# Abstract

Whenever an emergency occurs, personnel involved in its resolution make every possible effort to minimize casualties and keep citizens safe. Performing continuous and regular training exercises helps improve planning, actuation protocols and the harmonization of procedures between various agencies.

The application of information and communication technologies (ICT) in emergency management is a relevant research field. Particularly, the development of command and control systems (C2IS) to manage crisis resolution and the use of virtual worlds to develop training exercises are challenging and evolving areas. However, the insertion of a C2IS within a networked training system based on virtual worlds and using commercial off-the-shelf equipment has not been sufficiently exploited.

In this context, the development of a hybrid system connecting real computers and sensors with virtual computers is a key strategy. In particular, the deployment of a middleware to interconnect heterogeneous applications using standardized data formats.

This thesis contributes to facilitate performing training exercises in emergency management that in real life are complicated, inflexible and very expensive.

An architecture to connect a command and control system operating in the real world with one or several virtual worlds through an interconnection gateway that implements MPEG-V based data formats and by using web services via TCP/IP as a communication platform is proposed, deployed and validated.