

Prospects of Emergency Aviation Development as Part of the Civil Defence System in Croatia

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Abstract

Regarding the trend of globalisation and regionalisation and its impact on standardisation and establishment of a unique practice in emergency operations of protecting and rescuing people and assets in danger, as well as the strategic orientation of Croatia to equally participate in the integration projects – one of the necessary preconditions for that is the establishment of an adequate system of emergency aviation. Institutional and technical dimension of such a system would not only indicate the recognition of the obligations taken on by Croatia but would be applicable in the general, practical sense. The paper defines the notion of emergency aviation and provides its classification – Search and Rescue, Emergency Medical Service, Fire-fighting; analyses its role in the system of civil defence, and argues for the establishment of the emergency aviation system in Croatia. Theoretical assumptions of its modelling are elaborating.

Keywords: emergency aviation, civil defence, search and rescue, emergency medical service, fire-fighting.

1 Introduction

The concept and strategic planning of transport development, as well as adequate functioning of relevant public and social departments in Croatia, are based on the orientation towards the integration of Croatia and its equal participation in global and regional integration processes. The basic precondition is the harmonisation of the national regulations and manner of operations with the standardised model which ensures uniqueness of application at the international level.

Establishment of the emergency aviation system, of complementary and multipurpose character, would contribute both, to meeting the accepted international obligations and to the rational usage of technical and personnel resources. At the same time, it would considerably increase the efficiency of activities in all regions of Croatia.

The air transport means feature essential comparative advantages over other transport modes, and they are without alternative in circumstances that require fast response and accessibility to terrains of various configurations.

Emergency aviation can be defined as multipurpose system of co-ordinated activities in the air with the aim of search and rescue, evacuation, medical treatment and air-treating of the endangered regions in cases of all types of accidents including natural disasters.

The justification of organising an emergency airborne resources results partly from the liabilities of every ICAO member to have a search and rescue service (SAR) of aircraft in emergency cases, the need to join regional and global associations with humanitarian missions (UNDAC, INSARAG), as well as the best practices of the national search and rescue systems, fire-fighting and medical assistance.

The model of optimal performance, regarding efficiency and usage of available resources, is achieved by single management, mainly from communication and information aspect, i.e. by co-ordinated connecting of all the special units into an integral system.

Since the organisation aspect has been delegated to national responsibility, the models of emergency aviation system differ from region to region and reflect to a great extent the level of coordination of the administration and commercial operation aspects of the entire system of civil aviation of a country. The technologically advanced western countries, as a rule, develop the emergency aviation systems in a multi-purpose manner by the co-ordination of the facilities and the techniques of various transport modes, as well as through the regional co-operation. The main characteristic of these systems is increased efficiency and rational usage of the resources.

2 Emergency Aviation – the Term and Classification

Emergency aviation implies the engagement of air transport means aimed at prompt action in all emergency situations i.e. in case human lives and natural and material resources are endangered.

Emergency aviation is the operational segment and logistic support in the system of state care for protection and security of citizens and assets in case of danger.

According to the primary purpose, the emergency aviation can be classified into subgroups for search and rescue (SAR), fire-fighting and emergency medical service (EMS).

2.1 Search and Rescue

The search and rescue system as humanitarian service of the highest state priority is defined as the co-ordinated activity of locating and finding persons in danger, potential danger or disappeared persons and their safeguarding and care treatment. In cases of accidents in remote regions or regions inaccessible to conventional means of land transport, as well as aircraft or sea accidents, the aviation SAR airborne resources have no alternatives.

As the SAR activity includes also the evacuation of people, the emergency aviation operations are based, as a rule, on the implementation of the helicopter fleet, the exploitation characteristics of which best overcome the possible adverse terrain conditions for carrying out SAR operations.

In the majority of national models, the organisational structure of the SAR system has been incorporated in the government departments of the police and army.

However, the trend of commercialising the operational functions of the government administrations is recognised in the examples of progressive partnership and corporisation of traditionally separated and operationally autonomous systems, such as e.g. police, fire brigades, and emergency medical service, within a unique operative management in emergency conditions i.e. by a unique information and communication centre.

Apart from the obvious advantages such as a more rational usage of fixed and mobile infrastructure resources owned by the state, and the optimisation of personnel needs – the centralisation of managing; standardisation of operational procedures and the possibility of targeted public and private involvement, as well as reduction of the emergency service costs can be achieved in this way.

2.2 Fire-fighting

The airborne resources as part of the system of fire-fighting are an irreplaceable means of combating forest fires, fires of great dimensions and space coverage, fires in inaccessible areas, on islands, ships and platforms.

Early detection and fast initial attack on the fire are crucial for the efficiency of the fire-fighting operation.

Therefore, the primary function of aviation is to attack the fire directly with the aim of stopping or slowing down the spreading of fire and providing the fire-fighters on the ground with the time necessary for them to get organised and distributed physically along the fire site, to fight minor fires and to organise efficient control.

Comparative advantages of using aircraft in fire-fighting operations are reflected in their capability to:

- attack the fire fast,
- attack fire in regions which are inaccessible to ground fire-fighters,
- throw large amounts of water or chemicals on the fire in a short time interval,

- act rapidly at different places of the fire site with the aim of hitting the hot spots, protecting people and equipment on the ground and to control and eliminate the spot fires.

The aircraft is, thus, the initial tools of attack. The fire-fighting activity from air is characterised by dropping large amounts of water or fire-retarding chemicals on the fire or in front of it. There are two basic methods of fire-fighting activities from the air – direct attack on the fire front or subsequent dropping of fire-retarding chemicals which form barriers to the spreading of fire. Various air fire-fighting tactics are combined depending on the characteristics of fire, the size of ground fire-fighting resources, the number of fire-fighting aircraft and the dropping frequency capability.

Apart from direct fire-fighting, the advantages of aviation have been recently recognised as being tactical and logistic support to ground fire-fighting resources regarding transport of fire-fighters and equipment to the fire site, providing lighting on the fire site and TV broadcasting and video transmission of events on the ground to the fire-fighting operation centre, as well as infrared treatment of the high-risk area with the aim of detecting the potential foci and efficient prevention of fire recurrence.

2.3 Emergency Medical Service

Apart from doubtless efficiency in rescue and evacuation from inaccessible terrain, the air transport means prove their unsurpassable advantages over other transport modes, especially from the aspect of speed, which today, in medical treatment of the injured in transport accidents, accidents at work and the like, very often mean a saved life.

The existing level of motorisation and the trend of further growth imply, at the same time, a high level of threat for the health and lives of the inhabitants. According to statistical indicators, in about 65 percent of fatalities, death occurs within the first 25 minutes.

If the first medical assistance is given to the seriously injured within 14 minutes following the accident, the number of further complications causing death affects only 20 percent of all the treated injured persons.

In case of delayed first aid, i.e. medical treatment more than 28 minutes after the accident, the consequences and complications, including death, occur in 80 percent of cases.

These reasons indicate the need to supplement the conventional method of emergency medical treatment and the transport of the injured by a more advanced and faster method of air medical service.

Past experience of the countries with the developed air, as a rule helicopter, medical service prove that in air ambulance medical treatment the mortality is 50 percent smaller compared to conventional medical treatment by ground ambulance vehicles.

Practice confirms that helicopter emergency medical service – HEMS i.e. medical treatment and direct transport of the injured by air to a specialised medical institution, greatly reduce the time of total medical treatment and convalescence.

Direct access and the speed of intervention of specially equipped air means, along with the primary task of rescuing lives, affect the reduction of time required for medical treatment and relative reduction of the treatment costs, earlier return of the convalescents into the normal process of living and work, and all this resulting in the positive economic effect, which many times over exceeds the costs of HEMS exploitation.

3 International Regulations and Best Practices

3.1 International Standards and Recommendations

The liabilities of the countries to organise national operatives of search and rescue result from the international conventions accepted under the auspices of the United Nations – Chicago Convention, Convention on the High Seas and SOLAS Convention as well as the Convention on Maritime Search and Rescue.

The Annex 12 to the Chicago Convention regulates all the organisational and technical elements of organising national SAR systems. Annex 12 consists of five parts which describe in detail the requirements of organisations and co-operation, necessary to support the SAR operations, the model of preparatory measures and operative procedures of SAR services in cases of emergency. The methodology of organising SAR units, communication means, elements of public and private services and the minimum of equipment are determined in detail. The concept of national SAR plans and contents is recommended, as well as the preparatory measures of the rescue units and the training requirements. Furthermore, the standardised SAR operation procedures are elaborated, and the three phases of emergency situations defined with the accompanying operational activities.

The standardisation and unique SAR practice for the emergency aviation system need to be insured by accepting complementary national SAR plans. The national SAR plan should define all aspects of organisation and the national SAR operation. These aspects are, for instance, determining operative centres, training of professional teams, establishing of an integral communication network, publishing of regulations and procedures in performing SAR operations and training as well as the purchase of sophisticated equipment.

The implementing guidelines for the SAR plans are contained in International Aeronautical and Maritime Search and Rescue Manual – IAMSAR. The IAMSAR Manual is a joint publication of ICAO and IMO, which suggests the standardised outlook model to the member countries to set the main guidelines, related to the establishment and operationalisation of the SAR system, and in order to perform its humanitarian obligations. The IAMSAR Manual assumes standardisation of elements of the national SAR operational services, and stimulation of their co-ordination in the joint missions of providing assistance, if necessary. The Manual can also be of assistance to countries in the process of organisation of efficient SAR services, in promotion of harmonisation of aeronautical and maritime services and provision of medical assistance to persons in need regardless of their location, nationality or circumstances.

Apart from the internationally obligatory regulations related to the SAR operations in air and maritime transport, at the global level in the framework of the United Nations, a whole series of resolutions have been accepted, which refer to strengthening of efficiency and coordination of international assistance in search and rescue activities [1]. The latest UN Draft Resolution “Strengthening the effectiveness and coordination of international urban search and rescue assistance” adopted at the General Assembly on 10th December 2002 has reaffirmed the role of the UN coordinator for assistance in emergency situations and has urged the establishment of unique practice by applying INSARAG guidelines of the International search and rescue advisory group at national levels.

Due to large losses caused by frequent natural disasters of different types of major accidents, the need for a more systemic approach to organising humanitarian aid is increasingly present, which means legalisation of standardised minima of emergency operational services on the national levels. Therefore, the mandate of the International search and rescue advisory group and the preparation of the draft of the UN Convention on international assistance in search and rescue [2] and its acceptance would mean legalisation of certain obligations in the establishment of national SAR system.

On the European level, also, during the recent dozen years or so the political efforts have also been intensified towards the establishment of institutional and legal framework in the field of civil defence.

Since 1987 the European Council adopted seven resolutions on the strengthening of the cooperation of the members in civil defence, including also the 1999 Resolution, which has thus expanded the cooperation to the accession countries [3]. The European Council also brought the action plan in the field of civil defence.

The aspect of emergency regulations in Europe also encompasses the implementation of the technical standards [4] of HEMS, which are obligatory for all Joint Aviation Authorities members, and in the near future certainly for the entire European aviation community.

With the aim of optimising the emergency management and the establishment of unique European practice in centralising the operative emergency functions, a Decision of the European Council was brought in 1991 on the Introduction of a single European emergency call number [5].

3.2 Global and Regional Associations

3.2.1 International Search and Rescue Advisory Group – INSARAG

At the global level, in the field of civil defence and humanitarian assistance, the associate organisations have been established under the auspices of the United Nations.

International Search and Rescue Advisory Group - INSARAG was founded in 1991 representing joint efforts of the United Nations and the participating countries to establish more systemic organisation of international SAR system. INSARAG mission is oriented to the development of efficient international relations in the requirements of rescuing lives and humanitarian assistance in

case of natural and anthropogenic accidents. The INSARAG activities include enhancement of emergency preparations and cooperation among international SAR teams, as well as promotion of information exchange about the operational procedures and experiences.

The United Nations play the leading role in the coordination of assistance, mainly at the operative level, and therefore the key functions have been delegated to the UN coordinator and UN team for disaster management, consisting of humanitarian and non-governmental organisations.

3.2.2 United Nations Office for Coordination of Humanitarian Affairs – OCHA

Through its department Disaster Response Branch in Geneva, the United Nations Office for Coordination of Humanitarian Affairs - OCHA has established an emergency response system for coordination of activities of the international community in cases of natural disasters and ecological catastrophes.

Through its activities and international operations the OCHA covers the UN disaster assessment and coordination functions of SAR planning and development of the policy documents, representation in humanitarian affairs with political organisations, and coordination of emergency response at the international level.

3.2.3 International Civil Defence Organisation – ICDO

International Civil Defence Organisation - ICDO is an umbrella inter-governmental organisation with the mission of harmonising the national structure of the civil defence. As early as 1965, with its Resolution 2034 on assistance at times of natural catastrophes, the United Nations have invited all countries to undertake adequate measures of planning and actions, adapted to individual situations, and to centralise the management of emergency action in case of catastrophes.

In the majority of countries adequate measures of planning and actions regarding overcoming of accidents are covered by the terms – civil defence, civil safety and emergency management.

Civil defence is a system used by the states to ensure the protection and assistance to population, as well as protection of properties and environment.

ICDO in collaboration with the United Nations has been developing the relations with the national SAR systems, has managed the directory of national systems and proposed models of national SAR organisation. Taking into consideration the represented population, natural and material assets and protection programs, the development of the national organisation of the civil defence needs to encompass the following elements of the necessary response to the potential emergency situation:

- analysis of risk and danger,
- definition of priorities,
- inventory of available means,
- definition of missions entrusted to different agencies for the protection of population, assets and environment,

- setting of references and delegating power to the bodies of civil defence,
- founding or strengthening of the civil defence agency.

3.2.4 European Helicopter Medical Service and Air Rescue Committee – EHAC

The European Helicopter Medical Service and Air Rescue Committee - EHAC was founded in 2000 on the initiative of the national automobile clubs of Germany (ADAC), the Netherlands (ANWB) and Austria (ÖAMTC). As specialised association the EHAC represents the interests of air-medical service in Europe.

The association promotes the pro-European rescue-medical service with assistance of specialised helicopters in case of incidents, catastrophes, and diseases. EHAC was founded with the intention of improving civil air rescue and medical assistance, and of contributing to the intensification of cooperation among the countries in Europe.

Every organisation that includes HEMS, i.e. operates HEMS helicopters in compliance with JAR OPS 3 standards, has the right to join EHAC. An associate member can be any legal or physical entity indirectly related to the HEMS system (health insurance companies, rescue organisations, aircraft and special equipment manufacturers, etc.) as well as those organisations that provide repatriate flight services using fixed-wing aircraft.

Encouraged by the successes in rescuing lives and assisting those in emergency situations, the European air-medical network is expanding. In an increasing number of countries, the helicopter assistance service is becoming indispensable in rescuing lives. In the process of structural changes, international experience exchange is playing an important role. In the future, the newly determined rules, e.g. JAR OPS 3, will set unified standards for the HEMS operations. EHAC is actively participating in the defining of new important guidelines and regulations. It also wants to be the provider of “know-how” services to all those who are directly related to the establishment or management of HEMS.

The objectives of EHAC include:

- gathering information related to operations of air medical services at the international level,
- representing of interests of civil air medical services in complying with JAA, as well as national and international regulatory institutions,
- helping and advising national and international professional associations and institutions,
- developing high-quality standards for air medical helicopters and medical and auxiliary equipment,
- developing programs to train pilots, medical technicians and physicians (HEMS crew),
- promoting research that would enhance efficiency of air medical services,
- organising symposia and conferences.

3.2.5 European Emergency Number Association – EENA

The European Emergency Number Association (phone call) - EENA is a not-for-profit association, which was founded with the aim of promoting knowledge and efficient use of the unique European emergency dialling number 112 in Europe. It serves as discussion base for connecting all the actors – organisations, companies and individuals, related to the development and implementation of the emergency number 112.

4 Theoretical Approach to Emergency Aviation Operative Modelling

4.1 Evaluation of the Relevant Feasibility Criteria

The analysis of only two criteria – external transport costs, and social and economic consequences of fire, can be used to argue for the economic justification of organising the national emergency aviation operative. Huge costs that burden the state budgets, caused by the expansion of road transport and disturbance in the climate as well as the tendency of increasing the level of danger to natural vegetation by fires can be significantly reduced by the operationalisation of efficient operative of fast action from the air.

4.1.1 External Transport Costs

The external costs are transport generated social costs that have not been internalised in the transport sector but are rather compensated from the sources of other sectors or the entire community.

The external transport costs are classified as costs of accidents, environmental pollution and congestion. According to the cause, the category of transport accident costs has been quantified with a share of about 30 percent of external costs [6].

According to the research results, the segmentation of external costs per transport branches is indicative. The share of road transport in the total external costs is 92 percent, air transport 6 percent, rail transport 1.7 percent and water transport 0.3 percent. Two thirds of external costs are caused by passenger transport, whereas a third is caused by freight transport.

At the European level, within the context of implementing the main guidelines of common transport policy, fundamental research has been carried out with the aim of evaluating the external costs. Regarding the topical complexity and the underdeveloped scientific methodology of estimation and the limitation of input data, the research results at national and regional levels differ significantly. The lack of harmonisation is especially pronounced in monetarisation of external costs due to uneven criteria of evaluation.

The European Commission Green paper from 1995 has estimated the amount of external costs of transport in EU at 1.5 percent of GDP of accident costs, 0.6 percent of GDP of pollution costs and 2 percent of GDP costs of congestion. The non-covered external costs in the transport sector, according to the results of the research project performed by INFRAS and the Karlsruhe University on the

sample of the EU countries as well as Switzerland and Norway, refer to the costs of accidents in the amount of 7.8 percent of GDP. According to the research “Pilot Accounts – Results for Germany and Switzerland” [7], the amount of external costs of transport in Switzerland is about 10 percent of GDP, and in Germany about 2.7 percent of GDP.

Precise evaluation of external costs from the aspect of transport policy is a prerequisite of more realistic determining of the relation between revenues and expenditures in the transport sector. However, for the implementation of the concept of sustainable development the past knowledge about the qualitative dimension of transport as well as approximate amounts of uncovered external costs are also sufficient. For the argumentation of the positive i.e. negative effects of transport and the need to optimise the transport characteristics in the function of the welfare of people, the qualitative dimension of the mobility status is crucial, whereas the economic evaluation of external costs can be the function of political regime of performing the reforms of the transport system regarding better economic effects.

4.1.2 Social and Economic Consequences of Fires

The research field of social and economic consequences of fire is relatively undocumented with very few empirical and theoretical studies. The issue of importance of the evaluation and monetary definition of the damage caused by fires, with the aim of reducing and preventing them as well as for a more efficient fire-fighting protection, became more topical ten years ago, mainly at the national level, so that the input data are insufficient for a more precise international comparison. The research has been carried out in the US, Great Britain, Canada and Denmark, and the published statistics of fires in the economic evaluation of damage vary significantly from country to country due to the lack of uniformity of methodology of determining the caused damage.

The social and economic costs of fires are divided into the costs regarding human victims, direct physical costs, administrative costs, fire-fighting operative costs and fire prevention costs.

Table 1: Social and economic costs of fires [8]

Total costs (per mille of GDP)	Denmark	Canada	Great Britain	USA
Reference year of research	1998	1991	1993	1995
Human losses	1.1	1.8	2.2	1.5
Direct physical costs	2.0	2.2	1.5	1.3
Administration	0.3	0.6	0.2	0.9
Fire-fighting operative	0.9	2.9	1.8	2.4
Prevention	2.1	3.6	2.0	3.0
Total costs	6.3	11.1	7.7	9.1

In the available studies the estimate of fire-caused costs is expressed in per mille value of the gross national product. The total costs caused by fire in Denmark have been estimated at 6.3 per mille, in Canada 11.1 per mille, in Great Britain at 7.7 per mille, and in the US at 9.1 per mille of the gross national product. Refer to research performed by the Danish Emergency Management Agency these data are indicative, but need to be taken with reserve, due to the following reasons:

- the levels of economic development of the countries are different,
- the estimating methods are different,
- the research was carried out within different time intervals,
- the sample of initial research is of minor significance for international comparison.

All the available recent research confirm that the social and economic costs of fire are about one percent of the gross national product, with the indicative amount of direct physical costs compared to other accompanying costs.

4.2 Organisation and Management

At the European level, attempts have been recently made to set the legal framework of harmonising national systems of civil defence and international cooperation. Under the authority of the International Civil Defence Organisation in 2000 the framework was set for the Convention on Civil Defence Assistance, and in 2002 the Fifth Conference took place on preparation of Communication about the integrated strategy of the European Union on the prevention, preparation and response to the natural, anthropogenic and other risks.

The International Civil Defence Organisation has set the guidelines to develop the organisation of the civil defence and has proposed a model of national emergency systems.

The proposed “outlook model” is based on the centralisation of emergency functions and single management, where individual operational services are organisationally and communicationally unified within the Government emergency board. This umbrella board is also in charge of the Civil defence directorate with the function of implementing the emergency plans, which dictates the operative doctrine to regional civil defence administrations and operational units.

The government emergency board is managed by a Director, and consists of the representatives of the relevant ministries, which have sub-coordination functions in emergency management.

The national emergency operative implies the standardised information and communication system with a unique dialling number for all types of accidents and necessary special interventions.

The system is operationalised by the initiation of the main coordination centre, and, depending on the type and location of the accident, assessment of necessary allocations for the tasks of individual intervention missions, they are delegated to adequate regional or local coordination centres.

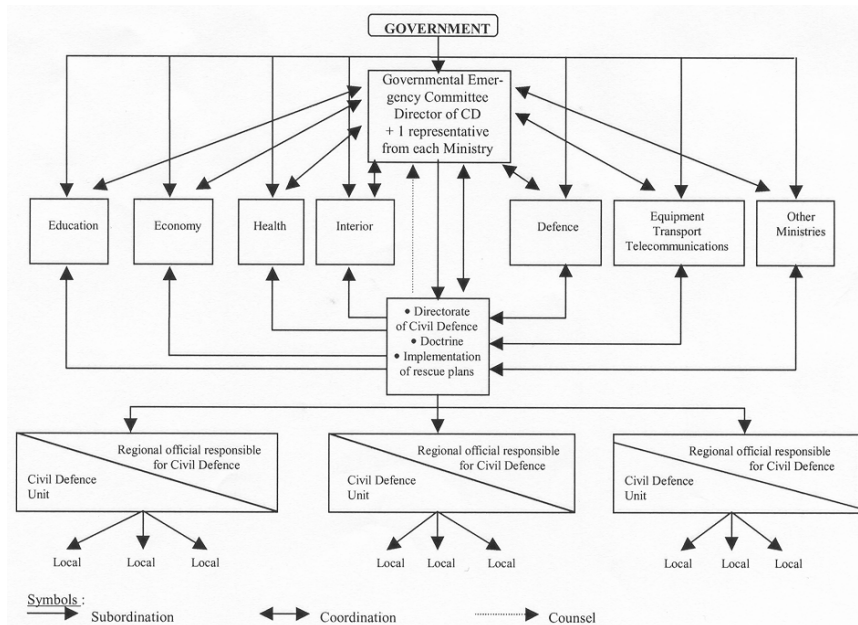


Figure 1: ICDO model of national emergency structure [9]

4.3 Status of Croatia

In Croatia the professional search and rescue service (SAR) has not been systemically organised at the national level. The existing SAR activities are marked by organisational overlapping of operative functions of relevant state departments – defence, internal affairs and transport, with the main characteristic of fragmentation and inefficiency.

The condition of the ambulance system in Croatia is unsatisfactory, and especially regarding the usage of helicopters for this purpose. The military helicopters that are used Mi-8 MTV1 from the Croatian Air Force fleet do not satisfy the need of providing emergency medical assistance. There is no single organisation managing the whole system and the procedure of dispatching helicopters is unacceptably inert and time-consuming. The medical personnel accompanying the patient/the injured does not have specialist knowledge, the system covers only the part of central Dalmatia, there is no standard of indications to call a helicopter. In all the cases, the patient/the injured is taken to the helicopter by the ambulance vehicle, the patients/the injured can embark only at a limited number of pre-determined landing sites. The type of helicopter used does not fulfil its purpose.

The fire protection is entrusted to the Administration for Protection and Rescue of the Ministry of the Interior, whereas the Ministry of Defence is in charge of exploitation and technical maintenance of the fire-fighting fleet.

Although the worldwide accepted model of fire-fighting operative organisation means the registering of aircraft into the civil register, due to uncoordinated civil

and military standards of licensing, certification, and maintenance, in Croatia the Canadair fleet was primarily owned by the Ministry of the Interior, delegated into the ownership of the Ministry of Defence and complying to the military standards of the operative.

Apart from the reason of satisfying the obligatory provisions of the international regulations and recommended practice, the justification for organising the SAR operative result from the geo-traffic and economically specific characteristics of Croatia:

- economic orientation of the country towards the development of tourism with the pronounced periodic fluctuations of the population;
- the most attractive area from the tourists point of view – Adriatic coast and the islands, is not accessible to conventional transport modes and is therefore to a certain extent isolated in terms of traffic;
- mountainous regions of Croatia are during winter partly cut off trafficwise due to harsh weather conditions;
- the efficiency of emergency medical interventions by ambulance vehicles is substantially reduced due to the unsatisfactory condition of the land transport infrastructure;
- regarding the statistics of transport accidents and fatalities, Croatia is at the very top according to the European standards;
- the danger of fire breaking out is emphasised.

5 Concluding Consideration and Proposal

Organising of the air emergency system is only one segment of the necessary operative for the protection of people and assets with the attribute of the socially beneficial activity.

The emergency operative in a wider sense encompasses all the available resources that are mobilised in case of danger – infrastructure, technology, experts and all types of logistic support.

There are numerous arguments in favour of organising the emergency aviation service in Croatia – ranging from the marked periodical fluctuation of population during tourist season, traffic isolation of certain regions, inefficiency of conventional types of ambulance due to the unsatisfactory land infrastructure, high levels of transport fatalities to the projection of the level of danger to which certain regions are exposed regarding natural disasters.

Organising of emergency aviation system as a multi-purpose operative would contribute both to the compliance of the accepted international liabilities and to the rational usage of technical and personnel resources, and mainly to the operation efficiency in all the regions of Croatia. The trends of globalisation and regionalisation stipulate the standardisation and unique practice regarding emergency service of protection and rescue of people and assets in danger.

The theoretical basis for the emergency aviation system modelling, feasible in Croatia, includes the wide range of issues:

- the specification of international standards and recommendations as well as the best practice for establishing the emergency aviation system;
- determining the influencing factors and the relevant elements to define the dimensions of emergency aviation resources;
- the comparative analyses of the existing systems of emergency aviation at the national levels;
- the assessment of the specific needs of the local environment.

The strategic orientation of Croatia is equal participation in the integration projects and the necessary presumption is the organising of the emergency aviation system, whose institutionalisation and technical dimension would represent the indicator not only of the compliance to the accepted liabilities but also applicable in the general practical sense.

The organisational structure of the SAR system in the majority of national models is incorporated in the state departments of police and army.

The commercialisation trend of operative functions of government administrations dictates partnership between police, fire brigades and emergency medical assistance, within a unique management in the emergency conditions, i.e. by a unique information and communication centre.

The international regulations have been divided into obligatory regulations: Chicago Convention, SOLAS Convention, Convention on Sea Search and Rescue, Convention on High Seas, and into other non-obligatory documents: UN Resolutions on Humanitarian Assistance, EU Resolution of the European Council on the Strengthening of Cooperation in Civil Defence. The mentioned international regulations dictate the state liabilities to organise national systems of search and rescue – SAR. The acceptance of a new UN Convention on Search and Rescue Assistance is being prepared.

The 1991 Decision of the European Council has regulated the obligation of introducing a unique call number 112 – of the centralised management of national emergency operatives.

The EMS fleet is in the majority of countries implemented also in the SAR operations of search and rescue, and the actions regarding evacuation in case of accidents (at sea, in the mountains, inaccessible areas) or natural disasters.

Due to the obligations accepted in accordance with international conventions, the majority of countries have organised SAR, mainly connected to aviation and sea. The national models of the organisation of fire-fighting activities are most often as autonomous governmental services entrusted to various departments – Ministry of the Interior, Defence, Agriculture, etc. In the European countries professional services of air operative have been organised for medical purposes with multipurpose possibilities.

Recognising the relevant criteria for establishing an efficient national emergency management – from the internationally obligatory regulations and standards, the status of the existing operative and the specific characteristics of the local environment, the feasible model in Croatia would certainly mean the foundation of an autonomous emergency agency within the direct authority of the Government.

The emergency agency has the task of implementing the SAR strategy and of accepting the national SAR plan in coordination with the relevant ministries. The implementation would be delegated to the organised main coordination centre which unifies different emergency services.

As part of the main coordination centre, also a communication - information centre is organised with a unique call number for various types of intervention – 112.

The main coordination centre delegates further coordination of the emergency tasks, depending on the location and type of accident, to local coordination centres.

The vertical stratification of emergency operational services implies intervention for various purposes – search and rescue, medical treatment, fire-fighting, reconnaissance, etc. primarily affecting the identification of professional activities, partners, and interested parties in technical, personnel, and financial – both direct and indirect, participation in the emergency management.

Apart from the government authorities, the emergency service can be supported by the non-governmental organisations – professional associations and private companies.

The horizontal stratification refers to the selection of the optimal specific transport means, equipment and logistics.

The emergency system also implies a coordinated cooperation of the military and civil departments.

The model of emergency operative for Croatia includes also a proper training centre for the specialised personnel. According to the international practice, the professionally trained operative teams for different types of interventions can be sent, on humanitarian and commercial basis, to emergency missions abroad.

After having received the emergency call, the headquarters with the coordinator of the emergency mission sent from the nearest local centre is organised at the accident site.

The assumptions of operationalisation of the proposed emergency management model refer primarily to the institutional and legal harmonisation, both because of the integration in a wider region and equal participation in regional and international missions; optimising operative procedures by centralising the functions of emergency management; more rational usage of technical and personnel resources; the increase of efficiency of the responding system, as well as because of the manifestation of social care for the lives of citizens, material assets and the environment.

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"Initiatives to develop a legal framework for international assistance in the

wake of natural disasters and environmental emergencies, outlining the responsibilities of countries receiving and providing support. Member States may wish to consider drafting a convention on the deployment and utilisation of international urban search and rescue teams. Such a convention would provide a working framework for complex issues such as air space utilisation, custom regulations for the import of equipment, and responsibilities of providing and receiving countries, that have to be resolved prior to the international response to a sudden onset natural disaster”.

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