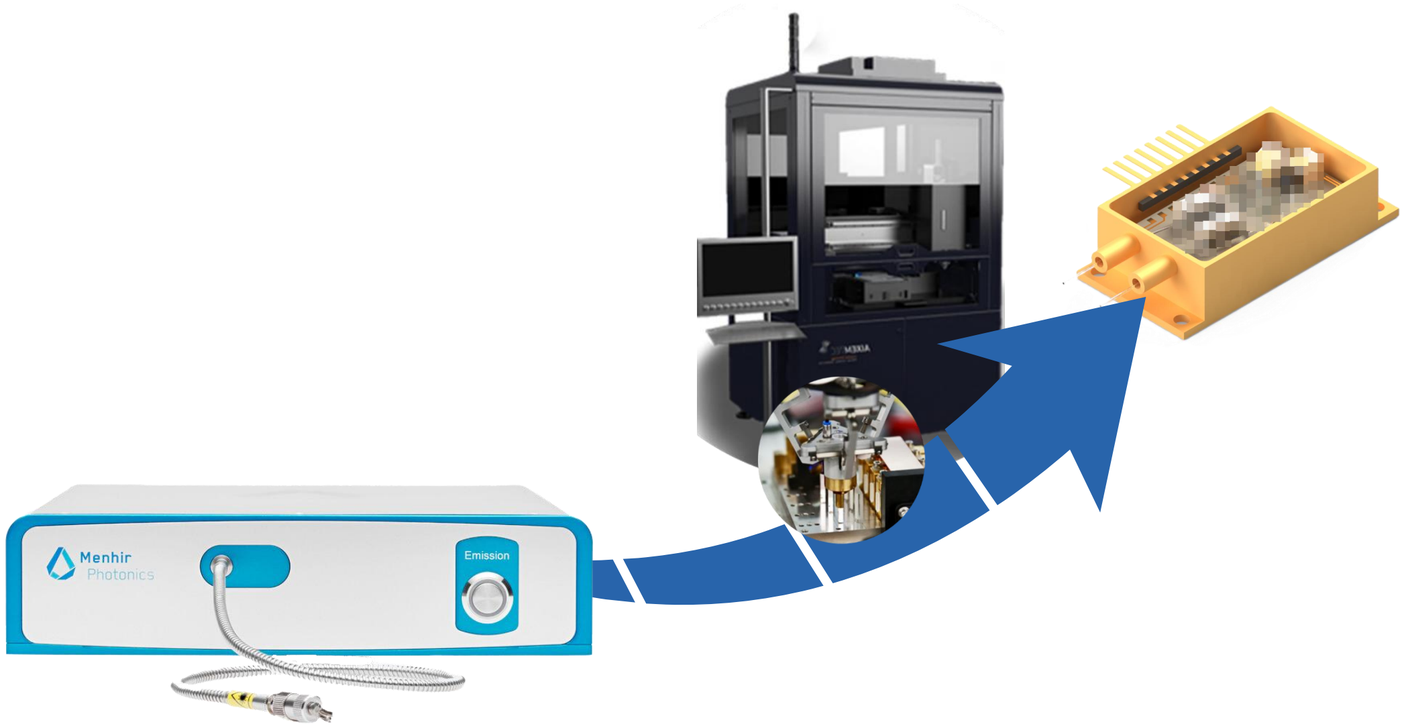
Menhir Photonics

# From Lab to Volume:

## Enabling 10k Laser Modules per Year




**Fabian Brunner**
Automation Engineer
Menhir Photonics AG

# Motivation

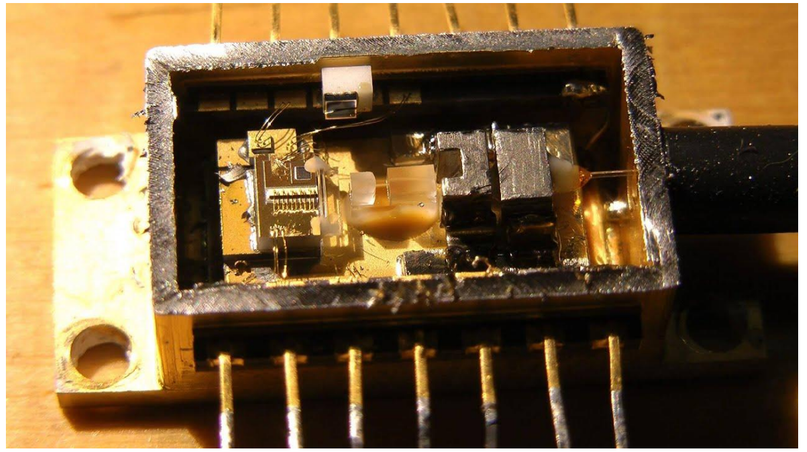
## Current

I. Bulky laser units

II. Production by hand

< 200 units/year

III. Intended for controlled environments



## Observation

- Market traction for medium volumes
- Maturity of free-space optical assemblies
- Proven laser design

→ THE TIMING IS RIGHT!

# Motivation

## Current

I. Bulky laser units

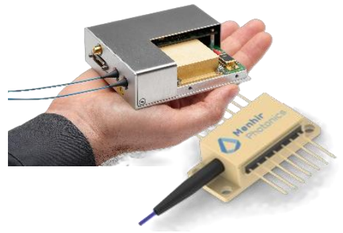
II. Production by hand

< 200 units/year

III. Intended for controlled environments

## Future

I. Miniaturization



II. Automated production

up to 10k units/year

III. Ruggedized design

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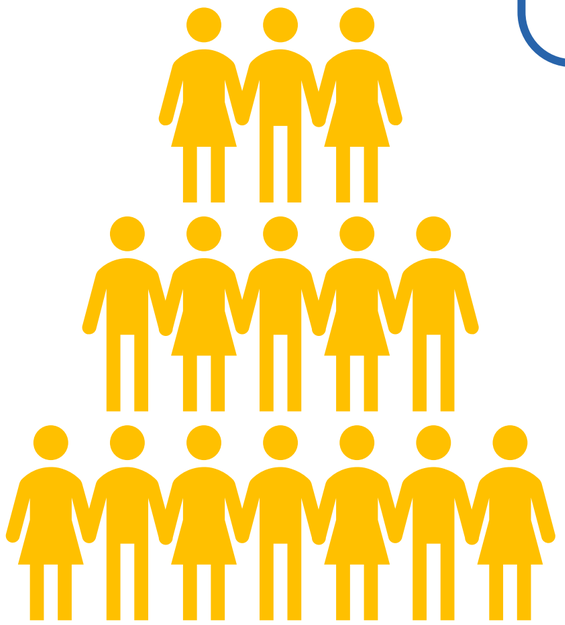
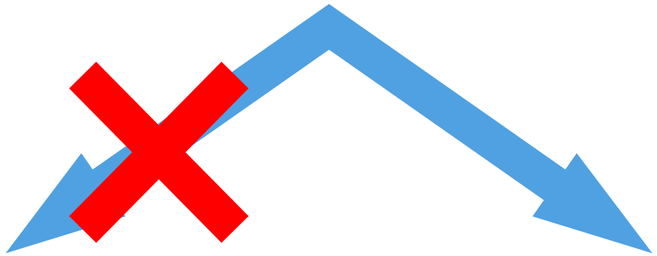
# Automation – why it makes sense!

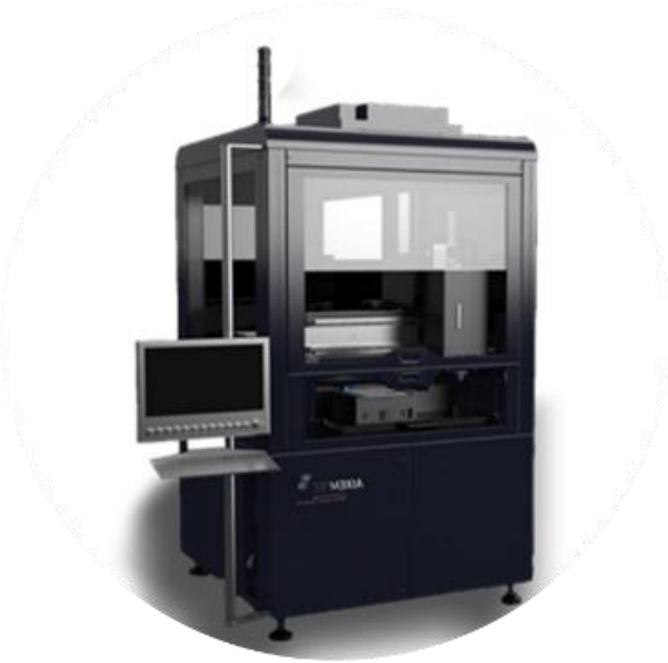
**10k lasers/year**

**=**

**1 laser every 52 min**







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# Automation – why it makes sense!

## Technical

- sub-micrometer alignment precision
- at limit of what is possible by manual assembly

## Economical

- labor resources and regulations in Switzerland
- tariffs uncertainty
- keep IP within company
- manufacturing costs/unit

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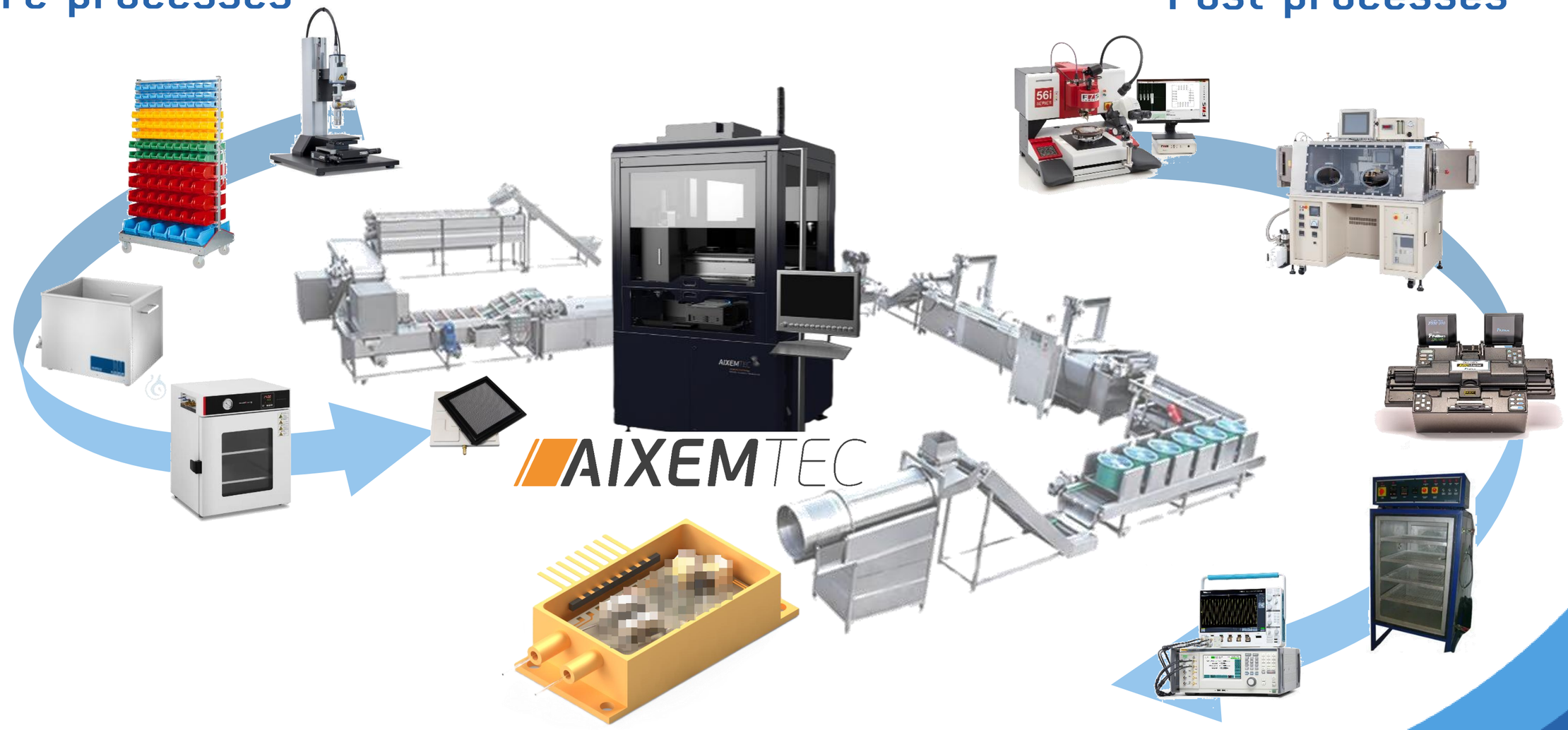
# What it takes…

## Pre-processes

## Post-processes



# Menhir Photonics' approach

## Risks

- numerous developments required
- many things are not our expertise
- parallel development streams
- high investment costs

## Strategy

- focus on core strength – building lasers
- outsource and collaborate

Avoid reinventing the wheel

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# Overview

## Product development

### Wafer-scale optics

- volume manufacturable
- designed for automated assembly
- quality and dicing precision

**price target 5 CHF/optics**

### Assembly machine

- customized solution

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### Laser design

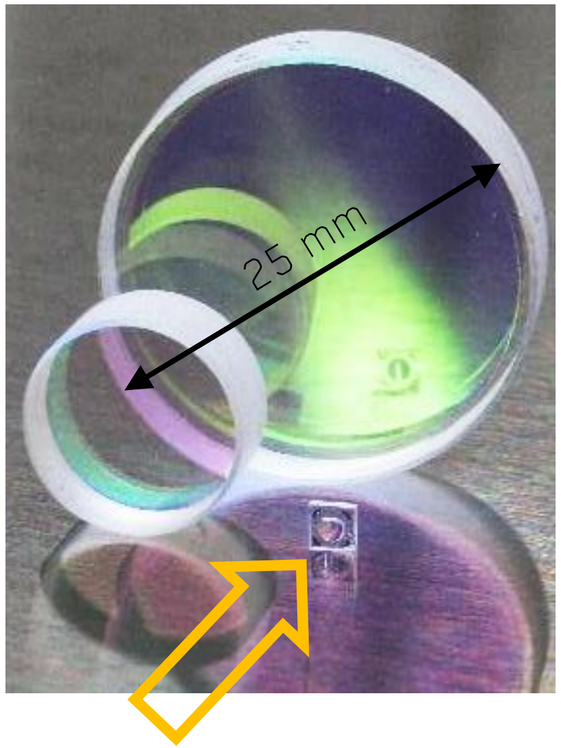
- core competence

### Package design

- hermetically sealed
- temperature controlled

### Fiber collimators

- precision
- scalable design



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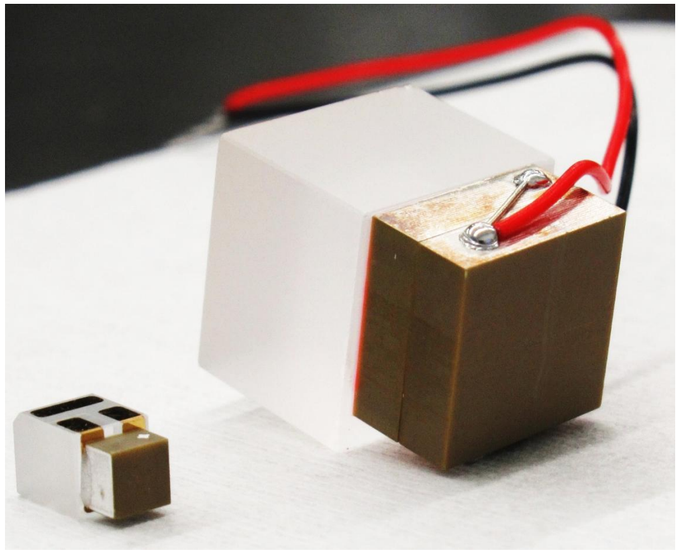
# Overview

## Process development

### Automated assembly
- Menhir core-knowhow



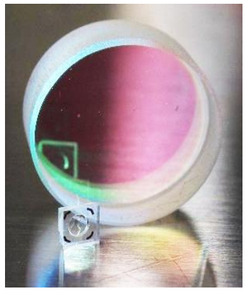
### Pre-processes
- sub-assemblies
- module preparation

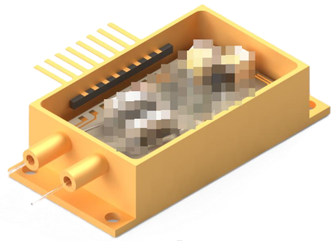
### Adhesive bonding
- curing
- shrinkage
- outgassing

### Post-processing
- wire-bonding
- vacuum bake-out
- hermetic sealing

### Testing and Qualification
- burn-in testing
- standards qualification
- quality management

# Automation Timeline





Today

Wafer-scale optics ready

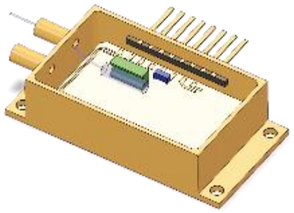
Q2 2026 | Q3 2026 | Q4 2026 | 2027 onwards

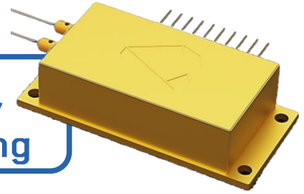
Package ready

Machine ready

First prototype

Wire-bonding, Hermetic sealing





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# Thank you!


**Swiss Accelerator innovation project supported by**

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Swiss Confederation

**Innosuisse – Swiss Innovation Agency**

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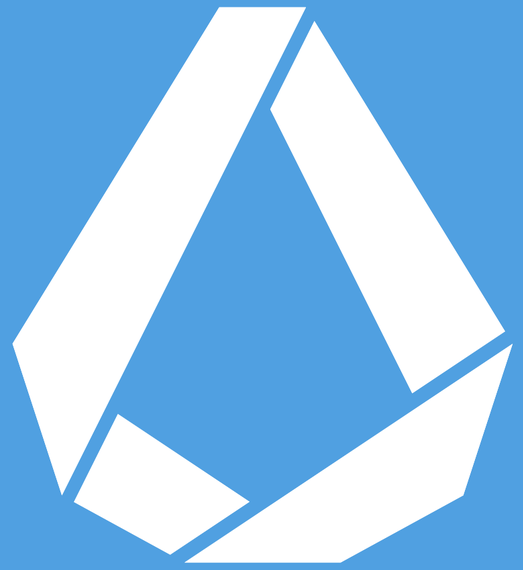

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