

OS INCÊNDIOS E O STRESS DOS BOMBEIROS COMO OBJETO DE INVESTIGAÇÃO CIENTÍFICA

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- Folheto: “(...) Dado que, estas catástrofes encontram, cada vez mais, sociedades vulneráveis e impreparadas para as enfrentar, será necessário inverter esta tendência com estratégias que passem pela formação e *informação de temas relacionados com esta problemática*”.
- Identificar e descrever resumidamente alguns projetos financiados sobre o tema do fogo.
- Descrever alguns estudos realizados com bombeiros e relativos a variáveis psicológicas.



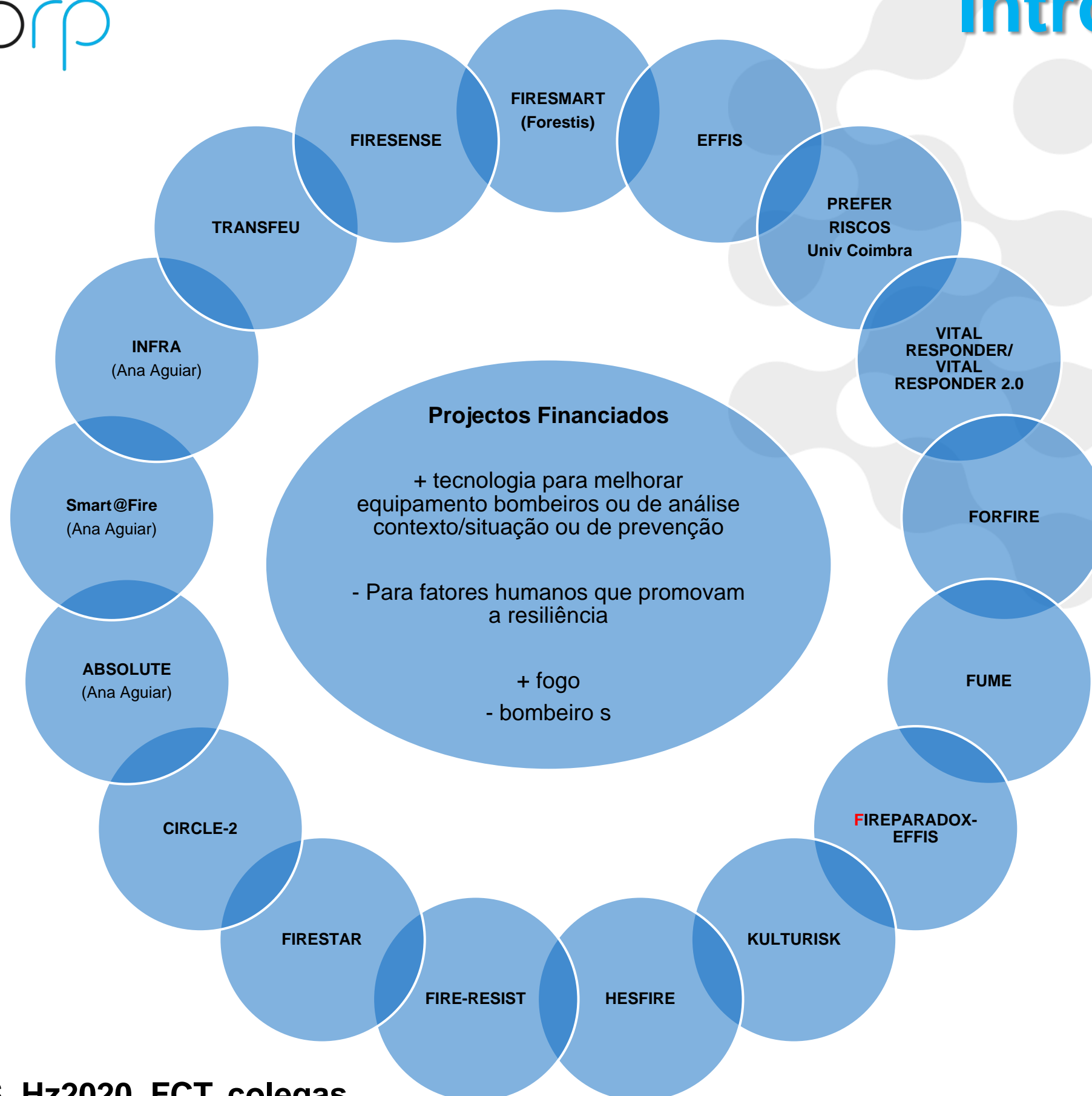
- Em Portugal tem crescido o número de incêndios, sobretudo florestais, com trágicas consequências financeiras, ambientais e humanas.
- Numa sociedade pouco preparada para lidar com esta ameaça constante, é fundamental a investigação sobre o fenómeno, abrangendo todas as dimensões, desde o risco natural do incêndio ao risco psicossocial vivido pelos bombeiros.





- A Comissão Europeia tem financiado investigação sobre incêndios, geralmente no âmbito das alterações climáticas ou da tecnologia.
- Exemplos: FIRESMART, FIRESENSE, TRANSFEU, FUME, FORFIRE, FIREPARADOX, FIRE-RSIST, PREFER, FIRE STAR.





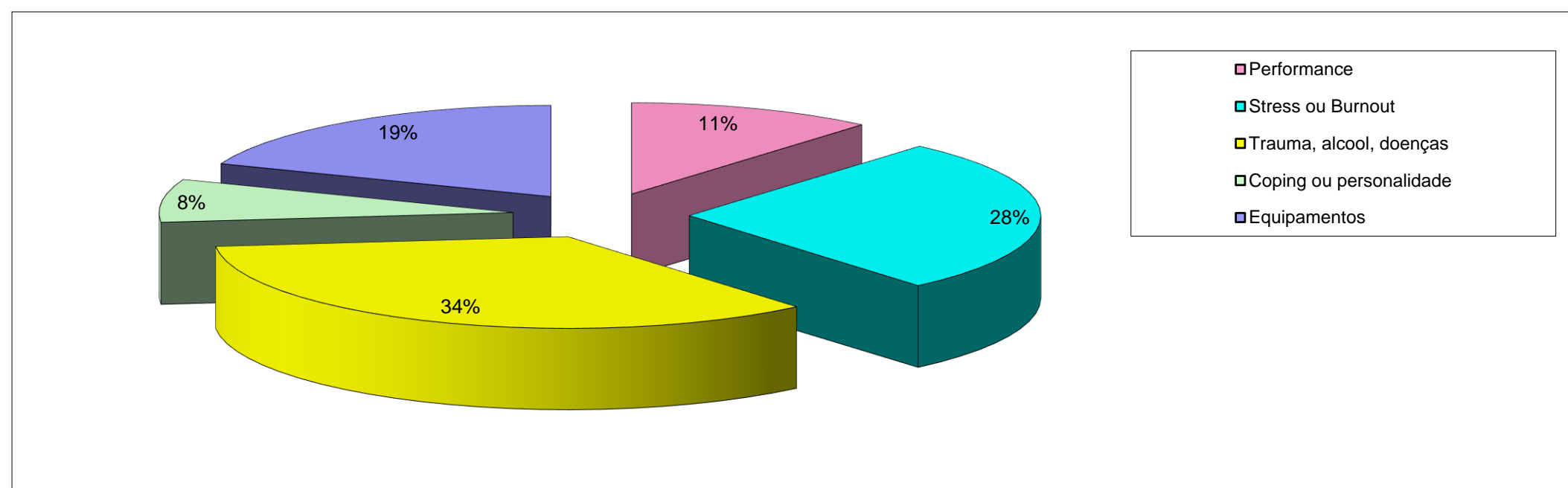
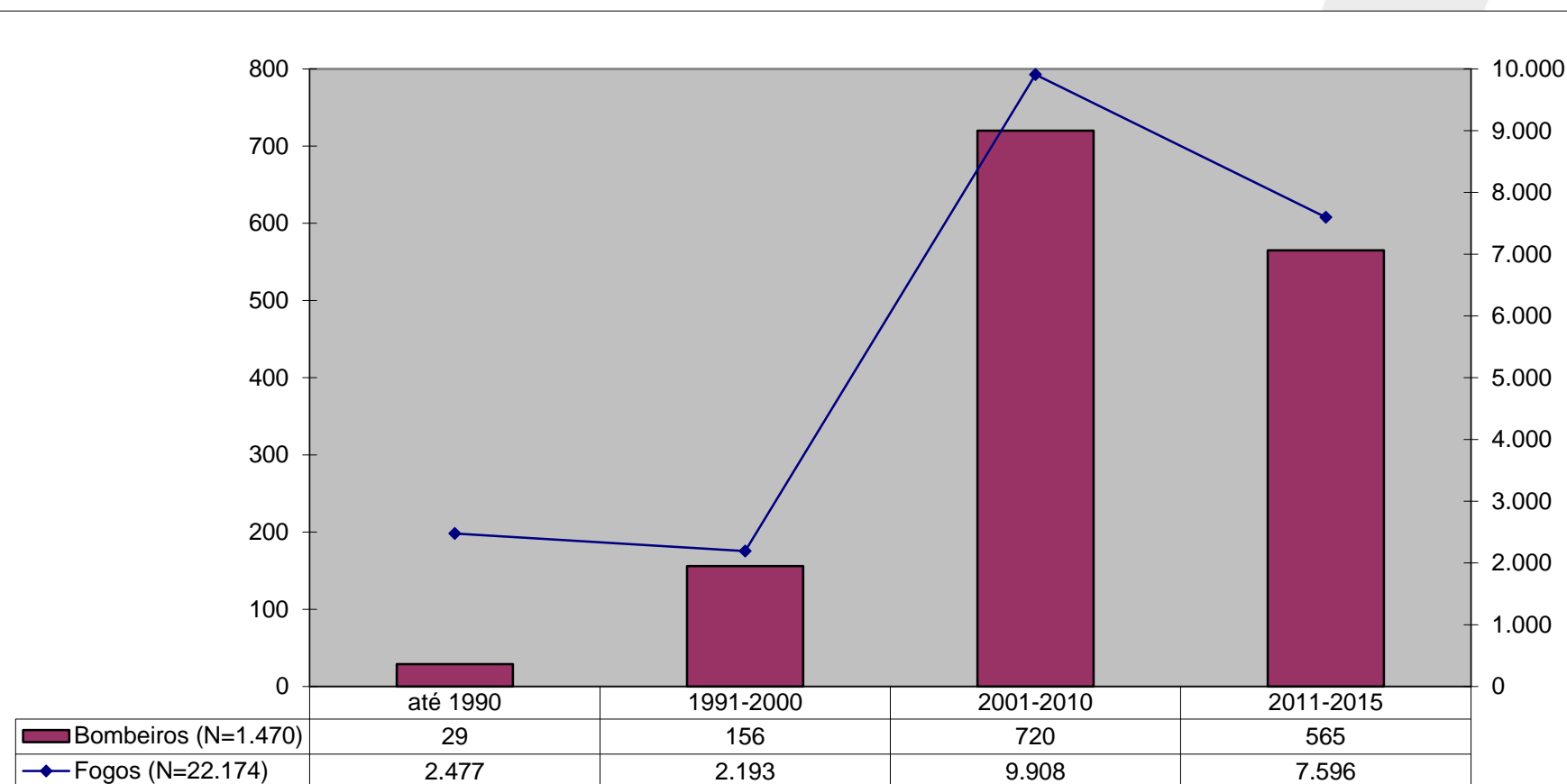
FIRESMART	<ul style="list-style-type: none"> - FIRESMART deals with forest fire prevention. We want to highlight and disseminate base knowledge and best practices - Spain (Coordinator), Luxembourg, Portugal, Belgium, Italy, France - Total cost: € 1 093 895 / EU contribution: € 920 000 - Parceiros: Forestis, - Site: http://www.firesmart-project.eu/
FIRESENSE	<ul style="list-style-type: none"> - FIRESENSE (Fire Detection and Management through a Multi-Sensor Network for the Protection of Cultural Heritage Areas from the Risk of Fire and Extreme Weather Conditions, FP7-ENV-2009-1-244088-FIRESENSE) - Greece (Coordinator), Netherlands, Turkey, Italy, Tunisia, Belgium - Total costs: € 3 628 702 / EU contribution: € 2 697 092 - Parceiros: Stichting Centrum voor Wiskunde en Informatica (Netherlands) - Site: http://www.firesense.eu/
TRANSFEU	<ul style="list-style-type: none"> - The main goal of TRANSFEU is to develop a holistic approach of fire safety-performance based-design methodology able to support efficiently European surface transport standardisation. - France (Coordinator), Italy, Belgium, Germany, Finland, Sweden, UK, Poland, Spain - Total costs: € 5 577 552 / EU contribution: € 3 658 183 - Parceiros: Tecnalia (spain) - Site: http://www.transfeu.eu/
CIRCLE-2	<ul style="list-style-type: none"> - CIRCLE-2 is a European Network of 34 institutions from 23 countries committed to fund research and share knowledge on climate adaptation and the promotion of long-term cooperation among national and regional climate change programmes. - Portugal (Coordinator), France, Austria, Spain, Italy, Sweden, Finland, Ireland, Germany, Greece, Turkey, Estonia, Belgium, UK, Hungary, Israel, Netherlands - Total Costs: EUR 2 271 877,3 / EU contribution: EUR 1 999 331 - Parceiros: FFCUL - Foundation of the Faculty of Sciences of Lisbon University, Portugal; MINECO - Ministry of Economy and Competitiveness, Spain; - Site: http://www.circle-era.eu/np4/home.html

FUME	<ul style="list-style-type: none"> - Fume is an EU7th Framework Programme funded project that aims at documenting and evaluating which changes in the land or in other factors occurred in the last decades that affected forest fires in Europe and other fire-affected areas of the world. - Spain (coordinator) UNIVERSIDAD DE CASTILLA - LA MANCHA , Italy, Germany, Portugal, France, Belgium, Greece, Sweden, Finland, Algeria, Tunisia, Morocco, United States, Australia, South Africa, Chile, Turkey - Total cost: EUR 8 228 226,79 / EU contribution: EUR 6 178 152,87 - Parceiros: FUNDACION CENTRO DE ESTUDIOS AMBIENTALES DEL MEDITERRANEO, FUNDACAO DA FACULDADE DE CIENCIAS DA UNIVERSIDADE DE LISBOA, UNIVERSIDAD DE CANTABRIA, Mediterranean Agronomic Institute of Zaragoza / International Centre for Advanced Mediterranean Agronomic Studies, AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS, "TECNOLOGIAS Y SERVICIOS AGRARIOS, S.A.", Instituto Superior de Agronomia - Site: http://fumeproject.uclm.es/
FORFIRE	<ul style="list-style-type: none"> - The major axis of the FORFIRE strategy is that the largest, most readily available and cost effective reduction in global fire loss and damage can be achieved by the combination of super-early stage fire detection followed by very rapid deployment of fire suppression techniques. Essentially, the strategy focuses on the prevention of the spreading of fire so that the degree of suppression required becomes small and low cost. - Ireland (coordinator), France, Romania, Spain, Poland, Greece - Parceiros: "PINDIATEC, S.L." (spain), TECNOLOGIAS AVANZADAS INSPIRALIA SL (spain) - Total cost: EUR 1 447 235 / EU contribution: EUR 1 099 560 - Site: file not found - FORFIRE - (System for highly-reliable, cost-effective, early-detection and accurate localisation of incipient forest fires)
KULTURISK	<ul style="list-style-type: none"> - The KULTURisk project aims at developing a culture of risk prevention by evaluating the benefits of different risk prevention initiatives. This evaluation will be carried out by developing a novel methodology and referring to different types of water-related catastrophes, such as river inundations, urban flash floods, storm surges, rainfall triggered debris flows and landslides. - Netherlands (coordinator) - UNESCO-IHE, Italy, Uk, Slovenia, <i>Schweiz</i> - Parceiros: - Total costs: - Site: http://www.kulturisk.eu/home
FIREPARADOX	<ul style="list-style-type: none"> - The Fire Paradox is a European project originated in the 6th Development Research European program. It was inaugurated in March 2006, and brings together 36 partners from 16 countries for 48 months. The project's objective is to create a scientific and technical basis in order to define which new practices and integrated management policies will ensure Europe's ability to prevent and fight fires most effectively. - Francisco Rego (Coordination), Conceição Colaço, Carlo Bifulco, Francisco Moreira, Filipe Catry, Liliana Bento. - Parceiros: - Site: http://www.fireparadox.org/

HESFIRE	<ul style="list-style-type: none"> - Vegetation fire patterns depend on environmental drivers that are expected to change in the future, including climate and the expansion of agriculture and associated fire practices into natural ecosystems. In return, fires have a major influence on vegetation distribution, the carbon cycle and climate. It is important to anticipate the result of these interactions on future ecosystem dynamics and carbon emissions, and to integrate these outlook when designing societal strategies for climate mitigation. Such an integrative approach is especially relevant to terrestrial policies (e.g. REDD), which could drastically modify global landuse patterns and thus the anthropogenic footprint on fire regimes. -Total cost: EUR 148 635,6 / EU contribution: EUR 148 635,6 - Coordinated in: Portugal - Instituto Superior de Agronomia - Call for proposal: H2020-MSCA-IF-2014 / Funding scheme: MSCA-IF-EF-RI - RI – Reintegration panel - to 2017-06-01, ongoing project - Topic(s): MSCA-IF-2014-EF - Marie Skłodowska-Curie Individual Fellowships (IFEF)
FIRE-RESIST	<ul style="list-style-type: none"> - FIRE-RESIST is a four-year €7.8 million EU funded initiative. Under the leadership of NewRail, Newcastle University, the consortium consists of 18 partners from ten European states. It started in February 2011 and will report full results in January 2015. Bringing together the rail, aerospace and marine industries the project aims to develop innovative solutions for improving composite material fire performance. FIRE-RESIST aims to address these issues through the development of a number of novel material technologies and improved simulation capabilities. The project will conclude with the design, prototyping and testing of a number of full-scale demonstrator parts drawn from the three transport sectors to evaluate the technologies developed. - Call for proposal: FP7-NMP-2009-LARGE- / Funding scheme: CP-IP - Large-scale integrating project - Coordinated in: United Kingdom - Países Parceiros: Finland, Germany, Portugal ("ANTHONY, PATRICK & MURTA-EXPORTACAO LDA), Belgium, Sweden, Italy, Spain, France - Total cost: EUR 7 777 381,73 / EU contribution: EUR 5 323 616 - http://www.fire-resist.eu/FireResist/index.xhtml
FIRE STAR	<ul style="list-style-type: none"> - The management of wildland-urban interfaces is one of the key-points of wildland fire prevention policy in Mediterranean regions. A decision support system is developed to assist end-users in the assessment of wildland fire risk for people and structures, and of the preventive efficiency of wildland fuel reduction, on these interfaces. Scientists and end-users will specify the services offered by the system, its content will be based on the predictions of advanced models of wildland fire behaviour and effects. Scientists will improve the physics and the predictive ability of the model of wildland fire behaviour and evaluate its predictions thanks to results of laboratory tests and field experimental fires. They will investigate the response of urban structures to wildland fire impacts. They will describe and model wildland fuel types representative of Mediterranean ecosystems. - Total cost: EUR 2 859 375 EU contribution: EUR 1 463 878 - Coordinated in: France - Project reference: EVG1-CT-2001-00041 / Funded under: FP5-EESD - From 2002-01-01 to 2005-03-31 - Participantes: France, Spain (UNIVERSIDAD CARLOS III DE MADRID), Portugal (UNIVERSIDADE DE TRAS-OS-MONTES E ALTO DOURO), United States, Finland, Australia - http://www.eufirestar.org/index.php

<p>PREFER (RISCOS, U. Coimbra)</p>	<ul style="list-style-type: none"> - PREFER is a project funded under the EU FP7 (G.A. 312931), to be developed in the period 2013-2015. It aims at responding to major fire prevention needs in Southern Europe by extensive exploitation of space-borne sensors. All reports on the state of Europe's forests indicate that the broad Mediterranean area is systematically affected by uncontrolled forest fires with large impact on ecosystems, soil erosion, slope instability, desertification trends, and local economies as a whole, with a negative mid-to-long term prospect because of Climate Change. In this scenario, the need to improve the information and the intelligence support to forest fire prevention is widely recognized to be relevant. Fire prevention is still the most cost-effective strategy when compared to firefighting and extinguishing that are costly, local, and triggered only in response to already ongoing crises. The main objective is to set up a space-based end-to-end information services to support prevention/preparedness and recovery phases of the Forest Fires emergency cycle in the EU Mediterranean Region. - Coordinator: Italy - Total cost: EUR 2 844 994,08 / EU contribution: EUR 1 906 357,88 - Call for proposal: FP7-SPACE-2012-1 / Funding scheme: CP-FP - Small or medium-scale focused research project - Parceiros/Participantes: Spain, Greece, Italy, Portugal (UNIVERSIDADE DE COIMBRA), France - http://www.prefer-copernicus.eu/
<p>EFFIS (RISCOS, U. Coimbra)</p>	<ul style="list-style-type: none"> - The European Forest Fire Information System (EFFIS) supports the services in charge of the protection of forests against fires in the EU countries and provides the European Commission services and the European Parliament with updated and reliable information on wildland fires in Europe. - http://forest.jrc.ec.europa.eu/effis/
<p>VITAL RESPONDER (João Paulo Cunha)</p>	<ul style="list-style-type: none"> - The goal of the Vital Responder research project is to explore the synergies between innovative wearable technologies, scattered sensor networks, intelligent building technology and precise localization services to provide secure, reliable and effective first-response systems in critical emergency scenarios. The core problem under consideration is to evaluate human stress in real-time under adverse conditions, by means of continuous online vital sign monitoring of first responders. - Coordinator - João Paulo Cunha - CESAM Responsible researcher - Ana Isabel Miranda - Execution dates - 2013-07-01 - 2015-06-30 (24 Months) - Funding Entity - FCT - Funding for CESAM - 41160 € / Total Funding - 199788 € - Proponent Institution - Faculdade de Engenharia da Universidade do Porto - Participating Institutions <u>Universidade de Aveiro</u>- Instituto de Telecomunicações (IT); Instituto de Engenharia Electrónica e Telemática de Aveiro (IEETA/UA) - Site: http://www.vitalresponder.pt/

Smart@Fire	<ul style="list-style-type: none"> - Smart@Fire is a European FP7 project that aims to develop a smart Personal Protective System (PPS) for fire fighters comprising a Personal Protective Equipment (PPE) turnout gear and a loosely coupled ICT system. The ICT system integrates safety critical functions and acts as communication node to the local center of command. The system must be compliant with and needs to be fitted into the fire fighter turnout gear. - Belgium (coordinator), Germany, France, Hungary, Netherlands, United Kingdom - Call for proposal: FP7-ICT-2011-8 - Total cost: EUR 2 260 574 EU contribution: EUR 1 507 173 - Parceiros: NEDERLANDS INSTITUUT FYSIEKE VEILIGHEID - Site: www.smartatfire.eu/
INFRA	<ul style="list-style-type: none"> - The overall objective of the INFRA project is to research and develop novel technologies for personal digital support systems as part of an integral, secure emergency management system to support first responders (FR) in crises occurring in critical infrastructures (CI) under all circumstances. - Coordinated in: Israel - ATHENA GS3-SECURITY IMPLEMENTATIONS LTD - Call for proposal: FP7-ICT-SEC-2007-1 - Funding scheme: CP-FP - Small or medium-scale focused research project - Parceiros: Ireland, Spain, Greece, United Kingdom, Netherlands, Israel - Total cost: EUR 3 809 464,91 / EU contribution: EUR 2 642 894,69 - Site: http://www.infra-fp7.eu
ABSOLUTE Aerial Base Stations with Opportunistic Links for Unexpected & Temporary Events	<ul style="list-style-type: none"> - Industry driven ABSOLUTE project will design, validate and demonstrate a rapidly deployable network architecture providing broadband services for large coverage areas affected by large scale unexpected events (or disasters) leading to the partial or complete unavailability of the terrestrial communication infrastructure. ABSOLUTE system will also be used for temporary events leading to the demand for very high throughput and augmented network capacity such as Olympic Games. The project will demonstrate the high capacity, low-latency and coverage capabilities of LTE-A (Long Term Evolution - Advanced) solutions adapted for broadband emergency communications through flexible 4G base stations embedded on Low Altitude Platforms (LAP) and terrestrial portable units. The ultimate goal in ABSOLUTE is to provide reference implementation and to participate to the relevant regulation and standardisation efforts for the adoption of 4G technology to improve the disaster recovery and crisis management of public safety and security stakeholders in Europe and worldwide. - Duration: Oct. 2012 – Oct. 2015 - Total Cost: € 11.3 m / EC Contribution: € 8 m / Funding scheme: IP - Project Coordinator: Isabelle Bucaille - Thales Communications & Security - France - Parceiros: France Telecom (FR), TriaGnoSys (DE), Deutsches Zentrum Für Luft Und Raumfahrt (DE), Create-Net (IT), University Of York (UK), Fraunhofer Heinrich Hertz Institute (DE), Eutelsat (FR), Universitaet Duisburg-Essen (DE), Allsopp Helikites (UK), Advanten (FR), Mira Telecom (ROM), BAPCO (UK), Agence nationale des fréquences (FR), RMIT University (AUS), Jozef Stefan Institute (SLO), Nomor Research (DE). - Site: http://www.absolute-project.eu/



- Calls/concursos mais de tecnologia ou clima, fator humano não é prioridade nestes projetos.
- Contudo, no combate aos incêndios ou outras situações os bombeiros enfrentam riscos físicos já bem discutidos, desvalorizando-se a dimensão emocional da tarefa e o desgaste/stress.



- European Foundation for the Improvement of Living and Working Conditions (2007): **mais de 20% dos profissionais da UE** consideravam a sua saúde afetada pelo stress no trabalho.
- European Agency for Safety and Health at Work (2013): **51% dos profissionais da UE** reconheceram a existência de stress no trabalho.
- European Agency for Safety and Health at Work: campanha “Managing stress and psychosocial risks at work” pretende para 2014/15 ter **locais de trabalho saudáveis** e onde o stress não faça adoecer o trabalhador nem diminuir a produtividade.
- OPP: Março a Nov 2015 <http://www.healthyworkplaces.pt/>



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Healthy Workplaces Campaigns

Running since 2000, the Healthy Workplaces Campaigns (formerly known as “European Weeks for Safety and Health at Work”) are one of EU-OSHA’s principal tools for raising awareness of issues related to occupational safety and health, and promoting the idea that good health and safety is good for business.

The campaigns are now the **largest of their kind in the world.**



**HEALTHY
WORKPLACES
AWARD**

PRÉMIO LOCAIS DE TRABALHO SAUDÁVEIS

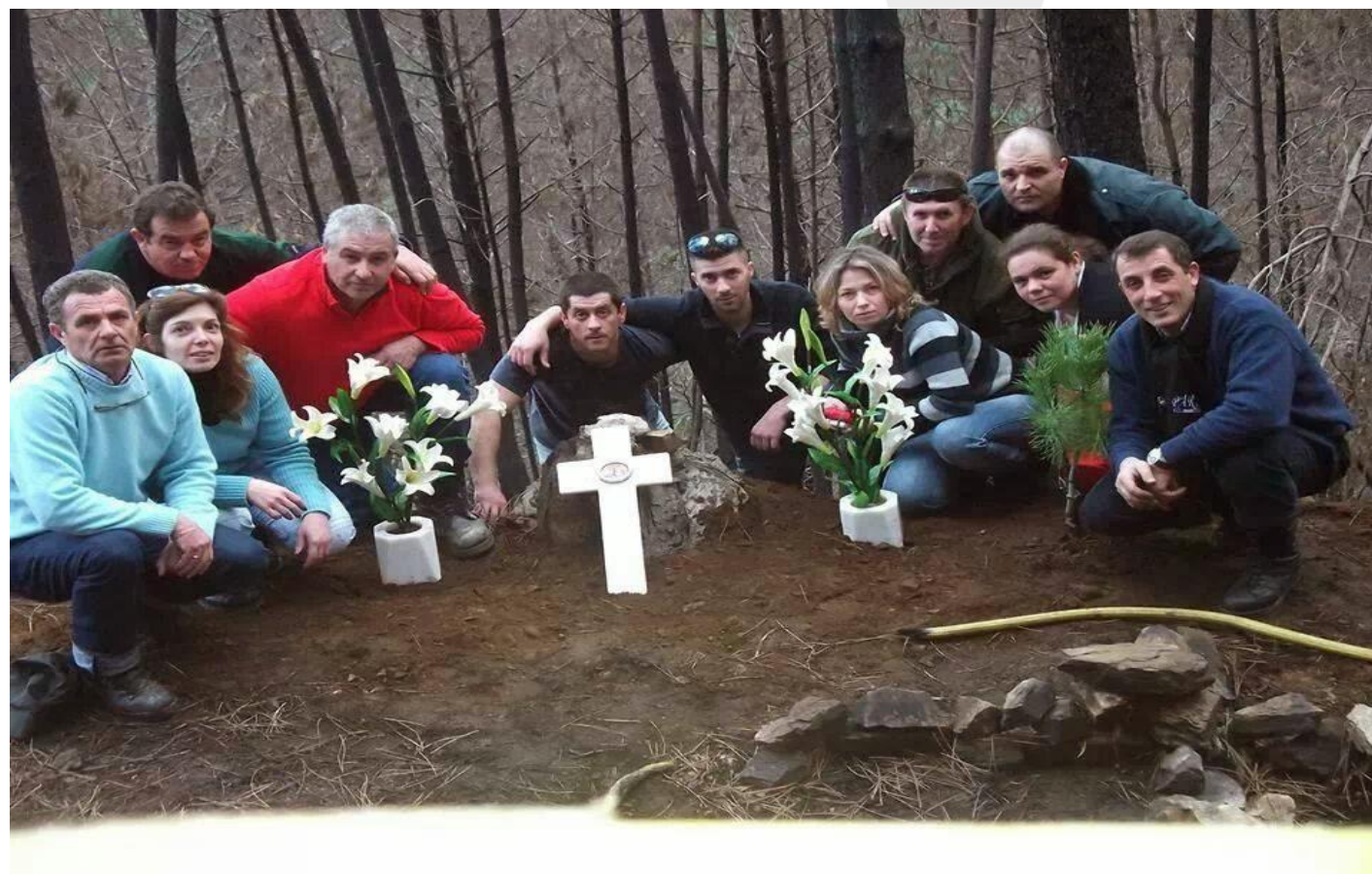
Vamos eleger as organizações que mais contribuem para a segurança, o bem-estar e a saúde (física e psicológica) no local de trabalho.

CANDIDATE A SUA EMPRESA



- Campanha pretende estimular locais de trabalho saudáveis.
- Dificilmente aplicada aos bombeiros, cujos níveis de stress/burnout não diminuem.

Bombeiros de Alcabideche regressam ao Caramulo para Homenagem...



- Vara (2009), recolha de 2006 3% de inquiridos em exaustão



territorium 16

*BURNOUT - UM RISCO NO DESEMPENHO E SATISFAÇÃO PROFISSIONAL NOS BOMBEIROS QUE TRABALHAM NA EMERGÊNCIA PRÉ-HOSPITALAR**

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Burnout e satisfação no trabalho em bombeiros que trabalham na área da emergência pré-hospitalar

Metodologia

Participantes

Inquirimos 119 bombeiros tripulantes de ambulância de socorro, distribuídos de forma semelhante pelas três zonas do país (zona norte com 38 inquiridos, centro com 39 e sul com 42), tendo uma média de idades de 31.84 anos (DP=5.94). Predominou sexo masculino (91%) e o estado civil casado ou em união de facto (56%). Relativamente à situação profissional, 47% dos inquiridos são bombeiros voluntários assalariados que trabalham para uma Associação Humanitária, 29% são bombeiros voluntários, 15% são bombeiros municipais e 9% são bombeiros sapadores. Trabalham sobretudo por turnos (84%), com uma média de 44 horas semanais, tendo em média 10.4 anos de serviço na área da emergência pré-hospitalar.

Natália Cordeiro Vara

Maio 2007

➤ Vara (2013), recolha de 2013 4% de inquiridos em exaustão

Estratégias de coping e emoções como preditoras do risco de *burnout* em bombeiros

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RISCOS NATURAIS ANTRÓPICOS E MISTOS

HOMENAGEM AO PROFESSOR DOUTOR
FERNANDO REBELO

DEPARTAMENTO DE GEOGRAFIA • FACULDADE DE LETRAS
UNIVERSIDADE DE COIMBRA

Este estudo pretende contribuir para uma melhor compreensão das relações entre as emoções, o burnout, as estratégias de coping e a satisfação com o trabalho numa amostra de 505 bombeiros voluntários e profissionais. Tem como principais objetivos: a) conhecer a prevalência de burnout nos Bombeiros, identificar as emoções expressas, as estratégias de coping e o nível de satisfação com o trabalho e verificar se o burnout, as emoções expressas, as estratégias de coping e satisfação com o trabalho variam em função de variáveis sociodemográficas e laborais; b) conhecer a relação entre burnout, emoções e satisfação profissional; c) verificar se as emoções e o coping são antecedentes preditores da síndrome de burnout nestes profissionais; d) identificar o melhor modelo que explica os efeitos do burnout e das emoções na satisfação profissional.

D2014

U. PORTO
FACULDADE DE PSICOLOGIA
E DE CIÊNCIAS DA EDUCAÇÃO
UNIVERSIDADE DO PORTO

**BURNOUT, EMOÇÕES, COPING E SATISFAÇÃO
PROFISSIONAL EM BOMBEIROS**

Natália Cordeiro Vara

TESE DE DOUTORAMENTO APRESENTADA

À FACULDADE DE PSICOLOGIA E DE CIÊNCIAS DA EDUCAÇÃO

DA UNIVERSIDADE DO PORTO EM: Abril 2014

ÁREA CIENTÍFICA: Psicologia



Stress crónico e burnout - Freudenberger (1974) e Maslach et al (1976, 2011, 2015):

- Referenciado em profissões que assentam no **trabalho com pessoas**. Inicia-se com problemas físicos, depois problemas no funcionamento intelectual e desgaste emocional acentuado, tendência a isolar-se, esgotamento dos recursos emocionais para enfrentar a situação e sentimento de perda do valor pessoal e profissional, modifica o sujeito.
- Tem consequências graves e prolongadas, leva à **erosão do espírito**, perda de fé nas tarefas de ajuda e na sua própria capacidade enquanto profissional, afeta o **desempenho profissional** e a qualidade dos **serviços prestados**.
- Prevalência do burnout variada e depende do grupo profissional e país, mas estima-se que seja **entre 3 a 16%** (Schaufeli & Enzmann, 1998) ou de **3 a 29%** (Carod-Artal & Vázquez-Cabrera, 2013)

- Sugere-se necessidade de monitorizar o stress em situação real (tal como o projeto VitalResponder)



Vital Responder project is presented in national TV in real use by Gaia professional firefighters



Vital Analysis: Annotating sensed physiological signals with the stress levels of first responders in action*

P. Gomes¹, M. Kalseler², C. Queirós³, M. Oliveira³, B. Lopes¹ and M. Coimbra¹, *Member, IEEE*

Abstract— First responders such as firefighters are exposed to extreme stress and fatigue situations during their work routines. It is thus desirable to monitor their health using wearable sensing but this is a complex and still unsolved research challenge that requires large amounts of properly annotated physiological signals data. In this paper we show that the information gathered by our Vital Analysis Framework can support the annotation of these vital signals with the stress levels perceived by the target user, confirmed by the analysis of more than 4600 hours of data collected from real firefighters in action, including 717 answers to event questionnaires from a total of 454 different events.

I. INTRODUCTION

A first responder is a person trained to intervene in emergency situations in order to help the general population. More



Fig. 1. Images of a version of the Vital Jacket[®], specially made for the firefighters, and the Vital Analysis framework running on a smartip.

Estudos empíricos

TABLE II

MEAN AND STANDARD DEVIATION (SD) VALUES OF THE STRESS APPRAISAL FOR EACH EVENT CATEGORY WHERE 0 IS MINIMUM AND 4 THE MAXIMUM.

Event categories	Mean	SD	Min	Max
Fire	1,23	1,002	0	4
Accident	1,40	0,857	0	3
Infrastructure/communications	0,50	0,798	0	2
Pre-hospital assistance	1,11	0,813	0	4
Legal conflict	0,80	0,837	0	2
Technological/Industrial	0,50	0,548	0	1
Services	1,01	1,033	0	3
Activities	0,77	0,725	0	2
Total	1,10	0,918	0	4

35th Annual International Conference of the IEEE EMBS
Osaka, Japan, 3 - 7 July, 2013

Are standard heart rate variability measures associated with the self-perception of stress of firefighters in action?

P. Gomes¹, M. Katseler², B. Lopes¹, S. Faria¹, C. Queirós² and M. Coimbra¹, *Member, IEEE*

TABLE III

P_k ASSOCIATION MEASURE AND MEAN VALUES FOR 5 MINUTES SEGMENTS, FOR THE 3 STAGES (PRE, IN AND POST) OF AN EVENT, ACCORDING TO THE FIREFIGHTERS SELF-ASSESSMENT.

Categories	PRE event				IN event				POST Event			
	HR	SDNN	HF	LF	HR	SDNN	HF	LF	HR	SDNN	HF	LF
Low stress	71.438	517.700	0.250	0.270	78.700	497.007	0.228	0.143	71.757	629.149	0.311	0.162
Medium stress	78.380	495.499	0.154	0.065	66.030	1234.907	0.914	0.952	73.551	151.148	0.010	0.006
High stress	75.632	611.502	0.242	0.111	65.539	1300.717	0.847	0.977	96.548	78.747	0.002	0.002
P_k	0.619	0.636	0.624	0.624	0.270	0.732	0.717	0.735	0.675	0.088	0.087	0.095

Dados relevantes:

- Frustração em eventos pouco stressantes, necessidade de acção.
- Stress diminui durante o evento (protocolo de acção)
- Pós evento com stress e ruminação, consequências a longo prazo do stress/trauma

- Estudos em tempo real de monitorização do comportamento
- Necessidade de investir em formação que previna o trauma/stress/burnout (ex: modelo Critical Incident Stress Management) dos profissionais de socorro.



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