PERSEUS

Decision Support for Personalized Autonomous Evacuation Systems

Currently, a personalized evacuation support system is not available. Many accidents have shown (e.g., fire accident at Düsseldorf airport) that individuals were moving in the wrong direction because of wrong or missing instructions. It is well known, that people act in a specific way under stress situations.

PERSEUS will be a computer system, which guides stressed human thought in evacuation scenarios occurring in different environments.

PERSEUS combines the local and the global information views. The local information view correlates all relevant data available immediately and directly from sensors in the area the person currently is, e.g. nearby doors, windows appropriate for evacuation, etc. State of the art communication architectures like BACnet, and robust meshed wireless networks will be integrated into the PERSEUS system. The global information view is generated by information from facility management and rescue command and control: static information like floor maps and 3D building models, maps and models of utilities (electrical cables, gas pipes, hearing network) and dynamic information, like doors status, temperature, unavailable exits, blocked corridors, spread of smoke, etc.

PERSEUS doesn't assume that all facility components are equipped with sensors – one of the central objectives is to achieve a maximum of functionality under the conditions of partially destroyed or sparse infrastructure. A completely new and innovative approach is the collaborative sensing based on permanent feedback by individuals.

After the alarming incident, such information generates growing collective knowledge about the dynamic situation. This allows a gradual improved decision-making about the best direction for evacuation. The personalization of evacuation allows optimized decision making for people with specific characteristics of movement, e.g. disabled people are not capable of using stairs.

PERSEUS is a system designed to work under uncertainty, such as unexpected threat evolution, or panic in user behavior, which, of course, is highly likely to happen in emergency situations. Specifically, the system aims at achieving a high degree of dependability. Generally speaking, uncertainty in an evacuation system may result from three main factors: a) user location and movement, b) threat evolution, and c) building status.
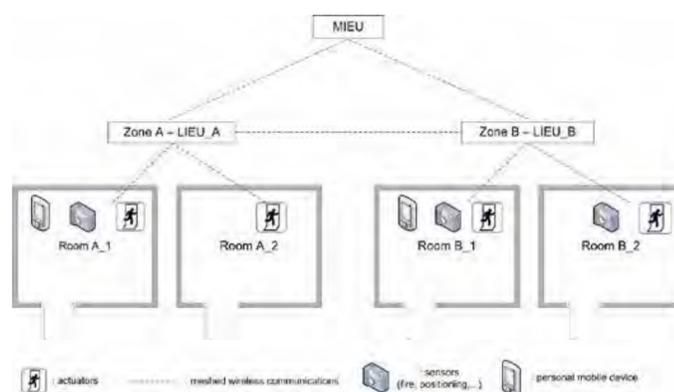
Bird´s eye view of PERSEUS Architecture