Project Achievements

CELTIC
Telecommunication Solutions

HNPS
Heterogeneous network

Heterogeneous Networks for Public Safety

The critical infrastructures that support communication are never more important than in the time of crisis or an emergency. Public Safety organisations throughout Europe strive to optimise communication technologies when dealing with emergencies. It is very important that first responders and emergency services have efficient access to all their services (voice and data).

Main focus

The project HNPS, Heterogeneous Network for European Public Safety, focused on a well controlled integration of communication systems, including private mobile radio systems and broadband services, using fixed or deployed networks. This controlled integration led to the concept of heterogeneous networks for future European public safety communications.

All kinds of communication networks are available nearly everywhere, but despite this public safety organisations struggle with interoperability issues. In the case of a large emergency with many participating organisations and units, it is very likely that these entities will use different communication technologies as well as services. This means that in a worst case scenario, they will not be able to communicate and/or work together.

The heterogeneous network concept developed by HNPS allows rapid integration of available communication resources in the event of a crisis or disaster, supporting the daily operations of public safety agencies by optimising resource allocation and providing a set of advanced digital services.
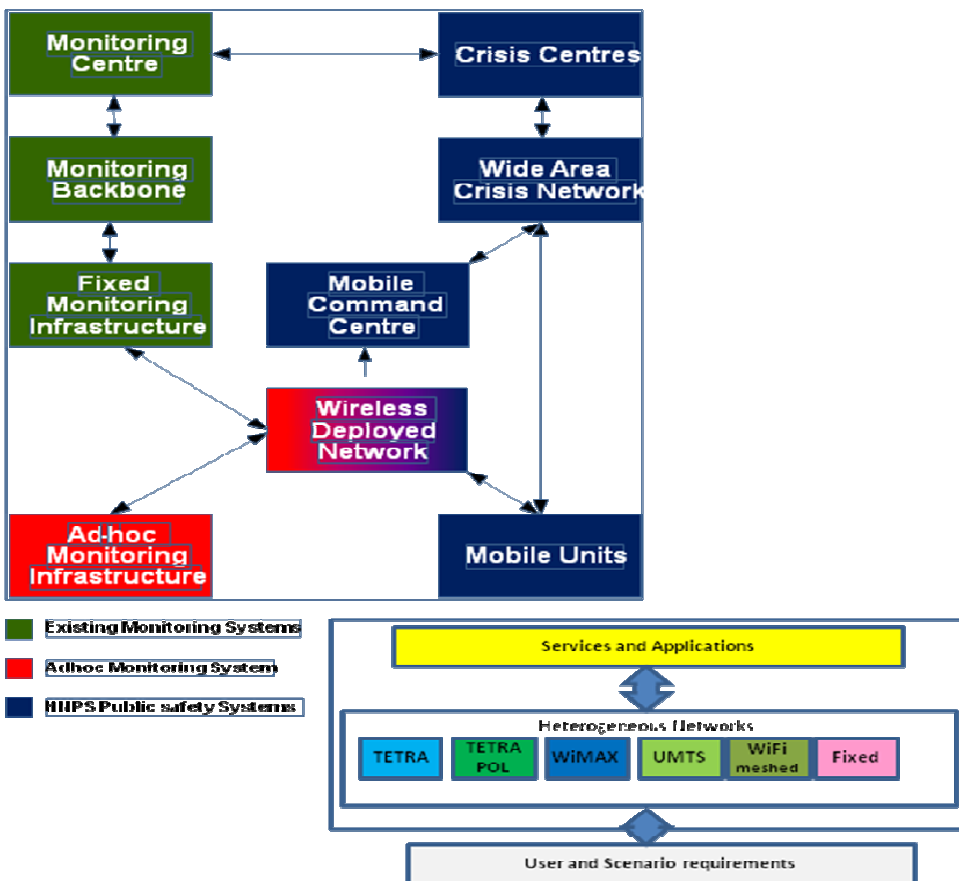
HNPS

Project ID: CP5-010

Start Date: 1 July 2008

Closure date: 30 December 2011

Partners:

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CASSIDIAN, France

Entreprise des Postes et Télécommunications, Luxembourg

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Project Website

www.celticplus.eu/projects/celtic-projects/call5/HNPS/hnps-default.asp

www.hnps.eu

Approach

The project's approach is based on the use of advanced IP technologies such as IPv6, multi-cast, network mobility, and Wireless Mesh Networks. It integrates a number of existing and emerging communication systems, e.g. GSM/GPRS, UMTS, TETRA, TETRAPOL, WiMAX, LTE and WLAN. It also includes wireless sensor networks and an experimental wireless mesh network based on the OpenAirInterface platform.

The project establishes an evolutionary approach; the gradual integration of different systems takes the complexity and compatibility of different standards and protocols into consideration. Likewise the system approach is used in application integration and test bed design. The test bed, developed in the project, created a platform for:

♦ System compatibility tests, carried out by different research and industrial organisations,

♦ Application integration and interoperability testing,

♦ Usability studies and field trials, with the participation of public safety users,

♦ Training and educational activities

Achieved results

HNPS aimed at providing innovative solutions for heterogeneous internetworking architectures, adaptive network control and management, interoperable middleware, network cross-layer protocols, ad hoc broadband wireless network protocols and adaptive applications. The deployment of these solutions as an integrated system for public safety means that not only communications are addressed, but also applications and services, such as crisis management, voice communication, localisation and video transmission and analysis solutions.

The overall operational scenario was divided in two main phases, each with its own relevant contributions and outstanding results:

♦ Detection and Verification, advanced tools for different video surveillance applications and thermal image analysis have been developed, so a given incident can be detected and alarms are sent to various subsystems.

♦ For the Management and Coordination of a hazardous event, a number of different resources are localised and mobilised. The communication needs can be covered in combining fixed radio networks (TETRAPOL, TETRA, Wi-Fi, WiMAX, UMTS and Sat-Com) and fast deployable network technologies (WiMAX, Wireless Meshed Networks and Wireless Sensor Networks). Voice applications, wideband data and localisation services have been developed to cope with the needs of the deployed resources in real time.

Within this two-stage framework, all the components, solutions and innovations detailed at the start of the HNPS project were realised:

♦ heterogeneous internetworking architectures

♦ adaptive network control and management

♦ interoperable middleware for applications interworking

♦ network cross-layer protocols

♦ Ad hoc broadband wireless network protocols

♦ Adaptive applications (tactical client, web-portal, video analytics, PMR application)

♦ Wireless sensor networks (body sensors, NBC sensors)

Impact

The project demonstrated that its concepts were valid, in a simulated scenario that was presented to public safety users in several workshops.

The scenario showed how different safety and emergency units (personnel including their equipment) could work together, whilst still using different communication solutions, by implementing the project's solutions. The use of these solutions improved the overall quality of public safety missions. HNPS successfully provided innovative solutions for heterogeneous interworking architectures, adaptive network control and management, interoperable middleware, network cross-layer protocols, ad hoc broadband wireless network protocols, and adaptive applications. Furthermore, HPNS achieved the development of an integrated system for public safety communication.

Dissemination activities in relation to these results have resulted in more than 10 papers published throughout the project at national and international transport, networking and emergency oriented journals and conferences.

In addition several partners plan to exploit the results of the project in new or updated products or solutions that will be available soon.