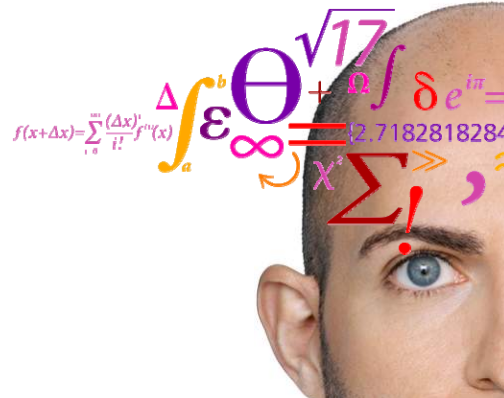


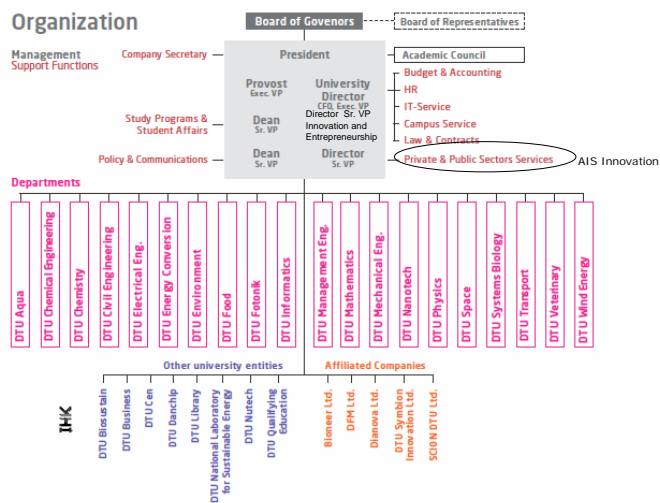
# The DTU Spin out support system

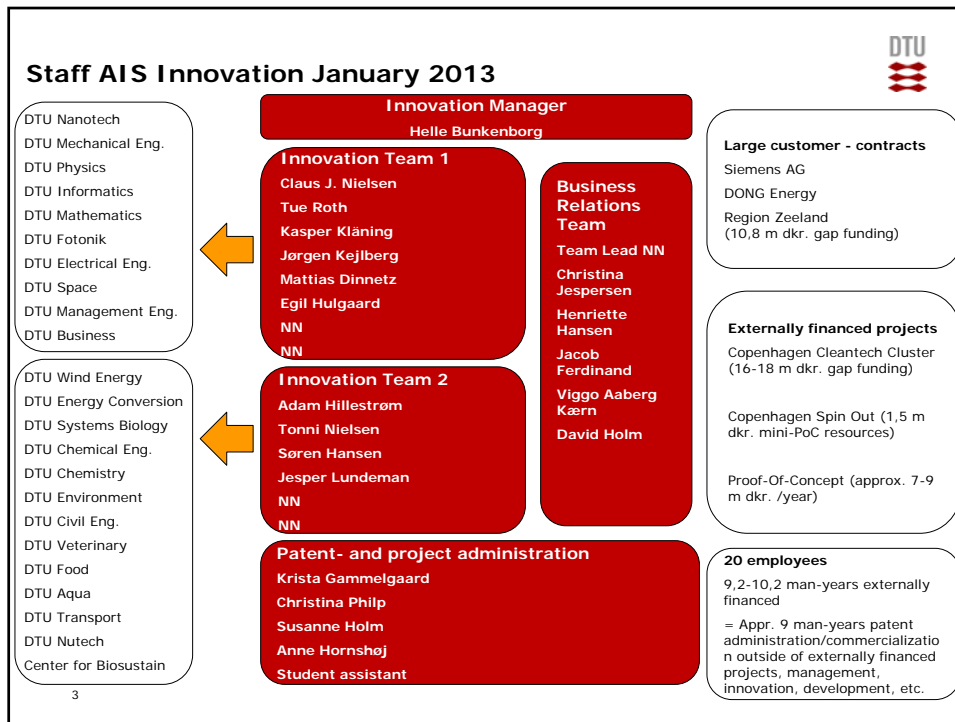
DTU Ph.d course, April 30 2013

Adam Hillestrøm  
AIS Innovation



# AIS Innovation – organization, relations and roles






**DTU**

## Technology Driven Innovation

- Handling inventions and patents
- Development of commercialization projects  
- including patents, GAP and PoC funding projects

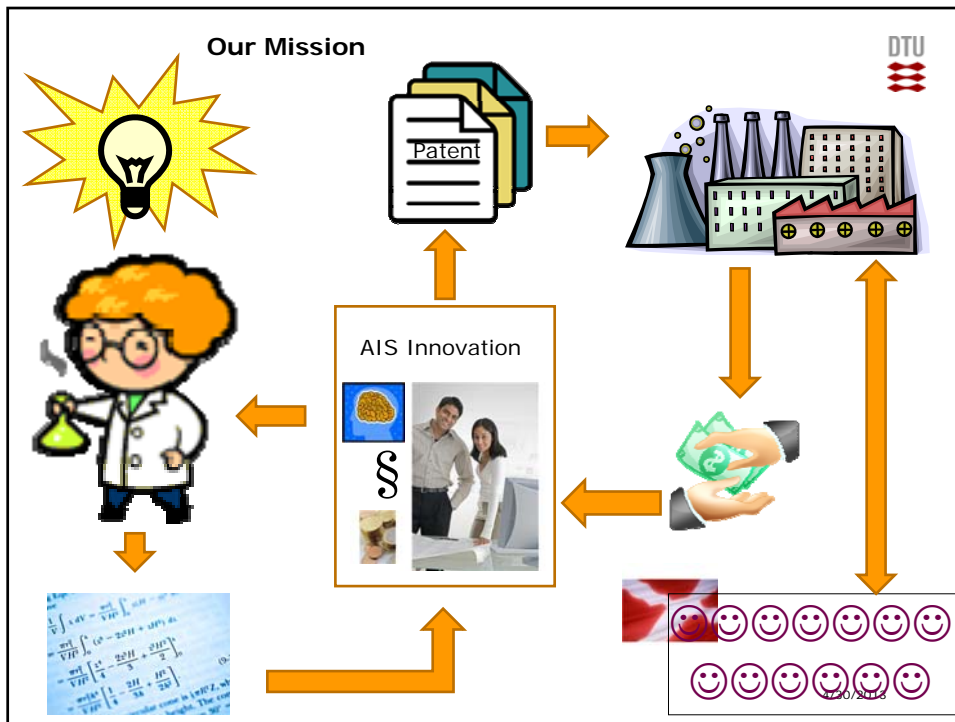
⇒ Purpose:

- Promoting innovation in the private and public sectors by creating new business for existing companies  
(through license agreements, sales of IPR and other cooperation agreements)
- Establishment of new companies based on DTU knowledge and IPR



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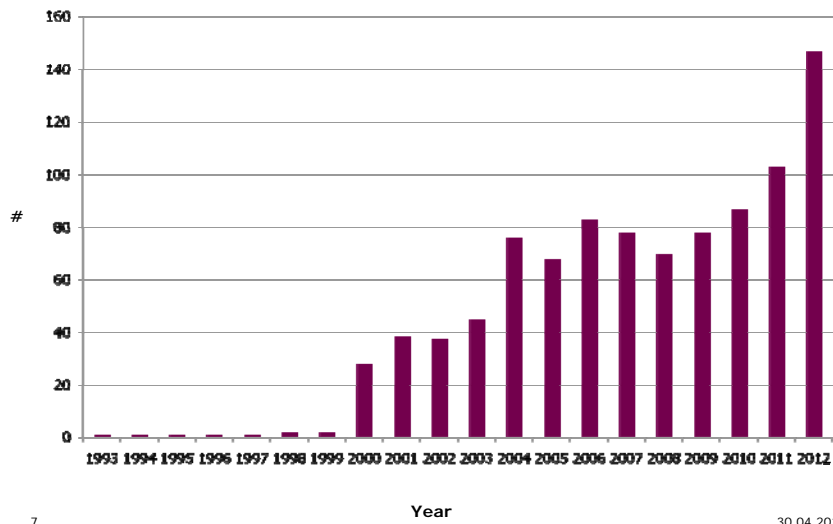
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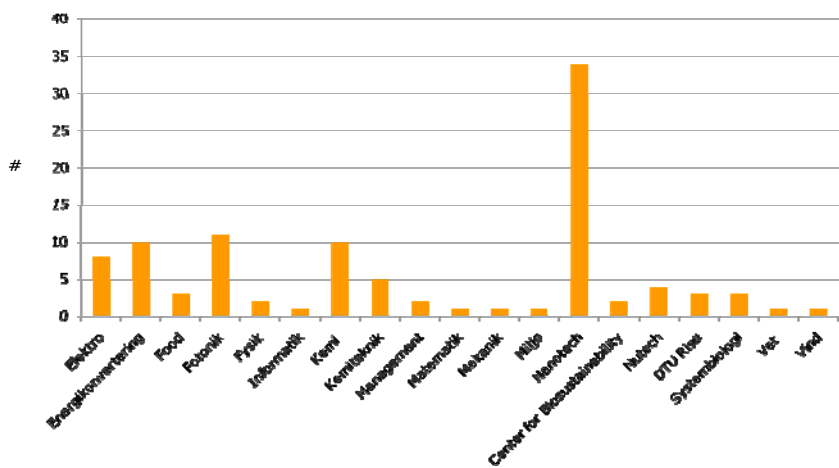
### Support Opportunities from AIS Innovation

- Assistance and consultancy in relation to applications and business plans
- Establishment of contact to relevant external partners
- Negotiations on licensing and IP transfer agreements
- Support during the establishment phase
  - Founder teams
  - Project Pilots
  - Mentors
  - Investor pitches
- Raising Start-Up capital
  - Pre seed grants
  - Innovation incubators
    - Seed Capital
    - CAT
    - Symbion
  - Early stage investors
  - Business angels

### Statistics – invention disclosures per year DTU



### Statistics – invention disclosures per year DTU



## The Patenting Process



- **The inventors fill in an invention notification form and file it with AIS**
  - Is actually an obligation
  - Must be agreed with - and signed by the patent responsible
- **AIS calls for a pre-meeting (inventors and patent responsible)**
  - Presentation and clarification regarding the invention
  - Discussion about commercial potential
  - Strategic importance for the institute
  - Discussion about different commercialization options
- **The invention is sent to a patent consultant for patentability evaluation**
  - The inventors sign an NDA to prevent publication before filing the patent application
  - The patent consultant will typically call for a clarification meeting and a few follow up calls
  - Findings from the evaluation will be presented for commenting within 10 working days
- **DTU evaluates if the invention will be taken over by DTU**
  - Must be approved by DTU management
  - Decision must be announced no later than 2 months from filing

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## DTU decides to take over the invention



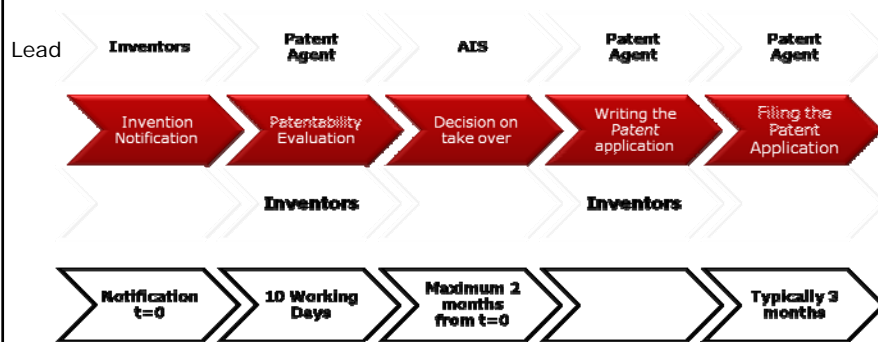
- **Requirements**
  - A strong patent can be filed
  - Must have an obvious commercial potential
  - The invention must be beyond the idea stage and reasonably documented
  - The inventors are committed to further develop and commercialize the invention
- **Implications**
  - DTU manages the patenting process and pays all associated costs (approx. 200.000 DKK for the first 3 years)
  - DTU has an obligation to commercialize the invention
  - Commercial income related to the patent (that exceeds the direct patenting costs) are shared as:
    - 1/3 to the inventors (personally)
    - 1/3 to the department
    - 1/3 to DTU
- **Process**
  - The patent application is written by the patent consultant and can typically be filed 3 months after the notification of invention
  - After that, the inventors are free to publish their results

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## Filing Process

- Important NOT to publish anything until the patent application is filed!
- Papers may however be sent for review, instructing not to publish until permission is granted



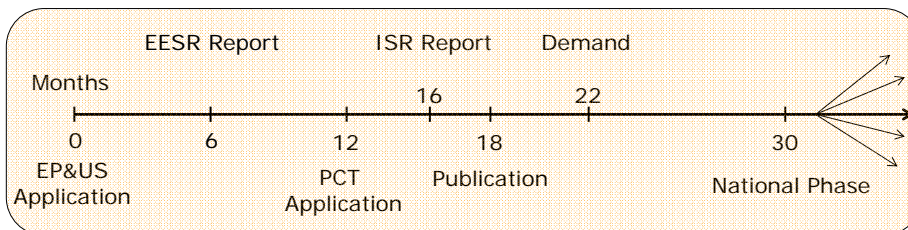
## DTU decides NOT to take over

### • Implications

- DTU gives rights back to the inventors
  - The inventors are free to publish results or to file a patent application at their own expense (approx. DKK 200.000 for the first 3 years)
  - DTU however still has the right to claim 1/3 of future income less patenting costs!
- We have not yet seen cases where the inventors have proceeded with the patenting process on their own
  - Although DTU decides not to take over the invention we are trying to make the process a positive experience for the inventors
    - Inventors understand why.
    - Inventors learned about patents and commercialization.
    - Inventors come back with new inventions.

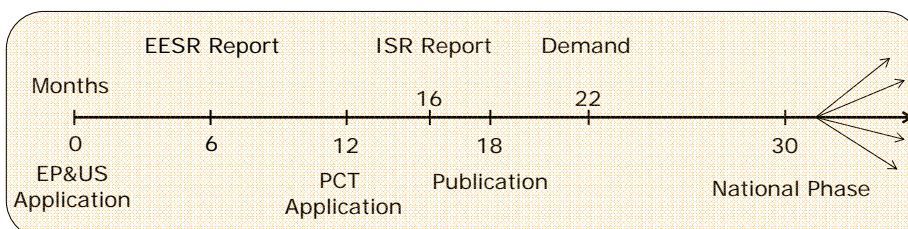
## DTU decides to take over the invention Typical Timeline

- Patent application developed by the patent agent (with limited support from the inventors)
  - To be filed typically 3 months after notification of invention
  - Usually filed in the EP and US -> Priority Date
  - To be filed in the PCT within one year -> Priority Year
  - Pay out inventors fee
- After 16 months first feedback from the PCT (ISR report)
- Possibility to challenge the findings until 22nd month (Demand)
- Published after 18 months – open to everyone!



## Timeline typical patenting process

- To be validated locally (National/Regional) after approx. 30 months
  - Country Selection
  - Rather expensive (Translations and local fees)
  - Should attempt to dispose of/sell the patent before national phase
- Patent issued after validation in the individual countries after 3-5 years!
- Costs may exceed DKK 500.000++!



## Commercialization efforts after filing



- **Commercialization meeting with inventors after filing**
  - Action plan for commercialization
  - Plan for further development of the technology
  - Possible ways of financing
  
- **Discussion about the interests of the inventors and departments**
  - Start-up potential ?
  - Sell or license the patent
  - Vehicle for research cooperation
  
- **AIS Innovations Business Developers Obligations**
  - Facilitates processes
  - Identify market opportunities
  - Create contact with relevant companies/institutions
  - Financing
  - General support to institutes and inventors
  - Represent the interests and rights of DTU

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## Development of commercialization projects



- **Invention that has start-up potential**

AND

- **Inventors that have aspiration and the courage to participate**

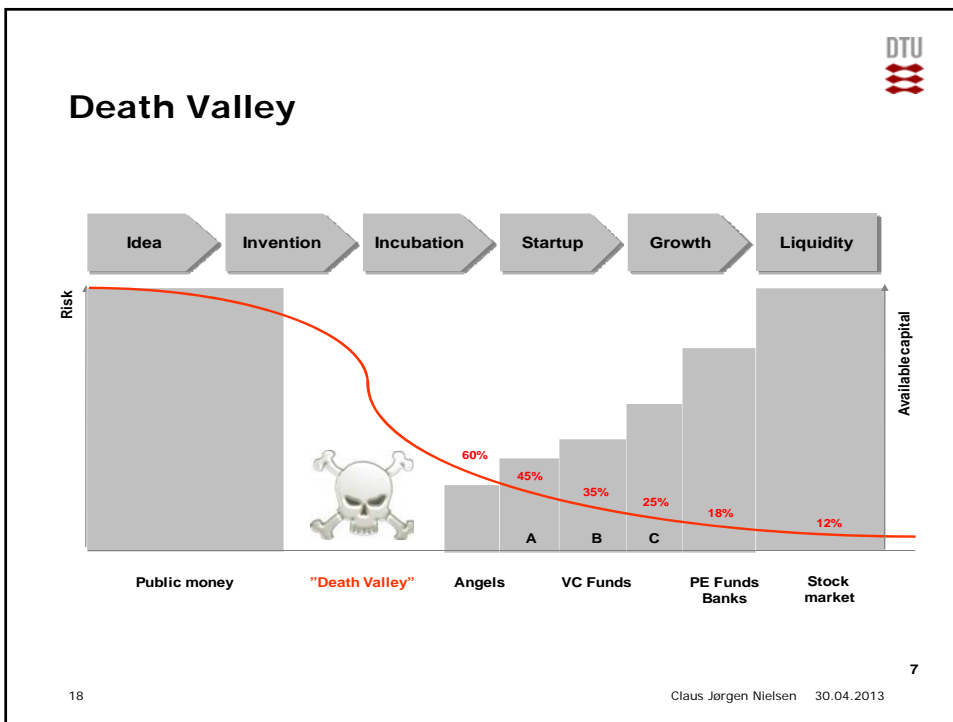
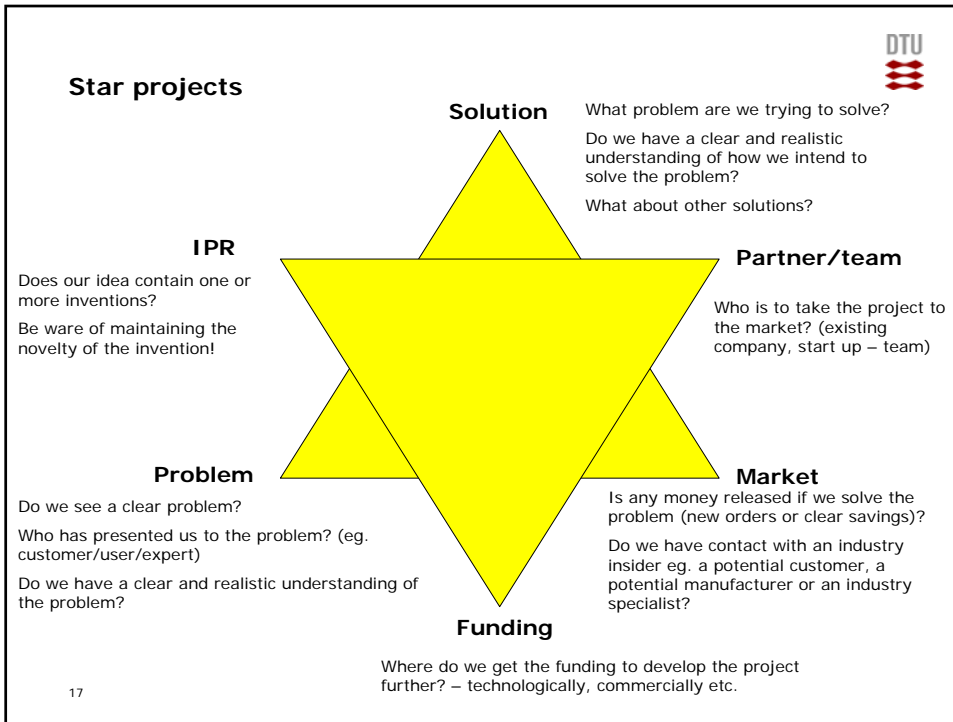
THEN

- **The Business Developers from AIS Innovation may participate more actively in supporting the inventors**
  - Ensure that public research funding is exploited in full to advance the maturity of the invention as much as possible
  - That is to a level where the effort no longer can be characterized as research
  
- **New sources of financing required**

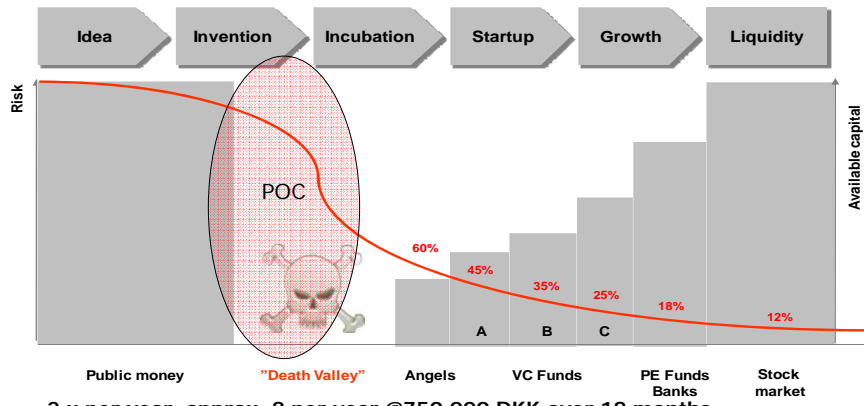
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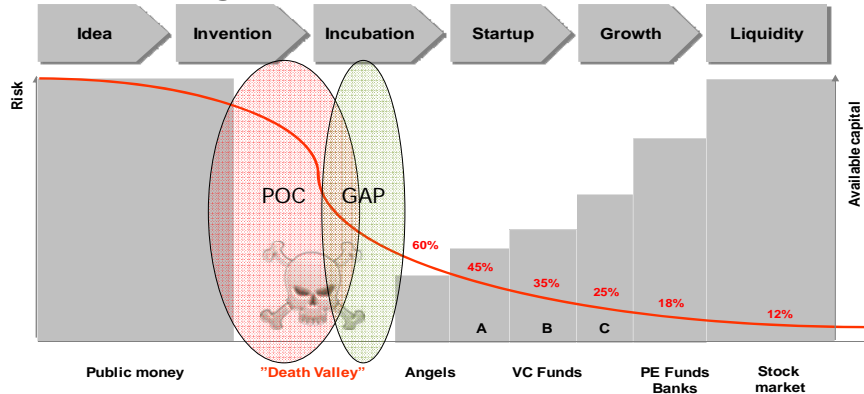
## Bridging the Death Valley Proof of concept funding



- 2 x per year, approx. 8 per year @750.000 DKK over 18 months
- Market research, commercial potential, technical development
- Inventors, External Consultants and Business Developers
- Structured process
  - Mini Business plan (Support from AIS),
  - Test of investor pitch in front of review panel, Mentor allocation
  - Selected by external review panel

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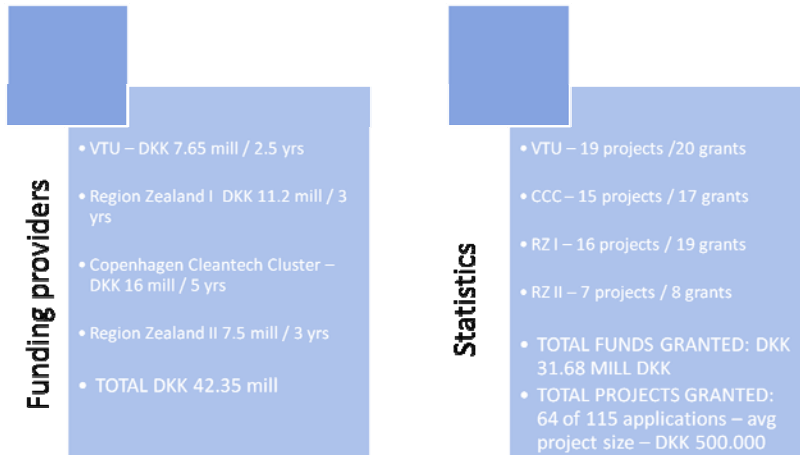
## Bridging the Death Valley GAP funding



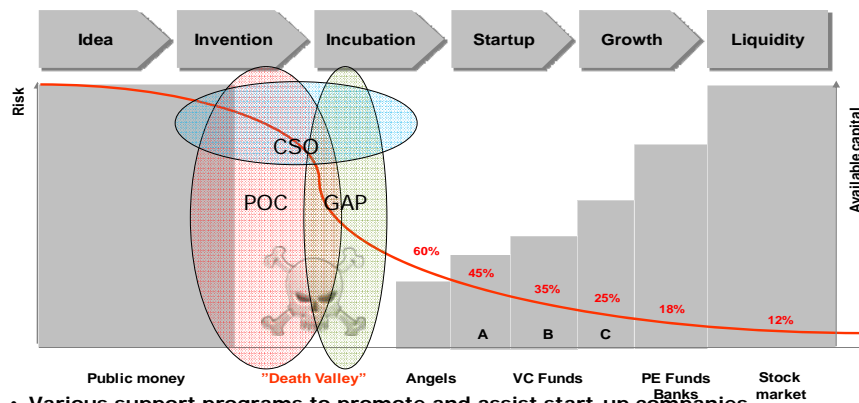
- 6 x per year, approx. 8 per year @200-700.000 DKK over 6 months
- Proof of Concept must have been demonstrated
- Last step to make the technology attractive for an external investor
- Very simple process
  - 5 page application, support from AIS Innovation
  - Must be supported by Letter of Intent/Expression of interest from external party
  - Selected by internal AIS review panel

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### GAP-funding – funding providers and available funds



### Bridging the Death Valley Support Programs/Copenhagen Spin Outs



• **Various support programs to promote and assist start-up companies**

- Biobusiness and Innovation Program, Accelerace BIO, CPH Spin-out, Copenhagen Cleantech Cluster, Medico Innovation, Region Sjælland

• **Broad range of support programs offered:**

- Education, Training, Mentors, Project Pilots

### **Commercialization of inventions – policy (preliminary)**

- Patent applications and patents as basis for commercialization – creating effect on market terms
- Mainly commercialization through licensing – particularly
  - Platform technologies relevant across industries / commercial partner cannot exploit
  - Patents supporting strategic focus areas (e.g. national test centers)
  - Patent families focusing on long term commercialization (e.g. fuel cells)
  - Broadest possible application requires a multiple of licensors
- 3 commercialization routes:
  - Licensing – exclusivity, incentive structures
  - Sale of IPR – incentive structures of particular importance
  - Spin out companies – long term, IPR “staircase”, quality, founderteam conditions

### **Commercialization of inventions – policy (preliminary)**

- Payment for IPR in the form of upfront, royalty, shares, research finance
- Ensuring long term application of inventions
- Our role in portfolio companies

## Commercialization of inventions - models

- Traditional model

- An invention disclosure becomes a commercialization project
- The commercialization project is matured to a level where it becomes interesting for third parties
- A founderteam shows interest in the commercialization project and takes over commercialization (writing business plan etc)
- Investor is brought into the process and negotiation between founderteam, DTU and investor is initiated
- The founderteam establishes a new company and DTU transfer IP in return for shares in the company – usually a modest level
- The company starts operation and run into financial problems after short time.....

## Commercialization of inventions - models

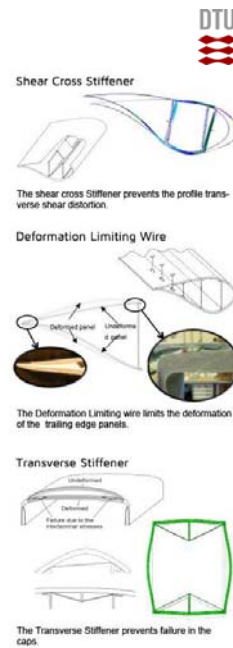
- Considerations about new model

- How can we reduce the risk of IP?
- License instead of IP transfer?
- Optimize timing of IP transfer?
- A new model employing an "IP transfer staircase"
  1. Option to a license / non exclusive or exclusive in return for a modest amount of money
  2. Time period to achieve certain milestones
  3. License / non exclusive or exclusive
  4. Time period to achieve milestones (usually capital raised)
  5. Transfer of IP in return for shares
  6. → stronger companies and reduced risk of losing IP



## BLADE ENABLER

- Solutions for structural design of wind turbine blades developed at DTU Wind Energy - protected by 7 patents
- 4 yrs commercialization history at DTU, intensive commercialization support, including approx. 1 mill DKK GAP-funding + PoC funding
- Long term negotiations resulted in establishment of Bladena ApS at the end of 2011
  - Total cap 2.6 mill DKK
  - 3 capital investors (CAT Science + two business angels)
  - DTU approx. 25% shareholding
- Refinancing of Bladena mid 2012
  - Improved capitalization
  - New investor and change of control
  - DTU diluted to approx. 16%



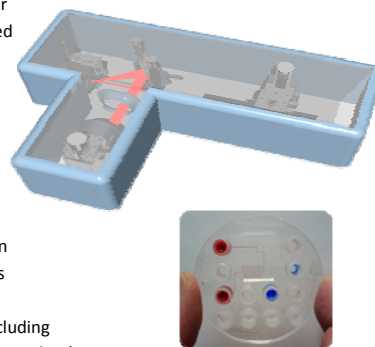
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## Commercialization project



- Solution for label free, free solution measurement of molecular interactions – the Holy Grail in pharma and biotech – developed at DTU Fotonik
- Business model based on sales of instruments and polymer micro fluidic channels (consumables)
- 2-3 yrs. commercialization history at DTU and intensive commercialization support, 2 x PoC funding, approx 1 mill DKK GAP-funding, approx 0.5 mil DKK Medico Innovation funding + 150K DKK competency development at DTU Business
- Long term negotiations with US competitor / partner (MSI ) including long stand still periods presenting the business case to international VC's



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## Commercialization project

- Status:
  - US partner remains interested in DTU's Biomologic project
  - Joint testing planned to February 2013
  - Result scenarios:
    - IPR transferred to MSI in return for MSI shares, MSI create a DK subsidiary
    - IPR exclusively licensed to MSI, no DK subsidiary

## Biomicore

- Biomicore develops safety critical hardware platforms
- Biomicore's patented hardware platform is inspired by biology and is – in parallel to human cells - a network of cells that may configure themselves and conduct a self-repairing process or a substitution of fellow cells in the network 100% autonomously.
- The hardware platform is divided into several "computing areas" aka. eCells (cf. human cells). Each eCell performs a simple function (a gene) of the user program (eDNA). While the chip is running the eDNA, each eCell continuously monitor other eCells for runtime faults. If a runtime fault is detected the remaining eCells utilize the eDNA to reconstruct the functionality of the faulty eCell on a nearby spare eCell.
- End-users are numerous and covering a wide span of industries. FPGA based products are found within digital signal processing, software-defined radio, smart grids, aerospace and defense systems, medical imaging, computer visioning, speech recognition, bioinformatics, computer hardware emulation, industrial automation, train interlocking / signaling, etc.



Founder Team: Michael Riebel Boesen,  
Jan Madsen, Niels Boje Lund, Carsten  
Snedker and DTU Informatics

DTU spinout, DTU license