



Big Science
Business
Forum
2022

Industrial perspective on Compact Light

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STRENGTH THROUGH COOPERATION

Outline

1 VDL Enabling Technologies Group

2 Compact Light

3 Successful collaboration

4 Possible improvement

5 Conclusions

Early involvement is key

Our key technologies

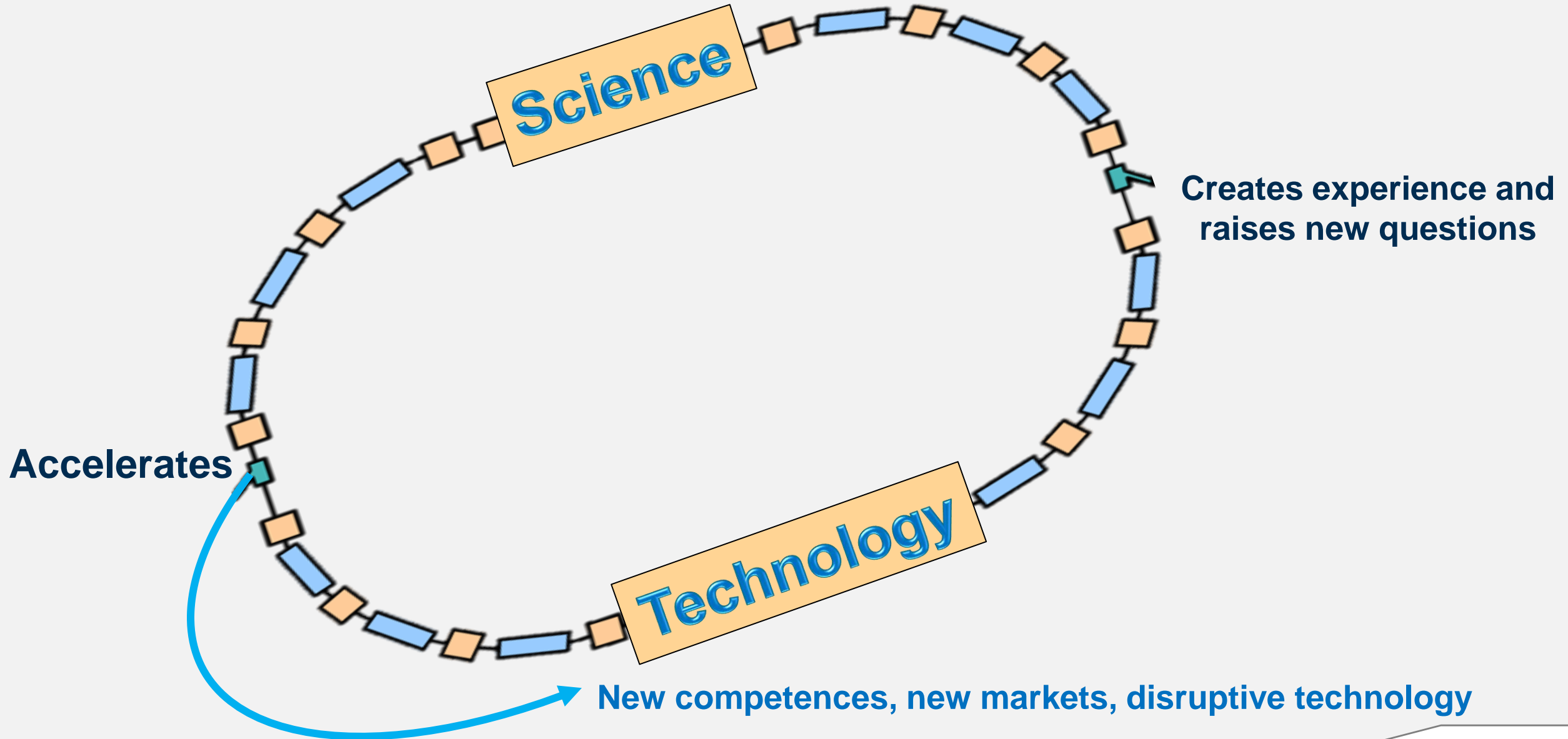


VDL ETG & (Big) Science

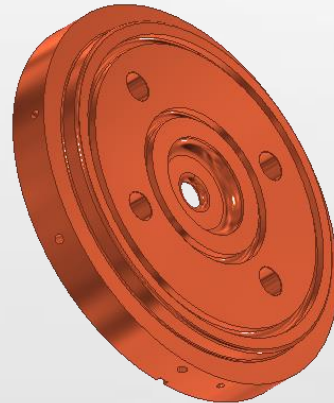
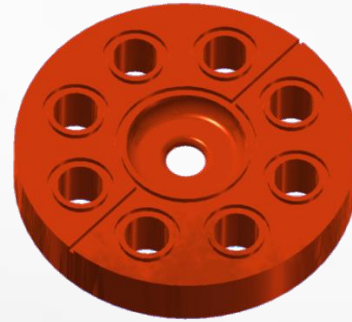
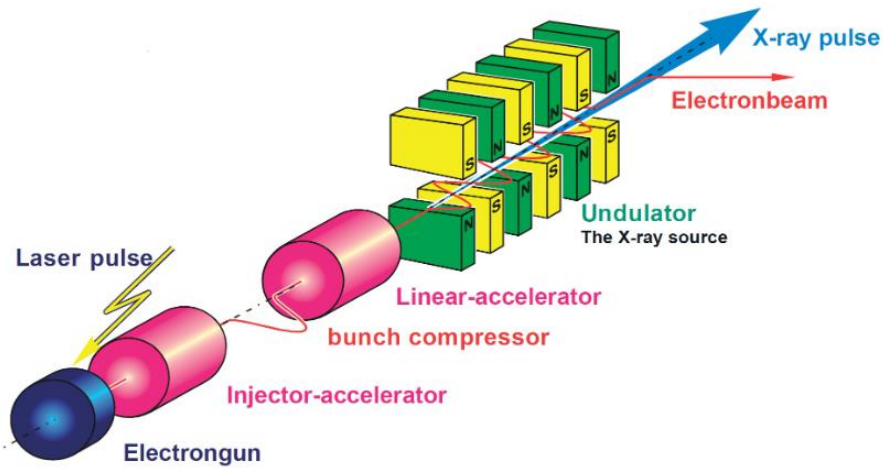


- VDL strengthens its (technical) competences via Science & Technology to better enable our mainstream businesses
- Big science projects and related spin-offs have significant business potential
- Excellent recruitment & marketing tool for the VDL Groep

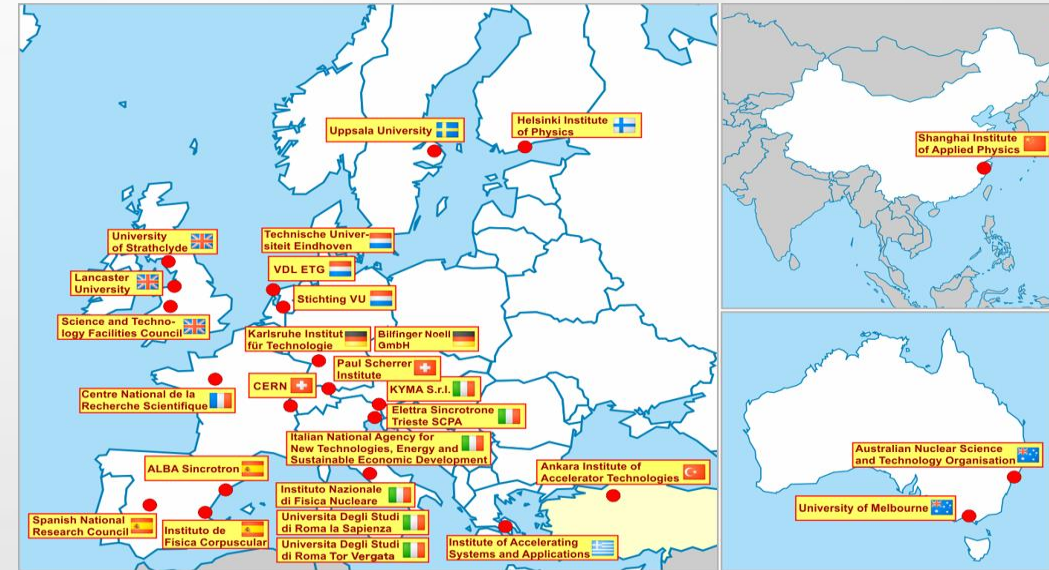
Science & Technology drives competences



Compact Light; a design study for innovative FEL facilities



Collaboration between 22 laboratories and 2 industries



VDL involved in:

- Industrial design of the X-band accelerator
- Design for manufacturing / Industrialisation

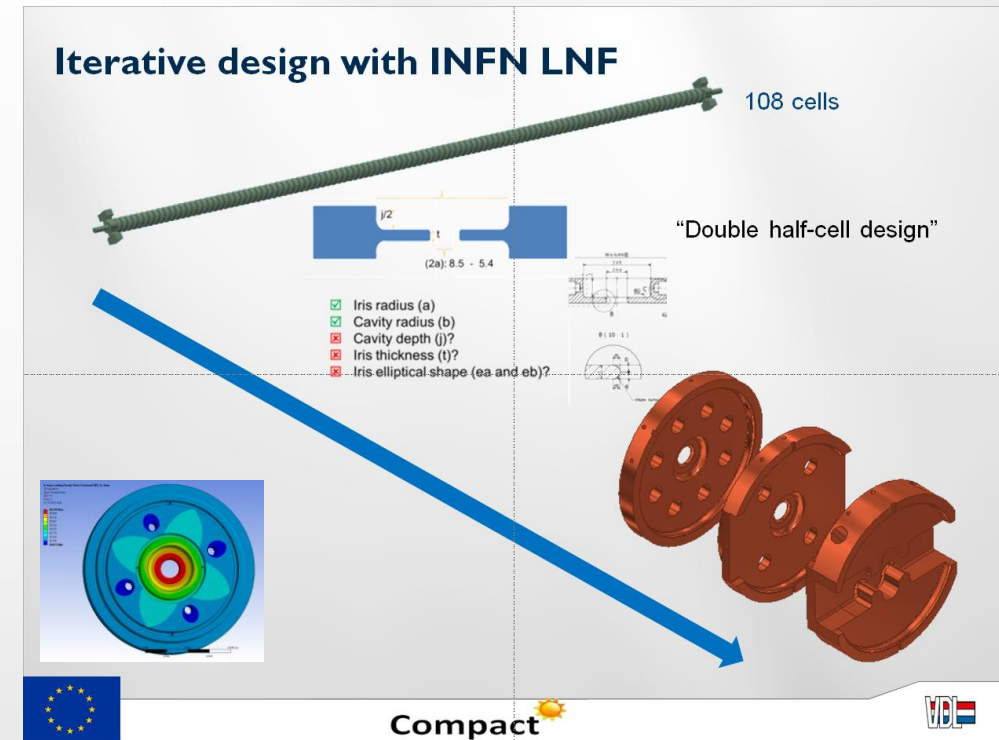
CompactLight is funded by the European Union's Horizon2020 research and innovation programme under Grant Agreement No. 777431.



Compact Light; ultimately a fruitful collaboration

What made this successful?

- Industry involvement from the beginning
 - Manufacturability starts in the design phase
- Leverage each other's strengths:
 - Science is not limited by the project focus an industry has.
 - Science pushes the (technology) limits, whereas industry aims to stay within the control limits.
- The rest are open doors, but still very applicable:
 - Find common ground and build from there
 - Communication!
 - 'Go with the flow' and be flexible
 - Interest in each others challenges.

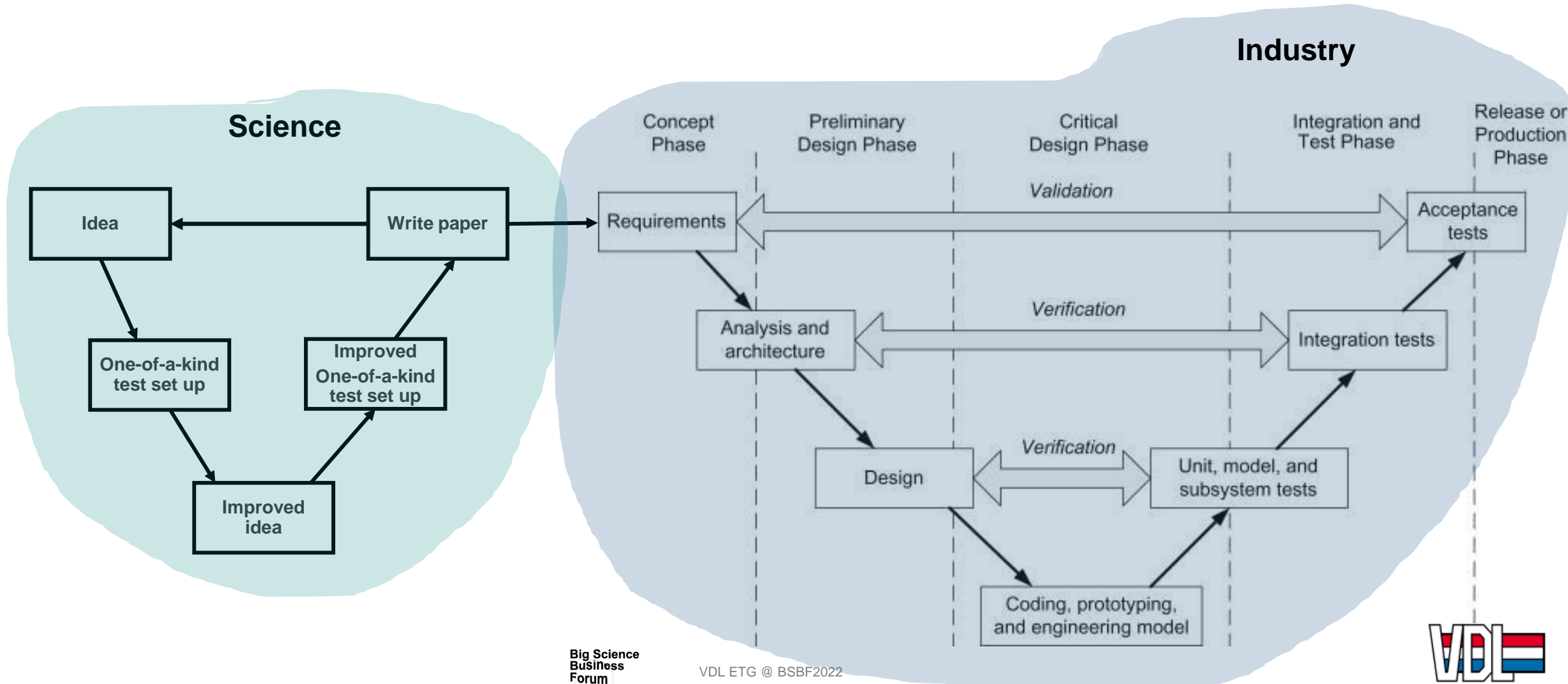


Next step: **IFAST**, where all key parts are made and tested.

VDL focus: both the electron gun and the X-band accelerator

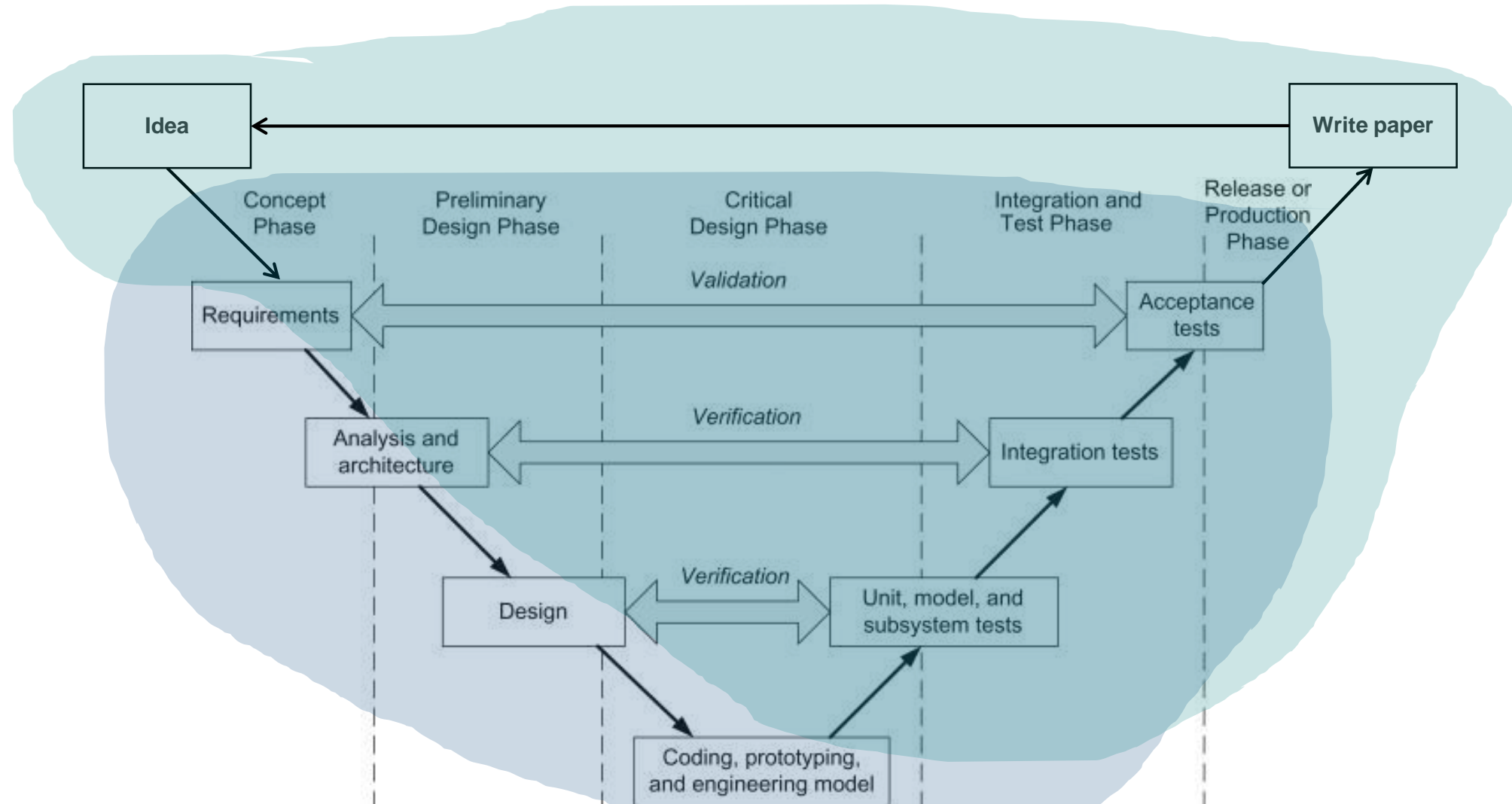
Opportunity to improve; early involvement. Moving from a 'W'

Normal way takes significant time, money & effort



... to a V, to save time, money and effort.

Early 'time to market', with leveraged strengths



Science and Industry

- To enable future innovation (trends), science development is crucial
- To enable future science programs, technology development is crucial

- Overcome the cultural gaps by valuing each others strengths
- Build science-industry teams to address challenges
- Find the overlap between technology concept and product development
- Time to market and costs can be reduced by early involvement from industry

Thank you for your attention!

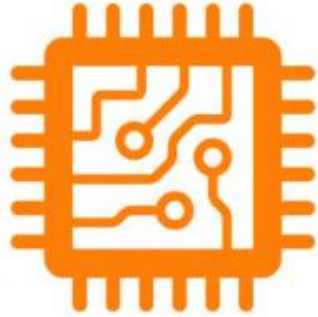
BACK-UP SLIDES

VDL ETG is a turn-key supplier with design capability



VDL ETG Markets

Semiconductor equipment market



Modules for lithography tools
Modules for metrology tools



Medical equipment market



Modules and parts for medical treatment equipment



Analytical equipment market



Modules and parts for analytical equipment



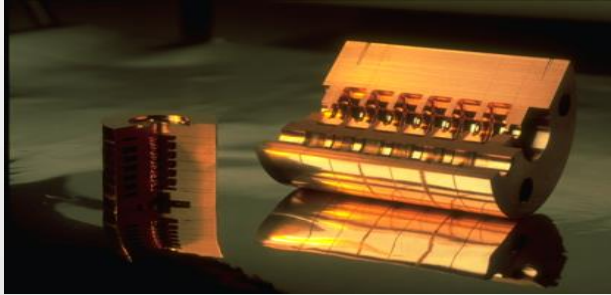
Science and Technology developments



VDL and CERN



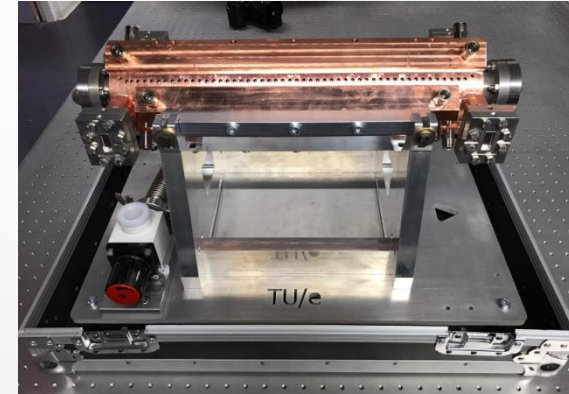
- ✓ Long standing supplier of CLIC prototype parts (since 1989)



circa 1994

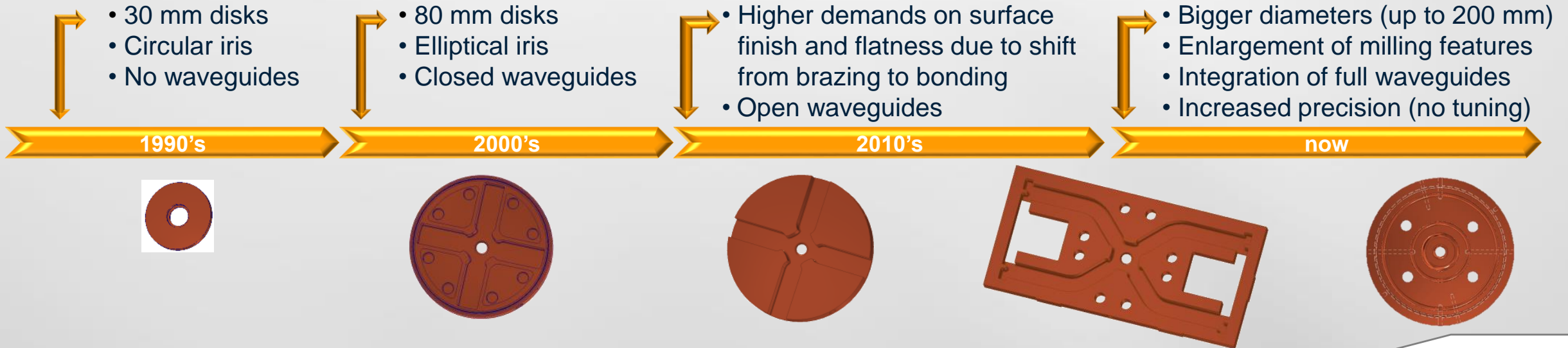


2010



Courtesy of TU/e
2020

✓ Evolution of requirements

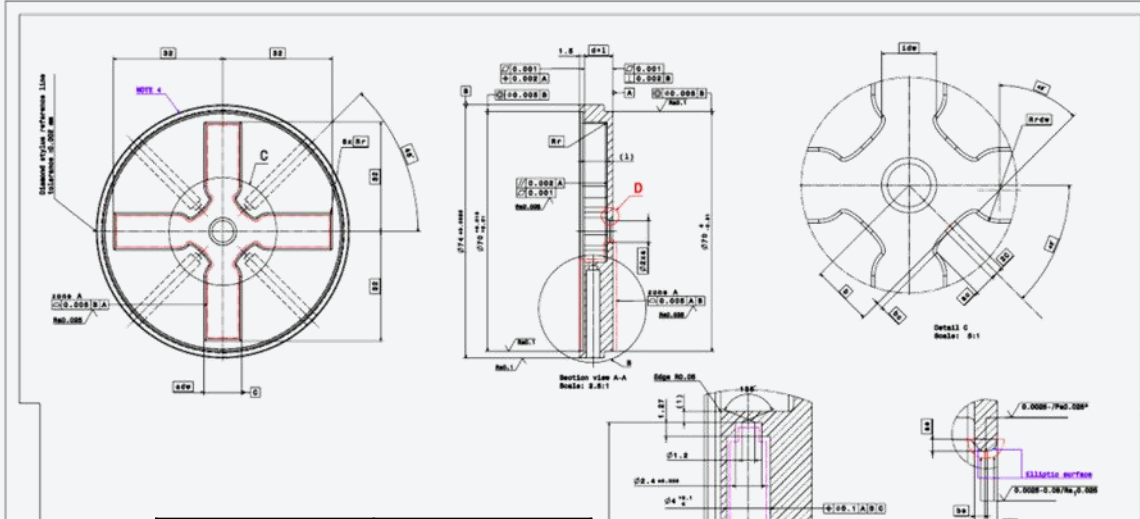


Accelerator structures for CLIC

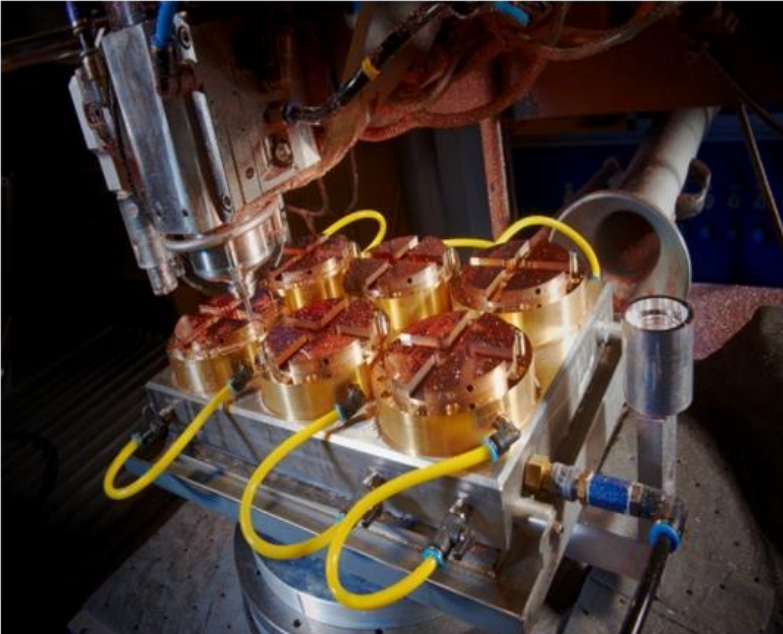
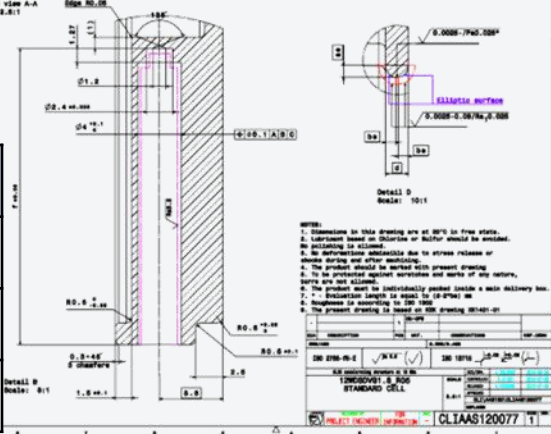


Gained competences:

- Ultra precision machining (UPT)
- Metrology
- Manufacturing strategies
- Part handling and cleaning
- Sub-module assembly



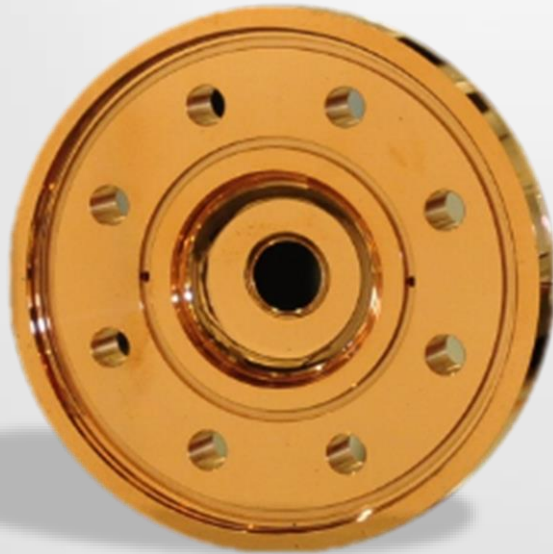
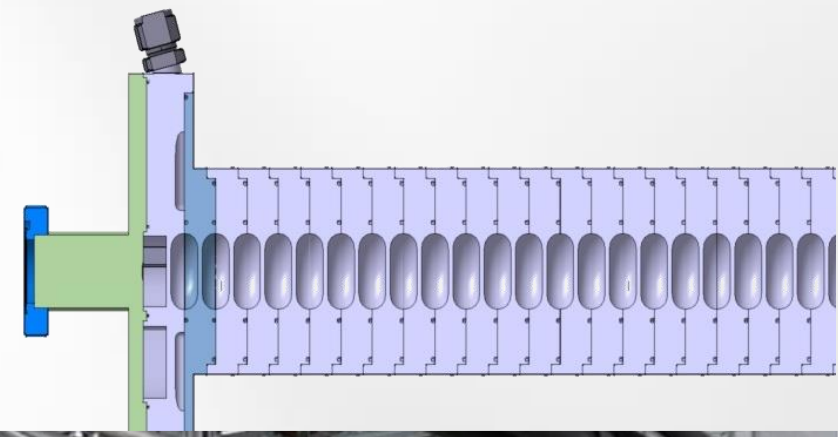
Results	Specified	Achieved
Form	5 μ m	2 μ m
Ra Iris	25 nm	5 nm
Ra Cross	50 nm	25 nm



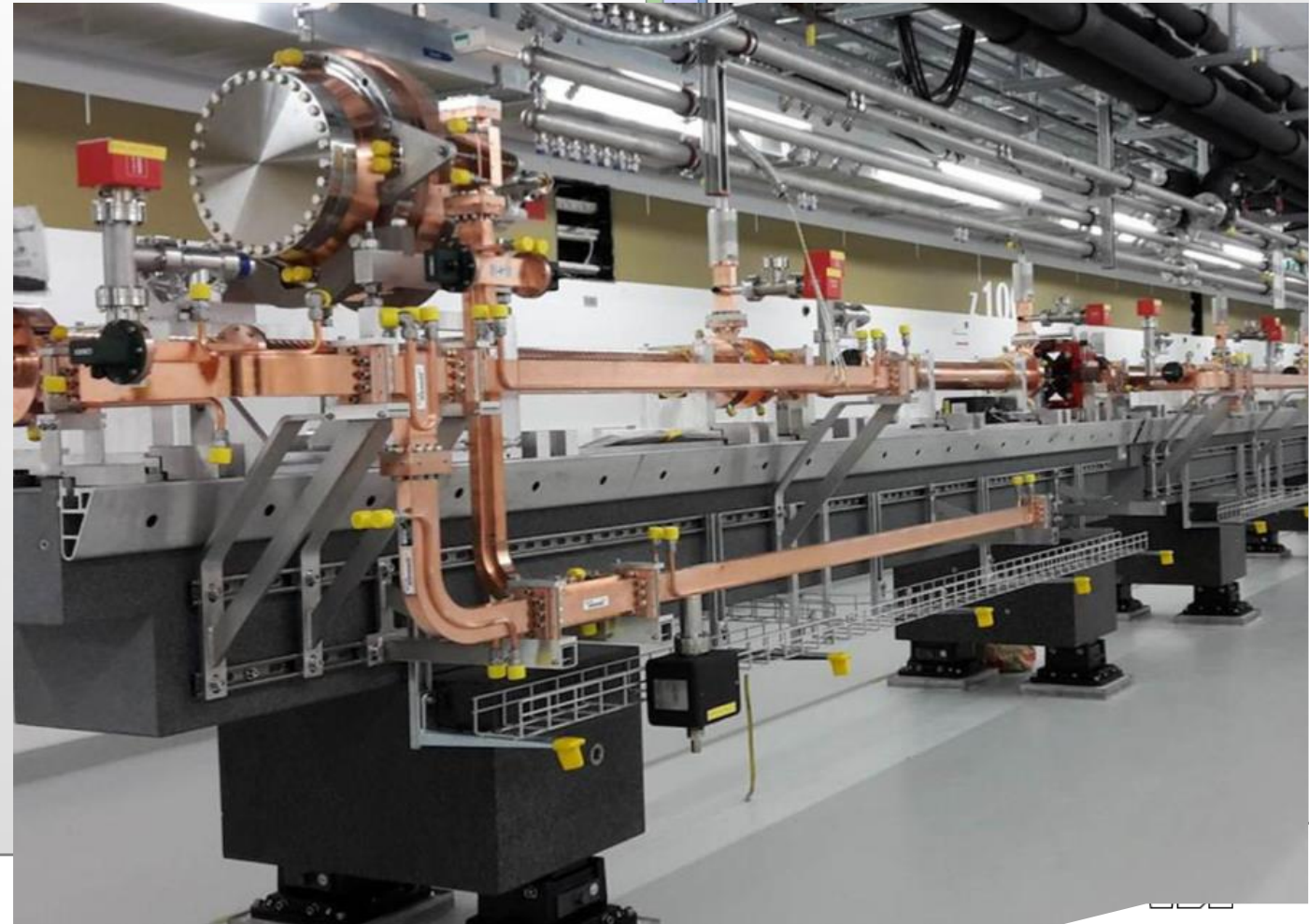
Accelerator projects: SwissFEL

Series manufacturing of 112 structures * 108 cups per structure

= 12 096 discs without polishing within +/- 5 micron



PSI SwissFEL
cavity coupled
linac accelerator

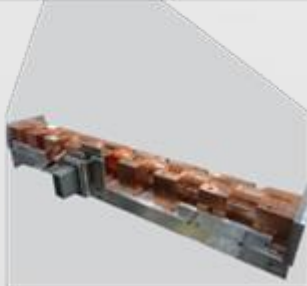


Accelerator projects: Proton therapy ADAM AVO

- LIGHT (Linac for Image Guided Hadron Therapy) developed by ADAM
- First modules delivered for high power test (Low power RF and bead pull test done @ VDL)
- Second device in production



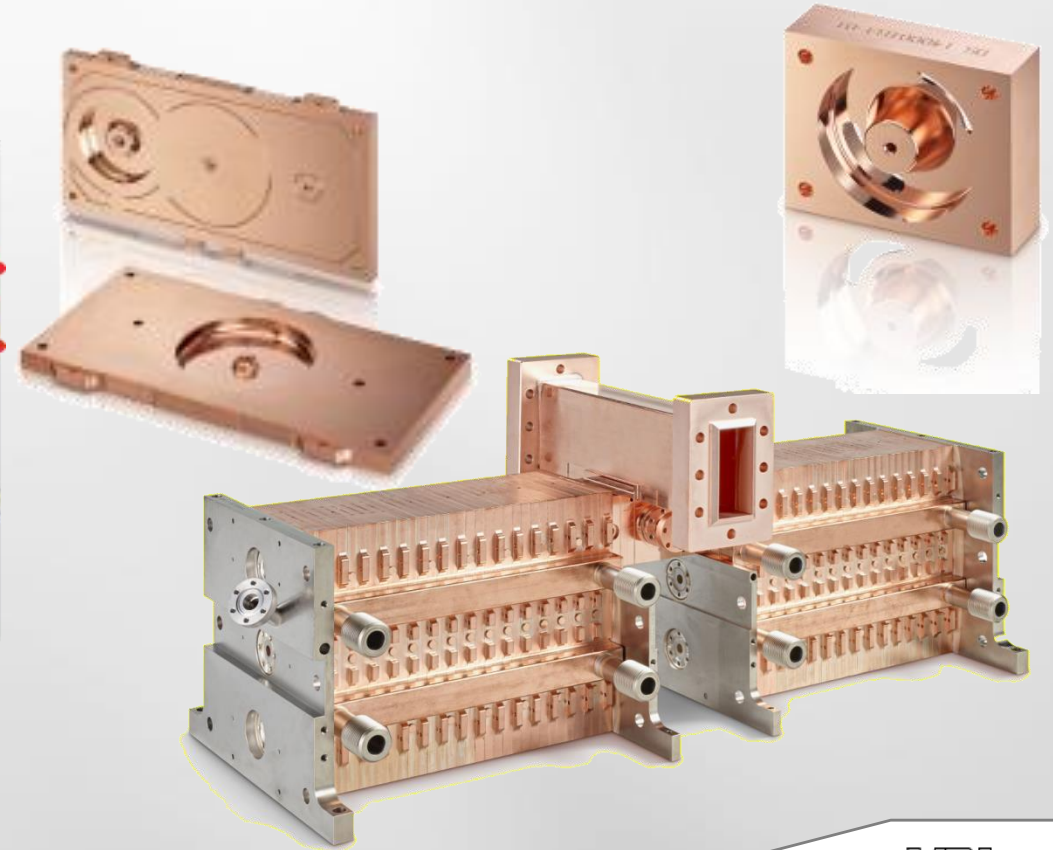
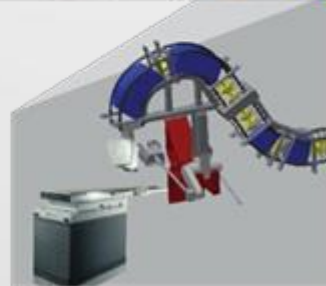
RFQ



SCDTL



CCL

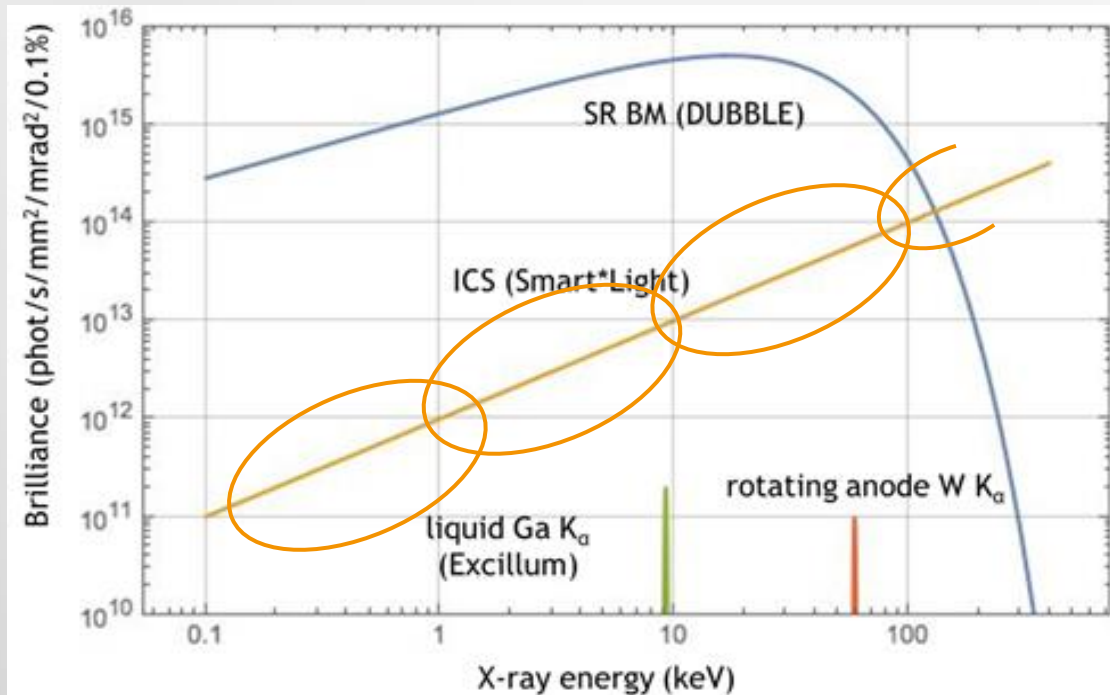


Spin-off collaboration project: Smart Light



Synchrotrons are the most powerful non-destructive diagnostic tool for industry, health, environment and heritage studies

→ Need for more beam time / accessibility and on site measurements



Smart*Light: a table-top alternative

