Hradec Králové Region
Experience with interregional R&D&I investment activities

Daniel Všetečka, Regional S3 manager
Jan Marek, INOTEX Ltd. – Technical director

Prague 11/3/2019

Hradec Králové Region

Cooperation in textile sector
- stakeholders -

HRADEC KRÁLOVÉ REGION

www.kr-kralovehradecky.cz

CIRI CENTRE FOR INVESTMENT DEVELOPMENT AND INNOVATION

www.cirihk.cz

clutex
cluster technical textiles

www.clutex.cz

ČTPT
CZECH TECHNOLOGY PLATFORM FOR TEXTILE

www.ctpt.cz

inoTEX®

www.inotex.cz

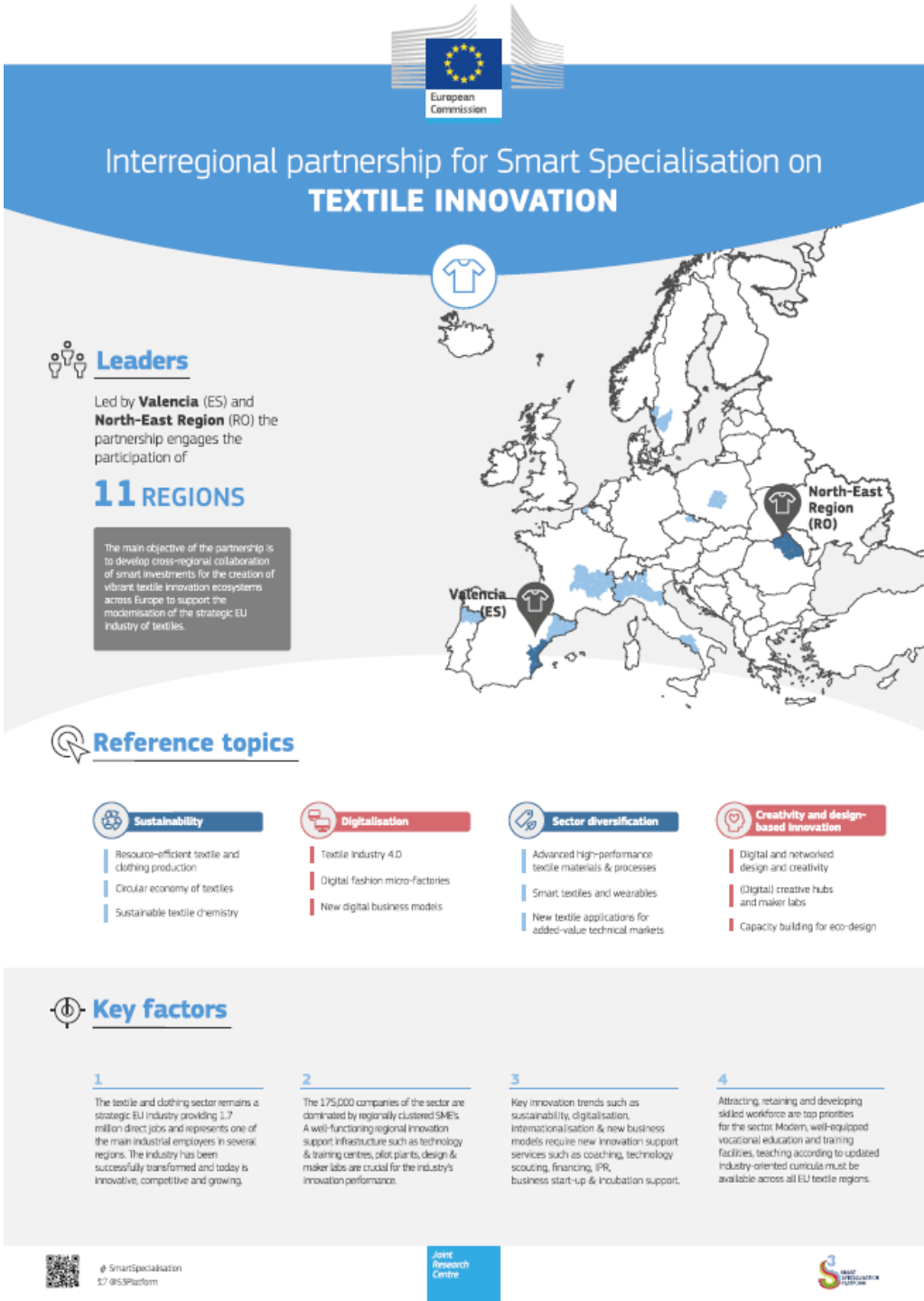
ERA-NET CROSSTEXNET

- Textile at the crossroads of new applications
- FP7 CSA project, 2009-2013, 17 partners
- Coordianted by Région Nord-Pas de Calais, France
- Hradec Králové Region (HKR) involved
- Project partners launched 4 joint international calls and funded 34 consortia applications
- All partners agreed on the call scope (SMEs, applied research)
- Consortia funding on national principle
- HKR funded SUSFLE (Sustainable Flameproof Fabrics for Technical Applications)
    - SMEs from Czech Republic, Italy, Spain and Turkey

RegioTex

SMART REGIONAL INVESTMENT IN TEXTILE INNOVATION

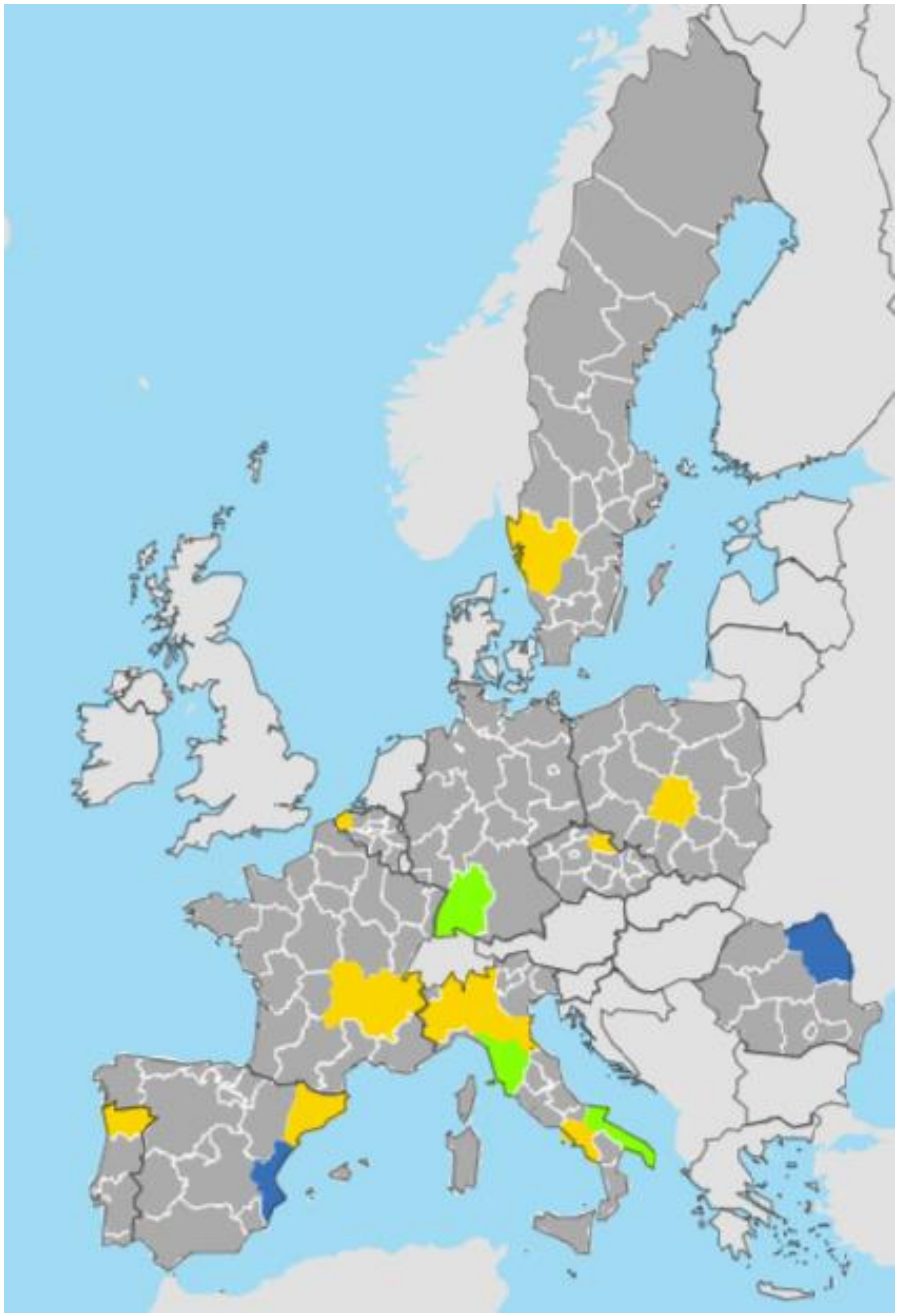
- S3 platform on industrial modernisation
- Regions in cooperation with
  - European Technology Platform for the Future of Textiles and Clothing
  - EURATEX (European Apparel and Textile Confederation)



Members

1. Valencia, Spain
2. Noth East, Romania
3. Auvergne-Rhône-Alpes, France
4. Norte, Portugal
5. Lodzkie, Poland
6. Campania, Italy
7. Catalonia, Spain
8. Piedmont, Italy
9. Emilia Romagna, Italy
10. Hradec Kralove, Czech Republic
11. West Flanders, Belgium
12. Lombardy, Italy
13. Vastra Gotalands Ian, Sweden

14. Baden Wurttemberg (DE)
15. Puglia (IT)
16. Tuscany (IT)



Thematic working areas

- Textile sustainability (resource-efficiency and circular economy)
- Industry 4.0 and new digital business models
- Sector diversification (Technical & smart textiles)
- Design- and creativity-based innovation (incl. eco-design)

Current state of play: Joint interregional projects pipeline under development

Lessons learned

- The Region needs strong ties to its HEIs, RTOs, SMEs, clusters etc. to operate internationally
- Regional S3 domain: New textile materials for new multidisciplinary applications
- Continuous learning from more advanced regions
- Networking/linking regional textile triple helix to international stakeholders
    - Best practise transfer
    - Research and technological trends
    - New contacts
    - New cooperations (along value chains)

COMPANY PROFILE

inoTEX®

INNOVATION FROM THE SOURCE

70 years experience in innovation

for textile wet processing

R&D – Technology Transfer –
Special small-lot productions – Services

Key strategy:

Implementation of tailored R&D into the practice by use of own scale-up productions

- textile chemistry and biotechnology, colouristic
- special machinery equipment and devices
- textile testing and analytical lab
- eco-services and consultancy

inoTEX®

INTERNATIONAL COLLABORATION

- **MEMBER OF** Textranet European Network of Textile Research Organizations **(executive committee)**
- **COLLECTIVE MEMBER OF** ETP Fibres Textiles Clothing EUROPEAN TECHNOLOGY PLATFORM
  TFE 1 – Resource sustainability and Circular economy
  TFE 2 – Efficient, cleaner productions, emerging technologies „From wet to dry“
- **ACTIVE PARTICIPATION IN MULTIDISCIPLINARY PROJECT CONSORTIA**
  FP-EU 5-7, H-2020, E!, EUROSTARS, COST, INTERREG, TACR-DELTA ZH

MULTIDISCIPLINARY APPROACH

INTERNATIONAL: CORNET NATIONAL: FLEXPRINT, ALTERBIO

ČTPT CZECH TECHNOLOGY PLATFORM FOR TEXTILE

COLLECTIVE RESEARCH

CLUSTERS - CLUTEX, NANOMEDIC, NANO PROGRESS

REGIONAL RIS 3 STRATEGIES

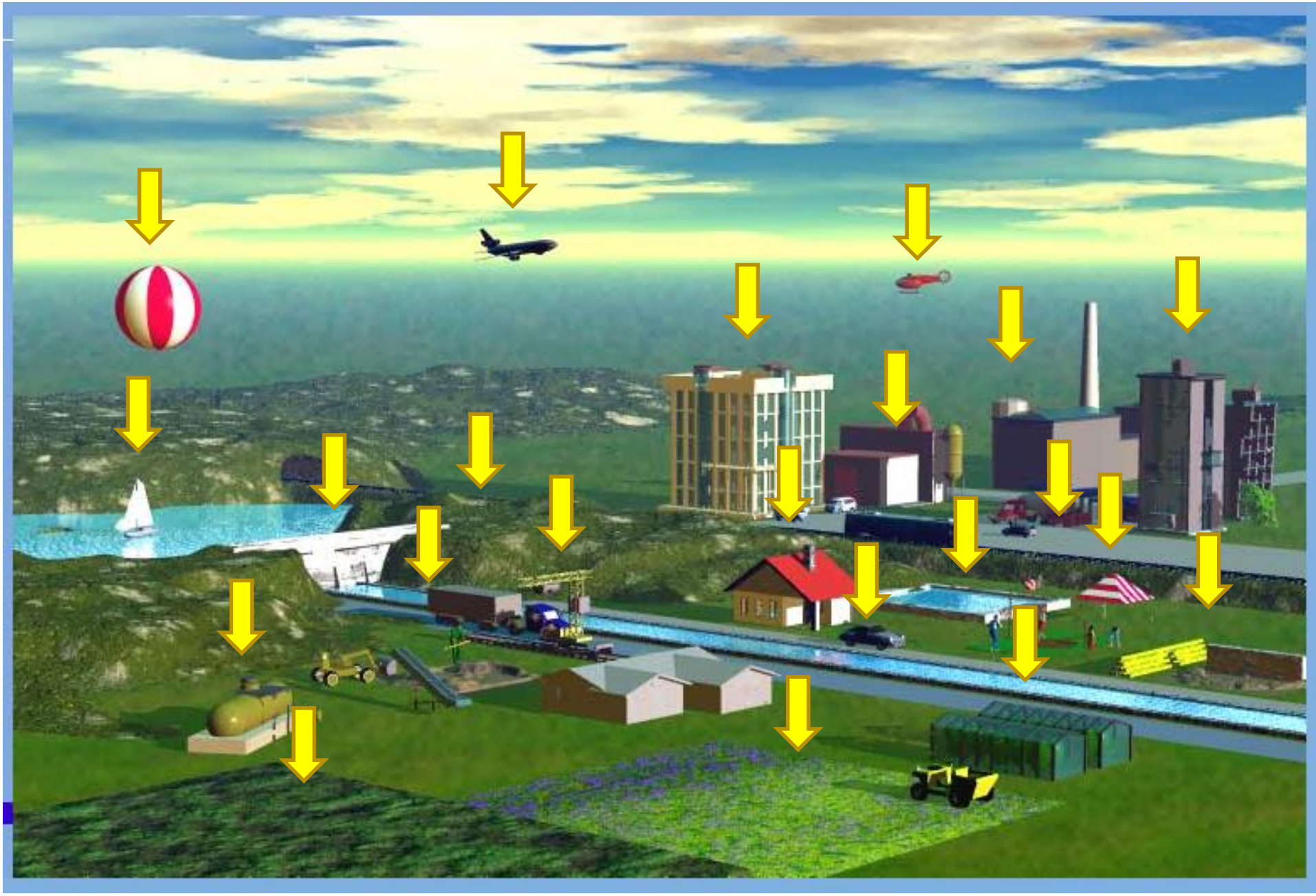
ERA-NET CrossTexNET – SUSFLE (2011-2014)

RegioTEX comming tool of regional „bottom up“ innovation strategy

RegioTex SMART REGIONAL INVESTMENT IN TEXTILE INNOVATION **HK region (+LIB+PCE) = NUTS 2 N-E Region**

European Union
European Regional Development Fund

TEXTILE IS EVERYWHERE - B2C, B2B



BLENDS OF NATURAL (WASTE BASED) AND BIOSYNTHETIC FIBRES FOR ECO-EFFICIENT HOME TEXTILES

ECO EFFICIENT
NATURAL BAST FIBRES

OILSEED FLAX (OF) FIBRE – NON USED WASTE AFTER NUTRIENT GROW

+

BIOBASED POLYMER FIBRES

BioPA (6.10) MADE FROM NON-FOOD PLANT OIL GROWN ON NON-AGRAR LAND

STEP FORWARD TO THE CIRCULAR ECONOMY BASED ON BIO-ECONOMY

MINISTRY OF INDUSTRY AND TRADE

clutex cluster technical textiles

inoTEX®

„BIO-RETTING“

❖ Enzymatically boosted extraction of fibres from robust oilseed-flax waste stems

TEXAZYM SER (INOTEX)

❖Spraying on the field – no additional wet processing step

❖High yield, fast, reproducible process

Combination with efficient **MECHANICAL CLEANING** (OFC – unique CZ device)

Bio-PA 6.10 as part of fully renewable OF/Bio-PA yarn for home textiles

Oil flax fibre

Cottonized OF

Blended yarn
Oil flax / Bio-PA
50/50

OF/BioPA fabric
wet
Processing/dyeing
optimization

Home fabric

Carpet tufting

inoTEX®

agri tec

SINTEX

clutex
cluster technical textiles

MINISTRY OF INDUSTRY AND TRADE

RWTH RHEINISCH-WESTFÄLISCHE TECHNISCHE HOCHSCHULE AACHEN

ITA

TFI

Forschungskuratorium textil

cornet

BleNaBIS

WE'RE IN!

KlimaExpo.NRW
Engine for Progress

The State Government of North Rhine-Westphalia

BleNaBis

Comfortable, but not always good for the climate: producing carpets from wool or synthetic materials such as polyamide is an energy-intensive business. In collaboration with a German - Czech consortium, the Institute for Textile Technology at RWTH Aachen University is developing a climate-neutral carpet yarn based on renewable raw materials in its BleNaBis project (Blends of Natural and Biosynthetic fibres for eco-efficient yarns and Carpets). The new yarn is composed of linseed fibres and a sustainable eco-polyamide fibre, which consists of about 70 per cent castor oil. The combination of these two fibres makes the carpet durable, high quality and sustainable.

The new fibre blend is expected to reduce the carbon footprint of a carpet by up to 50 per cent and makes carpet production less energy-intensive.

In recognition of this exemplary commitment to climate protection, KlimaExpo.NRW and the state government of North Rhine-Westphalia have honoured the project by including it

in their showcase of 1,000 steps towards a climate-friendly future.

KlimaExpo.NRW presents until 2022 a broad range of projects that explicitly illustrate the positive effects of climate protection initiatives on the economy and the society. Through communication activities ranging from the regional level right up to the international level and by networking a continuously growing showcase, the projects will become prime examples of climate protection.

www.klimaexpo.nrw

inoTEX®

European Good Practices in New materials and new applications

RESET
Interreg Europe

HOSPITAL SERVICE & ELDERLY PEOPLE LIFE STANDARD IMPROVING TEXTILES

One of steady growing market segments
rising volumes under the continuous pressure of costs
(often under the provider selection by public tender)

- **Functionality** = protection + comfort
- **Durability** = compensation of higher added value
  step towards resource sustainability (dematerialization)
- **Customised solutions** = interdisciplinary approach

PROGRESS IN MEDICAL CARE x TEXTILE INNOVATION x MAINTENANCE SERVICES

Preconditions for extensional growth on the market

INOTEX CONTRIBUTIONS USING THE NEW APPROACHES TO GET THE INNOVATIVE EFFICIENT PROBLEM SOLVING

RESET
Interreg Europe

A) Durable functional textiles for daily hospital use –

dematerialization supported by maintenance services (from ownership to rental)

B) Long-lasting comfort and functionality

Bio-modification of PES textiles
Permanent FR (light weight textiles, Co/PES Blends 50/50, eco-tox clean)

C) Smart flexible electronic

Autonomous, wire-less **wound dressing sensor**
Electroconductive fibres (organic PPy,PEDOT) – flexible electronic
Pressure senzors, Heating textiles, Senzor of right FR-PPE laundry maintenance

Small steps towards Tele-medicine and IND 4.0
resulting from interdisciplinary project activities

Efficiency – knowledge based solution – envi sustainability
New complex model – higher comfort and PPE efficiency costs covered by less cost per 1 cycle of use

STEP TOWARDS THE CIRCULAR ECONOMY (ETP FTC SIRA vision)

inoTEX®

European Union
European Regional Development Fund

A) DURABLE TEXTILES FOR DAILY USE AND LAUNDRY

RESET
Interreg Europe

Health care service functional textiles incl. re-activation by laundry services

Large volumes of textiles and garments – part of daily life of hospitals and other healt care facilities exposed by massive dirt and contamination

Microbial contamination can significantly negatively influence the whole medical treatment (risk of nosocomial infections)

Co/PES blends offer an excellent resistance against mech-phys damages durability of functional effects often fail more quickly

- **Harmonisation of durability and functionality** – part of maintenance services – revitalization of AMB by industrial laundry
- **Improvement of physiology comfort** (sufficient as such) can be realised by enzymatic hydrophilization
  (antistat = soil release treatment)

inoTEX®

EUREKA BATAN

European Union
European Regional Development Fund

B) LONG-LASTING COMFORT+FUNCTIONALITY

RESET
Interreg Europe

- **BIO-MODIFICATION OF PES TEXTILES**

Selective enzymatic treatment – an emerging tool of

PES hospital and clean room garment functionalization

TEXAZYM PES (INOTEX)

The unique functionalization of PES fibre substrate to improve

required durable protective properties

and comfort of widely used PES type of synthetic fibre

Hydrophilicity + functionality

Bio-processing as clean-production alternative to harsh alkali de-weighting +

no loss of weight + comfort

inoTEX®

BFUNTEX

European Union
European Regional
Development Fund

B) LONG-LASTING COMFORT+FUNCTIONALITY

RESET
Interreg Europe

DURABLE FR TREATMENT OF LIGHT WEIGHT 100% Co AND Co/PES 50/50 TEXTILES

(PPE EN ISO 15025, EN ISO 14116: 3/25x60, BED LINEN: EN ISO 12952)

TEXAFLAM DFR (Inotex) system

SUSFLE

CROSSTEXNET

- **Unique halogen, antimony, VOC, formaldehyde-free system**
- **Minimum loss of strength (tear strength) = light weight fabrics**
- **No yellowing, no significant change of soft handle, breathability**
- **WASH PERMANENT FR** (at least 25x60°C and more)

Processing: impregnation – dry cure – washing
PADDING / STENTER x JIG, JET

High wearing comfort – breathable – moisture transport – soft handle

inoTEX® NEXT TECHNOLOGY D'ÉTOFFE KARSU TEKSTİL SANAYİ VE TİCARET A.Ş. aitex comersan®

COFINANCING:

TUBITAK

REGIONE TOSCANA SviluppoToscana S.p.A.

ATEVAL

HRADEC KRÁLOVÉ REGION

European Union
European Regional Development Fund

B) LONG-LASTING COMFORT+FUNCTIONALITY

RESET
Interreg Europe

Medtech Protech Hometech

alterbio

TE02000006

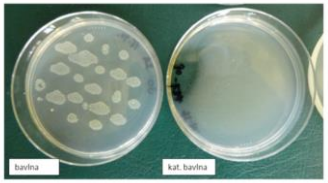
- **functional reactive dyeing with inherent antiodour / cleaning effect**

  singlet oxigen based, long lasting, durable 60°C + CHTD

Clothing
Face masks
Bedlinen

- **functional FR + AMB system (AgNPs)**

  durable FR + AMB with minimized leakage of AgNPs
  durability in repeated hospital CHTD laundry
  (peracetic acid, 60°C)



Protective clothing
Bedlinen
Full- white goods

inoTEX® COC Synpo

T A
Č R
Technology Agency of the Czech Republic

European Union
European Regional Development Fund

C) SMART FLEXIBLE ELECTRONIC FOR HEALTH CARE / ELDERLY PEOPLE

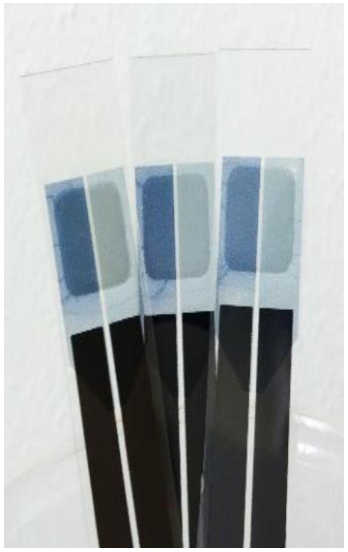
RESET
Interreg Europe

Monitoring of wound dressing humidity

Flexible printed autonomous sensor based on simple electrochemical cell

– exudate = electrolyte low voltage generated

– electrochromic sensor changes its colour



CZ PAT: 307387/2018

no wires - no mobility tie down
- no risk of disconnecting
- light weight

less risk of severe pain and wound devastation by redressment

T A
Č R
Technology Agency of the Czech Republic

flexprint
TE01020022

Prolongation of primary bio-active wound healing layer exchange
Simple monitoring of drainage layer saturation – by variable secernation
Low cost – single use – disposable sensor

inoTEX®

European Union
European Regional Development Fund

C) SMART – FLEXIBLE ELECTRONIC FOR HEALTH CARE / ELDERLY PEOPLE

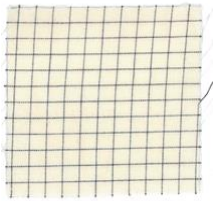
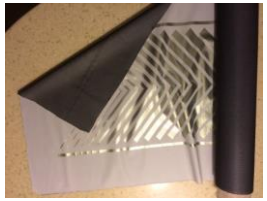
RESET
Interreg Europe

flexprint

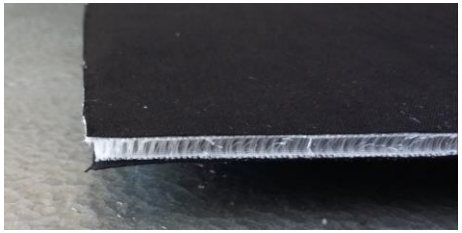
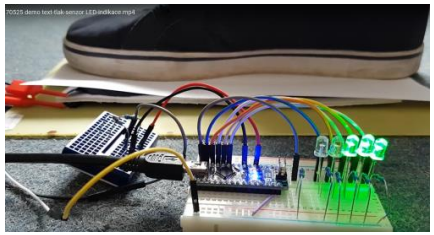
TE01020022

- **application of organic electroconductive polymers (PEDOT, PPY)**
  on textile substrates – yarn/fabrics
  - flexible e-textiles
  - antistatic, e-conductive, heating

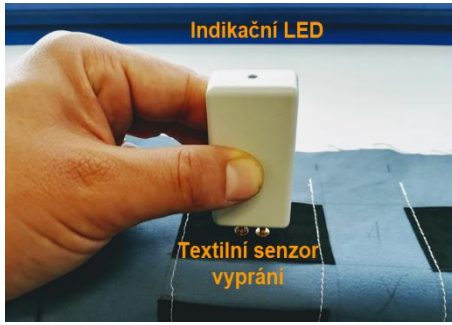


- **pressure responding sensors (e-polymer/3D textiles)**

- **sensor for nondestructive check of semidurable FR protective clothing - correct cleanning maitenance**



inoTEX®

COC

T A
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Technology Agency of the Czech Republic

Univerzita Pardubice

Fakultní nemocnice Hradec Králové

European Union
European Regional Development Fund

Interreg
CENTRAL EUROPE
European Union
European Regional
Development Fund

ENTeR

CENTROCOT
Innovation experience

Unione degli Industriali
della Provincia di Varese

IW INSTYTUT WŁÓKIENNICTWA
Textile Research Institute
5/15 Brzezinska Str., 92-103 LODZ, Poland, www.iw.lodz.pl

CTPT
CZECH TECHNOLOGY PLATFORM FOR TEXTILE

inoTEX®

ENTeR

EXPERT NETWORK ON TEXTILE RECYCLING

SACHSEN!TEXTIL

SACHSEN!TEXTIL e.V.

stfi
SÄCHSISCHES
TEXTIL
FORSCHUNGS
INSTITUT e.V.

Pannon Business Network
PBN

INNOVATEXT®

Innovative waste management and recycling methods in textile manufacturing make it possible to reduce and reuse waste. It helps cutting production costs while protecting the environment. ENTeR works in five central European countries that are involved in the textile business, to promote innovative solutions for waste management that will result in a circular economy approach to making textiles.

WWW.INTERREG-CENTRAL.EU/ENTER

European Union
European Regional
Development Fund

Interreg CENTRAL EUROPE
European Union
European Regional Development Fund

ENTeR

OUTPUT 1

Strategic Agenda on textile waste management and recycling

OUTPUT 2

Textile Waste Database

OUTPUT 3

Pilot cases

OUTPUT 4

High Level training modules

OUTPUT 5

Textile Network for circular economy

OUTPUT 6

Action Plan "Improvement of textile Industry towards Circular Economy"

WWW.INTERREG-CENTRAL.EU/ENTER

SÄCHSISCHES TEXTIL FORSCHUNGS INSTITUT e.V.

INNOVATEXT®

IW INSTYTUT WŁÓKIENNICTWA
Textile Research Institute
5/15 Brzezinska Str., 92-103 LODZ, Poland, www.iw.lodz.pl

SACHSEN!TEXTIL

SACHSEN!TEXTIL e.V.

Unione degli Industriali della Provincia di Varese

Pannon Business Network PBN

inoTEX®

ČTPT
CZECH TECHNOLOGY PLATFORM FOR TEXTILE

CENTROCOT
Innovation experience

European Union
European Regional Development Fund

Textile Clusters for Industrial Modernization
REGIOTEX supporting group

TEX4IM consortium

OTIR2020 - TUSCANY FASHION CLUSTER (NEXT TECHNOLOGY TECNOTESSILE S.R.L.)

ASTRICO NORD-EST

ATEVAL - ASOCIACION DE EMPRESARIOS TEXTILES DE LA REGION VALENCIANA

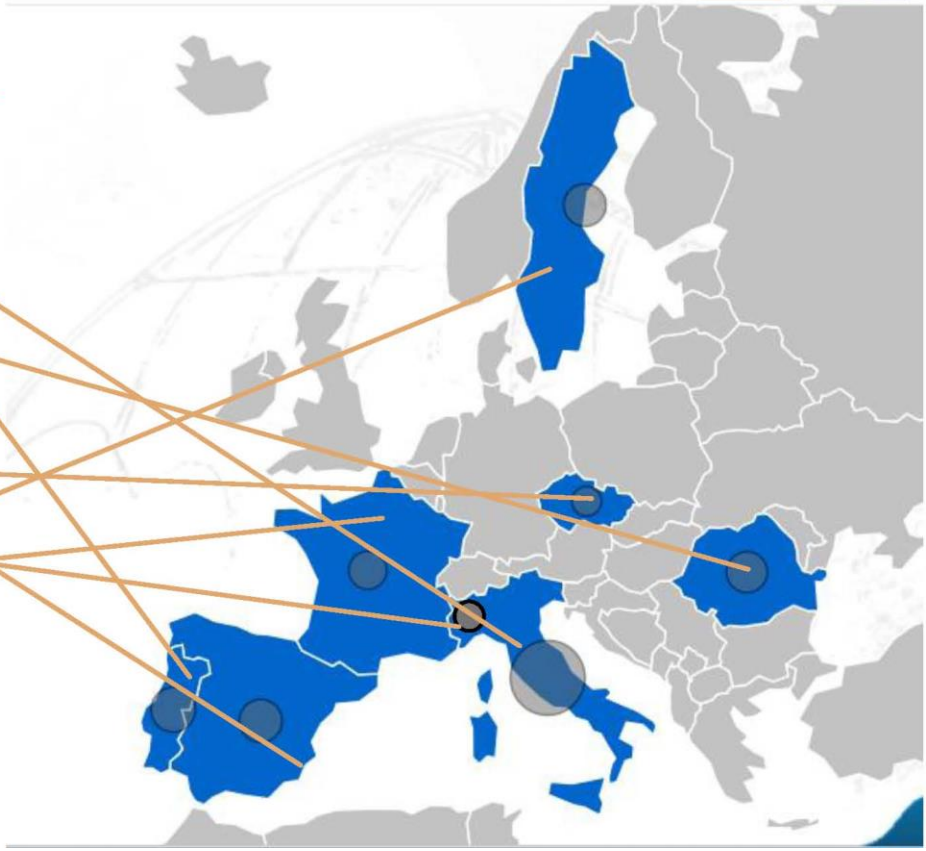
CITEVE - CENTRO TECNOLOGICO DAS INDUSTRIAS TEXTIL E DO VESTUARIO DE PORTUGAL

CLUTEX - KLASTR TECHNICKE TEXTILIE

PO.IN.TEX (CITTA STUDI SPA)

SMART TEXTILES (HOEGSKOLAN I BORAS)

UP-TEX

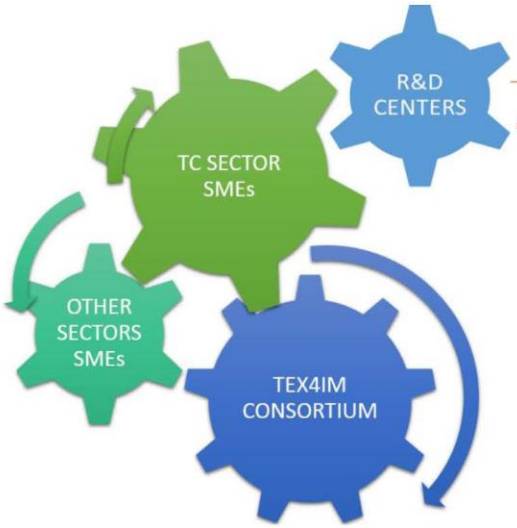


T E X I M

RegioTex
SMART REGIONAL INVESTMENT IN TEXTILE INNOVATION

clutex
cluster technical textiles

Co-funded by the COSME programme of the European Union



TEX4IM objectives

- Set up a sustainable **incubator and accelerator** system for the generation of joint investment projects in TC and other related or cross-linkable sectors;
- To develop a joint **strategy for industrial modernisation** of TC sector of Europe;
- To accelerate the uptake of innovation and increase of production by TC SMEs, thanks to a more focused and effective **R&D matching** and a more efficient design of **new business models and value chains**

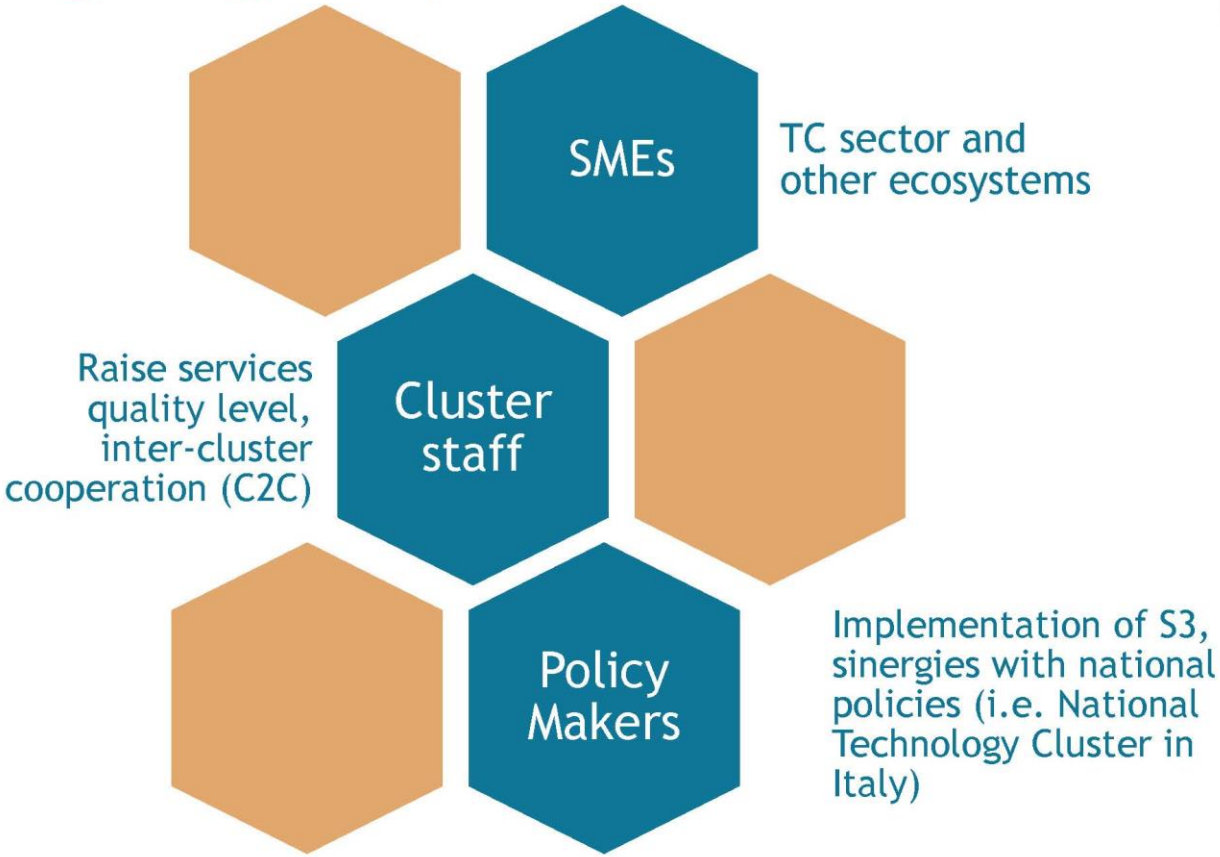
TEX4IM thematic priorities

Sustainability (resource-efficiency and circular economy)
Industry4.0 and new digital business models
Sector diversification (Technical & smart textiles)
Design- and creativity-based innovation

- Circular economy
- Industry 4.0 and advanced manufacturing
- Digital technologies, including digital platforms, e-marketing and thematic social communities;
- Advanced Textile Materials (ATM);
- Creativity as a new business model for TC value chains creation.

TEXIM

TEX4IM Target groups



T
E
X
I M

RegioTex
SMART REGIONAL INVESTMENT IN TEXTILE INNOVATION

FUTURE

ETP Fibres Textiles Clothing
EUROPEAN TECHNOLOGY PLATFORM

ETP FTC – adapted for the CZ specific TC

ČTPT
CZECH TECHNOLOGY PLATFORM FOR TEXTILE

ERA-NET / CROSSTEXNET HK Reg experience

CROSSTEXNET

utilized by RiS3 Textile Domain elaboration
(joined by LB and PCE Regions

HRADEC KRÁLOVÉ REGION

RegioTEX - EURATEX (involvement in SG+HLG;T1,2,3):

CHALLENGE – Interregional NETWORKING –
MULTIDISCIPLINARY APPROACH (Clusters)

clutex
cluster technical textiles

Towards more regional „bottom-up“ responsibility in innovation and technology transfer

- fast track from R&D to the industrial innovation (from TRL 3/4 – 7/8)
- comparability of CZ regional RiS with EU (incl. co-financing tools)
- interregional pilot projects (bank-ability), TT centers and demo labs

Thank you for your attention

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Jan Marek, INOTEX Ltd. – Technical director, marek@inotex.cz, +420 499 316 214