

MISSING FINDINGS THAT NEED PRACTICE AT DISASTER MANAGEMENT

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ABSTRACT

BASED ON THE CONCEPT THAT THE EUROPE AND ITS PARTS ARE REPRESENTED BY MODEL "SYSTEM OF SYSTEMS" DENOTED AS THE HUMAN SYSTEM THE IN-DEPTH STUDY OF DISASTERS AND DISASTERS' MANAGEMENT REVEALS THE DEFICITS AND CHALLENGES FOR FUTURE RESEARCH, SO THE NEEDS OF PRACTICE AT DISASTER MANAGEMENT MIGHT BE PROVIDED. THE FORMULATION OF TASKS FOR RESEARCH IS BASED ON PHILOSOPHY THAT EACH RESPONSIBLE GOVERNMENT SHOULD PROTECT THE INHABITANTS DAILY AND AT CRITICAL SITUATIONS. THE OUTPUTS ALSO SHOW THAT EUROPEAN CITIZENS ARE VERY THREATENED BY ORGANISATIONAL ACCIDENTS, THE CAUSES OF WHICH ARE THE HUMAN BEHAVIOUR DEFECTS AND MAINLY HUMAN MANAGEMENT DEFECTS ON ALL LEVELS OF GOVERNMENT.

KEY WORDS: *safety; security; disaster; disaster management; challenges for future research.*

ABSTRAKT

NA ZÁKLADĚ KONCEPTU, ŽE EVROPA A JEJÍ ČÁSTI JSOU ZOBRAZENY MODELEM "SYSTÉM SYSTÉMŮ", KTERÝ REPREZENTUJE LIDSKÝ SYSTÉM, DETAILNÍ STUDIUM POHROM A ŘÍZENÍ POHROM ODHALILO NEDOSTATKY A VÝZVY PRO BUDOUCÍ VÝZKUM, ABY BYLY POKRYTY POTŘEBY PRAXE PŘI ŘÍZENÍ POHROM. FORMULACE ÚKOLŮ PRO VÝZKUM JE ZALOŽENA NA FILOZOFII, ŽE KAŽDÁ ODPOVĚDNÁ VLÁDA BY MĚLA CHRÁNIT OBYVATELE DENNĚ, I V KRITICKÝCH SITUACÍCH. VÝSTUPY, TAKÉ UKAZUJÍ, ŽE OBYČANÉ EVROPY JSOU VELMI OHROŽENI ORGANIZAČNÍMI HAVÁRIEMI, JEJICHŽ PŘÍČINY JSOU ZPŮSOBENY PORUCHAMI LIDSKÉHO CHOVÁNÍ A ZEJMÉNA CHYBAMI PŘI ŘÍZENÍ NA VŠECH ÚROVNÍCH STÁTNÍ SPRÁVY.

KLÍČOVÁ SLOVA: *bezpečnost; bezpečí; pohroma; řízení pohrom; výzvy pro budoucí výzkum*

1. INTRODUCTION

Security situation in the Europe, world and in each territory continuously changes with time, and therefore, it is necessary to form new safety culture taking into account the actual knowledge and experiences with interdependences among the public assets leading to extreme social crises (in history e.g. great famines, at present illegal migration of great groups of people). With regard to the historical development there are: a lot of preventive and mitigation measures that have been applied into practice



by legal rules, technical standards and norms and public instructions; response systems; and renovation ways. However, it is true that their effectiveness decreases with time because new risks emerge and territory and human vulnerabilities increase in all domains with time.

The present findings show that for good security situation in the Europe the strategic, systemic and proactive approach is necessary to use [1-5]. Therefore, the European Union during the 7th Framework Programme solved several projects with target to prevent unexpected situations with dangerous impact on the Europe. One of the project was „Foresight Security Scenarios: Mapping Research to a Comprehensive Approach to Exogenous EU Roles (FOCUS)” [1]. FOCUS was co-funded by the European Commission under the 7th Framework Programme, theme "security"; call FP7-SEC-2010-1, work programme topic 6.3-2 "Fore sighting the contribution of security research to meet the future EU roles". It was solved in 2011-13 by 13 partners (Sigmund Freud Private University Vienna; Ceuss | Center For European Security Studies, Austria; Atos Origin Sociedad Anonima Española, Spain; Boc Asset Management GmbH, Austria; Institute of Information and Communication Technologies, Bulgaria; Cross-Border Research Association, Switzerland; Ingeniera De Sistemas Para La Defensa De España Sa (Isdefe), Spain; Czech Technical University Praha, Czech Republic; Secur Sprl, Belgium; Danube University Krems – University for Continuing Education, Austria; University Of Haifa, Israel; University of Natural Resources and Life Sciences Vienna, Austria; Instituto Nacional de Tecnica Aeroespacial (Inta), Spain; Cess GmbH Centre for European Security Strategies, Germany); the Sigmund Freud Private University Vienna was the project leader. The FOCUS was elaborated a set of scenarios, based on IT-supported foresight, ranging from natural and man-made disasters to terrorism and malicious attacks on Europe's critical infrastructures. Along with its IT Platform, two of the project's main deliverables were the creation of a long-term prediction and assessment tool at EU level and a roadmap to plan and prioritize future Security Research objectives. The paper presents results obtained by research co-ordinated by the CVUT [5].

The research comes out of the systematic concept of reality and its aim is systematically to create the Europe as a safe community that has a highly sustainable potential and it stands as a significant world power, i.e. it ensures the security of itself and of its vicinity (i.e. in the globalization era of the world) by using the human system management based on strategic, systemic and proactive system of systems management [1, 6]. The concept used is complex so that it enables the solution of most present problems.

This publication gives two principal results of research performed under the FOCUS project. It summarizes the results of disasters' research and disasters' management research in the Europe. On their basis it identifies the shortages, forms the tasks for the serious shortages remove and also proposes the directions, which the following research should head to, so that the Europe would systematically create the safe community and build the background for sustainable development. After this it gives the main challenges for research directed to Europe security in horizon 2035.

2. PRIMARY FINDINGS AND PRINCIPLES OF RESEARCH OF DISASTERS AND DISASTERS' MANAGEMENT

Present goal of humans is to live at safe space, and therefore the UN formulated the aim of a "safe human system" in 1994 [2] and the EU "safe community" in 2004 [3]. In agreement with the EU and UN proclamations and the professional knowledge there is necessary for conservation and sustainable development of the human society to create the safe territory. With regard to present knowledge we should consider that we want to build safe open dynamically variable system that is a complex system the model of which is the system of systems (SoS), i.e. several overlapping systems [7].

The security and development of both, the humans and the human system are disturbed by disasters, i.e. internal or external phenomena that lead or from a certain size can lead to damages, harms and losses on humans and human system public assets. It means that human system safety (i.e. set of measures and activities ensuring the security and development of both mentioned objects) needs to consider both, the processes, actions and phenomena that are under way in human society, environment, planet system, galaxy and other higher systems, and the human management acts.

Therefore, for safety reasons we need to negotiate with risks of different origin and kind. The research performed under the FOCUS project [1] deals with principles of negotiation with risk at stages of its mitigating and managing in selected sections of human system management and it gives tools to the public administration for public affairs governance because the public administration is responsible for territory governance and conditions. Especially, it concentrates to the EU governance.

On the basis of a current knowledge, from a systematic and strategic viewpoint, it is not possible to solve significant problems of a complex system (which represents every area, i.e. also the Europe) by reducing complex problems to a set of simple problems and by neglecting the non-linearity's and various interdependencies that create the specific couplings, which are the causes of risks across systems, among partial systems, between the system and its vicinity etc.

The current knowledge shows that it is necessary to deal with the problems on the basis of the systematic concept of reality, which is in case of our research the human system. Systematic concept is based on the systemic (holistic) thinking, the typical feature of which is the focusing on the whole views at systems and on research of relations among their individual parts. The characteristics of a systematic thinking are: to see both, the whole and the details at the same time; to focus on the dynamics of processes; to pay attention to relations, associations and interactions; to take into account the roles of a feedback; to consider the relativity of possible situations; and to think in a long-term way. A system according to its core means more than only a sum of parts, and therefore, the stress is put on: study of the interactions and associations; non-linear thinking; interactions; inductions; feedbacks; and experiments or realistic simulations. E.g. feedbacks cause non-linearity's in the system behaviour that is not predictable, and therefore, it is not possible to use the common prognostic methods for the identification of the possible states of a system.

For the characteristic and management of simply organized units, the results of analytic solutions are used. For the characteristic and management of composite systems (in practice the term construction is used) that are understood as a representation of elements that are organized and connected in a certain way and because of a proper structure they fulfil certain functions, there are used results of statistical solutions based on analytic functions, the parameters of which are variable in a certain interval, which is a reflection of various possible states / variants of the system behaviour. For the characteristic and management of complex systems, the results of simulations needs to be used since the given aggregates have many components (often systems too) those interact together and are organized in several levels, which causes that we observe: suddenly emerged behaviour features that are not possible to obtain from the knowledge of components' behaviour, it is the so-called emergence; hierarchy; self-organization; and various management structures, which all together seems as a chaos. Therefore, while observing it is necessary to take a multidisciplinary and interdisciplinary approach. For their management it is then necessary to use the multi-criteria approaches, the model of the system of systems and also to consider the cross-sectional risks [1,7]. For the solution of their problems the tools based on the theory of chaos [8], theory of fuzzy sets [9], complexity theory [10-12], theory of possibilities [13,14] exist. Since the Europe belongs among the developed parts of the world and the EU has ambitions to be the world power, it is necessary for it to build its politics on the current knowledge.

The systematic research of disasters the summary of which based on more than 5000 professional works, historical catalogues, databases, archives is in works [4, 15, 16] revealed that we need to consider the following disaster types as being the results of processes:

- in and out of the Earth: natural disasters (earthquake, floods, drought, strong wind, volcanic activity, land slide, rock slide etc.); land erosion; desertification; fundament liquefaction; sea floor spreading etc.,
- in the environment including the human body, animals and plants,
- in the human society separated to:

- unintentional: illnesses; epidemic; epiphyte; epizootic; involuntary human errors etc.,
- intentional: mutualism proper behaviour of an individual or groups of individuals: wrongful appropriation of property; kill in gahuman; bullying; religious and other in tolerance; criminal acts such as: vandalism and illegal business, robbery and attacking, illegal entry, unauthorized use of property or services, theft and fraud, intimidation and blackmail, sabotage and destruction, illegal migration of great groups of people; terror against individuals, terrorist attacks; local and other armed conflicts; intentional disuse of technologies, such as: improper application of CBRNE substances; data mining from social networks and other cyber networks used for psychological pressure on a human individual; incorrect governance of public affairs: corruption; abuse of authority; and the disintegration of human society into intolerant communities,
- which are connected with human activities: incidents; near miss; accidents; infrastructure failures; technology failures; loss of utilities etc.
- that are reactions of the Planet or environment to human activities: man-made earthquakes; disruption of the ozone level / layer; greenhouse effect; fast climate variations; contaminations of air, water, soil and rock; desertification caused by human bad river regulation; drop of the diversity of flora and fauna (animal and vegetal) variety; fast human population explosion; migration of great human groups; fast drawing off the renewable sources; erosion of soil and rock; land uniformity etc.
- connected with inside dependences in human system and its surrounding separated to:
 - natural: stress and movements of territorial plates; water circulation in environment; substance circulation in environment; human food chain; planet processes; interactions of solar and galactic processes;
 - human established: human society management; flows of raw materials and products; flows of energies; flows of information; flows of finances etc.

In social domain for reasons of internal relations the monitored adverse effects are put together to the following groups:

- subsequent crime and other offences. The group includes: vandalism and illegal dangerous behaviour, illegal migration of great groups of people, robbery raids and attacks, property crime, killing and rioting,
- tax fraud and fraud. The group includes: tax fraud, fraud,
- damage to the customs laws, including: customs fraud, smuggling of prohibited goods,
- illegal access to any information systems. The group includes: data theft or data changes, espionage, partly fraud- forgery of documents, partially terrorist attack, data mining from social networks leading to the psychological pressure on people,
- corruption and serious economic crime, including money laundering, extortion and humiliation. The group includes: corruption, abuse of authority,
- society disintegration into the intolerant groups. The group includes: religious and other intolerances.

Due to lack of data there are not considered: child labour, sabotages, infringement of law by government agencies, maritime piracy, severe negligence with criminal responsibility, misuse of postal services, an anonymous notice of alarming information, environmental crime including pollution, and violations of security regulations.

3. DATA AND METHODS OF SPECIALISED RESEARCH

For investigation of disasters, types of disasters management there were used original data and results of special projects, e.g. Switzerland - the PLANAT project, US – FEMA projects, Canada, the Netherlands, EMA (Australia), OCHA, the Czech Republic, IAEA, OECD, UN etc. – real references

are in [4] and in materials quoted in. For obtaining the original results there were also used: historical catalogues, databases, archives and original papers on phenomena that caused harms and losses on public assets in time period from historical time up to now, i.e. they belong to disasters; for some of them (floods, earthquakes, chemical accidents, epizootic, epidemic, electro-energy net failure) the results obtained are very detailed; and the different methods, from very simple method to scientific ones.

The outputs described in the next paragraphs were created by the pure scientific methods, i.e. analysis and synthesis of obtained published results on disasters; specific investigation of disasters by analytical and heuristic methods. Heuristic methods were in the first tested on real data if they are suitable for security tasks solution. Specific investigation of level of disaster management was performed by help of special questionnaire; and specific investigation for identification of critical items in territory management from the viewpoint human survival performed was performed by special logical tool specially tailored for the FOCUS targets [16]. Detail descriptions of data and methods with references are in publications quoted in appropriate places.

4. DEFICITS IN DISASTERS' MANAGEMENT

The detailed study on disasters and disasters' management in the EU [1,5] was concentrated to ten domains the outputs of which are concisely summarized in papers [1,17-29]. The works [1,5] also obtains results of theoretical study dealing with the form of EU security concept: it needs to be based on the systemic (holistic) thinking, the typical feature of which is the focusing on the whole views at systems and on research of relations among their individual parts; proactive approach; all hazard approach [30]; respecting the co-existence of overlapping systems [7]. For its realisation there is necessary sophisticatedly managing the disasters that damaged the security of community and its assets, i.e. to apply measures and activities of prevention, preparedness, response and renovation. For practical purposes there are necessary good technical solutions based on recent findings and experiences and correctly aimed governance of public affairs supported by legislative with sufficient legal force, finances, qualified human personnel and material base.

By the special questionnaire [5] there were collected data for security items:

- Security challenges for the EU that can be considered to have big impact in the 2035 time frame and currently are not sufficiently addressed in the planning of research.
- Most severe security challenges that should be addressed by research planning in the 2035 time frame.
- Challenges for future security research for prevention.
- Challenges for future security research for preparedness.
- Challenges for future security research for response.
- Challenges for future security research for renovation.
- Related main vulnerabilities to be addressed for future security research.
- Related main knowledge gaps to be addressed for future security research.
- Proposed type of future security research.
- Expected most needed topics of future security research.

In the first, there were collected data for individual disasters types. By their expert judgement [5] there were obtained the outputs for different aspects of the deficits at disasters' management from the viewpoint of safe community, separated according to disaster type, Tables 1 – 10.



Tab. 1 - Deficits at natural disaster management from the viewpoint of safe community concept.

Tab. 1 – Nedostatky v řízení přírodních pohrom z hlediska konceptu bezpečné komunity.

Security items	Research results
1	The list of disasters is necessary to supplement by: geomagnetic storms; desertification; land erosion; soil salinization; fall of a cosmic body; sand storms; ocean spreading; and sudden change of weather (cold wave or heat wave).
2	The disaster order with regard to the impact severity is: fall of a big cosmic body on Europe; earthquake; floods; forest fires; and drought.
3	To improve the prevention to natural disasters. To implement the system of management based on integral safety.
4	To improve the EU preparedness to natural disasters. Preparedness for protection against floods in the EU on cross-border scale is not coordinated and is insufficient. To implement the system of management based on integral safety.
5	To build the systematic approach for the response to natural disasters. Note: the individual Member States have the systems of response on various levels. To implement the system of management based on integral safety. To improve response to critical situations because disastrous earthquakes or extreme climatic phenomena are the cause of big economic and social impacts. They affect infrastructure (buildings, transport, energy and water supports), which represents a specific threat for the densely inhabited areas. I.e. targeted crisis management for case of extreme situations is necessary.
6	To build the systematic approach for the renovation to natural disasters. Note: the individual Member States have the systems of response on various levels. To implement the system of management based on integral safety.
7	The most infrastructure and the objects is only protected to the size of design disaster, i.e. at extreme disaster's sizes they fail, which represents a specific threat for the densely inhabited areas. The situation can be made worse by rising of the sea level. Strategic and long-term approach will be necessary to the territorial planning on both the continents and coastal areas including transport, regional development, industry, tourism and energetic politics. To improve knowledge on the vulnerability of protected assets that is only fragmental.
8	Key step to improvement is to ensure in-depth research based on data and not on just copying the already-known facts; to check every result, before implementing in practice, by a public opponent management by real experts (they show professionalism, objectivity and support of public interests) and by this to avoid the influence of lobbyists. To specify the methods for defining the scenarios for the identification, analysis, assessment, management of risks and dealing with risks are defined; no standards guaranteeing that the results of methods are comparable.
9	To operate systematic natural disaster's monitoring; to create legislation for prevention, preparedness, response and renovation with special attention to response to critical situations (crisis management, warning systems etc.); to study natural disaster characteristics in-depth; to improve the population education with aim to reduce its vulnerability to natural disasters.
10	In practice to implement the strategic management of integral safety that is systematic and proactive; to oppose projects in public way and to avoid the influence of lobbyists and other insisting groups. To implement professional knowledge for the benefit of the public interest.



Tab. 2 - Deficits at induced (man-made) disaster management from the viewpoint of safe community concept.
Tab. 2 - Nedostatky v řízení pohrom vyvolaných lidskou činností z hlediska konceptu bezpečné komunity.

Security items	Research results
1	The list of disasters is necessary to supplement by: rapid natural subsidence of surface; artificial surface subsidence due to undermining; and interaction due to militarization of outer space.
2	The disaster order with regard to the impact severity is: contamination of air, water, soil and rock missive's; uncontrolled human population explosion; migration of large groups of people; the militarization of space; and climate variations.
3	To improve attention to land degradation - lack of European legislation and objectives of soil protection.
4	To improve the EU preparedness for climate change because it is lagging behind in the sphere of adaptation (in contrast to the absurd emphasis on the causes of the greenhouse effect); to increase attention to adaptation in cross-border dimension (e.g. the possibility of international coordination and construction of dams and reservoirs) - attention to economic and social criteria.
5	To improve response to followed disasters because it is not specifically directed to any of the followed phenomena. The current level of response within the EU is often insufficient and toothless. It is necessary to form specific methodologies of response targeted to real nature of individual disasters.
6	To prepare tools for systematic regulation of recovery process; i.e. a recovery plan and plan for prevention of losses at renovation.
7	The critical situations in the EU can cause: the gradual depletion of non-renewable resources; erosion of soil and rock massifs; uniformity of the landscape; and disruption of large dams. How to solve lack of: drinking water, raw materials, resources, energy, food in case of uncontrolled human population explosion and migration of large groups of people.
8	To prepare special tools for management process, especially in crisis management. To specify the methods for defining the scenarios for the identification, analysis, assessment, management of risks and dealing with risks are defined; no standards guaranteeing that the results of methods are comparable.
9	To specify the methods for defining the scenarios for the identification, analysis, assessment, management of risks and dealing with risks are defined; no standards guaranteeing that the results of methods are comparable. To determine the degree of reliability of methods for generating, creating and determining of disaster scenarios is given by degree of knowledge in differentiated science disciplines and postulates (characters: theory, methodology, terminology, feedback-application). Create qualified catalogues and qualified characteristics of followed disasters, in order to make search for protective measures possible. To operate systematic natural disaster's monitoring; to create legislation for prevention, preparedness, response and renovation with special attention to response to critical situations (crisis management, warning systems etc.); to study disaster characteristics in-depth; to improve the population education with aim to reduce its vulnerability to these disasters. To propose and implement sanctions for contamination of air, water, soil and rock mass. To propose contingency plan for erosion of soil and rock massifs. To find the safeguard procedures for landscape uniformity.
10	To implement in practice the strategic management of integral safety that is systematic and proactive; to oppose projects in public way and to avoid the influence of lobbyists and other insisting groups. To implement professional knowledge for the benefit of the public interest.

Tab. 3 - Deficits at technological disaster management from the viewpoint of safe community concept.
Tab. 3 - Nedostatky v řízení technologických pohrom z hlediska konceptu bezpečné komunity.

Security items	Research results
1	The list of disasters is necessary to supplement by: disuse of technologies (nuclear, nano and IT); disuse of genetic engineering; and disuse (abuse) CBRNE agents.
2	The disaster order with regard to the impact severity is: beyond design accident with presence of radioactive substances; beyond design accident with presence of substances mutagenic, carcinogenic and harmful to reproduction; long-term outage of electrical infrastructure; long-term stoppage of drinking water supply; and long-term shortage of basic food.
3	To improve prevention of nuclear accidents and the preparedness for their cope needs to be improved on the lessons from Fukushima nuclear power plant accident. To process norms and standards for infrastructures that will: ensure their sufficient capacities; enhance their robustness and resiliency. To compile robust measures to prevent disuse of technologies.
4	To improve the EU preparedness for extreme technological disasters. With regard to lessons learned from Fukushima, to improve preparedness for emergency situations that can occur when safety and safety related systems fail.
5	To improve responses to followed disasters because they are given by national legislation and Member States have different response systems and the current level of response within the EU is often insufficient and toothless.
6	To prepare tools for systematic regulation of recovery process; i.e. a recovery plan and plan for prevention of losses at renovation.
7	To propose targeted crisis management for critical situations that can be caused by: beyond design nuclear accident; long-term outage of electric energy supply; long-term stoppage of drinking water supply; long-term shortage of food supply; long-term failure of the financial infrastructure; and long-term failure of the financial infrastructure.
8	How to solve lack of: technical resources, inadequate knowledge and training of managerial staff, poor response management and lack of finances.
9	With regard to the lessons from Fukushima to improve the methods associated with the determination of terms of references for design, construction and operation of technological buildings, equipment's and infrastructures; deterministic and stochastic approaches must be supplemented by expert judgement that considered influence of epistemic uncertainties. To improve: system of management of territory and objects; and integral risk management because procedures applied so far do not consider cross-cutting risks, which are the cause of cascading failures of complex systems.
10	To implement in practice the strategic management of integral safety that is systematic and proactive; to oppose projects in public way and to avoid the influence of lobbyists and other insisting groups. To implement professional knowledge for the benefit of the public interest.

Tab. 4 - Deficits at social disaster management from the viewpoint of safe community concept

Tab. 4 - Nedostatky v řízení sociálních pohrom z hlediska konceptu bezpečné komunity.

Security items	Research results
1	The list of disasters is necessary to supplement by: illegal production and distribution of narcotics and psychotropic substances; illegal migration of great groups of people; and proliferation of the weapons of mass destruction.
2	The disaster order with regard to the impact severity is: illegal access to information systems, cybercrime; terrorist attacks; corruption in government and public administration, including the political scene; serious economic crime, including money laundering, tax evasion; trafficking with human beings and illegal migration; illegal production and distribution of psychotropic substances; extremism,; and all forms discrimination and intolerance.
3	To improve prevention to studied disasters because: prevention is not systematically carried out for any of the above given disasters; prevention is of ten declared by signed treaties, conventions, treaties or bilateral /multilateral agreements but in reality no effective tools. To improve: close interdisciplinary cooperation of all parties involved at national level and consistency with other central institutions within the EU states; and sharing good practice, continuing education and training of experts responsible at the pan-European level.
4	To build systematically the preparedness for coping with the given disasters because: the preparedness is the most well established the best on a theoretical level; the level of practice is greatly affected by the economic stability of a particular Member State; and level detection (intelligence services, technical means, and the level of experts...) is variable and not interconnected.
5	To improve: set of empirical disaster scenarios; disaster monitoring; detection of causes leading to given disasters; and response methodology because the responses to disasters are only prepared on a theoretical basis without relation to empirically mapped situations. Because highly un acceptable impact on the current situation in EU countries they have long - term consequences of an economic crisis, it is necessary to find effective tool for inhabitants survive and for stabilization of economic situation that evocates a lot of followed disasters.
6	To prepare tools for systematic regulation of recovery process; i.e. a recovery plan and plan for prevention of losses at renovation.
7	To find tools for reduction of critical infrastructure vulnerabilities because they ensure daily needs of inhabitants – attention is necessary concentrated to terrorism, especially cyber-terrorism, intentional abuse of technologies easy ideological abuse of the internet-bullying people.
8	Though there are various methods, guidelines or legislative measures for determination of the object scenarios in both, the EU and the individual countries or regions, it is necessary to create: consistent data sets; effective mutual consultation and co-ordination of procedures and the inflexible adaptation to the rapidly evolving global (trans- national) conditions that bring new threat scenarios, and therefore, the require new more reliable methods determining new reliable scenarios.
9	Because prevention and preparedness are conditioned by the greatest possible synergy between the domain of followed disaster risk reduction and the domain of adaptation to global changes with aim in order that financial support to prevention activities may increase resilience to future crises, it is necessary to arrange comprehensive research of safety in all relevant domains, which are in such research to be linked, and in order that it may be possible to achieve synergistic effect and outcome. To establish: qualified monitoring the followed disasters; effective tools and legislation in



	prevention, preparedness, response and renovation – e.g. of Incorrect governance of public affairs also sanctions; qualified research based on real qualified data; and education. To improve: management of safety of the EU; cooperation in the security research; the implementation of existing directives and legislation; and strengthening the individual response tools of the EU to appurtenant disasters.
10	In practice to implement the strategic management of integral safety that is systematic and proactive; to oppose projects in public way and to avoid the influence of lobbyists and other insisting groups. To implement professional knowledge for the benefit of the public interest.

Tab. 5 - Deficits at selected disasters' management from the viewpoint of safe community concept.
Tab. 5 - Nedostatky v řízení vybraných pohrom z hlediska konceptu bezpečné komunity.

Security items	Research results
1	The list of disasters is necessary to supplement by biotechnologies because their use is not regulated despite the fact that the wastes are of ten more aggressive than chemical technologies.
2	The disaster order with regard to the impact severity is: abuse of power; corruption; decay of human society into intolerant groups; abuse of technology; and abuse of authority.
3	To introduce prevention measures against the abuse of biotechnologies, genetic engineering and nanotechnology.
4	To introduce preparedness measures against the abuse of biotechnologies, genetic engineering and nanotechnology.
5	To introduce qualified response measures and activities against the abuse of biotechnologies, genetic engineering and nanotechnology.
6	To introduce qualified renovation plans after the abuse of biotechnologies, genetic engineering and nanotechnology.
7	To introduce strategic management of territory respecting the public interest and all hazards approach that will respect all investigated disasters. Vulnerabilities: missing data catalogues no these disasters; qualified monitoring; systematic research etc.
8	To remove the following features of present society: the atmosphere in society, which leads to the pursuit of wealth and to low co-operation of in habitants in the interest of the public welfare; inadequate care for the health of humans, animals and plants aimed at ensuring a healthy population, heal thy and quality food and drinking water at an affordable price; and lack of legal protection and lack of the knowledge of the population in the area of the abuse of controlled technologies.
9	Collection of qualified data (monitoring, qualified catalogues), selection of processing data methods and creation of standards and norms that will be codified in legislative. Qualified research of disasters targeted to human security and education. Research focused on integral safety respecting the public interest and promoting policies for the support of public welfare that ensure a safe community of different geographic dimensions, and also the consensus among social, environmental and technological systems.
10	In practice to implement the strategic management of integral safety that is systematic and proactive; to oppose projects in public way and to avoid the influence of lobbyists and other insisting groups. To implement professional knowledge for the benefit of the public interest.

Tab. 6 - Deficits at extreme social disaster management from the viewpoint of safe community concept.

Tab. 6 - Nedostatky v řízení extrémních sociálních pohrom z hlediska konceptu bezpečné komunity.

Security items	Research results
1	The list of disasters is necessary to supplement by: incurable diseases; abduction / Children disappearance; vandalism; murder / Murder attempt / Assassination; and local conflicts.
2	The disaster order with regard to the impact severity is: incurable diseases; abduction / Children disappearance; local conflicts; terrorist attack; vandalism; and cybercrime.
3	To introduce prevention measures against: incurable diseases; terrorist attacks; abduction / Children disappearance; vandalism; murder / Murder attempt / Assassination; cybercrime or computer crime; and local conflicts.
4	To introduce preparedness measures and activities against: incurable diseases; terrorist attacks; abduction / Children disappearance; vandalism; murder / Murder attempt / Assassination; cyber crime or computer crime; and local conflicts.
5	To introduce response measures and activities against: incurable diseases; terrorist attacks; abduction / Children disappearance; vandalism; murder / Murder attempt / Assassination; cybercrime or computer crime; and local conflicts.
6	To introduce renovation measures and activities after: incurable diseases; terrorist attacks; abduction / Children disappearance; vandalism; murder / Murder attempt / Assassination; cybercrime or computer crime; and local conflicts.
7	To find countermeasures against relatively large number of victims, namely not only direct, but also those who suffered from the psychological harm. To stipulate clear boundaries of human freedom and democracy in human society.
8	Countermeasures against relatively large number of victims, namely not only direct, but also those who suffered from the psychological harm. Clear boundaries of human freedom and democracy in human society.
9	To formulate: countermeasures against followed social disasters; clear boundaries of human freedom and democracy in human society; and type of human education from childhood being oriented to respect the humans, nature, culture memories and to technological works supporting the human's lives. Research focused on integral safety respecting the public interest and promoting policies for the support of public welfare that ensure a safe community of different geographic dimensions, and also the consensus among social, environmental and technological systems.
10	In practice to implement the strategic management of integral safety that is systematic and proactive; to oppose projects in public way and to avoid the influence of lobbyists and other insisting groups. To implement professional knowledge for the benefit of the public interest.

Tab. 7 - Deficits at disaster management directed to public protection in the EU from the viewpoint of safe community concept.

Tab. 7 - Nedostatky v řízení pohrom v ochraně obyvatelstva v EU z hlediska konceptu bezpečné komunity.

Security items	Research results
1	The list of disasters is necessary to supplement by: missing the human dimensions in the EU governance; low support human daily needs; insufficient level of civil protection at critical situations.
2	The disaster order with regard to the impact severity is: missing the human dimensions in the EU governance; low support human daily needs; insufficient level of civil protection at critical situations.
3	To introduce prevention against: missing the human dimensions in the EU governance; low support human daily needs; insufficient level of civil protection at critical situations.
4	To introduce preparedness against: missing the human dimensions in the EU governance; low support human daily needs; insufficient level of civil protection at critical situations.
5	To introduce response to: missing the human dimensions in the EU governance; low support human daily needs; insufficient level of civil protection at critical situations.
6	To introduce renovation after: missing the human dimensions in the EU governance; low support human daily needs; insufficient level of civil protection at critical situations.
7	To remove: incapability of the EU and Member States to respect human dimension at governance; incapability of inhabitants to take care of himself / herself and his / her family, to secure his / her property, to have basic food and water for at least 24 hours; incorrect behaviour of humans in critical situations.
8	To concentrate to the strategic territory safety management in dynamic variable world in which will be taken into account aspects connected with: <ul style="list-style-type: none"> - human lives and health as protection of physical body, food, drinking, comfort, homeland, - human security as protection against psychological harm and loss of security, - property as protection in case of: buildings and fittings – loss, damage; domestic animals - death loss, loss, - public welfare as protection against: deterioration in the atmosphere among the humans; and the loss of security, - environment as protection of: air; surface water; ground water; soil; rocks; landscape; forest; flora; and fauna, - infrastructures and technologies as protection in case of: the failure of energy supply (electricity, heat, gas); failure of water supply drinking, failure of water supply utility; sewage system failure; failure of the transport network; failure of cyber infrastructure (communication and information networks); the failure of the banking and financial sector; failure of emergency services (police, fire-fighters, paramedics); failure of essential services in the area (food supply, waste disposal, social services, funeral services), industry, agriculture; and failure of state and local governments, i.e. of area management and management of human society. To compile principles of continuity plans and contingency plans.
9	To find the principles for strategic territory safety management in dynamic variable world that will solve problems in domains: technical; functional / operational; tactical; strategic; and political, the solutions of which will be interconnected and directed to common aim. How: to support humans; to respect human dimension in governance; to build material, technical and finance fundament; and to co-operate with states outside the EU.
10	In practice to implement the strategic management of integral safety that is systematic and proactive; to oppose projects in public way and to avoid the influence of lobbyists and other insisting groups. To implement professional knowledge for the benefit of the public interest.

Tab. 8 - Deficits at finance and banking failures' management from the viewpoint of safe community concept.

Tab. 8 - Nedostatky v řízení selhání ve finančním a bankovním sektoru z hlediska konceptu bezpečné komunity.

Security items	Research results
1	The list of disasters is necessary to supplement by: poor governance of finance and banking sectors; insufficient management; and corruption.
2	The disaster order with regard to the impact severity is: corruption; abuse of power; insufficient respect to public interest; poor sector top management; poor state management.
3	To introduce the effective prevention measures and activities against: corruption; abuse of power; insufficient respect to public interest; poor sector top management; and poor state management. To apply the system concept in dynamically variable world, cross-sectional risks' management and putting under control.
4	To introduce the effective preparedness measures and activities against: corruption; abuse of power; insufficient respect to public interest; poor sector top management; and poor state management. To apply the system concept in dynamically variable world, cross-sectional risks' management and putting under control.
5	To introduce the effective response measures and activities to: corruption; abuse of power; insufficient respect to public interest; poor sector top management; and poor state management. To apply the system concept in dynamically variable world, cross-sectional risks' management and putting under control.
6	To introduce the effective renovation measures and activities after: corruption; abuse of power; insufficient respect to public interest; poor sector top management; and poor state management. To apply the system concept in dynamically variable world, cross-sectional risks' management and putting under control.
7	To remove: poor sector top management; poor state management; inefficient activities of banks; redundant number of workers; shareholders pressure to obtain more advantageous conditions; and insufficient accountancy of banks or clients.
8	The causes of systemic risk that is the risk of transmission problems, the inability of one institution to meet its obligations will cause that other institutions will not be able to meet their own obligations. The relevant failure may cause significant liquidity problems and difficulties in repaying loans to banks and, consequently, may threaten the stability of the banking system as a whole. Protection against systemic risk is a part of the activities of regulators of financial markets (including the institutions of the banking supervision) and central banks.
9	The principles of stability of finance and bank sectors in the dynamically variable words. To improve: system of management of finance and bank sectors; and integral risk management because procedures applied so far do not consider cross-cutting risks, which are the cause of cascading failures of complex systems.
10	In practice to implement the strategic management of integral safety that is systematic and proactive; to oppose projects in public way and to avoid the influence of lobbyists and other insisting groups. To implement professional knowledge for the benefit of the public interest.

Tab. 9 - Deficits at supply chains' management from the viewpoint of safe community concept.

Tab. 9 - Nedostatky v řízení dodavatelských řetězců z hlediska konceptu bezpečné komunity.

Security items	Research results
1	To consider the risks of supply chains in the EU there are: traditional property risks- fires, natural disasters, power system outages and downtime device; theft, violence and terrorism; political instability and risks, fluctuations in exchange rates, supply interruptions due to political problems in the country of the supplier; fraud and some consequences of central planning economies; failures of computer and telecommunication networks; very demanding customers requiring fast and precise delivery; short product life cycles as a result of the diversity of products, the I substitutability and emphasis on the ircontinuous innovation and flexibility; complete conformity of the products according to the laws of individual countries; and failures in communication with suppliers.
2	The risk order with regard to the impact severity is: strategic risks, financial risks, operational risks and risks associated with threats followed according to the approach pursued by the All Hazard Approach.
3	To ensure the effective prevention measures and activities against: strategic risks, financial risks, operational risks and risks associated with threats followed according to the approach pursued by the All Hazard Approach.
4	To ensure the effective preparedness measures and activities against: strategic risks, financial risks, operational risks and risks associated with threats followed according to the approach pursued by the AllHazardApproach.
5	To ensure the effective response measures and activities to: strategic risks, financial risks, operational risks and risks associated with threats followed according to the approach pursued by the AllHazardApproach.
6	To ensure the effective renovation measures and activities after realisation of: strategic risks, financial risks, operational risks and risks associated with threats followed according to the approach pursued by the AllHazardApproach.
7	To remove consequences of fact that supply chain management deals with the mutual relationships among supply chain components, i.e. among suppliers, carriers, customers, vendors, managers for waste management, including those who engage in products after the end of their lifespan. These interactions are likely to change in the chain up and down depending on what the subject of interest of an organization in the supply chain. It is clear that effective communication can strengthen co-operation, reduce the potential for misunderstanding and influence the measures taken by organizations in the supply chain.
8	Interconnected management and putting under control of: construction and design and technological risks; credit risks, market risks, external risks, operational risks, and risks associated with the management and decision-making.
9	To evaluate the impacts of: traditional property risks (fires, natural disasters, power system outages and down time device); theft, violence and terrorism; political instability and risks, fluctuations in exchange rates, supply interruptions due to political problems in the country of the supplier; fraud and some consequences of central planning economies; failures of computer and telecommunication networks; very demanding customers requiring fast and precise delivery; short product life cycles as a result of the diversity of products, the irsubstitutability and emphasis on the ircontinuous innovation and flexibility; complete conformity of the products according to the laws of individual countries; and failures in communication with suppliers, on the supply chains and to find effective protective measures and activities. Effective protective measures and activities of supply chains. Determination of domains in which management based on philosophy “just in time” can threaten humans, e.g.: food chain; the necessary supplies at emergency situations; needs for ensuring the basic state functions etc.
10	In practice to implement the strategic management of integral safety that is systematic and proactive; to oppose projects in public way and to avoid the influence of lobbyists and other insisting groups. To implement professional knowledge for the benefit of the public interest.

Tab. 10 - Deficits at disasters' management directed to human survival from the viewpoint of safe community concept.

Tab. 10 - Nedostatky v řízení pohrom zacílených na přežití lidí z hlediska konceptu bezpečné komunity.



Security items	Research results
1	To remove gaps denoted below as knowledge gaps.
2	To remove gaps denoted below as knowledge gaps.
3	To remove gaps connected with prevention below denoted as knowledge gaps.
4	To remove gaps connected with preparedness below denoted as knowledge gaps.
5	To remove gaps connected with response below denoted as knowledge gaps.
6	To remove gaps connected with renovation below denoted as knowledge gaps.
7	To remove: underestimation of disaster severities; use of worse scenarios for decision-making; use of simulations instead of expert evaluation of empirical data; corruption; disuse of power etc.
8	<p>To get over the following weaknesses:</p> <ul style="list-style-type: none"> - there exists awareness of natural disasters, although systematic prevention aimed at increasing the resilience of buildings and technology is not always at necessary level, - in social area: in many cases not enough care is given to prevent human errors in processing plants and public affairs governance; there is not sufficient protection against bullying and similar phenomena in schools and workplaces; and there is not sufficient protection against misuse of CBRNE and IT technologies, - in the technology area there is a clear demonstration of pragmatism and technical education of the population - a clear promotion of innovation and new technologies, and support for government efforts enforcing the use of secure and high-quality technologies, - in the environmental area there is insufficient protection against contamination of air, water and soil; and low quality of waste treatment, - in areas related to internal dependencies in the human system inadequate care in following areas was observed (sorted by highest priority according to data from the respondents'), which causes: failures in management of human society for the benefit of the public interest, i.e. the lack of fight against: corruption, abuse of power and the disintegration of human society into intolerant communities; failures in services for citizens (health, education, social assistance); failures in flows of raw materials and products; failures of energy flows; failures in money flows; failures in information flows; and failures in public transport, - politicians and public administration workers are not responsible for the quality of their decisions in favour of the public interest, - professional accountability of public administration workers for decision-making in the public interest support is not required, - public administration does not use tools for identification, analysis and management of risks in the public interest (mainly because of ignorance and because of the lack of enforcement of the legislation), i.e., it is making ad hoc decisions, - there is no sufficient control of use of public resources, forces and means, - good work in the public interest is not fully appreciated and the interests of different lobbying and political groups are preferred, - the education and healthy development of the population is not supported.
9	<p>Strategic integral safety management in dynamically variable world on all important levels: technical; operational / functional; tactical; strategic; and political, those are interconnected. Research focus edo integral safety respecting the public interest and promoting policies for the support of public welfare that ensure a safe community of different geographic dimensions, and also the consensus among social, environmental and technological systems.</p>
10	<p>To implement in practice the strategic management of integral safety that is systematic and proactive; to oppose projects in public way and to avoid the influence of lobbyists and other insisting groups.</p> <p>To implement professional knowledge for the benefit of the public interest.</p>

The critical analysis of results given in tables 1 – 10 shows that main deficiencies in the EU disaster management are:

- all hazard approach is not systemically applied,
- some disasters are underestimated (mainly in social domain),
- systemic, strategic and proactive management is not always implemented into practice,

- gaps in risk management, risk engineering and in trade-off with risks,
- present research does not determine priority orientations, its targets are influenced by politicians or lobbies,
- application procedures and orientation of strategies are not regularly verified,
- reasonable strategy for disaster management is missing,
- the disaster management does not often respect disaster life cycle,
- accent to problem solving is missing, still only a lot of discussions on problems,
- lack of resources”,
- lack of instrument for ensuring the EU finance stability,
- lack of management supporting the public protection and sustainable development.

All the above given results agree in a statement that with regard to the horizon, which is the year 2035, it is necessary:

- to expect several new disasters since human system, i.e. both the area and the human society, develops dynamically. Research must ensure their early identification along with methods for their good governance with aim to ensure the safe EU and security for its citizens,
- to expect the growth of the vulnerability of the EU and its citizens (factors: the number of inhabitants, dependency on civilization comforts, resources exhausting, lack of water, energy, sources, environment contamination, social conflicts etc.) i.e. the size of risks of all kind will rise. Research must find a suitable management on the basis of qualified data on disasters that must be systematically gathered and interpreted in a qualified way,
- to support the research on disasters, methods for risk management and coping with risks and all that to ensure with aim to reach an efficiency in spending the sources, i.e. both the work's intensity and the level of financial support to define as adequate to risk level for the EU and its inhabitants,
- for the EU to prepare early tools for dealing with the possible extreme situations, i.e. to target the research so that it sought the solution to problems connected with disasters on technical, operative, tactical, strategic and political level,
- not to underestimate significant facts in the EU, and therefore, the research must create a qualified strategy for the systematic, strategic and proactive management of the EU area that will be able to react to changes and that will be justified enough for the politicians to implement it in practice,
- to reduce the influence of lobbyists at the assigning of research intentions and demand the professional presentations of research results in qualified expert magazines and books,
- for the EU, to create tools for qualified management targeted on security and sustainability of both the EU and its vicinity, i.e. to correctly combine the types of management (strategic, tactic and operative) based on the qualified data, expert assessments and correct methods of deciding and to effectively use the tools of state that are: education and training of citizens; specific education of technical and management workers; technical, health, environmental, cyber and other standards, norms and prescriptions, i.e. tools for the regulation of processes that can or could lead to disaster occurrence (origin) or to intensifying their impacts; inspections; executive units for coping with emergency situations and critical situations; systems for dealing with critical situations; security, emergency and crisis planning; and specific systems of management for coping with critical up to extreme situations. Research should create the site specific systems for the decision-making support,
- to introduce in the EU the research financing so that the research results would be interconnected, based on data (i.e. not to copy scripts and other tools) but try to obtain facts for decisions,
- to concentrate the research on finding of the way of the system of systems management in the dynamically variable world because of the complex nature of a system such as the EU.

5. MISSING FINDINGS FOR DISASTERS' MANAGEMENT

Synthesis of results obtained by detailed studies of disasters and disasters' management given in tables 1 – 10 is summarized in Table 11. The synthesis was performed by panel discussion of five experts and was based on philosophy that each responsible government needs to protect inhabitants daily and at critical situations, i.e. the EU needs also to preserve the basic functions of a state.

During the review the next requirements were respected: research needs to be targeted, i.e. the already-known needs not be researched without a good reason; research needs to seek and solve open problems, namely correctly with regard to current knowledge and experiences on ensuring the safe community and its sustainable development; research needs to demand objective results under given conditions, i.e. to systematically present the results in front of a relevant expert community and to make them be a subject to a public opponent control (it is necessary to avert plagiarism, to protect intellectual property, to support creative abilities of individuals that has a creative potential and that are willing to give it in favour of the EU and its inhabitants' development); and prevent to distortion of results in the style "the fundamental is what an authority says" because to slow down development. Therefore, it is necessary not to dissimulate conflicts among outcomes of projects since their existence is normal. Under the effort of finding the right solution, it is necessary to make it a subject of a thorough investigation with aim to find the causes of problems and to define an optimal solution of them in a given conditions and within the given possibilities. The main task of the future EU security research is to create systems for knowledge-based decisions and effective utilisation of land and nature. Therefore, the EU must remove prejudice in favour of lobbying groups the interest of which is different from public interest.

Tab. 11 – Challenges for management and research of disasters newly emerging or having the increasing destructive potential from the viewpoint of safe community concept.

Tab. 11 – Výzvy pro řízení a výzkum pohrom, které se nově vynořují nebo mají rostoucí ničivý potenciál z hlediska konceptu bezpečné komunity.

SECURITY ITEMS	RESEARCH RESULTS
Security challenges that can be considered to have big impact in the 2035 time frame and currently are not sufficiently addressed in the planning of research	The list of followed disasters is necessary to supplement by: <ul style="list-style-type: none"> • natural: geomagnetic storms; desertification; land erosion; soil salinization; fall of a cosmic body; sand storms; ocean spreading; and sudden change of weather (cold wave or heat wave), • technological: organising accidents in technological facilities; biotechnologies because their use is not regulated despite the fact that the irwastes are often more aggressive than chemical technologies; disuse of technologies (nuclear, nano and IT); disuse of genetic engineering; and disuse (abuse) CBRNE agents, • imperfect human activities: education infrastructure breakdown, research infrastructure breakdown, breakdowns (organising accidents) in public governance, defects of supply chains, • environmental (including human body): stress and movements of territorial plates; rapid natural subsidence of surface; water circulation in environment; substance circulation in environment; human food chain; planet processes; interactions of solar and galactic processes, incurable diseases in systems of humans, animals and plants, • environment reactions to human activities: artificial surface subsidence due to undermining; and interaction due to militarization of outer space,," • social: illegal production and distribution of narcotics and psychotropic substances, illegal migration of great groups of people, proliferation of the weapons of mass destruction.
Most severe security challenges that should be addressed by	The disaster order with regard to the impact severity is: <ul style="list-style-type: none"> • natural: fall of a big cosmic body on Europe; earthquake; floods; forest fires; and drought,



<p>research planning in the 2035 time frame</p>	<ul style="list-style-type: none"> • technological: beyond design accident with presence of radioactive substances; beyond design accident with presence of substances mutagenic, carcinogenic and harmful to reproduction, • imperfect human activities: corruption, disuse of power, insufficient respect to public interest, education infrastructure breakdown, research infrastructure breakdown, breakdowns (organising accidents) in public governance, defects of supply chains, blackouts, low robust technical and finance infrastructure - long-term outage of electrical infrastructure; long-term stoppage of drinking water supply; long-term finance market disorder; and long-term shortage of basic food, • environmental (including human body): disruption of water circulation in environment; disruption of substance circulation in environment; huge pandemics and epidemics and incurable diseases in systems of humans, animals or plants and across them, • environment reactions to human activities: contamination of air, water, soil and rock missive's; uncontrolled human population explosion; migration of large groups of people; the militarization of space; and climate variations, • social: abuse of power; corruption; decay of human society into intolerant groups; illegal migration of great groups of people; abuse of technology; and abuse of authority, illegal access to information systems, cyber crime, terrorist attacks, corruption in government and public administration, including the political scene, serious economic crime, including money laundering, tax evasion, trafficking with human beings and illegal migration, illegal production and distribution of psychotropic substances, extremism, all forms, discrimination and intolerance.
<p>Challenges for future security research for prevention, preparedness, response and renovation</p>	<ul style="list-style-type: none"> • To implement the system of management based on integral safety and to improve the prevention, preparedness, response and renovation. • To build the systematic approach for the response to disasters. Note: the individual Member States have the systems of response on various levels. • Especially to improve the response to critical situations because extreme disasters cause of big economic and social impacts (lesson learned from Fukushima accident). They affect infrastructure (buildings, transport, energy and water supports), which represents a specific threat for the densely inhabited areas. • To target crisis management for case of extreme situations is necessary. • To process norms and standards for infrastructures that will: ensure their sufficient capacities; enhance their robustness and resiliency. • To upgrade sector and cross-sector management - cross-sectional risks' (systemic) management and putting the cross-sectional risks' (systemic) under control. • To compile robust measures to prevent disuse of technologies. • To introduce early warning systems in case of disasters for which there are known symptoms that enabling the warning. • To prepare tools for systematic regulation of recovery process; i.e. a recovery plan and plan for prevention of losses at renovation. • To improve humanitarian assistance in case of extreme disasters. • To implement systematic use of disaster insurance policies. • To improve attention to land degradation - lack of European legislation and objectives of soil protection. • To improve the EU preparedness for climate change because it is lagging behind in the sphere of adaptation (in contrast to the absurd emphasis on the causes of the greenhouse effect); to increase attention to adaptation in cross-border dimension (e.g. the possibility of international coordination and construction of dams and reservoirs) - attention to economic and social criteria.



	<ul style="list-style-type: none"> • To upgrade management of social disasters - <i>Prevention</i> is not systematic ally carried out for any of the social disasters; prevention is of ten declared by signed treaties, conventions, treaties or bilateral /multilateral agreements but in reality no effective tools. It is necessary to improve: close interdisciplinary cooperation of all parties involved at national level and consistency with other central institutions within the EU states; and sharing good practice, continuing education and training of experts responsible at the pan-European level. <i>Preparedness</i> for coping with the given disasters is the most well established the best on a theoretical level but the level of practice is greatly affected by the economic stability of a particular Member State; and level detection (intelligence services, technical means, and the level of experts...) is variable and not interconnected. Because highly unacceptable impact on the current situation in EU countries they have long - term consequences of an economic crisis, it is necessary to find effective tool for inhabitants survive and for stabilization of economic situation that evocates a lot of followed disasters. • To upgrade process management – type “just in time” is not suitable for goods, measures and activities that are important for human survival.
<p>Related main vulnerabilities to be addressed for future security research</p>	<ul style="list-style-type: none"> • The most infrastructure and the objects is only protected to the size of design disaster, i.e. at extreme disaster’s sizes they fail, which represents a specific threat for the densely inhabited areas. The situation can be made worse by rising of the sea level. • The insufficient level of civil protection at critical situations from the public administration of states. • The low support human daily needs from the public administration of states. • The incapability of inhabitants to take care of himself / herself and his / her family, to secure his / her property, to have basic food and water for at least 24 hours; incorrect behaviour of humans in critical situations. • Strategic and long-term approach is not systematically included into the territorial planning on both the continents and coastal areas including transport, regional development, industry, tourism and energetic politics. • Low attention to land degradation - lack of European legislation and objectives of soil protection. • No sufficient the EU preparedness for climate change, because it is lagging behind in the sphere of adaptation (in contrast to the absurd emphasis on the causes of the greenhouse effect). • Lack of knowledge stress and movements of territorial plates; rapid natural subsidence of surface; water circulation in environment; substance circulation in environment; human food chain; planet processes; interactions of solar and galactic processes • Low attention to adaptation in cross-border dimension (e.g. the possibility of international coordination and construction of dams and reservoirs) - attention to economic and social criteria. • The knowledge on the vulnerability of protected assets is only fragmental. • No targeted crisis management for critical situations that can be caused by: beyond design nuclear accident; long-term outage of electric energy supply; long-term stoppage of drinking water supply; long-term shortage of food supply; long-term failure of the financial infrastructure; and long-term failure of the financial infrastructure. • The deficiency of early warning systems in case of disasters for which there are known symptoms that enabling the warning. • Lack of technical resources, inadequate knowledge and training of managerial staff, poor response management and lack of finances. • Lack of supply chain organisation at emergency and critical conditions. • In many cases not enough care is given to prevent human errors in processing plants and public affairs governance.
<p>Related main</p>	<ul style="list-style-type: none"> • Systematic collection of data on disasters of all types and their impacts.



<p>knowledge gaps to be addressed for future security research</p>	<ul style="list-style-type: none"> • No in-depth research based on data - key step - Missing data catalogues for these disasters; qualified monitoring, systematic detection system; systematic research etc. Special attention must be paid to social disasters because data for research are pure - collection and processing of data are on low level from methodical viewpoint - it is necessary to create: consistent data sets; effective mutual consultation and co-ordination of procedures and the inflexible adaptation to the rapidly evolving global (trans- national) conditions that bring new threat scenarios, and therefore, the require new more reliable methods determining new reliable scenarios. • Missing knowledge on solution of lack of drinking water, raw materials, resources, energy, food in case of uncontrolled human population explosion and migration of large groups of people. • Missing tools for robust crisis management in case of extreme disasters. • No verification of every result, before its implementing in practice by a public management opponent and by real experts, who demonstrate professionalism, objectivity and support of public interests - the way how to avoid the influence of lobbyists. • No specification of methods for defining the scenarios for the identification, analysis, assessment, management of risks and dealing with risks are defined; no standards guaranteeing that the results of methods are comparable. • No data and methods for investigation of interdependences, rules of co-existence of overlapping systems and of management and trade-off with cross-sectional risks.
<p>Proposed type of future security research</p>	<ol style="list-style-type: none"> 1. Monitoring of all kinds of disasters and their impacts. 2. How to implement in practice the strategic management of integral safety that is systematic and proactive and it is not influenced by lobbyists and other insisting groups. 3. How to implement the strategic territory safety management in dynamic variable world in which will be taken into account aspects connected with: <ul style="list-style-type: none"> - human lives and health as protection of physical body, food, drinking, comfort, homeland, - human security as protection against psychological harm and loss of security, - property as protection in case of: buildings and fittings – loss, damage; domestic animals - death loss, loss, - public welfare as protection against: deterioration in the atmosphere among the humans; and the loss of security, - environment as protection of: air; surface water; ground water; soil; rocks; landscape; forest; flora; and fauna, - infrastructures and technologies as protection in case of: the failure of energy supply (electricity, heat, gas); failure of water supply drinking, failure of water supply utility; sewage system failure; failure of the transport network; failure of cyber infrastructure (communication and information networks); the failure of the banking and financial sector; failure of emergency services (police, fire-fighters, paramedics); failure of essential services in the area (food supply, waste disposal, social services, funeral services), industry, agriculture; and failure of state and local governments, i.e. of area management and management of human society. To compile principles of continuity plans and contingency plans. 4. How to arrange stability of finance and bank sectors in the dynamically variable words. 5. How to implement professional knowledge for the benefit of the public interest. 6. How to prevent big impacts of the brain drain and the exodus of professionals; i.e. how to create experience databases. 7. How to upgrade cooperation in the security research; the implementation of existing directives and legislation; and strengthening the individual response

	<p>tools of the EU to appurtenant disasters.</p> <ol style="list-style-type: none"> 8. How to establish effective tools and legislation in prevention, preparedness, response and renovation – e.g. of Incorrect governance of public affairs also sanctions; qualified research based on real qualified data; and education. 9. Collection of qualified data (monitoring, qualified catalogues), selection of processing data methods and creation of standards and norms that will be codified in legislative. 10. Qualified research of disasters targeted to human security and improvement of population education. 11. With regard to the lessons from Fukushima to improve the methods associated with the determination of terms of references for design, construction and operation of technological buildings, equipment's and infrastructures; deterministic and stochastic approaches must be supplemented by expert judgement that considered influence of epistemic uncertainties. 12. To improve: system of management of territory and objects; and integral risk management because procedures applied so far do not consider cross-cutting risks, which are the cause of cascading failures of complex systems. 13. To operate systematic disaster's monitoring; to create legislation for prevention, preparedness, response and renovation with special attention to response to critical situations (crisis management, warning systems etc.). 14. To study disaster characteristics in-depth; to improve the population education with aim to reduce its vulnerability to these disasters. 15. To propose and implement sanctions for contamination of air, water, soil and rock mass. 16. To propose contingency plan for erosion of soil and rock massifs. 17. To find the safeguard procedures for landscape uniformity. 18. To apply Effective protective measures and activities of supply chains.
Expected most needed topics of future security research	<ul style="list-style-type: none"> • In practice to implement the strategic management of integral safety that is systematic and proactive and it is not influenced by lobbyists and other insisting groups. • To implement professional knowledge for the benefit of the public interest. • To specify the cases in which system “JUST IN TIME” is impossible to use from the viewpoint of human survival. • To find the way for: reduction of big impacts of the brain drain and the exodus of professionals – creation of experience databases; elimination of reasons for migration, such as poverty, climate change and hunger; establishment of comprehensive migration policy – e.g. measures and activities for case of sharp climate change, deforestation, desertification, biodiversity loss etc. • Proposal of human countermeasures against disasters and their impacts, if possible.

The experts also determine the order of disasters according to the criticality for human society in the Europe (the criticality denotes simultaneously the high vulnerability and high severity). Their order is: abuse of power (it leads to armed conflicts); corruption (it leads to economy, security and welfare losses); decay of human society into intolerant groups (it leads to security and welfare losses that can end up in armed conflicts); illegal migration of great groups of people (it leads to security and welfare losses that can end up in armed conflicts); abuse of technology (using the CBRNE, nano or genetic actions); systematic ground water drop (it leads to big deficit in drinking and utility water); soil salinization ((it leads to big deficit in food and quality of food); and organising accidents in technological facilities, especially nuclear etc.

6. ORIGINATORS OF THREATS THAT ARE IN WAY OF DISASTERS' MANAGEMENT PERFORMANCE

From Table 11 analysis it follows that many critical situations in human system is connected with the disasters' management of disasters for which the humans are responsible – behaviour of humans;

human factor; and disturbances in human society behaviour. Generally, it is possible to say that the cause of critical situations are organisational accidents that are connected with a human factor; especially with phenomena as corruption; abuse of power; suppress of the public interest; low respect to knowledge and engineering experiences; and low professional level of management. Their consequences are: government default; technologies failures; infrastructure failures; research failure; social system failure; decay of human society into intolerant groups; increasing number of impoverished people – seniors, dossiers, jobless – problem young people who are out of work and without education; disturbances of daily civil protection human needs; disturbance of daily civil protection, human security and public welfare; disuse of technology, space militarization; real data are in Table 12.

Tab. 12 – Phenomena that cause the disturbance of social relations, public welfare and human security.

Tab. 12- Jevy, které působí narušení sociálních vztahů, veřejného blaha a bezpečí lidí.

Domain	Defects leading to critical situations
Top governance	The domain management: is predetermined to political and military aspects; is short of human dimension and gives low support to the EU inhabitants; does not governed on the basis of qualified data processed by qualified methods; is often determined by fixed ideas without real assessment of their realisation; is based on image that all is stationary and it does not respect dynamic development of world that means to prepare possible extreme scenarios and measures for human's survival; and is not realised on the principle "Safety management system for system of systems".
Technical domain	In domain: no standards and norms for underground and high-rise buildings with regard to human security and public welfare; missing essential services provided to the citizens; scenarios for decision-making are prepared only by simulation without verification with use of real data – sometimes scenarios used were derived for different conditions, i.e. conditions of technology transfer were not fulfilled; no norms and standards for interoperability; no standards and norms for co-operation of diverse systems; no co-ordinated emergency plans on all levels (EU-wide to regional) – all must be on professional level respecting knowledge and experiences, continuity and contingency plans.
Organisational domain	In domain: missing the effort directed to reduction of weakness (low number of resources, contamination of environment, work price, unemployment) and to use of strength (qualified technician population); no effective tool against to corruption, power disuse, lobbying etc.; missing the support of co-operation on mutual partner principle; missing base for mutual understanding and mutual co-existence; no effective international teams of first responders; no base for close co-operation of first responders; no norms and standards for interoperability.
Knowledge domain	In knowledge base used for decision-making: missing systematic respect to present world nature – dynamic open system of systems; low effort directed to collection of qualified data on disasters and on lesson learned from responses to extreme disasters; underestimation of disasters at disasters' management; neglecting the creeping disasters as ground water stores, contamination of human food chain etc.; no qualified disasters' scenarios for decision making.

Proposal of problems' solving consists in the finding the way how to implement: systematic use of knowledge and experiences at decision-making; strategic safety management and strategic safety engineering based on the system of system approach and on principles integral safety based on integral risk management and trade-off with aim to avert the organisational accidents; human dimension into



governance (daily public protection and public protection at normal, abnormal and critical situations); rules for removing the corruption, lobbying and abuse of power; solidarity principle; responsible co-operation among partners; the good governance based on qualified data and on strategic, systemic and proactive management; systematic inspection by professionals, deputies and by public; legislative supporting the public interests into the state and sector management; solution of possible conflicts by peaceful way; special family politics, ensuring the availability of further education etc. It is also necessary to find the way how to establish and implement into daily practice the basic EU functions, because the economic base, political and military bases are not sufficient for the security of the EU inhabitants and for public welfare. For all these problems solving it is necessary to ensure: systematic building the knowledge base; systematic building material and technical base; qualified engineering procedures; the management based on qualified data; realising the EU governance that supports the EU inhabitants. The most effective seems systematic prevention of organisational accidents that lead to the government defaults on all levels. It is necessary to stop talking and to work with goal "security and sustainable development of humans".

7. CONCLUSION

Formulation of challenges for research is based on philosophy that each responsible government needs to protect inhabitants daily and at critical situations, i.e. the EU needs also to preserve the basic functions of a state; the real tasks are given for each public protected asset separately [1]. The basic requirement is so that the research: was targeted, i.e. the already-known was not researched without a good reason; sought and solved open problems, namely correctly with regard to current knowledge and experiences on ensuring the safe community and its sustainable development; demanded objective results under given conditions, i.e. to systematically present the results in front of a relevant expert community and to make them be a subject to a public opponent control. With this, plagiarism can be avoided, the real protection of intellectual property will be ensured and the development of creative abilities of individuals that has a creative potential and that are willing to give it in favour of the EU and its inhabitants' development will be supported; and would not distort the results – the style "the fundamental is what an authority says" holds development back. Therefore, it is necessary not to dissimulate conflicts among outcomes of projects since their existence is normal. Under the effort of finding the right solution, it is necessary to make it a subject of a thorough investigation with aim to find the causes of problems and to define an optimal solution of them in a given conditions and within the given possibilities.

The main task of the future EU security research is to create systems for knowledge-based decisions and effective utilisation of land and nature. Therefore, the EU needs to remove prejudice in favour of lobbying groups the interest of which is different from public interest.

The main deficiencies in the EU disaster management are the following items: all hazard approach is not systemically applied; some disasters are underestimated (mainly in social domain); systemic, strategic and proactive management is not always implemented into practice; co-existence of systems with different nature is not followed; gaps in risk management, risk engineering and in trade-off with risks; present research does not determine priority orientations, its targets are influenced by politicians or lobbies; application procedures and orientation of strategies are not regularly verified; reasonable strategy for disaster management is missing; the disaster management does not often respect disaster life cycle; accent to problem solving is missing, still only a lot of discussions on problems; lack of resources; lack of instrument for ensuring the EU finance stability; and lack of management supporting the public protection and sustainable development.

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