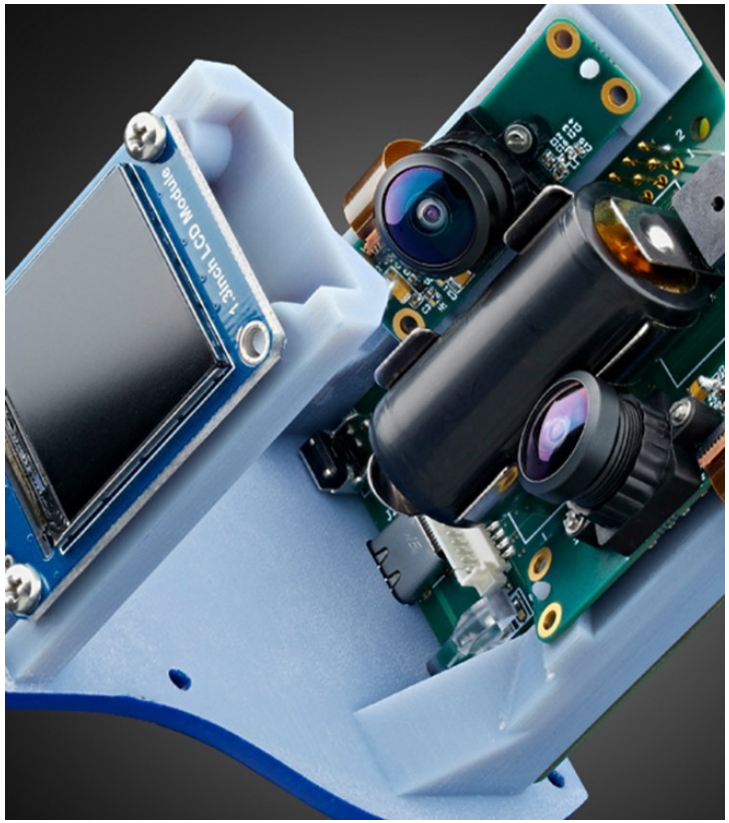
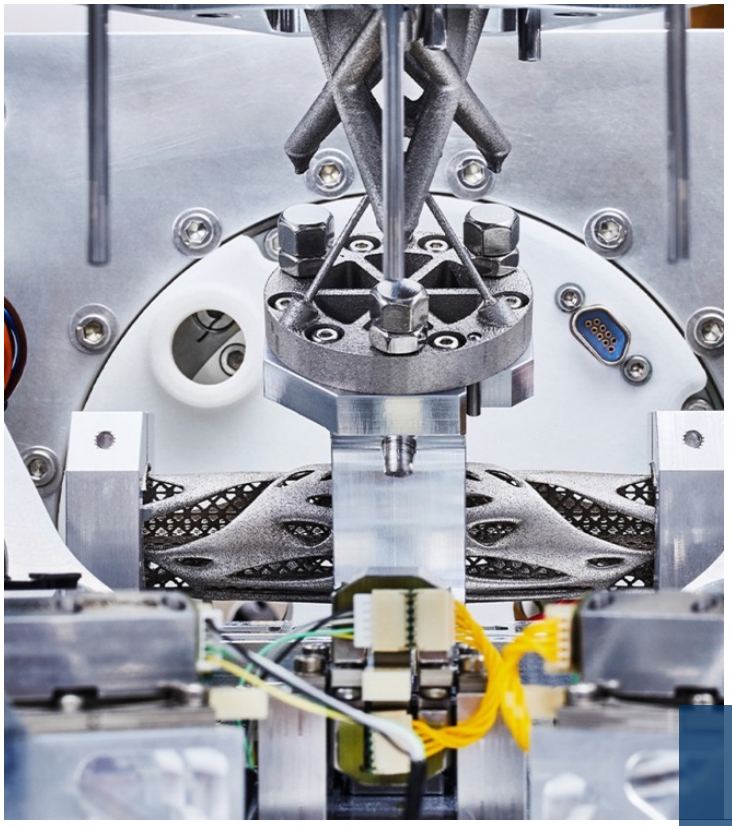






Andrea Dunbar
CTO

21st October 2026

AI AND PHOTONICS: SWISS INNOVATION

20 YEARS SWISS PHOTONICS

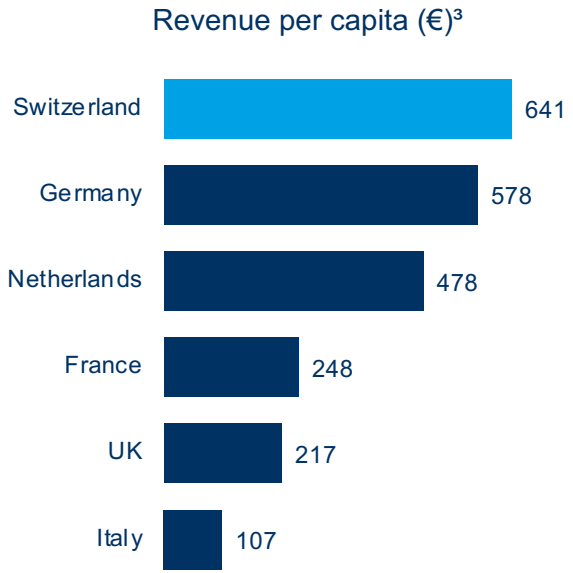
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FACING THE CHALLENGES OF OUR TIME

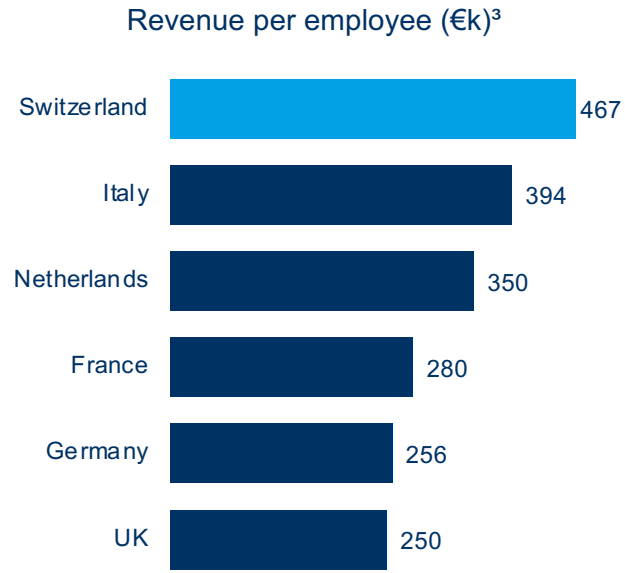
SMALL COUNTRY, OUTSIZED PHOTONICS INDUSTRY

€ 5.6 bn
annual revenue[1]

~12,000
jobs[1]

80–90%
exported[2]





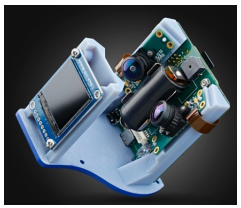
1.2% of Europe's population → 4.5 % of its photonics revenue[3]

[1] Swissphotonics, “Markets Addressed”, swissphotonics.net (accessed Oct 2026).
[2] Swissmem, White Paper Photonics Switzerland (2017): 80% export quota; Optech Consulting for Swissphotonics (2016): ~90%.
[3] Tematys / Photonics21 (2023), European photonics industry by country (€5.6 bn, 12,000 employees for CH); per-capita, per-employee and share values computed from it.

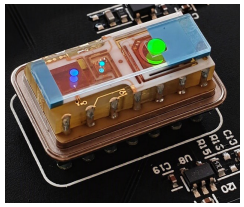
WHY PHOTONICS SUITS SWITZERLAND (AND CSEM)

Swiss precision and SME culture allow multiple niche markets - proximity allows one ecosystem

Strengths



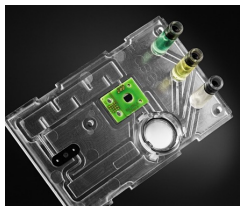
Miniaturisation



High-tech



Infrastructure



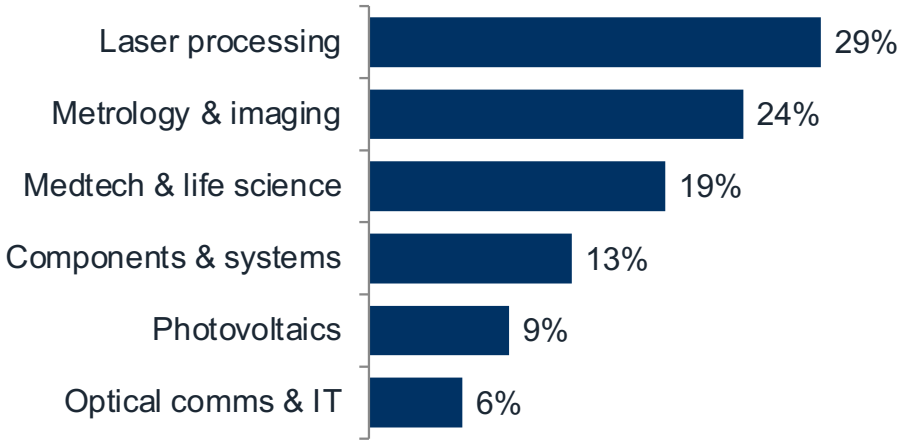
Integration

640
specialists

170
patent families

>50 ventures
since 1984

Switzerland: diverse specialist markets[1]

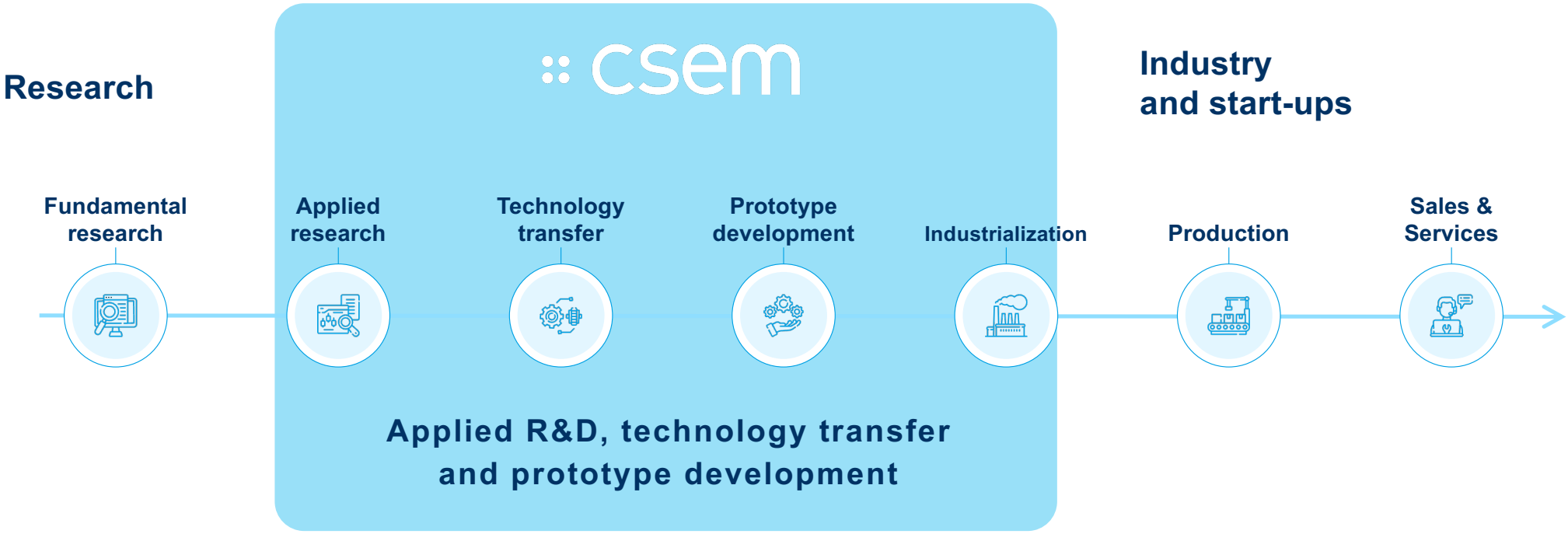


[1] Optech Consulting for Swissphotonics (2016): 2015 production data, last full breakdown (CHF 2.93 bn).
[4] WIPO, Global Innovation Index 2025 [5] EPO Patent Index 2025. CSEM figures and examples: supplied “Our strengths” slide.

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CSEM FOR INNOVATION

From ideas in the ETH domain and universities to products in Swiss industry



CSEM helps bridge the gap between research and market-ready products

WE INVENT, OTHERS SCALE

Just some of the Swiss photonics start-ups that became part of foreign groups

2015

Lemoptix
Laser projectors & 3D sensing
EPFL spin-off
→ **Intel (US)**[1]

2017

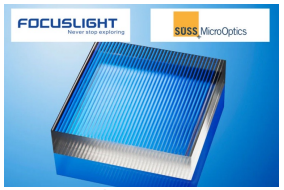


ViDi Systems
AI machine vision
CSEM roots
→ **Cognex (US)**[2]

2018

ID Quantique
Quantum-safe security
UNIGE spin-off
→ **SK Telecom (KR)**[3]
→ **IonQ (US), 2025**[4]

2024



Suss MicroOptics
Micro-optics
→ **Focuslight (CN)**[5]

2026

Polariton
Data-centre optics
ETH spin-off
→ **Marvell (US)**[6]

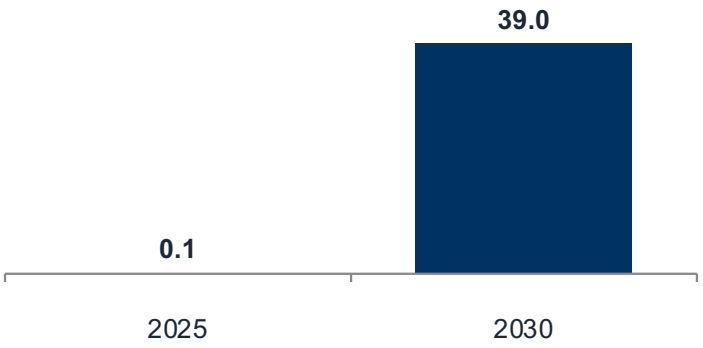
Each a success, but the scale-up now happens abroad · three of five are what AI needs today

[1] startupticker.ch (Mar 2015) [2] Cognex press release (Apr 2017) [3] SK Telecom Form 6-K (2018): 58% stake [4] Converge Digest (May 2025): controlling stake
[5] Yole group (Jul 2023) [6] Converge Digest (Apr 2026): acquisition announced

PHOTONICS FOR AI

AI data centres need light to move data

Co-packaged optics market, $ bn[1]



+83% Lumentum revenue, FY2026[2]

Swiss players in the race

HUBER+SUHNER
Optical circuit switches
Hyperscaler orders, sales from 2026[3]

LIGENTEC
Silicon-nitride chip foundry
~50%/yr growth, 200 mm with X-FAB[4]

CCRAFT CSEM
Lithium niobate foundry
2,000 wafers/month by 2030[5]

Lightium
Lithium niobate chips
$7M seed (2024)[6]

Enlightra
Multi-colour lasers
$15M raised, pilot 2027[7]

The challenge: scale
Swiss rounds $7–15M[67] vs a $39 bn market

Volume fabs | Packaging | Scale-up capital | Anchor customers

We have the components. How do we scale them → Panel Discussion

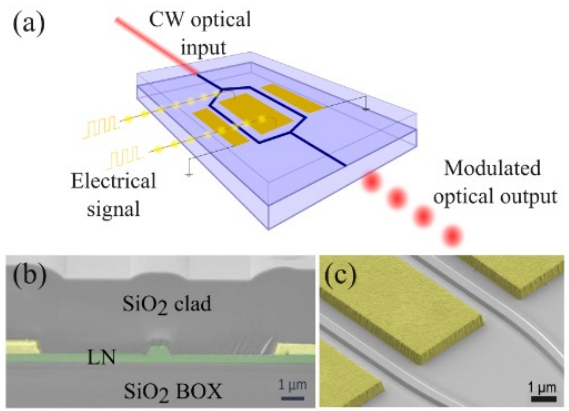
[1] TrendForce (Jun 2026), co- & near-packaged optics [2] Lumentum FY2026 (Pulse 2.0) [3] HUBER+SUHNER Annual Report 2025
[4] PIC Magazine (Dec 2025) [5] Photonics Online (Jul 2026) [6] Lightium (Sep 2024) [7] The Quantum Insider (Dec 2025)

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CSEM PHOTONICS FOR AI DATA CENTRES

Optical links that move more data with less energy

Modulate light

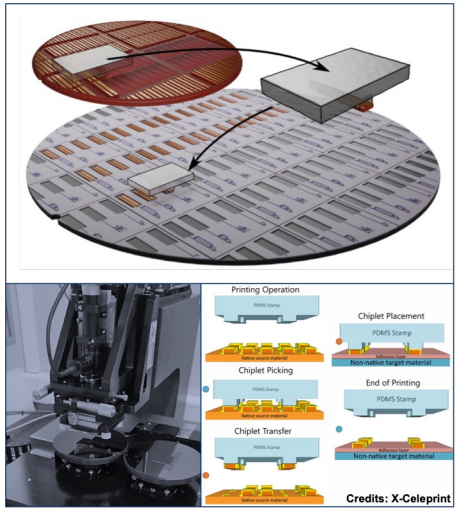


Fast, low-voltage modulators

Thin-film lithium niobate (TFLN) devices encode electrical data onto light.[1]

Next material: lithium tantalate (TFLT).[2]

Heterogeneous Integration

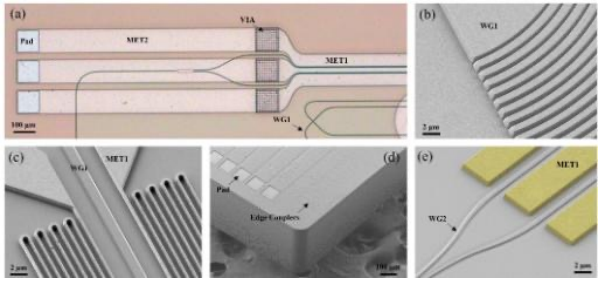


High-precision micro-transfer printing

Combine dissimilar materials onto a single substrate

Parallel process with high yield, Sub-micron placement accuracy

Scale photonic chips



Design platform and industrial transfer

150 mm wafer process and a validated design kit provide reusable photonic building blocks.[1]

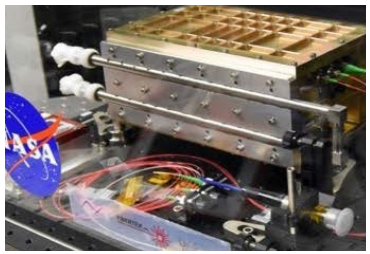
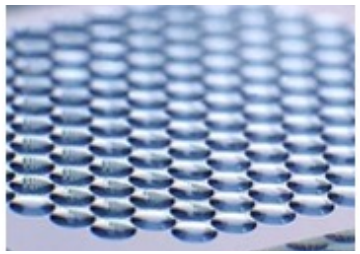
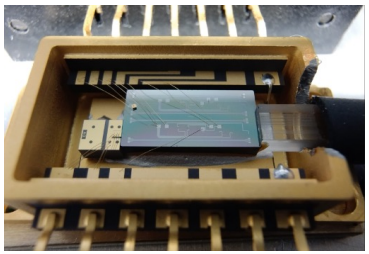
CCRAFT: CSEM spin-off for TFLN chips.[3]

[1] CSEM Scientific & Technical Report 2024, pp. 35–37. [2] CSEM PIC platform overview. [3] CCRAFT launch announcement, May 2025.

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THE CHALLENGE: STRONG IN SLOW MARKETS, SMALL IN THE BOOM

Swiss production shares and current market trends

Laser processing	Metrology & imaging	Medtech & life science	Components & systems	Optical comms, Quantum & IT
				
Weak	Weak	Growing	Growing	Booming

1

Over half of production is in weak or declining markets[1] **AI's key segment is just ~6%**

1. Taken from TRUMPF
2 Optech Consulting for Swissphotonics (2016)

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AI CHANGES THE RULES

Software commoditization shifts value to hardware & data

280× cheaper AI in under two years[1]

Plays to our strengths


Precision hardware


Unique sensing


Premium, not volume


Integration know-how

The challenges


Who captures the value?


Data ownership


Silos


Scale

Value moves from code to UNIQUE SENSORS, INSTRUMENTS and DATA

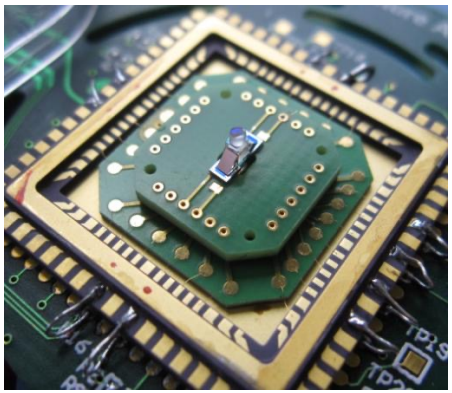
[1] Stanford HAI, AI Index 2025: cost per million tokens at GPT-3.5-level quality, $20.00 (Nov 2022) → $0.07 (Oct 2024).

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CAPTURE DATA OTHERS CAN'T

Not standard machines: instruments that sense what no one else can

Timing

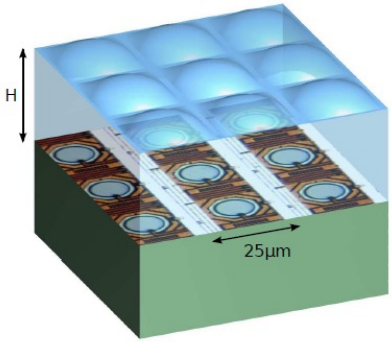


Atomic-clock optics

Precise time where GPS fails

Navigation · telecom · defence

Detectors



SPAD microlenses Charbon group[1]

Seeing single photons

Bio-imaging · lidar · quantum

Emitters

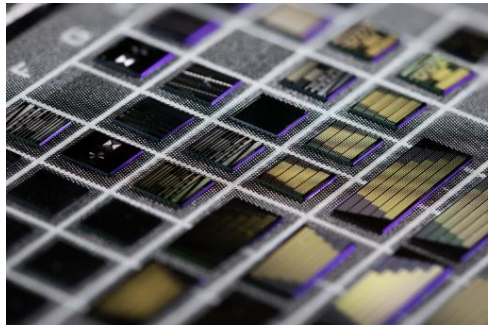


4K-MEMs[2]

Chemical fingerprints in the mid-infrared

Environment · breath diagnostics · process control

Quantum & new materials



TFLN & SiC photonic chips

New materials, new signals

Quantum · navigation · nanoscale imaging

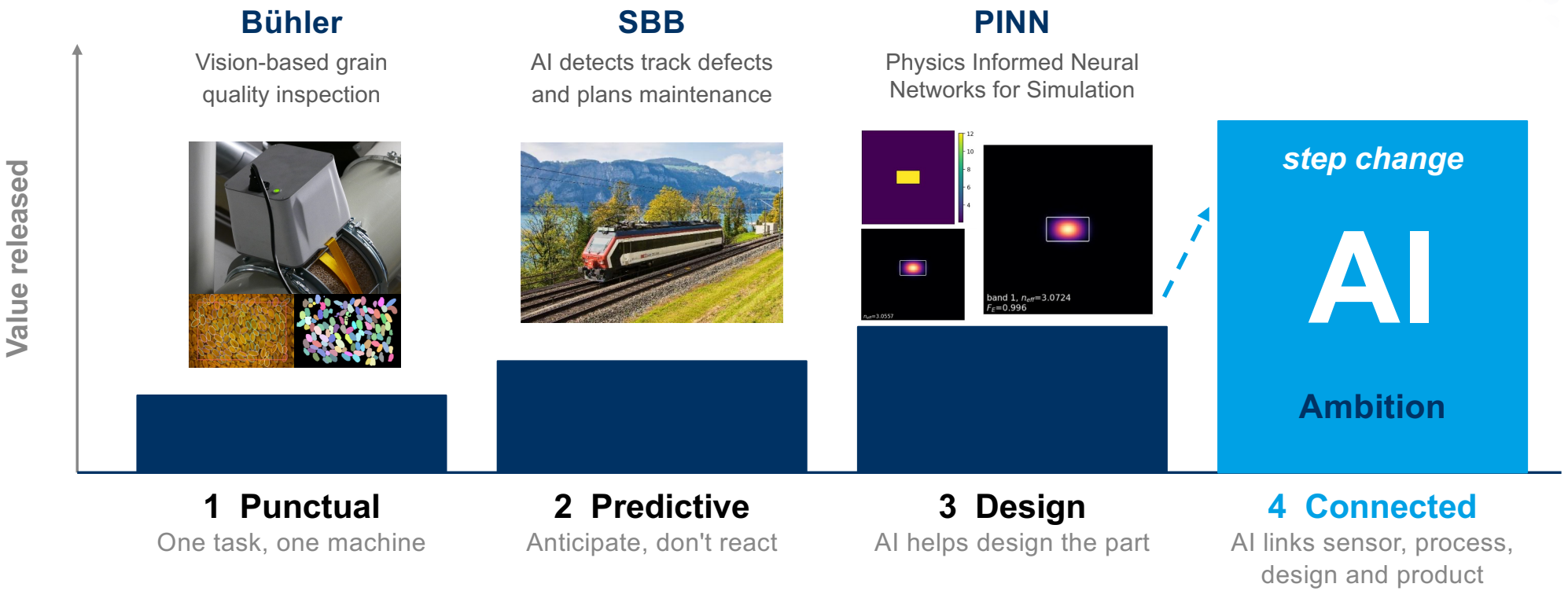
Build the instruments that capture data no one else can: SPACE, QUANTUM, DEFENCE

[1]J. Mata Pavia et al., Optics Express, **22**, 4202-4213 (2014), [2]www.4kmems.ch

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CSEM EXAMPLES ACROSS THE AI VALUE CHAIN

Part by part: small gains. Across the chain: a step change



Not one part better: AI across the whole chain

Illustrative, not to scale

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Who finds the optimal microlens first?

Same starting design · same lab · one experiment per week

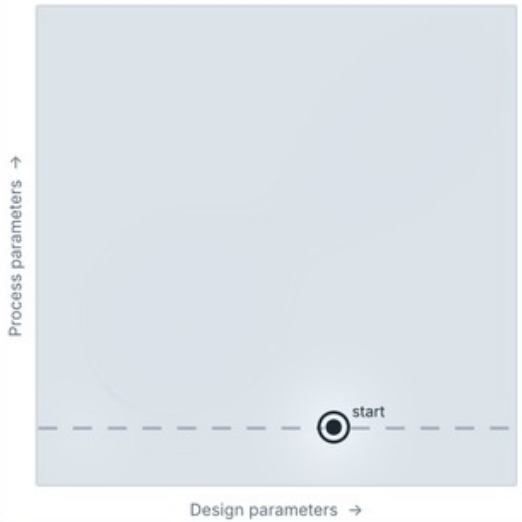
WEEK

0

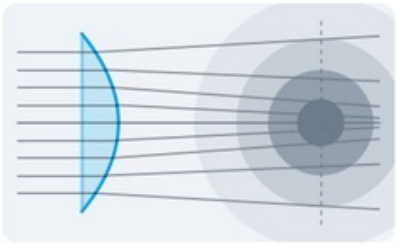
Stage by stage

each stage tunes its own parameters, then hands over

Design → Master → Replicate → Measure



Best lens so far



Lens quality

10%

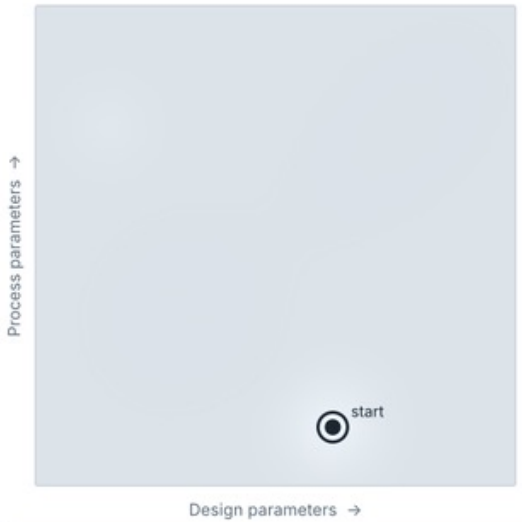
Experiments run

1

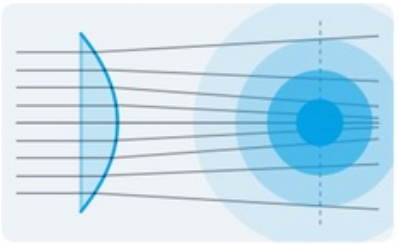
Connected AI

Bayesian optimisation across all stages at once

Design → Master → Replicate → Measure



Best lens so far



Lens quality

10%

Experiments run

1

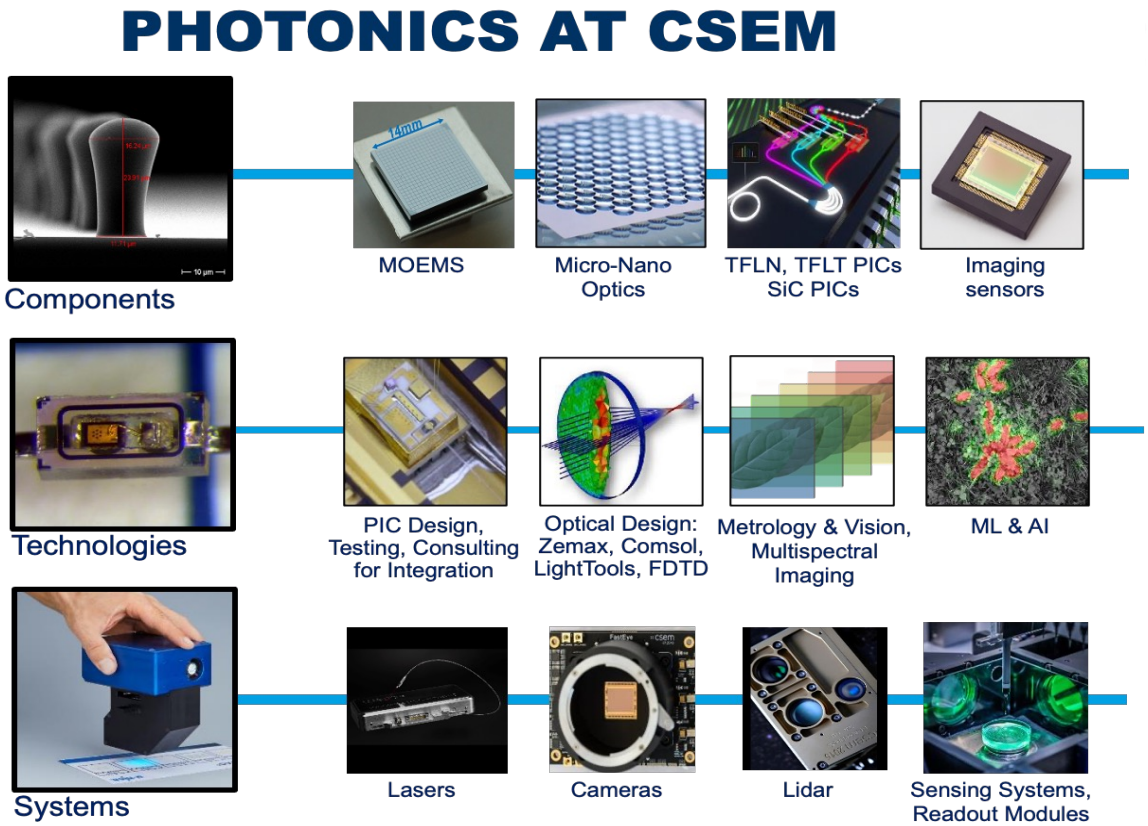






CONCLUSIONS

- **2 Challenges**
  - Scale up
  - Constant innovation
- **2 AI Changes**
  - Commoditization of software
  - Value shifts to hardware and data
- **2 Opportunities**
  - Keeping scales up in Switzerland
  - Embrace AI to innovate faster



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