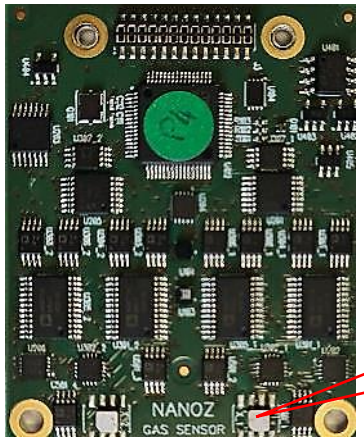
July 2024

NANOZ

The Smallest Selective Gas Sensor you have ever seen

NANOZ Gas detection in numerous applications tomorrow



Gas detection application

Ozone

E-nose application

Diagnosis of diabetes, cancer,…

NANOZ 1st hypoglycemia (diabetes) sensor in the world

CONFIDENTIAL

CUSTOMER

- **Our customer** (US based) has developed the 1st wearable device in the world enabling diabetes diagnosis by blowing in the device
- This device has been developed in cooperation with the University of Indiana who has selected NANOZ technology as the best gas component for this application
- This MedTech device detects hypoglycemia by detecting and measuring acetone
- It makes a measurement and communicates change of glucose level just by blowing on the device .
- FDA approval in progress
- **Detection and measurement capability of acetone and other VOCs are powered by** NANOZ

NANOZ Gas detection in industrial environment

CONFIDENTIAL

CUSTOMER

- **Our customer** (US based) is a worldwide leader in analytical products for gas measurement applications : gas emissions, air quality, process monitoring, gaseous fuels testing.

- He has looked for a small component, “free” to recalibration over time to replace existing technology (optical/electrochemical) in his products / devices

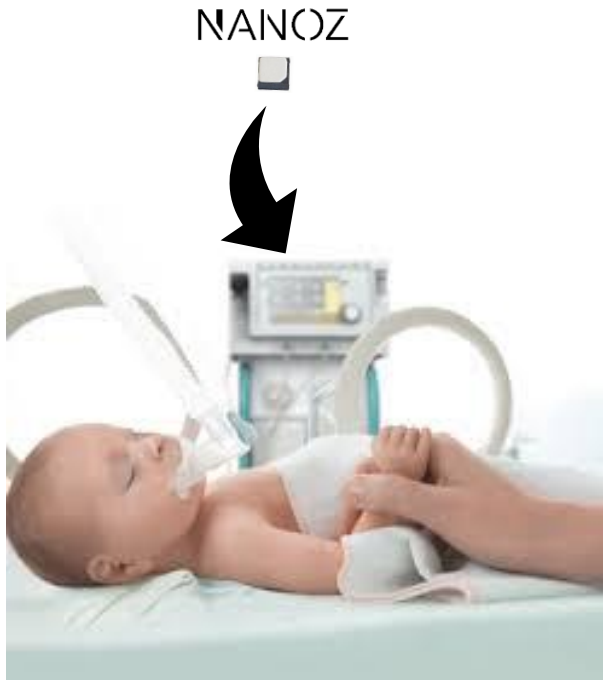
- **Detection and measurement capability Industrial gas is powered by NANOZ**

NANOZ Gas monitoring in medical device

CONFIDENTIAL

CUSTOMER

GAS



- **Our customer** is a worldwide leader in medical device
- One of his product is performing treatment of persistent pulmonary hypertension in the newborn by inhaled nitric oxide (NO, NO2)
  - ⇒ Improvement of arterial oxygenation
  - ⇒ Shortening of the period of mechanical ventilation required
  - ⇒ Shortening of the stay in intensive care
- Concentrations of inhaled NO, NO2 are measured continuously by the device in the inspiratory circuit near the patient
- **NO, NO2 measurement capability is powered by** NANOZ
- **Previous technology used by our customers leads to a much higher costs of maintenance**

NANOZ Electrical Vehicle preventive maintenance

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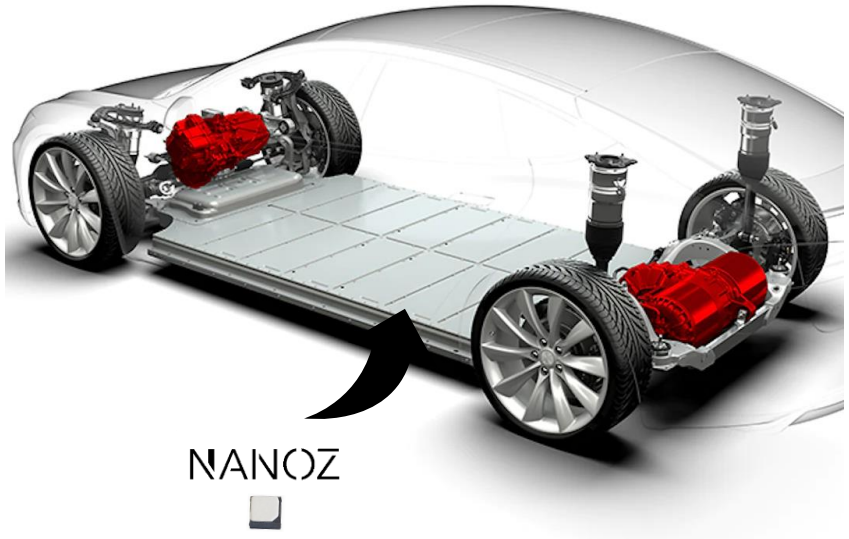
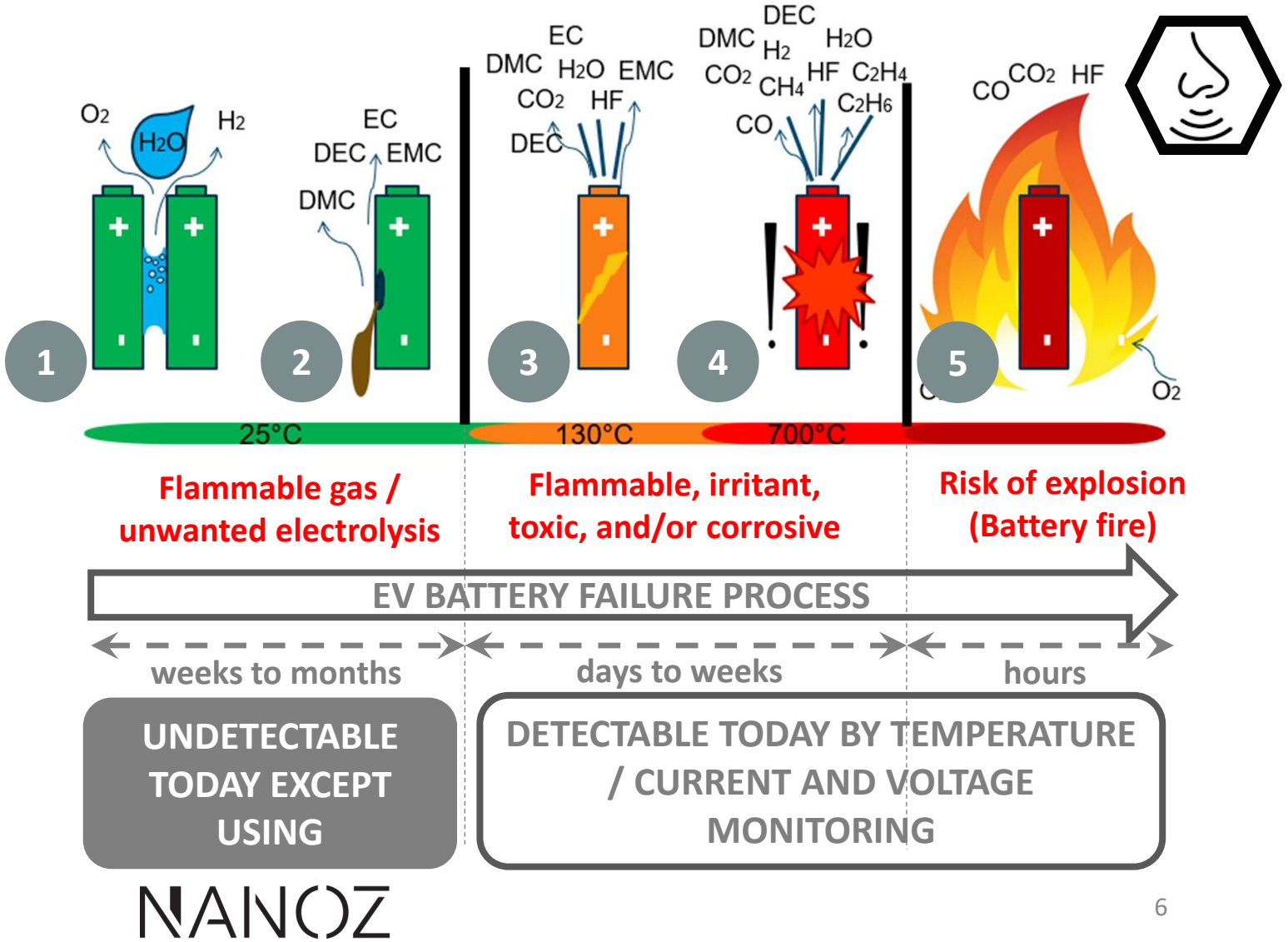
CUSTOMER





- **Our prospects** is a worldwide leader in component manufacturing.
- He is currently performing a sensor technology benchmarking to select the gas sensor component enabling early detection of EV failing automotive battery

NANOZ

NANOZ Food freshness monitoring during transportation

CONFIDENTIAL

PROSPECT

- **Our prospect** is a worldwide leader in development and manufacturing of refrigerating system for transport

- He is looking for a gas sensor technology enabling to make sure the food transported remains fresh until delivery
- The only gas sensor component able to detect the gas mixture emitted by spoiled food NANOZ
- **Our prospect** is about to place an order with NANOZ for the development of the customized AI algorithm

NANOZ Solving major customer pain points

<u>We don't find a sensor component combining the following specs :</u>

1. *very small / embeddable*
2. *sensitive*
3. *free from calibration over time*
4. *low cost*
5. ***able to identify a single gas or a gas mixture specific to an event (Selectivity)***

⇒ NANOZ, the only existing solution solving all these pain points together

NANOZ the future of the sensor market: MOx sensors

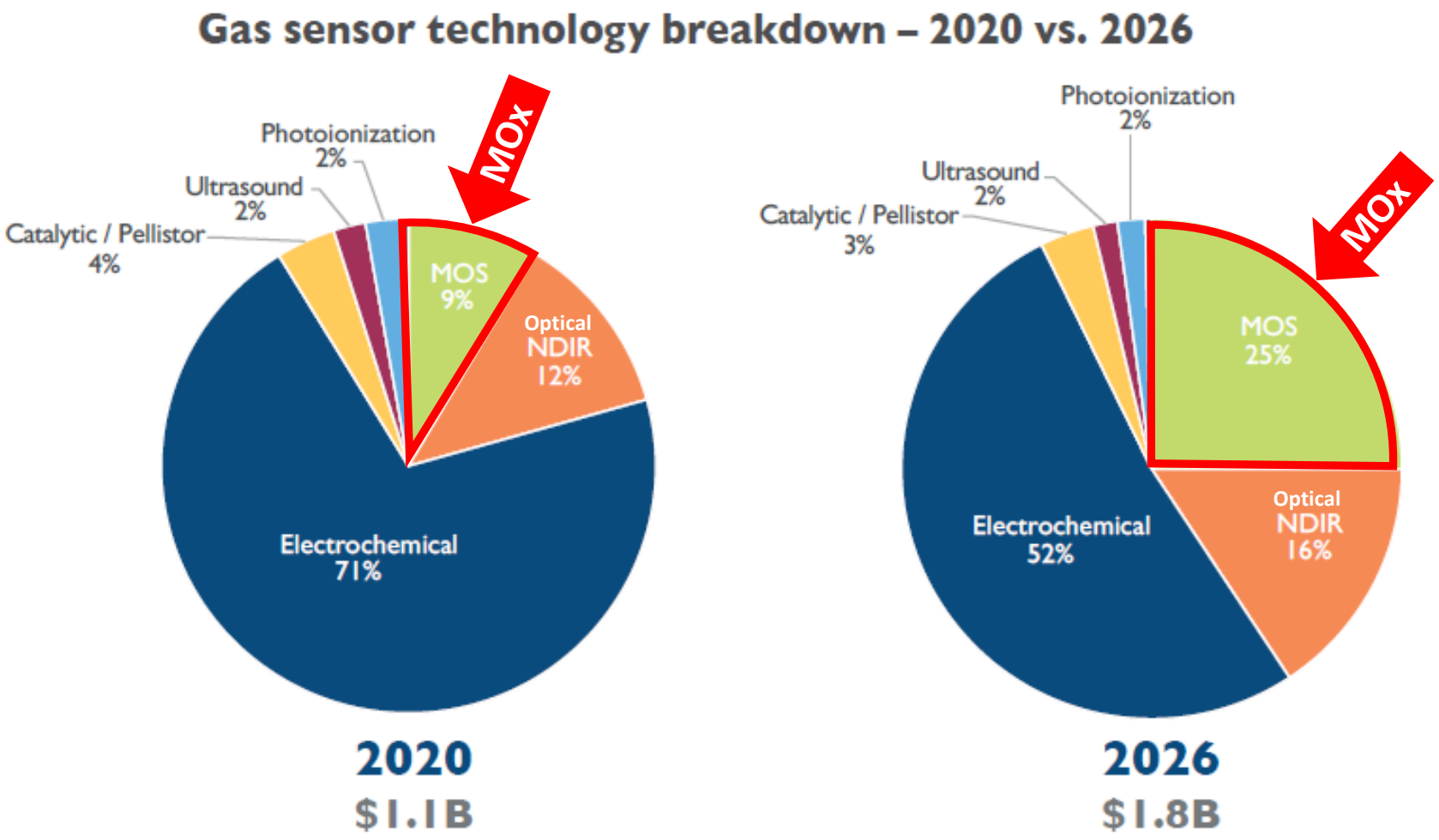
	Optical	Electrochemical	Mox (*)
Form			
Size	Ø 20 mm	Ø 9,2 x 12,4 mm	1,15 mm x 1,15 mm
Weaknesses	• Big size • High Power consumption • High price	• Recalibration required over time • Big Size for embedded application	• Selectivity

⇒ **MOx technology addresses all pain points of Optical and Electrochemical technologies**

⇒ **NANOZ fixes the only pain point of MOx technology : SELECTIVITY AND E-NOSE**

(*) Metal Oxide Semiconductor

MOx sensors : the fastest growth of the sensor market



- **Gas sensor market**
  - ► **$1.80B in 2026**
- **MOx (or MOS) sensors**
  - ► **$0,45B in 2026**
- Growth of gas sensor market will be driven by new E-nose application
- Protected unique competitive advantage of NANOZ technology shall make **NANOZ the worldwide leader of gas sensor component based upon MOx technology**

Source : Yole Développement, July 2021

NANOZ How NANOZ makes MOx technology selective

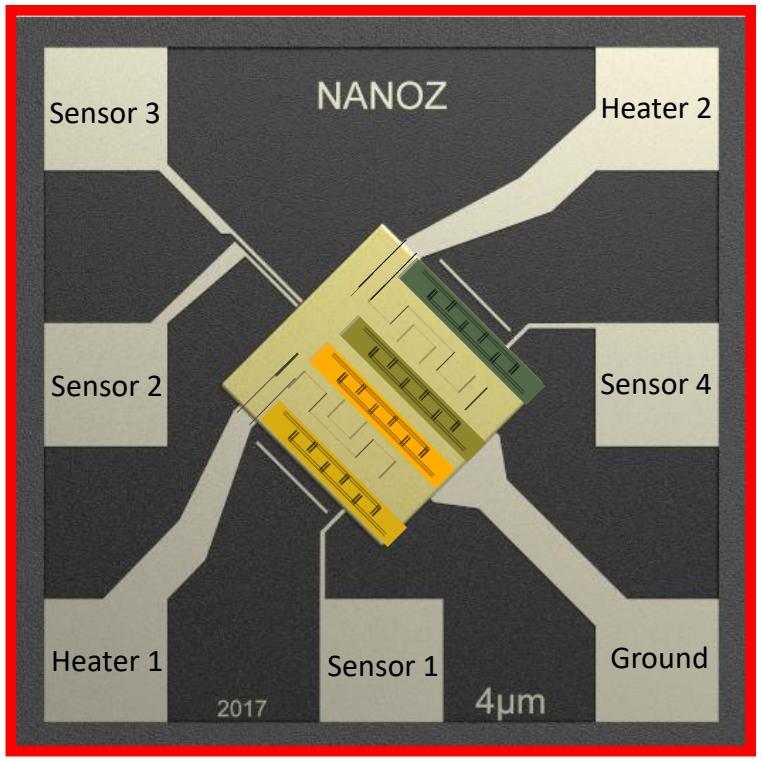
Thanks to the patent, NANOZ has got 4 sensors + 2 heaters on the same chip. The operation principle is based upon :

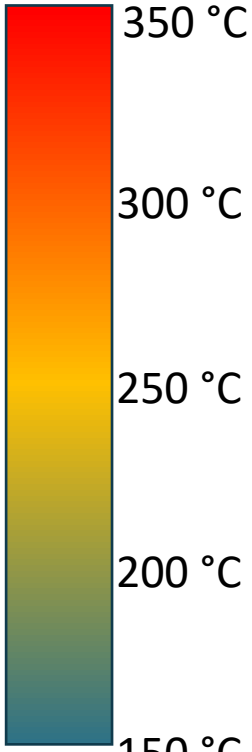
- 4 different signals coming out from the sensor for the same gas concentration
- AI algorithm processing the 4 signals

  ⇒ A unique and very accurate signature for each gas/concentration

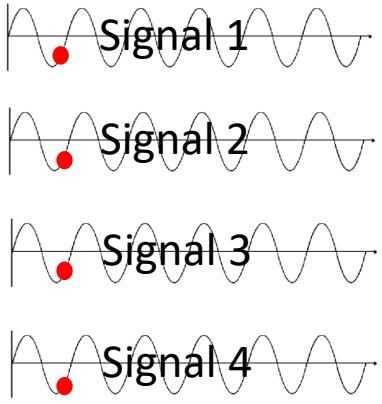
Support layer SILICON
Transducer (circuit)
Sensitive layer (Mox)

HW

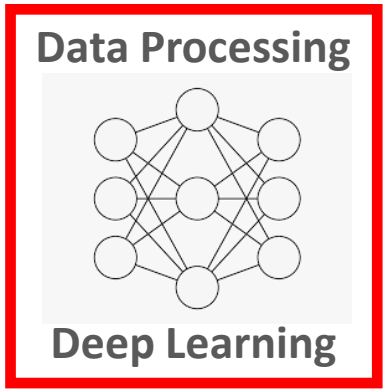


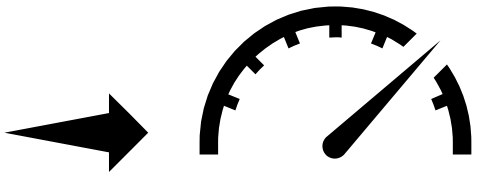


Triangular VHeaters = 1.8 – 2.2V; period 6s



AI





A unique and very accurate signature for each gas/concentration

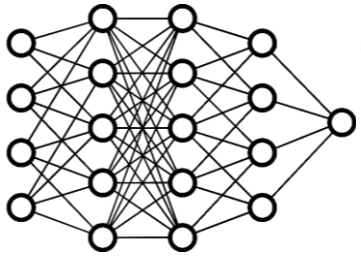
NANOZ How NANOZ train models for gas sensing needs?

NANOZ bench

NANOZ chips

Database collection

Data warehouse

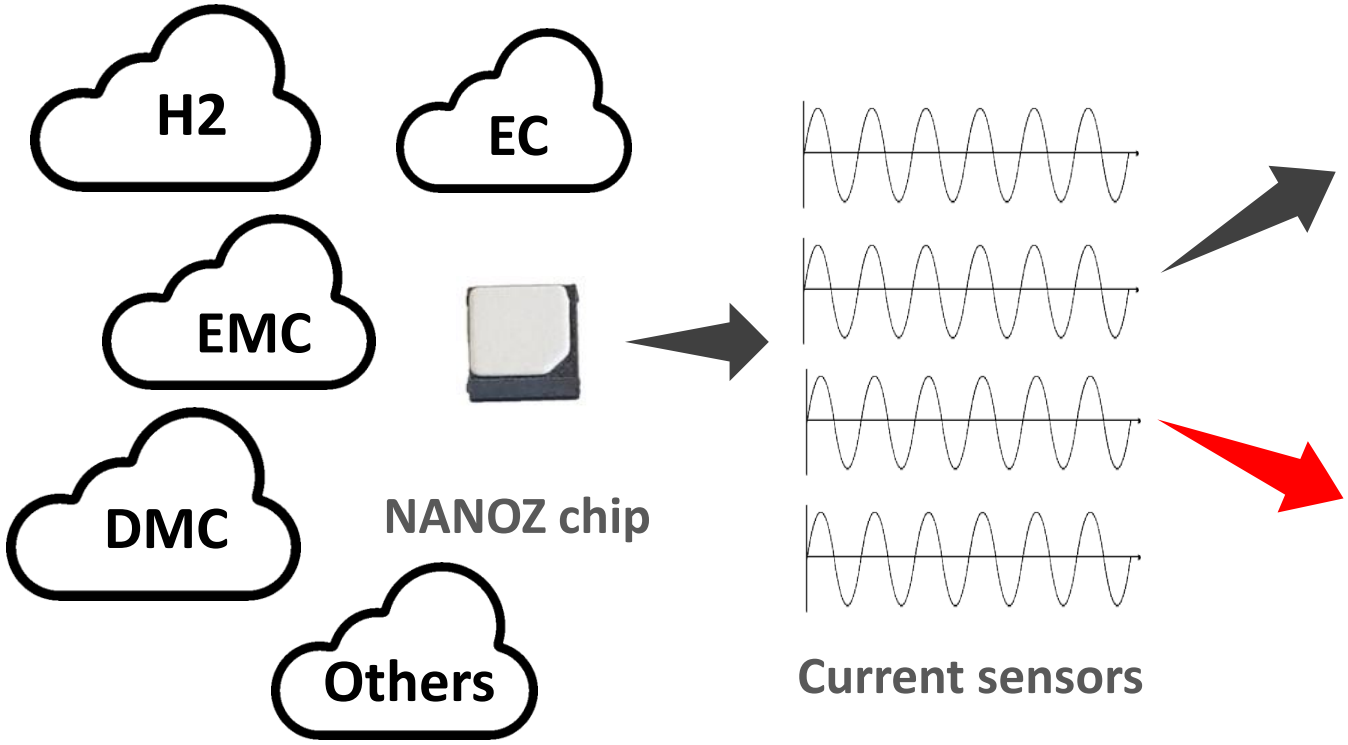


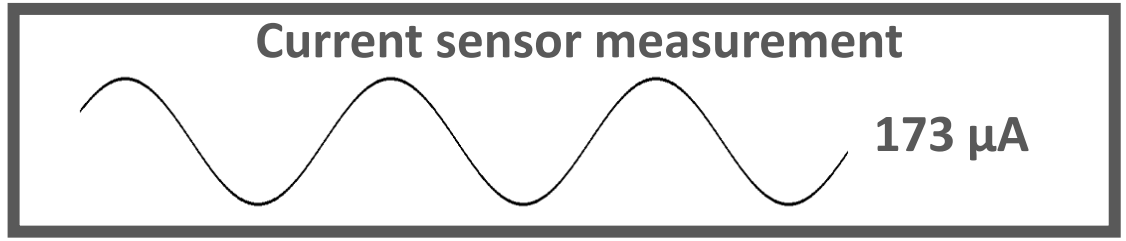
Deep learning model

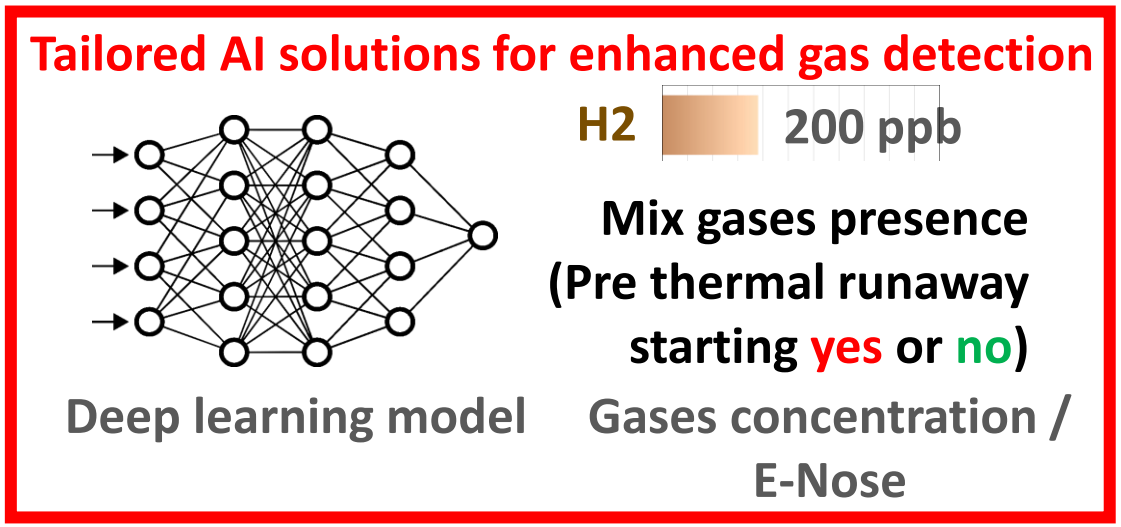
1. Train
2. Validate
3. Test
4. Ready to use

- ✓ Utilizing fully automated experimental benches, we craft bespoke databases tailored to your unique needs
- ✓ Benefit from our expertise in database structuring, ensuring optimal data for training AI models specific to your use cases

NANOZ How NANOZ predict gases concentration?







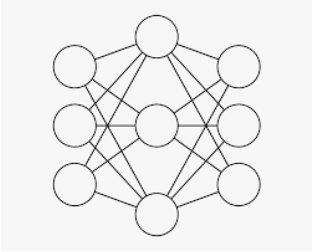
- ✓ Our AI solutions are engineered to account for nuances such as variation of temperature, humidity, manufacturing variation between sensor chips and drift associated with MOx technology
- ✓ “normal” sensor data interpretation will not take in account all variables like describe upside, so the concentration will be not reliable
- ✓ Our team of experts utilizes state-of-the-art equipment and techniques to train AI models designed specifically for your gas sensing needs

NANOZ One single component for many gases

- Sensor component is dedicated to a group of gases
- Algorithm is dedicated to customer use case (one single gas or specific mix of gases for e-nose application)

AI Algorithm

Data Processing



Deep Learning

- **Dedicated to customer use case** (one single gas or specific mix of gases) :
  - ⇒ Identification
  - ⇒ Concentration
- Embedded in microcontroller

Sensor component

Sensitive layer (Metal Oxide)

Transducer (circuit)

Support layer (Silicon)

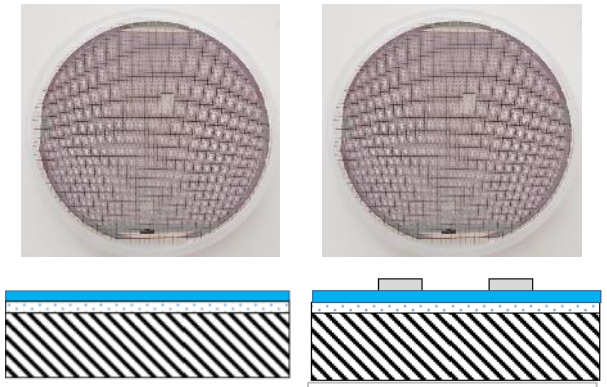
Same for **many gases** (incl VOC, CO, Ozone, Ethanol,…)

Same for **all gases**

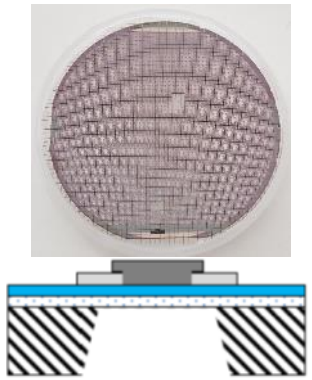
NANOZ A unique manufacturing know-how

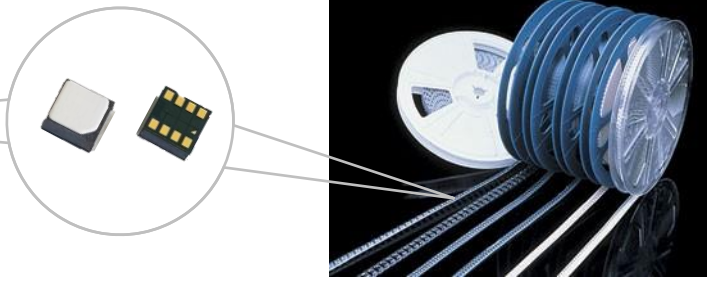
- NANOZ has developed a manufacturing know-how through 2 partnerships
  ⇒ IBS (Ion Beam Services) in France and ASE in Taiwan
- With these 2 partners, NANOZ manufactures in mass production
- In a second phase, a second partner will be select to be able to manage higher volume

Wafer	Electrode deposition (Transducer)	Sensitive nanolayer deposition	Wafer electrical test	Cutting / Chip packaging / Electrical test	Tape & Reel operation
	ibs Innovative Ion Implant	ibs Innovative Ion Implant	ibs Innovative Ion Implant	ASE GROUP 日月光集團	ASE GROUP 日月光集團



Wafer with electrode





Packaged chips in reels

NANOZ Manufacturing Quality Control

Wafer → Physical measurement (ibs Innovative Ion Implant) → Electrical measurement (ibs Innovative Ion Implant) → Final electrical mapping (ibs Innovative Ion Implant) → Cutting / Chip packaging / Electrical test (ASE GROUP 日月光集團) → Tape & Reel operation (ASE GROUP 日月光集團)

Measurement at each manufacturing steps on 13 areas of each wafer

Measurement all chips on the wafers and selection of the chips in the specifications

Measurement all chips packaged and selection of the chips in the specifications

Nanoz offer delivered to customers

Gas sensor components (in reels)

Gas sensor component is a « standard » off-the-shelf product.
1st sensitive layer is SnO2 which enables to address a wide range of gases (Ethanol, VOC including Formaldehyde, Acetone,…)
⇒ the 1st industrialization of our gas sensor component is based on this layer.

AI algorithm (processing signals from sensor) is customized for each use case
Can be developed:

- by Nanoz using data base built upon customer use case simulation on our bench and Nanoz AI algorithm library
- or by customers themselves (then we'll deliver components only)

NANOZ A solid IP building a technology barrier up

IP

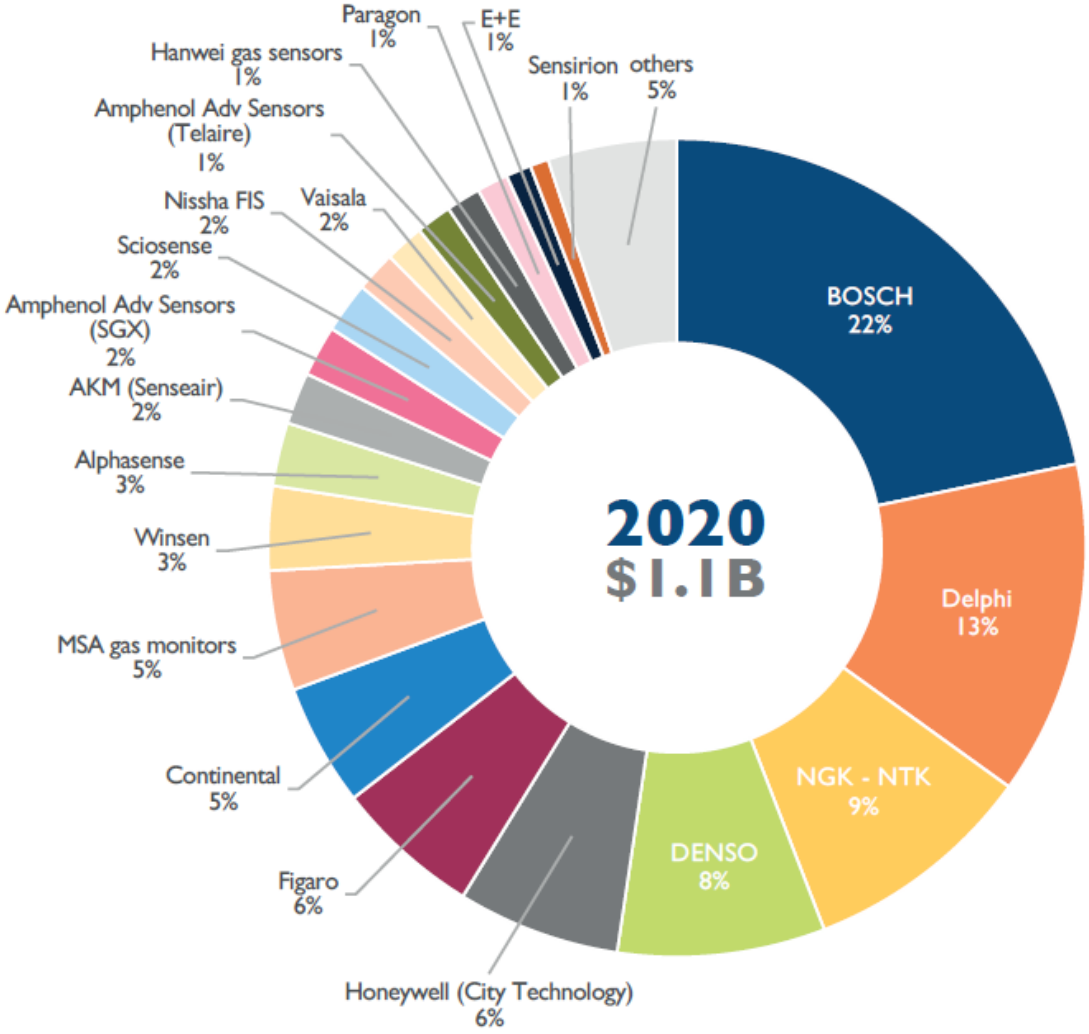
Patent owner	CNRS / Aix Marseille University
NANOZ IP rights	Exclusive license for all gases worldwide
Patent granting status per country	Granted in China, US, Japan, Korea, France Under proceeding in rest of Europe

Know-How

- NANOZ has gained many years' experience of manufacturing process
- The know-how manufacturing sensors from foundry with the final design and AI Algorithm has been built up over the last 10 years
- The know-how on deposition of SnO2 sensitive layer is very well mastered (perfected over the last 5 years)

Many players for many opportunities

Gas sensor industry - 2020 market shares by company



Main competitors (/OEM partners)

- **BOSCH**
- **DELPHI**
- **NGK – NTK**
- **DENSO**
- **HONEYWELL**
- **FIGARO**
- **CONTINENTAL**
- **MSA**

Source : Yole Développement, July 2021

NANOZ The only MOx sensor which has selectivity

OUR UNIQUE COMPETITIVE ADVANTAGE VERSUS OTHER MOX SENSORS:

For the same price and power consumption, selectivity provides the ability to identify and measure a single gas among many gases

COMPANY	NANOZ (FR)	Figaro (JP)	SGX (CH)	AMS/Sciosense	Sensirion (CH)	Bosch (GE)
Reference	**NGZS**	**TGS8100**	**MICS-5524**	**ENS160**	**SGP40**	**BME688**
Size (in mm2)	**8**	**8**	**35**	**9**	**6**	**9**
Filter	**Yes**	**No**	**No**	**No**	**Yes**	**No**
Selectivity	**Yes**	**No**	**No**	**No**	**No**	**No**
Power consumption (in continuous mode)	**35 mW (*)**	**15 mW**	**76 mW**	**43 mW**	**10 mW**	**52 mW**
Price (per unit)	**$4,20**	**$6,00**	**$5,69**	**$7,18**	**$4,36**	**$5,80**

(*) for 1 heater

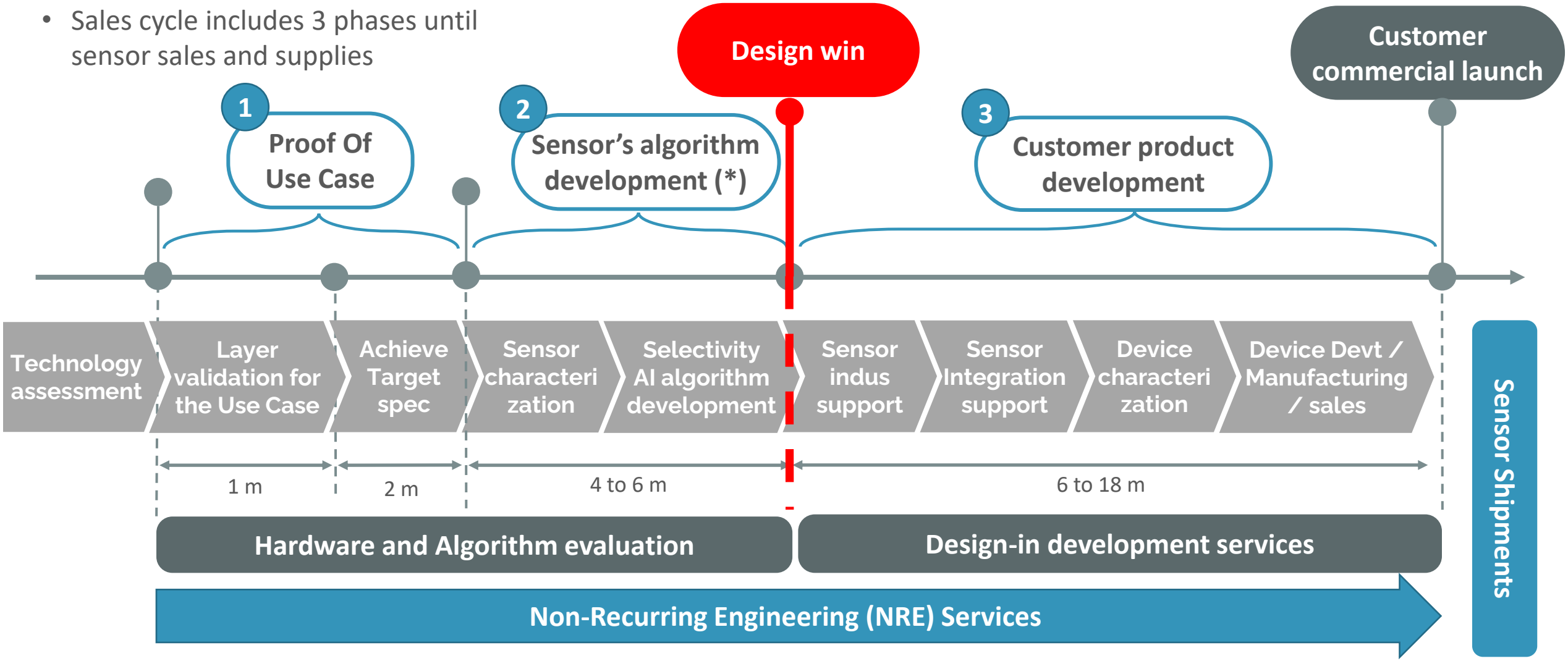
NANOZ 3 Focus market segments

- **Focus on**
  - ⇒ **“Industry”** (shortest time access)
  - ⇒ **“Medtech”** (Most promising)
  - ⇒ **“Vehicules & Transportation”** (winning application for EV)
  - ⇒ **e-nose application** (detection of mix of gases) for which our sensor is fitting perfectly
- **“Consumer”** (high volume) will come with electronic integration development program
- We may take a few opportunities on other market segments, but no sales / R&D focus

Market	Application	
	Single gas detection	E-nose
MedTech	Targeted	Targeted
Industry / Defense	Targeted	Targeted
Consumer		
Vehicles & Transportation	Targeted	Targeted
Smart City		
Smart Home		

NANOZ Sales cycle / Product Delivery

- Sales cycle includes 3 phases until sensor sales and supplies



(*) : developed by Nanoz or the customer

NANOZ Sales pipeline / Weighted revenue forecast

	USE CASE	SALES STATUS				FORECAST (in K€)		
		Negotiation in progress	NRE committed	Design Win achieved	Sensor orders committed	2024	2025	2026
						476	2 599	4 444
Worldwide leader of healthcare	Gas concentration controler for lung traitment		√	√	√	154	40	10
US SME in healthcare	Diabets diagnosis based upon Acetone and VOCs detection in breath		own algo	√	√	240	535	452
French SME in industry	Predicitve maintenance by detecting event from gas level monitoring		own algo	√	√	7	14	31
US SME in industry	Industrial gas measurements + Breath analyzer for disease		own algo	√	√	0	254	454
French SME in Defense	NRBC risk prevention for military forces by gas detection	√				0	370	73
US leader in food transportation	Food quality monitoring during transportation in refregirated containers	√				0	323	226
US component manufacturer	Automotive		√			25	474	1 117
Hundred+ other interested prospects		Waiting for the industrial samples				50	589	2 080

NANOZ Market demand per segment (prospects)

Ongoing exchanges with numerous prospects

Industry / Defense

Honeywell
GRTgaz
Air Liquide
TotalEnergies
AIRBUS HELICOPTERS
bp
SIEMENS

MedTech

OMRON
SAMSUNG
LG Life's Good
hellocare
amazon
Abbott

Vehicles & Transportation

GENTEX CORPORATION
NXP
BOSCH
Carrier
LG Life's Good
TOYOTA
Valeo
MAGNA
MANN+HUMMEL
Global Alliance Automotive

Consumer

SAMSUNG
BBK 步步高
beko
dyson
Haier
VESTEL
GARMIN
SITERWELL

NANOZ Management

Operational Members

- **Thibaud Sellam**, CEO, former sales manager for a large sensor manufacturer, CMR Group, in charge of export of sensors

- **Walter Opschoor,** Business Development Director, several experiences in sales general management and entrepreneurship in mobile phone accessories and electronics.

- **Arbi Maalaoui,** R&D Manager, holds a PhD and Engineering degree in material science. He has acquired solid experience in microelectronics, sensors and nanolayer deposition.

- **Didier Noel,** Financial Director, almost 20 years with Philips ending up as Managing Director of an international Business Unit. 5 years in KPMG as Senior advisor and 5 years in technology transfer (SATT)

Advisory Members

- **Dr. Khalifa Aguir,** Scientific Adviser, internationally well-known scientist in Nano sensors, he holds a doctorate in microelectronics. Director of the micro-sensor activity at the CNRS laboratory in Marseille.

- **Lucien Brau,** Strategic Adviser, large semiconductor experience in Product and Business Development. He managed several Business Units and founded StarChip a successful startup acquired by Safran Group.

NANOZ Achievements-to-date enable growth starting in 2024

Techno validation by CNRS

2018 : 1st Fund raising 1 M€

2019 : Nanoz Laboratory operational

2020 : Large R&D technological project

2020 : Industrial HW prototype

2022 : Strategic investment 0,6 M€

2022 : 1st Design Win in customer product

2022 : 1st supply agreement (US customer)

WE ARE HERE

Staff = 8

2024 : 2 new technological partnership

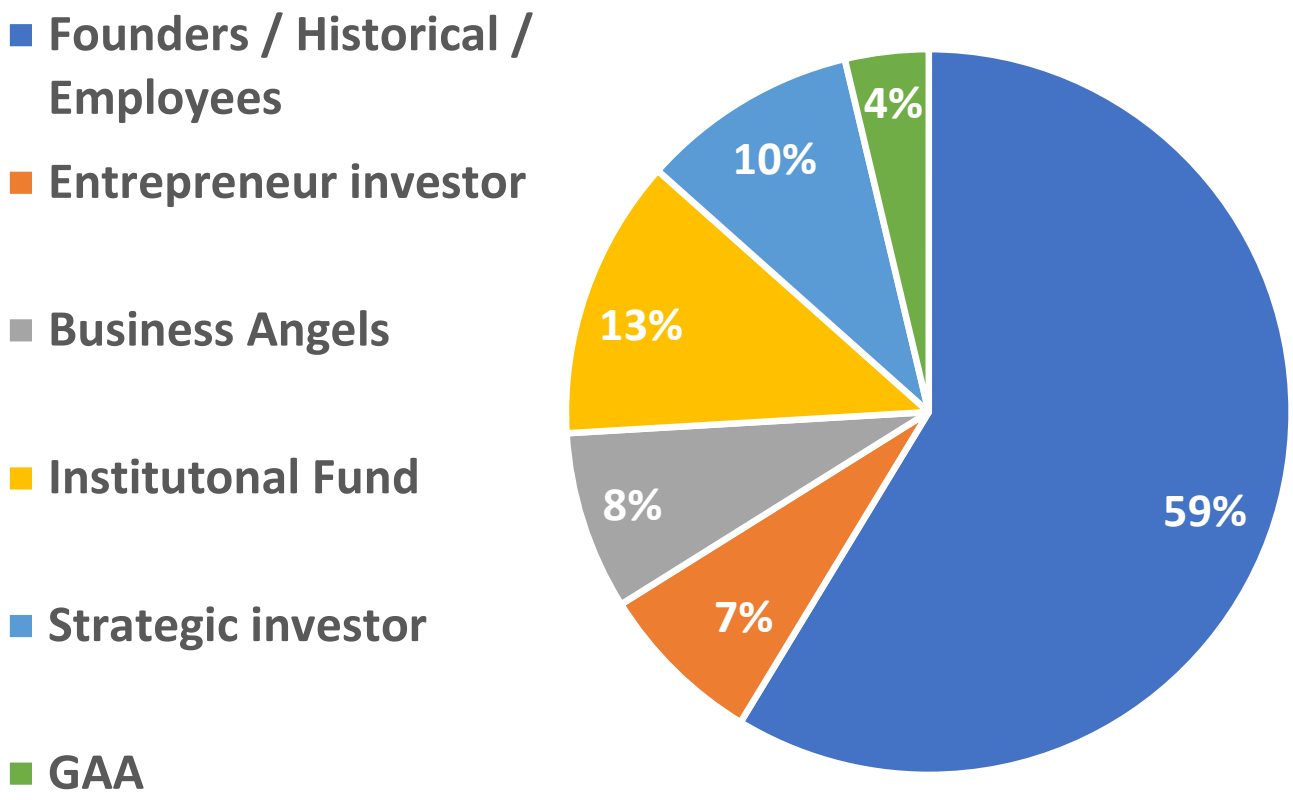
2024 : 2nd Fund raising in progress

2024 : Start of commercial shipments

bpifrance Entreprise Innovante

DEEPTECH

NANOZ Shareholding to date

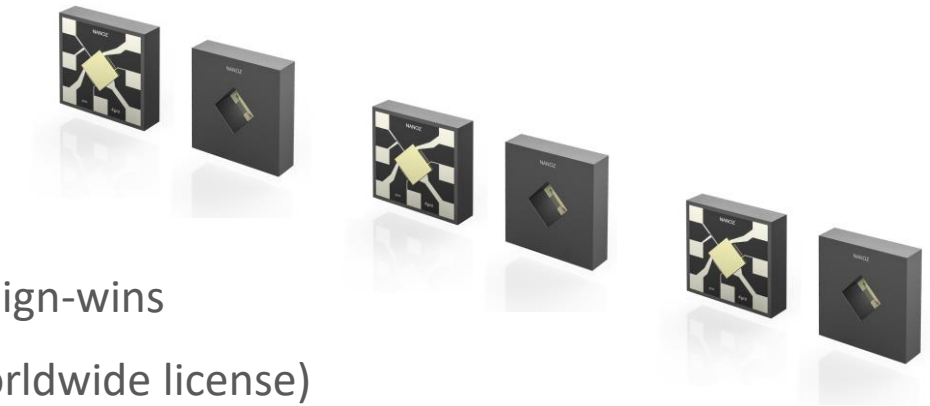


Investment opportunity

- Funding in equity sought = 4.5 M€
- Closing date : 31st of October 2024
- Funding needs :

Speed up sales / Go to market	Sales staff recruitment Exhibition costs	**1.0 M€**
Manufacturing optimization to get cost price down	Manufacturing pilot batch to increase the yield (increase the number of components passing quality tests in a same wafer)	**1.0 M€**
Electronic integration to make easier to integrate in the device	Integrate in the same packaging several components which are required together with our sensor component	**2.5 M€**

NANOZ Key Investments Highlights



Investment key highlights

- Product-market fit validated by 4 customer Design-wins
- Huge Technology Barrier-to-Entry (exclusive worldwide license)
- Unique product differentiators WW : Selectivity & E-nose
- A seasoned Semicon Founding team (worked together for 10 years)
- Unlocking the huge Gas Sensing market (including Smartphone industry)
- Highly Scalable model (Fab-less with standard processes)
- Reasonably low financial risk (modular capex phasing)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