

ALPES LASERS

Innovating photonics for a brighter future

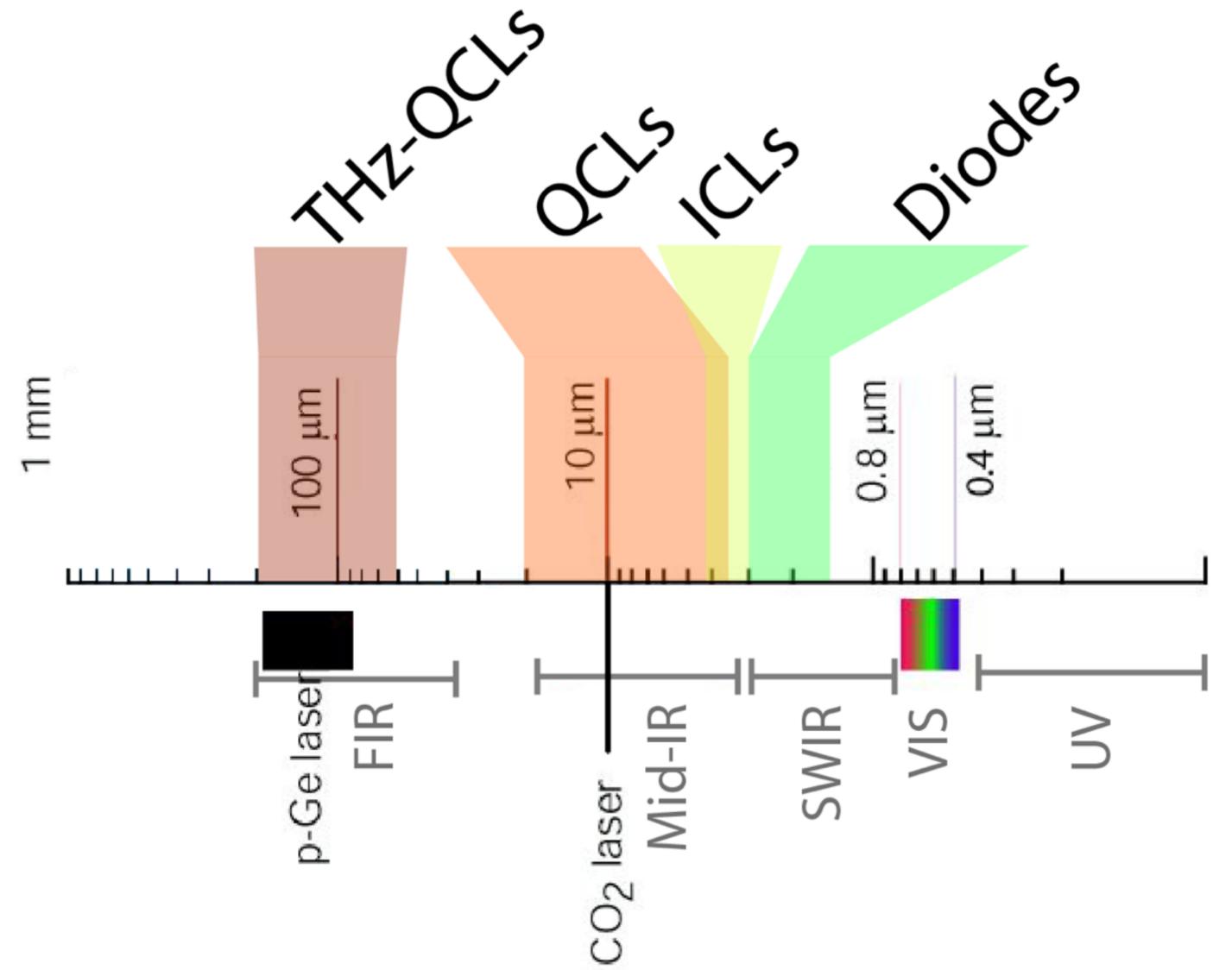
www.alpeslasers.ch

WHO WE ARE.



LASER TYPES.

Alpes Lasers produces a wide variety of laser sources, covering a very broad range of the electromagnetic spectrum.

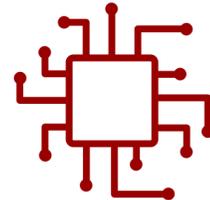




LASER SOURCES

- **Quantum Cascade Lasers**
 - DFB QCL
 - FP QCL
 - High Power QCL
 - THz QCL
 - Custom developments
- **Interband Cascade Lasers**
- **Laser diodes**

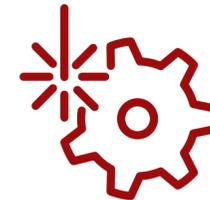
DESIGN & FABRICATION



ELECTRONICS

- **Electronic Drivers (Pulsed/CW)**
 - S2 Driver
 - S3 Driver
 - S4 Driver
 - S5 Driver
- **Temperature Controller**
- **External Cavity Controller**

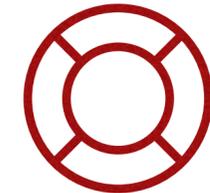
DESIGN & FABRICATION



ASSEMBLIES

- **External Cavity Laser kit**
- **Pigtails components/lasers**
- **Laser Laboratory Housing**
- **Laser/photodetector assemblies**
- **Custom systems**

DESIGN & INTEGRATION



SERVICES

- **Research on hire**
- **Custom laser sources development**
- **Custom systems development**

CUSTOM DEVELOPMENTS

WHERE WE OPERATE.

Alpes Lasers has a global network of resellers, and can cater to clients around the world efficiently and reliably.

US & Canada

Local distributor
Boston Electronics

Italy

Local distributor
Energy Laser s.r.l.

Germany

Local distributor
MG Optical Solutions

France

Local distributor
Opton Laser International (OLI)

Headquarters

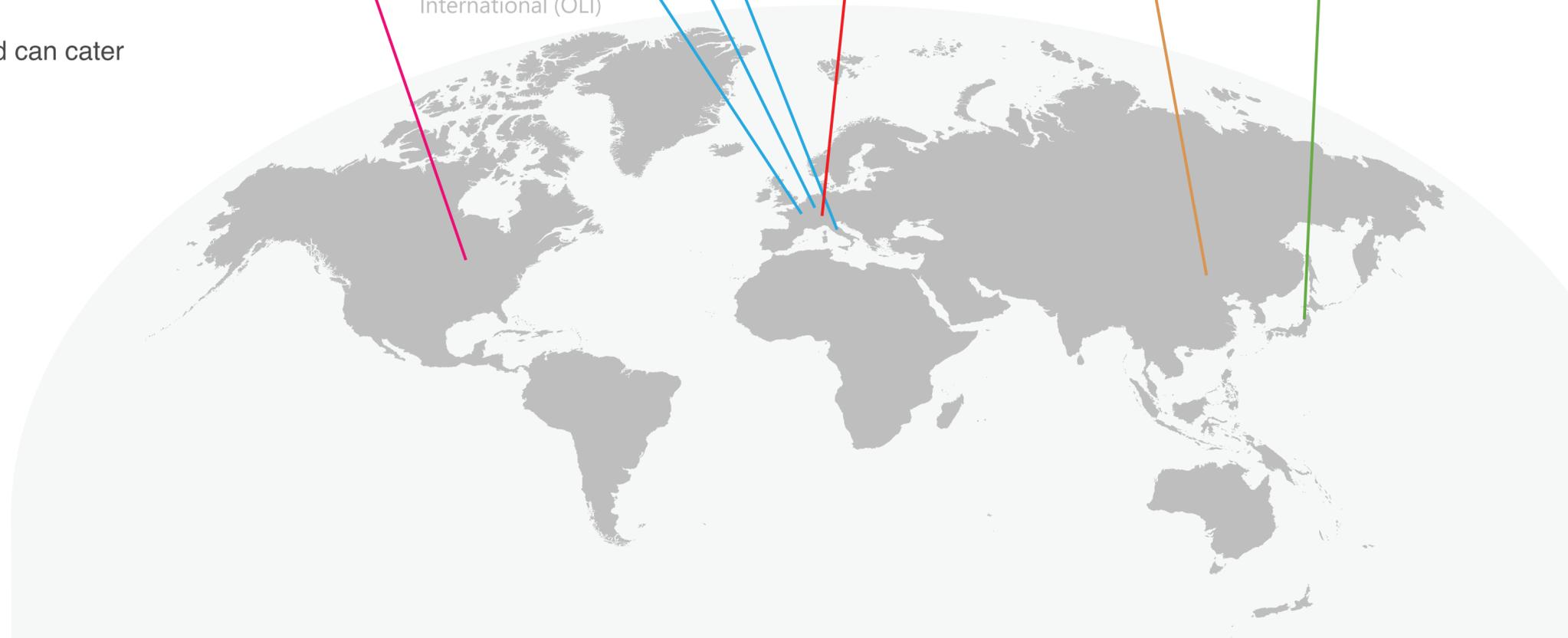
Alpes Lasers is based in St-Blaise
Switzerland (Canton de Neuchâtel)

China

Local distributors
Universal (Hong Kong)
Technology Co., Ltd

Japan

Local distributor
Keystone
International Co Ltd



ABOUT US

WHO WE WORK WITH.

Alpes Lasers has sold several thousands of devices to a global network of partners and clients.

DIEHL

 **TRIOPTICS**

Elbit Systems

 **Stanford University**

JPL
Jet Propulsion Laboratory
California Institute of Technology

ABB

DAYLIGHT SOLUTIONS

THALES

nlqo SYSTEM S.A.

 **esa**

 **AIRBUS**
DEFENCE & SPACE

KLA Tencor
Accelerating Yield



 **Fraunhofer**

TELOPS

NIST

GASERA

PAUL SCHERRER INSTITUT
PSI

IRsweep
Innovation in sensing

 **EMPA**

BLOCK engineering



TU WIEN

BOSTON UNIVERSITY

EPFL

TECHNISCHE UNIVERSITÄT DARMSTADT



ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Georgia Institute of Technology

cea



imec



PRINCETON UNIVERSITY



IARPA

 **csem**





INNOVATING **PHOTONICS.**

INNOVATING PHOTONICS.

OUR HISTORY

1994

Quantum Cascade Laser. Prof. Jerome Faist (ETH Zurich) Invents the Quantum Cascade Laser

1998

Alpes Lasers. Prof. Faist co-founds Alpes Lasers in Neuchâtel, Switzerland





2004

QCL DFB. First commercial QCL Distributed feedback (**QCL DFB**) devices

2006

External Cavity. First broadly-tuneable external cavity quantum cascade lasers (EC-QCL)

2015

Vernier lasers. Alpes Lasers launches the **Extremely Tuneable QCL (XT-QCL)** sources using the Vernier effect.



2015

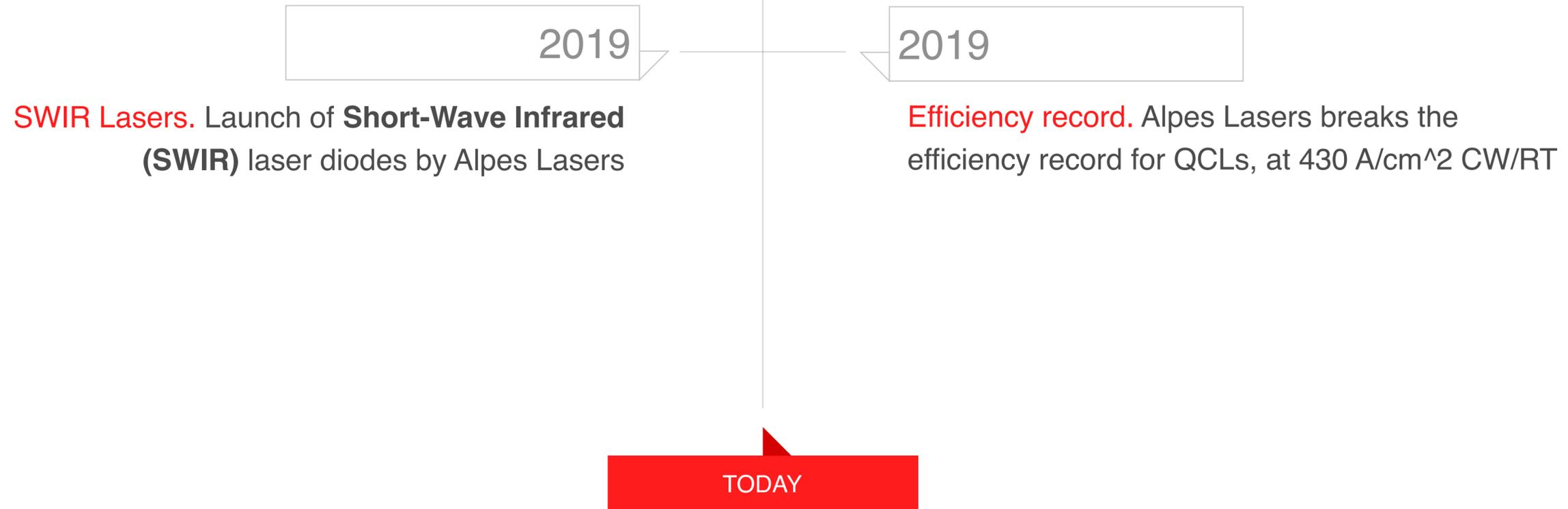
High Power Sources. Alpes Lasers launches QCL devices with a minimum average power of 1W and more than 9W of peak power (**HP-QCL**)

2015

Extended Tuning DFB-QCL. Alpes Lasers introduces a new class of **Extended Tuning DFB-QCL (QC-ET)**

2016

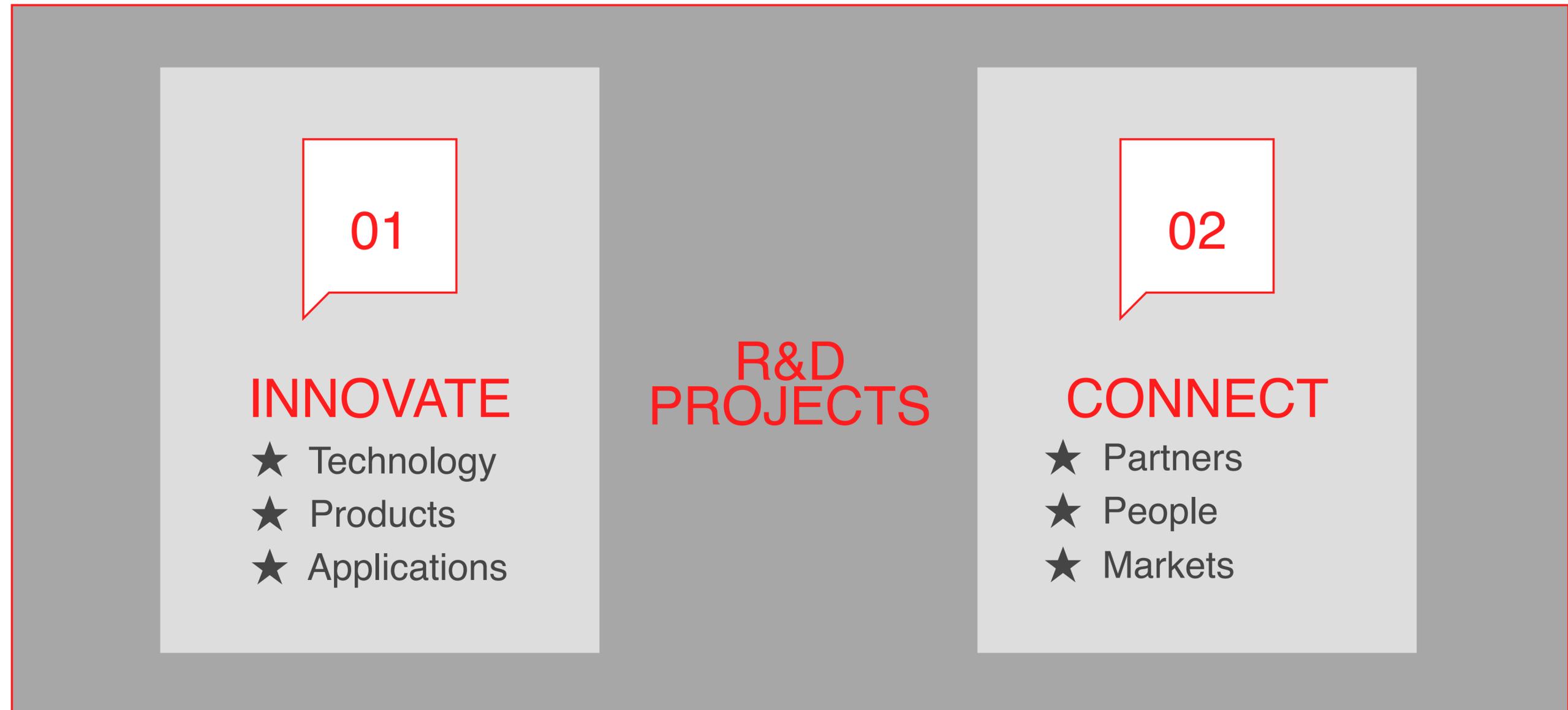
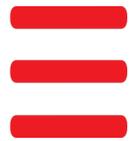
External Cavity Laser Kit. Alpes Lasers introduces the **External Cavity Laser Kit (ECLK)**



In 1998 Alpes Lasers was founded in Neuchatel, Switzerland by Jérôme Faist, then a Professor at the University of Neuchâtel, now at ETH Zürich, Antoine Müller and Matthias Beck.
Alpes Lasers was the first company to offer Quantum Cascade Lasers on the market, a priority it has maintained by commercialising the first CW laser in 2001 and the first broad gain laser in 2009.

CONSTANT NEED TO INNOVATE

BUSINESS STRATEGY.



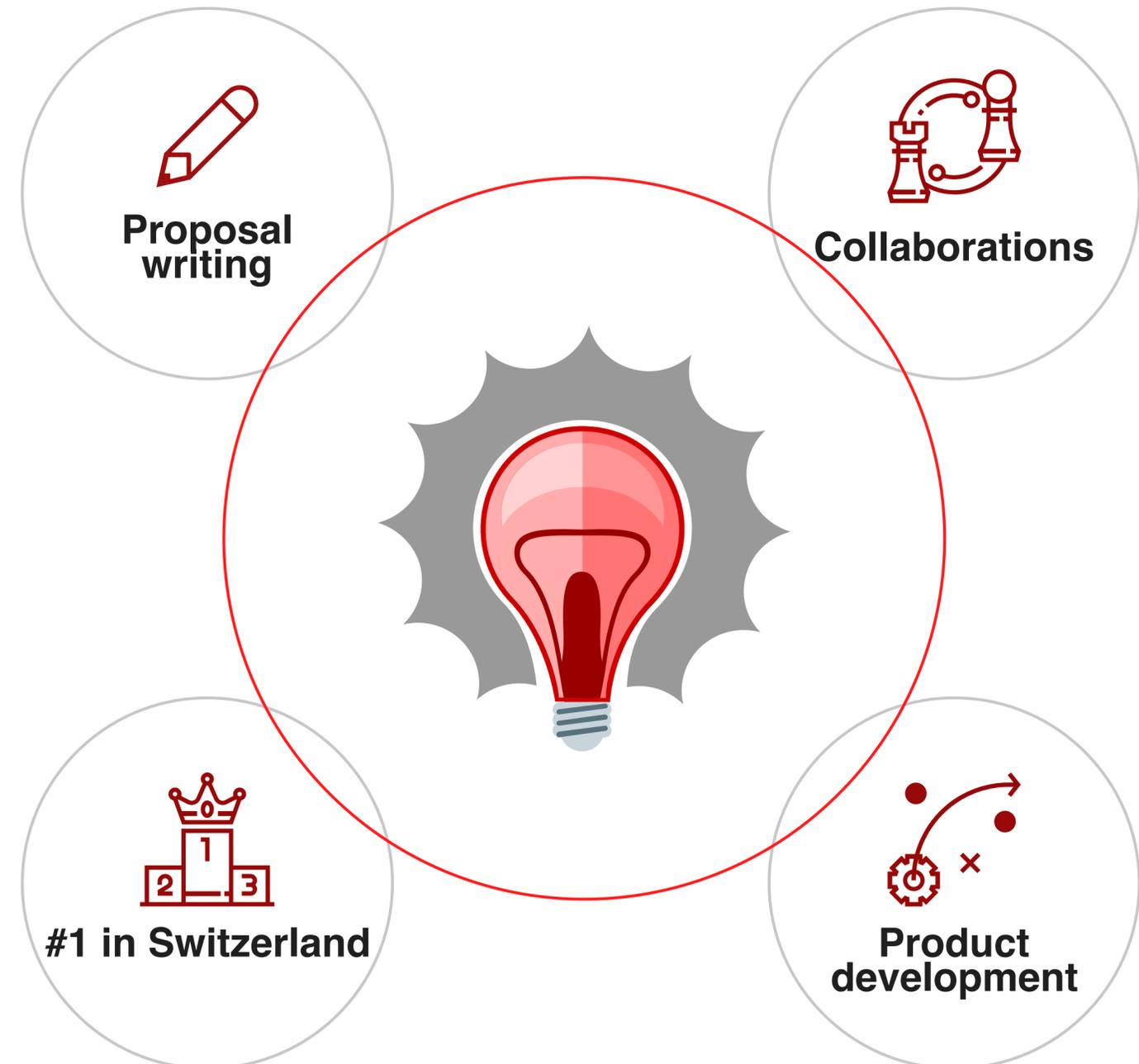


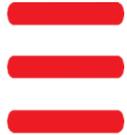
R&D PROJECTS.

R&D PROJECTS

INNOVATING PHOTONICS.

Alpes Lasers has raised over 10 M euro of funding in the last 4 years, by participating in highly innovative R&D projects. We are currently participating **14 active EU Grants** (9 H2020 & 5 EUROSTARS PROJECTS), making us the most active SME in Switzerland.





R&D PROJECTS

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MIRPHAB

- Mid-IR pilot production lines

WaterSpy

- Detecting bacteria in water, through Mid-IR spectroscopy

ACCORDS

- Ultra-sensitive and selective laser-based multi-species gas sensor for open path detection.

SOMMA

- Multipurpose sensing platform in the Mid-IR, based on broadly tunable laser sources (QCL-XT).

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BRICS

- Interband Cascade Laser (ICL) broadgain sources and external cavities development

NutriShield

- Mid-IR medical devices development

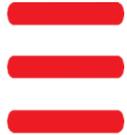
LEVES

- Low-cost tuneable QCL, based on blue-shift chirping

IQONIC

- Zero defect manufacturing in the optoelectronics industry





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QOMBS

- Quantum simulation for QCL combs optimisation

INGENIOUS

- Mid-IR wearable gas sensor for first responders

AQUASHIELD

- Laser-based sensing platform for drugs & explosives in wastewater

PHOOTONICS

- Active illumination with SWIR diodes, for medical applications (diabetic foot)



R&D PROJECTS



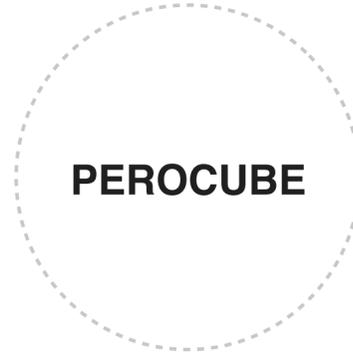
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HYDROPTICS

- Laser-based spectroscopy of liquids in the Oil & Gas industry, for process optimisation



PEROCUBE

- AFM-IR measurements for quality control of perovskite thin films



HOW
WE GOT THERE.

EU GRANTS

THE H2020 LANDSCAPE.



EU GRANTS

STRATEGY.

Identify calls

Initiate concept

Establish consortium

Write proposal

How to succeed?

Try to target applications of your technology, rather than the core technology itself. This will give you a **wider selection of topics**.

WHERE DO YOU ADD VALUE?

APPLICATIONS

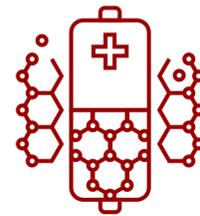
ADDING VALUE.

Alpes Lasers technologies add value to the following market segments



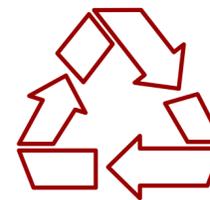
BIO / AGRO / FOOD

- Food safety
- Process optimisation
- Fat & protein analysis (milk)
- Ethylene sensing



MEDICAL / HEALTH

- Biomarker control (ie Glucose monitoring)
- Breath analysis
- Ophthalmology / Dermatology
- Pathogen detection
- Hyperspectral imaging



ENVIRONMENT

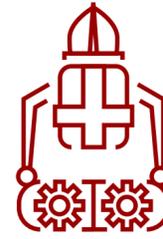
- COx, SOx, NOx, Ox Emissions monitoring
- Micro- & Nano-plastics detection
- Gas leakage detection
- Posphates, nitrates & oil detection in water
- Environmental lidar



APPLICATIONS

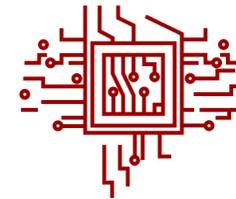
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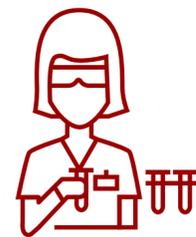
INDUSTRY 4.0

- 3D printing & surface micropatterning
- Bio-based materials (i.e. Graphene foam)
- Gas leakage detection
- Industrial Process monitoring (i.e. Oil & Gas)
- Micro/nano-machining & fabrication



ICT

- Laser-based communications
- Comb laser Frequency generator (5G devices)
- Quantum random number generator
- Cybersecurity



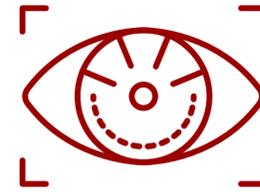
BASIC SCIENCE

- Study of protein dynamics
- Hyperspectral imaging
- Timer-resolved vibrational spectroscopy ($\mu\text{s}/\text{ms}$)
- Photochemistry / photocatalysis
- Study of light-induced reactions

APPLICATIONS

ADDING VALUE.

Alpes Lasers technologies add value to the following market segments



DEFENCE / SECURITY

- Explosives detection
- Drugs detection
- Pathogens detection
- Standoff detection
- IR Countermeasures (DIRCM)



AEROSPACE

- Instrument calibration / referencing
- Ultra-high accuracy distance measurement
- Mechanical quality control
- Free-space communications
- Spectroscopy missions
- Scientific missions



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Questions?

