

# DIGITALISATION

## A new Enabler for the Success of SMEs

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Sodankylä, Finland

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## Outline

Part 1: Introduction to CEMIS

Part 2: Digitalisation - A new Enabler for the Success of SMEs

# Part 1

## Introduction to CEMIS

# CEMIS in a Nutshell

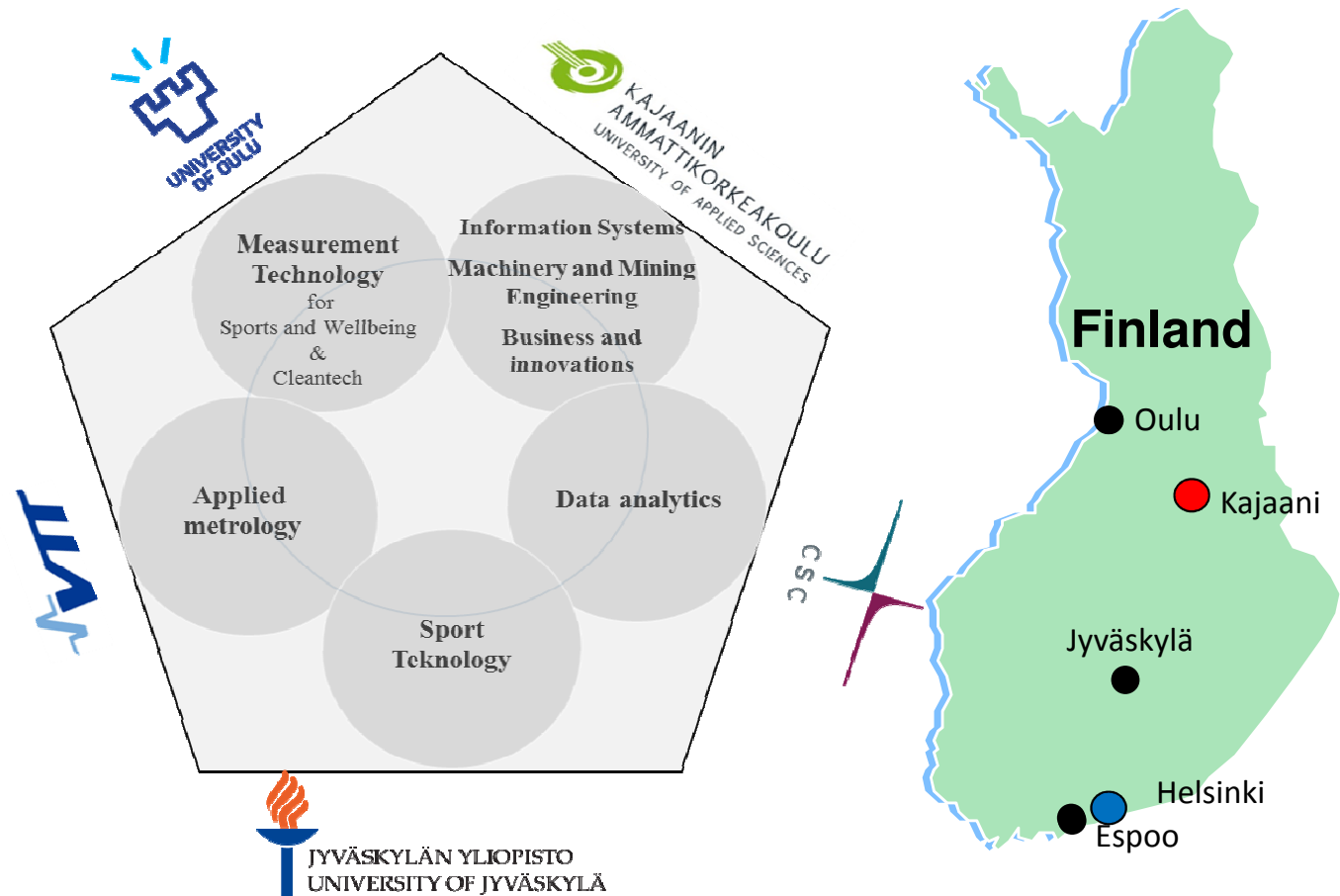
# CEMIS

*Centre for Measurement and Information Systems*

**CEMIS** is a contract based joint centre of University of Oulu, University of Jyväskylä, Technical Research Centre of Finland VTT, CSC-IT Centre of Science and Kajaani University of Applied Sciences.

CEMIS was founded in Kajaani in 2010 and employs around 110 professionals.

CEMIS specialises in research and higher education in the field of measurement and information systems.



**CEMIS' s mission** is to provide R&D –services, training and education, new technology and innovations for companies and research organizations developing and applying measurement and information systems.

**Need?**

**CEMIS**

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**Professionals or Training,  
R&D-services or Technology,  
Innovations or Business development**

**in**

**On-line measurement solutions for reliable process control or environmental monitoring**

**Non-invasive sensors for monitoring of wellbeing and health biomarkers**

**Test solutions for sports and wellbeing**

**International technology business**

**CEMIS' vision** is to be a desired international partner in measurement and information system development by 2020. It means that CEMIS is asked to participate in international projects and invited to act as an expert in international arenas. Furthermore, it means that there work foreign people at CEMIS, people from CEMIS work abroad, CEMIS has international projects, and foreign customers.

**CEMIS' mission** is to produce top class experts, new technology and new business for companies developing and using measurement and information systems by offering research and development services and university education in an innovative and international environment.

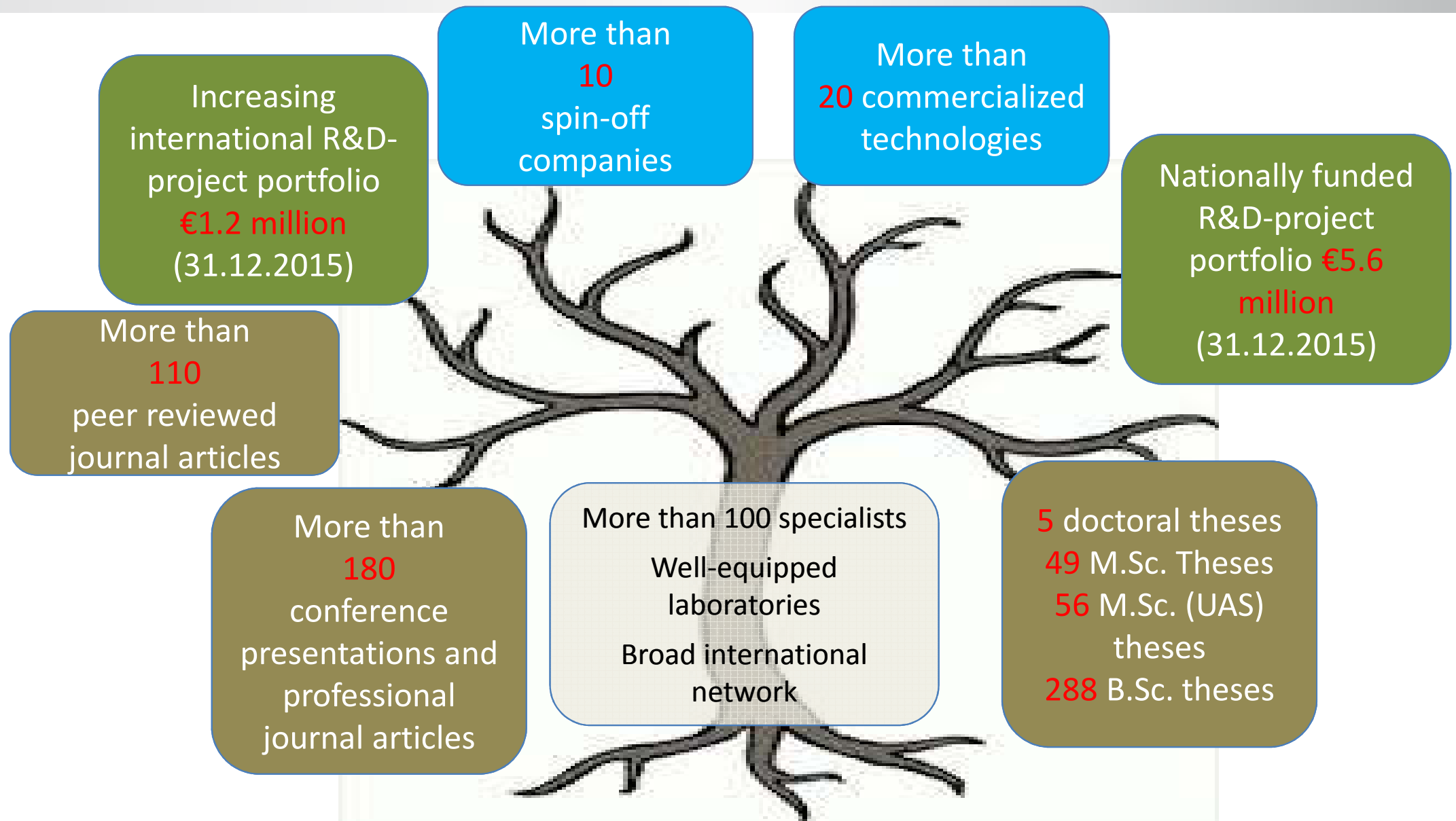
CEMIS employs over 100 measurement and information system experts. The centre's annual funding is approximately 10 million euros.

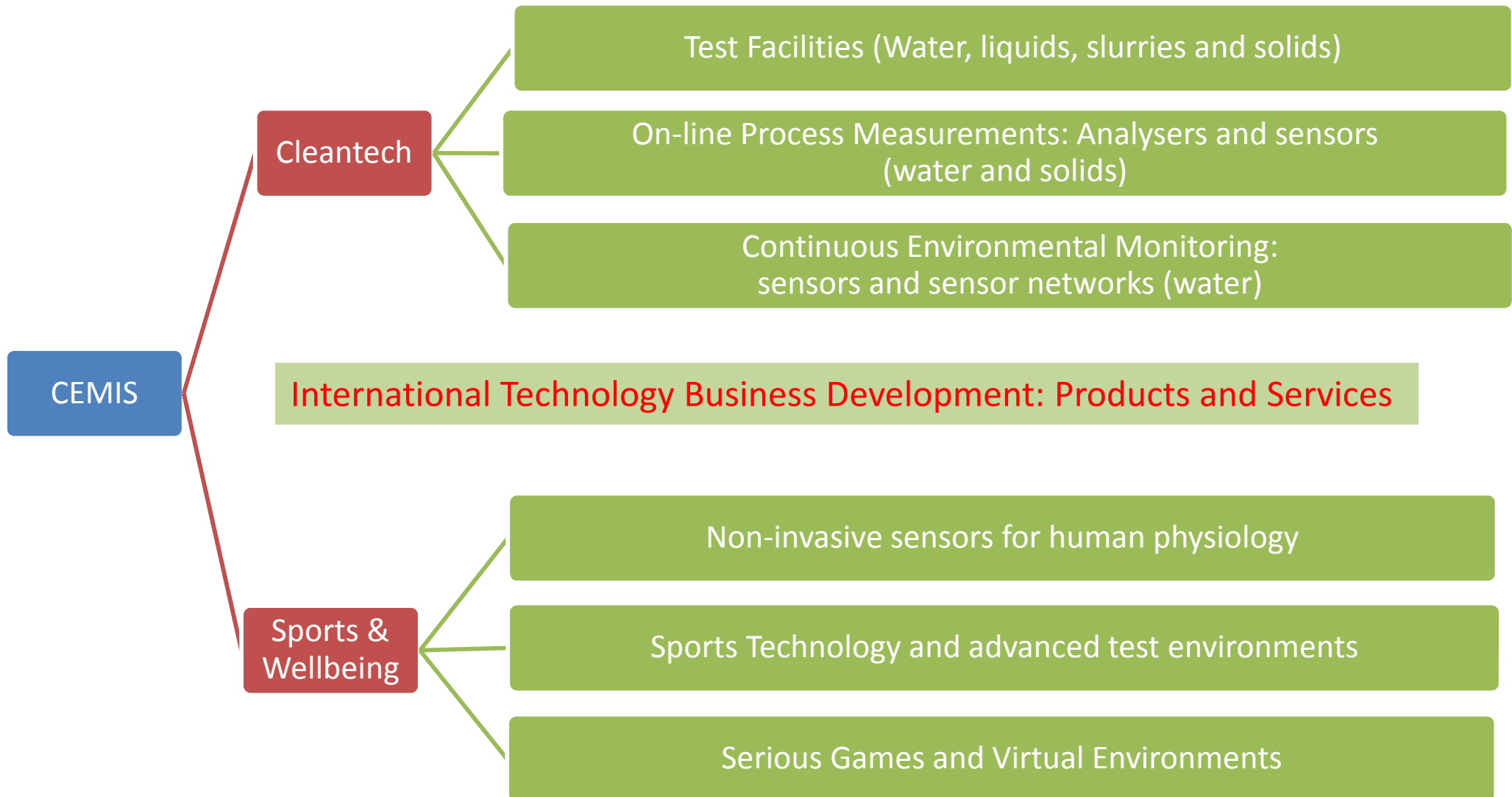
CEMIS pursues to have a recognized and responsible role within its host organizations, acknowledged national positioning and strong international emphasis. CEMIS aims to produce results to its host organizations measured with same indicators as they are assessed.

# CEMIS Achievements 2011-2015

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**CEMIS Business Development team (CBD)** helps research units of CEMIS, partner companies and other customers in

- technology commercialization (from the lab to the market),
- technology business development,
- market and business analyses,
- industry-driven R&D-project planning,
- service business development,
- international partnering and
- start-ups and SMEs growth consultations



### **University of Jyväskylä**

- Novel sport technology solutions
- Research in biomechanics, exercise physiology, and coaching and testing
- Education in sport technology (M.Sc. and Ph.D.)

### **University of Oulu - CEMIS Oulu**

- Development of sensors based on bio-specific detection, electrochemistry, digital imaging and optical spectroscopy
- Expert services in analytical chemistry and bioanalysis services
- Development of testing equipment

### **VTT MIKES Metrology**

- National Metrology Institute's calibration services of water flow, force, torque and mass
- Development of reliability and precision of measurement and testing devices

### **KAMK - Kajaani University of Applied Sciences**

- Training and education in game technology and business
- Exergaming environments, i.e. sports and wellbeing simulators
- Serious games for sports and health care
- Commercialisation services and business development

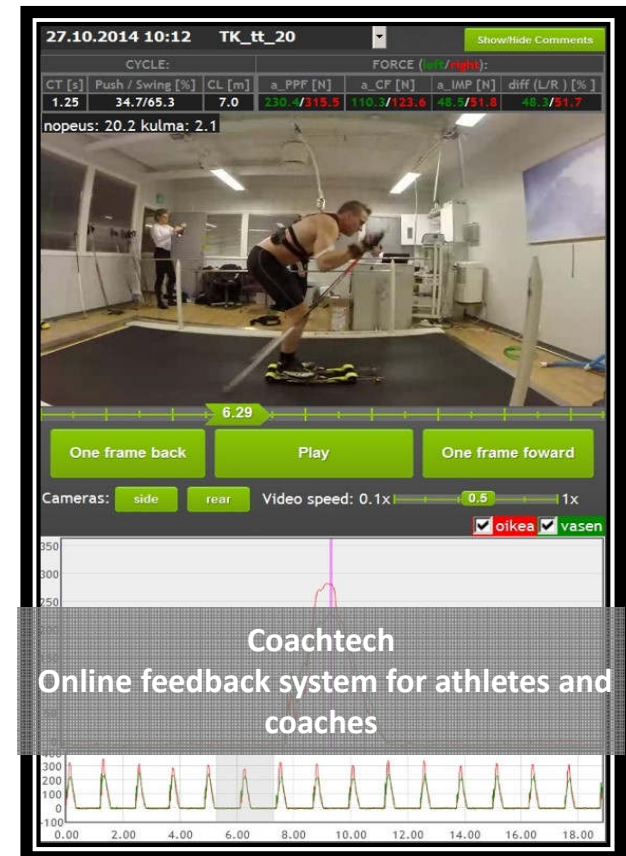
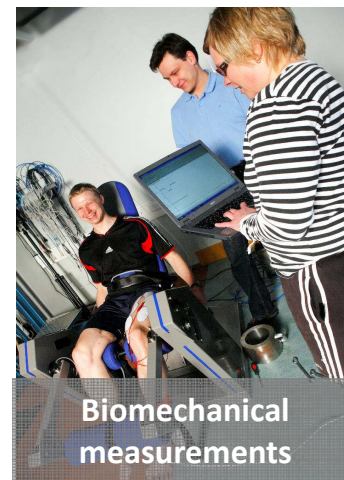
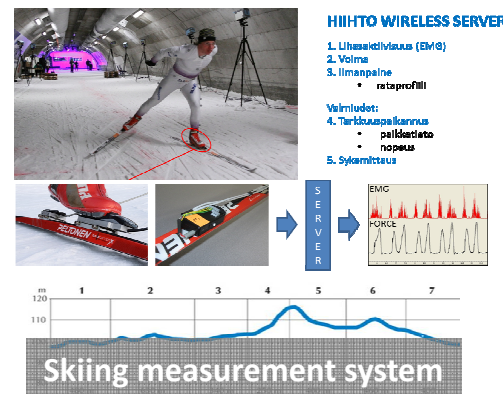
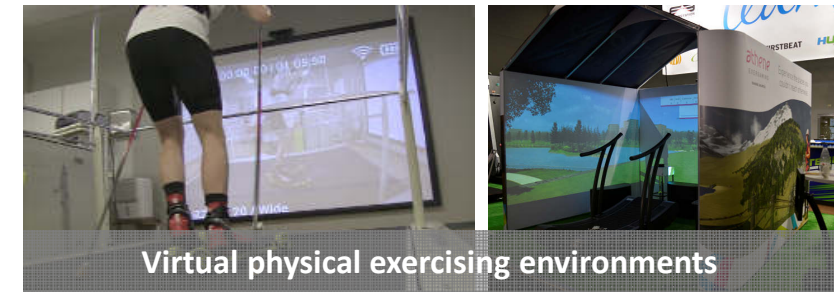
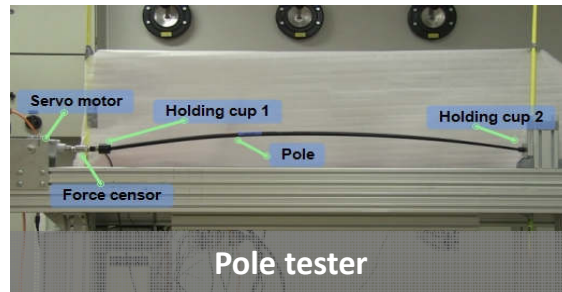
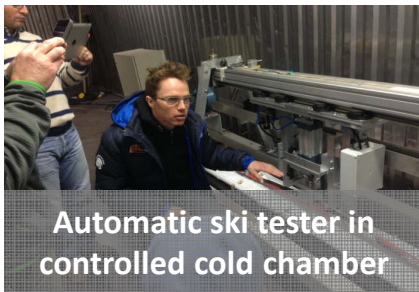
### **CSC**

- Sports and healthcare data management and analytics

# CEMIS Solutions for Sports and Wellbeing

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### **University of Oulu - CEMIS Oulu**

- Development of sensors based on biosensing, electrochemistry, digital imaging and optical spectroscopy
- Online measurement devices for process industry and environmental monitoring
- Expert services in analytical chemistry and bioanalysis services

### **VTT MIKES Metrology**

- National Metrology Institute's calibration services of water flow, force, torque and mass
- Development of reliability and precision of measurement and testing devices

### **KAMK - Kajaani University of Applied Sciences**

- Bachelor level education in information systems, as well as in mechanical and mining engineering
- Engineering services: HW, SW and mechanical designing and prototyping
- Testing and analysis services for industry (XRD, XRF, TG etc.)
- Commercialisation services and business development

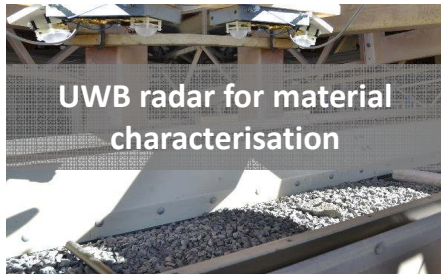
### **CSC**

- Real-time process and environmental data management and analytics

# CEMIS Solutions for Cleantech

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UWB radar for material characterisation



Machine vision for material characterisation



Field spectrometer for continuous process monitoring



On-line capillary electrophoresis



On-line toxic metal analyser



On-line toxic metal monitoring unit



Advanced raining monitoring



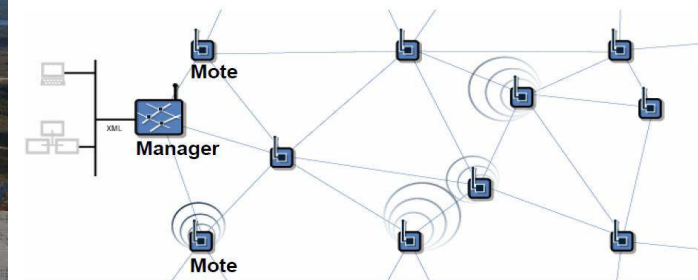
Unmanned measurement platform



Liquid flow calibration and testing environments



Wireless and self-powered wireless sensor network





# CEMIS R&D Results Commercialization

## 2011-2016

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RAIKU

PELITYS

MEAN

PREMIUM

CARDS

BIO-IN

MPA

ICEMET

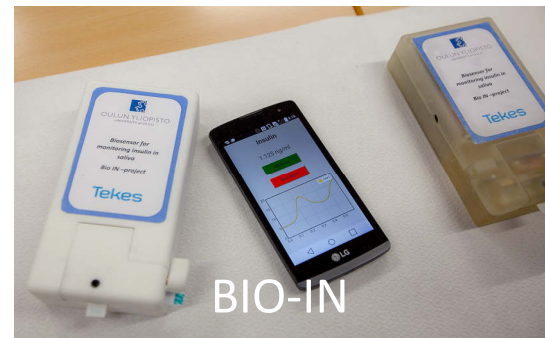
GEOROAD

PULU

Tekes TuTLI project



KS/Pentti Kangas



## Resources:

- More than 100 professionals in measurement and information education, training, research, technology development and technology business development (more than 20 with doctoral degree)
- CEMIS development programme with an annual volume of 1.5 million euros
- Annually around 30 R&D projects with industry (international, national and regional)
- Extensive test facilities, measurement systems and laboratory-scale processing capabilities
- Broad global network of collaborators (companies and research organizations)

## Key technologies:

- Electrochemical sensors
- Biosensors
- Optical spectroscopy
- Imaging technologies
- Chemical and Biochemical analytics

## Services:

- Research projects
- R&D-projects
- Test facilities for rent
- Tailored testing services
- Training and education
- Technology and business consultation
- Analysis services
- Calibration services



## Part 2

# DIGITALISATION

## A new Enabler for the Success of Finnish SMEs



# Digitalization – What it is?

“Integration of digital technologies into everyday life by the digitization of everything that can be digitized.” → public and “a citizen view”

“Digitalization is the use of digital technologies to change a business model and provide new revenue and value-producing opportunities; it is the process of moving to a digital business.”

Suom.:

”Yrityksille digitalisaatio on keino uudistaa liiketoimintaa. Esimerkkejä:

- Arvoketjun virtaviivaistaminen myymällä verkkokaupassa tuotteita suoraan toimittajien varastoista ilman omia myymälöitä ja varastoja.
- Kansainvälisen kasvun hakeminen verkkokaupan avulla.
- Joukkoistamisen hyödyntäminen asiakaspalvelussa.
- Ilmaisuuuden ekonomian ja kaksisuuntaisen markkinan hyödyntäminen ansainnassa.
- Uusien palvelutuotteiden luominen big datan, teollisen internetin ja pilvipalveluiden avulla.”

(Ref: Ilmarinen, Vesa & Koskela, Kai: Digitalisaatio – yritysjohtoon käsikirja)

Do not forget the mobile services and technologies – they are one of the most important elements of digitalization!

Broad concept with a lot of possibilities:

- Digitalisation of support processes, like:
  - Administration and financial reporting
  - Document management
- Digitalisation of sales and marketing
- Digitalisation of customer care, like with social media channels.
- Digitalisation of offering, like services with digital tools and products with new IoT solutions
- New services and products for digitalisation

Important to note:

- It is not only technology (although technology plays an important role)
  - It is a lot of interfaces and interfacing between the systems/services/tools
- Don't think only digitalization of existing processes, but re-plan, create new processes and "way of workings"
- Start by taking small changes iterative to the practice
- Involve your personnel and end-users in the change
- Be ready and prepared, it is coming anyway...

- Improve your performance:
  - Save time and effort
  - Save money
- Be more competitive
- Create and open new business possibilities
- Improve the user experience of your customers
- Make you employees and workers happier
- Improve you brand and image, both on the market and internally

Elisan ja Suomen Yrittäjien tutkimus PK-yrityksistä

<https://hub.elisa.fi/digitaalisuuden-hyodyntamisella-merkittava-yhteys-pk-yritysten-menestykseen/>



Näin tutkimus tehtiin:

- Kyselytutkimukseen vastasi 730 yrittäjää, joista 632 kuului Suomen Yrittäjien jäsenrekisteriin
- Tutkitut yritykset työllistävät 1-50 henkeä
- Tutkimuksen aiheisto kerättiin elo-syyskuussa 2016
- Elisa Oyj:n ja Suomen Yrittäjien tilaaman tutkimuksen toteutti Prior Konsultointi Oy

## Suom: "Pk-yritysten digitalisaatio Etelä-Pohjanmaalla"

- Digitalization had a positive effect on firm performance, especially related to business development. Digitalization of processes acted as a central factor.
- The benefits gained from digitalization were image and brand development, customer acquisition, development in customer service and development in competitiveness.
- A third of responded firms had had effects on new business opportunities, closer stakeholder relationships and enhancement on business processes.
- The most relevant obstacles in digitalization were the cost and finding of external experts.

### Ref.

- Joensuu-Salo, Sanna; Hakola, Jennika; Katajavirta, Marja; Nieminen, Tiina; Liukkonen, Jaana; Pakkanen, Jarkko; Nummela, Jarmo (2017)
- <http://urn.fi/URN:ISBN:978-952-7109-63-2>

# Digitalization – Some Examples

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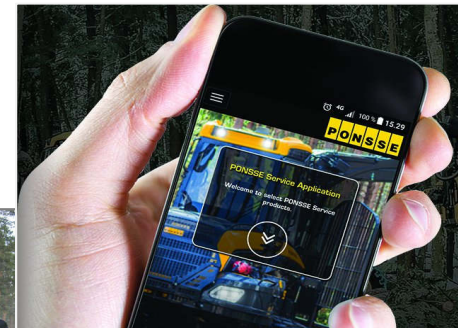
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## Modern vehicles and equipment for industry, agriculture and harvesting

- Includes a lot of software and electronics
- Are connect to the external systems and cloud
- Competitive advantages
- Better customer satisfaction
- New service models -> income



Photo from Sampo-Rosenlew Oy - [www.sampo-rosenlew.fi](http://www.sampo-rosenlew.fi)



Photos from Ponsse Plc -  
[www.ponsse.com](http://www.ponsse.com)



Photo from Normet Oy - [www.normet.com](http://www.normet.com)

## Mobile support for industrial field work and maintenance:

- A lot of possibilities
  - Check lists, field reports and quality deviations
  - Device and asset tracking
  - Installation documentation
  - Field service tasks and follow-up
  - Production tracking
  - Work time reporting
  - Safety training and induction
- Faster and more reliable data collecting
- Minimizes the delay from data collection/update to analysis/decisions
- Saves valuable time and effort
- Enables faster and more reliable decision making
- Improves reporting



Photo by courtesy of SCATMAN Ltd.

<http://scatman.fi/en/ind/>



## Other examples:

- EHP Environment Ltd:
  - Shift from HW to SW and services
- A mining machinery company:
  - Boosting global service business with digital in-field solutions

## VR and AR for industry applications:

- Virtugo - virtuaalinen turvapuisto by Infrasuunnittelu Oy and KAMK
  - <http://virtugo.fi>  
”TERVETULOA TYÖTURVALLISUUDEN UUDELLE AIKAKAUDELLE!  
Virtugo on uuden ajan työturvakoulutus ja pelillinen TR-mittaustyökalu rakennusteollisuuden työkohteisiin.”
- Augumenta Ltd. - <http://augumenta.com>
  - Augumenta SmartAlert brings a customizable application environment to use cases where workers use monocular display smartglasses.



# CEMIS



*Technology, Expertise and Innovations*

*On-line Measurements for Cleantech*

*Sports and Wellbeing Measurements*

*International Technology Business Development*

## Thank you!

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Leverage from  
the EU  
2014–2020



Kainuun liitto



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Transport and the Environment