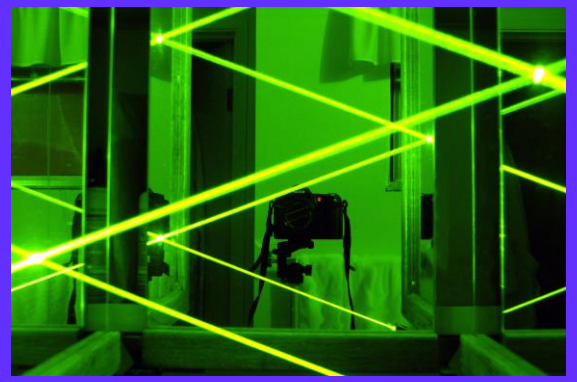
COMPTEK SOLUTIONS

THE SPINOFF PRIZE
ONE TO WATCH 2020
nature research awards

BOOSTING THE EFFICIENCY OF COMPOUND SEMICONDUCTORS



COMPTEK SOLUTIONS

Comptek Solutions provides key technology to improve the performance of compound semiconductors for OEMs in different industries.

Kontrox™, Comptek's technology, results in lower manufacturing costs and more competitive devices for the OEMs.

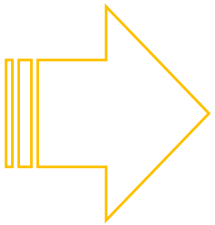
- Founded in 2017 as a spin-off from University of Turku, Finland
- State of the art proprietary 7000 sq. ft laboratory with 450 sq. ft ISO 5 clean room
- Team of 11 (with 8 PhD)
- Active customers, 650.000€ revenue 2019 and strong pipeline including global OEMs from different industries.
- 2 granted patent families,3 patent pending, 1 trademark

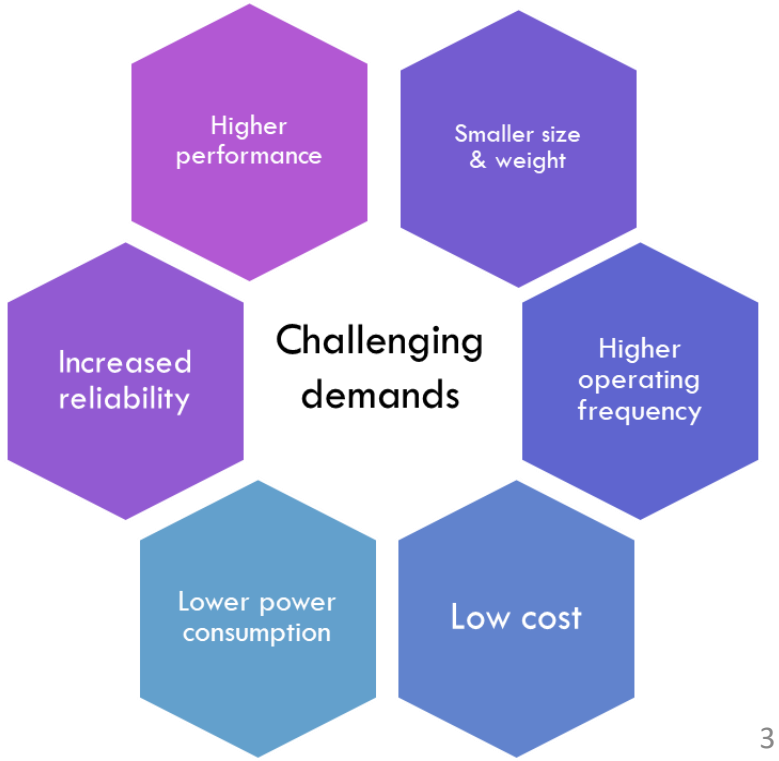
KONTROX™

COMPTEK SOLUTIONS

TECHNOLOGY TREND: HIGHER DEMANDS ON PERFORMANCE

- Booming applications (Mobility, 5G, VR/AR, optoelectronics, ..) **demand better performance & reliability**
- These applications use many compound semiconductor devices as their main HW solution: i.e lasers, uLEDs, detectors, RF power amplifiers and switches, Power amplifier modules, etc



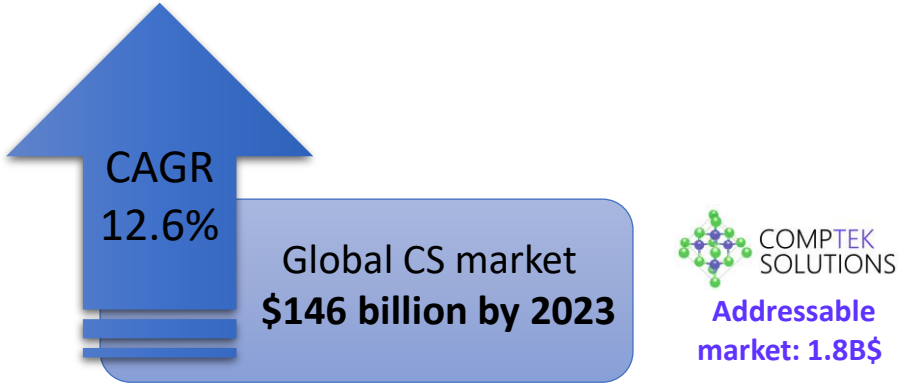


FAST GROWING MARKET

Many of the biggest tech trends require the use of compound semiconductor devices and are driving the market rapid growth:

- 5G and data communication
- IoT
- VR/AR
- connected and autonomous driving
- electrical vehicles

Market expected to grow at CAGR 12,6%



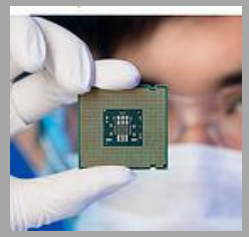
COMPTEK SOLUTIONS

Addressable market: 1.8B$

OPTOELECTRONICS
$40B

RF, 5G
$10B

POWER ELECTRONICS
$2B



MORE-THAN-MOORE
CPU market $44B

CONCENTRATED PV
$800M

THE FUTURE OF CPU: III-V COMPOUND SEMICONDUCTORS

III-V type of compound semiconductors are identified as the most promising solution towards next generation transistors for CPU applications

Two issues in type III-V adoption:

1

Heterointegration with silicon

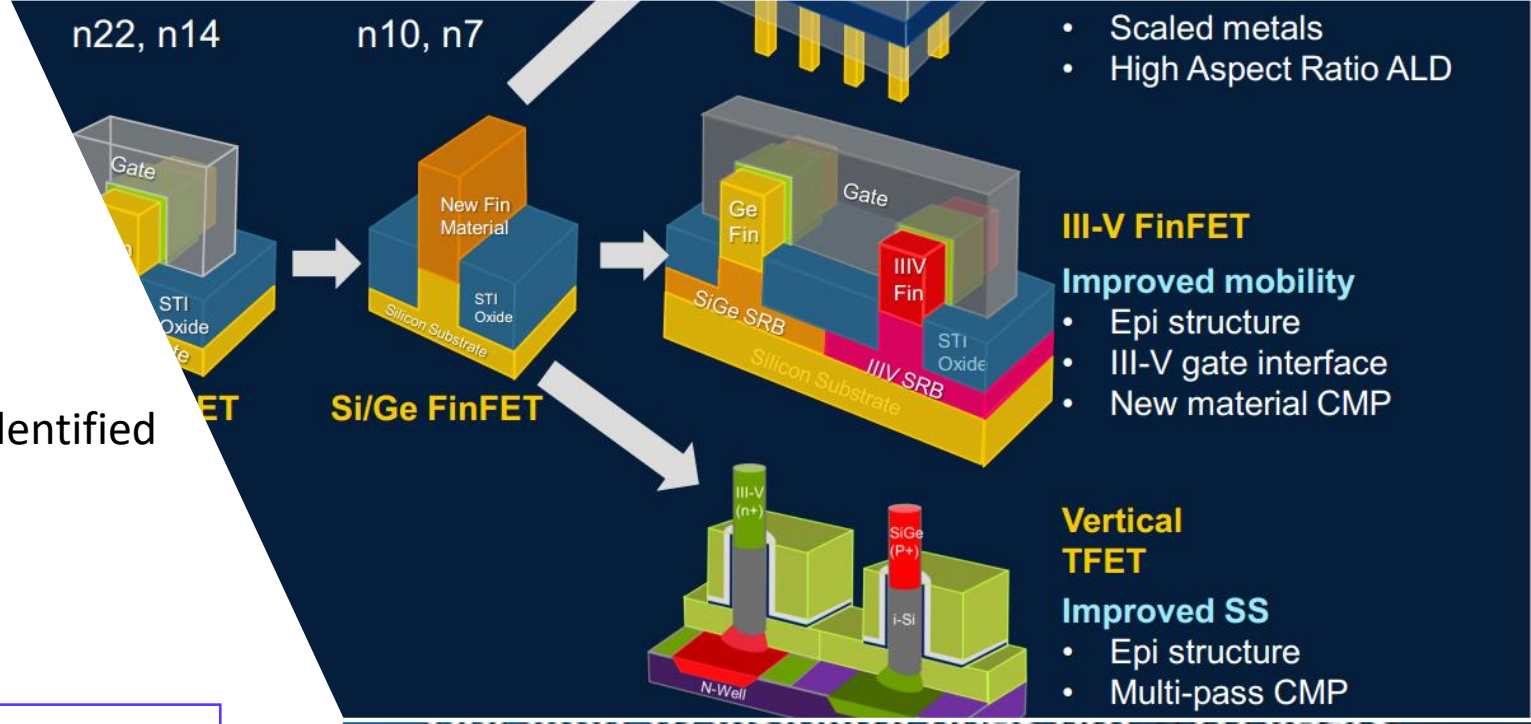
Solved with a new approach to silicon integration

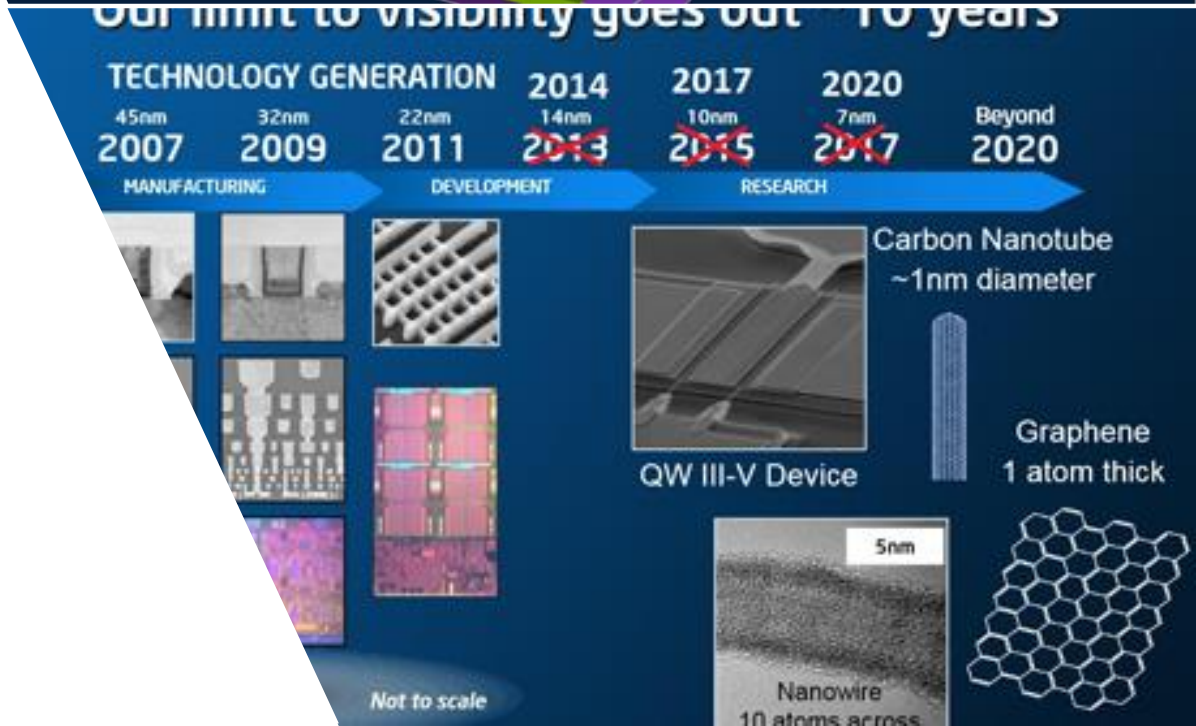
2

A stable and defect free III-V/gate dielectric interface

KONTROX™

We provide the best performing solution in the market





Picture: INTEL's roadmap for III-V type of compound semiconductors

THE PROBLEM: OXIDATION

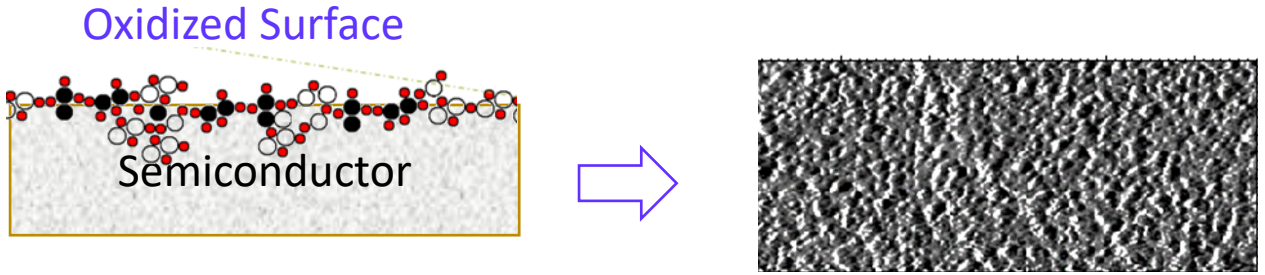
Well Known problem by the industry

Oxidation causes big amounts of defects that limit the performance and lower the manufacturing yields

This is the main reason that has restricted the use of these materials

Becoming more relevant for smaller devices such as mini/microLEDs

Example:
Efficiency of μLED is only 10% vs. 70% for normal LEDs

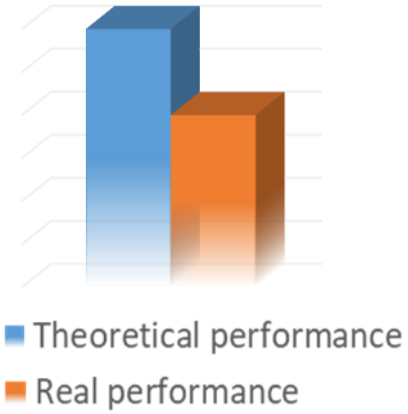


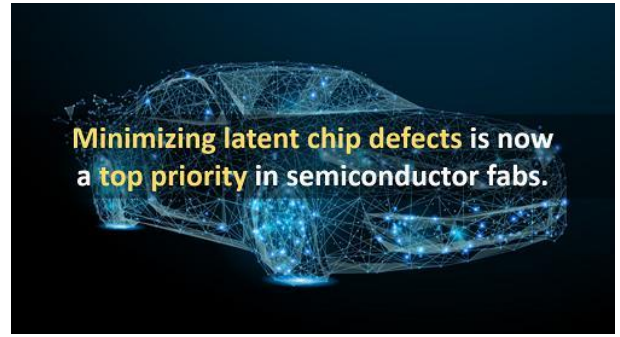
Oxidation results in:

1 **Performance drops**

2 **Reliability & lifetime issues**

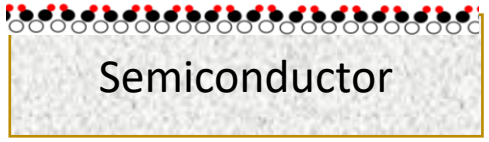
3 **Surfaces defects/ manufacturing losses**

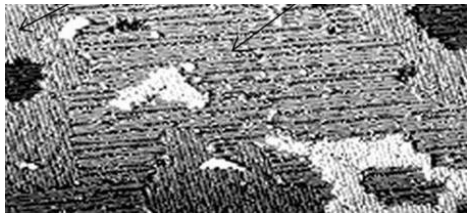




THE SOLUTION: KONTROX™

Desired Surface

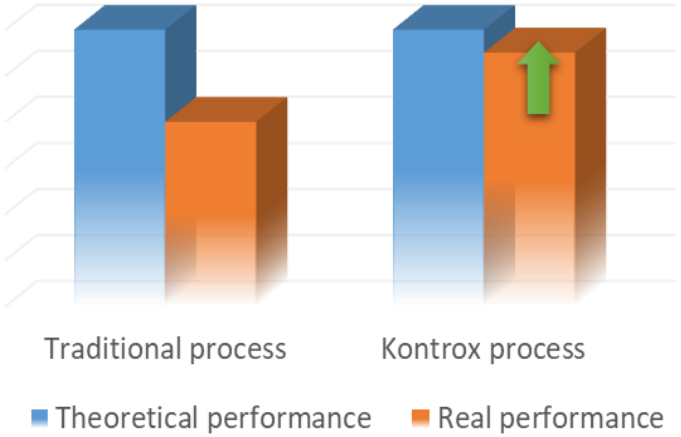


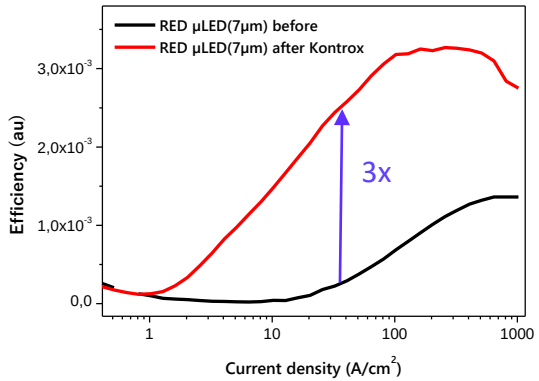


98% defect reduction

Crystalline structures

Stable under air exposure





Real Efficiency improvement for uLEDs

Comptek developed a breakthrough and counterintuitive approach to:

- **achieve 98% surface defect density reduction**
- **1st time ever** to get good quality, perfect novel crystalline oxide structures that are stable under air exposure

Processing improvements

Device improvements

Enabling new solutions in the market (e.g. microleds)

Lower manufacturing costs More competitive devices

COMPETITION LANDSCAPE

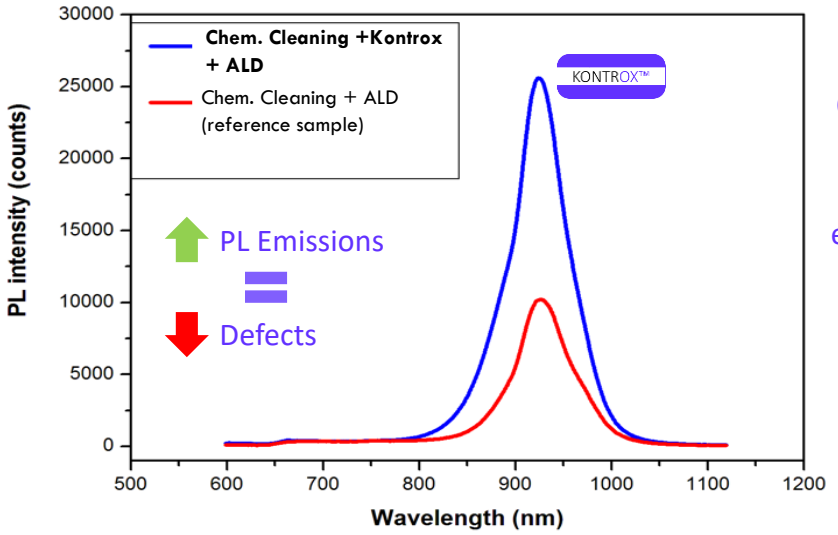
1. **Industry established methods :** Less effective methods used in the Industry: ALD, Interfacial Si, Sulfide passivation,…

2. **Invisible competition:** Companies internal R&D

No direct competing companies with similar technology focus in the market

Traditional methods used in the III-V industry	Defect density (1/cm²eV)
Interfacial Si	$2*10^{12}$
$(NH_4)_2S$	$2.5*10^{12}$
Chemical cleaning + ALD	$1*10^{13}$
III-V Kontrox	**$1.1*10^{11}$**

2 orders of magnitude less defects obtained with Kontrox™



Material surface quality Benchmark

A high level of PL emissions is indicative of a product with lower material defects.

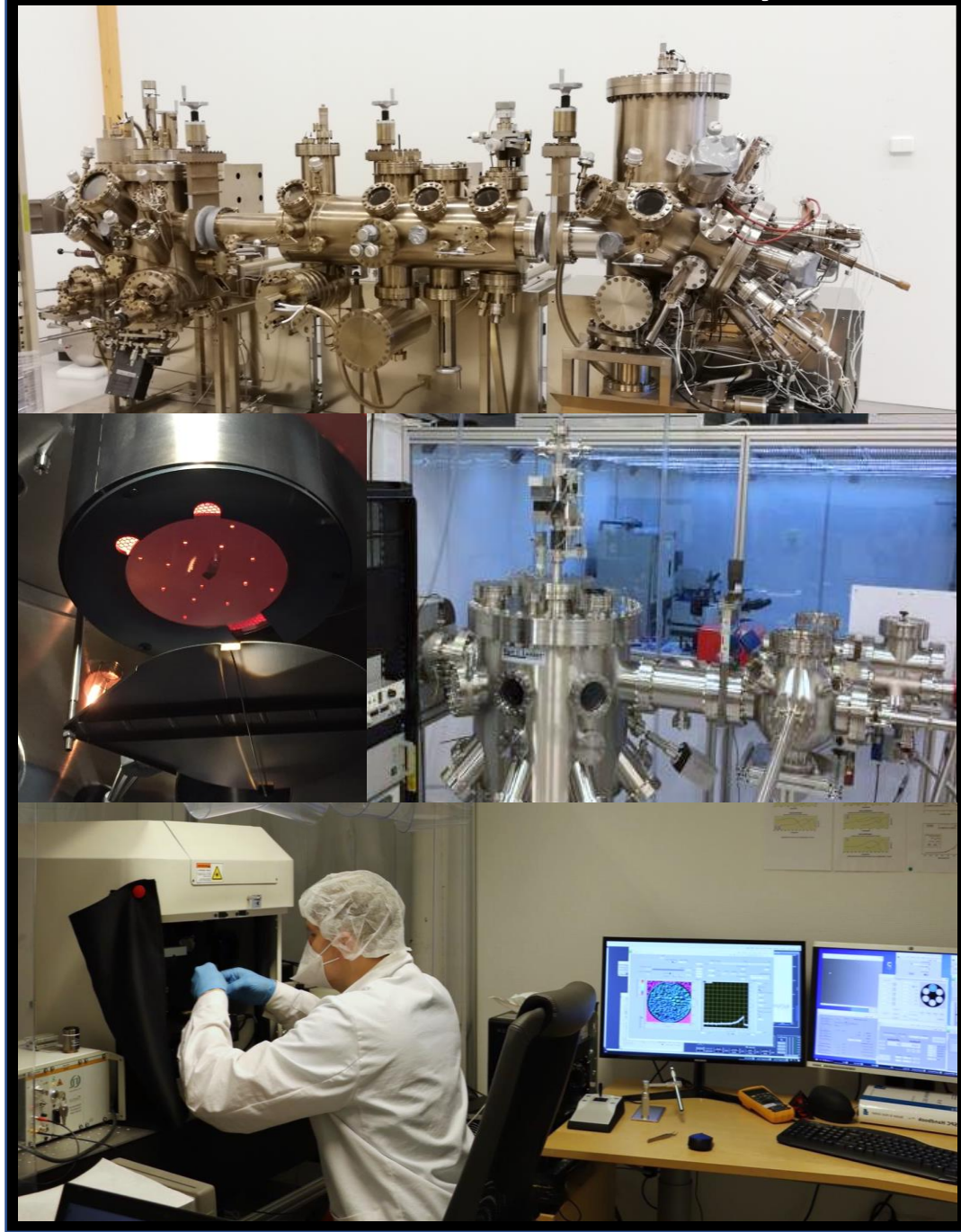
COMPTEK SOLUTIONS

YEARS OF RESEARCH

Spin off from the University of Turku, Finland

2008	Research initiated at the University of Turku, Finland
2011	**1st patent family**
2016	Technology Commercialization study funded by TEKES (Finnish Funding Agency for Innovation)
2017	**Company registered**. Offices located in Turku, Finland. Raised first round of funding from Inventure
2018	First revenue generated ~100K€ **3 patents**. EU SME phase I grant
2019	1st long term development and **commercial license** agreement signed. **1 patent** Revenue 650K€
2020	**Partnership agreement** with RIBER for equipment supply

State of the art laboratory



BUSINESS MODEL: FULL TURNKEY TECHNOLOGY SOLUTIONS

We provide fully customized processes tailored to improved customer´s devices to be implemented in customers factories
Monetization in form of licenses

KONTROX™

IP license

Process optimization & Implementation service

Process Tuning & Optimization, and implementation to customer products

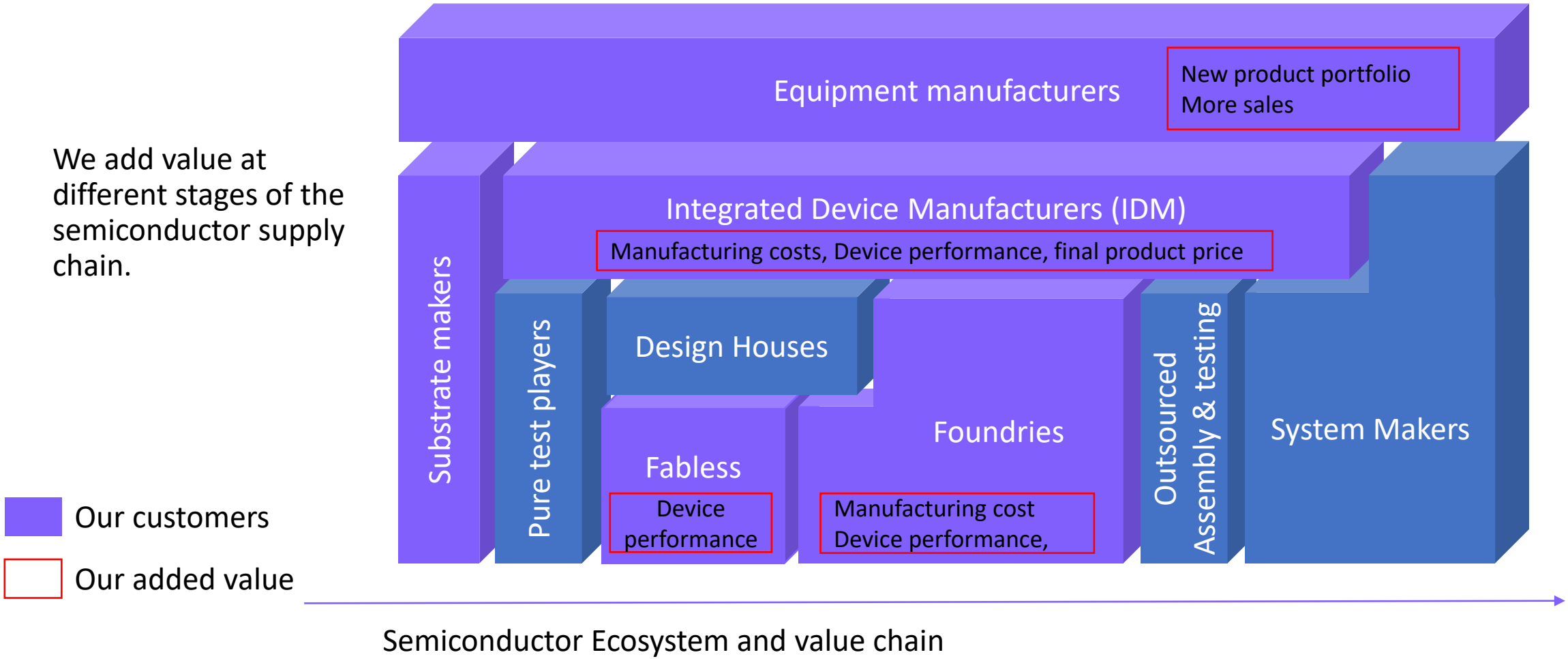
Tech transfer

Tailored Process + Equipment (via partner)

Parnertship agreement with **RIBER**
www.riber.com

BUSINESS MODEL: CUSTOMERS

We add value at different stages of the semiconductor supply chain.



BUSINESS MODEL: GO-TO-MARKET AND REVENUE MODEL

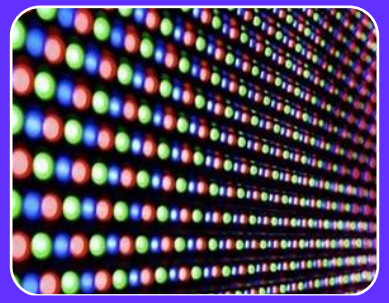
- Currently, 20+ leads at this stage with NDA signed

- Subject to NRE
- Average 2-4 months
- Monetization: project based billing

- Long term, 6-18 months development agreement
- technology validation & implementation studies
- Possibility to transfer to customers' site
- Monetization: project based billing + R&D license fee

- Monetization: royalty based models
- Long term contract with royalties expected in 2-5% range
- Commissions on Equipment sales via partners
- Equipment Calibration & tuning service

MARKET PULL FROM THE OPTOELECTRONICS MARKET



Mini, micro LEDs

- Proof of concept made with two companies: US well known company & European optoelectronics leader
- Open discussion with one Japanese world top brand

Lasers

- A lot of interest from high power laser makers
- Proofs of concept ongoing with
- Several open discussions around VCSEL applications for 3D recognition

IR detectors

- Discussions with several European companies
- Proof of concept definitions with major mobile phones maker for different applications

GaN for power conversion and RF applications

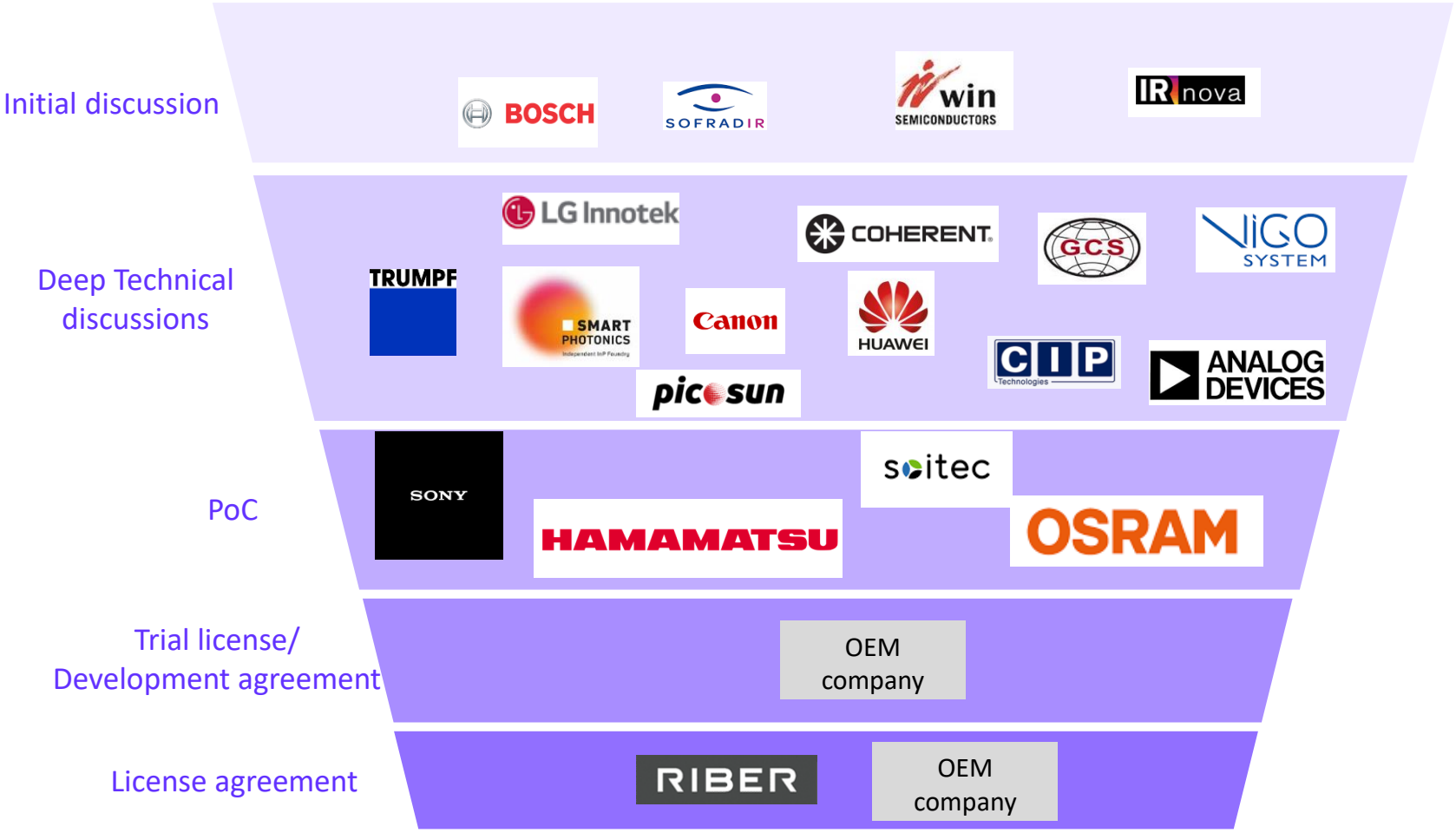
- Discussions ongoing with Tier1 automotive company for proof of concept
- 1 big IDM manufacturer under NDA

- Our customer current focus is mainly in mini-uLEDs and different Laser applications
- Internal developments ongoing for GaN power market.
- GaN and other RF (GaAs) applications will be the next focus area.

OUR TRACTION TODAY: FUNNEL OF LEADS AND CUSTOMERS

In a period of 2 years we succeeded in opening many sale leads from leading corporates in our target industries.

We have already secured several paying customers and 1 trial license and 1 commercial license agreements.



THE TEAM

Founders

Vicente Calvo, CEO
Founder
MSc Industrial Eng.
Lead innovator at Nokia

Jouko Lång, CTO
Founder
PhD Physics
Process inventor

Sales & Marketing

Markku Lammmassaari,
Sales director

Anastasia Manner
Marketing specialist

R&D

Marjukka Tuominen
Research Leader
PhD Physics
Process Inventor

Fredrik Pettersson,
Characterization expert
PhD Physics

Jaakko Mäkela,
Researcher
PhD Physics

Yanina Fedorenko,
Sr. Researcher
PhD Physics

Nikolay Houbenov
Sr. Researcher
PhD Chemistry

Arjun Mandal,
Researcher
PhD Physics

Henri Hellström
MSc student
Math/Statistics

Board members

Timo Tirkkonen,
Chairman of the board, Investor
Partner @ Inventure

Matti Hellgren,
Business Angel
CEO @ IoT foundation
Former CVP Microsoft & SVP Nokia

Erkki Heinonen,
MD at EQT solutions ltd.
Former Director of Sourcing @ Nokia

FUNDING TO DATE

2M€, of which 1M€ of non-equity funding

Burning rate: 75K€/month

What we have achieved:

- Build our own high-tech lab
- 2 granted patent families (US, JP, CN,EU,CA,RU,KR,…)
  3 patent pending and 1 trade mark
- a solid customers base and first commercial license agreement signed
- A partnership agreement with world top equipment manufacturer
- Break even point achieved in 2019

RAISING A SERIES @ 4M€

Already committed 1M€ INVENTURE

What we will achieve:

- Increase business development team and activities
- Increase our capacity to shorten the time to revenue cycle
- Strengthen the IP portfolio
- Expand our activities to other industry segments

What we are looking for:

- VC or CVC with experience in semiconductor industry
- Potential Industrial partners

COMPTEK SOLUTIONS