# The VDL high tech ecosystem

ET industry update

VDL Science & Technology, Hans Priem

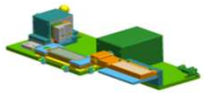
# VDL Groep

- Established in 19 countries
- > 90 operating companies
- > 16,000 employees, privately owned
- Turnover > €5 billion *(2017)*

| Sub contracting | Bus group | Finished products | Car assembly |
|---|---|---|---|
| ▪ mechatronic systems<br>▪ module assembly<br>▪ part and sheet metal<br>▪ surface treatments<br>▪ plastic processing | ▪ touring cars<br>▪ public transport bus<br>▪ mini and midi busses<br>▪ chassis modules | ▪ medical equipment<br>▪ process installations<br>▪ consumer products<br>▪ production automation<br>▪ packaging equipment | ▪ Mini<br>▪ BMW |

*VDL Science & Technology*



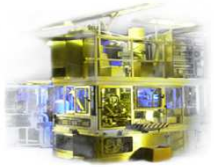






# High-end sub contracting: market segments

**Semiconductor Capital Equipment**



**Mechanization Projects**

**Analytical Equipment**

**Led Manufacturing Equipment**

**Medical Equipment**

**Solar Production Equipment**

**Science & Technology**

- Accelerator (& FELs)
- Instruments for astronomy
- Small satellites (assemblies & optics)

**Aerospace**

# Innovation power is key - how does VDL address?

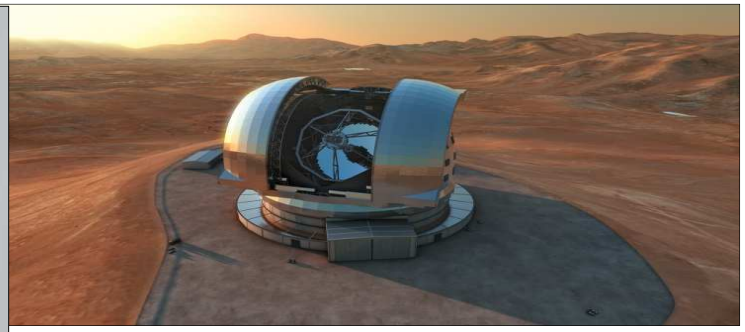
- Tomorrow's multinationals are founded today
- Innovation speed / power increases exponentially
- Market-creating innovation in Europe is lagging, applied research is under pressure
- Availability of (high quality) manpower is a limiting factor for our growth

- Enable the multinationals of tomorrow
  - Markets
  - Technology
- Create our own (international) innovation ecosystem
  - Take control own hands
- Only via networks we stay competitive (= innovative) NOW and in the future
  - Offer innovative solutions
  - Challenge is to find partners / customers with complementary networks (synergy)

# The VDL technology network


- Our network is a differentiator
- ..via this network..
- We actively support start-ups and spin-offs in specific markets
  - disruptive technology, existing markets
    - Automotive, space, medical, thin film, semiconductor
  - new technology, new markets
    - accelerator, contamination control, thermal, robotics

# Cooperation – an innovative support structure



*E-ELT telescope*

*Co-development and prototyping by ESO, TNO, NOVA, VDL, and partners*

# Why VDL Science & Technology?

- Big science projects and related spin-offs have business potential, for example
  - At this moment ESO E-ELT, CERN CLIC, PSI SLS, PSI SwissFEL
  - Its spin-offs (like ADAM, SMART*LIGHT, cosine,  and others) could grow to significant business levels
- VDL strengthens its (technical) competences via S&T to better enable our mainstream businesses
  - For example, teaming up with PSI and CERN provides crucial accelerator (network) knowledge to support our existing customers and to create opportunities for new start-ups
  - Cross synergy: DIFFER - heat pipes, PSI – TFS smartstage, PSI – VDL Bus, ESO/TNO – actuators and positioning
  - Strengthening our technology roadmap (eg precision machining, vacuum, handling, positioning, functional qualification)
- VDL continuously renews its sources of inspiration & innovation (applied research)
- Excellent marketing tool for the VDL Groep

# So many big science projects…priority setting

- High spin-off potential (new / disruptive)
- Strengthening the VDL technology roadmap
- Interesting business opportunity
- Good cultural fit

# Our business focus

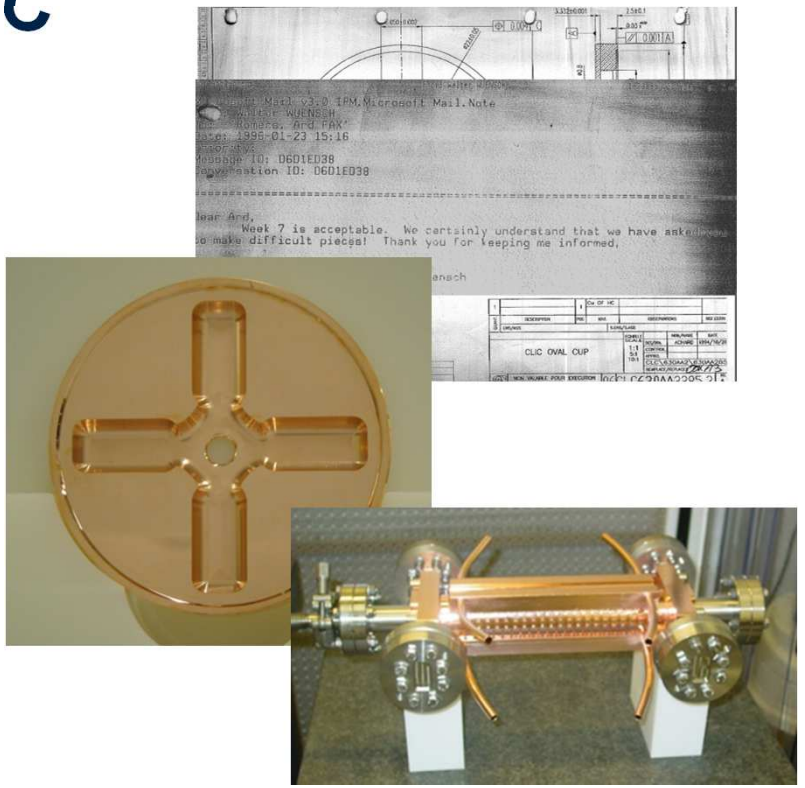
| priorities | pan-european | national | spin-off |
|---|---|---|---|
| accelerator | CERN | PSI, DESY | AVO, SL |
| astronomy | ESO | NOVA, ASTRON | technology, other projects |
| space | ESA | SSO, SRON, TNO | Synopta, cosine |
| energy | ITER | PSI, DIFFER | investigating |

- Most relevant S&T segments for VDL:
  - Normal conducting, SCX-band particle accelerators
  - Instruments for astronomy
  - Commercial small satellites (observation and communication)
  - Energy

- ..consequently…who are the obvious partners in the network
  - national government institutions (eg PSI, DESY, NOVA, SRON, DIFFER, 3TU, TNO, Nikhef)
  - big science projects (eg CERN, ITER, SLS, ESO, ESA, ET)
  - related spin-offs (AVO, SMART*LIGHT, cosine, Eulitha, Compass)

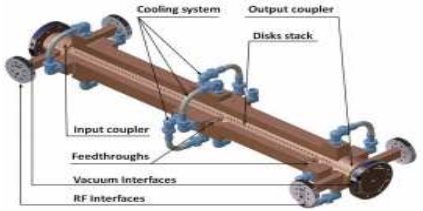
# Different views on CERN CLIC

- CERN: High gradient, normal conducting, dense electron bunches
- VDL: low Cost of Ownership, new applications
  - Size reduction
  - Reliability (using C&S-band frequencies and parts with X-band specifications)
  - Life Time (using C&S band frequencies and parts with X-band specifications)
  - Flexibility (ability to scale up/down)
  - Infrastructure (less energy & no cryo infrastructure required)
  - Disruptive, enabling new applications, markets
  - Active alignment with CERN KT, TT agreement in place

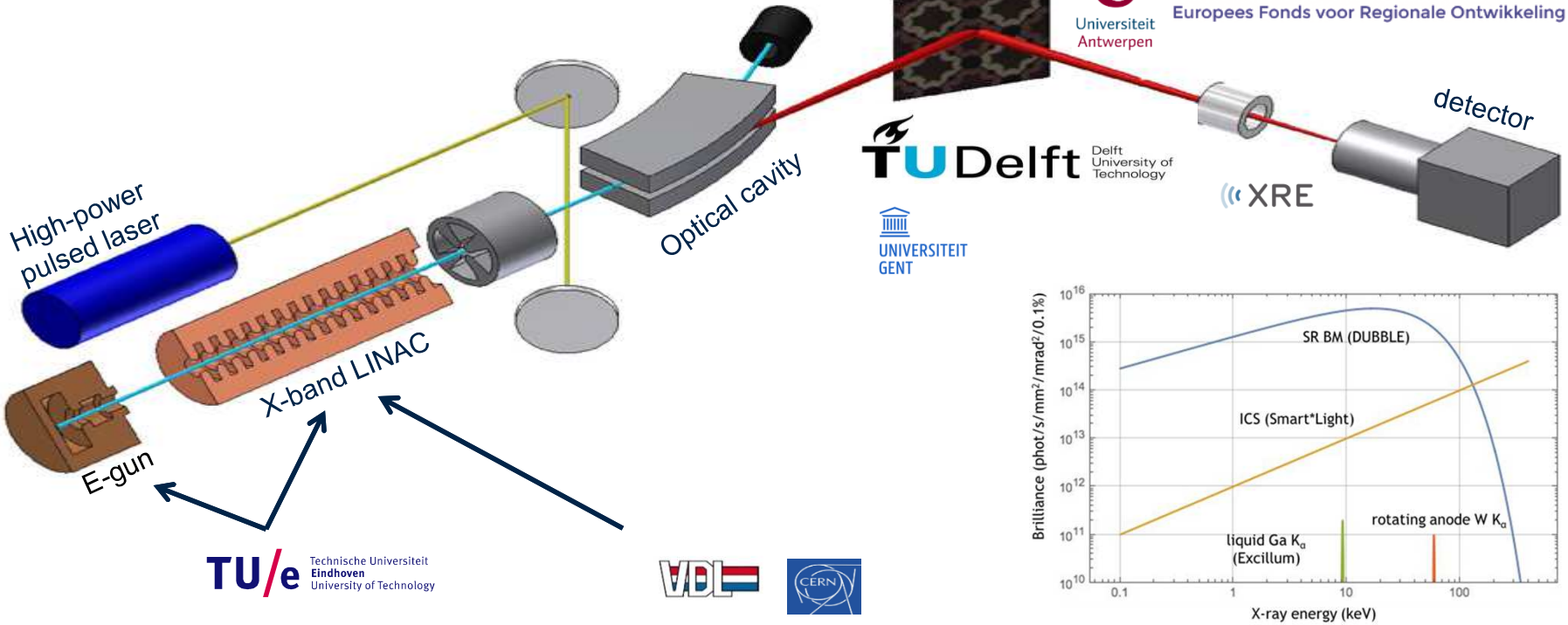


# VDL and SwissFEL

- No CERN CLIC – No SwissFEL
- High volume manufacturing
  - X/C-band structures
  - J-couplers
  - BOC Pulse compressor
  - E-gun
- Combining CLIC and SwissFEL…




# Creating a completely new market







Interreg Vlaanderen-Nederland
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# Long term VDL support

- VDL supports the lobby team actively

- Check list: check!
  - Spin-off potential
  - Strengthening the roadmap
  - Great business opportunity
  - Cultural fit

- ET will boost high tech in the Netherlands
  - labor, science, economy, skill sets