

PŘÍNOSY OOP VYTVOŘENÝCH V PROJEKTU IFREACT PRO BEZPEČNOST A PRACOVNÍ ČINNOSTI ZÁCHRANÁŘŮ V CBRN PROSTŘEDÍ

HOW IFREACT PPE WILL CONTRIBUTE TO FRs' SAFETY AND EFFICIENCY IN PERFORMING THEIR TASKS IN A CBRNE ENVIRONMENT

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Abstract

Over the last decade, security against various risks including terrorism, natural disasters and crime has gained relevance within the European Community, so that numerous Security Research and Development Projects were funded by the European Commission within the Seventh Framework Programme for Research and Technological Development FP7. One of the projects with an impact on the preparedness of civilian First Responders (FRs) for CBRN risks was IFREACT (Improved First Responder Ensembles against CBRN terrorism). The objective of IFREACT project was to innovate and create new PPE to equip civilian First Responders while dealing with CBRN events, which may be accidents or deliberate attacks. The IFREACT focused on developing a robust, economical and user-friendly PPE i.e. giving higher levels of comfort achieved by lower body burden (physiological and respiratory), maintaining good protection parameters for civilian responders working for a limited period of time in the warm zone of a CBRN event (6 hours). The development of an IFREACT ensemble consisted of adequate airway protection and skin protection with integrated communication means, and alternatively supplemented with miniaturized prototype biocollector enabling monitoring the bio-environment with 6 hour collection efficiency. The objective was attained, the IFREACT prototypes are easy-to-wear PPE equipped with safe hands-free communication equipment.

Key words: CBRNE Threats, emergency preparedness, crisis management, first responders, personal protection equipment, training.

1 CONTEXT

International events remind us that CBRN-E incidents can have multiple facets and can concern the civilian population. Our goal is to take care of victims and to keep FRs safe while performing their tasks. Recent events in Paris impact our way of understanding the suitability of our current countermeasures and demonstrate the accuracy of IFREACT goals in creating innovative PPE for civilian FRs. The usability of these PPE have been proven and tested in SUJCHBO's laboratory and in field exercises.

In this presentation, innovations will be highlighted from a medical end user's point of view.

The 13 November 2015 Paris events occurred at night, in a hostile and unpredictable environment since the attacks were carried out in multiple sites and with the ongoing threat of ur-accident.

The doctrine relies in this case, on what I call a 3 "S" strategy:

- ✓ S for *Situational awareness*, which should be global and shared between different head -quarters and FRs, in real time

- ✓ S for *Safety measures and security issues*, which should be applied via reliable communication means and secured information networks.
- ✓ And a third S is for *Safe health* for FRs and the general public with regards to suitable PPE, fast medical triage and treatment on the scene and in hospitals.

Increasing FRs' safety and reassurance and educating the population are also key factors to improve human behaviour.

Regarding these recent Paris events, what made it complex was having to deal with multiple attacks, uncertain geo-localization, working in the dark, the impossibility of using laptops to tag and trace victims, multiple similar injuries which strained hospital resources, the difficulty of using cell phones because of the noise even though the GSM network was working, the difficulty of using other sophisticated communication means in real time.

What helped was to apply contingency plans with a hierarchical organization. Triage and damage control treatment were good thanks to well-trained collaborative fire-fighters and medical teams used to working together in the pre-hospital field.

What we are sure of, in such situations, are the following: Anticipation, adaptability, flexibility are the key goals to achieve. Training is mandatory. The human factor is of utmost importance.

As a result, equipment should be user-friendly, in particular PPE, because we are generally not able to use well or do well, in a disaster situation, something we don't use on a daily basis.

We must be prepared for future man-made events that incur mass casualties. This can be worse in terms of severe injuries or deaths and will, for sure, complicate FRs' tasks and impact public behavior in a conventional setting or CBRN-E setting. By definition a CBRN-E event is an unexpected event. If it is combined with conventional injuries caused by a blast, bullets or a crush, it worsens the situation. Victims should be directed and escorted to the selected hospitals as soon as possible. Triage on site is done by a senior doctor and relies on simple classification. He only needs to feed a table showing bed capacities per hospital. It is the same table the headquarters use.

2 IFREACT RESULTS

It comes down to liaise with our project and new PPE we created in the case of CBRN-E events. In this respect, I believe we have to integrate the E element in our approach of dealing with CBRN threats.

The IFREACT project I was the coordinator of gave us the opportunity to work jointly with subject matter experts, manufacturers, end-users, decision-makers and CBRN-E institutes like SUJCHBO. The CBRN-E guidance was monitored through academic reports, field exercises, laboratory testing and technological development. A survey conducted in ten countries helped identify FR tasks at the scene and the type of PPE worn in each case.

This work led us to set up an action plan and to choose a modular concept adapted to various FR requirements (firefighters, policemen, EMS, special forces): 3 types of air permeable suits: HDS, LWS and undergarment, to be matched with 3 types of airway protection: a new mask, a mask attached to the hood, and a one size overpressure hood. On top of this we wanted to increase FR safety. I am glad we succeeded in creating PPE that can be worn easily and rapidly by any type of civilian FR, even those not trained on a regular basis, with the lowest physiological burden possible and a good level of protection against all kinds of toxins.

Three key results are worth to be outlined:

- ✓ *Firstly:* for a protection level compatible with warm zone CBRN risks we proved that the air-permeable suits matched with airway protection (called the ensembles) had no pumping effect at interfaces thanks to the simultaneous work between manufacturers.
- ✓ *Secondly:* all PPE reached our goal to decrease the burden as much as possible. The physiological index was found to be very low in lab and field tests and in any case half the air impermeable level.
- ✓ *Thirdly:* In addition, there is a rationale enabling EMS to wear IFREACT air permeable suits during the wet decontamination procedures.

The innovative one size overpressure hood with a large visor enables the FR to see and be seen by the victims. Details such as the possibility of wearing glasses and daily shoes are cost effective. Reflective and colored pieces of material help identify FRs even at night.

On top of this, we provided affordable communication means: an ear set and HUD enabling FRs to communicate between themselves and with headquarters thanks to smartphones. Doing so, FRs would be flexible and be reassured through communication means. FRs can communicate through the AIRBUS Conf Com tool. They can send videos; they can talk and receive audible or silent alarms. Prometech's HUD provides pictures and text to the FRs, giving information in the case of emergency evacuation, giving time spent in a contaminated area, or how much time is left or the number of victims or time needed to shower victims.

The choice of communication means and networks is the key factor for success. They should be reliable, interoperable and fast to deploy. Either we must apply the "scoop and run strategy" as we must leave the scene as quickly as possible because of a hostile environment or urgent surgery or we have time to deploy more sophisticated means like in the case of hostages (such as in Vincennes and the Bataclan club) giving time to negotiate and to be prepared for an assault, including time to inform medical teams. The same goes for decontamination procedures without conventional injuries

National operators' rules complicate the use of GSM bubbles. WIFI is not sufficiently reliable. In France we aim to deploy the Antares network offering a wider perimeter than GSM bubble. The choice depends on the situation. Will the GSM network be down or not? Can we rely on satellite communications? Is information confidential or not?

In this respect, the time needed to deploy a bubble, the perimeter of usability, and how to transport equipment by road or air should be anticipated.

While wearing well designed and light IFREACT PPE, FRs can perform their tasks in the warm zone for more than two hours without changing shifts, which could be unsafe and costly in terms of human resources. As a result, our objective was attained: affordable, easy-to-wear PPE equipped with safe hands-free communication equipment providing awareness of the situation in real time. Not to mention a Bio-collector attached to the suit.

I consider we fulfilled the 3 S goals with a good level of FR individual protection preserving good capabilities to treat victims. Wearing bulky PPE without being able to receive an alarm in the event of an emergency evacuation or to provide information in the event of an evolving event is not the proper way to protect civilian FRs nowadays.

The final testing was conducted in Cazaux with the help of the French military CBRN centre.

See the video UPEC website: http://www.dailymotion.com/video/x2hedey_projet-europeen-ifreact-vostfr_school