



UNICRINF

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Project Websites

www.celticnext.eu/project-unicrinf

<https://www.unicrinf.eu/>

Universal Critical Infrastructures

UNICRINF is a project that seeks to support the emergency services in the first moments immediately after a natural disaster or emergency has happened. Chaos and loss of communications are very common in these situations.

The overall objective of this project is to develop a solution that makes it possible to use the available communication infrastructures in order to create an integrated global platform to detect catastrophes, communicate with emergency teams and advise citizens.

Main focus

The main objective of this project is to build an emergency agnostic network which uses available mobile devices and surviving infrastructure to support applications for victims' triage, remote area disaster monitoring and sensors real-time information.

A special focus of this project is to provide quasi real-time monitoring of the survival communication infrastructure.

UNICRINF aims to cover all tasks and steps during a catastrophe: recover radio and fiber infrastructure; deploy and read specific sensor; control and advice the people involved in the catastrophe area; launch and coordinate the emergency protocols and services; monitor the communications infrastructure in emergency

scenarios, activity associated with fault management. All compiled and shown in a server application where all info will be centralized.

Approach

Throughout history, natural disasters, from floods to earthquakes, have caused many serious problems due to their negative effects on the lives of the people. No disaster in particular can be classified as the worst of all, but, according to the figures obtained from the experience, we can conclude that earthquakes are the type of disaster that have had the most negative effects on infrastructures, human losses, and economy.

Even though an earthquake itself is only a strong shake during a short time interval, the disaster is composed by the multitude of heavy damages that it causes: destruction of homes, land degradation, landslides and the destruction of important infrastructures such as roads, bridges and communication lines. This causes chaos in road and communication infrastructures and requires urgent actions to allow that the damage left by the earthquake is not magnified with the loss of more human lives due to the lack of communication and transport infrastructures. Rapid action by emergency teams in a coordinated way with the possibility of maintaining uninterrupted communication and transport is absolutely necessary.



The project considers the best communication technologies available in the today's market and implements them in advanced sensors networks, fiber, mobile and satellite areas, to provide a complete platform that allows to locate, to alarm and guide people through emergencies. It also provides fast emergency services to minimize the necessary time of reacting and to improving disaster management.

Regarding the technologies used for quasi-real time monitoring, troubleshooting and measurement of the network status, solutions capable of detecting emergency situations in a proactive and reactive manner and supervision of critical communications infrastructure in quasi real time has been provided.

Main results

Detection of damaged or remaining infrastructure will cover the analysis of data provided by new generation sensors and protocols. The following use cases are covered: Identification of remaining infrastructure using new generation sensors and protocols.

- ◆ Analysis of data and delimitation of damaged area.
- ◆ Identification of best network to be rebuilt with remaining infrastructure, and allowance of national roaming to share operators' networks.

- ◆ Identification of optimum locations to place emergency telecom elements, core and mobile.
- ◆ Develop emergency protocols to rebuild the infrastructure.

Implementation of video contribution protocols for emergency services:

- ◆ Information Channel and video news: implement a video contribution to broadcasters of video emergencies. The system will include a system that will deliver video assets in Live and VOD to Telecommunication providers with a simple content management system. The emergency video news contributors (emergency services, local town support services, TV news, etc) will be able to create new channels and to update the videos in a very simple way.
 - ◆ Immersive 360 Video Emergency monitoring: implement a portable on a vehicle system composed by a 360 video camera with a vehicle support device.
 - ◆ Aerial Drone with 360 Video Camera connected to 4G small cell: implement a system with a 360 Video Camera mounted in a professional aerial drone.
- Monitoring of the communications infrastructure in emergency scenarios:
- ◆ Solutions capable of detecting emergency situations in a proactive and reactive manner

- ◆ Supervision of critical communications infrastructures in quasi time real
- ◆ Troubleshooting and measurement of network status

Impact

Different technologies are developed in order to satisfy the objectives of the project and to obtain a full system that facilitates the actions after a catastrophe and to guarantee the communications.

- ◆ Monitoring system: The main technological development will be the fast deployment (plug and play) of (Wireless) Sensor Networks that will allow identifying the structural health and remaining life of the structures affected by the disaster.
- ◆ Communication system and launch of consequent actions: In order to guarantee communications during the catastrophe, an agnostic network will be developed. It will be included in the restricted area and will allow the contact of the emergency services with any mobile user connected there.
- ◆ Data analysis and protocol development: Data provided by sensors and damaged or remaining telecom infrastructure will be analyzed and used to identify damaged area, and to add the needed intelligence to the infrastructure.
- ◆ Technology that allows to detect in quasi near time real quasi anomalies associated with emergency situations, such as service interruptions
- ◆ Specification of functionalities to monitor the network and services in quasi-real time that can be displayed graphically.
- ◆ Generation of measurements of the state of the network and services in real time, such as location information and status among others.

About Celtic-Plus

Celtic-Plus is an industry-driven European research initiative to define, perform and finance through public and private funding common research projects in the area of telecommunications, new media, future Internet, and applications & services focusing on a new „Smart Connected World“ paradigm. Celtic-Plus is a EUREKA ICT cluster and belongs to the inter-governmental EUREKA network. Celtic-Plus is open to any type of company covering the Celtic-Plus research areas, large industry as well as small companies

or universities and research organizations. Even companies outside the EUREKA countries may get some possibilities to join a Celtic-Plus project under certain conditions.

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