

# E-GOVERNANCE TO FIGHT SEVERE WEATHER: THE ROMANIAN CASE

FURDU IULIAN<sup>1</sup>

<sup>1</sup> "Vasile Alecsandri" University of Bacău, Calea Mărășești 157, Bacău, 600115, Romania

**Abstract:** The aim of this paper is to describe and analyze last years romanian policies and e-government solutions in fighting extreme weather, their impact on the population, and future trends. IT warning solutions for severe weather are also presented.

**Keywords:** e-governance, ITC, government-to-citizen, extreme weather

## 1. INTRODUCTION

Severe and extreme weather refers to unpredictable, unusual or unexpected weather phenomena which have a destructive potential both from an economic point of view and in terms of people's safety and life. It is mostly related to extreme manifestation of temperature (drought, forest fire, extreme cold or heat waves), precipitation (floods, hale, etc.) and wind (blizzards, storms, hurricanes, etc.) and they are to become more frequent or more intense with human-induced climate change, according to United States Environmental Protection Agency [1]. Only in USA, in 2016 extreme weather caused 297 deaths and an economical damage of \$53.5 billion. Moreover, the 15 most destructive extreme weather cost events in 2016 was more than double of similarly disaster events in 2015, which totaled \$21.5 billion (Center for American Progress [2]). This statistics are strenghten by the U.S. National Weather Service report on weather fatalities in 2016 [3].

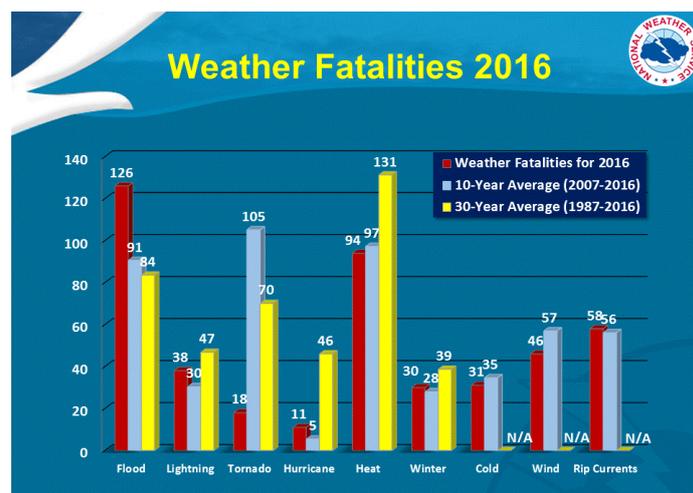


Fig.1. Weather Fatalities (USA) in 2016 by comparison to last 10 and 30 year average

As figure 1 proves weather fatalities in 2016 are comparable with average data within last decade, and even exceeds them in case of floods, lightening, hurricane, and winter. From this perspective a special attention should be given to inform, to educate, to raise awareness, and of course to warn the population as early as possible and to take all the needed measures to minimize the impact in case of natural disaster. Next chapter gives some insights on European ITC solutions to counteract severe weather.

## 2. EU COUNTRIES AND SEVERE WEATHER SOLUTIONS

There is still no dynamic website information within entire Europe related to extreme weather phenomena. Despite the fact that extreme weather data are dynamically updated within meteoalarm.eu site for example, the communication the site and EU citizens is static. That means there are no push up notifications or sms alerts given to EU citizens in case of severe weather, based on their location, despite the fact meteoalarm.eu website integrates all important severe weather information originating from the official National Public Weather Services across 34 European countries. „This information is presented consistently to ensure coherent interpretation as widely as possible throughout Europe”[4], but if you are exposed to being affected by an extreme weather event in EU, you are not warned, unless you are keeping online contact with meteoalert.eu site or other i.e. national – weather information service.

Romania neighboring countries are facing the same situation, except Poland. In Poland, the National Hydrological and Meteorological Service includes the meteorological protection functions which cooperates with emergency services and national government bodies, but fast transmission of current information on potential weather threats available to all citizens is still an issue [5]. However, Poland is a good practice example, meaning extreme weather maps generated by ISOK system could be transmitted as user-defined alerts, „generated twice a day and sent as text messages (SMS) and e-mails only for a specific area of interest chosen by the user” [5].

In Hungary met.hu [6] provides forecast and warnings for public since 2006, and the Hungarian MEANDER system makes ultra short range forecast and weather warnings in three steps, the data being presented as texts and hazard maps [7]. Still, no other type of phone warnings except you’re connected to met.hu. Same goes to Romania where national forecast meteorological site gives alerts based on hazard maps and texts [8]. Due to the last years extreme weather events that have led to the loss of human lives and important material damage, new governmental decisions were adopted, moving Romania with sinuous but upward steps towards a proper e-government solution. The next section describes this evolution and focuses on software implementation details for managing the severe weather alerting system.

## 3. ROMANIA AND ITS PROBLEMS CONCERNING SEVERE WEATHER

In Romania, the architecture of the Integrated Warning and Alarm System is geographically based pyramidal and includes: The National Command Center which has attributions in monitoring and commanding on regional and county command centers. County centers also coordinate local command centers [9].

### 3.1. First steps towards a collaborative alerting system in Romania

On Tuesday, 26, 2016, the State Emergency Department launched the DSU mobile app for Android and iOS, available on Google Play, and AppStore. The application has four components: information, alert, reporting, and learning (Figure 2).



Fig.2. Promo for DSU app (www.dsu.mai.gov.ro)

Within the information section, the users of the application will find the latest news from the emergency field, directly at the source. Emergency Situations Inspectorates, General Aviation Inspectorate, Ambulance Services, Mobile Emergency, Reanimation and Extrication Service (SMURD) and Mountain Rescue (Salvamont) can provide information to the DSU application users.

The application groups in the "alerts" section all information about emergencies on the Romanian territory: meteorological alerts, floods alerts, or blocked roads. Depending on the GPS coordinates, alerts in a user's area of interest will be prioritized for which the user will receive push notifications.

Through the "Reporting" section, the population has the opportunity to come to support the emergency services staff. Anyone witnessing an emergency situation, whether flood, landslide, fire or road accident, will be able to send pictures and videos to the Emergency Department contributing to improved information by accessing images from the very first moment. A report of a disaster situation through the "DSU" application will not be treated with the same priority as a 112 call, but will be used by the intervention teams to assess the situation and adapt the way of interventions.

Through the "learn" section, users have access to articles on earthquake, flood, fire, first aid, and rapid saving measures that can be taken if faced with an emergency. The lessons come with tests, where the knowledge gained through the articles can be verified. The application also comes with tests designed to verify users' knowledge of how they should behave for a disaster. The application was funded by the SMURD Foundation from extra-budgetary funds worth € 17,000 and will be improved over the course.

To promote the DSU application, a partnership with Discovery Networks has been completed, which will support the project through a communication campaign on its own channels and partners [10].

3.2. First issues and first upgrade for DSU app

First problems will come in a short period of time, when testing the application under real conditions in which the communication wave resulting from reporting of extreme phenomena has blocked the application. The solution consisted of resizing hardware resources so that there were no bottlenecks. Department officials have announced that "For those who have difficulty accessing the DSU application, the issue is known, and it is now working to resize the server to allow more simultaneous accesses" [11].

First upgrade come after one year: the users could now find where are located the shelters for civil protection, pharmacies open 24 hours a day or the closest police units within the city. The app was enhanced with an interactive map, and also, those in danger can call emergency number 112 directly from the application [12].

The application also contains links to the General Inspectorate for Emergency Situations, for companies and businesses that need Emergency Situations Authorization, and have easier access to a form that shows which documents are needed and where to go with them. As for children, an important component of the application is the educational component. For them, a role- playing game has been created through which the risks can be recognized. "Rex&Andrei versus Dr. Formidabilis" is the name of the game. Dr. Formidabilis mission is to create disasters, and children are mainly taught how to act and how to recognize the risk when it exists." Despite these update the application is not enough promoted and errors and blockages keep appearing. That why he was installed by more then 100k people, less then 0.6% of total 18 millions population. Moreover, DSU app has on Google Play 13% -1 star reviews from a total of 4 and 5 stars reviews (384 from 3939) as figure 3 proves.

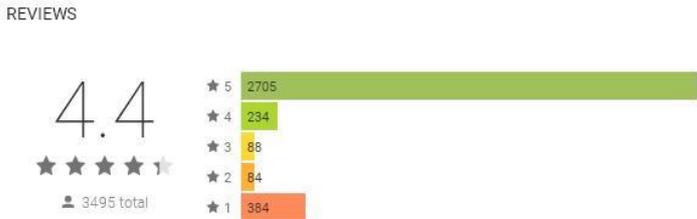


Fig.3. Reviews for DSU app (15.10.2017, <https://play.google.com/store/apps/details?id=ro.iconsult.dsu&hl=ro>)

### 3.3. The medEasy app

The Department for Emergency Situations and the Romanian IT company Qualitance have launched the medEasy mobile application for young emergency medical specialists (it has support for 1000 users) to help them perform and monitor their medical activities and procedures more quickly and to facilitate collaboration between residents and their tutors. The app can be found on the Google Play Store and the App Store, only available to its recipients.

According to the existing system, a resident doctor spends almost two minutes to report five standard procedures imposed, for example, on a case such as a cardiopulmonary stop. The application will allow the resident doctor to perform the same reporting in 40 seconds by simplifying the process and user experience, as the application developer shows.

„Taking into account that a Resident Emergency Unit (UPU) resident daily faces an average of 20 emergencies on average, the mobile reporting and validation application provides them with around 25 extra minutes to treat patients every day, which means about 15,000 minutes per day for all UPU's nationwide. The application streamlines the reporting process and optimizes user actions, with a total of hundreds of thousands of beneficiaries - physicians and patients” [13].

### 3.4. Next steps

Web platform [www.fiipregatit.ro](http://www.fiipregatit.ro) (figure 4) will become the official source of centralized information for the general public on emergency safety measures [14].

The platform is developed by [civictech.ro](http://civictech.ro) - a non-governmental and non-profit start-up. The proposed solution (25% implemented) will be developed in close collaboration with DSU specialists and will include the following functionalities:

- public user interface;
- content management interface;
- dynamic content layout based on geographic location of the user;
- Retrieving alerts / news information from the DSU mobile application system.

The project is currently in the process of documenting, analyzing and finalizing technical specifications. The concept of the interface has already been agreed and is in the finalization phase.

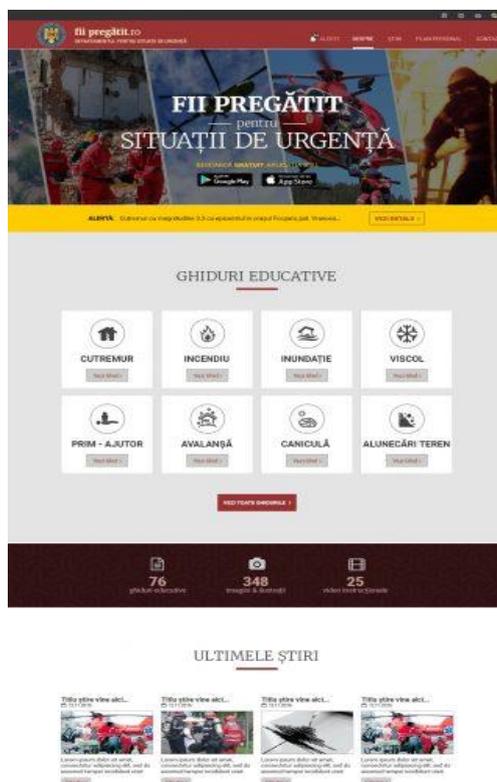


Fig.4. Preview of fiipregatit.ro platform [14]

”Sistem Alert/ Alert System”- the application for early warning the people in case of major risk situations. The "Alert System" application will be developed and implemented by ANCOM - National Authority for Communications Administration and Regulation, IGSU - General Inspectorate for Emergency Situations, STS - Special Telecommunications Service, DSU - Department for Emergency Situations, in collaboration with the mobile telephony operators.

The system to be implemented will use "cell broadcast messages" technology, which will allow simultaneous transmission of an alert message to all mobile phone users in a particular area of a mobile network [15] and it will work by sending specific alert messages sent to subscribers on their mobile phone, not just by a simple SMS, based on the existing and functional model in other European countries. Alarms will be issued according to emergencies at regional level - extreme weather phenomena, forest fires, explosion risk, other calamities and risk situations [16].

The authorities' response comes after recently eight people died in the storms from the western part of Romania (september 2017), and another 137 were injured, affecting 212 localities in 15 counties [17]. In parallel with the implementation of the alert system, a public information campaign and population training will be launched to use this system.

The government decided to set up the Ro-Alert system, Minister of Internal Affairs, stating that, according to meteorologists, in the coming period Romania will increasingly face the genre of „nowcasting” phenomena. „The system will be implemented with the support of STS- Special Telecommunications Service and will be operated by 24 hours a day by structures of Emergency Department and Emergency Situations Inspectorate”, (Carmen Dan- Minister of Internal Affairs [18]). Among the benefits we can include:

- transmitting warning messages adapted to the imminent event through the networks of the mobile operators;
- fast forwarding of messages to all users in the area threatened even in congested conditions by mobile operator networks;
- instantly display messages on the mobile terminal screen without the need for user intervention;
- cyclic repetition of alert messages at configurable intervals;
- the warning messages accuracy, since they are based solely on information provided by authorized sources.

#### **4. CONCLUSIONS**

E-government solutions concerning severe weather national alert system in Romania are on an ascending trend but further legislative efforts have to be done. Implementation of Ro-Alert system will be a great step forward to a more secure geographical and social space, by minimizing severe weather impact. Further upgrading and developing applications like DSU will have also a positive impact on users, contributing to a more reliable relation between the state and its citizens.

Nevertheless, other alarming systems and layers should be implemented in parallel since not all people use mobile phones. Broadcasting radio warnings or installing alarm system based on sirens could become viable alternatives, especially on remote areas where there are no GSM services.

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