HEALTH.E

ECSEL Joint Undertaking

EUROPEAN UNION

Health.E Moore for Medical

Implementing "Moore for Medical"

Innovation in Emerging Medical Devices

Health.E Lighthouse Symposium 8-9 March 2022

HEALTH.E

Session 1

Introduction, role of OTPs for innovation in electronic medical devices

- Ronald Dekker – Health.E lighthouse
- Rob van Schaijk – Philips, Eindhoven
- Jussi Hiltunen – VTT, Finland
- Jens Kraus – CSEM, Swiss

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LIGHTHOUSE INITIATIVE

Health.E
Moore for Medical

Accelerating innovation in medical devices

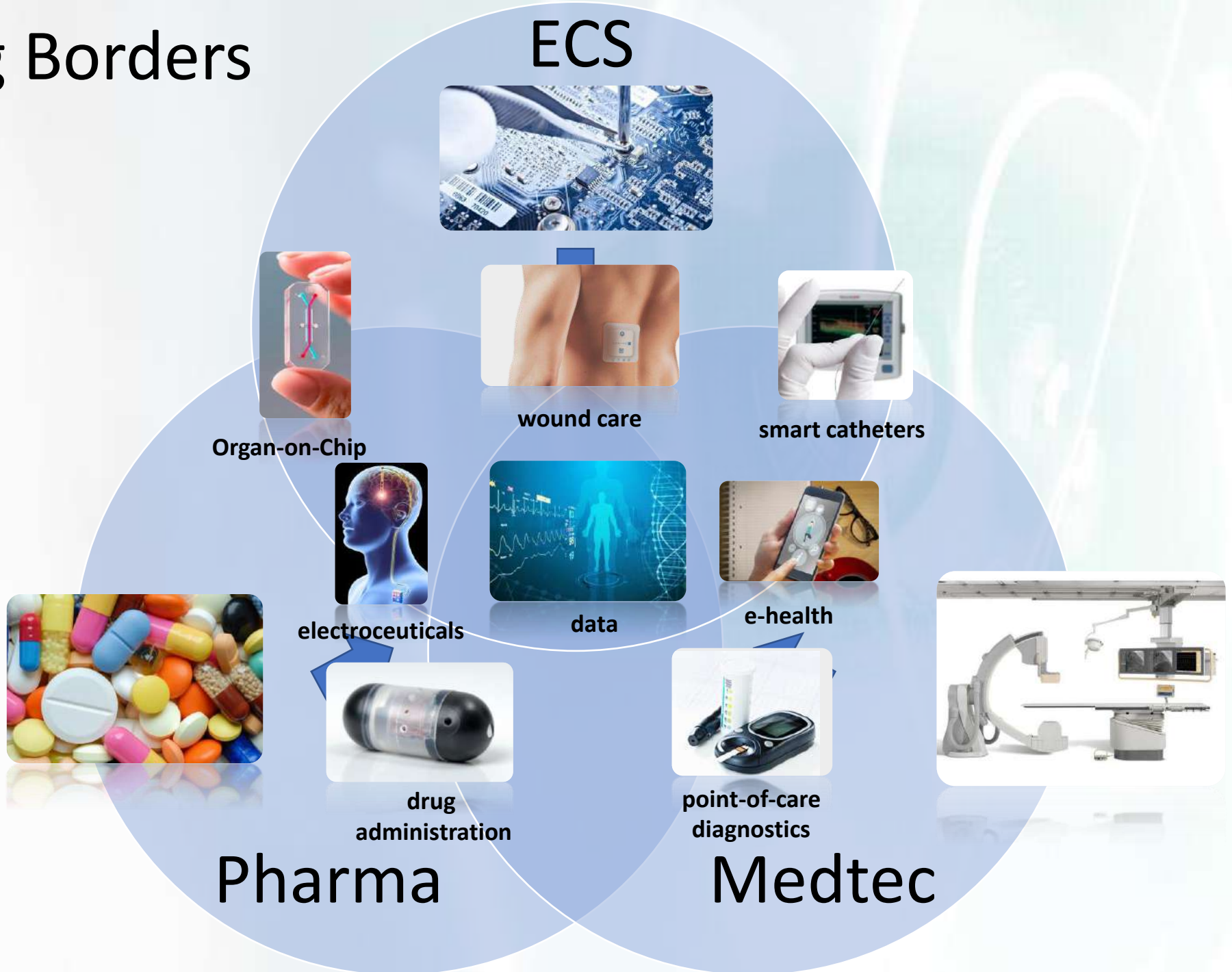
Enabling “Moore for Medical”

Ronald Dekker

ronald.dekker@philips.com

8th March 2022

Fading Borders



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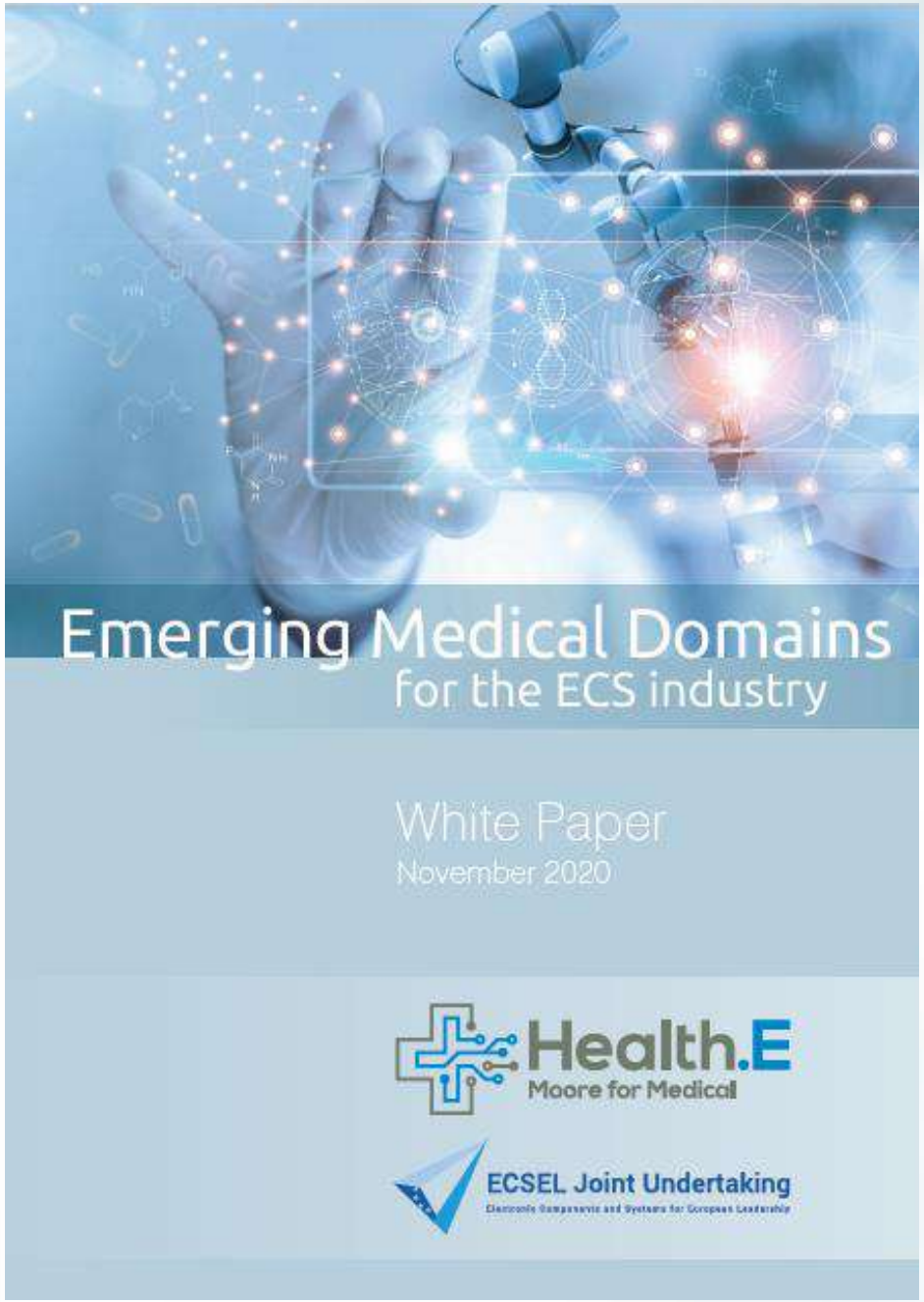

An introduction to 13 emerging medical domains that offer opportunities to the ECS community

Available from:

Health.E website: https:// www.health-lighthouse.eu

on-line workshop 26th August 2020

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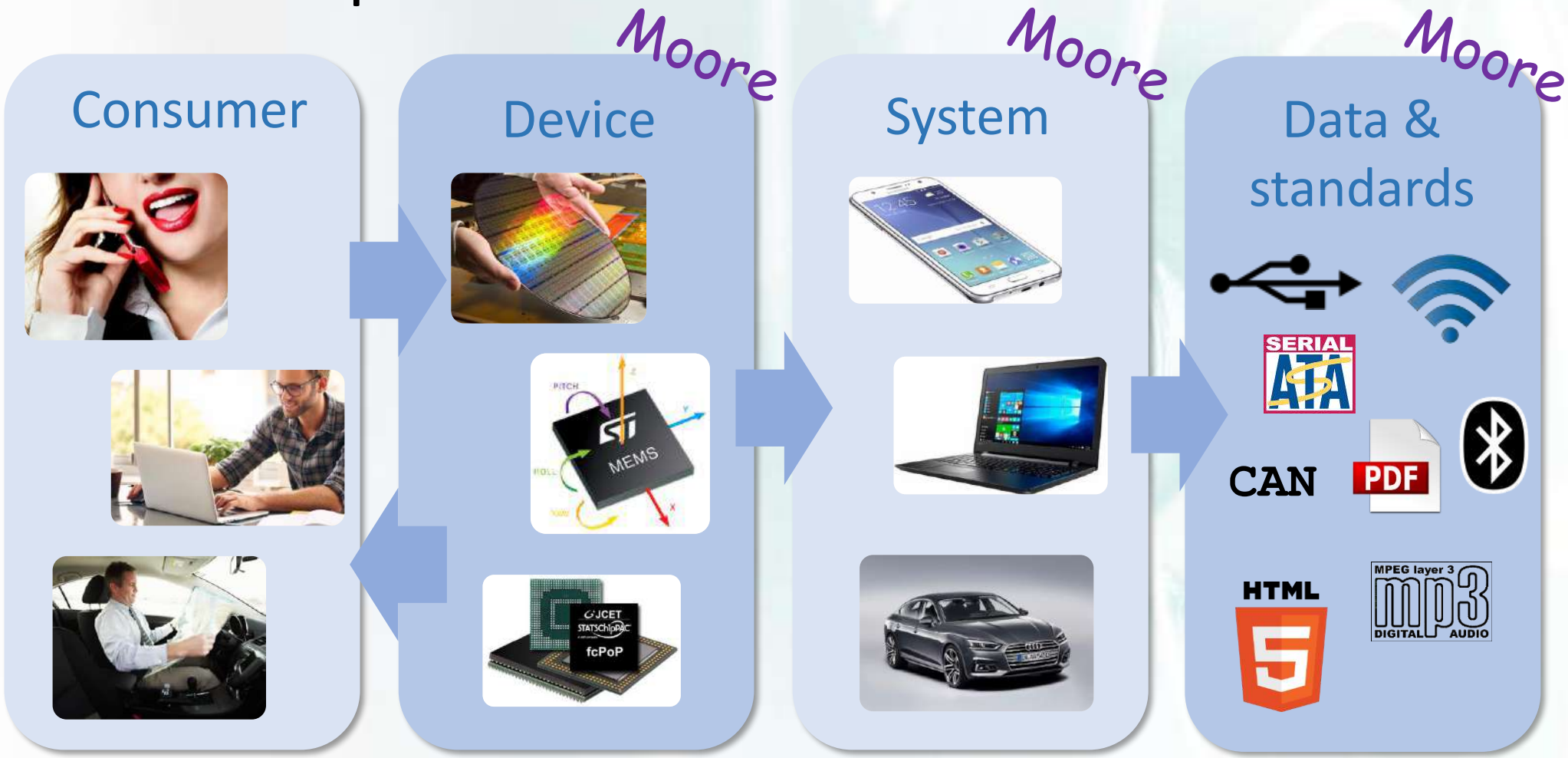
Consumer products



- Open platforms and standards at all levels
- Volumes drive innovation

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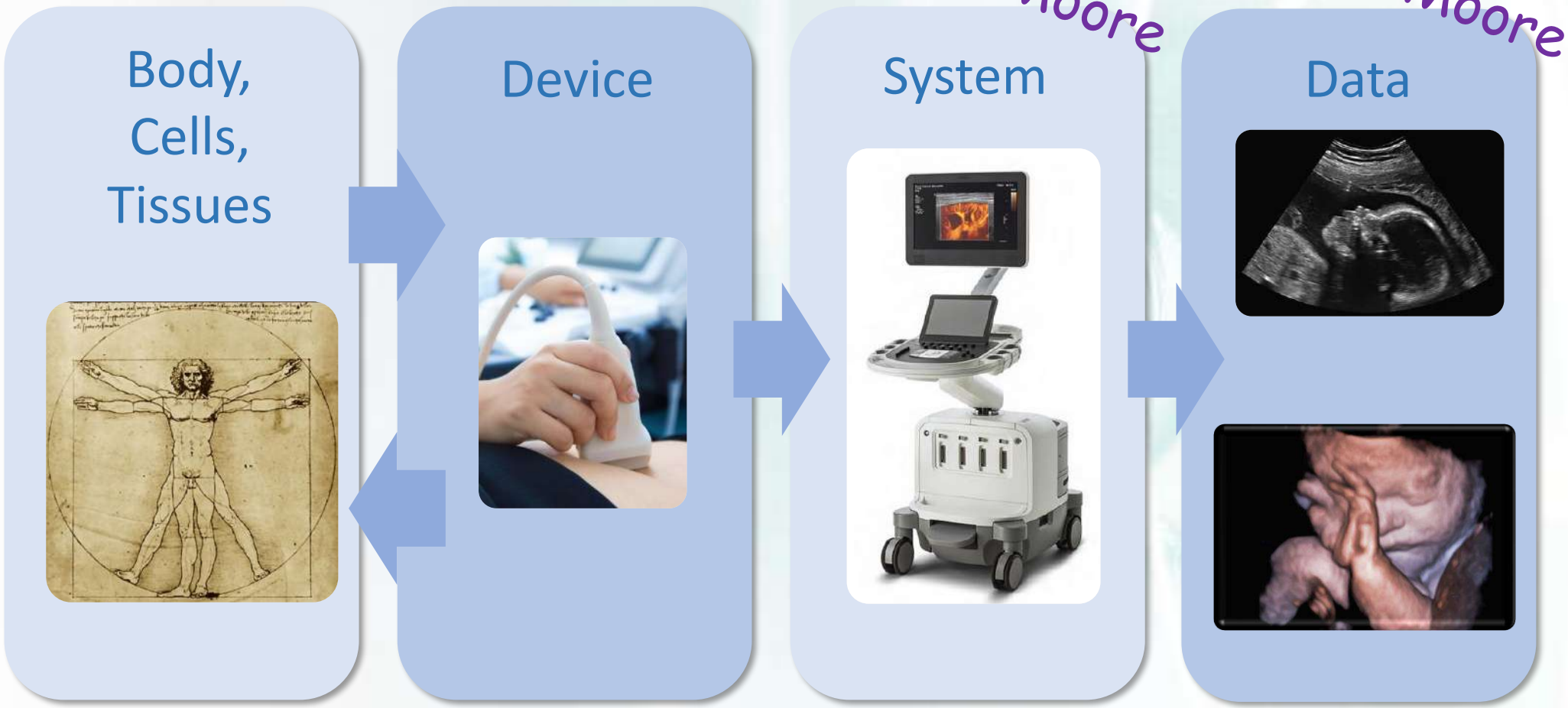
Typical medical product



- Relatively small volumes
- Innovation gets stuck at device level due to lack of open platforms

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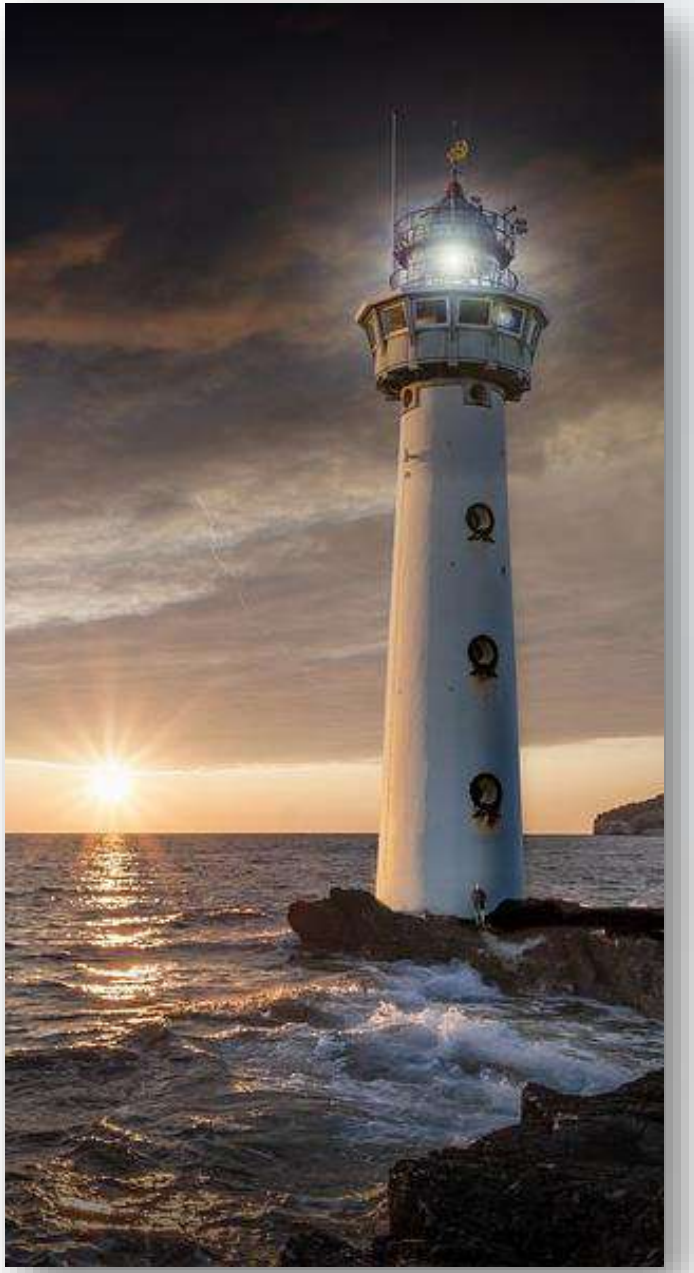

Health.E

Vision:

"Moore for Medical"

Mission:

Motivate the ECS community to work towards open technology platforms for medical devices on a device, system, and data level

Health.E
Moore for Medical

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Joint Undertaking

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Health.E lighthouse:

- **Create Awareness** in the ECS community for emerging opportunities
  - Translate the needs of MedTech and pharma into ECS language
  - Identify gaps in strategic research agendas (SRA)
- **Promote Open Technology Platform** model for medical technologies
  - Funnel innovation for medical devices (reduce fragmentation).
- . **Create a Sustainable Ecosystem**
  - Consisting of technology suppliers, device manufacturers, end-users
  - Transcending project boundaries
  - Connect to other European initiatives and communities

Make Europe the innovation hub for medical devices.

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Open technology platforms will:

- Stimulate innovation
  - ➢ create enough volume for sustained technology development
  - ➢ create new and better applications

    “concentrate on the application rather than technology development”
- Increase the agility of the industry

  → shorter time to market
- Reduce risk
  - ➢ in developing new products
  - ➢ liability
- Lower cost

Reach higher by standing on each others shoulders

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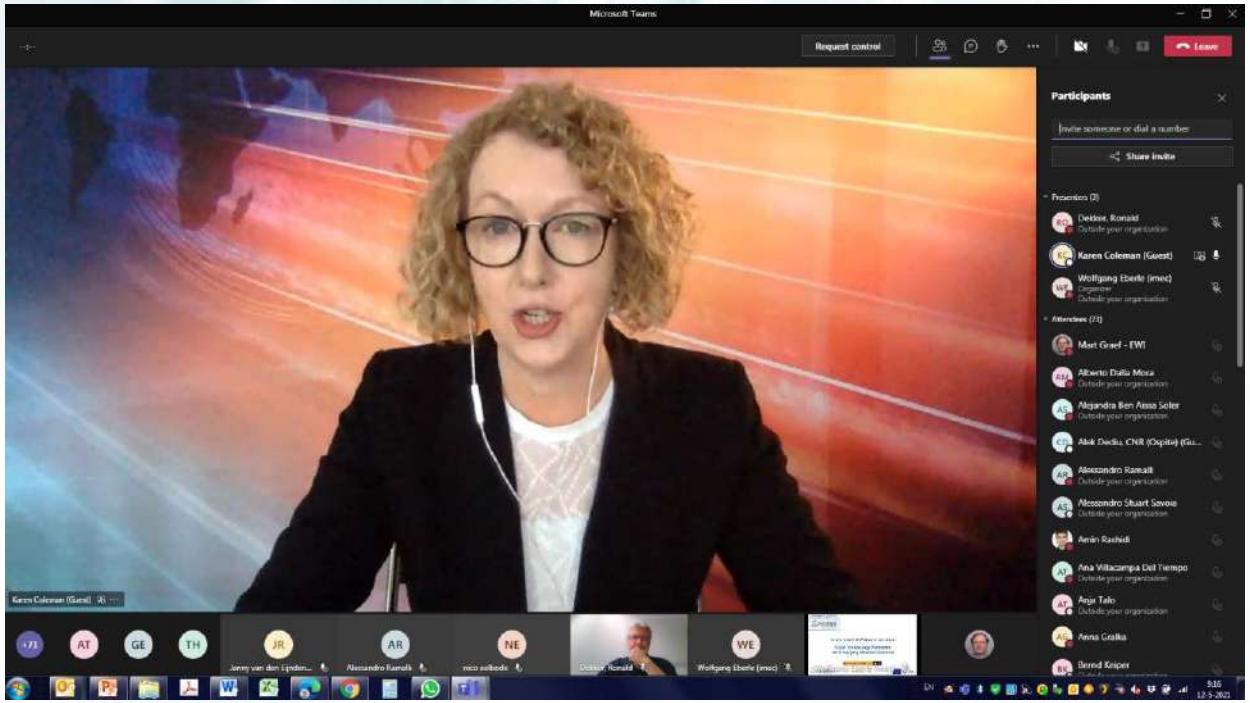
OTPs for medical devices? Challenges, issues and recommendations

Available from:

Health.E website: https:// www.health-lighthouse.eu

on-line workshop 12th May 2021



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Creating an Ecosystem

Concept creation

Infrastructure

Hospital

Platforms

Moore4Medical ECSEL Joint Undertaking

POSITION POSITION ECSEL Joint Undertaking

ULIMPIA ULIMPIA Penta

InForMed InForMed ECSEL Joint Undertaking

INCITE INCITE eniac

2014	2015	2016	2017	2018	2019	2020	2021	2022	2023

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Moore4Medical

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Application domains

WP1	WP2	WP3	WP4	WP5	WP6
Implantable	Organ-on-	Drug adherence	Next generation	Towards X-ray	Continuous

WP 7 Open platform access & Exploitation

WP 8 Project Management & Dissemination

Start June 2020, 65 partners, M68€ budget, www.moore4medical.eu

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HELoS Health.E Lighthouse Support Initiative

The Health.E Lighthouse is powered by the Health.E Lighthouse Support Initiative (HELoS)
ECSEL Coordination & Support Action (ECSEL-CSA) grant agreement: 871394

PHILIPS

Open CMUT platform

Rob van Schaijk
MEMS & Micro Devices PD&I
March 8th 2022

innovation you

The future of ultrasound imaging

1) Diagnostic imaging Hospital → point of care, monitoring, consumer applications
2) Integrated imaging solutions in 'cath lab' (intravascular, ultrasound, X-ray)

Low volume → high volume production

Philips Lumify

PulseNmore probe. Source: PulseNmore

Credit: Holst Centre

- *Digitalization*
- *Integration*
- *Miniaturization*
- *Artificial Intelligence*

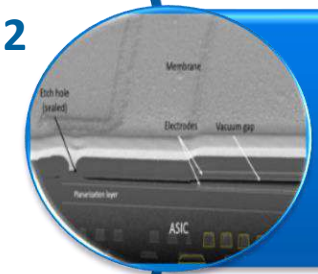
Sweet spot for CMUT → Key technology for ultrasound

1

General purpose → F_c : 1-10MHz

Application: multiple purpose **hand-held probes and patches**

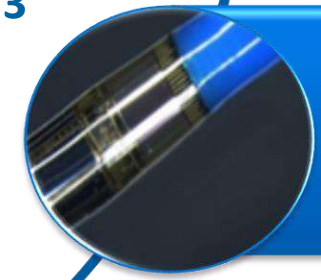
2



3D imaging → integration with ASIC

Application: ease of use → together with artificial intelligence → e.g. **patches and hand-held**

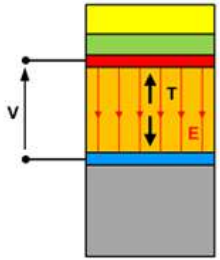
3



Miniaturization → F_c > 20MHz

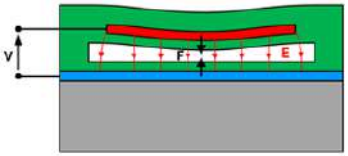
Application: **catheters and endoscopes**

Old

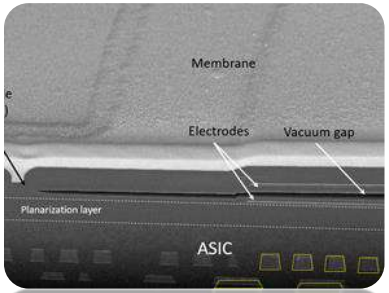


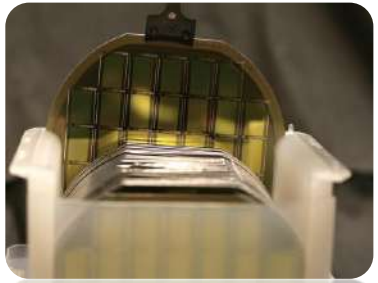
thick film ceramic piezo transducer

New



CMUT





CMUT modular technology platform

Technology development in EU projects:

Low frequency CMUT

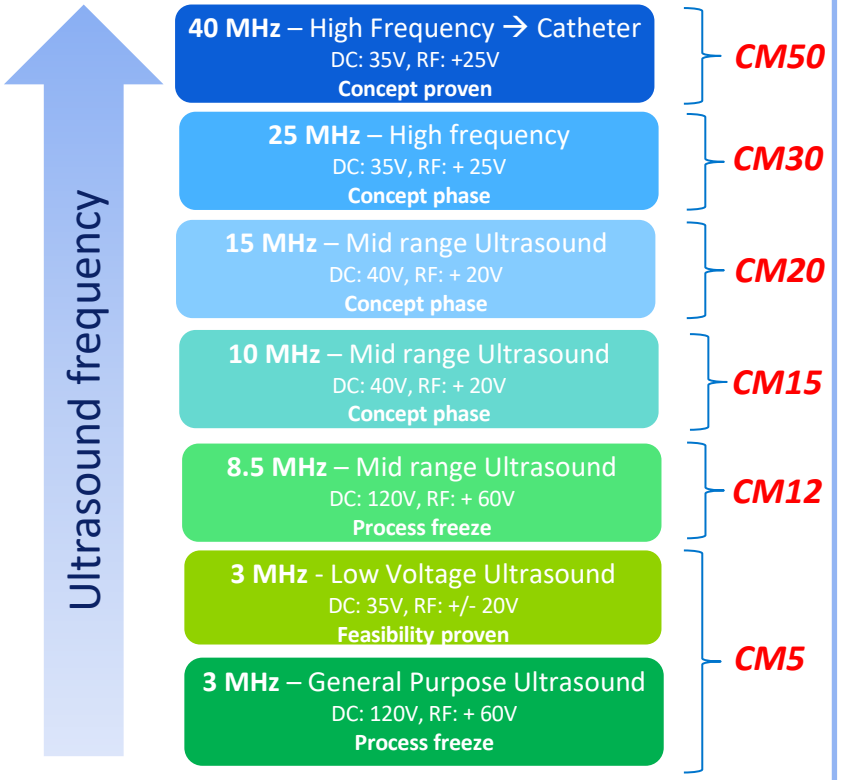
ULIMPIA
ULTRA-SOUND BODY PATCHES

Moore4Medical

High frequency CMUT

→ With interconnect technology (F2R)

InforMed



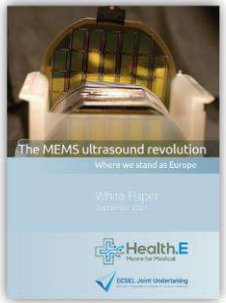
Pan-European benchmark of MEMS ultrasound transducers

- Benchmark of different MUT technologies
  - Definition of test devices and measurement methods
- Map the different technology options to the medical application space

Challenge:

- Only technology and not full ultrasound system

Laymans' whitepaper

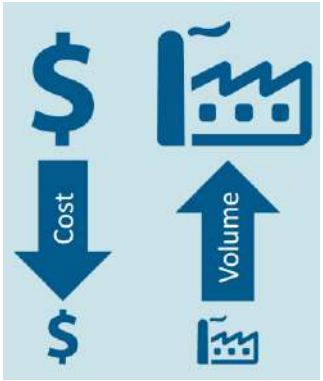


Technical whitepaper

Info on benchmark: www.position-2.eu

- Benchmark white papers
- Documentary on Position project

Open CMUT platform



- Successful development of CMUT platform with the support of EU projects
- For approx. 4 years our CMUT platform is open for external customers → **Why?**
  - Philips provides solutions nowadays and not only technology or hardware
  - Larger volumes → affordable technology
  - Larger volumes → larger revenues → investments in new applications/roadmap
  - High development costs (silicon processing) → share with multiple customers
  - CMUT platform can be used for multiple applications
- Leading companies exploring multiple applications with CMUT:
  - Medical, Automotive & Industrial
- ***MODULEUS***
  - Non ultrasound imaging application: security & biometry application
- ***Cephasonics Ultrasound***
  - Development of ultrasound system with CMUT → open for external users

MODULEUS

Cephasonics Ultrasound Solutions


PHILIPS

MedPhab

Photonic Medical Devices

Funded by

PHOTONICS 21

PHOTONICS PUBLIC PRIVATE PARTNERSHIP

Health.E lighthouse symposium

March 8, 2022, Eindhoven

Jussi Hiltunen – VTT Technical Research Centre of Finland

Mission

MedPhab
Photonic Medical Devices

- **Sustainable Photonics Pilot Line** dedicated to medical devices
- Enable **cost effective development** from prototype devices to manufacturing
- Several photonics and supportive technologies through **a single entry-point**
- Early adoption of **new photonics technologies**
- Develop and support the **entire supply chain**

Aimed at **reducing R&D costs** and **accelerating commercialization**

Applicability of MedPhab technologies

MedPhab
Photonic Medical Devices

Hospital Use

Users→ Medical Professionals

Technology → Fiber optic modules, Reader units

Home Care Diagnostics Services

Users→ Citizens jointly with professionals

Technology→ Minituarized modules for wearables

Equipment for in-vitro Diagnostics

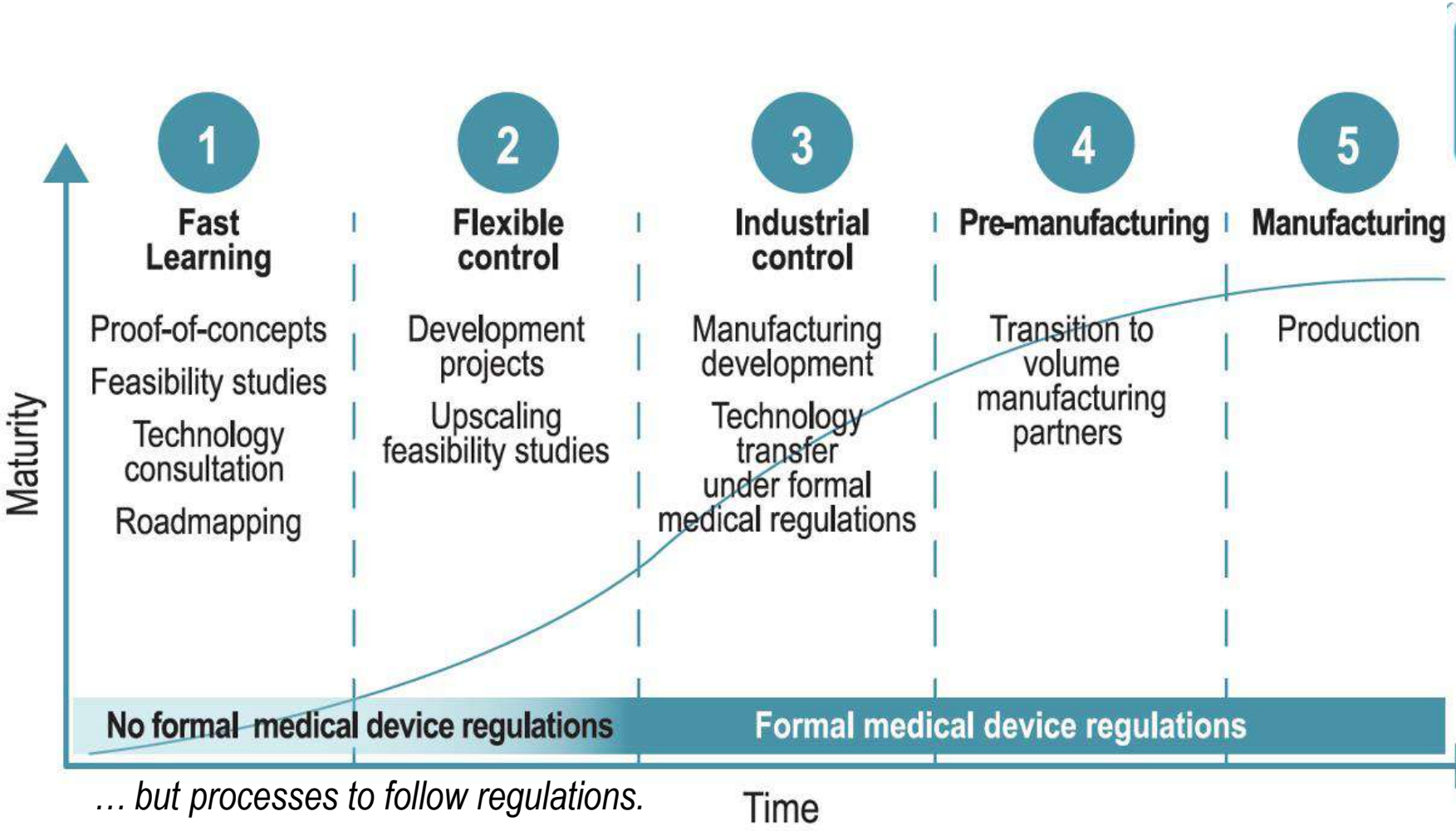
Users→ Professionals in laboratories

Technologies → Disposable microfluidic cartridges, Reader units

stryker POLAR Radisens DIAGNOSTICS ANTELOPE DIAGNOSTICS VIENNA LAB ESTABLISHED INNOVATIONS IN DIAGNOSTICS GENSPEED BIOTECH

Single-entry point for full development chain

MedPhab
Photonic Medical Devices



… but processes to follow regulations.

Front Office
Professionals in medical device domain

RTOs

VTT
Tyndall National Institute
csem
imec
JOANNEUM RESEARCH

ISO13485

PHILIPS
screentec
JABIL
III-V lab

Support

AMIRES
EPIC European Photonics Industry Consortium
NETHERLANDS CANCER INSTITUTE ANTONI VAN LEEUWENHOEK

Added value for stakeholders

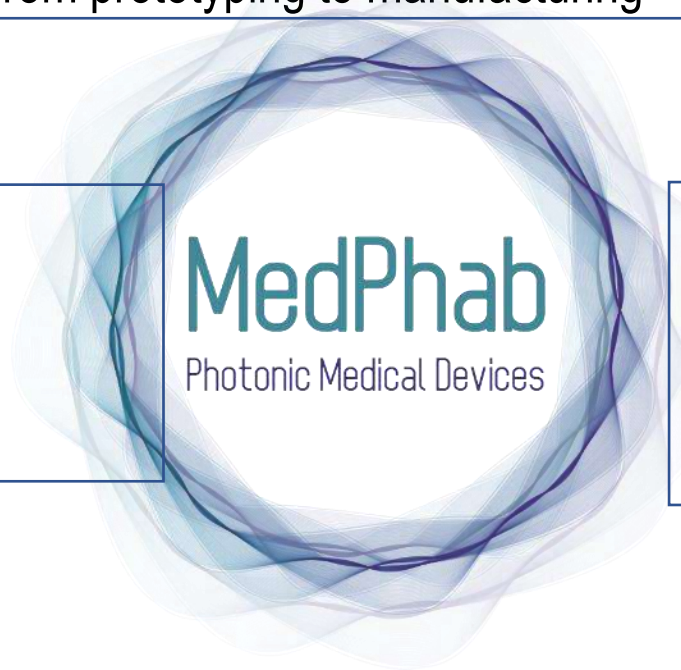
MedPhab
Photonic Medical Devices

Customers

- ✓ Accelerate product development through world-class RTOs and industrial partners who speak “the same language”
- ✓ Be matched with the right R&D partners through a single entry point
- ✓ Get a comprehensive evaluation of technology readiness and guidance in development priorities
- ✓ Medphab covers all project stages from prototyping to manufacturing

RTOs

- ✓ Improved customer service
- ✓ Creditability in medtech community



Industrial parties

- ✓ Customer cases with higher maturity from RTOs
- ✓ Update on the latest photonics technologies

Other key stakeholders

+Investors
+Other EU-initiatives

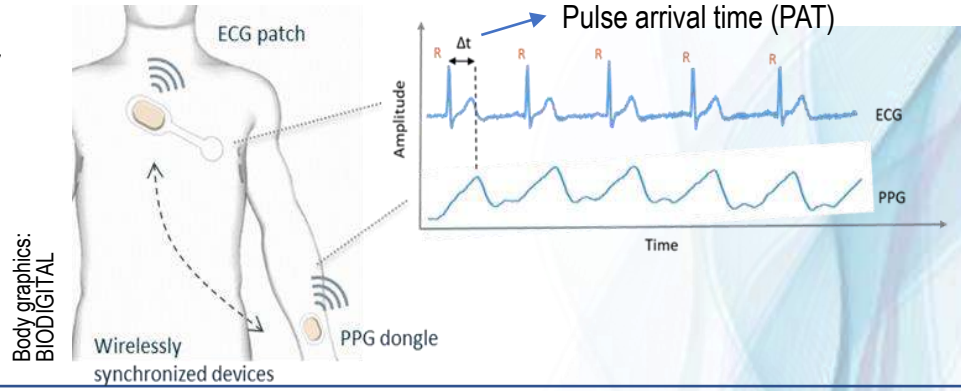
Personalized monitoring – Synchronized ECG and PPG tracking

MedPhab
Photonic Medical Devices

System description

Distributed wearable system enables the integration of multiple sensor heads on various body locations.

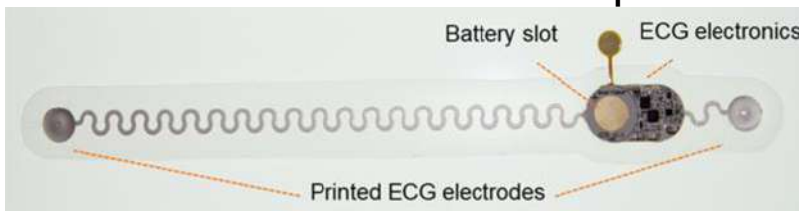
Depending on the sensor position, the biosignal data acquired can include ECG, heart rate and oxygen saturation.

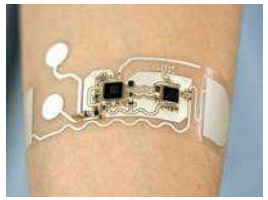


ECG electronic-module

- Currently single channel, multi-lead possible
- Disposable skin patch and reusable electronics engine

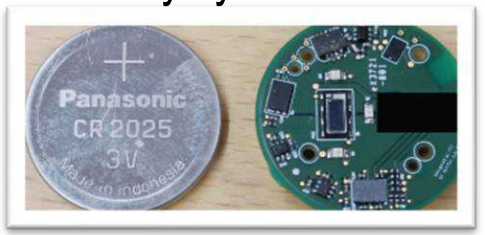
Wearable ECG patch





PPG optical module

- Multi-wavelength optical module
- Optical Heart Rage and Pulse Oximetry (SpO2)
- Wirelessly synchronized to the ECG patch

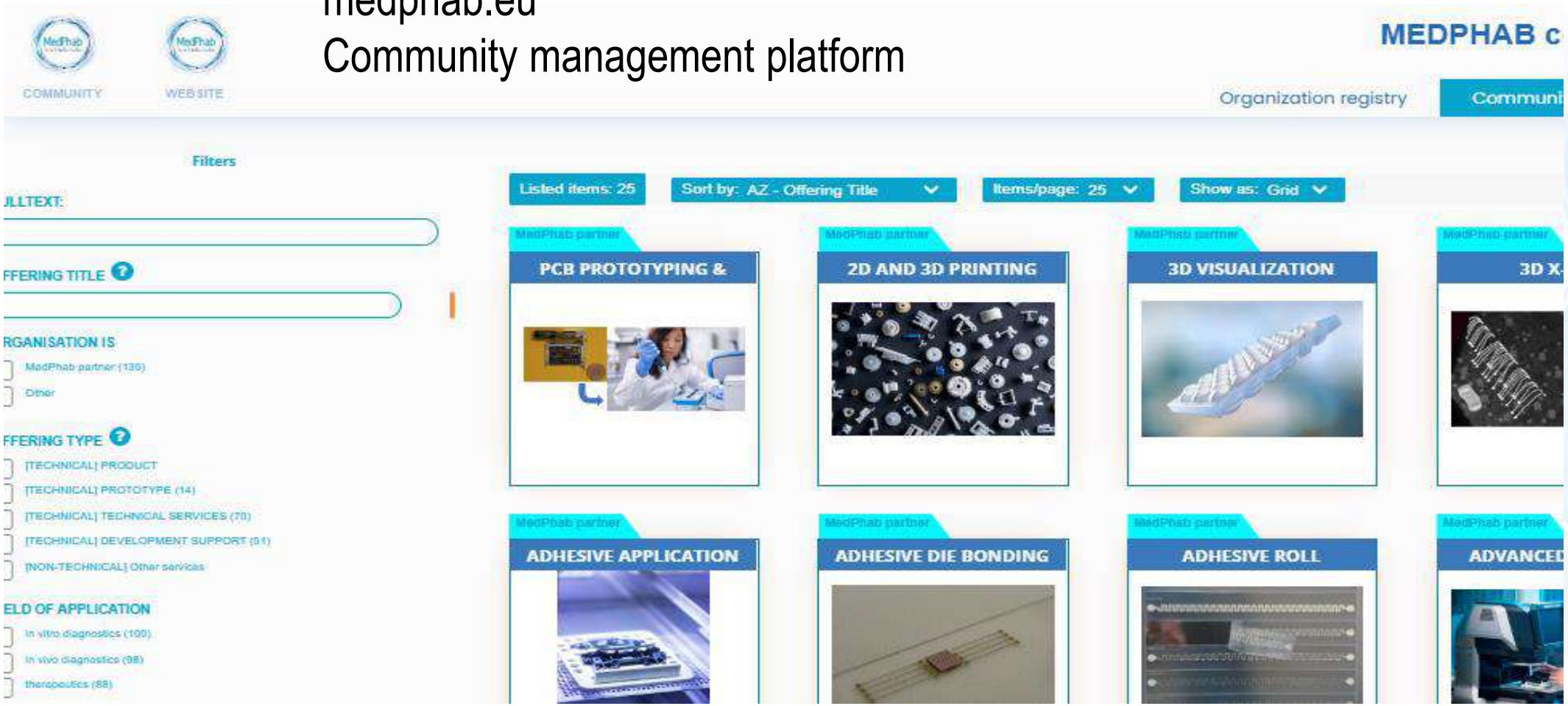


Technologies to make "production kits"

Enabling fabrication technologies

MedPhab
Photonic Medical Devices

medphab.eu
Community management platform



Financial support for Demo-case Projects

MedPhab
Photonic Medical Devices

3rd Party	EU-contribution for MedPhab services (Budget provided to MedPhab partners via MedPhab–Demo case fund)	3rd party in-cash contribution (on top of optional in-kind contribution)
SME (EU-based)	75%	25%
Large company (EU-based)	50%	50%

- Total budget of MedPhab Demo Case Fund: 1.85 M€
- **Maximum EU-contribution per project: 125 K€**

Thank you for your attention!

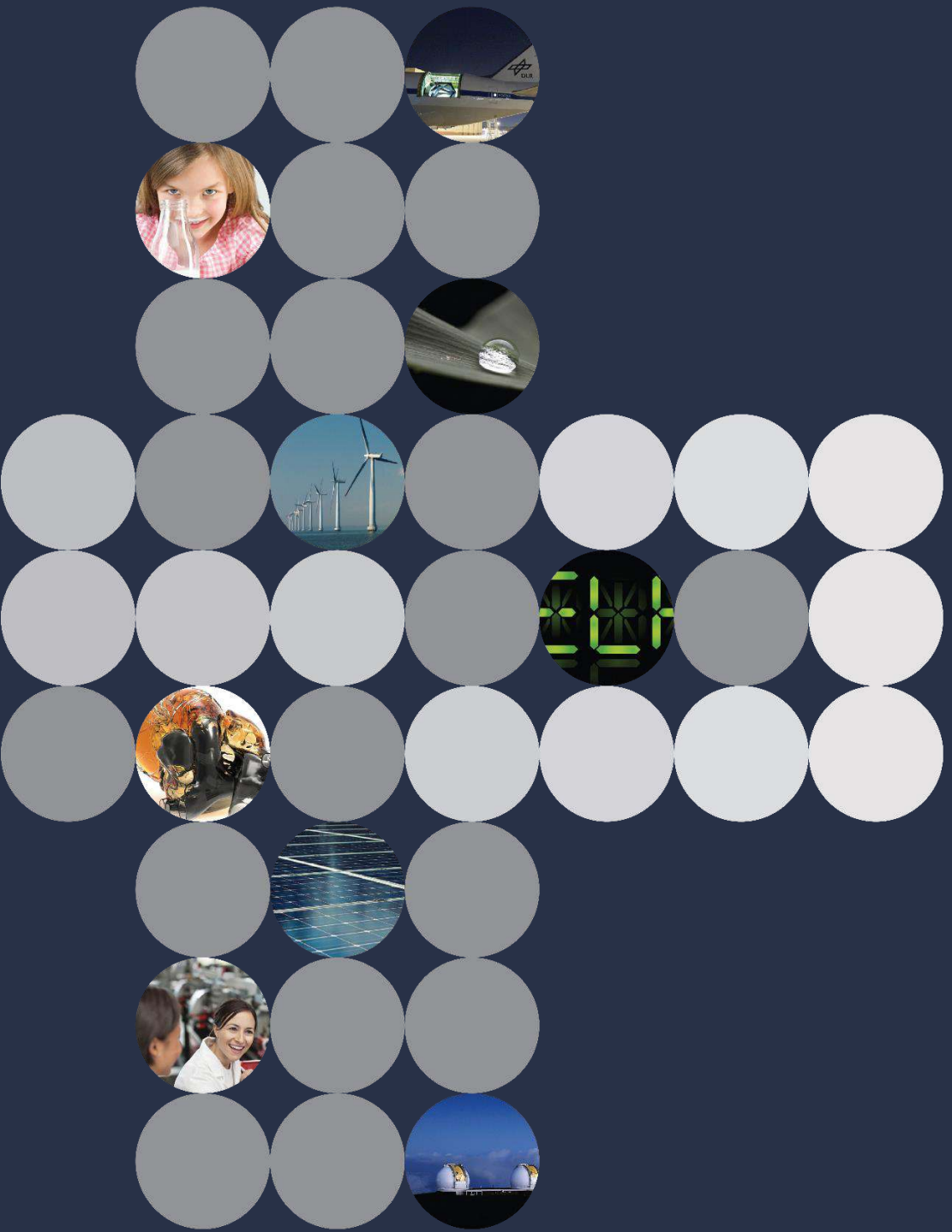
MedPhab
Photonic Medical Devices

info@medphab.eu

www.medphab.eu

www.linkedIn.com/medphab

www.twitter.com/medphab



Digital Health

personalized health(-care),
everywhere** and **at any time

Jens Krauss, Vice-President, CSEM
jens.krauss@csem.ch

Digital health segments towards **patient empowerment**

Technology

Management

Trend Health

***Wearables**, social media, sports, fitness, ...*

E-Health

Electronic patient records, telemedicine, e-medication, ...

Tech-Health

***Sensors, bio-markers, robotics**, genomics, ...*

Data Health

Signal processing, data analytics, Big Data & AI, IoMT, ...

csem

*Inspired by Swiss Digital Health Venture Funding Report 2021

IoMT and health data as driver of the **digital transformation**

- Daily use of **consumer health wearables** has increased in the US to 39% in 2020
- Shipped **wearables** reaches volume of 275M units in 2020 for a total of 49Bn US$ ($^1/_3$ = smartwatches)
- Market volume of **medical wearables** makes up to $^1/_4$ of the wearables for a total of 11Bn US$
- **Health apps** as one of the driver for consumer wearables with a total of ~350'000 apps today
- 55% of health apps use wearable **sensor data**

wrist bands

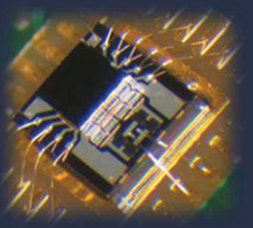
watches

armpods

smartphones

csem

CSEM DNA: small, precise and low-power



ISO 13485 MEDICAL

CSEM Status

Incorporated, **not-for-profit RTO**, supported by the Swiss Government and with a heritage within the Swiss watchmaker industry (majority shareholders)

CSEM Digital Health technologies

Track record of +20 years in **consumer health** and **medical devices** to strengthen competitivity through:

- ISO-13485 certification (since 2014)
- Multi-disciplinary integrated teams
- Operation at the University Hospital Campus BE

adhesives

glasses

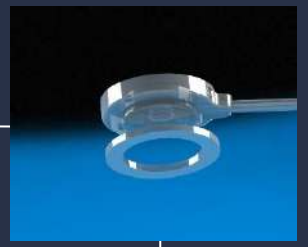
patches

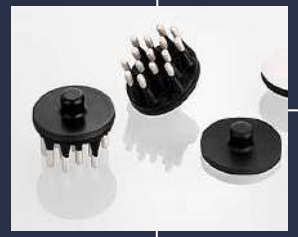
textiles

csem

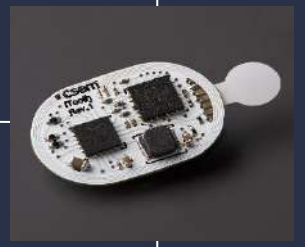
Digital Health **technology pillars** leading towards…

ASIC design
μ–technologies





sensor
electronics



processing &
data analytics

Medical Device Technologies

Medical Device Integration

Clinical Validation

csem

… data health science for prevention, diagnostic and treatment

Setup of clinical study
protocol design and compliance with ISO

Data gathering
Collection and secure transfer of clinical data

Data analysis
Feature extraction & AI algorithm design

System deployment
Implementation of digital health solutions

Privacy preserving cloud computing

Third party cloud provider should **never be trusted**, but data privacy laws and regulations should not prevent sharing of health data to progress on new innovative digital health tools.

Potentiel OTP use cases

for remote multi vital signs patient monitoring systems

1.1 Photoplethysmography, more than (heart) rhythm

Heart Rate (oHRM)
First CSEM patent
on PPG 2001

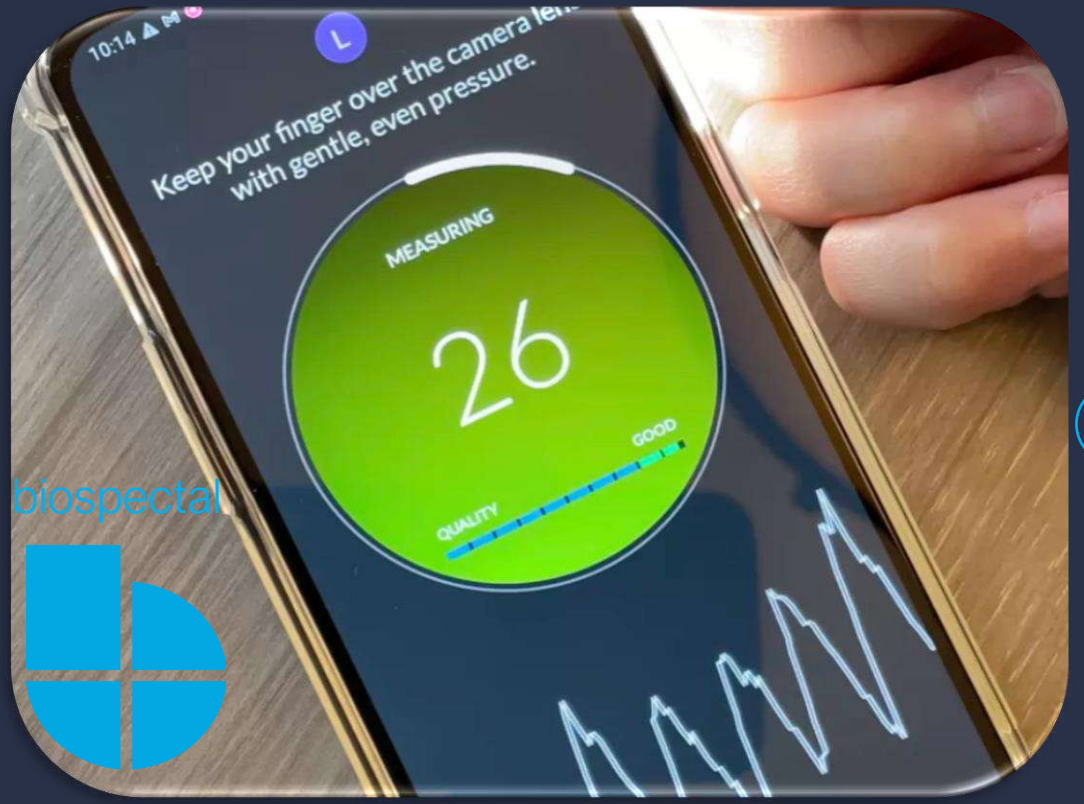
Respiratory Disorders
SpO2, respiration

oAFD®
Atrial fibrillation
detection

oBPM®
Continuous, cuff-less
blood pressure

csem

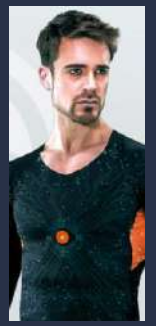
1.2 Revolutionizing **hypertension management** with oBPM™

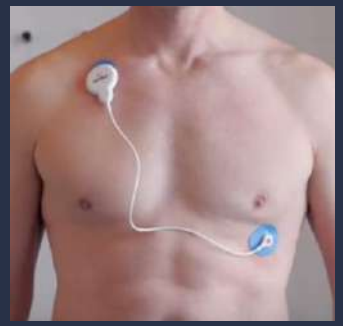


CSEM algorithms focus on model-based interpretable signal processing methods, but…
…the sharing of big data sets could help improving accuracy and patient safety

2.1 **Cooperative sensors:** active, smart, cableless and low-cost

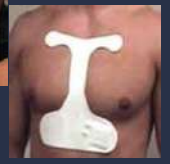
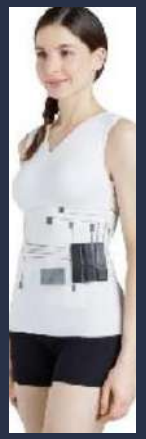
CSEM



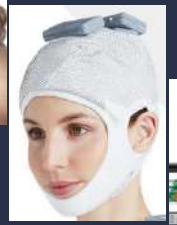
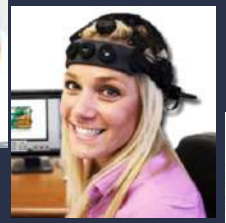

others

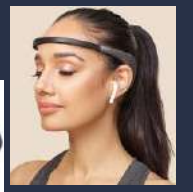
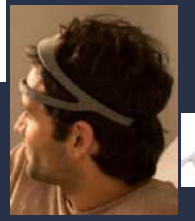




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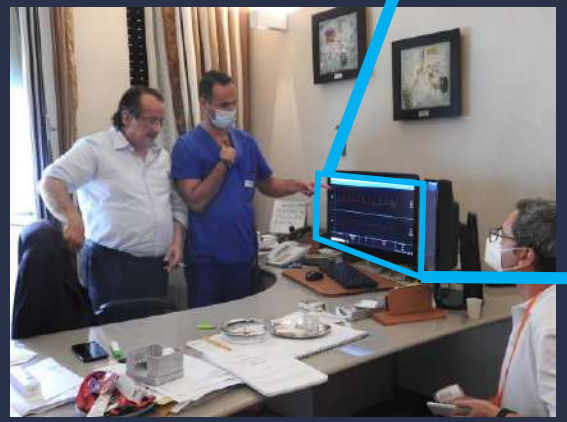
2.2 Data driven **remote patient monitoring** pilot to fight COVID-19



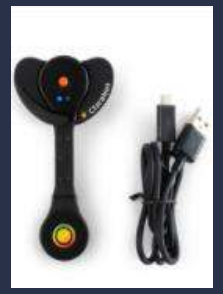
Tedious regulation process makes its impossible to deploy the implemented health solution pilot easily to other care providers

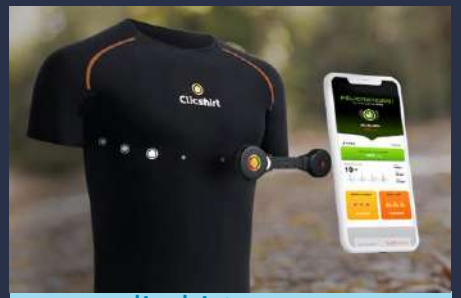
csem

Some thoughts how to reinforce digital health OTPs

- R&D challenges: **regulation issues** should not hinder progress in science
- Market challenges: **seamless integration** into healthcare process
- Data issues: how to ensure **data security & privacy** by respecting data property
- Consumer health vs medical devices: **reliability vs accountability**
- New digital health tools facing a **lack of reimbursement code**

CSEM **mission:** our digital health technology, your product





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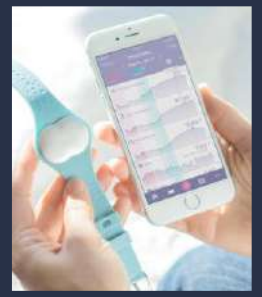
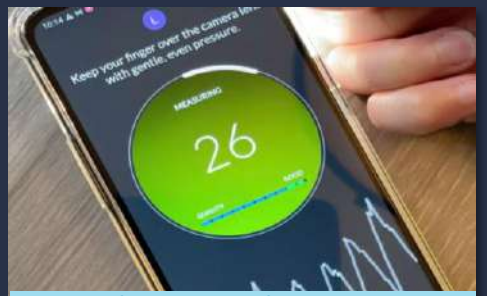


www.avawomen.com

www.decathlon.fr

www.vexatec.com



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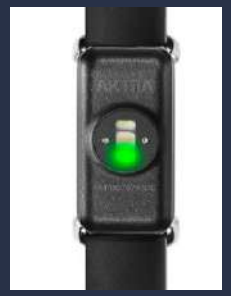
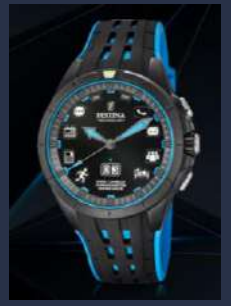


www.aktiia.com

www.ifit.com

www.swatchgroup.com



www.festina.com

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HEALTH.E

Session 2

RTO perspective

- Paul Galvin – Tyndall, Ireland
- Alexandre Delalleau & Aurore Lepecq – CEA Leti, France
- Liesbet Lagae – IMEC, Belgium
- Thomas Wittenberg – Fraunhofer, Germany

ECSEL Joint Undertaking

EUROPEAN UNION

Open Platform Technologies as Building Blocks for Emerging Digital Healthtech

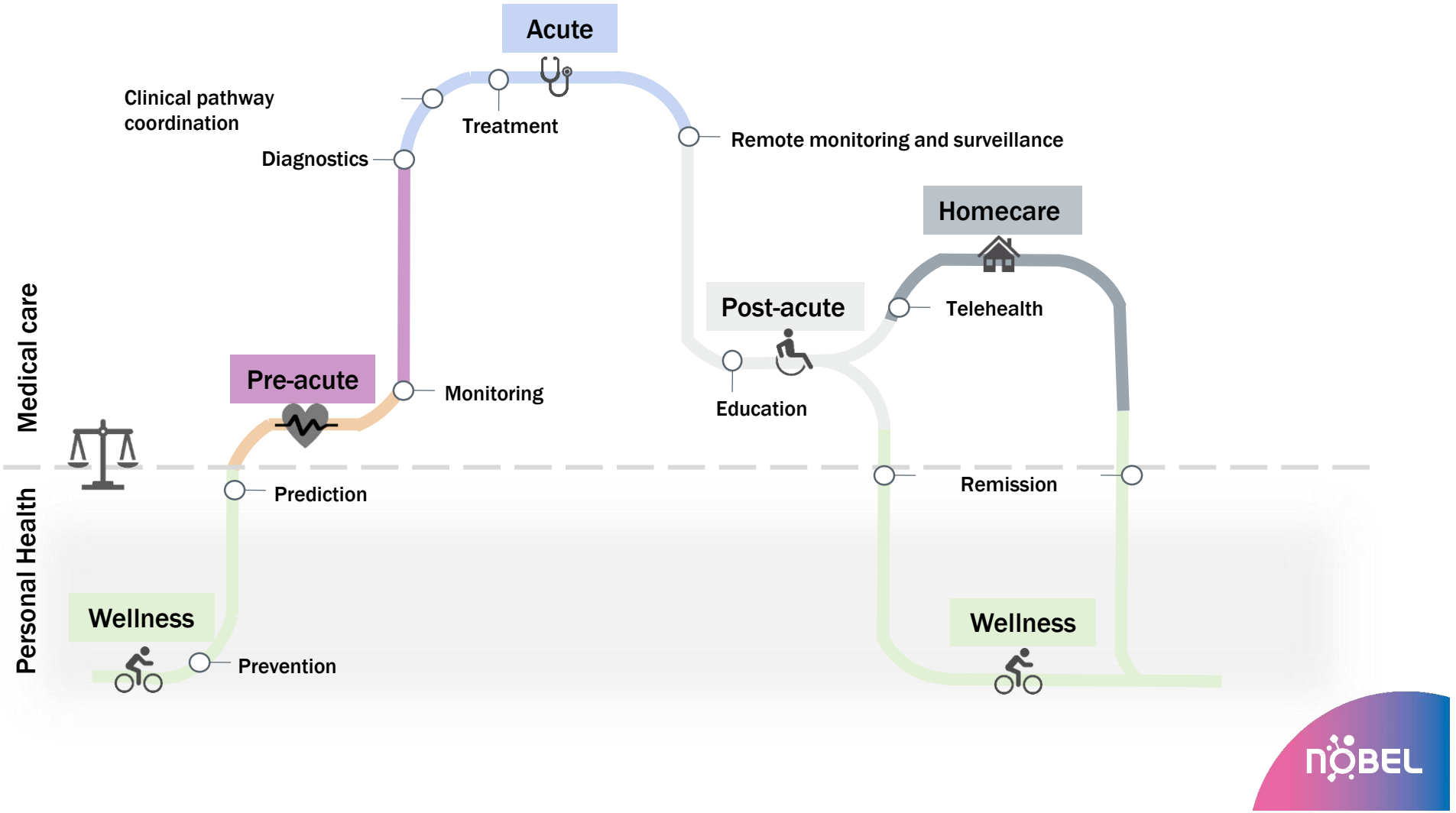
Dr Paul Galvin

Head of ICT for Health Strategic Programmes
Head of Life Sciences Interface Group
Head of Bioelectronics Cluster
Tyndall National Institute
University College Cork
Cork, Ireland

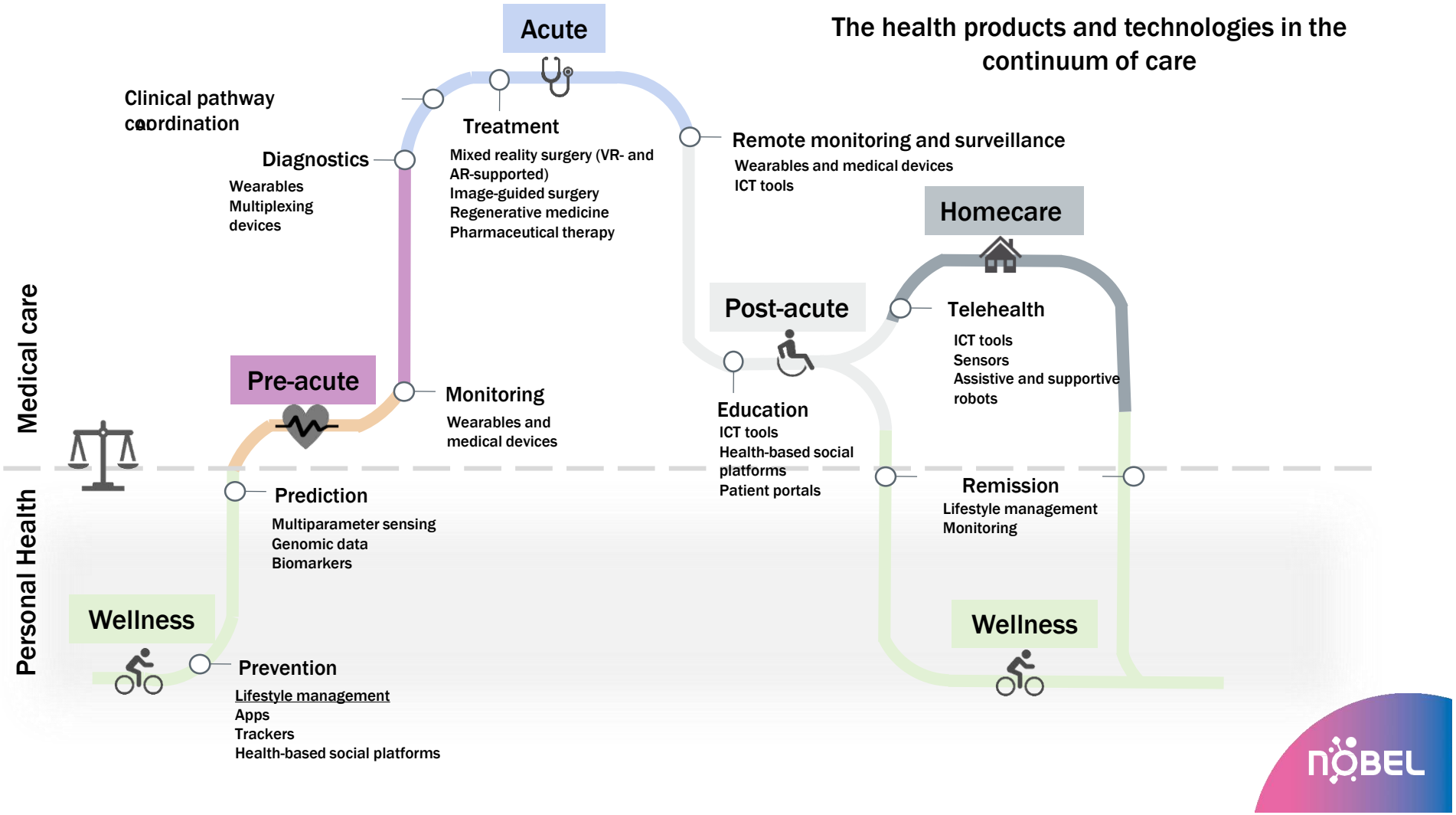
paul.galvin@tyndall.ie

Rialtas na hÉireann Government of Ireland
Tionscadal Éireann Project Ireland 2040
Ireland's European Structural and Investment Funds Programmes 2014-2020
Co-funded by the Irish Government and the European Union
European Union
European Structural and Investment Funds

A patient journey through the continuum of care



Smart Healthtech Products and Technologies in the continuum of care

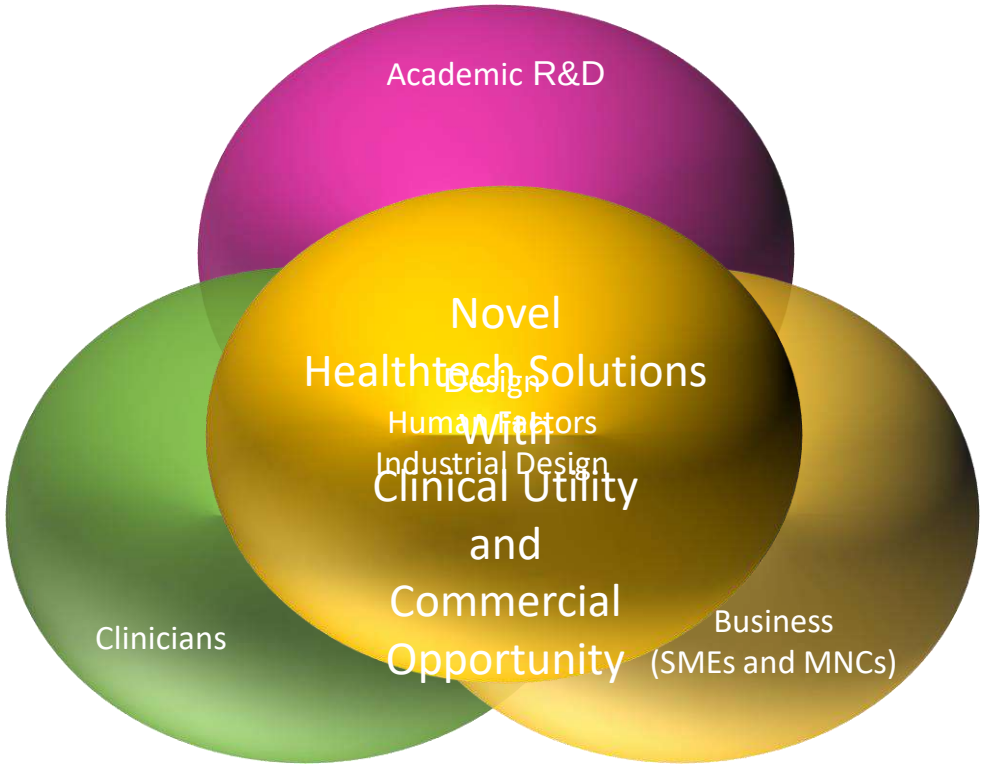


Health Innovation
ABCD ecosystem

Tyndall National Institute
Institiúid Náisiúnta

Collaborations involving:

- Global Medtech, Pharma & ICT Companies;
- Innovative SMEs;
- Contract Manufacturers;
- Innovative Clinicians;
- Leading Scientists and Engineers;
- Human Factors Design;
- Government agencies (IDA, EI, HRB, HSE, SFI, HPRA, etc)



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Digital Healthtech - Expert Building Blocks

Tyndall National Institute
Institiúid Náisiúnta

Smart Delivery Systems

Smart Drug Delivery Systems enable:

- Adherence to prescribed therapeutic programme
- Access to new therapies which require precision in dose levels and early warning of potential adverse events
- Programmable local release of high concentrations of drug to target tissue to minimise side effects
- Remote adjustment of therapeutic dose via telemedicine (with benefits on cost, safety and convenience).
- Closed loop feedback for personalised medicine
- Delivery of the right dose to the right tissue and the right time.
- Participatory medicine where applicable with patient monitoring / adjusting dosages within safe limits.

Smart drug delivery systems
Technology building blocks (1)

- Communications modules
  - BLE and other telecoms chips not optimal for wearables/ implantables
  - Mobile phone as gateway, or IOT (IOT roaming?)
- Power
  - Disposible battery / Energy harvesting / Inductive power
  - Low energy IC design
- Flexible electronics
  - Enable wearable solutions and/or electronics which can be conformal on 3D devices.
- AI
  - Local EDGE-based AI for optimal system performance
  - Cloud-based AI/ML to identify and leverage population patterns
- Human Factors Design
  - Physical form factor and out of the box experience
  - GUI compatible with all mobile platforms

Smart drug delivery systems
Technology building blocks (2)

- Fluidic actuation devices
  - MEMS pumps / valves
- Diagnostics for combination devices
  - Sensor system for verification of drug delivered to target tissue or related biomarker
  - Measurement of biomarkers to trigger initiation of drug delivery or inform threshold therapeutic dose reached.
  - Monitoring of systemic health to provide early identification of adverse events
- Smart delivery vehicles
  - needles for parenteral delivery
  - pills / inhalers / nebulisers for oral delivery
  - implants
- Security
  - Data encryption for GDPR
  - Authentication of drug
- Encapsulation
  - Biocompatibility, robust packaging, etc.

Smart Healthtech Systems Value Chains: Patients at the centre

Tyndall National Institute
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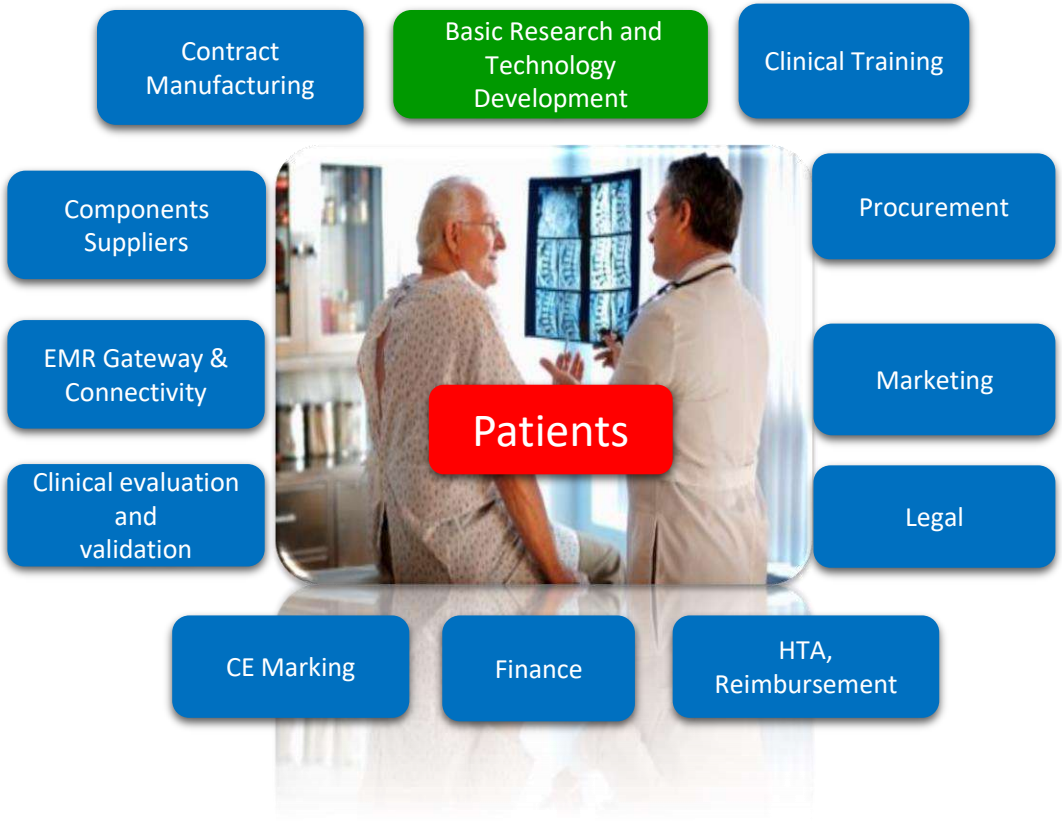
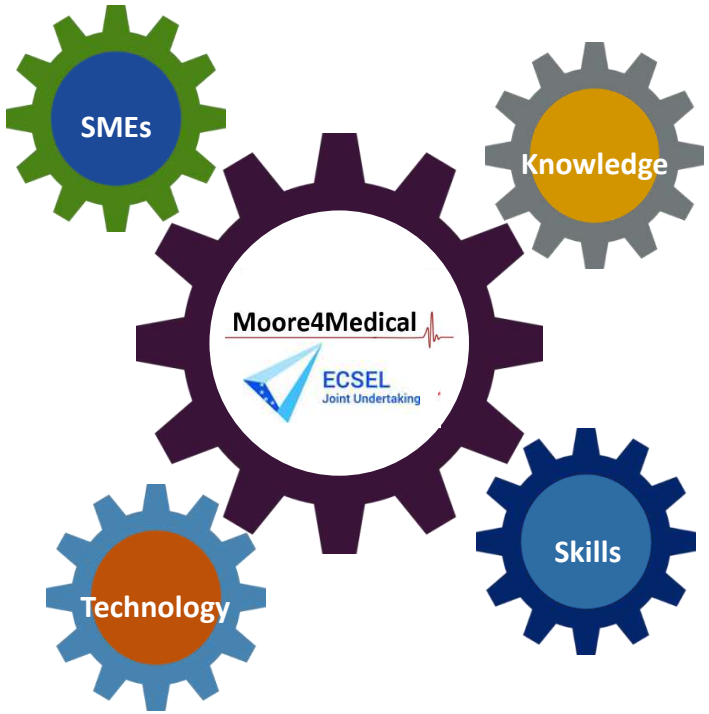




Moore4Medical

ECSEL Joint Undertaking

Health.E Moore for Medical

Digital Healthtech - Innovation Opportunities

- Digital Healthtech can enable Preventative, Predictive, Personalised and Participatory Medicine.

- Convergence in Medtech, Pharma and ICT manufacture and innovation.
  - Open platform technologies are emerging in Digital Healthtech to which should accelerate developments, leading to better clinical outcomes, a more sustainable delivery of healthcare to the community and economic impacts for EU.

- Precision Medicine
  - Decision support and Closed loop systems for treatment and monitoring – therapy can modulated to achieve the desired effect based on real-time monitoring of the patient
  - Digital Health - data collection at the device, patient and population levels will empower big data analytics for managing the supply chain, quantifying the effectiveness of the devices / therapy, and enabling population level analytics to inform future prediction and prevention solutions.

- Service rather than product based business models will be the future basis for reimbursement
  - Requirements for verification of efficacy provides opportunities for high value products with differentiation in the market.

Acknowledgements

NOBEL Smarter HealthTech in Europe

ECSEL Joint Undertaking

Moore4Medical

sfi Fondúireacht Eolaíochta Éireann Science Foundation Ireland

ENTERPRISE IRELAND where innovation means business

Celtic Advanced Life Science Innovation Network

EU Funds: Ireland Wales Programme 2014-2020

Ireland's European Structural and Investment Funds Programmes 2014-2020

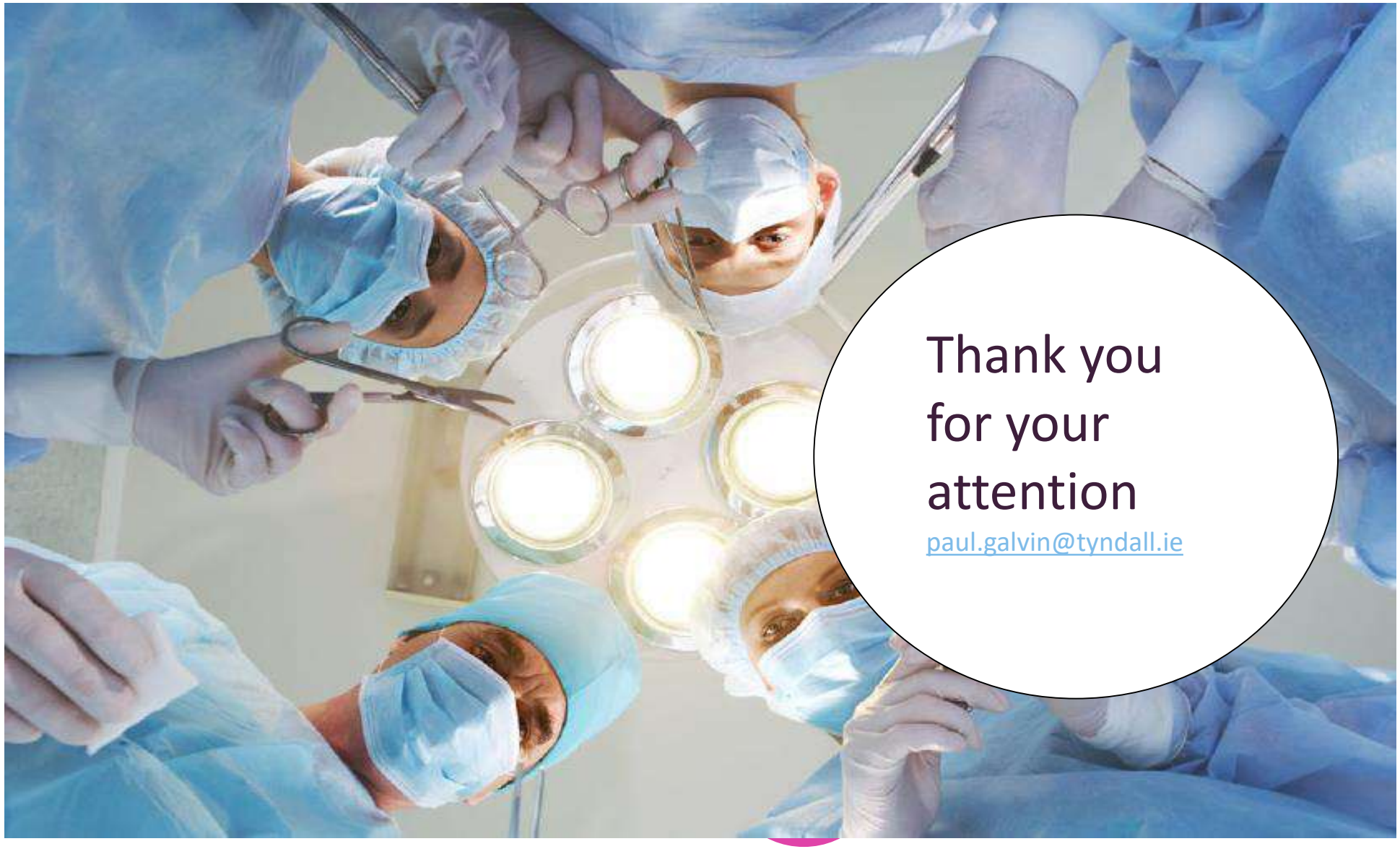
Co-funded by the Irish Government and the European Union

Cronfa Datblygu Rhanbarthol Ewrop European Regional Development Fund

Ireland's EU Structural Funds Programmes 2007 - 2013

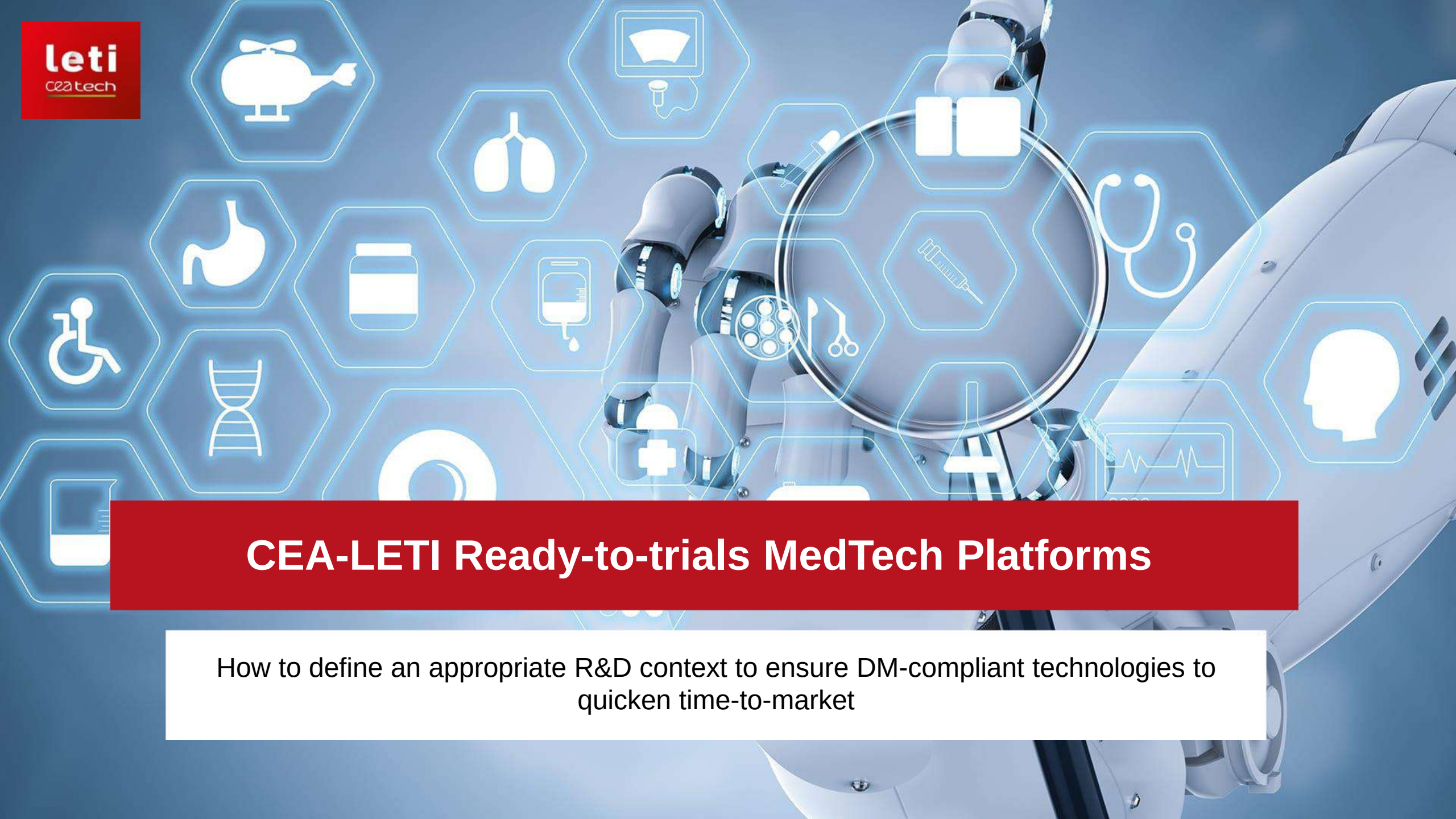
Co-funded by the Irish Government and the European Union

EUROPEAN REGIONAL DEVELOPMENT FUND



Thank you for your attention

paul.galvin@tyndall.ie



CEA-LETI Ready-to-trials MedTech Platforms

How to define an appropriate R&D context to ensure DM-compliant technologies to quicken time-to-market

PRESENTATION

Alexandre Delalleau

Head of the Medical Devices Platform

Aurore Lepecq

Head of the Laboratory of the systems in close proximity to the person

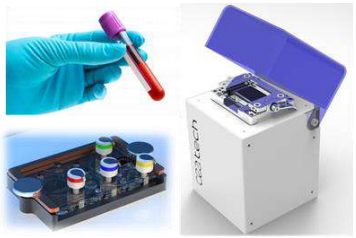
HEALTH-TECH ECOSYSTEM AT CEA

Non-implantable MD

Implantable MD

Customized MD

IVD MD



11
Departments

1000
Researchers

200
PhD students

22
Created startups

120
European projects since 2016

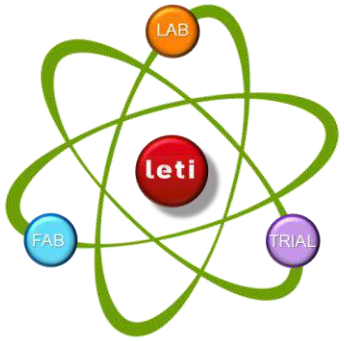
Micro Nano and bio-technologies (CEA-LETI) for Medical Devices

Two main dedicated departments : DTBS & Clinatec

Development of innovative technologies for diseases diagnosis & patients monitoring

THE CEA POSITIONING AMONG RTOS

A step-by-step guidance : "Medical Devices by Design"



How to Improve MD maturity before industrial transfer ?

A step-by-step guidance to develop medical devices
A decreasing support according to projects' development and depending on partners' maturity

CEA — *Industrial partners*

1	2	3	4	5	6	7	8	9
Idea	Concepts	Proof of concept	Demonstration	Solution development	Clinical trial	Production processes and technologies	Product launch	Product life cycling

GO

CE

THE TECHNICAL DEVELOPMENT PARADIGM

Accounting for regulation within development stages

Most of digital Medical Devices need actual data to develop specific sensor-related algorithms

Data has to be recorded in a real-"life" situation (hospital, home-care, …) and be compliant with regulation (safety, data management …)

Challenges :

- *How to use prototypes in actual clinical trials ?*
- *How to ensure a compliance regulation without influencing the whole research process ?*

REGULATION : THE RTOS UNLOVED STAGE

Medical devices modification cost versus time

"It alters creativity"
"It will slow-down the entire project"

1	2	3	4	5	6	7	8	9
Idea	Concepts	Proof of concept	Demonstration	Solution development	Clinical trial	Production processes and technologies	Product launch	Product life cycling

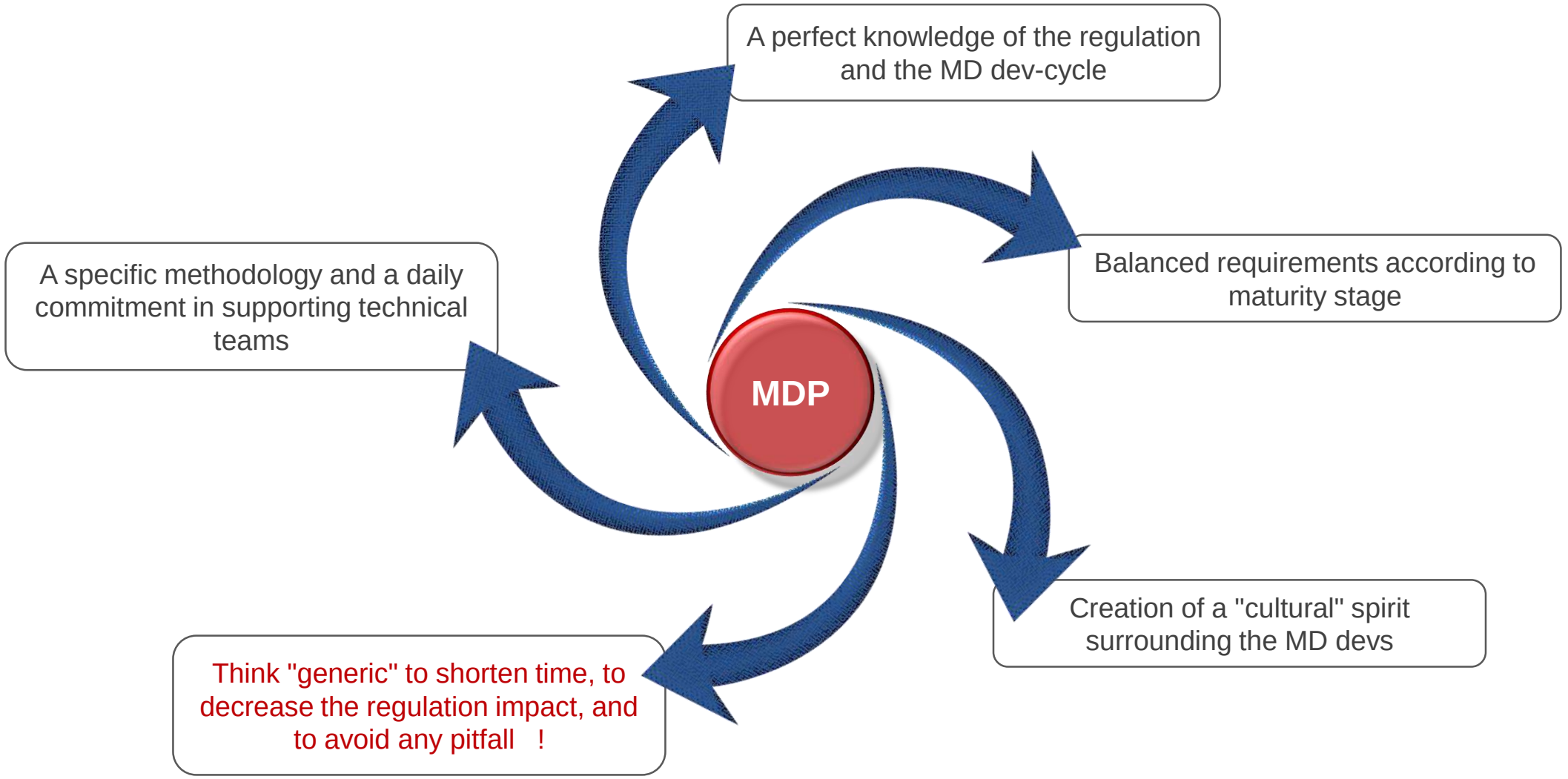
REGULATION : THE RTOS' UNLOVED STAGE

The "by-design" concept

MDR 2017:745, 746
Biocompatibility (ISO 10993)
Software dev (ISO 62304)
Optics (ISO 62471)
Electric safety (ISO 60601-1)
Electromagnetics (ISO 60601-1-2)
…

Avoid any pitfall while being transfer to industrial partners

THE CEA'S MEDICAL DEVICE PLATFORM (MDP)



LS2P: BETWEEN MEDICAL AND INDUSTRIAL WORLDS

Health-tech Innovation for everyone's health

Physiological study (Medical)

Collaborations with Practitioners = Human / Innovation link

Medical Device Production (Manufacturers)

Collaboration with Industries = Innovation / Techno link

L2SP Skills

Meaningful data in response of Doctors needs

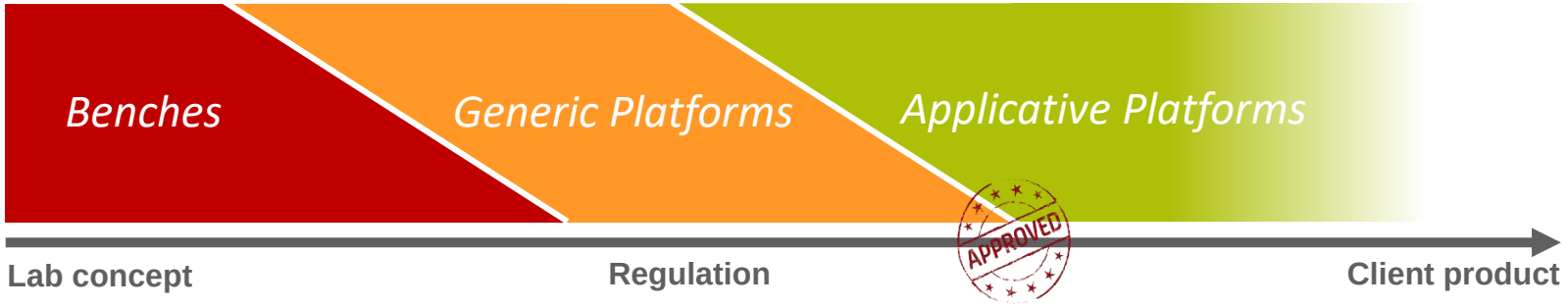
Sensor Integration

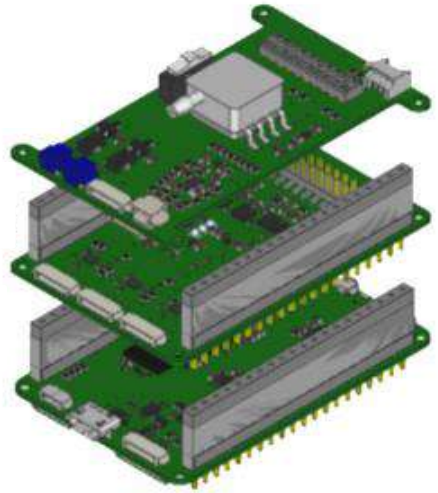
Data Aquisition

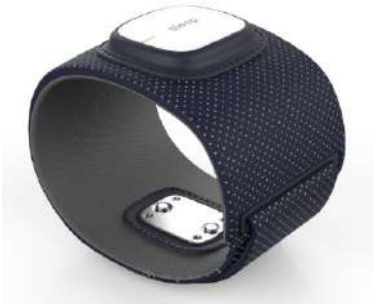
Data Processing

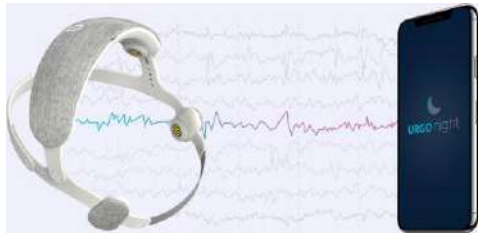
First prototype for future industries production

DEVELOPEMENT: FROM BENCH TO PRODUCT





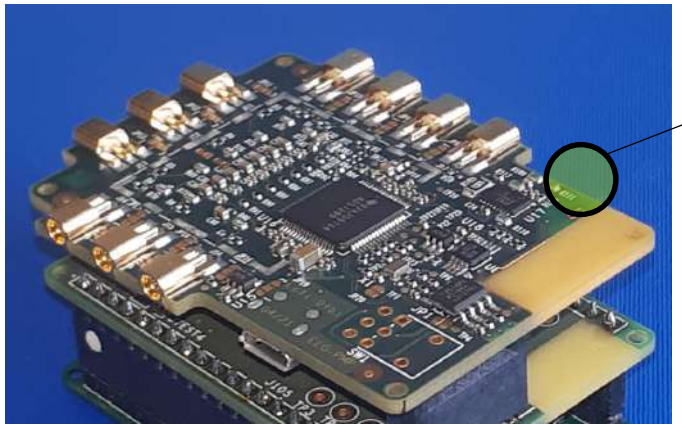




Imagine the possibilities…

GENERIC PLATFORM

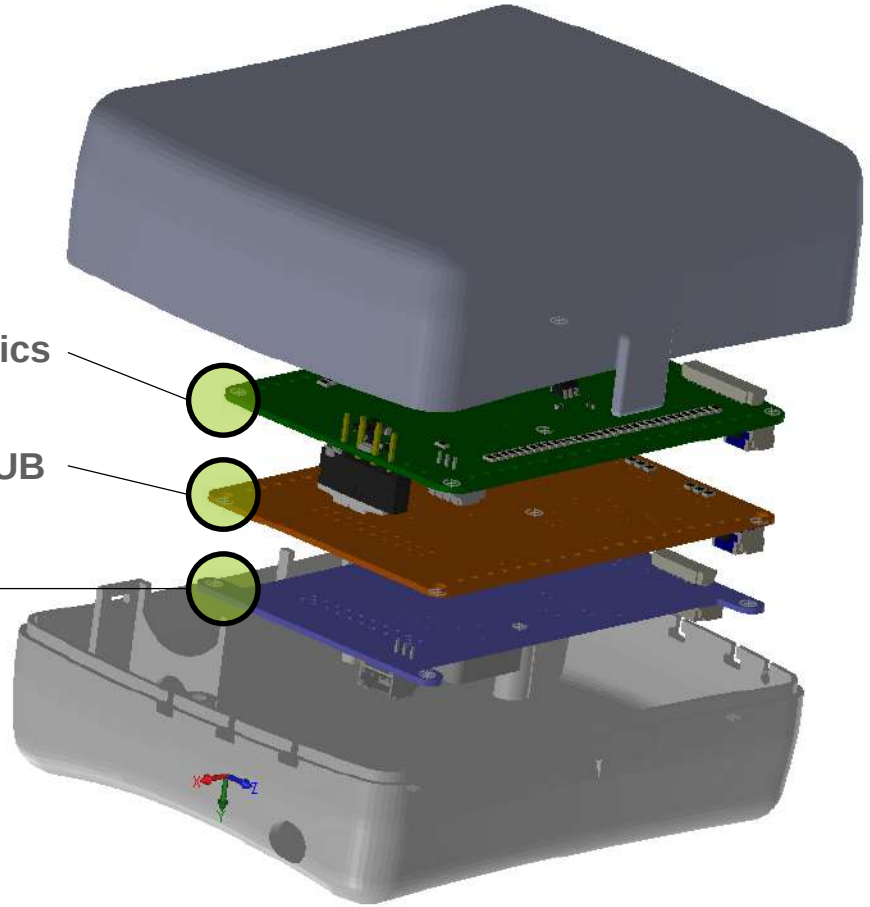
The Physiological Monitoring Platform (PMP)



Specific sensor frontend electronics

Generic communication HUB

Energy supply and embedded controller



GENERIC PLATFORM

The Physiological Monitoring Platform (PMP)

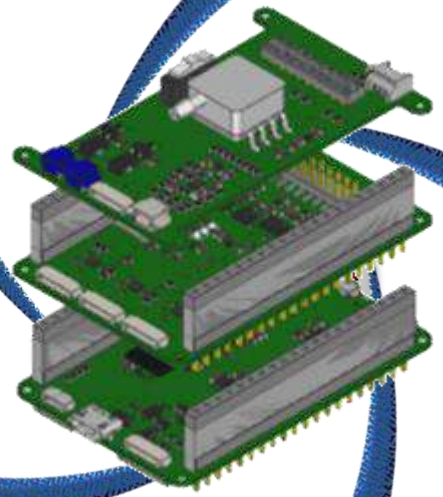
DATA ACQUISITION

SENSORS
- Analog inputs, single ended / diff
- SPI, I²C, I2S

SUPPLIES
- battery
- USB

OTHERS SPECIFICITIES
Certified for tests on person
µcontroller & FPGA

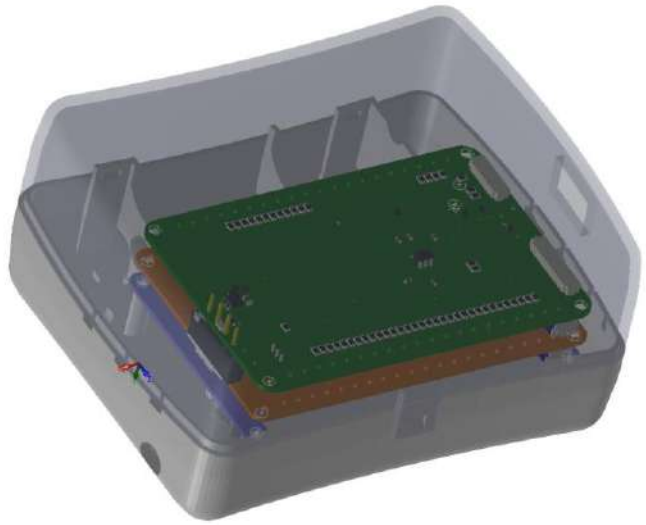
USER INTERFACE
- USB, BLE 5.0
- Script python for online processing



FROM PROTOTYPE TO PRODUCTS

Speed up development

-75% Regulatory workforce needed	Tech teams focused on their expertises More project to be ran simultaneously
-50% Regulatory costs	Costless projects for industrial partners
1 Month to integrate and drive a new sensor	Strongly accelerates time to design
Less, less, less Risks of project failure	

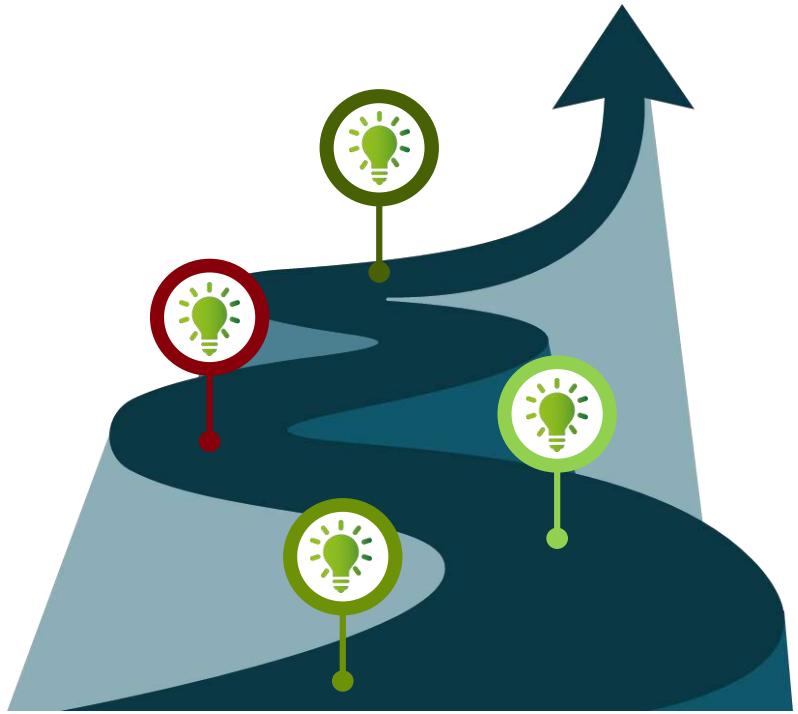


TO CONCLUDE

Facilitate the data collection to develop algorithms / deep learning

Ensure the highest data quality possible

Quicken R&D phases and decreases costs



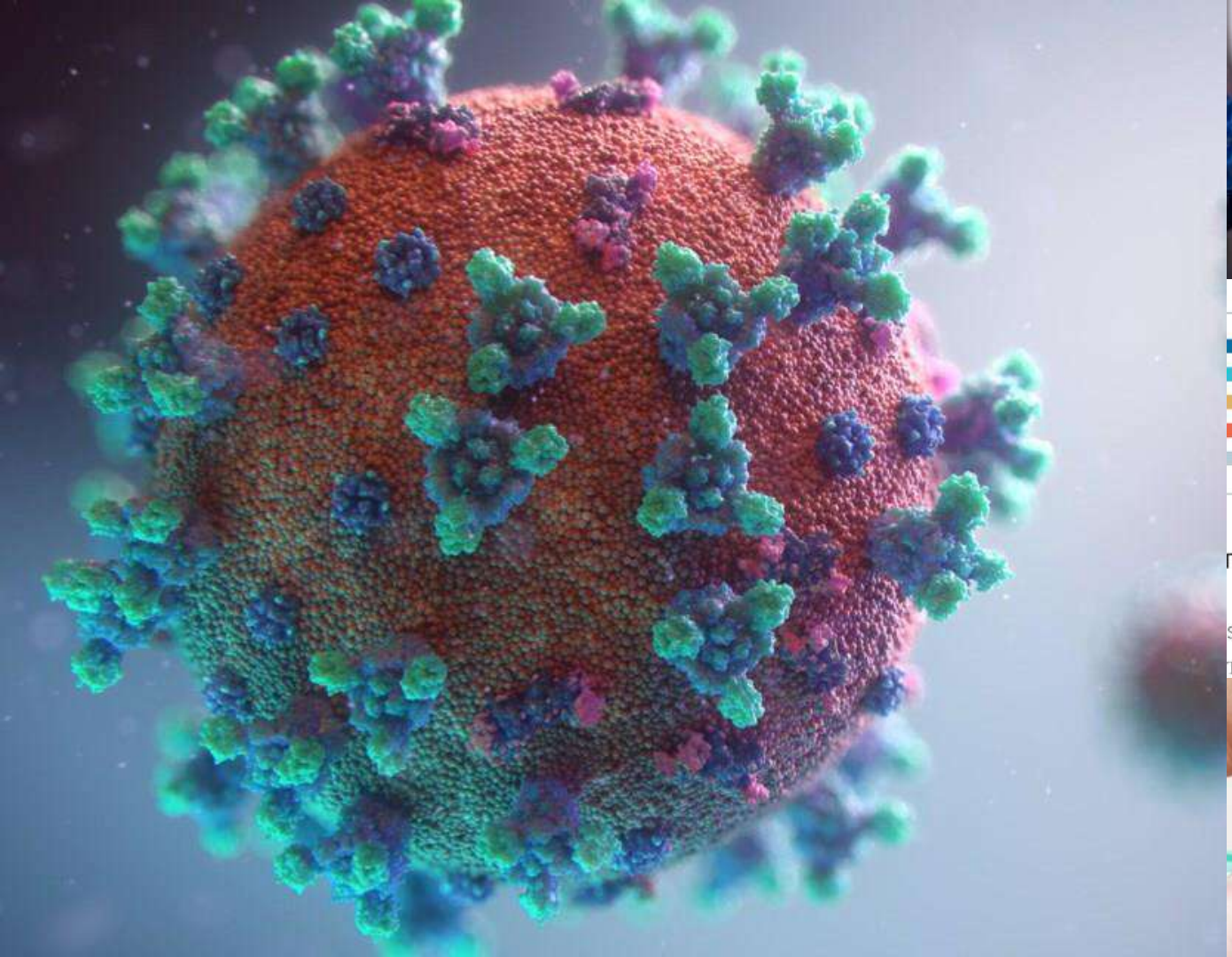
Drastically decreases the risk of projects' failure and costs evaluation

Can be used easily to draw some standardized connections to open-manufacturing platforms

Not reinventing the wheel

How imec's integrated platforms can help health applications

Prof. Liesbet Lagae. Imec Fellow and program director life science technologies
Dr. Wolfgang Eberle IMEC public funded program manager health



Billions of DNA PCR tests - 30 euro

Millions of NGS tests – 300 euro

All versus one

Ineffective Drugs:

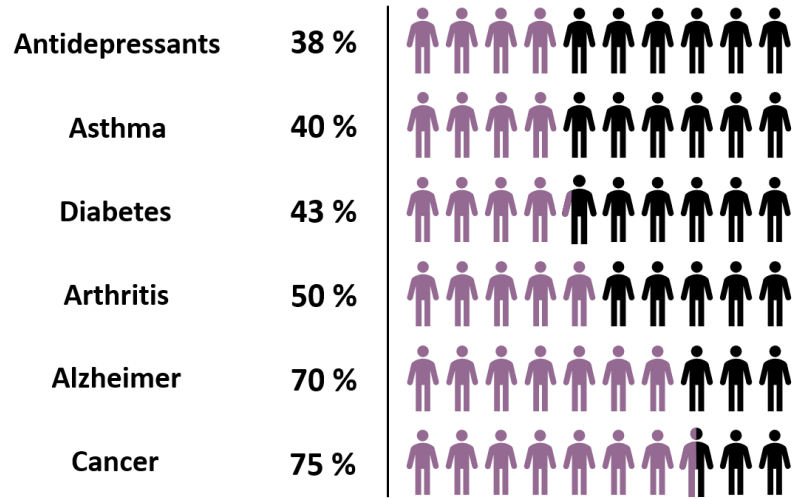


Fig. 3: Amount of patients with ineffectiveness of certain substances. [8]

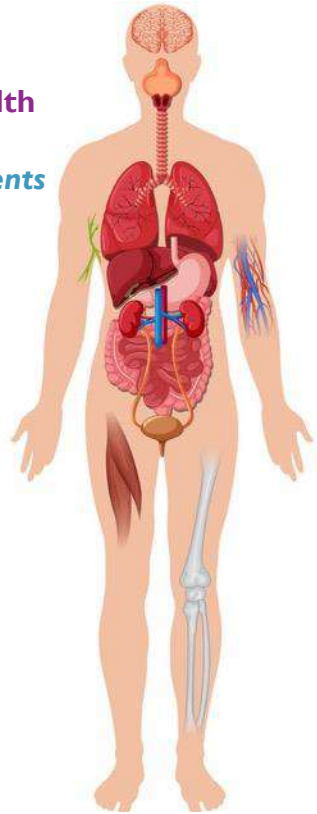
[The personalized medicine Report]

The patient's ask

We need more frequent health measurements
→ *Powerful health measurements*

We need therapies that work better
→ *Better preclinical models*

We need novel therapies in hands
→ *Advanced therapies & their manufacturing*



We need to understand the organ that defines us
→ *Brain interfacing technology*

We need less invasive & more precise surgery
→ *Precision surgical tools*

We need to continue unraveling biology
→ *Technology allowing to peer deeper through digital omics*

We need to fully leverage the potential of data
→ *Turning shared data into actionable insights*

Patient driven healthcare - from discovery to prevention

Therapeutic excellence will require system and technology co-optimization

Discovery	Preclinical		Therapeutics		Diagnostics & Monitoring	Prevention
Advanced Omics	Neurotech	Preclinical models	Precision therapies & Personalized Biomanufacturing	Surgical interventions	Powerful health measurements (Dx, imaging)	Digital Health – Digital twin

Applications

Privacy-preserving, secure, large-scale, multi-party analytics

HW Solutions

Chip R&D platforms

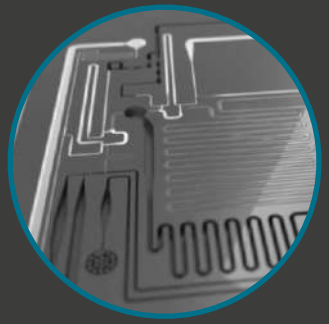
Process technology and material exploration

imec

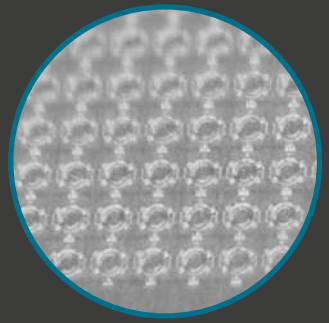
Scalable chip platforms at the heart of imec's health program

ELECTRONIC
CIRCUIT PLATFORM

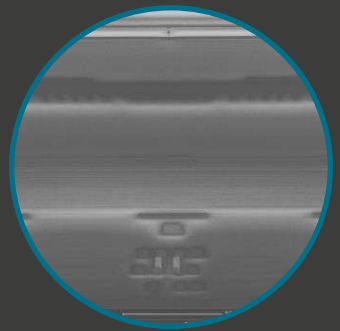
PHOTONICS CIRCUIT
PLATFORM



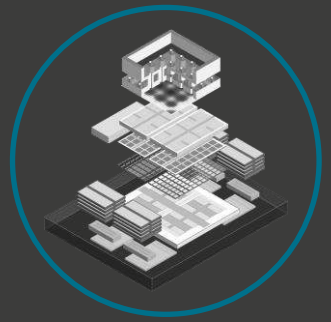
FLUIDIC
PLATFORM



ACOUSTIC
PLATFORM



ON CMOS MONOLITHIC
INTEGRATION



3D
INTEGRATION

imec

What we offer

R&D
COLLABORATION

Example: developing a new product prototype
From feasibility to product

INNOVATION
SERVICES

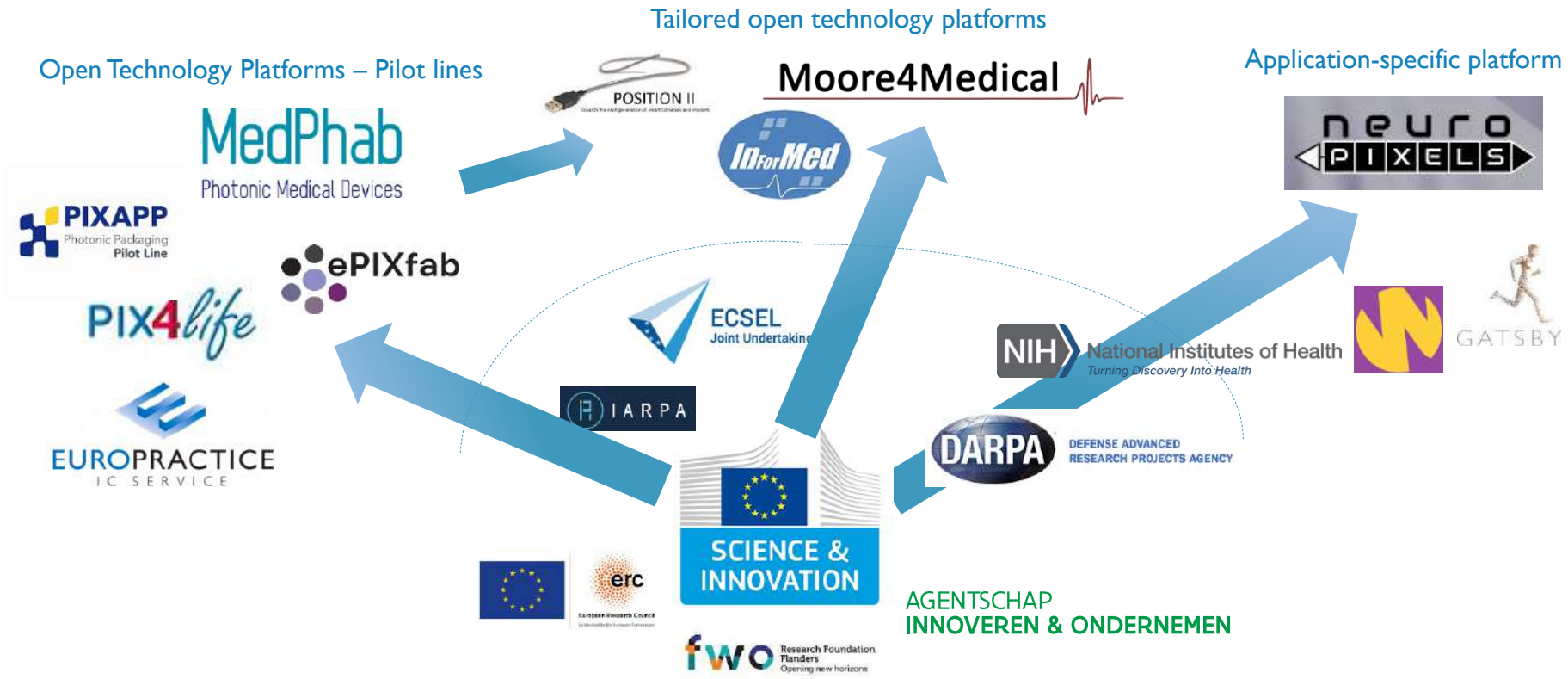
Example: using pilot line services

VENTURING
STARTUPS & FUNDS

Example: startup in need for imec IP

Some recent successes

Develop and offer open platforms and pilot lines to not reinvent the wheel



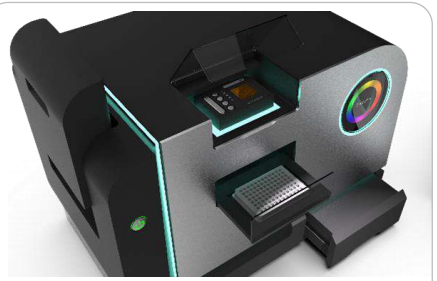
imec

Some recent successes

Use of platforms by SME companies

Pacific Biosciences

Single molecule DNA sequencing



Evonetix

3rd generation gene synthesis

Roswell

Single molecule DNA sequencing

Spectricity

Spectral sensing

Midiagnostics

Point of care – breathalyzer

Pulsify

Heart monitoring using ultrasound

Sarcura

carT cell instrumentation

Antilope Dx

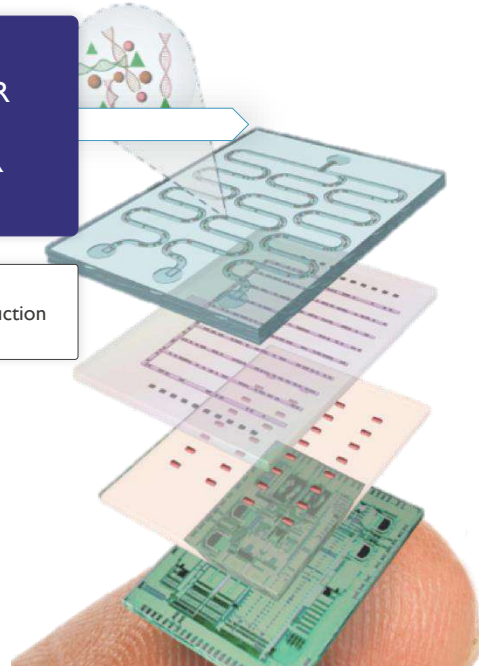
Point of care – saliva sensing

An example R&D Collaboration for chip integration

Feasibility + Development on Demand + Volume Manufacturing

FEASIBILITY PROJECT	DEVELOPMENT	PROTOTYPING	LOW VOLUME PRODUCTION	TRANSFER TO HVM PARTNER
Feasibility demonstrated specifications defined	Custom development proof-of-concept demonstration	Prototype chip tested, Ready for production, Ramp-up	Qualified product = 500-1000 wafers depending on process flow	High volume production

Highly dependent on 200mm and 300 mm pilot line infrastructure



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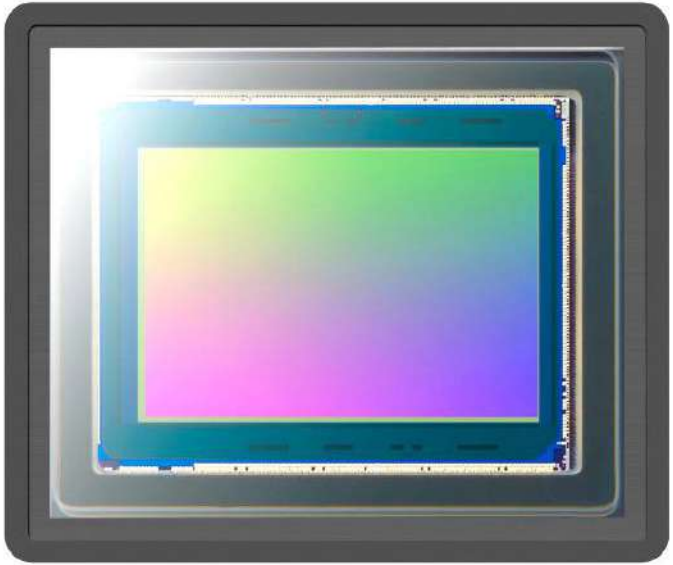
Photonics platform

Powerful commodity imager platforms combined with monolithic (visible range) photonic integration



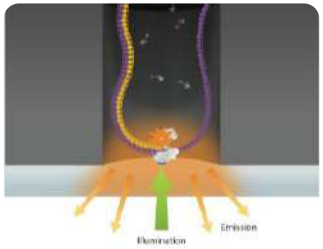
CMOS image sensor

+

2 M Optical filters

1 M Optical lens

1M Visible range photonic waveguides



1 M zero mode waveguides

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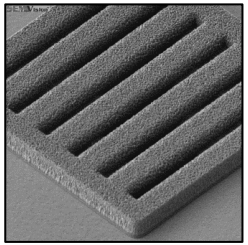
Multi electrode array platform

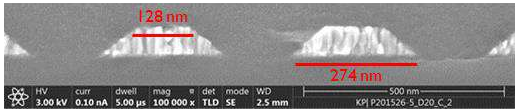
Large portfolio of electrode capabilities for sequencing, synthesis, electrophysiologic recording, stimulation and biosensing

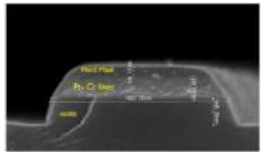
Biocompatible and CMOS compatible electrodes



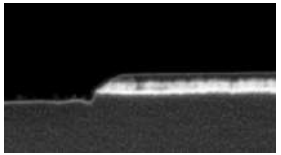
TiN electrodes ~150 kΩ @ 1kHz

Ru tracks buried in SiNx



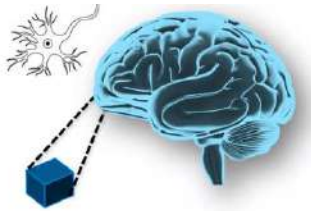


Pt electrodes (exposed or coated) 10nm-50nm



Ru electrodes (exposed or coated) 10nm-50nm

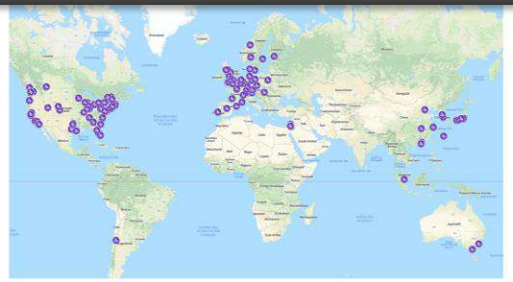
The challenge with "reading" from the brain



1 mm³ of mammalian cerebral cortex
50.000 neurons and 500.000.000 synapses

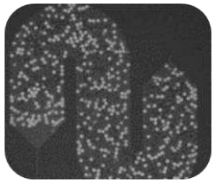
wellcome imec hhmi ALLEN INSTITUTE for BRAIN SCIENCE GATSBY

More than 300 research labs around the world rely on Neuropixels probes

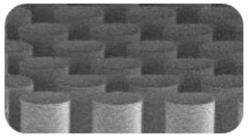


Precision fluidics platform

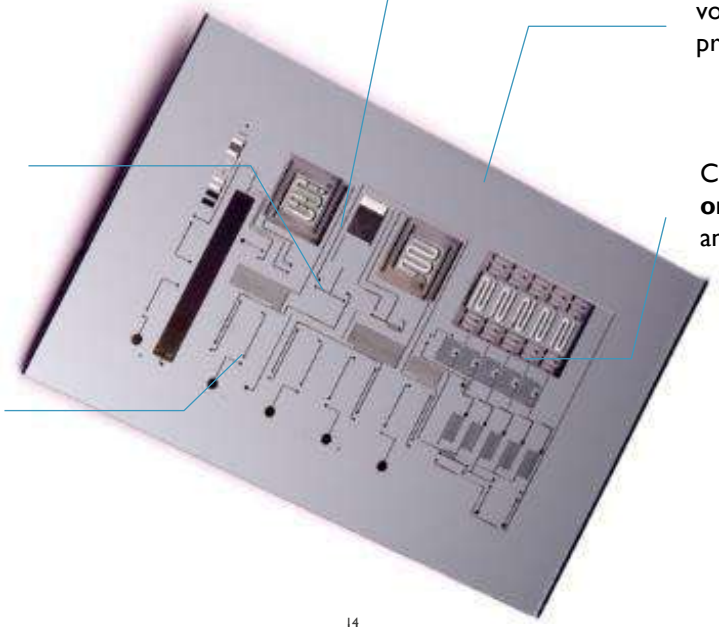
- Lower cost and high turnaround times
- Sample-to-result in one chip
- Full PCR analysis in less than 10 minutes
- Customizable chip functionalities
- Integration with CMOS



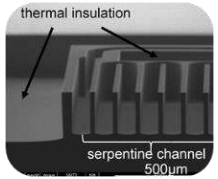
Integrated droplet generator, sorter & merging and on-chip digital PCR



Integrated filters for **DNA / protein purification / separation**

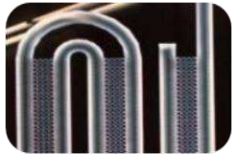


Ultra **fast PCR microreactor**:
40 cycles in 3 minutes



Packaging: combine low-cost, large volume plastics with small, high precision silicon microfluidics

Crossflow filter for **on-chip enrichment** and plasma separation



Boost technology uptake in medical devices via strategic partnering and via startup support

5-7 years for medical devices while only 3-5 years for consumer products; largely conservative and regulated sector

ACCELERATE CHIP DEVT

FASTER FORWARD using PILOT LINES AND SKILL BASE THAT IS BEING BUILD UP ACROSS EUROPE

STRATEGIC PARTNERING

STRATEGIC PARTNERING ACROSS ECOSYSTEM TO BRIDGE THE 'LONG' VALUE OF DEATH IN HEALTH

SUPPORTING VEHICLES

FUNDING AND FINANCING NEED TO FOLLOW THESE LONGER TIMELINES TOWARDS MARKET

Let us not reinvent the wheel everytime.

imec


imec
embracing a better life

FRAUNHOFER AAL:

BUSINESS MODELS, TECHNOLOGIES AND SERVICES

Thomas Wittenberg & Florian Kirchbuchner
Version 6, March 2022

Fraunhofer

Fraunhofer Society : Structure

- Founded in Munich in 1949
- 75 institutes across Germany
  total staff of over 29 000 P.
- Five Fraunhofer centres in the USA
- Representative offices and senior advisors in Asia, the Middle East and Moscow
- Total budget > € 2 billion with € 1.5 billion of income generated from contract research

Fraunhofer Society : Mission

- We live in an increasingly dynamic world.

- Technological cycles are getting shorter,
- lifestyles and requirement change dramatically.

- Needed are **innovative solutions** adding value for all stakeholders.

- **Applied research** is the foundation of our organization.
- We partn**er with companies** to transform original ideas into innovations that benefit society and strengthen the economy.

- Fraunhofer is the **international leader** of applied research.
- As an innovation driver, we lead strategic initiatives to master future challenges and thus achieve technological breakthroughs.

Fraunhofer Alliance AAL: „Assisted Healthy Living“

… is an interdisciplinary **alliance** of 10 institutes of the Fraunhofer-Gesellschaft (Fraunhofer IGD, IIS, HHI, IAO, IPA, FIT, ITEM, IMS, IIST, IZM)

… for a **joint offer** of research, development and evaluation of technologies and services

… for the fields of homecare, care, prevention, rehabilitation, diagnostics and therapy.

Fraunhofer AAL: Topics

- Sports & Personal Wellbeing
- „Smart home“ and "Home Care“
- Outpatient & Inpatient Care
- Outpatient & Inpatient Computer Assisted Therapy
- Outpatient & Inpatient Computer Assisted Rehabilitation
- Image- and Device-based Computer Assisted Diagnostics

Fraunhofer AAL: Goals & Technologies

The AAL Alliance pursues the goal of a **holistic system concept** in which **various technical components** and **digital assistance systems** can be integrated seamlessly and spontaneously. We research, develop and evaluate relevant technologies for our partners:

- **Vital and environmental sensors** (including point-of-care diagnostics).
- **Infrastructures for telematics**, networking, data exchange, communication & transmission.
- **AI-based data analytic**s for condition and event detection, including diagnostics
- User-friendly **human-machine interfaces** and device operations &
- **Actuator technology** for robotics, mobile service platforms and therapeutic measures

Fraunhofer AAL: Services for »Assisted Healthy Living« (1/3)

Development and integration of hardware and software:

High-quality, safe and economical development of software and hardware as well as integration of existing components into challenging environments, e.g. clinical or home-car settings,

Data evaluation and curation, software-as-a-service (SaaS) :

Data and information from sensors, devices and processes arise along the entire clinical care chain. Fraunhofer AAL offers support for the collection, processing and AI-based evaluation of such data collections, provides solutions for sensor-based or cloud-based evaluation, as well as "software-as-a-service"

Fraunhofer AAL: Services for »Assisted Healthy Living« (2/3)

Studies on user acceptance & accessibility, usability, user experience:
Good usability of interactive devices and their acceptance by end users are elementary for their success.
Important requirements are e.g. accessibility and intuitiveness to find an access to the product.
Fraunhofer AAL offers studies for the evaluation of human-machine interfaces.

Empirical and systematic evaluation of infrastructures and technologies:
The benefits and reliability of systems must be adequately evaluated and tested both before they are used in care and medical applications and during ongoing operation.
Fraunhofer AAL experts are specialized in analyzing complex issues effectively and efficiently and can provide reliable and neutral support in this evaluation

Fraunhofer AAL: Services for »Assisted Healthy Living« (3/3)

Development of business models, processes and concepts:
In order to transfer new products to the healthcare market, it is necessary to create suitable business models, new work processes, and integration concepts along the entire value chain with the involvement of all stakeholders from the healthcare sector. Fraunhofer AAL provides support here on the basis of many years of expertise and experience.

Thank you very much!

Contact

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HEALTH.E

Session 3

Industrial perspective

- Christine Dufour – XFAB, Germany
- Maartje van der Zalm – Salvia BioElectronics, Eindhoven
- Christoph Hennersperger – OneProjects, Germany / Ireland
- Johan Feenstra – SMART Photonics, Eindhoven

ECSEL Joint Undertaking

EUROPEAN UNION

Standard noble metal platform for silicon microfluidic applications

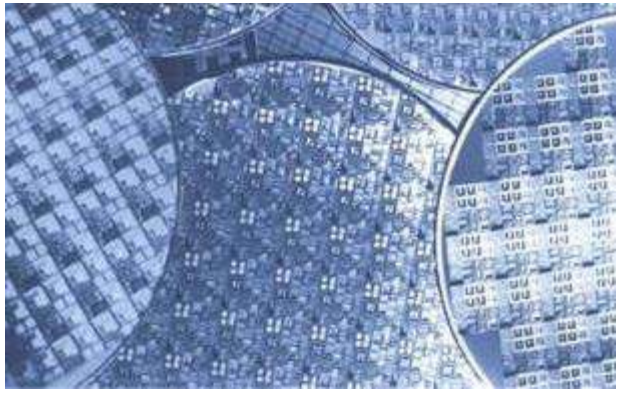
Benefits and challenges of standardization

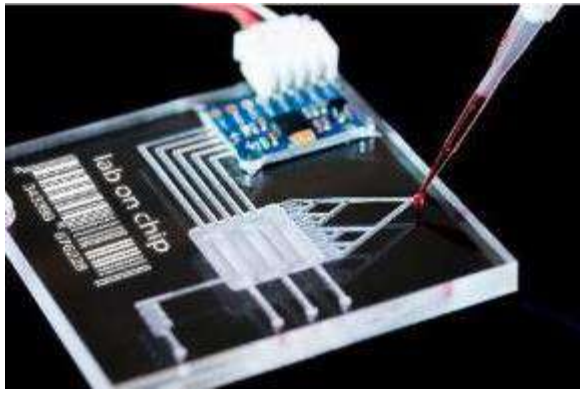
Christine Dufour – Program manager silicon microfluidic, X-FAB

March 2022

X-FAB : who are we ?

- We are a specialty foundry **offering a unique combination** of analog/mixed-signal, low noise transistors, high-voltage devices and embedded non-volatile memory options with sensor and actuator integration.
- We focus on automotive, industrial and **medical** end markets.
- We provide **best-in-class design** and **prototyping support** to enable first-time-right design.
- All of our sites are **automotive certified**.

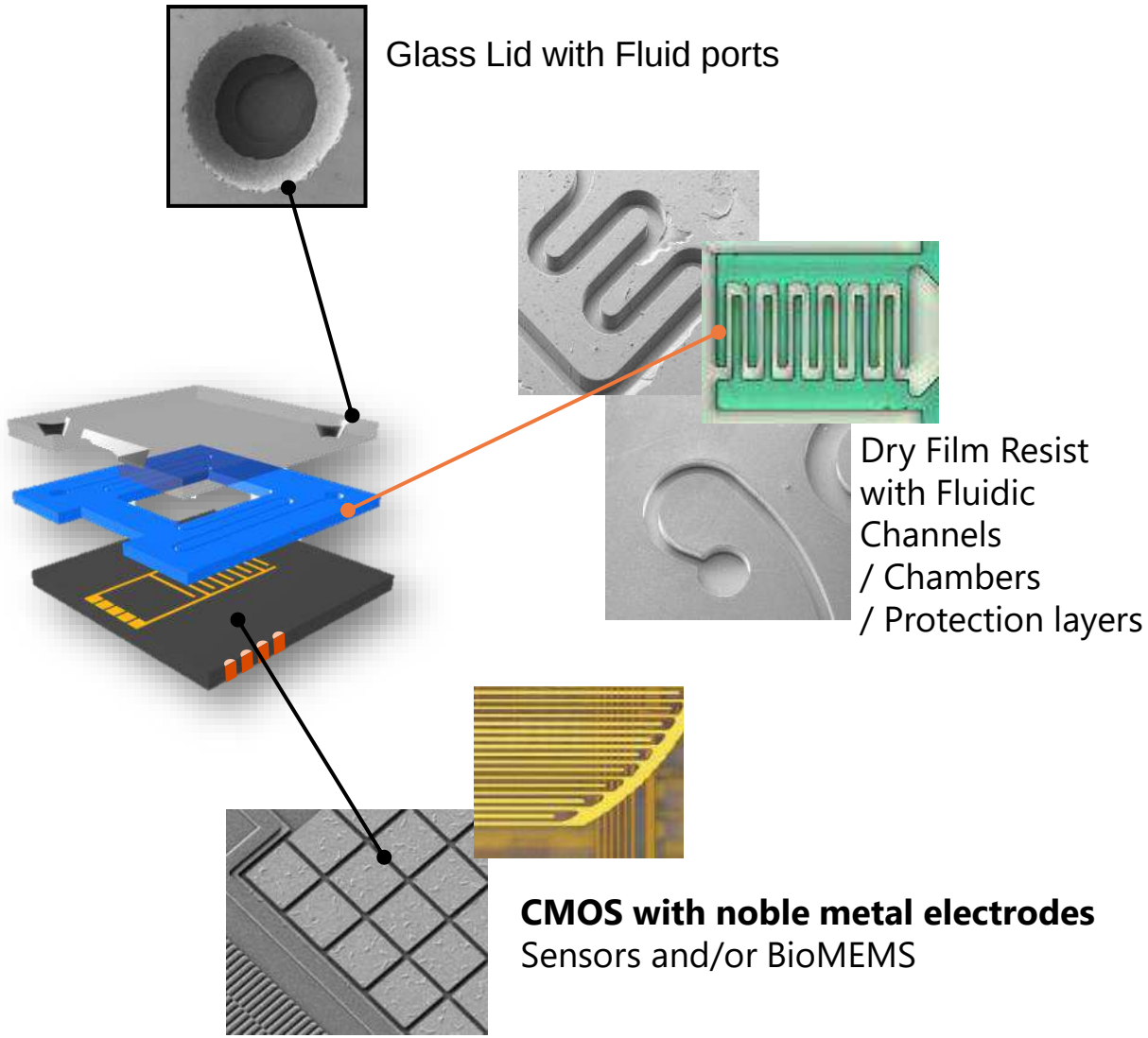




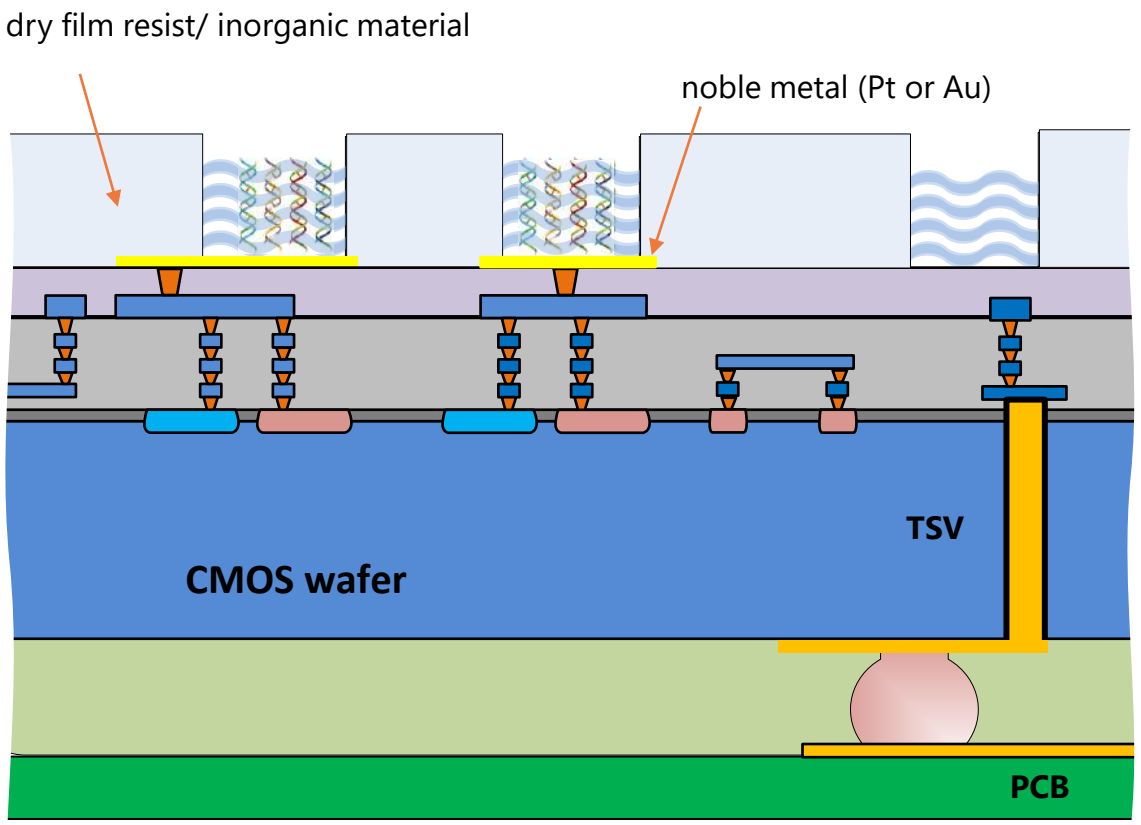
Your foundry partner for medical products

Silicon-based microfluidic devices

- lab-on-a-chip based point-of-care testing (PoCT) for viral and microbiological diagnostic
- analysis of single molecules, including DNA, RNA and proteins.
- DNA synthesis
- Micro Electrode Arrays for electrical cells monitoring
- …



Noble metal standard process module



Integrated with standard CMOS technologies

- Mixed-signal standard 0.35µm and 0.18µm CMOS/SOI technologies with low-noise transistors, for small signal detection
- Combined with tailored passivation interface and noble-metal electrodes
  - Integrated tungsten through passivation vias
  - Deposited and patterned of noble metals (Pt or Au)

Must be compatible with

- Post processing to create microfluidic structures on top
- Fluidic environment during usage (for cells cultures, for DNA detection, immunoassays)
- Biofunctionalization, cells attachment
- Post processing for final product packaging (Through Silicon Vias connection, plastic molding …)
- …

Standardization benefits and challenges

☑ Structural and electrical process parameters are characterized and documented:

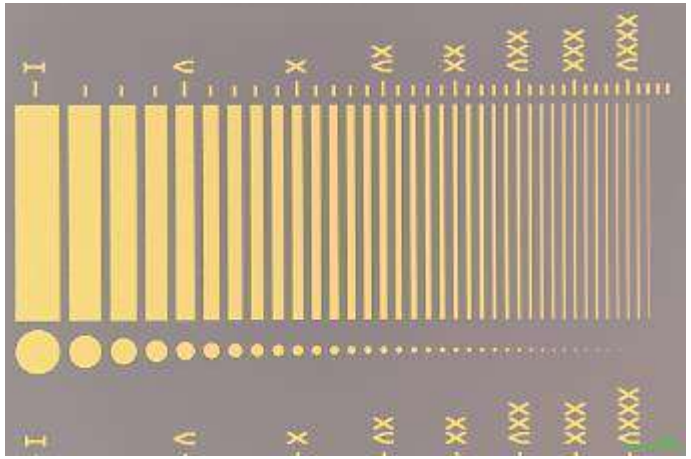
- Metal sheet resistance, leakage, parasitic capacitances … are monitored continuously (PCM structures). Thickness, roughness is measured.

☑ Design support and Design Rules are delivered for CMOS CAD and verification tools to ensure proper manufacturability of the noble metal module

- If the customer requirements are within our process specifications and guidelines, the design can start right away

☑ Compatibility with other X-FAB process modules ensures good integration:

- The quality of the noble metal and passivation is not jeopardized (avoid risk of scratches and particles deposition) during further post-processing and heterogeneous integration
- The good adhesion of the interface with a variety of materials to create the microfluidic structures on top is optimized
- Proven manufacturing flows
- …

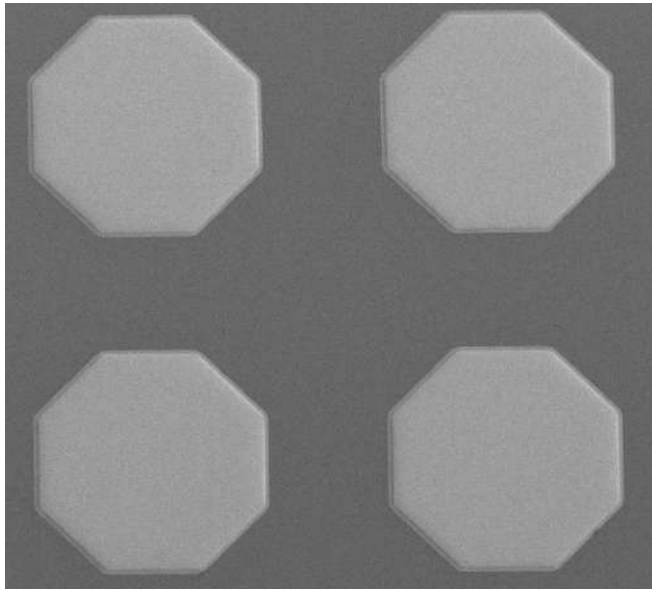


Design rules test chip

Standardization benefits and challenges

☒ Electrode characterization versus requirements for biofunctionalization (oligonucleotide probe spotting, enzyme, antibodies/antigens immobilization, cells attachment on top of the electrodes…) is customer/ application specific:

- biological protocol validation defined by the customer
- long feedbacks time
- risk of delay before inappropriate surface quality is detected
- surface property can be affected by further post-processing, packaging and storage conditions



? Can we further standardize:

- define meaningful surface properties requirements (like surface tension measurements …)
- faster characterization tests at wafer level, at device level (fast spotting evaluation tests…)
- storage conditions
- …

Standardization benefits and challenges

☑ To qualify the noble metal standard process module, reliability tests are conducted:

- Impact of the noble metal process module on CMOS transistors performances
- Integrity of the passivation interface (no cracks, pinholes)
  - Avoid the risk of corrosion of the CMOS metallization and vias due to the fluidic environment

☒ Automotive standards can be reused to qualify our noble module, but some tests are inadequate for disposable medical biochips

☒ These standards do not address the specificities of the microfluidic environment

? How do we qualify our semiconductor technology in a microfluidic environment?

- Define relevant test and standards

Key messages

- X-FAB is developing a comprehensive toolbox for smart integrated biochips to tackle the future opportunities of digital healthcare
- Mitigate standard approach and customer specific needs
  - time to market, risk, performance and cost
- We are building this standard offer with our customers and partners, and we value their experience and feedbacks
- We offer prototyping capabilities that support the implementation of noble metal structures directly on to X-FAB CMOS wafers
- In order to be successful, semiconductor companies, packaging companies and biomedical actors need to cooperate closely

"Let´s pave the way for further innovation by vertical integrated value chains and standardized key elements."

>> Check out X-FAB´s unique Prototyping Platform for Si-based Microfluidics

https://www.X-FAB.com/technology/silicon-based-microfluidics

xfab

Thank you.

www.X-FAB.com

Salvia BioElectronics

Maartje van der Zalm

Salvia BioElectronics

Salvia BioElectronics – What do these people have in common







Salvia BioElectronics – What do these people have in common

Migraine: 400,000,000

1 in 7 globally will
suffer migraine attacks

Salvia BioElectronics

Salvia BioElectronics – What do we stand for

Migraine: Drugs are not always the answer

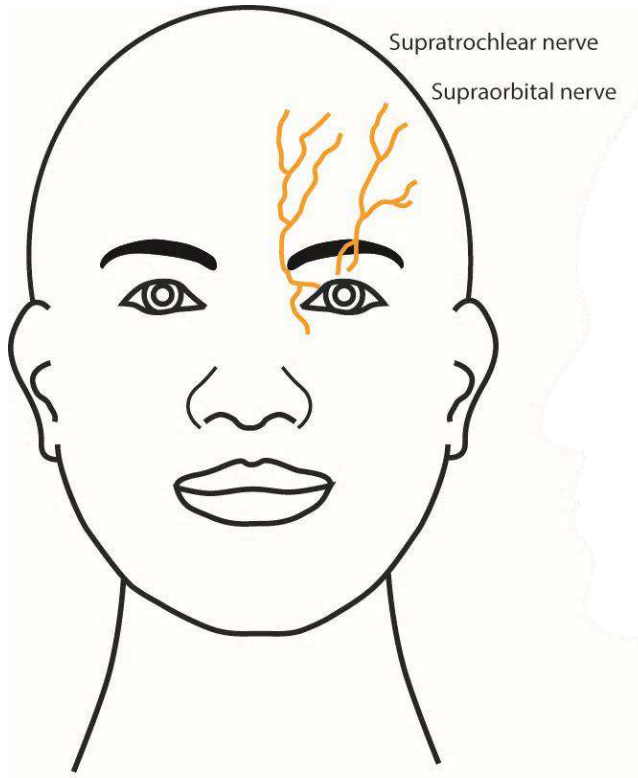
80% stop preventive meds within 1 year

Salvia BioElectronics – How it started

Nerves: information high-ways of the body

Nerve signals trigger biochemicals release

In chronic migraine nerve signals are different



Salvia BioElectronics – How it started

Nerves: information high-ways of the body

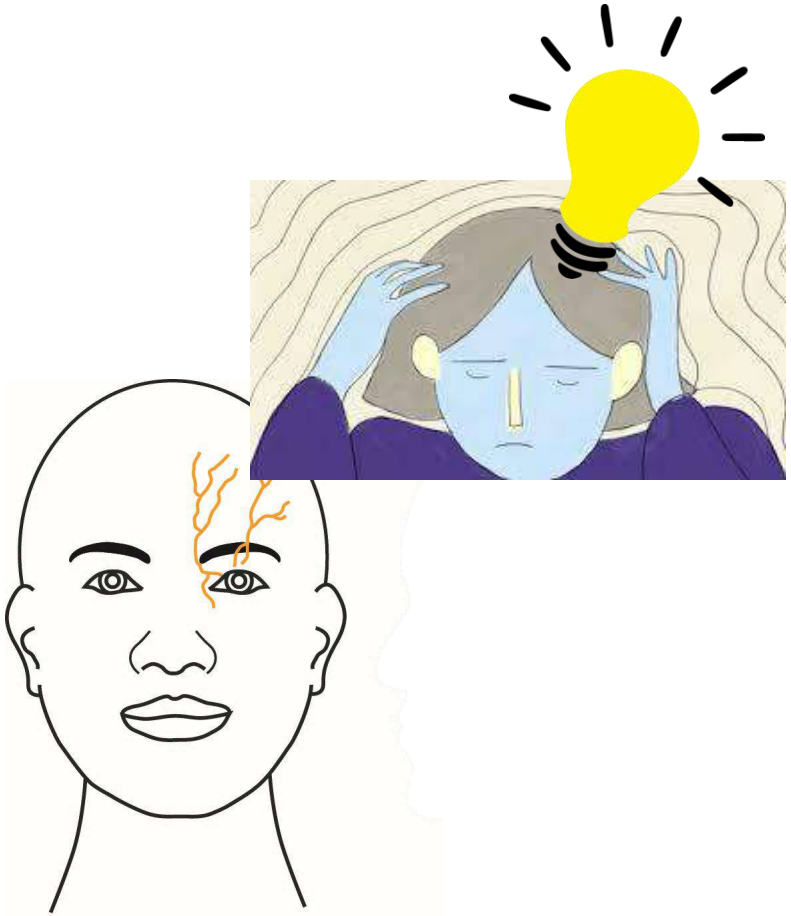
Nerve signals trigger biochemicals release

In chronic migraine nerve signals are different

Bioelectronics influence signal patterns

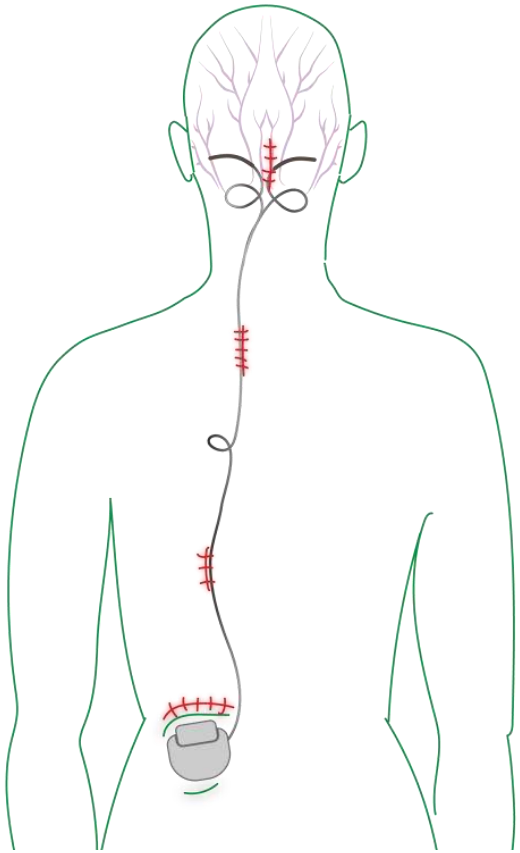
Restore the body's biochemical balances

Treat chronic pain



Salvia BioElectronics – How we change the life of patients

Devices currently used (off label)



Minimal invasive implant achieved by collaboration in several open platforms

Salvia BioElectronics – From design to manufacturing

InFormed – 2018

- Salvia starts with 5 engineers, 1 test set-up in collaboration with InForMed partners.

Position – 2019 to 2021

- Salvia grows to 15 engineers, 2 labs and manufactures first implant through supply chain for biological testing

M4M – 2021 to current

- Salvia gains ISO certification, passes several audits and is getting ready for verification testing.

Salvia BioElectronics

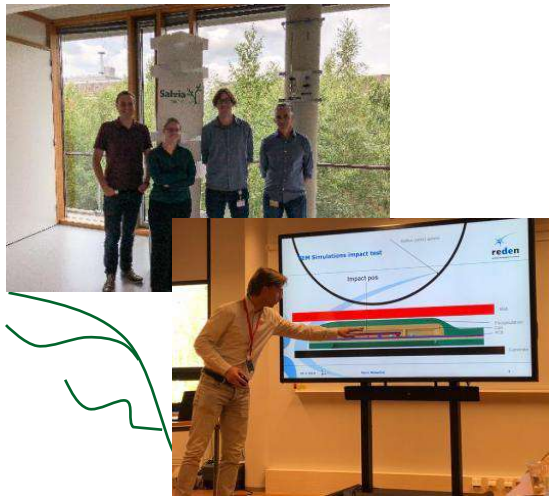
Salvia BioElectronics – Collaboration is the key to the future

Life-time testing for encapsulated implants

Salvia BioElectronics – Collaboration is the key to the future

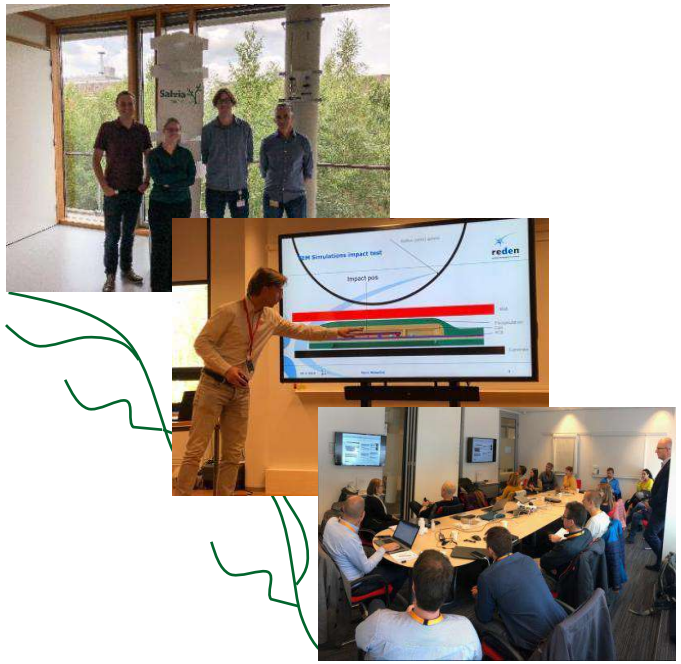
Miniaturization of non-hermetic cans

Salvia BioElectronics – Collaboration is the key to the future



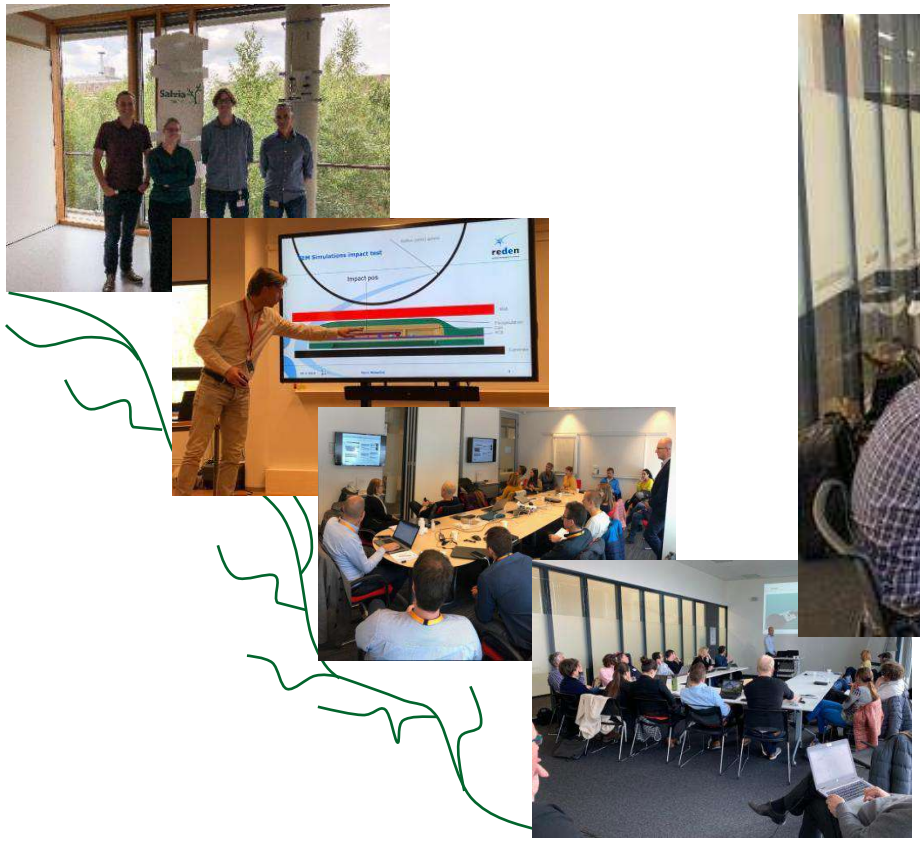
Ultra thin flexible electrode array

Salvia BioElectronics – Collaboration is the key to the future



Electronic design for flexible implants

Salvia BioElectronics – Collaboration is the key to the future



Power transfer for in-vivo testing

Salvia BioElectronics

Salvia BioElectronics – Collaboration is the key to the future

Powering for pre-clinical tests

Salvia BioElectronics

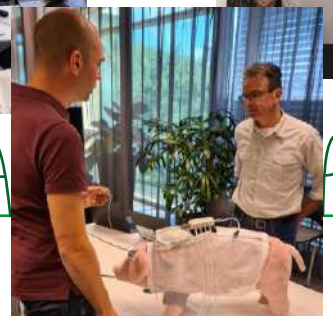
Salvia BioElectronics – Collaboration is the key to the future

Thin layer encapsulation

Salvia BioElectronics

Salvia BioElectronics – Collaboration is the key to the future

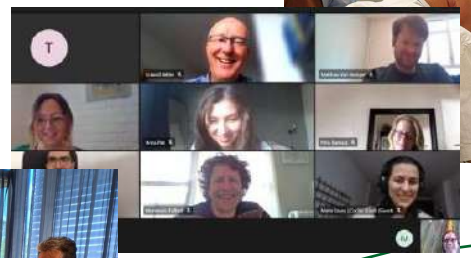
Life-time verification testing

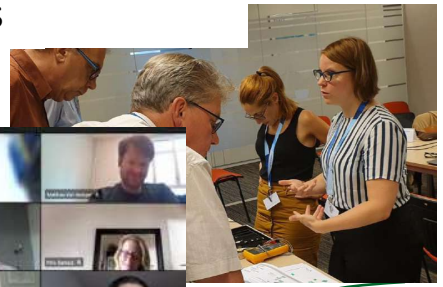


Salvia BioElectronics

Salvia BioElectronics – Collaboration is the key to the future

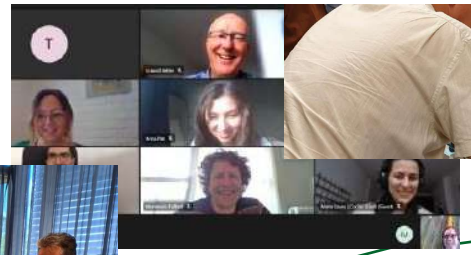
Manufacturing of flexible electrodes

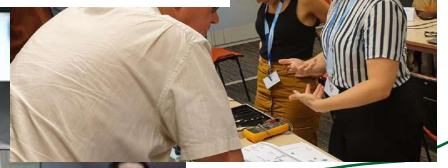




Salvia BioElectronics – Collaboration is the key to the future

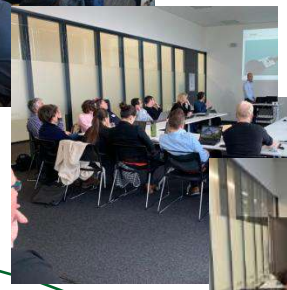
Soft polymer implant manufacturing



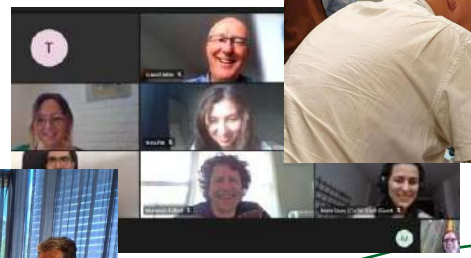


Salvia BioElectronics

Salvia BioElectronics – Collaboration is the key to the future



Implant tools



Salvia BioElectronics

Salvia BioElectronics – Collaboration is the key to the future

Salvia BioElectronics

Salvia BioElectronics – Collaboration is the key to the future

Products in hand

Salvia BioElectronics – Our path to the future

Verifying life-time reliability of fully integrated devices

Device passes Cytotoxicity, Biocompatibility, 6 month in-vivo animal implantation tests

Salvia BioElectronics

OneProjects

A DUBLIN & MUNICH COMPANY

THE NEW WAVE OF DISRUPTIVE INNOVATION IN CARDIAC IMAGING

MARCH 9TH, 2022 – HEALTH.E LIGHTHOUSE SYMPOSIUM

DR. CHRISTOPH HENNERSPERGER

Health.E
Moore for Medical

For more information on OneProjects please contact:
christoph.hennersperger@one-projects.com

THANK YOU

(WE ARE HIRING)

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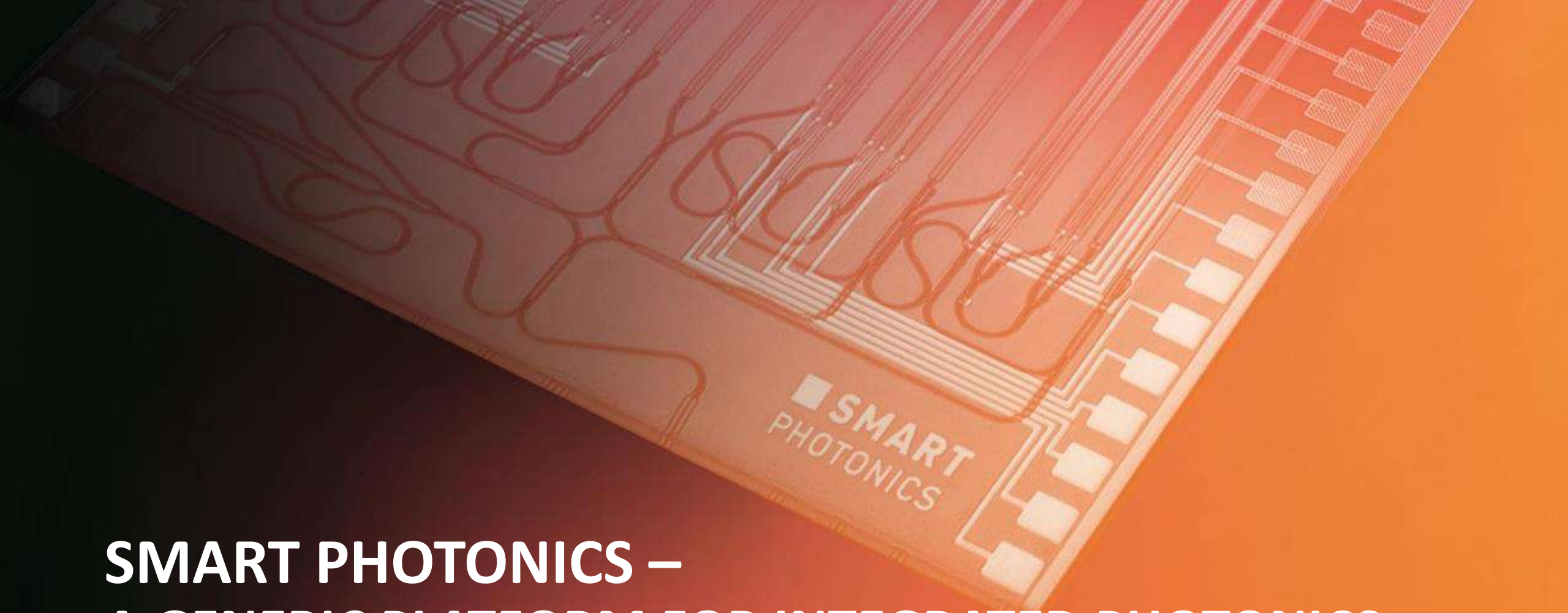


SMART PHOTONICS –
A GENERIC PLATFORM FOR INTEGRATED PHOTONICS CHIPS

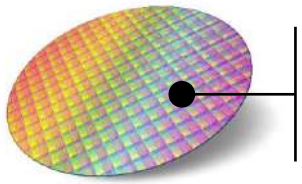
AGENDA

- Intro to Integrated Photonics
- SMART Photonics: position in value chain
- Generic platform approach with customers
- Some examples of healthcare demonstrators

SMART PHOTONICS

PHOTONICS HELPS SOLVE MAJOR SOCIETAL ISSUES

Photonic integrated circuit (PIC) integrate multiple photonic functions, like electronic ICs but with light instead of electrons…



One chip:
Light sources
Light transport
Signal modulation
Light detection
…

… which has many advantages over incumbents

More data	**Increased speed**	**Increased reliability**
Less power consumption	**Lower cost**	**Small form factor**

SMART PHOTONICS

SMART PHOTONICS: MADE IN EINDHOVEN

1991 — PHILIPS
Early 1980s: start of activities

1994 — TU/e
Eindhoven University starts R&D on monolithic integration

1998 — JDS Uniphase
First commercialization of components

2002 — NanoLab
Established first shared facility for integrated Photonics prototyping

2012 — SMART PHOTONICS
Acquisition by Uniphase for €1.2B
2012: Spin-off as independent pure-play foundry

2013
First Multi Project Wafer produced

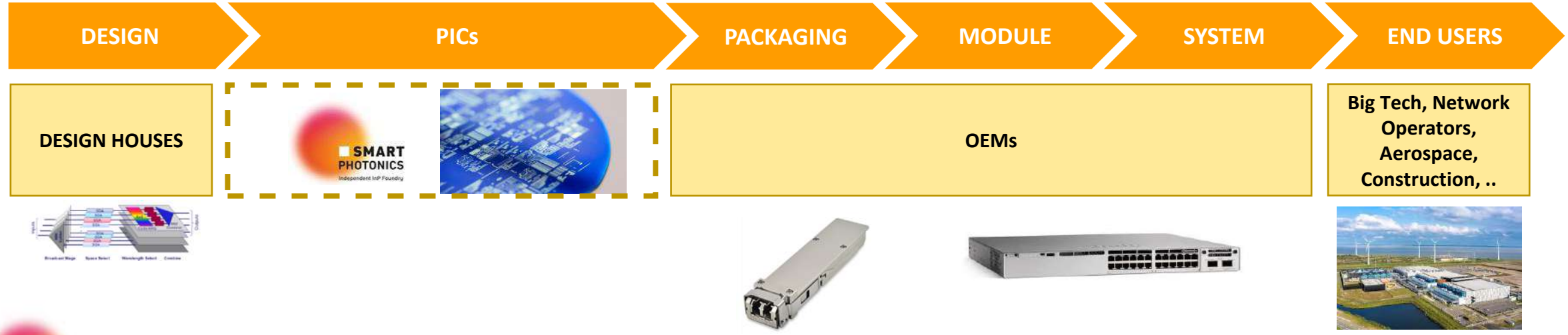
2017
Move to own cleanroom at High Tech Campus

2020
New Investment for capacity ramp up

SMART PHOTONICS

VALUE CHAIN POSITION

- We are producing Photonics chips: chips based on light instead of electronics
- We are the first player offering **production of integrated photonic chips as a foundry**.
- Our customers are predominantly OEMs and system companies
- Providing prototyping services and volume production



SMART PHOTONICS

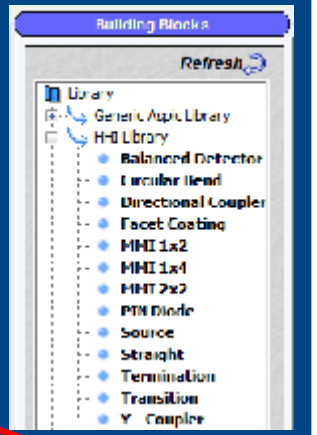
SMART PHOTONICS - STATE OF THE ART FACILITY

- 1400 m^2 Production facility
  - >1000 m^2 3” Production cleanroom (Class 1000)
  - Epitaxy growth, Front-end processing, testing
  - Unique lithography capabilities allowing extremely precise feature definition (100nm)
  - Operating on 3” wafers (equipment ready for 4” and 6”)
- 850 m^2 fully integrated R&D facility at Nano Lab, Eindhoven University Technology Science Park

DESIGN TOOLS

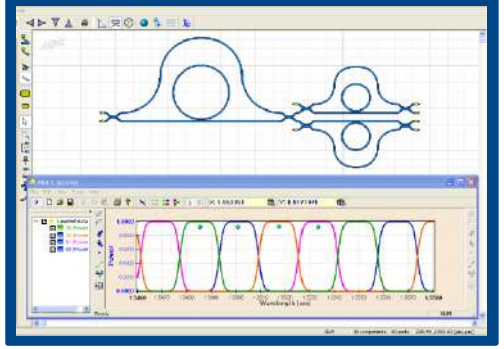
Designer

Design Kit

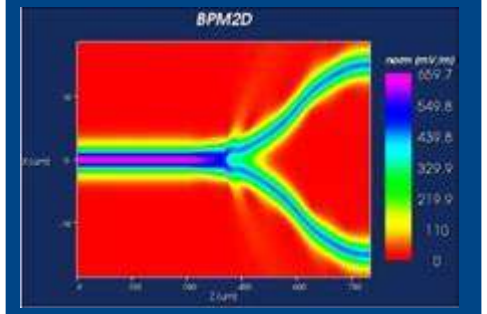


Foundry

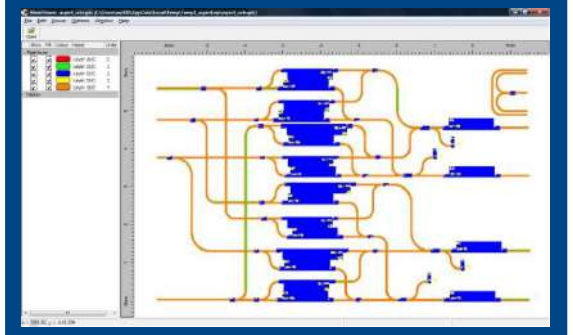
Circuit Simulator



Physical Simulations

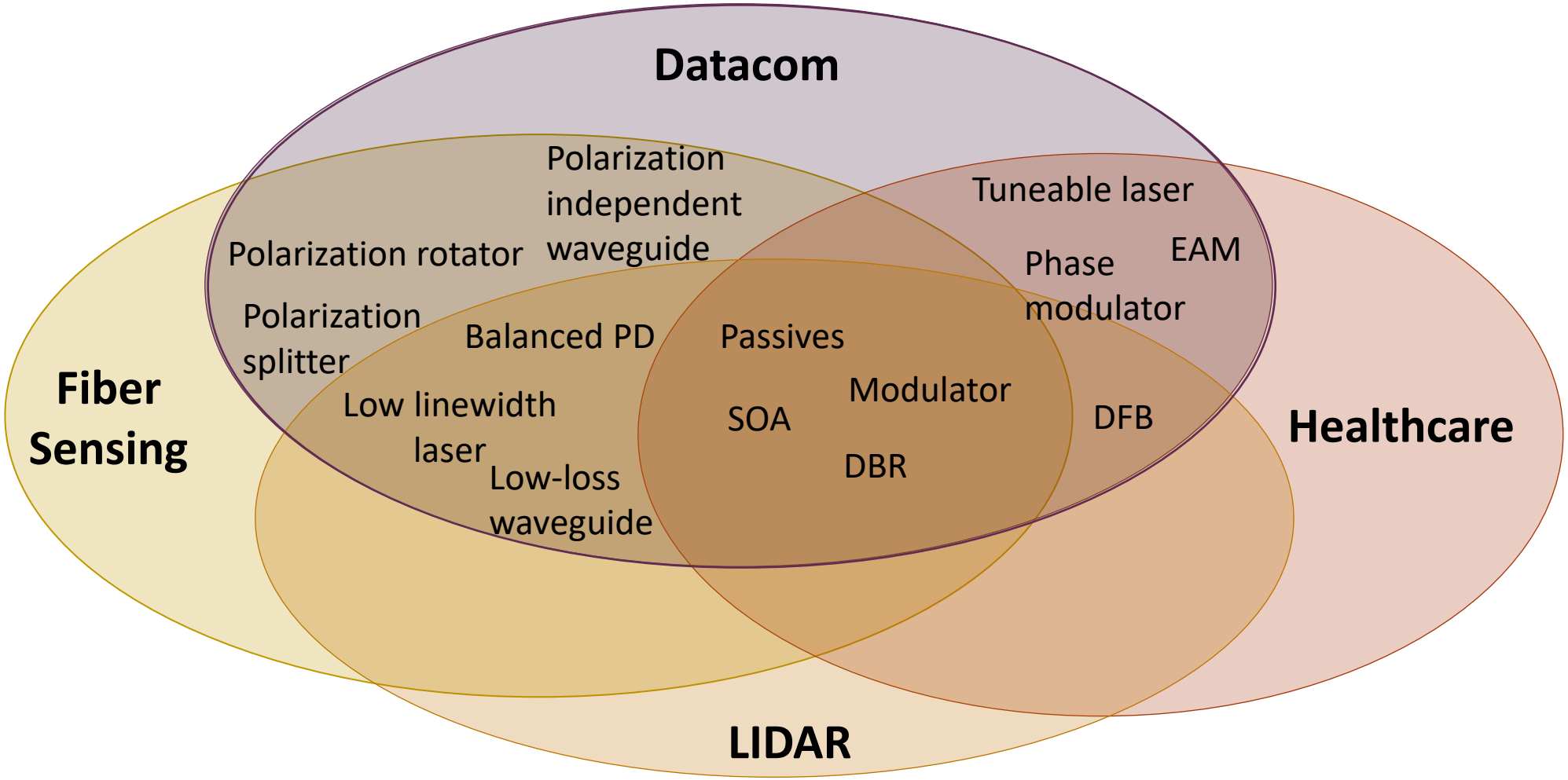


Mask Generator



SMART PHOTONICS

OPEN PLATFORM APPROACH



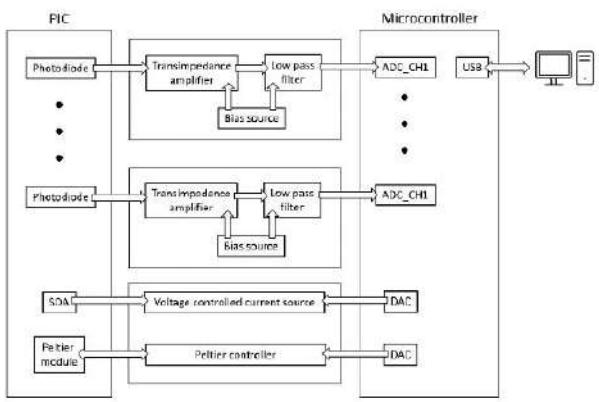
SMART PHOTONICS

MRI ASSISTANCE

Article

Photonic Integrated Interrogator for Monitoring the Patient Condition during MRI Diagnosis

Mateusz Słowikowski [1,2,*], Andrzej Kaźmierczak [1], Stanisław Stopiński [1,3], Mateusz Bieniek [1], Sławomir Szostak [1], Krzysztof Matuk [4], Luc Augustin [5] and Ryszard Piramidowicz [1,3]



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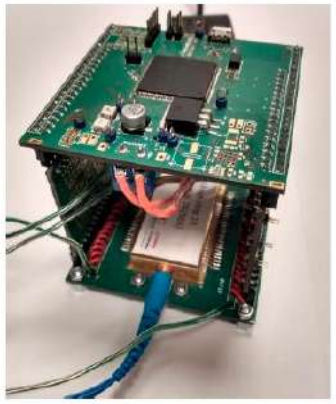
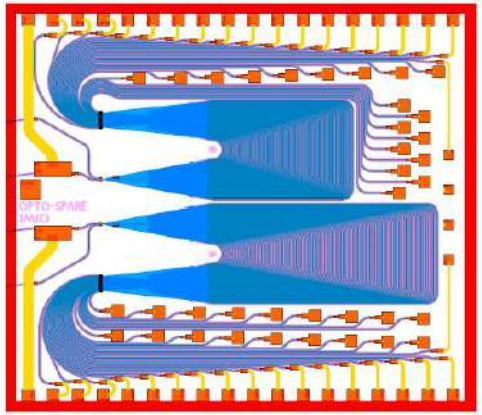


(b)



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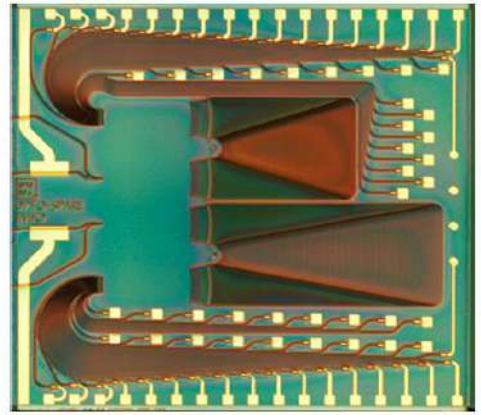


(b)

GAS SPECTROSCOPY AT 2UM

Monolithically integrated widely tunable laser source operating at 2 μm

S. Latkowski,[1,*] A. Hänsel,[2] P. J. van Veldhoven,[1] D. D'Agostino,[1] H. Rabbani-Haghighi,[1] B. Docter,[3] N. Bhattacharya,[2] P. J. A. Thijs,[1] H. P. M. M. Ambrosius,[1] M. K. Smit,[1] K. A. Williams,[1] and E. A. J. M. Bente[1]

[1]COBRA Research Institute, Eindhoven University of Technology, De Rondom 70, 5612 AP, Eindhoven, The Netherlands
[2]Optics Research Group, TU Delft, Lorentzweg 1, 2628 CJ, Delft, The Netherlands
[3]EFFECT Photonics B.V., Torenallee 20, 5617 BC, Eindhoven, The Netherlands
*Corresponding author: S.Latkowski@tue.nl

Absorption gas spectroscopy for Ammonia, CO (2um)

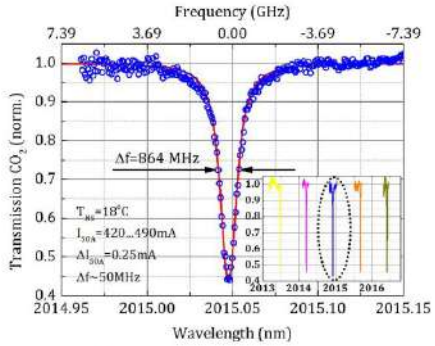
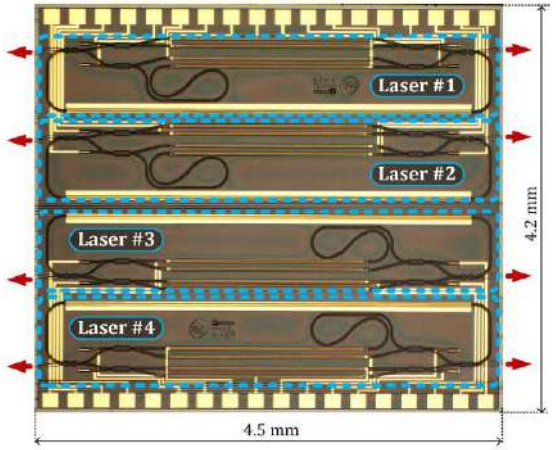
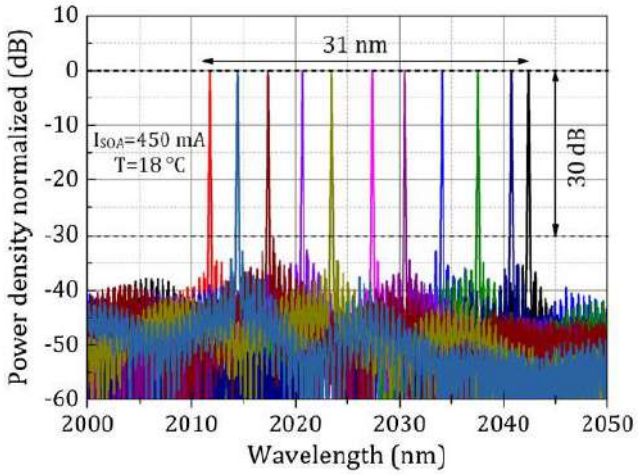


Fig. 7. Absorption line of CO_2 measured (blue circles) with the AMZI integrated tunable laser source and overlapped with the absorption profile simulated (solid red line) with the HITRAN software using parameters of the reference gas cell used for the experiment. The inset presents the measured absorption spectra of four more CO_2 transitions.





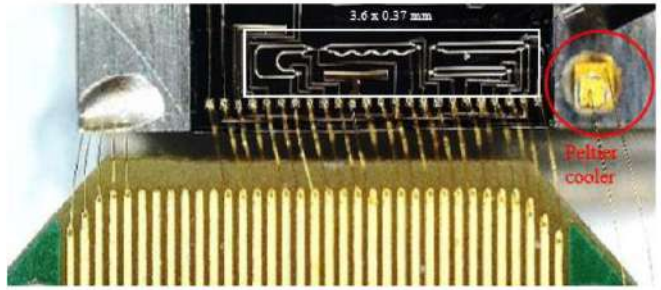
SMART PHOTONICS

OPTICAL COHERENT TOMOGRAPHY

Investigation of the wavelength tuning of an integrated laser system system on InP for Optical Coherence Tomography.

J. Hazan,[1]* T. Couka[2], R. Pajkovic[1], K.A. Williams[1], E.A.J.M. Bente[1]

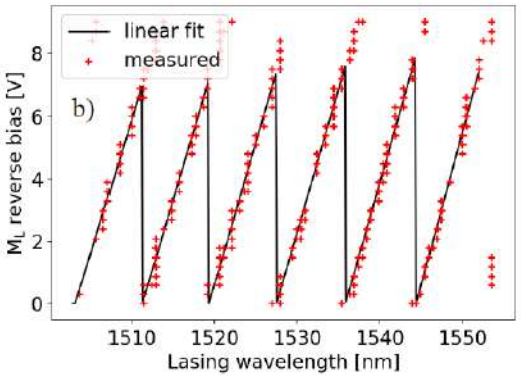
[1]Photonic Integration Group, Department of Electrical Engineering, Eindhoven University of Technology, PO Box 513,5600MB Eindhoven The Netherlands
[2]Ecole Nationale Supérieure d'Ingénieurs de Caen (ENSICAEN) CS 45053 - 14050 CAEN Cedex 4 - FRANCE
*E-Mail: j.hazan@tue.nl

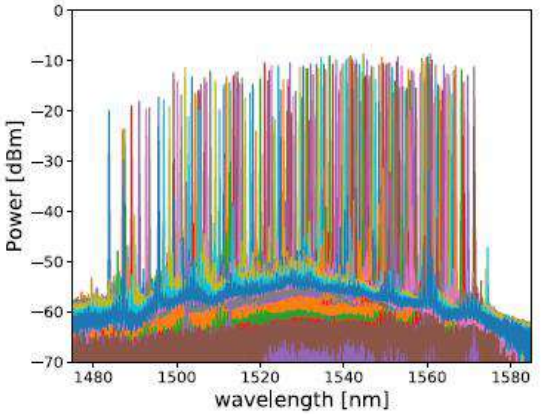


Widely tuneable laser fabricated via Multi-Project Wafer

At 1530 nm, also available in 1310

Investigation of tuning strategies for OCT





SMART PHOTONICS

HOW IS WORKING IN HEALTHCARE DIFFERENT FROM OTHER MARKET AREAS?

- Large OEM's addressing the market, but they are looking for solutions from their suppliers
- Scattered playing field with many smaller parties
- Technically, integrated photonics can offer solutions, but sometimes require adaption specifically for healthcare
- Currently volumes of applications still relatively small

SMART PHOTONICS

SUMMARY

- SMART Photonics is a key player as the foundry in the integrated photonics industry
- Integrated photonics is a very versatile platform, built on generic technology
- Photonic IC’s provide exciting opportunities for breakthrough applications in healthcare, thanks to miniaturization and ultra-high sensitivity

SMART PHOTONICS

HEALTH.E

Session 4

European / societal perspective and outlook

- Patrick Boisseau – MedTech Europe
- Yves Gigase – Key Digital Technologies (KDT)
- Peter Zandbergen – Strategic Research Agenda
- Andreas Lymbercius – Head of the EIC:
  European Innovation Council,
  Challenge-based Accelerator Sector

ECSEL Joint Undertaking

EUROPEAN UNION

Introducing the Innovative Health Initiative

Health.E Lighthouse Symposium, Eindhoven, 09-Mar-22

efpia

MedTech Europe
from diagnosis to cure

COCIR
Advancing Healthcare

Vaccines Europe
An industry for healthy lives

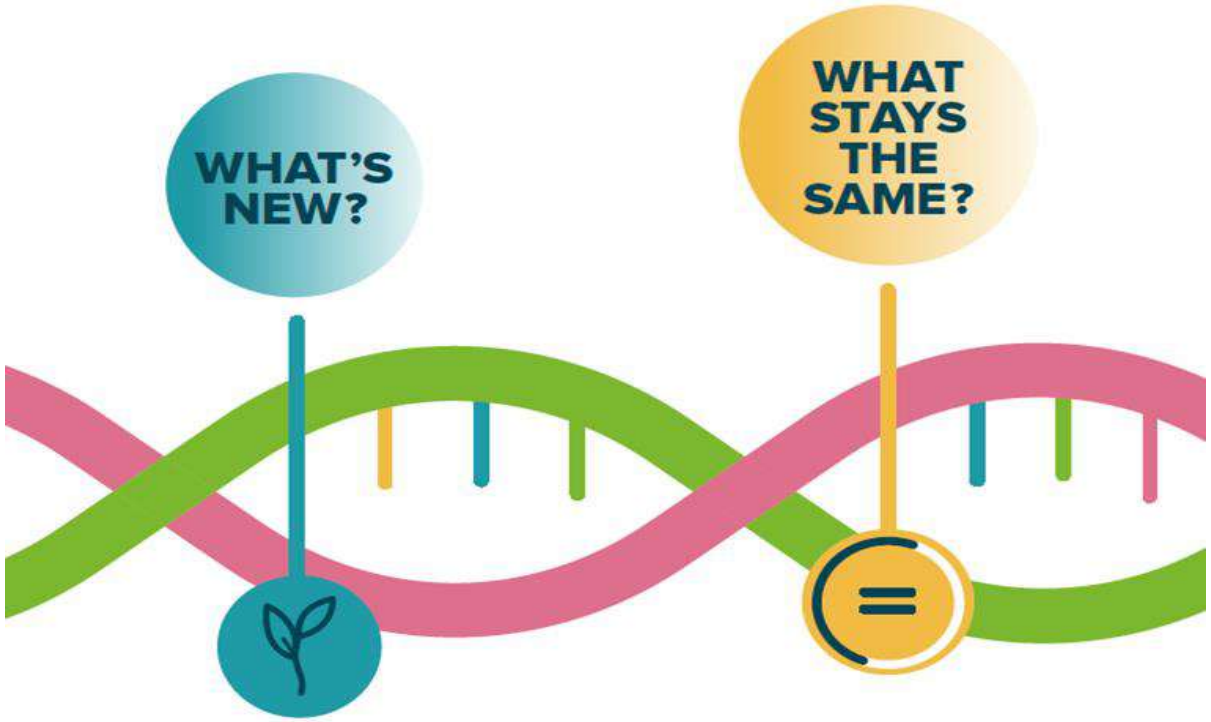
EuropaBio

innovative health initiative

Innovative Health Initiative at a glance

- Joint Undertaking (based on Article 187 TFEU)
- Cross sectorial between
  - pharmaceutical sector (EFPIA, Vaccines Europe, EuropaBio)
  - medical technologies sector (MedTech Europe, COCIR)
- Budget over 7 years
  - €1.2 billion in cash from EC
  - €1.2 billion in kind from industry and contributing partners

innovative health initiative



- The way we're governed will change.
- The scope of the partnership is broader than IMI as it will cover the **entire continuum of care**.
- There will be new, specific objectives that align with the EU's latest health policy strategies.

- **Funding comes equally** from the public and industry partners.
- Calls for proposals will be **open and competitive**.
- Projects started under IMI will be managed by IHI.

- New Strategic Research and Innovation Agenda
- The Science and Innovation Panel
- One and two stage calls

innovative health initiative

IHI SRIA – background

Focus

- **Cross-sectoral approaches** to facilitate creation of new products and services to **prevent, intercept, diagnose, treat and manage diseases** and foster recovery more efficiently.

Goal

- Lay foundations for development **of safer and more effective health care products or solutions** that respond to **unmet public health needs** and that can be implemented into healthcare systems.

- Better understand the determinants of health and priority disease areas
- Integrate fragmented health research and innovation efforts
- Demonstrate the feasibility of people-centred, integrated health care solutions
- Exploit the full potential of digitalisation and data exchange in health care
- Develop new and improved methodologies and models for the assessment of the added value of innovative and integrated health care solutions.

Call 1 – Ideas - Single-stage

1. Innovative patient-facing care pathways for patients with neurodegenerative diseases and comorbidities
2. Next generation imaging and image-guided diagnosis and therapy for cancer
3. Precision oncology: Innovative patient-centric, multi-modal therapies against cancer
4. Access and Integration of heterogeneous health data for improved health care in diseases areas of high unmet public health need

innovative health initiative

Call 2 – Ideas - Two-stage

1. New tools for prediction, prevention and monitoring of cardio-metabolic diseases including secondary manifestations to enable timely intervention

2. Strengthening EU clinical development excellence and innovation attractiveness: Harmonised methodology to promote the uptake of early feasibility studies (EFS)

innovative health initiative

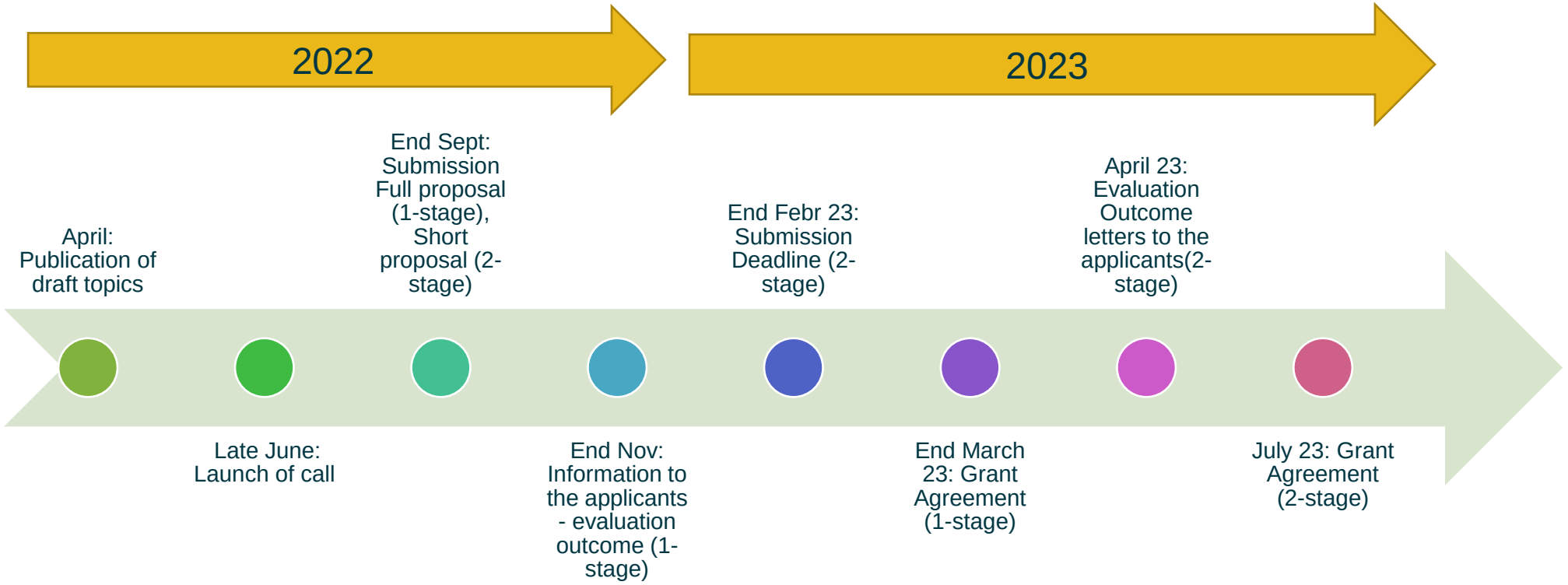
Eligibility rules: participation

Horizon Europe

- Any legal entity or international organisation regardless of its place of establishment
- At least 3 independent legal entities established in a different
  Member State or
  Associated Country
  NEW
  → IMPORTANT!
  1 legal entity should be established in a Member State
- IHI specific eligibility criterion
  NOT applicable: stage one of two-stage calls:
  NEW
  Costs related to contributions provided by participants shall amount to at least
  45% of the total project cost.
  → IKOP, IKAA or FC

innovative health initiative

Timeline


2022
2023
April: Publication of draft topics
Late June: Launch of call
End Sept: Submission Full proposal (1-stage), Short proposal (2-stage)
End Nov: Information to the applicants - evaluation outcome (1-stage)
End Febr 23: Submission Deadline (2-stage)
End March 23: Grant Agreement (1-stage)
April 23: Evaluation Outcome letters to the applicants(2-stage)
July 23: Grant Agreement (2-stage)

Open Technology Platforms in IHI

- IHI calls are industry oriented, aka designed for impact (products, solutions)
- Medtech companies might use and test OTPs sometimes in real environment (TRL >6) within IHI projects
- But no fundamental developments supported in IHI projects
- IHI is focusing on precompetitive developments

Getting involved in IHI

At programme/strategic level

- Join one of the industry trade associations who are IHI founding members (COCIR, EFPIA, EuropaBio, MedTech Europe, Vaccines Europe)
- Apply as an IHI contributing partner (similar to the status of IMI2 associated partner) ihi.europa.eu/shape-our-future-research/become-contributing-partner

Getting involved in IHI

- Become an evaluation and review expert:

ec.europa.eu/info/funding-tenders/opportunities/portal/screen/work-as-an-expert

- Be part of the Patient Pool:

ihi.europa.eu/projects-results/health-spotlights/impact-patients-research

- Propose new ideas: ihi.europa.eu/shape-our-future-research/propose-ideas

innovative health initiative

Getting involved in IHI

- Apply to IHI calls:
  - IHI website: Future opportunities and Open calls

ihi.europa.eu/apply-funding/future-opportunities

ihi.europa.eu/apply-funding/open-calls

  - Funding & tender opportunities Portal:

ec.europa.eu/info/funding-tenders/opportunities/portal/screen/home

- Participate in the brokerage events & info-days organised at Call launch

More information

Strategic Research and Innovation Agenda:

ihi.europa.eu/about-ihi/research-and-innovation-agenda

Horizon Europe General Model Grant Agreement

(Annex 5 - Specific rules for JU Actions):

ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/common/agr-contr/general-mga_horizon-euratom_en.pdf

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innovative health initiative

OUTLOOK FROM THE ECSEL/KDT JU OFFICE

Yves GIGASE, Head of Programmes

Health.E Lighthouse Symposium

Eindhoven, March 9th 2022

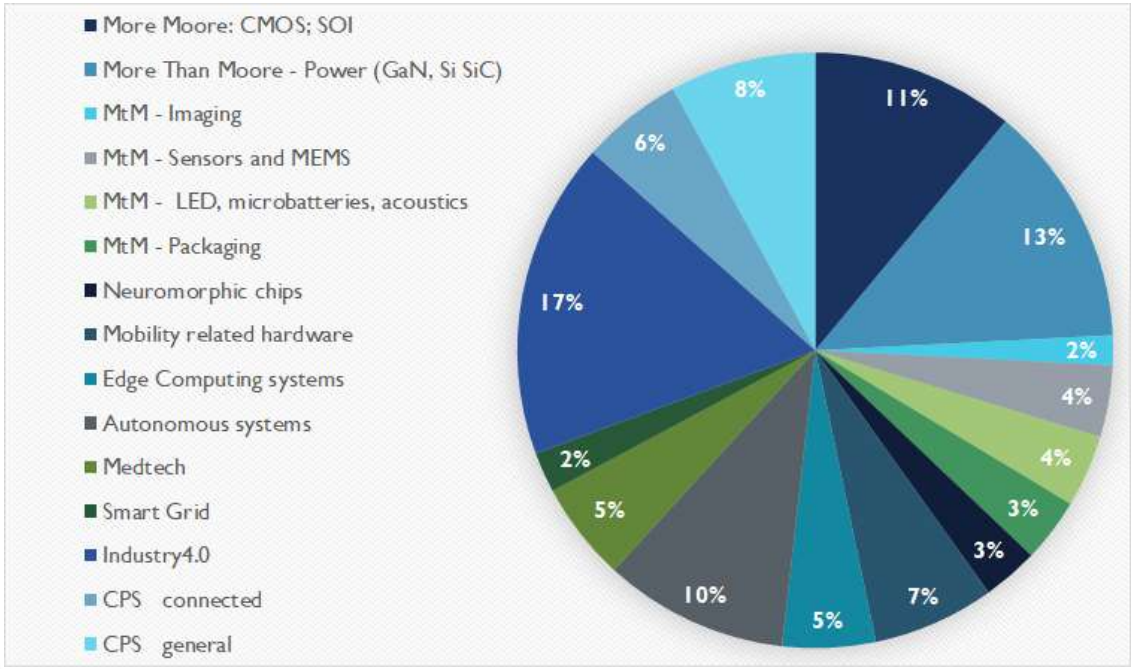
KDT JU
KEY DIGITAL TECHNOLOGIES JOINT UNDERTAKING

EUROPEAN PARTNERSHIP

FUNDING ECS INNOVATION FROM ECSEL TO KDT

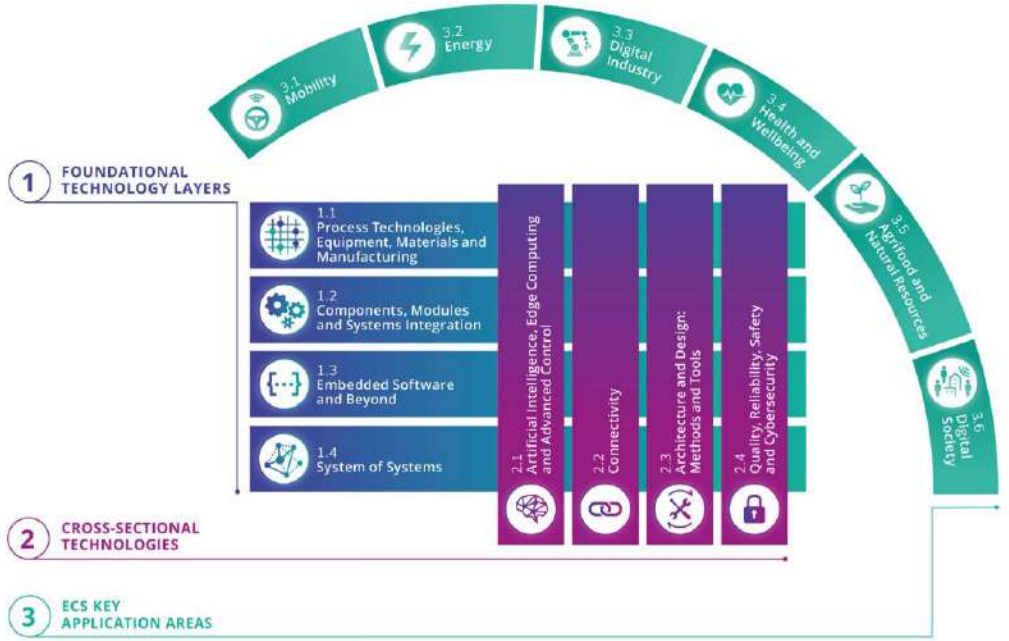
ECSEL-JU (2014-2021)

- 96 projects including 4 CSAs
- 3 220 beneficiaries from 35 countries / 29 participating states
- Budget: 4,69 B € cost, 2,28 B€ (EU+national)
- 408 500 Person-months



KDT-JU (2021-2027)

- New partnership to help speed up transition to green and digital Europe
- Budget : 6 B€ funded by 1,8 B€ (EU)+1,8 B€ (national)
- EU Chip Act: key role of KDT



ECSEL Portfolio on Smart Health

Target Objectives

1. Transform **healthcare** so that it becomes more and more applicable **outside the hospitals**.
2. **Open digital health platform ecosystem** for healthcare appliances and applications
3. **Mobile healthcare** systems for improved quality of life for e.g. elderly people with chronic disease
4. Medical equipment and devices to support **minimal invasive surgery** (e.g. imaging)

Home Healthcare | **Hospital Healthcare** | **Heuristic Healthcare**

Completed Projects:

- CSI (ENIAC)
- HIGH PROFILE (ARTEMIS)
- CHIRON (ARTEMIS)
- DeNeCor (ENIAC)
- INCITE (ENIAC)
- EXIST
- INFORMED
- ASTONISH
- ENSO
- SCOTT
- ENABLE-S3

Ongoing Projects:

- POSITION II
- FITOPTIVIS
- Moore4Medical
- HELoS → Health.E LI (Lighthouse Initiative)

The European Chips Act

3 Pillars

Chips for Europe Initiative:
pool resources from EU, MS and other, as well as the private sector, through:
the "Chips Joint Undertaking"
• strengthen R&D&I
• ensure deployment of:
  • advanced semi-conductor tools,
  • pilot lines for prototyping,
  • testing and experimentation of new devices,
  • train staff
  • develop an in-depth understanding of the semi-conductor ecosystem and value chain.
	New framework to ensure security of supply by:
	
	A. Attracting **investments** and enhanced **production capacities**.
	
	B. **Chips Fund to facilitate access to finance** for start-ups to help them mature their innovations and attract investors.
	
	C. D**edicated semiconductor equity investment facility** under InvestEU to support scale-ups and SMEs to ease their market expansion.
		Coordination mechanism between the Member States and the Commission for monitoring the supply of semiconductors, estimating demand and anticipating the shortages.
		
		• **monitor** the semiconductor value chain
		• **common crisis assessment**
		• coordinate **actions to be taken** from a new emergency toolbox
		• **react swiftly and decisively together**

CHIPS FOR EUROPE INITIATIVE

The Chips for Europe Initiative will largely be implemented by the new **Chips JU**

The Chips JU is a strategic re-orientation of the KDT JU, with an increased public budget from 3.6 billion to 11.0 billion EUR

What new actions by the Chips JU for the Chips for Europe Initiative? (New as on top of the KDT actions for R&D&I)

1. Design capacities for integrated semiconductor technologies
2. Pilot Lines for preparing for innovative production, and testing and experimentation facilities
   a) Pilot lines to experiment, test, and validate, including through PDKs, the performance of IP blocks, virtual prototypes, new designs and novel integrated heterogeneous systems in an open and accessible way.
   b) New pilot lines on semiconductor technologies such as FD-SOI down to 10-7 nm, advanced Gate-All-Around and leading-edge nodes (e.g. below 2 nm), complemented by pilot lines for 3D heterogeneous systems integration and advanced packaging.
3. Advanced Technology and Engineering Capacities for quantum chips
   a) Innovative design libraries for quantum chips
   b) Pilot lines for the integration of quantum circuits and control electronics
   c) Testing and experimentation facilities
4. A network of competence centres and skills development
5. 'Chips Fund' activities for access to capital by start-ups, scale-ups, SMEs and other companies in the semiconductor value chain

OTP's Whitepaper[1] Recommendations (1/3)

Stimulate the development of OTPs

Recommendations

- *"Stimulate… development and implementation of open platforms an explicit part of the requirements of project calls …development of OTPs that can also serve potentially high-volume non-medical applications"*
- *"Include requirements related to the development of open security/privacy tools on each call that relates to the handling of medical data"*
- *"Broaden evaluation .. to include criteria related to practicality, ease of implem., eval. of technologies "in the field" e.g. by means of (pre-) clinical trials."*

- Convincing the JU of this, JU being private and public partners
- The **reference document** to drive project call topics and requirements for the ECS community is the **ECS SRIA**[2].
  - See e.g., Multifunctional integration, Cross-sectorial needs, Specific requirements for Health & Wellbeing
  - Include security aspects for such topics
- **Focus Topics** as a new instrument in KDT calls part of the top down approach
  - Explicit requirements can be uptaken
  - But needs convincing Public authorities of urgency and need for such topic.

[1] Open Technology Platforms for Emerging Medical Domains, A Health.E lighthouse whitepaper

[2] The Electronic Components & Systems (ECS) Strategic Research and Innovation Agenda (SRIA) 2022 final edition was published on 17 January 2022 by the three Industry Associations AENEAS, EPoSS, and Inside.

OTP's Whitepaper[1] Recommendations (2/3)

Increasing the long term impact

Recommendations

- *"Enhance multi-disciplinary cooperation by promoting the integration of clinical validation within highly innovative research initiatives …technology projects are too short to also include the necessary clinical evaluations..."*
- *"Organize pan-European benchmarks for competing technologies"*
- *"Ensure that physicians, hospitals, caregivers and patients have an impact on the development roadmap from the very beginning"*
- *role of RTOs*

- Look for **synergies and common actions with IHI JU (other PPPs?)**
  - when it comes to clinical trials/validation
  - for benchmarking different medtech solutions
  - for roadmapping exercises
- Keep an eye on **EC priorities**
  - Independence goals incl. sovereignty
  - Other related roadmaps like the AI roadmap, Open-source tech roadmap
  - Green deal, sustainability, circular economy,...

[1] Open Technology Platforms for Emerging Medical Domains, A Health.E lighthouse whitepaper

OTP's Whitepaper[1] Recommendations (3/3)

Capitalization/commoditization of assets leveraging OTPs and ecosystems:

Recommendations:

- *"Stimulate large companies and foundries to take the lead in the development of OTPs accessible to third party users"*
- *"Stimulate the development of design and simulation tools to make the OTPs accessible to SME's, RTOs and academia"*
- *"Promote the creation and dissemination of public databases that are created with public funding with the purpose of being reused in further research"*

- All this relates to **deployment** and so should be analysed in the frame of the Chips JU (Chips Act)
- Access to open industrial platforms must be based on **transparency** (standard specs and APIs), **modularity** (Apps, tools, design,) and **clear rules** (IP management, standards, maintenance,…).
- **Public databases** are eligible for ECSEL/KDT funding but their continuity should be assured via other self-sustained communities under specific business models.

[1] Open Technology Platforms for Emerging Medical Domains, A Health.E lighthouse whitepaper

Thank You

Special thank you to the Health.E lighthouse initiative and the Helos project

E C S
Electronic Components and Systems

ECS-SRIA

Peter Zandbergen (Philips)

Chapter Lead Health and Wellbeing

The ECS-SRIA 2022

E C S

Electronic Components and Systems

EU Main Objectives covered by SRIA

Electronic Components and Systems

1

Boost industrial competitiveness through interdisciplinary technology innovations

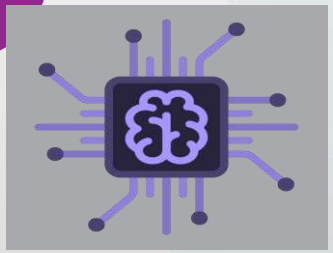
2

Ensure European digital autonomy through secure, safe and reliable ECS supporting key European application domains

3

Establish and strengthen sustainable and resilient ECS value chains the Green Deal

4



Unleash the full potential of intelligent and autonomous ECS-based systems for the European Digital Age

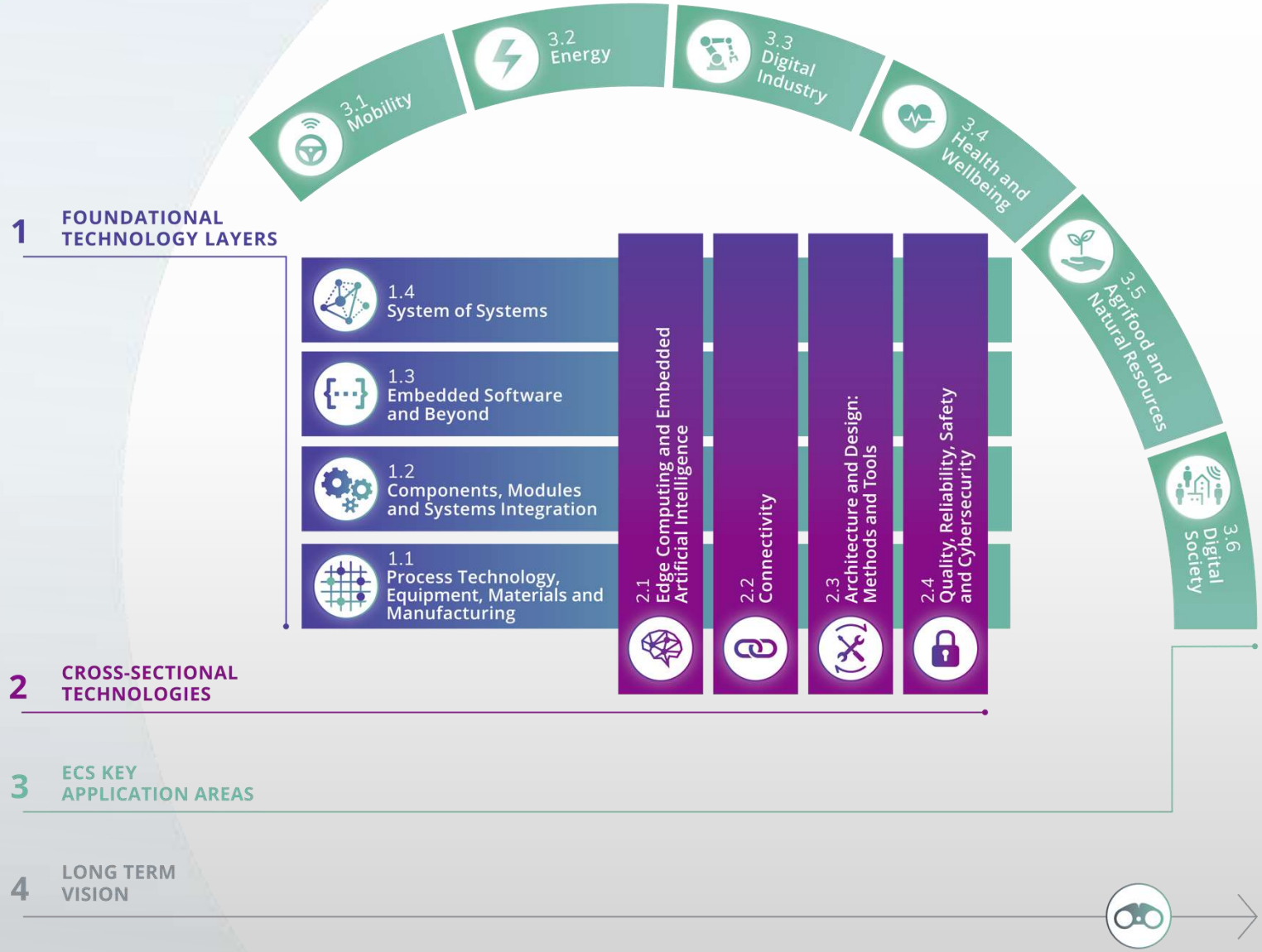
X

Ensure engineering support across the entire lifecycle of complex ECS-based systems

EC Strategic Priorities:
https://ec.europa.eu/info/strategy/ priorities-2019-2024_en

ECS-SRIA structure

Electronic Components and Systems



Foundational technologies

The **Foundational Technology Layers** cover the **technology stack** of a typical digitalization solution based on ECS.

They have **hierarchical dependencies**, due to the inherent nature of ECS and the way they compose and integrate in complex entities.

Essential to creating the main components of a digitalization solution.

Represent a very **fertile ground** where new **interdisciplinary** technologies, products and solutions can grow.

Cross sectional technologies

Four **Cross-Sectional Technology** chapters focus on **transversal** areas, where innovative results emerge from the **interdisciplinary** contribution of the foundational layers.

E.g.: embedded intelligence on the edge requires

- new integrated circuits
- to develop innovative electronic components
- that can be used to develop smarter and more connected components, modules and entire systems,
- running smart software that will offer new functionalities and capabilities
- that will allow these systems to interact, cooperate and merge in larger Systems of Systems.

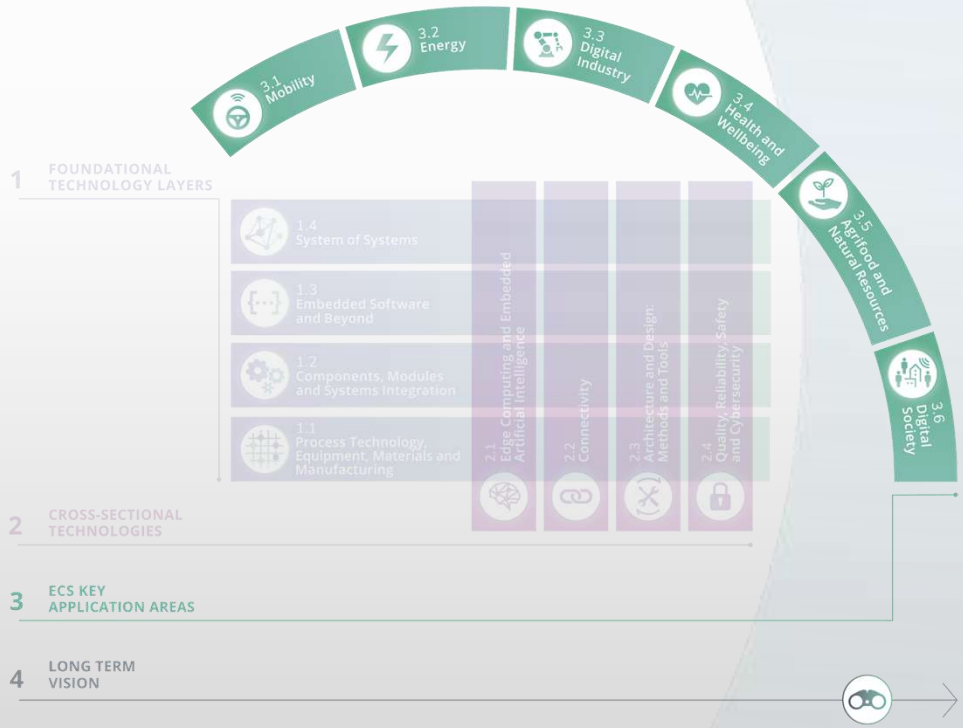
The innovation generated by cross-sectional technologies influences foundational layers and **amplifies the effect** of innovation also in the application domains.

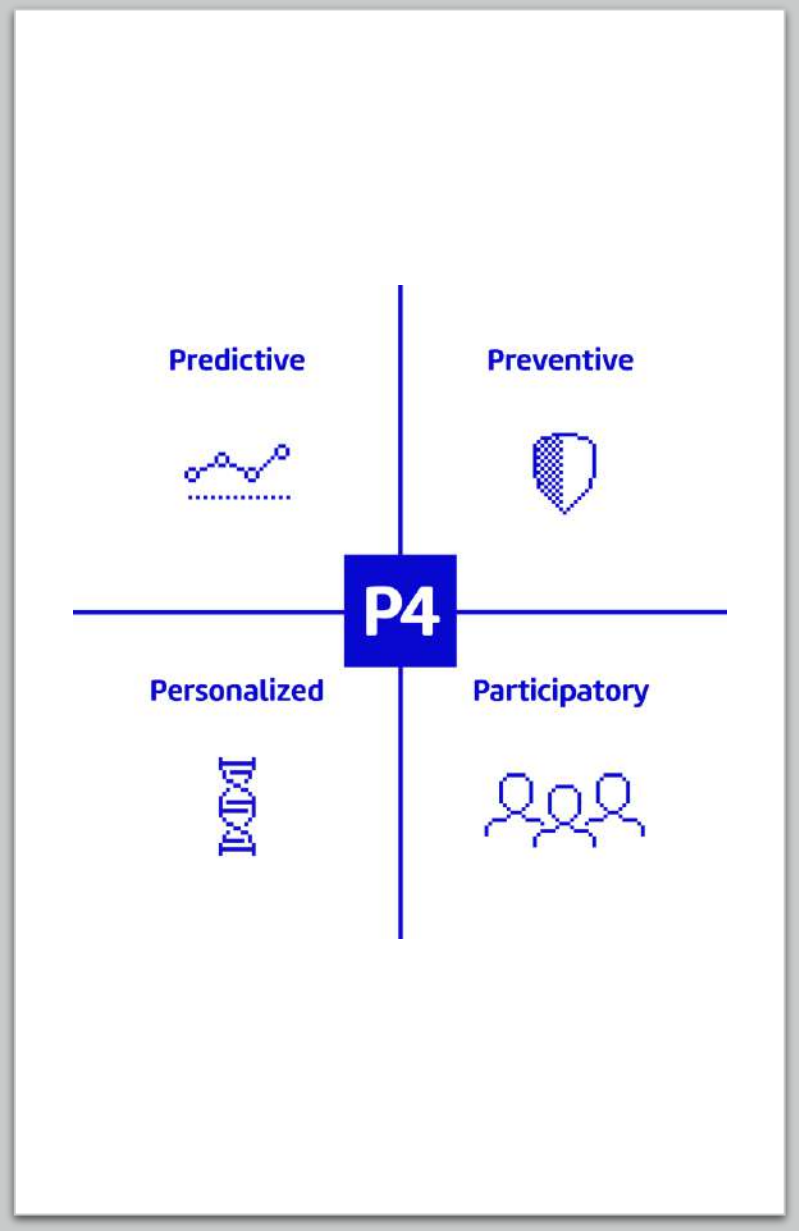
Application chapters and LTV

Six **Application chapters** describe the challenges of specific ECS application domains, that are key for Europe, and identify the required R&D&I efforts.

Finally, the **Long-Term Vision** chapter illustrates our vision of the ECS beyond the time horizon covered by the other chapters:

- it seeks to identify the research subjects that must be addressed at low TRL levels
- and help the research programs in the continuous improvement of European digital technology



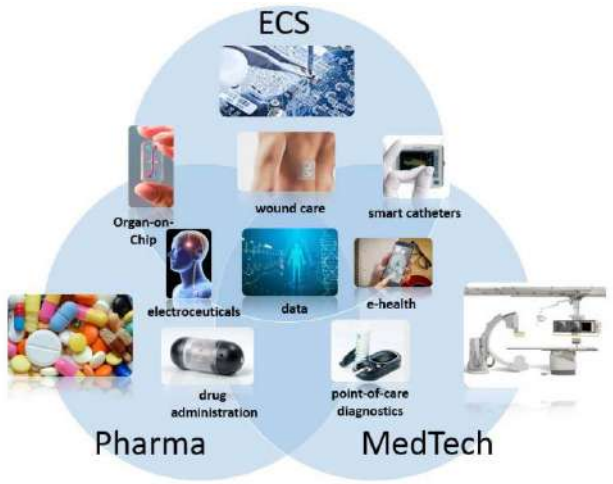


Health and Wellbeing

Electronic Components and Systems

Five major challenges have been identified for the healthcare and wellbeing domain:

- Major Challenge 1: enable digital health platforms based upon P4 healthcare.
- Major Challenge 2: enable the shift to value-based healthcare, enhancing access to 4P's game changing technologies.
- Major Challenge 3: support the development of the home as the central location of the patient, building a more integrated care delivery system.
- Major Challenge 4: enhance access to personalized and participative treatments for chronic and lifestyle-related diseases.
- Major Challenge 5: ensure more healthy life years for an ageing population.

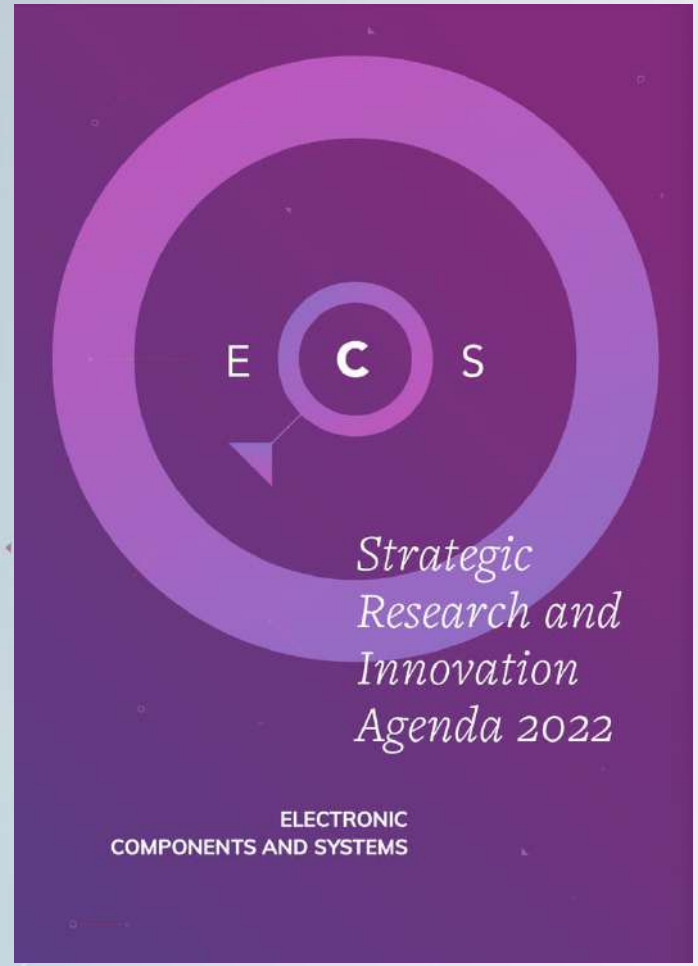


Health.E
Moore for Medical

Links with Lighthouse Health.E

E C S
Electronic Components and Systems

- Digital Health Platforms
  - Secure IoMT systems; Early Diagnosis; …
- Value Based Healthcare
  - MEMS Ultrasound for large area body conformal; Flexible electronics; Lab-on-Chip; …
- Healthcare at Home
  - Textile integration and the patch-type housing of electronics; Low-cost MEMS Ultasound; …
- Personalized and Preventive
  - Smart implantables; Organ on Chip; …
- Healthy Life Years
  - Low-power technology for sensors, microprocessors, data storage and wireless communication; …



E C S

Electronic
Components
and Systems

ECS-SRIA

Thanks for the attention.

Any question?

EIC

Backing visionary entrepreneurs

Andreas Lymberis, EISMEA, EIC Accelerator
Andreas.Lymberis@Ec.Europa.eu

European Innovation Council

Europe's most ambitious innovation initiative

- **€10 billion** programme to identify, develop and scale up breakthrough technologies and disruptive innovations in Europe
- **Unique** in the world to combine research on emerging technologies with Accelerator for startups, SMEs and scaleups
- EIC set to become **largest deep-tech investor** in Europe (over €3 billion)
- Enhances the **European innovation ecosystem** (partnerships with EIT, ERC, etc)
- **First work Programme** adopted 18 March 2021, €1.5 billion
- **Second Work Programme** adopted 7 February 2022, **€1.7 billion**

EIC main instruments and characteristics

Pathfinder (TRL1-4)
- **For consortia**
- Early stage research on breakthrough technologies
- **Grants up to €3/4 million**

Transition (TRL 4-6)
- **For consortia and single entities**
- Technology maturation from proof of concept to validation
- Business & market readiness
- **Grants up to €2.5 million**

Accelerator (TRL 6-9)
- **For individual SMEs**
- Development & scale up of deep-tech/ disruptive innovations by startups/ SMEs
- Blended finance (**grants up to €2.5 million; equity investment up to €15 million or above**)

- Focus on **breakthrough, market-creating, deep-tech**
- **Mainly bottom up** complemented by targeted funding on strategic technologies/ challenges
- Steered by **EIC Board** of leading innovators (entrepreneurs, investors, researchers, ecosystem)
- **Business Acceleration Services** (coaches/ mentors, corporates, investors, ecosystem)
- **Pro-active management** (roadmaps, reviews, re-orientations, etc) with EIC Programme Managers
- **Fast track access** to Accelerator for results from EIT, EIC Pathfinder,

EIC Accelerator 2021

European Innovation Council

>5000 short applications submitted

Average time to inform of outcome of short applications: **3 weeks**

164 companies selected for funding

- 96 blended finance
- 34 grant first; 9 grant only
- 5 equity only

Total funding up to €991m: €641m investments; €350m grant

Approx. **144 Seals of Excellence**

EIC Business Acceleration Services Achievements in 2021-2022

European Innovation Council

+50 Initiatives

+800 innovators took part

+2000 Corporate & investors involved

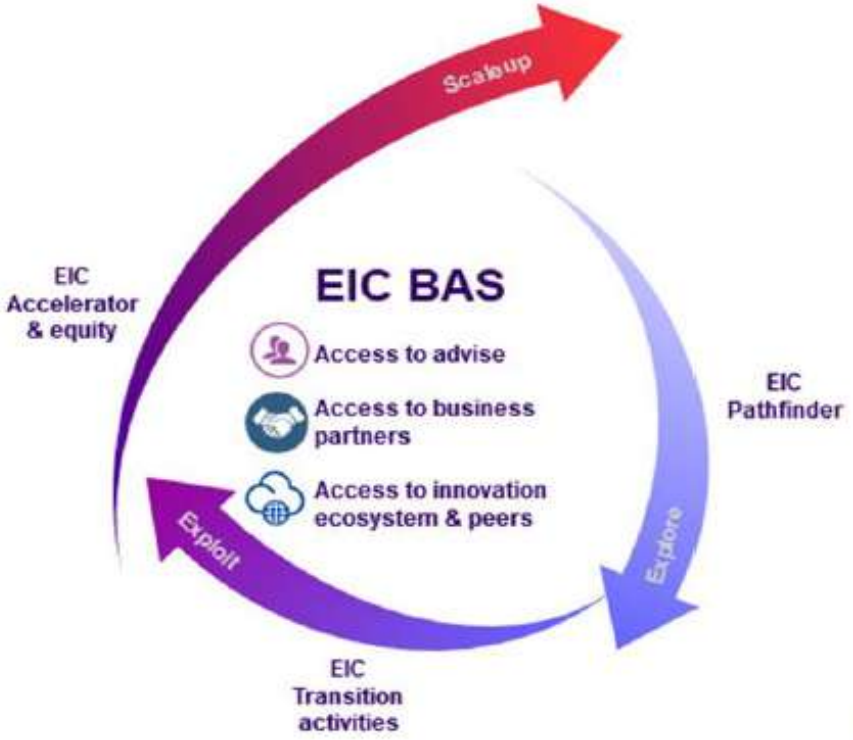
+600 1:1 meetings with business partners

20% Business follow-ups & deals

89% satisfaction

1k coaching sessions

EIC Pavilion at Top Global Trade Fairs



Impacts of the EIC pilot: > 5000 startups/SMEs supported; €9.6 billion follow up investments; €50 billion valuation; 4 'Unicorns', 91 'Centaurs'

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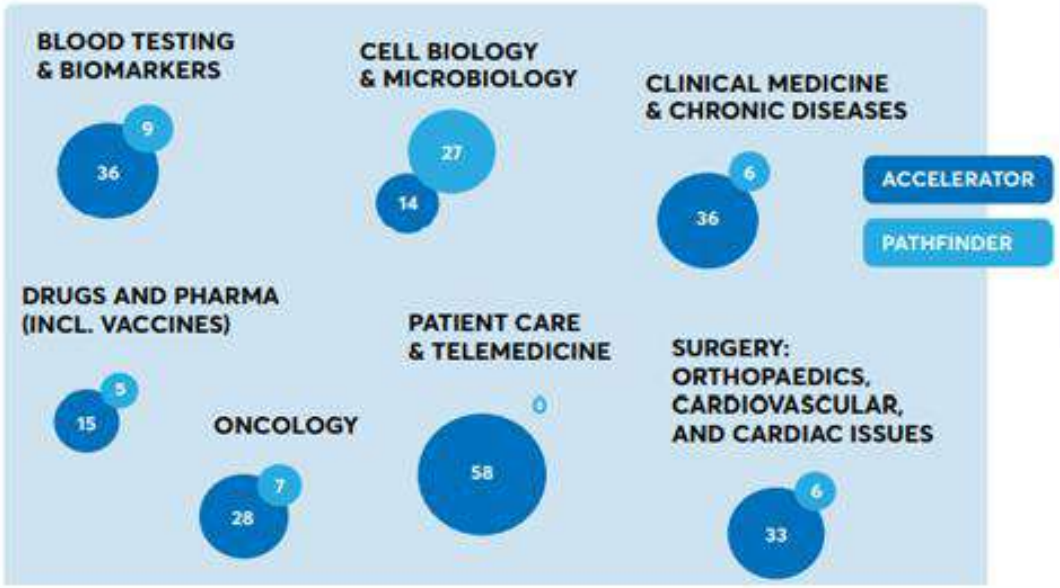
4 Unicorns

CELLINK A BICO COMPANY

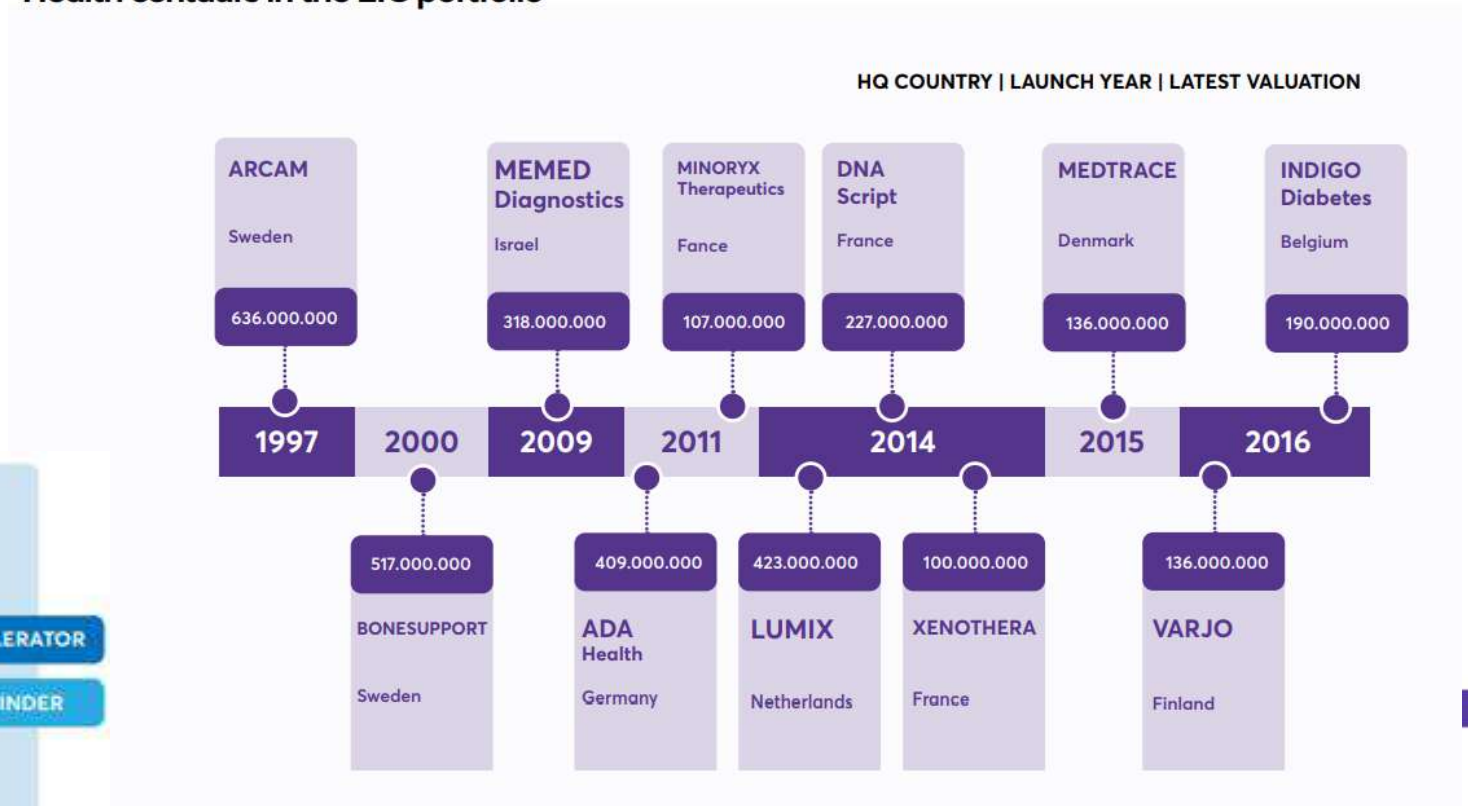
BIOARCTIC

SWORD HEALTH

infarm



Health centaurs in the EIC portfolio



EIC WP 2022

https://eic.ec.europa.eu/events/european-innovation-council-online-info-day-22-february-2022_en

https://eic.ec.europa.eu/eic-frequently-asked-questions_en

EIC Work Programme 2022 - overview

- **Budget: €1.69 billion**
  - EIC Pathfinder: €350 million *(+€50m)*
  - EIC Transition: €131 million *(+€31m)*
  - EIC Accelerator: €1.16 billion *(+€70m)*
- **Strong continuity** for main calls
- Some **simplifications and improvements** in application process
- Evolution of **EIC challenges**
- Additional support for **scaleup companies** and **women innovators**
- **Enhanced Business Acceleration Services** and support actions
- **Continuity with EIC Prizes**

EIC main calls in 2022 - overview

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Accelerator - Open	Short applications - **Apply any time** all year round Full applications – 3 cutoffs in 2022: • **23 March** • **15 June** • **5 October**	**~€623m** (grant & equity)
Accelerator – Challenges • Technologies for **Open Strategic Autonomy** *(healthcare, critical raw materials, quantum, space, security etc)* • Technologies for **'Fit for 55'** *(energy, buildings, mobility, land use, green digital, etc)*		**~€537m** (grant & equity)
Pathfinder - Open	**Deadline:** **4 May**	**~€183m**
Pathfinder - Challenges • **Carbon dioxide & nitrogen management** and valorisation; • Mid-long term, systems-integrated **energy storage**; • **Cardiogenomics**; • **Healthcare continuum** technologies; • **DNA-based** digital **data storage**; • Alternative **quantum** information processing, communication, and sensing	**Deadline:** **19 October**	**~€167m**
Transition – Open	**Apply any time** all year round Full applications – 2 cutoffs in 2022: • **4 May** • **28 September**	**~€70.5m**
Transition – Challenges • **Green digital devices** for the future; • Process and system integration of **clean energy technologie**s; • **RNA-based therapies and diagnostics** for complex or rare genetic diseases		**~€60.5m**

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Pathfinder calls 2022 – Summary table

	Pathfinder Open	Pathfinder Challenges
Total budget	€183 million	€167 million
Proposals (indicative)	Up to €3 million	Up to €4 million
Funding rate	100% of eligible costs	100% of eligible costs
Opening	1 March 2022	16 June 2022
Deadline	4 May 2022 at 17.00 CET	19 October 2022 at 17.00 CET
Length of proposal	17-page proposal (part B)	25-page proposal (part B)
Applicants	Consortia: min. 3 partners from 3 different MS/AC (of which at least 1 partner in a MS)	1. Single legal entities in a MS/AC (conditions apply) 2. Consortia: - If 2 partners: from different MS/AC, otherwise - Min. 3 partners from 3 different MS/AC (of which at least 1 partner in a MS)

EIC Transition Open and Challenges 2022

Why EIC transition?

Supports the maturation and validation of novel technologies beyond proof of principle (TRL 5-6) and business activities towards commercialisation

The Open funding supports all technologies and innovations

Challenges: predefined thematic priorities aiming to establish portfolios of projects

Who can apply ?

H2020 FET schemes and EIC pilot

ERA NET call - FET (CHISTERA, QUANTERA, FLAGERA)

ERC PoC projects

Financial contribution

Max EUR 2.5 m €

Booster grants up to EUR 50k to undertake portfolio activities

EIC Transition Call 2022 cut-offs

- **Total budget: 130M€**
  - **Open: 70M€**
  - **Challenge** Green Digital devices for the future: **30M€**
  - **Challenge** Process & system integration of clean energy technologies: **15M**
  - **Challenge** RNA-based therapies and diagnostics: **15M€**
- **Publication and Opening:** 9 February respective 2nd March
- **1st cut-off Open and Challenges:** 4th May
  - Interviews: planned for 2nd week of July (+/-) Results: last week of July
- **2nd cut-off Open and Challenges:** 28th September
  - Interviews: planned for 1st week of December (+/-) Results: end of the year
- Part B, sections 1 to 3,= maximum **20** A4 pages including cover

Why EIC Transition?
The 2 core elements of a Transition proposal

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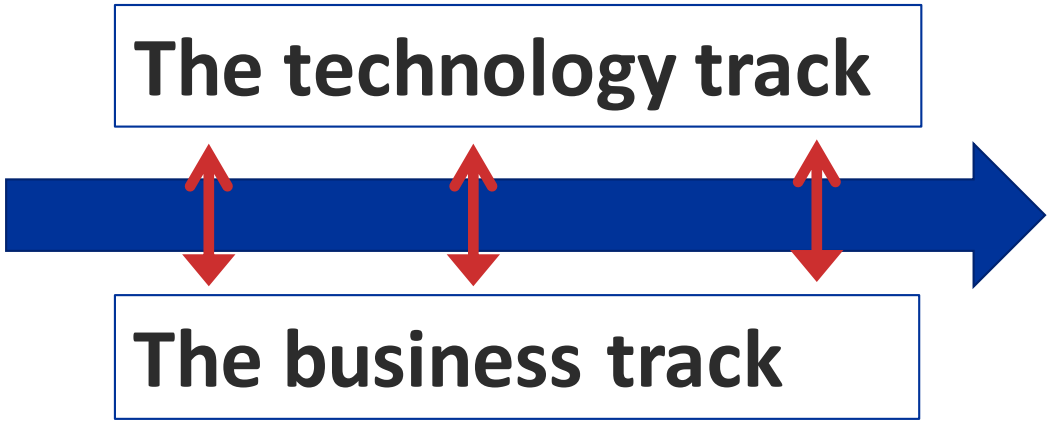
The starting point in the project should is Proof of concept validated in the lab (TRL3/4)



The end point should be a completely functional version of the technology tested or demonstrated in relevant environment (TRL 5-6), supported by a sound and implementable commercialisation strategy.

Can you apply?

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- Check the **original project is eligible** (e.g. started more than 12 months, or ended less than 24 months before the date of the Transition call deadline)
- You do **not need** to be a **participant**, Principle Investigator or **result owner** of the previous projects;
- **New participants** are **welcome** and encouraged to apply.
- However you need to prove **the commitment from the owner to negotiate** with you fair, reasonable, non-discriminatory access to the results.

Evaluation of proposals and next steps

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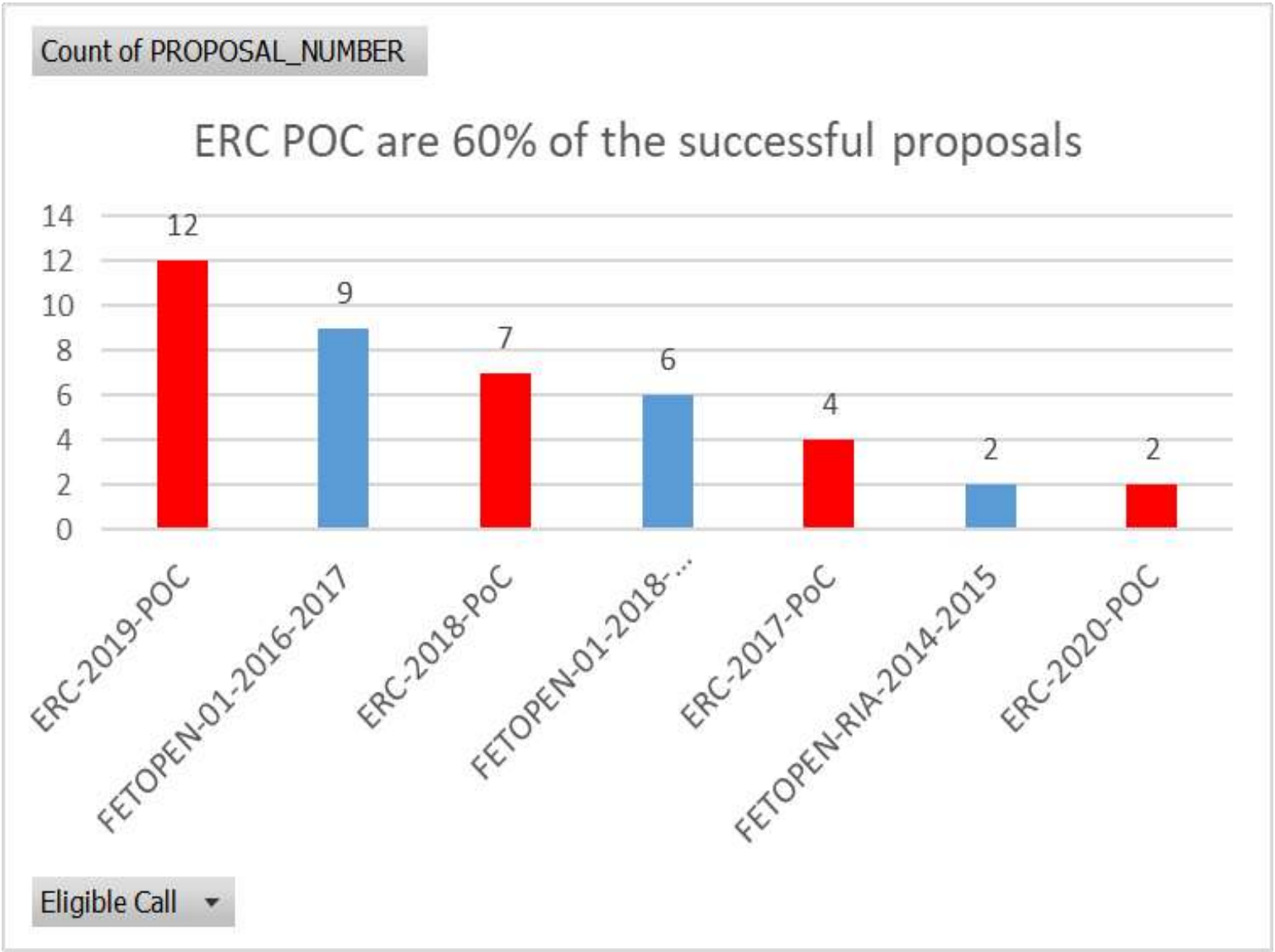
- **First remote evaluation phase by experts**
  - Average of the individual scores per criteria (excellence, impact, implementation)
  - Overall score sum of the three averages
  - Feedback 9 weeks after the call deadline
- **If successful, within 2x available budget, invited to a face-2-face interview**
  - You may bring only people mentioned in the proposal
  - Jury composed of max 6 members, may include 1 program manager
  - Convincingly pitch your proposal and answer clarifying questions
  - Recommends a Go/No Go, no change in the overall score
  - Invitation 13w and feedback 17 weeks after the call deadline
- **Grant agreement signed within 6 months from call closing.**
  Project starting<2-3M

Origin of the successful proposals



- 25 proposals selected for funding are originated by ERC Poc projects (60%)
- 17 proposals selected for funding are originated by FETOpen projects

Deviations need to be justified

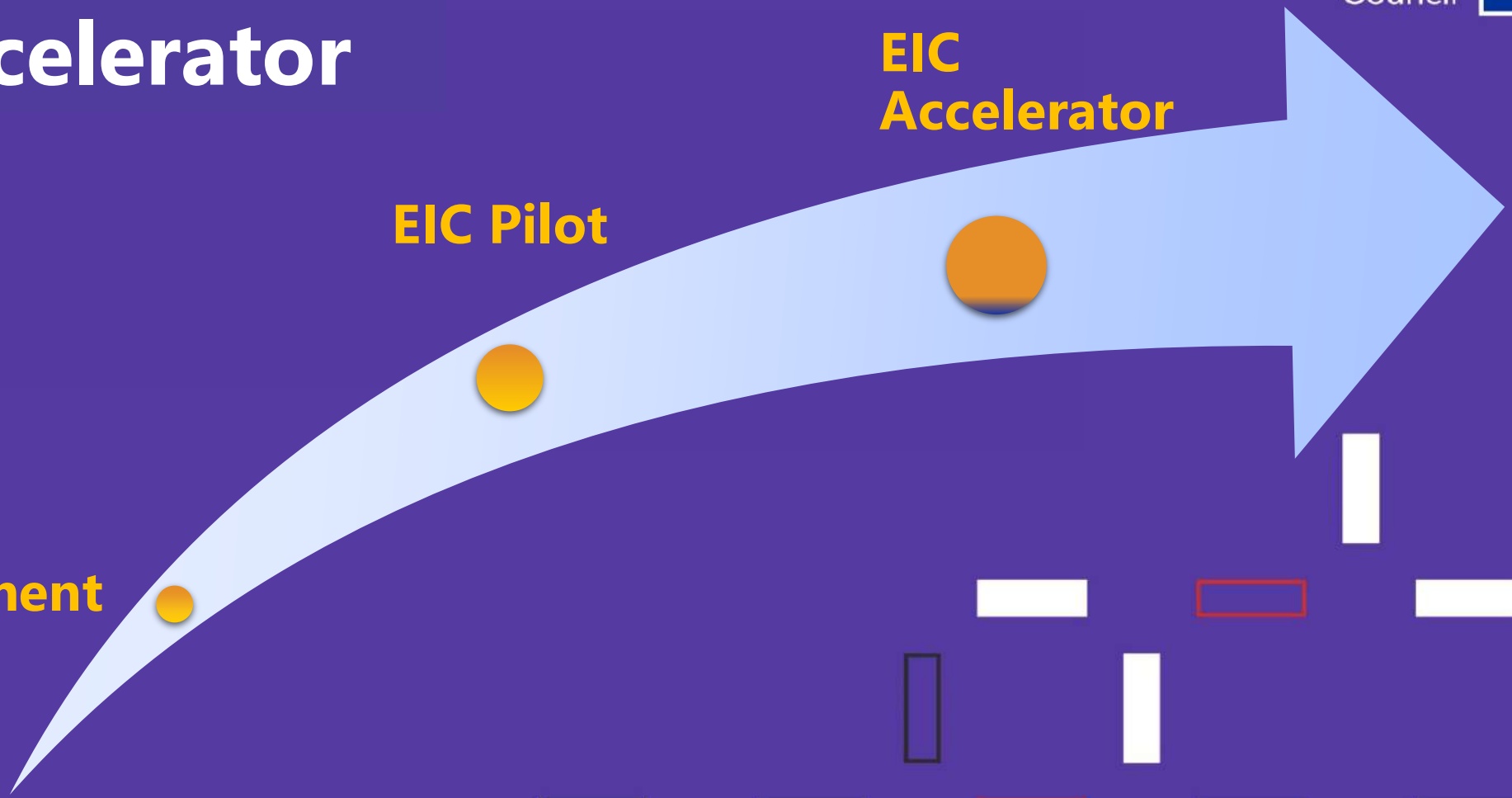
European Innovation Council

- Budget: 2.5 M€ is the **standard maximum budget**,
- Duration: 36 months is the **standard maximum duration**
- Early start of the project after grant signature (if successful).

- higher amounts and longer durations should be an **exception** and very convincingly justified

EIC Accelerator

European Innovation Council



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What are we looking for?

Start-ups and SMEs seeking to **scale up** high impact innovations with the **potential to create new markets** or disrupt existing ones

Innovations building on **scientific discovery** or technological breakthroughs (‘**deep tech**’)

Innovations where **significant funding** is needed over a **long timeframe** and are **too risky** for private investors alone

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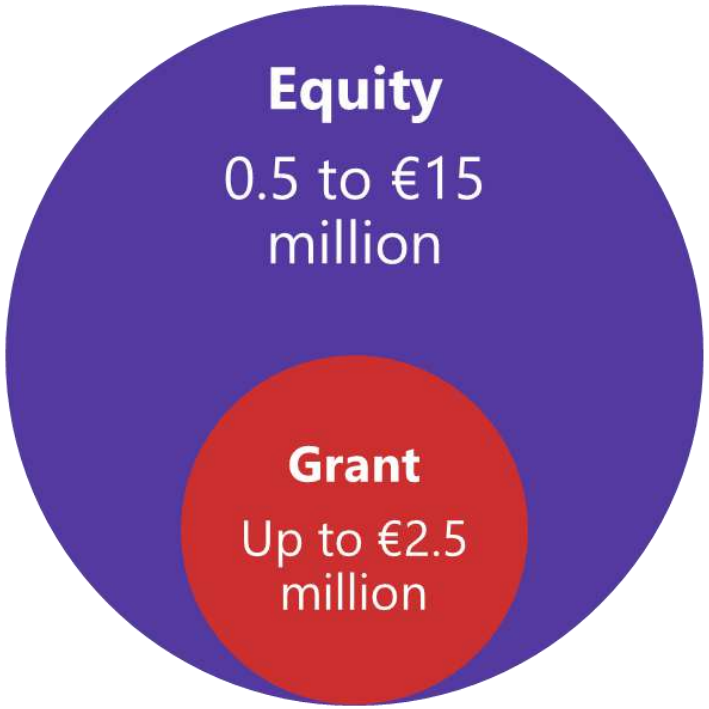
What can you apply for?

EIC Blended Finance



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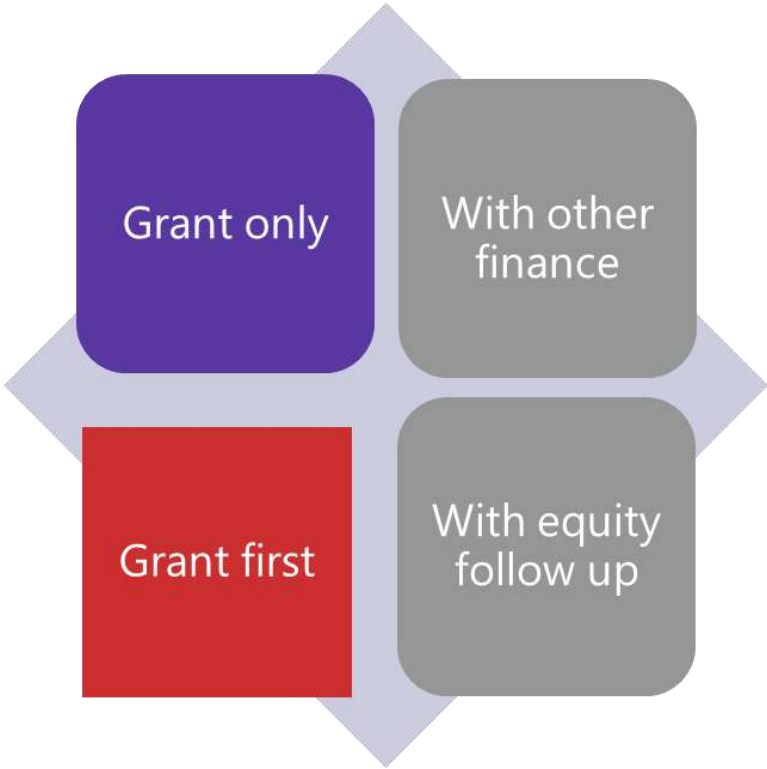

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Grant and investment

If you need support for development (TRL 5/6 → 8), deployment and scale-up (TRL 9).

Grant first

If your innovation still requires significant work to validate and demonstrate in relevant environments to assess its commercial potential.

Grant only

If you can prove that you have sufficient financial means for deployment and scale-up (TRL 9).

Investment only

If you are looking to fill the funding gap for rapid scale-up of your high-risk innovation and you don't need a grant.

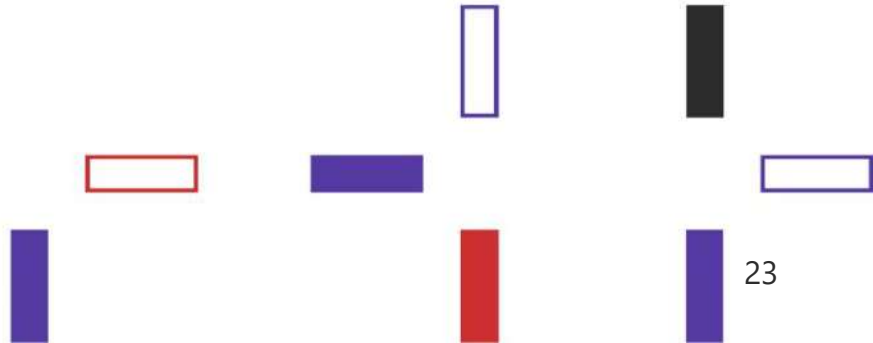
EIC Accelerator equity funding

- The EIC invests at **early stage** (seed, start-up, scale-up) from **€0.5 to 15 million*** in the form of equity or quasi-equity.
- Intended to finance **market deployment and scale up**.
- **Crowding in** of co-investments and follow-up investments in EIC funded companies of 3-5 times the level of EIC funding
- The EIC may reserve **follow-on capital** to invest in subsequent series.
- The EIC invests across **all technologies and verticals**, across **all EU countries** (and associated countries).
- The EIC provides **patient capital** (investments will normally be made with a long average perspective (7-10 years) with a maximum of 15 years).
- The EIC usually targets **minority ownership** stakes (from 10 to 25%), and up to a blocking minority in cases identified by the EC as of strategic interest for the EU.

* A more than EUR 15 million investment request is allowed in duly justified cases in 2022 on a pilot basis.

The EIC Fund today

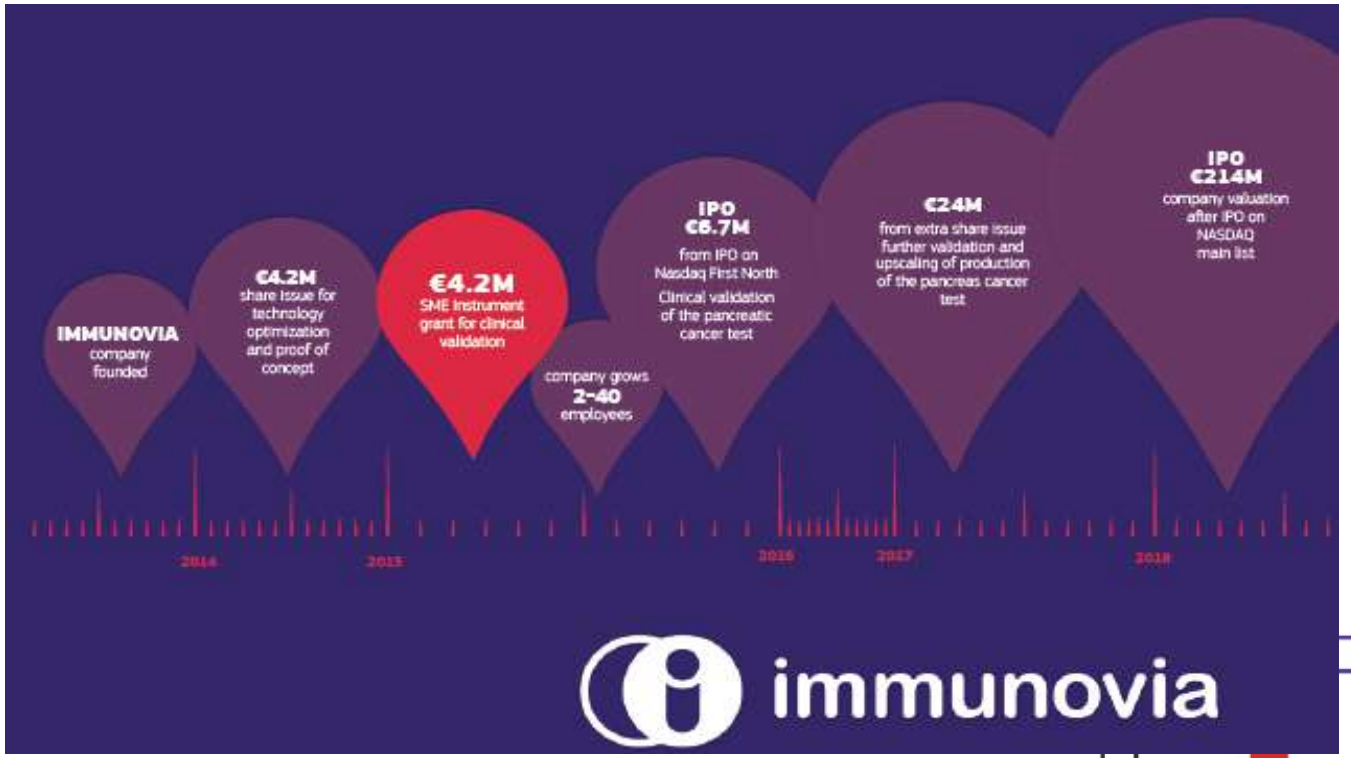
- The EIC Fund **is a venture capital fund:** Reserved Alternative Investment Fund (RAIF), a **flexible instrument** with possibility for multiple **compartments** (H2020, Horizon Europe…).
- The **European Commission** is the **shareholder**.
- It was **established in June 2020** under direct management by the Commission.
- The **European Investment Bank (EIB)** is the **investment adviser**.
- Since its incorporation, the EIC Fund has **approved 141 deals** (EUR 637 million) and **signed 75 investment agreements** (EUR 375 million).



Success story

Blood test to diagnose pancreatic cancer
672454 - IMMPACT

Founded in 2007 - Stockholm (SE)
Funding:
December 2014: €4M Phase 2
1 December 2015: IPO at NASDAQ Stockholm
26 April 2018: NASDAQ NYC
Market cap: 200 M€



http://www.immunovia.se/

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EIC Accelerator in 2022

- Open Accelerator
- EIC Accelerator Challenge: Technologies for Open Strategic Autonomy
  - *significant reduction of the European dependency on other regions for deep-tech innovations and services of EU key strategic interest; strengthening of European competitiveness, security and open strategic autonomy.*
- EIC Accelerator Challenge: Technologies for 'Fit for 55'
  - *accelerating decarbonisation by having high potential impact on reducing net CO_2 emissions; more inclusive and steady acceleration towards climate neutrality by 2050*

EIC Accelerator Challenge: Technologies for Open Strategic Autonomy

- **Components, technologies and systems for the pharmaceutical industry** (security of supply e.g. through synthetic biology and novel manufacturing technologies;
- **Strategic healthcare technologies** building on Europe's research strengths in cell and gene therapies, including ribonucleic acid (RNA) based therapies to ensure EU leadership;
- **Sustainable and innovative approaches, including circular approaches to critical raw materials (CRM)** for new sources of supply/extraction, processing, use, recovery or replacement aimed at improving efficiency use, so reducing EU dependency on external providers, and to build EU capacity at all stages of the raw materials value chains;
- **New applications of quantum technologies** on the ground and in space
- **Edge computing applications** including new business models to foster EU leading role in their development;
- **Innovative applications making use of data and signals from EU space infrastructures** (Galileo, Copernicus, etc.)
- **Development of space technologies**
- **Critical security technologies** for secure communication, data security and protection of borders
- **Technologies for innovative financial and payment infrastructures and services**

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The evaluation step by step

1
- You have a disruptive / deep tech idea with a potential to scale up
- **Tell us your story** and submit your short application to be assessed by remote evaluators

2
- We help you to prepare your **business plan** and draft a proposal with AI tool and coaching
- **You submit your full proposal**

3
- **Your full proposal** is assessed by remote evaluators

4
- **You pitch your innovation** in front of EIC Jury Members
- If selected, you sign the Grant Agreement

5
- **In case of investment component**, you enter a due diligence process + compliance checks
- At the end of the process, you sign the Investment Agreement

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Thank you!

@EUeic

#Eueic

https://eic.ec.europa.eu