citeve
TECNOLOGIA TÊXTIL

ceft
TRANSPORT PHENOMENA RESEARCH CENTER

U.PORTO
FEUP FACULDADE DE ENGENHARIA
UNIVERSIDADE DO PORTO

CeNTI
Centre for Nanotechnology
and Smart Materials

PORTO, 07/05/2021

DIF JACKET

THE FIRST YEAR OF THE PROJECT

S. F. NEVES, A. FONSECA, J. M. MIRANDA, F. MARQUES, J. RIBEIRO, R. MARQUES, G. SANTOS AND J. B. L. M. CAMPOS

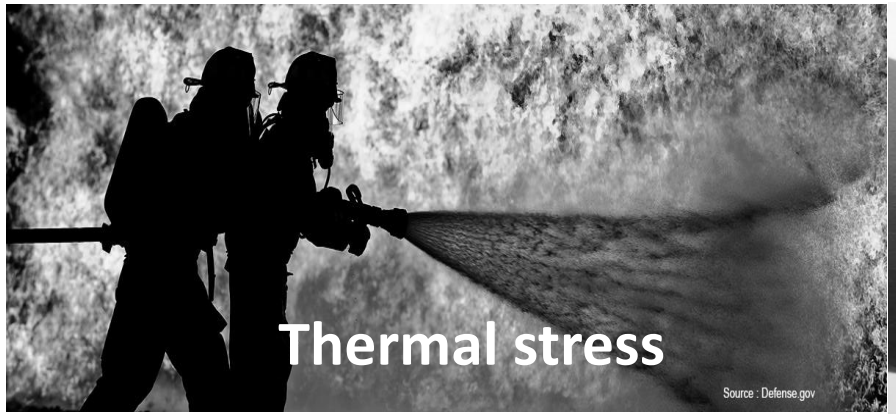
2ND WORKSHOP – SCIENTIFIC RESEARCH AND TECHNOLOGICAL DEVELOPMENT
PROJECTS ON FOREST FIRE PREVENTION AND FIRE FIGHTING

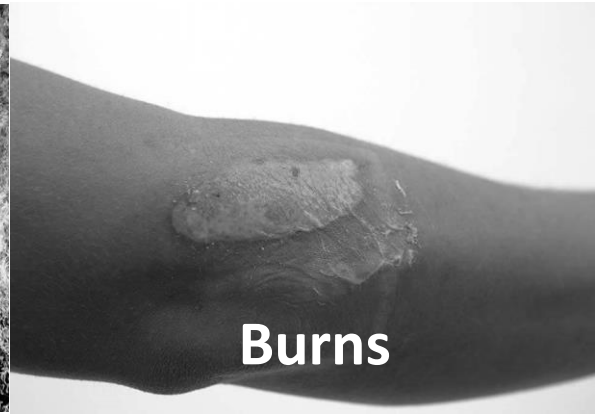
Outlook

- DIF-Jacket: context and main goal
- The partners
- Partners activities
- Main outputs and activities - 2020
- Next steps

CONTEXT: R & D THERMAL PROTECTIVE CLOTHING

declining trend of firefighters' *on site* injuries and fatalities





MAIN GOAL: New jacket with active thermal management

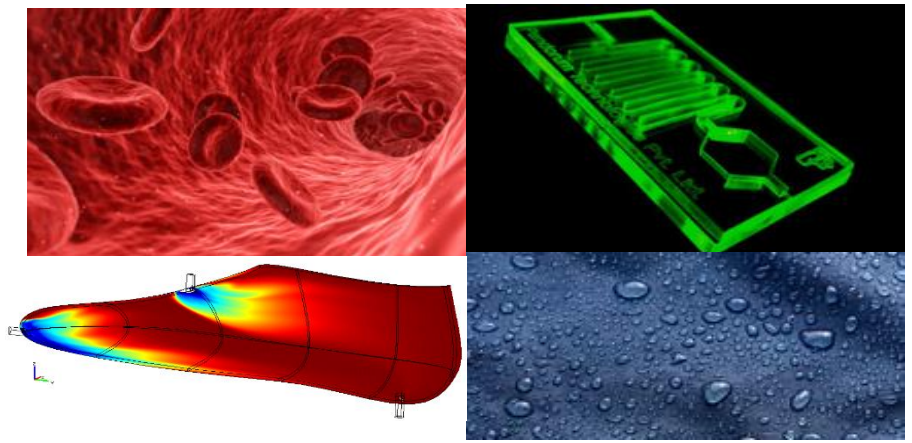
HOW:

- Combination of protective clothing components prepared in different layers
- Numerical models to optimize the design

TRANSPORT PHENOMENA CENTER

U.PORTO

FEUP FACULDADE DE ENGENHARIA UNIVERSIDADE DO PORTO

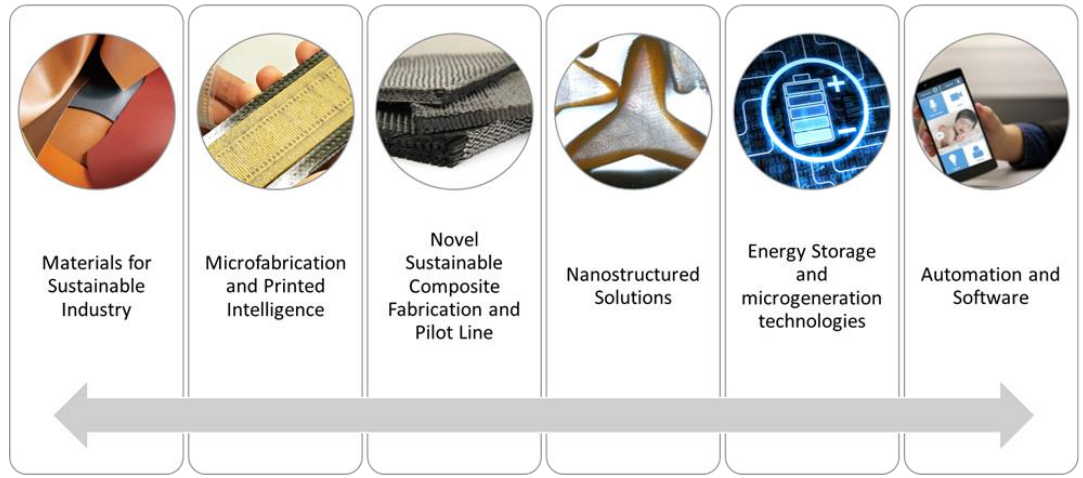


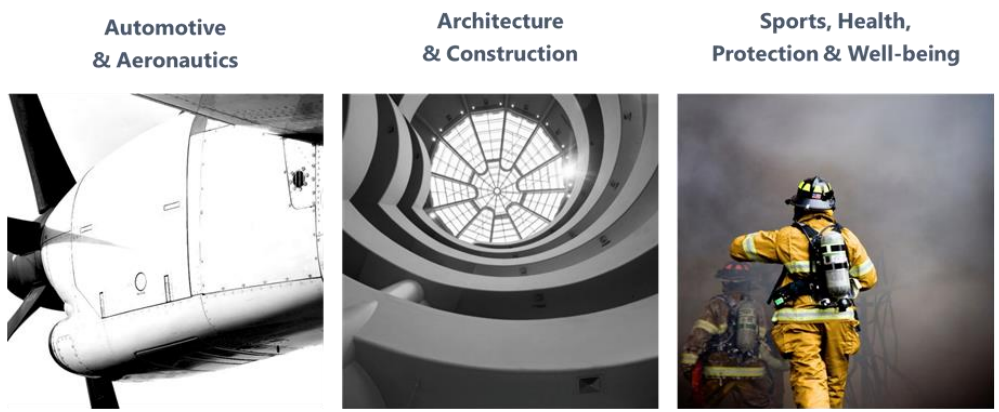
EXAMPLES OF RESEARCH SUB-TOPICS:

- Multiphase flows
- Biological Fluids
- Microfluidics
- Fuel Cells
- Systems for hydrogen generation and storage
- Heat and Mass Transfer in Textiles

CENTI

Centre for Nanotechnology and Smart Materials





Private Non-Profit RTD Institute established in 2006.

Focus on Research, Technological Development, Innovation and Engineering in areas of smart and functional materials for industrial sector.

- *Multicomponent* fibres
- *Smart materials/devices*
- *Multifunctional coatings*
- *Printed and Organic electronics*
- *Embedded Smart Systems*
- Laboratory validation to industrialization (lab2fab)

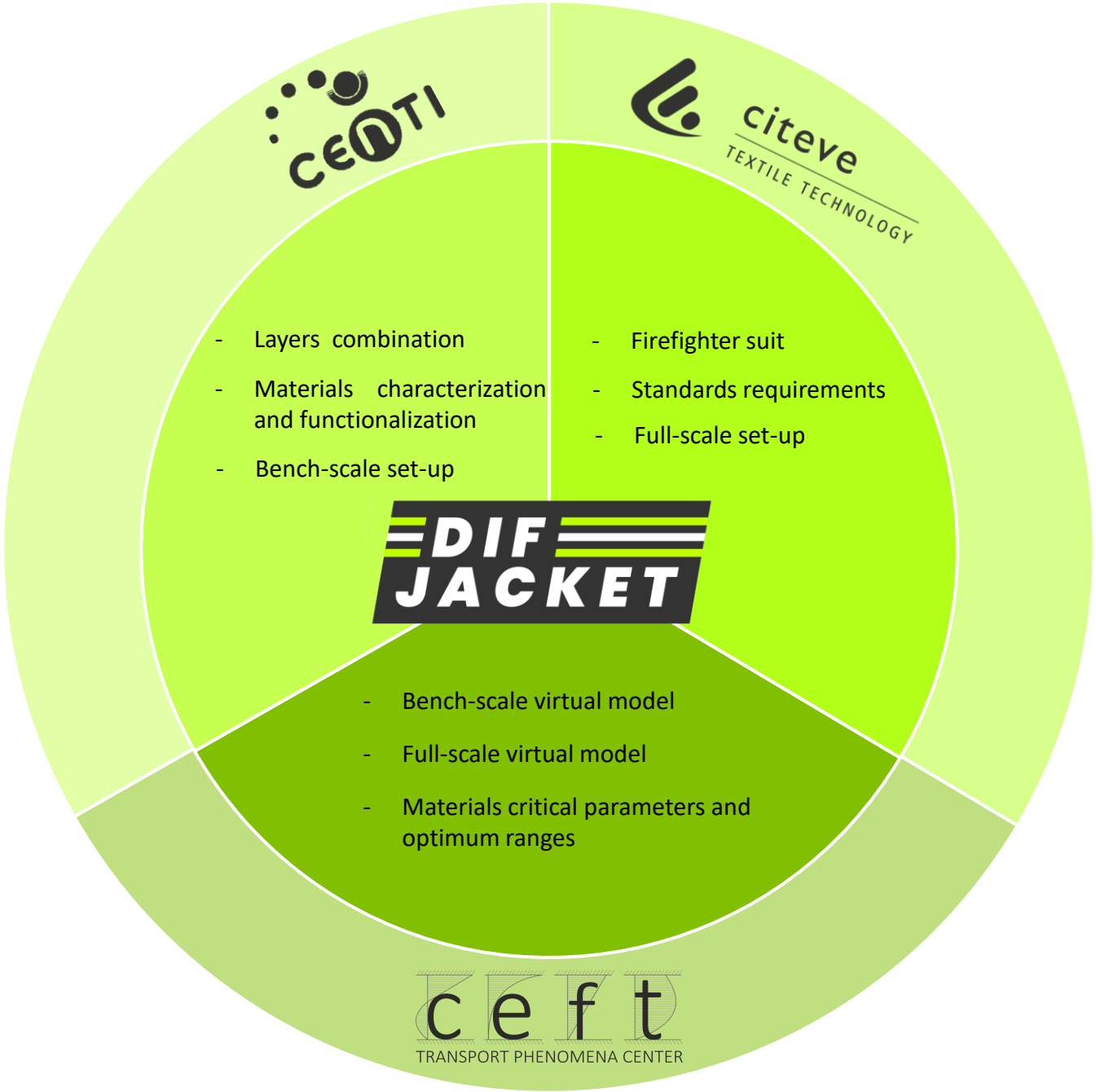
citeve

TEXTILE TECHNOLOGY

PORTUGAL
Brazil | Tunisia | Argentina | Pakistan | Chile | India

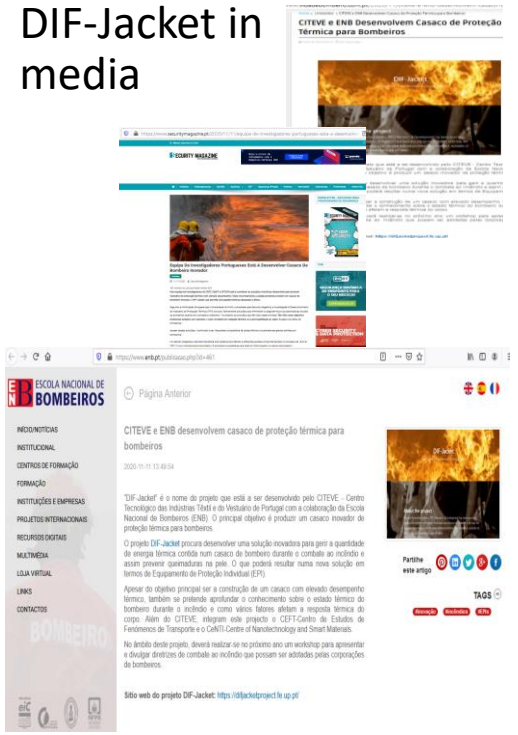
- Laboratorial activities
- R&D + Innovation
- Product standards and certification
- Technology Watch
- Training and Fashion intelligence
- Technological consultancy & development

PARTNERS ACTIVITIES



Main outputs and activities - 2020

DIF-Jacket in media



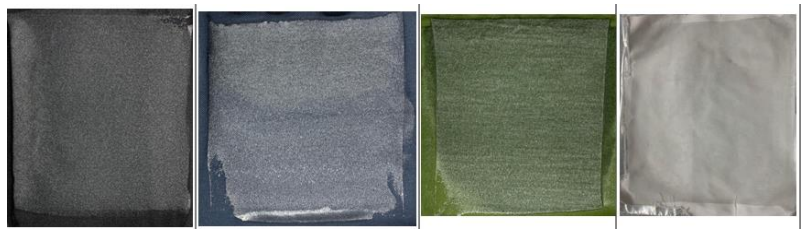
ELSEVIER

Applied Thermal Engineering
Volume 182, 5 January 2021, 115769

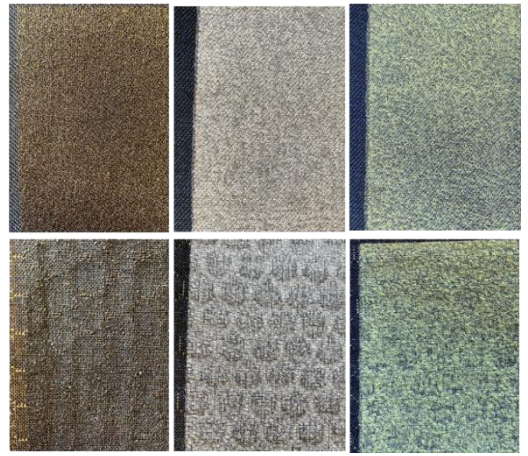
Thermal performance of a PCM firefighting suit considering transient periods of fire exposure, post – fire exposure and resting phases

A. Fonseca, S.F. Neves, J.B.L.M. Campos

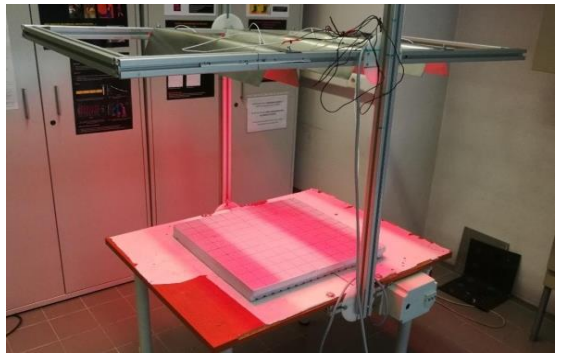
Promising solution using Phase Change Materials (PCMs) - numerical study



- Incorporation of microencapsulated PCMs in different textile samples
- PCM pocket built



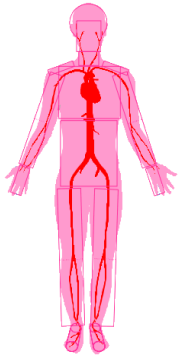
Incorporation of IR pigments on different textiles



Experimental set-up

Legislation and standards requirements analysis

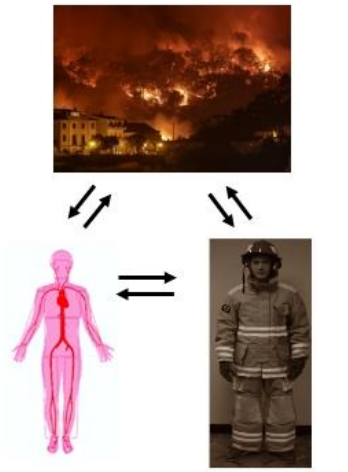
Study: implementation of the new solution in jacket



Thermoregulation model implemented

Next steps

- Development virtual bench-scale model considering the interdependency between the protective clothing, body and enviornment
- Experimental tests with several combinations of functionalized materials
- Development virtual full-scale model
- Prototype construction and performance test



https://bomdia.lu/wp-content/uploads/sites/7/2018/08/Fogo_Monchique.jpg
http://hdl.handle.net/2086/4129
https://doi.org/10.1016/j.apergo.2018.03.004

Heat fluxes/ temperatures in firefighters suit values - **scarce information**

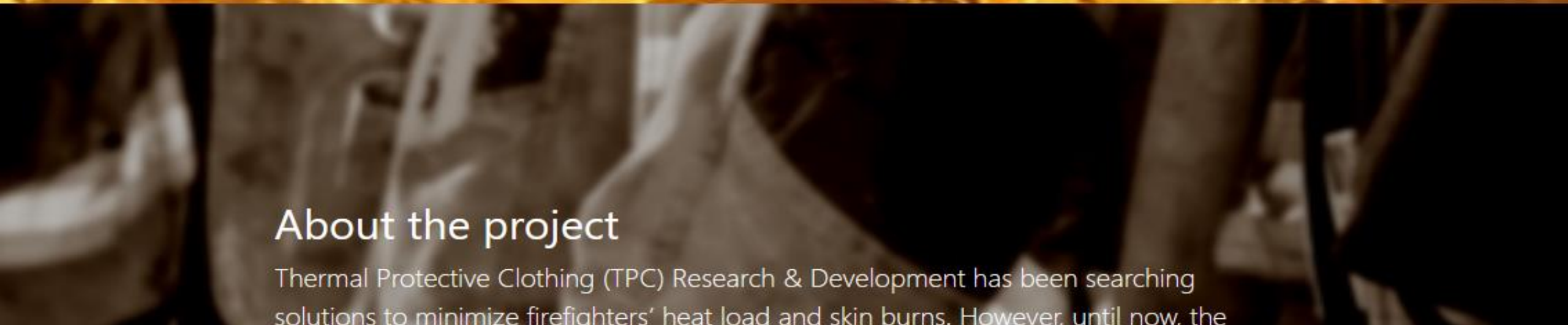
Dissemination of results:

- 3 workshops (2 in 2021; 1 in 2022)
- 1 roadshow in 8 cities of Portugal (2022)

https://difjacketproject.fe.up.pt/

DIF-Jacket

Development of an innovative firefighter jacket



About the project

Thermal Protective Clothing (TPC) Research & Development has been searching solutions to minimize firefighters' heat load and skin burns. However, until now, the

Thank you!

Supported by national funds through FCT, within the scope of the:

Projects: PCIF/SSO/0106/2018 and UIDB/00532/2020

PhD Grant: PD/BD/ 135097/2017

DIF-Jacket

https://difjacketproject.fe.up.pt/

DIF-Jacket project

sfneves@fe.up.pt

TRANSPORT PHENOMENA RESEARCH CENTER

FEUP FACULDADE DE ENGENHARIA UNIVERSIDADE DO PORTO

citeve TECNOLOGIA TÊXTIL

FCT Fundação para a Ciência e a Tecnologia

REPÚBLICA PORTUGUESA