DRAFT PROPOSAL FOR A PAN EUROPEAN NETWORK FIRE SERVICE KNOWLEDGE DEVELOPMENT AND EXCHANGE PROGRAM

1. INTRODUCTION

Modern society and the use of modern materials in buildings as well as developed construction methods have made firefighting more dangerous for fire fighters. The development and spread of fire and smoke in buildings and between buildings has become very complex, trends that most likely will continue. Moreover, transportation systems in modern society is getting more and more complex, including increased capacity, underground facilities and systems integrated with residential and commercial areas. Also, energy storage seems to be an emerging risk, including battery technology. Fires and other types of emergencies must of course be prevented, but there will unfortunately always be potential for accidents. Consequently, the work by the fire service, including suppression, search and rescue, must be given the possibility to use the best available knowledge, technology and tactics for making this work as safe and efficient as possible. The fire service faces major challenges to innovate their methods, tactics and techniques, in relation to the developing society.

Very little research has being conducted on subjects related to the fire service, especially regarding technology and tactics, and if any research is being or has been conducted, existing knowledge is neither shared between countries nor does it always find its way to the fire service.

This program aims at the foundation of a solid pan European network of universities, fire services and research institutes in order to share existing knowledge, find topics for collaboration on further research and collaborate on carrying out research for the fire service.

2. OBJECTIVES

The objectives of this proposal are to 1) found a solid pan European network of researchers and institutes conducting research for the fire services in Europe. Within this pan European network 2) knowledge would be shared between partner institutes and countries. By sharing existing knowledge as well as research programs knowledge 3) gaps can be identified and 4) proposals for further collaborate research will be identified.

3. METHODOLOGY

Present subjects of interest are defined based on an inventory among possible partners and on an Exchange of expert meeting in November 2016. These subjects form the working packages of this pan European network. There are 6 work packages, all with a strong focus on operational aspect of the fire service. For each working package a working group will be formed. Each working group has a chair. In each working group the partners working on this subject will meet eight times to exchange existing knowledge, define knowledge gaps and formulate research proposals. After the 6th meeting they will write a report and organize an international conference with keynotes and workshops to further disseminate the knowledge.

4. RESEARCH SUBJECTS

4.1 WP1: Fire behaviour

Due to changes in building materials as well as in furnishing and inventory, fires develops very differently compared to only a few decades ago. Also, building technology have changed, including more insulation and more air tight buildings. Consequently, fires grow faster, have potential for higher heat release rates, may reach higher temperatures and they becomes oxygen depleted faster (so called “ventilation control”). It should be noted that ventilation controlled fires may cause substantial hazardous situations for firefighters trying to enter buildings, extinguish fire and rescue people. Therefore, more understanding of fire behaviour is needed, especially from a fire service point of

view, and new tactics have to be developed to extinguish fire safely. This working package is suggested to focus on large scale experiments, the consequences for tactics and techniques, and on the collection of real fire cases.

4.2 WP 2: Construction fires

In recent years, the problem of so called construction fires has emerged. Such fires can be characterized by

- Fire spreading insides constructional elements or voids, such as ventilation shaft, crawl spaces, etc (hidden fires).
- Fire involving large parts of a building, such as facades or roofs (often in high-rises or large commercial buildings)

By assumption, the development and spread of such fires and the tactics for fighting them differs from compartment fires. Therefore, more understanding of construction fires is needed, especially with regard to technology and tactics to identify and fight them. This working package is suggested to focus on existing knowledge, gathering data from experiments as well as from real and to find best practices for protecting firefighting personnel.

4.3 WP3: Health and safety

During firefighting operations, firefighters as well as fire officers are exposed to a number of things. This includes heat stress, gases, particles, physical stress, psychological stress and structural failure of buildings. Such exposure have long term effects as well as short term effects on the human body. Some of the effects and their consequences are known, but there are no overall view on how these matters affects firefighters. More knowledge and understanding is needed, simply because firefighters should be kept safe throughout their carrier. This working package is suggested to focus on existing knowledge, experiments, the consequences for tactics and techniques, and on the collection of real fire cases.

4.4 WP4: Decision making

Research is available on decision making under stress, which related to fire service activities. However, human factors seems to be greatly underestimated and disregarded in decision making during firefighting operations. A reduction of the situational awareness caused by neurobiological and biogenetical factor has a major influence on the quality of decision making. The question is how to support incident commanders in practise. This working package is suggested to focus on human behaviour under stress, team behaviour under stress, support for decision makers and situational awareness.

4.5 WP5: Emerging risks

New challenges are emerging, regarding the safety of fire fighters as well as for firefighting technology and tactics. Examples includes lithium ion batteries, insulation materials in building constructions, new materials (nano technology), new fuels in transportation systems, solar panels, self-driving automotive, electrical vehicles and multi-storey wooden buildings. This working package is suggested to focus on identifying such emerging technologies and their impact on firefighting technology and tactics.

4.6 WP6: Innovations

Modern technology offers opportunities and also new challenges for the fire service. Examples of such technology includes autonomous vehicles, robot technology, drones, smart clothing, cloud based data sharing, communication systems, detection systems, smart homes, etc. This working package is suggested to focus on identifying such emerging technologies, their impact on firefighting technology and tactics and possible use within the fire service.