

Symposium on Big Science, 14NOV 2023  
Hans Priem, VDL ETG



# Sr management's vies on Big Science

Industry perspective of technology driven companies having science not as their mainstream

A large scale, slow, complex, multi-national project where scientists do their thing

Aaaargh....tendering

Technology rich, moving boundaries while building this “thing”

Interesting marketing

>> find out what technology is relevant for us, leverage on the PR

# VDL ETG: high-end contract manufacturing

Facts and figures

**10 COMPANIES**



SPREAD ACROSS  
**3 CONTINENTS**



REVENUE  
**>€1,5 BILLION**



**5500 EMPLOYEES**



**50% EXPORT**



COMPANY ACTIVITIES  
DIVIDED AMONG **>4 MARKETS**



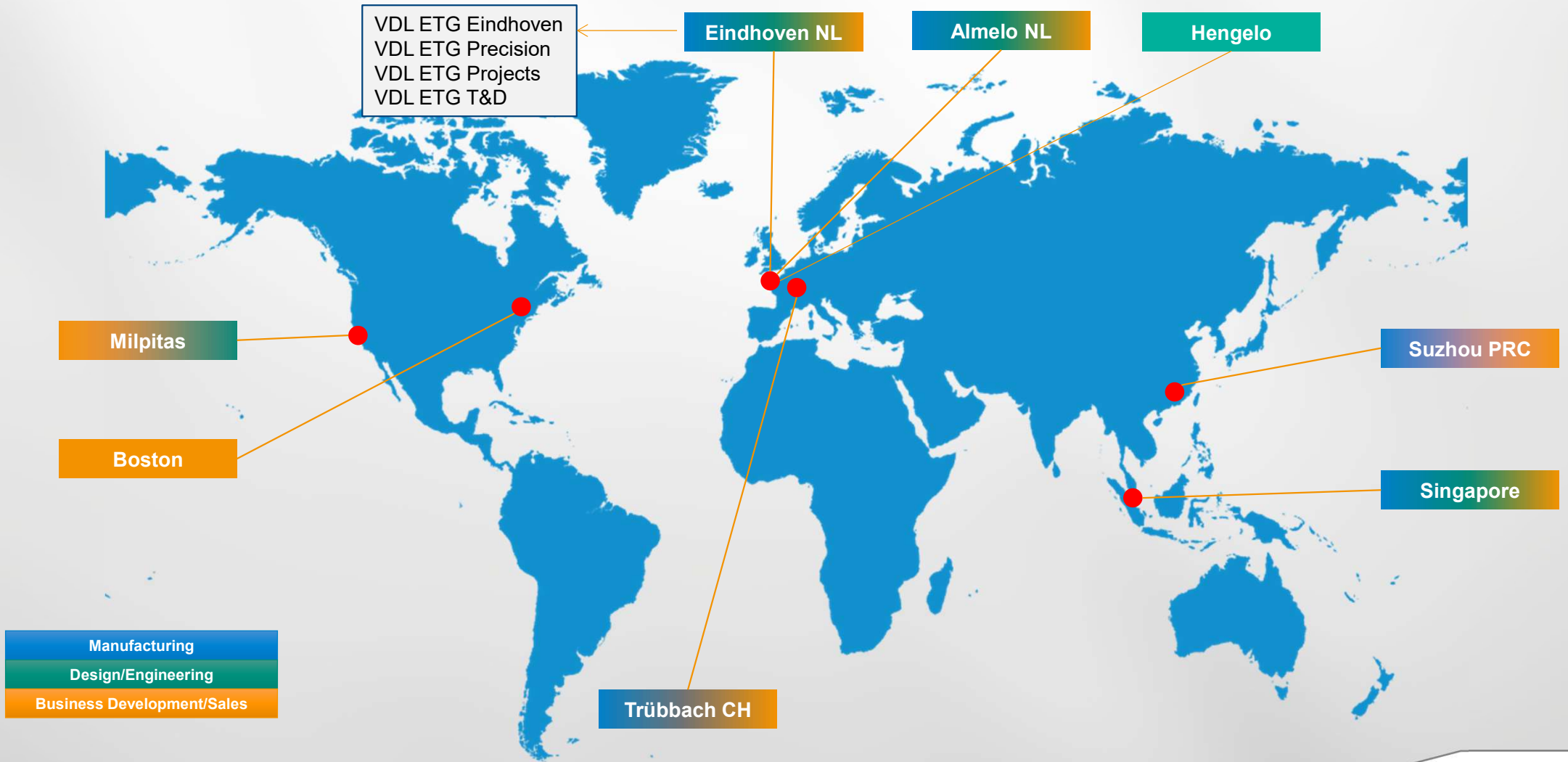
**STRONG** BALANCE SHEET POSITION  
SOLVENCY **54%**



**300,000 M<sup>2</sup>**  
PRODUCTION SURFACE AREA

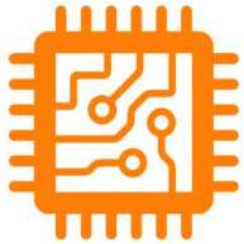


# VDL ETG



# VDL ETG – markets

Semiconductor equipment



Modules for lithography, metrology, inspection & others



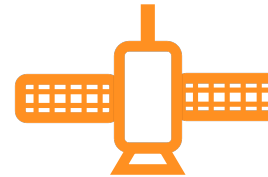
Medical equipment



Modules and parts for medical diagnostics and treatment



Satellites



Modules and parts laser based communication



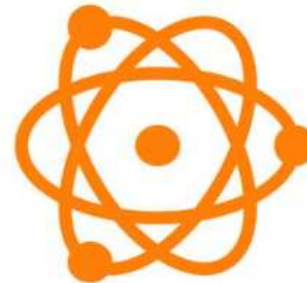
Analytical equipment



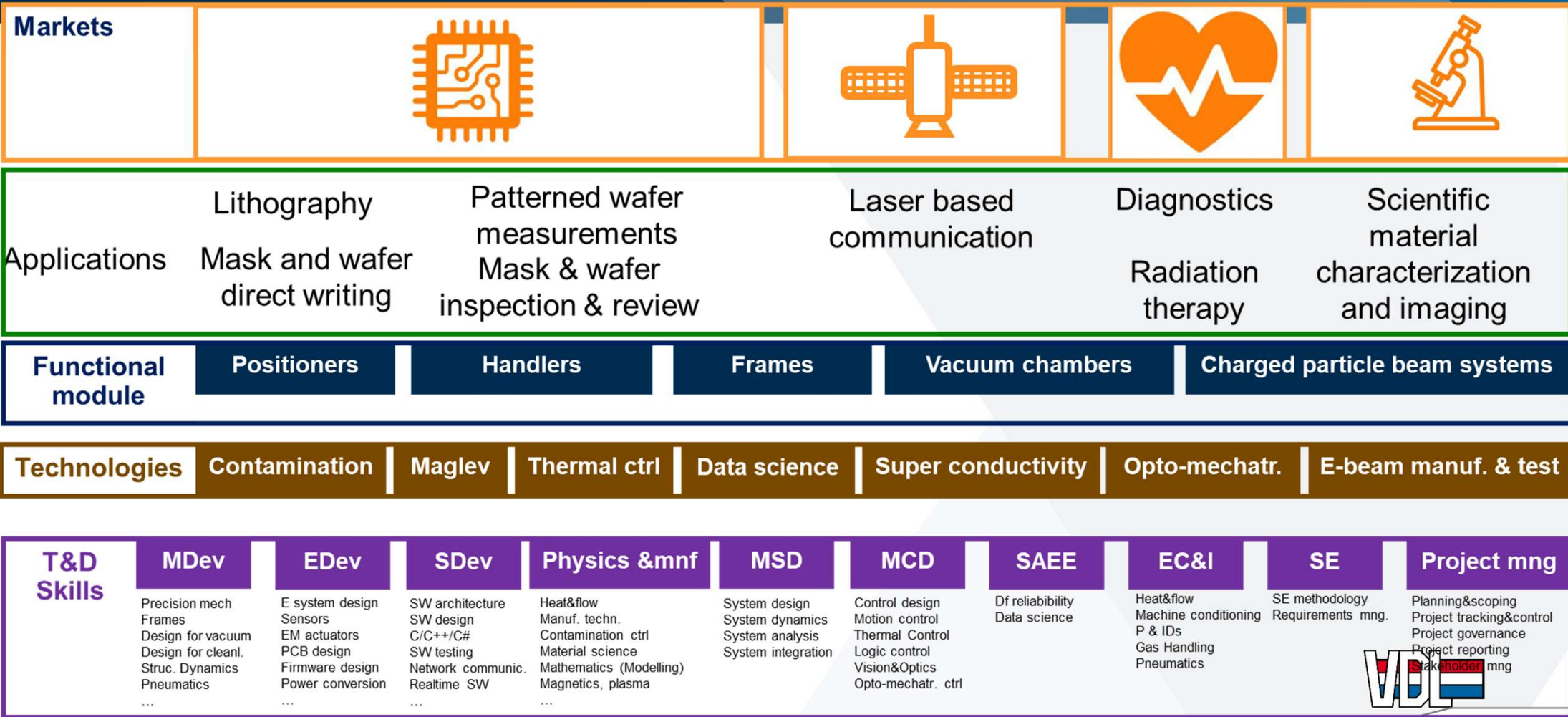
Modules and parts for analytical equipment



Science and Technology



# We manage via the technology axis



Manufacturing technologies to be included (welding, ultra high precision technology,...)

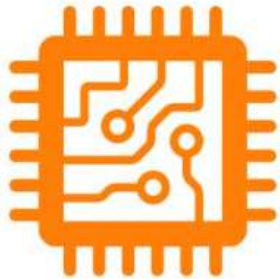


# Our key technologies



# Challenges in our market segments served

## Semiconductor equipment



Modules for lithography tools  
Modules for metrology tools

EUV, E-beam and X-ray  
productivity and yield

Vacuum  
Cleanliness  
Superconductors, cryo  
Precision mechanics

## Medical equipment



Modules and parts for medical  
treatment/diagnostics equipment

Better diagnostics – X-ray  
treatment – proton therapy

Vacuum  
X-ray, proton sources  
Accelerators and RF  
Precision mechanics

## Analytical equipment



Modules and parts for analytical  
equipment

New diagnostic techniques  
More reliable analytics

Vacuum and cryo  
X-ray and E-beam sources  
Cleanliness  
Precision mechanics

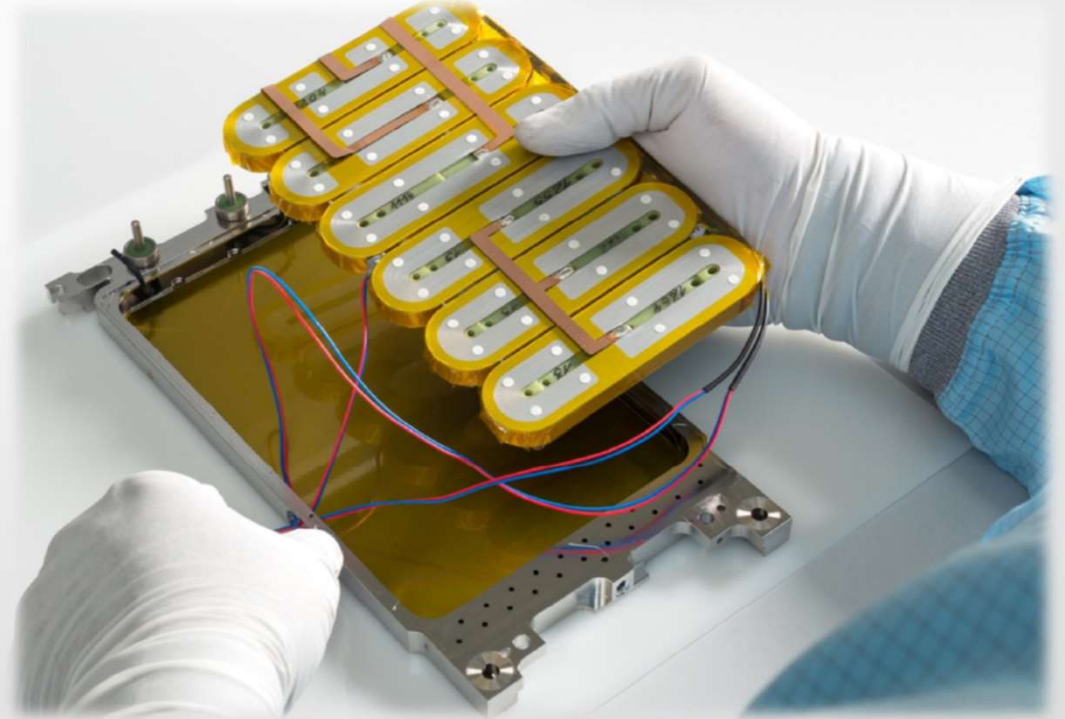
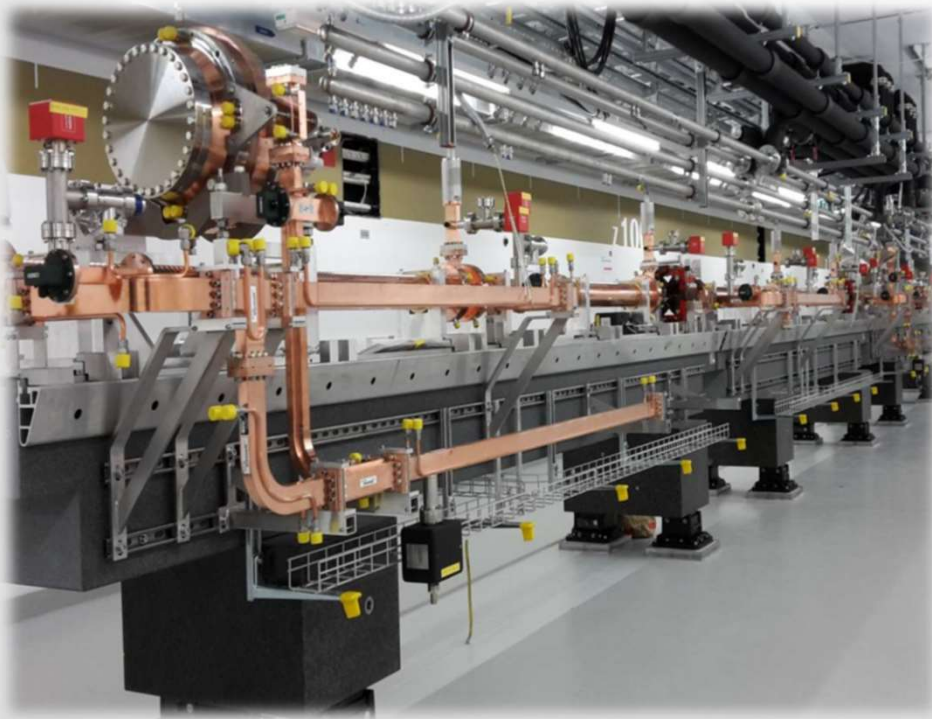


# Science drives our long term innovation power



# Mutual benefits

From research equipment to semiconductor equipment, and back



# We do not see the differences.....

There are many shared challenges in big science and high-tech (equipment)

Unidentified Falling Objects in the Large Hadron Collider:  
Formation, Charging Mechanisms and Dynamics of Dust Particulates in  
a High Energy Proton Accelerator

by

Philippe Belanger

B. Eng., Polytechnique Montréal, 2018



27 May 1996

**Contamination control in semiconductor  
manufacturing and particle deposition on wafer  
surfaces**

Benjamin Y.H. Liu

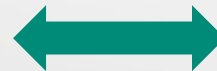
Author Affiliations +

Proceedings Volume 2714, 27th Annual Boulder Damage Symposium: Laser-Induced Damage in Optical  
Materials: 1995; (1996) <https://doi.org/10.1117/12.240427>

Event: Laser-Induced Damage in Optical Materials: 1995, 1995, Boulder, CO, United States

Accelerate Materials Insights with Our New Cold Field  
Emission Electron Gun for Atomic-Scale High-Resolution  
TEM

By Yuri Rikers  
01.20.2022



21 July 2000

**Double-shielded objective lens system for  
electron-beam lithography system**

Hiroya Ohta, Yasuhiro Sameda, Yasunari Sohma, Norio Saitou, Shin-ichi Katoh, Hiroyuki Itoh

Author Affiliations +

Proceedings Volume 3997, Emerging Lithographic Technologies IV; (2000) <https://doi.org/10.1117/12.390106>

Event: Microlithography 2000, 2000, Santa Clara, CA, United States

Carbon Nanotubes as Cold Electron Field Emitters for Electron Cooling in the CERN Extra  
Low Energy Antiproton (ELENA) Ring

Bruno Galante (CERN and Cockcroft Inst. Accel. Sci. Tech. and Liverpool U.), Ozgur Apsimon (Liverpool U. and Cockcroft Inst. Accel. Sci.  
Tech.), Javier Resta-López (GACE-ICMUV), Gerard A. Tranquille (CERN), Carsten P. Welsch (Liverpool U. and Cockcroft Inst. Accel. Sci.  
Tech.)

Aug 16, 2021



**Magnetic characterization of Mumetal® for passive shielding of stray fields down to the nano-Tesla level**

Arpaia, Pasquale (Naples U.) ; Burrows, Philip Nicholas (JAI, UK) ; Buzio, Marco (CERN) ; Gohil, Chetan (JAI, UK ; CERN) ; Pentella, Mariano (CERN ; Turin Polytechnic) ; Schulte, Daniel (CERN)

7 p.

*Nucl. Instrum. Methods Phys. Res., A* 988 (2021) 164904

[10.1016/j.nima.2020.164904](https://doi.org/10.1016/j.nima.2020.164904)

Accelerators and Storage Rings

CLIC

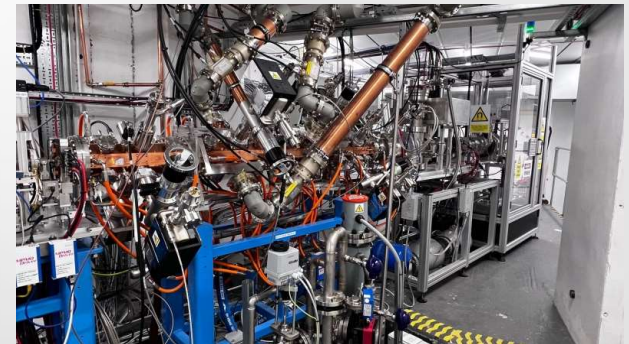
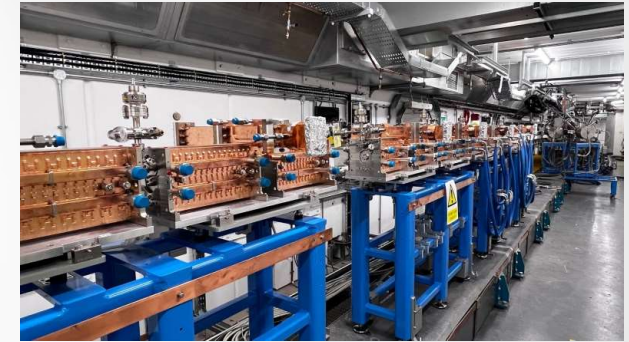
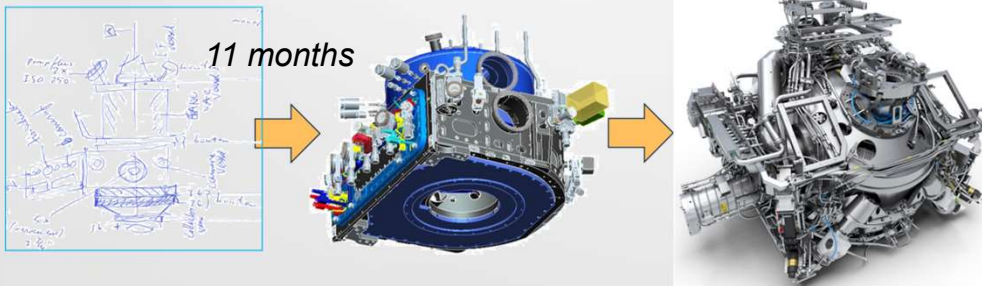
# Why do we need each other?

## Rationalizing a natural fit...

- **Development cycles are shortening – shorter time from new technologies to application**
- Equipment complexity is increasing – increased demand for new technologies to help address
- Process complexity is increasing – demand for improved technologies
- Requirements overlap
- Big science gets big – high-tech equipment does as well
- More fundamental understanding of materials and material science
- Where else does industry find the time to look into the fundamentals?

# Right now..technology hitting the market takes too long

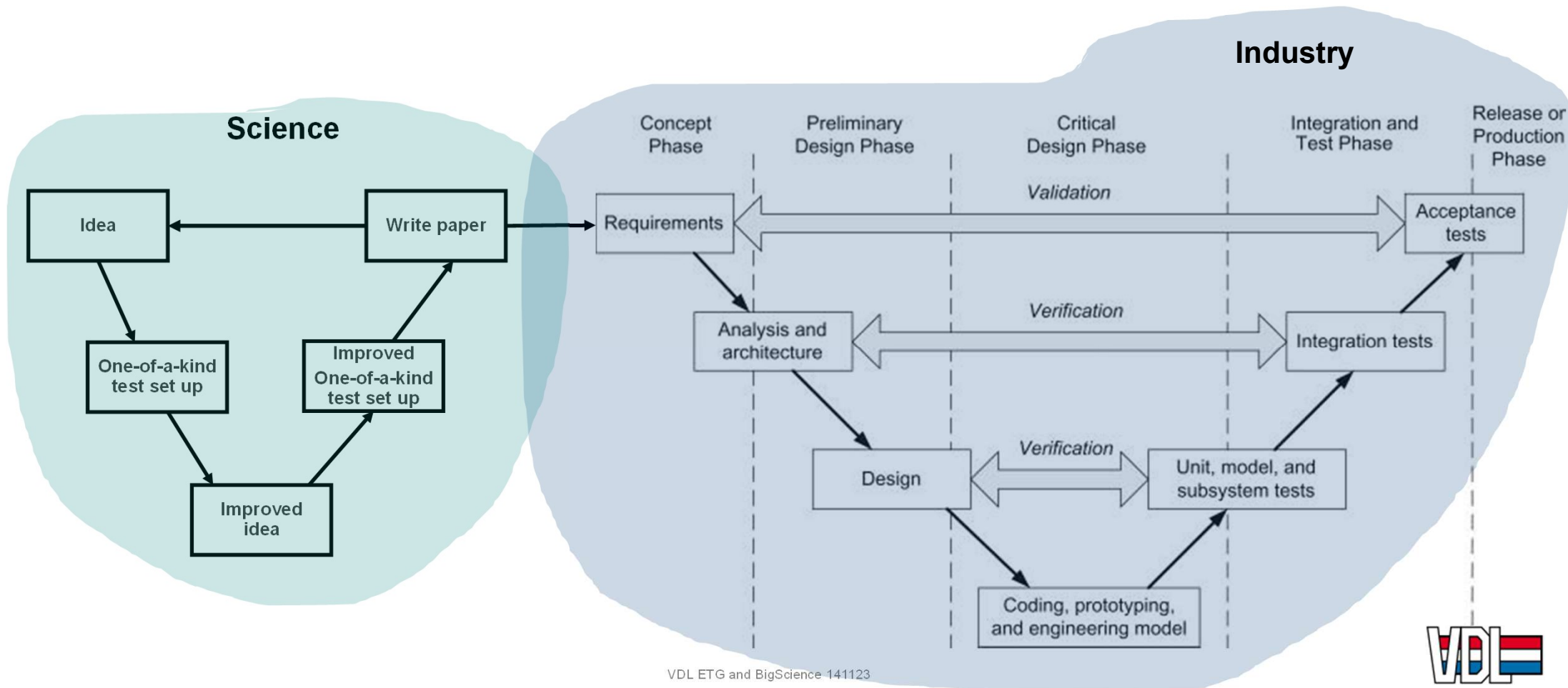
- ICS (CLIC based) 5 years, no light
- Proton therapy (RFQ) 7 years, almost there
- Radio therapy (NASDAQ) technology from the 1960s



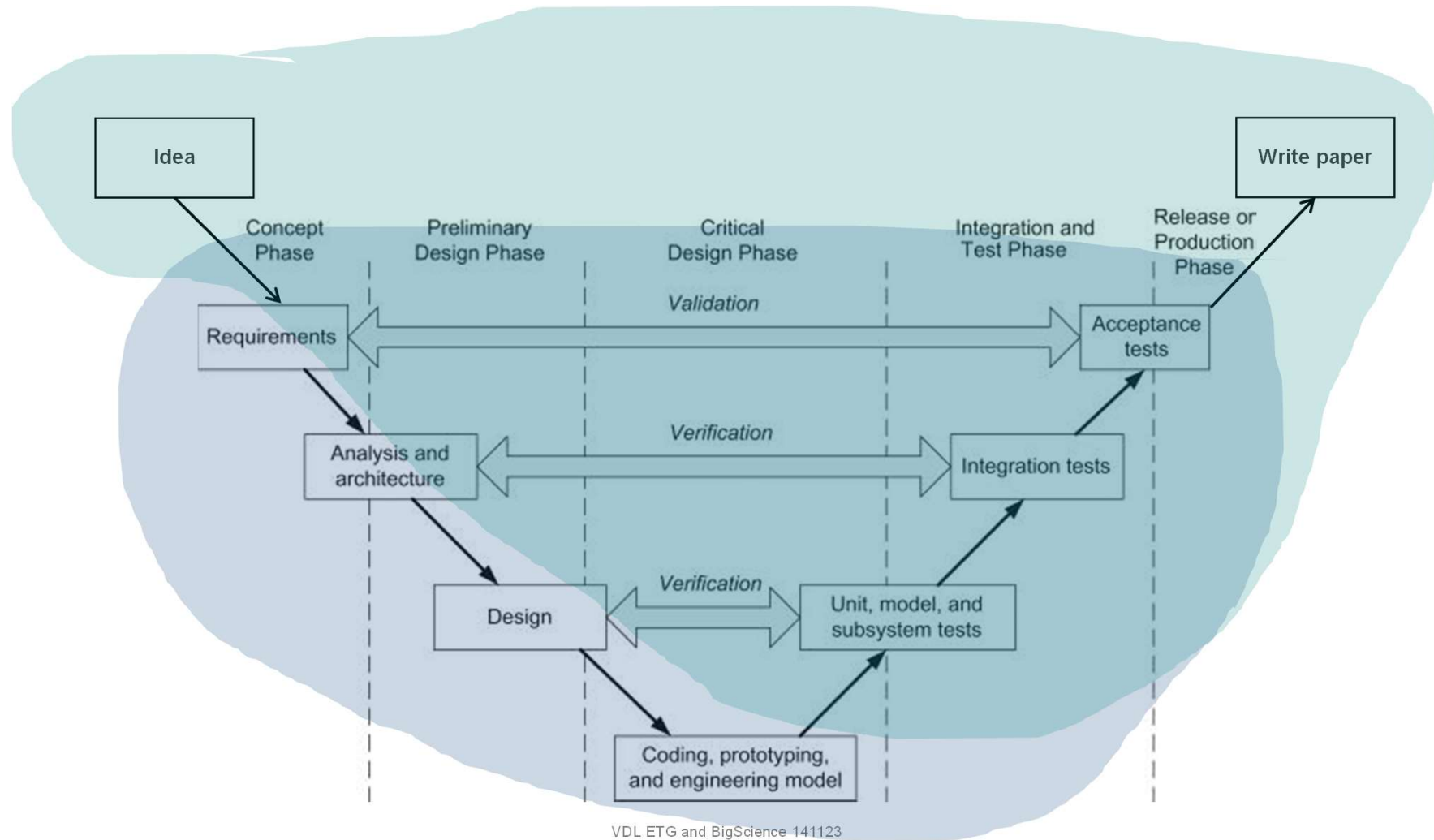
- The process from fundamental science to concept to product takes much too long, hampering innovation

# For example.. Moving from a 'W' to a V

Old-fashioned way takes significant time & money



# Leverage strong points of both; science and industry



# How can high-tech industry benefit from big science?

Let's take a suggestion from ChatGPT

In summary, the high-tech industry can benefit from big science through

- Collaborations focused at WIN-WIN
- access to data and knowledge,
- technology transfer,
- commercialization opportunities, and
- talent development.

The partnership between big science and the high-tech industry can drive innovation, create new business opportunities, and contribute to technological advancements with wide-ranging societal and economic impacts.



# Introducing PSI

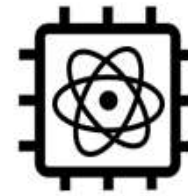
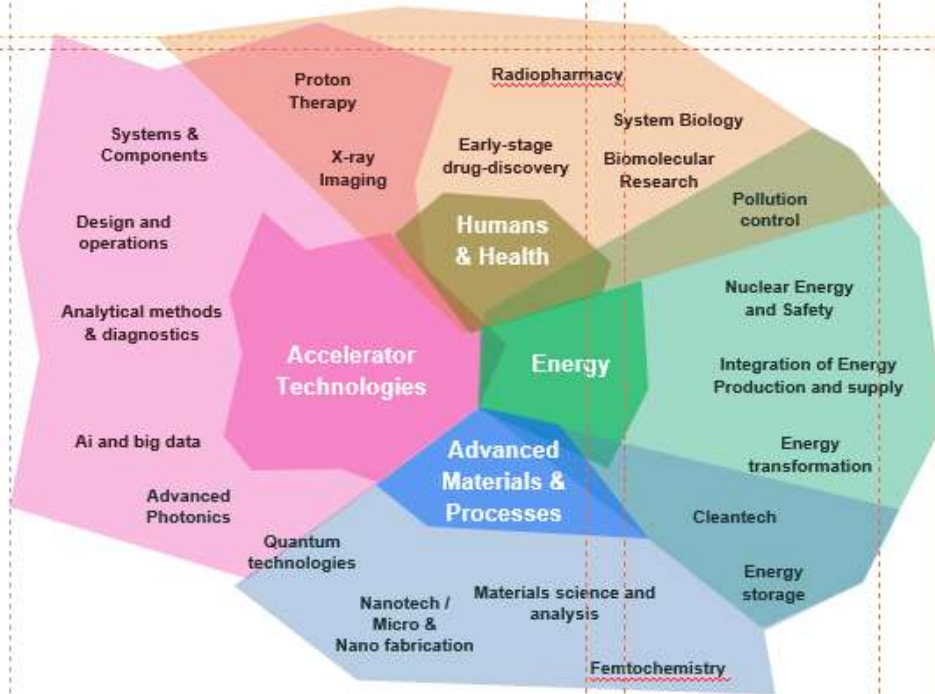


# Introducing Innovaare

# PSI science focus is matching the VDL ETG focus



## Focus Areas at Park Innovaare



Advanced Manufacturing & Semicon Tech

Photonics & Quantum Tech

Energy and Sustainability

Life Sciences

# Announcement

Switzerland Innovation Park Innovaare, **a leading, globally connected deep-tech innovation hub, together with its key founding partner Paul Scherrer Institut PSI and leading park member company VDL Enabling Technologies Group (ETG) (VDL ETG), are pleased to announce a new framework of high-tech equipment competence centers.**

Leveraging the multi-sector synergy between PSI's Deep-Tech fundamental research and VDL ETG's engineering capabilities, this initiative effectively forms a novel, geographically centralized industry and R&D cluster at Switzerland Innovation Park Innovaare and will provide industrial-scale enabling technologies to the Park Innovaare ecosystem members and the larger ecosystem. The initial focus will be on applications in semiconductors metrology, inspection and analytics, as well as optical communications.

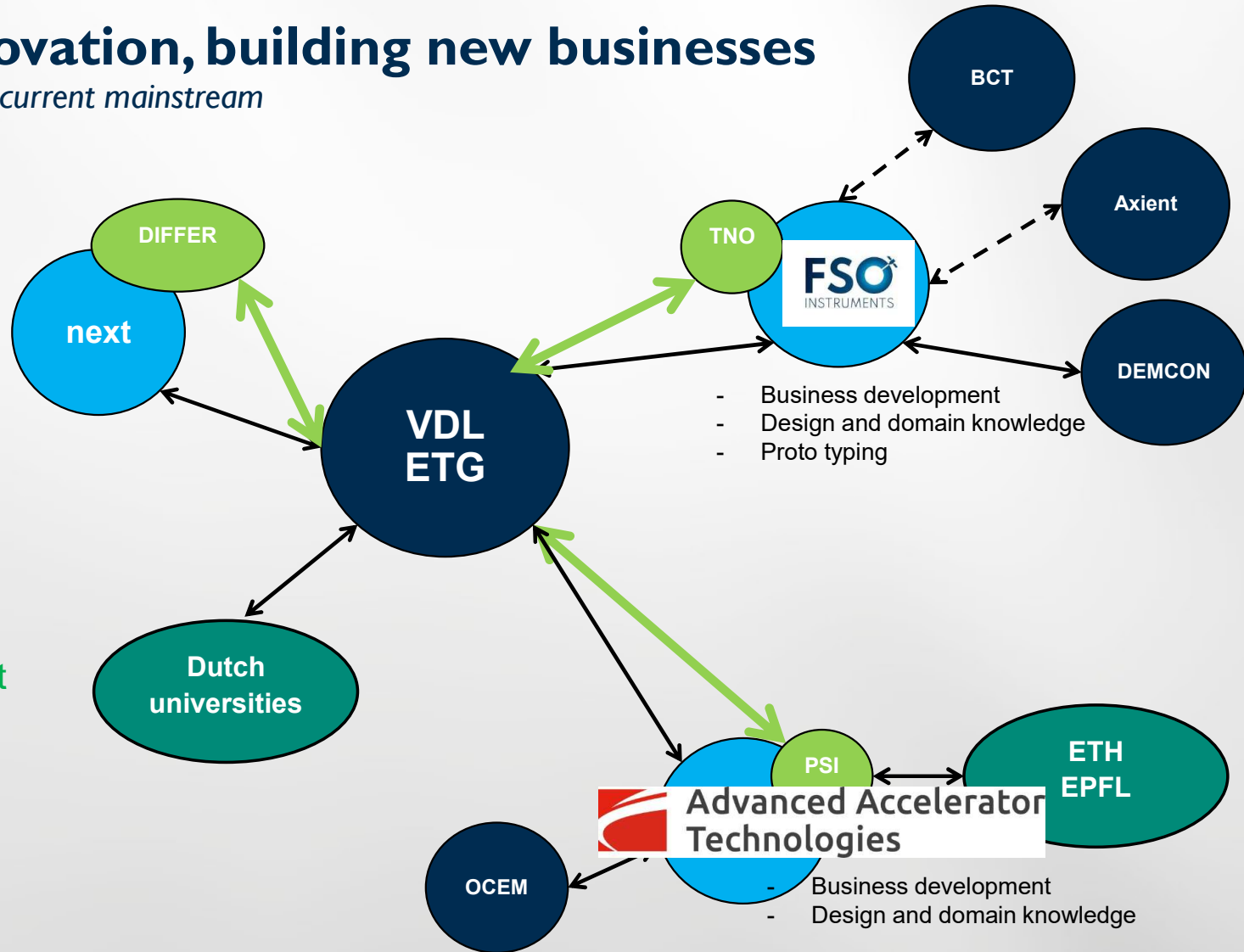
# We look for leverage

## Not from ChatGPT

- We build semiconductor equipment, medical and analytical equipment
- Big Science, large scale projects, are not in the core of our sales plans
- So..no opportunistic behavior
- We focus on partnerships with relevant science; eg accelerator technology, astronomy, fusion
  - Positioning, magnets, engineering, cryo technology, joining, coatings, high(est) vacuum,..
- We focus at building international networks of partners to address science challenges, which in the long term benefit our current of future mainstream business
- Large scale projects / big science cooperation is at the core of our strategy

# Boosting innovation, building new businesses

*..while strengthening our current mainstream*



- Technology benefitting current mainstream
- Manufacturing
- Business

## Question to the panel

Snelheid en innovatie-kracht is key voor het succes van/in Europa.

De doorlooptijd die nieuwe technologie / competences (zoals ontwikkeld door BS) er over doet om succesvol te worden toegepast door ondernemingen is te lang. Hierdoor lopen we windows of opportunity mis. We wereld draait tenslotte sneller en sneller.

Hoe kunnen we deze tijd minstens halveren?

