The Swiss Photonic Packaging Laboratory (SPPL)

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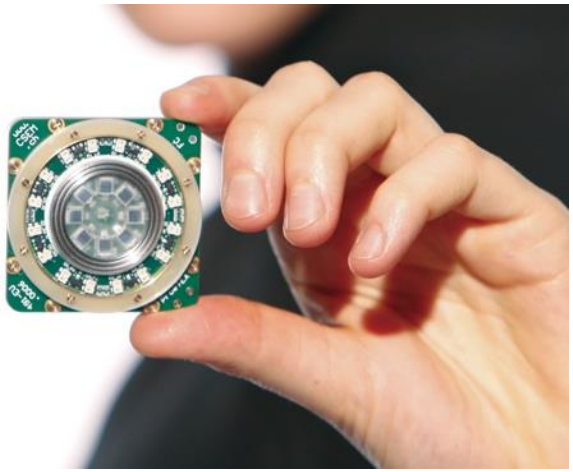


Photonics – benefits for Europe/Switzerland

- Photonics accepted as a EU key enabling technology
- Photonics components and systems
  - Development and integration
  - Automation whenever needed
  - (Small) series production
  - Testing of components
- Benefit for Europe/Switzerland:
  - Today assembly of optical systems is moving to Extreme East
  - Miniaturization and integration means automation:
    - Less dependence on human assembly
    - Possibility of relocating/regrowing industry back to Europe

Made in Switzerland

Made in Switzerland

Aims

- To be a one stop shop contact for the Swiss industries for Photonic Packaging.
- To build up a network with all interested research organisations within Switzerland.
- CSEM will serve as entrance point for customer requests.
- Requests will be discussed within the SPPL.

ensure the best solution for the customer

Background

- Starting point: CSEM Central Switzerland Center
  - The center has a well-equipped photonics packaging infrastructure in a clean room environment including
    - die bonders
    - flip-chip bonders
    - fine alignment stages
    - laser welders

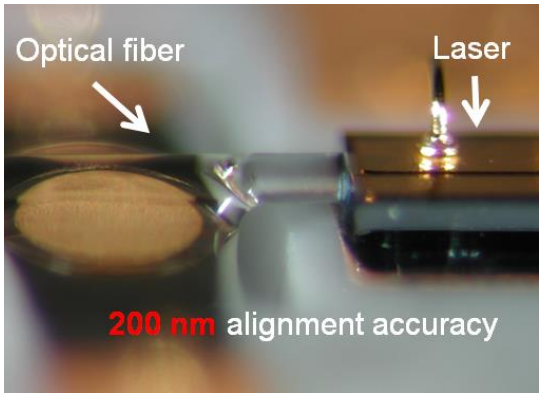
welding, soldering and high-precision (below 1 um) adhesive bonding

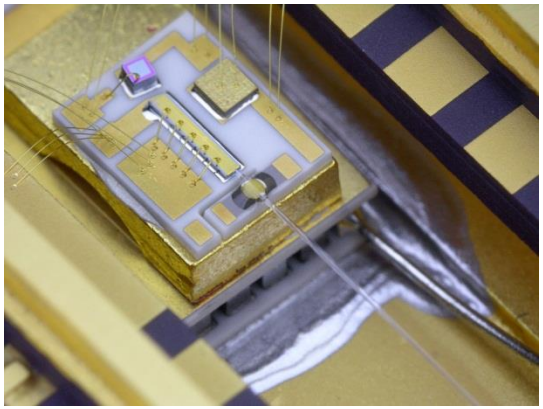
  - The center has successfully carried a number of photonic packagaging projects for Swiss clients including Oclaro, Fisba, Huber + Suhner and Axetris.

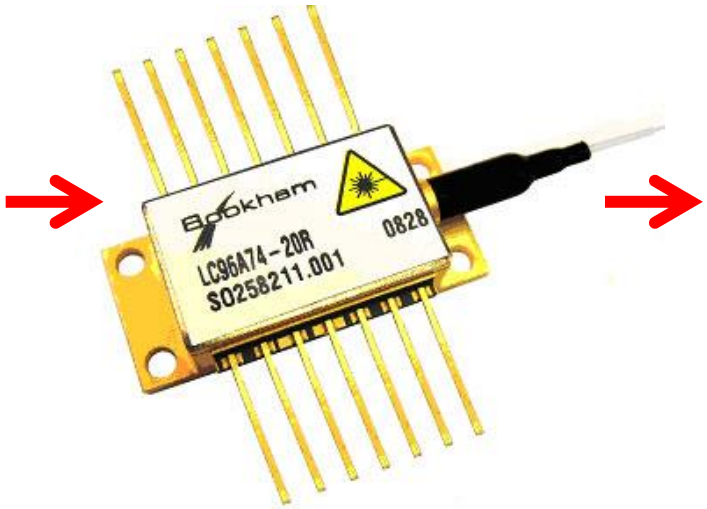
Packaging infrastructure

- Class 10‘000
- Temperature controlled
- Humidity controlled

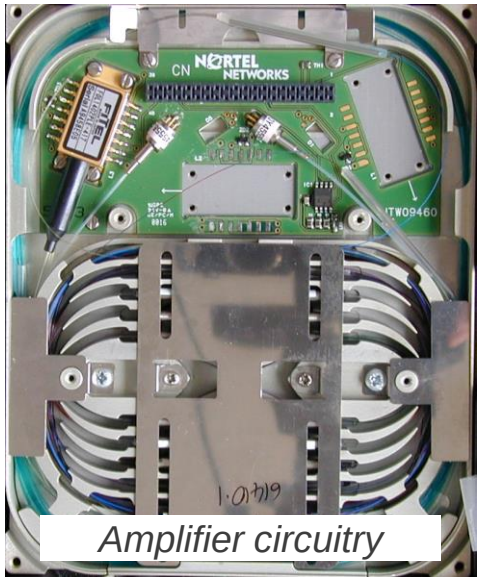
Optical telecom: laser modules





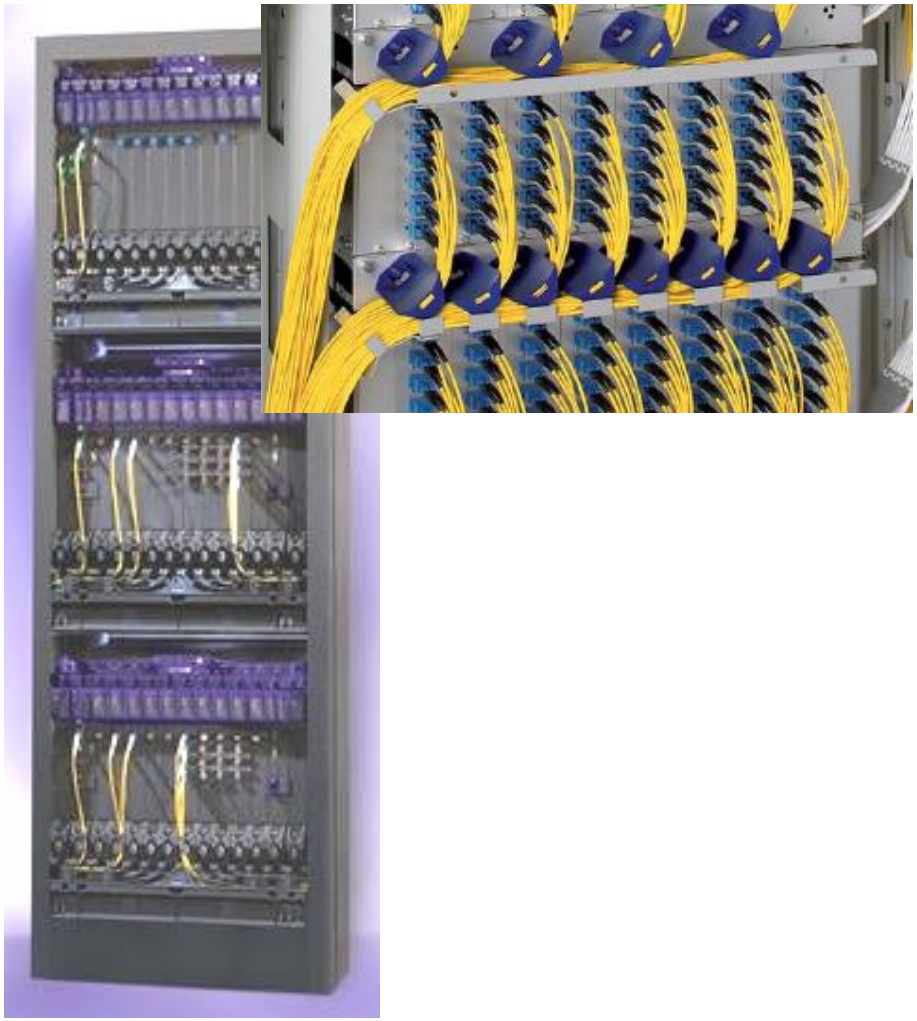


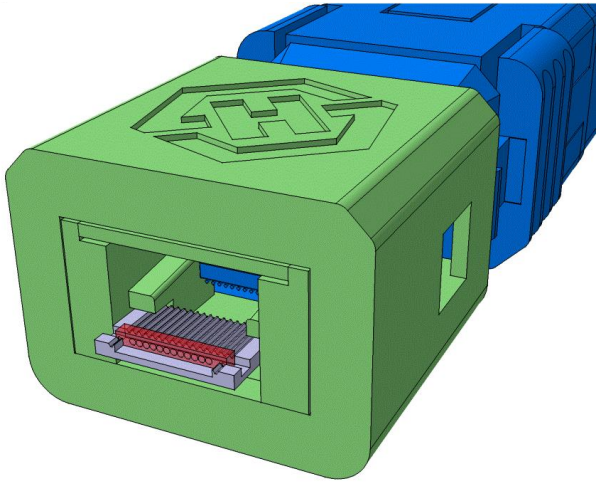
Laser module



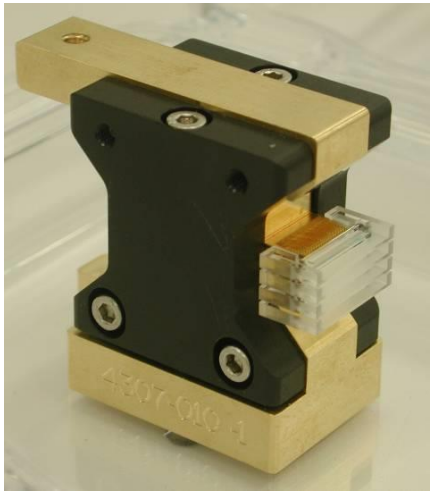
Amplifier circuitry

Optical telecom: multifiber connectors



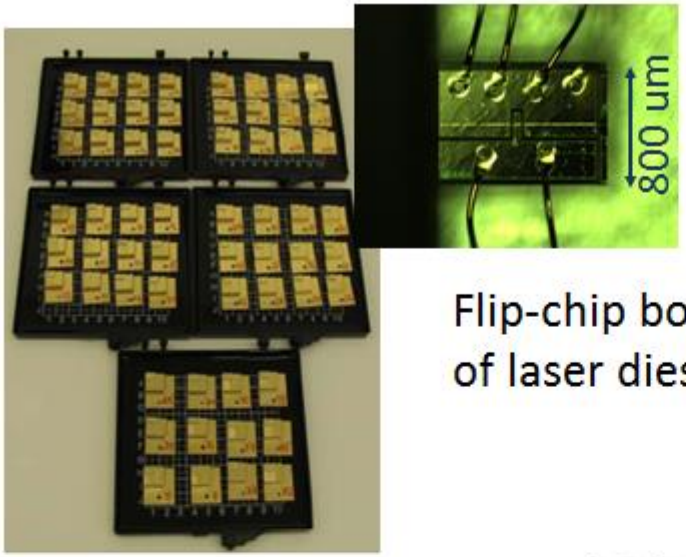


Materials processing



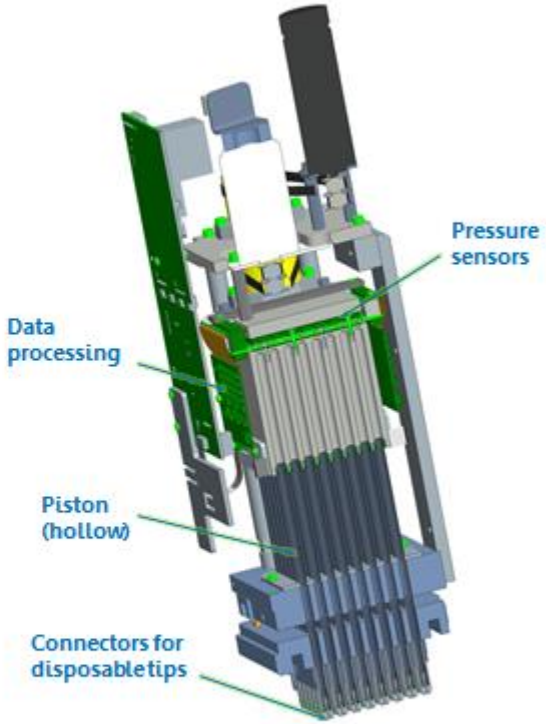
DDP 100

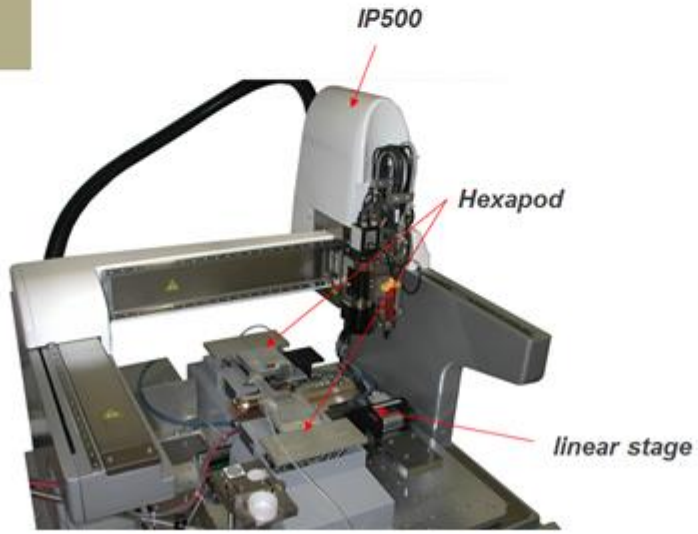
Manufacturing



Flip-chip bonding
of laser dies

Pressure sensing boards





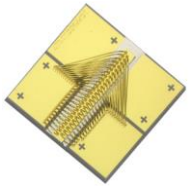
High-precision
adhesive fixing
of optical elements

Proposition - I

- Build up the SPPL to allow the already existing Photonic Packaging Laboratories in Switzerland to become more competitive on an international level and to even better serve the needs of the Swiss SMEs.

- The SPPL will lead to a reduction of the overall packaging development costs by avoiding unnecessary duplication of infrastructure.

- The partners within the SPPL will offer process development and small series production: very important as there are currently still hardly any standards in photonics packaging which is a big cost driver both for development and production.

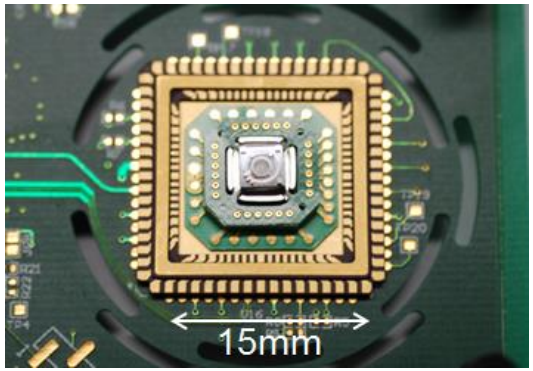


Proposition - II

- Starting point: SPPL composed of CSEM (lead) and 2 – 3 partners (to be contacted)
- After an initial consolidation phase, other partners are welcome to join.
- Closed discussions dedicated to specific topics including
  - high-precision adhesive fixing materials and technologies
  - AuSn and related soldering of optoelectronic components
  - wavelength tunability
  - …
- These discussions will be combined with laboratory visits at the partners' sites.

Proposition - III

- Regular steering meetings (e.g. bimonthly) will take place to align the offer of the SPPL.
- Dedicated small equipment purchase: can help the SPPL members to better support the Swiss industries
- Exchange of instruments between the SPPL members to allow a better use of the existing infrastructure.



Conclusion

- The SPPL will provide many opportunities for the Swiss photonics market including
  - the development of robust, reliable and low cost processes designed for devices/sensors and complete photonic systems
  - precision robot systems for automation
  - manufacturing capabilities through the building up an extension of an infrastructure for process development and pilot and small series