

ICT tools for Crisis Management Events – Rescue by aeronautical means

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Abstract: - Within this research we try to offer new approaches to reengineering the current rescue procedure in case of rescue by aeronautical means in Hellenic public territory. The proposed reengineering will give answer to existing problems like lack of resources, money spent and time limitations on rescue situations. The significance of solving such problems is more than profound regarding the human point of view, since with a better reengineering human life's are helped. In addition to that using this work economical and public resource management benefits can be gained. The core innovation of this research is the modeling of rescue procedure and reengineering of this aiming reduction in time and cost. There is a pro-found money spending in aerial transfers in Hellenic Republic rescue procedures, taking into account the difficult economic situation of Greece it is essential to introduce methods for reducing money wasting. Up to now previous work are based only to traditional reengineering with tradition writing. In this research we propose an electronic way of observing one particular rescue situation. The method we used to verify the proposed methods and models are through the presentation of the business procedure of aerial search and rescue by using the information tool, Bizagi Process Modeler. The al-ready existing situation is presented, followed by a suggestion of reorganizing its procedure. In addition to the above referred the tool and the methodology of supporting the implementation of operations is presented, together with the documentation and the registration of operations for further processing. It is not easy to realize both a reorganized model as well as its evaluation with the framework of such a project; nevertheless an evaluation of the suggested changes to the procedure and its comparison to the present situation is being undertaken.

Key-Words: - emergencies, crisis management, modeling, BPMN, Bizagi, information tools, search and rescue

1 Introduction

Today the policy of managing emergencies will have to be an integral part of the contemporary administration; this role of public administration changes within a globally, changing, social environment accordingly. This environment asks for effectiveness and efficiency in combination with high quality services and reduction of cost and expenditures.

On the other hand creating a model of procedures is recognized as an important act of reorganizing the procedures which will help the solution of their problems¹. This model focuses on the systematic register, the elaboration and description of the structure, the function and the activities of an organization as it is based on the graphical method of the description of procedures. The graphical method of the description of procedures is suitable for the presentation of the flow of process as well as the parallel sub process; in this way the necessary

level of detail for making the overview of the procedure easier is obtained².

Reorganizing the procedures is the act of fundamental reexamining and radical redesigning of administrative procedures so that great improvement in service, quality, time and cost of services is succeeded³. The basic principles of reorganizing these procedures have been referred in details by the researchers and are summarized according to Hammer και Champy¹ as follows: 1. Manager of Business, 2. Focus on the goal, 3. covering a client's necessities and demands, 4. being concentrated of the value of business, 5. Virtual Recourses, 6. Exclusiveness of information¹.

2 Analysis




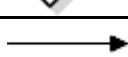
The methodology of reorganizing the procedure begins with understanding it first and then presenting it in five stages. These stages can not only be used as a sample of directions for the

methodology of reorganizing a procedure of an organization, but as steps of reorganizing the very structure of the organization itself, as well.

- a. Depiction of the already existing situation
- b. Analysis and evaluation of the already existing situation (AS – IS)
- c. Definition of the situation TO – BE
- d. Draft of a transitional plan to the situation TO – BE
- e. Evaluation and maintenance of the results

Business Process Modeling Notation (BPMN) was specified primarily by Business Process Management Initiative (BPMI) in 2004 and adopted by Object Management Group (OMG) in 2006 (White 2014). Based on the BPMN, four mainly basic categories of planning symbols are used: Activities, Gateways, Events and Connectors or Flows.

Table 1 BASIC PLANNING SYMBOLS BPMN

Event	
Activity	
Gateway	
Flow	

Source: BPMN Basics 2014 (<http://www.bpmn.org/>)

3 Materials and Methods

What is studied in this project is the case of the procedure of aerial search and rescue. CIVIL PROTECTION OPERATIONS CENTRE - KEPP coordinates the whole procedure and interacts with the bodies in charge. HELLENIC POLICE is responsible for the research and the FIRE BRIGADE/199 is responsible for the rescue. The SEARCH AND RESCUE COORDINATION CENTRE - EKSED is responsible for the helicopter taking off. This act follows a written request submitted by KEPP. When the case is about an incident, which is not submitted by a state service, but still through a phone call the use of helicopter is demanded, one has to follow the steps^{6,7}:

A. Non state service such as citizens, volunteers etc. calls KEPP referring that the need of using a

helicopter is urgent. The coordinators on shift of KEPP write down who asks the helicopter, the time and the telephone.

B. The coordinators on shift of KEPP call the director of KEPP for the incident.

C. The next step for the coordinators on shift of KEPP is to inform the bodies in charge for the incident pointing out to proceed in full investigation of the incident (exact place, report for injured people, any other valuable information) and then inform KEPP if there is actually an emergency of using a helicopter or not.

D. In case of inevitable use of helicopter, the coordinators on shift of KEPP call EKSED so that they prepare the helicopter to take off, emphasizing that a relevant document will shortly follow.

E. The coordinators on shift of KEPP and bodies in charge for the incident keep in contact with each other and KEPP is the one responsible for the coordination of the whole operation.

F. The coordinators on shift of KEPP prepare a document concerning the use of helicopter in operation and they send it to EKSED.

G. The coordinators on shift of KEPP follow the evolution of the incident being in constant communication with the bodies in charge; they register the time every act happens in detail until the whole operation finishes in the Daily Event Report.

Since we try to create a model of the procedure of aerial search and res-cue, the tool Bizagi Process Modeler has been used. Depicting the situation AS – IS, graphical presentation of the procedure has been accomplished and there followed by its Simulation, Process Validation and Time Analysis. Time Analysis helps us to end up in conclusions concerning the crucial parameter of time of completing this kind of operations, where many bodies are involved, and both time and cost play a decisive role. Referring to the Process Validation and its Simulation, a great number of counting the flow of work was specified – Max. Arrival count: 1000 – in order to confirm the Process Model, to stabilize its realization and to present reliable results. In the above mentioned process, five Lanes were used. In Time Analysis every step of the process had a time limit:

1) The first step starts with a phone call made by a non-state service to KEPP for a search and rescue incident with no time to spare as the time to be taken into account is charged on the next step.

2) The coordinators on shift of KEPP register all the clues needed for the operation – Time needed reaches 20 minutes.

3) Since the coordinators on shift of KEPP have been informed about the incident, call the director of KEPP so that he is aware of the situation being in progress – Time needed reaches 10 minutes. At the same time the coordinators on shift of KEPP inform both the bodies in charge within 10 minutes, as well as EKSED within 10 minutes too.

4) The bodies in charge who act in the area of the incident evaluate the conditions of the incident – Time needed reaches 1 hour maximum.

5) After having evaluated the incident and informed KEPP about its evolution, there follows the step of coordinating the operation; this is done by the coordinators on shift of KEPP – Time needed reaches 15 minutes.

6) The communication between KEPP and the bodies in charge continues during the whole procedure of the operation – Time needed reaches 3 days maximum. This is depicted in two steps: 1. Continuous communication and 2. Incident in progress.

7) While being in contact with the bodies in charge of handling the incident the coordinators on shift of KEPP prepare and send a written order to EKSED for the helicopter to take off within 20 minutes. There follows another written order concerning the preparation of caring injured people to the medical services within 20 minutes too. The coordinators on shift of KEPP call the director of KEPP to inform him about the evolutions – Time needed reaches 10 minutes. We have to clarify that to be able to understand the procedure, the bodies in charge after having evaluated the situation and keep in contact with KEPP within the coordination framework, consider the use of helicopter as necessary; the same happens with the use of an ambulance or with the general preparation for caring the injured people.

8) Then the preparation for the departure of the helicopter lasts 30 minutes. The preparation for caring the injured people lasts 30 minutes too.

9) The end of the operation is announced when the 3 days have passed - Time needed reaches 1 day (the last day of the operation).

10) The last step to follow is to register all the activities of the bodies in charge by the coordinators on shift of KEPP in the Daily Event Re-port, so that the procedure is completed and the incident is filed in the archives of KEPP - Time needed up to 6 hours.

Depicting the situation TO – BE, five Lanes were used, as they were presented in the present process with an additional sixth Lane, the one of the European Emergency Call Number 112⁸:

1) The first step of the procedure starts with a phone call made by a non-state service to 112^{9,10} for

a search and rescue incident with no time to spare as the time to be taken into account is charged on the next step.

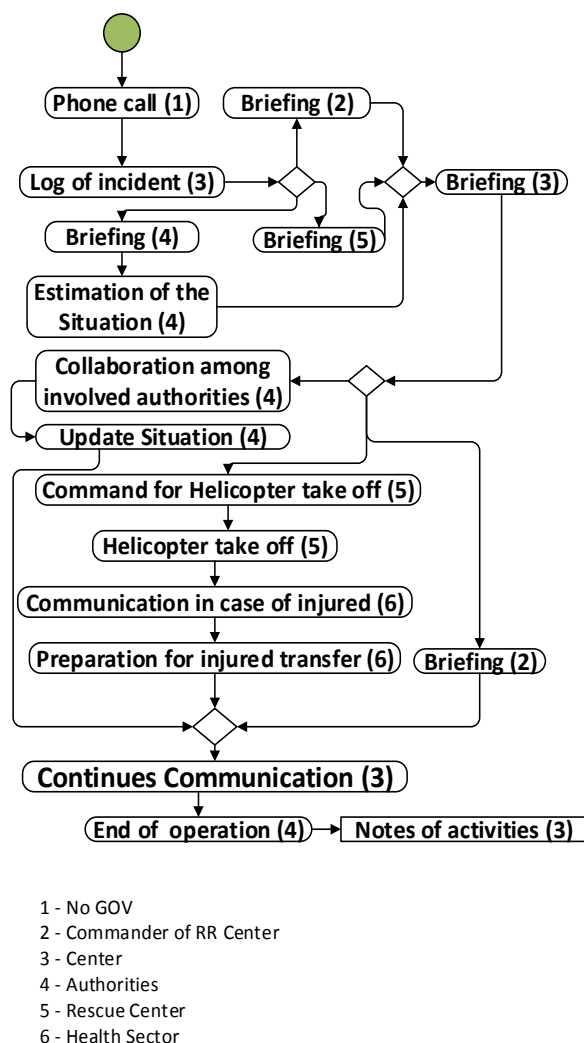


Fig. 1 SEARCH AND RESCUE AS – IS
DEPICTION

2) For this specific step, what is suggested in contrast to the already existing process, the coordinators of 112^{9,10} will have to register all the clues needed for the operation, so as to be in the position to inform KEPP – Time needed reaches 10 minutes. They will also have to inform the bodies in charge of the incident accordingly within 10 minutes, so that KEPP has no involvement with either the citizens or the volunteers; in this way KEPP focuses on the part of coordination. In this step of registration the time needed reaches 20 minutes.

3) After KEPP and the bodies in charge have been informed about the incident, they communicate with each other to exchange information by using

wireless devices TETRA, buying TETRA devices is suggested as the communication between KEPP and the bodies in charge be-comes easier in this way,^{11,12,13,14} which will make the coordination of the operation easier - Time needed up to 3 days maximum.

5) The end of the operation is announced when the 3 days have passed - Time needed reaches 1 day (the last day of the operation).

6) Finally, the registration of the activities of the operation is suggested to implement by using the information tool, which will reduce the time of registration from 6 hours to 1.

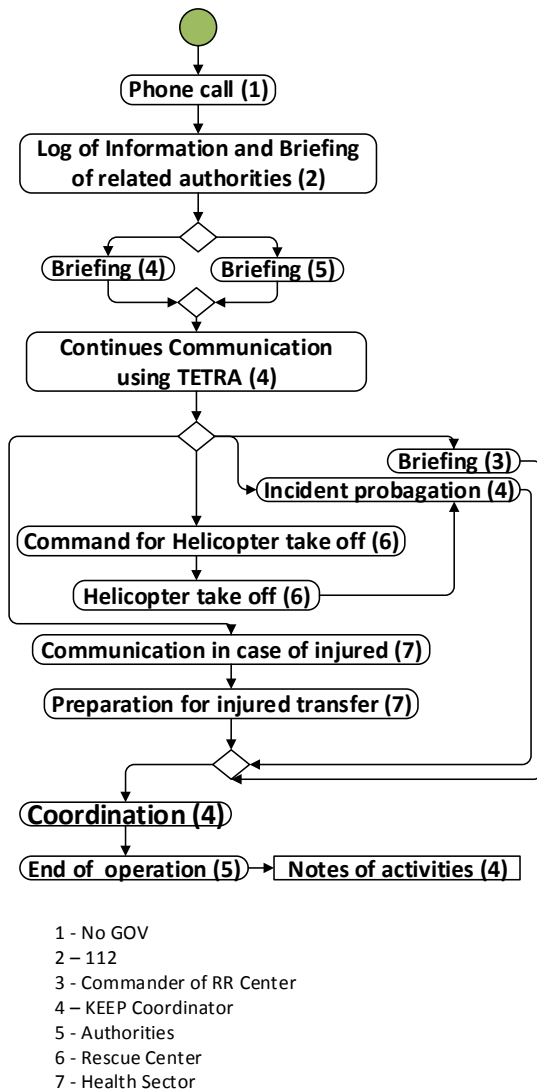


Fig. 2 REORGANIZING PROCESS TO – BE DEPICTION

4) At the same time, by using information tool, suitable for the present procedure or via e-mail the coordinators on shift of KEPP are not obliged to send written orders both to EKSED and the Medical Services as the orders are sent automatically and the time is annihilated. The time which remains the same is the 30 minutes necessary for the preparation of the helicopter to take off and the 30 minutes for the preparation of caring the injured people. The coordinators on shift of KEPP also need 10 minutes to inform the director of KEPP about the progress of the incident, as they did in the AS – IS procedure.

4 Results - Problem Solution

Reengineering the procedure by using the information tool Bizagi Process Modeler¹⁵, has revealed through the Time Analysis the capability of the bodies involved to modify time of every activity or step, which have no specific duration, such as the registration of clues concerning the incident lasting an average 20 minutes time. There is always the possibility of adaptation in case that the steps in question last less time - min. Time – or more - max. Time – than the average. Nevertheless there are activities with specific time, such as the time for the helicopter to take off, lasting 30 minutes. The results of Time Analysis depict the reduction of time, where an operation is carried out, in a reorganized procedure based mainly on the use of e-registration tools.

Table 2 TIME ANALYSIS

Activities / Steps		Min. Time (minutes)	
Before (AS-IS)	After (TO-BE)	Before (AS-IS)	After (TO-BE)
1	1	0	0
2,3,4	2	86 (11+5+5+5+60)	11
5,6	3	4335 (15+4320)	4320
7,8	4	87 (5+11+30+11+30)	68 (8+30+30)
9	5	1440	1440
10	6	360	60
Total		6308	5899

Activities / Steps		Max. Time (minutes)	
Before (AS-IS)	After (TO-BE)	Before (AS-IS)	After (TO-BE)
1	1	0	0
2,3,4	2	110 (20+10+10+10+60)	20
5,6	3	4335 (15+4320)	4320
7,8	4	110 (10+20+30+20+30)	70 (10+30+30)
9	5	1440	1440
10	6	360	60
Total		6355	5910
Activities / Steps		Avg. Time (minutes)	
Before (AS-IS)	After (TO-BE)	Before (AS-IS)	After (TO-BE)
1	1	0	0
2,3,4	2	98 (17+7+7+7+60)	17
5,6	3	4335 (15+4320)	4320
7,8	4	99 (7+16+30+16+30)	69 (9+30+30)
9	5	1440	1440
10	6	360	60
Total		6332	5906

5 Conclusion

The overview of this project is to highlight the modern administrative practices for the implementation of contemporary policies, related to

the dealing with crises and emergencies with the help of useful means offered by technology. An attempt has been made to apply the theory concerning the reorganizing of the business procedure of aerial search and rescue by using the information tool Bizagi Process Modeler. This attempt aims at creating a model and a pattern of the procedure and most specifically the complicated aspect of an operation where the points with problems become clear and easy to understand; in this way solutions for its improvement will be suggested.

By using the information tool Bizagi Process Modeler, the depiction is achievable and may be easily and quickly understood by all the bodies involved. In addition, with the help of Time Analysis being in progress and the Simulation, the possibility of elaborating the results for the average time of carrying out a complicated operation is offered. This attempt could be fundamental for further elaboration of clues in a procedure, which are not analyzed in this project, because of lack of time; these clues might be the reduction of cost, analysis of the recourses to be used, creation of scenarios and calendar analysis suggested applying by the same tool.

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