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Collaborative session between the committees:
Indoor localisation and communication during the emergencies

FIRE OF AN HISTORICAL PALACE IN ROME IN 1999

Fire spreads into a building composed of two adjacent edifices, joined by creating openings on each floor. Floors in the two edifices are not at the same elevation, so that their corridors are connected through stairs, which exploit loading docks height and outer walls width. The resulting building is particularly vast.

An important public office is hosted into one of the edifices, while the other one is under deep restoration. As a matter of fact it is an extension, which actually doubles the available area.

While the restoration works progress, any completed room is immediately used as a new office room. As a result of this, the offices' area often intersects the works' area, which can be reached through different main door and staircase from the road.

The two edifices have the same number of floors, but at elevations different up to 1-2 metres: because of the adaptation works at the ground floor, it is not clear that the whole building is made from two edifices. There are lifts in different places, and they allow to reach the different portions of the building. The interiors of the building are all lined with wood (most of the walls and floors, staircases, handrails, etc.).

The fire starts in a just refurbished wing of the portion of the building under restoration, which is located on the farthest corner from the 24/7 caretakers' lodge.

The fire alarm was partially tampered by disabling the acoustic alarms both on the floors and into the caretakers' lodge. Caretakers can get to know of an actual alarm only thanks to a warning light located behind them.

This intervention on the fire alarm was justified by a long-standing series of false alarms activated by the breaking of the glasses of the alarm buttons.

The fire starts for unknown reasons in two locked rooms and keeps smouldering for a long period before anyone becomes aware of it. The smoke is detected from the outside, but not from the

caretakers. The windows of the affected rooms overlook a light-well, indeed. The interested floor is the highest in its edifice.

Caretakers erroneously direct the first team of firemen arrived on place (an aerial ladder) to an adjacent building (which is not part of the concerned building). They believe that the smoke, poorly visible at that hour of the day (circa 10:30 P.M.), is coming out of there. From the roof of that building, reached with some difficulties, it is eventually possible to gain a first awareness of the fire location. From that point of view firemen can barely see the flames' glare. Some thirty minutes have already passed.

Caretakers direct the first fire truck towards the main door and staircase of the works' area. Fire hoses are deployed but firemen do not find a way to the fire. No traces of smoke can be detected within the building. The situation gets more and more confused. The room distribution is highly complicated, also because of the intersection with the works' area. After 15 minutes three fire teams and a ladder are on place. All of them walk on the roof of the building, into the works' area and into the offices without efficient radio communication. Due to the complexity of the room distribution and to their vastness, the fire teams loss visual contact. Even who has detected the fire cannot understand how to reach it and often is not able to communicate his findings to the fire director.

Two leading fire-fighters together with the caretakers and two high officials inspect several places; initially they use the staircases (as per Standard Operating Procedure), but soon after they give in to the insistence of the caretakers and use many times one of the lifts to go up to the fourth floor. From there it is possible to smell the fire, but it is not possible to see smoke or flames. Nevertheless, the situation gets progressively clearer.

Again further to pressing suggestions by the caretakers, the two firemen and a caretaker use a second elevator. This one is located into the same edifice just below a small tower one floor higher than the rest of the building, so that the lift brings them at small space located at the fifth floor . The space is completely filled with the smoke that filtered through. They do not get aware that the surrounding closed armoured windows do not give into space, but into an easily reachable terrace. The smoke is so thick that the lighting is inefficient and the photocells of the lift doors get blind and prevent doors from closing. The accompanying caretaker, knowing the place, manages to escape, but he is in shock and not able to report efficiently on the situation. The two firemen in distress (and injured) are seen through the windows from an external terrace. Rescue from other firemen arrives both from the inside of the building and from the terrace, by breaking the armoured windows. All the breathing apparatuses available on site are used. As soon as they are rescued, the two firemen are evacuated using one of the three aerial ladders on site.

One of the two firemen will suffer permanent brain damage because of the long time without enough oxygen.

The chronologic description of the facts does not make full justice to the difficulties encountered, which can be briefly summarised with: the wrong instructions from the caretakers, the extreme complexity and vastness of the building, the coexistence of works and offices, the tampering of the

alarm system, the inefficiency of the radio communications (at that time) between teams and with the fire director.

In the course of the days after the event, the firemen made several inspections and surveys into the building. Even in full daylight and without rushing they often lost their bearings. The fire resulted to have spread over an area of circa 1,000 square metres.

Suggested topics for the discussion

The situation described by the Italian Firemen happened in a restored historical building, where no updated maps were available for the rescuer. Is this an unfortunate episode? How the problem of internal maps of building is faced /solved across Europe?

As we heard, the team lost visual contact and could not report correctly to the chief commander their position. Yesterday we learnt about technologies and possible solutions for indoor location:

- Is there any specific experience or lesson learnt to share by the audience?
- How could PSCE support an initiative to define performances and minimum requirements for operative solutions on that?
- Indoor communication was a problem at that time (1999). What is the situation like today?
- Any indoor location system needs to communicate with the outside commander's IT system: can such system exploit the standard communication system or there is the need for another data communication system?
- The described event did not involve a productive site or a building with specific hazards. What additional complexity would they have added? How would it be possible to make rescuers aware of type and location of risks?
- In the event we have heard of, no civilians were involved. How the location of non-rescuers and valuable assets (e.g. paintings) inside a building could be implemented?
- Any indoor location system brings the need for a certain infrastructure. What is the appropriate cost for such infrastructure and who should pay for that?