On a fast, low-cost indoor mapping and positioning system for the management of natural hazards

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Civil protection teams working in areas affected by disasters - as floods or earthquakes - face challenging and risky situations because of (among other reasons) the lack of knowledge about an environment that may have changed drastically. One of the factors contributing to such risks is the lack of knowledge about their physical environment, especially when working indoors. Mapping and location indoor and outdoor technologies exist; for outdoors, very good levels of precision and accuracy may be obtained using off-the- helf equipment; on the other side, and although good solutions for indoor environments are available, these require some extra pre-deployed infrastructure in the area to navigate, which is unacceptable in the case of emergency teams. It may be said, then, that no mature indoor + outdoor integrated solution providing the appropriate precision and accuracy for the purposes of emergency teams exist. In this presentation, the assessment of a set of currently available sensors (IMUs,GB-D cameras, GNSS receivers) and algorithms is presented to show that it is already possible to build such a solution relying on them – providing that appropriate(indoor) lightning and texture conditions exist