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The Role of EASeR Project in Enhancing Search and Rescue Teams Performance

Rola projektu EASeR w poprawie skuteczności działań grup poszukiwawczo-ratowniczych

ABSTRACT

Purpose: The aim of the article is to present the obstacles which constitute the so-called “barrier effect” while exploring the area of urban search and rescue operations on the first day after an earthquake. It also includes preliminary results of research conducted under the implementation project “EASeR”, aimed at developing procedures and outlines for fire-fighters from Italy, helping them minimise the “barrier effect”. They may also prove useful for other countries.

Introduction: In the introduction, the authors outline the circumstances of the establishing of the INSARAG International Search and Rescue Advisory Group at the UN and its European counterpart with a broader spectrum of responsibilities (the EU Civil Protection Mechanism), along with the legal basis for the organisation, as well as recall the international guidelines defining standards and methodologies for the Search and Rescue Groups (GPR). The mechanism is responsible not only for USAR but also for almost 20 types of different civil protection assets. The authors also recall the whole cycle of the GPR mission, along with examples of natural disasters and circumstances that have led to the launching of the EASeR project. Finally, the assumptions of the project and its partners are presented.

Methodology: The initial research material related to the subject matter in question included international UN and EU normative documents establishing the organisational and operational standards for the conduction of actions, and the operation of search and rescue groups (USAR), as well as exemplary EU implementation projects. The identification of the initial “obstacles limiting the conduction of initial assessments (ASR 1–3) at the scene of action, defined by Italian fire-fighters from Pisa as a “barrier effect”, was the starting point for a wider analysis of the facts, and the development of a questionnaire and international surveys, using a diagnostic survey in over a dozen countries around the world.

Conclusions: The quantitative data and opinions on the main obstacles encountered during the disaster reconnaissance allowed the project experts to confirm or reject the pre-assumptions for the projected content of the final project documents, and during further meetings, it was possible to develop the final versions of operational procedures indexes for emergency services in Italy, as well as the index of guidelines for international USAR in the field of reconnaissance in the initial phase (the so-called ASR 1–3). After the consultation of the final project documents (procedures and guidelines), as a result of the collected opinions and further expert work, the second phase of the project was to take place.

Keywords: Urban Search and Rescue, barrier effect, INSASRAG, earthquake, EASeR project

Type of article: case study – analysis of actual events

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ABSTRAKT

Cel: Celem artykułu jest przedstawienie przeszkód składających się na tzw. „efekt bariery” podczas rozpoznawania terenu w ramach działań grup poszukiwawczo-ratowniczych w pierwszej dobie po trzęsieniach ziemi. Artykuł przedstawia także wstępne wyniki badań i dotychczasowe prace eksperckie związane z projektem wdrożeniowym „EASeR”, w ramach którego opracowane zostaną procedury i rekomendacje dla włoskich strażaków służące minimalizowaniu wspomnianego „efektu bariery”. Procedury te mogą stanowić także wsparcie dla innych krajów.

Wprowadzenie: We wstępie autorzy przedstawiają okoliczności utworzenia przy ONZ Międzynarodowej Grupy Doradczej ds. Poszukiwani i Ratownictwa INSARAG oraz jej europejskiego odpowiednika posiadającego szerszy zakres odpowiedzialności (Unijny Mechanizm Ochrony Ludności), podstawy prawne funkcjonowania tej organizacji. Przywołują także międzynarodowe wytyczne określające standardy i metodologię w zakresie grup poszukiwawczo-ratowniczych (GPR). Mechanizm odpowiada nie tylko za zakres modułów GPR, lecz też za ok. 20 typów różnych zasobów ochrony ludności. Autorzy przywołują również cały cykl trwania misji GPR oraz przykładowe katastrofy naturalne i okoliczności, które doprowadziły do projektu EASeR. Przedstawione zostały założenia projektu i jego partnerzy.

Metodologia: Wyjściowy materiał badawczy związany z problematyką stanowiły międzynarodowe dokumenty normatywne ONZ i UE ustanawiające standardy organizacyjne i operacyjne dla działania akcji i grup poszukiwawczo-ratowniczych (GPR) oraz przykładowe zrealizowane unijne projekty wdrożeniowe związane z problematyką projektu. Identyfikacja wstępnych „przeszkód” ograniczających prowadzenie rozpoznania wstępnego (ASR 1–3) na miejscu akcji, określona przez strażaków włoskich z miasta Pisa jako „efekt bariery”, była punktem wyjścia do dokonania szerszej analizy stanu faktycznego, opracowania kwestionariusza ankiety i przeprowadzenia międzynarodowych badań metodą sondażu diagnostycznego w kilkunastu krajach na całym świecie.

Wnioski: Uzyskane w badaniu sondażowym dane ilościowe oraz opinie na temat głównych przeszkód podczas rozpoznania po katastrofie pozwoliły ekspertom projektu potwierdzić lub odrzucić przyjęte wstępnie założenia do projektowanych treści końcowych dokumentów projektowych, a w czasie dalszych spotkań umożliwiły opracowanie końcowych wersji indeksów procedur operacyjnych dla służb ratowniczych we Włoszech, a także indeksu wytycznych dla międzynarodowych GPR w zakresie prowadzenia rozpoznania we wstępnej fazie (tzw. ASR 1–3).

Słowa kluczowe: grupa poszukiwawczo-ratownicza, efekt bariery, INSARAG, trzęsienie ziemi, projekt EASeR

Typ artykułu: studium przypadku – analiza zdarzeń rzeczywistych

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Introduction

The International Search and Rescue Advisory Group (INSARAG) was established in 1991 following the indications of the specialised Urban Search and Rescue (USAR) teams that operated together in the Mexican earthquake of 1985 and the Armenian earthquake of 1988. INSARAG is a humanitarian inter-governmental network of disaster managers and USAR practitioners, operating under the umbrella of the United Nations (UN) [1].

United Nations General Assembly Resolution 57/150 of 16 December 2002 on ‘Strengthening the effectiveness and coordination of international urban search and rescue assistance’ is a product of the work of the INSARAG that pursued its creation. This United Nations General Assembly Resolution makes many pertinent points central to the work of the INSARAG. It also endorses the INSARAG Guidelines and Methodology [2]. The tasks of the INSARAG are to improve efficiency in cooperation with international USAR teams working in collapsed structures, to strengthen the national USAR capacities, and to develop internationally accepted USAR procedures, guidelines and best practices.

A similar standardisation, as the INSARAG created for international USAR teams (heavy, medium) globally, was established within the framework of the Union Civil Protection Mechanism [UCPM] under decision No. 1313/2013/EU of the European Parliament and of the Council of 17 December 2013 [3] for the so-called civil protection modules for international missions of around twenty types of units (including, respectively, USAR heavy and medium modules). The UCPM is responsible for broader coordination of rescue and civil protection assistance of all the states participating in the Mechanism, as well USAR modules. Medium and heavy USAR teams undergo a process of international external classification [IEC] which confirms achieving the minimum standard for working in an international environment according to the INSARAG guidelines (vol. II, manual C of the Guidelines – IEC/Rs Guide). Light USAR teams were initially considered resources for national missions, but later on (after the Haiti 2010 and Nepal 2015 earthquakes), at the INSARAG Secretariat located in OCHA Geneva, that approach was changed, and during the highest stra-

ategic decision-making annual meeting of the INSARAG Steering Committee [ISC] in February 2018 the decision about the classification of light teams was confirmed.

During a USAR mission, there are the following 5 standard phases:

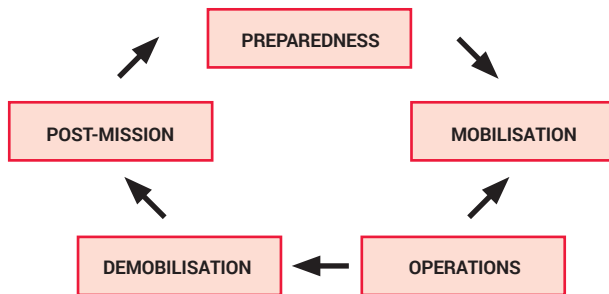


Figure 1. INSARAG International USAR Response Cycle
Source: Own elaboration based on INSARAG Guidelines, Vol. I, page 16.

The initial 36–48 hours after an earthquake are crucial for saving the injured people from debris. Later on, the chances for survival decrease dramatically. Therefore, the proper and timely assessment during urban search and rescue operations constitutes the key element of each emergency response, because it helps to prioritise the needs, to scale and adapt the relevant resources, and finally to effectively manage the operations. Each delay results in further issues that, in the end, reduce the chances for the victims trapped under the rubbles to be saved. There are a few earthquake prone countries in Europe that experience these problems during large-scale emergencies [4], [5], [6].

It seems enough to mention Italy which has been affected several times since the last significant earthquake in l'Aquila in 2009. The majority of them hit Central Italy, like the Amatrice village in August 2016, or Rigopiano in January 2017, where the avalanche triggered by a series of earthquakes destroyed a luxurious hotel. The same major obstacles to carry out the recce in an effective way appeared in each case. They have been named by Italian fire-fighters as “barrier effects.” In the case of the Amatrice site, a major difficulty was represented by a wide area located up in the hills, with a narrow road leading to the village and hundreds of missing persons, whereas in the Rigopiano site, the area was more circumscribed but not visible, and with relevant accessibility limits, because of heavy snow, up to 5 meters.

The other “barriers” met by Italian rescuers were related to the relevant data collection, helicopters deployment and the lack of dedicated software for topography survey of the destroyed buildings. Additionally, situations in which local people impede the proper execution of the quick assessment activities by asking for help for their relatives left under the rubbles have been reported among the major obstacles for the Urban Search and Rescue Team.

The operations performed by the reconnaissance team might not always be in line with the priority of intervention and might hamper the overall assessment activity. During an emergency, the assessment team is kept in the periphery of the most affected area and it is forced to ask for additional resources kept in the periphery as well. As a consequence, the time of completing the

assessment itself and the overall rescue operations become longer, which delays the whole process and decreases the chances of the victims to be saved. The USAR team assess the situation on site alone, using different methods, and together with other services and teams [7].

In different countries, several problems are experienced during USAR assessment but they have not been compared so far. Moreover, technical tools have been developed individually by countries and organisations without any comparisons. The ongoing Union Civil Protection Mechanism Training Programme [8] does not make extensive and detailed reference to this specific typology of assessment.

In such circumstances, the idea of the European Union's EASeR project (full name: ENHANCING ASSESSMENT IN SEARCH & RESCUE) was developed. The main objectives are to integrate the lack of studies and procedures to face the “barrier effect” during a SAR assessment in natural catastrophes, and to propose an integration of the existing operating procedures that deal with the problem in a general way (e.g. INSARAG Guidelines 2015) and best practices. The project also explores the possibility to tailor the already used equipment and innovative technology to the specific needs of SAR assessment (software, drones, advanced mapping and data collection), and to provide a scenario to test the project findings and the innovative technology for the first time under unique real-site conditions.

EASeR project – main goals and partners

The “Enhancing Assessment in Search & Rescue – EASeR” project is co-funded by the European Union Civil Protection Mechanism, and it targets a specific aspect of the urban search and rescue (USAR) assessment, called the “barrier effect,” during emergency interventions in response to natural catastrophes, especially earthquakes.

The term “barrier effect,” as used by the Fire Dep. of Pisa (IT), refers to the obstacles arising from a wide range of environmental factors such as heavy snow, traffic due to damage to the road system escaping in narrow/limited escape routes, road interruptions, and non-coherent management of the information flow (dissemination of false/fake information, correct information not taken into consideration, missing basic information). These factors can severely hamper the general assessment in SAR operations, as demonstrated by a direct experience of the USAR team of the Fire Dep. of Pisa, in both national and international interventions [8].

The project capitalises on the outcomes of other EU funded programmes (like MODEX – civil protection module exercises launched in 2016 and still on-going) and projects aimed at applying new technologies in emergency cases, such as “EmerGent – Emergency Management in Social Media Generation 2014–2017” [9] aimed at understanding the impact of social media during an emergency.

The EASeR project [10] aims to provide a practical strategy to carry a more efficient assessment in USAR with a positive cascade effect on the general performance of all subsequent operations.

The strategy of EASeR consists of the following four steps:

- a) analyzing the state of the art;
- b) providing operational tools as procedures to be validated in Italy (IT) and Guidelines to be disseminated at the international level;
- c) identifying new technologies that can be applied innovatively to support the assessment (software, drones);
- d) covering, as part of the developed procedures, the deployment of helicopters belonging to other corps, whenever possible.

Such procedures and innovative technologies are tested in a small-scale exercise where the assessment teams from Italy (IT), Czech Republic (CZ) and Poland (PL) face the “barrier effect.” The Fire Department of Pisa coordinates the project consortium composed by:

1. The Fire Rescue Brigade of the Moravian Silesian Region (FRB MSR, CZ).
2. The Scientific and Research Centre for Fire Protection – the National Research Institute (CNBOP-PIB, PL).
3. Timesis (SME, IT).

The EASeR general objective is to identify all the relevant elements to overcome the search and rescue assessment problems, and to enhance the response capacity in a complex emergency scenario due to natural catastrophes (e.g. earthquakes).

Through the drafting and validation of the operating procedures in Italy, and the drafting of international procedures, outlines and guidelines to be disseminated internationally, the improvement of the SAR assessment effectiveness will be tangible and sustainable after the project conclusion (the expected impact). The development of procedures also includes their testing through a small-scale exercise. In the medium-term/long-term perspective, EASeR is expected to contribute effectively to improving the efficiency of search and rescue operations, reducing the reaction time to the “barrier effect,” and strengthening the general deployment effectiveness of USAR teams.

European dimension of the project

The project partnership involves three EU countries with a deep and long-lasting experience in conducting national and international USAR activities (IT-CZ-PL). Italian, Czech and Polish Assessment experts of the Urban Search and Rescue teams are directly involved in the project, and team managers are directly interested in the project outcomes (procedures and procedure testing). The project outcomes are also expected to generate interest among other EU and non-EU countries, as the deliverables are designed to be replicable and customised. All the activities are grouped into five Working Packages (from WP0 to WP4), which implies a direct interaction and cooperation of the key experts at the national and international levels (a board of experts), as they are focused on producing key deliverables with a strong impact at both the national level (SOP-IT) and the European/international level (SOP-INT Outline, Guidelines). The exchange of know-how, testing and dissemination activities will be conducted in Italy, Czech Republic and Poland. The ultimate conference will be

guaranteed by each country to amplify the cascade effect of the project. Additionally, the involvement of the INSARAG Secretariat (located in UN OCHA) experts, who were invited to take part during the SOP workshops (WP1), should ensure a more thorough dissemination of the key deliverables, as well as the project impact and sustainability in the medium-term/long-term perspective. Therefore, the actions of EASeR, as a whole, can be viewed as an integration of the existing procedures already used in emergency cases at the EU level, and as potentially interesting also for the UCPM training programmes’ providers and EU Module exercises (MODEX). In the medium-term perspective, EASeR will address the development and testing of niche capacities, and innovative technologies and methodologies. Furthermore, the national civil protection authorities in IT, CZ, PL can take a direct advantage from the coordination of emergency cases if the assessment of USAR is more rapidly conducted and its efficiency is improved, thus overcoming the relevant limits of the “barrier effect.” People and victims in the affected areas during an emergency will act as the ultimate direct beneficiaries of the improved assessment in SAR operations.



Figure 2. The USAR Poland recon team in Nepal

Source: USAR Poland archives.

EASeR aims at addressing the preparedness priority of call 1. “Actions aimed at further developing the preparedness aspects of the Union Civil Protection Mechanism.” These are in particular related to: i) developing new response capacities through the development and testing of niche capacities, and innovative technologies and methodologies; ii) better planning of operations, and iii) enhancing the quality in the response capacity. In fact, the project strategy is designed to give a relevant contribution

to overcome the “barrier effect” through operational procedures that will integrate the existing procedures. The key deliverables (SOP-Italy, SOP-International and Guidelines) also include the description and procedures of the use of innovative technology (such instruments as drones, software, advanced mapping and other devices), currently used, or partially used, in some sectors of emergencies, but not yet tailored to the specific purposes of improving the assessment in SAR operations to overcome the “barrier effect.” SOP-INT and Guidelines also deal with helicopters deployment from other corps. As for Italy, the helicopters are already embedded in the National Fire-Fighters Corp. The innovation brought by the project consists in a strategic partnership that will work on the lack of existing procedures on SAR assessment. Three documents will be produced: SOP-IT, outline of SOP-INT and Guidelines/ Recommendations. The procedures, which are considered comprehensive and practical for end-users, are drafted and tested. The SOP-IT also aims at integrating the recent standardisation work carried out by the Fire Dep. of Pisa and other Fire Departments in Italy on “S.G.O. USAR Medium” that is a System of Operational Management (referring to methods). Once the project is completed, the SOP-INT may also integrate the guidelines internationally used by USAR teams (e.g. complementing UN OCHA INSARAG Guidelines review in 2020).

EASeR project methodology – ACTION PLAN

The overall concept underpinning the EASeR project is to improve the timely and efficient completion of assessment in SAR operations. It appears crucial to deploy the SAR teams and the entire emergency rescue system, as the assessment provides first-hand information and establishes priorities for on-site intervention. The assessment in SAR operations directly influences the subsequent interventions in the affected areas. If any serious obstacles impede an efficient conduction of the SAR assessment, the immediate consequence is the lack of knowledge of the needs and priorities in the affected area. As it seems that this subject has been neither faced in exercises nor explored in detailed guidelines, the EASeR seeks to develop an innovative methodology to apply operational procedures and test them. This stems from the direct experience of IT-SAR teams, from the available INSARAG Guidelines 2015, and from the need to integrate the existing procedures through the exchange of know-how to find suitable answers. The whole process developed in WP1, WP2, WP3 is aligned with quality control checks for documents production. In particular, the drafting phases of the procedures are carried out with a view to sharing the drafted index/subjects/themes, versions drafting, checks and test completion, taking into consideration the testing results (evaluation) and their submission to validation authorities. The EASeR methodology is summed up as follows: research of the existing good practices (including also the application of innovative technologies); exchange of know-how among senior experts and the development of SOP (workshops/working groups/remote working); the delivery of preliminary training before SOP testing; the use of technologies (as drones) and means (as helicopters) fitting into the scope and according to the drafted proce-

dures; preparing a team of evaluators to evaluate the application of procedures through a small-scale exercise; the organisation of a realistic scenario to test the assessment teams from IT, PL, CZ on the “barrier effect.”

The work within the first phase of the project (February – October 2018) was based on regular meetings, remote working and webinars, the aim of which was to define the structure, the content and the index of the following documents: the Italian Standard Operating Procedures, and the International Standard Operating Procedures – Outline and Recommendations for different levels of rescue missions and actors. The whole process, from the starting point, which was the decision to conduct an on-line survey, up to the final version of the documents, was carried out based on the thesis related to the “barrier effects.”

During the intermediate stages, the consortium partners were working on the value of each issue and how to reflect all of them inside the foreseen documents, considering the survey responses. Once this was agreed on, the next step was related to the development of the timeline of the assessment phase and how it could be represented in a SOP. One of the tools employed to this end was the matrix that covered all phases and actors possibly involved in these activities. Based on the matrix compilation and actual issues consolidation, draft versions of the International and Italian SOPs as well as Recommendations indexes were developed.

The Final Workshop was dedicated only to presenting the results to external experts who had a different background and affiliation, as well as to discussing the final shape with them, considering their experience. Among the USAR and civil protection experts invited to the meeting in Poland were representatives of the National Civil Protection from Italy, the National HQs of the Czech Fire and Rescue Service, the “Swiss Team leaders” consultancy for Switzerland and the “Solo Institute” from Turkey.

Applied research methodology – SURVEY

As already mentioned, the methodology used for the analysis of the state of the art included a questionnaire (an on-line survey) built up to inquire USAR Teams about their experience both at the national and international level, and about their knowledge and expertise, and also to define even more precisely what the “barrier effect” is and to reveal the previously unidentified gaps. This allowed the project team to collect data from several countries on the topic of the “barrier effect.” The most valuable and interesting opinions are presented further in the article.

To increase the work effectiveness, during an initial meeting a Board of Experts was established, including specialists in SAR activities from all the participating countries. The questionnaire was developed by the CNBOP-PIB research institute, based on initially identified issues, and the questions were agreed by PSC with all the partners before being disseminated among the USAR Teams’ representatives. The collected responses allowed for further analysis of the problem, and then the idea of matrix was born. The main goal was to identify the possible actors and crucial phases consisting of the most important factors in the development of the documents.

The online discussion, emails and webinars, combined with brainstorming during one of the meetings, made it possible to further develop the shape and structure of the final documents. The drafted versions of both the indexes of SOPs and recommendations was produced before the Final Workshop on SOPs, which served as the basis for further discussions with external experts.

The consolidated versions of all document indexes were distributed by the end of Working Package 1 led by CNBOP-PIB and they were made ready for the next step, which was the development of their content led by Timesis, and its testing led by the Fire Department of Pisa.

The questionnaire concept was developed at the end of the Initial Workshop on SOPs which was held in Italy, L'Aquila, on 22–23 February. The discussion on this element was preceded by two visits in the earthquake affected sites – Amatrice and Rigopiano, its aim being to explain better the “barrier effect” meaning. Based on the brainstorming, it was agreed that there was a need to divide the rescue assessment considering the activities before and after the event.

Then, the different phases had to be defined including preparedness (with training and equipment), activation, mobilisation, deployment and finally – operations. No less important was the definition of the potential actors involved in the process, identified through the following phases.

Survey design

The plan foreseen for the period between the Initial Workshop on SOPs in Italy and the meeting in Czech Republic was to develop an on-line survey, to disseminate it among at least 9 countries worldwide with different level of expertise in USAR activities, to collect the results and elaborate them, and to conduct an initial analysis of the “barrier effects” interfering with the rescue assessment process. The leader of WP1 in cooperation with other partners prepared the on-line version of the survey using the Google forms tool.

The survey was developed based on the list of “barriers” already identified. There was 1 initial general question and 10 detailed questions with 5 ranges of responses describing how

deeply the relevant elements within each “barrier” had been experienced by the respondents. The most valuable results are presented in below.

Taking into consideration the experience in the search and rescue operations, both at the national and international level, the USAR Teams involved in the survey were asked to answer the questions to get a wider point of view on the topic. This approach made it possible to get broader understanding of the constraints that rescuers faced in major emergencies such as earthquakes, landslides and hurricanes causing enormous destruction to the population, infrastructure and environment.

Each question referred to one “barrier” that was sequenced by additional more detailed sentences explaining the different aspects of the above mentioned problem, and the respondents were asked to provide their responses within the following range:

- 1 – I totally disagree.
- 2 – I disagree.
- 3 – I didn't face this aspect.
- 4 – I agree.
- 5 – I fully agree.

Besides the above-mentioned scale of responses, additional space was provided for comments, in case the range did not fully describe the issue. The main goal of the survey was to define the “barrier effect” more precisely and to eventually reveal some previously unidentified gaps, so the final results were important from the perspective of further SOPs and Recommendations development.

The main 10 initial barriers identified in 10 questions for survey purposes are:

- obstructed access to the incident zone;
- performance of the assessment personnel;
- team members' knowledge and training;
- difficulties in communication with the affected population;
- time pressure;
- communication in the incident zone;
- incident management;
- new technologies;
- information from media;
- helicopters use.

Phase of Assessment	Main Issues / Activites	Gaps / Aspects to improve	Possible solutions / Tools	Notes
Pre-alert				
Acitvation				
Mobilisation				
Planning				
Data collection				
Update on data collection				
Arrival on site and interaction with first responders				
Assessment on site				

Figure 3. First version of the content to be included in the “questionnaire” and main discussion points further developed in the survey
Source: Own elaboration.

Survey conduction – Range of tests

Once agreed among the partners and made ready, the survey was disseminated among USAR Teams representing different levels of experience, and it was eventually submitted by 12 countries (figure 4) with INSARAG classified and non-classified teams:

1. United Kingdom
2. Australia
3. Chile
4. Greece
5. Malta
6. Russia
7. USA
8. Japan
9. Netherlands
10. Poland
11. Italy
12. Czech Republic

All the selected respondents are normally members of team management components, having a role of team leaders, liaison officers, head of logistics, operations officers or, if they are not members of the team itself, representing the national level in the civil protection structure, as emergency relief coordinators or directors general. The survey was distributed in April and each potential respondent had 1 month to submit the form on-line. This should allow for collecting all survey outcomes before the meeting in Ostrava

(28–30 May 2019). CNBOP, acting as the leader, monitored the survey submission and prepared the summary for further discussion.

Survey results elaboration – Summary

The results of the survey were summarised by the CNBOP-PIB and presented during the meeting held in Czech Republic in May 2019. Most of the respondents agreed with a thesis related to the “barrier effect”, which was formulated in the general question that opened the survey: “Do you think that “barrier effects” have an influence on reconnaissance conducted in the emergency environment and affect the overall performance of the search and rescue teams?” (see fig. 5). Nine questions were raised, each of them scaled from 1 to 5, where 1 means “I totally disagree” and 5 “I fully agree”. The most interesting opinions shared by the respondents are presented further in this section (in charts).

In a few cases, responses to the more detailed questions which described the general issues were opposite. The same concerned the respondents’ remarks related to different aspects of the issues. Both were raised in further discussion among the experts. Nevertheless, it appears important to underline that there were many valuable comments, which allowed for defining some “barriers” more precisely, and also for revealing some new factors which consequently influenced the development of SOPs and Recommendations outline.

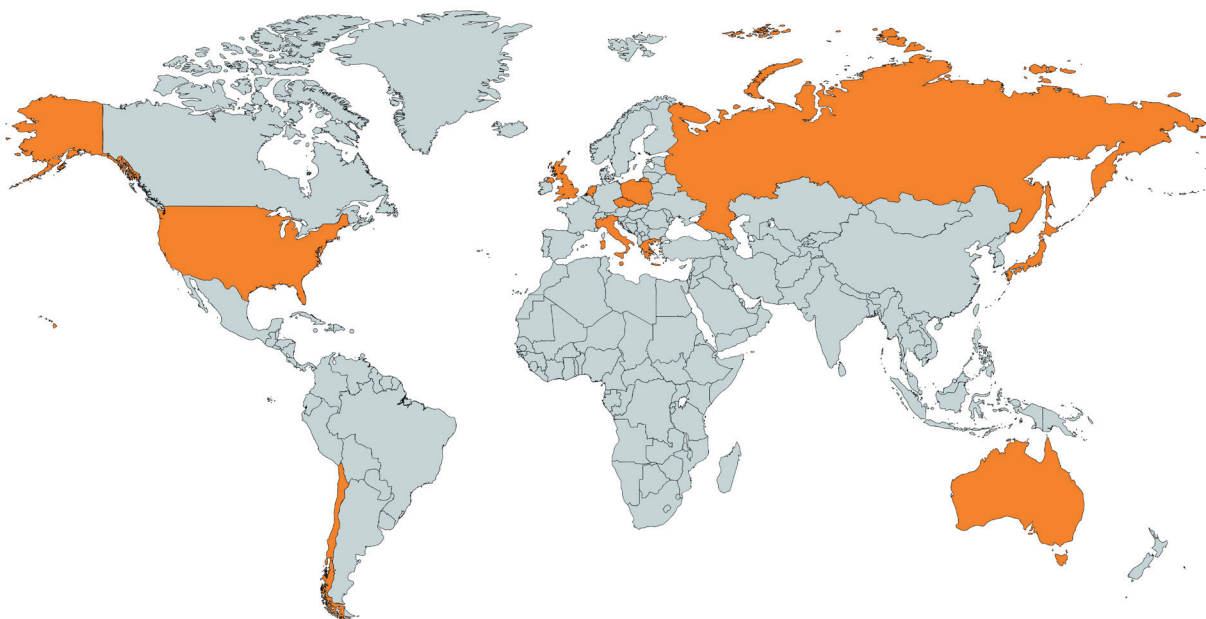


Figure 4. Map with countries participating in the survey
Source: Own elaboration.

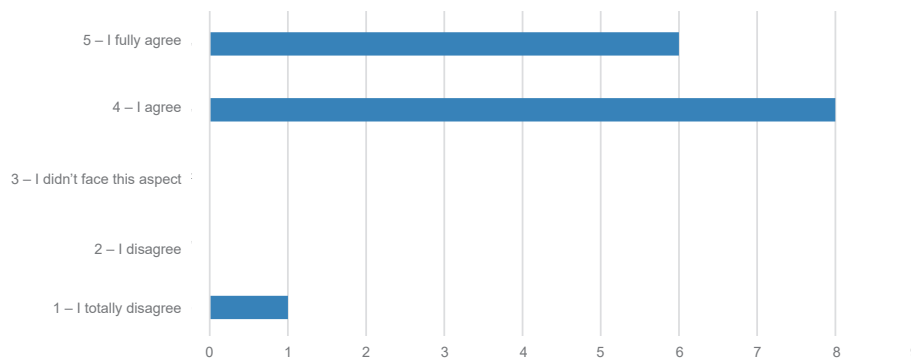


Figure 5. Responses to the first general question: "Do you think that "barrier effects" have an influence on reconnaissance conducted in the emergency environment and affect the overall performance of the search and rescue teams?"

Source: Own elaboration.

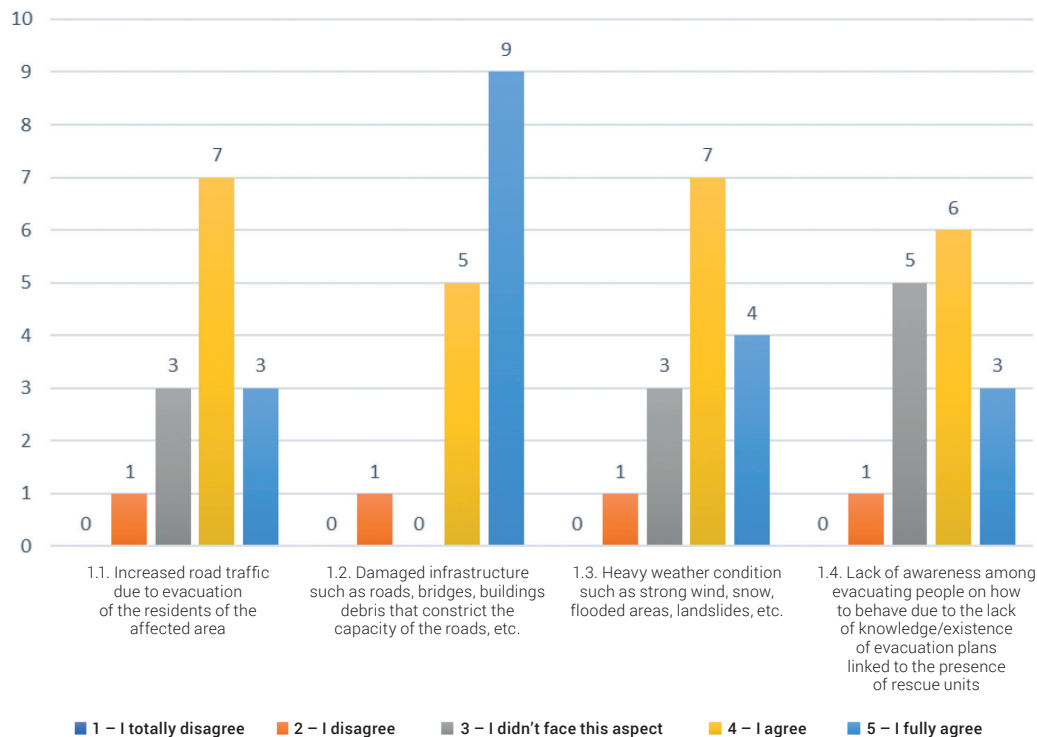


Figure 6. Responses to the question: What causes obstructed access to the incident zone?

Source: Own elaboration.

The elaboration made by the CNBOP-PIB finally led to identifying the most impacting factors that directed the work on the final shape of the documents, including:

- increased road traffic due to evacuation of residents of the affected area;
- damaged infrastructure;
- heavy weather conditions;
- cultural issues;
- unavailability of markings on buildings;
- damaged or congested communication infrastructure;
- special request from the affected population each time the rescuers appeared;

- non-coherent management of information flow.

The second question concerned the assessment performance. The provided responses are presented in figure 7.

Foreign language as a communication barrier during the assessment performance was raised as well. Communication is crucial to every operation. Therefore, responses to the question regarding technical communication in the incident zone are presented in figure 8.

The use of new technologies can significantly improve the effectiveness of assessment and operations. Therefore, the question related to the use of some new technology products and associated problems was also a part of the survey (fig. 9).

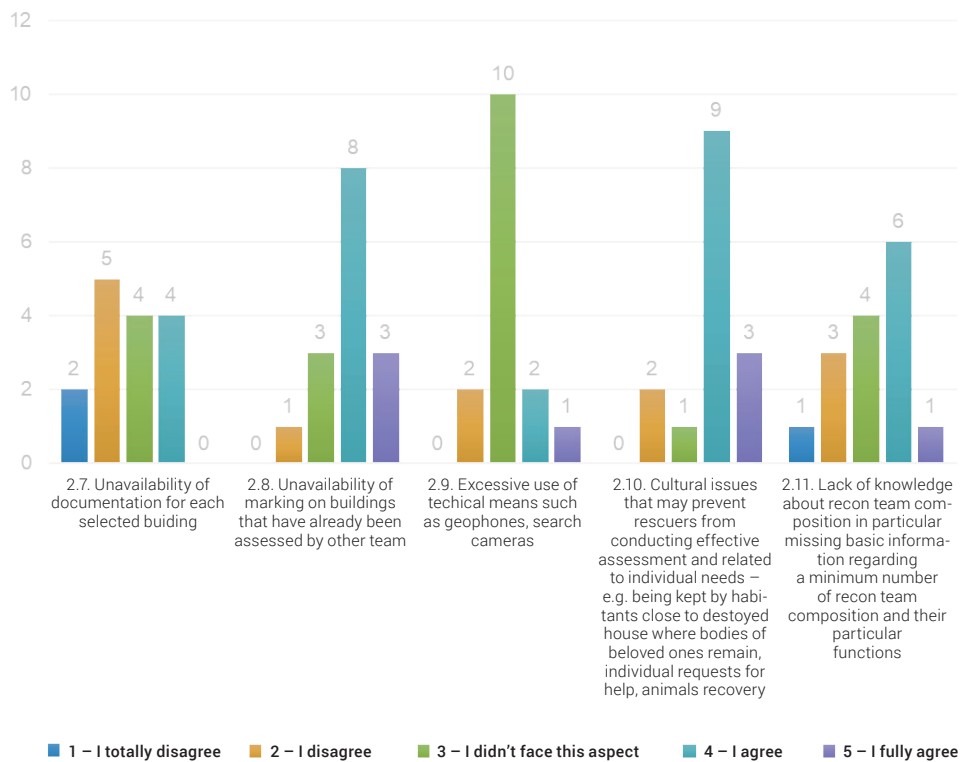


Figure 7. Responses to the questions regarding the assessment performance
 Source: Own elaboration.

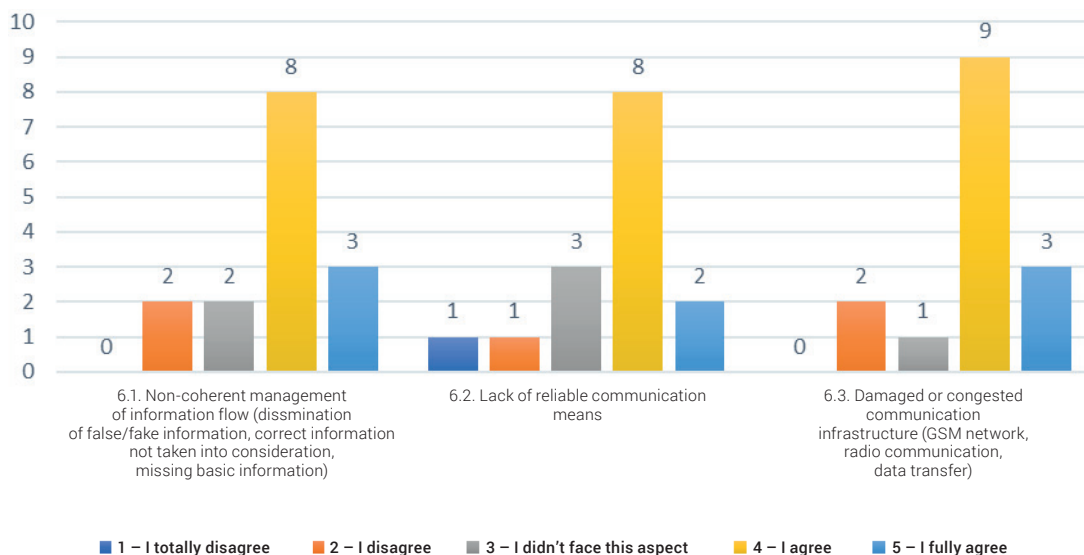


Figure 8. Responses on the main barriers with communication in the incident zone
 Source: Own elaboration.

The last question in the survey concerned information from the media, including social media. The results are presented in figure 10.

The outcomes of the survey as regards other questions, which were not presented in detail in the article, focused on how the “barrier effect” could influence the team members’ knowledge

and training, the difficulties in communication with the affected population, time pressure, incident management and helicopters use. The shared opinions were rather similar. The majority of respondents (8–9 out of 15) agreed or fully agreed that the team members’ knowledge of the guidelines and their practical training

could influence the “barrier effect” and performance of USAR teams. The majority of respondents (9–10 out of 15) also agreed that language could pose a barrier during international intersections and that the people interviewed by the respondents were affected by the effect of a disaster. As regards time pressure, the majority of respondents (overall, 7–9 out of 15) agreed or fully agreed that the “barrier effect” could be created by high or special expectations of the affected population, as well as by high pressure from supervisors on the assessment teams to “find someone.” Most respondents (8–11 out of 15) agreed that, at the incident

management level, the “barrier effect” could be created by the lack of experience on the assessment performance, the lack of SOP, the lack of awareness, the lack of standardised training and gaps in competence management or legislation of which the organisation is in charge. Only with questions concerning the use of helicopters and the lack of procedures or impossibility to use them, the respondents expressed different and opposing opinions (similar numbers of respondents agreed and disagreed, or did not face the aspect (respectively, 3–6 out of 15), so is not possible to present the trend or recognise this topic as a potential barrier.

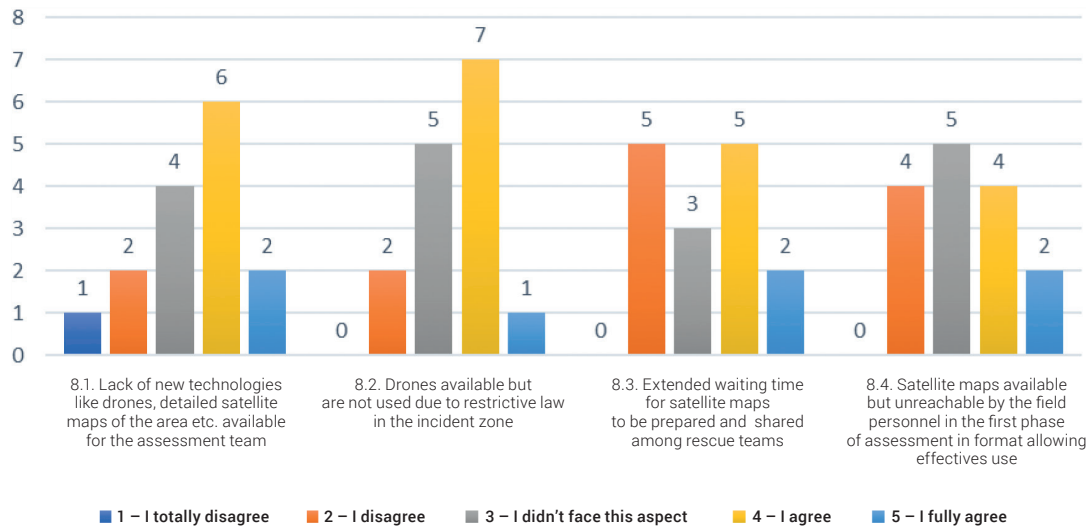


Figure 9. Chart presenting the quantitative responses regarding the use of new technologies during the assessment
Source: Own elaboration.

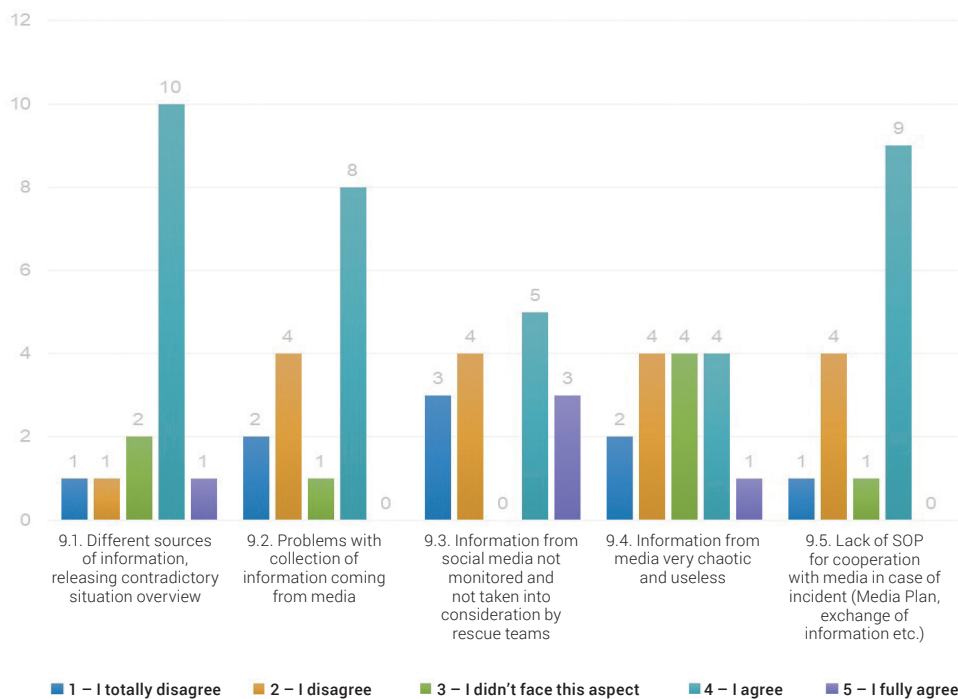


Figure 10. Chart presenting the quantitative responses on the main barriers regarding information from the media, including social media
Source: Own elaboration.

SOP outline and Matrix development

Responses provided in the survey conducted in all 3 existing INSARAG regions (Americas, Europe/Africa/Middle East, Asia – Pacific), along with the respondents’ comments, made it possible to proceed with the next stage of the project, i.e. to outline the index of the Standard Operational Procedures (SOP), taking into account the external feedback.

Further discussions on the shape of SOPs and Recommendations indexes were held. The brainstorming led to developing the initial definition of actors to whom SOPs may refer (the Operational Centre, initial respondents, national and international USAR teams). The next step was the final selection of the list of “barriers” to be included, and the final number of phases related to the assessment process. Each “issue” was numbered and matched with respective actors and phases. As the reference document for the final definition of SOPs shape and structure, INSARAG guidelines, as globally accepted by USAR teams, were chosen. The main outcome of the Board of Experts meeting was the document presented in figure 11, and its final version can be seen in figure 12.

The identification of the actors involved in the assessment was carried out through the following steps:

- analyzing any single issue and its content;
- crossing it with time and phases;
- initially, the local authorities were not considered as the element in the pool, but finally this actor was also added to the index.

Finally, it was agreed that the final document (SOPs) structure will include:

- section division by actors;
- section divisions by phases;
- section division by “barriers”.

The next chronological step after the research work (the examination of initial documents, survey results elaboration) included the development of draft versions of SOPs indexes. After remotely working for 1.5 month, the document had to be presented internally. This was the main purpose of the next project Board of Experts (BoE) meeting. It was agreed that both the international SOP documents and the Italian document would have the same baseline and their content would be tailored to the nations’ needs. The next BoE meeting involved a brainstorm on the structure of the SOPs, which resulted in different proposals on the sections division – by actors, by phases or by issues. Based on the same assumptions, the discussion on the Recommendations shape also had to be finalised by the end of the meeting, to have a foundation for further remote work. The final conclusions on the SOPs were as follows:

- Both SOPs will be divided on sections by actors;
- Each section will have subsections named by phases:
 - Preparedness,
 - Activation & mobilisation,
 - Deployment,
 - Operations;
- The issues identified will be matched to each phase in each section;
- The final part of the document will be dedicated to the lessons learnt.

The crucial element that had to be defined within the first phase of the project was related to a proper “barrier effect” explanation. The list of issues was reduced from the initial 14 to 10, because it appeared that some “barriers” had the same meaning so they could be collated and treated as one. The final list of issues included in SOPs and Recommendations is the following:

- access to worksites;
- performance, knowledge, skills & training of the assessment teams;

	TIMELINE				ISSUES (linked to barrier effect)	Number identification
	BEFORE EVENT	AFTER EVENT				
ACTORS					ACCESS TO WORKSITES	1
OPERATIONAL CENTRE					PERFORMANCE	2
FIRST RESPONDERS					KNOWLEDGE/SKILLS TRAINING	3
NATIONAL USAR					COMMUNICATION	4
INTERNATIONAL USAR					TIME PRESSURE	5
					COMMUNICATION (IT)	6
	Preparedness (Training and Equipment)	Activation and Mobilisation	Deployment	Operations	INCIDENT MANAGEMENT	7
	PHASES				NEW TECHNOLOGIES	8
					MEDICAL ISSUES	9
					USE OF AIRCRAFTS/HELICOPTERS	10
					INTERACTION BETWEEN ACTORS	11
					PEAK OF REQUEST	12
					DECISION MAKING PROCESS	13
					ACTIVITIES OUTSOURCING	14

Figure 11. Initial matrix consisting of the actors, timeline and issues for further development of the SOPs content

Source: Own elaboration.

ACTORS	TIMELINE				ISSUES (linked to barrier effect)	Number identification
	BEFORE EVENT	AFTER EVENT				
					ACCESS TO WORKSITES	1
OPERATIONAL CENTRE	1 (1.2, 1.3), 2 (2.1,2.10, 2.11), 4 (4.2), 5 (5.4), 6 (6.1, 6.2-6.6) plus 9, 7 (7.1-7.4), 8 (8.1-8.4), 10 (10.1-10.4), 11	1 (1.2, 1.3), 2 (2.1, 2.11), 5 (5.4) 6 (6.1, 6.2-6.6) plus 9, 8 (8.1-8.4), 10 (10.1-10.4), 11	1 (1.2, 1.3), 2 (2.1, 2.11), 4 (4.2), 5 (5.4), 6 (6.1, 6.2-6.6) plus 9, 8 (8.1-8.4), 10 (10.1-10.4), 11	1 (1.2, 1.3), 2 (2.1, 2.11), 4 (4.2), 5 (5.4), 6 (6.1, 6.2-6.6) plus 9, 8 (8.1-8.4), 10 (10.1-10.4), 11	PERFORMANCE	2
LOCAL AUTHORITIES	1 (1.1,1.2,1.3, 1.4), 2 (2.1, 2.10, 2.11), 3 (3.5), 4 (4.2), 6 (6.1) plus 9, 7 (7.5), 11	1 (1.2, 1.3), 2 (2.1, 2.11) 6 (6.1) plus 9, 11	1 (1.2, 1.3), 2 (2.1, 2.11), 4 (4.2), 5 (5.4), 6 (6.1) plus 9, 11	1 (1.2, 1.3), 2 (2.1, 2.10, 2.11) 4 (4.2), 6 (6.1) plus 9, 11	KNOWLEDGE/SKILLS TRAINING	
FIRST RESPONDERS	2 (2.10), 4 (4.2), 5 (5.1, 5.2, 5.3), 6 (6.1) plus 9, 7 (7.5)	1 (1.2, 1.3), 6 (6.1) plus 9	1 (1.2, 1.3), 4 (4.2), 6 (6.1) plus 9	1 (1.2, 1.3), 2 (2.10), 4 (4.2), 6 (6.1) plus 9	INTERACTION WITH THE AFFECTED POPULATION	3
NATIONAL USAR	2 (2.1, 2.3, 2.4, 2.10), 4 (4.2), 5 (5.1, 5.2, 5.3, 5.4), 6 (6.1, 6.2-6.6) plus 9, 7 (7.1-7.4), 8 (8.1-8.4), 10 (10.1-10.4)	1 (1.2, 1.3), 2 (2.1, 2.3, 2.4), 5 (5.4) 6 (6.1, 6.2-6.6) plus 9, 8 (8.1-8.4), 10 (10.1-10.4)	1 (1.2, 1.3), 2 (2.1, 2.3, 2.4), 4 (4.2), 5 (5.4), 6 (6.1, 6.2-6.6) plus 9, 8 (8.1-8.4), 10 (10.1-10.4)	1 (1.2, 1.3), 2 (2.1, 2.3, 2.4, 2.10) 4 (4.2), 5 (5.4), 6 (6.1, 6.2-6.6) plus 9, 8 (8.1-8.4), 10 (10.1-10.4), 11	TIME PRESSURE	4
INTERNATIONAL USAR	2 (2.3, 2.4, 2.10), 4 (4.2), 5 (5.1, 5.2, 5.3, 5.4), 6 (6.1, 6.2-6.6) plus 9, 7 (7.1-7.4), 8 (8.1-8.4), 10 (10.1-10.4)	2 (2.3, 2.4), 5 (5.4) 6 (6.1, 6.2-6.6) plus 9, 8 (8.1-8.4), 10 (10.1-10.4)	2 (2.3, 2.4), 4 (4.2), 5 (5.4), 6 (6.1, 6.2-6.6) plus 9, 8 (8.1-8.4), 10 (10.1-10.4)	2 (2.3, 2.4, 2.10), 4 (4.2), 5 (5.4), 6 (6.1, 6.2-6.6) plus 9, 8 (8.1-8.4), 10 (10.1-10.4), 11	COMMUNICATION (IT)	5
	Preparedness (Training and Equipment)	Activation and Mobilisation	Deployment	Operations	INCIDENT MANAGEMENT	6
	PHASES				NEW TECHNOLOGIES	7
					MEDIA MANAGEMENT	8
					USE OF AIRCRAFTS/HELICOPTERS	9
					ACTIVITIES OUTSOURCING	10

Figure 12. Matrix filled, including an additional actor – the local authorities
Source: Own elaboration.

- interaction with the affected population;
- time pressure;
- communications & IT;
- incident management and management of all the emergency;
- new technologies dependency and support;
- media management;
- use of aircrafts/helicopters and generally air, land and water vehicles;
- activities outsourcing.

Once the structure of the documents was ready, the last step involved its presentation to a wider audience, including external experts from Italy, Czech Republic, Switzerland and Turkey, during the Final Workshop, held in Poland on 3-5 October 2018.

Main outcome of the meeting was:

- Presentation of the draft “General Criteria” document
- Presentation of the consolidated versions:
 - Italian Standard Operating Procedures;
 - International Standard Operating Procedures – An Outline;
- Recommendations – for different levels of rescue missions and actors. A discussion with international experts on further development of the final indexes

The consolidated version of both the Italian and International SOPs reflected the above-mentioned structure while the index of

Recommendations was built on the same baseline as for the indexes of SOPs. However, the sections are divided by issues and the document is more general. It does not cover individual phases and is addressed to the following recipients:

- the National Civil Protection authorities at the EU and extra-EU level;
- local authorities (self-government, municipalities, public administration on different levels);
- assessment teams (all teams that carry out assessment activities in search and rescue (SAR);
- any other entities/teams involved in assessment.

The crucial part of the document is the table divided into columns consisting of each issue, its meaning and general recommendations/best practices. Follow up activities will be focused on the content filling, i.e. the exact actions to be taken in each case or examples of the effective solutions to minimise each barrier effect will be presented.

The final products are the consolidated versions of the indexes:

- Italian Standard Operating Procedures;
- International Standard Operating Procedures – An Outline
- Recommendations – for different levels of rescue missions and actors.

Both the International and Italian SOP documents have a similar structure, which considers the barriers, the mission phases and the actors. Each chapter refers to different actors involved in operations and is further divided into subsections

by different mission phases. Within each phase, different barriers are named. Based on the findings from the first phase of the project, the third document, referred to as Recommendations, was created. It is dedicated to different levels of actors and aims to give some hints to them as they are involved in the assessment phase. This document differs from SOPs because it is more generic and intends to give some best practices and advice in relation to each “barrier.”

Conclusions/Summary – Way Forward

During the initial phase of the disaster, such as an earthquake, the proper execution of wide-area and sector assessment, as well as the primary search and rescue (respectively, ASR levels 1, 2 according to the INSARAG guidelines) are crucial for the ultimate outcome of the whole mission. Therefore, each possibility of reducing the impact or overcoming the “barriers effect,” as defined

in EASeR project, is so important. Thanks to the survey results, it was possible to finalise the indexes of EASeR project documents. The EASeR project was presented to the INSARAG and UNDAC community during the Humanitarian Network Partnership Week in Geneva in 2019 [11]. Now it is time to fill the indexes of prepared documents with content as draft versions and make them practically verified, in terms of their usefulness, by the real USAR assessment teams during practical field exercises prepared by the Fire Department of Pisa. During this event, scheduled for 28 May – 2 June 2019, the USAR assessment teams of Italy, Poland and Czech Republic will be deployed in real site conditions of Poggioreale, Belice Valley, Italy. Consolidated SOPs and Recommendations will be built up and finalised after the small-scale exercise. If the results of that project provide good feedback following the completion of the project (February 2020), they will also be disseminated as support to the INSARAG Secretariat in UN OCHA, to be implemented by the INSARAG review working group in the review of globally recognised INSARAG guidelines.

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Abbreviations

ASR Level	– Assessment Search and Rescue Levels	LEMA	– Local Emergency Management Authority
BoE	– Board of Experts	MUSAR	– Medium USAR
CZ	– Czech Republic	MODEX	– EU Module exercises
EASeR	– ENHANCING ASSESSMENT IN SEARCH & RESCUE	OSOCC	– On Site Operational Coordination Centre
EQ	– earthquake	RDC	– Reception and Departure Centre
EmerGent project	– Emergency Management in Social Media Generation 2014–2017	USAR Poland	– Urban Search and Rescue Poland
HUSAR	– Heavy USAR – Heavy Urban Search and Rescue IT – ITALY	UNDAC	– United Nations Disaster Assessment and Coordination
INSARAG	– International Search and Rescue Advisory Group	UN OCHA	– United Nations Office for Coordination of Humanitarian Affairs
ISC	– INSARAG Steering Committee	UCPM	– Union Civil Protection Mechanism
S.G.O.	– System of Operational Management	PL	– Poland
		SOP-IT	– Standard Operating Procedures (Italy)
		HNPW	– Humanitarian Network Partnership Week

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as well as the deployment of Polish modules abroad, i.e. floods in Czech Republic, Bosnia and Herzegovina. He was member of the Heavy USAR Poland team deployed to international missions, i.e. Haiti EQ (2010), Nepal EQ (2015) and Sweden (2018). For the last 10 years he has participated in over 30 European civil protection exercises being nominated as a trainer, evaluator, Voluntary Pool certifier and team leader of the Polish State Fire Service modules (USAR, HCP, CBRNDT). He has acted as the national venue manager in the current module exercises cycle (2017/2018), responsible for the organisation of Wave 2017. Since 2009, as INSARAG expert assigned to take a role of IEC/R team member, he has participated in almost 10 classification exercises. Furthermore, he was involved in the Core Group responsible for the organisation of UN INSARAG activities during the Polish Chair in Europe/Africa/Middle East Group, such as International USAR teams exercises (POLEX 2013) and Regional Meeting in 2014. Member of the Mentors team preparing the Armenian USAR team for INSARAG classification in 2015. In the last 4 years, a coordinator of the Capacity Building projects for Ukraine and Armenia, in cooperation with Polish MoFA. A member of the assessors team during NATO EADRCC exercises in Armenia (2010), Georgia (2012) and Ukraine (2015).