Title:

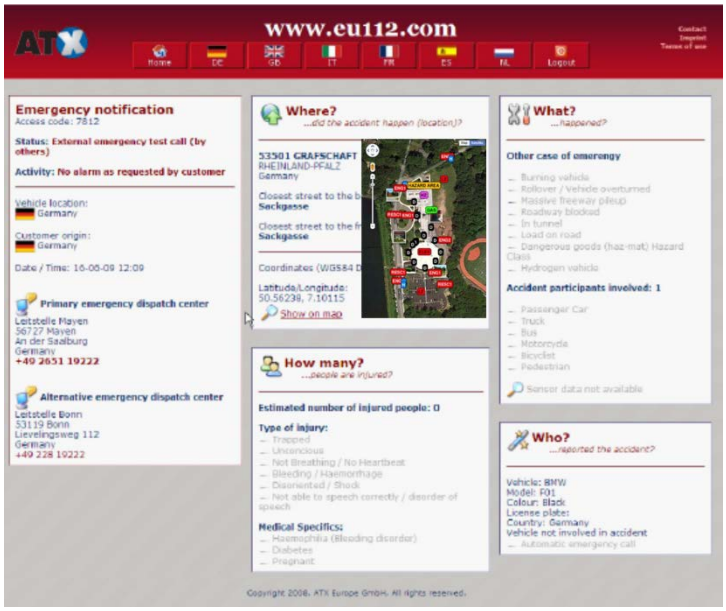
Development of a web SIP client app for communicating with an automated sensor-trigerred SIP client and for displaying meaningfull data to human (public-safety answering point - PSAP) operators in case of an emergency call

[1 diploma thesis, interaction with thesis # 1 is possible]

Scope:

Session Initiation Protocol (SIP) is an open, standards-based signaling method that negotiates multimedia sessions (i.e. voice and video calls) over the internet. SIP creates the messages that initiate and terminate multimedia calls between two endpoints. With its specialized structure, SIP is uniquely situated to broker WebRTC connections between two browsers. SIP and WebRTC are the proper combination for developers who want to build scalable, reliable, and durable communications applications. **The scope of the diploma theses** involves the development of a browser-hosted SIP enabled emergency app for the PSAP-112 side (a hypothetical Command and Control Centre) that is able to bi-directionally exchange data with an IP-enabled sensor monitoring platform (the caller) and to extract and display meaningfull data during an emergency call in progress. Open source webRTC solutions should be investigated.

Real data from an existing smart building monitoring prototype will be available for testing and include real-time commands, alerts, raw sensor data and video stream. A simple graphical user interface that displays the received/exchanged data (incl. alert type, position of the event and video data) will be developed so that the App operator is able to inspect relevant information visually and quickly for these spesialzed type of emergencies (that are currently not supported by all EU national PSAPs).



Special care will be given to support bi-directional communication so that the PSAP can take active role in the event monitoring. The web app aims to link SIP with webRTC and use geo location info as well as real time sensor and video info.

To facilitate the development the following recources are available:

- An open source SIP based API (based on Linphone library) and testbed (testing environemnt) that handles the signalling commands for automated calls that originate from telematics, sensors and user equipment such as tablets and smartphones that was recently released by the EU-co-funded NEXES project.

- (smart building monitoring platform) SW that enables an automated data-only call [following IETF draft spesification found in https://tools.ietf.org/html/draft-ietf-ecrit-data-only-ea-13] and handles sensor data storing and formatting. The relevant application (Android) has been developed by the I-SENSE Research Group (http://i-sense.iccs.ntua.gr/)

- Real data acquisition from an existing (3G enabled) sensor network. The relevant hardware (communication nodes and gateway) is provided by the I-SENSE Research Group (http://i-sense.iccs.ntua.gr/)

Required:

- Theoretical background on Mobile Communications and Networks, Multimedia Services
- Some experience with a programming language such as Python, Java, C++

Optional: Any hands-on experience with SIP or/and webRTC will be considered an asset.

What you will learn: Familiarity with IP data transport protocols and data formats in the IoT context, implementing and testing an end-to-end IoT client-cloud system with our help, experience on webRTC-based SIP compliant multimedia sharing apps.

Supervisors:

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