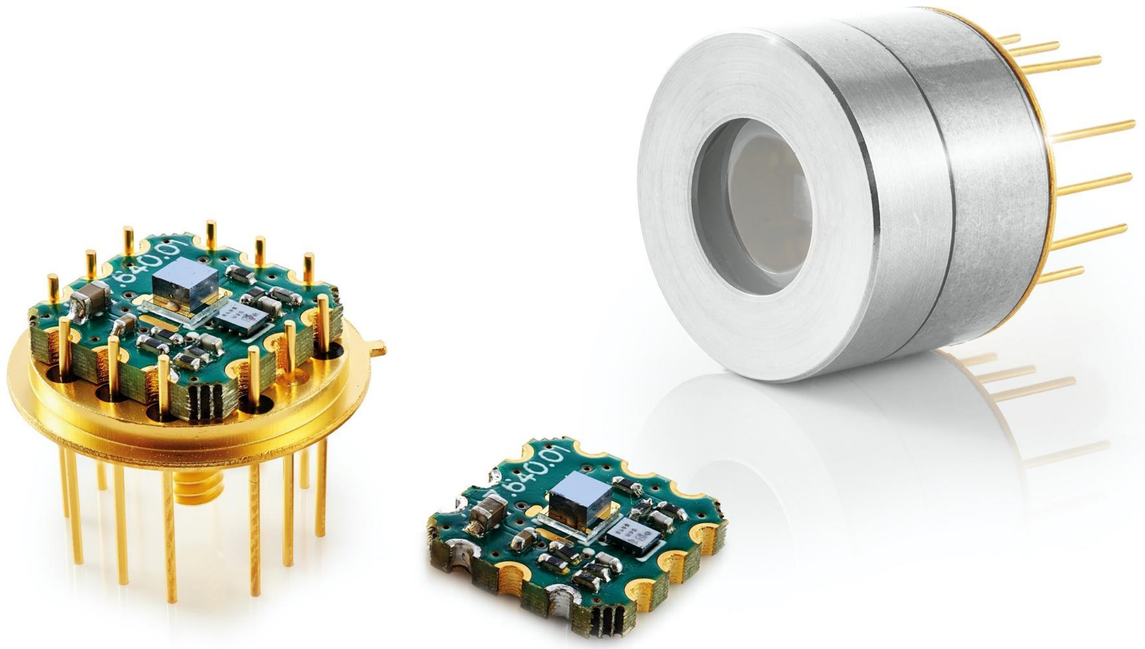
Financing Industry 4.0. Do you really need it?



COMPANY HIGHLIGHTS

Epitaxial wafers

Photon Detectors

IR Detection Modules

WHO ARE WE?

Founded in 1987, VIGO System consists of two manufacturing groups:

- **IR Detectors:** VIGO is the world’s leader in customised, high-tech uncooled photodetectors of middle and long wavelength range for industrial, medical, transport, environmental protection, space and security & defence technology applications.

- **III-V Epi-foundry:** VIGO's epi-foundry team has over 30 years of epitaxy experience. They manufacture III-V semiconductor materials for photonics and microelectronics applications, such as lasers, diodes, transistors and detectors.

The outcome of VIGO's innovative approach and industry-wide experience is truly high-end products. Our devices are easy to use, robust and reliable. Our materials are characterised by low impurities level and high uniformity.

The company has multiple production lines for infrared, photonics and microelectronic devices!

ABOUT US

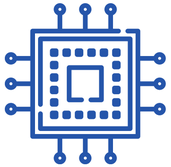
34 YEARS
ON THE MARKET

170
EMPLOYEES

100,000
CAPACITY OF
DETECTORS/YEAR

10,000
CAPACITY OF
EPI-WAFERS/YEAR

6 DETECTORS
ON MARS



Unique technology – 34 years of innovation and continuous improvement of the company's original concept

Value for money
– the best quality to price ratio

Custom-fit solutions – flexibility to tailor and test solutions that respond to the most demanding customer requirements (e.g. NASA, military industry)

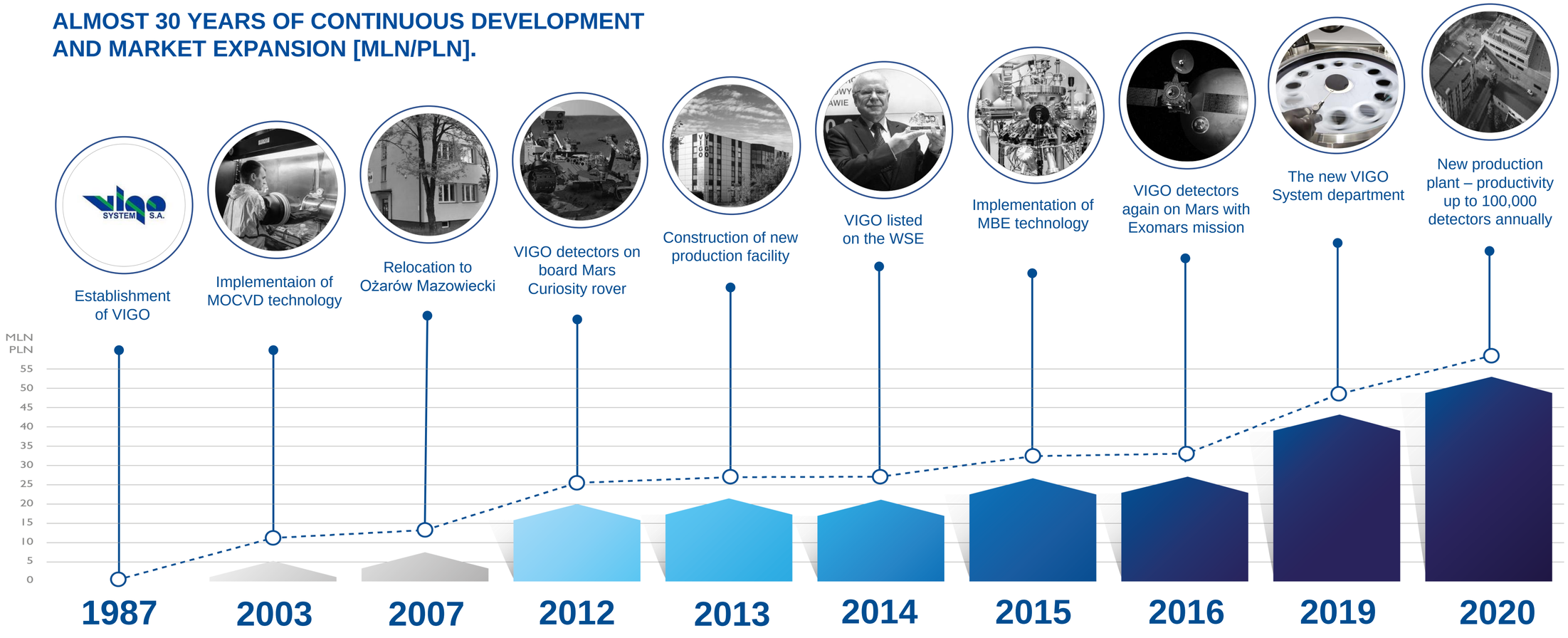
R&D capabilities – world-class scientific R&D expertise with
access to and affiliation with major academic research institutions
(e.g. MIT, Princeton, Fraunhofer Gesellschaft)

Research projects
– coordinator of and commercial partner in a number of national
and EU research projects
(e.g. Horizon 2020, POIR)

Highly educated and experienced personnel – friendly atmosphere promoting creativity and innovation 170 employees (1 professor, 14 PhDs and >60 engineers),

ABOUT US

ALMOST 30 YEARS OF CONTINUOUS DEVELOPMENT AND MARKET EXPANSION [MLN/PLN].



COMPANY CAPITALISATION

2020 = 100 M EUR

ABOUT US

IN BUSINESS RELATIONS WITH GLOBAL CORPORATIONS VIGO SYSTEM HAS BECOME A SUPPLIER FOR

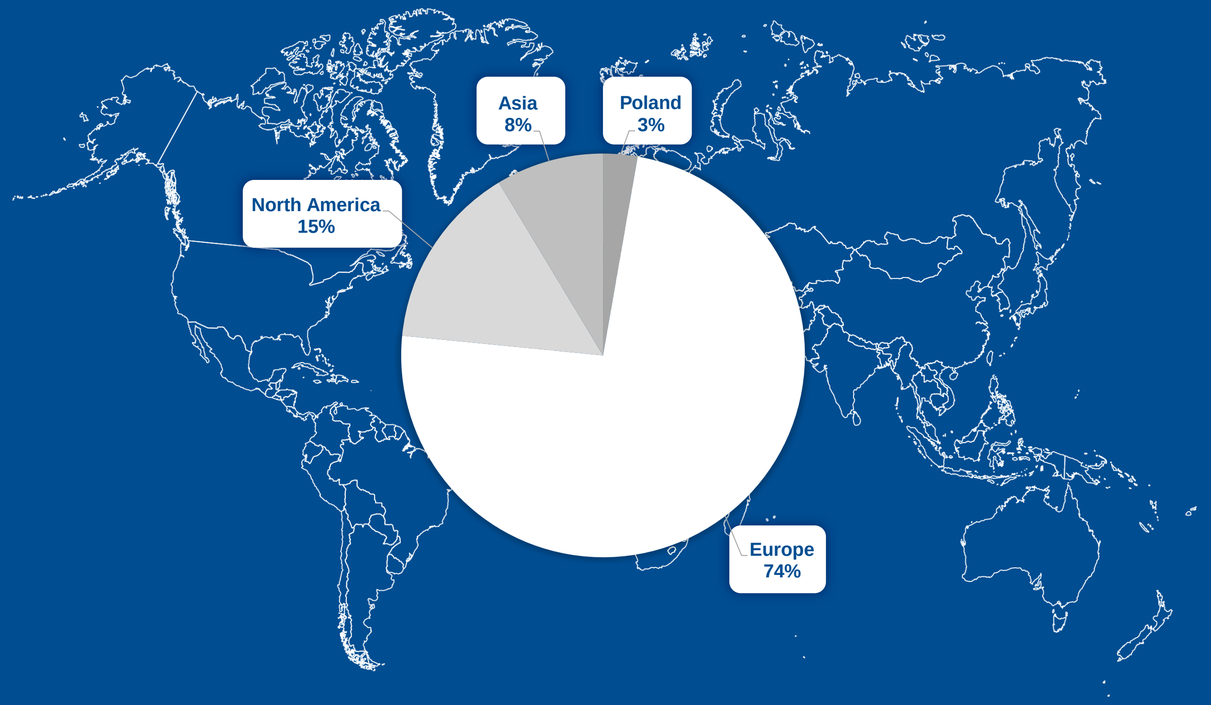
Safran Aerotechnics
(optoelectronics systems)

Emerson Electric Co.
(industrial gas analysers)

Caterpillar
(railway sensor systems)

TRUMPF
(laser industry)

MARKET SPLIT 2019



VIGO System has become a supplier of high-tech components for the most demanding customers.

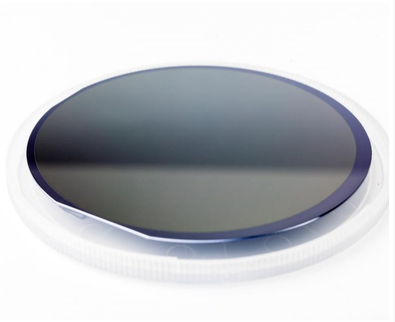
esa European Space Agency

NASA

PRODUCTION CAPACITY

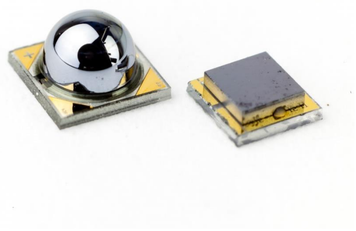
COMPLETE PRODUCTION LINE FOR INFRARED SEMICONDUCTORS AND PHOTONIC DEVICES (FROM NEAR TO FAR INFRARED)

IR DETECTORS
(FROM NEAR TO FAR INFRARED)



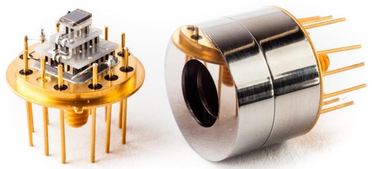
Epitaxy

Semiconductor wafer



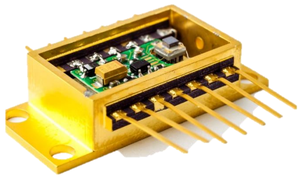
Processing

Detection chips



Micro assembly

Infrared detectors

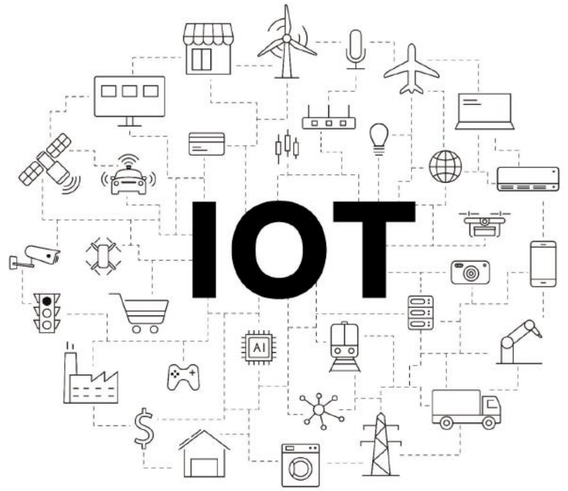


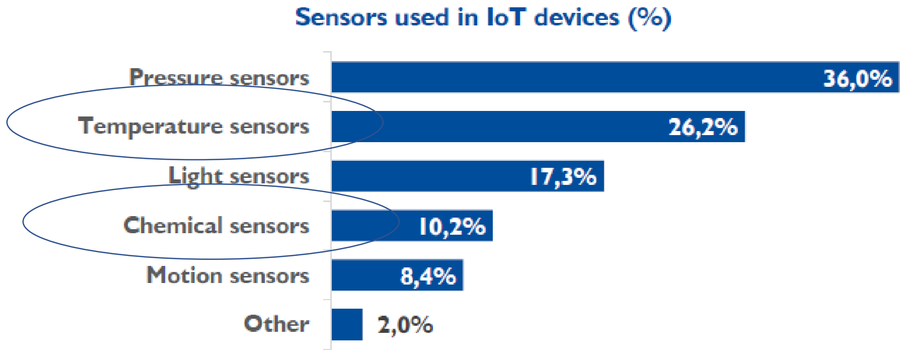
Integration with electronics

Detection modules

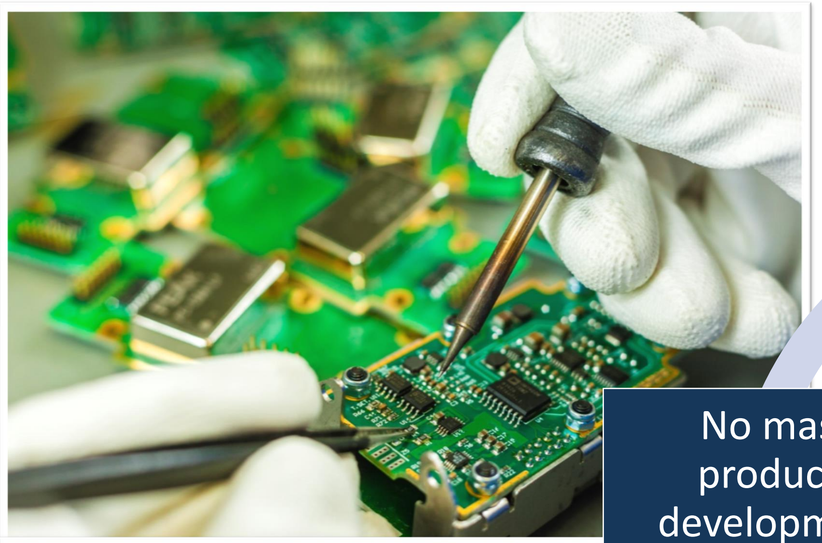
APPLICATIONS

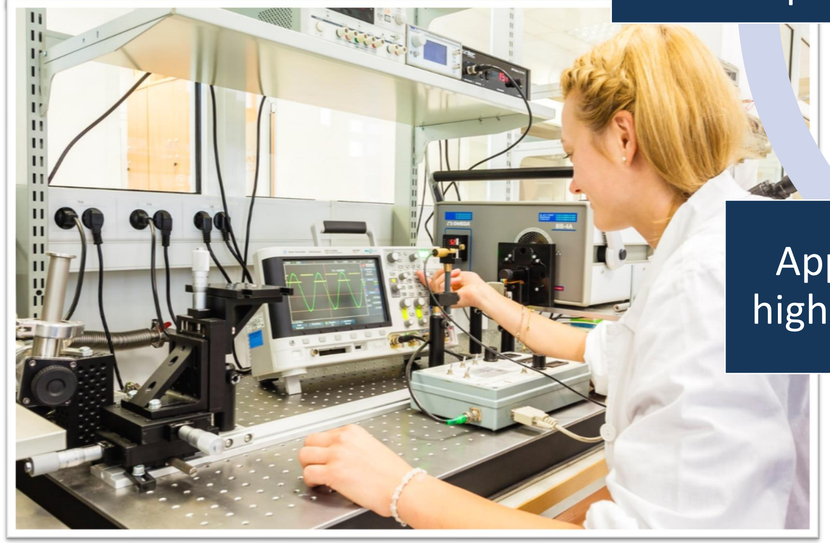
VIGO System HgCdTe or InAs and InAsSb IR detectors for:

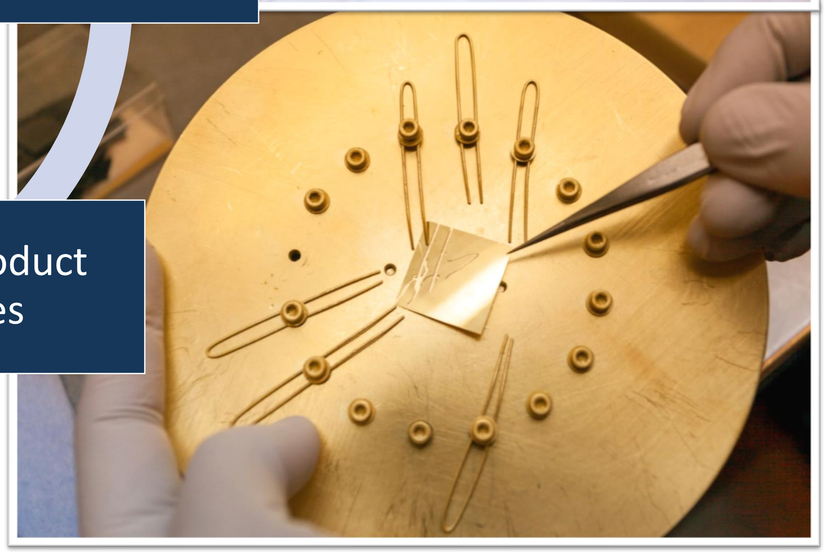




VIGO SYSTEM – PAST







Niche market?

Unique production, manufacture

High product prices

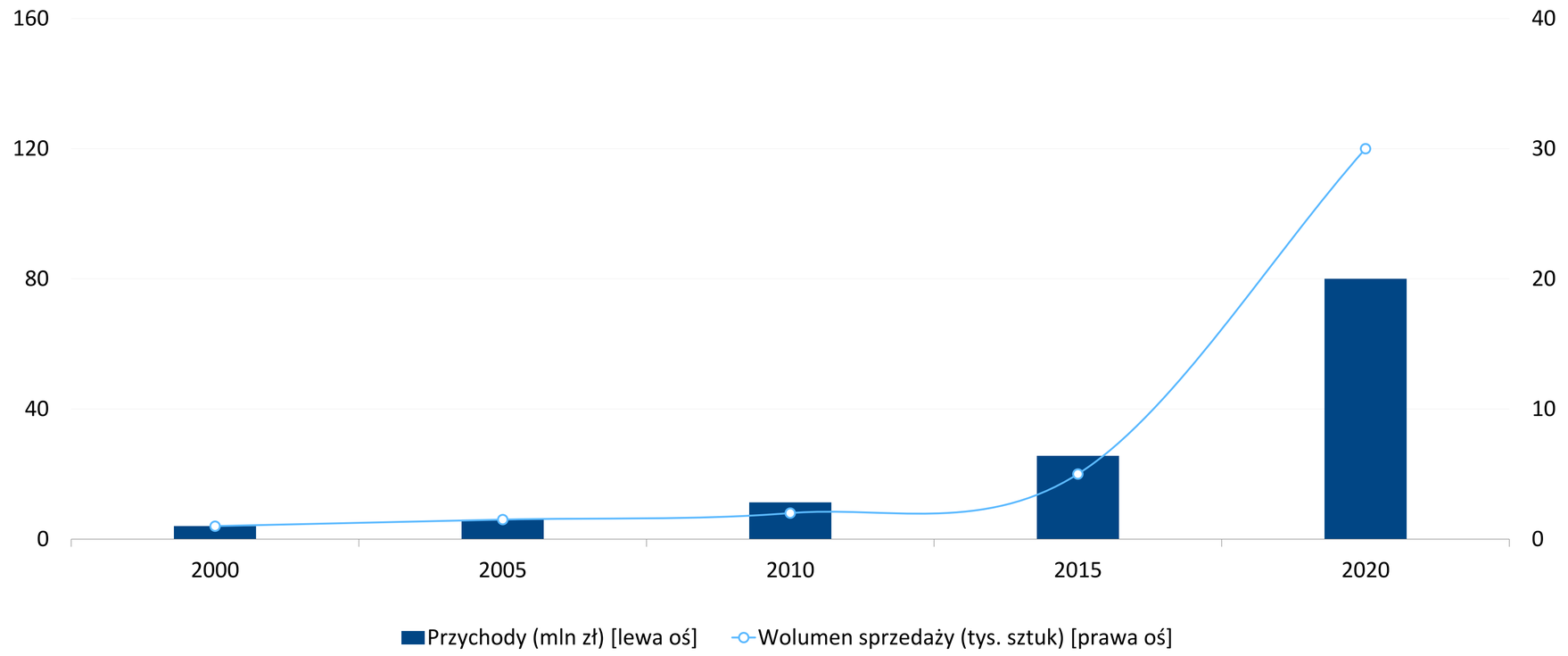
Application in high-end system

No mass products development

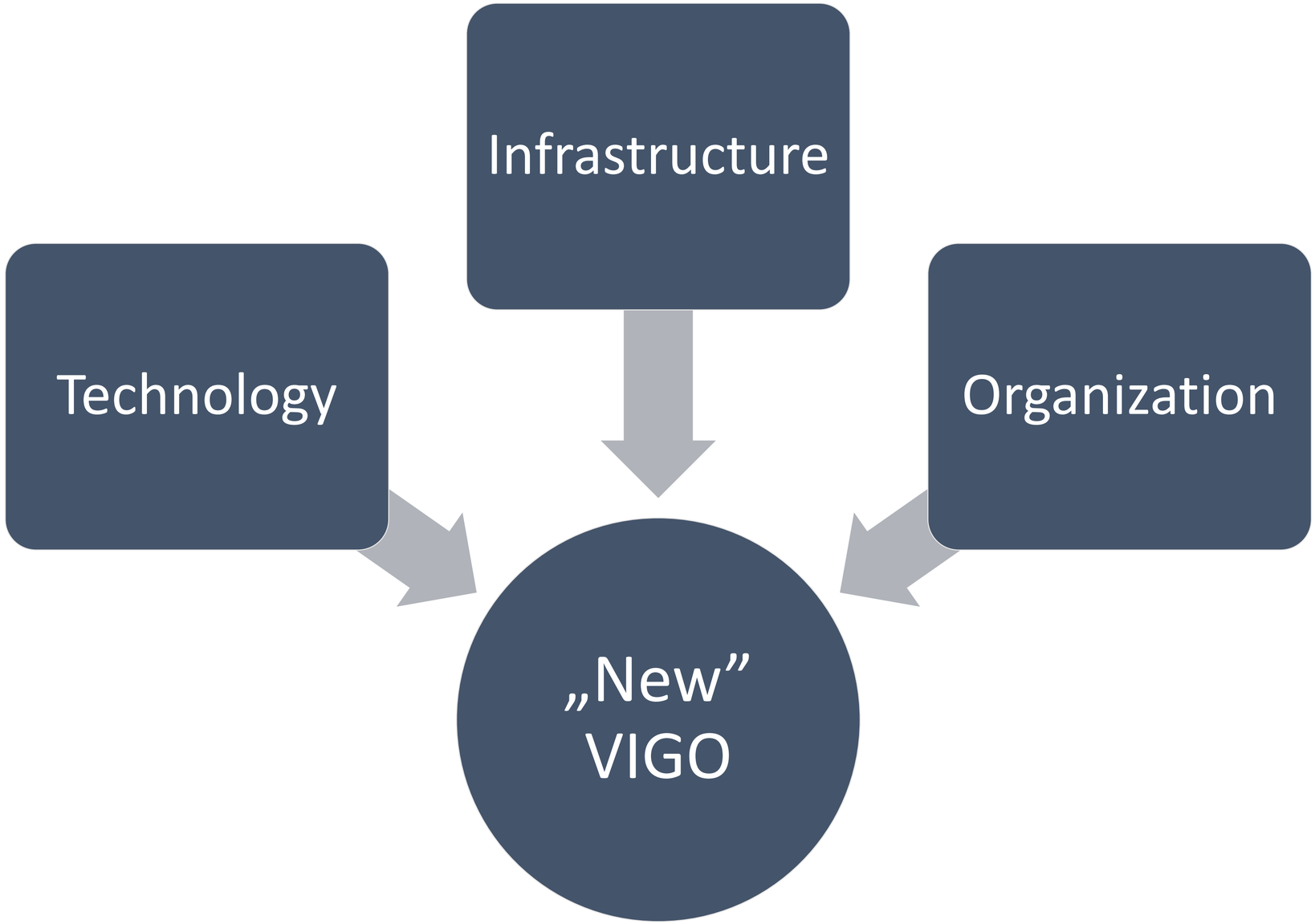
VIGO SYSTEM – STRATEGY 2020

Goals:

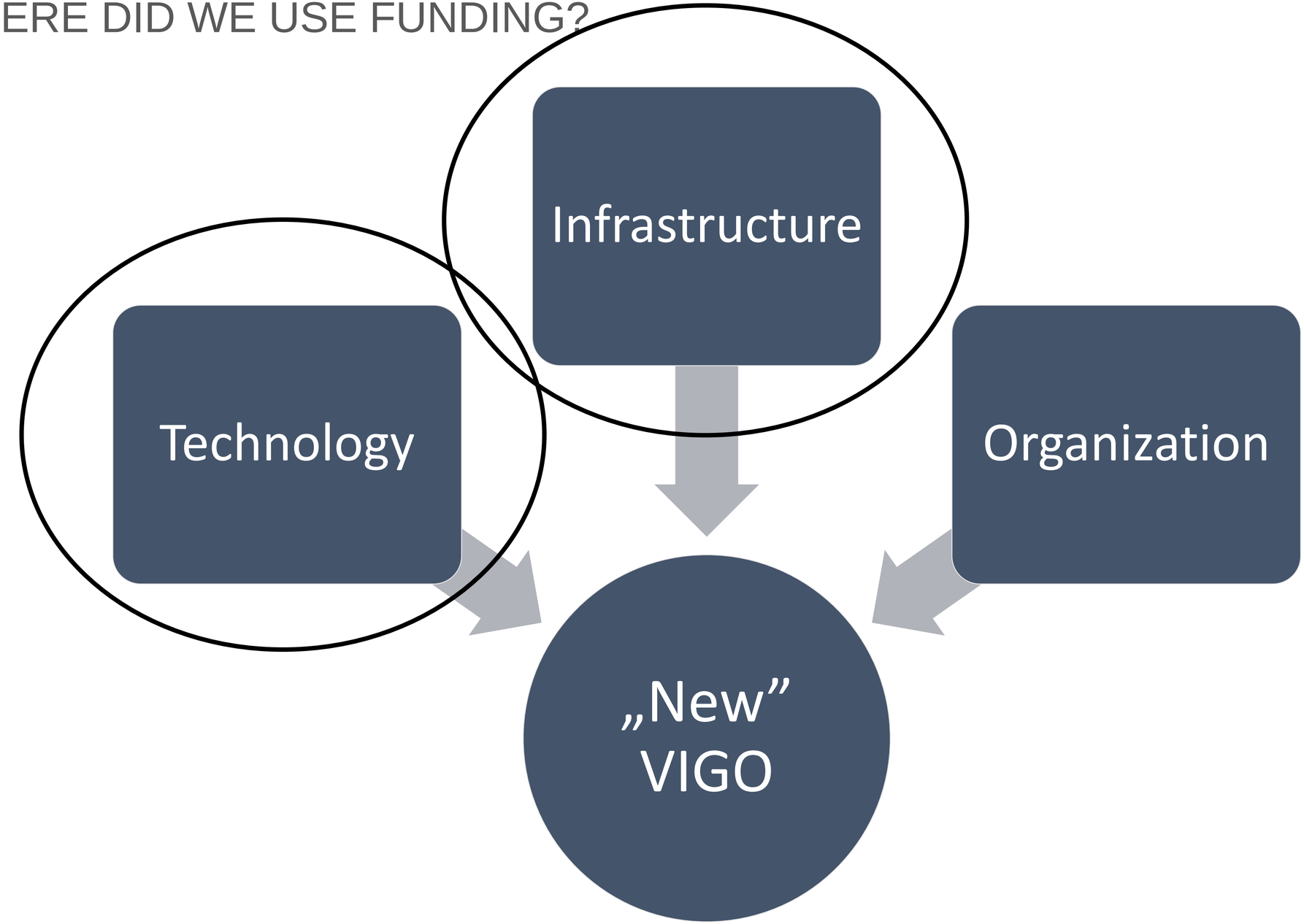
- 20-times higher sales volume
- Lower unit price



WHAT WE NEEDED TO ACHIEVE GOALS?



WHERE DID WE USE FUNDING?



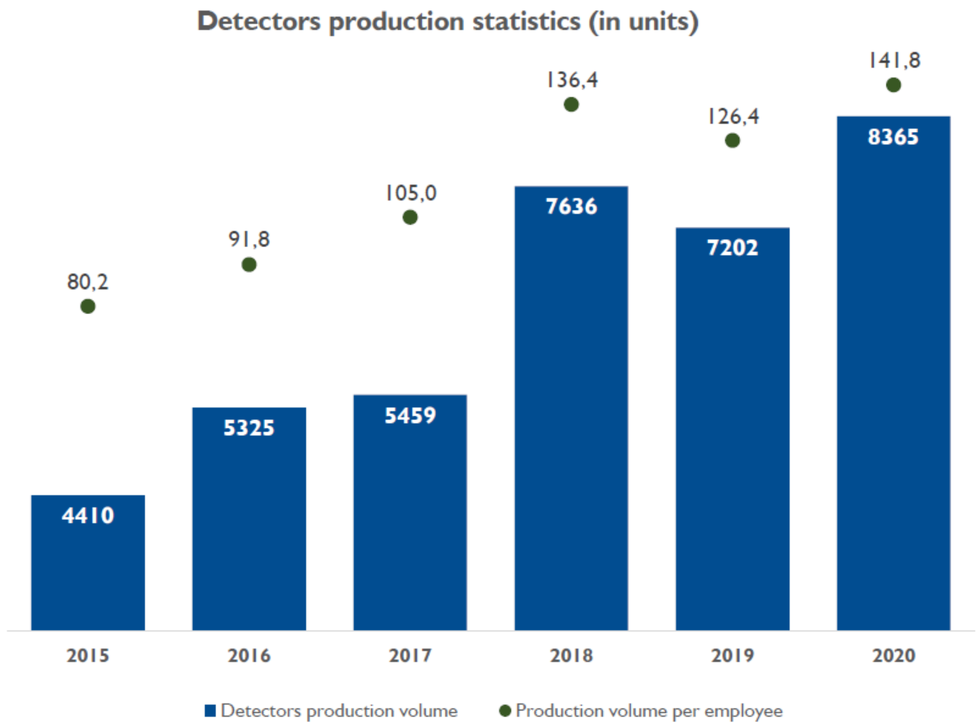
OUR PRODUCTION IN 2016

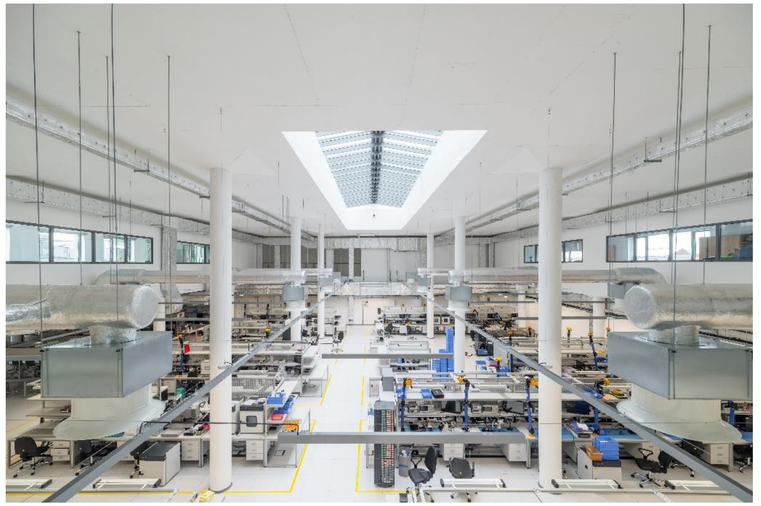
- Laboratory-industrial production
- Different assembly stastions
- Unique manual assembly
- Own database applications +ERP
- Production management through google sheets
- 40 different software application
- No integration of software

2016 = 5 000 detectors (produced)	**2023 = 100 000 detectors**
• 50% series production • 50% unique production	• 95% series production

VIGO TODAY

Throughout the last 5 years, VIGO System invested **PLN70 milion (15,5 mln EUR)** in the development of production capacity, new organisation, and processes automation, thus transforming from a manufacture of advanced detectors into a modern production plant.





INFRASTRUCTURE CHANGES FINANCING

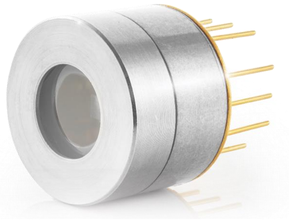
Co-financed projects:

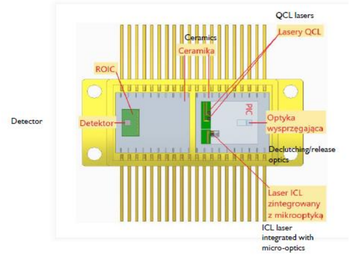
- Technological innovation loan (~27% covered by financing)
  - New building, its infrastrure, furnishings and machines (hermetization, flipchip, wirebonder, robot, MES etc.)
  - New cleanroom for wafer production and processing of structure (infrastructure and machines)

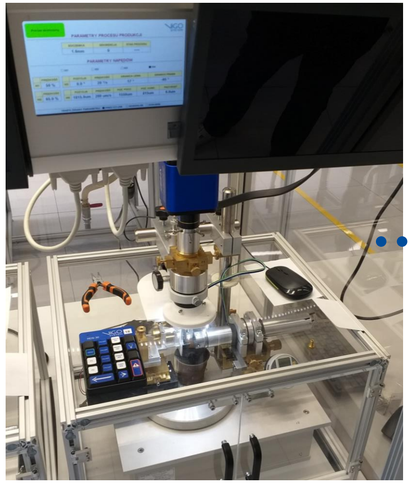
- Own financing:
  - **Digitalization of processes**
  - Developed measurement stands

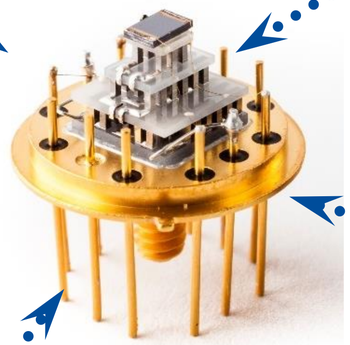
- Faster growth	- Not good for fast changing technologies
- Possibility to finance large infrastructure projects	- Long procedures
- Partially financed	- Well defined, what you want to buy
	- Difficult changes in the scope
	- Additional personel for administration of the project

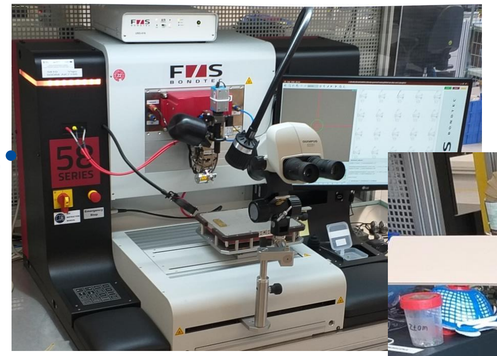
TECHNOLOGY EVOLUTION











CURRENT AND PAST RESERCH PROJECTS

TRIAGE

Ultra-broadband infrared gas sensor for pollution detection

MIRPHAB
CHEMICAL SENSING AND SPECTROSCOPY

MIRPHAB (Mid InfraRed PHotonics devices fABrication for chemical sensing and spectroscopic applications) https://www.mirphab.eu/

AQUARIUS

Broadband Tunable QCL based Sensor for Online and Inline Detection of Contaminants in Water

CHEQUERS

Compact High pErformance QUantum cascadE laseR Sensors

WATERSPY

High sensitivity, portable photonic device for pervasive water quality analysis

MIREGAS

Programmable multi-wavelength Mid-IR source for gas sensing

VIGO SYSTEM

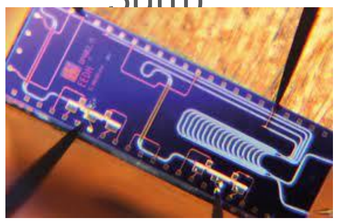
The National Centre for Research and Development

Sensors for Industry 4.0

Single and multielement detectors for Industry 4.0

MIRPIC

Demonstrator of the Photonics Integrated Circuit for Mid IR (3,5 – 5um)



TECHNOLOGY FINANCING

How do we use money for technology?

- New products
- New products features
- New production technologies

What did it bring to us?

- we can react faster to client demands
- Contact with end-users
- Development of our product roadmap
- Full usage of infrastructure

- Clear vision of new products
- Product development roadmap
- Technology development roadmap
- Cooperation with technological partners
- Networking
- Cooperation with end users

- IP protection
- Not always we do what was written in the proposal – changes in the project
- Long time from application to financing

Financing Industry 4.0.
Do you really need it?

WE ARE OPEN FOR COOPERATION ☺

…. AND QUESTIONS ☺

THANK YOU
FOR YOUR ATTENTION

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