

THE FUTURE OF EMERGENCY COMMUNICATIONS

An interview with the EMYNOS project coordinator Dr. Yacine Rebahi

Why do we need Next Generation emergency systems?

Everyone nowadays uses facebook, skype, and twitter. On the contrary, the present emergency systems are based on an old-fashioned telecommunication technology that cannot cope with the modern Internet-based services that the European citizens use every day. This is the main reason why we brought EMYNOS to life. Our framework enables users to use text, audio and video and make emergency calls across heterogeneous devices such as PCs, TV sets, mobile devices, AAC and haptic devices.

What are the main disadvantages of the current systems that you would like to improve?

Some of the present limitations are the partial media support and the lack of integration of social media. Currently only voice calls and sometimes SMS are accepted. There are no advanced features like accurate caller location, for example. The use of an analogue modem provides eCall services with limited data amount. These are just some of the disadvantages that we have addressed.

Could you mention some of the EMYNOS innovations?

We have developed a platform that enables people to make emergency calls not only using "their voice" but also using rich multimedia. This means you could make a video call or send a text message

to the emergency call center and they will reply. Actually it is not just text but real-time text! Various other functionalities such as emergency calls identification, caller location configuration, routing/redirection to the most appropriate or closest-available emergency call center, location information visualization, sensor data transmission, and protection against false calls were also targeted.

What do you mean by Real Time Text and why is it important?

RTT is a text communication where the message is displayed character by character. Normally you write a message and then press the „Enter“ key. However, in an emergency situation, where no time should be wasted, the better way would be, if the call center could see every character you write at that exact moment of writing, instead of waiting for the whole text to be sent. In this way, the person in the emergency call center could predict what you are trying to explain and react even faster. Sometime this could make a huge difference, especially given the fact that under a critical situation, every character of information received from the person in distress is important! It also provides means for communication where oral dialog is not possible or sufficient, for example if the caller is a person with hearing or speech disabilities.

RTT also enables the typing to be monitored by the receiver. In this way, every word will be seen, even if, for some reason, the user is unable to press the „Send“ button. In the meantime, the call taker could capture the typing pattern of the caller during the emergency communication. Such patterns could include corrections or hesitations. The level of writing difficulties can suggest the level of the stress or the physical condition of the person typing.

About Dr. Yacine Rebahi



Dr. Yacine Rebahi has a PhD in Mathematics and a Habilitation in Computer Science. He is currently working as a senior researcher and a project manager at the Fraunhofer FOKUS. He has been leading several research activities and working on Next Generation Networks, VoIP, security and public safety for almost fifteen years.

What else could be crucial in the context of an emergency and the EMYNOS team wanted to address?

What is also important, is the location of the caller. If you are using a smart phone with GPS, your location will be automatically sent when you make an emergency call. This would not be problem when you are outside. However, when you are in a building, GPS does not work correctly. For this scenario, in EMYNOS we have implemented several mechanisms. One of them is a solution based on WiFi enabled emergency calls from people inside a building.

Other issues that we addressed are support for people with disabilities and integration of social media. The project also demonstrated how the eCall concept could benefit from the IP technologies.

What is eCall?

It is an emergency solution for vehicles in case of crash. When a car accident happens, a call is automatically established between the car unit and the emergency call center.

What are the EMYNOS eCall extensions?

In EMYNOS, we implemented “eCall Next Generation” – which means it is not just a call that occurs but much more. Our implementation allows audio-video calls towards the emergency call centers and complements the location information with photos, videos and even sensor data.

Let me give an example: if a truck carrying some dangerous chemicals crashes on the highway, the



eCall extensions would send some additional information such as: what is the liquid temperature, is it burning, etc. This information will help the emergency center to decide what they need to do first and what kind of instructions to give to the passing by cars.



How can we exploit social media to support disaster management operations?

Until now, in public safety social media is used only in one direction. This means that when there is an emergency situation or a natural disaster, the fire brigade or police use their social media account to share information with the citizens. EMYNOS enables the communication in the other way around: citizens could use social media in order to support or improve public safety operations.

Imagine there is a fire in a forest: in this case, people close to the event could describe it in more details and send pictures to the emergency call center so the firefighters have better idea about the dimensions of the situation.

Handling emergency situation should not only be the task of the rescue teams. Involving citizens especially through facebook or twitter in monitoring events and sharing information will lead to a better management. Therefore, one of the points that we have targeted in the EMYNOS project is to make the bidirectional emergency communication possible.



Which target group would benefit the most from the framework?

Next Generation emergency systems are a topic that concerns the whole society. Everyone will benefit.

How do you plan to “integrate” elderly people into the emergency call process?

Elderly people or people with chronic diseases could especially benefit from Next Generation emergency systems. Let’s assume that some of them are using devices monitoring their health. Such being the case, the health sensors could provide the status of the elderly to the emergency services.

Imagine an oldman at home. In case he loses his balance and drops or the “health sensors” indicate a vital measurement above a critical threshold, then an automated SIP-based emergency call to the nearest located center is initiated. In this way, the old man does not even need to speak because the medical team already sees his vital parameters (for example heartrate) and know what is happening so they can send the most appropriate team and equipment.

How would you reach the people with various categories of disabilities?

EMYNOS could offer people with special needs full access to emergency services. Most of the current emergency systems have already implemented alternatives to voice calls. However, these are mainly limited to assistance for people with hearing and speech impairments. The solutions used so far, fail to provide access to emergency calls for users with other disabilities for instance. This is especially important when it comes to

people who do not communicate verbally or who due to their physical disability are not able to use a computer or a mobile phone by hand movements. It also affects people with visual impairments. Each of these groups of people needs individual customized solutions to overcome their disabilities.

One possible solution would be a total conversation. This means the combination of audio, video and real time text. Video can be also used for sign language communication for deaf people. In this case, however, a sign language interpreter is invoked as a third party in the call to facilitate the communication.

Many people with disabilities also use high-tech Assistive Technology devices or applications to improve their capabilities in everyday life. Some of these products can be extended to making emergency calls or sending emergency messages. For these reasons, the EMYNOS API for Assistive Technology was developed.

Could Next Generation emergency systems help Alzheimer's & Dementia patients?

People with dementia or other cognitive problems may find it easier to use symbols to communicate. One of our partners has developed a system that transforms text into symbols and vice versa. If there is a fire in the house, the caller could send a corresponding fire symbol while his message will be transformed into text. The answer of the call taker will also be translated into symbols.



Did you have the chance to show EMYNOS to the end users?

Yes, one of our pilots took place in Poland and lasted a couple of months. During this time, the system was used by people with all kind of disabilities. The most positive aspects noticed by users testing EMYNOS solutions were: increasing the feeling of safety and comfort as well as intuitive and easy-to-use interface. The possibility of sending disability profiles information to emergency call centers seems also to be very appealing to persons with low communication capabilities as it would foster the communication, raise their feeling of security and being taken seriously by the emergency operators.

Is someone willing to adopt or has already adopted the technology?

There are many potential users but adopting the technology is a long process. To adopt any kind of new technology means to change and adapt the old system or at least to make some extensions. This usually requires money and the support of the government.

Do you plan to cooperate or “have you already worked” with some institutions or companies?

The EMYNOS project unites partners with different expertise such as telecom/satellite operators, VoIP provider, eCall testers, end users. Together we formed a full chain for the provision of a Next



Generation emergency service - starting from the caller, going through the network, and ending at the emergency call taker.

For instance, during one of our pilots, we integrated and tested the EMYNOS framework with the system of the Austrian Red Cross. At the occasion of two other pilots, respectively held in Poland and Turkey, and workshops in Spain, the project partners successfully demonstrated the integration of EMYNOS with their existing legacy systems. People see the benefits but in order to make changes you need money and the support of the authorities, the process will take some time.

Which could be the barriers of successful use of the technology?

As I said, the main challenges are policies and funding. The emergency calls are free of charge. That is why some stakeholders (for instance network providers) do not see any benefits in improving the current infrastructure. Of course it is good for the citizens but it is not profitable. This delays the progress.

How many people could this technology potentially reach?

There are no limitations. The system could be implemented on a regional level, on a national level or even on an European level.

Is there a primary target group that you would like to address?

Emergency situations are not that often but everybody is concerned.

What were the most challenging aspects that you faced while working on this project?

One big challenge was the integration with already existing systems.

The project had two parts. The first one was the implementation of a testbed - purely Next Generation. The second part was the integration of this testbed with legacy, with the existing systems that are not open to receive calls from the internet. This means that we needed to create gateways - components that enable the communication between our testbed and the legacy systems. This was the biggest challenge during the past year.

Furthermore, we wanted to develop something that finds actual use in the future, so it was very important that our implementation complies with the existing standards. It is not only about the technology but also about regulations and policies. Standards are not all the time easy to implement. One standard even popped up after the project had already started.

How does the future of emergency systems look like?

First of all we need to find a working funding model and gather the money for improvement of the current emergency systems. It is also important that the policy makers try to "oblige" the mobile providers for instance to adopt Next Generation emergency technologies. One of the main aims of EMYNOS is to show to the public and the policy makers that we already have the technology and it works. So they need to push the stakeholders to move forwards.

I am optimistic about the future, we see that things are progressing in Europe but it will take time. The United States are planning to have a full system

with text, audio and video by 2020. In Europe we will need a couple of years more, but it is still a matter of time.

What would be the next step?

A complete upgrade in one step will be unrealistic. I would suggest to go step by step, feature after feature. Make sure that the first feature works fine, then implement the next one and so on until you have a full system. For example, the first step could be to add text. We could also include accurate location. Then video and so on. An IP-based Next Generation emergency system is the end point, the vision. We could achieve it step by step.

This interview was conducted by Maria Stoyanova, a graduate student in Computer Engineering and Physics at Beuth University of Applied Sciences and Technical University Berlin. Contact at [in/maria-stoyanova](https://www.linkedin.com/company/maria-stoyanova)

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