patented technology enabling mass production of miniaturized spectrometers for industrial or medical applications.
- Portfolio companies have closed two further stage investment rounds with external investors
- Portfolio companies, expressed in PLN, acquired a total of approx. PLN 20 million* in subsequent investment rounds and received positive decisions regarding European grants in the amount of over PLN 9 million* (*assumed EUR 4.6 exchange rate).

INVESTMENT AREAS

- Photonics, semiconductors, quantum technologies.
- Investments and development of technological projects (start-ups, spin-offs) with global potential in the production of technically advanced devices and components.

PORTFOLIO

Fluence

QustomDot

KSMVISION
OPTICAL QUALITY INSPECTION

Deep Detection

ChipCraft®

PHOTON IP

New company from Germany - undisclosed

VIGO PHOTONICS

FINANCIAL RESULTS FOR Q2 2023

CONSTANTLY GROWING ORDER PORTFOLIO

VISIBLE CONTINUOUS DEVELOPMENT OF PHOTONICS AND MIDDLE-IR SOURCES MARKETS AND INCREASING DEMAND FOR VIGO PRODUCTS, CONSTANTLY INCREASE THE ORDER PORTFOLIO DESPITE VARIABLE MARKET ENVIRONMENT

ORDER BOOK

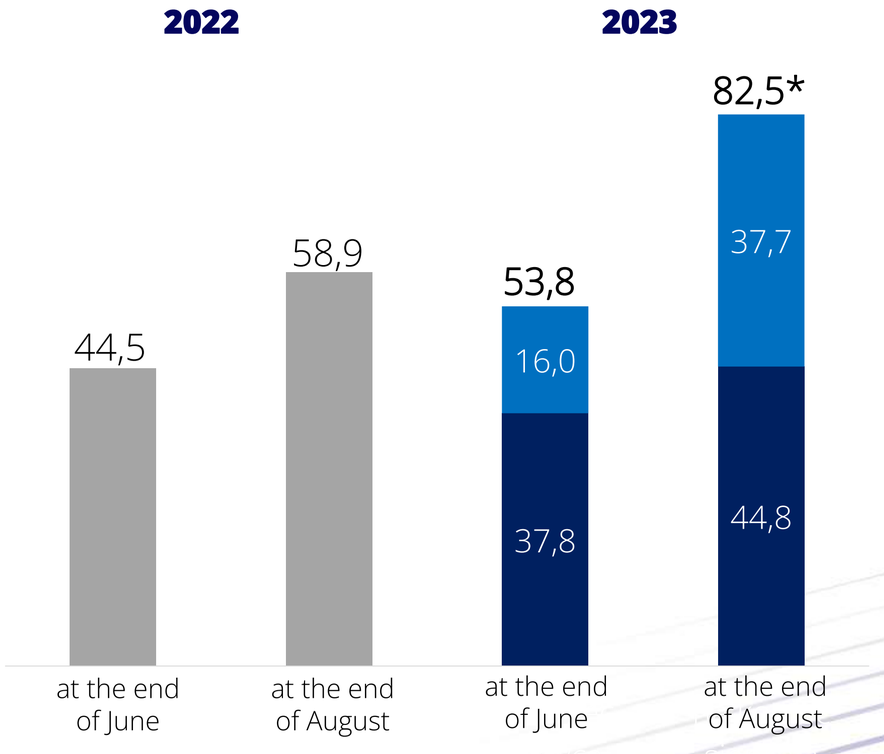
PLN 82.5 mn*

value of VIGO's order portfolio at the end of August 2023
(from the beginning of 2023)

Continuing high demand for VIGO Photonics products proves further dynamic development of the photonics market and its good prospects.

The highest value orders in industrial, transport and scientific applications.

*Value of orders received in 2023 and new contracts signed in 2023, excluding new contract with PGZ of 29.08.2023 (additional PLN 15.8 m)



SALES REVENUES

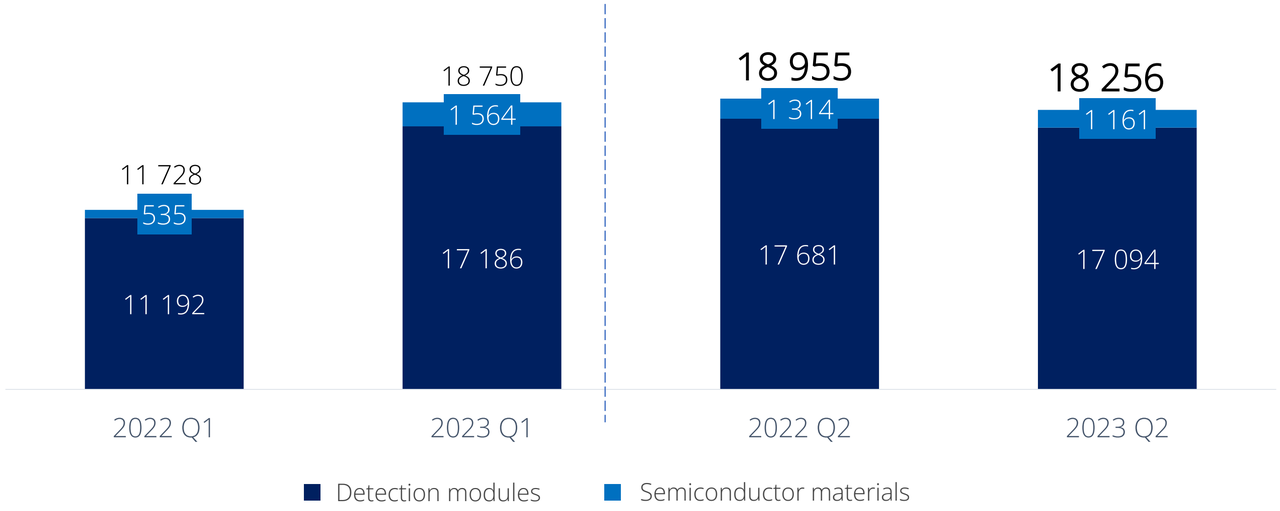
SALES REVENUES IN Q2 2023

- PLN 18.3 million of consolidated sales revenues (-4% y/y)
- Sales of detectors and detection modules amounted to PLN 17.1 million (-3% y/y), and semiconductor materials amounted to PLN 1.2 million (-12% y/y).
- Revenues in segments:
  - Industry: PLN 9.7 million (+6% y/y)
  - Military: PLN 3.4 million (-24% y/y)
  - Transport: PLN 2.7 million (-7% y/y)
  - Science and medicine: PLN 1.3 million (+19% y/y)
- Geographically, there was an 82% increase in sales in the USA, a 69% increase in Poland, a 21% decrease in Asia and a 16% decrease in Europe.
- Demand trends in segments
  - industrial - detectors for gas and semiconductor analyzers,
  - science and medicine – growing customer base as a result of increased sales activity
  - military – orders from the Polish and European customers
  - Transport – orders form a Chinese customer
  - epiwafers – growing orders for the QCL structures from a European customer

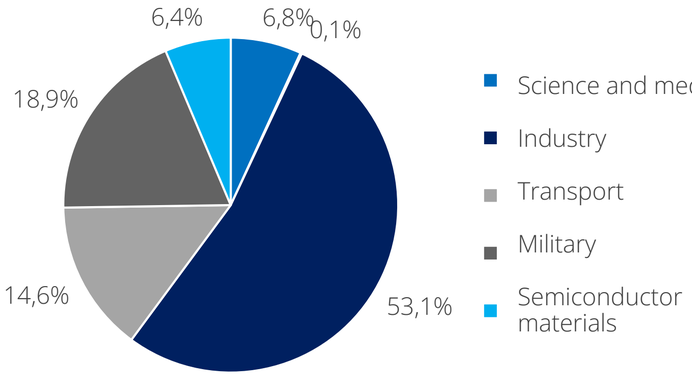
SALES REVENUES IN H1 2023

PLN 37.0 million of consolidated sales revenues (+20% y/y)

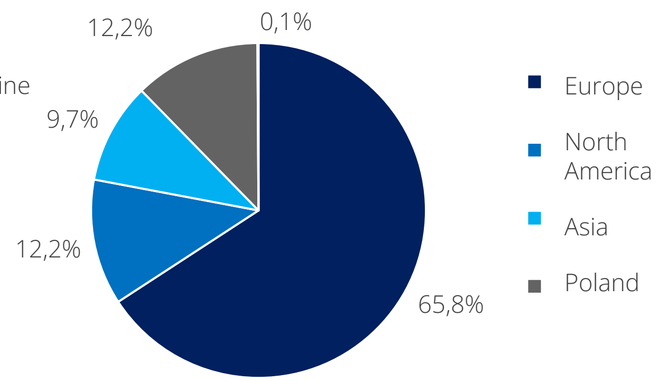
SALES REVENUES PER YEAR (PLN THOUSAND)



SALES REVENUES BY APPLICATION IN Q2 2023



SALES REVENUES BY REGION IN Q2 2023



OPERATING COSTS

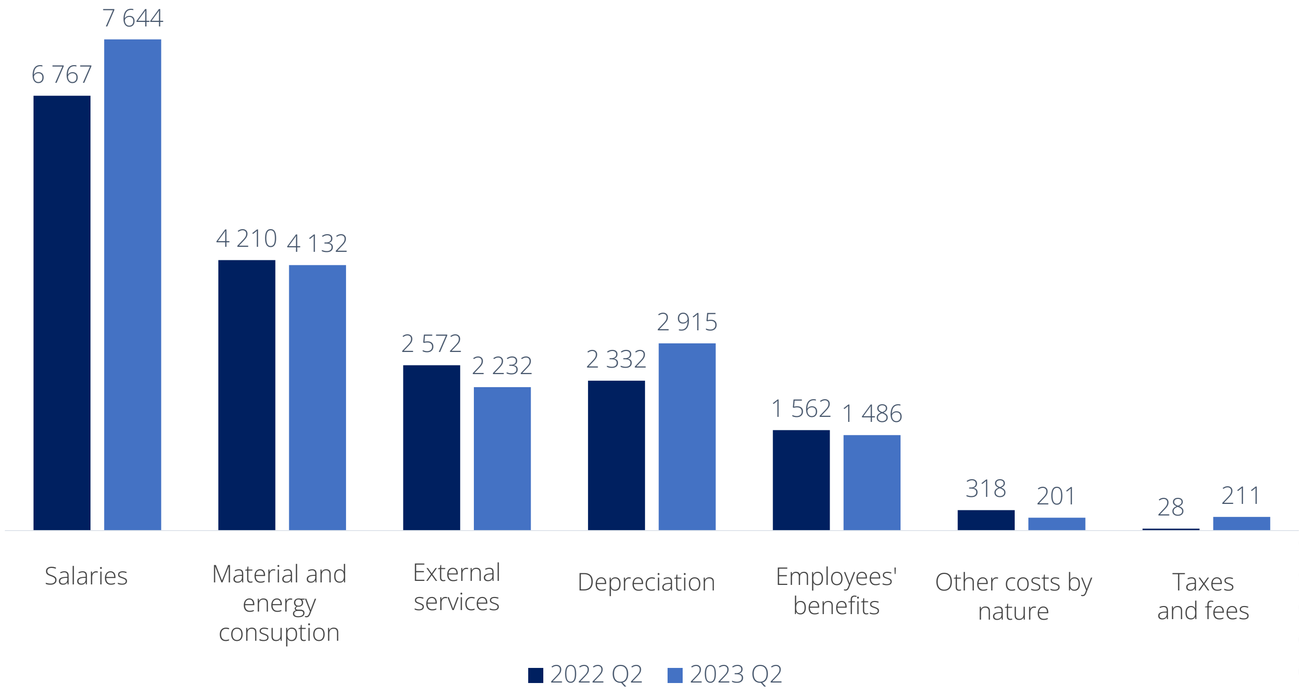
OPEX IN Q2 2023

- The costs of basic operating activities amounted to PLN 18.3 million (+5.8% y/y).
- The greatest impact on the decrease in costs had:
  - salaries
  - depreciation
- The pressure on salaries costs is strong and the costs are expected to increase in the following quarters

OPEX IN H1 2023

The costs of basic operating activities amounted to PLN 36.3 million (+14.5% y/y)

OPERATING COSTS IN Q2 2023 (PLN THOUSAND)



FINANCIAL PERFORMANCE

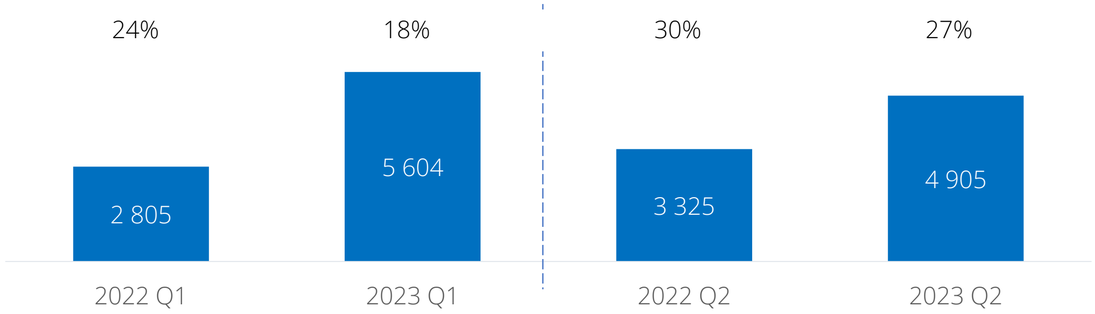
FINANCIAL PERFORMANCE IN Q2 2023

- Adjusted EBITDA: PLN 4.9 million (+48% y/y).
- Operating profit (EBIT): PLN 3.0 million (+70% y/y).
- Net profit adjusted for deferred tax: PLN 4.6 million (nearly 3x y/y).
- Significantly lower SG&A costs had impact on the financial results

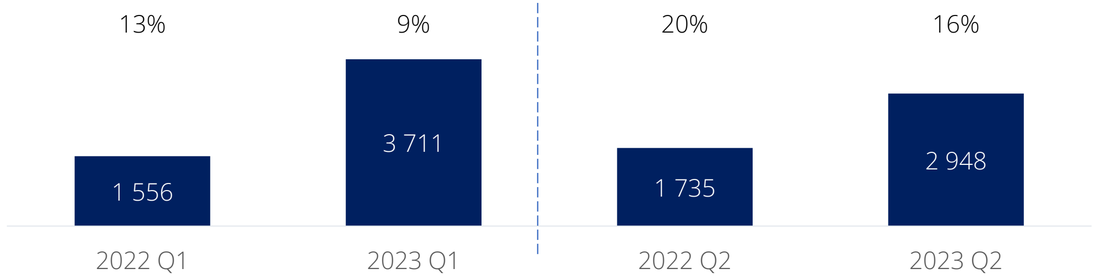
FINANCIAL PERFORMANCE IN H1 2023

Adjusted EBITDA PLN 10.5 million, EBIT PLN 56.7 million, adjusted net profit PLN 7.6 million.

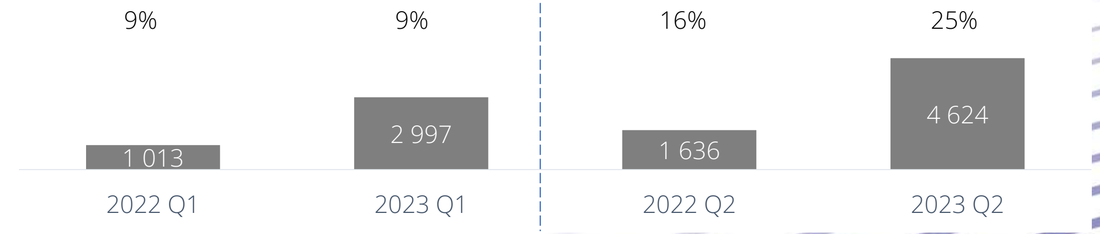
ADJUSTED EBITDA (PLN THOUSAND) AND EBITDA MARGIN



EBIT (PLN THOUSAND) AND EBIT MARGIN



ADJUSTED NET PROFIT (PLN THOUSAND) AND NET MARGIN



CASH FLOW

CASH FLOW IN H1 2023

- Cash flows from operating activities: reduced level of inventories and receivables and increased level of liabilities
- Cash flows from investing activities: higher revenues from received subsidies (PLN 9.9 million) and lower investment expenses (PLN 16.9 million)
- Cash flows from financial activities: PLN 5.2 million received and PLN 5.7 million of capital installments and PLN 1.1 million of interest repaid

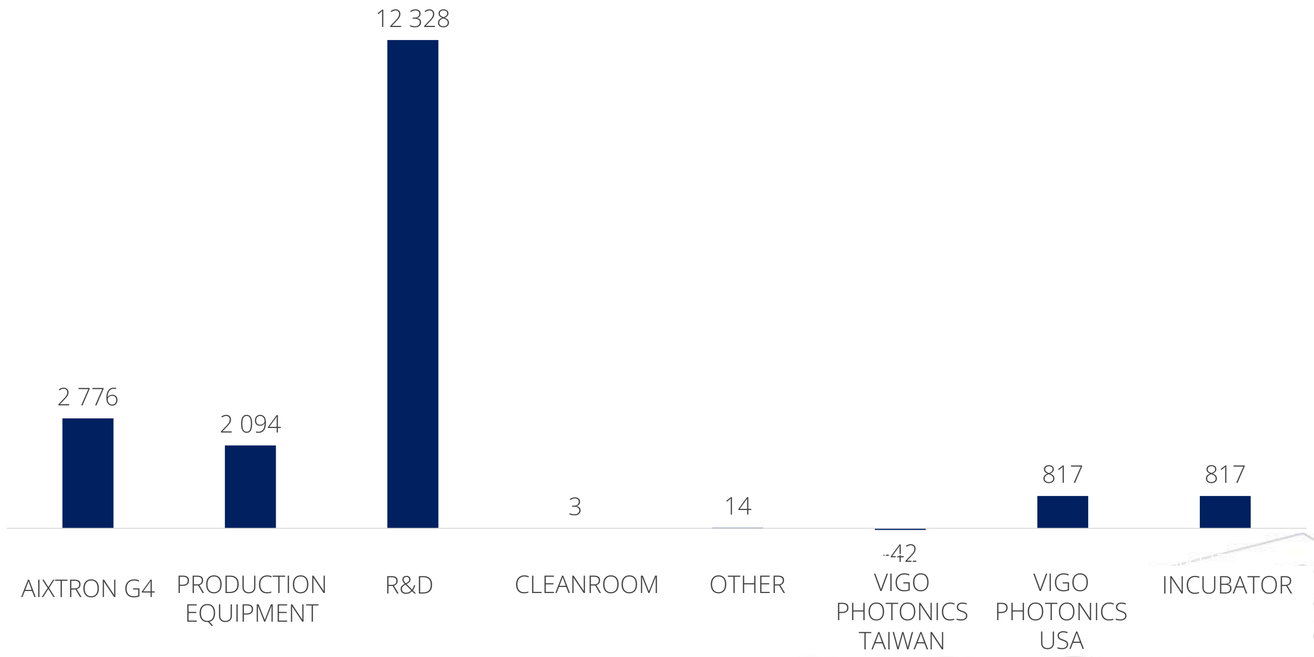
CASH FLOW STATEMENT [PLN THOUSAND]	01.01.2023 - 31.06.2023	01.01.2022 - 31.06.2022
Total adjustments:	**2 787**	**4 606**
Amortisation and/or depreciation	5 757	5 008
Change in provisions	245	297
Change in inventories	181	-3 704
Change in receivables	2 221	4 464
Change in liabilities, excluding loans and borrowings	-1 927	594
Other	-3 691	-2 053
A. Net cash flows from operating activities	**10 408**	**7 256**
Inflows	**9 874**	**9 657**
Funding received	9 865	9 556
Proceeds from the sale of fixed assets	9	101
Outflows	**-16 941**	**-26 562**
Purchase of intangible assets and tangible fixed assets	-6 099	-14 067
Expenditure on acquisition of shares	-440	-225
Expenditure on investment funds	0	0
Outlays on development work in progress	-10 402	-11 635
Loans granted	0	-635
B. Net cash flows from investment activities	**-7 068**	**-16 905**
Inflows	**5 220**	**12 283**
Credits and loans	5 220	12 283
Outflows	**-6 755**	**-4 993**
Repayment of credits and loans	-5 728	-4 430
Interest and commissions	-1 058	-546
C. Cash flows from financial activities	32	-17
D. Total net cash flows	**-1 535**	**7 290**
G. Cash at the end of period	**1 806**	**-2 359**
Total adjustments:	**4 128**	**4 133**

CAPITAL EXPENDITURE

CAPEX IN H1 2023

- CAPEX in H1 2023 amounted to PLN 18.8 million (accrual basis), of which the most important expenses concerned:
  - R&D expenses: PLN 12.3 million,
  - new MOCVD Aixtron reactor: PLN 2.8 million,
  - production equipment: PLN 2.1 million,
- Investment expenditure plan in 2023: PLN 44.7 million

CAPITAL EXPENDITURES INCURRED IN H1 2023 (PLN THOUSAND)

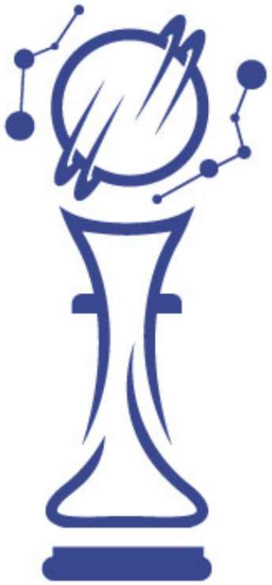


NEW COFINANCING FOR R&D WORKS ON A WATER QUALITY SENSOR

VIGO ON THE LIST OF PROJECTS FOR CO-FINANCING PLN 9.4 MILLION UNDER THE FIRST COMPETITION OF THE HYDROSTRATEG GOVERNMENT STRATEGIC PROGRAM "INNOVATIONS FOR WATER MANAGEMENT AND INLAND SHIPPING"

- Project name: Development of an innovative photonic water resources monitoring system
- Consortium: VIGO (leader), Warsaw University of Technology, European Regional Center for Ecohydrology of the Polish Academy of Sciences
- The total amount of eligible costs of the Project: PLN 24.0 million
- Amount of co-financing: PLN 20.2 million (84.4% of total costs eligible for support).VIGO eligible costs: PLN 13.1 million
- Co-financing for VIGO: PLN 9.4 million
- Duration of the Project and co-financing: 36 months; implementation will start on October 1, 2023

Program strategiczny
HYDROSTRATEG



- Project work
  - developed and verified new photonic and non-contact measurement methods,
  - built autonomous probes for remote monitoring of selected quality parameters of water resources (i.e. monitoring the content of nitrates, nitrites and phosphorus compounds).

Detection of signals will allow for miniaturization, automation and cost reduction with an increased level of security of the monitored areas.

VIGO PHOTONICS

OUTLOOK

FURTHER DEVELOPMENT ON A WAVE OF LONG-TERM MEGATRENDS CREATING A STRONG DRIVE FOR VIGO OPERATING DEVELOPMENT

TECHNOLOGY TRENDS

SYSTEM MINIATURISATION

Miniaturization and integration are the future of IR in mass applications

INTERNET OF THINGS (IoT)

Explosion of chip applications in the IoT

- USD 114 bn - estimated value of the IoT sensor market in 2025
- 15.6% CAGR 2022-2025

CONSUMER ELECTRONICS

IR as the catalyst of *wearable lab-on-chip* development

- USD 186 bn - estimated value of the wearables market in 2030
- 14.6% CAGR 2023-2030

AUTOMOTIVE

The growing importance of IR solutions (LIDAR sensors/ *self driving vehicles*)

- USD 4.5 billion - estimated value of the LIDAR market in 2030
- 28.5% CAGR in 2022-2030

GEOPOLITICAL TRENDS

SECURITY AND DEFENCE

Significant investments as a result of current political tensions - increase in budget spending by Western countries, incl. Poland

- 3% of GDP - planned Polish defense spending in 2024
- EUR 70 bn - planned EU defense spending until 2025

VALUE CHAIN STABILITY IN CHIP PRODUCTION AND DEVELOPMENT OF THE SEMICONDUCTOR INDUSTRY IN EUROPE AND THE USA

Securing chip production in Europe and the US and freeing from the risk of their concentration in Asia, incl. fabless manufacturing. Streams of money from governments in the form of subsidies and tax breaks for the construction of foundations in Europe (EUR 45 bn)* and the USA (USD 280 bn)*.

- USD 1,033 bn - estimated value of the global semiconductor market in 2031
- 20-30% - target of EU share in the global semiconductor market by 2030 (from 9% currently)

ECOLOGICAL TRENDS

ROHS AND ECOLOGY

RoHS** changes the mid-infrared (MIR) market – introduced i.e. ban on the use of mercury, cadmium, lead in industrial applications. Still a possibility of use in the military, aerospace and large industrial infrastructure.

ENVIRONMENTAL PROTECTION

The growing importance of environmental protection in many industries, incl. air and water quality monitoring, gas analysis, CO_2 emissions.

- USD 33 bn - estimated value of the gas and oil analytics market
- 23.8% CAGR 2022-2030

Sources: Research and Markets, Precedence Research Persistence Market Research * The European Chips Act in UE, the Chips and Science Act in USA, **Restriction of Hazardous Substances

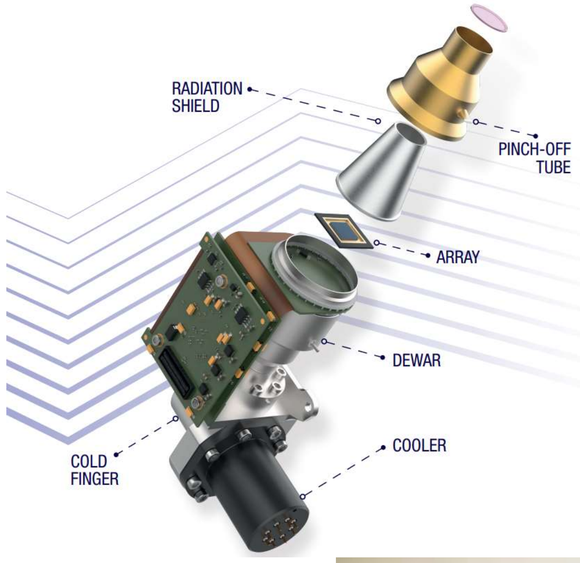
INFRARED ARRAY COVERING THE NEED TO INCREASE SECURITY AND DEFENSE OF COUNTRIES

INFRARED ARRAY - GENERAL INFORMATION

- Infrared detector arrays containing hundreds of thousands or millions of active pixels used in the construction of thermal imaging cameras for space and military applications and having a semiconductor layer made of III-V materials (InAsSb - MWIR, LWIR, or InGaAs - SWIR).
- Products based on the same technologies used to manufacture single-element detectors, products tailored to specific customer needs.
- Industries and applications: military, space - detectors for thermal imaging cameras

OBJECTIVES OF THE INITIATIVE

- Developing technology and building competence in the field of manufacturing matrix detectors both cooled (thermal) and uncooled (SWIR InGaAs), epitaxy, high-density processing, ROIC, hybridization, encapsulation.
- Becoming the main supplier of detectors for the Polish army/armament industry, customers outside Poland (industry, space).
- Technology Polonisation and increasing the potential of the Polish army, enabling the export of Polish optoelectronic solutions.



PHOTONIC INTEGRATED CIRCUITS (PIC) ADDRESSING THE NEED FOR SYSTEM MINIATURIZATION IN COMMON DEVICES

PHOTONIC INTEGRATED CIRCUITS (PIC) - GENERAL INFORMATION

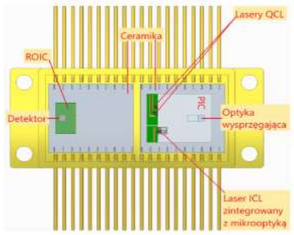
- A miniaturised circuit consisting of multiple optical and electronic components with different functionalities integrated on a common, usually semiconductor, substrate, a single chip.
- A photonic integrated circuit can replace the full functionality of an infrared sensor.

PIC - OBJECTIVES OF THE INITIATIVE

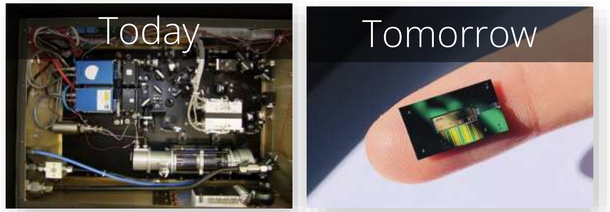
To be the world's first manufacturer of mid-infrared integrated circuits, gain a leading position on the markets for PIC for MWIR and obtain a significant share of the PIC market for SWIR.

- Complete production line (world's first) for PICs in the MIR range (MIRPIC), complete supply chain for MIRPICs.
- Development of optoelectronic systems for infrared photonics - ultimately hybrid PICs.

PIC for MIR scheme



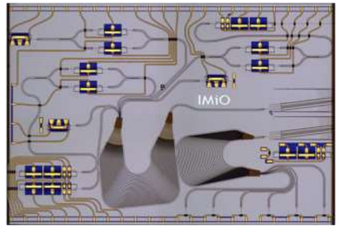
Gas detectors



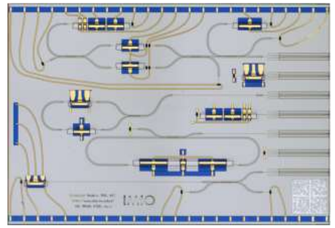
DEVELOPMENT OF THE FIRST MID-INFRARED PHOTONIC INTEGRATED CIRCUIT ON THE MARKET - MIRPIC PROJECT

- Cooperation: Warsaw University of Technology; Łukasiewicz Institute of Microelectronics and Photonics
- Launch: April 2021, lead time: 3 years
- Budget: PLN 29.3 mln, co-financing: PLN 26.6 mln.
- Potential applications: miniature gas sensors (smart cities, intelligent household appliances, automotive); advanced medical devices; wearables (high end)

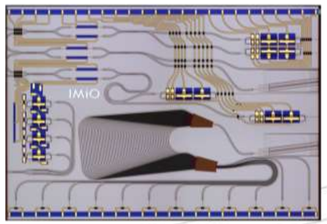
Over 10 years experience of the new Vigo team in photonic integrated circuit design - over 100 completed PIC projects



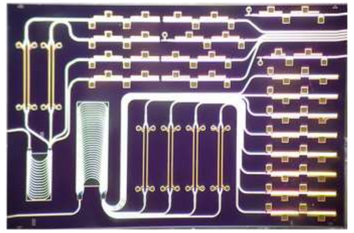
Multi-channel transceiver for free space optics

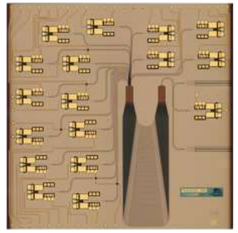

Optical time domain reflectometer

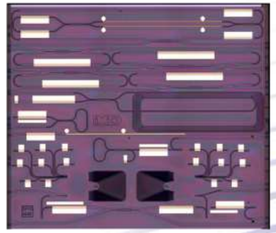

Multi-wavelength laser

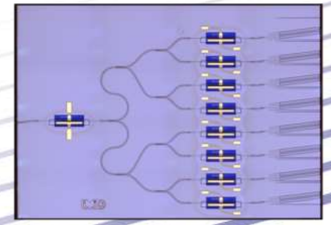


FBG interrogator unit


Multi-channel transmitter for FTTH networks


Spectrometer for FBG sensor interrogator


Discretely tunable laser


Lossless power splitter

VIGO IS AMONG THE EUROPEAN COMPANIES FROM THE ELECTRONICS INDUSTRY TO BE GRANTED FINANCING >EUR 100 MN FOR THE HyperPIC

THE EUROPEAN COMMISSION HAS ACCEPTED AN AMOUNT OF GRANT FOR VIOG PHOTONICS OF UP TO EUR 102.9 MN TO CARRY OUT THE HYPERPIC PROJECT. THE FINAL DECISION ON RELEASING FINANCING AND ITS VALUE WILL BE DETERMINED WITHIN THE FRAMEWORK OF A CONTEST PROCEDURE RELATING TO THE PROGRAMME: FINANCING FOR THE MODERN ECONOMY

GOAL OF HyperPIC PROJECT

- Introduction to the market, as the first company in the world, photonic integrated circuits (PIC) based on mid infrared
- Construction of a complete production line (first in the world) for PIC in the range of mid IR (MIRPiC)
- Building of a complete supply chain for MIRPIC circuits

SCOPE

- Development and implementation of technology allowing for integration of active and passive elements comprising an integrated circuits – a platform to build a various types of integrated circuits to be used in a wide range of applications
- Construction of state-of-the art foundry enabling to commence production of chips working in mid and long infrared in a mass scale

TIMING (2023-2030)

1. Research-Development-Innovation (RDI) Phase – 2023-2027
2. First Industrial Development (FID) Phase – 2023-2026 (construction of a foundry), 2027-2030 (launching of production based on developed technology
3. Mass production phase – since 2031

BUDGET

EUR 253.4 mn – total qualified costs (R&D expenditures, CAPEX on production lines and operating expenses after launching production).

FINANCING

A grant within confines of IPECI Microelectronics II (EUR 102.85 mn) as well as additional financing sources such as: equity and own funds, debt financing and other sources (ie. strategic project joint venture (JV) and off-balance sheet financing including project finance.

EUROPEAN PROJECT - IPCEI

The HyperPIC Project is a part of the European *project Important Projects of Common European Interest in Microelectronics and Communication Technologies* (IPCEI ME/CT) with a goal of strengthening of European microelectronics industry. Apart from VIGO Photonics, the most important semiconductor companies in Europe are participating in IPCEI ME/CT project. The total amount of state aid amounts to 8 bn EUR.

VIGO PHOTONICS

SUMMARY

OUTLOOK

CONTINUE TO EXECUTE THE 2023 AND 2026 STRATEGY WITH A FOCUS ON STRATEGIC INITIATIVES AND PRODUCTION EFFICIENCY BASED ON VIGO'S UNIQUE TECHNOLOGIES AND ACCELERATE COMMERCIALISATION OF NEW SOLUTIONS IN A FAST-GROWING AND FORWARD-LOOKING PHOTONIC MARKET, SUPPORTED BY NUMEROUS MEGATRENDS

MARKET

- ✓ a number of business opportunities enabling further dynamic growth of operations on the global, intensively developing markets of photonics and mid-infrared sources
- ✓ numerous market megatrends supporting dynamic development: system miniaturization, Internet of Things (IoT), consumer electronics, automotive, environmental protection
- ✓ global trends in securing the value chain in chip production and the development of the semiconductor industry in Europe and the USA, as well as significant investments in security and defense

COMPANY

- ✓ presence at the global forefront of industrial innovation - the company has only 3 direct competitors
- ✓ a unique advantage using an integrated value chain and a full range of product applications for customers from numerous industries, including their customization
- ✓ established market position and brand recognition - over 30 years of experience in the production of semiconductor materials, with a world-class R&D department
- ✓ investments made in recent years allow for long-term scaling of production

STRATEGY

- ✓ implementation of an ambitious development strategy addressing market changes and challenges in the long term, using a unique advantage in the value chain that will move VIGO to a higher utility curve (infrared matrices, PIC)
- ✓ active sales development and acquisition of new customers, including a growing portfolio of orders
- ✓ an appropriate level of investment in R&D and infrastructure in order to maintain a strong market position
- ✓ investments in innovative projects through the VIGO Ventures ASI fund

VIGO PHOTONICS

Q&A

VIGO PHOTONICS

THANK YOU FOR YOUR ATTENTION

Contact for investors:

Małgorzata Młynarska

Investor Relations Manager, cc group

e: malgorzata.mlynarska@ccgroup.pl

m: +48 697 613 709

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